

<b>SECTION 01 11 00</b>	<b>SUMMARY OF WORK</b>	<b>No. Of Pages</b>
<b>Division 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS</b>		
SECTION 00 01 10	TABLE OF CONTENTS	4
<b>Division 01 - GENERAL REQUIREMENTS</b>		
SECTION 01 11 00	SUMMARY OF WORK	4
SECTION 01 14 00	WORK RESTRICTIONS	2
-SECTION 01 31 19	PROJECT MEETINGS	3
SECTION 01 32 16.07	CONSTRUCTION PROGRESS SCHEDULE	2
SECTION 01 33 00	SUBMITTAL PROCEDURES	4
SECTION 01 33 01	OPERATION AND MAINTENANCE MANUAL	6
SECTION 01 35 00.06	SPECIAL PROCEDURES FOR TRAFFIC CONTROL	3
SECTION 01 35 29.06	HEALTH AND SAFETY REQUIREMENTS	3
SECTION 01 35 43	ENVIRONMENTAL PROCEDURES	4
SECTION 01 41 00	REGULATORY REQUIREMENTS	1
SECTION 01 45 00	QUALITY CONTROL	3
SECTION 01 52 00	CONSTRUCTION FACILITIES	2
SECTION 01 56 00	TEMPORARY BARRIERS AND ENCLOSURES	1
SECTION 01 61 00	COMMON PRODUCT REQUIREMENTS	3
SECTION 01 73 00	EXECUTION	2
SECTION 01 74 11	CLEANING	1
SECTION 01 74 21	CONSTRUCTION DEMOLITION & WASTE MANAGEMENT	5
SECTION 01 77 00	CLOSEOUT PROCEDURES	2
SECTION 01 78 00	CLOSEOUT SUBMITTALS	2
<b>Division 26 - ELECTRICAL</b>		
SECTION 26 05 00	COMMON WORK RESULTS ELECTRICAL	10
SECTION 26 05 03	COMMISSIONING – ELECTRICAL	5

SECTION 26 05 21.01	WIRES AND CABLES (0 – 1,000 V)	2
SECTION 26 05 34	CONDUITS & CONDUIT FASTENINGS & CONDUIT FITTINGS	4
SECTION 26 56 19	ROADWAY LIGHTING	2

**APPENDIX A – EXISTING EQUIPMENT**

---

## **SECTION 01 11 00                      SUMMARY OF WORK**

### **PART 1. GENERAL**

#### **1.1            PRECEDENCE**

- .1     For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other divisions of this specification

#### **1.2            WORK COVERED BY CONTRACT DOCUMENTS**

- .1     In preparation for and during construction of the project, the Contractor shall review the requirements of Section 01 35 43 – Environmental Procedures to ensure the desired minimal adverse effects are achieved. The Departmental Representative and Parks Canada's environmental surveillance officer (ESO) will refer to Section 01 35 43 – Environmental Procedures in determining compliance.
- .2     Without limiting the scope of work, the work of the Contract generally comprises the following:
  - .1     Electrical and lighting improvements

#### **1.3            WORK SCHEDULE**

- .1     Schedule work progress to allow Owner/Departmental Representative unrestricted access to inspect all phases of the Work.
- .2     Maintain fire and emergency access for the site at all times.
- .3     The work will be planned and phased to ensure continuity of water, sanitary and gas services to the Administration building during the construction period. Electrical service within the building will not be impacted since it is out of scope.
- .4     Construction equipment will operate only between 07:30 and 21:00 on weekdays, 10:00 – 18:00 on Saturday, to minimize disturbance to the public. No work will be allowed on Sunday or holidays. For long weekends, work is to end by noon on the day prior to the weekend or holiday and can resume at regular hours after the long weekend or holiday.
- .5     Within one week of contract award, the successful bidder will be required to provide a detailed project schedule to meet the above completion date for the Parks Canada Representative approval. When schedule has been approved by Parks Canada Representative, take necessary measures to complete work within scheduled time. No schedule changes will be permitted without Parks Canada Representative's approval.
- .6     No addition compensation will be provided to the Contractor for cold weather work or other weather-related delays or cost
- .7     This project will be undertaken according to the following schedule:
  - .1     Construction Start-up – On contract award – January 2018
  - .2     Construction Completion – 28 March, 2018

#### **1.4            CONTRACTOR USE OF PREMISES**

- .1     Contractor shall limit use of premises for Work, for storage, and for access, to allow:
  - .1     Owner occupancy.
  - .2     Work by other Contractors
- .2     Coordinate use of premises with the acceptance of the Departmental Representative.
- .3     Obtain additional storage or work areas needed for operations under the Contract with the acceptance of the Departmental Representative.

## **1.5 NATIONAL PARK REGULATIONS**

- .1 Contractor and all sub-contractors shall ensure that all work is performed in accordance with ordinances, laws, rules and regulations set out in the National Park Act.
- .2 Contractor and all sub-contractors shall obtain business licenses from Parks Canada Administration Office prior to commencement of work.
- .3 Contractor shall also be required to obtain Town of Banff business license as they will be working within the Town's boundaries as well.
- .4 The installation of the electrical facilities associated with Fortis Alberta must be carried out by a Fortis Alberta approved construction installer as per the requirements listed under the "Customer Installed Pre-Cast Base, Grounding and Ducting Process". A list of approved contractors are available from the Fortis Alberta website at [www.fortisalberta.com](http://www.fortisalberta.com)
- .5 Contractor and all sub-contractors shall comply with all laws and government regulations applicable to work under this contract.
- .6 All Contractor's and all sub-contractor's business and private vehicles are required to obtain vehicle passes from the Parks Canada Administration Office.
- .7 Contractor to equip all service vehicles and supervisory vehicles with Emergency Spill Kit DOT-E-10102 or equivalent.
- .8 Contractor is responsible to ensure all sub-contractors comply with the National Park Regulations in addition to the conditions of contract.

## **1.6 EXISTING SERVICES**

- .1 Carry out work at times and in a way as directed by Parks Canada Representative and governing authorities with minimum disturbance to public.
- .2 Notify Parks Canada Representative, Town of Banff and utility companies of intended interruption of services and obtain required permission.
- .3 Submit schedule to and obtain approval from Parks Canada Representative for any shut-down or closure of active service or facility including water, sewer, gas, power and communications services or public roadways. Adhere to approved schedule and provide notice to affected parties.
- .4 Where unknown services are encountered, immediately advise Parks Canada Representative and confirm findings in writing.
- .5 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by the Parks Canada Representative and authorities having jurisdiction.
- .6 Record locations of maintained, re-routed and abandoned service lines. This includes lines both abandoned in this project and previously abandoned lines which are encountered during the construction.
- .7 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .8 The contractor is responsible for any municipal permits required for offsite work.

## **1.7 OWNER OCCUPANCY**

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.



**1.8 CONSTRUCTION SIGNAGE**

- .1 No signs or advertisements, other than warning signs, are permitted on site.
- .2 Signs and notices for safety and instruction shall be in both official languages. Signs shall be diamond grade and shall conform to CAN3-Z321.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project or earlier if directed by the Departmental Representative.

**1.9 SETTING OUT OF WORK**

- .1 The Departmental Representative will identify location of all work sites. The Contractor shall be responsible for all other layout of work.
- .2 The Contractor shall not permanently mark any infrastructure or feature during their setting out of the work. They shall fully remove any set out marks, markers, or other identifiers that they installed, prior to demobilizing from the Work Sites.

**1.10 DOCUMENTS REQUIRED**

Maintain "one" copy of each of the following documents at the job site:

- .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 Building Permit
- .12 Business Licences
- .13 Environmental Protection Plan
- .14 Emergency Response Plan

**PART 2. PRODUCTS**

**2.1 NOT USED**

**PART 3. EXECUTION**

**3.1 NOT USED**

**END OF SECTION**

---

## **SECTION 01 14 00                      WORK RESTRICTIONS**

### **PART 1. GENERAL**

#### **1.1            ACCESS AND EGRESS**

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

#### **1.2            USE OF SITE AND FACILITIES**

- .1    Execute work with least possible interference or disturbance to normal use of facilities.
- .2    Maintain at least 10 onsite parking stalls for use by Administration Building staff between the hours of 7:30 a.m. and 5:30 p.m., Monday to Friday. Stalls must be accessible by road during these hours.
- .3    Parks Canada requires 24 hr access to the main administration building for maintenance and operations. Existing building egress locations must be maintained at all times. The contractor is required to contract a fire specialist if they intend to impact the building evacuation plan.
- .4    Make arrangements with Parks Canada Representative to facilitate work as stated in this section.
- .5    Maintain existing services to facility and provide all traffic diversion arrangements for safe personnel and vehicle access.
- .6    Maintaining power throughout construction.
- .7    Closures: protect work temporarily until permanent enclosures are completed.
- .8    Contractor must maintain public access to the main building between 8 am and 5 pm Monday to Friday. Public access requires handicapped access from the road to the east door of the building.
- .9    Contractor to provide adequate site fencing to minimize public access to those areas required for building and through traffic.
- .10   Contractor will be required to coordinate with emergency services any access limitations or service disruptions which may impact emergency response.

#### **1.3            WORK CONDUCTED OVER OR ADJACENT TO WATERWAYS**

- .1    All components of the Work shall be conducted in accordance with Section 01 35 43 - Environmental Procedures.
- .2    All components of the Work shall be conducted without equipment entering into wetlands, water bodies, streams and rivers. Refer to Section 01 35 43 - Environmental Procedures for details.
- .3    All waste materials from the Work shall be contained and collected in a manner to prevent any contact with the river valleys and waterways. All collected waste materials shall be disposed of in accordance with Section 01 35 43 - Environmental Procedures and the Environmental Protection Plan prepared for the project.

#### **1.4            SPECIAL REQUIREMENTS**

- .1    Hours of work: As provided in 01 11 00 – Summary of Work.
- .2    Submit schedule in accordance with 01 32 16.07 - Construction Progress Schedule

- .3 Ensure Contractor's personnel employed on site become familiar with the restrictions and obey Parks Canada regulations including safety, fire, traffic and security regulations.

**1.5 BUILDING SMOKING ENVIRONMENT**

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

**PART 2. PRODUCTS**

**2.1 NOT USED**

**PART 3. EXECUTION**

**3.1 NOT USED**

**END OF SECTION**

---

**SECTION 01 31 19                      PROJECT MEETINGS**

**PART 1. GENERAL**

**1.1            ADMINISTRATIVE**

- .1 The Parks Canada Representative will administer the Pre-Construction Meeting, Weekly Issue Meetings, Progress Meetings and the Site Administration / Contract Coordination Meetings.
- .2 The Parks Canada Representative will give advance notice of meeting dates, times and locations to affected parties.
- .3 Ensure that all meetings are attended by at least the Contractor's Superintendent, the Contractor's Project Manager and senior representatives of major Sub-Contractors, if requested by the Parks Canada Representative.
- .4 Ensure representatives of the Contractor, Sub-Contractor and Suppliers or Manufacturers attending the meetings are qualified and authorized to act on behalf of the party each represents.
- .5 The Parks Canada Representative will chair the meetings and record discussions and decisions, and circulate the minutes to PCA and the Contractor. The Contractor is to circulate the minutes to Sub-Contractors, Suppliers and Manufacturers.
- .6 Notify the Parks Canada Representative in writing of any discrepancies or inconsistencies within two (2) days of receipt of minutes for recording in the next meeting. Failure to notify the Parks Canada Representative of discrepancies or inconsistencies within two (2) days of receipt of minutes will be deemed acceptance of the minutes as recorded.

**1.2            PRE-CONSTRUCTION MEETING**

- .1 Parks Canada Representative will schedule a meeting to discuss administrative procedures and responsibilities. *Meeting may be expedited to meet construction schedule prior to formal contract award.*
- .2 The Contractor's Superintendent, the Contractor's Project Manager and senior representatives of major Sub-Contractors involved in the Work, to be in attendance.
- .3 The meeting will be held in the on the Site or at an alternate location at or near the Site.
- .4 Agenda includes the following:
  - Appointment of official representative of participants in the Work (Contractor's Superintendent, Contractor's Project Manager, Contractor's Safety Professional, Contractor's Scheduler and Quantity Surveyor, Contractor's Foreman, the Resident Engineer and a Parks Canada Representative).
  - Responsibilities of the Contractor, and the Parks Canada Representative.
  - Site safety, site restrictions and hours of operation.
  - Occupational health and safety relationships and responsibilities. Submittal of Site Safety Manual and implementation of Site orientation program.
  - Sustainable issues compliance and coordination.
  - Schedule of Work, progress scheduling.
  - Schedule of submittals.
  - Requirements and schedule for temporary facilities, offices, utilities, fences.
  - Delivery schedule of major and key equipment.

