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**DRAWINGS:**

## KM 108.6 – HIGHWAY 93N, NIGEL CREEK BRIDGE

227903-001	COVER SHEET, DRAWING LIST AND LOCATION MAP
227903-002	GENERAL ARRANGEMENT EXISTING CONDITION
227903-003	GENERAL ARRANGEMENT FINAL CONDITION
227903-004	DECK JOINT MODIFICATION – SHEET 1 (PHASE 1 COMPLETION)
227903-005	DECK JOINT MODIFICATION – SHEET 2 (PHASE 1 COMPLETION)
227903-006	CAST-IN-PLACE BARRIER – LAYOUT AND REINFORCEMENT (PHASE 1 COMPLETION)
227903-007	BICYCLE RAILING (PHASE 1 COMPLETION)
227903-008	DECK DIAPHRAGM AND PIER PYLON MODIFICATIONS (PHASE 1 COMPLETION)
227903-009	NEW SHEAR KEY AT PIER CAP – GENERAL ARRANGEMENT (PHASE 2)
227903-010	NEW SHEAR KEY AT PIER CAP – SECTION AND DETAILS (PHASE 2)
227903-011	STRINGER BEARING REPLACEMENT – GENERAL ARRANGEMENT (PHASE 2)
227903-012	STRINGER BEARING REPLACEMENT – DETAILS (PHASE 2)
227903-013	PIER MODIFICATIONS (PHASE 2)
227903-014	SPANDREL COLUMN MODIFICATIONS (PHASE 2)
227903-015	ARCH RIB MODIFICATION (PHASE 2)

**REFERENCE DRAWINGS:**

1960 ORIGINAL DESIGN DRAWINGS, NIGEL CREEK BRIDGE BANFF-JASPER HIGHWAY MILE 68.8 (KM 108.6), BANFF NATIONAL PARK.

1 OF 11	GENERAL LAYOUT
2 OF 11	NORTH ABUTMENT
3 OF 11	NORTH ABUTMENT REINFORCING
4 OF 11	SOUTH ABUTMENT
5 OF 11	SOUTH ABUTMENT STEEL REINFORCEMENT
7 OF 11	PIERS / BORE HOLES
8 OF 11	BEARINGS / REINFORCING STEEL SCHEDULE
9 OF 11	STRUCTURAL STEEL
10 OF 11	DECK

NIGEL CREEK BRIDGE 2004 REPAIRS, BANFF NATIONAL PARK, DRAWING REFERENCE B2004R5

S1	NIGEL CREEK BRIDGE MISCELLANEOUS REPAIRS
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2009 NIGEL CREEK BRIDGE REHABILITATION PROJECT NO. 418894  
HWY 93N – ICEFIELDS PARKWAY KM 108.6, BANFF NATIONAL PARK

S-100	COVER PAGE
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S-101	GENERAL NOTES
S-102	GENERAL LAYOUT
S-103	EXPANSION JOINT DETAILS
S-105	MISCELLANEOUS DETAILS – SHEET 1
S-106	MISCELLANEOUS DETAILS – SHEET 2

RECORD DRAWINGS - 2020/2021 BRIDGE REHABILITATION, PROJECT NO. 565-11:

BRIDGE DRAWINGS: KM 108.6 – HIGHWAY 93N, NIGEL CREEK BRIDGE

565-11-001 REV 1	COVER SHEET, DRAWING LIST AND LOCATION MAP
565-11-002 REV 1	GENERAL ARRANGEMENT EXISTING CONDITION
565-11-003 REV 1	GENERAL ARRANGEMENT FINAL CONDITION
565-11-004 REV 1	ABUTMENT MODIFICATIONS
565-11-005 REV 1	DECK DIAPHRAGM AND PIER PYLON MODIFICATIONS
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565-11-008 REV 1	DECK JOINT MODIFICATIONS – SHEET 1
565-11-009 REV 1	DECK JOINT MODIFICATIONS – SHEET 2
565-11-010 REV 1	CAST-IN-PLACE BARRIER – LAYOUT AND REINFORCEMENT – SHEET 1
565-11-011 REV 1	CAST-IN-PLACE BARRIER – LAYOUT AND REINFORCEMENT – SHEET 2
565-11-012 REV 1	BICYCLE RAILING – SHEET 1
565-11-013 REV 1	BICYCLE RAILING – SHEET 2

REDLINE MARKUP DRAWINGS DATED 2023 AUGUST 18 - 2020/2021 BRIDGE REHABILITATION, PROJECT NO. 565-11:

ROADWAY DRAWINGS: HIGHWAY 93N, NIGEL CREEK BRIDGE FLARE REHABILITATION, DRAWING REFERENCE 2121-00203-04

C000 (REDLINE MARKUP)	COVER SHEET
C001 (REDLINE MARKUP)	LOCALITY SKETCH, DRAWING INDEX AND LEGEND
C101 (REDLINE MARKUP)	PLAN – BARRIER FLARES
C301 (REDLINE MARKUP)	TYPICAL SECTIONS
C302 (REDLINE MARKUP)	BICYCLE RAILING DETAILS

**REFERENCE MATERIAL:**

Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure, May 2015

BMP in FR\_PratiquesExemplairesdeGestion (French version of Parks Canada National Best Management Practices – Roadway, Highway, Parkway and Related Infrastructure, May 2015)

Direction for Permitted Users Conducting Water-related Activities in LLYK

Whirling Disease Protocol (French version of Direction for Permitted Users Conducting Water-related Activities in LLYK)  
Standard CMS Translations (Jul 2018)

Construction Signage Translation (Jul 2018)

David Thompson Pit – Location Map

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 All sections.

**1.2 WORK COVERED BY CONTRACT DOCUMENTS**

- .1 Work of this Contract comprises rehabilitation of the Nigel Creek Bridge located at km 108.6 of Highway 93N (Icefields Parkway) in Banff National Park, Alberta as nominally measured from the Trans Canada Highway.
- .2 The rehabilitation includes rehabilitation work Phase 2 and finishing of not completed works in rehabilitation Phase 1. Phase 1 work was carried out in two stages. These stages are referred to as Stage 1 and Stage 2 and are shown on the drawings.
- .3 Preparation of an Environmental Protection Plan for the Work.
  - .1 An "Environmental Protection Plan" (EPP) is to be prepared and followed by the successful Contractor to meet the requirements of Section 01 35 43 – Environmental Procedures, to ensure that any adverse effects are minimal. The Contractor's EPP must be approved by the Departmental Representative on behalf of Parks Canada Agency (PCA) prior to the commencement of construction. The Departmental Representative and Parks Canada's Environmental Surveillance Officer (ESO) will refer to the approved EPP and these specifications in determining compliance with the plan and contract specifications. The EPP will form part of this contract.
- .4 Without limiting the scope of work, the work of this Contract generally comprises the following:
  - .1 Mobilization and site preparation.
  - .2 Project management and coordination.
  - .3 Traffic management during construction.
  - .4 Installation and maintenance of temporary barriers.
  - .5 Quality control and quality assurance of all construction activities.
  - .6 Environmental management during construction.
  - .7 Health and Safety management during construction.
  - .8 Protection of utilities and coordination of utility relocations.
  - .9 Confirmation of inventory of owner supplied materials stored on site upon Contract Award and preparation and submission of list of deficiencies.
  - .10 Construction to be completed in stages.
  - .11 Source appropriate site(s) outside of the Park for disposal of waste materials.
  - .12 Bridge Rehabilitation works – completing works from Phase 1, including but not limited to:
    - .1 Localized concrete removal at deck joints Stage 1 (including top of abutment back walls) and removal and disposal of existing Stage 1 deck joints.

- .2 Removal of existing asphalt and subgrade, as noted in the contract documents and as directed by the Departmental Representative.
- .3 Modification of steel deck diaphragms at piers.
- .4 Roughening of all existing construction joints and cleaning exposed reinforcement from rust.
- .5 Supply of concrete and installation of new roadway and sidewalk deck joints at Stage 1.
- .6 Supply and construction of concrete railing curbs in vicinity of Stage 1 deck joints.
- .7 Supply and construction of cast-in-place barriers and installation of barrier expansion joints at Stage 1 deck joints.
- .8 Caulking of barrier joints and barrier control joints at Stage 1.
- .9 Installation of railing gap filler profile (HSS 102x51x3.2) at Stage 1 pier pylons.
- .10 Closing former railing holes and painting of end post assemblies of former railing at pier pylons.
- .11 Supply and placement of subgrade and asphalt pavement.
- .12 Application of lane markings.
- .13 Supply and installation of cyclist signage.
- .13 Bridge Rehabilitation works - Phase 2, including but not limited to:
  - .1 Supply and installation of new shear key assemblies at pier caps.
  - .2 Localized concrete removal below existing stringer bearings at pier caps.
  - .3 Removal and disposal of existing stringer bearings at pier caps.
  - .4 Supply and installation of new stringer bearings at pier caps.
  - .5 Repair of concrete spalls at pier cap and bearing seats (south pier).
  - .6 Partial depth concrete repairs when authorized by Departmental Representative.
  - .7 Supply and installation of pier cap post-tensioning.
  - .8 Supply and installation of spandrel column modifications.
  - .9 Supply and installation of arch rib modifications.
- .14 Demobilization.

### 1.3 CONTRACT METHOD

- .1 Construct Work under combined price contract.

### 1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit Project construction progress schedule in accordance with Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart.
- .3 Submit site-specific and Work Plan Health and Safety Plan in accordance with Section 01 35 29.06 - Health and Safety Requirements.

**1.5 WORK BY OTHERS**

- .1 Other contractors may be working in Banff National Park. The Contractor shall coordinate his operations with others. No claims for any delays or inconvenience will be entertained.
- .2 The Contractor is advised that the following work in the vicinity has been or will be contracted by Parks Canada:
  - .1 Poboktan Creek Bridge Rehabilitation at km 157.7 of Highway 93N. Anticipated contract completion is October 2024.
  - .2 Paving project at the South end of the Ice Fields Parkway.
- .3 The Contractor is advised that events may be planned during the anticipated construction season that could impact traffic patterns within Banff National Park (i.e., annual bike race events).
- .4 Where it is necessary that work is to proceed in areas of the project common to both the Contractor and other forces, the Contractor shall cooperate with the other forces and the Owner in reviewing their construction schedules, sharing his work space, and shall coordinate his operations with the other Contractors including traffic management and construction staging.

**1.6 WORK SEQUENCE**

- .1 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .2 Schedule work progress to allow Departmental Representative unrestricted access to inspect all phases of the Work.
- .3 Required Stages:
  - .1 The bridge shall be rehabilitated in stages. One lane of single lane alternating traffic must be provided at all times during construction, except:
    - .1 During installation of the new cover and splice plates for the arch rib modifications:
      - .1 No traffic is permitted; except in the event of emergency when only one single vehicle with a GVW of less than 4550kg will be allowed on the bridge. This work shall be planned for times with very low traffic volume (at night-time between 22:00 and 06:00) and will require minimum one weeks notification (7 days) and approval of the Departmental Representative. Maximum length of closure 8 hours, unless approved otherwise by Departmental Representative.
      - .2 During replacement of bearings located at the bridge CL until jacks are locked:
        - .1 No traffic is permitted. In the event of emergency, temporarily pause operations and lock jacks to allow passage of the emergency vehicle. No traffic permitted on structure if jacks unlocked. This work shall be planned for times with very low traffic volume (at night-time between 22:00 and 06:00) and will require minimum one weeks notification (7 days) and approval

of the Departmental Representative. Maximum length of closure 8 hours, unless approved otherwise by Departmental Representative.

- .2 After jacks are locked and until replacement of centreline bearing is completed, one lane of traffic can be reopened.
  - .1 Two lanes of traffic not permitted at any point during replacement of bearings at bridge CL.
- .2 During Phase 2 scope of work (except as noted in Item 1.6.3.1 of this specification section and excluding work required for pier cap external post tensioning):
  - .1 Traffic lane on the side of the deck where work is being done to be closed.
  - .3 Some work items must be completed prior to others. Construction sequence requirements are as indicated on the drawings.
  - .4 Pre-Mobilization Submittals – To be submitted no later than 14 days after award.
  - .5 Shop Drawings and Concrete Mix Design(s) – To be submitted no later than 30 days after award.
  - .6 Substantial Completion – 2024 November 01.
  - .7 Final Completion – 2024 November 30.
- .4 Maintain fire access/control.
- .5 Protect workers and public safety.
- .6 Work shall be carried out in accordance with Section 01 14 00 – Work Restrictions and Section 01 35 43 – Environmental Procedures.

## 1.7 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for storage, for Work, and for access, to allow:
  - .1 Owner occupancy.
  - .2 Public usage.
- .2 Co-ordinate use of premises under direction of Departmental Representative.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 The Contractor and any Subcontractors shall obtain a business license from the Parks Canada Office in Banff, prior to commencement of the contract.
- .5 All Contractor's business and private vehicles are required to obtain a vehicle work pass from Parks Canada. These permits may be obtained at the Parks Canada Administration Office in Banff.
- .6 Refer to Section 01 52 00 - Construction Facilities, Section 01 55 26 – Traffic Control and Section 01 56 00 - Temporary Barriers and Enclosures, for temporary facilities, access roads and parking areas, traffic regulations, and utilities.
- .7 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

- .8 Ensure that operations conditions of exiting work at completion are still the same, equal to or better than that which existed before new work started.

## **1.8 OWNER FURNISHED ITEMS**

- .1 There are no owner supplied materials for this project (rehabilitation works Phase 2), except supplied material currently stored at David Thompson Pit for works not completed at rehabilitation Phase 1. This includes:
  - .1 (4) roadway and (4) sidewalk deck joints for Stage 1,
    - .1 Strip seal for roadway deck joints is on site. Continuous seal is partially installed at each joint as part of the completed Stage 2 roadway joint replacements.
  - .2 (4) sidewalk deck joint cover plates,
  - .3 (32) stop movement bar assemblies,
  - .4 (2) deck diaphragm modifications ((2) base plates c/w shear studs, and beveled washers),
  - .5 (2) curb cover plates at piers and (2) curb cover plates at abutments for Stage 1 deck joints,
  - .6 (2) railing gap filler profile (HSS 102x51x3.2) for Stage 1 pier pylons.
  - .7 (4) barrier expansion joints assemblies for Stage 1 barriers, and,
  - .8 (2) deck edge protection angles.
- .2 Shop drawings for fabricated Owner Supplied items submitted by the previous Contractor under the Phase 1 contract can be provided upon request after Contract Award.
- .3 Contractor to take inventory of materials stored on site and provide list of deficiencies to Departmental Representative immediately after Contract Award.
- .4 All other items (cast-in-place concrete, reinforcement, concrete anchors, plow guard plates, bolts, nuts, etc.) for finishing Phase 1 works are to be supplied by the contractor.
- .5 Unless specified as an Owner Furnished Item, all materials required to complete the Work are to be supplied by the Contractor. Unless specifically noted otherwise in the specifications, supply of materials required to complete the Work will not be measured but considered incidental to the Work.

