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Canada

## LACHINE CANAL LIGHTING NETWORK REHABILITATION

### ELECTRICAL SPECIFICATIONS ISSUED FOR TENDER

*Ce document ne doit  
pas être utilisé à des  
fins de construction*

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## 1. GENERAL

### 1.1 Contractor Use of Premises

- .1 The following list describes the scope of work, without being limited to such. The Contractor shall perform detailed work to deliver a complete, operational and performing installation. Unless otherwise indicated, work includes the supply, installation, connection of equipment and commissioning.
  - .1 Disconnect circuit conductors.
  - .2 Remove and disassemble lamp into its various components.
  - .3 Store lamp (post, davit, light fixture) at location determined by Parks Canada.
  - .4 Cut road, excavate, backfill to infrastructure, compact and repair asphalt.
  - .5 Excavation, removal of concrete base, backfill hole resulting from its removal, compact and ship off-site.
  - .6 Apply loose soil and turf on all backfilled areas.
  - .7 Supply and install anchors.
  - .8 Protect trees, shrubs and fences. Under no circumstances shall excavation works come within two meters of tree fronts.
  - .9 Ship and dispose of excavation surplus.
  - .10 Backfill, level and make final adjustments to soil.
  - .11 Supply and install shafts, conduits, conductors and cables.
  - .12 Supply, install, connect and start-up street lamps.
  - .13 Signage required throughout duration of works as required by the Highway Safety Code.
  - .14 Signage required throughout duration of works as required by the Highway Safety Code.
  - .15 Electrotechnical testing.

## 1.2 Demolition

- .1 The Contractor shall provide all materials, labour and tools required to execute all demolition works mentioned in these specifications or indicated on the plans.
- .2 The Electrical Contractor shall be responsible for all demolition works indicated on the plans mentioned in these specifications or that are necessary for the completion of the works.
- .3 No dismantled device, equipment or electrical components must be reused unless otherwise indicated on plans.
- .4 All existing devices and equipment that must be removed for the execution of the works must be removed by the Contractor and submitted to the Owner. Any device or piece of equipment that the Owner does not want must be removed from the site by the Contractor at the Contractor's expense and in accordance with environmental standards and municipal, provincial and federal laws and regulations.
- .5 Devices and equipment that must be temporarily removed for the execution of works and reinstalled or relocated during the execution of works, as indicated on the plans, shall be the Contractor's responsibility until the completion of works.
- .6 Dismantling or demolishing an existing system or piece of equipment involves disconnecting the power supply, removing conductors and cables all the way to the power supply point, removing conduits, supports, straps and attachments, and removing them from the site.

## 1.3 Temporary power for site tools

- .1 Temporary installations and connections to existing services shall be supplied by the Contractor at the Contractor's expense and must comply with all applicable conditions and codes.
- .2 The Contractor shall supply, at his expense, all temporary lighting. Temporary lighting must be sufficient to meet the needs of all disciplines involved in the works.

- .3 The Contractor is responsible for supplying, installing and connecting all temporary components required, such as power outlets, cables, conduits, protective devices, etc.
- .4 The Contractor shall, upon completion of works, dismantle all temporary components used to supply power to tools used on site. Any disconnection of the facility's power network must be witnessed by the Respondent or his delegate.

#### 1.4 Laws, Codes and Regulations

- .1 Strictly comply with environmental protection laws, regulations and ordinances during demolition, removal and storage works.
- .2 Except in the case of stricter or more restrictive indications, execute demolition works in accordance with the provisions of the laws, standards, regulations and safety codes in effect, particularly the Safety Code for the Construction Industry (R.R.Q., c.S-2.1, r.6), Sub-Section 3.18 – Requirements Prior to Demolition, the National Building Code of Canada with amendments for Quebec (particularly Part 8 – Safety Measures at Construction and Demolition Sites as amended by Chapter 1 of the Construction Code), the National Fire Code of Canada (particularly Section 2.14 – Demolition Sites, Section 2.8 – Emergency Measures, and the articles in Appendix A that apply to these sections).

#### 1.5 Restoration

- .1 Prior to presenting a quote, the Contractor shall carefully examine the construction site. During his assessment, the Contractor shall take into account any particularities that could pose a threat to safety or the smooth execution of works.
- .2 The Contractor shall examine all aspects in order to assess:
  - .1 The nature and scope of works to be executed;
  - .2 Any site access challenges;
  - .3 Any factors that could make it difficult to execute works;
  - .4 Devices and equipment required;
  - .5 Existing underground and overhead utilities.

## 1.6 Temporary signage plans

- .1 Within a minimum of one (1) week prior to work commencing at the site, the Contractor shall submit to the Parks Canada Representative a series of signage plans for each step of the proposed works, as well as site access passes and site access/traffic management indicators for work teams (including sub-contractors, suppliers and others). These plans, which shall be submitted to the Supervisor for approval, must be signed and sealed by an engineer who is a member of the Quebec Order of Engineers (Ordre des Ingénieurs du Québec). The plans must indicate all signage required and measures that the Contractor will take to control and direct bike traffic. In addition, the plans must be modified as needed for the various proposed work phases.

## 1.7 Work Sequence

- .1 Construct work in stages to accommodate the parks Canada Representative's use of premises during construction.
- .2 Coordinate Progress Schedule and coordinate with the Departmental Representative occupancy during construction.
- .3 Phases:
  - .1 The work will be divided into two (2) distinct phases:
    - .1 Phase 1 – Section south of the canal: From Chemin du Musée to the Gauron Lafleur Bridge (plans E01 to E04).
    - .2 Phase 2 – Section north of the canal: From the Gauron Lafleur Bridge to Highway 15 (plans E304 to E13).
- .4 Construct work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of work will provide alternate usage.
- .5 Maintain fire access/control.

**1.8 Partial Occupancy by the Parks Canada Representative**

- .1 Execute Certificate of Substantial Performance for each designated portion of work prior to the occupancy by the Parks Canada Representative. Contractor shall allow:
  - .1 Access for the Parks Canada Representative's personnel.
  - .2 Use of parking facilities and traffic lanes.
  - .3 Operation of control and electrical systems.

**1.9 Items Supplied by the Parks Canada Representative**

- .1 Parks Canada Representative Responsibilities:
  - .1 Arrange for delivery to site in accordance with Progress Schedule.
  - .2 Inspect deliveries jointly with Contractor.
  - .3 Submit claims for transportation damage.
  - .4 Arrange for replacement of damaged, defective or missing items.
- .2 Contractor Responsibilities:
  - .1 Designate submittals and delivery date for each product in Progress Schedule.
  - .2 Receive and unload products at site.
  - .3 Inspect deliveries jointly with the Parks Canada Representative; record shortages, and damaged or defective items.
  - .4 Handle products at site, including unpacking and storage.
  - .5 Protect products from damage, and from exposure to elements.
  - .6 Assemble, install, connect, adjust, and finish products.
  - .7 Provide installation inspections required by public authorities.



- .8 Repair or replace items damaged by Contractor or Subcontractor on site under his control.

### 1.10 Required Documents

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

## 2. PRODUCTS

- .1 Not used.

## 3. EXECUTION

- .1 Not used.

## 1. GENERAL

### 1.1 Access

- .1 Design, construct and maintain temporary accesses to work areas, including stairs, runways, ramps or ladders, and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

### 1.2 Use of Site and Facilities

- .1 Execute work with least possible interference or disturbance to normal use of premises. Arrange with the Parks Canada Representative to facilitate execution of work.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Protect work temporarily until permanent enclosures are completed.
- .4 Always install protective fences around trenches and excavations to prevent falls.

### 1.3 Existing Services

- .1 Notify the Parks Canada Representative and utility companies of intended service interruptions and obtain required permission.
- .2 Provide for personnel, pedestrian and vehicular traffic.

### 1.4 Special Requirements

- .1 Carry out noise-generating work Monday to Friday from 7 am to 5 pm.
- .2 Submit schedule in accordance with Section 01 32 16.07 – Construction Progress Schedule – Bar Chart (GANTT).
- .3 Ensure Contractor’s personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .4 Keep within limits of work and avenues of ingress and egress.

- .5 Ingress and egress of Contractor's vehicles at site is limited to areas indicated on plans.
- .6 Deliver materials outside of peak traffic from 7 am to 11 am, unless otherwise approved by Parks Canada Representative. Coordinate deliveries with Parks Canada Representative.
- .7 The Contractor is solely responsible for work performed in winter conditions and associated costs. The Contractor must ensure that all clauses, conditions specific to various specifications sections and manufacturer requirements are respected at all times during performance of work. When required, the Contractor must demonstrate to the Parks Canada Representative that said conditions and requirements are met. The Contractor must take measures to correct situation to satisfaction of the Parks Canada Representative.
- .8 Concrete and asphalt work must be done in summer or fall.
- .9 Landscaping work, such as spreading of peat, must be done in the spring.

### **1.5 Smoke-Free Environment**

- .1 Comply with smoking restrictions. Smoking is not permitted in the work area. Use designated smoking areas.

## **2. PRODUCTS**

- .1 Not used.

## **3. EXECUTION**

- .1 Not used.

## 1. GENERAL

### 1.1 Unit or Lumber Prices

- .1 The total amount of the contract is broken down according to a description of work paid on a flat-rate basis (flat-rate prices) and paid work on a unitary basis (unit prices).
- .2 Each of the unit or lump sum prices to be broken down shall include all expenditures, work, disbursements, payments, direct or indirect costs, mobilizations, demobilizations and acts, all facts, and all responsibilities, obligations, omissions and errors of The Contractor in connection with the completion of this work. These prices also include the transportation and use of materials, the cost of labor, materials, tools and equipment required for the performance of the contract, and all costs Corporate, administration, insurance, contributions, interest, rents, taxes and other incidental expenses. It must include losses and damages that may result from the nature of the work, fluctuations in prices and wages, business risks, strikes, delays not attributable to the Departmental Representative, transportation restrictions, Accidents and the action of the elements of nature.

### 1.2 Definitions

- .1 Fixed price: where the work is determined in a precise and detailed manner and a price is agreed and accepted by both parties for the whole.
- .2 Unit price: where the specifications for the work are determined in a precise and detailed manner and all quantities on the schedule are provided as an estimate.

## 2. PRICE SCHEDULE LINE ITEM DESCRIPTIONS

- .1 Site organization
  - .1 This section includes the organization of the site and all elements described in this Part. It is paid on a flat-rate basis and includes all the requirements outlined in Division 1 (General Requirements) of this Specification as well as all other work that is not part of other Schedule items but is necessary for the full the work.

- .2 It also includes the costs of mobilization and demobilization, the cost of purchasing, depreciating or leasing machinery, tools and equipment, personnel, materials, site facilities and any mobilization As may be required to meet the schedule of work.
- .3 Maintenance and operating costs for the maintenance of machinery, equipment and tools included in the worksite facilities during the course of the work and the personnel supporting these facilities are also included.
- .4 This price includes, but is not limited to:
  - .1 Land
    - .1 Expenses for the acquisition, lease, compensation and use of land other than those which may be made available to the Contractor, either for the construction site or for temporary deposits.
    - .2 The costs of use and maintenance of the lands made available to the Contractor.
  - .2 Arrangements of Site Site Areas
    - .1 Land development required for development of site facilities.
    - .2 Site drainage.
    - .3 Site and personnel offices.
    - .4 Office of Parks Canada Representative.
    - .5 Premises for storage of equipment.
    - .6 External Storage for Equipment and Equipment.
    - .7 Barriers and fencing required throughout the duration of the work, including any movement and all temporary safety devices.
    - .8 The costs of guarding.

- .3 Machinery, Equipment and Tools
  - .1 All machinery and equipment required to maintain site operations including operation (eg for receiving and managing materials).
  - .2 Light trucks.
  - .3 Scaffolding.
  - .4 Generators and temporary lighting.
  - .5 tools.
  - .6 Compressors.
- .4 Networks
  - .1 Toilets on site.
  - .2 Water supply to existing site facilities from existing hydrants.
  - .3 Fire protection.
  - .4 Water for compaction of materials and dust suppressant.
  - .5 Power Supply.
  - .6 Lighting on site.
  - .7 Telephone and Internet links for use and use of Parks Canada Representative.
- .5 Health and Safety
  - .1 All equipment and supplies required to ensure health and safety in accordance with Section 01 35 29.06 of the Construction Specification and applicable laws and regulations.

- .6 Services
  - .1 This lump sum price includes the total remuneration including the salaries and bonuses of the contractor's site staff and clerical staff who will provide the services of site organization during the duration of the work, including but not limited to:
    - .2 Superintendency and project management.
    - .3 Topographic survey services.
    - .4 Studies of construction methods.
    - .5 Quality control.
    - .6 Health and Safety.
    - .7 Work planning and subcontractor management.
    - .8 Supply and Logistics.
    - .9 Preparation and management of documentation (in accordance with Section 01 33 00 of the construction specifications, including shop drawings, final plans, operating manuals and suppliers).
    - .10 Commissioning.
    - .11 Transportation, accommodation and subsistence costs of (indirect) support staff and all workers throughout the duration of the work.
- .7 Miscellaneous
  - .1 Licenses
  - .2 Supply and installation of 1220 mm x 2440 mm works identification sign, corresponding to a 3.0 m<sup>2</sup> for each worksite access.
  - .3 All other related costs for completion of work not included in unit and or lump sum prices.

