REHABILITATION OF THE WASTEWATER TREATMENT SYSTEM – DARVARD ISLAND – SAINT-OURS CANAL NATIONAL HISTORIC SITE

Technical Specifications

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Sign-off Sheet

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END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

.1 The Contractor must plan and provide all the extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

.2 Works covered by this contract consist of the replacement of the existing septic tank and leaching field located on Darvard Island, Saint-Ours Canal National Historic Site with a new wastewater treatment system with rejection in the receiving environment and modification of the collecting infrastructure, and include, without limitation, the following activities:

.1 Demolition work, off-site transportation and disposal of various materials to an authorized disposal facility.

.2 First and second class excavation.

.3 Completion of activities before starting works, including field visits, taking photos and videos of the sites, exploration wells, locating buried services before digging, preparatory works including the protection of the existing services to be preserved and land to be protected due to their archaeological character and particularities, the installation of temporary environmental and pumping measures, temporary cofferdams, etc.

.4 Construction of a new Bionest type wastewater treatment system and an outfall to the Saint-Ours Canal including supply, installation and mechanical and electrical connections of the precast concrete tanks, equipment and process accessories.

.5 Materials supply and arrangement of an interior local inside the Superintendent’s House including mechanical process equipment, concrete slab, electricity, and plumbing.

.6 Supply, installation, mechanical and electrical connections of a new raw wastewater pumping station including precast concrete tank, process equipment and accessories.

.7 Modification of the Workshop drainage.

.8 Modification of the Superintendent’s house drainage.

.9 Installation of underground infrastructure and related.

.10 Backfill excavations, first with excavated soil that is deemed "clean" and has permissible geotechnical properties, then with imported soil to the infrastructure

level, using materials that meet the specifications in this document, and according to specifications on plans.

.11 Grassing works.

.12 Refection of the site such as pavement structure, pavement, trails and all other affected amenity by the works.

.13 Complete cleaning within the boundaries of the work and disposal of waste materials outside the property of Canada Parks. including snow removal from facilities (work sites, site and temporary parking lots, storage places, etc.), etc.

.14 Protection and prevention measures to prevent any damage to existing buildings, structures and developments on the site.

.15 All other related work for a complete and functional work and all ancillary work which, although are not specified in this specification, is customary and necessary for the completion of the work required to complete it for the use to which they are intended, including the restoration of places as before works.

1.3 WORK SEQUENCE

.1 Plan and provide all extraordinary measures required by government recommendations for Covid-19 (Coronavirus). The Contractor must include in their prices all extraordinary costs required.

.2 Execute the work in such a way that Parks Canada Agency (PCA) can use and have access to the “Workshop” and “Superintendent’s House continuously during the works. Plumbing equipment inside those buildings will be put out-of-service prior to the works.

.3 Coordinate Progress Schedule and coordinate occupancy with Canada Parks Representative during construction of **which do not harm navigation in the Canal. For this purpose, the works in the canal must be completed before May 21, 2021. The remaining of works should be finished before June 24, 2021**

.4 Maintain fire access/control. also provide the means of fire fighting.

.5 The Contractor must be acquainted of the deadlines for suppliers of materials, including approximately eight (8) weeks for precast concrete tank and pumping station.

.6 Field work shall not exceed forty (40) days, excluding the start-up and the performance tests.

1.4 OWNER OCCUPANCY

.1 The Parks Canada Agency (PCA) or its collaborators may have to occupy buildings for the duration of construction.

.2 Cooperate with PCA in scheduling operations to minimize conflict and to facilitate PCA usage.

1.5 EXISTING SERVICES

.1 The Contractor shall establish the location of all public and private underground utilities prior to the commencement of works by calling on specialized firms (Info-excavation and/or other private companies). If deemed necessary, hydrovac shall be used to visually confirm the position of underground utilities prior to digging.

.2 When necessary, the Contractor shall relocate any existing equipment (underground or otherwise) that could affect the safe execution of the works. The Contractor shall replace, at its own expense, any equipment (underground or otherwise) that was not intended to be dismantled and that was damaged during the execution of works. Upon completion of works, the Contractor shall ensure that all equipment is functional.

.3 Any works related to disconnecting/reconnecting, securing or temporarily re-routing public utilities (overhead or underground) shall be executed in accordance with applicable codes, standards and regulations, and shall be coordinated with the companies or the municipality that owns such service lines, and all requirements that they issue to this effect must be complied with in full.

.4 Any works related to disconnecting/reconnecting, securing or temporarily re-routing private service lines (overhead or underground) shall be executed in accordance with applicable codes, standards and regulations, and shall be coordinated with PCA management via Stantec.

.5 During works specified in points 3 and 4, the Contractor shall maintain safe distances from electrical equipment as specified by the CNESST or other relevant regulatory bodies.

.6 If it is not possible to maintain safe distances from electrical equipment as specified by the CNESST, or if overhead power lines pass over areas to be excavated or near them and could be affected by the works, such equipment must be secured or temporarily re-routed, ensuring minimal service interruptions for connected customers. Once rehabilitation works have been completed, re-routed equipment must be returned to their original location, ensuring minimal service interruptions.

.7 The Contractor is fully responsible for the safety and stability of overhead and/or underground utilities for the full duration of the works and must select appropriate protective measures in accordance with type and sequence of planned work.

.8 Notify PCA and utility companies of intended interruption of services and obtain required permission. The Contractor shall inform, in writing, the PCA representative of selected protective measures 72 hours prior to the execution of these works.

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

.10 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.6 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Change Orders.
.5 Other Modifications to Contract.
.6 Field Test Reports.
.7 Copy of Approved Work Schedule.
.8 Health and Safety Plan and Other Safety Related Documents.
.9 Fisheries and Oceans Canada Notice on river outfall.
.10 Other documents as specified.

1.7 CONTRACT DOCUMENTS

.1 All work mentioned in the tender documents (plans, specifications, price schedule, addenda, etc.) are integral parts of the contract. All portions and sections of the contract are complementary to one another. The General Contractor and specialized contractors shall take into account all the requirements of each of the sections of these specifications and tender documents when carrying out works.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 WORK CALENDAR

.1 Long period

.1 The works covered by this contract must be completed no later than June 24, 2021, with the exception of start-up and performance tests. Work must begin no later than two (2) weeks following contract award.

.2 Short period

.1 Within the long period provided, the Contractor has forty (40) working days to perform the work. The performance tests of the collection network and the outfall must be carried out during this period.

.2 The start-up and performances tests of the treatment system will be carried out when the site opens in spring 2021.

1.3 WORKSITE ACCESS

.1 The Contractor shall visit the site at least five (5) business days prior to the commencement of works to mark the ground to indicate work areas so that these can be kept free of vehicles, materials or other. Parks Canada Agency shall be responsible for ensuring that vehicles are moved out of the area marked by the Contractor.

.2 Access should be through the dam. Access through the lock will be available only to pedestrians. No material or equipment can be transported through the lock.

.3 The contractor must also notify the PCA two (2) working days before to allow the delivery of materials or free access without delay through the dam.

.4 Without prior arrangement, the contractor must allow a two (2) hours delay per passage over the dam.

.5 The contractor will have access at all times (during normal working hours) to the site with a service car (pick-up truck) through the dam. The contractor will however be responsible for locking the barrier after each passage and must respect the load limits.

.6 The PCA reserves the right to block the lock access, at any time, for maintenance reasons

.7 An access must always be maintained for PCA employees so that they have access to their facilities. The Contractor must coordinate the work according to this requirement. PCA employees must still comply with the Contractor's health and safety criteria and vice versa.

1.4 1.4 KEYS AND ACCESS TO BUILDINGS

.1 The Contractor is responsible for the keys and building access cards that the organization provides and the related restrictions. In the event of loss of keys or cards, the Contractor must immediately notify the person in charge of the organization. The Contractor must assume the total cost of replacing locks if necessary, work carried out by the company designated by the organization.

.2 The Contractor will be responsible for changing the lock on the main entrance door and the side door of the basement of the "Maison du Surintendant". He must give two (2) copies of the keys to Parks Canada for the duration of the work. The Contractor shall replace the Parks Canada locks upon completion of the work. The Contractor shall repair, at his expense, any damage caused by the installation or removal of these locks.

.3 The Contractor may not make a duplicate of the keys without the written authorization of the Director of Building Management.

.4 The Contractor must never, without prior authorization, transfer the keys or magnetic cards that are provided to anyone.

.5 The Contractor must return to the person in charge of the organization, at the end of the contract, all duplicate keys, building keys and magnetic cards covered by the agreement.

.6 At no time may the Contractor's employees open the door to anyone. If necessary, they should address these people to the head of the organization.

1.5 USE OF SITE AND FACILITIES

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

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

.3 Plan and provide all extraordinary measures required by government recommendations for Covid-19 (Coronavirus). The Contractor must include in their prices all extraordinary costs required.

.4 The Contractor shall supply and maintain adequate sanitary facilities for its staff. Use of PCA sanitary facilities is prohibited.

.5 Use of the site is restricted to the work areas indicated on the plans. The written approval of the Representative of Parks Canada is required for any occupancy located outside the limits of the work (storage of machinery and equipment, storage of materials, etc.).

.6 Throughout the duration of the work, the Contractor must not use the site or other location on Agency property for the purposes of lodging or temporary residence for its employees.

.7 Protect the facilities by temporary means for the duration of the work.

.8 Put in place appropriate means to protect existing structures to be preserved.

.9 Repair or replace as directed by the Representative of Parks Canada, for the purposes of connection to the existing structure or to an adjacent structure, or for the purposes of

harmonization with them, the parts of the existing structure which have been modified during construction.

.10 The Contractor must take note and use rolling equipment according to the structural capacity of the dam limited to 20 tons for a one unit vehicle and 36 tons for a two-unit vehicle.

.11 The Contractor must remove and dispose of the trees indicated on the plan, if required. The trees must be identified at the start of the project and approved by the client and the Representative of Parks Canada. He will have to replant other species of trees, in accordance with plans and specifications. All pruning and stump removal activities must be preauthorized by PCA and performed by a specialized firm and in the presence of PCA.

.12 The Contractor must remove and dispose of all Phragmites in accordance with environmental standards as well as plans and specifications.

1.6 EXISTING SERVICES

.1 The Contractor shall locate all public and private underground utilities prior to the commencement of works by calling on specialized firms (Info-excavation and/or other private companies). If deemed necessary, hydrovac shall be used to visually confirm the position of underground utilities prior to digging.

.2 Notify the Canada Parks Representative and utility companies of intended interruption of services and obtain required permission. The Contractor shall inform, in writing, the Canada Parks Representative e of selected protective measures 72 hours prior to the execution of these works.

.3 Provide the circulation for staff and vehicular.

.4 Construct barriers in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

1.7 SPECIAL REQUIREMENTS

.1 Submit schedule of works to the Canada Parks Representative at least seven (7) days before start of work.

.2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic, and security regulations.

.3 Keep within limits of work and avenues of ingress and egress.

1.8 DRILLING OF THE CANAL SHEET PILE WALLS

.1 The Contractor shall use the services of divers for drilling and connecting the sanitary sewer pipe to the canal sheet pile.

.2 Services provided by divers shall be in accordance with the following and all other applicable standards:

.1 Services provided by the Contractor shall be in accordance with CAN/CSAZ275.4, Competency Standard for Diving Operations, CAN/CSAZ275.2, Safety Rules for Diving Workers, most recent versions, and applicable federal regulations - Canada Labour Code, Part XVIII - Diving Activities or provincial regulations.

The Contractor shall manage its activities in such a way that the health and safety of the public, its personnel and other workers at the inspection site, as well as the protection of the environment, shall always take precedence.

.2 Provide the Contractor's personnel with the appropriate equipment, apparatus, tools and machinery, including personal protective equipment (PPE), ensure that the equipment is properly maintained and used in the prescribed manner, in accordance with the Canada Labour Code (CLC) and provincial regulations where applicable.

.3 All work shall be completed to the satisfaction of the Parks Canada Project Authority. Any work not accepted shall be rectified immediately at no additional charge.

.4 The Contractor shall be fully responsible for any damage he may cause to Parks Canada property or to third parties during the performance of the work.

.5 The general plan of a diving operation shall be documented and discussed in detail and agreed to by the Diving Supervisor, divers and Agency representatives on site.

.6 Each diving operation should be led by a competent Diving Supervisor whose main responsibilities include:

(a) Planning the dive;

(b) Advising the team of emergency procedures to be followed in the event of a device or system failure;

(c) Ensuring that the necessary equipment is in place and in good condition;

(d) Directs the diving operation; and

e) Remain on the dive site for the duration of the operation.

Each diver should, to the satisfaction of the Supervisor, fully understand the signals, practices and, where appropriate, the tasks of his or her fellow divers and any other persons with whom he or she is required to work, as well as the instructions given to them.

.7 Prior to any diving operation, the Diving Supervisor shall ensure that all facilities and all diving equipment that will be used are in good condition, including umbilicals, winches, cables, etc.

.8 The Contractor shall provide its own lockout procedures, plugs and accessories (personal padlock and identification sheet).

1.9 EXCLUSION ZONE

.1 Provide a trunk protection device around certain trees to be protected for this purpose (such as cottonwood or others) near the work to be done. The recommended method is stipulated in the BNQ standard, landscaping using plants. In addition, a geotextile membrane with granular material with a minimum thickness of 300mm above it must be installed in the area of 3 meters around the trunk to avoid damaging the root system of the tree. These two protective measures must be carefully removed after the work is completed in order to restore the site to its initial state.

1.10 EXCAVATION ALONG THE FOUNDATIONS OF HISTORIC BUILDINGS

.1 Since the foundations of historic buildings are fragile, no more than three (3) linear metres of foundation should be uncovered at a time during excavation works. The Contractor is responsible of the work method to ensure foundation integrity.

1.11 VIBRATION CONTROL

.1 Control vibrations when using a soil compaction vibrator, percussion equipment and rock-removal equipment, and when performing excavation work near buildings. When this type of equipment is used or this type of work is carried out within 30 metres of existing structures that must be preserved, the particle velocity in the soil located in immediate proximity to the structure must be kept within the following ranges on any of the three wave components (vertically, horizontally or diagonally):

.1 Frequency ≤ 10 Hz: 3 mm/sec

.2 10 Hz < frequencies ≤ 30 Hz: 10 mm/sec

.3 Frequencies > 30 Hz: 12 mm/sec

.2 The Contractor must enlist the services of a vibration control firm to ensure that proper measures are taken to protect structures at the site. For works near buildings on the site and over City of Montreal sewer collection pipes situated on the site, the firm must measure vibratory waves using a sufficient number of seismographs (minimum of one) on the structures requiring protection that are nearest to the equipment or work (e.g., building foundations, manholes, snow chute, etc.). No vibratory wave measurements are required on the Mill Street right-of-way. If seismographs cannot be installed in existing manholes, the Contractor shall install a concrete block in the ground at approximately two (2) meters deep. The seismograph must be installed on this concrete block to monitor vibrations. The firm specializing in vibratory wave control must determine the type of concrete and the maximum size of the block or determine an equivalent method. The concrete block must be removed upon completion of works.

.3 Vibratory wave measurements must be done before the start of the work to measure the current vibrations that will serve as a basis for comparison. During work execution, waves must be continuously recorded.

.4 The Contractor shall prepare and submit to the Canada Parks Representative a detailed weekly report covering the recording of the vibrations caused by the equipment or works carried out near structures requiring protection. The report must include the following:

.1 Seismograph location, distance between seismographs, location of works, and the shortest distance between structures requiring protection and the location of works;

.2 A copy of each recording and the recordings for peak vector sum in mm/s, particles and frequencies;

.3 A summary of damage caused (with support photos), if any;

.4 The signature of the person in charge.

.5 The report must be accompanied by the recording film with an indication of the nature, direction and size of each of the components contributing to the peak vector sum.

.6 A copy of this report must be immediately submitted to the Canada Parks Representative.

1.12 SMOKE-FREE ENVIRONMENT

.1 Comply with smoking restrictions. Smoking is not permitted.

1.13 PARKS CANADA ACT

.1 All works must be carried out in accordance with the National Parks Act.

END OF SECTION

1.1 NOTES

.1 *Note 1*: The units of the payment methods are indicated in the unit price of the submission slip. They include but are not limited to: the supply of materials and labor, as well as their transportation and installation, the specific measures depending on the nature of the work, codes and professional standards required. The quantities indicated must be approved in advance by the Engineer and the PCA Representative.

.2 *Note 2*: The Contractor must add in each item of the tender form entitled "General expenses…" to plan and provide all the extraordinary measures required according to government recommendations for Covid-19 (Coronavirus), and this, for him and his subcontractors as well as his suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

1.2 PAYMENT

.1 Payment for the items in the Contractor's bid constitutes full compensation for the supply of materials, equipment, accessories, machinery, tools and labor, transport, taxes, direct or indirect costs, obligations, acts, facts, omissions or errors attributable to the Contractor, installation, general costs and profits.

.2 All costs relating to site organization, site facilities, coordination between the various contributors, contract administration costs, permits and insurance premiums, contributions, interest, rents, location of existing services, security costs, traffic management costs, environmental management costs, snow removal costs, surveying and staking costs must be distributed among the items in the tender form.

.3 The removal or temporary relocation and reinstallation of items in place, such as signs, posters, concrete, wood or other edging must be included in the prices of the tender form.

.4 Even if the description of the items in the tender form does not explicitly mention them, the price, whether unit or lump sum, includes all incidental expenses for the complete implementation of the works in accordance with the requirements of the estimates, indications of the drawings and the rules of the art.

.5 The overall price must include losses and damage that may result from the nature of the work, fluctuation in prices and wages, business risks, strikes, delays not attributable to the Agency, accidents, from the action of the elements of nature and any other fortuitous event.

.6 The Contractor must submit a fair price representative of the work to be performed for all items of the schedule. When establishing its prices, the Contractor must plan an economic implementation strategy, which respects the rules of the art and which minimizes the impacts on the structures, infrastructures and surrounding environments, in particular, the buildings, the pavement structure, wetland, nearby stream, etc.

1.3 DESCRIPTION OF THE ARTICLES

.1 Civil Works

.1 Preparation, security of the premises and overhead fixed costs

.1 Article 1.1.1. Overheads, mobilization, demobilization, traffic maintenance and signage

.1 This item includes the mobilization and demobilization of personnel and equipment on the site, the implementation of all health / safety requirements, obtaining permits and permit fees, all lodging costs and cover and subsistence, installation and maintenance of the construction trailer, chemical toilets, fences, supply and installation of a new chain link fence or an opening in the existing fence for temporary access to the site (if required), including concrete, posts, bars, fasteners, netting. This item also includes the installation and maintenance of temporary signage in accordance with MTMDET standards, including temporary signage, coordination with the authorities, surveying and staking fees for works and survey fees that do not are not charged to any items of the price schedule, the site security costs (if necessary), the protection of existing public utilities in the work areas as well as all the other elements required by the "Documents of call of" offers ".

.2 The lump sum price tendered for the work provided for in this item is payable as follows:

.1 A first amount corresponding to 30% of the lump sum tendered for this item is payable when the general mobilization is completed;

.2 A second amount corresponding to 50% of the lump sum tendered for this item is payable in proportion to the estimate of the work;

.3 The balance of the lump sum tendered for this item is payable when the general demobilization is fully completed.

.2 Article 1.1.2. Deforestation, stump removal, recovery of topsoil and disposal of waste materials Removal of existing pavement and disposal

.1 The price is a lump sum removal and disposal of trees, shrubs and plants, previously approved by the Engineer and the Manager of the APC. This compensation constitutes full compensation for the removal and off-site disposal of materials at a site that meets MELCC requirements, as well as all other items required by the "Tender Documents".

.3 Article 1.1.3. Environmental Protection

.1 The price at payment item 1.1.2 of the Tender Form is a lump sum to compensate for all the costs incurred by the Contractor relating to the protection of the environment, in accordance with the requirements of this contract.

.2 The price covers the following, but is not limited to:

.2 Everything described in Section 01 35 43, Environmental protection such as the preparation, presentation and implementation of the environmental protection plan; preparation, presentation and implementation of the emergency spill plan; the preparation, presentation and implementation of the location plan for the various site installations; the preparation, presentation and implementation of work area plans; the preparation, presentation and implementation of the air pollution prevention plan; the preparation, presentation and implementation of the contamination prevention plan; preparation, presentation and implementation of the wastewater management plan; the preparation, presentation and implementation of the plan for the designation and protection of wetlands and historical, archaeological, cultural and biological resources; protective measures for the existing tree, plants; temporary installations to prevent pollution; the preparation, presentation and implementation of a plan to protect the historic and heritage character of the site.

.3 The lump sum tendered for this payment item is payable as follows:

.1 A first amount corresponding to 20% of the lump sum tendered for this item is payable when the implementation of the protection plans is completed;

.2 The other progress payments under this item will be paid at each count at a percentage consistent with that of the general progress of the work for this count.

.4 Article 1.1.4. Removal of stone sidewalk / gravel path, including foundation

.1 This item includes sawing, excavation, loading, transport and off-site disposal of excavated materials in a site that complies with MELCC requirements, as well as all the other elements required by the “Documents d 'offers'.

.2 The price of the item is fixed

.5 Article 1.1.5. Removal and sanitary line disposition

.1 This item includes the removal and off-site disposal of the sewer line, the excavation and backfilling up to the infrastructure line, as well as all other elements required by the "Tender Documents”.

.2 This item is paid by the linear meter

.6 Article 1.1.6. Filling abandoned pipes with lean concrete

1. This item includes the supply of materials and manpower required to fill pipes abandoned by lean concrete, as well as all other elements required by the "Tender Documents."

2. This item is paid at the unit price

.7 Article 1.1.7. Manholes to remove

.1 This item includes the excavation, removal, transport and off-site disposal of manholes and / or sumps in a site complying with MELCC requirements, the depletion of water from the trenches and the diversion of water in the pipes, the delivery of recoverable materials to the site designated by the Representative of Parks Canada, the plugging of the end of the pipes if required, as well as all the other elements required by the " offers ".

.2 This item is paid in m³

.8 Article 1.1.8. Removal and driving arrangement Aq. 19mm

.1 This item includes the removal and off-site disposal of the water main, the excavation, the sorting of materials, the removal, the loading, the transport and the disposal of its valves, its lockable outlets. and its existing accessories in a site complying with MELCC requirements and backfilling up to the infrastructure line, as well as all the other elements required by the “Tender Documents”.

.2 This item is paid by the linear meter.

.9 Article 1.1.9. Dismantling of the septic tank and disposal off site

.1 This item includes sawing, demolition, excavation, sorting of materials, removal, loading, transport and off-site disposal of excavated materials including contaminated materials in a site complying with MELCC requirements, and backfilling up to the infrastructure line, as well as all other elements required by the “Tender Documents”.

.2 This item includes the emptying of wastewater present in the tanks and pipes as well as their off-site arrangements in accordance with the regulations in force.

.3 This item is paid at the fixed price.

.10 Article 1.1.10. Off-site soil disposal measurement including storage site, temporary stacking, 84-hour wait and disposal according to MELCC criteria. (provision)

.1 The Contractor must consider when preparing the prices of his tender that in certain localized places the soils in place are of category B-C and> C in terms of their contamination. This remuneration constitutes full compensation for the loading and stacking of contaminated materials, the supply and installation of protective membranes, batteries and ballasting equipment, segregation or screening of waste, all costs. sampling and analysis (one analysis per 100 tons).

.2 The price is an amount payable per cubic meter of "this type of soil" required and approved in advance by the APC Representative

.11 Article 1.1.11. Exploration wells (provision)

1. Exploration wells are paid individually.

2. This compensation is a complete compensation for sawing, removing surface coatings, excavating, researching and locating pipes, taking technical information, transmitting to the APC representative information collected in geodesic coordinates (x,y,z), backfilling of excavations, compacting and repairing of the premises, as well as all other elements required by the "Tender Documents".

.2 Article 1.2. Sanitary sewer

.1 Article 1.2.1. Supply and installation of a 100mm and 150mm diameter DR-35 PVC sanitary sewer

.1 This item includes the supply and installation of the sanitary sewer pipe including accessories, plugs, various connection pieces, monolithic tees, excavation and dewatering of trenches, deviations of existing pipes if required, bedding, coating, backfilling up to the infrastructure line, transportation and off-site disposal of excavated materials in a site that meets MELCC requirements, as well as all the other elements required by the “Tender Documents”.

.2 This item also includes the piercing of the lock sheet pile and connection to the proposed pipe using service of qualified divers

.3 This item is paid by the linear meter

.2 Article 1.2.2. Pipe connection proposed on existing manhole

.1 This item includes the connection of the pipe to the existing manhole including the drilling of the manhole, sleeve or reduced if necessary, the making of the watertight joint at the connection, the supply and installation of all the other materials necessary for the implementation of this work, as well as all the other elements required by the “Tender Documents”.

.2 This item is paid at unit cost

.3 Article 1.2.3 sanitary manhole supply and installation Ø-900m

1. The sanitary sewer MANHOLES are paid to the unit.
2. This compensation is a complete compensation for the supply and installation of prefabricated reinforced concrete looks, with rubber trim, cunette, access chimney, frame, guide and adjustable lid, levelling rings, ladders, protective grilles, deflectors if required, connections to the proposed pipes, perimeter embankment around the eye. , the geotextile membrane, waterproofing tests, the search and repair of sources of infiltration where appropriate, as well as all other elements required by the "Tender Documents."

.4 Article 1.2.4. Supply and installation of an outfall via sheet pile

.1 This item includes the connection of the pipe to the sheet pile including cutting, welding, plan and method of connection to the sheet pile signed by an engineer member of the Order of Engineers of Quebec, sleeve or reduced if necessary, the making of the joint watertight at the connection, the supply and installation of all the other materials necessary for the complete implementation of this work, as well as all the other elements required by the “Tender documents”.

.2 This item is paid at the fixed price.

1. Article 1.2.5 Cleaning, televised inspection and checking deformations of the sanitary sewer line

1. Cleaning, televised inspection and checking the deformation of sanitary sewer lines prior to provisional and final receipt are paid per linear meter.

2. This compensation is a complete compensation for the sealing test, cleaning and television closed-circuit inspection of the sanitary sewer lines by a specialized company and using a rotating head camera, the provision of a television inspection report including photos and USB key (2), the repair of defects identified by this inspection, as well as all other elements required by the "Call Documents".

.3 Article 1.3. Aqueduct

.1 Article 1.3.1. Supply and installation of an aqueduct pipe, including cathodic protection and deviations from the plans (19mm in diameter)

.1 This item includes the supply and installation of conduits, including excavation, dewatering of trenches, fittings and accessories, sleeves, plugs, traps, retaining devices and their cathodic protection, buttresses concrete, the required deviations as well as thermal insulation if required. This remuneration also includes the bedding, coating, backfilling up to the infrastructure line, disinfection and leak testing, as well as all the other elements required by the "Tender documents ".

.2 This item is paid by the linear meter.

.2 Article 1.3.2. Pipe connection proposed on existing pipe

.1 This item includes locating and clearing the existing pipe, sawing the existing pipe, cleaning the pipe, connecting the pipe to the existing pipe including sleeve or reduced if necessary, disinfecting the connection parts , the making of the watertight seal at the connection, the supply and installation of all the other materials necessary for the complete implementation of this work, the leak tests, as well as all the other elements required by the "Tender Documents ”.

.2 This item is paid at the unit price

.4 Article 1.4. Storm sewer

.1 Article 1.4.1. Supply and installation of perforated HDPE floor drain

.1 This item includes the supply and installation of the storm sewer line including accessories, plugs, excavation and dewatering of trenches, bedding, coating, backfilling, transport and disposal off-site materials excavated at a site that meets MELCC requirements, as well as all other items required by the “Tender Documents”.

.2 This item also includes the supply and complete installation of the floor drain, including the related accessories and minor work.

.3 This item is paid by the linear meter

.5 Article 1.5. Landscaping

.1 Article 1.5.1. Construction of stone path / gravel area including foundation and geotextile

.1 This item includes the shaping and leveling of the works up to the finished profiles, the supply and the installation of materials for the construction of gravel roads including the bedding, sawing, excavation work, the foundation in granular materials, the loading, the transport, the off-site disposal of the excavated material in a site that complies with the MELCC requirements, the accessories, as well as all the other elements required by the "Tender documents ".

.2 This item is paid per square meter

.2 Article 1.5.2. Topsoil 100 mm thick and finishing earthwork

.1 This item includes the supply and implementation of topsoil 100 mm thick and finishing earthwork up to the finished levels, watering, stakes and accessories, initial maintenance work, as well as than all other elements required by the “Tender Documents”.

.2 This item is paid per square meter

.3 Article 1.5.3. Sodding by plates

.1 This item includes the supply and implementation of the sod including watering, stakes and accessories, the first maintenance work, as well as all the other elements required by the "Tender Documents”.

.2 This item is paid per square meter.

.6 Mechanical Process Works

.1 Article 2.1 Pumping Station

.1 The precast reinforced concrete pumping station is paid at a lump sum including, without being limited to, design, manufacturing, supply, delivery, installation, connection, testing, commissioning as well as all materials, equipment and services necessary for the complete execution of the work. Pumping station includes but is not limited to two (2) pumps, control panel, junction boxes, guiding bars, control

floats, slide system, ventilation vent as well as all the piping, taps and accessories required for a complete and optimal operation. The whole, as specified in sections 44 01 00 and 44 00 50 of the technical specifications and as shown on the plans.

.2 The backfill around and between each of the tanks and manholes must be composed of MG-20 compacted to 95% of the P.M. in layers 300mm thick (Complies with the corresponding BNQ standard)

.2 Article 2.2 Septic Tank

.1 The precast reinforced concrete septic tank with effluent filter is paid at a lump sum including, without being limited to, design, manufacturing, supply, delivery, installation, connection, testing, commissioning. As well as all materials, equipment and services required for the complete execution of the work. The whole, as specified in sections 44 01 00 and 44 00 50 of the technical specifications and as shown on the plans.

.2 The backfill around and between each of the tanks and manholes must be composed of MG-20 compacted to 95% of the P.M. in layers 300mm thick (Complies with the corresponding BNQ standard)

.3 Article 2.3 Biological Reactor Tank

.1 The precast reinforced concrete tank used for the biological reactor is paid at a lump sum including, without being limited to, design, manufacturing, supply, delivery, installation, connection, testing, commissioning. As well as all materials, equipment and services required for the complete execution of the work. The whole, as specified in sections 44 01 00 and 44 00 50 of the technical specifications and as shown on the plans.

.2 The backfill around and between each of the tanks and manholes must be composed of MG-20 compacted to 95% of the P.M. in layers 300mm thick (Complies with the corresponding BNQ standard)

.4 Article 2.4 Settling Tank

.1 The precast reinforced concrete settling tank with effluent filter is paid at a lump sum including, without being limited to, design, manufacturing, supply, delivery, installation, connection, testing, commissioning. As well as all materials, equipment and services required for the complete execution of the work. The whole, as specified in sections 44 01 00 and 44 00 50 of the technical specifications and as shown on the plans.

.2 The backfill around and between each of the tanks and manholes must be composed of MG-20 compacted to 95% of the P.M. in layers 300mm thick (Complies with the corresponding BNQ standard)

.5 Article 2.5 Granular Materials Foundation

.1 Article 2.5.1 MG-20 Foundation for the precast concrete tanks and pumping station

.1 This item is paid per square meter and includes supply and installation of granular materials, spreading, leveling and compaction, structural adjustments, as well as all other elements required by the "Tender documents".

.2 Article 2.5.2 Geotextile membrane for the precast concrete tanks

.1 This item is paid per square meter according to the actual covered area, without addition for overlaps. The price covers the supply, storage, handling, transport, installation, assembly, fixing rods (if required), their implementation, cleaning and leveling and any incidental expense.

.6 Article 2.6 Bionest Treatment System

.1 Article 2.6.1 Bionest System Components

.1 Bionest system components are paid at a lump sum including, without being limited to, design, manufacturing, supply, delivery, installation, connection, testing, commissioning and all the materials, equipment and services required for the complete execution of the works. These equipment include, but are not limited to, the Bionest media, the recirculation pump and line, the inlet and outlet manifolds, the complete aeration system, the UV disinfection system, the phosphorus removal system, the pumping station integrated into the reactor, the control panel as well as all the valves, piping and accessories necessary for a complete and functional system. The whole, as specified in sections 44 01 00 and 44 00 50 of the technical specifications, as shown on the plans.

.2 Article 2.6.2 Related Equipment

.1 Related equipment is paid for at a lump sum including, but not limited to, supply, configuration assistance as well as calibration. These amenities include, but are not limited to, the portable composite sampler, instantaneous sampler, stand-alone eyewash station, and chemical transfer pump. The whole, as specified in sections 44 01 00 and 44 00 50 of the technical specifications.

.7 Article 2.7. Drainage

1. Article 2.7.1. Workshop retention pit

1. The workshop retaining pit is paid at a global price including, but not limited to, dismantling the existing drain, capping the existing pipe, supplying, installing and anchoring the new retaining pit. All this, as specified in the 44 01 00 and 44 00 50 of the technical tender, as shown in the plans.

2. Article 2.7.2. Superintendent's House Drainage Line

.1 The drainage line of the superintendent's house is paid for at an overall price including, but not limited to, the pipe, drilling and sealing of the foundation wall and the cap on the existing pipe. All this, as specified in the 44 01 00 and 44 00 50 of the technical tender, as shown in the plans.

.7 Electricity Works

.1 Article 3.1.1 4#6 TECK90 cable

.1 The price is a unit amount per linear meter. This item includes supply and installation of cables, connectors, fasteners, anchors, hardware, and accessories, as well as any incidental expenses required to carry out work as described in Contractual Documents.

.2 The price includes connections to equipment, cables, and conductors.

.2 Article 3.1.2 PA1 Electrical distribution panel

.1 The price is a lump sum. This item includes supply and installation of an electrical distribution breaker panel, circuit breakers, fasteners, supports, hardware, and accessories, as well as any incidental expenses required to carry out work as described in Contractual Documents.

.2 The price also includes the supply and installation of the circuit breaker to be added to the existing panel.

.3 Article 3.1.3 15-20A, 125 V receptacles

.1 The price is a unit amount. This item includes supply and installation of a receptacle, a box, a cover, screws, fasteners, hardware, and accessories, as well as any incidental expenses required to carry out the work as described in Contractual Documents.

.4 Articles 3.1.4, 3.2.1, 3.3.1, 3.4.1 et 3.5.1 53 mm dia. Rigid PVC conduit

.1 The price is a unit amount per linear meter. This item includes supply and installation of rigid PVC conduit, supports, fasteners, anchors, hardware, and accessories, as well as any incidental expenses required to carry out work as described in Contractual Documents.

.2 The price also includes sleeves as well as the "Link-Seal" joints, diamond drilling, and any incidental expenses for the work.

.5 Article 3.1.5 14 AWG RWU90 conductors

.1 The price is a unit amount per linear meter. This item includes supply and installation of conductors, connectors, fasteners, hardware, and accessories, as well as any incidental expenses required to carry out work as described in Contractual Documents.

.2 The price includes connections to equipment, cables, and conductors.

.6 Article 3.1.6 Green 14 AWG RWU90 conductors

.1 The price is a unit amount per linear meter. This item includes supply and installation of conductors, connectors, fasteners, hardware, and accessories, as well as any incidental expenses required to carry out work as described in Contractual Documents.

.2 The price includes connections to equipment, cables, and conductors.

.7 Article 3.1.7 2#12 TECK90 cable

.1 The price is a unit amount per linear meter. This item includes supply and installation of cables, connectors, fasteners, anchors, hardware, and accessories, as well as any incidental expenses required to carry out work as described in Contractual Documents.

.2 The price includes connections to equipment, cables, and conductors.

.8 Articles 3.2.2 et 3.3.2 10 AWG RWU90 conductors

.1 The price is a unit amount per linear meter. This item includes supply and installation of conductors, connectors, fasteners, hardware, and accessories, as well as any incidental expenses required to carry out work as described in Contractual Documents.

.2 The price includes connections to equipment, cables, and conductors.

.9 Articles 3.2.3 et 3.3.3 Green 10 AWG RWU90 conductors

.1 The price is a unit amount per linear meter. This item includes supply and installation of conductors, connectors, fasteners, hardware, and accessories, as well as any incidental expenses required to carry out work as described in Contractual Documents.

.2 The price includes connections to equipment, cables, and conductors.

.10 Articles 3.2.4, 3.3.4, 3.4.2 et 3.5.2 2#18+1#18 Green SJOW cable

.1 The price is a unit amount per linear meter. This item includes supply and installation of cables, connectors, fasteners, anchors, hardware, and accessories, as well as any incidental expenses required to carry out work as described in Contractual Documents.

.2 The price includes connections to equipment, cables, and conductors.

.3

.11 Article 3.6.1 Electrical tests.

.1 The price is a lump sum. This item includes execution of tests, production of reports, supplying of measurement equipment, manpower, supply and installation of connectors and equipment for splices, hardware, and accessories, as well as any incidental expenses required for completion of work as described in Contractual Documents.

.2

.12 Article 3.6.2 Demolition.

.1 The price is a lump sum. This item includes removal of materials, unplugging equipment, disposal of materials, provision of equipment and manpower, as well as any incidental expenses required to carry out work as described in Contractual Documents.

.2 The price also includes taking charge, transportation, and unloading of the following existing equipment at the Canada Park Agency's workshops located at 1840 Burgundy, in Chambly, being: Pump control panel, pumps, conductors, and pump cables.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 PRICES AND PAYMENT

.1 The costs of project meetings must be included in the bid prices for each relevant item of the Tender Form.

1.3 ADMINISTRATIVE

.1 Plan to hold project meetings every two (2) weeks throughout the duration of the work.

.2 The Principal Supervisor prepares agenda for meetings.

.3 The Principal Supervisor distributes a written notice of each meeting five (5) working days prior to the meeting date to the Contractor, the Parks Canada Agency (PCA) project manager, the Principal Supervisor, and the Design Engineer (when required).

.4 Provide physical space and plan for meetings.

.5 The Principal Supervisor presides at meetings.

.6 The Principal Supervisor records the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Distribute copies of meeting minutes within seven (7) working days after meetings to meeting participants and affected parties not in attendance.

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

.9 Provide a schedule of specific meeting indicated in all specification section to allow tracking of work execution and all other meeting required.

1.4 PRECONSTRUCTION MEETING

.1 Within ten (10) working days after emission of contract award letter, Parks Canada Representative organise a kick-off meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities.

.2 The PCA project manager, the Principal Supervisor, the Design Engineer, as well as the Contractor and the main Subcontractors will be in attendance.

.3 The Parks Canada Representative establishes time and location of meeting and notifies parties concerned at least five (5) working days before meeting.

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

.5 Agenda to include:

.1 Appointment of official representative of participants in the Work;

.2 Site development plan;

.3 Order of execution of Works;

.4 Shop Drawing of temporary access system (footbridge);

.5 Overall plans (GANTT diagram) and the schedule of work;

.6 Signaling plans;

.7 Surveys;

.8 Environmental Protection Plan (EPP);

.9 Schedule of submission of shop drawings, samples, colour chips, procedure. Submit submittals in accordance with Section 01 33 00 – *Submittal Procedures;*

.10 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 – *Construction Facilities;*

.11 Delivery schedule of specified equipment, for each structure;

.12 Site security in accordance with Section 01 56 00 – *Temporary Barriers and Enclosures;*

.13 Proposed changes, change orders, procedures, approvals required, mark-up, administrative requirements;

.14 Owner provided products;

.15 Record drawings in accordance with Section 01 33 00 – *Submittal Procedures*;

.16 Take-over procedures, acceptance, and warranties;

.17 Monthly progress claims, administrative procedures, photographs, hold backs;

.18 Appointment of inspection and testing agencies of Contractor and of Canada Parks Agency;

.19 Insurances, transcript of policies.

1.5 PROGRESS MEETINGS

.1 The Parks Canada Representative shall establish a schedule of the progress meetings to be held every two (2) weeks during the Work, until its completion.

.2 Contractor, major Subcontractors involved in Work, the PCA project manager, and the Principal Supervisor are to be in attendance.

.3 Parks Canada Representative notifies parties a minimum of five (5) working days prior to meetings.

.4 The Contractor must submit to the Parks Canada Representative a work schedule based on the real progress of the work a minimum of twenty-four (24) hours prior to the meetings. The presented schedule must compare the real progress to the original work schedule.

.5 Government Representative records minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) working days after meeting.

.6 Agenda to include the following:

.1 Review, approval of minutes of previous meeting;

.2 Review of Work progress since previous meeting;

.3 Field observations, problems, conflicts;

.4 Health and safety;

.5 Problems which impede construction schedule;

.6 Review of off-site fabrication delivery schedules;

.7 Corrective measures and procedures to regain projected schedule;

.8 Revision to construction schedule;

.9 Progress schedule, during succeeding work period;

.10 Review submittal schedules: expedite as required;

.11 Maintenance of quality standards;

.12 Review proposed changes for effect on construction schedule and on completion date;

.13 Other business.

1.6 MEETINGS PRIOR TO IMPLEMENTATION

.1 Must be in attendance: The Contractor including the Engineer who signed the procedure, and all principal Subcontractors participating in the work, the Laboratory Testing Representative, and the Principal Supervisor.

.2 The Parks Canada Representative shall advise the parties at least five (5) days prior to the meetings.

.3 The meeting shall only take place once the procedure has been judged complete by the Parks Canada Representative. The meeting agenda shall include a review of the procedure and the contractual requirements for the work.

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 Chart (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 (5) days 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 workweeks.

.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 the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involve 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 the Parks Canada Representative to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

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

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

.3 Limit activity durations to maximum of approximately ten (10) working days, to allow for progress reporting.

.4 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 Provide submittals in accordance with Section 01 33 00 – *Submittal Procedures*.

.2 Submit to the Parks Canada Representative within **seven (7) working days** of the contract award letter emission a Bar (GANTT) Chart as **Master Plan** for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to the Parks Canada Representative within **five (5) working days of receipt of approval of Master Plan.**

1.4 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule, according with work planned in Tender Form:

- .1 Collection network
- .2 Outfall.
- .3 Wastewater treatment system.
- .4 Electrical works
- .5 Surveys.
- .6 Any other work shown on drawings, specifications, and Tender Form.

1.5 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 The Parks Canada Representative will review and return revised schedules within **five (5) working days**.