## **1.9 OWNER OCCUPANCY**

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

## **1.10 CONSTRUCTION SIGNAGE**

- .1 No sign or advertisements, other than warning signs, are permitted on site.
- .2 Signs and notices for safety and instruction shall be in both official languages.
  - .1 Graphic symbols shall be diamond grade and shall conform to CAN3-Z321.
  - .2 Use approved translation list for signage.

- .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.
- .4 All temporary traffic control signs that are used for longer than one day shall be mounted on wood posts installed in the shoulder areas at locations accepted by the Departmental Representative.
- .5 Signage shall be coordinated with other Contractors.

## **1.11 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Environmental Protection Plan.
  - .2 Contract Drawings.
  - .3 Specifications.
  - .4 Addenda.
  - .5 Reviewed Shop Drawings.
  - .6 List of Outstanding Shop Drawings.
  - .7 Change Orders.
  - .8 Other Modifications to Contract.
  - .9 Copy of Traffic Accommodation Strategy (TAS).
  - .10 Safety Plan.
  - .11 WHMIS and associated SDS.
  - .12 Labour conditions and wage schedules.
  - .13 Applicable current editions of municipal regulations and bylaws.
  - .14 Field Test Reports.
  - .15 Copy of Approved Work Schedule.
  - .16 Health and Safety Plan and Other Safety Related Documents.
  - .17 Restricted Activity Permits.
  - .18 Other documents as specified.

## **1.12 REFERENCE DOCUMENTS**

- .1 In addition to the Reference Material listed in Section 00 01 10 – Table of Contents, the following reference documents can be provided upon request after Contract Award:
  - .1 1960 Original Shop Drawings of Nigel Creek Bridge.
  - .2 Shop drawings for fabricated Owner Supplied items submitted by the previous Contractor under the Phase 1 contract.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not used.

Project: 227903

Parks Canada

Bridge Rehabilitation  
Nigel Creek Bridge, Hwy 93N, km 108.6  
Banff National Park

Section 01 11 00  
SUMMARY OF WORK  
Page 7

**Part 3 Execution**

**3.1 NOT USED**

.1 Not used.

**END OF SECTION**

**1.1 MEASUREMENT PROCEDURES**

- .1 The cost to the Contractor to meet the requirements described in this section shall be considered incidental to the Work and no additional payment will be made.

**1.2 ACCESS AND EGRESS**

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.
- .2 Lane closures and other disruptions to traffic shall be performed in accordance with Section 01 55 26 – Traffic Control, and must be done in coordination with the Departmental Representative.

**1.3 USE OF SITE AND FACILITIES**

- .1 The Work Sites shall be specified by the Departmental Representative and shall only be used for the purposes of the Work. The Work Sites will be made available by Parks Canada to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.
- .2 While the Work Sites are under the Contractor's control, the Contractor shall be entirely responsible for the security of the Work Sites and of the Work, and for the security of the work of Other Contractors located on the Work Sites.
- .3 Keep the Work Sites clean and free from accumulation of waste materials and rubbish regardless of source. Remove snow as necessary for the performance and inspection of the work.
- .4 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
  - .1 Herds of bighorn sheep are commonly observed crossing the structure. In accordance with Section 01 35 43 – Environmental Procedures, Contractor not to approach any wildlife.
- .5 Provide for all traffic. Construct barriers in accordance with Section 01 55 26 – Traffic Control and Section 01 56 00 – Temporary Barriers and Enclosures.
- .6 Construction camps inside any National Park are not permitted.
- .7 Office/tool trailer may be set up near the bridge sites at a location approved by the Departmental Representative.
- .8 Provide sanitary facilities for work force in accordance with governing regulations and the Environmental Procedures for this project. Post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.
- .9 Any damage to the Work Sites caused by the Contractor shall be repaired by the Contractor at its expense.
- .10 The work may be performed 24 hours a day, seven days per week, with following work restrictions for slowing or stopping of traffic.
  - .1 Work restrictions related to slowing or stopping of traffic are provided in Section 01 55 26 – Traffic Control.

- .11 The Contractor is advised that events may be planned during the anticipated construction season that could impact traffic patterns within Banff National Parks (i.e. annual bike race events).

#### **1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1 Execute work with least possible interference or disturbance to public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

#### **1.5 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 (including any temporary works) 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.
- .4 The Contractor is responsible for the development and supply of construction access to the Work as approved by the Departmental Representative.

#### **1.6 EXISTING SERVICES**

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 The locations of Utilities, if any, shown or not shown on the Drawings, are subject to verification by the Contractor.
- .3 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the work, using hand labour as required.
- .4 The Contractor shall assess the possible impact of its operations on all Utilities that may be affected by its operations, and shall protect, divert, temporarily support or relocate, or otherwise appropriately treat such Utilities to ensure that they are preserved.
- .5 The Contractor shall establish and maintain direct and continuous contact with the owners or operators of any Utilities which may interfere with the Work.
  - .1 The Contractor shall advise Utilities of intended Works within fourteen days of Contract Award and obtain written approval for the intended methods of preserving the Utilities during Construction from all Utility Owners a minimum three (3) weeks prior to affecting any Utility.
  - .2 The Contractor shall be responsible for coordinating work and schedule to accommodate any blackout periods or other restrictions related to the Utilities. No claims for any delays or inconvenience will be entertained.
  - .3 The Contractor shall keep the Departmental Representative informed of all communications with the Utility companies and authorities at the Construction Progress meetings.

- .6 The Contractor shall immediately report any damages to Utilities to the Departmental Representative and to the Utility owner or authority affected, and shall promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

## **1.7 SURVEY OF EXISTING PROPERTY CONDITIONS**

- .1 Submission of a tender is deemed to be confirmation that the contractor has inspected the site and is completely familiar with all conditions or restrictions affecting execution and completion of work.
- .2 The Contractor shall regularly monitor the condition of the Work Site and of property on and adjoining the Work Site throughout the construction period, and shall immediately notify the Departmental Representative if any deterioration in condition is detected. Such monitoring shall cover all pertinent features and property including, but not limited to, buildings, structures, roads, walls, fences, slopes, sewers, culverts, and landscaped areas.
- .3 The Departmental Representative may, but shall not be obligated to survey and record the condition of the Work Sites and of properties on or adjoining the Work Sites prior to the commencement of construction by the Contractor. If requested, the Departmental Representative will provide a copy of the survey records to the Contractor for reference.
- .4 Whenever supplied with survey records, the Contractor shall satisfy itself as to the accuracy and completeness of the survey records provided by the Departmental Representative for any area before commencing construction in that area. Commencement of construction in any area shall be interpreted to signify that the Contractor has accepted such survey records as being a true record of the existing conditions prior to construction.
- .5 The provision of the records of a survey of existing conditions by the Departmental Representative shall in no way limit or restrict the Contractor's responsibility to exercise proper care to prevent damage to all properties within or adjacent to the Work Sites, whether all such properties are covered by the survey or not.

## **1.8 PROTECTION OF PERSONS AND PROPERTY**

- .1 The Contractor shall comply with all applicable safety regulations of the Workers' Compensation Board of Alberta (WCB of AB), the Provincial OH&S Act and Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.
- .2 The Contractor shall comply with the Canada Labour Code, Canada Occupational Safety and Health Regulations.
- .3 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or adjacent to the Work Site to the extent that may be affected by conduct of work.
- .4 The Contractor shall promptly take such measures as are required to repair, replace, or compensate for any loss or damage caused by the Contractor to any property, or if Parks Canada so directs, shall promptly reimburse to Parks Canada the costs resulting from such loss or damage.

**1.9 USE OF PUBLIC AREAS**

- .1 The existing Nigel Creek Bridge structure is load posted with gross vehicle weight limits as follows:**
  - .1 Single-Unit Vehicle: 26 tonnes**
  - .2 Two-Unit Vehicle: 35 tonnes**
  - .3 Vehicle Train: 39 tonnes**
  - .4 Overweight permits are required for all vehicles, including construction vehicles, that are in exceedance of the posted load limits.**
- .2 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas.
- .3 Steel tracked equipment with cleats will not be allowed on pavement designated for future use. Asphalt, granular, embankment and excavation materials may be hauled on existing highway but this shall be by standard highway trucks not exceeding legal highway load limits and applicable load restrictions.
  - .1 Loads crossing Nigel Creek Bridge are restricted as specified in Item 1.9.1 of this specification section.
- .4 All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle.
- .5 All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner which will prevent dropping of materials or debris on the roadways, and where contents may otherwise be blown off during transit such loads shall be covered by tarpaulins or other suitable covers. Spill of materials in public areas shall be removed or cleaned immediately by the Contractor at its own expense.
- .6 All activities shall be in accordance with Section 01 35 43 – Environmental Procedures and the Environmental Protection Plan prepared for the project.

**1.10 SUPERVISORY PERSONNEL**

- .1 Within five Days after award notification, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.
- .2 The following personnel shall be included in the list:
  - .1 Project Superintendent;
  - .2 Deputy Project Superintendent;
  - .3 Environmental Representative;
  - .4 Traffic Control Representative;
  - .5 Quality Control Representative;
  - .6 Health and Safety Coordinator.
- .3 The Project Superintendent shall be employed full time with full authority to supervise the Work, and who shall be directly available to the Departmental Representative during all active periods of Work. Either they or their designated Deputy shall be present on the Work Site each and every workday that Work is being performed, from the commencement of Work to Total Performance of the Work. Project Superintendent and

their designated Deputy should have a minimum of 5 years experience in the type of works being performed. Project Superintendent and their designated Deputy are responsible for supervising all their subcontractors and ensuring each subcontractor has their own foreman onsite during all works.

- .4 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence. Deputy Project Superintendent should have a minimum of 5 years experience in the type of works being performed and be approved by the Departmental Representative.
- .5 Environmental Representative must:
  - .1 Be responsible for completing Environmental Protection Plan and ensuring personnel adhere to contract requirements as related to environmental activities.
- .6 Traffic Control Representative must:
  - .1 Be responsible for development, implementation and execution of the Traffic Management Plan.
- .7 Quality Control Representative must:
  - .1 Be responsible for development, implementation and execution of the Quality Management Plan.
- .8 Health and Safety Coordinator must:
  - .1 Have minimum 2 years site-related working experience specific to activities associated with roadway and bridge construction.
  - .2 Have working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
  - .4 Be responsible for implementing, enforcing daily, and monitoring site-specific Contractor's Health and Safety Plan.
  - .5 Be on site during execution of Work and report directly to and be under direction of the site supervisor.

## 1.11 MEETINGS

- .1 Hold meetings in accordance with Section 01 31 19 – Project Meetings.
- .2 The Work includes attending meetings between the Contractor and the Departmental Representative. The meetings will be called and chaired by the Departmental Representative as required. The Contractor shall be represented at such meetings to the satisfaction of the Departmental Representative.
- .3 The Departmental Representative will schedule an initial meeting to be held on site after award notification. Senior representatives of Parks Canada, the Departmental Representative, Contractor, major subcontractors, and field inspectors, shall attend this meeting.
- .4 Progress and status meetings will be held on a weekly basis or more frequently as directed by the Departmental Representative.

- .5 Cost of attending the above meetings shall be considered incidental to the Contract items and no additional payment will be made.

**1.12 WASTE DISPOSAL**

- .1 Refer to Section 01 35 43 – Environmental Procedures.
- .2 All surplus, unsuitable, and waste materials shall be removed from the job site to approved sites outside the National Parks unless specified otherwise in other sections of these Specifications.
  - .1 Contractor to track and provide proof of tracking of number of material loads to recycling.
- .3 Deposits of any construction debris into any waterway are strictly forbidden.
- .4 Cost for waste disposal described above shall be considered incidental to the Contract items and no additional payment will be made unless specified otherwise in other sections of these Specifications.

**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**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 SECTION INCLUDES**

- .1 Prime Cost Sum.
- .2 Measurement procedures.

**1.2 PRIME COST SUM**

- .1 Include in Contract Price a Prime Cost Sum of \$350,000.
- .2 Do not include in Contract Price, additional contingency allowances for products, installation, overhead or profit.
- .3 The Contract Price, and not the Prime Cost Sum, includes Contractor's head office overhead and profit in connection with such prime cost sum.
- .4 Prime Cost Sum provided for in the lump sum arrangement table is not a sum due to the Contractor. Rather, payment will be made against it for miscellaneous work not included in the unit price table under the General Conditions of the Contract.
- .5 Any and all additional work must be approved in writing by the Departmental Representative prior to commencement.
- .6 Expenditures must be substantiated with verified invoices and/or approved daily extra work reports, if requested by the Departmental Representative.
- .7 Prime Cost sum items may include but are not limited to:
  - .1 Partial depth concrete patch repairs at abutments and piers as directed by the Departmental Representative.
  - .2 Supply of replacement for deficient Owner Supplied items for completion of Phase 1.
  - .3 Supply and installation of additional reinforcement, rebar couplers, barrier anchor bar assemblies or concrete anchors.
  - .4 Miscellaneous painting of concrete surfaces.
  - .5 Additional road structure repairs.
  - .6 Miscellaneous work and additional repairs as directed by the Departmental Representative.
- .8 Once a Prime Cost Sum item has been agreed upon with Parks Canada, it shall be included as an item on the Project Schedule. This shall occur on the next update of the Project Schedule.

**1.3 MEASUREMENT PROCEDURES**

- .1 Payment for work under the Prime Cost Sum will be made using negotiated rates or by material, labour and equipment rates as per the following:
  - .1 Rental rates will be in accordance with current Alberta Roadbuilders and Heavy Construction Association rate schedule, and will be all inclusive and fully

operated. Hourly rental of equipment will be measured in actual working time and necessary travel time within project limits.