- .4 Provision of timetable of work in two formats: (\*.mpp & \*.pdf) including all the updates and other information required.
  
- .8 Electrical
  - .1 Lighting Units
    - .1 For the price schedule's line item entitled "Lighting Units", the bidder shall list a price per unit that includes the supply and installation of each lamp. The price shall include, without being limited to:
      - .1 Supplying and installing a street lamp including accessories such as the pole, footing, base cover, lug, etc.
      - .2 Supplying, installing and wiring connections inside the lamp post, fuse holders, fuses, and splices.
      - .3 Final adjustments to ensure pole verticality.
      - .4 Connecting the street lamp to the circuit.
      - .5 All other related works required to complete the work as specified in the plans and specifications.
    - .2 Payment of this item will be made based on the progress of the work, as approved by Parks Canada Representative.
  - .2 Trenches Without Paving
    - .1 For the price schedule's line item entitled "Trenches Without Paving", the bidder shall list a price per linear metre for the construction of trenches. The price shall include, without being limited to:



- .1 Retaining and protecting work areas.
  - .2 Supporting and protecting public utilities.
  - .3 Protecting trees, shrubs and fences.
  - .4 Excavating and drying of trench, disposing of excavated materials and/or waste, encasing and backfilling.
  - .5 Compacting and installing signalling tape.
  - .6 Backfilling, final levelling and final adjustments.
  - .7 Site rehabilitation.
  - .8 All other related works required to complete the work as specified in the plans and specifications.
- .2 Payment of this item will be made based on the progress of the work, as approved by Parks Canada Representative.
- .3 Trenches Under Paving
- .1 For the price schedule's line item entitled "Trenches Under Paving", the bidder shall list a unit price per linear metre for the construction of trenches. The price shall include, without being limited to:
    - .1 Cutting the pavement, excavating, backfilling to infrastructure, and compacting (see details on plan) after the installation of ducts, signalling tape, removal of extra/unusable excavated material and all incidental expenses;
    - .2 All other related works required to complete the work as specified in the plans and specifications.

.2 Payment of this item will be made based on the progress of the work, as approved by Parks Canada Representative.

.4 Concrete Bases

.1 For the price schedule's line item entitled "Concrete Bases", the bidder shall list a unit price for the construction of concrete bases. The price shall include, without being limited to:

.1 Excavating.

.2 Shoring trench, controlling water and supporting nearby structures.

.3 Preparing the bed.

.4 Constructing of the mound around the concrete base, if required.

.5 Supplying and installing the concrete bases, poured on site (including the anchor bolts, encased ducts and reinforcements) or the prefabricated base.

.6 Backfilling and compacting.

.7 Disposing of extra excavated material and/or waste.

.8 Final levelling and adjustments to the concrete base.

.9 All other related works required to complete the work as specified in the plans and specifications.

.2 Payment of this item will be made based on the progress of the work, as approved by Parks Canada Representative.

.5 PVC Ducts

- .1 For the price schedule's line item entitled "PVC Ducts", the bidder shall list a unit price per linear metre for supplying and installing PVC ducts, with ducts being measured parallel to the trench, from the centre of one concrete base to the centre of the next. The price shall include, without being limited to:
  - .1 Supplying and installing rigid PVC ducts with the diameter indicated on the schedule.
  - .2 Cleaning of the duct, passing a mandrel and stiff bristle brush, and installing a 6 mm nylon cable for pulling conductors or cables.
  - .3 All other related works required to complete the work as specified in the plans and specifications.
- .2 Payment of this item will be made based on the progress of the work, as approved by Parks Canada Representative.

.6 Conductors

- .1 For the price schedule's line item entitled "Conductors", the bidder shall list a unit price per linear metre for supplying and installing conductors. The price shall include, without being limited to:
  - .1 Supplying and installing RWU-90 conductors in ducts, with caliber as indicated on plans.
  - .2 Measuring to be from one base centre to another.

- .3 An additional 3 metres per rise for each cable in a concrete base.
  - .4 An additional 3.5 metres per rise for the power supply and distribution.
  - .5 An overall additional 4 metres for each cable passing through a pull block.
  - .6 An additional 1 metre for each cable passing through a pull box or junction box.
  - .7 All other related works required to complete the work as specified in the plans and specifications.
- .2 Payment of this item will be made based on the progress of the work, as approved by Parks Canada Representative.

.7 Ground-Level Pull Box

- .1 For the price schedule's line item entitled "Ground-Level Pull Box", the bidder shall list a unit price for supplying and installing pull boxes. The price shall include, without being limited to:
  - .1 Excavating.
  - .2 Supplying and installing the pull box duct.
  - .3 Backfilling.
  - .4 All other related works required to complete the work as specified in the plans and specifications.
- .2 Payment of this item will be made based on the progress of the work, as approved by Parks Canada Representative.

.8 Modification of Power Supply and Control Panel

.1 For the price schedule's line item entitled "Modification of Power Supply and Control Panel", the bidder shall list a lump-sum price for supplying and installing the equipment indicated on the plans and specifications. The price shall include, without being limited to:

.1 Supplying, installing and connecting all electrical equipment indicated on the plans and specifications.

.2 Installing, modifying and connecting the distribution components, breakers, contactors, terminal blocks, fuse holders, protective covers, astronomical timer, electric eye, selector switches, bushings and labelling stickers.

.3 Modifying the existing electrical distribution, connecting, relocating and pivoting of power supply and control panels.

.4 All other related works required to complete the work as specified in the plans and specifications.

.2 Payment of this item will be made based on the progress of the work, as approved by Parks Canada Representative.

.9 Simple Street Lamp Disassembly

.1 For the price schedule's line item entitled "Simple Street Lamp Disassembly", the bidder shall list a unit price for dismantling simple street lamps. The price shall include, without being limited to:

.1 Disconnecting power conductors.

- .2 Removing the street lamp and dismantling it into its various parts (post, davit, light fixture).
  - .3 Removing conductors inside the post.
  - .4 Removing the various components (lamp, fuse holder, fuses).
  - .5 Storing the street lamp (post, davit, light fixture) at the location determined by Parks Canada.
  - .6 All other related works required to complete the work as specified in the plans and specifications.
- .2 Payment of this item will be made based on the progress of the work, as approved by Parks Canada Representative.

.10 Concrete Base Dismantling

- .1 For the price schedule's line item entitled "Concrete Base Dismantling", the bidder shall list a unit price for dismantling concrete bases. The price shall include, without being limited to:
  - .1 Excavating.
  - .2 Sectioning ducts.
  - .3 Removing the concrete base and transporting it off site.
  - .4 Backfilling the hole resulting from its removal and compacting.
  - .5 All other related works required to complete the work as specified in the plans and specifications.

- .2 Payment of this item will be made based on the progress of the work, as approved by Parks Canada Representative.

.11 Electrotechnical Testing

- .1 For the price schedule's line item entitled "Electrotechnical Testing", the bidder shall list a lump-sum price. The price shall include, without being limited to:

- .1 Ensuring verifications are performed by an independent firm, as required in the specifications, including the necessary equipment.
- .2 Issuing a report and performing additional inspections.
- .3 All other related works required to complete the work as specified in the plans and specifications.

- .2 Payment of this item will be made based on the progress of the work, as approved by Parks Canada Representative.

.12 Anti-Theft Device

- .1 For the price schedule's line item entitled "Anti-Theft Device", the bidder shall list a unit price for installing an anti-theft device within lamp posts. The price shall include, without being limited to:

- .1 Supplying and installing a steel plate and neoprene protection.
- .2 Supplying and installing nuts and bolts.
- .3 All other related works required to complete the work as specified in the plans and specifications.

- .2 Payment of this item will be made based on the progress of the work, as approved by Parks Canada Representative.

**3. PRODUCTS**

- .1 Not Applicable.

**4. EXECUTION**

- .1 Not Applicable.



## 1. GENERAL

### 1.1 Administrative

- .1 Schedule and administer project meetings throughout the progress of the work at Parks Canada Representative's request.
- .2 If schedule changes, notify Parks Canada Representative of meeting four (4) days in advance of meeting date.
- .3 Meetings will take place every two (2) weeks at the site trailer.
- .4 Departmental Representative will record meeting minutes.
- .5 Parks Canada Representative will distribute copies of minutes to meeting participants via email within five (5) days after meetings.
- .6 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

### 1.2 Pre-Construction Meeting

- .1 Schedule a pre-construction meeting within 15 days after date of Contract Award with Contract parties to discuss administrative procedures and define parties' responsibilities.
- .2 Parks Canada Representative, Contractor, major subcontractors and site inspectors shall attend pre-construction meeting.
- .3 Establish time and location of meeting and notify parties concerned a minimum of five (5) days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
  - .1 Appointment of official representative of participants in the work.
  - .2 Schedule of Work: in accordance with Section 01 32 16.07 – Construction Progress Schedule – Bar Chart (GANTT)).

- .3 Schedule of submission of shop drawings.
- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 – Construction Facilities.
- .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .7 Record drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .8 Maintenance manuals in accordance with Section 01 78 00 – Closeout Submittal.
- .9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 – Closeout Submittals.
- .10 Monthly progress claims, administrative procedures, photographs, hold back.
- .11 Appointment of inspection and testing agencies or firms.
- .12 Insurances, transcript of policies.

### 1.3 Construction Progress Meetings

- .1 During course of work and prior to project completion, schedule progress meetings bi-weekly.
- .2 Contractor and Parks Canada Representative are to be in attendance.
- .3 Notify parties minimum five (5) days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) days after meeting.
- .5 Agenda to include
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of work progress since previous meeting.

- .3 Field observations, problems, conflicts.
- .4 Problems which impede construction schedule.
- .5 Review of off-site fabrication delivery schedules.
- .6 Corrective measures and procedures to regain projected schedule.
- .7 Revision to construction schedule.
- .8 Progress schedule, during succeeding work period.
- .9 Review submittal schedules: expedite as required.
- .10 Maintenance of quality standards.
- .11 Review proposed changes for effect on construction schedule and on completion date.
- .12 Miscellaneous.

**2. PRODUCTS**

- .1 Not used.

**3. EXECUTION**

- .1 Not used.

## 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 charts, activities or other project elements are listed from top to bottom, on the left side of the chart, while dates are shown across the top, from left to right. Activity durations are shown as date-placed horizontal bars. Generally, Bar Charts should be derived from a commercially available computerized project management system.
- .3 Baseline: Original approved plan (for a project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Workweek: Monday to Friday, inclusive, will provide five-day workweek 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 an 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 a project, usually the completion of a major deliverable.
- .8 Project Schedule: Planned dates for performing activities and planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy project objectives. The monitoring and control process involves using the Project Schedule in executing and controlling activities. It is used as a basis for decision-making throughout the project life cycle.
- .9 Project Planning, Monitoring and Control System: Overall system managed by the Park 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 Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate are defined times of completion and 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 Parks Canada Representative within ten (10) working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

## 1.4 Project Milestones

- .1 Project milestones form interim targets for Project Schedule.
  - .1 Exterior work must be completed within four (4) months of Award of Contract date.
  - .2 Interim Certificate (Substantial Completion) within four (4) months of Award of Contract date.

## 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 to the Contractor.
- .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 a detailed project schedule from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows.
  - .1 Contract award.
  - .2 Shop drawings, samples.
  - .3 Permits.
  - .4 Mobilization.
  - .5 Civil engineering.
  - .6 Electrical engineering.
  - .7 Testing and commissioning.
  - .8 Supplied equipment with long delivery times.

## 1.7 Project Schedule Reporting

- .1 Update Project Schedule on bi-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 Project Meetings

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

**2. PRODUCTS**

.1 Not used.

**3. EXECUTION**

.1 Not used.

## 1. GENERAL

### 1.1 Administrative

- .1 Submit to Parks Canada Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Parks Canada Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Parks Canada Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent work are coordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Parks Canada Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Parks Canada Representative's review.
- .10 Keep one (1) reviewed copy of each submission on site.



## 1.2 Shop Drawings and Product Data

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow seven (7) days for Parks Canada Representative's review of each submission.
- .5 Adjustments made on shop drawings by Parks Canada Representative are not intended to change Contract Price. If adjustments affect value of work, state such in writing to Parks Canada Representative prior to proceeding with work.
- .6 Make changes in shop drawings as Parks Canada Representative may require, consistent with Contract Documents. When resubmitting, notify Parks Canada Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in duplicate, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.

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

**SUBMITTAL PROCEDURES**

- .10 Submit one (1) electronic copy of product data sheets or brochures for requirements requested in specification sections and as requested by Parks Canada Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .11 Submit one (1) electronic copy of test reports for requirements requested in specification sections and as requested by Parks Canada Representative.
  - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accordance with specified requirements.
  - .2 Testing must have been within three (3) years of date of contract award for project.
- .12 Submit one (1) electronic copy of certificates for requirements requested in specification sections and as requested by Parks Canada Representative.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .13 Submit one (1) electronic copy of manufacturer's instructions for requirements requested in specification sections and as requested by Parks Canada Representative.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .14 Submit one (1) electronic copy of manufacturer's Field Reports for requirements requested in specification sections and as requested by Parks Canada Representative.
- .15 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

- .16 Submit one (1) electronic copy of Operation and Maintenance Data for requirements requested in specification sections and as requested by Parks Canada Representative.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Parks Canada Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of work may proceed.
- .20 The review of shop drawings by Parks Canada Representative is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that Parks Canada Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
  - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of work of sub-trades.