.3 Revise impractical schedule and resubmit within **five (5) working days**.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes, as minimum, milestone and activity types as follows:

- .1 Award letter, Contract attribution;
- .2 Shop Drawings, samples and time to settle;
- .3 Permits;
- .4 Mobilization/demobilisation;
- .5 Minimally one activity for each article of the Bid Form;

.6 Key milestones of the Project and any other tasks or deliverables required.

1.7 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on **weekly** basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, 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.

1.8 WORK PROGRESS FOLLOW-UP PLAN

.1 Develop a graphical follow-up from the intervention sector plans to present the productivity of key activities, such as: excavation, tank's installation, collection network and others.

.2 Update this follow-up plan before each site meeting each two (2) weeks.

1.9 PROJECT MEETINGS

.1 Hold meetings in accordance with section 01 31 19 – *Project Meetings*.

.2 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.

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

END OF SECTION

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 ADMINISTRATIVE

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

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

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

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

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

.6 When corrections must be made to the documents, the Contractor must correct the documents and resubmit them for approval. The Contractor must verify and sign the revised documents as described above.

.7 Notify the Canada Parks Representative in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

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

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

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

.11 All documents sent to the Representative of Parks Canada must be written in French. Any document in unilingual English must be translated into French before being issued.

1.3 WORKSHOP DRAWINGS AND TECHNICAL DATASHEETS

.1 The expression "workshop drawings" means the drawings, diagrams, illustrations, tables, performance or performance graphs, brochures and other documentation that the Contractor must provide to show in detail a part of the work concerned.

.2 Submit shop drawings bearing the seal and signature of an engineer who is a member in good standing of the Ordre des Ingénieurs du Québec (OIQ), when specified in this document.

.3 The shop drawings must indicate the materials to be used as well as the methods of construction, fixing or anchoring to be employed, and they must contain the assembly

diagrams, the details of the connections, the relevant explanatory notes and any other information necessary for the execution of the work. When works or elements are connected to other works or to other elements, indicate on the drawings that there has been coordination of the requirements, regardless of the section under which the works or elements will be supplied and installed. Make references to the specifications and to the preliminary design drawings.

.4 Allow ten (10) working days for the Representative of Parks Canada to examine each batch of documents submitted.

.5 Changes made to workshop drawings by the Representative of Parks Canada are not intended to change Contract Price. If this is the case, notify the Representative of Parks Canada in writing before starting the work.

.6 Make changes to shop drawings as requested by the Representative of Parks Canada, in accordance with the requirements of the contract documents. When resubmitting drawings, notify the Representative of Parks Canada in writing of any changes that have been made in addition to those required.

.7 The documents submitted must be accompanied by a cover letter containing the following information:

- .1 the date;
- .2 the name and number of the project;
- .3 the name and address of the Contractor;
- .4 the designation of each drawing, technical datasheet and sample as well as the number submitted;
- .5 the reference to the items of the specifications and to the plan sheet number;
- .6 any other relevant data.

.8 The documents submitted must bear or indicate the following:

- .1 date of preparation and dates of overhaul;
- .2 the name and number of the project;
- .3 the name and address of the following persons:
  - .1 the subcontractor;
  - .2 the supplier;
  - .3 the manufacturer.
  - .4 the Contractor's stamp, signed by the latter's authorized representative, certifying that the documents submitted are approved, that the measures taken on site have been verified and that the assembly conforms to the requirements of the contractual documents;
  - .5 relevant details for the portions of the work concerned:
    - .1 materials and manufacturing details;
    - .2 layout or configuration, with dimensions, including those taken on site, as well as clearances;

.3 details of assembly or adjustment;

.4 details of anchors for lifting of prefabricated elements;

.5 characteristics such as power, flow or capacity;

.6 performance characteristics;

.7 reference standards;

.8 operational mass;

.9 wiring diagrams;

.10 single line diagrams and schematic diagrams;

.11 links with adjacent works.

.9 Distribute copies of workshop drawings and technical datasheets after Parks Canada Representative has completed verification.

.10 Submit one (1) electronic copy of shop drawings prescribed in technical sections of this specification and as reasonably required by the Representative of Parks Canada.

.11 Submit one (1) electronic copy of test reports prescribed in technical sections of this specification and requested by the Representative of Parks Canada.

.1 The report signed by the official representative of the testing laboratory must certify that materials, products or systems identical to those proposed in the course of the work have been tested in accordance with the prescribed requirements.

.2 Tests must have been carried out within three (3) years preceding date of contract award.

.12 Submit one (1) electronic copy of certificates prescribed in specification Sections and required by Parks Canada Representative.

.1 Documents, printed on official correspondence paper of the manufacturer and signed by a representative of the latter, must certify that the products, materials, equipment and systems supplied comply with the specifications of the specifications.

.2 Certificates must bear a date after contract award and indicate the name of the project.

.13 Delete information that does not apply to the work.

.14 In addition to current information, provide any additional details that apply to the work.

.15 When the workshop drawings have been verified by the Representative of Parks Canada and no error or omission have been detected or they contain only minor corrections, the printouts are returned, and the finishing work and installation can then be undertaken. If the workshop drawings are rejected, the annotated copy (s) will be returned and the corrected workshop drawings must be resubmitted as specified above before any fabrication and installation work can be undertaken.

.16 The review of workshop drawings by the Representative of Parks Canada is intended only to verify compliance with the general concept of the data indicated on them.

.1 This examination does not mean that Parks Canada approves the detailed design presented in the shop drawings, the responsibility rests with the Contractor who submits them and does not release the latter from the obligation to transmit complete and accurate shop drawings, and to comply with all job requirements and contract documents.

.2 In addition, this revision does not release the Contractor from its responsibility for errors or omissions in the workshop drawings or from its responsibility to respect all the requirements of the contract documents. The Contractor is responsible for the dimensions to be confirmed and correlated on the construction site, the techniques that relate only to the manufacturing, construction and installation processes as well as the coordination of the work of all trades.

.3 Workshop drawings must not consist of endless copies of catalog pages or advertising brochures.

.4 The equipment shown on the workshop drawings must comply with the specifications of the plans and specifications, and the characteristics required in the plans and specifications must be clearly identified. Shop drawings will be examined a first time by the Representative of Parks Canada and returned to the Contractor to mention whether they are compliant or not. Revised drawings subsequently returned by the Contractor shall comply, failing which, the costs for the subsequent examination of all versions of the drawings shall be paid by the Contractor to the Representative of Parks Canada, at the defined hourly rates. in Government Decree 1235-87 (in force 2009-04-01).

1.4 PROVISIONAL WORK PLANS

.1 The provisional works plans describe the recommended method to allow the work to be carried out.

.2 In a non-limiting way, these are the following temporary works:

.1 The works required for environmental protection;

.2 The works and working methods for water management;

.3 The works and working methods for traffic management;

.4 Development of storage sites;

.5 Temporary support structures;

.6 Protection of work areas;

.7 Any other work or work method necessary for the execution of the work.

.3 In accordance with the terms of the article "workshop drawings and technical datasheets" of this section, the provisional works plans must be submitted to the Representative of Parks Canada for verification.

.4 All provisional work plans must be signed and sealed by an engineer member in good standing of the OIQ.

1.5 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status. The Contractor must provide the end-of-project manual.

.2 Submit copies of insurance policies immediately after contract award.

1.6 NON-LIMITATATIVE LIST OF DOCUMENTS TO BE SUBMITTED

.1 The Contractor must submit the documents in the list below. The latter is not exhaustive and can be modified without notice.

- .1 Insurance documents;
- .2 Surety bonds;
- .3 List of labor and equipment rates
- .4 List of suppliers and subcontractors;
- .5 Timeline;
- .6 Notice of opening to the CNESST;
- .7 Agreement with bulk carriers;
- .8 Location of existing utility services;
- .9 Health and safety program;
- .10 Action plan for environmental protection;
- .11 traffic management plans;
- .12 Provisional works plans;
- .13 Location (s) of disposal of excess excavation and signed agreement from the site owner;
- .14 Documents required for 1st class excavation (if required) (blasting plan, work method, rock survey, etc.);
- .15 List and contact details of intermediate survey stations set up by the Contractor;
- .16 Shop drawings and technical sheets:
  - .1 Drinking water pipe, fittings and plug;
  - .2 Valve and valve box;
  - .3 Retaining joints;
  - .4 Connection sleeve;
  - .5 Service connection;
  - .6 Connection harness;
  - .7 Hold and line stops;
  - .8 Service box;
  - .9 Tracer wire;
  - .10 Membrane;
  - .11 Manhole;
  - .12 Fill/rinse terminal and access terminal;

.13 .Prefabricated edging;

.14 Complete wastewater treatment system:

- .1 Raw wastewater pumping station;
- .2 Septic tank;
- .3 Bionest reactor with integrated pumping station;
- .4 UV disinfection system;
- .5 Phosphorus removal system;
- .6 Ventilation system;
- .7 Settling tank;
- .8 Layout of the existing room;
- .9 Related equipment;
- .10 Wastewater pipes.

.15 Complete operation and maintenance manuals for all equipment;

.16 Wastewater treatment system performance test report;

.17 Frame and cover;

.18 Sediment barrier;

.17 Certificates of conformity for granular materials and stones;

.18 Work method for boring the sheet pile wall;

.19 Formulas for cement concrete, asphalt, topsoil and turf mixes.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 REFERENCES

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

.2 Health Canada, Workplace Hazardous Materials Information System (WHMIS)

.3 Province of Quebec

.1 Loi sur la santé et la sécurité du travail, L.R.Q., c. S-2.1- 2014 update.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit site-specific Health and Safety Plan: Within seven (7) working days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site-specific safety hazard assessment.

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

.3 Submit two (2) copies of Contractor's authorized representative's work site health and safety inspection reports to the Parks Canada Representative.

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

.5 Submit copies of incident and accident reports.

.6 Submit the WHMIS Material Safety Data Sheets (MSDS).

.7 The Parks Canada Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within seven (7) working days after receipt of plan. Revise plan as appropriate and resubmit plan to Parks Canada Representative within five (5) working days after receipt of comments from the Parks Canada Representative.

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

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

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

1.4 FILING OF NOTICE

.1 The Contractor must send a written work advisory to the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST) at least ten (10) working days prior to the beginning of work.

1.5 SAFETY ASSESSMENT

.1 The Contractor must plan and provide all the extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as his suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

.2 Conduct an assessment of the risks and safety hazards present on the site in relation to the works to be performed.

.3 It is the responsibility of the Contractor to conduct audits to ensure the safety of the work done near the Chambly Canal Walls and structures. These checks are needed to avoid the risks of instability or collapse of the walls.

1.6 MEETINGS

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

.2 Notify the Parks Canada Representative at least five (5) days before this meeting.

1.7 REGULATORY REQUIREMENTS

.1 Perform the Works in accordance with the requirements of the authorities having jurisdiction over the Municipality of Saint-Ours.

1.8 GENERAL REQUIREMENTS

.1 The Contractor must plan and provide all the extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as his suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

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

.3 The Parks Canada Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.9 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that conduct of Work may affect them.

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

.3 Contractor shall be the Principal Contractor as described in the Quebec Act Respecting Health and Safety code for the Construction for only their scope and areas of work as defined and described this project specification.

1.10 COMPLIANCE REQUIREMENTS

.1 Comply with the health and safety regulations, Loi sur la santé et la sécurité du travail, Règlement sur les établissements industriels et commerciaux, R.R.Q.

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

1.11 UNFORSEEN HAZARDS

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

1.12 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of the Canadian government, and in consultation with the Parks Canada Representative.

1.13 CORRECTION OF NON-COMPLIANCE

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

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

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

1.14 BLASTING

.1 Blasting and other use of explosives are not allowed.

1.15 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from the Parks Canada Representative.

1.16 WORK STOPPAGE

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

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 REFERENCE STANDARDS

.1 Ensure environmental protection in accordance with these specifications and the following standards:

- .1 Guide d'intervention – Protection des sols et réhabilitation des terrains contaminés (MDDELCC, 2016);
- .2 Ministère du Développement durable, de l'Environnement et des Parcs du Québec : Guide d'échantillonnage à des fins d'analyses environnementales : Cahier 5 – Échantillonnage des sols, 2010 ;
- .3 Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs du Québec, Modes de conservation pour l'échantillonnage des sols, 2013;
- .4 Canadian law on the environmental protection (1999) (L.C. 1999, ch. 33)
- .5 Canadian Environmental Quality Guidelines (CEQGs, 1999);
- .6 Fisheries Act (R.S.C., 1985, c. F-14);
- .7 The Règlement numéro 2008-47 sur l'assainissement des eaux de La Communauté métropolitaine de Montréal (CMM);
- .8 Quebec laws and regulations:
  - .1 Law on the species at risk (L.C. 2002, ch. 29).
  - .2 Law of 1994 on the Convention on Migratory Birds (L.C. 1994, ch. 22)
  - .3 Critères de qualité de l'eau de surface du MELCC (protection de la vie aquatique – effet aigu)
  - .4 Historic Canal Regulations (SOR / 93-220)
  - .5 Environment Quality Act (CQLR, c Q-2), 2018;
  - .6 Regulation respecting solid waste (CQLR, c Q-2, r 13), 2013;
  - .7 Regulation respecting the burial of contaminated soils (CQLR, c Q-2, r 18), 2018;
  - .8 Regulation respecting the landfilling and incineration of residual materials (CQLR, c Q-2, r 19), 2018;
  - .9 Regulation respecting hazardous materials (CQLR, c Q-2, r 32), 2018;
  - .10 Land Protection and Rehabilitation Regulation (CQLR, c Q-2, r 37), 2018;
  - .11 Regulation respecting contaminated soil storage and contaminated soil transfer stations (CQLR, c Q-2, r 46), 2018;

.2 The standards and general documents cited above are complementary, regardless of the nature of work to be done. In the event of a discrepancy between the documents and these specifications, the specifications have priority.

1.3 DEFINITIONS

.1 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.

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

1.4 NON-COMPLIANCE WITH REQUIREMENTS

.1 Failure to comply with one or other of the clauses of this section as well as the basic Parks Canada impact study attached in appendix B of the specifications or following the issuance of notice of non-compliance, is liable to a permanent withholding established according to the damage caused to the environment and according to the actual costs incurred for Parks Canada as an offense for each of the offenses, upon simple observation by the Representative or by one of his representatives. The same is true for non-compliance with the articles of the CCDG relating to environmental protection.

.2 Any violation that has not been corrected the following day is again liable to withholding. It is the same for each of the following days, until the anomaly is corrected. In addition, any expense related to any damage to the environment is at the expense of the Contractor, particularly with regard to characterization and analysis expertise as well as replacement wildlife habitat work and compensation.

.3 In the event of failure by the Contractor to repair the damage, the Owner will correct and charge the Contractor for the cost of this work and delays by means of withholding on payments.

.4 In the case of work carried out for the federal government, the sections of Division 1 have priority over the technical sections of the project specifications. The Contractor must comply at all times with the National Parks Act and related regulations.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

- .1 Before the work
  - .1 Health and safety plan
  - .2 Schedule of work
- .2 During the work
  - .1 Weight tickets

.2 Five (5) days before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Canada Parks Representative.

.3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.4 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.5 Include in Environmental Protection Plan:

.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.

.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.

.3 Names and qualifications of persons responsible for training site personnel.

.4 Descriptions of environmental protection personnel training program.

.5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.6 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

.1 Plan must include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

.7 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.8 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.9 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.10 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.11 Waste Water Management Plan identifying methods and procedures for management of discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

.12 A plan for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

.13 Pesticide treatment plan to be included and updated, as required.

1.6 MITIGATION MEASURES

.1 The mitigation measures described in Table 9 of the "Évaluation d'impact de base" must be implemented to the satisfaction of the Canada Parks Representative.

1.7 FIRES

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

1.8 DRAINAGE

.1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.

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

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

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements in an aquatic environment the applicable discharge standards, i.e. the CCME recommendations for water quality - protection of aquatic life, the MELCC surface water quality criteria (protection of aquatic life - effect acute) and CMM regulation 2008-47 for suspended solids, pH and C10-C50. It is the responsibility of the contractor to demonstrate compliance with these standards.

1.9 PLANT PROTECTION

.1 Where required for excavation, cut roots as directed:

.1 Prune exposed roots cleanly at side of trench nearest plants to be preserved. Pruned ends to point obliquely downwards.

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

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

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

.4 No tree may be cut without the approval of the Representative of Parks Canada, except those indicated on the plans. These must be identified beforehand and approved by the client and the Representative of Parks Canada.

1.10 POLLUTION CONTROL

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

.2 Install geotextile over the fences around the site to prevent wind erosion. Keep the geotextile in good condition throughout the work.

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

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

.5 Do not use chemicals in water spray systems to reduce the emission of dust and particles.

1.11 HISTORICAL/ARCHAEOLOGICAL CONTROL

.1 Preserve the archeological nature of the site in accordance with Section 01 35 43b – Archeology.

1.12 NOTIFICATION

.1 The Canada Parks Representative 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 the Canada Parks Representative of proposed corrective action and take such action for approval by the Canada Parks Representative.

.1 Take action only after receipt of written approval by the Canada Parks Representative.

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

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

1.13 WORK CARRIED OUT IN OR NEAR WATER BODY OR STREAM

.1 It is forbidden to extract any natural or human material from the bed of water courses or near them, unless otherwise indicated.

.2 Treated wood residues and dust must not be discharged into waterways or come into contact with runoff water flowing into a water course.

.3 It is forbidden to introduce any type of waste or material into or near waterways.

.4 The Contractor must provide his environmental protection plan for authorization at least seven (7) days before the start of work. This protection plan must clearly show all the elements used to protect the watercourses.

.5 The Contractor must take the necessary measures to minimize the suspension of materials by the stirring of the bed of watercourses or resulting from activities near the watercourse. To do this, the Contractor must minimize the entry of water on the site and treat the water coming out of it by using temporary structures (cofferdams, sedimentation basin, filtering berm, etc.). Examples of layout are shown in the appendix to this section.

.6 It is prohibited to use machinery in a watercourse. Temporary watercourse crossings should be designed and constructed to minimize erosion problems.

.7 When work must be carried out in water, isolate the work area so as to work dry or limit the contribution of sediment to the aquatic environment (e.g. cofferdams, embankment and pumping, temporary diversion, curtain turbidity).

.8 Do not cross logs or construction materials from one bank to the other using the watercourse.

.9 The flow of a watercourse recognized as fish habitat must not be interrupted. The Contractor must ensure a minimum flow downstream of the work equivalent to the normal flow of the watercourse.

.10 During additional deforestation operations, the Contractor must ensure that the felled trees do not fall towards a water course or a forest edge located outside the deforestation limits.

.11 The Contractor must not modify the direction of the natural flow of runoff water except when it is directed to a ditch which is designed for this purpose.

.12 At no time is the Contractor authorized to draw water from a watercourse without having received written authorization from the Representative of Parks Canada.

1.14 PREVENTION OF SOIL AND WATER POLLUTION

.1 The Contractor and Subcontractors who perform work requiring the use of motorized equipment, fuel transfer or using hazardous products must know and apply the procedures to be followed in the event of a spill. This procedure must be displayed in plain view of the employees, on the work site. Each generator must rest in a sealed container capable of collecting the total volume of its hydrocarbon content (gasoline, diesel, oil or others).

.2 The Contractor must ensure that the machinery, tools and equipment that will be used in carrying out the work are safe, clean and in good working order. The Representative of Parks Canada reserves the right to refuse access or to expel from the site machinery, tools and equipment that do not meet these requirements. Visibly poorly maintained equipment that shows evidence of leaks or risks of leaks will be removed from the site at the expense of the Contractor or the Owner of the equipment, at no cost to the Customer. In

addition, machinery that must travel or operate within 30 m of a watercourse must use biodegradable vegetable oil.

.3 No storage of material or equipment in a natural environment outside the work site area is permitted. Waste piled up before being taken out of the site must be placed on a waterproof canvas with a low point in its center and covered with a second waterproof canvas to ensure that it contains any form of leachate, which must be treated. in an accredited establishment outside the boundaries of the National Historic Site.

.4 If the Contractor must store hazardous materials and hydrocarbons for the purposes of the project, he must have retention bins on the storage sites.

.5 General maintenance, refueling and cleaning of equipment and rolling stock must be carried out more than 30 m from the watercourse.

.6 The Contractor must have on hand, on site, an emergency response kit and personnel trained to use it to respond to events requiring an environmental response.

.7 Without being limited to it, this response kit must include and group together a minimum of equipment and devices appropriate to contain any spill so as to minimize the risks of the spread of contamination caused by an oil spill, hazardous products or other contaminants. This intervention kit, identified as "EMERGENCY - ENVIRONMENT" must contain:

.1 An absorbent roll 3 inches in diameter, 12 feet long;

.2 An absorbent rod 3 inches in diameter, 4 feet long;

.3 Twenty-five absorbent layers;

.4 Two (2) bags of 7 liter absorbent (sphagnum moss type);

.5 An epoxy stick;

.6 Two (2) DANGER posters;

.7 Three plastic recovery bags;

.8 Self-adhesive TDG labels (transport of dangerous goods) class 4.1;

.9 An indelible marker pen;

.10 Two (2) pairs of rubber gloves;

.11 Two (2) pairs of protective glasses;

.12 Duct Tape type adhesive tape;

.13 Some tools: wire cutters and screwdriver;

.14 Garrison "Environmental Incident Report" declaration forms, provided by the Ministerial Representative.

.8 Intercept runoff from outside the construction site and keep this water off the site by channeling it to stabilized facilities or locations.

.9 Evacuate runoff off the site by channeling it to approved facilities that promote sedimentation before it reaches a body of water.

.10 Put in place temporary physical protection measures to prevent any loss of soil caused by rain and snowmelt water.

.11 Cover and protect piles with fine materials during heavy rains or prolonged stoppage of work to prevent erosion and sedimentation.

.12 The various devices must be designed according to the drainage pattern, the stability of the soil and the development of the site.

.13 Sediment barriers (straw bales or geotextile barriers) are installed to keep the sediments within the limits of the site and prevent them from reaching a body of water.

.14 The straw bale filter is constructed using tightly assembled straw bales anchored in a trench (Annex 2). The trench intended to receive the straw bales must be dug at the base of a slope following the contours so that the barrier intercepts the runoff water. Bales must be carefully wedged in the trench so that they are properly nested in it.

.15 The geotextile barrier is made of a geotextile membrane, intended for this use, supported by wooden posts (Appendix 3). It is very important that at its base, the geotextile membrane is well embedded in the ground in order to ensure its effectiveness.

.16 The sediment trap and the filtering berm are two devices generally paired and installed in a ditch (Appendix 4). The sediment trap is a cavity dug into the ditch to slow the flow of water and allow sediment to settle. The berm is a temporary ridge of gravel or crushed rock that dissipates energy from the water flowing into the ditch. When the sediment trap is 50% full, it should be emptied and, when necessary, the filter material should be cleaned or replaced.

.17 Temporary installations in wetlands are prohibited. In addition, soil and drainage conditions must be maintained.

.18 Limit the surfaces to be stripped to avoid the risk of erosion. At the end of each working day, the Contractor must protect, by covering membranes or by sediment barriers, any exposed surface vulnerable to erosion and likely to produce sediment towards a body of water or towards a ditch flowing into a water environment. Immediately stabilize exposed soils at the end of the work to prevent erosion and sedimentation. The 30 m strip on either side of the streams should be stripped (when required) after the culverts are in place.

1.15 PROCEDURES IN CASE OF A SPILL OF OIL, HAZARDOUS MATERIALS OR OTHER CONTAMINANTS

.1 In the event of spills, the intervention and cleaning operations of the places where a spill has occurred must be carried out by the Contractor according to the following procedure:

- .1 Ensure human safety and recover spill immediately.
- .2 If the Contractor is unable to contain or immediately recover the spill or if the spill occurs in water, notify, depending on the area of work:
  - .1 Local fire department (9-1-1);
  - .2 Parks Canada 1-888-762-1422;

.3 Environment Canada alert network 1-866-283-2333 (24 hrs).

.3 The Contractor must then immediately report the spill (regardless of the quantity) to the Representative of Parks Canada and write and submit to the Representative of Parks Canada the intervention report provided by the Representative of Parks Canada.

.4 The Contractor shall be held responsible for any spill of product deemed harmful to the environment or to Parks Canada property, and if applicable, the Contractor shall immediately carry out, at his expense, the corrective measures prescribed by the Representative of Parks Canada.

.5 Failure to intervene adequately and to the satisfaction of Parks Canada due to the size or type of the spill, the costs of additional interventions requiring Parks Canada personnel or machinery, its partner or its contractor, will be incurred. charged to the Contractor.

.6 Intervention report:

.1 In the event of an intervention, the Contractor must immediately complete the event declaration form (Environmental incident report, provided by the Representative of Parks Canada), and submit it to the Representative of Parks Canada.

.2 This document will be submitted at the preliminary meeting before the start of work.

1.16 TEMPORARY STORAGE OF HAZARDOUS PRODUCTS

.1 Hazardous products must be gathered in separate lot at a horizontal distance of 1 m. Incompatible products must be separated by a horizontal distance of 3 m. The lots should be located at least 30 m from the line of trees / shrubs and at least 6 m from a surface covered by herbaceous plants / grasses.

.2 Safety distances must be respected, 100 m from watercourses, 15 m from tents and 3 m from combustible material and roads. Access should be provided for emergency responders.

.3 Tankers must meet road standards. When transferring fuel, the tanker must be grounded. The refueled vehicle or tank must be connected to the tanker, by an earth cable, making sure that contact is made on bare metal.

.4 Storage areas are equipped with a liquid retention or collection system (Polyspill pallets, basin, waterproof coverings, speed bumps, trenches, drains blocked or connected to a recovery system). Rainwater is drained regularly or the storage area is protected to prevent the accumulation of rainwater.

.5 Flammable and combustible liquid containers must be stored in an upright position.

.6 Containers in poor condition must be disposed of immediately outside Parks Canada territory, in accordance with the most restrictive environmental standards. The containers must be identified according to WHMIS.

.7 Temporary storage of hazardous materials must indicate the risks with TDG (transportation of dangerous goods) signs.

Part 2 EXECUTION

2.1 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – 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.

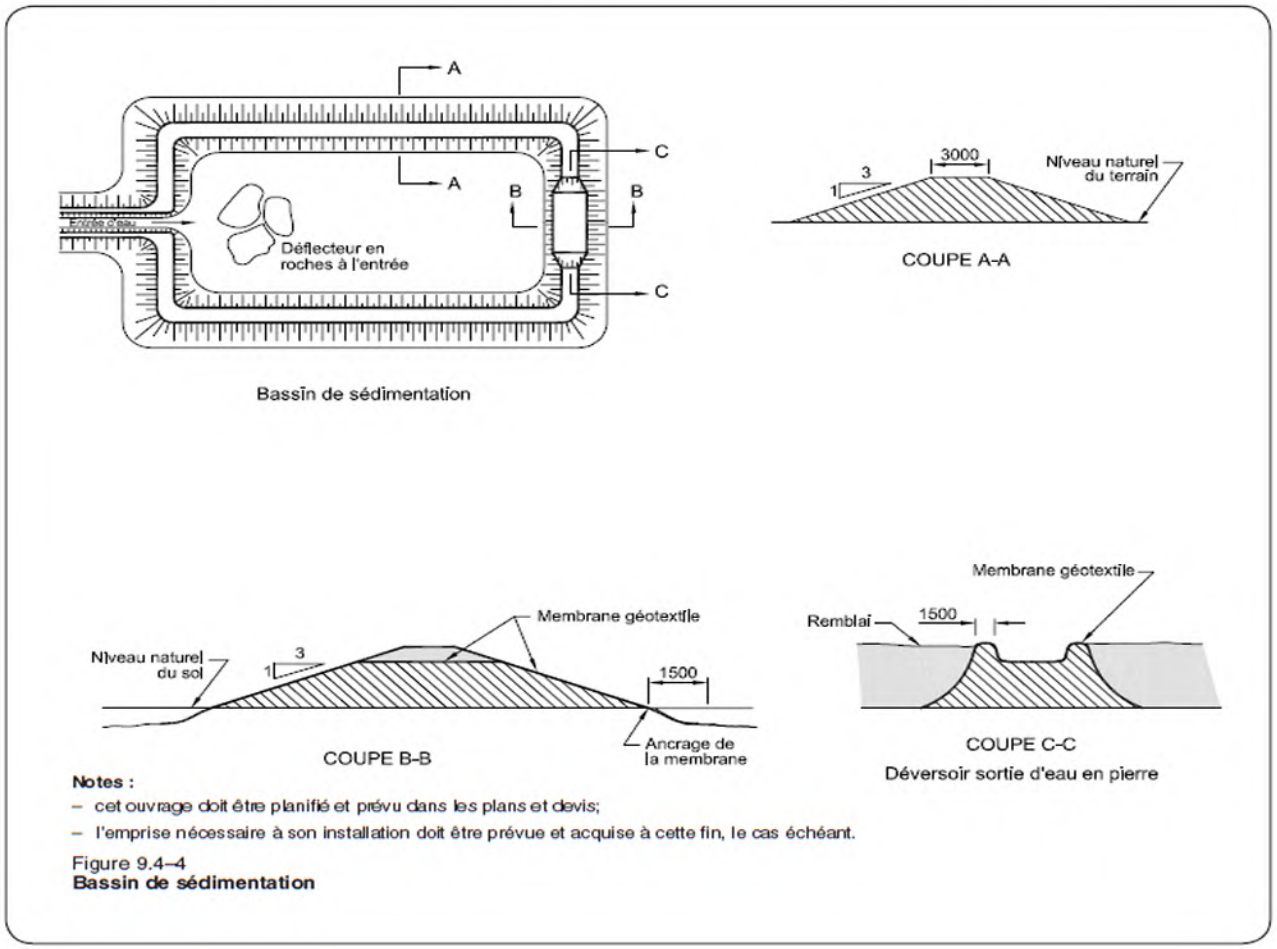
.4 Waste Management: separate waste materials for recycling and reuse.

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

END OF SECTION

Appendix 1

Sedimentation Basin



Notes :

- cet ouvrage doit être planifié et prévu dans les plans et devis;
- l'emprise nécessaire à son installation doit être prévue et acquise à cette fin, le cas échéant.

Figure 9.4–4
Bassin de sédimentation

Appendix 2

Straw Bales

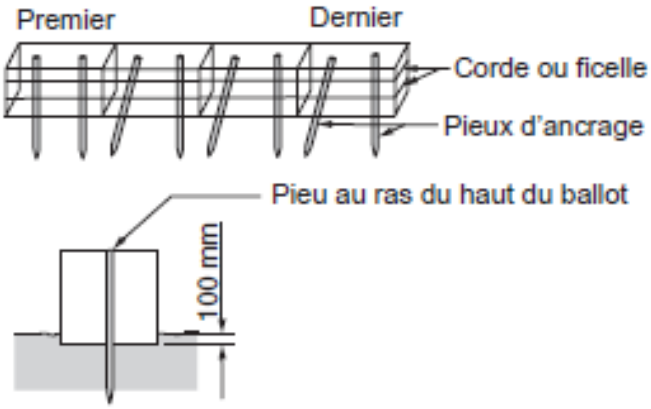
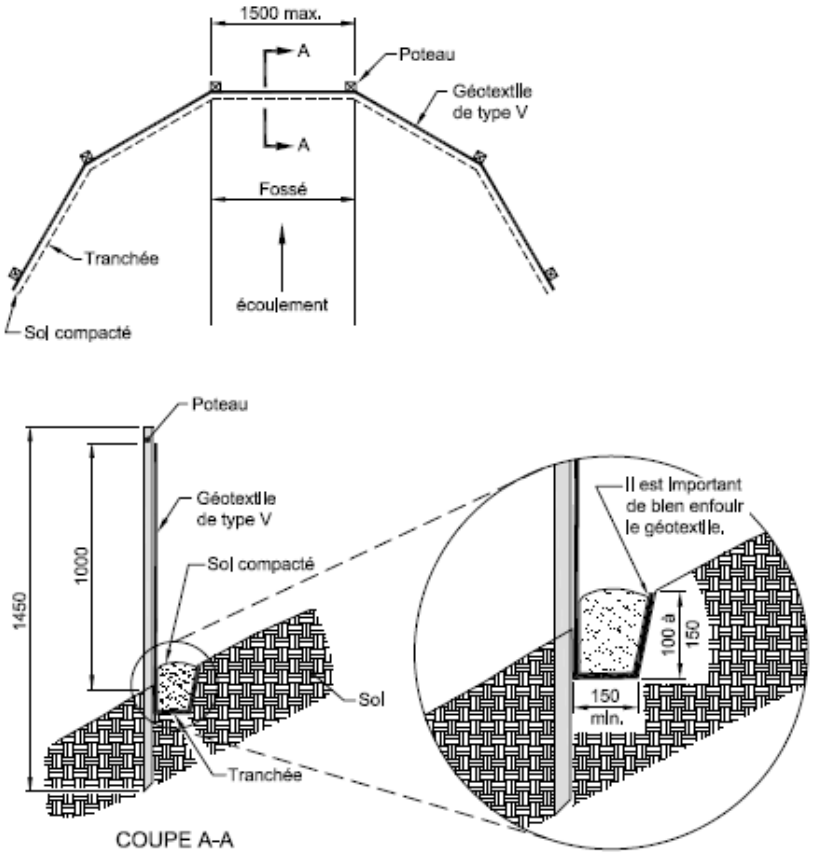


Figure 9.4–1
Exemple d'ancrage de ballots de paille pour disposition en série

Appendix 3

Membrane Barrier



Note :

– les cotes sont en millimètres.

Figure 9.4–2
Installation d'une barrière munie d'un géotextile

Appendix 4

Sediment Trap

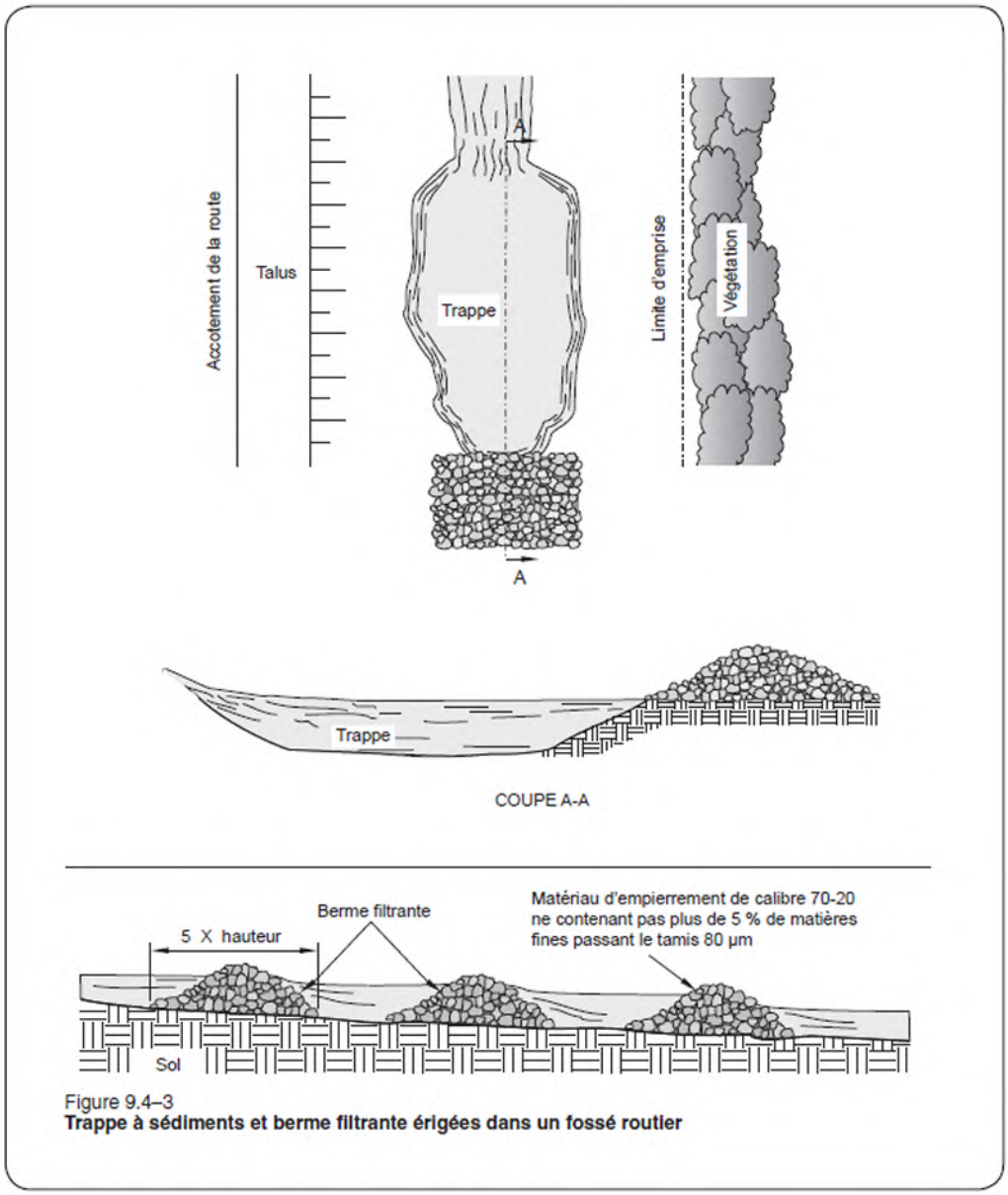


Figure 9.4–3
Trappe à sédiments et berme filtrante érigées dans un fossé routier

Appendix 5

Environmental Surveillance Sheet

PROJECT IDENTIFICATION				
Site: **Project Name :** **Work Date** **Surveillance Date :** **Surveillance Activity:**		☐ Worksite visit ☐ Other Surveillance Activity (specified):		
Mitigation Measure		**YES**	**NO**	**IF NO, REASON:**
Use of the Machinery				
Use equipment and vehicles in good working order in accordance with the regulations in force.				
Limit land movements and shut down the engine of inactive machinery.				
Inspect and maintain gear and their exhaust systems to ensure they are in good condition.				
Avoid any sudden movement of machinery when working in an aquatic environment.				
Stop work in extreme weather conditions.				
If the turbidity of the water inside the streams becomes significant, the contractor will have to reduce the speed of action, rip rap or any other work causing this turbidity.				
Delimit the perimeter of the site and prohibit public access. Ensure the safety of workers, visitors and the general public by marking out work sites and using protective barriers and adequate signage.				
Issue an advisory in the local media and to the local population to inform the public of the construction period and the work area.				
Recommend the use of vegetable oil for all equipment in contact with water.				
The parking, washing and maintenance areas for machinery as well as the storage of equipment are located more than 30 m from a body of water.				
Clean the work and temporary storage area adequately and regularly.				
Restore the premises as quickly as possible after the work.				

Faults and Accidents			
Have an emergency plan and ensure its immediate application in the event of an accidental spill and contact the following organizations without delay: Environment Canada: 1-866-283-2333 and Urgence-Environnement du Québec: 1-866-694- 5454.			
Ensure that a meeting is held with site personnel to inform them of the contractual requirements in terms of the environment and safety, including the components of the emergency plan.			
Provide recovery kits (socks and absorbent oleophilic and water-repellent materials, polyethylenes, waterproof bags, waterproof containers, shovels, gloves, leak plugs, etc.) at all times on the site for petroleum products and waste and absorbent materials in spill case.			
Do not handle or store hydrocarbons and hazardous products within 30 m of the shore.			
Identify and use a temporary and isolated storage site for materials equipment. It must be located at a minimum distance of 30 m from any water point.			
In the event of an aquatic spill, the contaminated water will be confined and collected by a specialized firm and sent to a treatment center authorized by the MELCC.			

Comments: Field observations, presence of wildlife, poor waste management, presence of used oils, leaks on machinery, work carried out not taken into account in the environmental assessment, any detail not mentioned in the measurements attenuation, etc.

MANAGEMENT (NUMBER AND DIGITAL ANNOTATION) OF PICTURES FOR EACH SITE			
01			
02			
03			
04			

SURVEILLANCE	
Prepared by :	
Date:	
Organism:	
Telephone and email:	

1.1 RELATED REQUIREMENTS

1. All sections are applicable.

1.2 SPECIFIC CONDITIONS

1. The site of the rehabilitation works has been recognized by the Canadian Government as an area with archaeological potential. Therefore, any excavation of soil that may contain archeological remains must be supervised by an archeologist appointed by the Canadian government.

2. Due to the high probability of finding archeological remains during the planned excavations, these works are subject to the terms set out in this section.

3. The inventory done in 2015 on the North part of the Island is presented in Appendix C for reference.

1.3 ACCESS AND COOPERATION

1. The Contractor shall cooperate and comply with all directives issued by the Canada Parks Representative during excavation works to prevent the loss of archeological information at the site.

2. The Contractor shall facilitate access to works and cooperate with the archeologist. The archeologist or his representative shall work at the site as needed to protect and record any remains. Their role will be to guide the Contractor to avoid any loss of archeological information and to collect information about any remains found.

3. If necessary, the Contractor shall allow the archeological team to conduct tests and take archeological samples.

1.4 ARCHEOLOGICAL FINDINGS

1. The Contractor shall inform the Parks Canada representative, or in his absence the archeologist or his representative, of any archeological findings (construction or housing remains, objects or pieces of objects) from the site and wait for directives prior to continuing work where the item was found.

2. Remains, antiquities and other objects of historical, archeological or scientific interest (remains, object or fragment of object) found on the work site, excavation zone or demolition zone shall remain Crown property. The Contractor shall protect any such findings and obtain instructions from the Canada Parks Representative.

1.5 WORK STOPPAGE

1. In its contract, the Contractor shall include, at its expense, excavation stoppages of approximately 30 minutes per half-day in areas where an archeologist is required to be present. If unused, these stoppages shall be accumulated and may be used at a later date, as needed. A record of unused time shall be kept by the Canada Parks Representative in accordance with the Contractor and the archeologist.

2. In the event of a work stoppage exceeding 30 minutes, the Canada Parks Representative shall assess the implications of the stoppage and shall inform the Contractor. The Contractor may have to use its machinery in another area to allow the archeologists to continue their work. If it is not possible to use the machinery in another area, the Contractor shall be compensated in the bank of hours or, if it is empty, in accordance with agreements established at the start-up meeting.

3. In the event that cultural resources are discovered when an archeologist is not present, the Project Manager/Project Owner shall imperatively suspend work in the immediate area of the discovery and inform the Parks Canada Agency Project Lead.