- .2 Transportation time to and from site to be reimbursed only if equipment is exclusively used for additional work.
- .3 Equipment paid on standby will be paid on 50% of the relevant rate less operator rates to a maximum of 10hrs per day.
- .4 When based upon actual costs for additional works under Prime Cost Sum, payment will be based upon supplied invoices and other work records.
- .5 The Prime Contractor may apply a 10% mark-up to subcontractor or supplier invoices only, as approved by the Departmental Representative. No mark-up will be allowed on relevant equipment and labour rates.
- .6 A claim for additional payment will not be considered submitted until all required documentation has been received by the Departmental Representative.
- .7 The Departmental Representative's, or their delegate's, signature on extra work reports is only a record of the equipment, materials and labour hours utilized on the task, not an agreement to entitlement or quantification of that Work. Review and acceptance may be based on Contractor submitted finalized extra work reports, which are to include appropriate rates, quantities and applicable invoices. Labour and equipment rates are to be reviewed by the Departmental Representative against the appropriate accepted rates when submitted for payment.
- .8 The Contractor shall submit extra work reports to the Departmental Representative within 24 hours of the day of extra work.
  - .1 Extra work reports not submitted within the specified timelines may be denied payment at the Departmental Representative's sole discretion.
- .9 The Departmental Representative's, or their delegate's, signature on any of the Contractor's Daily Extra Work Reports shall not be an agreement to waiver any portion of the Contract regardless of any wording to the contrary.
- .10 Unless otherwise provided for in the Contract, payment on a time and materials basis represents complete payment (exclusive of GST) and reimbursement for all impacts, related costs and expenses, including, without limitation: time; labour; materials; equipment; mobilization; subcontracting; overhead; profit; general supervision; occupational tax and any other Federal or Provincial revenue legislation exclusive of GST; premiums for public liability and property damage insurance policies; bonding; for the use of all tools and equipment for which no specific rental payment provision exists; and for all costs incurred by the Contractor in supplying materials.
- .11 Reimbursement for Living Out Allowance (LOA), as agreed upon by the Departmental Representative, shall be pro-rated based on the portion of the standard 10-hour work day spent on extra work items up to a maximum of 10 hours. LOA reimbursement will only be considered for extra works completed under Force Account rates and payment for LOA will not exceed the agreed upon daily rate.

**Part 2          Products**

**2.1              NOT USED**

.1          Not Used.

**Part 3          Execution**

**3.1              NOT USED**

.1          Not Used.

**END OF SECTION**

**Part 1 General****1.1 DESCRIPTION**

- .1 Mobilization and Demobilization consists of preparatory work and operations including but not limited to, those necessary for the movement of personnel, equipment, buildings, shops, offices, supplies and incidentals to and from the project sites.
- .2 Any protective measures or movement of Contractor trailers necessitated by animal interactions and required by Parks Canada will be paid by the Departmental Representative, and are not to be anticipated in the Lump Sum Contract Price for Mobilization and Demobilization.

**1.2 MEASUREMENT PROCESS**

- .1 Mobilization and Demobilization:
  - .1 Payment will be made under “**Lump Sum Price Item – Mobilization / Demobilization**”.
  - .2 50% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.
  - .3 Only one mobilization and demobilization will be paid for the entire project. No additional mobilization and demobilization will be paid due to any summer or winter shutdown.
- .2 The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, buildings, shops, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of the Departmental Representative and all other Agencies having Jurisdiction.
- .3 Payment of only 5% of the total price tendered will be scheduled as outlined above. If the amount bid for mobilization and demobilization is greater than 5% of the total price tendered, payment of the remainder of the amount will be authorized when the contract has been completed.

**Part 2 Products****2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution****3.1 NOT USED**

- .1 Not Used.

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DEMOBILIZATION  
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**END OF SECTION**

**Part 1 General****1.1 ADMINISTRATIVE**

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants, affected parties not in attendance and Departmental Representative.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

**1.2 PRECONSTRUCTION MEETING**

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Agenda to include:
  - .1 Appointment of official representative of participants in the Work.
  - .2 Schedule of Work: in accordance with Section 01 32 16.19 - Construction Progress Schedule - Bar (GANNT) Chart.
  - .3 Schedule of submission of shop drawings. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
  - .5 Review of Contractor prepared Owner Supplied Materials Deficiency List.
  - .6 Delivery schedule of specified equipment in accordance with Section 01 32 16.19 - Construction Progress Schedules – Bar (GANNT) Chart.
  - .7 Site security in accordance with Section 01 14 00 – Work Restrictions, 01 52 00 Construction Facilities, 01 56 00 - Temporary Barriers and Enclosures and 01 35 43 – Environmental Procedures.

- .8 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .11 Monthly progress claims, administrative procedures, photographs, hold backs.
- .12 Close out procedures and submittals in accordance with Sections 01 77 00 – Closeout Procedures and 01 78 00 – Closeout Submittals.
- .13 Appointment of inspection and testing agencies or firms.
- .14 Insurances, transcript of policies.

### 1.3 PROGRESS MEETINGS

- .1 During course of Work and until to project completion, schedule progress meetings weekly.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum 5 days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.
- .5 Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.
  - .3 Review Environmental issues.
  - .4 Review Traffic Control and Emergency Response Protocol issues.
  - .5 Review site safety and security issues.
  - .6 Field observations, problems, conflicts.
  - .7 Problems which impede construction schedule.
  - .8 Review of off-site fabrication delivery schedules.
  - .9 Corrective measures and procedures to regain projected schedule.
  - .10 Revision to construction schedule.
  - .11 Progress schedule, during succeeding work period.
  - .12 Review submittal schedules: expedite as required.
  - .13 Maintenance of quality standards.
  - .14 Review proposed changes for affect on construction schedule and on completion date.
  - .15 Other business.

## Part 2 Products

### 2.1 NOT USED

- .1 Not Used.

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**Part 3            Execution**

**3.1                NOT USED**

.1                Not Used.

**END OF SECTION**

**Part 1 General****1.1 DEFINITIONS**

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Sunday, inclusive, will provide seven day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Contractor to enable monitoring of project work in relation to established milestones.

**1.2 REQUIREMENTS**

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Ensure all of the Work required for the Contract is identified in the Project Schedule. Refer to Section 01 11 00 – Summary of Work for a potential list of activities.
- .3 Ensure Master Plan and Detail Schedules clearly identifies all task dependencies as defined in the contract documents.
- .4 Plan to complete Work in accordance with prescribed milestones and time frame.
- .5 Limit activity durations to maximum of approximately 5 working days, to allow for progress reporting.

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- .6 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.
- .7 Include an allowance in Schedule for Work performed under Prime Cost Sum.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

### 1.4 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
  - .1 Completion of each stage of construction.
  - .2 Substantial Completion: see Section 01 11 00 - Summary of Work
  - .3 Final Completion: see Section 01 11 00 - Summary of Work

### 1.5 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within 10 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

### 1.6 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
  - .1 Award.
  - .2 Shop Drawings, Samples.
  - .3 Permits.
  - .4 Submittals.
    - .1 Project Schedule.
    - .2 Contractor Chain of Command including Sub-Contractors
    - .3 List of Subcontractors and Suppliers
    - .4 Work Plan

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- .5 Construction Staging
- .6 Survey Plan
- .7 Environmental Protection Plans, review and implementation
- .8 Traffic Accommodation Strategy, review and implementation
- .9 Site Access
- .10 Quality Management Plan, review and implementation
- .11 Quality Control Plan
- .12 Emergency Response Protocol
- .13 Site Specific Health and Safety Plan, incl. SDS sheets
- .14 On site Contingency and Emergency Response Plan, review and implementation.
- .15 Shop Drawings
- .16 Concrete / asphalt mix Designs
- .5 Mobilization.
- .6 Bridge Rehabilitation Works:
  - .1 Supply, delivery and installation of required access scaffolding and platforms.
  - .2 Fabrication of components (including but not limited to shear key assemblies, stringer bearings, pier cap post-tensioning, spandrel column modifications, arch rib modifications, and any items deficient from Owner Supplied Materials for completion of Phase 1).
  - .3 Installation of deck diaphragm modifications.
  - .4 Replacement of Stage 1 deck joints.
  - .5 Construction of cast-in-place barriers and installation of barrier expansion joints at Stage 1 deck joints.
  - .6 Installation of approach asphalt pavement and lane markings.
  - .7 Installation of new shear key assemblies.
  - .8 Installation of new stringer bearings.
  - .9 Repair of concrete spalls at pier cap and bearing seats.
  - .10 Installation of pier cap post-tensioning.
  - .11 Installation of spandrel column modifications.
  - .12 Installation of arch rib modifications.
  - .13 Supply and placement of subgrade and asphalt pavement.
  - .14 Line marking.
  - .15 Installation of cyclist signage.
- .7 Demobilization.
- .8 Completion.

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**1.7 PROJECT SCHEDULE REPORTING**

- .1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

**1.8 PROJECT MEETINGS**

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

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 01 78 00 – Closeout Submittals.

**1.2 REFERENCE STANDARDS**

- .1 Not used.

**1.3 ADMINISTRATIVE**

- .1 Submit to Departmental 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 Departmental 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 Departmental 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 Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.

**1.4 SHOP DRAWINGS AND PRODUCT DATA**

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.
- .3 The term "asphalt mix design" means engineering design for proportioning materials in asphalt concrete pavement including all supporting test results and materials properties.

Asphalt mix design to be performed by a qualified test laboratory licensed to practice in Alberta.

- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .5 Allow fourteen (14) days for Departmental Representative's review of each submission.
- .6 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .7 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .8 Submit letter of certification with all mix designs.
- .9 Accompany submissions with transmittal letter, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .10 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.

- .7 Operating weight.
- .8 Wiring diagrams.
- .9 Single line and schematic diagrams.
- .10 Relationship to adjacent work.
- .11 After Departmental Representative's review, distribute copies.
- .12 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .13 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .14 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
  - .2 Testing must have been within 3 years of date of contract award for project.
- .15 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .16 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .17 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .19 Delete information not applicable to project.
- .20 Supplement standard information to provide details applicable to project.
- .21 If upon review by Departmental 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.

- .22 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
- .1 This review shall not mean that Parks Canada 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.

## **1.5 SAMPLES**

- .1 Not used.

## **1.6 MOCK-UPS**

- .1 Not used.

## **1.7 CERTIFICATES AND TRANSCRIPTS**

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

## **1.8 REQUIRED CONTRACT SUBMITTALS**

- .1 General
- .1 This Clause identifies the plans, programs, and documentation required prior to mobilization on site and during the construction phase.
- .2 Pre-Mobilization Submittals
- .1 Submit the following plans and programs to the Departmental Representative for review a minimum of fourteen (14) days prior to mobilization to the project site. The Contractor shall not begin any site Work until the Departmental Representative has authorized acceptance of the submittals in writing. The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Authorizations of the programs shall not relieve the contractor for the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.
- .1 Inventory and Deficiency List of Completion of Phase 1 Owner Supplied Materials.
- .2 Project Schedule, detailing the schedule of the workdays and manpower required to complete each phase of the project in accordance with

## Section 01 32 16.19 Construction Progress Schedule – Bar (GANTT) Chart.

- .3 Contractor Chain of Command, listing key Contractor personnel, including names and positions, addresses, telephone, cellular telephone and/or pager numbers. The list shall include the names and telephone/cellular telephone/pager numbers for contact persons who are available on a 24-hour basis in the event of emergencies.
- .4 List of Sub-Contractors and Suppliers
- .5 Work Plan, describing the Contractor's intended methods of construction including but not limited to the environmental mitigation strategies and projected number of personnel on site.
  - .1 Include work staging plan, including any temporary works required to permit staging of work, including but not limited to temporary access platforms and debris containment.
- .6 Quality Control Plan in accordance with Section 01 45 00 – Quality Control.
- .7 Traffic Accommodation Strategy, in accordance with the requirements of Section 01 55 26 - Traffic Control.
- .8 Environmental Protection Plans (EPP) which shall meet the requirements of Section 01 35 43 – Environmental Procedures.
- .9 Site Access Plan which shall include but not be limited to, engineering Drawings and procedures for accessing all areas of the Work. This shall include access scaffolding, fixed and suspended work platforms, temporary railings, etc.
  - .1 Drawings for temporary works, including but not limited to access scaffolding, fixed and suspended work platforms, temporary railings, etc., to be stamped and signed by a professional engineer (P. Eng.) registered or licensed in Province of Alberta.
- .10 Bearing Replacement Procedure, in accordance with Section 02 41 16 – Structure Demolition.
- .11 Contractor shall develop an "Emergency Procedures Protocol" in consultation with Parks Canada.
- .12 Health and Safety Plan – The Contractor shall have a Certificate of Recognition (COR) or Registered Safety Plan (RSP) including a site specific Health and Safety Plan acceptable to the Departmental Representative. The Contractor shall implement and maintain the Health and Safety Plan during the Work.
- .13 Health and Safety Plan must include:
  - .1 Contractor's safety policy.
  - .2 Identification of applicable compliance obligations.
  - .3 Definition of responsibilities for project safety/organization chart for project.
  - .4 Site specific hazard assessment.

- .5 General safety rules for project.
  - .6 Job specific safe work procedures.
  - .7 Inspection policy and procedures.
  - .8 Incident reporting and investigation policy and procedures.
  - .9 Occupational Health and Safety meetings.
  - .10 Occupational Health and Safety communications and record keeping procedures.
  - .11 Results of safety and health risk or hazard analysis for site tasks and operation.
  - .14 Submit copies of Material Safety Data Sheets (SDS).
  - .15 Medical Surveillance: where prescribed by legislation, regulation, or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to the Departmental Representative.
  - .16 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
  - .2 Submit a copy of the filed Notice of Project with Provincial authorities.
  - .3 The Contractor shall not construe the Departmental Representative's authorization of the submittals to imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Authorization of the programs shall not relieve the Contractor from the responsibility to conduct the Work in strict accordance with the requirements of Federal or Provincial regulations, this specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor shall remain solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.
- .3 Construction Phase Submittals
- .1 Weekly Progress Reports that outline the Work completed to date as well as the anticipated Work to be performed for the following week on a day-to-day basis.
  - .2 Quality Control Inspection Reports – The Contractor shall maintain daily inspection reports that itemize the results of all Quality Control inspections conducted by the Contractor. The reports shall be made available for review by the Departmental Representative upon request. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each payment request.
  - .3 Traffic Accommodation logs.
  - .4 Shop drawings – The Contractor shall submit all shop drawings required to fabricate and conduct the work a minimum twenty-one days (three weeks) prior to fabrication.
  - .5 Concrete Mix Designs and supporting data.
  - .6 Product Data Sheets.
  - .7 Mill certificates.

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- .8 Deck surveys at stringer bearing locations.
- .9 Progress Photographs:
  - .1 Formats:
    - .1 Electronic: .jpg files
    - .2 Quality: minimum five (5) mega pixels, full-colour, and not scanned.
  - .2 Identification: spreadsheet listing name and number of project, description of each photograph with the corresponding file name and date taken.
  - .3 Viewpoints: four (4) viewpoints determined by the Departmental Representative.
  - .4 Detail Documentation: photographs documenting key details of the construction and as requested by the Departmental Representative.
  - .5 Submission Frequency: prior to commencement of work and weekly thereafter with progress statement, or as directed by the Departmental Representative.
  - .6 Submit two (2) copies of CD with all electronic pictures and the associated identification as part of the closeout package.
- .10 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative and authority having jurisdiction weekly.
- .11 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .12 Submit copies of incident and accident reports.
- .4 Project Completion Submittals
  - .1 Record Drawings – The Contractor shall submit copies of all Contractor's Drawings revised as necessary to record all as-built changes to the Work and the Contractor shall submit a set of Contract Drawings clearly marked to record as-built changes to the Work.
  - .2 Quality Control/Quality Assurance Records – The Contractor shall submit a bound and itemized set of project quality control and quality assurance records.