### 1.3 Photographic Documentation

- .1 Submit one (1) electronic copy of colour digital photography in jpg format, standard resolution, monthly with progress statement.
- .2 Project identification: name and number of project and date of exposure indicated.

**1.4 Certificates and Transcripts**

- .1 Immediately after Award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after Award of Contract.

**2. PRODUCTS**

- .1 Not used.

**3. EXECUTION**

- .1 Not used.

**SHOP DRAWING - IDENTIFICATION FORM**

(This form must be filled out by the Contractor.)

<b>PROJECT:</b> PARKS CANADA LACHINE CANAL LIGHTING NETWORK REHABILITATION	<b>OWNER (CLIENT):</b>
	<b>ARCHITECT:</b>

**SUBCONTRACTOR:**  
 Address:  
  
 Responsible person:  
 Telephone:  
 Email

**ENGINEER:** **SNC-LAVALIN INC.**  
 455 René-Lévesque Blvd. West  
 Montreal (Quebec) H2Z 1Z3  
 TEL.: 514-393-1000

**SUPPLIER:**  
 Address :  
  
 Responsible person:  
 Telephone:  
  
 Email:


**GENERAL CONTRACTOR:**  
 Responsible person:  
 Telephone :  
 Email:  
 Approval:  
 (Signature)

**MANUFACTURER:**  
 Address :  
  
 Responsible person:  
 Telephone:  
 Email:

<b>PRODUCT SUBMITTED:</b> AS IS EQUIVALENT SUBSTITUTION	<b>DRAWING ISSUED FOR:</b> VERIFICATION INFORMATION COORDINATION OTHER _____
--	--

**SPECIALTY (discipline):**  
**SHOP DRAWING NO.:** \_\_\_\_\_ **NUMBER of PAGES:** \_\_\_\_\_  
**TERM OF DELIVERY (after verification):**  
**DESCRIPTION OF SHOP DRAWING:**  
  
  
**REFERENCE TO DRAWING:**  
**REFERENCE TO SPECIFICATIONS:**  
 Volume: \_\_\_\_\_ Article: \_\_\_\_\_  
 Division: \_\_\_\_\_ Page: \_\_\_\_\_  
**COMMENTS:**  
  
  

REV.	DATE ISSUED



**Verification of conformity**

**SNC-LAVALIN**

Nature and scope of the examination

Verification of conformity according to the specifications and drawings.

This verification is by no way a complete and detailed audit of the design.

No correction noted  
 Perform indicated corrections  
 Correct and resubmit  
 Refused

Date: \_\_\_\_\_

Signature  Engineer  Other

\_\_\_\_\_  
 Name OIQ member N° \_\_\_\_\_

The review of this paper is limited to the nature and scope indicated. The person or company who prepared it cannot be relieved of its obligations in any cases, of any nature whatsoever.





## 1. GENERAL

### 1.1 Section Includes

- .1 The Contractor shall manage his operations so that safety and security of the public and of site workers always take precedence over cost and scheduling considerations.

### 1.2 References

- .1 Canada Labour Code - Part II, Canadian Occupational Safety and Health Regulations.
- .2 Canadian Standards Association (CSA).
- .3 Workplace Hazardous Materials Information System (WHMIS).
- .4 Act Respecting Occupational Health and Safety, R.S.Q. Chapter S-2.1.
- .5 Construction Safety Code, S-2.1, r.6.

### 1.3 Submittals

- .1 Submit the documents required according to Section 01 33 00 – Submittal Procedures.
- .2 Submit to the Parks Canada Representative, the CSST, the *Association paritaire en santé et sécurité du secteur de la construction* (ASP Construction), the site-specific safety program, as outlined in 1.8 at least ten (10) days prior to start of work. The Contractor must review his program during the course of the project if any change occurs in work methods or site conditions. The Parks Canada Representative may, after receiving the program or at any time during the project, ask the Contractor to update or modify the program in order to better reflect the reality of the construction site and activities. The Contractor must make the required changes before work begins.
- .3 Submit to the Parks Canada Representative the site inspection sheet, duly completed, at the intervals indicated in 1.13.1.



- .4 Submit to the Parks Canada Representative within 24 hours a copy of any inspection report, correction notice or recommendation issued by federal or provincial inspectors.
- .5 Submit to the Parks Canada Representative within 24 hours an investigation report for any accident involving injury and any incident exposing a potential hazard.
- .6 Submit to the Parks Canada Representative all safety data sheets for hazardous material to be used at the site at least three (3) days before they are to be used.
- .7 Submit to the Parks Canada Representative copies of all training certificates required for application of the safety program, in particular:
  - .1 General construction site safety and health courses.
  - .2 Safety officer attestations.
  - .3 First aid in the workplace and cardiopulmonary resuscitation.
  - .4 Lockout procedures.
  - .5 Wearing and fitting of individual protective gear.
  - .6 Forklift truck.
  - .7 Positioning platform.
  - .8 Any other requirement of regulations or the safety program.
- .8 Emergency plan: the emergency plan, as defined in 1.8.3, shall be submitted to Parks Canada Representative at the same time as the site-specific safety program.
- .9 Notice of site opening: notice of site opening shall be submitted to the *Commission de la santé et de la sécurité du travail* before work begins. A copy of such notice shall be submitted to Parks Canada Representative at the same time and another posted in full view at the site. During demobilization, a notice of site closing shall be submitted to the CSST, with copy to the Parks Canada Representative.

- .10 Plans and certificates of compliance: submit to the CSST and Parks Canada Representative a copy signed and sealed by an engineer of all plans and certificates of compliance required pursuant to the Construction Safety Code (S-2.1, r. 6), or by any other legislation or regulation or by any other clause in the specifications or in this contract. Copies of these documents must be on hand at the site at all times.
- .11 Certificate of compliance delivered by the CSST: the certificate of compliance is a document delivered by the CSST confirming that the Contractor is in good standing with the CSST, i.e., that he has paid out all the benefits concerning this contract. This document must be delivered to Parks Canada Representative at the end of the work.

#### 1.4 Hazards Assessment

- .1 The Contractor must identify all hazards inherent to each task to be carried out at the site.
- .2 The Contractor must plan and organize work so as to eliminate hazards at source or promote mutual protection so that reliance on individual protective gear can be kept to a minimum. Where individual protection against falling is required, workers shall use a safety harness that meets standard CAN/CSA-Z-259.10-M90. Safety belts shall not be used as protection against falling.
- .3 Equipment, tools and protective gear which cannot be installed, fitted or used without compromising the health or safety of workers or the public shall be deemed inadequate for the work to be executed.

#### 1.5 Meetings

- .1 The Contractor's decisional representative must attend any meetings at which site safety and health issues are to be discussed.
- .2 Set up a site safety committee and convene meetings in accordance with the Construction Safety Code (S-2.1, r.6).

#### 1.6 Legal and Regulatory Requirements

- .1 Comply with all legislation, regulations and standards applicable to the site and its related activities.

- .2 Comply with specified standards and regulations to ensure safe operations at a site containing hazardous or toxic materials.
- .3 Regardless of the publication date shown in the Construction Safety Code, always use the most recent version.

### 1.7 Site-Specific Conditions

- .1 At the site, the Contactor must take into account the following specific conditions:
  - .1 The terminal's personnel and users' circulation near the construction area.

### 1.8 Safety and Health Management

- .1 Acknowledge and assume all the tasks and obligations which customarily devolve upon a principal Contractor under the terms of the Act Respecting Occupational Health and Safety (R.S.Q., chapter S-2.1) and the Construction Safety Code (S-2.1, r.6).
- .2 Develop a site-specific safety program based on the hazards identified and apply it from the start of project work until close-out is completed. The safety program must encompass all information appearing in 1.7 and must be submitted to all parties concerned, in accordance with the provisions set forth in 1.3. At a minimum, the site-specific safety program must include:
  - .1 Company safety and health policy.
  - .2 A description of the work, total costs, schedule and projected workforce curve.
  - .3 Flow chart of safety and health responsibilities.
  - .4 The physical and material layout of the site.
  - .5 First aid and first-line treatment standards.
  - .6 Identification of site-specific hazards.
  - .7 Risk assessment for the tasks to be carried out, including preventive measures and the procedures for applying them.

- .8 Training requirements.
- .9 Procedures in case of accident/injury.
- .10 Written commitment from all parties to comply with the prevention program.
- .11 A site inspection schedule based on the preventive measures.
- .3 The Contractor must draw up an effective emergency plan based on the characteristics and constraints of the site and its surroundings. Submit the emergency plan to all parties concerned, pursuant to the provisions of 1.3. The emergency plan must include:
  - .1 Identification of persons in charge at the site.
  - .2 Identification of those with first aid training.
  - .3 Training required for those responsible for applying the plan.
  - .4 Any other information needed, in light of the site characteristics.

## 1.9 Responsibilities

- .1 No matter the size of the construction site or how many workers are present at the workplace, designate a competent person to supervise and take responsibility for health and safety. Take all necessary measures to ensure the health and safety of persons and property at or in the immediate vicinity of the site and likely to be affected by any of the work.
- .2 Take all necessary measures to ensure application of and compliance with the safety and health requirements of the Contract Documents, applicable federal and provincial regulations and standards as well as the site-specific safety program, complying without delay with any order or correction notice issued by the *Commission de la santé et de la sécurité du travail*.
- .3 Take all necessary measures to keep the site clean and in good order throughout the course of the work

### 1.10 Communications and Posting

- .1 Make all necessary arrangements to ensure effective communication of safety and health information at the site. As workers arrive on site, they must all be informed of their rights and obligations pertaining to the site-specific safety program. The Contractor must insist on their right to refuse to perform work which they feel may threaten their own health, safety or physical integrity or that of other persons at the site. The Contractor must keep and update a written record of all information transmitted with signatures of all workers involved.
- .2 The following information and documents must be posted in a location readily accessible to all workers:
  - .1 Notice of site opening.
  - .2 Identification of principal Contractor.
  - .3 Company OSH policy.
  - .4 Site-specific safety program.
  - .5 Emergency plan.
  - .6 Data sheets for all hazardous material used at the site.
  - .7 Minutes of site committee meetings.
  - .8 Names of site committee representatives.
  - .9 Names of those with first aid training.
  - .10 Action reports and correction notices issued by the CSST.

### 1.11 Unforeseen Circumstances

- .1 Whenever a source of danger not defined in the specifications or identified in the preliminary site inspection arises as a result of or in the course of the work, immediately suspend work, take appropriate temporary measures to protect the workers and the public and notify the Parks Canada Representative, both verbally and in writing. Then the Contractor must modify or update the site-specific safety program in order to resume work under safe conditions.

### 1.12 Inspection of Site and Correction of Hazardous Situations

- .1 Inspect the work site and complete the site inspection sheet at least once a week.
- .2 Immediately take all necessary measures to correct any lapses from legislative or regulatory requirements and any hazards identified by a government inspector, by the Parks Canada Representative, by the site safety and health coordinator or during routine inspections.
- .3 Submit to the Parks Canada Representative written confirmation of all measures taken to correct lapses and hazardous situations.
- .4 Give the safety officer or, where there is no safety officer, the person assigned to safety and health responsibilities, full authority to order interruption and resuming of work as and when deemed necessary or desirable in the interests of safety and health. This person should always act so that the safety and health of the public and site workers and environmental protection take precedence over cost and scheduling considerations.
- .5 Without limiting the scope of sections 1.8 and 1.9, the Parks Canada Representative may order cessation of work if, in his view, there is any hazard or threat to the safety or health of site personnel or the public or to the environment.

### 1.13 Blasting

- .1 Blasting and other use of explosives are forbidden unless authorized in writing by the Parks Canada Representative.
- .2 Any operation involving explosives must be carried out under the supervision of a qualified shot firer.
- .3 The purchase, carriage, storage and use of explosives must comply with all applicable federal and provincial legislation:
  - .1 Canada: Explosives Act (E-17), Explosives Regulations (C.R.C. CH. 599), Standard for Storage of Blasting Charges and Detonators, Transportation of Dangerous Goods Act and Regulations.

- .2 Quebec: Explosives Act (E-22), Explosives Regulations (E-22, r.1), Construction Safety Code (S-2.1, r.6), Transportation of Dangerous Goods Regulations.
- .4 The Contractor shall obtain all permits required pursuant to the legislation and regulations referred to above and keep copies on hand at the site.
- .5 The Contractor shall facilitate inspection of the site, stored explosives and vehicles used to transport explosives by any government representatives or police officers whose jurisdiction encompasses explosives.

#### 1.14 Powder Actuated Devices

- .1 Use of power hammers must be authorized by the Parks Canada Representative.
- .2 Any person using a power hammer shall hold a training certificate and meet all requirements of Section 7 of the Construction Safety Code (S-2.1, r. 6).
- .3 Any other explosive-actuated devices are not permitted.

#### 1.15 Work at Heights

- .1 General
  - .1 The Contractor must ensure that any person carrying out work that poses a risk of falling more than 2.4 m use fall protection equipment.
  - .2 Plan and organize work so as to eliminate the danger at source or ensure collective protection, thereby minimizing the use of personal protective equipment. When personal fall protection is required, workers must use a safety harness that complies with CSA standard CAN/CSA Z-259.10 M90. A safety belt must not be used as fall protection.
  - .3 Every person using an elevating platform must have training regarding this equipment.
  - .4 Wearing a safety harness is obligatory in any elevating platform with telescopic, articulated or rotary boom.