1.6 MANUAL EXCAVATIONS FOR ARCHEOLOGICAL PURPOSES

1. Given the possibility of making archeological discoveries, the Contractor is advised that, during the works, manual excavation may be required along with any other types of work to protect possible discoveries. The Contractor shall be compensated in accordance with predetermined agreements.

1.7 PROTECTION OF REMAINS AND STRUCTURES

1. The Contractor shall take all reasonable precautions during excavations and other works to protect any uncovered remains and to allow their examination by archeologists. Parks Canada will not tolerate any deviation in this regard. If the Contractor’s negligence results in damage to remains, the Contractor shall be held responsible and the Canada Parks shall determine the impact.

2. In the event that the Canada Parks Representative authorizes the demolition of archeological elements at the site, the Contractor shall take the necessary precautions to protect any adjacent archeological structures that are not slated for demolition. Elements shall be demolished progressively and in a controlled manner after all archeological surveys are complete. If structures are damaged during the works, immediately inform the Parks Canada Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 REFERENCES

.1 Soil and aggregate control guide (2019), Road Project Management Department, (MTQ) - « Guide *de contrôle de la qualité des sols et des granulats (2018); Direction de la gestion des projets routiers; Ministère des Transport (MTQ) »*

.2 Concrete control guide (2019), Road Project Management Department, (MTQ) - « *Guide de contrôle de la qualité du béton (2019); Direction de la gestion des projets routiers; Ministère des Transport (MTQ) »*

1.3 INSPECTION

.1 Allow the Parks Canada Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections, or approvals by the Parks Canada Representative instructions, or law of Place of Work.

.3 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.

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

1.4 INDEPENDENT INSPECTION AND TESTING AGENCIES

.1 **The Contractor is responsible to execute all required tests** to ensure compliance with contractual requirements (concrete, soil and aggregate).

.2 The Representative of Parks Canada will be responsible for engaging the services of testing and inspection bodies (lab) in order to carry out additional tests. The cost of these services will be borne by the PCA. This does not absolve the Contractor to carry out tests to meet contractual requirements and provide test details and results.

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

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

.5 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Parks Canada Representative at no cost to the Parks Canada Representative. Pay costs for retesting and re-inspection.

1.5 ACCESS TO WORK

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

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

1.6 PROCEDURES

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

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

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

.4 The Contractor must take notice and apply the quality control procedure of different guide indicated at point 1.2 *References (concrete, soil and aggregate)* according to all different works to do.

1.7 REJECTED WORK

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

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

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

1.8 CERTIFICATION

.1 Where certification is required on plans and specifications, the Contractor shall provide a copy of the certificate to Parks Canada prior to commencement of work subject to this requirement. The certificate must be valid for the duration of this work.

1.9 COMPLIANCE CERTIFICATION

.1 Where a certificate of compliance is required on drawings and specifications, the contractor may not use any material for which such a certificate has not been transmitted to the Parks Canada Representative.

.2 The manufacturer of the material must sign this certificate of compliance. The certificate of compliance and the receipts for the delivery of the materials must be drawn up in such a way that they can be linked. The Contractor must return the certificate of compliance to the Parks Canada Representative within the prescribed time.

.3 If the Contractor is unable to provide all required information to the drawings and specifications, the Contractor shall at its own expense use a registered laboratory to provide missing information on the certificate of compliance. The attestation of compliance must then be signed by the representative of the laboratory which executed the tests.

1.10 QUALIFICATION

.1 Where a design is required, the Contractor shall provide a copy of the certificate to Parks Canada prior to the commencement of work subject to this requirement. The certificate must remain valid for the duration of the work.

1.11 REPORTS

.1 Submit four (4) copies of inspection and test reports to the Parks Canada Representative.

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

1.12 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

.2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by the Parks Canada Representative and may be authorized as recoverable.

1.13 MILL TESTS

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

1.1 WORK COVERED BY CONTRACT DOCUMREFERENCE STANDARDS

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 1.189-last edition, Exterior Alkyd Primer for Wood.

.2 CGSB 1.59- last edition, Alkyd Exterior Gloss Enamel.

.2 CSA Group (CSA)

.1 CSA-A23.1/A23.2- last edition, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-0121 last edition, Douglas Fir Plywood.

.3 CAN/CSA-S269.2 last edition, Access Scaffolding for Construction Purposes.

.4 CAN/CSA-Z321- last edition, Signs and Symbols for the Occupational Environment.

.3 U.S. Environmental Protection Agency (EPA) / Office Water

.1 EPA 832-R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plan and Best Management Practices.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 INSTALLATION AND REMOVAL

.1 The Contractor must plan and provide all the extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as his suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

.2 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. Provide this plan five (5) business days before start of work. Construction trailers are only allowed in the parking located on the other side of the lock. Fees must be included in the cost of overhead.

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

.4 Indicate the areas that must be coated with a geotextile membrane and gravel to prevent soil settlement in the areas considered by PCA with archaeological potential

.5 Indicate use of supplemental or other staging area.

.6 Provide construction facilities in order to execute work expeditiously.

.7 Remove from site all such work after use.

.8 The Contractor must demobilize and dismantle all facilities at the end of the work. The dismantling of the equipment must be scheduled within the contractor's completion period.

1.4 SITE STORAGE/LOADING

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.5 CONSTRUCTION PARKING

.1 The Contractor is solely responsible for parking his vehicles and those of his employees and subcontractors. The contractor must limit himself to the work area. Make sure not to park in grassy areas.

.2 Three parking spaces will be reserved for the use of the contractor on the bank side lock. Access to the site from these parking lots is not guaranteed at all times.

.3 The Contractor may not, at any time, allow his workers and those of his subcontractors to park in the access roads and in the areas designated as prohibited parking.

.4 Respect municipal parking regulations in effect on the street or elsewhere.

.5 Provide and maintain adequate access to project site.

1.6 SECURITY

.1 The Contractor must plan and provide all the extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

.2 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.7 FIELD DRAINING

.1 Provide temporary pumping and drainage facilities required to keep excavations and site free of standing water or ice.

1.8 WATER SUPPLY

.1 The Contractor shall ensure his continuous supply of water during his work for his needs and provide all necessary measures for insulation of heating pipes according to temperature.

.2 Make the necessary arrangements to connect the network to that of the utility company concerned, and assume all costs of installation, maintenance and disconnection.

1.9 TEMPORARY POWER SUPPLY AND TEMPORARY LIGHTING

.1 The Contractor is responsible for the power supply required for his site.

.2 No power source will be provided to the Contractor by PCA.

.3 Make the necessary arrangements to connect the network to that of the utility company concerned, and assume all costs of installation, maintenance and disconnection.

.4 Provide temporary lighting for the duration of the work and maintain the network.

1.10 OFFICES

.1 No worksite office is required for this project.

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

1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

.3 Request approbation for temporary toilet location by the Representative of Parks Canada.

1.12 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances. When the temperature is below -10° Celsius, sanitary installation must be heated.

.2 The toilets must be cleaned in accordance with the requirements of this section. No wastewater or washing water should be released into the environment.

.3 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.13 CONSTRUCTION SIGNAGE

.1 Provide and erect project sign, within three (3) weeks of signing Contract, in a location designated by Agency Representative.

.2 APC provides the electronic file of the panel according to its brand image. The Contractor shall ensure the printing on coroplast panels and install them on site at the time of mobilization.

.3 No panel or sign other than the information panels shall be installed on site.

.4 Provide and install signing panels for directing visitors near the site.

.5 Provide construction panels consisting of a foundation, a frame including 3 copies of panels: 2 times (3'x4 ') for the bike path and 1 time (4'x6') for the public way, to be located as per Agency Representative’s instructions.

.1 Foundations: 15 MPa concrete to CSA-A23.1 minimum 200 mm x 900 mm deep.

.2 Framework and battens: SPF, pressure treated minimum 89 x 89 mm.

.3 Signboard: 19 mm Medium Density Overlaid Douglas Fir Plywood to CSA O121.

.4 Paint: alkyd enamel to CAN/CGSB-1.59 over exterior alkyd primer to CAN/CGSB 1.189.

.5 Fasteners: hot-dip galvanized steel nails and carriage bolts.

.6 Vinyl sign face: printed project identification, self adhesive, vinyl film overlay, supplied by Consultant.

.6 Locate project identification sign as directed by Consultant where indicated and construct as follows:

.1 Build concrete foundation, erect framework, and attach signboard to framing.

.2 Paint surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.

.3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.

.7 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols to CAN/CSA-Z321.

.8 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Agency Representative.

.9 In case of vandalism or damage, the Contractor shall supply new panels at its expenses.

1.14 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Develop access roads as well as temporary detours to maintain traffic including maintenance work on bicycle paths and / or detours

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

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

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

.5 Dust control: adequate to ensure safe operation at all times. The product shall be submitted for approbation before usage.

.6 Provide snow removal during period of Work.

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

.8 Construct access and haul roads necessary.

.9 Provide site tracks with adequate slope and width; avoid sharp curves, blind turns and any dangerous intersection.

1.15 CLEAN-UP

.1 The Contractor must plan and provide all extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

.2 Remove construction debris, waste materials, packaging material from work site daily.

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

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

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

.6 Ensure snow removal when required at various work sites, storage, temporary arrangements such as site trailers and parking, etc.

1.16 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, specific to site that complies with EPA-832-R-92-005 and requirements of authorities having jurisdiction, whichever is more stringent.

.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

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.3 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations.

.2 Install geotextile over the fences around the site to prevent wind erosion. Keep the geotextile in good condition throughout the work.

1.4 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.5 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 REFERENCES

.1 References to relevant standards can be made in each section of the specifications.

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

.3 Cost for such testing will be borne by the Parks Canada Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

1.3 QUALITY

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

.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining the levels of quality and performance equal or superior. 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 Contractor responsibility but is precaution against oversight or error. The Contractor must 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 the Parks Canada Representative based upon requirements of Contract Documents.

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

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms. Provide complete documents and complete data sheets for each product.

1.4 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 the Parks Canada Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

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

.3 No substitution of materials will be accepted without the Parks Canada Representative approval.

1.5 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 Construction timber, sheet materials, panel materials, and timber on rigid supports must be placed flat such that they do not rest directly on the ground. Provide a gentle slope to encourage the flow of condensate.

.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 the Parks Canada Representative.

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

1.6 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work. In the event that existing objects on the work site are to be returned to Parks Canada, the Contractor must leave them in the basement of the Superintendent’s House.

1.7 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 the Parks Canada Representative in writing, of conflicts between specifications and manufacturer's instructions, so that the Government Representative will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Parks Canada Representative to require credit or removal and re-installation at no increase in Contract Price or Contract Time. The Contractor is responsible to removal and re-installation of incorrect installation products at his expense.

1.8 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 the Parks Canada Representative if required Work is such as to make it impractical to produce required results.

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

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

1.9 CO-ORDINATION

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

.2 The Contractor is responsible for coordination and placement of openings, sleeves and accessories.

.3 The Contractor must take into account that he will need to coordinate the installation of the wastewater treatment system with the system supplier.

1.10 CONCEALMENT

.1 Before installation inform the Parks Canada Representative if there is interference. Install as directed by the Parks Canada Representative.

1.11 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.

1.12 LOCATION OF APPLIANCES

.1 The location indicated for appliances, sockets and other electrical or mechanical equipment must be considered approximate.

.2 Inform the Representative of Parks Canada of any problem that may be caused by the choice of the location of a device and proceed with the installation according to his instructions.

1.13 FASTENINGS

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

.2 Prevent electrolytic action between dissimilar metals and materials.

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

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

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

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

1.14 FASTENINGS - EQUIPMENT

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

.2 Unless otherwise indicated, use sturdy, semi-fine quality fasteners with hexagonal head. Use grade 304 stainless steel parts for exterior installations.

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

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

1.15 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated with written approval of the Parks Canada Representative.

1.16 EXISTING UTILITIES

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 QUALIFICATIONS OF SURVEYOR

.1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to the Parks Canada Representative.

.2 The survey must be made with the georeferenced NAD83(CSRS).

1.3 SURVEY REFERENCE POINTS

.1 The Contractor shall make all calculations for the execution of the work and shall carry out all surveys necessary for the completion of the Contract, with exception to the work carried out by APC. To this effect, he must have a competent survey team to carry out this work.

.2 At the start of the work, the Contractor verifies the reference points established by the Department to ensure the reliability of the surveys to be carried out during construction.

.3 The Contractor is required to supplement the general staking with additional staking. This entails the transfer of all points necessary for construction to the field, to allow an easy and quick check.

.1 The surveyor must do the research and recover the official Provincial and Federal geodesic landmarks and implant all permanent and temporary geodesic landmarks into the site and ensure compliance during all the work.

.2 The stakes and markers established by the Contractor shall make possible the verification of the positioning of the structure by the Government Representative before the Contractor start construction.

.3 The stakes and markers must include implantation and the identification of stations and wall section on all the construction length on panels of minimum dimension 300 mm x 200 mm.

1.4 SURVEY REQUIREMENTS

.1 The Contractor shall install stakes in line with each of the proposed structures, showing the elevation of the final slabs. The work of setting up and checking the benchmarks must be carried out jointly with the Park Representative. The Contractor must ensure that the elevations and profiles of the sewer line shown on the plans are respected.

.2 Establish two (1) permanent grading markers on site, referenced to established bench marks by survey control points. Record locations data in Project Record Documents.

.3 Avoid use the existing landmark on the tipped wall because these are not representative of the existing data.

.4 Contractor must install the stake chain every five (5) metres minimum, unless a curve is present in which case the Contractor must then install the stakes every one (1) meter minimum.

.5 Establish lines and levels, locate, and lay out, by instrumentation.

.6 Stake for grading, fill and topsoil placement and landscaping features.

.7 Stake embankments.

1.5 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify the Parks Canada Representative of findings.

.2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by the Parks Canada Representative.

1.6 RECORDS

.1 Maintain a complete, accurate log of control and survey work as it progresses. Submit log in EXCEL and PDF format no later than forty-eight (48) hours after each survey.

.2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.

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

1.7 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit all required documents in accordance with Section 01 33 00 – *Submittal Procedures*.

.2 Submit certificate **signed by surveyor** certifying and noting elevations and locations of completed Work.

.3 Provide a DWG (As built) plan showing the dimensions and levels of the new conduits, accessories, manholes, service connections, public utility conduits and others.

1.8 SUBSURFACE CONDITIONS

.1 Promptly notify the Parks Canada Representative in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should the Parks Canada Representative determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 PROJECT CLEANLINESS

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

.2 Remove waste materials from site. Do not burn waste materials on site.

.3 Carry out snow removal and snow storage operations when required, in locations previously approved by APC.

.4 Clear snow and ice from access to building. Bank/pile snow in designated areas only or remove from site. It is also prohibited to throw snow removed during snow removal into the historical canal or the river, as indicated in the Historic Canals Regulations.

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

.6 Provide and use marked separate bins for recycling.

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

1.3 FINAL CLEANING

.1 At the completion of work, remove surplus materials, tools, and construction equipment and materials that are no longer required to perform the remaining work.

.2 Remove debris and waste materials in the works area and leave areas clean and ready to occupy.

.3 Prior to final inspection, remove surplus materials, tools, equipment and construction materials.

.4 Make the necessary arrangements and obtain permits from authorities having jurisdiction to dispose of debris and waste materials.

.5 Sweep and clean sidewalks, steps and other exterior surfaces; sweep or rake the rest of the site.

.6 Remove dirt and other debris from exterior surfaces.

.7 Clean and sweep roofs and gutters.

.8 Sweep and clean hard surfaces.

.9 Clean roofs, downspouts, drains and outlets.

.10 Remove snow and ice from access roads to the building.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 This Section includes requirements for management of construction waste and disposal, which forms the Contractor's commitment to reduce and divert waste materials from landfill.

1.2 RELATED REQUIREMENTS

.1 Section 01 52 00 – Construction Facilities

.2 Section 01 74 11 – Cleaning

1.3 DEFINITIONS

.1 Clean Waste: Untreated and unpainted; not contaminated with oils, solvents, sealants or similar materials.

.2 Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction.

.3 Hazardous: Exhibiting the characteristics of hazardous substances including properties such as ignitability, corrosiveness, toxicity or reactivity.

.4 Non hazardous: Exhibiting none of the characteristics of hazardous substances, including properties such as ignitability, corrosiveness, toxicity, or reactivity.

.5 Non toxic: Not poisonous to humans either immediately or after a long period of exposure.

.6 Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

.7 Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

.8 Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.9 Return: To give back reusable items or unused products to vendors for credit.

.10 Reuse: To reuse a construction waste material in some manner on the project site.

.11 Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

.12 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

.13 Toxic: Poisonous to humans either immediately or after a long period of exposure.

.14 Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

.15 Volatile Organic Compounds (VOC's): Chemical compounds common in and emitted by many building products over time through outgassing:

.1 Solvents in paints and other coatings;

.2 Wood preservatives; strippers and household cleaners;

.3 Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.

.4 When released, VOC's can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.

.16 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate waste management requirements with all Divisions of the Work for the project, and ensure that requirements of the Construction Waste Management Plan are followed.

.2 Preconstruction Meeting: Arrange a pre-construction meeting before starting any Work of the Contract attended by the Contractor, affected Subcontractors and the Canada Parks Representative to discuss the Construction Waste Management Plan and to develop mutual understanding of the requirements for a consistent policy towards waste reduction and recycling.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Storage Requirements: Implement a recycling/reuse program that includes separate collection of waste materials as appropriate to the project waste and the available recycling and reuse programs in the project area.

.2 Handling Requirements: Clean materials that are contaminated before placing in collection containers and ensure that waste destined for landfill does not get mixed in with recycled materials.

.1 Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.

.2 Arrange for collection by or delivery to the appropriate recycling or reuse facility.

.3 Hazardous Waste and Hazardous Materials: Handle in accordance with applicable regulations.

PART 2 EXECUTION

2.1 CWM PLAN IMPLEMENTATION

.1 Manager: The Contractor is responsible for designating an onsite party or parties responsible for instructing workers and overseeing and documenting results of the CWM Plan for the project.

.2 Distribution: Distribute copies of the CWM Plan to the job site foreman, each Subcontractor, the Canada Parks Representative, Stantec Consulting Ltd. and other site personnel as required to maintain CWM Plan.

.3 Instruction: Provide on site instruction of appropriate separation, handling, and recycling, salvage, reuse, composting and return methods being used for the project to Subcontractors at appropriate stages of the project.

.4 Separation Facilities: Lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, composting and return:

.1 Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.

.2 Hazardous wastes shall be separated, stored, and disposed of in accordance with local regulations.

.5 Progressive Documentation: Submit a monthly summary of waste generated by the project to ensure that waste diversion goals are on track with project requirements:

.1 Submission of waste summary can coincide with application for progress payment, or similar milestone event as agreed upon between the Canada Parks Representative, the Contractor and Stantec Consulting Ltd.

.2 Monthly waste summary shall contain the following information:

.1 The amount in tonnes or m^3 and location of material landfilled;

.2 The amount in tonnes or m^3 and location of materials diverted from landfill;

.3 Indication of progress based on total waste generated by the project with materials diverted from landfill as a percentage.

2.2 SUBCONTRACTORS' RESPONSIBILITY

.1 The Subcontractors shall cooperate fully with the Contractor to implement the CWM Plan.

.2 Failure to cooperate may result in the Canada Parks Representative not achieving their environmental goals, and may result in penalties being assessed by the Contractor to the responsible Subcontractor.

END OF SECTION

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Contractor's Inspection: The Contractor shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify the Canada Parks Representative in writing of satisfactory completion of the Contractor's inspection.

.2 Request the Canada Parks Representative's inspection.

.2 Canada Parks Representative’s Inspection:

.1 The Canada Parks Representative and the Contractor shall inspect Work and identify defects and deficiencies.

.2 The Contractor shall 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, materials and systems have been tested and are fully operational.

.4 The required certificates have been submitted.

.5 The necessary training in the operation of devices, materials and systems has been given to the Owner's personnel.

.6 The equipment was commissioned in accordance with the requirements of the contract documents and a copy of the final commissioning report was submitted to the Representative of Parks Canada.

.7 Work is completed and ready to be submitted for final inspection.

.4 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by the Canada Parks Representative and the Contractor.

.2 When Work is incomplete according to the Canada Parks Representative, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Completion: When the Representative of Parks Canada considers that the deficiencies and defects have been corrected and that the contractual requirements seem largely satisfied, the Contractor may submit a request for production of a certificate of substantial completion of the work.

.6 Beginning of the warranty period and the period of exercise of the right of retention: The date of acceptance by the Owner of the declaration of substantial completion of the work submitted will be the date of the start of the period of the exercise of the right of retention and the warranty period, unless otherwise prescribed by the regulations relating to the right of retention in force at the place of work.

.7 Final payment

.1 When the Representative of Parks Canada considers that the deficiencies and defects have been corrected and that the contractual requirements are fully met, the Contractor may submit a request for final payment.

.2 If the work is deemed incomplete by the Representative of Parks Canada, the Contractor must complete the items that were not performed and submit a new inspection request.

.8 Payment of withholding: after issuance of the certificate of substantial completion of the work, submit a request for payment of holdback in accordance with the provisions of the contractual agreement.

1.3 FINAL CLEANING

.1 Clean in accordance with requirements of the contractual documents.

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

.2 Waste Management: separate waste materials for recycling and reuse in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 REFERENCES

.1 Canadian Environmental Protection Act (CEPA)

.1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting one (1) week prior to contract completion with Contractor's representative and the Parks Canada Representative, in accordance with Section 01 31 19 – *Project Meetings*.

.2 The Parks Canada Representative shall establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 When requested, provide documents confirming the type, supplier, and quality of the products installed.

.3 Provide “As built” plans indicating the intervention zones, the modifications from the “For construction” plans and the approved final profiles.

.4 Provide a list of replacement materials / equipment, special tools and spare parts.

.5 Provide warranty certificates.

.6 Provide schedule, training and procedure for maintenance and operation of wastewater treatment system and pumping station.

.7 Provide an operation and maintenance manual for the wastewater treatment system and the pumping station.

.8 Provide the performance test report for the wastewater treatment system.

.9 Provide procedure and training for winterizing the wastewater treatment system and pumping station.

1.5 FORMAT

.1 The instructions must be prepared by competent persons having the required knowledge regarding the operation and maintenance of the products described.

.2 Organize data as instructional manual, two (2) printed copies and one (1) electronic.

.3 Provide electronic version for review by Parks Canada Representative. Hard copies can be provided only upon substantial completion of the work.

.4 Documents must be written in French.

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

.6 When multiple binders are used correlate data into related consistent groupings.

.1 Identify contents of each binder on spine.

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

.8 Arrange content by systems and process flow under Section numbers and sequence of Table of Contents.

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

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

.11 Drawings: provide with reinforced punched binder tab.

.1 Bind in with text; fold larger drawings to size of text pages.

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

1.6 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume: provide title of project;

.1 Date of submission;

.2 Name, addresses, and telephone numbers of Government Representative and Contractor with name of responsible parties;

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

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

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

.5 Typewritten Text: as required to supplement product data.

.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 – *Quality Control*.

1.7 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, at site for Parks Canada Representative one record copy of:

.1 Contract Drawings.

.2 Change Orders and other modifications to Contract.

.3 Reviewed shop drawings, product data, and samples.

.4 Field test records.

.5 Performance tests report.

.6 Operation and Maintenance Manual.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples apart from documents used for construction.

.1 Provide secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.

.1 Label each document "Project Record" in neat, large, printed letters.

.4 Maintain record documents in clean, dry, and legible condition.

.1 Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by the Parks Canada Representative.

1.8 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of black line opaque drawings, provided by the Parks Canada Representative.

.2 Record information concurrently with construction progress.

.1 Do not conceal Work until required information is recorded.

.3 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.2 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.3 Field changes of dimension and detail.

.4 Changes made by change orders.

.5 Details not on original Contract Drawings.

.6 References to related shop drawings and modifications.

.4 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.5 Other Documents: maintain field test records, required by individual specifications sections.

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

1.9 FINAL SURVEY

.1 Submit final site survey certificate in accordance with Section 01 71 00 – *Examination and Preparation*, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.10 STORAGE, HANDLING AND PROTECTION

.1 Store equipment, spare parts and special tools in such a way as to prevent any damage or deterioration.

1.11 WARRANTIES AND BONDS

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

.2 Submit warranty management plan, thirty (30) days before planned pre-warranty conference, for the Parks Canada Representative's approval.

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

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

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

.6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

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

.8 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers, or suppliers involved.

.2 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item, material, system or batch.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names, and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.3 Procedure and status of tagging of equipment covered by extended warranties.

.4 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

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

.10 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the Parks Canada Representative to proceed with action against Contractor.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Demonstrate scheduled operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of interim completion.

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

.3 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 technical specifications.
- .4 Ensure testing, adjusting, and balancing has been performed and equipment and systems are fully operational.

.4 Demonstration and Instructions:

- .1 Demonstrate start-up, operation, control, adjustment, troubleshooting, at scheduled times and 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.

1.3 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 Parks Canada Representative 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 two copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.4 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

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All sections are applicable.

1.2 REFERENCE STANDARDS

.1 Canadian Environmental Protection Act,1999 (CEPA 1999)

.1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).

.2 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 National Research Council Canada (NRC)

.1 National Fire Code of Canada [2015] (NFC).

.4 Transportation of Dangerous Goods Act (TDG) 1999 (c. 34).

.5 Canada Labour Code, Part II.

.6 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2003-400)

1.3 DEFINITIONS

.1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.

.2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.

.3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment, or disposal.

.4 Workplace Hazardous Materials Information System (WHMIS): a Canada-wide system established to ensure that employers and workers are aware of the hazards of products used in the workplace. Labelling, MSDSs and worker training programs are the means used, under WHMIS, to convey information about hazardous materials. WHMIS is implemented under a combination of federal and provincial legislation.

1.4 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 hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit WHMIS MSDS to Parks Canada Representative for each hazardous material required prior to bringing hazardous material on site.

.3 Submit hazardous materials management plan to Parks Canada Representative that identifies hazardous materials, usage, location, personal protective equipment requirements, and disposal arrangements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Co-ordinate storage of hazardous materials with Parks Canada Representative and abide by internal requirements for labelling and storage of materials and wastes.

.2 Store and handle hazardous materials and waste in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.

.3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada (NFC) requirements.

.4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.

.1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.

.2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Parks Canada Representative.

.5 Transfer flammable and combustible liquids away from open flames or heat-producing devices.

.6 Solvents or cleaning agents must be non-flammable or have flash point above 38 degrees C.

.7 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.

.8 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.

.9 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:

.1 Store hazardous materials and wastes in closed and sealed containers.

.2 Label containers of hazardous materials and wastes in accordance with WHMIS.

.3 Store hazardous materials and wastes in containers compatible with that material or waste.

.4 Segregate incompatible materials and wastes.

.5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.

.6 Store hazardous materials and wastes in secure storage area with controlled access.

.7 Maintain clear egress from storage area.

.8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.

.9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.

.10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

.10 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

.11 Report spills or accidents immediately to Parks Canada Representative. Submit a written spill report to Parks Canada Representative within 24 hours of incident

1.6 TRANSPORTATION

.1 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.2 When exporting hazardous waste to another country, ensure compliance with Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations.

.3 When hazardous waste is generated on site:

.1 Co-ordinate transportation and disposal with Parks Canada Representative;

.2 Comply with applicable federal, provincial, and municipal laws and regulations for generators of hazardous waste;

.3 Use licensed carrier authorized by provincial authorities to accept subject material;

.4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this material;

.5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations;

.6 Only trained personnel handle, offer for transport, or transport dangerous goods;

.7 Provide photocopy of shipping documents and waste manifests to Parks Canada Representative;

.8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Parks Canada Representative;

.9 Report discharge, emission, or escape of hazardous materials immediately to Parks Canada Representative and appropriate provincial authority. Take reasonable measures to control release.

Part 2 Products

2.1 MATERIALS

.1 Description:

.1 Bring on site only quantities hazardous material required to perform Work.

.2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

Part 3 Execution

3.1 WASTE MANAGEMENT

.1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.

.2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.

.3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.

.4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.

.5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

.6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.

.7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

.8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:

.1 Hazardous wastes recycled in manner constituting disposal.

.2 Hazardous waste burned for energy recovery.

.3 Lead-acid battery recycling.

.4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 23 11 – Excavation and Backfilling - Underground Services

1.2 SCOPE OF WORK

.1 Ensure the supervision of work and supply all manpower, equipment, tools, materials, transportation and other services required to carry out and complete the work described and specified in this section and contract documents, including but not limited to : site preparation, excavation, backfilling with appropriate granular material, and compacting of surfaces as specified for the preparation of various infrastructures for drainage (syphons, spillways, ditch, etc.), pavement, concrete curbs, grassing, etc.

1.3 REGULATIONS

.1 Provide shoring and bracing of excavations, protect slopes and embankments, and carry out all work in compliance with the strictest prevailing provincial and municipal regulations.

1.4 TESTS AND INSPECTIONS

.1 Tests on materials and backfill compaction measurements shall be carried out by a Laboratory designated by the Canada Parks Representative.

.2 No later than one week before the filling or backfilling, provide the designated Laboratory with a 25 kg sample of the fill material proposed for the execution of the work.

.3 Do not start filling or backfilling work until the Canada Parks Representative has approved the material proposed for the execution of the work.

.4 No later than 48 hours before the start of filling or backfilling work using approved materials, notify the Canada Parks Representative of the upcoming execution of this work, so that the designated organization can carry out compaction tests.

1.5 UNDERGROUND UTILITY NETWORKS

.1 Before starting the work, determine the location of all underground utility lines located on or near the worksite.

.2 If need be, arrange with the proper authorities to move underground utility lines that interfere with the execution of the work, and assume the cost of this move.

1.6 PROTECTION

.1 Protect excavations against frost.

.2 Keep excavations clean, free of stagnant water and loose materials.

.3 When the soil's volume can vary significantly due to fluctuations in moisture content, cover and protect it to the satisfaction of the Canada Parks Representative.

.4 Protect elements, both natural and man-made, that must remain intact. Unless otherwise indicated or unless they are located in the work zone, protect trees from damage.

.5 Protect all utility lines that must remain in place.

1.7 SITE PREPARATION

.1 Site preparation work consists in, but is not limited to, supplying the materials and manpower required to carry out excavation work, according to good engineering practices, up to the infrastructure line of the various surface restorations, including :

.1 Saw cuts, pavement removal, and demolition of the concrete,

.2 The loading, transportation and disposal of excavation surplus to a site complying with the directives of the MELCC's Soil - Protection and Contaminated Sites Rehabilitation Policy,

.3 This work must be carried out in compliance with the requirements of Section 31 23 11 - Civil - Excavation and Backfilling - Underground Services.

1.8 EARTHWORK AND LEVELING

.1 Earthwork and levelling consist in, but are not limited to, supplying the materials and manpower required to carry out, according to good engineering practices, earthwork and levelling of the site in compliance with the plans' specifications, including:

.1 The loading, transportation and disposal of excavation surplus to a site complying with the directives of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.2 The supply and placement of backfill materials approved by the Canada Parks Representative.

PART 2 - PRODUCTS

2.1 BACKFILL MATERIAL

.1 Backfill materials must be approved by the Canada Parks Representative prior to their use and must comply with Section 31 23 11 - Excavation and Backfilling - Underground Services.

2.2 SOURCE OF MATERIALS

.1 The Contractor must provide the address of the supplier of the backfill materials.

PART 3 - EXECUTION

3.1 EXCAVATION

.1 For slabs and other paved surfaces, dig to the level of the infrastructure. Remove topsoil, organic materials, debris and other loose or harmful materials encountered at this level.

3.2 BACKFILLING

.1 Carry out backfilling work in compliance with the strictest specifications in Section 31 23 11 - Excavation and Backfilling - Underground Services and the following specifications:

.1 Each layer of backfill shall be compacted separately to the required density. Materials must be poured onto the backfill platform and pushed forward by bulldozers. It is forbidden to unload transportation vehicles along an embankment and to allow materials to roll down a slope,

.2 All embankment materials must be deposited and spread over the full width required by the embankment's theoretical slope, in even layers with a maximum 300 mm thickness after compaction. The diameter of the gravel shall not exceed 2/3 of the thickness of the layer, except in the case of the final 300 mm layer beneath the infrastructure line, where the stone's size must be less than 100 mm,

3.3 LEVELING WORK

.1 Carry out levelling work ensuring that water does not run towards the buildings, walls and paved surfaces, but that it is directed towards catch basins and other evacuation structures approved by the Canada Parks Representative. Level the ground, giving it a progressive slope between various points indicated on the drawings.

.2 Except where otherwise indicated, the ratio of embankment slopes shall not be less than 1 V : 3 H.

3.4 FILL OR SURPLUS MATERIALS

.1 Supply all fill materials other than approved and reusable surplus excavation material required for the execution of backfilling and levelling work, taking into account admissible tolerances, plus or minus, for general earthwork.

.2 Earthwork and levelling work include the loading, transportation and disposal of surplus materials off-site to a location complying with the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy, and are carried out at the Contractor's expense.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 31 32 19.16 – Soils stabilization with geotextile.

.2 Section 32 91 21 – Topsoil Placement and Grading.

.3 Section 32 92 23 – Sodding.

1.2 REFERENCES

.1 Use the last edition of the references hereafter:

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM C117, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422-632002, Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698, 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, 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, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.

.4 Canadian Standards Association (CSA International)

.1 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.1 CSA-A3001, Cementitious Materials for Use in Concrete.

.2 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.5 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 DEFINITIONS

.1 Excavation classes: two (2) classes of excavation will be recognized; common excavation and rock excavation.

.1 Rock: solid material in excess of 1.00 m^3 and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m^3 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 twenty-five (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 Recycled fill material: material, considered inert, obtained from alternate sources, and engineered to meet requirements of fill areas are not allowed in this project

.7 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 ASTM C136: Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.

.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.

.8 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 a **survey of existing conditions rapport** as described in *item 1.7 EXISTING CONDITIONS* of this Section.

.2 Submit for review by the Parks Canada Representative proposed dewatering heave prevention methods as described in PART 3 of this Section.

.3 Submit to the Parks Canada Representative written notice at least seven (7) days prior to excavation work, to ensure cross sections are taken.

.4 Submit to the Parks Canada Representative written notice when bottom of excavation is reached.

.5 Submit to the Parks Canada Representative testing inspection results report as described in PART 3 of this Section.

.3 Documents and Workshop Drawings

.1 Submit workshop drawings for excavation, cofferdam, trenching and backfilling work to the Parks Canada Representative for approval, signed by a qualified engineer, a member of the *Ordre des ingénieurs du Canada Quebec*.

.2 Prior to commencement of work, submit documentation with regards to the location of underground utilities.

.4 Procedure

.1 Submit to the Parks Canada Representative, for review, the procedure for storing excavation materials to be used for the backfill.

.2 Submit to the Parks Canada Representative, for review, the procedure for preparing, presenting and correcting the cut and typical profile of excavation.

.5 Technical Specifications

.1 Before commencing the work referred to in this section, submit a list of the main equipment and materials

.6 Samples:

.1 Inform the Parks Canada Representative at least two (2) weeks prior to beginning Work, of proposed source of fill unshrinkable fill materials and provide access for sampling.

.2 Ship samples prepaid to the Government Representative, in tightly closed containers to prevent contamination and exposure to elements.

1.5 QUALITY ASSURANCE

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

.2 Qualification Statement: submit proof of insurance coverage for professional liability prior to commencing work

Materials testing and compaction testing shall be carried out by a Laboratory designated by the Contractor. A registry of all the essays must be provided by the Contractor.

.3 No more than one (2) week prior to the commencement of backfilling or filling provide the designated testing organization with the descriptive records and grading of the proposed fill material for the work.

.4 Notify the Parks Canada Representative in writing not later than forty-eight (48) hours prior to commencing backfilling or filling with the approved materials so that the designated testing laboratory can perform the necessary compaction tests.

.5 Submit design and supporting data at least two (2) weeks prior to beginning Work.

.6 Design and supporting data submitted to bear stamp and signature of qualified Professional Engineer, member of the *Ordre des ingénieurs du Québec*.

.7 Retain the services of a recognized, competent engineer, member in good standing of the *Ordre des ingénieurs du Québec* (where the work will be performed) for the design and inspection of cofferdams, shoring works, bracing works, and underpinning works used during the performance of Work.

.8 The Contractor must perform tests on excavated soils and submit a written report to validate the possibility of using the excavated soils. Do not use the excavated soils before receiving the official acceptance written notice of the report by the Parks Canada Representative.

.9 Health and Safety Requirements:

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

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse recycling in accordance with Section 01 74 19 - *Waste Management and Disposal.*

1.7 EXISTING CONDITIONS

.1 Buried services:

.1 Before commencing work verify 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, notify the Parks Canada Representative, and clearly mark such locations to prevent disturbance to services during Work.

.6 Confirm locations of buried utilities by careful test excavations soil hydrovac methods.

.7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.

.8 Record location of maintained, re-routed and abandoned underground lines.

.9 Confirm locations of recent excavations adjacent to area of excavation.

.10 Take a photographic and natural ground level survey.

.2 Existing buildings and surface features:

.1 Conduct, with the Parks Canada Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey benchmarks monuments, various street furniture, street lamps (Concrete foundation, fixtures, and others) 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 undertake repairs as directed by the Departmental Representative at the Contractor's expense.

.3 If required for excavation work, cut roots or branches according to the section's 01 35 43 "*Environmental procedures*" and according to the Parks Canada Representative directions.

Part 2 Products

2.1 MATERIALS

.1 Type 1 and Type 2 fill: properties to Section 31 05 16 - Aggregate Materials and the following requirements:

.1 Crushed, pit run or screened stone, gravel or sand.

.2 Gradations to be within limits specified when tested to ASTM C136 ASTM C117. Sieve sizes to CAN/CGSB-8.1 CAN/CGSB-8.2.

.3 Table:

Sieve Designation	% Passing	
	Type 1	Type 2
75 mm	-	100
50 mm	-	-
37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-

9.5 mm	50-100	-
4.75 mm	30-70	22-85
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
0.075 mm	3-8	0-10

.2 Geotextiles: to Section 31 32 19.16 – *Soils stabilization with geotextile.*

Part 3 Execution

3.1 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement, sidewalk, slab and concrete walls neatly along limits of proposed excavation in order that the surface break evenly and cleanly.

.3 Temporary erosion and sedimentation protection

.1 Install geotextile sediment barriers in accordance with Section 01 35 43 - *Environmental Procedures* at locations proposing erosion risks, mostly at excavation works along the watercourse and at the perimeter of each soil piles.

3.2 PREPARATION/PROTECTION

.1 Protect existing features in accordance with Section 01 56 00 - *Temporary Barriers and Enclosures* and applicable local regulations.

.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 the Parks Canada Representative.

.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 STRIPPING OF TOPSOIL

.1 Begin topsoil stripping of areas as indicated by the plans and specifications after area has been cleared of brush, weeds, grasses, and removed from site.

.2 Stripping must be done in such a way as to avoid contaminating the topsoil usable for landscaping with underlying materials of different composition. Thus, the depth of clearing varies per the nature of the terrain.

.1 Do not mix topsoil with subsoil.

.3 The Contractor shall, at its own expense, recover and store all the topsoil required for its work and provide the necessary space for storage

.1 Stockpile height not to exceed two (2) m and should be protected from erosion.

.2 Supply a localisation plan of soil piles on the site.

.4 If organic soils cannot be used for landscaping, the Contractor shall dispose them.

3.4 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Section 01 35 29.06 - Health and Safety Requirements and the Health and the Canada Labour Code.

.1 Where conditions are unstable, the Contractor's engineer shall verify and advise methods.

.2 During backfill operation:

.1 Unless otherwise indicated or directed by the Parks Canada Representative, remove sheeting and shoring from excavations.

.2 Do not remove bracing until backfilling has reached respective levels of such bracing.

.3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.

.3 Upon completion of substructure construction:

.1 Remove cofferdams, shoring and bracing.

3.5 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Provide for the Parks Canada Representative's review, approval details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

.1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 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.

3.6 EXCAVATION

.1 Advise, by writing, the Parks Canada Representative at least seven (7) working days in advance of excavation operations for initial cross sections to be taken.

.2 Excavate to lines, grades, elevations and dimensions as indicated.

.3 Keep the excavated and stockpiled materials at a safe distance away from edge of trench as directed by the Parks Canada Representative and the approved soils piles localisation plan.

.4 Soil excavated during construction work will be managed in accordance with the requirements of the MELCC's Guide d'intervention - Protection des sols et réhabilitation des terrains contaminés. Water accumulating in the excavations will be pumped into leak-proof containers and analyzed before discharge into storm sewers, if it meets the applicable quality criteria as anticipated or, if not, it will be disposed of off-site in an authorized location.

.5 Do not obstruct flow of surface drainage or natural watercourses.

.6 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.7 Notify the Parks Canada Representative when bottom of excavation is reached.

.8 Obtain the Parks Canada Representative’s approval of completed excavation.

.9 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by the Parks Canada Representative.

.10 Correct unauthorized over-excavation as follows:

.1 Fill under other areas with granular backfill (Type 2) compacted to not less than 90 % of corrected Standard Proctor maximum dry density.

.2 If excavated bottom materials have been stirred, compact them to a density at least equal to that of the unmovable soil.

.11 Install geotextiles, immediately after excavation, in accordance with the Parks Canada Representative and Section 31 32 19.16 - SOILS STABILIZATION WITH GEOTEXTILE.

3.7 STOCKPILING

.1 The contractor has, at its own expense, to recover and stockpile all the backfill material needed for the works and get the locations for stockpile.

.1 Stockpile the granular material to prevent segregation.

.2 The contractor has to take the necessary measure to make sure the compactable excavation material, stockpiled, are protected from bad weather and can be used as backfill.

.3 The contractor has to expect a minimum of three (3) working days delay before receiving the additional excavated soil qualification results by the soil laboratory mandated by Parks Canada Agency's. All other tests are at the contractor charge.

.4 Take the appropriated control measure against erosion and sedimentation, in accordance to section 01 35 43 – *Environmental procedures,* to prevent the migration of sediment off the work site limits et towards water streams.

3.8 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D1557.

.1 Use Granular backfill (Type 2) as indicated on the plans, fill and compact to 90 %.

.2 Use recoverable material from cuttings as indicated in Plans and compact up to 90%.