**Part 2 Products****2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution****3.1 NOT USED**

- .1 Not Used.

Project: 227903

Bridge Rehabilitation  
Nigel Creek Bridge, Hwy 93N, km 108.6  
Banff National Park

Section 01 33 00  
SUBMITTAL  
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**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 02 83 10 – Lead Base Paint Abatement – Minimum Precautions.

**1.2 REFERENCE STANDARDS**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheet (MSDS)
- .3 Province of Alberta
  - .1 Occupational Health and Safety Act.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1 Contractor's safety policy.
  - .2 Identification of applicable compliance obligations.
  - .3 Definition of responsibilities for project safety/organization chart for project.
  - .4 General safety rules for project.
  - .5 Job specific safe work procedures.
  - .6 Inspection policy and procedures.
  - .7 Incident reporting and investigation policy and procedures.
  - .8 Occupational Health and Safety meetings.
  - .9 Occupational Health and Safety communications and record keeping procedures.
  - .10 Results of site specific safety hazard assessment.
  - .11 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and the authority having jurisdiction weekly.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS SDS - Safety Data Sheets.
- .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 14 days after receipt of plan. Revise

plan as appropriate and resubmit plan to Departmental Representative within 7 days after receipt of comments from Departmental Representative.

- .8 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations, including but not limited to:
  - .1 Consideration of risks due to working at great height above creek.
  - .2 Consideration of risks due to steep embankments and slopes.
  - .3 Address potential rescue operations.
  - .4 Consideration of risks due to wildlife.
  - .5 Remote setting without cell reception and significant distance to hospital.

#### **1.4 FILING OF NOTICE**

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

#### **1.5 SAFETY ASSESSMENT**

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

#### **1.6 MEETINGS**

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

#### **1.7 REGULATORY REQUIREMENTS**

- .1 Do Work in accordance with National Parks Act.

#### **1.8 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 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

#### **1.9 RESPONSIBILITY**

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

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

#### **1.10 COMPLIANCE REQUIREMENTS**

- .1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

#### **1.11 UNFORSEEN HAZARDS**

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition 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 Departmental Representative verbally and in writing.

#### **1.12 HEALTH AND SAFETY CO-ORDINATOR**

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have minimum 2 years site-related working experience specific to activities associated with bridge construction and working at great heights.
  - .2 Have working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
  - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
  - .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

#### **1.13 POSTING OF DOCUMENTS**

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

#### **1.14 CORRECTION OF NON-COMPLIANCE**

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

#### **1.15 BLASTING**

- .1 Blasting or other use of explosives is not permitted.

**1.16 POWDER ACTUATED DEVICES**

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

**1.17 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**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 All Sections.

**1.2 MEASUREMENT PROCEDURES**

- .1 The cost to the Contractor to meet the environmental and aesthetic protection requirements described in this Section shall be considered incidental to the Work and no additional payment will be made.
  - .1 Costs for handling, modification and repair of bird netting and bird wrapping on the existing bridge during the completion of the Work will not be measured but considered incidental to the Work.
  - .2 Costs for removal and disposal of bird netting and bird wrapping on the existing bridge at project completion shall not be measured but considered incidental to the Work.

**1.3 GENERAL**

- .1 All Contractor operations shall be performed in such a manner that no detritus or any other waste material from his operations shall enter Nigel Creek or any other waterway, ditches, or wetlands within Banff National Park.
- .2 If, in the opinion of the Departmental Representative or Parks Canada, full containment of Contractor's detritus or other waste material is not being achieved, operations may be ordered halted until the situation is rectified.
- .3 In addition to the requirements outlined in the project specifications, the Contractor shall adhere to the *Parks Canada National Management Practices for Roadway, Highway, Parkway and Related Infrastructure* (BMP's), and the *Direction for Permitted Users conducting water-related activities in LLYK* (Decontamination Procedure), which are provided as reference documents.
  - .1 Where there is a discrepancy or inconsistency between the project specifications, the BMP's, and the Decontamination Procedure, the most rigorous with regard to environmental stewardship shall be followed.
- .4 The following key mitigations are highlighted. This list does not replace the comprehensive mitigation requirements and details provided elsewhere in the project specifications, the BMP's, or the decontamination procedure:
  - .1 The Environmental Protection Plan (EPP) certified by a Qualified Environmental Professional (QEP) is to be submitted at least 14 days prior to the start of construction. EPP to be approved by BNP Field Unit (FU) prior to start of construction.
  - .2 All contractor personnel working on site are required to attend an on-site environmental briefing conducted by the BNP FU.
  - .3 Removal of vegetation used by birds (either migratory or non-migratory) to be completed outside of the nesting period of April 21 to August 15. If removal of

vegetation within the nesting period is required, pre-clearance nest surveys and potential additional bird-related mitigations will be required with BNP Field Unit (FU) approval.

- .4 Bird nesting on existing bridge and on temporary structures to be prevented. Active nests cannot be relocated and species specific setback distances will be required until nestlings have fledged.
  - .5 Work will be conducted outside areas of known historical or cultural significance and there will be no trespass over such areas.
  - .6 To minimize fire risk, a single location on site for smoking shall be designated and a plan developed for proper disposal of cigarette butts.
  - .7 No vehicle fueling or servicing permitted within 100 m of Nigel Creek.
  - .8 Equipment, propane storage, and fuel lines to be inspected daily for leaks. All equipment stored overnight in staging areas to be stored on tarps with appropriate containment and with drip trays and/or pans under fuel tanks.
  - .9 Prior to coming on site, all equipment that came into contact with soil at previous site (i.e. clearing, grading, etc.) must be cleaned (blow down/scrape down) and approved by the BNP FU.
  - .10 To prevent spread of whirling disease, all gear and equipment arriving on site which may be used instream/touching water must be cleaned and decontaminated in accordance with the protocol outlined in the Decontamination Procedure for whirling disease prevention. Proof of decontamination to be provided to Departmental Representative and ESO prior to commencement of works.
  - .11 Restricted Activity Permits (RAP) are required for some portions of the work, including but not limited to, clearing of vegetation and use of on-site water as a water source for construction purposes.
  - .12 Materials laydown shall be on the construction right-of-way.
- .5 BNP Field Unit (FU) to be kept apprised of timelines, work periods, and construction activities so that their staff can provide information to the public to prevent additional safety risks for recreational users in the vicinity of the Project site during construction. Communication to the FU shall be through the Departmental Representative.

#### **1.4 NATIONAL PARK REGULATIONS**

- .1 The Contractor shall ensure that all work is performed in accordance with the ordinances, laws, rules, and regulations set out in the Canada National Parks Act and Regulations.
- .2 The Contractor and any sub-Contractors shall obtain a business license from Parks Canada Administration Office in Banff, prior to commencement of the contract.
- .3 All Contractor's business and private vehicles are required to obtain a vehicle work pass from Parks Canada. These permits may be obtained free of charge at Parks Administration Office in Banff.

#### **1.5 IMPACT ASSESSMENT ACT (IAA) 2019**

- .1 Execution of the work is subject to the provisions within the Impact Assessment Act (IAA) and subsequent amendments.

- .2 The Contractor is required to prepare an Environmental Protection Plan (EPP) before commencing construction activities or delivery of materials to site, which will include the topics in the following sub sections. The EPP shall be prepared and certified by a Qualified Environmental Professional (QEP) (such as Professional Biologist or Professional Agrolgist) and in accordance within Parks Canada Environmental Procedures. The EPP to include, but not be limited to:
  - .1 Details on how the work limits will be marked and procedures to keep operations within the clearing boundaries to minimize damage to vegetation and soil.
  - .2 An overall site Erosion and Sedimentation Control (ESC) Management Plan which outlines areas where erosion and sedimentation are likely to occur and the means by which the Contractor proposed to control these issues. In addition, a localised ESC plan which directs specific mitigation for working in close proximity to Nigel Creek may be required during construction at the discretion of the Departmental Representative or the ESO.
  - .3 A Spill Response Plan (SRP), in accordance with this specification and the project BIA and BMPs.
  - .4 An Emergency Response Plan that outlines procedures to follow in the case of an emergency (e.g. wildlife encounter, equipment malfunction/failure or fire).
  - .5 A Fire Prevention Plan which describes the fire prevention equipment (e.g. fire extinguishers) and procedures on-site in the event of a fire. Should a fire occur, the Jasper Dispatch and the Fire Duty Officer shall be notified immediately.
  - .6 Wildlife and Human Conflict Management Plan: Detail strategies to be implemented to prevent unnecessary interactions with wildlife, including bird nesting mitigation plan.
- .3 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the Work being suspended pending rectification of the problems.
- .4 The Contractor shall notify the ESO (Environmental Surveillance Officer) and the Departmental Representative in a reasonable timely manner of any actual or potential environmental incidents or failure of protection measures, and immediately of any violations of environmental approvals, permits, authorizations, or EPP measures.

## 1.6 RELICS AND ANTIQUITIES

- .1 The *Accidental Finds Protocol* shall be followed in the event that items are found when archaeologists or cultural resource managers are not present on-site during construction activities.
  - .1 *Accidental Finds Protocol*: There may be cultural resources present in the project area that have not yet been discovered (even after an archaeological assessment has been carried out or no assessment was deemed necessary for the project). **If staff observe any significant cultural resources while working, they should stop work in the immediate area, and contact the Departmental Representative to discuss any protective measures that might be needed.**
  - .2 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tables, and similar objects found on the

site shall remain the property of Parks Canada. Protect such articles and request directives from Parks Canada.

- .3 Provide 48 hours notice to Parks Canada prior to commencing any work that may interfere with or affect any identified historical or archaeological site. Commence work only upon written instruction from Parks Canada.

## 1.7 WILDLIFE

- .1 Avoid or terminate activities on site that attract or disturb wildlife.
- .2 Pets are not allowed on the work site, or in any administrative or laydown areas.
- .3 All personnel will be instructed by Parks Canada's ESO in procedures to follow in the event of wildlife appearance near or intrusion onto the construction site. Personnel are not to attract or approach any wildlife seen near the site, and are to vacate their location in the event of aggressive behaviour or persistent intrusion by bears, cougars, wolves, elk, or moose. The ESO and the Departmental Representative are to be notified about the circumstance immediately. The Warden Service will be called to determine the course of action. The general presence of wildlife observed near the construction site, any carcasses, or unusual wildlife observations shall be reported to the ESO and the Departmental Representative. Contractor's staff shall receive basic training in early response to wildlife events during the "environmental briefing".
  - .1 Herds of bighorn sheep are commonly observed crossing Nigel Creek Bridge. Contractor Personnel are not to approach or use any method to deter the animals from crossing.
    - .1 Work activities may continue provided animals do not show any signs of distress as assessed by the Departmental Representative.
- .4 Bird nesting:
  - .1 Bird nesting shall be prevented on the existing bridge structure and on temporary structures.
    - .1 Contractor to conduct inspections at least two times daily, and if partially constructed nests are observed, these shall be removed immediately before they become active. Results of the daily inspections shall be documented and provided to the ESO.
    - .2 If active nests, roosts, or dens of species protected by SARA or the Migratory Birds Convention Act are identified, immediately notify the Departmental Representative and the ESO to determine appropriate mitigation measures. No active nests to be removed and work activities will be stopped and site shut down at the discretion of the ESO until nestlings have fledged.
    - .3 No claims for any delays or inconvenience related to the discovery of functional bird nest(s) will be entertained.
    - .4 A nest is considered an active nest if it can function as a nest, i.e. it is able to support a resting bird, eggs or chicks. If the constructed materials look 50% complete or more, or if there is any evidence of nest use (e.g. supporting a resting bird or eggs), it is considered an active nest.
  - .2 Bird netting and bird wrapping is currently installed on the existing bridge.

- .1 Contractor to maintain, repair, replace netting and wrapping as necessary to prevent nesting on existing bridge.
  - .2 Sequentially remove the least amount of netting that can feasibly be removed to facilitate construction activity in progress.
  - .3 Perform inspections of all exposed areas twice daily, and if partially constructed nests are evident immediate remove them prior to them becoming active.
- .5 Removal of vegetation to be completed prior to April 21.
- .1 Removal of vegetation after April 21 only in accordance with requirements in this section (Section 01 35 43 – Environmental Procedures).
    - .1 Contract QEP to conduct pre-clearance nest-sweeps and pre-disturbance surveys for suitable bat roost trees.

## **1.8 DRAINAGE**

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water. Do not cause erosion of slopes and embankments.
- .2 Do not pump water containing suspended materials into waterways, sewer, or drainage systems.
- .3 Control dispersal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
- .4 The Contractor's EPP will detail how the dewatering will be undertaken, with special attention to the environmental sensitivity of the discharge area, freezing conditions operation, overflow avoidance, decanting, and settlement pond reclamation.

## **1.9 FIRE PREVENTION AND CONTROL**

- .1 A fire extinguisher will be carried and available for use on each machine in the event of fire (e.g. ignited by a spark) to prevent the fire from burning the unit or spreading to other fuels in the work area. Basic fire fighting equipment – e.g. three shovels, two pulaskis, and two 20 litre backpack pumps shall be maintained at the construction site at a location known and easily accessible to all the Contractor's staff.
- .2 Machinery and equipment shall be operated in a manner and with all original manufacturer's safety devices to prevent ignition of flammable materials in the area.
- .3 Care shall be taken while smoking on the construction site to ensure that accidental ignition of any flammable material is prevented.
  - .1 Designate a single location on site for smoking and develop a plan for proper disposal of cigarette butts.
- .4 The Contractor shall maintain an awareness of the fire danger rating (Index) in the work area by contracting the Parks Fire Duty Officer. Fire prevention care is to be commensurate with the fire Index.
- .5 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The ESO and the Departmental Representative shall be notified of any fire immediately.

- .6 Fires or burning of waste materials is not permitted.