- Site security and arrangements for Parks Canada Representative and PCA access to the Site.
- Document Management Procedures (method of tracking and filing requests for information (RFIs), CCN's, CCOs, etc., procedures used for logging record drawing information, and other document related issues).
- Submittal procedures and schedule.
- Contemplated Change Notice (CCN) and Contract Change Order (CCO) procedures.
- Record Drawings.
- Operation manuals and maintenance data.
- Commissioning, acceptance, warranties.
- Monthly progress payments, administrative procedures, holdbacks, protocols for communication, reporting, inspection etc.
- Inspection and testing agencies or firms.
- Ambiguities or questions of interpretation identified in the Contract Documents.

### **1.3 WEEKLY ISSUE MEETINGS**

- .1 The Contractor's Superintendent and the Contractor's Project Manager to be in attendance.
- .2 The meeting will be held in the Contractor's trailer on the Site.
- .3 Agenda to include any issues / concerns.

### **1.4 PROGRESS MEETINGS**

- .1 The Contractor's Superintendent, Contractor's Project Manager and senior representatives of major Sub-Contractors involved in the Work to be in attendance.
- .2 The meeting will be held on the site.
- .3 The Progress Meetings are to be held weekly or more/less frequently if so decided by the Parks Canada Representative.
- .4 Agenda includes the following:
  - Review approval of minutes of previous meeting.
  - Old business.
  - Occupational health and safety incidents, records and procedures.
  - Schedule (provide a 3-week 'look-ahead' schedule – Refer to Section 01 32 16.06 Construction Progress Schedule).
  - Document Management Issues.
  - Submittal status.
  - Requests for information.
  - Proposed Contract modifications.
  - Change Order status.
  - Site coordination.
  - Quality control.
  - Site cleanliness.
  - Erosion and Sedimentation Control Measures.
  - Construction Site Solid Waste Management Program.
  - Other action items.

- .5 Submit for information only, in accordance with Section 01 33 00 Submittal Procedures, at each regularly scheduled progress meeting:
- Totals of all personnel currently on Site associated with the Contract, broken down by trade and Sub-Contractor including all staff.
  - Totals of all major equipment currently on Site, over a two thousand dollar replacement value, broken down by type and Sub-Contractor

#### **1.5 SITE ADMINISTRATION / CONTRACT COORDINATION MEETINGS**

- .1 At monthly intervals, or more frequently as required, the Parks Canada Representative will call a Site Administration / Contract Coordination Meeting. The purpose of this meeting will be to discuss and resolve issues relating to the interactions among the various ongoing works.
- .2 The Contractor's Superintendent and Contractor's Project Manager to be in attendance.
- .3 Agenda will include issues related to site administration or construction contract coordination.

#### **1.6 SPECIAL MEETINGS**

- .1 Special meetings may be held at the request of the Parks Canada Representative, PCA, or the Contractor to discuss specific items. Arrange for attendance by parties requested by the Parks Canada Representative.
- .2 The Contractor shall either conduct separate construction Waste Management Meetings or discuss waste management goals and issues as part of the Pre-Construction Meeting and Progress Meetings.

### **PART 2. PRODUCTS**

#### **2.1 NOT USED**

### **PART 3. EXECUTION**

#### **3.1 NOT USED**

**END OF SECTION**

---

## SECTION 01 32 16.07 CONSTRUCTION PROGRESS SCHEDULE

### PART 1. GENERAL

#### 1.1 RELATED REQUIREMENTS

- .1 Sections as noted herein.

#### 1.2 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Each activity normally has an expected duration, an expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. Activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system, i.e. MS Project.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Will provide work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete 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 the project, usually completion of a major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones.
- .9 Dynamic: a detailed record of tasks or activities that must be accomplished to satisfy Project objectives.
- .10 Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

#### 1.3 REQUIREMENTS

- .1 Ensure Master Plan and detail schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 14 working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.
- .5 The Bar Chart shall identify the activities on the Critical Path.

#### 1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Consultant within seven (7) days of Award of Contract, a Bar (GANTT) Chart as the Master Plan for planning, monitoring and reporting of project progress.

- .3 Submit Project Schedule to Consultant within seven days of receipt of acceptance of Master Plan.

#### **1.5 MASTER PLAN**

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Parks Canada Representative will review and return revised schedules within seven days.
- .3 Revise impractical schedule and resubmit within seven days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

#### **1.6 PROJECT SCHEDULE**

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Contractor to ensure detailed Project Schedule includes as minimum milestone and sufficient detail of activity to coordinate with others and specifically may impact any Park's operations, including temporary services.
- .3 Temporary Services Plan should be submitted and must be able to be tracked in the project schedule.

#### **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 Project Meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

### **PART 2. PRODUCTS**

#### **2.1 NOT USED**

### **PART 3. EXECUTION**

#### **3.1 NOT USED**

**END OF SECTION**



---

## **SECTION 01 33 00                      SUBMITTAL PROCEDURES**

### **PART 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 co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6    Notify 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 co-ordinated.
- .8    Contractor's responsibility for errors and omissions in submission is not relieved by the Parks Canada Representative's review of submittals.
- .9    Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by the Parks Canada Representative's review.
- .10   Keep one 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 Alberta, 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 co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4    Allow 7 calendar days for Parks Canada Representative's review of each submission.
- .5    Adjustments made on shop drawings by the 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:
  - Date.

- Project title and number.
  - Contractor's name and address.
  - Identification and quantity of each shop drawing, product data and sample.
  - Other pertinent data.
- .8 Submissions include:
- Date and revision dates.
  - Project title and number.
  - Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - Details of appropriate portions of Work as applicable:
    - .1 Fabrication
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.
    - .9 Single line and schematic diagrams
    - .10 Relationship to adjacent work.
- .9 After Parks Canada Representative's review, distribute copies.
- .10 Submit PDF copies of shop drawings for each requirement requested in specification Sections and as Parks Canada Representative may reasonably request.
- .11 Submit PDF of product data sheets or brochures for requirements requested in specification Sections and as requested by the Parks Canada Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .1 Submit PDF copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by the Parks Canada Representative
  - .2 Supplement standard information to provide details applicable to project.
  - .3 If upon review by the 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.
- .12 The review of shop drawings by Parks Canada (PCA) is for sole purpose of ascertaining conformance with general concept.

- .1 This review shall not mean that PCA approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
- .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

### **1.3 PHOTOGRAPHIC DOCUMENTATION**

- .1 Submit electronic copy of colour digital photography in jpeg, standard resolution or PDF
- .2 Take daily photographs of all utility and underground work
- .3 Take photographs of site conditions before, during, and after construction. Take photographs of any unique or unusual items.
- .4 Photographs to be submitted digitally. All photographs to be labelled with meaningful titles.

### **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.

## **PART 2. PRODUCTS**

### **2.1 NOT USED**

## **PART 3. EXECUTION**

### **3.1 NOT USED**

**END OF SECTION**

## **SECTION 01 33 01**

## **OPERATION AND MAINTENANCE MANUAL**

### **PART 1. GENERAL**

#### **1.1 SUMMARY**

Section Includes:

- .1 Mechanics and administration of the submittal process for:
  - .1 Operation and Maintenance Manuals.
  - .2 Content requirements for Operation and Maintenance Manuals.

#### **1.2 DEFINITIONS**

- .1 Operation and Maintenance (O&M) Manuals:
  - .1 Contain the information required for proper installation and maintenance of building materials and finishes.
  - .2 Contain the technical information required for proper installation, operation and maintenance of process, electrical and mechanical equipment and systems.

#### **1.3 SUBMITTAL SCHEDULE**

- .1 Operation and Maintenance Manuals and Completed Equipment Record Sheets: Initial submittal within 30 working days after date Shop Drawings are approved by Parks Canada Representative.

#### **1.4 PREPARATION OF SUBMITTALS**

- .1 General:
  - .1 All submittals and all pages of all copies of a submittal shall be completely legible.
  - .2 Drawings will be prepared in Autocad
  - .3 Submittals which, in the Parks Canada Representative's sole opinion, are illegible will be returned without review.
- .2 Operation and Maintenance Manuals:
  - .1 Owner's use of manufacturer's Operation and Maintenance materials:
  - .2 Materials are provided for Owner's use, reproduction and distribution as training and reference materials within Owner's organization.
    - .1 Applicable to hard copy or electronic media.
    - .2 Applicable to materials containing copyright notice as well as those with no copyright notice.
  - .3 Notify manufacturer of this intended use of materials provided under the Contract.
  - .4 Number each Operation and Maintenance Manual transmittal with the original root number of the associated Shop Drawing.
    - .1 Identify resubmittals with the original number plus a suffix letter starting with "A."
- .3 Submittal format:
  - .1 Interim submittals: Submit two (2) paper copies until manual is approved.
  - .2 Final submittals:
    - .1 Within 20 days of receipt of approval, submit one (1) additional paper copy and two (2) electronic copies on Compact Disc (CD-ROM) in Portable Document Format (PDF).
      - .1 Compact discs to be secured in jewel cases.

- .2 Electronic copies will be reviewed for conformance with the approved paper copy and the electronic copy (PDF) requirements of this Specification.
- .3 Non-conforming CDs will be returned with comments.
  - .1 Provide final CDs within 20 days of receipt of comments.
- .3 Paper copy submittals:
  - .1 Submit Operation and Maintenance Manuals printed on 8-1/2 x 11 IN size heavy first quality paper with standard three-hole punching and bound in appropriately sized three- ring (or post) vinyl view binders with clear overlays front, spine and back.
    - .1 Provide binders with titles inserted under clear overlay on front and on spine of each binder.
      - .1 As space allows, binder titles shall include, but not necessarily be limited to, Project Name and number, related Specification Number and Equipment Name(s) & Tag Numbers.
      - .2 Provide a Cover Page for each manual with the following information:
        - .1 Manufacturer(s).
        - .2 Date.
        - .3 Project Owner and Project Name.
        - .4 Specification Section.
        - .5 Project Equipment Tag Numbers.
        - .6 Model Numbers.
        - .7 Engineer.
        - .8 Contractor.
      - .3 Provide a Table of Contents or Index for each manual.
      - .4 Use plastic-coated dividers to tab each section of each manual per the manual's Table of Contents/Index for easy reference.
      - .5 Provide plastic sheet lifters prior to first page and following last page.
    - .2 Reduce Drawings or diagrams bound in manuals to an 8-1/2 x 11 IN or 11 x 17 IN size.
      - .1 Where reduction is not practical to ensure readability, fold larger Drawings separately and place in vinyl envelopes which are bound into the binder.
      - .2 Identify vinyl envelopes with Drawing numbers.
      - .3 Mark each sheet to clearly identify specific products and component parts and data applicable to the installation for the Project.
        - .1 Delete or cross out information that does not specifically apply to the Project.
  - .4 Electronic copy submittals:
    - .1 Electronic copies of the approved paper copy Operation and Maintenance Manuals are to be produced in Adobe Acrobat's Portable Document Format (PDF) Version 5.0 or higher.
    - .2 Do not password protect and/or lock the PDF document.
    - .3 Create one (1) PDF document (PDF file) for each equipment O&M Manual.
    - .4 Drawings or other graphics must be converted to PDF format and made part of the one (1) PDF document.
    - .5 Scanning to be used only where actual file conversion is not possible.

- .6 Rotate pages that must be viewed in landscape to the appropriate position for easy reading.
- .7 Images only shall be scanned at a resolution of 300 dpi or greater.
- .8 Perform Optical Character Recognition (OCR) capture on all images.
- .9 Achieve OCR with the "original image with hidden text" option.
- .10 Word searches of the PDF document must operate successfully to demonstrate OCR compliance.
- .11 Create bookmarks in the navigation frame, for each entry in the Table of Contents/Index.
  - .1 Normally three levels deep (i.e., "Chapter," "Section," "Sub-section").
- .12 Thumbnails must be generated for each PDF file.
- .13 Set the opening view for PDF files as follows:
  - .1 Initial view: Bookmarks and Page
  - .2 Magnification: Fit in Window.
  - .3 Page layout: Single page.
  - .4 Set the file to open to the cover page of the manual with bookmarks to the left, and the first bookmark linked to the cover page.
  - .5 All PDF documents shall be set with the option "Fast Web View" to open the first pages of the document for the viewer while the rest of the document continues to load.
- .14 File naming conventions:
  - .1 File names shall use a "ten dot three" convention (XXXXX-YY-Z.PDF) where XXXXX is the Specification Section number, YY is the Shop Drawing Root number and Z is an ID number used to designate the associated volume.
  - .2 Example 1:
    - .1 Two (2) pumps submitted as separate Shop Drawings under the same Specification Section:
      - .1 Pump 1 = 11061-01-1.pdf.
      - .2 Pump 2 = 11061-02-1.pdf.
  - .3 Example 2:
    - .1 Control system submitted as one (1) Shop Drawing but separated into two O&M volumes:
      - .1 Volume 1 = 13440-01-1.pdf.
      - .2 Volume 2 = 13440-01-2.pdf.
- .15 Labeling:
  - .1 As a minimum, include the following labeling on all CD-ROM discs and jewel cases:
    - .1 Project Name.
    - .2 Equipment Name and Project Tag Number.
    - .3 Project Specification Section.
    - .4 Manufacturer Name.
    - .5 Vendor Name.
- .16 Binding:
  - .1 Include labeled CD(s) in labeled jewel case(s).
    - .1 Bind jewel cases in standard three-ring binder Jewel Case Page(s), inserted at the front of the Final paper copy submittal.