.2 All groundfill materials shall be deposited and applied in uniform layers up to 300 mm thick after settlement. The diameter of the stone present in the embankments must not exceed the thickness of the layer; 300 mm. The diameter of the stones must not exceed the thickness of the layer. In addition, the diameter for the last 300 mm must be less than 150 mm. The Contractor must dispose of stones larger than above mentioned outside the building site. The payment for the disposal of the stones must be provided at the disposal post of the contaminated soils <A.

3.9 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:

.1 The Parks Canada Representative has inspected and approved installations.

.2 Inspection, testing, approval, and recording location of underground utilities.

.3 Removal of concrete formwork.

.4 Removal of shoring and bracing; 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 Do not use materials in the canal or on the banks with fine material (less than 5 mm) that may end up in the water with rainfall or when the dewatered area is put back into the water.

.5 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.6 Backfilling around installations:

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within seventy-two (72) hours after placing of concrete.

.3 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.1 Permit concrete to cure for minimum fourteen (14) calendar's days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from the Parks Canada Representative;

.2 If approved by the Parks Canada Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Parks Canada Representative.

.7 Install drainage filter system in backfill as indicated as directed by the Parks Canada Representative.

3.10 RESTORATION

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 19 - *Waste Management and Disposal,* trim slopes, and correct defects as directed by the Parks Canada Representative.

.2 The final leveling shall cover the alterations to be made to render the profiles in accordance with the theoretical longitudinal and transverse lines and all the work required for the cleaning and restoration of the premises.

.1 In accordance with sections 32 91 21 – *Topsoil placing and grading* and 32 92 23 – *Sodding.*

.2 Return pavements affected by work to condition and level prior to start of work, taking care to respect the original thickness of these structures.

.3 Clean and rehabilitate areas affected by work as instructed by Parks Canada Representative and in accordance with 01 74 11 – *Cleaning.*

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 All Sections of Division 01 – General Requirements.

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

1.2 REFERENCES

.1 Use the last edition of these references:

.2 ASTM International

- .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
- .3 ASTM D4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
- .4 ASTM D4716, Standard Test Method for Determining the (In-Plane) Flow Rate Per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
- .5 ASTM D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.3 Canadian General Standards Board (ONGB or CGSB)

- .1 CAN/CGSB-4.2 No. 11.2, Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
- .2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.
  - .1 No.2-, Methods of Testing Geosynthetics - Mass per Unit Area.
  - .2 No.3-, Methods of Testing Geosynthetics - Thickness of Geotextiles.
  - .3 No.6.1, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.
  - .4 No.7.3, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
  - .5 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

.4 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.5 Minister of Transports of Quebec (MTQ)

.1 Standard 13101 – « Géotextiles » of the Tome VII – « Matériaux », of the standards – « Ouvrages routiers »

.2 « Cahier des charges et devis généraux » of the MTQ – « Infrastructures routières, Construction et réparation » (edition 2019)

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 geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Test and Evaluation Reports:

.1 Submit copies of mill test data and certificate at least two (2) weeks prior to start of Work.

1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Storage and Handling Requirements:

.1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect geotextiles from direct sunlight and UV rays.

.3 Replace defective or damaged materials with new.

.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan Waste Reduction Work Plan in accordance with Section 01 74 19 – *Waste Management and Disposal.*

Part 2 Products

2.1 MATERIAL

.1 Geotextiles: fabrics of woven or nonwoven synthetic fibers, supplied in rolls. Geotextiles must be **Type IV** per Ministry of Transport of Quebec standard 13101. Physical and hydraulic properties of the standard 13101 must be met; the standard can be found in Volume VII of road works standards.

.2 Securing pins and washers: to CSA G40.21, Grade 300 W, hot-dipped galvanized with minimum zinc coating of 600 g/m^2 to ASTM A123/A123M.

.3 Factory seams: sewn in accordance with manufacturer's recommendations.

.4 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

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 geotextile material installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of the Parks Canada Representative.

.2 Inform the Parks Canada Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from the Parks Canada Representative.

3.2 PROTECTION

.1 Vehicular traffic not permitted directly on geotextile before finalizing the establishment of a minimum layer of 300 mm of granular material.

.2 Do not overload soil or aggregate covering on geotextile.

3.3 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 Join successive strips of geotextile with securing pins in the middle of the overlapping strip width.

.5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.

.6 After installation, cover with overlying layer within four (4) hours of placement.

.7 Replace damaged or deteriorated geotextile to approval of the Parks Canada Representative.

.8 Place and compact soil layers in accordance with Section 31 23 33.01 – *Excavating, Trenching and Backfilling*.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – *Cleaning*.

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

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

.3 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 19 – *Waste Management and Disposal*.

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

1. Section 31 23 11 – Excavation and Backfilling - Underground Services

2. Section 33 31 00 – Sanitary and Storm Sewers

1.2 EXTENT OF WORK

1. Supervise work and provide all labour, equipment, tools, materials, transportation and other services required to execute and complete all work described and specified in the present section and in the contract documents, including but not limited to: providing, laying and compacting aggregates necessary for the construction of one or more aggregate base courses and the supply and laying of one or more layers of asphalt concrete mixed in a central plant and laid over an aggregate surface, in all cases in compliance with the lines, thicknesses, levels and profiles indicated on the contract drawings or as specified by the Canada Parks Representative.

1.3 REFERENCES

1. Bureau de normalisation du Québec (B.N.Q. – Quebec standards office) (latest edition).

   .1 NQ 2501-255 : Sols - Détermination de la relation teneur en eau-masse volumique - Essai avec énergie de compactage modifiée (2 700 kN.m/m^3). [Soils – Determination of wet density – test with modified compacting energy]

2. Ministère des Transports du Québec (Quebec transportation department, hereafter MTQ) (latest edition)

   .1 Cahier des charges et devis généraux du Ministère des Transports du Québec, latest edition. [General specifications]

      .1 Section 13 - Revêtement de chaussée en enrobé. [Pavement with asphalt mixes]

   .2 Cahiers des Normes, Ouvrages Routiers, vol. I “Conception routière”, most recent edition. [Road construction standards – design]

   .3 Cahiers des Normes, Ouvrages Routiers, vol. VII “Matériaux”, most recent edition. [Road construction standards – materials]

      .1 Standard 2101 - Granulats. [Aggregates]

.2 Standard 2102 - Matériaux granulaires pour fondation, sous-fondation, couche de roulement granulaire et accotement. [Aggregates for base course, subbase, aggregate surface course and shoulder]

.3 Standard 4101 - Bitumes. [Asphalts]

.4 Standard 4105 - Émulsions de bitume. [Bituminous emulsions]

.5 Standard 4201 - Enrobés à chaud formulés selon le principe de la méthode Marshall. [Hot mix asphalts mixed using Marshall method principles]

.6 Standard 10201 - Peinture alkyde pour le marquage des routes. [Alkyd paint for road markings]

.7 Standard 13101 - Géotextiles. [Geotextiles]

.8 Standard 14601 - Microbilles de verre pour peinture servant au marquage des routes. [Glass micro-beads for road-marking paint]

1.4 WORK PERFORMED BY OTHER COMPANIES OR CONTRACTORS

1. Where applicable, the Contractor must coordinate its work with that of any other Contractor, company or public utility that needs to perform work of any nature whatsoever, before or during the period of work covered by the present contract.

1.5 INSPECTION AND TESTING

1. Analyses and tests of materials and compacting work are to be done by a testing Laboratory designated by the Canada Parks Representative.

2. The Canada Parks Agency shall pay said Laboratory's inspection and testing fees. If any tests must be repeated due to the discovery of non-conformities, the tests must be repeated at the Contractor's expense.

3. Granulometric analysis: fill materials are tested to determine if they are suitable for their intended use and compliant with specifications.

4. Wet density analysis: tests are performed on the compacted material in accordance with standard NQ 2501-255 Sols - Détermination de la relation teneur en eau-masse volumique - Essai avec énergie de compactage modifiée (2 700 kN.m/m^3). [Soils – Determination of wet density – test with modified compacting energy]

5. Compaction tests.

.1 The Canada Parks Representative reserves the right to have compaction tests performed in order to verify that specified compactness has been reached. The Contractor shall assist in the performance of such tests and may not claim compensation for work stoppages or other losses of time resulting from performance of such tests.

6. The frequency of tests is defined by the Canada Parks Representative.

7. The same Laboratory shall provide the Canada Parks Representative with progressive reports confirming that it has performed all tests ordered and that the test results are consistent with the plans and specifications. In addition, the Laboratory must provide the Canada Parks Representative with a final report confirming that all fill material is consistent with the plans and specifications and that no laying of concrete or pavement was authorized before delivery of the report.

8. If the Contractor uses a fill material other than that sampled for testing, all fill material must be removed and replaced at the Contractor's expense.

1.6 LABORATORY

1. At the Canada Parks Representative's request, a Laboratory will be present on-site to perform qualitative tests on materials and to monitor their placing.

.1 In situ density tests and other qualitative tests

.1 In the case of in situ density tests and other qualitative tests performed to verify the compaction of the infrastructure or of aggregate fills, the cost of the first test performed for acceptance of a layer of material in a given zone shall be covered by the Canada Parks Representative.

.2 However, if the results of such tests show the work not to be compliant with the standards listed in the specification, the Contractor must complete the repairs or take other necessary actions. Further in situ density tests shall then be at the Contractor's expense.

1.7 DOCUMENTS TO BE SUBMITTED

1. Asphalt must meet the specifications of ministry of transport of Quebec (MTQ) standard 4101. Asphalt shall be sampled at the production facility before work commences.

2. Submit test results and the certificate issued by the manufacturer attesting that the bituminous binder to be used meets the requirements of the present section.

3. Submit to the Canada Parks Representative for approval the proportioning formula for the asphalt concrete mix together with test results for the mix, at least two (2) weeks before the beginning of work.

1.8 DELIVERY TICKETS

1. Each load delivered to the site shall be accompanied by a delivery ticket in duplicate. The Canada Parks Representative's must sign one copy as a receipt for the Contractor and keep the other copy.

1.9 GEOTEXTILES

1. Geotextile work comprises the supply of all materials, labour and equipment required for the installation of geotextile membranes, and also includes any loss of material for overlapping during installation of the membrane; in other words, the Contractor is paid by the theoretical square metre of surface to be covered by the geotextile membrane.

PART 2 - PRODUCTS

2.1 GOTEXTILE MEMBRANE

1. Geotextile membranes installed in the infrastructure must be Type III and meet the requirements of ministry of transport of Quebec MTQ standard 13101.

2.2 AGGREGATES FOR SUBBASE AND BASE COURSE

1. Aggregates used for the subbase and base course must meet the requirements of MTQ (ministry of transport of quebec) standards 2101 and 2102 and those of Section 31 23 11 – Excavation and Backfilling - Underground Services.

2.3 LIQUID DUST-CONTROL AGENT

1. When vehicles must drive on an aggregate surface and weather conditions cause excessive dust to be raised, hindering traffic and harming the environment, the Canada Parks Representative may request that the surface be treated with a liquid dust-control agent consisting of a calcium chloride ($CaCl_2$) solution.

2. The agent is to be applied to a levelled, prepared surface.

3. The calcium chloride solution, which must be 35 % by weight, is applied under pressure in one or two applications at the rate of 1,0 L/m^2 unless otherwise indicated.

4. The aqueous calcium chloride solution must meet the requirements of standard NQ 2410-001 "Solution aqueuse de sels inorganiques utilisée comme abat-poussière" [Aqueous solution of inorganic salts used as dust-control agents].

5. The Contractor shall ensure that the specified application rate is respected. No application is to be made during rain or on an excessively damp surface.

6. If necessary, the Canada Parks Representative may verify the compliance of the product. Sampling of the material on site is done from the spreader tank according to standard ASTM-D260, and analysis of the aqueous solution is done using the Solvay 832-A method or by densimetry. The samples are used for determining the quality and concentration of $CaCl_2$ in the solution. Solutions must be applied using a spreader with spray bar fitted with accessories appropriate to the work such as a tachometer, pump, pressure gauge and spray bar with jets and sprinklers.

7. Application of liquid calcium chloride includes purchase, transportation, application and all other incidental expenses.

PART 3 - EXECUTION

3.1 GENERAL

1. The construction of bases and pavement shall be done after spring thaw, once the site is completely free of snow-melt runoff water. The preparation and laying of asphalt mixes must be done in favourable weather and at an ambient temperature suitable for producing a smooth surface meeting the requirements of the present specification. It is not permitted to operate when moisture in aggregates affects the temperature of the mix or the pace of operations, or when the base is soaked or covered with puddles or mud. The temperature of the surface to be paved must be at least 5 °C with an upward trend. When the surface temperature drops below 7 °C, no surface course may be laid without the Canada Parks Representative's written permission. At all times, the mix must be compacted until it reaches the specified density. No surface mix is to be laid after October 15 without the Canada Parks Representative's permission.

2. At all times, the Contractor must take the necessary steps to reduce to a minimum dust emissions caused by the work.

3. The asphalt mix is composed of coarse and fine aggregates or fine aggregates alone, evenly coated with asphalt binder in a mixing plant and at a temperature favourable for mixing and laying.

3.2 ALIGNMENTS AND LEVELS

1. All work must be done in conformity with the alignments and levels indicated in the plans and details.

2. Except as otherwise indicated on the plans, final resurfacing elevations must be the same as the elevations for connection to existing pavement.

3. If obstructions or other circumstances not foreseen on the plans disrupt the work to the point that changes are required, the Canada Parks Representative may require that work be modified or moved.

3.3 PAVEMENT REPAIR

1. When existing pavement is excavated, the Contractor fills the upper portion of excavations and repairs the joint with existing asphalt mix in the following manner:

   .1 Make a saw cut and excavate, lay the conduit and asphalt;

   .2 Fill with class "A" aggregate, compacted to 90 % of the modified Proctor value, in layers no thicker than 600 mm, to one (1) metre below the level of the surface course. From that level to the underside of the pavement, required compactness for crushed stone shall be 95 % (modified Proctor); the final layer of fill using MG-20b under the infrastructure line shall be compacted to 95 % of the modified Proctor value to a thickness of 150 mm.

   .3 Make a new saw cut in the pavement, 1 metre (min.) from each side of the original saw cut, and excavate at 45° to one (1) metre below pavement level;

   .4 Fill with stone for the base according to specifications in a thin layer of 150 mm to the underside of the pavement and compact to a minimum of 95 % of the modified Proctor value;

   .5 Coat the sides of the pavement with a tack coat before paving.

2. Original markings must be repainted, included in the cost of paving. After repairing the cut, seams are hot milled using the thermal regeneration method in order to melt the seams.

3.4 REPAIR OF SURFACE TO BE COVERED

1. On an aggregate base

   .1 When the scarification and removal of part of the base course are necessary due to contamination of same owing to a delay, outside the Contractor's responsibility, between constructions of the base and covering with asphalt concrete, the Contractor shall advise the Canada Parks Representative before undertaking such operations.

   .2 After authorization by the Canada Parks Representative, the Contractor shall proceed to the cleaning, scarification and removal of a portion of the base course, and spread additional crushed rock in order to correct the profile of the base course.

   .3 The surface to be covered must have a slope and direction consistent with the plans, longitudinal profiles and cross sections as included in the contract, must not deviate by

more than 5 mm from the theoretical profile. It must be dry, compacted as per requirements and free of foreign or loose materials.

.4 All manholes, valve rooms, valve boxes, and similar infrastructure are adjusted and levelled to 10 mm below the final level of the surface course, while catch basins are installed 25 mm lower than the final surface course level. The cost of such work is included in surface preparation work.

3.5 SUBBASE

1. Generalities

.1 The subgrade surface must be prepared in accordance with the requirements of the articles titled "Compacting of materials" and "Subgrade preparation." The thickness of the sub foundation is determined by the tender documents. Aggregates are spread in layers of uniform thickness not to exceed 300 mm. The spreading method used must prevent all segregation of aggregates.

.2 Compacting is then done using the method described under "Compacting of materials." The required degree of compactness is 95 % of maximum dry density as determined by the modified Proctor test.

.3 Before laying the subbase, the sub foundation surface must be free or ruts or other depressions and must not deviate by more than 10 mm from the levels and longitudinal and cross sections shown on the plans.

2. Construction method

.1 Subbases are then constructed in successive layers. Specified aggregates are spread across the entire width of the subgrade or sub foundation at a uniform thickness, without segregation, in compliance with the cross section of the planned pavement. The surface is then levelled and, if necessary, moistened or dried in order to obtain the desired compactness.

.2 Each layer must be compacted separately in compliance with the requirements of the section on "Compacting of materials." The required degree of compactness is 95 % of maximum dry density as determined by the modified Proctor test. Areas that are difficult to access must be compacted manually using appropriate tampers, special compactors or vibrating plates.

.3 The Contractor shall also include the costs of the following procedure: laying of the subbase and base course, adjustment above public utilities to 100 mm ± 25 mm below the level of the surface course, including the supply of adjustment rings and cleaning of manholes, valve chambers and catch basins (even if said structures were dirty at the start of work).

3. Shaping

.1 Final shaping of the street must follow a slope and alignment compliant with the plans.

4. Unstable or contaminated areas

.1 If weak points slump under the compactor or subgrade soil or mud mix with the subbase, such unstable or contaminated materials must be removed and those portions of the subbase shall be rebuilt after strengthening of the subgrade.

5. Subbase cleaning

.1 If paving is done long after the subbase is constructed, the subbase is to be decontaminated. Such work includes the removal and transportation of materials deemed by the Canada Parks Representative to be contaminated, and the shaping and compaction of the subbase.

6. Placing

.1 Place geotextile membranes after the subgrade has been inspected and approved by the Canada Parks Representative.

.2 Place subbase materials after the subgrade has been inspected and approved by the Canada Parks Representative.

.3 Acceptance of material and density tests are described in Section 31 23 11 - Excavation and filling - Underground Services.

.4 At the joint between new and existing pavement structures, a transition must be made in the various foundation layers with a slope having a ratio of 1 V : 1 H.

3.6 WASTE MATERIAL

1. Waste material shall be disposed of in compliance with Section 31 23 11 - Excavation and Backfilling - Underground Services.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 32 92 23 –Sodding

1.2 SCOPE OF WORK

.1 Ensure supervision of the work and supply all manpower, equipment, tools, materials, transportation and other services required to carry out and complete the work described and specified in this section and contract documents, including but not limited to: the excavation and backfilling of specified areas and the application of topsoil in preparation for sodding work.

1.3 REFERENCES

.1 Bureau de normalisation du Québec (B.N.Q.) latest edition.

.1 NQ 0605-100 (latest edition) : Landscaping using vegetation.

1.4 ELEMENTS TO BE SUBMITTED

.1 Advise the Canada Parks Representative of the proposed source of topsoil and provide access allowing said representative to conduct the analysis of materials. The acceptance of the topsoil will depend on the results of soil analyses and the inspection, Work shall not start until the topsoil has been approved by the Canada Parks Representative.

.2 Topsoil tests and analyses shall be carried out by a laboratory with the Canada Parks Representative assuming the cost of these.

.3 Analyze the topsoil prior to stripping and stockpiling to determine its contents of clay, sand, mud, phosphorous, potassium (NPK), magnesium (Mg), soluble salts, growth inhibitors, and soil sterilizers as well as its pH.

.4 Provide the Canada Parks Representative with a copy of the soil analysis report as well as recommended soil improvements.

1.5 WORK SCHEDULE

.1 Topsoil shall be spread and finish earthwork carried out at the appropriate time for undertaking sodding work under the best possible conditions, within ten (10) days following the end of the initial spreading work.

1.6 TOPSOIL AND FINISH EARTHWORK

.1 Topsoil and finish earthwork consist in, but are not limited to, supplying the materials and manpower required to carry out the spreading of topsoil and finish earthwork, according to good engineering practices, including:

.1 The supply and application of topsoil to a minimum thickness of 150 mm,

.2 Topsoil mixes including granulometry and specified amendments,

.3 Finish earthwork,

.4 Finish levelling according to specified tolerances,

.5 The cleaning and off-site disposal of non-reusable materials at a location complying with the directives of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy.

PART 2 - PRODUCTS

2.1 SOIL IMPROVEMENT MATERIALS

.1 Fertilizer: commercial, synthetic, granular with a fast-acting source of phosphorous, containing no more than 35 % soluble nitrogen.

.2 Composition for sodding : 10-25-10 fertilizer.

.3 Compost : commercial AA or B-type screened commercial mix whose components have fully decomposed.

.4 Ground agricultural lime with a carbonate content of at least 85 %.

.5 Granulometric requirements: passing percentage by weight: 90 % passing through a sieve with openings of 1 mm; 50 % passing through a sieve with openings of 125 µm.

.6 Using the quantity of lime needed, as determined by the soil analysis, to obtain the required degree of acidity (pH).

.7 Bone meal: raw or steamed bone meal, finely ground, containing at least 3 % nitrogen and 20 % phosphoric acid.

.8 Coarse sand: hard, granular sand, complying with the CSA A62-56-M1976 standard, well cleaned and free of any impurities, chemical product or organic matter.

2.2 MIX OF SCREENED TOPSOIL

.1 Mix for areas to be sodded and seeded:

.1 Two parts loam,

.2 One part black soil,

.3 One part coarse sand,

.4 3 % to 7 % organic matter.

2.3 CHARACTERISTICS OF MIXES

.1 The cation exchange capacity (C.E.C.) must be between 10 and 20.

.2 The chemical verification of the soil shall be carried out using the “Walkey Black” oxidation method.

.3 The acidity level (pH) must be 6.5.

.4 Include the following chemical element in the proportions shown:

Chemical elements	**Proportion**
Phosphorus (P)	100 ppm
Potassium (K)	125 ppm
Magnesium (Mg)	200 ppm
Calcium (Ca)	2 000 ppm

.5 Fall within the following grading range:

Screen	**Passing %**
10 mm	100
5 mm	98 to 100
1,25 mm	90 to 97

630 µm	65 to 90
315 µm	25 to 65
160 µm	15 to 25
80 µm	5 to 15

.6 Water retention capacity: maximum 20 %.

PART 3 - EXECUTION

3.1 PREPARATION OF EXISTING AREA

.1 Level the ground, filling dips and creating a slope favoring the flow of water. Remove soil that has been contaminated by toxic materials, remove debris as instructed by the Canada Parks Representative.

.2 Loosen to a depth of 100 mm the entire area covered by the foundation layer to be covered in topsoil, Repeat the operation wherever the transportation material and spreading of the soil have compacted said foundation layer.

.3 Clear the surface of debris, roots, vegetation branches and stones more than 50 mm in diameter.

3.2 SPREADING OF THE TOPSOIL

.1 Have the Canada Parks Representative inspect and approve the condition of the foundation layer before starting to spread the topsoil.

.2 Where planting and seeding work is to be carried out (as specified by the Canada Parks Representative and the plans), spread the topsoil on the approved and non-frozen foundation layer in even layers containing an adequate amount of water.

.3 Spread the topsoil according to instructions, to a thickness of at least 150 mm on the areas to be sodded.

.4 Where slabs of sod are to be laid, spread the topsail leaving a thickness of 15 mm for the surface layer.

.5 Manually spread topsoil around places where it is hard to use motorized equipment

.6 Take into account 25 % settling of soil volume when placing the soil, to comply with projected levels.

3.3 SOIL IMPROVEMENT MATERIALS

.1 Incorporate soil improvement materials in prescribed quantities based on the results of soil sample analyses.

.2 Ensure the penetration of the compost and soil improvement materials into the full thickness of the topsoil layer before incorporating the fertilizer.

3.4 SPREADING OF THE FERTILIZER

.1 Spread the fertilizer at least one week after the application of lime.

.2 Spread the fertilizer evenly over the entire surface of the topsoil, in quantities based on results of sample analyses.

.3 Ensure the penetration of the fertilizer into the entire topsoil layer.

3.5 FINISH EARTHWORK

.1 Level and move the soil so as to eliminate any irregularities and dips, ensuring the flow of surface water. Apply a layer of loosened loam, breaking it up and raking it.

.2 Use a 50 kg roller measuring at least 900 mm wide to firm up the layer of topsoil over which the sod is to be laid, making it smoother, more even, with a fine, loose texture, to the satisfaction of the Canada Parks Representative.

3.6 RESTORATION OF STOCKPILING AREAS

.1 Restore the condition of the stockpiling areas used for the work, to the satisfaction of the Canada Parks Representative.

3.7 SURPLUS MATERIALS

.1 Excavation surplus refused by the Canada Parks Representative for the project's backfilling purposes (except for contaminated materials, demotion materials and special waste) must be disposed off-site.

.2 All of the aforementioned disposal work must be carried out in compliance with the MELCC's Directives and/or Regulations which, in the event of discrepancy with the above, will prevail over the preceding requirements.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 32 91 21 –Topsoil and Finish Earthwork

1.2 SCOPE OF WORK

.1 The Contractor shall assume, in compliance with plans and other documents, the supervision of work, and supply all manpower, equipment, tools, materials, transportation and other services required to carry out and complete the work described and specified in this section and contract documents, including but not limited to: covering the specified surfaces with a permanent lawn.

1.3 REFERENCES

.1 Bureau de normalisation du Québec (B.N.Q) latest edition.

.1 NQ 0605-100 : Aménagement paysager à l'aide de végétaux [Landscaping using vegetation].

.2 NQ 0605-300 : Produits de pépinières et de gazon [Nursery and lawn products].

.3 NQ 0640-0640-050 : Gazon en plaques - Classification et caractéristiques [Grass sod - Classification and characteristics].

1.4 ELEMENTS TO BE SUBMITTED

.1 Cultivated sod must be approved at the supply source by the Canada Parks Representative.

.2 Once the sod source has been approved, no other source shall be used without written authorization.

.3 Submit a sample of each type of grass sod.

.4 Samples must be approved by the Canada Parks Representative before work is undertaken.

1.5 CALENDAR

.1 The installation of grass sod must coincide with the spreading of topsoil.

1.6 SODDING A LAWN

.1 Work related to sodding consists in, but is not limited to, supplying the materials and manpower required for installing a lawn on the specified areas, in compliance with good engineering practices, including:

.1 Supplying the manpower, equipment and materials for the excavation and repair of surfaces,

.2 Supplying and applying topsoil,

.3 Supplying and spreading fertilizer,

.4 Supplying and installing sod slabs or rolls,

.5 Controlling weeds,

.6 Anchoring using stakes,

.7 Ensuring maintenance during the installation and warranty period,

.8 Disposing of non-reusable materials on a site complying with the directions of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 No. 1 cultivated sod: the quantity of sod and the source of supply must comply with standards described in section 17 of the "Guide Specifications for Nursery Stock", latest edition, published by the Canadian Nursery Landscape Association.

.1 No. 1 Kentucky bluegrass: cultivated sod grown from a mix of at least 3 varieties. The sod will be delivered in slabs or large rolls, depending on contract specifications.

.2 Broken, dried, or yellowed slabs will be refused by the Canada Parks Representative.

.3 Quality of cultivated sod:

.1 Grass containing no more than 2 dicotyledon seeds (broadleaf weeds) or 10 other seeds per 40 m^2 area,

.2 Grass whose density is such that no soil remains visible from a height of 1 500 mm, after mowing to a height of 40 mm,

.3 Maximum mowed height: 35 mm to 65 mm,

.4 Thickness of the sod slabs' soil: 6 mm to 15 mm,

.5 Characteristics of the sod slabs' soil: sandy. Any other type of supporting soil will be refused.

.2 Seeding of indigenous meadow (20.00% flowers and 80.00% grass)

.1 100% Indigenous mixture including 9 flowers and 1 grass of meadow.

.2 Height at maturity: 45 cm

.3 Average height: 30 to 45 cm

.4 Add annual Ray-grass as a shelter plant to help reduce the appearance of weeds.

.3 Water: potable.

.4 Fertilizer: 1-2, 5-1 granular fertilizer.

.5 Herbicide: the type, rate and application method are subject to the approval of the Canada Parks Representative.

.6 No pesticides should be used near water (within 3 meters of the high-water mark). If pesticides are required elsewhere on the work site, the pesticide treatment plan must be submitted for approval by Parks Canada Representative.

PART 3 - EXECUTION

3.1 PREPARATION WORK

.1 Ensure that the soil's relief is adequate and that areas to be sodded are prepared as prescribed in Section 32 91 21 - Topsoil and Finish Earthwork. Notify the Canada Parks Representative of any discrepancy with the drawings and wait for instructions from the Canada Parks Representative before starting the work.

.2 Carry out levelling for the finish earthwork to create a gentle, even slope, free of dips and mounds, within 10 mm, in keeping with the required contours and levels, to favor natural surface drainage.

.3 Before undertaking the installation of the sod, have the level and thickness of the topsoil approved by the Canada Parks Representative.

3.2 INSTALLATION OF THE SOD

.1 Sod slabs must be installed within 36 hours of the time they have been harvested.

.2 The sod must have a minimum thickness of 40 mm and be moist enough to withstand transportation. It must be loaded and unloaded by hand and installed without delay. A chemical fertilizer is used.

.3 It is forbidden to install slabs of sod when the ground is excessively wet, when temperatures are below the freezing point, or on frozen soil. Slabs of sod must be dense, green, of even composition, and virtually weed-free. Slabs must be of a uniform thickness and the part of the slab consisting of soil must not be thicker than 15 mm. Grass that allows the soil to be visible when it is mowed to a height of 40 mm will not be accepted.

.4 The Contractor shall spread evenly, over the entire area to be sodded, a fertilizer applied according to the Manufacturer's instructions, mixing it well with the layer of topsoil.

.5 Install the slabs of sod in parallel lines perpendicular to the slope, flush with adjacent surfaces and with staggered joints. Move the slabs as close together as possible without overlapping. Using a sharp knife, cut out asymmetrical or overly thin slabs. In embankments, position slabs starting at the bottom of the embankment, and secure them using small stakes. Use a sufficient number of anchoring stakes on slopes whose ratio is below 1 V : 3 H.

.6 If required, place the stakes as follows:

.1 At 200 mm centre-to-centre, 100 mm from the top edge of the first slabs covering the slope.

.2 Use at least 3 to 6 stakes per square meter.

.3 Use at least 6 to 9 stakes per square meter, in surface water; modify the placement of the stakes as directed by the Canada Parks Representative.

.4 Plant the stakes so that they protrude from the surface of the soil by 20 mm.

.5 Using a light roller, press the slabs of sod into the soil to ensure good soil to sod contact. It is forbidden to use a heavy roller to correct surface irregularities.

.7 In the water stream, slabs are laid transversely to the direction of the flow, with joints made outside the water.

.8 The sod is rolled using a lawn roller weighing no more than 30 kg and must be watered well until the provisional acceptance of the work by the Canada Parks Representative.

.9 Once the sod has been laid, it must be watered sufficiently to allow the moisture to seep into the sod and soil to a depth of 150 mm.

3.3 PLANTING

.1 For bare-rooted plants, place a 50 mm layer of fill at the bottom of the hole.

.2 For plants with tontine clod, remove the upper third (1/3) of the burlap, paying attention not to damage the clod.

.1 Do not remove the canvas or the rope which is under the root ball.

.3 For plants in containers or whose root ball is wrapped with a non-degradable material, completely remove the container or envelope without damaging the root ball.

.4 Plant plants vertically where indicated.

.1 Orient them so that they produce the best possible effect, taking into consideration neighboring works such as buildings, roads and sidewalks.

.5 For vegetal ground cover, also backfill to the final level and pack the soil to eliminate air pockets.

.6 Water plants well.

.7 After soil compaction, backfill to final level.

3.4 PROTECTION OF SODDED AREAS

.1 Protect sodded areas using fencing if necessary.

3.5 MAINTENANCE DURING THE ROOTING PERIOD

.1 Maintain sodded areas from the start of the work until its provisional acceptance.

.2 Water the grass as much and as often as needed to ensure that the layer of soil directly below the grass is always moist to a depth of 75 mm to 100 mm.

.3 Mow the grass, the first time, to a height of 40 mm when it has reached a height of 60 mm. Remove grass clippings likely to choke the grass. Mow the grass until provisional acceptance, maintaining a mowed height of 40 cm to 60 cm.

.4 Maintain sodded areas, keeping them 100 % weed-free. Comply with prevailing municipal by-laws on the use of pesticides. If necessary, use a mechanical process.

.5 Spread a nitrogen-rich natural fertilizer once sodding work has been completed. Spread the fertilizer evenly over the sodded area at a rate of 0,5 kg per 100 m^2 and water well to foster penetration. Re-apply approximately one month after completion of the work.

.6 Postpone fertilization to the following spring if the work must be carried out within four weeks of the end of the growth season.

3.6 ACCEPTANCE OF WORK

.1 Sodded areas will be accepted at the time of inspection, provided that:

.1 The grass is growing well and the sod has taken root.

.2 The grass is free of weeds and bare areas.

.3 The soil is not visible from a height of 1 500 mm when the grass has been mowed to a height of 40 mm.

.4 The grass has been mowed at least twice.

.2 Areas sodded in the fall will be approved the following spring, one month after the start of the growing season, provided conditions for acceptance have been met.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 23 11 – Excavation and Backfilling - Underground Services

.2 Section 32 11 00 – Roadwork

.3 Section 33 31 00 – Sanitary and Storm Sewers

1.2 SCOPE OF WORK

.1 Ensure the supervision of the work and provide all manpower, equipment, tools, materials, transportation and other services required to carry out and complete all work described and specified in this section and Contract documents, including but not limited to: the dismantlement of sections of the waterworks system, the supply and installation of water mains including valves and valve boxes, etc. and all accessories required, as well as the execution of tests and the commissioning of the system.

.2 Water supply pipes including pipes of normal or short length, special parts, connectors, and all other accessories needed for the system's complete installation.

.3 The Contractor shall visit the work site in order to take stock of conditions imposed by the location: services, labour, accessibility, constraints, etc, in order to evaluate the work.

.4 The bidder shall never be able to maintain, after tabling his bid or during the course of the contract's execution, that he had not been informed of conditions imposed by the site. The Canada Parks Representative shall at no time and in no way be held responsible or blamed for losses or damages occurring during the site visit.

.5 The Contractor shall coordinate the pipe route, check the location of existing pipes, whether or not they appear on the plans (public utilities, municipal and private networks), and conduct the necessary digs.

.6 The Contract shall provide shop drawings of all equipment.

.7 Restoration of sites to their original condition: as the case may be, sodding, concrete curbs/sidewalks, pavement.

1.3 REFERENCES

.1 NFPA 1 - Uniform Fire Code.

.2 NFPA 14 - Standard for the Installation of Stand Pipe and Hose Systems.

.3 NFPA 24 - Standard for the Installation of Private Fire Service Mains and their Appurtenances.

.4 National Fire Code of Canada.

.5 National Plumbing Code of Canada, latest edition.

.6 Municipal standards in effect.

.7 Bureau de normalisation du Québec (B.N.Q. – Quebec Standards Bureau) latest edition.

.1 BNQ 1809-300: Construction Work — General Technical Clauses — Drinking water and sewer pipes.

.2 NQ 3624-250: Non-plastified polyvinyl chloride (PVC-U) pipes and connectors — Rigid pipes for the conveyance and distribution of water under pressure — Characteristics and test methods.

1.4 SHOP DRAWINGS

.1 Shop drawings of equipment and/or materials shall be provided to the Canada Parks Representative prior to the start of work.

.2 Required shop drawings include, but are not necessarily limited to the following:

.1 Pipes and accessories,

.2 Valves,

.3 Valve boxes,

.4 Joints and retention collars,

.5 Anodes,

.6 Valve and meter chambers,

.7 Service connection accessories

.3 Work related to the drawings shall not begin until the drawings have been reviewed by the Canada Parks Representative.

.4 The Contractor shall present an exhaustive list of materials to be used, including the names of manufacturers and suppliers.

.5 Within the framework of the Contract, all materials shall be uniform and come from the same manufacturer.

1.5 CERTIFICATION OF MATERIALS

.1 At least two weeks prior to the start of work, present the results of tests conducted by the manufacturer and the certificate attesting that the pipes and accessories comply with the requirements of this section.

.2 Ensure that pipes bear the certification stamp.

1.6 TRANSPORTATION, STORAGE AND HANDLING

.1 Deliver, store and handle materials in compliance with the manufacturer's instructions.

.2 The Contractor shall take the following precautions when handling pipes:

.1 Pipes shall be handled so as not to touch sharp objects.

.2 Avoid impact when lifting.

.3 Storage surfaces shall be flat and clean.

.4 Pipes shall not be dropped or allowed to knock against another pipe.

.5 Packing shall be protected from excessive exposure to heat, direct sunlight, oil and grease.

.3 All materials found to be damaged or in poor condition, shall be rejected and replaced at the Contractor's expense.

1.7 WORK BY OTHER COMPANIES OR CONTRACTORS

.1 If need be, the Contractor shall be required to coordinate his work with that of the Municipality or any other contractor, company or public utility, which may need to carry out work of any nature whatsoever, before or during the execution of the work covered by this contract.

1.8 ALIGNMENT AND LEVELS

.1 Pipes shall be laid in compliance with the alignment shown on the plans, to a minimum cover depth of 1,8 m (6 ft.). Accessories such as valves, stop valves and fire hydrants shall be located where required. Socket joints shall be well centred and valves shall be vertical.

.2 In the event that obstructions not covered by the drawings interfere with work to the point of requiring changes to the plans, the Canada Parks Representative can require that work be modified or displaced accordingly, or he can make the necessary arrangements with the owners of said obstructions for their demolition, displacement or reconstruction However, vertical deviations shall be carried out where an underground pipe if located at the same level as the projected pipe.

1.9 WORK ON THE EXISTING WATERWORKS SYSTEM

.1 The Municipality alone is authorized to operate existing valves. When part of the waterworks system is closed, burlap covers or other clear indicators are installed over the fire hydrants, which are out of commission, to prevent fire departments from connecting their equipment to them in an emergency. The burlap shall cover at least 600 mm of the top part of the hydrants and shall be firmly secured. The fire department shall be notified prior to the work.

1.10 FIRE PROTECTION AND WATER MAIN PUT OUT OF COMMISSION

.1 Work to put sections of the fire protection pipe and water main out of commission consists in, but is not limited to, the supply of materials and manpower required for the removal, or condemnation according to good engineering practices, of sections indicated in the plans and specifications, including:

.1 Saw cuts,

.2 Removal of the pavement and infrastructure,

.3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.4 The dewatering of excavations,

.5 The removal of pipes, valves, fire hydrants, accessories, thrust blocks, retention systems,

.6 The supply and installation of lean concrete,

.7 The supply and placement of approved backfill material, up to the infrastructure,

.8 Restoration of sub-bases and pavement,

.9 Protection and repair of public utilities,

.10 All other work required for the full use of these structures.

1.11 NEW WATER AND FIRE PROTECTION MAINS

.1 Work related to new water and fire protection mains consists in, but is not limited to, the supply of materials and manpower required for the installation, according to good engineering practices, of new water pipes, including:

.1 Saw cuts,

.2 Removal of the pavement and infrastructure,

.3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.4 The dewatering of excavations,

.5 The supply and installation of accessories such as plugs, tees, crosses, elbows, reducers, couplings, etc,

.6 Cathodic protection,

.7 The contact wire,

.8 Thrust blocks,

.9 Retention systems,

.10 The supply and installation of the base course, surround and backfilling with approved material up to the infrastructure,

.11 Cleaning, watertightness tests, flushing, disinfection, and conductivity tests,

.12 Protection and repair of public utilities,

.13 All other work required for the full use of these structures.

1.12 VALVES AND VALVE BOXES

.1 Work related to valves and valve boxes consists in, but is not limited to, the supply of materials and manpower required to carry out, according to good engineering practices, the installation of new valves and valve boxes including:

.1 Saw cuts,

.2 Removal of the pavement and infrastructure,

.3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.4 The dewatering of excavations,

.5 Accessories,

.6 Cathodic protection,

.7 Thrust blocks,

.8 Retention systems,

.9 The supply and installation of the base course, surround and approved backfill up to the infrastructure,

.10 Protection and repair of public utilities,

.11 All other work required for the full use of these structures.

1.13 CONNECTION TO EXISTING SYSTEMS

.1 Work consists in, but is not limited to the connection, according to good engineering practices, of new systems to existing ones, including:

.1 Saw cuts,

.2 Removal of the pavement and infrastructure,

.3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.4 The dewatering of excavations;

.5 The clearing of existing structures,

.6 Connection in compliance with the BNQ 1809-300 standard,

.7 Cathodic protection,

.8 Accessories,

.9 The supply and installation of the base course, surround and approved backfill up to the infrastructure.

PART 2 - PRODUCTS

2.1 GENERALITIES

.1 All pipes, connections, flanges, valves, fire hydrants and all accessories used in fire protection shall be ULC, UL and F.M. listed and certified. All equivalents shall comply with requirements of AWWA standards for drinking water.

.2 Parts shall be from a single manufacturer of fire protection equipment certified to ULC, UL and F.M. standards, bearing the manufacturer's name and trademark on the equipment along with the "Factory Mutual" designation plate bearing the serial number and nominal pressure. Unless otherwise prescribed or indicated, the equipment shall be designed to withstand hydraulic service pressure of 1.2 MPa (175 psi).

2.2 VALVES

.1 Resilient seat valves

.1 Gate valves shall have a resilient seat and mechanical joints. The cast-iron seat shall be entirely covered in rubber permanently bound to the seat. The body shall be produced from cast iron covered inside and out by an epoxy-based product complying with the AWWA C550 standard. The stem shall be fixed and made of bronze. The stem nut shall be 50 mm^2.

.2 Valves shall comply with AWWA standard C-509 and other more recent applicable AWWA standards. They shall have at least two O-ring joints at the packing box level to ensure watertightness. They shall have an epoxy coating inside and out, in compliance with the AWWA C-550 standard. They shall have a sliding gate with a 100 % urethane coating.

.3 Valve gates shall be capable of withstanding an operating pressure of 850 kPa. All bolts shall be of stainless steel, grade 304.

2.3 VALVE BOX

.1 Unless otherwise indicated, 150 mm valve boxes shall be of grey cast-iron, Grade 30, complying with the ASTMA48 standard, sliding model whose base shall adapt flawless to the valve. The length of the top part shall be fixed while that of the lower part shall vary depending on the conditions of the site, and shall rest on a guide plate. The box shall be maintained at the centre of the valve by a cast-iron disk designed for this purpose. An adjustable ductile-iron head shall be fitted onto the box's two sliding parts.

2.4 SERVICE CONNECTIONS

.1 The connection pipe is K-type copper.