- .5 Delineate a danger zone in any place where equipment for work at heights is used.

#### 1.16 Excavating and Trenching

- .1 To follow Canadian Safety Code guidelines on excavation.

#### 1.17 Cleaning Work

- .1 The Contractor must ensure that non-compatible chemicals are stored in such a way that they never come into contact with each other.
- .2 Ensure workers wear the proper gloves when using cleaning products.
- .3 Ensure workers wear the proper gloves when cleaning outdoors if there is a risk of contact with biological contaminants (droppings, birds' nests, etc.).
- .4 For outdoor work, advise the Parks Canada Representative of any accumulation of bird or animal droppings so he/she can advise you of the necessary procedures to follow.



## 1. GENERAL

### 1.1 References

#### .1 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.

### 1.2 Action and Informational Submittals

#### .1 Product Data

- .2 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Parks Canada 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 training site personnel.
  - .3 Descriptions of environmental protection personnel training program.

- .4 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
  - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .5 Spill Control Plan to include procedures, instructions and reports to be used in event of unforeseen spill of regulated substance.
- .6 Non-Hazardous Solid Waste Disposal Plan identifying methods and locations for solid waste disposal including clearing debris.
- .7 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.

### 1.3 Fires

- .1 Fires and burning of rubbish on site are not permitted.
- .2 Provide supervision, attendance and fire protection measures as directed.

### 1.4 Site Clearing and Plant Protection

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Minimize stripping of topsoil and vegetation.

### 1.5 Pollution Control

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

- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
  - .1 Provide temporary enclosures where directed by Parks Canada Representative.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

## 1.6 Notification

- .1 Parks Canada 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 Parks Canada Representative of proposed corrective action and take such action for approval by Parks Canada Representative.
  - .1 Take action only after receipt of written approval by Parks Canada Representative.
- .3 Parks Canada 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.

## 2. PRODUCTS

- .1 Not used.

**3. EXECUTION****3.1 Cleaning**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
  - .1 Leave work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

## 1. GENERAL

### 1.1 References and Codes

- .1 Perform work in accordance with National Building Code of Canada (NBC), including amendments up to tender closing date, and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
  - .1 Contract documents.
  - .2 Specified standards, codes and referenced documents.

### 1.2 Hazardous Material Discovery

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Parks Canada Representative.
- .2 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Parks Canada Representative.

### 1.3 Smoke-Free Environment

- .1 Comply with smoking restrictions and municipal by-laws.

## 2. PRODUCTS

- .1 Not used.

## 3. EXECUTION

- .1 Not used.

## 1. GENERAL

### 1.1 Inspection

- .1 Allow 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 Parks Canada Representative.
- .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 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, Parks Canada Representative shall pay cost of examination and replacement.

### 1.2 Independent Inspection Agencies

- .1 Independent inspection/testing agencies will be engaged by Parks Canada Representative. Cost of such services will be borne by Parks Canada Representative.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relieve responsibility to perform work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Parks Canada Representative at no cost to Parks Canada Representative. Pay costs for retesting and reinspection.

### 1.3 Access to Work

- .1 Allow inspection/testing agencies access to work, off-site manufacturing and fabrication plants.
- .2 Cooperate to provide reasonable facilities for such access.

### 1.4 Procedures

- .1 Notify appropriate agency and 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.

### 1.5 Rejected Work

- .1 Remove defective work, whether result of poor workmanship, use of defective products or damage and whether incorporated into work or not, which has been rejected by 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 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 Parks Canada Representative.

### 1.6 Reports

- .1 Submit three (3) copies of inspection and test reports to Parks Canada Representative.

**1.7 Mock-ups**

- .1 Prepare mock-ups for work specifically requested in specifications. Include for work of sections required to provide mock-ups.
- .2 Construct in locations acceptable to Parks Canada Representative as specified in specific section.
- .3 Prepare mock-ups for Parks Canada Representative's review with reasonable promptness and in orderly sequence, to not cause delays in work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 If requested, Parks Canada Representative will assist in preparing schedule fixing dates for preparation.
- .6 Specification section identifies whether mock-up may remain as part of work or if it is to be removed and when.

**2. PRODUCTS**

- .1 Not used.

**3. EXECUTION**

- .1 Not used.



## 1. GENERAL

### 1.1 References

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
  - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA-0121-M1978 (R2003), Douglas Fir Plywood.
  - .3 CAN/CSA-S269.2-M1987 (R2003), Access Scaffolding for Construction Purposes.
  - .4 CAN/CSA-Z321-96 (R2001), Signs and Symbols for the Occupational Environment.

### 1.2 Installation and Removal

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation. Provide OMEGA type fence 1,800-mm high, on each side excavations.
- .2 Indicate use of supplemental or other staging area.
- .3 Provide or install construction facilities in order to execute work expeditiously.
- .4 Remove from site all such work after use.

### 1.3 Hoisting

- .1 Provide, operate and maintain hoists required for moving of workers, materials and equipment. Make financial arrangements with subcontractors for their use of hoists.

- .2 Hoists to be operated by qualified operators.

#### 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 Onsite Parking

- .1 Provide and maintain adequate access to project site.
- .2 Clean traffic lanes used by construction equipment.

#### 1.6 Offices

- .1 Owner will provide location for storage and site office for workers. Electrical services fit-out will fall under the Contractor's responsibility.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary within designated area. Direct location of these offices.
- .4 Parks Canada Representative's site office:
  - .1 The Owner will provide a temporary office for Parks Canada Representative.

#### 1.7 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 Leave on site materials not required to be stored in weatherproof sheds in manner to cause least interference with work activities.

- .3 Ensure that no materials, equipment and devices installed for their protection are likely to catch in the wind.

### 1.8 Sanitary Facilities

- .1 The Contractor is responsible for providing sanitary facilities in the Contractor's work zone. Facilities must be cleaned frequently.

### 1.9 Construction Signage

- .1 Provide and erect three (3) project signs, within three (3) weeks of signing the Contract, in a location designated by Parks Canada Representative.
- .2 Construction signs measuring 1.2 m X 2.4 m, of wood frame and plywood construction, painted with exhibit lettering produced by a professional sign painter.
- .3 Indicate on sign name of Owner and Contractor of design and style established by Parks Canada Representative.
- .4 No other signs or advertisements, other than warning signs, are permitted on site.

### 1.10 Protection and Maintenance of Traffic

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Parks Canada Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger and direction signs.
- .4 The Contractor's traffic on roads selected for hauling material to and from site shall interfere as little as possible with public traffic.

- .5 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .6 Construct access and haul roads as necessary.
- .7 Provide necessary lighting, signs, barricades and distinctive markings for safe movement of traffic.
- .8 Dust control must be adequate to ensure safe operation at all times.
- .9 Location, grade, width and alignment of construction and hauling roads: subject to approval by Parks Canada Representative.
- .10 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .11 Provide snow removal during period of work.
- .12 Remove, upon completion of work, haul roads designated by Parks Canada.

### 1.11 Cleaning

- .1 Remove construction debris, waste materials and packaging materials from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Do not store new or salvaged material in construction facilities.

### 1.12 Temporary Partitions

- .1 Provide temporary partitions to delineate the work by zone, in accordance with requirements in plans.

## 2. PRODUCTS

- .1 Not used.

**3. EXECUTION**

.1 Not used.

## 1. GENERAL

### 1.1 References

- .1 Within text of each specifications section, reference may be made to reference standards. List of standards reference writing organizations is contained in affected sections.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, Parks Canada Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be borne by Parks Canada Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

### 1.2 Quality

- .1 Products, materials, equipment and articles incorporated into 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 satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with 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.

### 1.3 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 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 Parks Canada Representative at commencement of work and should it subsequently appear that work may be delayed for such reason, Parks Canada Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

### 1.4 Storage, Handling and Protection

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

- .6 Store sheet materials, lumber and sheet material on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Parks Canada Representative.
- .9 Touch up damaged factory finished surfaces to Parks Canada Representative's satisfaction. Use touch-up materials to match original. Do not paint over nameplates.

## 1.5 Transportation

- .1 Pay costs of transportation of products required in performance of work.

## 1.6 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. Do not rely on labels or enclosures provided.
- .2 Notify Parks Canada Representative in writing of conflicts between specifications and manufacturer's instructions, so that Parks Canada Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Parks Canada Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

## 1.7 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 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. 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 Parks Canada Representative, whose decision is final.

**1.8 Coordination**

- .1 Ensure cooperation 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.

**1.9 Existing Utilities**

- .1 When breaking into or connecting to existing services or utilities, execute work at times directed by local governing authorities, with minimum of disturbance to work, building occupants and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

**2. PRODUCTS**

- .1 Not used.

**3. EXECUTION**

- .1 Not used.

## 1. GENERAL

### 1.1 Project Cleanliness

- .1 Maintain work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Parks Canada Representative. Do not burn waste materials on site, unless approved by Parks Canada Representative.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers for collection of waste materials and debris.
- .5 Dispose of waste materials and debris at designated dumping areas on Crown property.
- .6 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

### 1.2 Final Cleaning

- .1 When work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining work.
- .2 Remove waste products and debris other than that caused by others, and leave work clean and suitable for occupancy.
- .3 Prior to final review, remove surplus products, tools, construction machinery and equipment.

- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Parks Canada Representative. Do not burn waste materials on site.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Clean lighting reflectors, lenses and other lighting surfaces.

**2. PRODUCTS**

- .1 Not used.

**3. EXECUTION**

- .1 Not used.

## 1. GENERAL

### 1.1 Waste Management Goals

- .1 Prior to start of work, conduct meeting with Parks Canada Representative to review and discuss PWGSC's waste management goal and the Contractor's proposed Waste Reduction Work plan for Construction, Renovation and/or Demolition (CRD) waste that will be generated during the project.
- .2 Parks Canada Representative's waste management goal: to divert a minimum 25% of total project waste from landfill site.
- .3 Target percentage goals are achievable for waste diversion. The Contractor shall review and confirm Parks Canada Representative's Waste Audit acceptable values.
- .4 Minimize the amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse and recycling of solid waste produced by CRD activities.
- .5 Protect the environment and prevent environmental pollution damage.

### 1.2 References

- .1 Definitions:
  - .1 Approved/authorized recycling facility: Waste recycler approved by applicable provincial authority or other users of material for recycling approved by Parks Canada Representative.
  - .2 Class III: Non-hazardous waste – construction, renovation and demolition waste.
  - .3 Construction, Renovation and/or Demolition (CRD) Waste: Class III solid, non-hazardous waste materials generated during construction, demolition and/or renovation activities.
  - .4 Cost/Revenue Analysis Workplan (CRAW): Based on information from the Waste Reduction Workplan and intended as a financial tracking tool for determining the economic status of waste management practices (Schedule E).

- .5 Inert Fill: Inert waste – exclusively asphalt and concrete.
- .6 Waste Source Separation Program (WSSP): Implementation and coordination of ongoing activities to ensure designated waste materials will be sorted into predefined categories and sent for recycling and reuse, maximizing diversion and potential to reduce disposal costs.
- .7 Recyclable: Ability of product or material to be recovered at end of its life cycle and remanufactured into new product for reuse.
- .8 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .9 Recycling: Process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating or thermally destroying waste.
- .10 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:
  - .1 Salvaging reusable materials from remodelling projects, before the demolition stage, for resale, reuse on current project or for storage for use on future projects.
  - .2 Returning reusable items, including pallets or unused products to vendors, for example.
- .11 Salvage: Removal of structural and non-structural materials from deconstruction/disassembly projects for the purpose of reusing or recycling.
- .12 Separate Condition: Refers to waste sorted into individual types.
- .13 Source Separation: Act of keeping different types of waste materials separate beginning from the point they became waste.
- .14 Waste Audit (WA): Detailed inventory of estimated quantities of waste materials that will be generated during construction, demolition, deconstruction and/or renovation. Involves quantifying by volume/weight amounts of materials and wastes that will be reused, recycled or landfilled.

- .15 Waste Diversion Report: Detailed report of final results, quantifying cumulative weights and percentages of waste materials reused, recycled and landfilled over course of project. Measures success against Waste Reduction Workplan (WRW) goals and identifies lessons learned.
- .16 Waste Management Coordinator (WMC): The Contractor's representative responsible for supervising waste management activities as well as coordinating required submittal and reporting requirements.
- .17 Waste Reduction Workplan (WRW): Written report which addresses opportunities for reduction, reuse or recycling of materials generated by project. Specifies diversion goals, implementation and reporting procedures, anticipated results and responsibilities. The Waste Reduction Workplan's information is acquired from the Waste Audit.

### 1.3 Documents

- .1 Post and maintain in a visible and accessible area at job site one (1) copy of the following documents:
  - .1 Waste Audit.

### 1.4 Action and Informational Submittals

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Prepare and submit the following prior to project start-up:
  - .1 One (1) paper copy and one (1) electronic copy of the completed Waste Audit (WA).
- .3 Prepare and submit monthly, throughout the project or at intervals agreed to by Parks Canada Representative, the following:
  - .1 Receipts, scale tickets, waybills, and/or waste disposal receipts that show quantities and types of materials reused, recycled or disposed of.
  - .2 Updated Waste Materials Tracking form.