- .2 Jewel Case Page(s) to have means for securing Jewel Case(s) to prevent loss (e.g., flap and strap).
- .5 Operation and Maintenance Manuals for Materials and Finishes:
  - .1 Building Products, Applied Materials and Finishes:
    - .1 Include product data, with catalog number, size, composition and color and texture designations.
    - .2 Provide information for re-ordering custom manufactured products
  - .2 Instructions for Care and Maintenance:
    - .1 Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods and recommended schedule for cleaning and maintenance.
  - .3 Moisture Protection and Weather Exposed Products:
    - .1 Include product data listing, applicable reference standards, chemical composition, and details of installation.
  - .4 Provide recommendations for inspections, maintenance and repair.
  - .5 Additional requirements as specified in individual product specifications.
- .6 Operation and Maintenance Manuals for Equipment and Systems:
  - .1 Submission of Operation and Maintenance Manuals for equipment and systems is applicable but not necessarily limited to:
    - .1 Major equipment.
    - .2 Equipment powered by electrical, pneumatic or hydraulic systems.
    - .3 Specialized equipment and systems including instrumentation and control systems and system components for HVAC process system control.
    - .4 Valves and water control gates.
  - .2 Equipment and Systems Operation and Maintenance Manuals shall include, but not necessarily be limited to, the following completed forms and detailed information, as applicable:
    - .1 Fully completed type-written copies of the associated Equipment Record(s), Exhibits B1, B2 and B3, shall be included under the first tab following the Table of Contents of each Operation and Maintenance Manual.
      - .1 Each section of the Equipment Record must be completed in detail.
      - .2 Simply referencing the related manual for nameplate, maintenance, spare parts or lubricant information is not acceptable.
      - .3 For equipment items involving components or subunits, a fully completed Equipment Record Form is required for each operating component or subunit.
      - .4 Submittals that do not include the associated Equipment Record(s) will be rejected without further content review.
      - .5 Electronic copies of the Exhibits may be obtained by contacting the Project Manager.
    - .3 Equipment function, normal operating characteristics, limiting operations.
    - .4 Assembly, disassembly, installation, alignment, adjustment, and checking instructions.

- .5 Operating instructions for start-up, normal operation, control, shutdown, and emergency conditions.
- .6 Lubrication and maintenance instructions.
- .7 Troubleshooting guide.
- .8 Parts lists:
  - .1 Comprehensive parts and parts price lists.
  - .2 A list of recommended spare parts.
  - .3 List of spare parts provided as specified in the associated Specification Section.
  - .4 Outline, cross-section, and assembly Drawings; engineering data; and electrical diagrams, including elementary diagrams, wiring diagrams, connection diagrams, word description of wiring diagrams and interconnection diagrams.
  - .5 Test data and performance curves.
  - .6 As-constructed fabrication or layout Drawings and wiring diagrams.
  - .7 Instrumentation or tag numbers assigned to the equipment by the Contract Documents are to be used to identify equipment and system components.
  - .8 Additional information as specified in the associated equipment or system Specification Section.

## 1.5 TRANSMITTAL OF SUBMITTALS

- .1 Operation and Maintenance Manuals:
  - .1 Submit to Contract Administrator. Submit with reasonable promptness and in an orderly sequence as to not cause delay of work:
    - .1 All submittals must be from Contractor.
  - .2 Submittals will not be received from or returned to subcontractors.
  - .3 Operation and Maintenance Manual submittal stamp may be Contractor's standard approval stamp.
  - .4 Provide submittal information defining specific equipment or materials utilized on the Project.
    - .1 Generalized product information, not clearly defining specific equipment or materials to be provided, will be rejected.
- .2 Expedited Return Delivery:
  - .1 Include prepaid express envelope or airbill in submittal transmittal package for any submittals Contractor expects or requires express return mail.
  - .2 Inclusion of prepaid express envelope or airbill does not obligate Parks Canada Representative to conduct expedited review of submittal.
- .3 Electronic submittals will not be accepted except for approved Operation and Maintenance Manuals as required by this Specification.
  - .4 Fax Transmittals:
    - .1 Permitted on a case-by-case basis to expedite review when approved by Parks Canada Representative.
    - .2 Requires hard copy transmittal to immediately follow.
      - .1 Parks Canada Representative will proceed with review of fax transmittal.
      - .2 Parks Canada Representative's approval or rejection comments will be recorded.
- .3 Provisions apply to both:



- .1 Initial transmittal contents.
- .2 Supplemental information required to make initial transmittal contents complete.

#### **1.6 PARKS CANADA REPRESENTATIVE'S REVIEW ACTION**

- .1 Operation and Maintenance Manuals:
  - .1 Parks Canada Representative will review and indicate one of the following review actions:
    - .1 A - ACCEPTABLE.
    - .2 B - REVISE AND RESUBMIT.
  - .2 Acceptable paper copy submittals will be retained with the transmittal form returned with a request for one (1) additional paper copy and two (2) electronic copies on CD-ROM.
  - .3 Deficient submittals (paper copy and/or electronic copy) will be returned along with the transmittal form which will be marked to indicate deficient areas.

#### **PART 2. PRODUCTS**

##### **2.1 NOT USED**

#### **PART 3. EXECUTION**

##### **3.1 NOT USED**

**END OF SECTION**

## **SECTION 01 35 00.06 SPECIAL PROCEDURES FOR TRAFFIC CONTROL**

### **PART 1. GENERAL**

#### **1.1 REFERENCES**

- .1 Manual of Uniform Traffic Control Devices for Streets and Highways - 2002.

#### **1.2 PROTECTION OF PUBLIC TRAFFIC**

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 When working on travelled way:
  - .1 Place equipment in position to present minimum of interference and hazard to travelling public.
  - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
  - .3 Do not leave equipment on travelled way overnight.
    - .1 Do not close any lanes of road without approval of Departmental Representative. Before re-routing traffic erect suitable signs and devices in accordance with instructions contained in Part D of UTCD.
    - .2 Keep travelled way graded, free of pot holes and of sufficient width for required number of lanes of traffic.
  - .4 Provide minimum 7 m wide temporary roadway for traffic in two-way sections through Work and on detours.
  - .5 Provide minimum 5 m wide temporary roadway for traffic in one-way sections through Work and on detours.
    - .1 As directed by Departmental Representative, provide detours or temporary roads to facilitate passage of traffic around restricted construction area:
  - .6 Do grading for detour in accordance with Section 31 24 13 - Roadway Embankments.
  - .7 Place and compact granular sub-base in accordance with Section 32 11 16.01 - Granular Sub-base.
  - .8 Place and compact granular base in accordance with Section 32 11 23 - Aggregate Base Courses.
- .3 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, unless other means of road access exist that meet approval of Departmental Representative.

#### **1.3 INFORMATIONAL AND WARNING DEVICES**

- .1 Provide and maintain signs, flashing warning lights and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices as specified in Part D, Temporary Conditions Signs and Devices, of UTCD manual.
- .3 Place signs and other devices in locations recommended in UTCD manual.
- .4 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.

- .5 Continually maintain traffic control devices in use by:
  - .1 Checking signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
  - .2 Removing or covering signs which do not apply to conditions existing from day to day.

#### **1.4 CONTROL OF PUBLIC TRAFFIC**

- .1 Provide competent flag persons, trained in accordance with, and properly equipped as specified in, UTCD manual in following situations:
  - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
  - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
  - .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
  - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
  - .5 For emergency protection when other traffic control devices are not readily available.
  - .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
  - .7 Delays to public traffic due to contractor's operators: maximum 15 minutes.
  - .8 Where roadway, carrying two-way traffic, is restricted to one lane, for 24 hours each day, provide portable traffic signal system. Adjust, as necessary, and regularly maintain system during period of restriction. Signal system to meet requirements of Part IV of Manual of Uniform Traffic Control Devices for Streets and Highways

#### **1.5 OPERATIONAL REQUIREMENTS**

- .1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted if required and as approved by the Departmental Representative and the Town of Banff:
- .2 Maintain existing conditions for traffic crossing right-of-way.
- .3 Maintain existing conditions for traffic crossing right-of-way except when required for construction.
- .4 Requirements for traffic control, lane diversion, lane closures, etc. are a function of construction phasing and methodology. Due to the work location, the Town of Banff may impose special conditions for the Road Use Permits. For example, work at specific hours or night time work may be required.
- .5 Concrete barriers are required for any trenching adjacent to vehicle traffic.

**PART 2. PRODUCTS**

**2.1 NOT USED**

**PART 3. EXECUTION**

**3.1 NOT USED**

**END OF SECTION**

---

## **SECTION 01 35 29.06 HEALTH AND SAFETY REQUIREMENTS**

### **PART 1. GENERAL**

#### **1.1 REFERENCES**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Province of Alberta
- .3 Occupational Health and Safety Act, R.S.A. - Updated 2013.

#### **1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .3 Results of site specific safety hazard assessment.
  - .4 Results of safety and health risk or hazard analysis for site tasks and operation.
    - .1 Submit 1 copy of Contractor's authorized representative's work site health and safety inspection reports to Parks Canada Representative weekly, including minutes of safety toolbox meetings.
    - .2 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
    - .3 Submit copies of incident and accident reports.
    - .4 Submit WHMIS MSDS - Material Safety Data Sheets to Parks Canada Representative.
    - .5 Parks Canada Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 3 days after receipt of plan. Revise plan as appropriate and resubmit plan to Parks Canada Representative within 3 days after receipt of comments from Parks Canada Representative.
    - .6 Parks Canada Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
    - .7 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Parks Canada Representative.
    - .8 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .5 Emergencies: In the event of emergency call 911
  - .1 All other inquiries: Banff Dispatch - 403 762 1473.
  - .2 All predator sightings to be reported to Banff dispatch.

#### **1.3 FILING OF NOTICE**

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

#### **1.4 SAFETY ASSESSMENT**

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

#### **1.5 MEETINGS**

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

## **1.6 REGULATORY REQUIREMENTS**

- .1 Do Work in accordance with Section 01 41 00 - Regulatory Requirements.

## **1.7 GENERAL REQUIREMENTS**

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Parks Canada Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

## **1.8 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Report all accidents to Parks Canada Representative immediately.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

## **1.9 COMPLIANCE REQUIREMENTS**

- .1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta Reg.
- .2 Comply with R.S.Q., c. S-2.1, an Act respecting Health and Safety, and c. S-2.1, r.4 Safety Code for the Construction Industry.
- .3 Comply with latest Occupational Health and Safety Regulations.
- .4 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

## **1.10 UNFORSEEN HAZARDS**

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

## **1.11 POSTING OF DOCUMENTS**

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

## **1.12 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Parks Canada Representative.
- .2 Provide Parks Canada Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Parks Canada Representative may stop Work if non-compliance of health and safety regulations is not corrected.

## **1.13 WORK STOPPAGE**

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

**PART 2. PRODUCTS**

**2.1 NOT USED**

**PART 3. EXECUTION**

**3.1 NOT USED**

**END OF SECTION**

---

**SECTION 01 35 43 ENVIRONMENTAL PROCEDURES**

**PART 1. GENERAL**

**1.1 NATIONAL PARKS ACT**

- .1 Perform work in accordance with the ordinances and laws set out in the National Parks Act and Regulations.

**1.2 CANADIAN ENVIRONMENTAL ASSESSMENT ACT**

- .1 Execution of work is subject to provisions within the Canadian Environmental Assessment Act, 2012.
- .2 Failure to comply with or observe environmental protection measures, as identified in these specifications, may result in work being suspended pending rectification of problem(s).

**1.3 MIGRATORY BIRDS ACT**

- .1 Avoid any construction activities which affect nesting birds.
- .2 Any trees required to be cut prior to must be inspected for nesting birds, roosting bats by a qualified professional, to be approved by Parks Canada Representative. Trees found to have nesting birds or roosting bats are not to be disturbed until the tree is permanently vacated.

**1.4 RELICS AND ANTIQUITIES**

- .1 Give immediate notice to the Parks Canada Representative if evidence archaeological finds are encountered during construction, and await Parks Canada Representative's written instructions before proceeding with work in this area.
- .2 Relics, antiquities, items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found on site shall remain Department's property. Protect such articles and request directives from Parks Canada Representative.
- .3 Provide 48 hours' notice to Parks Canada Representative prior to commencing any work that may interfere with or affect an identified historical or archaeological site. Commence work only upon written instructions from Parks Canada Representative.
- .4 The Contractor is to review the Archaeological Overview Assessment (AOA) in Schedule B of this Tender to understand the potential for artifacts within the work area. The AOA also outlines protocols for dealing with artifacts during the course of the work.