#### **1.10 SITE ACCESS AND PARKING**

- .1 A plan detailing access to the construction site shall be prepared by the Contractor and included in the EPP. This includes access off/on the Icefield Parkway (Highway 93N) in the vicinity of the project – see specifications and drawings; access within the work limits, including day-to-day entry/egress, and plans for delivery and approach for large dimension materials will be anticipated and described. The access plan shall describe worker transportation to and from the construction site, and parking of worker's private vehicles.
- .2 Restrict vehicle movements to work limits.
- .3 Do not park vehicles in areas beyond work limits, unless specifically authorized by the ESO and the Departmental Representative.
- .4 A construction office is anticipated for the bridge contract. The construction office may be located on the construction right-of-way, actual location subject to the approval of the Departmental Representative and ESO. It is anticipated the construction office may comprise the Contractor's main office, a materials testing trailer, the Departmental Representative, and ESO trailer and toilets. Special measures are required to ensure that conflict with bears that are known to frequent the whole construction area does not arise. These include, but may not be limited to:
  - .1 Food, products, lunches, waste food products, or any other materials attractive to bears brought to this office location or to the bridge sites shall be secured within the trailers or by other specified means. Waste shall be secured in the trailers and removed daily from the office location.
    - .1 Food to be eaten inside vehicles and/or site trailers to minimize wildlife attractants.
  - .2 In the event of quick or persistent attraction of bears to the office location, the site may require electric fencing, or removal to an alternate location, at the direction of the Departmental Representative.
- .5 As an alternative to the above mentioned locations, a Contractor's office and work headquarters may be established at another location at the discretion of Parks Canada. The Contractor shall prepare a plan regarding structures, equipment, waste materials management, water, power and sewage services, materials lay-down area, fuel storage, operations, etc. required at this location. The plan will be subject to review and approval by the Departmental Representative. This site may be shared with other Contractors.
- .6 A workers accommodation camp will not be permitted.
- .7 Materials lay-down shall be on the construction right-of-way, or in unusual circumstances – e.g. over-size components, at an alternate location to be determined by the Departmental Representative in consultation with ESO.

#### **1.11 CONTRACTOR'S OPERATIONS**

- .1 Confine all operations to the work limits as staked or designated by the Departmental Representative. No activities of any kind may be carried out beyond those work limits without the written permission of the Departmental Representative.

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- .2 Do not store or stockpile construction materials in the trees bordering or being preserved on site. Do not unreasonably encumber the site with products.
- .3 Provide sufficient sanitary facilities and maintain in a clean condition.
- .4 Conduct operations at all times in such a manner as to preserve the natural features and vegetation in the area. Cut and fill slopes shall be blended with adjoining topography. Material from fill slopes shall not be permitted to slough or roll into surrounding tree cover or to bury any plant material designated to be retained.
- .5 When in the opinion of Parks Canada, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic facilities beyond the staked or designated work area, the Contractor shall be responsible at his expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of Parks Canada.
- .6 Failure to comply with or observe environmental protection requirements as identified in these specifications may result in work being suspended pending rectification of the problems and operators of equipment being charged under the National Park Act.

**1.12 SOIL AND LANDFORMS**

- .1 Plan and schedule Project activities for dry weather whenever possible. If significant wet weather is encountered, take additional measures as described below to minimize erosion potential.
- .2 Minimize construction and equipment travel during periods of heavy rainfall (50 mm or more in 1 hour). Halt excavation activities during heavy rainfall events.
- .3 Identify contingency plans for isolating worksites during high precipitation, high wind and runoff events in the EPP.
- .4 Minimize the area of exposed soil at any given time by using techniques such as phased construction activities, retaining vegetation as much as possible.
- .5 Following completion of construction works, stabilize the exposed soils as soon as possible using temporary measures (e.g. mulch, erosion sediment control blankets, seeding, plastic sheeting, planting long-term vegetation, etc.).
- .6 Have erosion and sediment-control materials readily available on-site. Materials may include but are not limited to rock, gravel, grass seed, sediment fencing, staking, and polyethylene sheeting.
- .7 Minimize disturbance of existing soils and landforms (stream bank, riprap and similar).
- .8 Store all equipment on the road or on previously disturbed or hardened surfaces to minimize soil compaction.

**1.13 WATER (SURFACE AND GROUND)**

- .1 ESC Management plan (included with the EPP) to be implemented and all components to be regularly maintained to guarantee effectiveness. The condition of all active components must be provided in an inspection report for review to the ESO on a weekly basis.

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- .2 Plan project activities for dry weather to allow easier containment of contaminated runoff and sediment.
  - .1 If scheduled activity requires working in wet conditions, isolate the area of work and use/install appropriate sediment controls to prevent the release of sediment-laden water or other deleterious substances into surface waters.
- .3 If on-site water will be used as a water source for construction purposes, obtain a Restricted Activity Permit (RAP) for water withdrawal and put in place proper intake screening procedures to prevent fish impingement and entrainment.
- .4 If accidental spills or leaks occur from equipment, follow procedure in the SRP (submitted as part of the EPP) and notify the BNP ESO immediately.
- .5 Fuel management and Spill Containment requirements are explained in the Equipment Fueling, and Spill Containment sub sections respectively.
- .6 Locate concrete wash stations away from water sources and identify their locations in the EPP in consultation with the BNP ESO.

#### **1.14 WORK AROUND AND OVER WATER**

- .1 The construction project shall take place outside the wetted perimeter of the adjacent creek. Some of the construction will require working over the creek. In these instances, the Contractor is to describe the measures in the EPP, to be employed to ensure debris, fugitive materials, and especially deleterious substances do not enter the stream or any other body of water – e.g. material produced by concrete curing, cleaning of steel members, drilling etc..
- .2 Sediment control measures shall be to the satisfaction of the ESO.
- .3 Fuel management requirements are explained in the Equipment Fuelling, and Spill Containment sub section.
- .4 Do not operate construction equipment in waterways.
- .5 To prevent the spread of aquatic invasive species, all gear and equipment arriving onsite which may be used instream/touching water must be cleaned and decontaminated according to the protocol outlined in the Decontamination Procedure. Proof of decontamination will be required prior to commencement of works. Decontamination will include all Personal Protective Equipment (boots, gloves, etc.), nets, and heavy equipment. Proof may be supplied in the form of photos or other means which provide documentation.
- .6 Install debris netting system as required to prevent debris from falling into the creek during all work activities.
- .7 Immediately stabilize shorelines and banks that might be disturbed by the works; if the original gradient of the channel banks cannot be restored, restore to a stable gradient.
- .8 Do not operate construction equipment in waterways.

#### **1.15 POLLUTION CONTROL**

- .1 Maintain all temporary erosion and pollution control features for this project.
- .2 Control emissions from equipment and plant to local authorities emission requirements.

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- .3 Only use stationary emission sources such as portable diesel generators, compressors, etc. when necessary.
- .4 No equipment (motor vehicle or construction equipment) motor to run idle when not in used, unless required under extenuating circumstances, and carpooling is encouraged to reduce air emissions and noise pollution.
- .5 Prevent sandblasting and other extraneous materials from contaminating air beyond application area by providing suitable, temporary enclosures or mats to the satisfaction of the Departmental Representative and the ESO.
  - .1 Refer also to Section 02 83 10 – Lead Base Paint Abatement – Minimum Precautions for removal of lead base paint on parts of existing structure.
- .6 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and on-site work. Dust generating activities will be minimized as much as possible during windy periods.

#### **1.16 START-UP AND ENVIRONMENTAL BRIEFING**

- .1 All staff employed at the construction site shall attend a briefing regarding their individual and collective responsibilities lasting approximately 1 hour, to ensure avoidable adverse environmental impact does not arise from their activities and personal choices. Employees must attend this briefing before beginning their work at the site. Each employee, having received the environmental briefing, will be issued a certification sticker to be displayed on their helmet. Employees of other service and materials providers who attend the site – e.g. concrete truck operators, crane operators, and truck drivers must be apprised of their duty not to cause adverse environmental impact.
- .2 Parks Canada will have an ESO attending the site to monitor the construction activity for conformance with the EPP. The ESO or alternate designated Parks Canada staff member will present the "environmental briefing". The ESO's main duties are to monitor the progress of the construction on an on-going basis to ensure compliance with environmental protection measures, and to provide guidance through the Departmental Representative, in the event of unanticipated environmental problems. Although the ESO has authority to enforce National Parks Act violations, direction to the Contractor will be the duty of the Departmental Representative.

#### **1.17 HAZARDOUS PRODUCTS AND MATERIALS**

- .1 A list of products and materials to be used or brought to the construction site that are considered or defined as hazardous to the environment shall be presented in the EPP. Such products include, but are not limited to waterproofing agents, grout, concrete finishing agents, hot poured rubber membrane materials, blasting agents, etc. A plan detailing the containment and storage, security, handling, use, unique spill response requirements, and disposal of empty containers, surplus product or waste generated in the application of these products shall be presented in the EPP. Hazardous products shall be secured in secondary containment and stored no closer than 100 m from any waterway.
- .2 Fuels, gases, or other deleterious substances to be contained within appropriate containers.

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- .3 Equipment stored overnight in staging areas to be stored on tarps with appropriate containment and with drip trays and/or pans under fuel tanks.
- .4 Transport fuels, gases, or other deleterious substances according to the federal Transportation of Dangerous Goods Regulations.
- .5 Special care to be taken in storage and application of patching and sealing compounds, tar, asphalt, paint, and chemical surface sealants. Dispose of these items outside of the Park.

#### **1.18 SPILL CONTAINMENT PLAN**

- .1 A spill response plan shall be presented in the EPP. Elements to be addressed shall include, but not necessarily limited to:
  - .1 Spill response kit capable of dealing with the 110% of largest possible spill shall be maintained in good working order on the construction site.
  - .2 Staff shall be informed of the location of the response kit, and be trained in its use.
  - .3 Hazardous materials are to be stored and used in minimal required quantities in accordance with all applicable federal and provincial legislation.
  - .4 All spills are to be immediately contained with the source of spill arrested, reported to the Departmental Representative and cleanup initiated. In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment.
- .2 Dispose of any absorbent materials used in the clean-up or soils contaminated by the spill in appropriate facilities and transport in accordance with the federal Transportation of Dangerous Goods Regulations.

#### **1.19 EQUIPMENT FUELLING AND MAINTENANCE**

- .1 Equipment used on the project shall be fuelled with E10 gasoline and low sulphur diesel fuels.
- .2 A fuel delivery, storage, and distribution plan shall be submitted. Topics to be addressed in the EPP will include, but not necessarily be limited to:
  - .1 Diesel and gasoline supply vehicles, including bulk tankers shall be parked more than 100 metres away from the creek or any other body of water.
  - .2 Fuel tanks with manual or electric pump delivery systems shall be used, gravity feed is not allowed.
  - .3 Fuelling personnel shall maintain immediate attention to and presence at the fuelling operation.
  - .4 Fuelling sites will be identified by the Departmental Representative and the ESO. Any fuelling closer than 100 m to the creek or any other body of water will require the authorization and oversight of the ESO or the Departmental Representative.
  - .5 Lubricant changes and minor repairs shall be conducted at a location identified by the Departmental Representative in consultation with the ESO. Waste

lubricants, used filters and other waste maintenance products shall be removed from Banff National Park to recycling or certified disposal sites.

- .6 Equipment shall be inspected daily for fluid/fuel leaks and maintained in good working order.
  - .1 Record Inspections.
  - .2 Immediately address detected leaks.
  - .3 Inspect tanks, hoses and connections prior to use.
  - .4 Wrap hose connections and secure with absorbent pads during fuel/oil transfers.
  - .5 Keep hose, valves, and equipment in a containment area whenever possible.
  - .6 Hose length and this number of connections shall be minimized and use dripless connections if possible.
  - .7 Drain hoses when finished.
- .7 Equipment to be used on the project site shall be thoroughly cleaned of soil, seeds, and any debris or external contaminants outside the national park before delivery to the work site.

## **1.20 WASTE MATERIAL STORAGE AND REMOVAL**

- .1 The Contractor shall prepare a Construction and Waste management plan as part of the EPP. The Plan shall include the following basic principle:
  - .1 Waste reduction which follows the 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
  - .2 Contractor to track and provide proof of tracking of number of material loads to recycling.
- .2 Wastes generated at the construction site are to be contained and removed in a timely and approved manner. The EPP shall detail the waste management procedures, including the following:
  - .1 Describe the management of waste.
  - .2 Construction wastes shall be stored in containers at an approved location and removed promptly when the containers are 90% full.
  - .3 A concerted effort to reduce, reuse and recycle materials is expected.
  - .4 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
  - .5 Provide containers to deposit recyclable materials.
  - .6 Transport all recyclable materials to an approved recycling facility off site.
  - .7 Waste materials are to be disposed of at a certified construction waste landfill outside the National Parks. No burying, burning or discarding of waste materials will be permitted at the construction site, or elsewhere in Banff National Park.
  - .8 No materials attractive to wildlife are to be stored at the site overnight – daily removal is mandatory. Human food products are to be contained in a manner so as not to attract animals and waste food stuffs are to be removed from the construction site every day.

- .9 Portable container toilets are to be provided in sufficient numbers and locations to ensure convenient usage including frequency of pump out.
- .3 All garbage must be stored and handled in conformance with the National Parks' Garbage Regulations.
- .4 No food, domestic garbage or hazardous wastes may be deposited in the trade waste site.
- .5 Dispose of all hazardous wastes in conformance with the Environmental Contaminates Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.
- .6 Provide bear proof garbage containers on-site for domestic garbage generated on-site by Contractor's personnel and make arrangement for collection on a daily basis or when directed by the Departmental Representative.
- .7 Maintain the site in a tidy condition, free from the accumulation of waste products, debris and litter.
- .8 Do not dispose of or allow to disperse waste or volatile materials such as mineral spirits, oil and paint thinners or other hazardous wastes into waterways. Provide clean-up equipment and adequate supply of absorbent material on-site.
- .9 Demolished asphalt shall be disposed of immediately following removal. Stockpiling of demolished asphalt is not permitted on site.

## **1.21 VEGETATION REMOVAL AND PROTECTION OF THE WORK LIMITS**

- .1 Follow mitigation measures provided in BMPs Section 7.
- .2 Brushing and clearing to be permitted only within the Project area. Clearing of vegetation at any time requires a Restricted Activity Permit (obtained through the Departmental Representative and ESO).
- .3 Vegetation removal during the bird nesting period (April 21 to August 15) requires pre-clearance nest-sweeps to be conducted by QEP.
- .4 Store all equipment either on the road or on previously disturbed or hardened surfaces to minimize vegetation disturbance.
- .5 Minimize the amount of vegetation cleared or disturbed. Visibly delineate the area to be cleared to avoid unnecessary vegetation removal. Clearly mark area with highly visible materials such as flagging tape to inform equipment operators of the area they are to work in. Equipment operators to ensure no mechanical damage is caused to trees and other vegetation outside the designated clearing area.
  - .1 Any vegetation damaged outside the designated clearing area to be replaced in size and kind two fold.
- .6 Equipment to be used on the project site shall be thoroughly cleaned of soil, seeds, and any debris or external contaminants outside the national park before delivery to the work site.
- .7 Minimize migration of invasive species from the Project site:
  - .1 Prior to entry onto new segments of the Project area, clean (blow down/scrape down) all equipment that came into contact with soil at previous segments (i.e.

clearing, grading, decompaction, or restoration equipment) to satisfaction of Departmental Representative, where possible and appropriate.

- .2 Construction staff and others to scrape mud off their boots and brush seeds and dirt from their clothing before leaving the Project site.
- .8 Disturbance to vegetation in areas temporarily disturbed by heavy equipment and other construction-phase related activities (including lay-down sites, temporary work sites, and material stock pile sites) will be restored as quickly as possible by planting grass seed or seeding. Reclamation standards will follow suggested plant density, cover and composition standards specified in in Clauses 10.39 to 10.41 of the PCA BMPs.
- .9 All vegetation debris to be removed from the National Parks. No other debris management options (piling and burning, mulching, etc.) have been approved for this project. Any change from removing debris will require approval from the Departmental Representative on a case-by-case basis.