- .3 Written monthly summary report detailing cumulative amounts of waste materials reused, recycled and landfilled, and brief status of ongoing waste management activities.
- .4 Submit the following prior to final payment:
  - .1 Waste Diversion Report, indicating final quantities (in tonnes) by material types salvaged for reuse, recycling or disposal in landfill and recycling centres, re-use depots, landfills and other waste processors that received waste materials.
  - .2 Provide receipts, scale tickets, waybills and waste disposal receipts that confirm quantities and types of materials reused, recycled or disposed of and destination.

#### 1.5 Waste Audit (WA)

- .1 Parks Canada Representative will prepare the WA prior to project start-up. The WA will be provided with bid documents.
- .2 The WA provides a detailed inventory, estimated quantities and types of waste materials that will be generated, as well as their potential to be reused and/or recycled and the project's waste diversion goals and objectives.
- .3 After Contract Award, the Contractor shall review the WA and confirm that the anticipated quantities of waste generated are accurate and that the goals are achievable.
- .4 If, after review, the Contractor determines that indicated quantities or opportunities in the WA are not accurate or achievable, he shall provide written details of discrepancies and revised quantities for areas of concern. The Contractor shall meet with Parks Canada Representative to review and justify revisions.
- .5 Post the WA on site, where the Contractor and subcontractors are able to review its content.

#### 1.6 Waste Reduction Workplan (WRW)

- .1 Prepare and submit the WRW at least ten (10) days prior to project start-up.

- .2 The WRW identifies strategies to optimize diversion through reduction, reuse, and recycling of materials and comply with applicable regulations based on information acquired from the WA.
- .3 The WRW should include, but not be limited to:
  - .1 Applicable regulations.
  - .2 Specific goals for waste reduction, identifying existing barriers and developing strategies to overcome them.
  - .3 Destination of materials identified.
  - .4 Deconstruction/disassembly techniques and schedules.
  - .5 Methods to collect, separate and reduce generated wastes.
  - .6 Location of waste bins on site.
  - .7 Security of on-site stock piles and waste bins.
  - .8 Protection of workers and subcontractors.
  - .9 Clear labelling of storage areas.
  - .10 Training plan for the Contractor and subcontractors.
  - .11 Methods to track and report results reliably.
  - .12 Details on materials handling and removal procedures.
  - .13 Recycler's requirements.
  - .14 Quantities of materials to be salvaged for reuse or recycling, and materials sent to landfill.
  - .15 Requirements for monitoring onsite waste management activities.
- .4 Structure the WRW to prioritize actions and follow the 3Rs hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .5 Post the WRW or a summary where workers on site are able to review its content.



- .6 Monitor and report on waste reduction by documenting total volume (in tonnes) and cost of actual waste removed from project.

### 1.7 Use of Site and Facilities

- .1 Execute work with minimal interference and disturbance to the normal use of premises.
- .2 Maintain security measures established by the facility and provide temporary security measures approved by Parks Canada Representative.

### 1.8 Waste Processing Sites

- .1 The Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off site to approved and/or authorized recycling facilities or to users of material for recycling.

### 1.9 Quality Assurance

- .1 After Contract Award, a mandatory site examination will be held for this project for the Contractor responsible for construction, renovation demolition/deconstruction waste management.
  - .1 The date, time and location will be arranged by Parks Canada Representative.

### 1.10 Storage, Handling and Protection

- .1 Store materials to be reused, recycled and salvaged in locations as directed by Parks Canada Representative.
- .2 Unless specified otherwise, materials for removal become the Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to a licensed disposal facility.

- .5 Protect structural components not removed and salvaged materials from movement or damage.
- .6 Support affected structures. If the safety of the building is at risk, cease operations and immediately notify Parks Canada Representative.
- .7 Provide on-site facilities and containers for the collection and storage of reusable and recyclable materials.
- .8 Separate and store materials produced during the project in designated areas.
- .9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
  - .1 On-site source separation is recommended.
  - .2 Remove co-mingled materials to off-site processing facility for separation.
  - .3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
  - .4 Materials reused on site are considered to be diverted from landfill and as such are to be included in all reporting.
- .10 Ensure that waste and reusable/recyclable materials cannot be blown away by the wind, enter an aircraft's path or reduce visibility airside.
- .11 Keep rubbish in closed containers so that they are inaccessible to birds.

### 1.11 Disposal of Waste

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner into waterways, storm or sanitary sewers.
- .3 Keep records of construction waste including:
  - .1 Number and size of bins.

- .2 Waste type of each bin.
- .3 Total tonnage generated.
- .4 Tonnage reused or recycled.
- .5 Reused or recycled waste destination.
- .4 Remove materials on-site as work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in the waste audit.

### 1.12 Scheduling

- .1 Coordinate work with other activities on site to ensure timely and orderly progress of work.

## 2. PRODUCTS

- .1 Not used.

## 3. EXECUTION

### 3.1 General

- .1 Do work in compliance with the WRW.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

### 3.2 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
- .2 Leave work area clean at end of each day.
- .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 in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .5 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .6 Source separate materials to be reused/recycled into specified sort areas.

## 1. GENERAL

### 1.1 References

- .1 Refer to the present Contract's General Conditions.

### 1.2 Administrative Requirements

- .1 Acceptance of Work Procedures
  - .1 Contractor's Inspection: The Contractor shall conduct inspection of work, identify deficiencies and defects, and repair as required to comply with Contract Documents.
    - .1 Notify Parks Canada Representative in writing of satisfactory completion of inspection and submit verification that corrections have been made.
    - .2 Request Parks Canada Representative inspection.
  - .2 Parks Canada Representative Inspection.
    - .1 Parks Canada 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 and systems: Tested, adjusted, balanced and fully operational.
    - .4 Training on the operation of equipment and systems has been provided to the building's O&M staff.
    - .5 Work: Complete and ready for final inspection.

- .4 Final Inspection
  - .1 When completion tasks are done, request final inspection of work by Parks Canada Representative.
  - .2 When work is deemed incomplete by Parks Canada Representative, complete outstanding items and request re-inspection.
- .5 Declaration of Substantial Performance: When Parks Canada Representative considers deficiencies and defects corrected and the requirements of the Contract substantially performed, make application for a Certificate of Substantial Performance.
- .6 Commencement of Lien and Warranty Periods: Date of Parks Canada Representative's acceptance of submitted declaration of Substantial Performance shall be the date for commencement for the warranty period and commencement of the lien period, unless required otherwise by lien statute of Place of Work.
- .7 Final Payment:
  - .1 When Parks Canada Representative considers final deficiencies and defects corrected and the requirements of Contract met, make application for final payment.
  - .2 When work is deemed incomplete by Parks Canada Representative, complete outstanding items and request re-inspection.
- .8 Payment of Holdback: After issuance of the Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with the contractual agreement.

### 1.3 Final Cleaning

- .1 Clean in accordance with Section 01 74 11 – Cleaning.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

**2. PRODUCTS**

.1 Not used.

**3. EXECUTION**

.1 Not used.

## 1. GENERAL

### 1.1 Administrative Requirements

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

### 1.2 Action and Informational Submittals

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Two (2) weeks prior to Substantial Performance of the work, submit to the Parks Canada Representative four (4) final copies of operating and maintenance manuals in French.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in work.



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

### 1.3 Contents – Project Record Documents

- .1 Table of contents for each volume: provide title of project;
  - .1 Date of submission; names.
  - .2 Addresses, and telephone numbers of Consultant and Contractor, 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.

### 1.4 As-Built Documents and Samples

- .1 Maintain, in addition to requirements in General Conditions, at site for Parks Canada Representative one (1) record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.

- .5 Reviewed shop drawings, product data and samples.
- .6 Field test records.
- .7 Inspection certificates.
- .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
  - .1 Provide files, racks and secure storage.
- .3 Maintain record documents in clean, dry and legible condition.
  - .1 Do not use record documents for construction purposes.

#### 1.5 Recording Information on Project Record Documents

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Parks Canada Representative.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
  - .1 Do not conceal work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including.
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.

- .5 Changes made by change orders.
- .6 Details not on original Contract Drawings.
- .7 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including.
  - .1 Manufacturer, trade name and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

## 1.6 Equipment and Systems

- .1 For each item of equipment and each system include description of unit or system and component parts.
  - .1 Give function, normal operation characteristics and limiting conditions.
  - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
  - .1 Include regulation, control, stopping, shut-down and emergency instructions.
  - .2 Include summer, winter and any special operating instructions.

- .5 Include manufacturer's printed operation and maintenance instructions.
- .6 Include sequence of operation by controls manufacturer.
- .7 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .8 Provide installed control diagrams by controls manufacturer.
- .9 Provide Contractor's coordination drawings with installed colour coded piping diagrams.
- .10 Provide charts of valve tag numbers with location and function of each valve, keyed to flow and control diagrams.
- .11 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .12 Additional requirements: as specified in individual specifications sections.

## 1.7 Maintenance Materials

- .1 Spare Parts
  - .1 Provide spare parts in quantities specified in individual specifications sections.
  - .2 Provide items of same manufacture and quality as items in work.
  - .3 Deliver to site; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Parks Canada Representative.
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.

- .2 Extra Stock Materials
  - .1 Provide maintenance and extra materials, in quantities specified in individual specifications sections.
  - .2 Provide items of same manufacture and quality as items in work.
  - .3 Deliver to site; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Parks Canada Representative.
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.
- .3 Special Tools
  - .1 Provide special tools, in quantities specified in individual specifications section.
  - .2 Provide items with tags identifying their associated function and equipment.
  - .3 Deliver to site; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Parks Canada Representative.
    - .2 Include approved listings in Maintenance Manual.

### 1.8 Delivery, Storage and Handling

- .1 Store spare parts, maintenance materials and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.

- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Remove and replace damaged products at own expense and for review by Parks Canada Representative.

### 1.9 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, to Parks Canada Representative for approval.
- .3 Warranty Management Plan to include required actions and documents to assure that 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 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 Listing and status of delivery of Certificates of Warranty for extended warranty items.
  - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
    - .1 Name of item.
    - .2 Model and serial numbers.
    - .3 Location where installed.
    - .4 Name and phone numbers of manufacturers or suppliers.
    - .5 Names, addresses and telephone numbers of sources of spare parts.
    - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
    - .7 Cross-reference to warranty certificates as applicable.
    - .8 Starting point and duration of warranty period.
    - .9 Summary of maintenance procedures required to continue warranty in force.
    - .10 Cross-reference to specific pertinent Operation and Maintenance manuals.

- .11 Organization, names and phone numbers of persons to call for warranty service.
- .12 Typical response time and repair time expected for various warranted equipment.
- .4 Procedure and status of tagging of equipment covered by extended warranties.
- .5 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.

#### 1.10 As-Built Plans

- .1 Upon completion of works and prior to provisional acceptance, the Contractor shall supply the Supervisor with a complete album of the plans, and with all modifications made during the works clearly indicated in red. The location of the concrete bases and conduits must be specifically indicated. The location information must include the following points:
  - .1 Location of the concrete bases in relation to one another.
  - .2 Location of pull boxes and underground conduits in relation to the concrete bases.
  - .3 Costs incurred for the production of plans must be distributed on all items on the price schedule.

#### 1.11 Warranty Tags

- .1 Tag, at time of installation, each warranted item. Provide durable, oil- and water-resistant tag approved by Parks Canada Representative.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.



- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
  - .1 Type of product/material.
  - .2 Model number.
  - .3 Serial number.
  - .4 Contract number.
  - .5 Warranty period.
  - .6 Inspector's signature.
  - .7 Construction Contractor.

**2. PRODUCTS**

- .1 Not used.

**3. EXECUTION**

- .1 Not used.

## 1. GENERAL

### 1.1 Summary

- .1 Acronyms and definitions:
  - .1 AFD – Alternate Forms of Delivery, service provider.
  - .2 Cx – Commissioning.
  - .3 EMCS – Energy Monitoring and Control Systems.
  - .4 O&M – Operation and Maintenance.
  - .5 PI – Product Information.
  - .6 PV – Performance Verification.
  - .7 TAB – Testing, Adjusting and Balancing.

### 1.2 General

- .1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives of Cx:
  - .1 Verify that installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent;
  - .2 Train O&M personnel.
- .2 The Contractor shall assist in the Cx process, operating equipment and systems, trouble-shooting and making adjustments as required.
  - .1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.

- .3 Design Criteria: as per the Client's requirements or as determined by the designer. Must meet project functional and operational requirements.

### 1.3 Overview of Commissioning

- .1 Cx activities supplement field quality and testing procedures described in relevant technical sections.
- .2 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities include transfer of critical knowledge to facility operational personnel.
- .3 Parks Canada Representative will issue an Interim Acceptance Certificate when:
  - .1 Completed Cx documentation has been received, reviewed for suitability and approved by Parks Canada Representative;
  - .2 Equipment, components and systems have been commissioned;
  - .3 O&M training has been completed.

### 1.4 Non-Conformance to Performance Verification Requirements

- .1 Should equipment, system components and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the non-functional system, including related systems as deemed required by Parks Canada Representative, to ensure effective performance.
- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

### 1.5 Conflicts

- .1 Report conflicts between the requirements of this section and other sections to Parks Canada Representative before start-up and obtain clarification.
- .2 Failure to report a conflict and obtain clarification will result in the application of the most stringent requirements.