**1.5 WILDLIFE**

- .1 Avoid or terminate activities on site that attract or harass wildlife.
- .2 Immediately notify Parks Canada Representative who will notify Parks Canada Environmental Surveillance Officer of any predator sightings at (403) 762 1416. Bears, wolves, cougar activity or encounters on or around site. Other wildlife encounters should be reported within 24 hours.

**1.6 FIRES**

- .1 Fires and burning of rubbish on site not permitted. Permits will not be issued for this site.
- .2 Parks Canada Representative reserves the right to refuse fire permits pending environmental conditions.



## **1.7 DISPOSAL OF WASTE**

- .1 All garbage must be stored and handled in conformance with National Parks Garbage Regulations.
- .2 All domestic garbage should be stored over the short term in wildlife-proof dumpsters. Domestic recycling should be put in appropriate facilities. Contaminated materials are to be taken out of the Park.
- .3 Do not bury rubbish and waste materials on site.
- .4 Maintain the site in a tidy condition, free of waste material, debris and litter.
- .5 All waste must be removed from the Park within a reasonable time as directed by the Parks Canada Representative

## **1.8 DRAINAGE**

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Dewatering of a construction site will require a special permit.
- .3 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Parks Canada requirements and in conformance with the Environmental Contaminants Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.
- .5 An Erosion and Sedimentation Control (ESC) plan will be required to be approved by Parks Canada Representative prior to beginning work.

## **1.9 SITE CLEARING AND PLANT PROTECTION**

- .1 Protect trees and plants on site and adjacent properties where indicated.
  - .1 Locations of all trees existing on site to be surveyed prior to construction and final decisions on tree removal to be made on a case-by-case basis in the field by Parks Canada Representative.
  - .2 Trees identified as existing-to-remain within or adjacent to the limit of Work require a Tree Protection Zone (TPZ) during construction by means of a protective barrier or fencing by the contractor. Fencing may be standard snow fence 1200 min. height or equivalent to approval of Parks Canada Representative.
  - .3 Approval of TPZs by PCA is required prior to commencing work.
  - .4 Activities which are likely to injure or destroy the tree are not permitted within the TPZ including
    - .1 Parking of vehicles or machinery
    - .2 Travel or operation of vehicles or machinery
    - .3 Storage of equipment, materials, or stockpiles
  - .5 The Contractor is responsible for damages to trees or shrubs identified as existing-to-remain within the limits of Work. Damages may include the cost of repair, removal, and replacement (at the rate of three trees per tree removed) as determined by assessment of damages by PCA. Species and installation locations for replacement trees to be approved by Parks Canada Representative.
- .2 Where absolutely necessary to work adjacent to existing trees and shrubs, Contractor shall exercise all possible care to avoid injury to vegetation. Where roots or limbs over 25 mm in diameter and/or bark are damaged during operations, immediately inform Parks Canada Representative for inspection and direction.

- .3 Permits are required from Parks Canada Environmental Surveillance Officer if a tree is to be removed. Contact Parks Canada Environmental Surveillance Officer.

#### **1.10 CONTRACTOR'S OPERATIONS**

- .1 Hazardous Materials Management Plan and Spill Response Plan required to be approved by Parks Canada Representative prior to mobilizing to site
- .2 Confine all operations to work limits as staked or designated by Parks Canada Representative. No activities of any kind may be carried out beyond those work limits without Parks Canada Representative's written permission.
- .3 Do not store or stockpile construction materials in trees bordering, or being preserved on site. Do not unreasonably encumber site with products.
- .4 Equipment maintenance shall only be carried out in designated areas or as approved by Parks Canada Representative and Parks Canada Environmental Surveillance Officer. Use of turnouts, campgrounds, picnic areas, work camps, etc., for equipment oil changes and other servicing will not be permitted.
- .5 Used oil, filter and grease cartridges, lubrication containers and other products of equipment maintenance shall be collected and disposed of at nearest industrial waste facility.
- .6 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.
- .7 Provide sufficient sanitary facilities and maintain in a clean condition.
- .8 Refuelling. Any refuelling to be done in locations greater than 100m from a watercourse and as far as is practically possible from onsite storm infrastructure.
- .9 All tree removal will be following Migratory Birds Act.
- .10 Conduct operations at all times in such a manner as to preserve natural features and vegetation in area. Cut and fill slopes shall be blended with adjoining topography. Material from fill slopes will not be permitted to slough or roll into surrounding tree cover or to bury any plant material designated to be retained.
- .11 When, in opinion of Parks Canada Representative, negligence on part of Contractor results in damage or destruction of vegetation, or other environmental or aesthetic features beyond staked or designated work areas, Contractor shall be responsible, at his expense, for complete restoration of trees including replacement of trees, shrubs, topsoil, grass, etc. to Parks Canada Representative's satisfaction.
- .12 As no non-native vegetation is allowed in Park, all construction equipment shall be thoroughly washed before entering Banff National Park.

#### **1.11 CONTRACTOR'S EMPLOYEE BRIEFING**

- .1 Conduct briefing sessions for all employees and sub-contractor employees highlighting requirements of this section, including operation of equipment strictly.
- .2 Initial site meeting with Contractor, Parks Canada Representative, Park Project Manager and Parks Canada Environmental Surveillance Officer will occur prior to construction commencing.
- .3 Contract documents have been developed in accordance with Canadian Environmental Assessment Act screening requirements. Construction methods which are directly affected by CEAA screening will be reviewed at initial site meeting. Contractor will be expected to comply with and ensure construction practices meet the CEAA Standards. Failure to comply may lead to cessation of work.

#### **1.12 COMPLIANCE WITH PARKS CANADA DEVELOPMENT PERMIT**

- .1 Read, understand and comply with Parks Canada Building Permit and all stipulations provided therein.

**PART 2. PRODUCTS**

**2.1 NOT USED**

**PART 3. EXECUTION**

**3.1 NOT USED**

**END OF SECTION**

**SECTION 01 41 00                      REGULATORY REQUIREMENTS**

**PART 1. GENERAL**

**1.1            REFERENCES AND CODES**

- .1    Meet or exceed requirements of:
  - .1    Contract documents.
  - .2    Specified standards, codes and referenced documents.

**1.2            WHMIS**

- .1    Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada and Health and Welfare Canada.

**1.3            BUILDING SMOKING ENVIRONMENT**

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

**1.4            NATIONAL PARKS ACT**

- .1    Perform Work in accordance with National Parks Act when projects are located within boundaries of National Park.

**PART 2. PRODUCTS**

**2.1            NOT USED**

**PART 3. EXECUTION**

**3.1            NOT USED**

**END OF SECTION**

## **SECTION 01 45 00**

## **QUALITY CONTROL**

### **PART 1. GENERAL**

- .1 The Contractor is totally responsible for quality of Material and Product which he provides for the Work.
- .2 The Contractor is responsible for quality control testing and shall perform such inspections and tests as are necessary to ensure that the Work conforms to the requirements of the Contract Documents.
- .3 During the progress of the Work, a sufficient number of tests shall be performed by the Contractor to determine that Material, Product and installation meet the specifications and standards requirements.
- .4 Minimum requirements regarding quality control are specified in various sections of the specifications, however, the Contractor shall perform as many inspections and tests as are necessary to ensure that the Work conforms to the requirements of the Contract Documents.
- .5 Testing shall be in accordance with pertinent codes and regulations and with selected standards of the American Society for Testing Materials (ASTM) and Canadian Standards Association (CSA).
- .6 Product testing, mill test and laboratory reports to demonstrate that Product and Material supplied by the Contractor meet the specifications are specified under various sections of the Contract Documents.

### **1.2 QUALITY CONTROL TESTING BY THE CONTRACTOR**

- .1 The Contractor shall retain the services of a licenced independent testing agency under supervision of a registered professional Engineer, and pay for the cost of testing services for quality control including, but not limited to, the following:
- .2 Any product testing that is required and is specified under various sections of the specifications
- .3 The Contractor shall promptly process and distribute all required copies of test reports and test information and related instructions to all of his Subcontractors and Suppliers to ensure that all necessary retesting and replacement of construction can proceed without delay.

### **1.3 QUALITY ASSURANCE TESTING BY THE OWNER**

- .1 The Owner shall retain and pay for the services of an independent testing agency for testing for quality assurance, for the Owner's purposes.
- .2 The Owner's testing agency and the Parks Canada Representative shall inspect and test Materials, Products and the Work for conformance with the test requirements of the Contract Documents; however, they do not undertake to check the quality of the Work on behalf of the Contractor nor to provide quality control.
- .3 Inspections and test by the Owner's testing agency and by the Parks Canada Representative do not relieve the Contractor of his responsibility to supply Materials and Products and to perform the Work in accordance with the requirements of the Contract Documents.
- .4 The Parks Canada Representative, at his discretion, may order or perform any additional inspections and test for purposes of his own or for purposes of the Owner.

- .5 The Contractor shall coordinate with the Parks Canada Representative the scheduling of testing and inspection by the Owner's testing agencies or by the Parks Canada Representative, to enable testing to be done as necessary, without delay, and the Contractor shall notify in writing the Parks Canada Representative minimum 48 hours in advance of operations to allow for such inspection and test by the Parks Canada Representative's testing agency. Coordination shall include providing equipment and safe access necessary to perform testing and inspections (i.e. trench box, loaded truck for proof roll, etc.)

#### **1.4 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 written notice minimum one week in advance of operations requesting inspection if Work is designated for special tests, inspections or approvals by Parks Canada Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 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.

#### **1.5 ACCESS TO WORK**

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

#### **1.6 PROCEDURES**

- .1 Notify appropriate agency and Parks Canada Representative minimum 48 hours 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.

#### **1.7 REJECTED WORK**

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by 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.

**1.8      REPORTS**

- .1      Submit 1 copy of inspection and test reports to Parks Canada Representative.

**PART 2. PRODUCTS**

**2.1      NOT USED**

**PART 3. EXECUTION**

**3.1      NOT USED**

**END OF SECTION**

---

**SECTION 01 52 00                      CONSTRUCTION FACILITIES**

**PART 1. GENERAL**

**1.1            ACTION AND INFORMATIONAL SUBMITTALS**

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

**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.
- .2    Identify areas which have to be gravelled to prevent tracking of mud and get approval from Parks Canada Representative.
- .3    Identify areas to be used for stockpiling soil and material and get approval from Parks Canada Representative.
- .4    Indicate use of supplemental or other staging area.
- .5    Provide construction facilities in order to execute work expeditiously.
- .6    Remove from site all such work after use and restore the areas in their original condition.

**1.3            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.

**1.4            CONSTRUCTION PARKING**

- .1    Parking will be permitted on site provided it does not disrupt performance of Work or normal operations of the National Park. Parking areas must be approved by Parks Canada Representative. Parking will not be permitted in the vegetated area outside of the perimeter fence.
- .2    Provide and maintain adequate access to project site.

**1.5            SECURITY**

- .1    Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays, if Parks Canada deems reasonable non-personnel efforts are not sufficient.

**1.6            OFFICES**

- .1    If required by Contract, provide office of sufficient size to accommodate required work activities of Contractor and all Sub-Contractors and Parks Canada Representatives. Parks Canada Representative to approve location of trailer.
- .2    Contractor is responsible to deal directly with utility companies for any utility hook ups required for site office.
- .3    Provide marked and fully stocked first-aid case in a readily available location.

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



**1.8 SANITARY FACILITIES**

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

**1.9 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 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .8 Dust control: adequate to ensure safe operation at all times and enjoyment of surrounding areas by the public to the satisfaction of PCA.
- .9 Provide snow removal during period of Work.

**1.10 CLEAN-UP**

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Contractor will be responsible for clean-up of surrounding areas in the case of negligence of waste management. (i.e. waste blown away in the wind)
- .4 Store materials resulting from demolition activities that are salvageable.
- .5 Stack stored new or salvaged material not in construction facilities.

**PART 2. PRODUCTS**

**2.1 NOT USED**

**PART 3. EXECUTION**

**3.1 NOT USED**

**END OF SECTION**

**SECTION 01 56 00                      TEMPORARY BARRIERS AND ENCLOSURES**

**PART 1. GENERAL**

**1.1            INSTALLATION AND REMOVAL**

- .1    Provide temporary controls in order to execute Work expeditiously.
- .2    Remove from site all such work after use.

**1.2            ACCESS TO SITE**

- .1    Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work as per Section 01 14 00 Work Restrictions. Exceptions may be made with prior written approval from the Parks Canada Representative.