## 1.22 SENSITIVE AND NO-GO ZONES

- .1 The ESO may identify sensitive areas and no-go zones in proximity to the work site. Even though these areas may lie outside the construction limit they must not be intruded into by personnel. The Contractor shall describe measures to be employed to achieve that goal.

## Part 2 Products

### 2.1 NOT USED

- .1 Not Used.

## Part 3 Execution

### 3.1 CONCRETE MANAGEMENT

- .1 Wet and uncured concrete is an acutely toxic substance for an aquatic environment. Extra care not to introduce these materials into the environment is required. The Contractor is to prepare an EPP which address concrete plant location, operation, and reclamation where required, to the satisfaction of the Departmental Representative. This plan shall include the following concrete management elements:
  - .1 During saw-cutting, cooling fluids shall be contained, collected, and disposed of at an approved disposal facility.
  - .2 Concrete mixer truck washout shall be contained in a buried or above ground tank, with wash products moved back to the concrete batching yard or an approved facility for disposal.
  - .3 Water contaminated in the placing of cement and curing of concrete shall be contained and removed from the site to an approved disposal facility.
- .2 If a concrete batching plant is used it shall be operated pursuant to applicable dust, air emission, and water quality control regulations.

**3.2 STORAGE AND CONTAINMENT OF EXCAVATED MATERIAL**

- .1 The EPP shall detail the plan for both temporary storage and permanent disposal of surplus excavated material.

**3.3 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES**

- .1 Removal and storage of snow shall be described, and a plan shall be approved by the ESO and the Departmental Representative.
- .2 Within the EPP a contingency plan for control of dust generated from the construction site shall be prepared, with materials availability arranged in the event of their need.
- .3 It may be desirable or necessary to maintain security services at the construction site during quiet times. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamperproof and cannot be drained by vandals.
- .4 Develop a response plan for, and be suitable equipped for, fires on and immediately adjacent to the work area.

**END OF SECTION**

**Part 1 General****1.1 MEASUREMENT PROCEDURES**

- .1 This Work shall be incidental to contract and will not be measured for payment.

**1.2 DEFINITIONS**

- .1 Quality Control (QC): The process of checking specific products or services to determine if they comply with relevant quality standards and identify ways to eliminate causes of unsatisfactory product or service performed.
- .2 Quality Assurance (QA): The process of ensuring that the Contractor's Quality Management Plan (QMP) (QC, non-conformances, etc.) is being followed. The results of the QA are provided as feedback to both the Contractor and the Departmental Representative. Where required, the Contractor shall implement changes to the project based on the feedback received from the QA process.

**1.3 QUALITY MANAGEMENT PROGRAM**

- .1 The Contractor shall prepare a Quality Management Program. The purpose of the program shall be to ensure the performance of the Work in accordance with Contract requirements.
- .2 The Quality Management Program shall be described in a Quality Management Plan. The Contractor shall submit the Quality Management Plan to the Departmental Representative for acceptance in accordance with Section 01 33 00 - Submittal Procedures. The Plan shall develop a logical system for tracking and documenting the Quality Control of the Work as well as the Contractor's internal Quality Assurance procedures to verify the compliance of the Quality Control process. A systematic format and a set of procedures patterned on a recognized Quality Control Standard will be acceptable, subject to review by the Departmental Representative.
  - .1 The Contractor is responsible for quality control and quality assurance of all construction activities.
- .3 The Quality Management Plan shall at a minimum include the following information:
  - .1 Distribution list, providing a list of names to whom the Manual shall be distributed;
  - .2 Title page, identifying the Contract, Contractor and copy number;
  - .3 Revision page, identifying the revision number and date of the Manual;
  - .4 Table of contents;
  - .5 Revision control, tabulating the revision number, date of revision, description of revisions and authorized signature;
  - .6 Details of measuring and test equipment including methods and frequency of calibration;
  - .7 Purchasing details of all materials and equipment including procurement documents and vendor's Quality Control Program standards;

- .8 Procedures for inspection of incoming items, in-process inspection and final inspection and tagging of all supply items;
  - .9 Details of special processes as identified by the Departmental Representative, including qualifications of personnel and certification;
  - .10 Procedures for shipping, packaging and storage of materials;
  - .11 Procedures for maintaining quality records and Statements of Compliance, including filing and storage of documents for a period of one year after Completion of the Works;
  - .12 Details of any non-conformance, including identification and recording of deficiencies, tagging procedures for "HOLD" or "REJECT" items, and final disposition of non-conformance forms by the Quality Control Manager;
  - .13 Inspection and test checklists, including tabulated checklists describing all manufacturing and delivery activities such as Inspection or Test, frequency of tests, description of tests, acceptance criteria of tests, such as verification, witnessing or holding tests and sign-off by the Quality Control Manager and the Quality Assurance Manager, if the Quality Assurance Manager witnesses the tests;
  - .14 Forms used to ensure the application of the inspection and test checklist requirements. These forms shall be identified in the checklists and describe all testing requirements for Specification compliance; and
  - .15 Details of the Quality Assurance Program including the Contractor's procedures to verify the compliance to the Quality Control process of on-site work and off-site work by fabricators.
- .4 The Contractor shall appoint qualified and experienced Quality Control and Quality Assurance Personnel, who are dedicated to quality matters and who will report regularly to the Quality Control Manager and Quality Assurance Manager as well as Contractor's management at a level which shall ensure that Quality Control and Quality Assurance requirements are not to be subordinated to manufacturing, construction or delivery. The Quality Control and Quality Assurance Personnel shall be empowered by the Contractor to resolve quality matters. Personnel involved in Quality Assurance shall be independent of the Quality Control Process.
- .5 The Quality Management Plan shall include samples of all forms to be filled in by the Quality Control and Assurance Personnel. All forms shall be signed by the Quality Control Manager and Quality Assurance Manager and submitted promptly to the Departmental Representative.
- .6 An independent check of all Work shall be performed by the Contractor. The Contractor shall appoint Quality Control Inspectors to ensure compliance of products and workmanship with Contract requirements. Quality Assurance Inspectors, will periodically (shall be a minimum of 10% of the Quality Control checks) perform a second independent check to assess if the Quality Control process is being followed. The same personnel may not be used to perform a given task and to check the quality and accuracy of the task.
- .1 A testing agency independent from the Contractor must be engaged by the Contractor to perform either Quality Control or Quality Assurance for a given task as part of the Quality Program.

- .7 At completion of the Work a bound and itemized copy of all Quality Control and Quality Assurance documents and reports shall be prepared by the Contractor's Quality Control Manager and Quality Assurance Manager and submitted to the Departmental Representative.

#### 1.4 TESTING

- .1 All Quality Control technicians are to be certified by the Canadian Council of Independent Laboratories (CCIL) for testing asphalt, aggregates and concrete, as applicable to the testing requirements for that item of Work.
- .2 Testing required to provide Quality Control and Quality Assurance to assure that the Work strictly complies with the Contract requirements shall include, but not be limited to:
- .1 Testing of all structural concrete, reinforcing steel, granular material, asphalt, miscellaneous structural elements and metals, utilities installed, and all source acceptance testing;
  - .2 All testing specified in the Contract Documents; and
  - .3 Any other testing required as a condition for deviation from the specified Contract procedures.
- .3 The quality control testing proposed and testing frequency shall at a minimum, achieve the requirements of the following:
- .1 Wherever these standards refer to standards (e.g. CSA, ASTM, and others) the minimum testing frequencies in these standards shall be utilized.
  - .2 If no testing standard is identified in the specifications, testing proposed shall be in accordance with AT Standard specifications for Highway Construction.
  - .3 The Contractor and its independent Quality Assurance testing agency that will carry out the testing must satisfy themselves that the test frequencies being completed are sufficient to ensure the quality requirements of the QMP.
- .4 The Contractor shall be fully responsible and bear all costs for all quality control testing and shall conduct such testing in the following manner:
- .1 Provide testing facilities and personnel for the tests and inform the Departmental Representative in advance to enable the Departmental Representative to witness the tests if it so desired;
  - .2 Notify the Departmental Representative when sampling will be conducted;
  - .3 Within one day after completion of testing, submit test results to the Departmental Representative; and
  - .4 Identify test reports with the name and address of the organization performing all tests, and the date of the tests.
- .5 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.
- .6 Testing agencies, their inspectors, and their representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the Contract Documents, nor to approve or accept any part of the Work.

- .7 The minimum frequency for Quality Control testing for the new approach asphalt will be as follows:

	<b>ASTM TEST</b>	<b>MINIMUM FREQUENCY</b>
Tests During Aggregate Production	C 136, Dry Sieve Analysis of Aggregate	- Split Stockpiles: 1 for each stockpile for every 2 hours of production
	Or	- One main stockpile: for every 300 tonnes
	C 117 Sieve Analysis of Aggregates by Washing (Modified for Field Lab with drying done over a hotplate or similar heating element)	- Blend Sand: 1 for every 100 tonnes during stockpiling - Natural filler: 1 for every 50 tonnes during stockpiling
	D 5821 Determining the Percentage of Fractured Particles in Coarse Aggregate	Every second coarse aggregate sieve test
	C 117 Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the crusher
Asphalt Products Tests	Tack and Prime	Mill certifications.
Tests during Asphalt Plant Mixing	C 136, Dry Sieve Analysis of Aggregate	1 of combined aggregate (off the belt) every 300 tonnes
	C 556 & D 2216, Moisture Content	Aggregate: 1 tests/Lot Asphalt mix: 1 on first Sub-Lot and every second day.
	C 117 Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the plant cold feed
	D 5581 Resistance to Plastic Flow Using Marshall Apparatus	One set of three briquettes for 1,200 tonnes or Lot, whichever is less.
	D 6307 Asphalt Extraction, Ignition Method	One/Sub-Lot
	D-5 Penetration of Bituminous Materials	One per Manufacturer's Batch. Samples should be taken for every 3000 tonnes of mix.
	D 2171 Viscosity	Contractor's Option
	D 2041 Maximum Theoretical Density	One per sub-lot
Test During Asphalt Paving for Density Testing	AASHTO T 245-97 Resistance to Plastic Flow Using Marshall Apparatus	One 15 kg sample for every Sub-Lot or minimum 1/day for field testing
	Core Samples	At start, two cores for each Sub-Lot. After rolling pattern established, only one core for each Sub-Lot. All Marshall mix cores to be a minimum of 100mm diameter, Superpave mixes shall require minimum 150 mm diameter cores.

- .1 These are the minimum frequencies and the Contractor is responsible to assess the need to increase testing frequency, where aggregate source is not uniform or

any other condition exists that may warrant it. QC frequencies may be reduced below this level, subject to the Departmental Representative's authorization, should the Contractor's QC plan be proven very effective.

- .2 Passing the minimum quantity of QC tests does not relieve the Contractor from the obligation of meeting the Contract requirements and any identified non-compliant works or products shall be rectified by the Contractor at their cost.
- .8 Quality Assurance testing will be undertaken by the Contractor through an independent CSA certified testing firm. The independent testing firm will complete random sampling, inspection, and testing for the purposes of determining the compliance with specifications and other contract documents. The frequency, location of the inspections, sampling, and tests shall be a minimum of 10% of the Quality Control testing frequency.
- .9 The Contractor shall be responsible for third party testing of materials incorporated into the works.
- .10 The Departmental Representative may perform quality audits as desired. Such audits will not relax the responsibility of the contractor to perform work in accordance with Specifications. To facilitate this work the contractor shall:
  - .1 Notify appropriate agency and Departmental Representative in advance of work which the Departmental Representative may want to test.
  - .2 Submit samples and/or materials required for testing, as specifically requested in the Specifications or as requested by the Departmental Representative. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the work.
  - .3 Provide labour and facilities to obtain and handle samples and materials on site.

## 1.5 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental 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, Contractor shall uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental 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, Departmental Representative shall pay cost of examination and replacement.

## 1.6 INDEPENDENT INSPECTION AGENCIES

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

- .2 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .3 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Departmental Representative at no cost to the Departmental Representative. Pay costs for retesting and re-inspection.

#### **1.7 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.

#### **1.8 PROCEDURES**

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

#### **1.9 REJECTED WORK**

- .1 Any instances of unacceptable work discovered by either the Quality Control or Quality Assurance personnel will require the preparation of a non-conformance report (NCR).
- .2 If instances of unacceptable work are discovered by the Departmental Representative, the Departmental Representative may issue a non-conformance report (NCR).
- .3 The Contractor shall expediently correct any non-conformances, whether the result of poor workmanship, use of defective products or damage and whether incorporated in the Work or not, the Contractor shall replace or re-execute in accordance with the Contract Documents.
- .4 Make good other Contractor's work damaged by such removals or replacements promptly.
- .5 Payment for the work itself may be withheld until the NCR issue has been resolved to the satisfaction of the Departmental Representative.
- .6 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Departmental Representative may deduct from Contract Price difference in value between Work performed and that called for by the Contract Documents, amount of which will be determined by the Departmental Representative.

#### **1.10 REPORTS**

- .1 Submit one (1) electronic copy of all inspection and test reports to Departmental Representative in accordance with Section 01 33 00 - Submittals Procedures.

- .2 Submit to the Departmental Representative one paper copy and one electronic copy of all Non-Conformance Reports.

**1.11 TESTS AND MIX DESIGNS**

Furnish test results and mix designs as requested.

**1.12 MILL TESTS**

- .1 Submit mill test certificates as required in specification sections.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 01 55 26 - Traffic Control

**1.2 REFERENCE STANDARDS**

- .1 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-S269.2, Access Scaffolding for Construction Purposes.
  - .2 CAN/CSA-Z321, Signs and Symbols for the Occupational Environment.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.4 INSTALLATION AND REMOVAL**

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

**1.5 SCAFFOLDING**

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, temporary stairs, staging, swing staging, ladders and platforms.
- .3 Provide Departmental Representative access to all parts of the work during construction and as required for inspection of the completed works.

**1.6 HOISTING**

- .1 Provide, operate and maintain hoists/cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Hoists and/or cranes to be operated by qualified operator.

**1.7 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.

**1.8 CONSTRUCTION PARKING**

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.

**1.9 SECURITY**

- .1 The Contractor shall be entirely responsible for the security of the Work site and of the Work at all times while the Work Sites are under the Contractor's control (including after working hours and during holidays). Provision of security personnel, as determined necessary by the Contractor to maintain a secure site, will not be measured but considered incidental to the work.