.2 Connection

.1 The connection shall use a stainless steel or bronze connection collar (saddle) (bolts shall be of stainless steel); the support surface shall surround the entire pipe and shall be at least 50 mm wide, measured lengthwise on the pipe. The choice and installation of collars shall comply with the recommendations of the saddle manufacturer. Piercing of the pipe shall use a drill designed especially for this purpose, in good condition, according to the pipe manufacturer's recommendations.

2.5 ACCESSORIES AND FITTINGS

.1 All pipe sleeves, fittings or flanges and other accessories required within the framework of this project shall comply with the specifications of the National Board of Fire Underwriters and Factory Mutual and shall be capable of withstanding service pressure of 1,2 MPa (175 psi).

2.6 BEDDING AND SURROUND MATERIALS

.1 Base course and cover materials shall comply with the requirements of Section 31 23 11 - Excavation and Backfilling - Underground Services.

2.7 FILL MATERIALS

.1 Fill materials shall comply with Section 31 23 11 - Excavation and Backfilling - Underground Services.

2.8 CATHODIC PROTECTION

.1 Plan to install high potential magnesium anodes for all service entrances, valves and fire hydrants.

.2 For the selection of anodes, the following table presents the size and number of anodes required based on the cast iron or steel accessories to be protected.

CAST-IRON ACCESSORIES	TYPE OF ANODE	WEIGHT/MODEL
Elbows, tees, crosses, etc.	High potential magnesium	1 X 32 lbs./AS32
Service entrances (2 in. max.)	High potential magnesium	1 X 32 lbs./AS32

.3 Magnesium anodes used shall be of the high potential type and shall comply with the most recent version of ASTM G97 and ASTM B843 grade M1C standards.

2.9 EXPANDED POLYSTYRENE INSULATION

.1 Extruded expanded polystyrene insulation shall comply with the requirements of the CAN/ULC S701-97 type 4 standard (formerly the CAN/CGSB 51.20 – M87standard), and shall have a minimum compressive strength of 415 kPa (60 psi).

.2 Extruded expanded polystyrene insulation shall be supplied in panels measuring 600 mm x 2 400 mm.

2.10 BUOYANCY PROTECTION

.1 Wherever there are angles, changes in direction, intersections with a tee, the ends of the pipelines (plugs), pipes and fire hydrants shall be protected from pressure by a concrete buttress poured on site or prefabricated thrust blocks (of dimensions approved by the Canada Parks Representative), positioned between the pipe and the reworked soil. The use of rubble stone is prohibited. The Canada Parks Representative shall designate each location where buttresses are required. See this section's article on "Buttresses and Retention Devices (thrust blocks)".

PART 3 - EXECUTION

3.1 PREPARATION WORK

.1 Before proceeding with placement, remove water or debris, which may have accumulated inside the pipes, connections, valves, fire hydrants and accessories. Check the material carefully for defects and have it approved by the Canada Parks Representative. Defective material shall be removed from the site, according to the Canada Parks Representative's instructions.

.2 The Contractor shall turn off existing valves in order to isolate sectors where work is to be carried out, empty water from the pipes to be decommissioned and pump out this water before proceeding with the work.

3.2 VERIFICATION OF THE SITE

.1 After marking the location of underground installations and before cutting or removing pavement or conducting excavation work for the installation of pipes, the Contractor shall verify, in the presence of the Canada Parks Representative, the location of existing water pipes.

.2 The Contractor shall take measures to determine the depth of existing water pipes at the points where connections are to be made.

.3 Following excavation work, the Contractor shall verify the dimensions, type and condition of the exposed water pipe.

.4 In the event that a condition significantly different from contract prescriptions is discovered, the Contractor shall immediately notify the Canada Parks Representative of the situation.

.5 When necessary, the profile shall be adjusted according to the Canada Parks Representative's instructions, so as to avoid any sudden changes in the slope and alignment of the pipe and connection.

3.3 DIGGING TRENCHES

.1 Trenches shall be dug in compliance with Section 31 23 11 - Excavation and Backfilling - Underground Services.

3.4 CONNECTION TO THE EXISTING SYSTEM

.1 Connections perpendicular to an existing waterworks pipe are carried out under pressure. A sliding gate valve box shall be installed at all times.

3.5 BASE COURSE FOR PIPES AND STRUCTURES

.1 Have the layout and depth of the trench approved by the Canada Parks Representative before placing the base course material.

.2 The base course and surround of the pipes and underground structures shall be carried out in compliance with the requirements of Section 31 23 11 - Excavation and Backfilling - Underground Services.

.3 The loading, transportation and disposal of excavation surplus from work on the base course and surround for pipes and structures shall be at the Contractor's expense.

3.6 INSTALLATION OF PIPES

.1 The Contractor shall supply and install fire protection pipes as well as waterworks pipes in compliance with the diameters and locations shown on the plans and at a minimum cover depth of 1,8 m (6 ft.), including all connectors and accessories needed.

.2 The Contractor shall supply and use all equipment required for the safe and easy handling and installation of pipes. He shall take all precautions to prevent the

deterioration of the pipes. He shall clean and dry the interior of the curb box bases and male extremities prior to assembly. He shall examine all pipes and connectors prior to installation, since he shall be required to remove and replace any defective parts, even those, which have already been incorporated in the fire protection pipelines.

.3 The Contractor shall take special care to keep soil or debris from entering the pipes during installation. To this end, he shall place a plug at the end of the last sheet installed. This plug shall only be removed to place the following sheet.

.4 All pipes shall be installed in a straight line. An elbow shall be used for each change in direction. Each of the elbows and connectors installed shall be accompanied by restrained joints to counter buoyancy at these points.

.5 The installation of pipes and their junctions shall be carried out in strict compliance with the requirements of the pipe manufacturer.

.6 If, following installation, a pipe is found to be defective, the Contractor shall, at his expense, remove and replace it with a pipe in good condition and of the quality stipulated in these specifications.

.7 All pipe parts (pipe sections, elbows, couplings, etc) in contact with drinking water and used to connect the new main to the existing system shall be cleaned and disinfected using a 5 % chlorine solution prior to their installation.

.8 The Contractor shall anchor accessories. Wherever there is a vertical or horizontal change in direction and when placing all accessories (elbows, tees, plugs, valves and others) and fire hydrants, the Contractor shall supply and install retention devices and thrust blocks. See this section's article on "Buttresses and retention devices (thrust blocks)".

3.7 CATHODIC PROTECTION

.1 Install the magnesium anode at the bottom of the excavation, allowing a minimum lateral clearance of 600 mm from the cast iron or copper element to be protected.

.2 Anodes shall be installed with their anolyte. If the tube or sack containing the anolyte is damaged during handling and 20 % or more of the anolyte is lost, the Contractor shall be required to replace the damaged anode with a new one, at his expense.

.3 In order to minimize stress on the connection, prior to its connection to the cast iron or copper structure, the cable shall be wrapped around the pipe section.

.4 The anode shall be connected to the cast iron or copper element to be protected by either an aluminothermic weld or mechanical connection. In the case of an aluminothermic weld, it shall be necessary to comply with the following:

.1 A mould whose dimensions are suited to the connector's diameter shall be used.

.2 The following steps shall be followed when welding the cables to the pipes:

.1 Clean and polish a surface of the element to be protected with a file, until the metal is bright,

.2 Strip the cable to be welded to a length of 35 mm,

.3 Insert and pinch to the exposed part of the cable,

.4 Place the cable on the prepared part of the connector,

.5 Place and firmly secure the mould to the cable and light the powder using a lighter specially designed for this purpose,

.6 Remove all slag or weld deposits,

.7 Check the integrity of the weld by lightly tapping it sideways with a hammer,

.8 Any failed or questionable weld shall be redone,

.9 Check the connection by pulling on it strongly.

.5 It is imperative that the mechanical or aluminothermic weld connection be protected against any humidity. To this end, a Mastic coating shall be applied to the connection, so as to cover it entirely.

.6 Backfill the anode using subsoil compacted to 90 % M.P.

3.8 THERMAL INSULATION

.1 In places where the cover is less than 1,8 m (6 ft.), thermal insulation shall be installed to provide adequate protection against the effects of frost.

.2 Place the insulation over the granular cover material surrounding the pipe, in compliance with the Canada Parks Representative's specifications on the plans' details.

.3 Place sheets lengthwise and parallel to the pipe's middle line, staggering the traverse joints.

.4 Butt all sheets together and secure to keep them from moving.

3.9 BUTTRESSES AND RETENTION DEVICES (THRUST BLOCKS)

.1 The Contractor shall build concrete buttresses where there are elbow connectors, tees, fire hydrants and plugs, and wherever they are required by the Canada Parks Representative. These buttresses shall be of the size and weight indicated on the details plan, in keeping with the type of direction change and the pipe's diameter. They shall be supported by firm, stable soil, preventing any shifting.

.2 A compressible asphalt sheet-type material measuring 12,5 mm (½ in.) thick shall be placed between the pipe and the concrete buttress.

.3 Behind the existing pipes where a perpendicular connection is to be made, a concrete buttress shall be installed to transfer all possible thrust exerted by the unworked soil.

.4 Wherever there is a vertical or horizontal change in direction and during the placement of all valve and fire hydrant connectors (elbows, tees, crosses, couplings, etc.), the Contractor shall install, in addition to thrust blocks, a retention system in compliance with the BNQ 1809-300 standard.

3.10 INTERSECTING SERVICES

.1 Wherever there is an intersection with buried municipal services or public utilities, a minimum clearance of 300 mm (12 in.) shall be maintained, except in the case of municipal service entrances where this value can be reduced to 150 mm (6 in.). The minimum clearance shall be increased to 500 mm (20 in.) in the event that a water main is built parallel to another municipal service or public utility. In the event that the normal clearance cannot be respected, work shall be carried out in compliance with the requirements of the MELCC.

3.11 BACKFILLING

.1 Backfilling shall be carried out in compliance with Section 31 23 11 - Excavation and Backfilling - Underground Services.

3.12 CLEANING AND DISINFECTION

.1 Service interruption

.1 When work requires a partial closing of the existing system, a request to interrupt water service shall be submitted to the Municipality by the Canada Parks Representative at least 48 hours in advance. The latter will coordinate, with the Municipality, the closing and opening of valves or the distribution of notices to citizens. The handling of the existing system's valves shall be carried out exclusively by municipal employees.

.2 Connection to the existing system

.1 The part used for connecting to the existing system shall be installed at the end of the work, before the flushing, rinsing and disinfection stages. The Contractor shall ensure that the parts are clean and that no dirt can be introduced into the pipe.

.2 The Contractor shall plan for the installation of a main stop with a K-type soft copper pipe end near the point of connection and as indicated on the commissioning plan, making it possible for the specialized firm to inject the chlorine solution used to disinfect the existing system.

.3 Drinking water and fire hydrant pipes

.1 All inspections shall be carried out by specialized firms and all inspection reports with recommendations shall be signed by an engineer.

.2 As soon as the Contractor has received the order to start the work, he shall entrust the specialized firm to prepare a plan for flushing, disinfecting and commissioning the drinking water pipes, in keeping with the approved plans.

.3 Generalities

.1 The Contractor shall produce an appropriate scaled plan proportioned to accurately show the new drinking water pipe, its accessories and connections, as well as the part of the existing system affected by the work. The plan shall pinpoint the location of interventions on the drinking water pipe for cleaning, rinsing, disinfection and sampling work. This plan and the equipment required to carry out the work shall be reviewed by the Canada Parks Representative before the Contractor can proceed with the tests. Furthermore, it is imperative that these tests be carried out by a specialized firm accredited by the Canada Parks Representative and in his presence.

Note: A specialized firm is defined as a company, which has the proper equipment and competencies to carry out the flushing, cleaning, restoration and disinfection of drinking water pipes as well as conduct watertightness tests on drinking water and sewer pipes.

.2 The recognized specialized firm shall advise the project manager at least 24 hours prior to the start of the work.

.3 The final connection of a new pipe to the existing network can only be carried out after all required tests have been conducted and the Canada Parks Representative's approval has been obtained.

.4 Cleaning

.1 Cleaning work shall be carried out so as to keep water or mud from re-entering the pipes.

.2 In the presence of the Canada Parks Representative, the Contractor shall clean all newly installed water pipes. The use of non-abrasive pigs is favoured for small diameters (600 mm or under) while a manual cleaning shall be used for larger diameters. In the latter case, a CCTV inspection shall validate the quality of the cleaning. The recording format shall be pre-approved by the Canada Parks Representative.

.3 The method used shall keep dirt from being drawn into the cavity of the pipes' assembly joint.

.4 Work shall be carried out so as to keep water or mud from re-entering the cleaned pipes. To this end, the Contractor shall plan measures such as excavation, pumping or the discharge of water into a ditch or storm sewer. In collaboration with the Canada Parks Representative, the Contractor shall also anticipate the impact and repercussions of chlorinated water discharged into the environment. In this regard, he shall be required to take appropriate measures to prevent such discharge through neutralization or other means.

.5 All pipe parts (pipe sections, elbows, couplings, etc.) used to connect the new pipe to the existing system and which will be in contact with the drinking water, shall be cleaned then disinfected using a 5 % chlorine solution (50 g/L) prior to their installation. The length of the connecting section shall not exceed 6,0 m.

.6 In new or existing parts of the system, which have been isolated to allow connection to an existing pipe and in which cleaning pigs cannot be used, the Contractor shall eliminate all particles from the pipe by running water through the pipe at a speed of at least 1 m/s for a minimum of 30 minutes. However, he must flush at least three times the volume of water contained in this entire part of the system before it can be put back into service.

.7 During the flushing, when butterfly valves are called for, the latter shall be replaced by pipe sections of the same diameter. After each pig has been removed in collaboration with the specialized firm, equipment that had been removed shall be immediately reinstalled, allowing watertightness tests to be carried out.

.5 Watertightness test for drinking pipe

.1 After filling the trench and immediately following the cleaning work, the pipe and connections shall be subjected, section by section (from one valve to another), to a watertightness test. This test shall be carried out as follows:

.1 First, ensure that the air has been well purged using appropriate equipment if required.

.2 Next, apply a minimum hydrostatic pressure of 850 kPa, measured simultaneously by two different manometers of adequate precision graded on a scale of no more than 50 kPa at the lowest point or a point approved by the Canada Parks Representative. Manometers shall be of the viscous damping type and shall have a scale making it possible to measure approximately twice the test pressure required.

.3 Plan for a pressure stabilization period to compensate for the absorption of water or expansion of the pipe.

.4 Maintain this constant pressure for 60 consecutive minutes.

.5 During this period, measure the quantity of water needed to maintain this test pressure.

.2 The quantity of water to be added must be inferior, for each section tested, to 1 L/mm nominal diameter per kilometre in length per 24-hour period, which in the case of the principal nominal diameters corresponds to the following values:

Acceptable leak, in litres per hour per 100 m of pipe with a joint every 5,5 m on average								
Nominal diameter of the pipe (mm)	50	100	150	200	250	300	350	400
Quantity of water, (l/hr.)	0,21	0,42	0,63	0,83	1,04	1,25	1,46	1,67

Note:
For nominal diameter values exceeding 400 mm or nominal diameter values different from those in the table, the acceptable leak value is determined by calculations based on the following:

$$\left(\frac{\text{1 L/mm of nominal diameter}}{\text{1 km of pipe length * 24 hr.}} \right)$$

When the joints between the pipes are not at a distance of 5,5 m but at a shorter or longer distance, it is necessary to calculate the acceptable leak based on the total number of joints (pipes and accessories) as follows:

$$L = \frac{ND\sqrt{P}}{130{,}400}$$

L = value of the acceptable leak, in litres per hour
N = number of joints in the pipe, including those at the extremities

(Example of calculations: for a pipe measuring 100 m in length, with no accessories and with an average distance of 4.0 between joints, the number of joints is 26).
D = value of the nominal value of the pipe, in millimetres;
P = pressure within the pipe during the test, in kilopascal (850 kPa, see article e 11.1.3.1 b of BNQ 1809-300).

.3 When the leak in a given section exceeds the aforementioned maximum values, the Contractor shall locate and correct this leak at his expense. He shall repeat the test at his expense until the quantity of water added to the system is below the prescribed limit. The correction to the work shall be inferior to the quality of the projected work and must be accepted by the Canada Parks Representative. Defective parts shall be replaced by new parts and the use of repair saddles is prohibited.

.4 Furthermore, all visible leaks shall be corrected by the Contractor, even if they fall below acceptable leak values.

.5 For provisional acceptance, watertightness tests must be conducted under the responsibility of the Contractor who shall then provide all the collaboration needed to carry out all tests. All test results, including non-compliant results shall be contained in a report. This report shall be transmitted to the Canada Parks Representative for approval and is required for the provisional acceptance of the work. If the result is negative, article 4.12 of the NQ 1809-900 standard shall apply.

.6 Disinfection

.1 Generalities

.1 If need be, once the results of watertightness tests have been accepted and before the water pipes and their connections to the property line are put into service, the Contractor shall disinfect them as well as their accessories.

.2 Disinfecting part of an existing system

.1 If the connection to the existing pipe has not been carried out under pressure, work shall include the disinfection of existing pipes, which had to be closed to carry out the connection, as well as the disinfection of the new pipes (as per the approved disinfection plan). In this instance, the disinfection is necessarily carried out with a free chlorine concentration between 25 ppm and 50 ppm at every point of the disinfected pipe, including fire hydrant supply pipes. The chlorine solution must remain in the pipe for a minimum of one hour, in order not to interrupt the water supply for too long a period. After a full rinsing of the

pipe, the concentration of residual chlorine shall not exceed that of the existing system.

.2 Once the system is back in service, the specialized firm shall take a water sample from the existing system, which has been disinfected, for bacteriological analysis by a laboratory accredited by the Ministry of the Environment. The results of the bacteriological analysis shall be sent to the Contractor by the specialized firm. The Contractor shall then communicate the results to the Canada Parks Representative within 24 to 48 hours following the lifting of the sample.

.3 The installation of corporation valves required to introduce the chlorine solution into the existing system as well as in the new pipes, is carried out by the Contractor.

.4 The Municipality notifies citizens affected by the interruption in water service.

.3 Disinfection of the new pipe.

.1 The specialized firm shall carry out the disinfection of the new pipe using a free chlorine concentration between 25 ppm and 50 ppm at every point in the disinfected pipe including pipes supplying the fire hydrant, and with a residual minimum of 10 ppm after 24 hours (AWWA'S continuous feed method).

.2 The specialized firm shall ensure that the chlorine solution is evenly distributed throughout all the pipes. To this end, it measures chlorine concentrations at several points in the pipes.

.3 The results of the residual chlorine measurement shall be noted in a table of results i. The residual chlorine test shall be conducted after the system's disinfection but prior to its rinsing.

.4 To ensure that no chlorine made its way back into the existing system during disinfection, the specialized firm shall check the concentration of free chlorine at a supply point on the existing system as close as possible to the connection point.

.5 Immediately following disinfection, the Contractor shall turn off valve(s) located at the point of connection to the existing system, which supply the new drinking water pipe.

.6 As soon as the contact period is over, all pipes without exception and all fire hydrants shall be emptied to restore the chlorine concentration to a value that does not exceed that of the existing system.

.4 Sampling by a specialized firm.

.1 After notifying the Canada Parks Representative, the specialized firm shall lift control samples from locations identified in the approved flushing plan. In addition, a control sample of the quality of the existing system's water shall be lifted. It must ensure that new pipes are cleared of their chlorine content at the time of sampling. To this end, it is necessary to measure residual chlorine at each sampling point and on the existing system. Results of these measurements shall appear on the certificate of compliance issued for the flushing, disinfection and commissioning of new waterworks pipes.

.2 Samples shall be sent by the specialized firm to a laboratory accredited by the Ministry of the Environment for analysis.

.3 The Contractor shall close the valve(s) located at the point of connection to the existing system and which supply the new drinking water pipe immediately after disinfection.

.5 Analysis

.1 Control analyses requested from the laboratory accredited by the Ministry of the Environment at each sampling points are:

.1 Turbidity measurement.

.2 Total coliform count using the membrane filter technique.

.3 Atypical colony count.

.4 Heterotrophic, aerobic and anaerobic bacteria count.

.2 When the results of the analyses reveal water of good quality, the Contractor shall transmit them to the Canada Parks Representative. Water of good quality is defined as one whose turbidity is under 1 UNT with a total coliform count under 1/100 ml and an atypical colony count equal to or below the number found in the existing system.

.6 Certificate of compliance

.1 When all work has been completed as required, the Contractor shall provide a certificate of compliance to the Canada Parks Representative who shall then validate it and add it to the work acceptance document.

.7 Washing:

.1 The first stage consists in eliminating all particles from the pipe by allowing water to circulate at a speed of at least 1 m/s for a minimum of 30 minutes, to change the total volume of water contained in the pipe. This washing shall be carried out at the pressure of the neighbouring system while maintaining a minimum residual pressure of 275 kPa in this system and using a temporary connection system that meets with the Canada Parks Representative's satisfaction. To wash a pipe with a diameter of 300 mm or less, the Contractor shall use a fire hydrant outlet of 65 mm in diameter located at one end of the pipe. For a pipe with a diameter of 350 mm or more, he shall use at least two fire hydrant outlets. To wash the connectors, the Contractor must bleed them to the Canada Parks Representative's satisfaction.

.8 Filling:

.1 Subsequently, the Contractor shall fill the pipe with a chlorinated water solution whose concentration is at least 50 mg/L of free chlorine. The quantities required to obtain this concentration are shown in Table 1.

TABLE 1

MINIMUM QUANTITY OF CHLORINE REQUIRED PER 100 m OF PIPE TO OBTAIN A SOLUTION WITH A CONCENTRATION OF 50 mg/L

(Article 11.1.4.3 of BNQ 1809-300 and 5.4.8.6 of Directive 001)

Nominal diameter of the pipe		**100 % chlorine in kg**	**1 % chlorine solution in litres**
mm	**(in.)**		
50	(2)		1,0
75	(3)		2,2
100	(4)	0,04	3,97
150	(6)	0,09	9,06
200	(8)	0,16	16,27
250	(10)	0,25	26,33
300	(12)	0,36	36,51
350	(14)	0,50	49,54
400	(16)	0,65	64,83
450	(18)	0,82	82,09
500	(20)	1,02	101,22
600	(24)	1,44	145,81
750	(30)	2,26	227,77
900	(36)	3,28	327,97
1050	(42)	4,46	446,58
1200	(48)	5,84	583,30
These values were obtained based on values contained in ANSI/AWWA C651 standard			
NOTE: .1	*The weight of chlorine at 100 %, expressed in grams, is obtained by multiplying, using a factor of 10, the volume, in litres, of the chlorine solution at 1 %.*		
.2	*Since it is necessary to bleed the fire hydrants to ensure that the chlorine solution has penetrated the entire network, the quantity of chlorine injected must be higher than that calculated using the table.*		

Note: Chlorine solutions deteriorate over time, i.e., their initial concentration is reduced after a period of time. As a result, it is common practice to consider that chlorine solutions have a maximum service life of 45 days. Chlorine sold in the form of tablets and whose concentration is 100 % does not deteriorate over time. It is common commercial practice to use the nominal concentration percentage to designate chlorinated solution; for example, a solution with a nominal concentration of 12 % may contain only 10,4 % of free chlorine.

.9 Disinfection:

.1 The Contractor shall ensure that the chlorinated water solution with a concentration of 50 mg/L penetrates each of the system's pipes and accessories. To this end, the valves and fire hydrants are opened for a few minutes. At the start of the 24-hour test period, the Contractor shall use a chlorimeter to confirm that the concentration of free chlorine, has a minimum value of 25 mg/L is all of the system's pipes and accessories. At the end of the 24-hour test period, the Contractor shall check the concentration of free chlorine using a chlorimeter. This concentration must have a minimum value of 10 mg/L, if this value is not reached, the system disinfection test must be repeated.

.2 When a drinking water pipe has been soiled (dirty water, sand, soil, debris or other matter) during installation work, a second sampling must be conducted 16 hours after the first sampling. If the results of these analyses do not comply with the requirements of this article, the disinfection must be repeated at the Contractor's expense.

.10 Rinsing:

.1 When test results comply with requirements, the Contactor shall rinse out each of the system's pipes and accessories as described above, until the concentration of chlorine is below 1 mg/L as measured by a chlorimeter. Then, bacteriological analyses using the membrane filter technique shall be conducted by a Laboratory accredited by the MELCC on samples lifted by a representative of the accredited Laboratory in the presence of the project manager. Two samples shall be analyzed for each 150 m of disinfected pipe.

.11 Acceptance:

.1 The disinfection of the pipe shall be accepted once a laboratory examination of samples reveals the presence of no total and fecal coliform bacteria in 100 ml of water, no enterococcal bacteria, no atypical bacteria (non-coliform) and the HAAB does not exceed 100 UFC/ml of water. All test results including those showing non-compliance must be noted in a report. This report shall be signed and sealed by an engineer and given to the project manager for approval. It is required for the provisional acceptance of the work. If analyses fail to meet requirements, the disinfection of the pipe and laboratory analysis of new samples shall be repeated. This work and related charges shall be at the Contractor's expense.

Note:
UFC: units forming calories
HAAB: Heterotrophic aerobic and anaerobic bacteria

3.13 COMMISSIONING

.1 The Contractor shall provide the Canada Parks Representative with a commissioning plan prepared by the specialized firm for approval, and make whatever modifications may be requested. This plan shall be produced using AutoCad software (latest version).

.2 The plan shall indicate if work includes the use of temporary systems as well as installation and disinfection details if applicable. If required, this plan shall also indicate the part of the existing system that shall be out of service during connection work. The plan shall be transmitted and approved by to the Canada Parks Representative for verification and correction, if deemed necessary.

.3 The illustration of pipes shall correspond to true condition with regards to length, orientation of pipes as well as the position of equipment. Sketches need not be to scale, but must provide a clear and concise visual interpretation.

.4 Plans shall include, at the very least, the following information:

.1 Regulation and bid numbers.

.2 Name of the Engineer as well as the name and contact information of the individual in charge.

.3 Temporary numbering of fire hydrants and valves.

.4 Street names or numbers.

.5 Pipe lengths.

.6 Pipe diameters.

.7 Location of valves.

.8 Location of fire hydrants, plugs, drainage valves and others.

.9 Relevant sections of the existing system.

.10 Cleaning pig insertion and removal points.

.11 The pipeline route of each cleaning pig.

.12 Chlorine injection and rinsing points.

.13 Location of sampling points (1/150 m of pipe for new pipes as well as the existing system).

.14 Location of excavations required for flushing, rinsing, disinfection and sampling work.

.5 Upon reception of the commissioning plan approved by the Canada Parks Representative, the Contractor shall start work on the installation of new pipes and conduct connection work to the existing waterworks system as per the plan.

.6 On the work site, the Contractor shall identify fire hydrants (numbering consistent with the approved plan) using firmly secured labels.

3.14 VERIFICATION OF CONDUCTIVITY

.1 Once the installation of the pipes has been completed, the Contractor shall check the electrical transmission in the pipe and/or the copper conductor. These tests shall be carried out at the Contractor's expense but conducted by a specialized firm and are included in the bid. All inspection reports with recommendations shall be signed by an engineer.

.2 Using a generator, current of 200 A at 50 V shall run between two contact points located less than 150 m from each other. The Contractor shall take all measures required to prevent any accident or damage to individuals or private property.

3.15 RESTORATION OF THE SITE

.1 Once the installation of the pipes and accessories has been completed, surfaces must be restored to their original condition, as per the Canada Parks Representative's instructions.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 31 23 11 – Excavation and Backfilling - Underground Services

.2 Section 32 11 00 – Roadworks

.3 Section 33 11 16 – Waterworks System and Fire Protection

1.2 SCOPE OF WORK

.1 Ensure the supervision of the work and provide all the manpower, equipment, tools, materials, transportation and other services required to carry out and complete all work described and specified in this section and Contract documents, including but not limited to: the dismantlement of existing sewer networks including underground structures, the supply and installation of pipes, connectors and accessories, manholes, catch basin manholes, catch basins, service connections, joints, connections to existing pipes or manholes, trench maintenance, dewatering of excavations, trench filling, watertightness tests, etc.

1.3 REFERENCES

.1 Bureau de normalisation du Québec (B.N.Q. – Quebec Standards Bureau) (latest edition).

.1 BNQ 1809-300: Construction Work – General technical clauses – Drinking water and sewer pipes.

.2 NQ 2622-126: Pipes and monolithic lateral connections made of reinforced and non-reinforced concrete for the evacuation of sanitary and storm sewers.

.3 NQ 2622-420: Sewer manhole, catch basins and manifold chambers of prefabricated reinforced cement concrete.

.4 NQ 3221-500: Frames, gratings, manhole covers, catch basins and valve boxes – cast of grey or ductile cast iron for civil engineering works - Characteristics and test methods.

.5 NQ 3624-110: Polyethylene pipes and connectors (PE) – Semi-rigid or flexible pipes for the evacuation of surface water, soil drainage and culverts - Characteristics and test methods.

.6 NQ 3624-120: Polyethylene pipes and connectors (PE) - Open or closed profile pipes with a smooth interior wall for the storm sewer and soil drainage - Characteristics and test methods.

.7 NQ 3624-130: Rigid non-plastified polyvinyl chloride (PVC) pipes, with a diameter equal to or smaller than 150 mm, for underground sewers.

.8 NQ 3624-135: Non-plastified polyvinyl chloride (PVC-U) pipes - -200 mm to 600 mm-diameter Pipes for underground sewers and soil drainage - Characteristics and test methods.

.2 National Plumbing Code of Canada (latest edition).

1.4 DEFINITIONS

.1 Accessories: devices and apparatus other than the sewer pipe, which are used along with the sewer. This includes connectors such as tees, crosses, elbows and stoppers.

.2 Backfilling: operation consisting in filling the trench with foundation, cover and fill materials.

.3 Gasket: a rubber ring, which provides a watertight joint for connectors, pipes and couplings, etc.

.4 Manhole: a specially built opening, usually in the upper part of a sewer, chamber or other infrastructure, for maintenance or other purposes.

.5 Service connection: pipe draining sanitary or storm water from the property line to the main sanitary or sewer pipe respectively.

1.5 SAMPLES

.1 Present samples for testing purposes to the Canada Parks Representative at the latter's request, and at the Contractor's expense.

1.6 SHOP DRAWINGS

.1 Shop drawings are required but are not necessarily limited to the following:

.1 Connectors (tees, elbows, couplings),

.2 Rubber joint gaskets,

.3 Sewer pipes,

.4 Frames, covers and gratings.

.5 Adjustment units,

.6 Manholes,

.7 Catch basins,

.8 Catch basin manholes,

.9 Culverts and accessories,

.10 Flow regulator,

.11 Geotextile membranes,

.12 Overflow chamber,

.13 Check valve,

.14 Safety stop.

.2 Work related to the drawings may only start after said drawings have been revised by the Canada Parks Representative.

.3 The Contractor shall present an exhaustive list of the materials to be used, including the name of the manufacturer and supplier.

.4 Within the limits of the Contract, all materials must be uniform and come from the same manufacturer.

1.7 CERTIFICATION OF MATERIALS

.1 At least 2 weeks prior to the start of the work, present the results of tests conducted by the manufacturer and the certificate attesting that the pipes, manholes, catch basin manholes and catch basins comply with the requirements of this section.

.2 Ensure that pipes bear the certification stamp.

1.8 TRANSPORTATION, STORAGE AND HANDLING

.1 Deliver, store and handle materials in compliance with the manufacturer's instructions.

.2 The Contractor shall take the following precautions when handling pipes:

.1 The pipe shall be handled so as not to touch sharp objects.

.2 Avoid impact in lifting.

.3 Storage surfaces shall be flat and clean.

.4 Pipes shall not be dropped or allowed to knock against another pipe.

.5 Gaskets shall be protected from excessive exposure to heat, direct sunlight, oil and grease.

.3 All materials found to be damaged or in poor condition shall be rejected or replaced at the Contractor's expense.

1.9 WORK SCHEDULE

.1 Prepare the work schedule so as to minimize interruptions to existing services and maintain a normal flow rate during construction work.

.2 Provide the Canada Parks Representative with the schedule of projected interruptions for approval, and comply with this duly approved schedule.

.3 When service interruptions are required, inform the Canada Parks Representative and Authorities involved at least 48 hours in advance.

1.10 WORK BY OTHER COMPANIES OR CONTRACTORS

.1 If need be, the Contractor shall be required to coordinate his work with that of the Municipality or any other contractor, company or public utility, which may need to carry out work of any nature whatsoever, before or during the execution of work covered by this contract.

1.11 ALIGNMENT AND LEVELS

.1 The Contractor shall strictly respect the layout and profile of the sewer (or sewers) called for in the contract drawings, as well as the class and diameter of pipes, the number, positions and elevations of the manholes, catch basin manholes, and catch basins.

.2 The final location of an underground structure must not be more than 100 mm (4 in.) from that shown in the contract drawings. The final elevation of an underground structure must not be more than 25 mm (1 in.) from that indicated on these same drawings.

.3 In the event that obstructions not covered by the drawings interfere with work to the point of requiring changes to the plans, the Canada Parks Representative can require that work be modified or displaced accordingly, or he can make the necessary arrangements with the owners of said obstructions for their demolition, displacement, or reconstruction.

.4 The Contractor shall take necessary precautions during excavation work, to locate known or unknown underground structures, and shall be responsible for their repair should they be damaged as a result of his negligence.

1.12 REMOVAL OF SEWER PIPES

.1 Work related to the removal of sewer sections consists in, but is not limited to, the supply of materials and labour required for the removal, according to good engineering practices, of sections shown in the plans and specifications, including:

.1 Saw cuts,

.2 Removal of the pavement and infrastructure,

.3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.4 The dewatering of trenches and diversion of water in the pipes,

.5 The complete removal of existing sewer pipes, as well as their transportation to the site designated by Owner authorities,

.6 The sealing of pipe extremities,

.7 The supply and application of lean concrete,

.8 The protection and repair of public utilities,

.9 Backfilling and placement of approved material up to the infrastructure,

.10 The restoration of sub-bases and pavement.

.2 The Contractor shall carry out work to seal the openings of connectors in compliance with the BNQ 1809-300/ standard.

1.13 SEWER PIPES TO BE CONDEMNED

.1 Work related to the condemnation of sewer sections consists in, but is not limited to, the supply of the materials and labour needed for the condemnation, according to good engineering practices, of sections shown in the plans and specifications, including:

.1 Saw cuts,

.2 Removal of the pavement and infrastructure,

.3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.4 The dewatering of trenches and diversion of water in the pipes,

.5 The supply and application of lean concrete for filling the condemned pipes,

.6 The sealing of pipe extremities and/or openings in an existing manhole,

.7 The protection and repair of public utilities,

.8 Backfilling and placement of approved material up to the infrastructure,

.9 The restoration of sub-bases and pavement.

.2 The Contractor shall carry out work consisting in sealing the openings of connectors in compliance with the BNQ 1809-300 standard.

1.14 MANHOLE TO BE REMOVED

.1 Work related to the removal of the manhole consists in, but is not limited to, the supply of materials and labour needed for the removal, according to good engineering practices, of existing manholes shown in the plans and specifications, including:

.1 Saw cuts,

.2 Removal of the pavement and infrastructure,

.3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.4 The dewatering of trenches and diversion of water in the pipes,

.5 The complete removal of the manhole,

.6 The sealing of the extremities of pipes in place,

.7 The protection and repair of public utilities,

.8 Backfilling and placement of approved material up to the infrastructure,

.9 The restoration of sub-bases and pavement.

.2 The Contractor shall carry out work to seal the opening of connectors in keeping with the BNQ 1809-300 standard.

1.15 INSTALLATION OF SEWER PIPES

.1 Work related to sewer pipes consists in, but is not limited to, the supply of materials and labour needed to carry out, according to good engineering practices, the installation of sewer pipes, in keeping with the diameters and materials specified in the plans, including:

.1 Saw cuts,

.2 Removal of the pavement and infrastructure,

.3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.4 Supply and installation of pipes,

.5 The dewatering of trenches and diversion of water in the pipes,

.6 Supply and installation of the base course and cover,

.7 Supply and installation of sewer pipes,

.8 Accessories,

.9 Backfilling and placement of approved material as far as the infrastructure,

.10 Distortion tests (PVC pipe) as well as infiltration and watertightness tests (sanitary sewer pipe) and CCTV inspection (sanitary sewer pipe and storm sewer pipe),

.11 Repairs to existing pavement, curbs and sidewalks,

.12 Protection and repair of public utilities and all other work required for the full use of these structures.

1.16 INSTALLATION OF PREFABRICATED MANHOLES AND CATCH BASIN MANHOLES

.1 Work related to prefabricated manholes consists in, but is not limited to, the supply of materials and labour needed to carry out, in keeping with good engineering practices, the installation of new sewer manholes and catch basic manholes, including:

.1 Saw cuts,

.2 Removal of the pavement and infrastructure,

.3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.4 The supply of manholes as specified in the plans,

.5 The dewatering of excavations,

.6 The supply and installation of the base course,

.7 Accessories, gutters,

.8 The connection of pipes to the manhole,

.9 The supply and installation of the machined frames and covers,

.10 In-depth cleaning of the manhole,

.11 Backfilling and placement of approved material as far as the infrastructure,

.12 Watertightness tests,

.13 Repairs to existing pavement, curbs and sidewalks,

.14 Protection and repair of public utilities.

1.17 INSTALLATION OF CATCH BASINS

.1 Work related to catch basins consists in, but is not limited to, the supply of materials and labour needed to carry out, in keeping with good engineering practices, the installation of catch basins including:

.1 Saw cuts,

.2 Removal of the pavement and infrastructure,

.3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.4 The supply of catch basins as specified in the plans,

.5 The dewatering of trenches,

.6 The supply and installation of the base course,

.7 Connection of the catch basins to the network,

.8 Accessories,

.9 In-depth cleaning of the catch basin,

.10 Backfilling and placement of approved material as far as the infrastructure,

.11 Infiltration tests and CCTV inspection,

.12 Repairs to existing pavement, curbs and sidewalks,

.13 Protection and repair of public utilities.

1.18 CATCH BASINS TO BE REMOVED

.1 Work related to the removal of catch basins consists in, but is not limited to, the supply of materials and labour needed to carry out, in keeping with good engineering practices, the removal of the catch basin including:

.1 Saw cuts,

.2 Removal of the pavement and infrastructure,

.3 The excavation, loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.4 Sealing of the connection point to the water main,

.5 The dewatering of trenches,

.6 Backfilling and placement of approved material up to the infrastructure,

.7 Repairs to existing pavement, curbs and sidewalks,

.8 Protection and repair of public utilities.

.2 The Contractor shall carry out work to seal the opening of connectors in keeping with the BNQ 1809-300 standard.

1.19 CONNECTION TO AN EXISTING PIPE

.1 Work related to connections to an existing pipe consists in, but is not limited to, the supply of materials and labour needed to carry out, in keeping with good engineering practices, the connection to an existing pipe, including:

.1 Saw cuts,

.2 Removal of the pavement and infrastructure,

.3 Loading, transportation and disposal of excavation surplus and waste to a site complying with the requirements of the MELCC's Soil Protection and Contaminated Sites Rehabilitation Policy,

.4 Clearing of the existing structure,

.5 Cleaning of pipes and joints,

.6 Production of the watertight connection joint,

.7 Connection in compliance with the BNQ 1809-300 standard,

.8 The supply and installation of the base course and surround,

.9 Accessories,

.10 Backfilling and placement of approved material up to the infrastructure.

1.20 STOPPERS OR GRATINGS

.1 Work related to stoppers or gratings consists in, but is not limited to, the supply of materials and labour needed to carry out, in keeping with good engineering practices, the installation of stoppers and gratings, including:

.1 The supply and installation of stoppers or gratings as per instructions provided in the plans.

PART 2 - PRODUCTS

2.1 PIPES

.1 Reinforced concrete pipes:

.1 Unless otherwise stipulated in the plans, storm sewer pipes measuring 300 mm or more in diameter are to be made of Class IV reinforced concrete. The concrete shall be sound, free of chips and flaws, and pipes shall be of regular shape. Joints shall have rubber gaskets complying with the requirements of the NQ 2622-126 or ASTM C443M standard. When required, the lubricant shall comply with the recommendations of the pipes' supplier.

.2 Pipes shall bear the manufacturer's name or trademark, production date, and class of pipe as well as their BNQ number.

.3 Prior to the start of the work, the Contactor shall make known the name of the manufacturer of the pipes he intends to use, and which must hold a BNQ certificate for the diameter and class of pipe supplied.

.4 The Contractor shall be particularly careful when handling and unloading the pipes, as well as lowering them into the trench to avoid cracking, chipping or breaking them. Any pipe that is damaged in any way whatsoever will be refused by the Canada Parks Representative and the Contractor shall be required to replace them, whether or not they have been incorporated into the structures.

.5 The Canada Parks Representative reserves the right to require that reinforced concrete pipes be checked for their resistance to collapsing under outside loads. These tests shall be carried out in compliance with the method and requirements of NQ 2622-126 standards. These tests shall be entrusted to a Laboratory selected by the Contractor and approved by the Canada Parks Representative. Laboratory reports shall be sent to the Canada Parks Representative at least three (3) days prior to the installation of pipes.

.6 A standard part of each diameter and from each manufacturer shall be tested in this manner, for each 500 m (1,640 ft.) of pipe to be installed. However, the Canada Parks Representative reserves the right to require that a larger number of samples be tested, should he deem it necessary.

.7 All costs incurred for these tests, except for Laboratory tests, shall be the responsibility of the Contractor, including the supply of samples, their transportation to the Laboratory and all related expenses.

.8 For each delivery, the Contractor shall provide the Canada Parks Representative with an attestation of compliance. The attestation of compliance must contain the following information, for each production lot:

.1 The name of the pipes manufacturer.

.2 The production date and place.

.3 The class, category and nominal dimensions.

.4 Results of analyses, tests and quality control measures required by the NQ 2622-125 standard "Tuyaux circulaires en béton armé et non armé – Guide de fabrication et de contrôle de la qualité en usine " (Circular reinforced and non-reinforced concrete pipes — Guide to production and quality control in the plant).

.5 The production lot number.

.9 A production lot consists of pipes of the same class, category and dimension, which have been manufactured during a single ongoing production cycle under the same conditions.

.2 Polyvinyl chloride (PVC) pipes:

.1 Unless otherwise specified in the plans, sanitary and storm sewer pipes in diameters of 250 mm or less, as well as catch basin connectors shall be of polyvinyl chloride (PVC).