**1.3            PUBLIC TRAFFIC FLOW**

- .1    Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

**1.4            FIRE ROUTES**

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

**1.5            PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

- .1    Protect surrounding private and public property from damage during performance of Work.
- .2    Be responsible for damage incurred.

**PART 2. PRODUCTS**

**2.1            NOT USED**

**PART 3. EXECUTION**

**3.1            NOT USED**

**END OF SECTION**

---

## **SECTION 01 61 00                      COMMON PRODUCT REQUIREMENTS**

### **PART 1. GENERAL**

#### **1.1            REFERENCES**

- .1 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.
- .2 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 in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining 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 Remove and replace damaged products at own expense and to satisfaction of Parks Canada Representative.

**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. Obtain written instructions directly from manufacturers.
- .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 CO-ORDINATION**

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

**1.9 SETTING OUT OF WORK**

- .1 Parks Canada Representative will supply horizontal reference control points benchmark elevations only for this project.
- .2 Contractor will set grades and layout work in detail from control points established by Parks Canada Representative.
- .3 Contractor shall employ competent survey staff for complete detailed layout of work.
- .4 Survey supervisor shall have experience in urban field survey work, including obtaining horizontal and vertical measurements, record keeping and calculation of quantities, generally associated with 3 to 5 years minimum related experience.
- .5 Contractor will be responsible for correction of any error associated with his layout.
- .6 Contractor shall supply such devices as straight edges and templates required to facilitate Parks Canada Representative's inspection of work.
- .7 Contractor shall supply stakes and other survey markers required for laying out the work.
- .8 Cost of setting out of work will not be paid for directly but shall be considered incidental to contract unit prices tendered.

**1.10 REMEDIAL WORK**

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

**1.11 EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by PCA, 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.

**PART 2. PRODUCTS**

**2.1 NOT USED**

**PART 3. EXECUTION**

**3.1 NOT USED**

- .1 END OF SECTION

## **SECTION 01 73 00                      EXECUTION**

### **PART 1. GENERAL**

#### **1.1                      SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
  - .1 Structural integrity of elements of project.
  - .2 Integrity of weather-exposed or moisture-resistant elements.
  - .3 Efficiency, maintenance, or safety of operational elements.
  - .4 Visual qualities of sight-exposed elements.
  - .5 Work of Owner.
- .3 Include in request:
  - .1 Identification of project.
  - .2 Location and description of affected Work.
  - .3 Statement on necessity for cutting or alteration.
  - .4 Description of proposed Work, and products to be used.
  - .5 Alternatives to cutting and patching.
  - .6 Effect on Work of Owner.
  - .7 Date and time work will be executed.

#### **1.2                      MATERIALS**

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

#### **1.3                      PREPARATION**

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

#### **1.4                      EXECUTION**

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Remove samples of installed Work for testing.
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

- .8 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .10 Restore work with new products in accordance with requirements of Contract Documents.
- .11 Fit Work as per current codes to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

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

**PART 2. PRODUCTS**

**2.1 NOT USED**

**PART 3. EXECUTIONS**

**3.1 NOT USED**

**END OF SECTION**

**SECTION 01 74 11                      CLEANING**

**PART 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. Do not burn waste materials on site.
- .3    Clear snow and ice as required. Pile snow in designated areas only.
- .4    Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5    Provide on-site containers for collection of waste materials and debris.
- .6    Waste containers must be secure and prevent animals and public from accessing.
- .7    Dispose of waste materials and debris outside of Banff National Park.

**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, and leave Work clean and suitable for occupancy.
- .3    Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4    Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .5    Mop clean and wipe down any interior areas affected by the work.
- .6    Remove dirt and other disfiguration from exterior surfaces.
- .7    Sweep and wash clean paved areas.

**1.3           WASTE MANAGEMENT AND DISPOSAL**

- .1    Separate waste materials for reuse and recycling.

**PART 2. PRODUCTS**

**2.1           NOT USED**

**PART 3. EXECUTION**

**3.1           NOT USED**

**END OF SECTION**



**SECTION 01 74 21**

**CONSTRUCTION DEMOLITION & WASTE MANAGEMENT**

**PART 1. GENERAL**

**1.1 SECTION INCLUDES**

- .1 This schedules and procedures for systematic Waste Management Program for construction, deconstruction, demolition, and renovation projects, including:
  - .1 Diversion of Materials.
  - .2 Waste Audit (WA) - Schedule A.
  - .3 Waste Reduction Workplan (WRW) - Schedule B.
  - .4 Demolition Waste Audit (DWA) - Schedule C.
  - .5 Cost/Revenue Analysis Workplan (CRAW) - Schedule D.
  - .6 Materials Source Separation Program (MSSP).
  - .7 Canadian Governmental Responsibility for the Environment Resources – Schedule E.

**1.2 DEFINITIONS**

- .1 Demolition Waste Audit (DWA): Relates to actual waste generated from project.
- .2 Materials Source Separation Program (MSSP): Consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .3 Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.
- .4 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .5 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.
- .6 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:
  - .1 Salvaging reusable materials from re-modelling projects, before 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.
- .7 Salvage: Removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .8 Separate Condition: Refers to waste sorted into individual types.
- .9 Source Separation: Acts of keeping different types of waste materials separate beginning from first time they became waste.

**1.3 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)**

- .1 Prepare MSSP and have ready for use prior to project start-up.
- .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by authorities having jurisdiction.
- .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .4 Provide containers to deposit reusable and recyclable materials.
- .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations. Containers shall be clearly marked.

- .6 Locate separated materials in areas which minimize material damage.
- .7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.
  - .1 Transport to recycling facility.

#### **1.4 STORAGE, HANDLING AND PROTECTION**

- .1 Unless specified otherwise, materials for removal become Contractor's property.
- .2 Protect, stockpile, store and catalogue salvaged items.
- .3 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to approved local facility.
- .4 Protect structural components not removed for demolition from movement or damage.
- .5 Support affected structures. If safety of building is endangered, cease operations and immediately notify Department having jurisdiction.
- .6 Protect surface drainage, mechanical and electrical from damage and blockage.
- .7 Separate and store materials produced during dismantling of structures in designated areas.
- .8 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
  - .1 On-site source separation is recommended.

#### **1.5 DISPOSAL OF WASTES**

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of any waste into waterways, storm, or sanitary sewers.
- .3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

#### **1.6 USE OF SITE AND FACILITIES**

- .1 Execute work with least possible interference or disturbance to normal use of premises.
- .2 Provide security measures approved by Parks Canada Representative.

#### **1.7 SCHEDULING**

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

### **PART 2. PRODUCTS**

#### **2.1 NOT USED**

### **PART 3. EXECUTION**

#### **3.1 APPLICATION**

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

### 3.2 CLEANING

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

### 3.3 DIVERSION OF MATERIALS

- .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Parks Canada Representative and consistent with applicable fire regulations.
  - .1 Mark containers or stockpile areas.
  - .2 Provide instruction on disposal practices.
- .2 On-site sale or distribution of salvaged materials to third parties is not permitted.

Demolition Waste:

Demolition Waste		
Material Type	Recommended Diversion (%)	Actual Diversion %
Pipes	100	
Valves and fittings	100	
Electrical Equipment	80	
Asphalt	100	
Metal	100	
Rubble	100	
Wood (uncontaminated)	100	
Other	100	

Construction Waste		
Material Type	Recommended Diversion (%)	Actual Diversion %
Cardboard	100	
Plastic Packaging	100	
Rubble	100	
Steel	100	
Wood (uncontaminated)	100	
Other	100	

### SCHEDULE A - Waste Audit (WA)

Material Category	Material Quantity (unit)	Estimated Waste (%)	Total Waste Quantity (units)	Generation Point	Recycled %	Reused %
Wood and Plastics						
Material - Description						
Off cuts						
Warped pallets						
Forms						
Plastic Packaging						
Cardboard Packaging						
Doors / Windows						
Painted frames						

Glass						
Wood						
Metals						
Others						

#### SCHEDULE B – Waste Reduction Workplan (WRW)

Material Category	Person Responsible	Total Quantity of Waste (unit)	Actual Reused Amount (unit)	Actual Recycled Amount (unit)	Material Destination
Wood and Plastics Material					
Chutes					
Warped Pallets					
Plastic Packaging					
Forms					
Pallets					
Painted frames					
Glass					
Wood					
Metals					
Others					

#### SCHEDULE C – Demolition Waste Audit (DWA)

Material Description	Quantity	Unit	Total	Volume	Weight	Remarks and Assumptions
Wood, Plywood						
Pipes						
Valves and fittings						
Electrical Equipment						
Asphalt						
Metal						
Rubble						
Wood (uncontaminated)						
Others						

#### SCHEDULE D – Cost / Revenue Analysis Workplan (CRAW)

Material Description	Quantity (unit)	Volume (cumulative)	Weight (cumulative)	Disposal Cost/Credit \$(+/-)	Category Sub Total \$(+/-)
Wood, Plywood					
Wood, Plywood					
Pipes					
Valves and fittings					
Electrical Equipment					
Asphalt					
Metal					
Rubble					
Wood (uncontaminated)					
Others					

**3.4 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT**

.1 Schedule E - Government Chief Responsibility for the Environment:

Province	Address	General Inquires	Fax
Alberta	Alberta Environmental Protection Petroleum Plaza, South Tower 9915 - 108 <sup>th</sup> Street Edmonton AB T5K 2G8	403-427-2739	
	Alberta Special Waste Management Corporation Pacific Plaza, Suite 610 10909 Jasper Avenue NW Edmonton AB T5J 3L9	403-422-5029	403-428-9627

**END OF SECTION**

---

**SECTION 01 77 00                      CLOSEOUT PROCEDURES**

**PART 1. GENERAL**

**1.1            ADMINISTRATIVE REQUIREMENTS**

- .1 Acceptance of Work Procedures:
  - .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .1 Notify Parks Canada Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    - .2 Request Parks Canada Representative's inspection.
  - .2 Parks Canada Representative's Inspection:
    - .1 Parks Canada Representative and Contractor to inspect Work and identify defects and deficiencies.
    - .2 Contractor to correct Work as directed.
  - .3 Completion Tasks: submit written certificates 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 and fully operational.
    - .4 Certificates required by Utility companies: submitted.
    - .5 Operation of systems: demonstrated to Owner's personnel.
    - .6 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, and Contractor.
    - .2 When Work incomplete according to 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 requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
  - .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of 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 requirements of Contract met, make application for final payment.
    - .2 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

**PART 2. PRODUCTS**

**2.1 NOT USED**

**PART 3. EXECUTION**

**3.1 NOT USED**

**END OF SECTION**

---

## **SECTION 01 78 00                      CLOSEOUT SUBMITTALS**

### **PART 1. GENERAL**

#### **1.1            ADMINISTRATIVE REQUIREMENTS**

- .1    Pre-warranty Meeting:
  - .1    Convene meeting one week prior to contract completion with Parks Canada Representative, to:
    - .1    Verify Project requirements.
    - .2    Review 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    One week prior to Substantial Performance of the Work, submit to the Parks Canada Representative, two final copies of operating and maintenance manuals in English.
- .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            FORMAT**

- .1    Organize data as instructional manual.
- .2    Binders: vinyl, hard covered, 3 'D' ring, loose leaf [219 x 279] mm with spine and face pockets.
- .3    When multiple binders are used correlate data into related consistent groupings.
  - .1    Identify contents of each binder on spine.
- .4    Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5    Arrange content under Section numbers and sequence of Table of Contents.
- .6    Text: manufacturer's printed data, or typewritten data.
- .7    Drawings: provide with reinforced punched binder tab.

#### **1.4            RECORD DOCUMENTS AND SAMPLES**

- .1    Maintain, at site for Parks Canada Representative one record copy of:
  - .1    Contract Drawings.
  - .2    Specifications.
  - .3    Addenda.
  - .4    Change Orders and other modifications to Contract.
  - .5    Reviewed shop drawings, product data, and samples.
  - .6    Field test records.



- .7 Inspection certificates.
- .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
  - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
  - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
  - .1 Do not use record documents for construction purposes.
  - .2 Keep record documents and samples available for inspection by Parks Canada Representative.

## **1.5 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS**

- .1 Record information on set of drawings, 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 horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .2 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .3 Field changes of dimension and detail.
  - .4 Changes made by change orders.
  - .5 Details not on original Contract Drawings.
  - .6 References to related shop drawings and modifications.
- .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.