### 1.6 Commissioning Schedule

- .1 Integrate to the construction schedule the items related to the Cx activities, in accordance with Section 01 32 16.07 – Construction Progress Schedules – Bar (GANTT) Chart.
- .2 Provide adequate time for Cx activities prescribed in technical sections and Cx sections, including:
  - .1 Approval of Cx reports;
  - .2 Verification of reported results;
  - .3 Repairs, retesting, re-commissioning, re-verification;
  - .4 Training.

### 1.7 Starting and Testing

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

### 1.8 Witnessing of Equipment Start-Up and Tests

- .1 Provide 14 days' notice prior to commencement.
- .2 Parks Canada Representative shall witness start-up and testing.

## 1.9 Procedures

- .1 Verify that equipment and systems are complete, clean and operating in normal and safe manner prior to conducting start-up, testing and Cx.
- .2 Conduct start-up and testing in the following distinct phases:
  - .1 Delivery and installation
    - .1 Verification of conformity to specifications, approved shop drawings and completion of PI report forms.
    - .2 Visual inspection of quality of installation.
  - .2 Start-up: follow accepted start-up procedures.
  - .3 Operational testing: document equipment performance.
  - .4 System PV: include repetition of tests after correcting deficiencies.
  - .5 Post-substantial performance verification: to include fine-tuning.
- .3 Correct deficiencies and obtain approval from Parks Canada Representative after distinct phases have been completed and before commencing the next phase.
- .4 Document requires tests.
- .5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Parks Canada Representative. If results reveal that equipment start-up was not in accordance with requirements and resulted in damage to equipment, implement following.
  - .1 Minor equipment/systems: implement corrective measures approved by Parks Canada Representative.
  - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Parks Canada Representative.

- .3 If the evaluation report concludes that major damage has occurred, Parks Canada Representative shall reject equipment.
  - .1 Rejected equipment shall be removed from site and replaced with new.
  - .2 Subject new equipment/systems to specified start-up procedures.

#### 1.10 Start-up Documentation

- .1 Assemble start-up documentation and submit to Parks Canada Representative for approval before commencement of Cx.
- .2 Start-up documentation to include:
  - .1 Pre-start-up inspection reports.
  - .2 Signed installation/start-up check lists.
  - .3 Start-up reports.
  - .4 Step-by-step description of complete start-up procedures to permit Parks Canada Representative to repeat start-up at any time.

#### 1.11 Operation and Maintenance of Equipment and Systems

- .1 Operate and maintain systems for length of time required for Cx to be completed.
- .2 After completion of Cx, operate and maintain systems until issuance of certificate of interim acceptance.

#### 1.12 Test Results

- .1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.
- .2 Provide manpower and materials, and assume costs for re-commissioning.

### 1.13 Commissioning Performance Verification

- .1 Carry out Cx:
  - .1 Under actual operating conditions, over entire operating range, in all modes.
  - .2 On independent systems and interacting systems.
- .2 Cx procedures to be repeatable and reported results are to be verifiable.
- .3 Follow equipment manufacturer's operating instructions.
- .4 EMCS trending to be available as supporting documentation for Performance Verification.

### 1.14 Witnessing of Commissioning

- .1 Parks Canada Representative shall witness Cx activities and verify results.

### 1.15 Authorities Having Jurisdiction

- .1 Where specified, start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.
- .2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.
- .3 Provide copies to Parks Canada Representative within five (5) days of test and with Cx report.

### 1.16 Extrapolation of Results

- .1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Parks Canada Representative in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

### 1.17 Deficiencies, Faults and Defects

- .1 Correct deficiencies found during start-up and Cx to the satisfaction of Parks Canada Representative.
- .2 Report problems, faults or defects affecting Cx to Parks Canada Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from Parks Canada Representative.

### 1.18 Completion of Commissioning

- .1 Upon completion of Cx, leave systems in normal operating mode.
- .2 Complete Cx prior to issuance of Interim Certificate of Completion.
- .3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Parks Canada Representative.

### 1.19 Activities upon Completion of Commissioning

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

### 1.20 Maintenance Materials, Spare Parts and Special Tools

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

## 2. PRODUCTS

- .1 Not used.

## 3. EXECUTION

- .1 Not used.



## 1. GENERAL

### 1.1 Related requirements

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 - Cleaning.

### 1.2 References

- .1 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.
- .2 Reference Standards:
  - .1 CSA Group
    - .1 CSA C22.1, Canadian Electrical Code, Part 1 (last Edition), Safety Standard for Electrical Installations.
    - .2 CSA C22.10, Quebec construction code, Chapter V, Electricity Canadian electrical code, Part 1 (21st edition) with Quebec amendments.
    - .3 CAN/CSA-C22.3 No.1, Overhead Systems.
    - .4 CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
  - .2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
    - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

### 1.3 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 charging station, lampposts, conduits and wiring as well as protective devices and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop drawings:
  - .1 Submit drawings of concrete bases and poles stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
  - .2 Shop drawing identification sheet duly completed and accompanying the shop drawing must be provided in one (1) copy, electronic, PDF, colour, high quality and sent to: [dessindatelier\\_me@snclavalin.com](mailto:dessindatelier_me@snclavalin.com). The email subject line must include the SNC-Lavalin project number and, if known, the name of the Project Director.
  - .3 If changes are required, notify Parks Canada Representative of these changes before they are made.
- .4 Certificates:
  - .1 Provide CSA certified material.
  - .2 Where CSA certified material is not available, submit such material to inspection authorities for approval before delivery to site.
  - .3 Submit electrotechnical test results of installed electrical systems
  - .4 Permits and fees: in accordance with General Conditions of contract.

#### 1.4 Closeout Submittals

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

### 2.2 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.

## 3. EXECUTION

### 3.1 Examination

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

### 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.1 except where specified otherwise.

### 3.3 Nameplates and Labels

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

### 3.4 Conduit and Cable Installation

- .1 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .2 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

### 3.5 Coordination 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 The Contractor must provide an electrotechnical testing report with the results of the verifications on: conductor and joint insulation, ground resistor, and voltage drops. The Contractor shall hire a qualified independent firm working in this field to carry out the tests. Two (2) copies of the electrotechnical testing report shall be issued, signed by an Engineer, and provided to the Parks Canada Representative.

- .2 Voltage measurements: voltage drops for each of the circuits must comply with the maximum voltage drop allowable under the Quebec Electrical Code. Grounding verification: the resistor must be measured between the Hydro-Québec network neutral and the ground rod, between the Hydro-Québec network neutral and the ground wire network, and between the ground rod and the ground wire network.

### 3.7 System Startup

- .1 Instruct operating personnel in operation, care and maintenance of systems, system equipment and components.
- .2 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.

## 1. GENERAL

### 1.1 Related Requirements

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

### 1.2 References

- .1 CSA International
  - .1 CAN/CSA-C22.2 No.18, Outlet Boxes, Conduit Boxes and Fittings.
  - .2 CAN/CSA-C22.2 No.65, Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
- .2 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 and include product characteristics, performance criteria, physical size, finish and limitations.

### 1.4 Closeout Submittals

- .1 Submit the required documents/elements.

### 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 wire and box connectors.
  - .3 Replace defective or damaged materials with new.

## 2. PRODUCTS

### 2.1 Materials

- .1 Pressure type splicing connectors for conductors AWG 8 and larger: using uninsulated solderless compression connections, Burndy type, KPA and QA-B models, or equivalent, and covered with rubber splicing tape conforming to standards for this type of splice.
- .2 Fixture type splicing connectors, Elastimold type, for roadway lighting with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

## 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 in presence of Parks Canada Representative.
  - .2 Inform 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 Parks Canada Representative.

### **3.2 Installation**

- .1 Remove insulation carefully from ends of conductors cables and:
  - .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.
  - .2 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap.

### **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.



## 1. GENERAL

### 1.1 Related Requirements

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

### 1.2 References

- .1 CSA International
  - .1 CAN/CSA-C22.2 No.0.3, Test methods for electrical wires and cables.
  - .2 CAN/CSA-C22.2 No.65, Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).

### 1.3 Product Data

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

### 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 in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wire and box connectors.
  - .3 Replace defective or damaged materials with new.

## 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 RWU90 XLPE.

## 3. EXECUTION

### 3.1 Field Quality Control

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform wires tests using method appropriate to site conditions and to approval of Parks Canada Representative and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

### 3.2 General Cable Installation

- .1 Install cable in trenches.
- .2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).
- .3 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.
- .4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.

### 3.3 Installation of Building Wires

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

- .2 In underground ducts in accordance with Section 33 65 76 – Direct buried underground cable ducts.
- .3 In surface in accordance with Section 26 05 34 – Conduits, conduit fastenings and conduit fittings.

## 1. GENERAL

### 1.1 Related Requirements

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

### 1.2 References

- .1 Canadian Standards Association (CSA International)
  - .1 CSA C22.1, Canadian Electrical Code, Part 1, last Edition.

### 1.3 Action and Informational Submittals

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

## 2. PRODUCTS

### 2.1 Ground Pull Boxes

- .1 The pull box consists of a concrete box and cover. It is used to facilitate pulling electrical cables for future connections. The Contractor must comply with manufacturer's installation instructions to prevent the box from moving once installed.
- .2 The pull box cover must be engraved with the indications listed on the plans. The engraving must be carried out in-plant by the manufacturer.

## 3. EXECUTION

### 3.1 Ground Pull Boxes Installation

- .1 Install pull boxes according to manufacturer's installation instruction.

## 1. GENERAL

### 1.1 Related Requirements

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

### 1.2 References

- .1 Canadian Standards Association (CSA International)
  - .1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
  - .2 CSA C22.2 No. 45, Rigid Metal Conduit.
  - .3 CSA C22.2 No. 83, Electrical Metallic Tubing.
  - .4 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.

### 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 conduit manufacturing data.
- .3 Quality assurance submittals:
  - .1 Test reports: submit certified test reports.
  - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .3 Instructions: submit manufacturer's installation instructions.

## 2. PRODUCTS

### 2.1 Conduits

- .1 Rigid metal conduit: to CSA C22.2 No. 45, aluminum threaded.
- .2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .3 Rigid PVC conduit: to CSA C22.2 No. 211.2.

### 2.2 Conduit Fastenings

- .1 One hole steel straps to secure surface conduits 50 mm and smaller.
  - .1 Two hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 1.5 m on centre.
- .4 Threaded rods, 6 mm diameter, to support suspended channels.

### 2.3 Conduit Fittings

- .1 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.
- .2 Watertight connectors and couplings for EMT.
  - .1 Set-screws are not acceptable.

### 2.4 Fish Cord

- .1 Polypropylene.

### 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 datasheets.

#### 3.2 Installation

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in mechanical and electrical service rooms or in unfinished areas.
- .3 Use rigid aluminum threaded conduit except where specified otherwise.
- .4 Use rigid PVC conduit underground.
- .5 Install fish cord in empty conduits.
- .6 Dry conduits out before installing wire.

#### 3.3 Conduits Underground

- .1 Slope conduits to provide drainage.
- .2 Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

#### 3.4 Cleaning

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

## 1. GENERAL

### 1.1 Related Requirements

- .1 Section 26 05 00 - Electrical - Common Work Results for Electrical.
- .2 Section 33 65 76 - Electrical - Direct Buried Underground Cable Ducts.

### 1.2 References

- .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 Storage and Handling Requirements:
  - .1 Store materials 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.



## 2. EXECUTION

### 2.1 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 in presence of Parks Canada Representative.
  - .2 Inform 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 Parks Canada Representative.

### 2.2 Cable Installation in Ducts

- .1 Install cables as indicated in ducts.
- .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.

### 2.3 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 500 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 Representative 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.

## 2.4 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.

## 2.5 Protection

- .1 Repair damage to adjacent materials caused by cables installation.

## 1. GENERAL

### 1.1 Related Requirements

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

### 1.2 References

- .1 CSA International
  - .1 CSA C22.2 No. 5-13, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, and NMX-J-266-ANCE-2013).

### 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.

## 2. PRODUCTS

### 2.1 Breakers General

- .1 Circuit breakers: to CSA C22.2 No. 5
- .2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual operation.
- .3 Common-trip breakers: with single handle for multi-pole applications.

## 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.

## 3. EXECUTION

### 3.1 Installation

- .1 Install circuit breakers.

### 3.2 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.

## 1. GENERAL

### 1.1 Related Requirements

- .1 Section 26 05 00.0 - Electrical – Common Work Results for Electrical.

### 1.2 References

- .1 CSA Group
  - .1 CSA C22.2 No.206-13(C2013), Lighting Poles.