.2 Polyvinyl chloride (PVC) pipes for gravity applications shall comply with the requirements of standard NQ 3624-130, type DR-28, for diameters of 100 to 150 mm and standard NQ 3624-135, type DR-35, for diameters of 200 mm or more.

.3 Connectors shall be of the "wide-mouthed" type and consist of a section with a solid wall and rubber gasket installed in the plant and securely blocked to keep it from moving.

.4 Monolithic tees used for connecting pipes to the sanitary sewer shall be made of polyvinyl chloride (PVC) complying with the requirements of NQ 3624-130 and NQ 3624-135 standards.

.3 High density polyethylene (HDPE) pipes :

.1 High Density Polyethylene (HDPE) pipes has to meet the latest CSA B182.13, CSA B182.14, CSA B182.15 and ASTM F2562 standards.

2.2 SECURITY GRATE, LANDING, PLATFORM (UNDERGROUND STRUCTURE)

.1 All landings, platforms, footbridges, security grates and other similar works, as well as their supports to be installed in underground structures shall be made of galvanized steel. All of these steel components shall be produced in the plant. All shall be welded and must be sturdy.

.2 Security grates are required for manholes whose depth is equal to or greater than 3 m while landings, platforms and footbridges are required in manholes 6 or more meters deep.

.3 Galvanized steel safety landings consist of two grates, which can be opened independently from each other and shall be installed at regular intervals (spaced every six meters maximum). The diameter of chimneys housing said landings shall be at least 1 200 mm (see detail).

2.3 GALVANIZED STEEL ACCESSORIES

.1 When galvanized steel parts are required, hot dip galvanizing shall comply with the CAN/CSA-G164M-92, class C standard. The quantity of zinc deposited must be at least 610 g/m^2 of exposed surface.

.2 The special paint, which can be used on the job site to protect a non-galvanized cut surface shall be a ready-mixed zinc-rich coating complying with CAN/CGSB-1.181 and ONGC 1-GP-181M standards.

.3 The mechanical anchors used to secure accessories to the concrete walls must be of grade 316 stainless steel.

2.4 ALUMINIUM ACCESSORIES

.1 Aluminum bars, pins, wires and extrusions, sheets or plates shall comply with the ACNOR HA.4-M1990 (6061-T6) standard. Rivets and bolts shall be of galvanized steel, except for the concrete wall's mechanical anchoring bolts, which shall be of grade 316 stainless steel. All aluminum elements shall be anodized after welding. Aluminum welding shall comply with the ACNOR HA.6-1980 (4043) standard. All aluminum in contact with the concrete, masonry or any material other than aluminum should be separated from the latter by neoprene at least 5 mm thick over the entire contact surface.

2.5 SEWER MANHOLE AND CATCH BASIN MANHOLE

.1 Prefabricated sewer and catch basin manholes.

.1 Manholes and catch basin manholes shall be of reinforced concrete in compliance with the NQ 2622-420 standard. Unless otherwise indicated in the plans, manholes and catch-basin manholes shall be of the 1200 mm diameter and shall have rubber gaskets complying with NQ 2622-420 and ASTM C443M standards.

.2 On sanitary sewer pipes, manholes shall be watertight with rubber gasket joints and monolithic base poured on the bottom section of the manhole. The bottom of these manholes is built so that water is discharged through a semi-circular canal (gutter). The canal is smooth and even, and the curvature's radii are the longest allowed by available space; no sharp turn shall be accepted. The bottom is made entirely of concrete.

.3 Manholes on storm sewers shall be of the same type as those described above, the bottom featuring a semi-circular canal (gutter) as described in the preceding point. If the angle makes the use of a gasket impossible, a flexible watertight joint shall be produced using activated oakum. No rigid joint shall be accepted.

.4 The manufacturer shall hold a certificate of compliance with the ASTM C-443 standard for joint gaskets, issued by a Laboratory recognized by the Ministère des Transports du Québec (MTQ – Quebec Department of Transport).

.5 Concrete used in the construction of these manholes shall have a compressive strength of 40 MPa at 28 days, and these manholes shall be built in compliance with the NQ 2622-420 and ASTM C-478 standards. In all cases, the strictest standard shall prevail. The surfaces of the manhole shall be those obtained upon removal of forms. The use of a surface coating or finishing mortar is not allowed.

.6 Manhole elements likely to be located 600 mm or less from the profile of the street shall meet the requirements of tests with de-icing salts to determine resistance to freeze/thaw cycles, as described in the "Cahier des charges et devis généraux" issued by the Ministère des Transports du Québec (MTQ — Quebec Department of Transport). This compliance must be attested to by a Laboratory accredited by the MTQ.

.7 All horizontal and vertical joints, which are not watertight, shall be immediately repaired by a specialized firm, which shall produce a special report confirming said repairs along with a two (2) years guarantee. This specialized firm must be approved by the Canada Parks Representative. Only flexible repair methods such as activated oakum, acrelamide or polyurethane injection are allowed. Any other flexible repair method shall be subject to an equivalence application. No rigid repair shall be permitted.

.2 Rungs and ladders

.1 Materials used in the production of ladders and rungs are cold worked. Ladder bars are produced of 15 M deformed reinforcing steel with a spacing of 300 mm (12 in.) c/c at ± 25 mm and rungs made of 20 M deformed reinforcing steel with a spacing of no more than 300 mm (12 in.). The steel shall be galvanized. The ladder shall be secured to the wall using bolts screwed into anchors set in the concrete at the time of pouring.

.2 The middle of the top bar shall never be more than 660 mm below the final elevation from the cover. Wall clearance shall be 150 mm from the recess.

.3 Frames, covers and grates

.1 The frame and cover shall be of the adjustable type with guide rings and no other standard type shall be installed without the authorization of the Canada Parks Representative.

.2 Cast iron and shaping for frames, guides and covers shall comply with the NQ 3221-500 standard. Parts shall be flawlessly moulded with no cracks, scars, blisters or other defects. The warping tolerance in all directions shall be less than 1 mm (1/32 in.). All parts whose weight is less than 95% of the weight indicated by the manufacturer shall be rejected. All cast-iron parts shall bear the manufacturer's name or trademark. All unidentified parts shall be refused.

.3 In the case of all manholes and catch basin manholes located above grade, the frame shall be of class 30 grey cast iron while the cover and the grate shall be of class 65-45-12 ductile cast iron.

.4 In the case of manholes located in paved areas, the frame and cover shall be produced from class 65-45-12 ductile cast iron while the conic guide shall be produced of grey cast iron in self-adjusting model for the cover, with resilient frame seat for the frame and the guide channel.

.5 The frame shall not rest directly over the guide channel. There shall be a space of at least 40 mm (1 1/2 in.) between the underside of the frame and the top of the guide channel. To this end, it is necessary to raise one side of the adjustable part and tamp down the bituminous mix between the supporting rim and the top of the concrete section of the manhole or catch basin manhole. Repeat the process on the other side to obtain even support under the entire rim, and exceed the level of surrounding pavement by 50 mm (2 in.) before running the roller.

.6 In the case of catch basin manholes located in paved areas, the frame shall be self-adjusting model with resilient frame seat. The frame and grate shall be of class 65-45-12 ductile cast iron and the guide channel shall be of class 25 grey cast iron.

.7 Frames, covers and grates for manholes and catch basin manholes shall be capable of withstanding heavy traffic.

.8 Covers must bear the following inscriptions, as the case may be:

"Storm sewer", "Sanitary sewer".

.9 For the standard type, the cast iron, shaping and machining of the frame and cover shall comply with ASTM standards for class 25 grey cast iron (Standard Specification Gray Iron Casting, Designation A-48).

.4 Adjustment

.1 To adjust manholes and chambers to the proposed elevation, the Contractor shall use heads whose heights shall vary from 200 to 475 mm. Heads shall have a continuous groove on the top face, to accommodate the installation of a strip of butyl as well as a lip to hold the frame or levelling ring.

.2 A standard ring measuring 300 mm in height shall be installed beneath the head, when the height of the manhole allows. No ring of a height other than 300 mm shall be installed directly beneath the head of the manhole.

.3 Stacking rings shall be installed in heights of 300, 600, 900, 1 200 and 1 800 mm.

.5 Identification of parts

.1 To ensure that parts are installed at the right location, it is necessary for them to be identified on the inside, respecting the numbering of manholes on the plans of the Canada Parks Representative.

.6 Rubber adjustment risers

.1 To adjust manholes measuring no more than 100 mm in height, the Contractor shall use rubber risers.

.2 The types of rubber rings, which the Contractor may use, based on the adjustment height, are the following:

.1 Flat 12.5, 25, 38, 50 and 75 mm rubber rings.

.2 Angled 12.5-25, 25-38, 38-50, 50-63 and 63-75 mm rubber rings.

2.6 CATCH BASIN

.1 Catch basin

.1 Catch basins shall be of reinforced concrete in compliance with the NQ 2622-420 standard. Unless otherwise indicated in the plans, catch basins will be 610mm diameter and have a butyl gasket.

.2 The catch basin's concrete shall have a compressive strength of 35 MPa while the head and levelling rings shall have a compressive strength of 40 MPa.

.3 Elements of all catch basin models shall meet the durability requirements of freeze/thaw cycle tests using de-icing salts, as described in the "Cahier des charges et devis généraux" issued by the Ministère des Transports du Québec (MTQ – Quebec Department of Transport). This compliance must be attested to by a Laboratory accredited by the MTQ.

.4 The base course rests on a stable sub-course and consists of a 150 mm cushion of MG-20b calibre crushed stone.

.5 Catch basins are connected to the storm sewer main by the DR-35 PVC pipe with a minimum diameter of 200 mm. The pipe's connection to the main uses a monolithic tee or appropriate saddle, and the Contractor shall only pierce mains using special drills produced specifically for this purpose.

.6 The connection between the pipe and the catch basin must have a rubber gasket. At every joint, sections of the catch basin must have a rubber gasket or butyl tape.

.7 When two (2) catch basins are connected in a series, the connection to the water main shall use a 300 mm-diameter PVC pipe.

.8 The use of a hammer to pierce the pipe is prohibited at all times.

.9 Backfilling around the catch basin shall be with MG-20b crushed stone compacted to 90 % of M.P. over a 600 mm width.

.2 Frames, grates and traps

.1 The catch basin shall be of the adjustable type with guide rings and no other standard type can be installed without the authorization of the Canada Parks Representative.

.2 The cast iron and shaping of frames, guides and covers shall comply with the NQ 3221-500 standard. They shall be flawlessly moulded with no cracks, scars, blisters or other defects. The warping tolerance in all directions shall be less than 1 mm (1/32 in.). All parts whose weight is less than 95 % of the weight indicated by the manufacturer shall be rejected. All cast-iron parts shall bear the manufacturer's name or trademark. All unidentified parts shall be refused.

.3 In the case of the catch basin located above grade, the frame and grate shall be of ductile cast iron.

.4 In the case of the catch basin located in paved zones, the frame and the guide channel shall be self-adjustable model. The frame and grate shall be of class 65-45-12 ductile cast iron and the guide shall be of class 25 cast iron.

.5 Frames and grates shall be capable of withstanding heavy traffic.

.6 In the case of standard types, catch basins shall have a ductile cast iron grate. Grates shall have a diameter of 750 mm and weigh a minimum of 75 kg. Grates rest on a cast iron seat anchored in the plant to the catch basin's head section. When subjected, in a position of use, to load test using a 200 mm-diameter plate the catch basin's grate shall be capable of withstanding a 150 kN load.

.7 Catch basins shall be fitted with a class 30 grey cast iron trap.

.3 Rubber adjustment risers

.1 To adjust the catch basin measuring no more than 100 mm in height, the Contractor shall use rubber risers.

.2 The types of rubber rings, which the Contractor may use based on the adjustment height, are the following:

.1 Flat 12.5, 25, 38, 50 and 75 mm rubber rings.

.2 Angled 12.5-25, 25-38, 38-50, 50-63 and 63-75 mm rubber rings.

2.7 RUBBER JOINTS

.1 All rubber joints for sewer and waterworks pipes shall comply with the standard applicable to the type of pipe involved.

2.8 ASPHALT MASTIC

.1 In these exceptional cases when it is used in the production of sewer pipe joints, asphalt mastic shall comply with the ASTM's C-14 and C-76 standards. It shall be cold formed, lend itself to trowel application, be freeze and water resistant, be unaffected by waste water, and harden over time while retaining its elasticity. The mastic used shall provide a high level of adhesion to concrete and adequate tensile strength.

2.9 BEDDING AND SURROUND MATERIALS

.1 Base course and cover materials shall comply with Section 31 23 11 - Excavation and Backfilling - Underground Services.

2.10 BACKFILL MATERIALS

.1 Backfill materials shall comply with Section 31 23 11 - Excavation and Backfilling - Underground Services.

2.11 EXPANDED POLYSTYRENE INSULATION

.1 Extruded expanded polystyrene insulation shall comply with the requirements of the CAN/ULC S701-97 type 4 standard (formerly the CAN/CGSB 51.20 - M87 standard), and shall have a minimal compressive strength of 415 kPa (60 psi).

.2 Extruded expanded polystyrene insulation shall be supplied in panels measuring 600 mm x 2,400 mm.

2.12 GEOTEXTILE MEMBRANE

.1 Geotextile membranes shall comply with the MTQ's standard 13101 - Geotextiles and shall be type III.

2.13 UNSHRINKABLE FILL

.1 The unshrinkable fill shall comply with article "Unshrinkable Fill" of section 31 23 11 - Excavation and Backfilling - Underground Services.

PART 3 - EXECUTION

3.1 PREPARATION WORK

.1 Clean and dry pipes and connectors prior to their installation and remove all defective material from the site, to the Canada Parks Representative's satisfaction.

.2 Have pipes, connectors, manholes, catch basin manholes, and catch basins approved by the Canada Parks Representative prior to their installation.

.3 Retain and protect existing structures.

3.2 VERIFICATION OF THE LOCATION

.1 After marking the location of underground installations, and before any pavement cutting or removal, or excavation activities for the installation of the pipes have been carried out, the Contractor shall verify, in the presence of the Canada Parks Representative, the location of existing sewer pipes.

.2 The Contractor shall take measures to determine the depth of existing sewer pipes at the point where connections are to be made.

.3 Following the excavation work, the Contract shall verify the dimensions, type and condition of the exposed sewer pipe.

.4 In the event that a condition, which is significantly different from those prescribed in the contract be discovered, the Contractor shall immediately notify the Canada Parks Representative of this finding.

.5 When necessary, the profile shall be adjusted according to the Canada Parks Representative's instructions, so as to avoid any sudden changes in the slope and alignment of the sewer pipe and connection.

3.3 DIGGING OF TRENCHES

.1 Dig trenches in compliance with Section 31 23 11 - Excavation and Backfilling - Underground Services.

3.4 PIPE BEDDING AND STRUCTURES

.1 Have the layout and depth of the trench approved by the Canada Parks Representative before placing the bedding material.

.2 The bedding and surround materials for pipes and underground structures shall be produced in compliance with the requirements of Section 31 23 11 - Excavation and Backfilling - Underground Services.

3.5 PIPE INSTALLATION

.1 Pipes shall be installed in compliance with contract drawings, with all necessary connections and accessories. The Contractor shall clean the extremities and interior of the various parts prior to their assembly. All pipes shall have rubber gaskets.

.2 Installation work shall be carried out dry at the bottom of the trench, in keeping with the requirements of Section 31 23 11 - Excavation and Backfilling - Underground Services. The Contractor shall install pipes starting with the lowest point in the system, moving up the slope. Female pipe extremities shall be positioned upstream. The Contractor shall keep earth or debris from entering the pipes during installation. All pipes shall be installed in a straight line; each change in direction shall involve only one manhole. All pipes incorrectly aligned or collapsing following installation shall be removed and placed on a new bed.

.3 Seal all lifting holes using prefabricated plugs approved by the Canada Parks Representative and secured with unshrinkable grout.

.4 As needed, pipes shall be cut to accommodate special gaskets, connections and plugs, according to the manufacturer's instructions, without damaging the pipe or its coating, and to ensure that the tip of the pipe is smooth and perpendicular to the latter's axis.

.5 Prefabricated saddle tees or connectors produced on site shall be used to connect new pipes to existing sewer pipes. Ensure that joints are solid and watertight.

.6 When work is to be interrupted, temporarily block the ends of the pipes upstream, using removable watertight plugs.

.7 Polyvinyl chloride (PVC) pipes shall be checked for distortion of the interior diameter upon final reception of the work or before paving work, or at a period specified by the Canada Parks Representative. The Contactor shall refer to this section's article "Distortion Tests".

.8 On the 300 mm or less pipes, lubricant must be applied on the male end exclusively. The quantity used must be the minimal quantity recommended by the pipe manufacturer. No lubricant excess is tolerated inside the pipe.

3.6 PIPE INSULATION

.1 Thermal insulation of all sewer pipes installed at a depth of less than 1,5 m is required.

.2 Place the insulation over the compacted granular surround material covering the pipe as described in the detail provided.

.3 Place the sheets lengthwise and parallel to the pipe's middle line, staggering the transversal joints.

.4 Sheets shall be butt jointed and secured to prevent movement.

3.7 MANHOLE, CATCH BASIN MANHOLE AND CATCH BASIN

.1 The Contractor shall supply and install, in locations indicated in contract drawings, prefabricated reinforced concrete sewer manholes, catch basin manholes and catch basins. Prefabricated underground structures shall be pre-approved by the Canada Parks Representative.

.2 The Contractor shall take the following parameters into account when ordering these structures, including:

.1 The density of the fill material to be considered in the structural proportioning shall be that of saturated clay.

.2 The elevation of the ground water table to be taken into account is that which is equivalent to the finished ground surface. To this end, all structures shall take buoyancy into account.

.3 The structure shall be capable of withstanding heavy vehicle traffic.

.3 Before proceeding with production, the Contractor shall provide the Canada Parks Representative with shop drawings, plans and diagrams of the installation, fitting and/or assembly related to the production and installation.

.4 These structures shall be delivered in monolithic modules fitted with a lifting device allowing each unit to be easily handled and assembled with others on the work site. If lifting holes are required for lifting, these shall have been designed so as not to completely run through the element involved and not compromise watertightness. Only handling systems adapted to the lifting device and recommended by the supplier shall be used. The Contractor shall store the various modules on the work site so as not to damage them, particularly at the joints; all parts with cracks or signs of impact shall be replaced at the Contractor's expense.

.5 Joints between each of the elements to constitute a given underground structure shall be fitted with a rubber gasket or a key path preventing lateral movement following assembly with a butyl gasket. Joints must first have been cleaned, lubricated and cleared of all materials and/or malformation, which could compromise assembly and/or watertightness.

.6 Following assembly, all cavities or lifting holes present on the surface of the prefabricated elements shall be sealed using a filling compound.

.7 In the case of prefabricated underground structures, the clear interior dimensions shall not vary by more than 12 mm (1/2 in.) from those shown in the contract drawings. The thicknesses of walls, floor and roof shall not vary by more than 6 mm (1/4 in.) from those required. Following assembly, no divergence greater than 25 mm (1 in.) from the vertical determined by a plumb line shall be accepted for any wall of a prefabricated underground structure. No joint shall have an opening greater than 10 mm (3/8 in). Watertightness shall subsequently be verified by visual inspection; any infiltration noted during the inspection shall be caulked by the Contractor, to the Canada Parks Representative's satisfaction, using an epoxy-based compound.

3.8 CATCH BASIN CONNECTION

.1 Unless otherwise indicated in the plans, the catch basins' connections to the main sewer line shall use DR-35 polyvinyl chloride (PVC) pipes with a diameter of 200 mm (8 in.) and joints with rubber gaskets. They shall be built at a minimum angle of 30º from the main sewer line's horizontal half-diameter. The construction of catch basin connections shall use a saddle tee installed on the main sewer.

.2 A minimum clearance of 1,0 m shall be ensured between a catch basin connection and a main sewer joint or between two catch basin connections. In the latter case, it shall be preferable to carry out the connection on each side of one of the main pipe's joints.

3.9 BACKFILLING

.1 Backfilling shall be carried out in compliance with Section 31 23 11 - Excavation and Backfilling - Underground Services.

3.10 CONNECTION TO EXISTING PIPES OR UNDERGROUND STRUCTURES

.1 Projected pipes:

.1 The Contractor shall carry out the connection of all projected pipes to existing pipes or underground structures. To this end, he shall first locate and clear existing pipes or underground structures and determine their exact profile and diameter to ensure that that parts needed for connecting work are available on site when the work is to be carried out. He shall then empty existing pipes, pierce existing underground structures, provide the special connectors required and produce all watertight joints needed to connect the proposed pipes to existing pipes or underground structures.

.1 Connections without rubber gaskets: For sanitary pipes of more than 610 mm and storm sewers, all pipe connections to existing sewer manholes shall be carried out using a form, outside the manhole, into which a minimum 15 cm thickness of unshrinkable mortar shall be placed. It is necessary to ensure that the excavation remains dry until the concrete has set.

.2 Interior finish of sewer manholes: The interior finish of existing sewer manholes calls for concreting the bottom of the sewer manholes so as to adopt the form of sewer pipes in place by forming a semi-circular channel up to half the pipe's diameter. This correction immediately follows the progression of the work. The channel shall be smooth and even, with radii as long as available space allows, with no sharp turns shall be allowed.

.2 Projected underground structures (manholes, catch basins, etc.):

.1 The Contractor shall carry out the connection of all projected or existing pipes to projected underground structures. To this end, he shall first locate and clear existing pipes to determine their exact profile and diameter. He shall then supply the special connectors required by the pipes and produce all watertight joints needed for the connection to projected underground structures.

3.11 SERVICE INTERSECTIONS

.1 Wherever underground municipal services or public utilities intersect, a minimum clearance of 300 mm (12 in.) shall be maintained except in the case of municipal service entrances where this value can be reduced to 150 mm (6 in.). The minimal clearance shall be increased to 500 mm (20 in.) in the event that a sewer pipe is built parallel to another municipal service or public utility.

.2 Where proposed pipes intersect or a proposed pipe crosses under an existing service, the Contractor shall fill the space between the two services using a Class A granular material compacted to 95 % M.P. Furthermore, the last space beneath the top service, which cannot be correctly filled with compacted Class A material, shall be filled with unshrinkable fill to prevent compaction.

3.12 REPAIRS

.1 All work to be redone or repaired shall be carried out at the Contractor's expense before the Canada Parks Representative recommends the provisional acceptance of the work.

.2 If major repairs are required following tests described in the aforementioned articles, the Canada Parks Representative shall require that a special CCTV inspection be carried out, at the Contractor's expense, where repairs were made.

.3 When the floors and rises have been located, a maximum tolerance of 10 % of the nominal diameter shall be accepted. Should the floors or rises exceed this tolerance, the Contractor shall be required to redo the defective part of the sewer, rendering it acceptable.

.4 Sewer lines must end with a female end. In the event of the impossibility of a straight alignment of the services, only long radius bends are accepted.

3.13 WATERTIGHTNESS TESTS AND ACCEPTANCE (SANITARY SEWERS)

.1 Generalities

.1 A watertightness test shall be carried out on all sanitary sewer pipes, including all of their accessories (sewer manholes, pumping stations, connectors) and on all of their connections.

.2 The Contractor shall carry out watertightness tests in compliance with the flowing articles and the most recent version of the BNQ 1809-300. All of these tests shall be conducted, at the Contractor's expense, by an independent specialized firm approved by the Canada Parks Representative. All of these expenses are included in the bid.

Note: A specialized firm is defined as a company, which has the proper equipment and competencies to carry out cleaning and disinfection work as well as conduct watertightness tests on drinking water and sewer pipes.

.3 All positive and negative results of said tests must be included in reports produced and signed by the specialized firm's Engineer.

.4 The Contractor shall produce an appropriate scaled plan proportioned to accurately show the new sewer pipes, their accessories (sewer manhole, pumping station) and connections as well as the part of the existing network affected by the work. This plan must indicate where interventions have been carried out to ensure the watertightness of the sewer pipes and, if required, distortion measurements. This plan and equipment for the execution of this work shall be revised by the Canada Parks Representative before the Contractor can proceed with the tests.

.5 The recognized specialized firm shall advise the project manager at least 24 hours prior to the start of the work.

.6 The final connection of a new pipe to the existing network can only be carried out after all required tests have been conducted and the Canada Parks Representative's approval has been obtained.

.7 The following table illustrates the tests, which must be successfully passed in order for work to be accepted.

.8 In the case of sanitary sewers built on an existing street where residents must remain connected, the Contractor shall install a Y at each property line, allowing him to insert a balloon for testing the sewer section involved. Once all tests have been carried out, a plug is fitted on the Y which is cut at a level 1 m beneath the final ground elevation.

TESTS TO BE CONDUCTED

FOR NEW SANITARY SEWER NETWORKS

Type of structure	Test methods to be respected				
	CCTV inspection with video recording	Verification of water infiltration	Low air-pressure leak test	Joint by joint low air-pressure leak test	Water exfiltration leak test
Pipes with a nominal diameter of < 600 mm (24 in.)	To be conducted	To be conducted	To be conducted		
Connections		To be conducted	To be conducted		

Note: 1 : Low air-pressure leak test b section
2 : It is necessary to conduct and successfully pas the low air-pressure leak test "by section" or "joint by joint".
3 : Visual inspection only.

.9 Instrumentation of units for watertightness tests:

.1 Plugs to be installed upstream and downstream from the section or segment being tested, shall be fitted with 2 manometers making it possible to obtain 2 pressure readings.

.2 Monometers shall be of the viscous damping type with a range of 0 kPa to 50 kPa, graded in intervals of no more than 1 kPa, and accurate to within 0.5 kPa.

.3 A clear tube measuring 2,4 m in length shall make it possible to check manometers.

.4 A chronometer.

.5 A pressure release system making it possible to avoid pressures exceeding 42 kPa in the pipes being tested.

.2 Cleaning

.1 Throughout the duration of the work and until its provisional acceptance by the Canada Parks Representative, it shall be necessary to keep all drains, sewer pipes, manholes, catch basins and their connections absolutely clean and free of all obstructions. The Contractor shall also be responsible for any damage resulting from the sewer's poor operation.

.2 Prior to a CCTV inspection, before the works have been accepted and the pipes put into service, a complete cleaning shall be carried out. No product or coating shall be applied to the structures before the tests.

.3 Should the volume of debris be significant, the Contractor shall hire a specialized firm to produce a report attesting to the cleaning of the pipes. The Canada Parks Representative shall be provided with a certificate attesting to the disposal of sludge at an authorized site. The Contractor shall then be required to run clean water through the system from the point(s) upstream from the system until the water runs downstream filling every possible floor.

.3 CCTV inspection

.1 The Contractor shall arrange to have a specialized firm conduct an inspection, using a camera with a rotating head and video recording, of all sewer pipes installed within the framework of this contract. Any irregularities in the pipes, joints, connectors, or lack of cleanliness in the system etc, shall be located and photographed. The Contractor shall provide the Canada Parks Representative with the report of the televised inspection along with two (2) copies of the videocassette or DVD. The Contractor shall, at his own expenses, carry out any work required to redo, clean or repair structures deemed to so require.

.2 Should major repairs be required following a first inspection, the Canada Parks Representative may, if he deems it necessary, demand a second CCTV inspection of strategic locations. This second inspection shall be carried out at the Contactor's expense.

.4 Water infiltration tests

.1 When checking for the infiltration of water in the pipes and underground structures, there shall be no trace of water except for that resulting from the condensation of steam contained in the air or, in the case of concrete, from natural oozing.

.2 Should the presence of water, drops of water or dripping be visible, a test measuring the infiltration of water shall be conducted.

.3 The Contractor shall install a plug upstream from the pipe and a weir downstream from the pipe, depending on the method chosen.

.4 The water infiltration rate measured in the pipes shall not exceed 18,5 L per millimetre of the pipe's inner diameter per kilometre of length per 24 hour period (18.5 L/mm•km•24 hr.).

.5 In the case of underground structures, the maximum allowable infiltration rate, including the joints of pipes to the structures, shall be 2 L per hour per metre in height (2 L/hr.•m), but shall never exceed 10 L per hour for each structure checked individually.

.6 The test may be conducted on one or several pipe sections, provided the length of the main pipe subjected to the test does not exceed 200 m. If the rate of water infiltration is measured using to volumetric method or with the help of a weir, two measurements must be taken at 10 minute intervals. The results must appear in the test report.

.7 If the test is positive, the exfiltration test must then be conducted. If the test is negative, the sections involved shall be refused and the Contractor shall be required to carry out repairs as quickly as possible.

.5 Exfiltration test using low air-pressure leak method on sanitary sewer pipes measuring no more than 900 mm in diameter

.1 Fields of application and procedures:

.1 Air tests are applied section by section or by segment of pipe, excluding sewer manholes but including lateral connections, connections to the street's right of way as well as, in the case of sewers, those of catch basins.

.2 The maximum allowable air loss must be verified by measuring the time required for a 7 kPa drop in pressure (1 psi) in the section or segment being tested, following a stabilization at 3 kPa (0.5 psi) above the highest pressure point from which the time required for the drop in pressure was measured, without ever exceeding 42 kPa (6 psi). This time is called the "measured drop time".

.3 When the water table is lower than the crown of the pipe at the time when the test is conducted, the top starting pressure is 24 kPa (3.5 psi). If the water table reaches or exceeds the crown of the pipe, the top starting pressure is 34 kPa (5 psi).

.2 Measures of implementation:

.1 Clean the pipe section or segment to be tested, particularly where pneumatic plugs come into contact with the pipe.

.2 In the case of concrete, a preliminary soaking of the pipe is accepted. However, the soaking time shall not exceed 72 hours. No product can be added to the water during the soaking period, nor during the watertightness test.

.3 Isolate the section by adequately sealing all of the openings on the section, segment or joint using pneumatic plugs inflated to the internal pressure recommended by the manufacturer.

.4 Add air slowly to the section or segment on which testing is being conducted until the internal pressure reaches 27 kPa (4 psi) or 37 kPa (5.5 psi) without ever exceeding 42 kPa (6 psi).

.5 Once the internal pressure of 27 kPa (4 psi) or 37 kPa (5.5 psi) has been obtained, allow the pressure and air temperature to stabilize for at least two (2) minutes, adding only the amount of air required to maintain pressure.

.6 Once the temperature and pressure have been stabilized, the air supply is cut off and the pressure allowed dropping to 24 kPa (3.5 psi) or 34 kPa (5 psi). The test per se begins once the pressure is 24 kPa (3.5 psi) or 34 kPa (5 psi), the moment when the

chronometer is started. Once the pressure reaches 17 kPa (2.5 psi) or 27 kPa (4 psi), the chronometer is stopped.

The drop time is compared to the value specified in the minimum drop time tables for a 7 kPa (1 psi) drop in pressure. Refer to the "Tables of Minimum Drop Time Required. If this time is higher than or equal to the required test period, the section or segment is accepted. If not, the test is refused.

3.14 WATERTIGHTNESS TESTS AND ACCEPTANCE (STORM SEWER)

.1 Generalities

.1 In the case of the storm sewer, no watertightness test will be carried out IN the joints of these pipes; only a CCTV inspection with video recording shall be conducted. Infiltrations detected by the CCTV inspection shall be caulked by the Contractor to the Canada Parks Representative's satisfaction.

.2 Cleaning

.1 Throughout the duration of the work and until its provisional acceptance by the Canada Parks Representative, it shall be necessary to keep all drains, sewer pipes, manholes, catch basins and their connections absolutely clean and free of all obstructions. The Contractor shall also be responsible for any damage resulting from the sewer's poor operation.

.2 Prior to a CCTV inspection, before the work has been accepted and the pipes put into service, a complete cleaning shall be carried out. No product or coating shall be applied to the structures before the tests.

.3 Should the volume of debris be significant, the Contractor shall hire a specialized firm to produce a report attesting to the cleaning of the pipes. The Canada Parks Representative shall be provided with a certificate attesting to the disposal of sludge at an authorized site. The Contractor shall then be required to run clean water through the system from the point(s) upstream from the system until the water runs downstream filling every possible floor.

.3 CCTV Inspection

.1 The Contractor shall arrange to have a specialized firm conduct an inspection, using a camera with a rotating head and video recording, of all sewer pipes installed within the framework of this contract. Any irregularities in the pipes, joints, connectors, or lack of cleanliness in the system etc, shall be pinpointed and photographed. The Contractor shall provide the Canada Parks Representative with the report of the televised inspection along with two (2) copies of the videocassette or DVD. The Contractor shall, at his own expense, carry out any work required to redo, clean or repair structures deemed to so require.

.2 Should major repairs be required following a first inspection, the Canada Parks Representative may, if he deems it necessary, demand a second CCTV inspection of strategic locations. This second inspection shall be carried out at the Contactor's expense.

3.15 DISTORTION TEST

.1 The distortion test shall comply in every regard to the requirements of the BNQ 1809-300 standard.

.2 The distortion test applies to the following types of pipes: polyvinyl chloride (PVC), high-density polyethylene (PEHD), corrugated aluminized steel or aluminum, and ribbed aluminized steel.

.3 After proper cleaning, the Contractor shall check the distortion of every storm and sanitary sewer pipe. It is recommended that this measure be combined with the CCTV inspection test, which would make it possible to better visualize distortion.

.4 Any distortion of the true inner diameter exceeding 5 %, verified after the complete backfilling of the pipe and prior to the provisional inspection of the pipe shall result in the replacement of the pipe involved.

.5 Any distortion of the true inner diameter exceeding 7,5 %, verified between 60 and 30 days prior to the final reception of the work shall result in the replacement of the pipe involved.

.6 Verification of the true inner diameter shall be carried out in the presence of the Canada Parks Representative and to the latter's satisfaction, using a unit providing at least 9 points of contact with the pipe or a laser profilometer whose measuring accuracy is at least 0,25 %.

.7 Verification of distortions shall be carried out by a specialized firm approved by the Canada Parks Representative and the original of its report shall be signed by an engineer who is a member in good standing of the Ordre des Ingénieurs du Québec or a technologist employed by the firm, and handed to the Canada Parks Representative. The use of a vibration dissolution unit is prohibited.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 CSA Group.

.1 CSA C22.1-F15, Canadian Electrical Code, Part 1 (23rd Edition), Safety Standard for Electrical Installations.

.2 CSA C22.2 No. 0.3-06 (R2014), Test Methods for Electrical Wires and Cables.

.3 CAN/CSA-C22.3 No.7-F10, Underground Systems.

.4 CAN3-C235-83(R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

.5 CSA 282-09, Emergency Electrical Power Supply for Buildings.

.6 CSA-Z462-15, Electrical Safety.

.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.

1.2 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.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit for review single-line electrical diagrams under plasticized envelop, in A1 format, and located in the exterior cabinet.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.

.2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.

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

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

.5 If changes are required, notify Parks Canada Agency (PCA) of these changes before they are made.

.4 Certificates.

.1 Provide CSA certified material and equipment.

.2 Where CSA certified equipment and material is not available, submit such equipment and material to an Authority Having Jurisdiction for approval before delivery to site.

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

.4 Permits and fees: In accordance with General Conditions of Contract.

.5 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.

.6 Submit certificate of acceptance from Authority Having Jurisdiction upon completion of Work to Parks Canada Agency (PCA).

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 77 00 - Closeout Procedures.

.2 Operation and Maintenance Data: Submit operation and maintenance data:

.1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.

.2 Operating instructions to include following:

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

.2 Operating 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.

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

.4 Post instructions where directed.

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

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

1.5 DELIVERY, STORAGE, AND HANDLING

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

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

.3 Storage and Handling Requirements:

.1 Store materials, indoor, off ground, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.4 Packaging Waste Management: Remove for reuse as specified in Waste Reduction Workplan in accordance with Section 01 74 19 - Waste Management and Disposal.

1.6 WORK UNDER TENSION AND DANGER OF ARCING FLASH

.1 All work must be done "Off".

.2 Live Work:

.1 All work must be done "Off". However, if the Contractor is to perform live work for exceptional reasons, the latter must make a written request to the Departmental Representative with a clear indication of the conditions requiring live work.

.2 Any work carried out on live equipment must be carried out in accordance with the CSA Standard Z462 "Safety in the Field of Electricity at Work". Refer to tables 1 and 4 of CSA Standard Z462.

.3 The Contractor must obtain acceptance from the Departmental Representative before starting the work under tension.

.3 "Electric Arc Hazard" Marking:

.1 Provide and install a label on all electrical equipment (except those that comply with CSA Z462, item 4.3.3.1), as requested by the CCQ-E and of type "Figure Q.1" and as shown in Appendix Q of CSA Z462 Standard.

Part 2 Products

2.1 DESIGN REQUIREMENTS

.1 Operating Voltages: To CAN3-C235.

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

.1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

.3 Language Operating Requirements: Provide identification nameplates for control items in French and English.

.4 Use one nameplate for each language.

2.2 MATERIAL AND EQUIPMENT

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

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

.3 Factory-assemble control panels and component assemblies.

2.3 EQUIPMENT AND CONTROLS

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

2.4 WIRING TERMINATIONS

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

2.5 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, numbered, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour Coding: To CSA C22.1.

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

2.6 FINISHES

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

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: Prior to installation:

.1 Visually inspect substrate in presence of Parks Canada Agency (PCA).

.2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after received of written approval to proceed from the Parks Canada Agency (PCA).

3.2 INSTALLATION

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

.2 Do overhead and underground systems in accordance with CAN/CSA-C22.3 No.71, except where specified otherwise.

3.3 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to pouring of concrete.

.1 Sleeves through concrete: Plastic, sized for free passage of conduit, and protruding 50 mm.

3.4 LOCATION OF OUTLETS

.1 Locate outlets in accordance with Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.

3.5 CO-ORDINATION OF PROTECTIVE DEVICES

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

3.6 FIELD QUALITY CONTROL

.1 Load Balance:

.1 Measure phase current of all existing and new panel boards with normal loads operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

.2 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS, phase and neutral currents on panel boards, 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 to:

.1 Power distribution system including phasing, voltage, grounding, and load balancing;

.2 Circuits originating from branch distribution panels;

.3 Lighting and its control;

.4 Insulation resistance testing:

.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.

.2 Megger 350-600 V circuits, feeders and equipment with a 1,000 V instrument.

.3 Check resistance to ground before energizing.

.3 Carry out tests in presence of Parks Canada Agency (PCA).

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

3.7 SYSTEM START-UP

.1 Instruct Parks Canada Agency (PCA) in operation, care, and maintenance of systems, system equipment, and components.

.2 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.

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

3.8 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.

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

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

.3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

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

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes requirements for selective demolition and removal of electrical installations.

.2 Selective demolition works shall consist, but are not limited to, the removal and disposition, in whole or in part, of the following equipment and networks:

.1 Electrical distribution, including electrical distribution panels, circuit breakers, cabinet, contactors, conduits, wiring, expansion joints, hardware, and accessories;

.2 Lighting fixtures, lamp posts, and controls.

1.2 RELATED REQUIREMENTS

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

1.3 REFERENCE STANDARDS

.1 CSA Group (CSA).

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

1.4 DEFINITIONS

.1 Demolish: Dismantle items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged or removed and reinstalled.

.2 Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes, cabling and wiring from electrical component to panel, taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged or removed and reinstalled.

.3 Remove and Salvage: Dismantle items from existing construction and deliver them to Parks Canada Agency (PCA) ready for reuse.

.4 Remove and Reinstall: Dismantle items from existing construction, prepare them for reuse, and reinstall them where indicated.

.5 Existing to Remain: Existing items of construction that are maintained onsite.

.6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment, if handled improperly, as defined by Federal Hazardous Products Act (RSC 1985), including latest amendments.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.

1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: Perform work of this Section in accordance with:

.1 Provincial/Territorial Workers' Compensation Boards/Commissions.

1.7 SITE CONDITIONS

.1 Discovery of Hazardous Substances: It is not expected that Hazardous Substances will be encountered in Work; immediately notify Parks Canada Agency (PCA) if materials suspected of containing hazardous substances are encountered and perform following activities:

.1 Hazardous substances will be as defined in Hazardous Products Act.

.2 Stop work in area of suspected hazardous substances.

.3 Take preventative measures to limit users' and workers' exposure. Provide barriers and other safety devices and do not disturb.

.4 Hazardous substances will be removed by Parks Canada Agency (PCA) under a separate contract or as a change to Work.

.5 Proceed only after written instructions have been received from Parks Canada Agency (PCA).

Part 2 Products

2.1 MATERIALS

.1 Electrical Repair Materials: Use only new materials, CSA or ULC labelled as appropriate and matching components remaining after work associated with components identified for removal or demolition are completed.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Existing Conditions: Visit site, thoroughly examine and become familiar with conditions that may affect the work of this Section before tendering the Bid; Parks Canada Agency (PCA) will not consider claims for extras for work or materials necessary for proper execution and completion of the contract that could have been determined by a site visit.

3.2 PREPARATION

.1 Protection of existing systems to remain: Protect systems and components indicated to remain in place during selective demolition operations and as follows:

- .1 Prevent movement and install bracing to prevent settlement or damage of adjacent services and parts scheduled to remain;
- .2 Notify Parks Canada Agency (PCA) and cease operations where safety of adjacent structures or services appears to be endangered and await additional instructions before resuming demolition work specified in this Section.

3.3 EXECUTION

.1 Coordinate requirements of this Section as follows:

- .1 Remove existing luminaires, electrical devices and equipment including associated conduits, boxes, wiring, and similar items, unless specified otherwise;
- .2 Perform demolition work in a neat and workmanlike manner:
  - .1 Remove tools or equipment after completion of work and leave site clean and ready for subsequent renovation work;
  - .2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.
- .3 Remove existing conduits, boxes, cabling and wiring, as indicated;
- .4 Seal open ends of conduit with silicone sealant where they are inaccessible or cannot be removed without damaging adjacent construction.

3.4 CLOSEOUT ACTIVITIES

.1 Demolition Waste Disposal: Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre).

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

.1 CSA Group (CSA).

.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).

1.3 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 wire and box connectors, and include product characteristics, performance criteria, physical size, finish, and limitations.

.3 Sustainable Design Submittals:

.1 Construction Waste Management:

.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 77 00 - Closeout Procedures.

.2 Operation and Maintenance Data: Submit operation and maintenance data for wire and box connectors for incorporation into manual.

1.5 DELIVERY, STORAGE, AND HANDLING

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

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

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wire and box connectors from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

.1 Pressure Type Wire Connectors: To CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors, as required.