## **PART 2. PRODUCTS**

### **2.1 NOT USED**

## **PART 3. EXECUTION**

### **3.1 NOT USED**

**END OF SECTION**

## SECTION 26 05 00

## COMMON WORK RESULTS ELECTRICAL

### PART 1. GENERAL

#### 1.1 RELATED SECTIONS

- .1 The General Conditions, Supplements and Amendments shall govern this Section (read in conjunction with Instructions to Tenderers/Bidders). This section covers items common to all Electrical sections and is intended only to supplement the requirements of Division 1.
- .2 Reference to "Electrical Divisions" shall mean all sections of Divisions 26, 27, 28, 33, 34, and 48 in the Master Format of the Canadian Master Specifications.
- .3 Provide materials, equipment and plant, or specified design, performance and quality, and current models with published certified ratings for which replacement parts are readily available. Provide project management and on-site supervision to undertake administration, meet schedules, ensure timely performance, ensure coordination, and establish orderly completion and the delivery of a fully commissioned installation.
- .4 The most stringent requirements of this and other electrical sections shall govern.
- .5 All work shall be in accordance with the Project Drawings and Specifications and their intent, complete with all necessary components, including those not normally shown or specified, but required for a complete installation.
- .6 Connect to equipment specified in other Sections and to equipment supplied and installed by other Trade Contractors or by the Owner. Uncrate equipment, move in place and install complete; start up and test. Include all field assembly of loosely/separately packaged accessories.

#### 1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
  - .1 CSA C22.1, Canadian Electrical Code, Part 1 (current edition), Safety Standard for Electrical Installations.
  - .2 Comply with all electrical CSA standards and electrical bulletins.
  - .3 CAN/CSA-C22.3 (current edition), Overhead Systems.
  - .4 CAN3-C235 (current edition), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
  - .1 EEMAC 2Y-1 (current edition), Light Gray Colour for Indoor Switch Gear.
- .3 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
  - .1 IEEE SP1122- (current edition), The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

#### 1.3 SUSTAINABLE REQUIREMENTS

- .1 Waste Management and Disposal
  - .1 Separate and recycle waste materials in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal and with the Waste Reduction Work plan.
  - .2 Avoid using landfill waste disposal procedures when recycling facilities are available.
  - .3 Place materials defined as hazardous or toxic waste in designated containers.

#### **1.4 DESIGN REQUIREMENTS**

- .1 Operating voltages: to CAN3-C235 (current edition).
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
  - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: provide identification nameplates and labels for control items in English.

#### **1.5 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 The "Engineer" is defined as McElhanney Consulting Services Ltd..
- .3 The "Trade Contractor" is defined as the supplier of the Scope of Work as defined in the Electrical Specifications sections in Division 26 and 33.
- .4 "Provide" is defined as "supply, install, test and commission."
- .5 "Install" is defined as all work and materials necessary to place the specified item into full operation, securely fastened, and to give a presentable finished appearance. "Install" also includes all necessary connections and conductors.
- .6 "Coordinate" is defined as: to make all arrangements directly with agencies and individuals, confirm schedules, be in attendance at the time work is being carried out, and take full responsibility for having the work carried out correctly and in a timely manner to meet the construction schedule.

#### **1.6 SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal.
- .2 Product Data: submit WHMIS MSDS – Material Safety Data Sheets
- .3 Shop drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered, or licensed in, the Province of **AB**, Canada.
  - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, wiring, conduit, and other items that must be shown to ensure co-ordinated installation.
  - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
  - .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
  - .5 Submit number of copies indicated in Submittals Section 01 33 00 of drawings and product data to the authority having jurisdiction.
  - .6 If changes are required, notify Engineer of these changes before they are made.
  - .7 Submit a detail schedule of all shop drawings prior to the first progress draw. Schedule shall include specification section, equipment name, manufacturer's name, distance from site to final manufacturing location, percent recycled content and delivery date.
- .4 Quality Control: in accordance with Section 01 45 00 (01400) - Quality Control.
  - .1 Provide CSA certified equipment and material.

- .2 Where CSA certified equipment and materials are not available, submit such equipment and material to inspection authorities for special approval before delivery to site.
- .3 Submit test results of installed electrical systems and instrumentation.
- .4 Permits and fees: in accordance with General Conditions of contract.
- .5 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Engineer.

#### **1.7 QUALITY ASSURANCE**

- .1 Quality Assurance: in accordance with Section 01 45 00 (1400) - Quality Control.
- .2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Trade Contractor license in accordance with authorities having jurisdiction.
  - .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
  - .2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.
- .3 Site Meetings:
  - .1 In accordance with Section 01 32 16 - Construction Schedule.
- .4 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 (01060) - Health and Safety Requirements.

#### **1.8 DELIVERY, STORAGE AND HANDLING**

- .1 Material Delivery Schedule: provide Engineer with schedule of all materials within 2 weeks after award of Contract. Progress claims will not be reviewed until updated schedules are provided.
- .2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse.

#### **1.9 PERMITS AND FEES**

- .1 Submit to Electrical Review Department, Local Fire Authorities and Supply Authority the necessary number of drawings and specifications for examination and approval prior to commencement of work. Obtain all required permits and pay all fees.
- .2 Arrange for review of all Work by the authorities having jurisdiction. On completion of the Work, furnish final unconditional certificates of approval by the inspecting authorities.

#### **1.10 EQUIPMENT RESTRAINT**

- .1 It is the entire responsibility of the equipment manufacturers to design their equipment so that the strength and anchorage of internal components of the equipment exceeds the force level used to restrain and anchor the unit itself to the supporting structure.

#### **1.11 DRAWINGS AND MEASUREMENTS**

- .1 Drawings are generally diagrammatic and are intended to indicate the scope and general arrangement of work and are not detailed installation drawings. Do not scale the drawings. Obtain accurate dimensions from the Civil and Structural drawings.
- .2 Consult the Civil drawings and details for exact locations of equipment. Obtain this information from the Engineer where definite locations are not indicated.
- .3 Take field measurements where equipment and material dimensions are dependent upon building dimensions.

- .4 Where imperial units have been indicated in brackets [ ] following the requirements in SI units, the conversion is approximate and provided for convenience. The SI units shall govern.

#### **1.12 PROJECT COORDINATION**

- .1 Check drawings of all trades to verify space and headroom limitations for work to be installed. Coordinate work with all trades and make changes to facilitate a satisfactory installation. Make no deviations from the design intent involving extra cost to the Owner without the Engineer's written approval.
- .2 The drawings indicate the general location and route to be followed by the electrical services. Where details are not shown on the drawings or only shown diagrammatically, the services shall be installed in such a way as to conserve headroom and interfere as little as possible with the free use of space through which they pass. Service lines shall run parallel to building lines.
- .3 Work out jointly all interference problems on the site and coordinate all work before fabricating or installing any material or equipment. Where necessary, produce interference/coordination drawings showing exact locations of electrical systems or equipment within service areas, shafts and the ceiling space. Distribute copies of the final interference/coordination drawings to the Engineer and all affected parties.
- .4 Ensure that all materials and equipment fit into the allotted spaces and that all equipment can be properly serviced and replaced, if and when required. Advise the Engineer of space problems before installing any material or equipment. Demonstrate to the Engineer on completion of the work that all equipment installed can be properly, safely serviced and replaced, if and when required.

#### **1.13 PROVISION FOR FUTURE EQUIPMENT AND CONSTRUCTION**

- .1 Leave clear spaces designated for future equipment or building expansion where indicated. Plan for the installation under this contract and ensure clear, accessible, unhindered access to the space is allowed for.
- .2 Where contract documents do not clearly indicate the future expansion requirements but known services are required, provide written "request for information" to the Engineer before making assumptions as to intent.

#### **1.14 SEQUENCE OF WORK**

- .1 Before interrupting major services, notify the Owner well in advance and arrange an acceptable schedule for the interruptions.
- .2 Before interrupting any services, complete all preparatory work as far as reasonably possible and have all necessary materials on site and pre-fabricated (where practical) and work continuously to keep the length of interruption to a minimum.
- .3 Include for the cost of all work that may be required out of regular hours to minimize the period of service interruption when modifying the existing systems.
- .4 All trades in this Division shall make allowance for the implications of having to totally complete all work in the new addition before proceeding with work in the existing building.

#### **1.15 TENDER INQUIRIES**

- .1 All Trade Contractor queries during the tender period shall be made in writing to the Engineer. Trade Contractor queries will be collected and suitable addenda will be issued for clarification. No verbal information will be considered valid or issued by the Engineer's office during tender. All tender queries may be emailed, mailed or couriered to the Engineer's office. No telephone queries will be answered.

#### **1.16 EXAMINATION**

- .1 Visit the site before preparing the tender and examine all existing conditions. No extra cost will be considered for any misunderstanding of the work to be done resulting from failure to visit the site.
- .2 Examine the documents for details of work included. Obtain a written clarification in the event of conflict within the specification, between the specification and the drawing, or in the drawing. Obtain written clarification from the Engineer if work affecting the installation is not clear. Where this is not done in advance, allow in the tender sum for providing the more costly alternative.

#### **1.17 RESPONSIBILITIES**

- .1 Ensure that equipment does not transmit noise and/or vibration to other parts of the building, as a result of poor installation practices.
- .2 Where the Contract Documents do not contain sufficient information for the proper selection of equipment for bidding, notify the Engineer during the tendering period. If clarification is not obtainable, allow for the most expensive arrangement. Failure to do this shall not relieve the Trade Contractor of responsibility to provide the intended equipment.
- .3 Protect equipment and material from the weather, moisture, dust and physical damage.
- .4 Cover equipment openings and open ends of conduits, piping and pull boxes as work progresses. Failure to do so will result in the Trade being required to adequately clean or replace materials and equipment at no extra cost to the Owner.
- .5 Protect all existing services encountered. Obtain instructions from the Engineer when existing services require relocation or modification.
- .6 Refinish damaged or marred factory finish to factory finish.
- .7 The specifications and drawings form an integral part of the Contract Documents. Neither drawings nor the specifications shall be used alone. Work omitted from the drawings but mentioned or reasonably implied in the specifications, and vice versa, shall be considered as properly and sufficiently specified and shall be provided. Misinterpretation of any requirement of either plans or specifications shall not relieve the Trade Contractor of the responsibility of properly completing his trade to the approval of the Engineer.

#### **1.18 STANDARD OF ACCEPTANCE**

- .1 Standard of Acceptance means that the item named and specified by the manufacturer and/or catalogue number forms part of the specification and sets standard regarding performance, quality of material and workmanship and when used in conjunction with a reference standard, shall be deemed to supplement the standard.
- .2 Where two or more manufacturers are listed, the manufacturer's name shown first or underlined or shown with a model name and/or number was used in preparing the base design. Tenders may be based on any one of those named, provided that they meet every aspect of the base design and every aspect of the drawings and specifications.
- .3 Where other than the first named or the underlined manufacturer or scheduled/specified manufacturer is selected or approved, include for the cost of any resulting work (both under this Division and other Divisions) and any necessary redesign of installation or structure. Submit redesign drawings for review with Shop Drawings. Maintain installation, access and servicing clearances. Equipment/materials shall not exceed the available space limitations. Redesign drawings shall be to scale and of a standard equal to the Project Drawings.
- .4 A visible manufacturer's nameplate shall indicate manufacturer's name, model number, serial number, capacity data, electrical characteristics and approval stamps.

#### **1.19 PROGRESS CLAIM AND CHANGE ORDER BREAKDOWNS**

- .1 Ten (10) days after the award of contract, submit price breakdowns.
- .2 In particular cases, more detail may be necessary to properly assess a change order or progress claims. This additional information could include all suppliers and all trade contractors when requested by the Engineer. Provide details for each section of the electrical work listed for each separate electrical change order.
- .3 Mark-up information is required for change orders but is optional on the original tender price.
- .4 Progress claims will not be certified nor payment made beyond 90% of the overall Electrical contract until commissioning and verification of the systems are complete. This procedure is to allow for any necessary deficiency holdbacks on items which do not become apparent until the systems are commissioned.

#### **1.20 WARRANTY**

- .1 Use of installed equipment during construction shall not shorten or alter the warranty period, as specified in Division 1.
- .2 Take note of any extended warranties specified.
- .3 Furnish a written warranty stating that all work executed under this Division will be free from defects of material and workmanship for a period of two (2) years from the date of substantial performance.
- .4 Promptly investigate any electrical or control malfunction and repair or replace all such defective work and all other damages thereby which becomes defective during the time of the warranty.

#### **1.21 SUBSTANTIAL PERFORMANCE REQUIREMENTS**

- .1 Refer to each section in specifications for detailed requirements.
- .2 Before the Engineer is requested to make a review for substantial performance of the work:
  - .1 Commission all systems and prove out all components, interlocks and safety devices.
  - .2 Submit a letter certifying that all work is complete for the intended use, operational, clean and all required submissions have been completed.
  - .3 A complete list of incomplete or deficient items shall be provided. If, in the opinion of the Engineer, this list indicates the project is excessively incomplete, a substantial completion review will not be performed.
- .3 The work will not be considered to be ready for use or substantially complete until the following requirements have been met:
  - .1 All reported deficiencies have been corrected.
  - .2 Operating and Maintenance Manuals completed.
  - .3 "As Built" Record Drawing ready for review.
  - .4 Systems Commissioning has been completed and has been verified by the Engineer.
  - .5 All demonstrations to the Owner have been completed.
- .4 Engineer's Letters of Assurance will not be issued until the following requirements have been met:
  - .1 All items listed in .1 above have been completed or addressed.
  - .2 Provincial or City Electrical Review – Certificate of Review.
  - .3 Certificate of Substantial Performance.
  - .4 Signed off copy of Engineer's Final Review Report.