### 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 roadway lighting 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 roadway lighting from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## 2. PRODUCTS

### 2.1 Aluminium Poles

#### .1 General

- .1 Round extruded aluminum pole with a wall 0.219 in. (5.6 mm) thick, with welds at upper and lower portions of the footing. The pole must have the following characteristics:
  - .1 Mounting on concrete anchor base.
  - .2 Two-section square base cover in folded aluminum.
  - .3 Access handhole above pole base for wiring connections, with welded-on reinforcing frames and bolted-on cover.
  - .4 Textured black colour and compliant with AAMA 2603. Application of thermosetting polyester paint, minimum 4 mils/100 microns with a tolerance of  $\pm 1$  mils/24 microns.
  - .5 Anchor bolts: steel with shims, nuts and covers.
  - .6 Anchor bolts shall have a cover.
  - .7 Round pole with two (2) banner holders for installation of banner.
  - .8 Ground lugs for 6 AWG wires located at access door height.
  - .9 Counterweight system to eliminate resonance frequency.
  - .10 Oblong holes for the pole's base shall accept a bolt circle varying from 35 mm (9.3 in.) to 279 mm (11 in.).
  - .11 All poles shall be able to support wind loads as per the following:
    - .1 Resist 100 km/h winds with 140 km/h gust wind.
    - .2 Every second lamp post must be equipped with an anti-theft device for wiring

## 2.2 Luminaires

- .1 General characteristics:
  - .1 Luminaire with aluminium cast housing, LED light strip, weatherproof (IP66), black. Opening and closing system to access components shall be without tools.
  - .2 Luminaire shall be cUL (or CSA) approved and dark-sky compliant and have undergone 3G vibration testing as per CALTrans 611 vibration testing, GR-63 CORE 4.4.1/5.4.2 Earthquake zone 4, or ANSI C136.31-2001. Test reports shall be available upon request.
  - .3 Fixture must be equipped with overvoltage protection in compliance with standard IEEE / ANSI C62.41.2, and listed for test procedures LM-79 and LM-80.
  - .4 Minimum warranty of ten (10) years for all components and all manufacturing and operating defects as well as a minimum 10-year warranty on corrosion-, ultraviolet- and abrasive-resistant luminaire finish.
  - .5 All hardware shall be made of stainless steel.
  - .6 Factory pre-wired luminaires with integral regulator.
  - .7 Luminaire types are described below.
- .2 LED fixture:
  - .1 Number of LED's: 32.
  - .2 Type: designed for console installation.
  - .3 Voltage: 240 VAC.
  - .4 Dimensions: 688 mm long x 357 mm wide x 99 mm high.
  - .5 Lamp: LED from Philips Lumec, 72 W, 5,178 lumens, 700 mA, 3,000°K colour temperature, minimum 70 colour rendering index (CRI) and minimum 61,000-hour service life at 700 mA.

- .6 Distribution: Type III , IV and V medium Power supply: 240 VAC, plug-in type, LED power supply and driver circuit, class 1 with power factor greater than 90%, harmonic distortion rate (THD) less than 20% at full load. Circuit protected by 10 kV overvoltage suppressor in compliance with IEEE/ANSI C62.41.2. The regulator must be able to start at temperatures up to at least 40°C.
- .7 Ballast: black.
- .8 Option: fuse and control 0-10V.

### **3. EXECUTION**

#### **3.1 Examination**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for roadway lighting installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Parks Canada Representative.
  - .2 Inform Parks Canada Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

#### **3.2 Installation**

- .1 Install poles true and plumb in accordance with manufacturer's instructions.
- .2 Install luminaires on pole.
- .3 Check luminaire orientation, level and tilt.
- .4 Connect luminaire to existing lighting circuit and control circuit.
- .5 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.



### **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.

## 1. GENERAL

### 1.1 Related Requirements

- .1 Section 32 01 90.33 - Tree and shrub preservation.

### 1.2 Measurement Procedures

- .1 Measure following items in hectares within limits as indicated:
  - .1 Clearing.
  - .2 Grubbing.
  - .3 Close cut clearing.
  - .4 Underbrush clearing.
- .2 Measure clearing isolated trees and grubbing isolated tree stumps as number of isolated trees cleared and number of isolated stumps grubbed.
- .3 Fixed price payment will be made for:
  - .1 Clearing isolated trees.
  - .2 Grubbing.

### 1.3 Reference Standards

- .1 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.

### 1.4 Definitions

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.

- .2 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.
- .3 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.
- .4 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of fallen timber and surface debris.
- .5 Grubbing consists of excavation and disposal of stumps and roots boulders and rock fragments of specified size to not less than specified depth below existing ground surface.
- .6 EAB refers to Emerald Ash Borer a non-native, invasive beetle that is highly destructive to ash trees where it occurs.
  - .1 Woodchips in the context of EAB consist of untreated, raw bark and wood fragments broken or shredded from logs or branches. Woodchips are to be less than 2.5 cm in at least any two dimensions.
  - .2 Firewood in the context of EAB consists of non-manufactured, solid wood material, with or without bark, cut into sizes less than 1.2 metres long and less than 25 cm in diameter which may be handled manually.
  - .3 Logs in the context of EAB consist of untreated, raw wood greater than 1.2 metres in length and greater than 25 cm diameter.
  - .4 Enclosed vehicle in the context of EAB consist of any vehicle transporting regulated wood material that is equipped to preclude the loss of materials or the escape of EAB while in transit.

## 1.5 Quality Assurance

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

- .2 Safety Requirements: worker protection.
  - .1 Workers must wear long sleeved clothing, gloves, dust masks, safety boots, protective clothing, eye protection, respirators, safety vests when clearing and grubbing.
  - .2 Workers must not eat, drink or smoke while applying herbicide material.
  - .3 Clean up spills of preservative materials immediately with absorbent material and safely discard to landfill.

## 1.6 Storage and Protection

- .1 Prevent damage to existing buildings, natural features, root systems of trees, site appurtenances, trees, fencing, water courses, existing pavement, utility lines, bench marks, landscaping, shrubs which are to remain.
  - .1 Repair damaged items to approval of Parks Canada Representative.
  - .2 Replace trees designated to remain, if damaged, as directed by Parks Canada Representative.

## 1.7 Waste Management and Disposal

- .1 Separate waste materials for recycling or reuse in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.
- .2 Consider felled timber from which saw logs, pulpwood, posts, poles, ties, or fuel wood can be produced as saleable timber.
- .3 Ash wood mixed with the wood of other species is to all be managed and disposed of as ash wood.

## 2. PRODUCTS

- .1 Bituminous based paint of standard manufacture specially formulated for tree wounds.

- .2 Soil Material for Fill:
  - .1 Excavated soil material: free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, deleterious, or objectionable materials.
  - .2 Remove and store soil material for reuse.

### 3. EXECUTION

#### 3.1 Temporary Erosion and Sedimentation Control

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or 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.

#### 3.2 Preparation

- .1 Inspect site and verify with Parks Canada Representative, items designated to remain.
- .2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.
  - .1 Notify Parks Canada Representative immediately of damage to or when unknown existing utility lines are encountered.
  - .2 When utility lines which are to be removed are encountered within area of operations, notify Parks Canada Representative in ample time to minimize interruption of service.
- .3 Keep roads and walks free of dirt and debris.

### 3.3 Application

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

### 3.4 Isolated Trees

- .1 Cut off isolated trees as indicated by Parks Canada Representative at height of not more than 300 mm above ground surface.
- .2 Grub out isolated tree stumps.
- .3 Prune individual trees as indicated.
- .4 Trim trees designated to be left standing within cleared areas of dead branches 4 cm or more in diameter; and trim branches to heights as indicated.
- .5 Cut limbs and branches to be trimmed close to bole of tree or main branches.
- .6 Paint cuts more than 3 cm in diameter with approved tree wound paint.

### 3.5 Grubbing

- .1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas.
- .2 Grub out stumps and roots to not less than 200 mm below ground surface.
- .3 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m<sup>3</sup>.
- .4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.

### 3.6 Removal and Disposal

- .1 Remove and discard materials off site.

- .2 The Contractor is responsible for monitoring all cut ash wood and firewood until it is properly disposed of as determined by Parks Canada Representative

### **3.7 Finished Surface**

- .1 Leave ground surface in condition suitable for immediate grading operations to approval of Parks Canada Representative.

### **3.8 Cleaning**

- .1 Proceed in accordance with Section 01 74 11- Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, flagging tape, tools and equipment.

## 1. GENERAL

### 1.1 Section Includes

- .1 Materials and installation for fertilizing and preserving root systems of plants affected by changing grades or excavation.
- .2 Materials and installation of ground protection and other measures as deemed necessary to protect existing trees according to contract drawings and conditions outlined in this section.

### 1.2 Related Sections

- .1 Section 01 33 00 – Submittal Procedures.

### 1.3 References

- .1 Canadian Standards Association (CSA International)
  - .1 CSA G30.5-M1983 Welded Steel Wire Fabric for Concrete Reinforcement.
- .2 Department of Justice Canada
  - .1 Canadian Environmental Protection Act (CEPA), 1999, c.33.
  - .2 Fertilizers Act (R.S. 1985, c. F-10).
  - .3 Fertilizers Regulations (C.R.C., c. 666).
  - .4 Transportation of Dangerous Goods Act (TDGA), 1992, c.34.
- .3 Health Canada - Pest Management Regulatory Agency (PMRA)
  - .1 National Standard for Pesticide Education, Training and Certification in Canada 1995.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).



#### 1.4 Submittals

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit monthly written reports on maintenance during warranty period to the Parks Canada Representative identifying:
  - .1 Maintenance work carried out.
  - .2 Development and condition of plant material.
  - .3 Preventative or corrective measures required which are outside Contractor's responsibility.

#### 1.5 Delivery, Storage and Handling

- .1 Place materials defined as hazardous or toxic in designated containers.
- .2 Dispose of unused fertilizer material at official hazardous material collections site approved by the Parks Canada Representative.
- .3 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, regional and municipal regulations.
- .4 Do not dispose of unused fertilizer material into sewer system, into streams, lakes, onto ground in any other location where they will pose health or environmental hazard.
- .5 Ensure emptied containers are sealed and stored safely.

#### 1.6 Scheduling

- .1 Obtain approval from the Parks Canada representative of schedule indicating beginning of Work.

#### 1.7 Maintenance during Warranty Period

- .1 From time of acceptance by the Park Canada Representative to end of warranty period, perform following maintenance operations.
  - .1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.

- .2 Apply fertilizer in early spring at manufacturer's suggested rate.
- .3 Remove dead, broken or hazardous branches from plant material. Seek approval from Park Canada Representative prior to removing any branches. Pruning may only be carried out by a certified arborist.
- .4 During periods of extended drought, wind or grading, trunks, limbs and foliage should be sprayed with water to remove accumulated construction dust.
- .5 Maintain tree protection fencing in good repair.
- .6 Maintain ground protection in good repair.

## 2. PRODUCTS

### 2.1 Materials

- .1 Fertilizer:
  - .1 To Canada Fertilizer Act and Fertilizers Regulations.
  - .2 Complete, commercial, slow release with 35 % of nitrogen content in water-insoluble form.
- .2 Anti-desiccant: commercial, wax-like emulsion.
- .3 Water: potable - free from impurities that inhibit growth.

### 2.2 Tree Protection Fencing

- .1 The modular construction fencing shall act as the tree protection fencing. Refer to Section 01 56 00 – Temporary Barriers and Enclosures.

### 2.3 Ground Protection

- .1 Mulch: 2” unpainted, untreated wood chip or bark mulch.
- .2 Granular A.

- .3 Steel plates.

### 3. PART 3 - EXECUTION

#### 3.1 Identification and Protection

- .1 Do construction occupational health and safety in accordance with Section 01 35 30 – Health and Safety.
- .2 The trees of the Lachine Cal are situated on a designated National Historic Site and are considered cultural assets, their protection is essential.
- .3 Extreme care must be taken to protect existing trees (including crown, trunk and root system) from damage, compaction and contamination during all stages of work. The roots of a tree can extend from the trunk to approximately 2-3 times the distance of the dripline.
- .4 No material, construction equipment, or vehicles are to be stored in the tree protection zone (TPZ) or within the critical root zone (drip line) of trees at any time.
- .5 No movement of vehicles, equipment or pedestrian in the TPZ will be permitted.
- .6 The use of tree trunks as a backstop, winch support, anchorage, as a temporary power pole, signpost or other similar function is prohibited.
- .7 Any disturbed vegetation or landscaping will be repaired or replaced without delay to the satisfaction of the Park Canada Representative.

#### 3.2 Tree Protection Fencing

- .1 Supply and erect solid barriers to protect existing trees in accordance with the drawings and to the approval of the Park Canada Representative.
- .2 Tree protection fencing must be installed before construction begins and equipment arrives on site and maintained until the project is completed.
- .3 Removal of fences, even temporarily to allow deliveries or equipment access is not allowed unless approved by the Park Canada Representative and ground protection is installed.

### 3.3 Ground Protection within the Critical Root Zone

- .1 Ground protection must be installed before construction begins and equipment arrives on site and maintained until the project is completed.
- .2 In areas where the critical root zone cannot be fenced and is within the limits of work, wood chip or bark mulch must be installed to a minimum depth of 6", followed by a layer of Granular A with ¾" plywood sheets laid on top. Steel plates can also be used in place of plywood. Leave the tree trunks clear of mulch. Install where indicated in the drawings and as directed by the Park Canada Representative to protect the sensitive root zone.
- .3 Asphalt removal from within the critical root zone must be supervised by a certified arborist. Once removed, the granular base shall be protected from repeated compaction from vehicular circulation by the placement of steel plates.

### 3.4 Excavation within the Critical Root Zone

- .1 Limits of excavation to be approved by the Park Canada Representative prior to commencing work.
- .2 Hand digging, hydraulic, or pneumatic excavations are permitted methods for excavation within the critical root zone.
- .3 Do not cut or damage roots greater than 25mm (1") diameter. When larger roots are encountered, consult a certified arborist before proceeding. If there are no roots greater than 25mm diameter, leave at least two (2) of the largest roots per meter of trench. Retain as many roots as possible.
- .4 Prune roots that must be removed using sharp, clean tools such as secateurs or a landscape handsaw. Make a clean cut and leave as small a wound as possible. All root pruning to be supervised by a certified arborist.
- .5 If any roots are exposed during construction, they should be immediately reburied with soil or wrapped in peat moss and burlap and kept moist until they can be buried permanently. Avoid exposing roots during hot, dry weather.