.2 Fixture Type Splicing Connectors: To CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

.3 Bushing Stud Connectors: To NEMA and to consist of:

.1 Connector body and stud clamp for round copper conductor.

.2 Clamp for stranded copper conductors.

.3 Stud clamp bolts.

.4 Bolts for copper conductors.

.5 Sized for conductors as indicated.

.4 Clamps or connectors for armoured flexible conduits, 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 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after received of written approval to proceed from Parks Canada Agency (PCA).

3.2 INSTALLATION

.1 Remove insulation carefully from ends of conductors and cables, and, depending, proceed with the following:

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

.2 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap;

.3 Install bushing stud connectors in accordance with pertinent NEMA Regulations and in accordance with the manufacturer's recommendations.

3.3 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.

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

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

.3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

.2 Section 26 05 20 - Wire and Box Connectors (0-1,000 V).

.3 Section 26 05 43.01 - Installation of Cables in Trenches and in Ducts.

1.2 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA)/CSA International.

.1 CSA C22.2 No. 0.3, Testing Methods for Electrical Cables and Wires.

1.3 PRODUCT DATA

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

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 WIRES

.1 Conductors: Stranded for 10 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 for interior use.

.3 Copper Conductors: Size as indicated, with 1000 V insulation of cross-linked thermosetting polyethylene material rated RWU90 XLPE for exterior use.

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 the tests according to the methods approved by the local Authority Having Jurisdiction over installation.

.3 Perform tests before energizing electrical system.

3.2 GENERAL - CABLE INSTALLATION

.1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1,000 V).

.2 Cable Colour Coding: To Section 26 05 00 - Common Work Results for Electrical.

.3 Conductor length for parallel feeders to be identical.

.4 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend.

3.3 INSTALLATION OF WIRES

.1 Install wiring:

.1 In conduits, in accordance with Section 26 05 43.01 – Installation of cables intrenches and in ducts.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

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

.1 ANSI/IEEE 837-02, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

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 to install the grounding products. Printed product literature and data sheets for grounding equipment must include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 77 00 - Closeout Procedures.

.2 Operation and Maintenance Data: Submit operation and maintenance data for grounding equipment for incorporation into manual.

1.5 DELIVERY, STORAGE, AND HANDLING

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

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

.3 Storage and Handling Requirements:

.1 Store materials off ground, indoor, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wire and box connectors from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 EQUIPMENT

.1 Copper Conductors: Size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE for interior use or with 1000 V insulation of cross-linked thermosetting polyethylene material rated RWU90 XLPE for exterior use.

.2 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including, but not necessarily limited to:

- .1 Grounding and bonding bushings.
- .2 Protective type clamps and inspection boxes.
- .3 Bolted type conductor connectors.
- .4 Bonding jumpers, straps.
- .5 Pressure-wire connectors.

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 grounding equipment installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate/supports.
- .2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION - GENERAL

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

.2 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly clean bonding wire to exterior of flexible conduit.

.3 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.

3.3 SYSTEM AND CIRCUIT GROUNDING

.1 Install system and circuit grounding connections.

3.4 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to following list: Service equipment, duct systems, distribution panels, and outdoor lighting.

3.5 FIELD QUALITY CONTROL

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

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

.3 Perform tests before energizing electrical system.

3.6 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.

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

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

.3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.3 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements 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 indoors, in dry location, off ground, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect hangers and supports from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: Remove for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 SUPPORT CHANNELS

.1 316L stainless steel "U" shape, size 41 x 41 mm, 2.5 mm thick, set in surface mounted with 316L stainless steel anchor bolts.

.2 316L stainless steel supports.

.3 Fasteners made of 316L stainless steel.

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 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after received of written approval to proceed from the Parks Canada Agency (PCA).

3.2 INSTALLATION

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

.2 Fasten exposed conduit or cables to structure or support system using clamps.

.3 For surface mounting of two or more conduits use "U"-channels at a maximal 1.5-m interval.

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

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

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

3.3 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.

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

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

.3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

.1 CSA Group (CSA).

.1 CSA C22.1-F15, Canadian Electrical Code, Part 1, 23rd Edition.

.2 CSA C22.2 No.40 (R2009), Short Circuit, Junction and pull Boxes.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Waste Management and Disposal:

.1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 CONDUIT BOXES

.1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of devices.

2.2 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 35 mm and pull boxes for larger conduits.

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

Part 3 Execution

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

.1 CSA Group (CSA).

- .1 CAN/CSA C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
- .2 CSA C22.2 No. 45-M1981(R2003), Rigid Metal Conduit.
- .3 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
- .4 CSA C22.2 No. 83-M1985(R2003), Electrical Metallic Tubing.
- .5 CSA C22.2 No. 211.2-M1984(R2003), Rigid PVC (Unplasticized) Conduit.
- .6 CAN/CSA C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data: Submit manufacturer's printed product literature, specifications and datasheets.

- .1 Submit cable manufacturing data.

1.4 QUALITY INSURANCE

.1 Test Report: Submit the testing reports delivered by independent and well-known laboratories.

.2 Certification: Submit the signed documents from the manufacturer, certifying that the products and materials satisfy the required physical characteristics and performance criteria.

.3 Instructions: Submit installation instructions supplied by the manufacturer.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

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

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

1.6 GENERAL

.1 All the conduits, tubes, and their paths are not necessarily on the drawings. Those that are present are represented schematically.

Part 2 Products

2.1 CONDUITS

.1 Electrical Metallic Tubing (EMT): To CSA C22.2 No. 83, with watertight couplings.

.2 Conduits and tubes to have a minimal nominal diameter of 21 mm, unless noted otherwise.

2.2 CONDUIT FASTENINGS

.1 One-hole galvanized steel straps to secure surface conduits 50 mm and smaller.

.1 Two-hole steel straps for conduits larger than 50 mm.

2.3 CONDUIT FITTINGS

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

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

.3 Watertight connectors and couplings for EMT.

.1 Set-screws are not acceptable.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings for linear expansion at entry to panel.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

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

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

3.4 CLEANING

.1 Proceed in accordance with Section 01 74 00 - Cleaning.

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

.1 Insulated Cable Engineers Association, Inc. (ICEA).

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 cables, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 DELIVERY, STORAGE, AND HANDLING

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

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

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect cables from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

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 cable installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate.
- .2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 CABLE INSTALLATION IN DUCTS

.1 Install cables in ducts as indicated.

.2 Do not pull spliced cables inside ducts.

.3 Install multiple cables in duct simultaneously.

.4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.

.5 To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.

.6 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.

.7 After installation of cables, seal duct ends with duct sealing compound.

3.3 FIELD QUALITY CONTROL

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

.2 Perform tests using qualified personnel.

- .1 Include necessary instruments and equipment.

.3 Check phase rotation and identify each phase conductor of each feeder.

.4 Check each feeder for continuity, short circuits and grounds.

- .1 Ensure resistance to ground of circuits is not less than 50 megohms.

.5 Pre-acceptance tests:

- .1 After installing cable but before splicing and terminating, perform insulation resistance test with 1,000 V megger on each phase conductor.
- .2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.

.6 Provide Parks Canada Agency (PCA) with list of test results showing location at which each test was made, circuit tested, and result of each test.

.7 Remove and replace entire length of cable if cable fails to meet any of test criteria.

3.4 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.

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

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

.3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

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

3.5 PROTECTION

.1 Repair damage to adjacent materials caused by cables installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

.2 Section 26 28 16.02 - Moulded Case Circuit Breakers.

1.2 REFERENCE STANDARDS

.1 CSA Group (CSA).

.1 CSA C22.2 No.29-11, Panelboards and Enclosed Panelboards.

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 panelboards, and include product characteristics, performance criteria, physical size, finish, and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.

.2 Include on drawings:

.1 Electrical detail of panel, branch breaker type, quantity, ampacity, and enclosure dimension.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 77 00 - Closeout Procedures.

.2 Operation and Maintenance Data: Submit operation and maintenance (O&M) data for panelboards for incorporation into O&M Manual.

1.5 DELIVERY, STORAGE, AND HANDLING

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

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

.3 Storage and Handling Requirements:

.1 Store materials off ground, indoors, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect panelboard from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 PANELBOARDS

.1 Panelboards: To CSA C22.2 No.29 and product of one manufacturer.

.1 Install circuit breakers in panelboards before shipment.

.2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.

.2 250-V panelboards: Bus and breakers rated for 22 kA (symmetrical) minimally for the 250-V panelboards, unless otherwise indicated.

.3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.

.4 Panelboards: Mains, number of circuits, and number and size of branch circuit breakers as indicated.

.5 Minimum of two flush locks for each panelboard.

.6 Two keys for each panelboard and key panelboards alike.

.7 Copper bus with neutral of same ampere rating of mains.

.8 Mains: Suitable for bolt-on breakers.

.9 Trim with concealed front bolts and hinges.

.10 Trim and door finish, grey color baked enamel, type to be “door-in-door” to ease maintenance.

.11 Ground bus.

.12 Where the word “Espace” (Space) is used to denominate a circuit, no breaker should be installed, in addition of a removable cover plate. The word “Libre” (Vacant) means to supply and install a breaker.

2.2 BREAKERS

.1 Breakers: to Section 26 28 16.02 - Moulded Case Circuit Breakers.

.2 Breakers with thermal and magnetic tripping in panelboards, except indicated otherwise.

.3 Main Breaker: Mounted in panel.

2.3 EQUIPMENT IDENTIFICATION

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

.2 Nameplate for each panelboard, size 4, engraved as indicated.

.3 Complete circuit directory with typewritten legend showing location and load of each circuit, mounted in plastic envelope at inside of panel door.

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 panelboards installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.

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

3.2 INSTALLATION

.1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.

.2 Connect loads to circuits.

.3 Connect neutral conductors to common neutral bus with respective neutral identified.

3.3 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.

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

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

.3 Waste Management: Separate waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

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

3.4 PROTECTION

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

.2 Repair damage to adjacent materials caused by panelboard installations.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

.1 CSA Group (CSA).

.1 CSA C22.2 No.42-10, General Use Receptacles, Attachment Plugs and Similar Devices.

.2 CAN/CSA C22.2 No.42.1-F00(R2009), Cover Plates for Flush-Mounted Wiring Devices (Bi-national Standard, with UL 514D).

.3 CSA C22.2 No.55-FM1986(R2008), Special Use Switches.

.4 CSA C22.2 No.111-10, General-Use Snap Switches (Bi-national Standard, with UL 20).

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 wiring devices, and include product characteristics, performance criteria, physical size, finish, and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.

.1 Indicate on drawings:

.1 The details surrounding the integration in the architectural elements.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 77 00 - Closeout Procedures.

.2 Operation and Maintenance Data: Submit operation and maintenance (O&M) data for wiring devices for incorporation into O&M Manual.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance 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 in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wiring devices from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 RECEPTACLES

.1 Duplex receptacles of specified "Industrial" grade type, CSA type 5-15 R, 125 V, 15 A, "U" ground, with following features:

.1 Ivory 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 outlet receptacles for maintenance, specified "Industrial" quality allowing 15 and 20 A inputs, type CSA 5-20R, 125 V, 20 A.

.3 Single outlet receptacles, twist-lock, specified “Industrial” quality, type CSA L5-20R, 125 V, 20 A.

.4 Other outlets designed for allowable tension and ampacity: according to indications on drawings.

.5 Hospital grade GFI, 15-20 A, 120 V receptacle.

.6 Receptacles of one manufacturer throughout project.

2.2 COVER PLATES

.1 Stainless steel utility box cover for wiring devices installed in surface-mounted utility boxes.

.2 All the cover plates must originate from a single and same manufacturer.

.3 Stainless steel cover plates must be installed according to the specifications for the secured areas, mounted in built-in pull boxes.

.4 Cast cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.

.5 Weatherproof during use, double lift spring-loaded cast aluminum cover plates, complete with gaskets for outdoor-rated duplex receptacles, as indicated.

.6 All installations must be provided by a single manufacturer.

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 Visually inspect substrate.

.2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.

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

3.2 INSTALLATION

.1 Receptacles:

.1 Install 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 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.

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

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

.3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

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

3.4 PROTECTION

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

.2 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 RELATED REQUIREMENTS

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

1.2 REFERENCE STANDARDS

.1 CSA Group (CSA).

.1 CSA C22.2 No.106-05(R2010), HRC-Miscellaneous Fuses.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

.1 Provide fuse performance data characteristics for each fuse type and size above 200 A. The supplied characteristics should also include the average fusion time at a given current.

.3 Shop Drawings:

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

.2 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Ship fuses in original containers.

.2 Do not ship fuses installed in switchboard.

.3 Store fuses in original containers in storage cabinet.

.4 Waste Management and Disposal:

.1 Separate waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

1.5 EXTRA MATERIALS

.1 Provide maintenance materials in accordance with Section 01 77 00 - Closeout Procedures.

.2 Three spare fuses of each type and size installed above 600 A.

.3 Six spare fuses of each type and size installed up to and including 600 A.

Part 2 Products

2.1 FUSES - GENERAL

.1 Fuse type references L1, L2, J1, R1, etc., have been adopted for use in this Specification.

.2 Fuses: Product of one manufacturer.

2.2 FUSE TYPES

.1 Class L fuses, 200 kA interruption capacity.

.1 Type L1: Time delay, capable of carrying 500% of its rated current for 10 s minimum.

.2 Type L2: Fast acting.

.2 Class J fuses, 200 kA interruption capacity.

.1 Type J1, time delay, capable of carrying 500% of its rated current for 10 s minimum.

Part 3 Execution

3.1 INSTALLATION

.1 Install fuses in mounting devices immediately before energizing circuit.

.2 Ensure correct fuses fitted to physically matched mounting devices.

.3 Ensure correct fuses fitted to assigned electrical circuit.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

.2 Section 26 24 16.01 - Panelboards Breaker Type.

.3 Section 26 28 20 - Grounding Fault Circuit Interrupters - Class A.

1.2 REFERENCE STANDARDS

.1 CSA Group (CSA).

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

1.3 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 circuit breakers, and include product characteristics, performance criteria, physical size, finish, and limitations.

.3 Include time-current characteristic curves for breakers with interrupting capacity of 22,000 A symmetrical (rms) and over at system voltage and with an allowable ampacity of 200 A and more.

.4 Certificates:

.1 Prior to installation of circuit breakers in either new or existing installation, Contractor must submit three copies of a production certificate of origin from the manufacturer. Production certificate of origin must be duly signed by factory and local manufacturer's representative certifying that circuit breakers come from this manufacturer and are new and meet Standards and Regulations.

.1 Production certificate of origin must be submitted to Parks Canada Agency (PCA) for approval.

.2 Delay in submitting production of certificate of origin will not justify any extension of contract and additional compensation.

.3 Any work of manufacturing, assembly, or installation to begin only after acceptance of production certificate of origin by Parks Canada Agency (PCA). Unless complying with this requirement, Parks Canada Agency (PCA) reserves the right to mandate manufacturer listed on circuit breakers to authenticate new circuit breakers under the contract, and to Contractor's expense.

.4 Production certificate of origin must contain the following information:

.1 Manufacturer's name and address and person responsible for authentication. Person responsible must sign and date certificate;

.2 Licensed dealer's name and address and person of distributor responsible for Contractor's account;

.3 Contractor's name and address, as well as person responsible for project;

.4 Local manufacturer's representative name and address. Local manufacturer's representative must sign and date certificate;

.5 Name and address of building where circuit breakers will be installed:

.1 Project title.

.2 End user's reference number.

.3 List of circuit breakers.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance 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 circuit breakers in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect circuit breaker from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: Remove for reuse as specified in Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 GENERAL REQUIREMENTS

.1 Moulded-case circuit breakers, circuit breakers, accessory high-fault protectors and ground-fault circuit-interrupters: To CSA C22.2 No. 5. Rated 22 kA.

.2 Bolt-on Moulded Case Circuit Breaker: Quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient. Rated 22 kA.

.3 Common-trip Breakers: With single handle for multi-pole applications.

.4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.

.1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.

.5 Circuit breakers to have minimally the same current interruption capacity as the panel it is installed in.

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 MAGNETIC BREAKERS (DESIGN B)

.1 Moulded case circuit breaker to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for short-circuit protection.

2.4 ADDITIONAL FEATURES

.1 Include:

.1 Interlock device between two breakers as indicated.

.2 "On-Off" locking device for each breaker.

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 installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate.

.2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.

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

3.2 INSTALLATION

.1 Install circuit breakers as indicated.

3.3 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.

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

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

.3 Waste Management: Separate waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

.2 Section 26 24 16.01 - Panelboards Breaker Type.

.3 Section 26 28 16.02 - Moulded Case Circuit Breakers.

1.2 REFERENCE STANDARDS

.1 CSA Group (CSA).

.1 CAN/CSA C22.2 No.144-M91(R2006), Ground Fault Circuit Interrupters.

.2 National Electrical Manufacturers Association (NEMA).

.1 NEMA PG 2.2-1999(R2009), Application Guide for Ground Fault Protection Devices for Equipment.

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 ground fault circuit interrupters, and include product characteristics, performance criteria, physical size, finish, and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.

.4 Test and Evaluation Reports: Submit test report for field testing of ground fault equipment to Parks Canada Agency (PCA) and certificate that system as installed meets criteria specified.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 77 00 - Closeout Procedures.

.2 Operation and Maintenance Data: Submit operation and maintenance (O&M) data for ground fault circuit interrupters for incorporation into O&M Manual.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and handle materials in accordance 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 in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect ground fault circuit interrupters from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

.1 Equipment and components for ground fault circuit interrupters (GFCI): To CAN/CSA C22.2 No.144.

.2 Components comprising ground fault protective system to be of same manufacturer.

2.2 BREAKER TYPE GROUND FAULT INTERRUPTER

.1 Two-pole ground fault circuit interrupter for 15 A or 20 A, 120 V, single-phase, with testing and reset devices, as indicated.

.1 Transition device to detect ground faults, Class A.

.2 Rated 22 Ka.

2.3 GROUND FAULT PROTECTOR UNIT

.1 Self-contained with 15 A or 20 A, 120 V circuit interrupter and, «Hospital grade» duplex or single receptacle complete with:

.1 Solid state ground sensing device.

.2 Facility for testing and reset.

.3 CSA Enclosure 1, surface-mounted with steel face plate.

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 ground fault circuit interrupters installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate.
- .2 Inform Parks Canada Agency (PCA) of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

.1 Do not ground neutral on load side of ground fault relay.

.2 Pass phase conductors, including neutral, through zero sequence transformers.

.3 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.

3.3 FIELD QUALITY CONTROL

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

.2 Arrange for field testing of ground fault equipment by the Contractor before commissioning service.

.3 Demonstrate simulated ground fault tests.

3.4 CLEANING

.1 Progress Cleaning: Clean in accordance with Section 01 74 11 - Cleaning.

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

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

.3 Waste Management: Separate waste material in accordance with Section 01 74 19 - Waste Management and Disposal.

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

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:

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

1.3 QUALITY ASSURANCE

.1 Quality Assurance Submittals: Submit following in accordance with Section 01 45 00 - Quality Control.

.1 Certificates: Signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.

.2 Manufacturer's Instructions: For installation and special handling criteria, installation sequence, cleaning procedures, and maintenance.

1.4 DELIVERY, STORAGE, AND HANDLING

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

.2 Delivery and Acceptance Requirements:

.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: Remove for reuse and return by manufacturer of pallets crates padding packaging materials.

Part 2 Products

2.1 PVC DUCTS AND FITTINGS

.1 Rigid PVC Duct of type DB2/ES2 is prohibited.

.2 Rigid PVC Ducts:

.1 Nominal length: 6 and 3 m ± 12 mm.

.3 Rigid PVC bends, couplings, reducers, bell end fittings, plugs, caps, adaptors same product material as duct to make a complete installation.

.4 Rigid PVC 90°, 45° bends, and 5° angle couplings as required.

2.2 SOLVENT WELD COMPOUND

.1 Solvent cement for PVC ducted joints.

2.3 CABLE PULLING EQUIPMENT

.1 6 mm stranded nylon pull rope tensile strength 5 kN.

2.4 WARNING TAPE

.1 Standard 4-mil polyethylene 76 mm wide tape, yellow with black letters, imprinted with "CAUTION BURIED ELECTRIC CABLE BELOW".

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install duct in accordance with manufacturer's instructions and at elevations as indicated.

.2 Clean inside of ducts before laying.

.3 Slope ducts with 1 to 400 minimum slope.

.4 Install plugs and cap both ends of ducts to prevent entrance of foreign materials during and after construction.

.5 Pull through each duct wooden mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth, and other foreign material.

.1 Pull stiff bristle brush through each duct immediately before pulling-in cables.

.6 Install a pull rope continuous throughout each duct run with 3 m spare rope at each end.

.7 Place continuous strip of warning tape 300 mm above duct before backfilling trenches.

.8 Notify the Parks Canada Agency (PCA) for field review upon completion of direct buried ducts and obtain acceptance prior to backfill.

3.3 CLEANING

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

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

END OF SECTION

TABLE OF CONTENTS

PARTIE 1 GENERAL

1.1 SCOPE OF WORK

.1 The Contractor shall suplly all materials, equipment, labor, tools, machinery and all auxiliary work required for the complete and functional installation of all process mechanical equipment, machinery and piping and its accessories, as described in division 44, the other sections of the tender document and as shown on the plans. The work also includes technical assistance to the Owner, provisional acceptance testing, commissioning and training of personnel, including performance testing of equipment and, if applicable, processes.

.2 The Contractor is responsible for consulting and analyzing all plans and specifications in order to understand all the process mechanics work of the project which is also related to the following disciplines: civil, structural and electrical.

.3 No discharge of wastewater into the environment must take place during the execution of the work. The Contractor must provide at his own expense all the necessary measures to prevent and avoid any discharge of wastewater into the environment and ensure that the installation of wastewater treatment equipment is completed before starting the discharge of domestic wastewater into the treatment system. Tightness/Leak tests of the sanitary sewer pipes shall be performed as described in the Civil Specifications section (section 33 31 00) prior to the commissioning of the wastewater treatment system. Tightness/Leak tests of prefabricated concrete tanks shall be performed as described in the Process Mechanics section of the specifications (section 44 01 00) prior to the commissioning of the wastewater treatment system.

.4 The Contractor shall, without limitation, include the following supplies and services as part of its mandate:

- .1 Coordination of work with suppliers of equipment for the wastewater treatment system as described in the plans;
- .2 Obtaining technical documentation and drawings for the preparation of shop drawings and all documentation related to wastewater treatment equipment;
- .3 Ordering equipment, packaging equipment and delivering equipment to the site;
- .4 Unloading equipment at the site;
- .5 Supply of instrumentation as required by suppliers;
- .6 The supply of spare parts;
- .7 The proper installation of wastewater treatment equipment as described in the plans;

.8 The Contractor shall use a Contractor certified by the Supplier of the wastewater treatment technology for the installation of the equipment specific to this treatment process and as described in the plans;

.9 Coordination for the installation and commissioning of equipment for wastewater treatment;

.10 The Contractor must ensure that the Supplier of wastewater treatment technology ensures the commissioning of wastewater treatment equipment;

.11 Preparation and implementation of staff training and production of the operating manual;

.12 Provision of operation, maintenance and final drawings ("as built") manuals.

1.2 GENERAL REQUIREMENTS FOR MATERIALS AND PROCESSES

.1 General

.1 Scope

.1 This specification defines general requirements relating to the quality of materials used for mechanical equipment as well as those applicable, where appropriate, to treatment processes.

.2 Reference standards

.1 In general, and without limitation, the most recent version of the codes and standards published by the following organizations apply:

.1	CSA	Canadian Standards Association
.2	AFBMA	Anti-Friction Bearing Manufacturers Association
.3	AGMA	American Gear Manufacturers Association
.4	AISI	American Iron and Steel Institute
.5	EMEA	Electrical and Electronics Manufacturers Association of Canada
.6	ANSI	American National Standard Institute
.7	ASME	American Society of Mechanical Engineers
.8	ASTM	American Society for Testing and Materials
.9	AWWA	American Water Works Association
.10	BNQ	Standards of the Bureau de normalization du Québec
.11	CCE	Canadian Electrical Code

.12	NBC	National Building Code of Canada
.13	CSST	Commission on Health and Safety at Work
.14	CWB	Canadian Welding Bureau
.15	HY	Hydraulic Institute
.16	IEEE	Institute of Electrical & Electronics Engineers
.17	ISO	International Standard Organization
.18	MMA	Monorail Manufacturers Association
.19	MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
.20	NSF	National Safety Foundation
.21	CGSB	Canadian Government Standards Board
.22	REIC	Industrial and Commercial Establishments Regulations
.23	SAE	Society of Automotive Engineers
.24	CPSS	Steel Structure Painting Council

PARTIE 2 PRODUCTS

2.1 SCREWS AND BOLTS

.1 Screws, bolts, nuts, fasteners and threads must comply with the requirements of the CSA standards. All fasteners in contact with or near wastewater or sludge must be constructed of grade 316 stainless steel.

.2 The screws and bolts used must be manufactured according to the metric measurement standards in force in Canada and the province of Quebec.

.3 The equipment must be bolted to the frames and structures, the head of the bolt over the mechanisms to be connected so that the bolts cannot come out of the holes even if the nut is lost. Information relating to the tension in the bolts and the tightening limits shall be indicated on the Contractor's drawings, if applicable.

.4 The protrusion of the bolts beyond the nuts, after being properly tightened, must be at least two (2) exposed threads without exceeding the value of one diameter. Unless otherwise specified, hex nuts must be used.

.5 In the case of notched holes, washers should be installed with all nuts and bolt heads.

2.2 WELDING

.1 The design, execution and inspection of the welds must comply with the requirements of the most recent applicable standards, CSA, W 59 or ASME B31.1.

.2 Preferably, welding is carried out in the manufacturer's workshop. Welding on aluminum must only be carried out in the workshop.

.3 The parts of the welded assemblies, whose parts are machined to ensure precise alignment, must undergo thermal relaxation before machining.

.4 The results of non-destructive testing must be documented and submitted to the Representative of Parks Canada during the manufacturing process.

2.3 BEARING LUBRICATION

.1 Oil lubricated bearings must be fitted with crankcases and level indicators. Grease lubricated bearings should be supplied with grease nipples and should be provided with extensions, if applicable.

.2 The equipment will be supplied with all bearings, ball bearings, etc., lubricated and ready to operate.

.3 All equipment must be fitted with adequate protection against splashing oil or grease during normal operation.

.4 All oils in contact with drinking water or likely to come into contact with or contaminate drinking water must comply with NSF-61 standard.

2.4 ROTATING MECHANISMS

.1 All equipment with rotating mechanisms such as belts, pulleys, chains, gears, couplings, etc., must be designed to operate under all load conditions, without jerking. Mechanisms that cannot be physically housed in enclosures must be fitted with protective devices to ensure the safety of operating and maintenance personnel.

.2 The selection of these rotary mechanisms must be made according to the standards defined by AGMA.

2.5 VIBRATION

.1 Equipment subject to transmitting vibrations to the structure or buildings must be provided with dampers capable of absorbing such vibrations.

2.6 NOISE

.1 The noise level produced during normal operation by a piece of equipment and measured at one (1) meter from it must not exceed 70 dBA, under expected operating conditions, according to the measurement standards defined in the "International Standard Organization (ISO), recommendation R 495". In the event that the noise level generated by the equipment exceeds this value of 70 dBA. The Contractor must, at his own expense, make the necessary correction (acoustic shelter, etc.).

2.7 MATERIALS OF MANUFACTURE

.1 In general, the materials must comply with the following requirements or be of an equivalent nature, i.e. possessing properties similar to those of the materials specified and, if necessary, be certified by means of certificates of conformity.

.1	Structural steel	CSA G40.21M
.2	Structural aluminum	ASTM B 241 Alloy 6061-T6
.3	Ductile iron	STM A 48
.4	Stainless steel	ANSI type 304 or 316

.2 All contact surfaces between two different metals must be separated by non-conductive materials, if there is a possibility of cathodic reaction.

2.8 CORROSION AND PROTECTION OF EQUIPMENT

.1 All parts of the equipment which are installed in a humid or corrosive environment or which come in contact with water, etc., must be designed to resist corrosion by these elements for a period of at least five (5) years, either by the nature of the materials of manufacture, or by the application of a proven protective coating or by covering with proven resistant materials. The recommended materials are specified in the specification sections.

.2 In cases where coating protection is used, unless the protection method is specified in the special technical clauses, the equipment must be painted using a paint system which ensures sufficient durability.

.3 The Contractor must guarantee that after a period of sixty (60) months, the degree of rust must be equal to or less than level 7 of the SSPC (Steel Structure Painting Council) scale for anti-rust paints.

2.9 BEARINGS AND BEARINGS

.1 The service life L 10 of any bearing, calculated according to AFBMA standards, must not be less than 100,000 hours.

2.10 FITTINGS, PIPING AND VALVES INTEGRATED INTO THE EQUIPMENT

.1 The class of pipes supplied must be established by the Contractor according to the operating conditions (temperature, pressures, etc.). However, CPV pipes cannot be used if the temperature of the conveyed fluid can exceed 25 °C.

.2 All accessories that accompany the piping supplied such as fittings, joints, couplings, rings, sleeves, etc., must be made of the same type of material as the piping to which they are connected.

.3 For all the piping forming an integral part of the equipment, the Contractor must also include the supports, stops and expansion joints required to ensure compliance

with the requirements of the manufacturers of the type of pipe supplied, based on the maximum stresses that may occur.

.4 All valves and gates supplied with the equipment must meet the requirements of AWWA, NSF61 or similar quality requirements. The materials of manufacture of these valves and gates must be specified by the Contractor according to the service conditions (temperature, pressure, etc.).

.5 All valves, regardless of their diameter and type, whether motorized and / or automated or not, must be equipped with a manual operating mechanism (handwheel, lever, etc.) including the required release accessories. whether they are motorized and / or automated.

.6 All valves with a diameter of 150 mm and more that they are motorized and / or automated or not must be provided with a gear drive mechanism with handwheel.

2.11 QUALITY MANAGEMENT

.1 The Contractor shall establish, document and apply, for this project, a quality program, in accordance with the ACNOR standard CAN3-Z299.4-85, ISO-9001 or equivalent.

.2 The “Quality Verification Document” of the said program must be submitted by the Contractor within ten (10) days of contract award.

.3 The manufacture of all the equipment and products covered by this call for tenders will be subject to the quality control requirements of the ACNOR standard CAN3-Z299.4-85, ISO-9001 or equivalent.

.4 The Contractor shall submit to the Representative of Parks Canada, during the presentation of the shop drawings, the various documents relating to the inspections and tests that the manufacturers / suppliers involved in the project intend to carry out on the equipment in order to comply with the requirements prescribed in this tender document.

.5 must have access to the establishments of the Contractors’ and his subcontractors’, as well as those of his manufacturers / suppliers, during working hours, for the purposes of surveillance and / or quality audit.

2.12 IDENTIFICATION OF PROCESS MECHANICAL INSTALLATIONS

.1 General

.1 All the equipment parts of the process systems as well as the piping must be clearly and legibly identified in the manner described below.

.2 The Contractor must submit, for verification by the Representative of Parks Canada, a schematic diagram of the equipment with the identification, name and numbering he proposes to use.

.3 This identification (name, numbering) must be the same everywhere, both on the plans, the equipment, and in the operating manuals.

.4 Plates, strips, identification labels must be displayed in a conspicuous place and not be covered with paint or other materials. Unless otherwise indicated, the identification plates, strips and labels must be white-face and black core.

.5 Where insulation is required, the identification should be affixed to the insulation.

.2 Equipment identification

.1 Manufacturer's nameplates must be affixed to the equipment. These plates must indicate the name of the Manufacturer, the model, the serial number and, depending on the equipment, the power of the motors, the type of electrical supply, the capacity of the unit and any other relevant information.

.2 In addition to the Manufacturer's nameplates, all equipment such as valves, pumps, boosters, blowers, tanks, etc. must be identified by means of 50 mm ϕ medallions made of polyethylene. These medallions must comply with the Canadian Government Standards Office (CGSB) Standard (F) 24-GP-3a-1967 entitled "Code, Identification and Classification of Duct Systems".

.3 For equipment related to water transfer and treatment, the Contractor must use the following colors on the medallions, signs and identification labels:

.1 Primary color : yellow (dangerous product)

.2 Secondary color : purple (poison / radioactive)

.3 Letters and numbers : black

.4 On works with a high flow rate or with a large number of equipment, the Contractor must use PVC panels to identify the main equipment, reserving the medallions for secondary equipment of the same series. Signs must also conform to the CGSB standard listed above.

.3 Piping identification

.1 All piping must be painted in accordance with the applicable color code, described in the section “Equipment and Piping Finishes”.

.2 In addition to this painting, the Contractor must complete the identification of all pipes, including stainless steel and CPV, with sticky labels of yellow (primary) and purple (secondary) on which lettering and black arrows, indicating the nature and direction of flow of the product transported.

.3 The identification labels must be placed at regular intervals on the pipe, but no more than five (5) meters apart, to successively have complete identification (letters and arrows) alternating with a single arrow.

.4 In particular, at strategic points (valves, taps, check valves, tees, crossings, partition or floor sleepers, etc.), the above identification must be supplemented by the indication of the origin and destination of the product

being transported, all in accordance with the principle shown in the figures at the end of this section and described in the CGSB standard.

.5 Identification tags must conform to the CGSB standard mentioned in the previous article and must be as manufactured by Signis or approved equivalent; their size must be appropriate for the outside diameter of the pipe to be identified; their position must allow quick identification by the personnel.

.4 Valves Identification :

.1 The Contractor must identify all the valves using the same panels, medallions and labels, in the same way as for the equipment as specified above in the "General" sub-article of the "Identification of Process Mechanical Installations".

.5 Use of pictograms

.1 In his system identification diagram, the Contractor must use pictograms clearly indicating the position of the various safety equipment installed on the works and other strategic points.

.2 These pictograms must also conform to the CGSB standard, and be as manufactured by Signis, or approved equivalent.

2.13 PROVEN PROCESSES

.1 Each of the treatment processes mentioned must meet the following requirements to be considered acceptable:

.1 Mechanical performance

.1 The mechanical performance of each component of the process must have been demonstrated during a period of at least two (2) years of use. In addition, each component must have been used for a period of at least one (1) year in an application similar to that proposed.

.2 Process efficiency

.1 The process must achieve the performance testing objectives described in the Process Mechanics Divisions (Division 44), and elsewhere in the tender document for each process.

2.14 EQUIPMENT AND PIPING FINISHES

.1 Workshop treatment

.1 All process equipment and ferrous metal piping and ancillary parts (i.e. fittings, flexible joints, valves and taps) covered by the process mechanics divisions (division 44) will receive a surface treatment and primer paint in the shop. All equipment that includes a finish coating in the manufacturer's standard product designation will be provided with said coating.

.2 The surface preparation, the primer and the finishing coat (s), carried out in the workshop by the manufacturer, must be compatible with the service required of the equipment as well as with "local" operating conditions.

.3 No part or equipment in bronze, aluminum, stainless steel, galvanized steel, plastic and PVC should be painted: these materials should be properly cleaned after their manufacture.

.4 Galvanization will be carried out by hot immersion (hot-dip galvanizing), after manufacture, with a zinc layer of at least 600 g / m², all in accordance with the ACNOR Gj0164 standard.

.5 Pumps, motors or any other equipment and accessory parts (fittings, valves, etc.) may however be supplied with the manufacturers' standard finish provided they meet the following requirements:

.1 The protection system selected must be of a class allowing adequate resistance to corrosion for an average period (5 to 10 years) under the conditions prevailing inside the building, in underground stations or outdoors, and it must be certified by a manufacturer with at least five (5) years of experience in protecting this type of equipment.

.2 Site treatment

.1 After their installation on the site, the Contractor will proceed with the “finishing” painting of the piping, according to the applicable color code.

.2 The type of paint and the final choice of colors for each system must be approved in advance by the Engineer.

.3 The number of coats of paint to be applied (minimum 2 coats) must ensure total coverage of the original paint from the equipment manufacturer. The type of paint for said topcoat must be compatible with the finish of the equipment supplied by the manufacturer. The application of a third coat of paint may be required by PCA. The Contractor is then required to carry out this work at no additional cost.

.4 This on-site paint treatment is particularly applicable to all pipes and cast-iron parts, valves, flaps, fittings, flanges, supports, etc.

.5 Bronze, aluminum, galvanized steel, stainless steel, plastic and PVC parts will not receive any paint: these materials must be properly cleaned after installation.

.6 The copper piping will be cleaned with a stripper to remove all traces of grease and will receive two (2) coats of "urethane" varnish, in accordance with the CGSB standard 1-GP-176b.

.7 All aluminum parts in contact with concrete will receive, in the workshop, a layer of bitumastic paint, undiluted, according to the requirements of the CGSB standard 1-GP-108M, type 1.

.8 The paint will need to be touched up at fixing points, supports and base plates, etc., where the paint has been damaged during transport or

assembly of the equipment. Touch-ups must be done with paint identical to that originally applied to the equipment in accordance with the Contractors' instructions.

.3 Color code:

PIPES - EQUIPMENT	COLOR	N° PAINT		
		C.I.L.	SICO N° abandoned	SICO New number
Drinking water	Light blue	3938-7	2035-61	3027-41
Non-potable service water	Dark blue with "NOT DRINKABLE" *	4848-9	2030-53	SM 820
Service hot water	Medium blue	3941-9	2036-42	3028-32
Raw wastewater	Grey	4072-8	2167-12	SM 1008
Sand washing water	Ocher	4701-9	2093-64	3100-64
Sand	Rust	4700-9	2113-43	3084-53
Primary sludge	Brown Brown	4671-2	2135-63	3194-43 **
Recirculated sludge and excess sludge	Light brown	3072-8	2122-22	SQ 6569
Thickened sludge	Dark brown	4611-2	2117-63	3060-63 **
Digested sludge	Black	4673-2	2178-63	SM 1347
High pressure process air	Light green	3529-9	2066-13	SM 986
Control compressed air	Dark green	4788-5	2066-64	SQ 6741
Chlorine	Pale yellow	3117-5	2086-34	SQ 6245
Ozone	Purple	4353-9	2016-22	SQ 9769
Alum	White	4574-7	2164-11	SM 833
Chemical products	Orange	2637-5	2104-34	SM 650
Polymers	Pink	2504-8	2007-12	3056-12 **
Emergency equipment	Red	4596-4	2005-55	SM 736
Valves, flaps, etc.	Same color as the adjacent one			

NB: Building mechanics ducts and others according to the architect (without possible confusion with this code).

* To be labeled "*UNDRINKABLE*» In places where this water is used.

** Suggested number: color not identical but close.

PARTIE 3 EXECUTION

3.1 DISINFECTION OF TANKS

.1 Not applicable.

3.2 PLANS

.1 The plans generally show the location of the proposed pipes and equipment.

.2 When the piping is only indicated schematically, its location will be established in such a way as to maintain maximum vertical clearance (free height) and in such a way as to interfere as little as possible with the use of the rooms where it will be fitted.

.3 The location of pipes and equipment must be in accordance with the dimensions shown on the plans; their location should not be established from a reading to scale on the said plans.

.4 Parks Canada Representative may request that the equipment be moved up to one (1) meter, if deemed necessary, at no additional cost.

.5 No supplement will be allocated for the change (s) of passage of conduits, pipes, sheaths, etc., which may be deemed necessary by site conditions.

.6 If the Contractor foresees the need to issue additional sketches for clarification, he must notify the Parks Canada Representative at least fifteen (15) days prior to the execution of the work.

.7 All the works or materials, shown on the plans and not described in the specifications or vice versa, are part of this contract as well as all the materials not indicated in the plans and specifications but necessary for the completion of the work.

3.3 EQUIPMENT

.1 Equipment means all the materials necessary for the erection of an element of the process. The materials composing this equipment must be complete and the Contractor shall include any other elements deemed necessary for the proper functioning of each unit.

.2 All equipment is built to ensure optimum performance. Each piece of equipment must be complete in its entity and must include each part or accessory necessary using the most resistant materials and characteristics desirable for intermittent or

continuous operation to be efficient and their maintenance easy and proper. Also, the materials should be chosen according to their specific use.

.3 All equipment and materials shall be new, fabricated, assembled and factory tested, ready for installation. They must not bear any visible or invisible damage that could cause its failure during the work.

.4 The Contractor shall provide the General Contractor with all diagrams, drawings, all written instructions necessary for the proper installation of the equipment as well as any other information which, in the opinion of the Parks Canada Representative, would facilitate the work.

.5 A copy of these instructions must be given to the Parks Canada Representative before installation, for supervision of the work.

.6 Unless otherwise specified, the various items must be a manufacturer's standard product and the parts required for maintenance must be available at all times. Similar equipment must be supplied by the same manufacturer.

.7 The Contractor will be responsible for unloading the equipment arriving on the site, for their inspection by the Parks Canada Representative, for their storage, their installation and their connection. Equipment not installed will be stored under lock and key by the Contractor.

.8 If any equipment is to be reassembled at the site, it must be reassembled by the Contractor, under the Supplier’s supervision.

.9 If required, the lifting gear required for handling the equipment, from the point of delivery to installation, will be at the Contractor's expense.

.10 The Contractor must ensure that the openings provided in the building for the entry of major equipment are sufficient.

.11 No work such as pipes, conduits, etc., will be hidden until the Parks Canada Representative has inspected and approved it.

.12 The equipment must have the characteristics and dimensions appropriate to the places where it will be installed.

3.4 ELECTRICAL WORK

.1 All equipment driven by an electric motor must be connected by the Contractor, complete with their respective motor including their control panels.

3.5 PUMP UNITS

.1 Not applicable.

PARTIE 4 EQUIPMENT CLEANLINESS AND PROTECTION

.1 The Contractor must take all the necessary precautions to protect the equipment and keep it clean.

.2 Upon completion of the work by this division, the Contractor must ensure that the interior and exterior of the systems are definitively clean and, if necessary, do the required cleaning. The Contractor must also remove all surplus materials, tools, equipment and debris and leave the site in clean and undamaged condition, to the satisfaction of the Parks Canada Representative.

END OF SECTION

TABLE OF CONTENTS

PARTIE 1 GENERALITIES

1.1 RELATED REQUIREMENTS

.1 The Contractor must meet the general instructions applicable to division 44, section "44 00 50 - Specific general instructions - Process mechanics".