## 1.22 DEFICIENCY HOLDBACK AND DEFICIENCY REVIEWS

- .1 Work under this Division which is still outstanding when substantial performance is certified will be considered deficient and a sum equal to at least twice the estimated cost of completing that work will be held back.
- .2 It is expected that outstanding work will be completed in an expeditious manner and the entire holdback sum will be retained until the requirements for Total Performance of work have been met and verified.

## 2.0 PRODUCTS

### 2.1 MATERIALS AND EQUIPMENT

- .1 Provide material and equipment in accordance with Section 01 61 00 Common Product Requirements.
- .2 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from inspection authorities before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.
- .3 Factory-assemble control panels and component assemblies.

### 2.2 WARNING SIGNS

- .1 Warning Signs: in accordance with requirements of authority having jurisdiction.

### 2.3 WIRING TERMINATIONS

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

### 2.4 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, numbered and coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1 (current edition).
- .4 Use colour coded wires in communication cables, matched throughout system.

### 2.5 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
120/208 V	Blue	
347/600 V	Orange	
Up to 25 kV	Yellow	
Emergency distribution	Red	Blue/Orange
Communication Systems	Green	
Fire Alarm	Red	
Emergency Voice	Red	Green
Security Systems	Red	Brown



## **2.6 FINISHES**

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
- .1 Paint outdoor electrical equipment "equipment green" finish.
- .2 Paint indoor switchgear and distribution enclosures as per the prime colours defined in Part 2.5, Conduit and Cable Identification

## **2.7 BASES SUPPORTS**

- .1 Where conduit and equipment is located on walls or slabs which will not permit the support of equipment, provide suitable supports to the building structure. Supports shall be constructed of steel members or of steel pipe and fittings designed to safely support the equipment.
- .2 All equipment bases shall be set on pads of kinetic pre-compressed fibreglass or vibration isolators sized to suit the equipment which they ought to support.

## **2.8 INSERTS, SLEEVES AND CURBS**

- .1 Provide all inserts, sleeves and curbs required for the work of this contract.
- .2 Use only factory-made threaded or toggle type inserts as required for support and anchors, properly sized for the load to be carried. Place inserts only in portions of the main structure and not in any finishing material.
- .3 Use factory-made expansion shields where inserts cannot be placed, but only where approved by the Engineer and only for loads of 50 kg or less.
- .4 Do not use powder-activated tools unless with written permission of the Engineer.
- .5 Supply and locate all inserts, holes, anchor bolts and sleeves in time when walls, floors and roof are erected.
- .6 Size sleeves to provide 25 mm clearance all around.
- .7 Use the following sleeving materials:
  - .1 Through all interior walls, use Schedule 40 steel pipes, machine cut, flush with finished structure. Check room finish schedules.
  - .2 Through all exterior walls above grade, use Schedule 40 steel pipes, machine cut, flush with finished structure inside and to suite flashing on outside.
  - .3 Through all exterior walls below grade and all other waterproof walls, use wrought iron pipes. Check flashing details for further information.
  - .4 Through all waterproof floors, through washrooms, janitor's closets, boiler rooms, mechanical rooms, kitchen and through roofs, use wrought iron sleeves, machine cut. Extend sleeves 100 mm above finished floor upward and cut flush with underside of floor.
  - .5 Approved type plastic sleeves, conduit sleeves or 18-gauge galvanized steel sleeves may be used as an alternative for Schedule 40 steel sleeves in interior areas.
  - .6 Provide 100 mm high, 100 mm wide water-tight concrete curbs with 20 mm chamfered edges around all sleeves passing through waterproof floors except where furred in.
  - .7 Sleeves are not required in walls and dry area floors where conduit is installed ahead of wall construction.
  - .8 Pack all sleeves between the conduit or cable passing through the sleeve and the sleeve and all spare sleeves with loose fibreglass insulation. Seal the annular space on both sides as follows:
    - .1 For all horizontal sleeves in exposed areas, use a seal of equal or better fire rating than the wall to be sealed.

- .2 For all horizontal concealed sleeves through firewalls and through walls separating areas of different air pressure, use a permanently resilient silicone base or equal sealing compound.
- .3 For all vertical sleeves through roofs, washrooms, janitor closets, equipment rooms, use permanently resilient silicone base or equal compound, non-flammable and waterproof. Ensure that the seal is compatible with floor and ceiling finishes. Check the room finishes schedules for further information.
- .4 The Trade Contractor to provide sleeving diagrams/drawings to the structural Engineer for review and approval prior to any work commencing.

## **2.9 CUTTING AND PATCHING**

- .1 The Trade Contractor shall employ the particular trades to do all required cutting and patching and the repairing of surfaces for his work.
- .2 Supporting members of any floor, wall or the building structure shall be cut only in such a location and manner as directed by the Engineer or the Structural Engineer.
- .3 Provide fire barriers around all components in holes which penetrate fire separations. The fire barrier medium provided shall make the fire separation equal to or better than the one which was cut away. All materials shall be CSA approved and UL listed.
- .4 All floor saw cutting and drilling required for electrical services is to be performed within hours approved by Owner. Prior written notice of 48 hours must be given to the Owner.

## **2.10 ACCESS PANELS AND DOORS**

- .1 Install concealed electrical equipment requiring adjustment or maintenance in locations easily accessible through access panels or doors. Install systems and components to result in a minimum number of access panels. Indicate access panels on "Record" drawings.
- .2 Provide other Trades with panels, doors or the frame therefore, complete with all pertinent information for installation. Supply to Trade in whose work they occur to install them. Ensure that access doors are installed in a manner to match the building material grids where applicable.
- .3 Prepare detail drawings showing location and type of access doors in coordination with other trades before proceeding with installation and hand these to the Engineer for review.
- .4 Size access doors to provide adequate access and commensurate with the type of structure and architectural finish. Should it be necessary for persons to enter, provide minimum 610 mm x 460 mm size doors.
- .5 Ensure proper fire rating of access doors in fire separations.
- .6 Access doors shall be Le Hage, SMS, Pedlar or Acudor with 14 US gauge steel door panel, rust-resistant concealed hinges and positive locking with self-opening screwdriver-operated lock. Frame shall be suitable for wall installation and shall have integral keys for plaster walls. Doors in tile wall shall be stainless steel and ceiling shall be suitable for plaster covering with only the frame joint showing. All other doors shall be prime painted steel. Minimum size of doors shall be 12" x 18" (300 mm x 450 mm). Wherever possible, 24" x 24" (600 mm x 600 mm) doors shall be used.
- .7 Lay-in type tiles, properly marked, may serve as access panels. Marking of ceiling tiles must be coordinated with Owner.
- .8 Panels in plaster surfaces shall have dish-shaped door and welded metal lath, ready to take plaster. Provide a plastic grommet for door key access.
- .9 Other access doors shall be welded 12-gauge steel, flush type with concealed hinges, lock and anchor straps, complete with factory prime coat. Obtain approval of non-standard door construction details.

### **3.0 EXECUTION**

#### **3.1 INSTALLATION**

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

#### **3.2 NAMEPLATES AND LABELS**

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

#### **3.3 FIELD QUALITY CONTROL**

#### **3.4 CLEANING**

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

**END OF SECTION**

---

**SECTION 26 05 03                      COMMISSIONING – ELECTRICAL**

**1.0      GENERAL**

**1.1      SECTION INCLUDES**

- .1 Material and installations for Commissioning

**1.2      RELATED SECTIONS**

- .1 This section of the specification forms part of the contract documents and is to be read, interpreted and coordinated with all other parts.

**1.3      REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA C22.1 (current edition), Canadian Electrical Code, Part 1

**1.4      SUSTAINABLE REQUIREMENTS**

- .1 Waste Management and Disposal
  - .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and with the Waste Reduction Work plan.
  - .2 Avoid using landfill waste disposal procedures when recycling facilities are available.
  - .3 Place materials defined as hazardous or toxic waste in designated containers.

**1.5      OPERATING AND MAINTENANCE MANUALS**

- .1 Provide operating and maintenance manuals in accordance with the requirements of this section and Section 26 05 00 – Common Work Results – Electrical.
- .2 Submit the number of manuals as indicated.
- .3 Provide the services of electricians, manufacturer's representatives and technicians required to provide information which is necessary for the manuals. Note that a substantial completion certificate will not be issued until such a time as the manuals have been submitted in their finals accepted form.
- .4 Operating and maintenance data shall be submitted to the engineer for review. A list of comments will be generated and returned to the Trade Contractor as necessary. This process will continue until the manuals are acceptable to the engineer.
- .5 The manuals shall be set up by the specification Section. Provide all information appropriate for each section.
  - .1 Review Certificates
  - .2 Letter of Guarantee
  - .3 List of Suppliers and Contacts
  - .4 Single Line Diagrams
  - .5 Distribution Panel
  - .6 Lighting and Power Panels
  - .7 Lighting Systems including fixtures, drivers, lamps
  - .8 Digital control system
  - .9 Wiring Devices
  - .10 Specialties

## **1.6 DATA FOR OPERATING AND MAINTENANCE MANUALS**

- .1 Only data associated with actually installed systems should be included in Operating and Maintenance Manuals.
- .2 Include in operations and maintenance data:
  - .1 Details of design elements, construction features, component function and maintenance requirements, to permit effective start up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.
  - .2 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists. Advertising or sales literature is not acceptable.
  - .3 Wiring and schematic diagrams and performance curves.
  - .4 Names and addresses of local suppliers for items included in maintenance manuals.
  - .5 Copy of reviewed shop drawings.
  - .6 Copies of all certificates including:
    - .1 Electrical Safety Authority (ESA) final certificate.
    - .2 Life safety systems verification certificate and test.
    - .3 Commissioning reports.

## **1.7 GENERAL TESTS**

- .1 Conduct and pay for tests of the following systems:
  - .1 Power distribution systems.
  - .2 All circuits, including power, data, control and communication circuits.
  - .3 Lighting and associated controls.
  - .4 All systems.
- .2 Give sufficient prior notice to the Engineer of the proposed time of the tests so that he can be represented at the tests if he so decides. Submit all test reports in triplicate to the Engineer for his review and records.
- .3 Submit test results with all operation and maintenance data.
- .4 Test all systems in accordance with details in appropriate sections.
- .5 Testing methods and test results shall be in accordance with CSA, the Electrical Code and regulations of the supply authority, other authorities having jurisdiction and in accordance with other sections of these Specifications.
- .6 Remove and replace with new materials all conductors that are found to be shorted or grounded.
- .7 With the systems completely connected and lamped, the following tests shall be made:
  - .1 Control and Switching: Test all circuits for the correct operation of devices, switches and controls.
  - .2 Polarity Tests: Test all circuits for the correct operation of devices, switches and controls.
  - .3 Voltage Tests: Make a voltage test at the last outlet of each circuit. The maximum drop in potential permitted will be 3% on 120 V and 208 V branch circuits, 2% on 208 V feeder circuits. Correct any deficiency in this regard.

- .4 Phase Balance: Measure the load on each phases at each switchboard, splitter, distribution panel, lighting panel and power panel and report the results in writing to the Engineer. Rearrange phase connections as necessary to balance the load on each phase as instructed by the Engineer, with the arrangement being restricted to the exchanging of connections at the distribution points mentioned in this paragraph. After making any such changes, update the record drawings and as-built drawings to show the modified connections.
- .5 Supply Voltage: Measure the line voltage of each phase at the load terminals of the main breakers and report the results in writing to the Engineer. This test shall be carried out with the majority of electrical equipment in use.
- .6 General Operations: Energize and put into operation each and every electrical circuit and item. Make repairs, alterations, replacements, tests and adjustments necessary for a complete and satisfactory operating electrical systems.
- .8 Provide labour, instruments, apparatus and pay all expenses required for the tests. The Engineer reserves the right to demand proof of the accuracy of all instruments used.
- .9 When the tests are performed, the Engineer may require that equipment, outlets, devices, etc., be opened and/or removed from their housings and/or outlet boxes in order that the interior of the equipment and wiring terminations and connections may be examined. Provide all labour and tools for this purpose.
- .10 Grounding Systems
  - .1 Conduct visual and Mechanical Review.
    - .1 As per Section.
  - .2 Complete the following Electrical Testing:
    - .1 As per Section.
- .11 Lighting Controls – Centralized Systems
  - .1 Conduct visual and Mechanical Review.
    - .1 As per Section.
  - .2 Complete the following Electrical Testing:
    - .1 As per Section.
- .12 Communication Systems
  - .1 Conduct visual and Mechanical Review.
    - .1 As per Section.
  - .2 Complete the following Electrical Testing:
    - .1 As per Section.