**1.10 OFFICES**

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.
- .4 Departmental Representative's Site office.
  - .1 Provide temporary office for Departmental Representative with sufficient working space for minimum of two persons and to include.
    - .1 Minimum (2) desks, (2) office chairs, printer.
  - .2 Provided office to be at minimum a separate room with a lockable door separate from the Contractor's working area. A separate trailer may be provided.
  - .3 Provide uninterrupted power supply and heat for office.
  - .4 Provide air-conditioning for office.
  - .5 Provide reliable satellite Internet connection with sufficient bandwidth to support phone calls for Departmental Representative usage.
  - .6 Inside dimensions minimum 3.6 m long x 3.0 m wide x 2.4 m high, with floor 0.30 m above grade, complete with two 50% opening windows and one lockable door.
  - .7 Insulate building and provide heating system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.
  - .8 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.
  - .9 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10 % upward light component.
  - .10 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.
  - .11 Equip office with 1 x 2 m table, 4 chairs, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.
  - .12 Maintain in clean condition.
  - .13 The contractor shall remove from site all such work after use.

**1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

**1.12 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.

**1.13 CONSTRUCTION SIGNAGE**

- .1 No other signs or advertisements, other than warning signs, are permitted on site.
- .2 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 Departmental Representative.

**1.14 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 Departmental 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 Construct access and haul roads necessary.
- .8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operation at all times.
- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

Parks Canada

- .12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .13 Provide snow removal during period of Work.
- .14 Remove, upon completion of work, haul roads designated by Departmental Representative.

**1.15 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 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

- .1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 REFERENCE STANDARDS**

- .1 Alberta Infrastructure and Transportation
  - .1 Traffic Accommodation in Work Zones - 08.
  - .2 Traffic Control Standards.
- .2 BC MoTI – Standard Specifications for Highway Construction.
- .3 U.S. Department of Transportation
  - .1 Manual of Uniform Traffic Control Devices for Streets and Highways (MUTCD).

**1.2 MEASUREMENT AND PAYMENT**

- .1 Traffic Control will be paid under "**Lump Sum Price Item – Traffic Control**" prorated by the portion of overall Contract Work completed.
  - .1 Payment for traffic control will commence once the Contractor has implemented their accepted Traffic Accommodation Strategy and setup is accepted by the Departmental Representative.
  - .2 Temporary pavement marking and layout will not be measured but considered incidental to work.
  - .3 Cost of keeping the existing roadway within the Work limits clean and free of pot holes shall be considered incidental to lump sum and no additional payment will be made.
  - .4 The cost of snow removal required by the Contractor to complete the work identified in the Contract shall be considered incidental to lump sum and no additional payment will be made.
  - .5 Cost to maintain traffic control over any summer or winter shut down will be considered incidental to lump sum and no additional payment will be made.
- .2 Additional hours of Traffic Control Personnel requested by the Departmental Representative beyond those specified will be paid for separately.

**1.3 GENERAL**

- .1 The Contractor shall design, supply, erect, move and maintain all traffic control devices, signs, temporary pavement marking, other safety measures, and provide staff to ensure safe passage of all traffic from commencement of site work to date of acceptance by the Departmental Representative.
- .2 All traffic and warning signs shall be either bilingual or of a symbolic or pictorial type. If bilingual signs are used, the English and French message shall be of equal letter size and at same elevation, with English on left and French on right. Assistance in translation of construction and warning signs to French may be obtained from Parks Canada.
- .3 Temporary pavement marking used shall be acceptable to the Departmental Representative. These temporary pavement markings shall be in accordance with AT-

Traffic Accommodation in Work Zones. Spacing between temporary line markings to not exceed 10m.

- .4 All temporary markings and other associated markings will be removed at the contractor's expense prior to completion of the Contract but not before the final pavement markings have been installed to the satisfaction of the Departmental Representative.
- .5 At all work sites, the Contractor shall mark **accurately**, at regular intervals, the location and type of existing painted lines prior to their removal or covering, including start and ends of passing lanes and intersections, with a stake at the side of the roadway and make a written record of markings in a book, in order that painted lines can be accurately re-established after work is completed. If no lines are present the Contractor shall mark **accurately (+ or – 20 mm)** and at regular intervals in accordance with the latest edition of the AT – Traffic Control Standards.
- .6 The Contractor shall develop and implement a Traffic Accommodation Strategy (TAS) in accordance with AT Traffic Accommodation in Work Zones, except where specified otherwise in the Contract Documents. The TAS shall take into account all hazards associated with construction operations on a busy highway and minimize risks to motorists prior to beginning Work. The TAS shall be updated regularly in response to any incidents or changes in conditions, be they weather, work, traffic, or otherwise.
- .7 The Contractor shall coordinate traffic management procedures with other Contractors working in the area.

#### 1.4 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 Carry out traffic regulation in accordance with Traffic Accommodation in Work Zones except where specified otherwise.
- .3 When working on travelled way:
  - .1 Place equipment in position to minimize 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.
- .4 Close lanes of road only after receipt of written approval from Departmental Representative.
  - .1 Before re-routing traffic erect suitable signs and devices to Traffic Accommodation in Work Zones.
- .5 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic.
- .6 A minimum of single lane alternating traffic shall be maintained on Highway 93N at all times, except:

- .1 During installation of the new cover and splice plates for the arch rib modifications:
  - .1 No traffic is permitted; except in the event of emergency when only one single vehicle with a GVW of less than 4550kg will be allowed on the bridge. This work shall be planned for times with very low traffic volume (at night-time between 22:00 and 06:00) and will require minimum one weeks notification (7 days) and approval of the Departmental Representative. Maximum length of closure 8 hours, unless approved otherwise by Departmental Representative.
- .2 During replacement of bearings located at the bridge CL until jacks are locked:
  - .1 No traffic is permitted. In the event of emergency, temporarily pause operations and lock jacks to allow passage of the emergency vehicle. No traffic permitted on structure if jacks unlocked. This work shall be planned for times with very low traffic volume (at night-time between 22:00 and 06:00) and will require minimum one weeks notification (7 days) and approval of the Departmental Representative. Maximum length of closure 8 hours, unless approved otherwise by Departmental Representative.
  - .2 After jacks are locked and until replacement of centreline bearing is completed, one lane of traffic can be reopened.
    - .1 Two lanes of traffic not permitted at any point during replacement of bearings at bridge CL.
- .7 The minimum Clear Roadway for one lane of normal traffic shall be 3.70 m unless otherwise approved in writing from the Departmental Representative.
- .8 Traffic lane to be separated from Construction Zone using BC MoTI 690 high standard precast concrete median barriers or approved equivalent, except as noted following:
  - .1 Concrete median barrier to be removed on arch span for spandrel column and arch rib modifications and to be replaced with delineators.
- .9 During Phase 2 scope of work, except for specific stages as noted in Item 1.4.6 of this specification section and excluding work required for pier cap external post tensioning:
  - .1 Traffic lane on the side of the deck where work is being done to be closed.
- .10 Traffic lane to remain closed until replacement or modification of the individual item (bearing, spandrel column, arch rib segment, etc.) is completed in entirety.
- .11 Clear roadway shall be measured by extending straight lines parallel to the roadway at the narrowest constriction point in the work zone from inside the faces of construction barriers, or from the faces of other constrictions, on each side of the clear roadway and measuring the perpendicular distance between the lines.
- .12 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, except where other means of road access exist that meet approval of Departmental Representative.

- .13 Provide competent flag personnel, trained in accordance with, and properly equipped to Traffic Control Manual for Work on Roadways, to manually control portable traffic signal system on the wire (remote control not permitted) or flag to actively manage queues to balance wait times in the two traffic directions while single lane alternating traffic is in effect:
  - .1 From June 15 to September 15, between the hours of 8:00 and 20:00, and
  - .2 24 hours a day from 22:00 Thursday to 06:00 Tuesday of long weekends, as defined in Item 1.6.6.1 of this Section.
  - .3 Use of automated (timed) portable traffic signal system during these hours is not permitted.
- .14 Monitor traffic equipment and queue lengths with on-site personnel at all times (24 hours a day) while single lane alternating traffic is in effect:
  - .1 Between the hours of 07:00 and 22:00 monitoring with on-site personnel to be provided on **both** sides of the bridge.
- .15 Clear snow and ice from the roadway within the work zone.

## 1.5

### 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 to Traffic Accommodation in Work Zones.
- .3 Signs must be pictorial or in both official languages. Use the approved translation list for signage.
- .4 Place signs and other devices in locations recommended in Traffic Accommodation in Work Zones.
- .5 All construction signs shall be installed to prevent incidental blow down or displacement and must remain in service throughout the construction period. Construction signage heights to be minimum 1.5m from ground to the bottom of the sign, or as per BC MoTI - Traffic Control Manual for Work on Roadways (1999), whichever is higher.
- .6 Supply, install and maintain 2 flashing arrow boards (FAB), as required for the Works, in accordance with the accepted TAS. All FAB shall be as per MUTCD (latest edition).
  - .1 Location of the FABs will be agreed with the Departmental Representative.
  - .2 Removal of FABs will only be permitted upon completion of work.
  - .3 Payment for FABs will be incidental to the Lump Sum Price for Traffic Control.
- .7 Supply, install, maintain and remove two (2) changeable message signs (CMS) to inform the traffic of construction delays. All CMS shall be as per MUTCD (latest edition).
  - .1 Location of the CMS will be agreed with the Departmental Representative.
  - .2 Text for CMS will be directed by the Departmental Representative.
  - .3 Removal of CMS will only be permitted upon completion of work.
  - .4 Payment for CMS will be incidental to the Lump Sum Price for Traffic Control – All other Work.

- .8 Supply, install and maintain 2 speed reader boards (SRB), as required for the Works, in accordance with the accepted TAS.
  - .1 Location of the SRBs will be agreed with the Departmental Representative.
  - .2 Removal of SRBs will only be permitted upon completion of work.
  - .3 Payment for SRBs will be incidental to the Lump Sum Price for Traffic Control – All other Work.
- .9 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.
- .10 Continually maintain traffic control devices in use:
  - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
  - .2 Remove or cover signs which do not apply to conditions existing from day to day.

## 1.6 CONTROL OF PUBLIC TRAFFIC

- .1 In addition to requirements defined in Item 1.4 of this Section, provide competent flag personnel, trained in accordance with, and properly equipped to Traffic Accommodation in Work Zones for situations as follows:
  - .1 When public traffic is required to pass workmen, materials, working vehicles and/or equipment that block all or part of travelled roadway.
  - .2 When vehicles are entering or exiting Worksite access points.
  - .3 When it is necessary to institute one-way traffic system through construction area or other blockage and traffic signals are not in use.
  - .4 Where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
  - .5 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.
  - .6 Where temporary protection is required while other traffic control devices are being erected or taken down.
  - .7 For emergency protection when other traffic control devices are not readily available.
  - .8 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
  - .9 At each end of restricted sections where pilot cars are required.
  - .10 Delays to public traffic due to contractor's operators:
    - .1 Single lane alternating traffic: 15 minutes maximum when approved by the Departmental Representative. Emergency vehicles (i.e. ambulance, RCMP, Park Warden) must be granted immediate passage at all times. The Departmental Representative reserves the right to reduce delay time for public traffic at times when specified delay results in excessive backup of public traffic. Delay is defined as the total additional time required to pass through a work zone minus the time that would be

- required at the posted speed. Delay time shall be the maximum time elapsed as measured from the back of the approach queue to the resume speed sign.
- .2 During installation of the new cover and splice plates for the arch the rib modifications when approved by the Departmental Representative for 8 hours maximum, in the event of emergency only one single vehicle with a GVW of less than 4550kg is allowed on the bridge at a time: Emergency vehicles (i.e. ambulance, RCMP, Park Warden) must be granted preferred passage at all times provided that it will be only one vehicle with less than 4550kg GVW on the bridge at a time.
  - .2 The Departmental Representative will monitor the traffic control measures, and may require modifications of these measures from time to time to achieve satisfactory traffic flow, safety of traveling public and coordination with adjacent contracts. The Contractor shall bear the costs of implementing these requirements so as to ensure the traffic control specifications and associated performance standards are met.
  - .3 The Contractor shall maintain a dust free construction zone by means of cleaning and watering when required.
  - .4 During hours of darkness, if permitted under these specifications, Contractor shall determine requirements but as a minimum, flag persons shall be additionally equipped with a red signal hand-light of sufficient brightness to be clearly visible to approaching traffic and flagging stations shall be illuminated by overhead lighting. Signs indicating hazardous conditions and signs requiring increased attention shall be marked with flashers.
  - .5 Where roadway, carrying two-way traffic, is restricted to one lane, for 24 hours each day, provide portable traffic signal system.
    - .1 Adjust, as necessary, and regularly maintain system during period of restriction.
    - .2 Ensure signal system meets requirements of Traffic Accommodation in Work Zone.
  - .6 Work restrictions related to slowing or stopping of traffic:
    - .1 During the following long weekend periods, no work is permitted that will stop or slow traffic to slower than 30 km/hr:
      - .1 From 22:00 2024 March 28 to 06:00 2024 April 02.
      - .2 From 22:00 2024 May 16 to 06:00 2024 May 21.
      - .3 From 22:00 2024 June 27 to 06:00 2024 July 02.
      - .4 From 22:00 2024 August 01 to 06:00 2024 August 06.
      - .5 From 22:00 2024 August 29 to 06:00 2024 September 03.
      - .6 From 22:00 2024 September 26 to 06:00 2024 October 01.
      - .7 From 22:00 2024 October 10 to 06:00 2024 October 15.
      - .8 From 22:00 2024 November 07 to 06:00 2024 November 12.
    - .2 Traffic may be stopped or slowed to slower than 30 km/hr during these periods only if and when an exemption request has been approved by the Departmental Representative in writing. Any exemption request shall be submitted in writing and be made at least one week in advance of traffic impact to be considered. Approval of exemption request is not guaranteed and shall not be relied upon. No

claims for any delays or inconvenience due to denial of exemption request will be entertained.

- .3 At all other times, traffic may be stopped or slowed to slower than 30 km/hr when approved by Departmental Representative and provided maximum delays to public traffic do not exceed allowable as specified in this section.

**1.7 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 to a reduced speed limit of 30 km/hr.
- .2 Maintain existing conditions for traffic crossing right-of-way except when required for construction.
- .3 Provide the Departmental Representative with construction advisories for posting to the Official Alberta Traffic Advisor website (<http://511.alberta.ca/>) and update advisories regularly to reflect the current and planned construction activities and highway closures.

**1.8 NOT USED**

- .1 Not Used.

**Part 2 Execution**

**2.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1        General****1.1            RELATED REQUIREMENTS**

- .1        Section 01 35 43 – Environmental Procedures.
- .2        Section 01 52 00 – Construction Facilities.
- .3        Section 01 55 26 - Traffic Control.

**1.2            REFERENCE STANDARDS**

- .1        Canadian Standards Association (CSA International)
  - .1        CSA-O121, Douglas Fir Plywood.