1.2 SCOPE OF WORK

.1 This section concerns the complete and functional execution of all the work required for the construction and commissioning of the equipment of the wastewater treatment system, including but not limited to: the manufacture, supply, transport , unloading, installation, commissioning, testing, warranty and operation until provisional acceptance of equipment including:

.1 Dismantling of the existing septic tank with all related equipment and disposal of waste in an appropriate disposal site, in accordance with the laws and standards in force;

.2 Dismantling of the existing pumping station with all related equipment and disposal of waste in an appropriate disposal site, in accordance with the laws and standards in force;

.3 Dismantling of part of the existing purification field with all related equipment and disposal of waste in an appropriate disposal site, in accordance with the laws and standards in force;

.4 The supply, installation and commissioning of the prefabricated concrete pumping station including pumps, control panel, accessories, wiring and connections required for a complete and functional operation;

.5 The supply, installation and commissioning of prefabricated concrete tanks (septic tank, Bionest reactor and settling tank), including all openings, covers, accessories, process air piping, instrumentation, the probes, controls, panels, wiring and connections required for complete and functional operation;

.6 The supply, installation, connection and commissioning of a pumping station integrated into the Bionest reactor;

.7 The supply and installation of components for the interior design of the room dedicated to the components of the wastewater treatment system;

.8 The supply, installation and commissioning of wastewater treatment equipment including air pumps, UV disinfection system and their controller, flowmeter, dephosphatation system including coagulant metering pump and tank for 55 gallon barrel alum;

.9 Supply, installation and commissioning of control panels for the wastewater treatment system, allowing equipment control and transmission of alarms to the existing intrusion alarm system;

.10 The power supply to the pumps of the raw water pumping station and the pumping station integrated into the Bionest reactor, including the buried electrical wiring and the connection to the electrical distribution panel of the technical building;

.11 Supply and installation of all piping, including, without limitation, valves, accessories, instrumentation and connections for all equipment located inside the technical room for a complete and functional operation;

.12 Supply and installation of all air lines between the Bionest reactor and the technical room;

.13 The supply and installation of all wastewater pipes, without limitation:

.1 Between the pumping station and the septic tank;

.2 Between the septic tank and the Bionest reactor;

.3 Between the Bionest reactor and the technical room;

.4 Between the technical room and the settling tank;

.5 Between the settling tank and the discharge pipe to the river.

.2 Notwithstanding the scope of the above, the Contractor is responsible for the placement and installation of all process equipment on the plans and / or described in this specification. He is responsible for the setting of this equipment, their incorporation and their fixing to the structures, the definition of concrete forms required for the process mechanics and its installation.

.3 The Contractor must provide the facilities, equipment and apparatus required for the installation work, including temporary handling and pumping equipment as well as labor.

.4 During the work, the Contractor is responsible for any damage to the existing infrastructure and must repair them at his expense during the work to the satisfaction of the Engineer.

.5 The Contractor is responsible for coordinating the work and the supply of various parts with the Supplier of the advanced secondary treatment system and other subcontractors (tank manufacturer, electrician, etc.).

.6 The Contractor is responsible for ensuring that the prefabricated concrete tanks are clean, waterproofing, and dry during works in the factory and on the site for the assembly of the various components by the Supplier of the wastewater treatment system.

.7 The Contractor is responsible for consulting all the plans and specification sections to understand all the components required for the proper and safe operation of the process mechanical equipment.

.8 The Contractor will be responsible for installing sufficient anchors and bases to ensure that the pipes / equipment / accessories will be supported and held perfectly in position, taking into account the pressures and forces that may be exerted on these pipes / equipment / accessories as well as being responsible for fixing the equipment to the walls.

.9 The Contractor shall ensure to provide all the materials, equipment, and labor to supply power and control all related instruments and equipment.

.10 Thus, the Contractor must provide, without limitation, the power supply, cables and conduits and any other equipment and work necessary for the proper functioning of the equipment provided for in this section.

.11 The distribution panel is specified in the "Electricity" section of the specifications and the Contractor must provide all the necessary connections between the control panel (s) and other equipment and the distribution panel.

.12 The Contractor shall submit workshop drawings referred to for all the mentioned work as described in section 01 33 00 – Submittal procedures.

1.3 REFERENCES

.1 ASTM International

.1 ASTM C117, Standard Test Method for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf / ft3 (600 kN-m / m3)).

.4 ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf / ft3 (2,700 kN-m / m3))

.2 Canadian General Standards Board (CGSB or CGSB)

.1 CAN / CGSB-8.1, Wire mesh test sieves, non-metric.

.2 CAN / CGSB-8.2, Wire Mesh Test Sieves, Metric.

.3 CSA International

.1 CSA A23.1 / A23.2, Concrete - Constituents and workmanship / Tests and standard practices for concrete.

.2 CSA A23.4, Precast concrete: components and execution of the work.

.3 CSA B66, Requirements for the design, constituent materials and construction of prefabricated septic tanks and holding tanks.

1.4 DOCUMENTS TO SUBMIT FOR APPROVAL / INFORMATION

.1 Submit the documents and samples required in accordance with section 01 33 00 - Submittal procedures.

.2 Data sheets

.1 Submit the required technical data sheets as well as the manufacturer's instructions and documentation concerning the septic tank, the tank for the biological reactor, the settling tank, the pumping station and the control panel as well as all the equipment of the advanced treatment system.

.2 Technical data sheets must indicate product characteristics, performance criteria, dimensions, limitations, and finish.

.3 Workshop drawings

.1 The submitted workshop drawings must bear the seal and signature of a competent engineer recognized or licensed to practice in Canada, in the province of Quebec.

.2 Workshop drawings: in accordance with CSA A23.4.

.1 Indicate on the drawings the following:

.1 Calculations relating to items designed by the manufacturer;

.2 Tables and bending diagrams relating to steel reinforcement parts;

.3 The curvature of the elements;

.4 Formwork;

.5 The nomenclature of finishes;

.6 The handling and installation methods;

.7 Storage facilities;

.8 Openings, sleeves, inserts and related reinforcing elements;

.9 Pump performance curves.

.4 Calculation notes

.1 The Contractor must provide as part of the engineering mandate, for approval by the Parks Canada Representative, the calculation notes demonstrating the sizing of the wastewater treatment technology equipment and the design bases selected.

.5 Performance report

.1 The Contractor must submit, for approval by the Parks Canada Representative, the performance report of the wastewater treatment system.

.2 The Contractor must submit, for approval by the Parks Canada Representative, the performance report of the pumping station.

.6 Operating and maintenance manuals

.1 The Contractor shall submit, for approval by the Parks Canada Representative, following the conclusion of the performance tests, all complete operating and maintenance manuals for all the equipment of the wastewater treatment system.

.2 The Contractor shall submit, for approval by the Parks Canada Representative, following the conclusion of the performance tests, all complete operating and maintenance manuals for all pumping station equipment.

1.5 HEALTH AND SECURITY

.1 This section is complementary to section “01 07 12 - Safety requirements”.

.2 General

.1 The Contractor must obtain all installation manuals specifying the health and safety measures to be followed from the various suppliers in order to manage his activities so that the health and safety of the public and site personnel as well as the protection of the environment always takes precedence over issues related to costs and work schedule.

.3 References

.1 Canada Labor Code, Part II, Canada Occupational Safety and Health Regulations.

.2 Canadian Standards Association (CSA).

.3 Workplace Hazardous Materials Information System (WHMIS) / Health Canada.

.1 Material Safety Data Sheet (MSDS).

.4 Act respecting occupational health and safety, RSQ Chapter S-2.1.

.5 Safety code for the construction industry, S-2.1, r.6.

1.6 QUALITY ASSURANCE

.1 Manufacturers and installers of precast concrete must meet the requirements of CSA A23.4.

1.7 TRANSPORT, STORAGE AND HANDLING

.1 Transport, store and handle materials and equipment in accordance with section “01 61 00 - General Product Requirements and manufacturer's written instructions”.

.2 Delivery and Acceptance: Deliver materials and equipment to the site in their original packaging, which must bear a label indicating the name and address of the manufacturer.

.3 Warehousing and handling

.1 Store materials and equipment so that they are off the ground, in a clean, dry and well-ventilated area, in accordance with the manufacturer's recommendations.

.2 Store tanks and pumping station in such a way as to protect them from nicks, scratches and blemishes.

.3 Replace damaged materials and equipment with new materials and equipment.

1.8 EQUIVALENCE

.1 This section takes precedence over the other equivalence sections in the specifications.

.2 The supplier of the wastewater treatment unit is fully responsible for the supply and proper functioning of all the equipment described in this section. The contractor must however ensure that all the parts and work to construct the works have been considered in an item of his tender.

.3 The plans and specifications are based on the wastewater treatment equipment of the supplier Bionest. The Contractor must present his price with the equipment specified in this estimate and if he wishes, he can propose an alternative of equivalence by indicating when submitting the tender the credits allocated for Parks Canada.

.4 The plans and specifications are based on pumping equipment from MEI Assainissement. The Contractor must present his price with the equipment specified in this estimate and if he wishes, he can propose an alternative of equivalence during the submission of the tender by indicating the credits allocated for Parks Canada.

.5 The Contractor must demonstrate that the equivalence alternative will guarantee adequate performance that meets the discharge requirements presented in the following section. The Contractor shall assume the costs incurred for the modifications to be made to the plans and specifications if another supplier is proposed on an equivalent basis. The Contractor must submit revised plans, signed and sealed by an engineer member of the OIQ in workshop drawing. In addition, the Contractor will be responsible until the end of the work for the proposed equivalence alternative including detailed engineering for the installation of equipment for the treatment of wastewater in the proposed site. No annexe building will be accepted. The Contractor shall submit workshop drawings of the layout of the wastewater treatment equipment for approval.

.6 The Parks Canada Representative will not be required to accept equivalences if they do not conform to the processing principle, appearance requirements, operation requirements or specified products. In addition, the analysis costs of the equivalence proposal must be defrayed by the Contractor according to the evaluation of the efforts by the Parks Canada Representative.

PARTIE 2 PROCESSING CHAIN

2.1 DESCRIPTION

.1 Wastewater treatment from Darvard Island must be of the advanced secondary type with a capacity of 12 m³/day, as provided by Bionest or approved equivalent, with discharge into the nearest receiving environment (river Richelieu). The wastewater treatment system must consist of the following equipment:

.1 One (1) pumping station with a minimum useful volume of 0.75 m³ including two (2) water lift pumps and accessories;

.2 One (1) prefabricated reinforced concrete septic tank with a minimum effective volume of 18 m³;

.3 One (1) Bionest prefabricated reinforced concrete reactor with a minimum effective volume of 27.6 m³ with aeration system, recirculation system, media and all accessories specific to Bionest technology;

.4 One (1) pumping station integrated into the Bionest reactor including two (2) lift pumps and accessories;

.5 One (1) pre-fabricated reinforced concrete dephosphatation sludge settling tank with a minimum effective volume of 13.3 m³;

.6 One (1) UV disinfection system;

.7 One (1) dephosphatation system;

.8 One (1) discharge pipe to the river (see civil plan).

2.2 FLOWS TO BE PROCESSED

.1 The design flow rates used are presented in the following table:

Board 1 - Design flow rates retained

Debit	Unit	Value
Design flow	m3 / d	12
Hourly peak factor used	-	8
Hourly peak flow	L / s	1.25

2.3 LOADS TO BE PROCESSED

.1 The design charges retained are presented in the following table:

Board 2 - Design charges retained

Settings	Values	
	Concentration, mg / L	Load, kg / d
BOD5	400	4.8
TSS	300	3.6
Total nitrogen	125	1.5
Total phosphorus	10	0.12

.2 In addition, the wastewater to be treated must meet the characteristics presented in the following table:

Board 3 - Quality of treated water expected

SETTINGS	CONCENTRATION
	MG / L
pH	6 to 9
Mean temperature	> 10 ° C
Hardness	<120 mg / L
Iron	<0.3 mg / L
Manganese	<0.05 mg / L
Alkalinity	> 1115 mg of CaCO3 / L1

[1] to be confirmed when operating the system

2.4 REQUIRED TREATMENT PERFORMANCE

.1 The quality of treated water must at least meet the following concentrations:

Board 4 - Quality of treated water expected

SETTINGS	CONCENTRATION	PERIOD
BOD5	<15 mg / L	Annual
TTS	<15 mg / L	Annual
Fecal coliforms	<200 CFU / 100 mL1	May 1 to October 31
	<50,000 CFU / 100 mL	From November 1 to April 30
Total phosphorus	<1 mg / L	Annual

[1] values after reactivation (<20 CFU / 100mL before reactivation)

PARTIE 3 PRODUCT

3.1 RAW WATER PUMPING STATION

.1 Supply, install and commission a prefabricated reinforced concrete pumping station equipped with two (2) lift pumps including all accessories, guide bars, control fleets, slide system, piping and valves required, control panel, junction boxes and carbon air filter for complete and optimal operation.

.2 The pumping station will be MEI Sanitation model SPM-1220x1220 or approved equivalent with a minimum effective volume of 750 L. It must be equipped with two (2) Hydromatic model S3SD lift pumps of 1 HP, 208V / 3 phases / 60 Hz, a control panel, control fleets, check valves, isolation valves, piping, etc.

.3 The prefabricated reinforced concrete pumping station must be designed in accordance with standard BNQ-2622-420.

.4 The pumping station must be clean, watertight and dry when working in the factory and on the site.

.5 The pumping station must be designed to withstand the pressure of the soil taking into consideration its depth and the expected thickness of cover. The Contractor must submit a calculation note for the hydrostatic thrust signed by an engineer member of the Order of Engineers of Quebec (OIQ).

.6 The Contractor shall submit the plans signed and sealed by an engineer member of the Order of Engineers of Quebec (OIQ) of the prefabricated concrete septic tanks.

.7 Lift pumps must have the following characteristics:

- .1 Motor housing: cast steel;
- .2 Impeller: in cast steel;
- .3 Impeller type: anti-clogging;
- .4 Volute: in cast steel.
- .5 Motor shaft: stainless steel;
- .6 Shaft seal: carbon / ceramic;
- .7 Bearings: upper and lower ball bearings.
- .8 Be equipped with thermal overload protection and a humidity detection probe.
- .9 Allow the passage of solids of 63.5mmØ.

.8 The pumping station must be fitted with, without being limited to, the following accessories:

- .1 Ductile iron cover, series CFM-MH1050FD from MEI Assainissement;
  - .1 The free internal dimension must be at least 755mmØ.
  - .2 The leaf must be hinged and must be assisted by lifting cylinders to facilitate its opening. It must have a self-locking retaining arm to keep the opening at 90 °.
  - .3 Two (2) guide bars are incorporated into the leaf for safe entry.
  - .4 The cover must be ductile iron and its accessories made of stainless steel.
  - .5 The product must have two gaskets in order to be gas-tight and against infiltration / exfiltration. A neoprene in the frame and a rubber ring in the flapper.

.6 A lock must be incorporated into the leaf and must be lockable with a unique key.

.7 The product must be able to withstand a load capacity that meets SCAN / CSA-S6-88 standards.

.2 Two (2) bases for ductile iron slide systems;

.3 Two (2) 316 stainless steel lifting chains;

.4 One (1) removable shaft for installation of level floats including electrical wiring between floats and technical building;

.5 Two (2) 304 stainless steel guide bars;

.6 One retractable aluminum ladder with 304 stainless steel anchors;

.7 Upper stainless steel support for guide bars;

.8 Two (2) NEMA 4X PVC junction boxes;

.9 Electrical wiring in Schedule 40 PVC conduits between pump motor and mechanical room (see electrical drawings);

.10 Schedule 80 PVC 75 mm check valves;

.11 Schedule 80 PVC ball valves;

.12 Back pressure or bleed valves;

.13 Link joints for discharge lines;

.14 G-Lo k type seals for inlet pipes;

.15 Rubber gasket between sections to ensure tightness;

.16 75 mm PVC DR-21 discharge pipes by civil.

.9 The Contractor must provide a control panel for the lift pumps to be installed in the technical building. The Contractor must also ensure the wiring, conduits, CPV sheaths for the electrical connection and control, PLCs, and starters (if required), accessories and any other equipment required for the full operation of the lifting water system in order to obtain a fully autonomous and functional complete system.

.10 The duplex pumping station control panel will be as supplied by MEI Sanitation, model PCM-MEI-DETC, or approved equivalent and must be equipped with the following components, but not limited to:

.1 NEMA 4 enclosure;

.2 Selector for pond lamp;

.3 Voltage transformer for the control power supply;

.4 Configurable controller with digital display for adjusting the timed operating mode;

.5 Control fuse;

.6 Heating module;

.7 Visual and audible alarm;

.8 Dry alarm contact;

.9 Each pump will be fitted with:

.1 Manual / Off / Automatic selector;

.2 Thermomagnetic circuit breaker;

.3 Contactor;

.4 Display of pump overloads;

.5 Running time totalizer;

.6 Event counter;

.7 High temperature protection;

.8 Protection against humidity;

.9 Operating status indicator light (on, fault).

.10 Connection terminal block;

.11 Panel separation for control section and power supply;

.12 Location: Inside in the technical room;

.13 Number of pumps: Two (2) pumps;

.14 Mode of use: Timed;

.15 CSA certification.

.11 Spare part:

.1 One (1) Hydromatic brand model S3SD lift pump from MEI Sanitation or approved equivalent of 1 HP, 208-230 V / 3 phases / 60 Hz

3.2 SEPTIC TANK

.1 Supply, install and commission a prefabricated reinforced concrete type septic tank with a minimum effective volume of 18,000 L as manufactured by MEI Sanitation model FSM-22000 or approved equivalent.

.2 The septic tank must comply with the recommendations of the Guide for the Study of Conventional Technologies for the Treatment of Household Wastewater and be equipped with three (3) inspection chimneys of 750 mm in diameter and ductile iron lids with lockable key. The septic tank must be waterproof.

.3 The septic tank must be fitted with a Polylok PL-525 type pre-filter (1.6 mm filter holes) or approved equivalent. A high-level fleet must be installed on the pre-filter and connected to the alarm system in the technical room.

.4 The piping required for the Bionest treatment system must be integrated into the upper slab.

.5 The septic tank must be clean, waterproof and dry during work in the factory and on the site.

.6 The height of the maximum backfill must not exceed 1 meter.

.7 The septic tank must be designed to withstand the pressure of the soil, taking into consideration its depth and the expected thickness of cover. The Contractor must submit a calculation note for the hydrostatic thrust signed by an engineer member of the Order of Engineers of Quebec (OIQ).

.8 The Contractor shall submit the plans signed and sealed by an engineer member of the Order of Engineers of Quebec (OIQ) of the prefabricated concrete septic tank.

3.3 BIOLOGICAL REACTOR

.1 Supply, install and commission a prefabricated reinforced concrete tank serving as a biological reactor including: the aeration system, the vents, the recirculation pump, the pumping station integrated to the UV disinfection system as well as all the necessary accessories for a complete and functional system as offered by Bionest or approved equivalent.

.2 The biological reactor must be of the prefabricated type in reinforced concrete, with a minimum effective volume of 27,600 L as manufactured by MEI Sanitation model FSM-35000 or approved equivalent.

.3 The biological reactor must comply with the recommendations of the Guide for the study of conventional technologies for the treatment of wastewater from domestic sources concerning septic tanks and be equipped with three (3) inspection chimneys 750 mm in diameter and ductile iron lids with lockable key. The biological reactor must be sealed.

.4 The biological reactor must be clean, waterproof and dry during work in the factory and on the site.

.5 The height of the maximum backfill must not exceed 1 meter.

.6 The biological reactor must be designed to withstand soil pressure taking into consideration its depth and the expected cover thickness. The Contractor must submit a calculation note for the hydrostatic thrust signed by an engineer member of the Order of Engineers of Quebec (OIQ).

.7 The biological reactor must have an opening for the ventilation duct of 150 mm.

.8 The biological reactor must include the Bionest media at a quantity of 92.5 m2 / m3 (effective liquid volume), the aeration system, the inlet and outlet manifolds, the recirculation pump, pipes and electrical conductor.

.9 The recirculation pump will be installed at the outlet of the reactor and will recirculate the flow at a rate of 1.5 to 1, ie a flow rate of +/- 20.8 L / min. The recirculation flow will be conveyed to the head of the reactor.

.10 The Contractor shall submit the plans signed and sealed by an engineer member of the Order of Engineers of Quebec (OIQ) of the precast concrete biological reactor.

.11 The Contractor shall submit the plans signed and sealed by an engineer member of the Order of Engineers of Quebec (OIQ) for the internal components, Bionest, of the biological reactor.

3.4 PUMPING STATION INTEGRATED WITH THE BIOLOGICAL REACTOR

.1 The Wastewater Treatment Technology Supplier must design and deliver a pumping station integrated with the biological reactor. The pumps will be of the Liberty FL-52M type of 0.5 HP powered by 240V / 1 phase / 60 Hz.

.2 The Wastewater Treatment Technology Supplier must provide a Liberty brand control panel model AE21L = 3-3. The Contractor is responsible for the electrical connection of this panel and pumps.

.3 The Contractor is responsible for supplying the electrical conductors and conduits between the control panel and the junction box in the reactor for supplying the pumps as well as the electrical conductors and conduits between the control panel and the junction box in the reactor for the control fleets (3 fleets).

3.5 AIR PUMPS

.1 The Wastewater Treatment Technology Supplier shall design and supply the air pumps required to ensure the operation and performance of the proposed wastewater treatment system.

.2 Provide seven (7) Hiblow brand air pumps, model HP-200, powered on 110 Vac / 1 phase / 60 Hz for an air flow of 189.14 L / min @ 3.3 PSI.

.3 The air pumps must be installed on a KLETON brand 4-shelf wire mesh shelf.

.4 The wastewater treatment technology supplier must submit for workshop drawing approval the sizing and technical specifications of the proposed air pumps.

.5 Spare parts :

.1 One (1) Hiblow model HP-200 air pump.

3.6 SETTLING TANK

.1 The Contractor shall supply and install a prefabricated reinforced concrete tank for the decantation of dephosphatation sludge with a minimum effective volume of 13,300 L, as manufactured by MEI Sanitation, model FSM-18000 or approved equivalent.

.2 The sludge settling basin must comply with the recommendations of the Guide for the study of conventional technologies for the treatment of wastewater from domestic sources concerning septic tanks with the exception of the separating wall, fitted with two (2) inspection chimneys. 750 mm diameter and ductile iron lids with lockable key. The basin must be waterproof.

.3 The basin must be fitted with a Polylok PL-625 type pre-filter or approved equivalent. A high-level fleet must be installed on the pre-filter and connected to the alarm system in the technical room.

.4 The settling tank must have an opening for the ventilation pipe of 100 mm.

.5 The settling tank must be clean, waterproof and dry during factory and site work.

.6 The height of the maximum backfill must not exceed 1 meter.

.7 The settling tank must be designed to withstand the pressure of the soil, considering its depth and the expected thickness of cover. The Contractor must submit a calculation note for the hydrostatic thrust signed by an engineer member of the Order of Engineers of Quebec (OIQ).

.8 The Contractor shall submit the plans signed and sealed by an engineer member of the Order of Engineers of Quebec (OIQ) of the prefabricated concrete septic tank.

3.7 UV DISINFECTION SYSTEM

.1 Provide a complete UV disinfection system to ensure the elimination of fecal coliforms below 200 CFU / 100 ml.

.2 The UV system will consist of two (2) UVMAX® Model F4 units as supplied by Viqua or approved equivalent. The UV lamps will be powered by a 110-240 Vac / 1phase / 60hz power supply. The power consumption of a lamp and of the controller shall be 130 W. The initial instantaneous flow is 11.7 L / min.

.3 The Supplier of the wastewater treatment technology must submit, for approval by the Parks Canada Representative, the sizing of the UV reactors, the redundancies in place (if required), the guaranteed flows and the technical specifications of the equipment including the controllers and the required accessories.

.4 The supplier must also submit for approval, as the workshop drawing, the proposed layout drawings as well as a process diagram including the sizing selected.

.5 Supply and install an Endress + Hauser Picomag electromagnetic flowmeter or approved equivalent.

3.8 COAGULANT DOSING SYSTEM FOR DEPHOSPHATION

.1 The Contractor shall install one (1) complete dosing system mounted on one (1) simplex platform made of material compatible with aluminum sulphate delivered at 48.5%. The dosing system should include all accessories and control instruments to ensure accurate and reliable dosing.

.2 Provide one (1) Stenner Pumps brand metering pump, model 45MHP22 or approved equivalent, 1/3 HP, 120 V / 1 phase / 60 Hz with a metering rate of 0.331 mL / L @ 100 psi.

.3 The dosing system should include, but not be limited to:

.1 A static mixer;

.2 One 55 gal aluminum sulphate (48.5%) polyethylene barrel, manufactured to ASTM-D-1998, with low-level fleets, Switch-TekTM LV20 type, Flowline or approved equivalent, to connect the alarm system in the technical building.

.3 A high density polyethylene non-slip containment station with removable grid.

.4 All valves for the coagulant dosing system must be Chemline brand or approved equivalent.

.5 Spare parts :

.1 One (1) dosing tube for the peristaltic dosing pump.

3.9 PIPING

.1 Unless otherwise indicated in the plans, all interior piping will be in Schedule 40 PVC with screwed, flanged or glued joints depending on the type of connection to be made. The Contractor must provide enough joints / unions to allow easy and quick dismantling of all sections of pipes without having to cut them.

.2 Flexible pipes must be provided for the air lines from the air pumps to the biological reactor.

.3 All piping must be adequately supported by means of suitable fixing devices.

3.10 VENTILATION

.1 A pipeline network connecting the pumping station, the biological reactor, technical building and the settling tank must be set up.

.2 This pipe network must be built underground to the rear of the “Maison du Superintendent”. The pipes must then be positioned so as to limit their visibility. The pipes shall offer a downward slope to the tanks to allow condensation discharge. An anti-vermin device must be provided.

3.11 BOLTS AND FLANGES

.1 All bolts will be 316L stainless steel, regardless of the different specifications, elsewhere in this document. Flanges in permanent dry condition shall be galvanized steel and flanges in submerged / wet conditions shall be 316L stainless steel.

3.12 SAMPLERS

.1 The supply of a wastewater sampler shall be of the peristaltic pump type, polypropylene sampled water storage bottle, GLS model manufactured by Teledyne ISCO or approved equivalent.

.1 The sampler controller supplied in a waterproof case must include a 16-key keypad and include programs for compound sampling.

.2 The controller must be able to initiate a sample by time interval, momentary external contact, pulse count, or manual.

.3 The sampler will be of the composite type, with the samples deposited in a single container;

.4 The 3/8 inch vinyl sample line 25 feet long will be fitted with a strainer with anchor;

.5 The sampler must be equipped:

.1 A liquid detector.

.2 A sample tube change indicator.

.6 The sample container shall be polypropylene with a capacity of 9.4 L (2.5 gallons).

.7 The sampler must be supplied with all related equipment necessary for its proper functioning including, but not limited to, extension cord, safety equipment for sampling, theft prevention equipment and cleaning products. Training must be provided for the use of the equipment, including the presentation of the method limiting the risk of breakage and theft during the sampling period. The Contractor can provide a composite sampler inside the room with a pipe network to the sampling point to avoid the risk of theft or breakage. However, the Contractor is responsible for the installation and the design.

.2 Provide a modified peristaltic pump type instant sample pump that can be mounted on a drill. The peristaltic pump must be Masterflex model L / S 15.

.1 All related equipment including, but not limited to, sampling tubes, anchors, battery drill and charger, and cleaning products.

3.13 TECHNICAL AREA

.1 The technical room is located in the basement of the “Maison du Superintendent” and consists of a room of approximately 3.3 mx 5 m.

.2 All of Bionest's components must be installed in the planned room.

.3 The Contractor must submit a workshop drawing for approval by the engineer, the final layout of the equipment to be installed in the technical room including details of materials, paint or other required.

.4 Drillings, patching and the installation of panels to support the components must be provided in the building foundation. **The Contractor must take notice of the condition of this foundation during the planned visit before submitting bids. No additional costs may be required given the actual state of the foundation.**

.5 The Contractor must coordinate with the Supplier the positioning of the holes in the foundation necessary for the connections of all the components.

.6 The Contractor must seal the openings in the building properly to prevent freezing and water infiltration.

.7 The Contractor is responsible for providing the electrical outlets and connections as required in the electrical section of the estimate.

.8 Supply and install a stand-alone Fendall 2000 eyewash station or approved equivalent.

.9 Provide a Lutz Model B36 or equivalent approved portable chemical transfer pump with all required accessories.

.10 The Contractor must provide an alarm relay system. This system shall allow the transmission of all the alarms to the existing alarm system in addition to indicating which alarm is active. The Contractor must provide the connections to the existing system. Below is a non-limitative list of the inlet and outlet of this alarm housing:

.1 Inlet.

.1 Raw wastewater pumping station.

.2 Septic tank high level.

.3 Reactor's integrated pumping station.

.4 Settling tank high level.

.5 Chemical product low level.

.6 Air pumps low pressure.

.7 UV #1.

.8 UV #2.

.2 Outlet.

.1 Raw wastewater pumping station.

.2 Other alarms.

.11 The Contractor must plan and carry out all the holes required in the foundation, both for hydraulic lines and electricity. The contractor must also provide for the sealing of these openings.

3.14 LIMITATION OF SUPPLY OF BIONEST COMPONENTS

.1 Bionest supplies and installs the following components. The installation of certain components must be coordinated with the Contractor, among others, surface preparation, insulation and backfill for the installation of the air duct. Please refer to the Bionest installation specifications for more details.

.1 Septic tank :

.1 High level fleet and electric conductor.

.2 Bionest reactor:

.1 BionestMD Media;
.2 Ventilation system;
.3 Entrance and exit nannies;
.4 Recirculation pump, line and electrical conductor;
.5 Electric conductor for BIOLARM (recirculation pump).

.3 Pumping station integrated into the Bionest reactor:
.1 All pumping equipment.

.4 Exterior:
.1 Ventilation duct.

.5 Decanter:
.1 High level fleet and electric conductor.

.6 Technical area :
.1 Ventilation system.
.1 Air pumps (7).
.2 Shelves.
.2 UV disinfection system.
.3 Electromagnetic flowmeter.
.4 Dephosphatation system.
.5 Water pipes for disinfection and dephosphatation.
.6 Integrated pump station control panel.
.7 Alarms linked to Bionest components.

.2 The Contractor is responsible for the supply, installation, and connection of the following electrical components:

.1 Power supply of components.
.2 Electrical conductors between the control panel and the junction box in the reactor for supplying the pumps;
.3 Electrical conductors between the control panel and the junction box in the reactor for the control fleets;
.4 All the electrical conduits necessary for the proper functioning of all the equipment in the treatment sector.

.3 The Contractor is responsible for routing the various conduits and conductors inside the technical room and making the connections to the components.

3.15 WORKSHOP

.1 The Contractor must dismantle and dispose of the existing floor drain in the workshop in accordance with applicable regulations.

.2 The Contractor must condemn the pipe of the existing floor drain by providing and installing a plug.

.3 The Contractor shall supply and install a retention pit and the appropriate polyethylene cover from Fibro-Drain model 1824P or approved equivalent.

.4 The retention pit must be designed and installed to withstand soil and hydrostatic pressure considering its depth. The Contractor must submit a calculation note for the hydrostatic thrust and the anchoring method signed by an engineer member of the Order of Engineers of Quebec (OIQ).

3.16 SUPERINTENDENT'S HOUSE DRAIN

.1 The Contractor must supply and install a discharge line between the floor drain pump located in the basement of the superintendent's house and the existing storm drain. The section located inside must be provided in CPV DR-21. Refer to tender and civil plans for the section located outside.

.2 The existing interior pipe must be dismantled and adequately plugged near the sanitary pipe.

3.17 SANITARY CONDUCT HOUSE OF THE SUPERINTENDENT

.1 The contractor must supply and install a new sanitary pipe inside the building to reposition the outlet as shown on the plans. The pipes, fittings, fixings, and accessories used must comply with the National Plumbing Code, the Construction Code, the Safety Code and any other applicable regulations and standards.

.2 The Contractor is responsible for properly fixing the new pipe.

.3 The Contractor is responsible for dismantling and disposing of the existing pipe.

.4 The Contractor is responsible for drilling and sealing the new opening in the foundation of the building.

.5 The Contractor is responsible for adequately sealing the existing abandoned opening in the foundation.

PARTIE 4 EXECUTION

4.1 EXAM

.1 Verification of conditions: before proceeding with the installation of the equipment, ensure that the condition of the surfaces / supports previously implemented under the terms of other sections or contracts is acceptable and allows the work to be carried out in accordance with the written instructions of the maker.

.1 Make a visual inspection of surfaces / supports in the presence of the Parks Canada Representative.

.2 Immediately inform the Parks Canada Representative of any unacceptable conditions found.

.3 Begin installation work only after correcting unacceptable conditions and receiving written approval from the Parks Canada Representative.

4.2 INSTALLATION

.1 Use seating and upholstery materials that are not frozen.

.2 Prefabricated reinforced concrete tanks must be installed on a foundation of at least 300 mm crushed gravel 20mm net installed in a geotextile membrane.

.3 Backfilling around and between tanks and manholes must be carried out with MG-20 compacted to 95% of the P.M. in layers 300mm thick (in accordance with the corresponding BNQ standard).

.4 Make watertight seals at the inlet and outlet of the prefabricated tanks.

.5 Before backfilling, perform a leak test in the presence of the Parks Canada Representative.

.1 Fill the prefabricated tanks with clean water up to the level of the drainpipe and wait 24 hours.

.2 No leak will be tolerated.

.3 If a leak occurs, remove the sealing materials and reinstall them as directed by the Parks Canada Representative.

.6 The Contractor must coordinate the necessary openings and sleeves with the other disciplines.

.7 The tanks and the pumping station must be installed in a place free from motorized traffic.

.8 The height of the chimneys must be adjusted so that the final earthwork ensures that surface water does not drain towards the inspection openings.

.9 The earthwork must be arranged so that the covers are not hanging on for pedestrians.

.10 The openings of the reservoirs and the pumping station must have a minimum clearance, free of friable backfill material, ensuring the handling of the inspection covers without the material risking falling into the reservoir.

.11 Install the equipment according to the manufacturer's instructions.

.12 Electrical wiring, if required, shall be the responsibility of the electrical contractor. Wiring should be done in accordance with the manufacturer's guidelines and applicable local, state, and national codes.

.13 The septic tank, the biological reactor and the settling tank must be filled with clear water (drinking water) before commissioning. The use of the drinking water network, 19 mm diameter pipe with a relatively low flow rate, present on the site is permitted.

4.3 CLEANING

.1 Cleaning during work: carry out cleaning work in accordance with section 01 74 11 - Cleaning.

.1 Leave the premises clean at the end of each working day.

.2 Final cleaning: remove surplus materials / equipment, waste, tools and equipment from the site in accordance with section 01 74 11 - Cleaning

4.4 GUARANTEE

.1 The supplier of the raw water pumping station must warrant the water pumping system against defects in materials and workmanship as well as workmanship for a period of one (1) year (12 months) from the date of provisional acceptance.

.2 The supplier of advanced secondary treatment technology must guarantee, from the date of provisional acceptance:

.1 system components for a period of two (2) years (24 months);

.2 peripheral components for a period of one (1) year (12 months);

.3 The media of the biological reactor for a minimum period of ten (10) years;

.4 Labor for a period of one (1) year.

.3 The warranty must cover parts, labor, travel and living expenses paid by the supplier to provide on-site services authorized by Parks Canada. The warranty must be provided by the supplier of the equipment and not by a third party.

PARTIE 5 INSTALLATION, COMMISSIONING AND PERFORMANCE TESTING

5.1 GENERAL

.1 Protocols, procedures and test reports to be submitted for approval to the Parks Canada Representative must include the acceptance criteria for each test.

.2 When the tests are carried out, the results are noted in the test report as the tests progress. All test reports must be signed by the qualified person in charge of the Supplier.

.3 All tests must be done in the presence of the Parks Canada Representative. The test reports must be sent immediately after the tests have been carried out to the Contractor for their validation by the Parks Canada Representative.

.4 For each test that does not present satisfactory results, the Contractor must send for validation to the Parks Canada Representative, within a period not exceeding five (5) days, what he plans to do as a corrective action and specifying the impacts on the work schedule of the Contractor's contract.

.5 The Contractor must give forty-eight (48) hours written notice to the Parks Canada Representative before the scheduled date of each test.

.6 The Contractor must plan and provide the material, apparatus and test equipment and labor required for the performance of the tests and pay all costs thereof. The Contractor assumes all the costs of the tests, including the re-tests and those of the repair of the equipment.

.7 The workforce of personnel provided by the Contractor, during assistance during installation, commissioning, performance testing, must have a minimum of three (3) years experience in the field of water treatment.

.8 The Contractor is responsible for providing and following the test schedule submitted with his protocol and for making the necessary arrangements for each test so as not to delay or unduly prolong the tests.

.9 If an item of equipment does not meet the Supplier's data or the performance specified during a test, the Contractor must replace the defective equipment as soon as possible and pay all the costs incurred by this replacement.

.10 The order of activities, proposed for installation by the Contractor and for commissioning and performance tests by the Contractor, is presented in the following table.

Board 5 - Summary of installation, commissioning and performance testing activities

ACTIVITIES	DURATION	RESPONSIBLE
INSTALLATION		
Unloading of wastewater treatment equipment	To be determined by the Contractor	Contractor
Installation of equipment for wastewater treatment	To be determined by Supplier	Supplier of advanced secondary processing technology
Inspection and examination of installed equipment		Supplier
List of installation deficiencies		Supplier
Correction of installation deficiencies		Contractor
Installation approval		Supplier
START-UP		
Pre-operational checks		Supplier and Contractor
Corrections following pre-operational checks		Supplier and Contractor
Commissioning of wastewater treatment equipment	To be determined by Supplier	Supplier
Start-up test for wastewater treatment		Supplier and Contractor
PERFORMANCE TESTS		
Performance tests for wastewater treatment	Following a minimum normal use period of two (2) weeks	Supplier and Contractor

5.2 INSTALLATION

.1 The installation of the wastewater treatment equipment will be done by a contractor certified by the supplier of advanced secondary type treatment technology.

5.3 START-UP

.1 All equipment should be checked and tested to ensure compliance with commissioning protocols produced by the wastewater treatment technology supplier.

.2 During commissioning including start-up tests and continuous tests, the Customer bears the cost of energy.

.3 Start test

.1 Start-up tests must be carried out on the entire wastewater treatment system.

.2 After the installation and mechanical verification of the wastewater treatment equipment, the Supplier must notify the Contractor seven (7) days before the start of the start-up tests.

.3 Start-up tests will be the responsibility of the Supplier. The Contractor shall however provide the labor for the operation of the equipment as well as any element required during the start-up tests. However, the Contractor remains fully responsible for the treatment equipment supplied and for its operation during the start-up tests.

.4 The start-up tests must be carried out by simulating as much as possible all operating and emergency conditions, including checking the hydraulic profile and the flow at maximum flow rate as well as the pressure drops through the pipes.

.5 The performance of the systems must be recorded by the Supplier and all test reports carried out must be provided to the Contractor for approval by the Parks Canada Representative.

.6 If, in the opinion of the Parks Canada Representative, the start-up tests show that the equipment, or a portion of the equipment does not succeed in meeting the requirements of the technical specification, the Contractor must modify or replace, at its expense, any defective part of the equipment until it meets the requirements of this specification.

.7 Following the start-up tests, the Supplier must issue a certificate of conformity to the Contractor, for approval by the Parks Canada Representative, indicating the requests for corrective actions and demonstrating that the solutions have been found or are under way of being. This certificate must be submitted with its authorization request to the Contractor to carry out the continuous tests.

5.4 PERFORMANCE TESTS

.1 After carrying out the start-up tests, the Contractor must demonstrate that the equipment meets the performance criteria of the technical specifications.

.2 The Contractor must carry out performance tests for the entire wastewater treatment system.

.1 The performance tests cannot be carried out before the site opens scheduled for spring 2021.

.3 The performance tests must be carried out by the Supplier according to a test protocol that he must submit for approval by the Parks Canada Representative. This protocol should describe the objectives and methodology of the trials.

.4 A complete report must be submitted by the Supplier to the Contractor, for approval by the Parks Canada Representative, containing all the results obtained during the performance tests. The report summarizes:

.1 The performance testing protocol;

.2 The operating conditions recorded during the tests and the modifications and justifications for the deviations from the previously approved protocol;

.3 Presentation of results with interpretation and discussion of results;

.4 The conclusions and recommendations.

.5 If the results of the performance tests do not comply with the established requirements, the Contractor must make the required modifications at his own expense in order to achieve the stated performance, to the satisfaction of the Parks Canada Representative. Provisional acceptance of the Contractor's contract is not pronounced if the results of the performance tests do not meet the established requirements.

.6 In the event of a dispute between the parties, as to the results of the performance tests, and at the request of the Parks Canada Representative, these must be redone by an independent firm. The costs thus incurred will be handled by the party in default.

.7 The Contractor must carry out performance tests to verify that the performance criteria required in the technical specifications are met.

.8 The Contractor must carry out hydraulic tests to demonstrate that the unit capacity of the equipment supplied meets the requirements in terms of flow rate according to the specifications of the technical specifications.

.9 All costs required for performing the performance tests are the responsibility of the Supplier.

.10 The following parameters must be measured at the frequency indicated in the following table during each test period:

Board 6 - Monitoring parameters during the wastewater treatment test period

SETTING	UNIT	RAW WATER	TREATED WATER	FREQUENCY
Temperature	° C	X	X	Once (1) time (One-off)
pH		X	X	Once (1) time (One-off)
MY	UCV	X	X	Once (1) time (One-off)
BOD_5C	mg / L	X	X	Once (1) time (One-off)
Total nitrogen	mg of N / L	X	X	Once (1) time (One-off)
Total phosphorus	mg P / L	X	X	Once (1) time (One-off)

Fecal coliforms	CFU / 100 mL	X	X	Once (1) time (One-off)
Alkalinity	mg CaCO3 / L	X	X	Once (1) time (One-off)
Hardness	mg CaCO3 / L	X		Once (1) time (One-off)
Iron	mg / L	X		Once (1) time (One-off)
Manganese	mg / L	X		Once (1) time (One-off)

5.5 PROVISIONAL AND DEFINITIVE ACCEPTANCE OF THE WORKS

.1 Only one (1) provisional acceptance of the works will be carried out at the end of the works.

.2 Only one (1) final acceptance of the works will be carried out one (1) year after the provisional acceptance of the works.

END OF SECTION