## **1.8 SYSTEM TURN OVER**

- .1 Provide labour, material, tools, etc., required to system turn over the electrical systems in the presence of the Engineer and the Owner.
- .2 Operate all systems and demonstrate how they conform to specifications. Under supervision, make adjustments and fine tune systems.

## **1.9 CARE, OPERATION, START-UP AND TRAINING OF OWNER'S PERSONNEL**

- .1 Instruct operating personnel in operation, care and maintenance of equipment.
- .2 Arrange and pay for services of manufacturer's factory service representative to supervise start-up of installation, check, adjust, balance and calibrate components.

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

#### **1.10 TRAINING WITH OWNER PERSONNEL**

##### **.1 General:**

- .1 Detailed information regarding contents, duration and instructors for any particular building system is included in Specification Section 01 91 40 – Commissioning – Training.

##### **.2 Trade Contractor:**

- .1 The trade contractor shall have the following training responsibilities:

- .1 Provide the Engineer with a training plan two weeks before the planned training according to the outline described in Section 01 91 41 – Commissioning – Training.
- .2 Provide designated Owner Representative with comprehensive training in the understanding of the systems and the operation and maintenance of each major piece of commissioned electrical equipment or system.
- .3 Training shall start with classroom sessions, if necessary, followed by hands-on training on each piece of equipment, which shall illustrate the various modes of operation, including start-up, shutdown, fire/smoke alarm, power failure, etc.
- .4 During any demonstration, should the system fail to perform in accordance with the requirements of the O&M Manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.
- .5 The appropriate trade or manufacturer's representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing trade contractor or manufacturer's representative. Practical building operating expertise, as well as in-depth knowledge of all modes of operation of the specific piece of equipment, is required.
- .6 The training sessions shall follow the outline in the Table of Contents of the O&M Manual and illustrate wherever possible the use of the O&M Manual or reference.
- .7 Training shall include:
  - .1 Use the printed installation, operation and maintenance instruction material included in the O&M Manuals.
  - .2 Include a review of the written O&M manual instructions, emphasizing safe and proper operation requirements, preventative maintenance, special tools needed and spare parts inventory suggestions. The training shall include start-up operation in all modes possible, shutdown, seasonal changeover and any emergency procedures.
  - .3 Discuss relevant health and safety issues and concerns.
  - .4 Discuss warranties and guarantees.
  - .5 Cover common troubleshooting problems and solutions.
  - .6 Explain information included in the O&M manuals and the location of all plans and manuals in the facility.
  - .7 Discuss any peculiarities of equipment installation or operation.
  - .8 Classroom sessions shall include the use of overhead projections, slides, and video and audio materials as might be appropriate.
- .8 Hands-on training shall include start-up; operation in all modes possible, including manual; shutdown; and any emergency procedures and maintenance of all pieces of equipment.
- .9 The trade contractor shall fully explain and demonstrate the operation, function and overrides of any local packaged controls, not controlled by the central control system.

- .10 Training shall occur after functional testing is complete, unless approved otherwise by the Project Manager.
- .11 Duration of Training:
  - .1 The trade contractor shall provide training on each piece of equipment.

**END OF SECTION**



---

**SECTION 26 05 21.01 WIRES AND CABLES (0 – 1,000 V)**

**PART 1. GENERAL**

**1.1 SECTION INCLUDES**

- .1 Materials and installation for Wires and Cables (0 – 1,000 V)

**1.2 RELATED SECTIONS**

- .1 This section of the specification forms part of the contract documents and is to be read, interpreted, and coordinated with all other parts.

**1.3 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA C22.1 (current edition), Canadian Electric Code, Part 1.

**1.4 SUSTAINABLE REQUIREMENTS**

- .2 Waste Management and Disposal
  - .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and with the Waste Reduction Work plan.
  - .2 Avoid using landfill waste disposal procedures when recycling facilities are available.
  - .3 Place materials defined as hazardous or toxic waste in designated containers.

**1.5 SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature, specifications and data sheets, and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit WHMIS MSDS – Material Safety Data Sheets in accordance with Section 01 47 15 – Sustainable Requirements: Construction and Section 02 81 01 – hazardous Materials and include: product characteristics, performance criteria, physical size, horsepower, watt rating, limitations and finish.
  - .3 Provide product data in accordance with Section 01 33 00 – Submittal Procedures.

**1.6 DELIVERY STORAGE AND HANDLING**

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00- Common Product Requirements.
- .2 Deliver, store and handle materials in accordance with manufacturer's written instruction.
- .3 Handle materials with suitable lifting equipment.
- .4 Store materials in heated, dry, weather-protected enclosure.

**PART 2. PRODUCTS**

**2.1 BUILDING WIRES**

- .1 Conductors shall be stranded for 10 AWG and larger. Minimum size shall be 12 AWG.
- .2 Copper and Aluminum conductors shall be sized as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE and RWU90 XLPE, non-jacketed.

## **2.2 CONTROL CABLES**

- .1 Type shall be LVT with two soft annealed copper conductors, sized as indicated.
  - .1 Insulation shall be thermoplastic.
  - .2 Sheath shall be thermoplastic jacket.
- .2 Type shall be low energy 300 V control cable with solid annealed copper conductors sized as indicated LVT with two soft annealed copper conductors, sized as indicated:
  - .1 Insulation shall be PVC, TW, TWH, or Polyethylene.

## **PART 3. EXECUTION**

### **3.1 GENERAL CABLE INSTALLATION**

- .1 Install cable in conduit in accordance with CEC Requirements.
- .2 Cable Colour Coding shall be in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .3 Conductor length for parallel feeders to be identical.
- .4 Lace or clip groups of Feeder Cables at distribution centres, pull boxes, and termination points.
- .5 Wiring in walls shall be typical drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
- .6 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be two-wire circuits only, i.e. common neutrals not permitted.
- .7 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

### **3.2 INSTALLATION OF CONTROL CABLES**

- .1 Install control cables in conduit underground ducts.
- .2 Ground control cable shield, as required.

### **3.3 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.

### **3.4 FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Perform tests before energizing electrical system.

**END OF SECTION**

---

**SECTION 26 05 34                      CONDUITS & CONDUIT FASTENINGS & CONDUIT FITTINGS**

**1.0        GENERAL**

**1.2        SECTION INCLUDES**

- .1   Material and installation for conduits, conduit fastenings and conduit fittings.

**1.3        RELATED SECTIONS**

- .1   This section of the Specification forms part of the contract documents and is to be read, interpreted and coordinated with all other parts.

**1.4        REFERENCES**

- .1   Canadian Standards Association (CSA International)
  - .1   CAN/CSA C22.2 No. 18 (current edition), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
  - .2   CSA C22.2 No. 45 (current edition), Rigid Metal Conduit.
  - .3   CSA C22.2 No. 56 (current edition), Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
  - .4   CSA C22.2 No. 83 (current edition), Electrical Metallic Tubing.
  - .5   CSA C22.2 No. 211.2 (current edition), Rigid PVC (Unplasticized) Conduit.
  - .6   CAN/CSA C22.2 No. 227.3 (current edition), Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

**1.5        SUSTAINABLE REQUIREMENTS**

- .1   Waste Management and Disposal
  - .1   Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and with the Waste Reduction Work plan.
  - .2   Avoid using landfill waste disposal procedures when recycling facilities are available.
  - .3   Place materials defined as hazardous or toxic waste in designated containers.

**1.6        SUBMITTALS**

- .1   Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2   Product Data:
  - .1   Provide manufacturer's printed product literature, specifications and data sheets, and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2   Submit WHMIS MSDS - Material Safety Data Sheets and include: product characteristics, performance criteria, physical size, horsepower, watt rating, limitations and finish.

**1.7        DELIVERY, STORAGE AND HANDLING**

- .1   Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2   Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .3   Handle materials with suitable lifting equipment.
- .4   Store materials in heated, dry, weather-protected enclosure

## **2.0 PRODUCTS**

### **2.1 CONDUITS**

- .1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.
- .2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.
- .3 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .4 Rigid PVC conduit: to CSA C22.2 No. 211.2.
- .5 Flexible metal conduit: to CSA C22.2 No. 56, liquid-tight flexible metal.

### **2.2 CONDUIT FASTENINGS**

- .1 One-hole steel straps to secure surface conduits 50 mm and smaller.
  - .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 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.
- .2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.
- .3 Watertight connectors and couplings for EMT.
  - .1 Set-screws are not acceptable.

### **2.4 EXPANSION FITTINGS FOR RIGID CONDUIT**

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

### **2.5 FISH CORD**

- .1 Polypropylene.

## **3.0 EXECUTION**

### **3.1 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.
- .3 Use rigid hot dipped galvanized steel threaded conduit except where specified otherwise.
- .4 Use epoxy coated conduit in corrosive areas.
- .5 Use rigid PVC conduit underground.

- .6 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.
- .7 Minimum conduit size: 25 mm.
- .8 Mechanically bend steel conduit over 19 mm diameter.
- .9 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .10 Install fish cord in empty conduits.
- .11 Remove and replace blocked conduit sections.
  - .1 Do not use liquids to clean out conduits.
- .12 Dry conduits out before installing wire.

### **3.2 MANUFACTURER'S INSTRUCTIONS**

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

### **3.3 SURFACE CONDUITS**

- .1 Surface conduits shall only be installed in mechanical and electrical rooms.
- .2 Run parallel or perpendicular to building lines.
- .3 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .4 Run conduits in flanged portion of structural steel.
- .5 Group conduits wherever possible on suspended channels.
- .6 Do not pass conduits through structural members except as indicated.
- .7 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

### **3.4 CONCEALED CONDUITS**

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not install conduits in terrazzo or concrete toppings.

### **3.5 CONDUITS UNDERGROUND**

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

### **3.6 MAINTENANCE – CLEARANCES**

- .1 Provide clearance around systems, equipment and components for observation of operation, review, servicing, maintenance and as recommended by manufacturer and CEC, Part 1.

### **3.7 CLEANING**

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

**END OF SECTION**

---

## **SECTION 26 56 19 ROADWAY LIGHTING**

### **PART 1. GENERAL**

#### **1.1 SECTION INCLUDES**

- .1 Materials and installation for concrete, steel, aluminum and wood lighting poles.

#### **1.2 RELATED SECTIONS**

- .1 This section of the specification forms part of the contract documents and is to be read, interpreted and coordinated with all other parts.
- .2 Section 26 50 00 – Lighting.

#### **1.3 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA C22.2 No. 206-M1987(R1999), Lighting Poles.

#### **1.4 SUSTAINABLE REQUIREMENTS**

- .3 Waste Management and Disposal
  - .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and with the Waste Reduction Work plan.
  - .2 Avoid using landfill waste disposal procedures when recycling facilities are available.
  - .3 Place materials defined as hazardous or toxic waste in designated containers.

#### **1.5 SUBMITTALS**

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

### **PART 2. PRODUCTS**

#### **2.1 STEEL POLES**

- .1 Steel poles shall be in accordance with CSA C22.2 No.206 designed for underground wiring and:
  - .1 Mounting on concrete anchor base.
  - .2 Style: as per drawings.
  - .3 Access handhole above pole base for wiring connections, with welded-on reinforcing frame and bolted-on cover.
  - .4 Size shall be as per drawings.
  - .5 Anchor bolts shall be four steel with shims, nuts and covers, as per drawings.
  - .6 Finish shall be as per drawings.
  - .7 Grounding lug.

#### **2.2 LUMINAIRE MOUNTING BRACKETS**

- .1 Mounting brackets steel for specified luminaires:
  - .1 Single and twin brackets as indicated.
  - .2 Arm extension length: as indicated.

#### **2.3 LUMINAIRES**

- .1 Luminaire with cast aluminum weatherproof housing and:
  - .1 LED flood light, as per drawings.

### **PART 3. EXECUTION**

#### **3.1 INSTALLATION**

- .1 Install poles true and plumb, complete with brackets in accordance with manufacturer's instructions.
- .2 Install luminaires on pole.
- .3 Check luminaire orientation, level and tilt.
- .4 Connect luminaire to lighting circuit.
- .5 Perform tests in accordance with Section 26 05 00 – Common Work Results – Electrical.
- .6 Provide lighting control system in accordance with drawings. Provide owner training as indicated on drawings and 26 05 03 – Commissioning – Electrical.

#### **3.2 MAINTENANCE – CLEARANCES**

- .1 Provide clearance around systems, equipment and components for observation of operation, review, servicing, maintenance and as recommended by manufacturer and CEC, Part 1.

#### **3.3 CLEANING**

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

**END OF SECTION**



## **Appendix A – Existing Equipment**