- .6 Directional micro-tunneling and boring may be permitted within the limits of the critical root zone subject to the approval of the Park Canada Representative.
- .7 Open face cuts that are consistent with an approved plan and that require root pruning, require the services of a certified arborist. An exploratory dig, either by hand or using a low water pressure hydro vacuum, or air spade method, must be completed prior to commencing with open face cuts.

### 3.5 Lowering Grade Around Existing Tree

- .1 Begin Work in accordance with schedule approved by the Park Canada Representative.
- .2 Cut slope not less than 500 mm from tree trunk to new grade level.
- .3 Excavate to depths as indicated. Protect from damage root zone which is to remain.
- .4 When severing roots at excavation level, cut roots with sharp tools.
- .5 Cultivate excavated surface manually to 15 mm depth.
- .6 Prepare homogeneous soil mixture consisting by volume of:
  - .1 60 % excavated soil cleaned of roots, plant matter, stones, debris.
  - .2 25 % coarse, clean sterile sand.
  - .3 15 % organic matter.
  - .4 Grade 2:12:8 fertilizer at rate of 1.5 kg/m<sup>3</sup>.
- .7 Place soil mixture over area of excavation to finished grade level. Compact to 85 % Standard Proctor Density.
- .8 Water entire root zone to optimum soil moisture level.

### 3.6 Watering

- .1 Ensure that the ongoing maintenance and irrigation of the site vegetation is performed by a qualified contractor, while the construction hoarding is in place.
- .2 During the construction period, water existing trees within protected areas by applying water to surface, soaking area 1.5 times the diameter of the dripline of each tree.
- .3 Watering schedule to be approved by the Park Canada Representative.

### 3.7 Damage to Trees

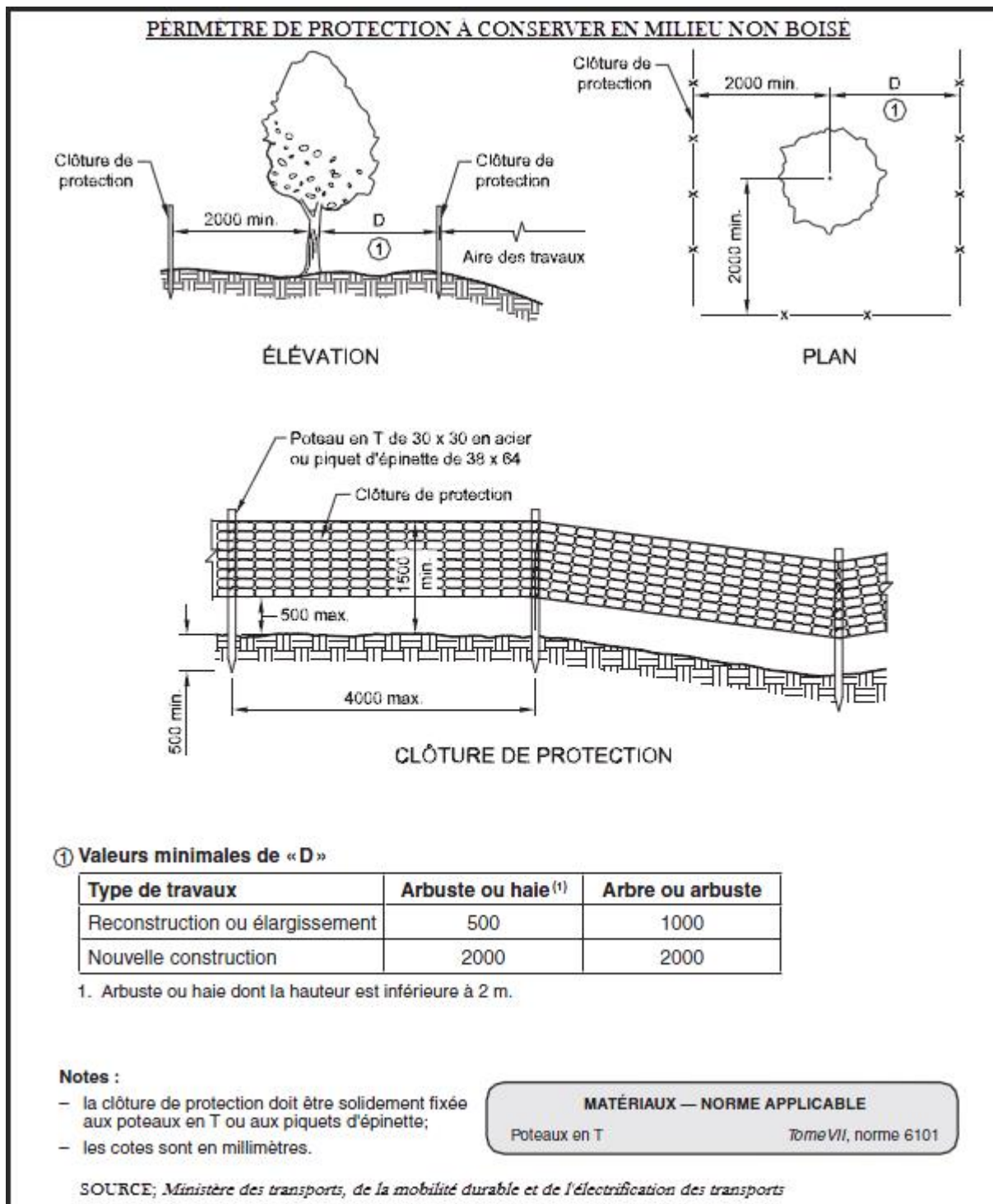
- .1 Any damage or injury to trees shall be reported as soon as possible to the Park Canada Representative.
- .2 A substantial fine, as determined by the Park Canada Representative, may be enforced for any damage to the trees including unauthorized pruning.

### 3.8 Pruning

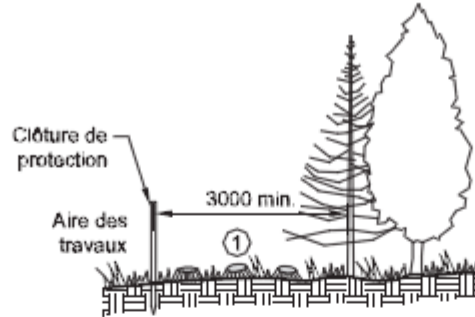
- .1 If pruning is required, consult an arborist and seek approval from the Park Canada Representative.
- .2 Prune crown to compensate for root loss while maintaining general form and character of plant.

### 3.9 Anti-Desiccant

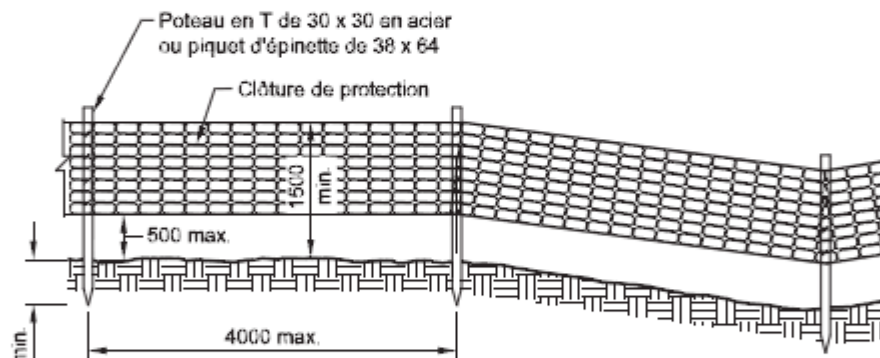
- .1 Apply anti-desiccant to foliage where applicable and as directed by the Park Canada Representative.



PÉRIMÈTRE DE PROTECTION À CONSERVER EN MILIEU BOISÉ



ÉLEVATION



CLÔTURE DE PROTECTION

① Coupe à ras de terre.

**Notes :**

- la clôture de protection doit être solidement fixée aux poteaux en T ou aux piquets d'épinette;
- les cotes sont en millimètres.

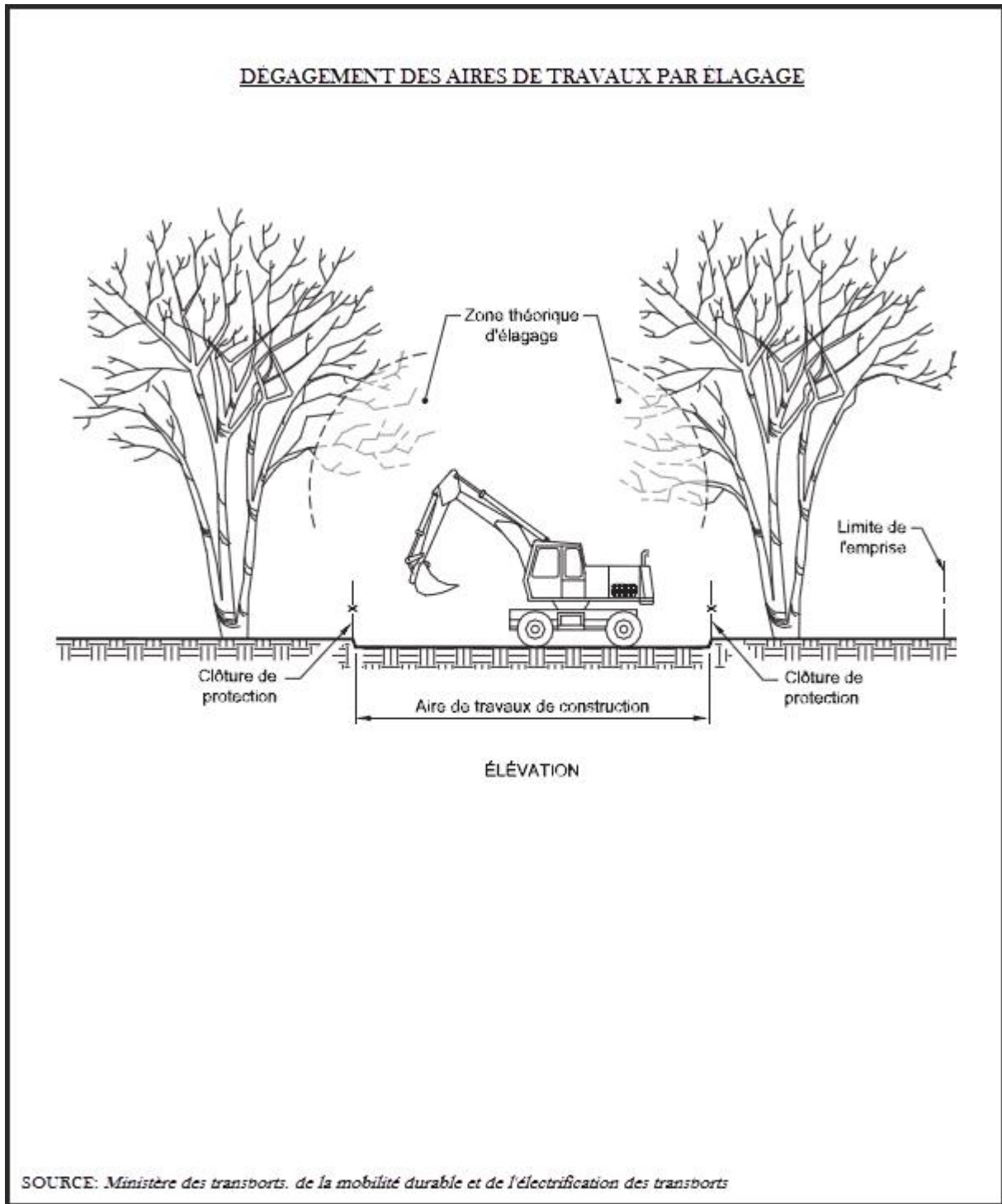
**MATÉRIAUX — NORME APPLICABLE**

Poteaux en T

Tome VII, norme 6101

SOURCE; Ministère des transports, de la mobilité durable et de l'électrification des transports





## 1. GENERAL

### 1.1 Related Requirements

- .1 Section 26 05 00 - Electrical - Common Work Results for Electrical
- .2 Section 26 05 43.01 - Electrical - Installation of Cables in Trenches and in Ducts.

### 1.2 References

- .1 CSA International
  - .1 CSA C22.2 No. 211.0.

### 1.3 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.

### 1.4 Delivery, Storage and Handling

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

## 2. PRODUCTS

### 2.1 PVC Ducts and Fittings

- .1 Rigid PVC duct: Type ES2-rigid, with moulded fittings, for direct burial expanded flange ends, Trade size 6.
  - .1 Nominal length: 3 m plus or minus 12 mm.

- .2 Rigid PVC split ducts.
- .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 degrees, 45 degrees bends as required.

## 2.2 Solvent Weld Compound

- .1 Solvent cement for PVC duct 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**".

## 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 datasheets.

### 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 steel 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 2 m spare rope at each end.
- .7 Place continuous strip of warning tape 300 mm above duct before backfilling trenches.
- .8 Install markers as required.
- .9 Notify the Parks Canada Representative 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.