**1.3            INSTALLATION AND REMOVAL**

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

**1.4            HOARDING**

- .1        Erect temporary site enclosure using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m on centre. Provide one lockable truck gate. Maintain fence in good repair.
- .2        Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.
- .3        Provide screening around construction materials and / or equipment as directed by the Departmental Representative for protection of wildlife.

**1.5            GUARD RAILS AND BARRICADES**

- .1        Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors, roofs, and bridge decks or girders.
- .2        Provide as required by governing authorities.

**1.6            WEATHER ENCLOSURES**

- .1        Design enclosures to withstand wind pressure.

**1.7            DUST TIGHT SCREENS**

- .1        Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2        Maintain and relocate protection until such work is complete.

**1.8 ACCESS TO SITE**

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

**1.9 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.

**1.10 FIRE ROUTES**

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

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

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

**1.12 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for recycling.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 All Technical Sections.

**1.2 REFERENCE STANDARDS**

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

**1.3 QUALITY**

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining 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 up to the end of the warranty period, 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 Departmental 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.

**1.4 AVAILABILITY**

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify

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

## **1.5 STORAGE, HANDLING AND PROTECTION**

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber and fabricated metals on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

## **1.6 TRANSPORTATION**

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

## **1.7 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

**1.8 QUALITY OF WORK**

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental 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. Departmental 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 Departmental Representative, whose decision is final.

**1.9 CO-ORDINATION**

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves, conduits, pipes, anchors and accessories.

**1.10 CONCEALMENT**

- .1 In finished areas conceal ducts in curbs or barriers, except where indicated otherwise.
- .2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

**1.11 REMEDIAL WORK**

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

**1.12 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use stainless steel fasteners and anchors for securing exterior work, unless non-corrosive hot dip galvanized steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

**1.13 PROTECTION OF WORK IN PROGRESS**

- .1 Prevent overloading of parts of structure. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

**1.14 EXISTING UTILITIES**

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

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 All Technical Sections.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.3 MATERIALS**

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

**1.4 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.

**1.5 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 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .7 Restore work with new products in accordance with requirements of Contract Documents.
- .8 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .9 Conceal ducts in curbs or barriers, except where indicated otherwise.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for recycling.

**Part 2 Products****2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution****3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 PROJECT CLEANLINESS**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .3 Clear snow and ice from work areas.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling.
- .7 Dispose of waste materials and debris off site.
- .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

**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 Remove waste products and debris including that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Sweep and wash clean paved areas.

- .11 Clean drainage systems.
- .12 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .13 Remove snow and ice.

**1.3 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for recycling.
  - .1 Contractor to track and provide proof of tracking of number of material loads to recycling.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General****1.1 ADMINISTRATIVE REQUIREMENTS**

- .1 Acceptance of Work Procedures:
  - .1 Contractor's Inspection:
    - .1 Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .2 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    - .3 Request Departmental Representative inspection.
  - .2 Departmental Representative Inspection:
    - .1 Departmental 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 Work: complete and ready for final inspection.
  - .4 Final Inspection:
    - .1 When completion tasks are done, request final inspection of Work by Departmental Representative and Contractor.
    - .2 When Work is deemed incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

**1.2 FINAL CLEANING**

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for recycling.

**Part 2 Products****2.1 NOT USED**

- .1 Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 77 00 – Closeout Procedures.

**1.2 AS -BUILT DOCUMENTS AND SAMPLES**

- .1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
  - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
  - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
  - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

**1.3 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS**

- .1 Record information on set of black line opaque drawings.
- .2 Record information concurrently with construction progress.
  - .1 Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: mark each item to record actual construction, including:
  - .1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .2 Field changes of dimension and detail.
  - .3 Changes made by change orders.

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

#### 1.4 **WARRANTIES AND BONDS**

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .3 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .4 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .5 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
  - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
  - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
  - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
  - .4 Verify that documents are in proper form, contain full information, and are notarized.
  - .5 Co-execute submittals when required.
  - .6 Retain warranties and bonds until time specified for submittal.
- .6 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .7 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .8 Written verification to follow oral instructions.
  - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

**Part 2            Products**

**2.1                NOT USED**

.1                Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1                Not Used.

**END OF SECTION**

**Part 1 General****1.1 DESCRIPTION**

- .1 Removal of existing asphalt pavement to depths and extents shown in the Contract Documents and as accepted by the Departmental Representative.

**1.2 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Measure for payment for Milling will be the square metres of asphalt pavement of existing approach roadway actually removed, stockpiled, and disposed of in accordance with the Contract Document or as directed by the Departmental Representative.
  - .1 Payment for milling shall be made under “**Unit Price Item - Asphalt Pavement Removal – Partial Depth Milling**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
  - .2 Payment per square metre of asphalt removal, whether partial or full depth, will remain the same, regardless of the number of passes required to complete the Work, to the depth and extents specified, as per the Contract Documents.
  - .3 Items considered incidental to the Work include, but are not limited to:
    - .1 All operations involved in milling and pulverizing including but not limited to;
      - .1 Survey, cold milling or excavating, sweeping, loading, hauling, stockpiling and/or disposal and cleaning of remaining pavement surface
      - .2 Overhaul.
      - .3 Asphalt Concrete Pavement placing and subsequent removal at milled tie-in locations.
      - .4 Temporary removal and reinstallation of barriers, guardrails, guardrail posts, etc.
      - .5 Cleaning of existing pavement shoulder, whether via sweeping or other methods.
      - .6 Maintaining milled areas, including drainage, until completion of asphalt paving.
      - .7 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
    - .4 Traffic Control required for this Work shall be incidental to “**Lump Sum Price Item - Traffic Control**” and no separate payment will be made to the Contractor.
    - .5 Mobilization and demobilization required for this Work shall be incidental to “**Lump Sum Price Item – Mobilization / Demobilization**” and no additional payment will be made for remobilization of equipment if all milling work cannot be completed at once.
- .1 In accordance with Section 01 45 00 - Quality Control.

Parks Canada

**1.4 SUBMITTALS**

- .1 In accordance with Section 01 33 00 - Submittal Procedures.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

**1.6 DEFINITIONS**

- .1 Profile Milling: Removal of asphalt concrete pavement to an accurate depth of cut, profile and cross slope and shall include loading the milled material directly into trucks.
- .2 Partial Depth Milling: Removal of asphalt concrete pavement, other than Profile Milling.

**Part 2 Products****2.1 MATERIALS**

- .1 The Contractor is to ensure that the maximum particle size of milled materials is less than 50 mm and shall sieve or otherwise separate/remove larger particles at their cost.

**Part 3 Execution****3.1 PREPARATION**

- .1 Prior to beginning removal operation, the Contractor shall inspect and verify with the Departmental Representative, all areas, depths and lines of asphalt pavement to be removed.
- .2 Placement of gravels to level the running surface for the milling machine, if required, will be considered incidental to the Work and no additional payment will be made.
- .3 Have appropriate Traffic Control measures in accordance with Section 01 55 26 - Traffic Control.

**3.2 PROTECTION**

- .1 Protect existing pavement not designated for removal, concrete deck, concrete curb and barriers, light units and structures from damage. In event of damage, the Contractor shall immediately replace or make repairs to the satisfaction of the Departmental Representative at no additional cost.

**3.3 REMOVAL**

- .1 Use cold milling, planning or grinding self-powered equipment with automatic grade controls capable of operating from string line, and capable of removing part of pavement surface to depths or grades indicated.
- .2 For Full Depth Asphalt Removal, it is anticipated that the depth of the existing pavement is 150mm deep. Existing asphalt pavement thickness is not uniform and will vary from one location to the next.

- .3 Partial Depth Asphalt Pavement Removal by milling to lines and grades shown on the IFC Drawings or as established by Departmental Representative in field:
  - .1 Use self-powered equipment and methods of removal and hauling which do not damage or disturb underlying roadway structure.
- .4 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
  - .1 Provide for suppression of dust generated by removal process to ensure a dust free Work Site.
- .5 To tie in from existing pavement to new overlay, remove existing asphalt pavement by milling to lines and grades established by Departmental Representative in field or as per the Contract Documents.
- .6 If applicable, at mill and fill locations, remove existing asphalt to the depths, lengths and width specified in the Contract Documents and as established by Departmental Representative in field.
- .7 If the base course is disturbed by milling operations the Contractor will be required to rectify the base course, to the acceptance of the Departmental Representative, at the Contractor's cost.
- .8 In low areas where water may pond, the Contractor shall cut drainage channels through the shoulders to prevent water from collecting in the milled areas, prior to opening the lane(s) to traffic, as directed by the Departmental Representative.
- .9 The maximum delay between the area cold milled and the completion of asphalt paving of the same area will be seven (7) days. The Contractor shall be responsible for maintaining the milled surface for the travelling public as directed by the Departmental Representative.

### **3.4 STOCKPILING OF MATERIAL**

- .1 The Contractor shall dispose of removed asphalt material offsite outside of the National Parks.
- .2 Removed asphalt material shall remain the property of the Contractor.
- .3 The material shall be stockpiled by a loader and in such a manner as to prevent consolidation which means exercising caution and minimizing running equipment on the stockpiles. Trucks and trailers shall not drive on the pile.
- .4 The height of the pile shall not exceed the height of the loader bucket.
- .5 The Contractor shall be responsible to remove any contamination of the stockpile millings.

### **3.5 FINISH TOLERANCES**

- .1 Finished surfaces in areas where asphalt pavement has been removed shall be within +/-5 mm of the grade specified and shall not be uniformly high or low.

**3.6 SWEEPING**

- .1 Sweeping shall be done using the same lane closures as the milling operation and all loose material must be removed prior to opening the lane(s) to traffic.
- .2 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand work and brooming as required. No extra payment will be made for sweeping or associated hand work.

**END OF SECTION**

**Part 1 General****1.1 SUMMARY**

- .1 This Section includes requirements for the following:
  - .1 Local demolition and removal of concrete at deck joints and abutment back walls, including removal of existing Stage 1 deck joints.
  - .2 Localized removal of existing asphalt ramps at Stage 1 deck joints.
  - .3 Local demolition and removal of concrete at stringer bearings. Removal of existing stringer bearings.
  - .4 Partial depth concrete removal for patch repairs.
- .2 This Section does not include partial depth removals (milling) of approach asphalt pavement. See Section 02 41 13 – Asphalt Pavement Removal.
- .3 This section does not include for the removal of Hazardous Substances or asbestos abatement. See Section 02 83 10 – Lead Base Paint Abatement Minimum Precautions.

**1.2 RELATED REQUIREMENTS**

- .1 Section 02 41 13 – Asphalt Pavement Removal
- .2 Section 02 83 10 – Lead Base Paint Abatement Minimum Precautions.
- .3 Section 03 10 00 – Concrete Forming and Accessories.
- .4 Section 03 20 00 – Concrete Reinforcing.
- .5 Section 03 30 00 – Cast-in-Place Concrete.
- .6 Section 03 31 23.13 – High-performance Structural Concrete for Bridge Decks.
- .7 Section 32 12 16 – Asphalt Concrete Pavement (EPS)

**1.3 MEASUREMENT AND PAYMENT**

- .1 Measurement Procedures.
  - .1 Measure removal of concrete at deck ends and abutment back walls for Stage 1 deck joint installation in linear metres to the blockout depth and width indicated. **"Unit Price Item – Structure Demolition - Removal of concrete at deck and abutments for Stage 1 deck joint installation"**.
    - .1 Removal of deck joint assemblies will not be measured but considered incidental to the work.
    - .2 Removal of existing asphalt ramps at Stage 1 deck joints will not be measured but considered incidental to the work.
    - .3 Local excavation and backfilling at the abutments will not be measured but considered incidental to the work.
    - .4 Local full depth asphalt removal and replacement of asphalt in kind at the abutments, as required to complete the work, will not be measured but considered incidental to the work.

- .2 No measurement for payment will be made under this section for local demolition, removal and disposal of concrete at stringer bearings and removal and disposal of existing stringer bearings. Include costs in Section 05 12 33 – Structural Steel for Bridges.
- .3 Measure partial depth concrete removal for patch repairs in square metres. Payment shall be made under "**Unit Price Item – Structure Demolition - Partial Depth Patch Repair of Concrete Spalls at Bearing Seats (North Face of South Pier)**".
  - .1 Include costs of concrete removals, surface preparation and supply and placement of concrete into unit price of partial depth concrete removal.
  - .2 Area of partial depth repair only includes repair areas additional to specified areas of concrete removal for bearing replacement.
- .4 Payment for surface preparation for new concrete materials to be included in above removal items.
- .5 Payment for stockpiling and disposal to be included in above removal items.
- .6 All demolished materials are considered waste and to be disposed of outside of the National Parks at a certified construction waste landfill.

#### 1.4 REFERENCE STANDARDS

- .1 CSA Group (CSA)
  - .1 CSA S350, Code of Practice for Safety in Demolition of Structures.
  - .2 CSA S6:19, Canadian Highway Bridge Design Code.
- .2 Department of Justice Canada (Jus)
  - .1 Impact Assessment Act (IAA), 2019.
  - .2 Canadian Environmental Protection Act (CEPA), 1999.
    - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
    - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.
    - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
    - .4 Motor Vehicle Safety Act (MVSA), 1995
    - .5 Hazardous Substances Information Review Act, 1985
- .3 U.S. Environmental Protection Agency (EPA)
  - .1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.
  - .2 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.
  - .3 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.
- .4 National Fire Protection Association (NFPA)
  - .1 NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.
- .5 American National Standards Institute (ANSI)

- .1 ANSI A10.6 – Safety and Health Program Requirements for Demolition Operations.

## 1.5 DEFINITIONS

- .1 Hazardous Substances: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.

## 1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate with Departmental Representative for the material ownership as follows:
  - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner 's property, demolished materials shall become Contractor's property and shall be removed from Project site.
    - .1 All demolished materials considered waste and to be removed and disposed of outside of National Parks.
  - .2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during demolition remain Owner's property:
    - .1 Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Departmental Representative.
    - .2 Coordinate with Departmental Representative, who will establish special procedures for removal and salvage operations.
- .2 Pre-Demolition Meetings:
  - .1 Convene pre-demolition meeting prior to beginning work of this Section, with Departmental Representative in accordance with Section 01 31 19- Project Meetings to:
    - .1 Verify project requirements.
    - .2 Verify existing site conditions adjacent to demolition work.
    - .3 Co-ordination with other construction subtrades.
- .3 Hold project meetings every week.
- .4 Ensure key personnel attendance.
- .5 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

## 1.7 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:

- .1 Shop Drawings: Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada as follows:
  - .1 Submit for review and approval demolition drawings, diagrams or details showing sequence of demolition work and supporting structures.
  - .2 Submit shop drawings for temporary works stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.
- .2 Prepare and submit a written procedure for stringer bearing replacement at least two (2) weeks prior to commencement of Work.
  - .1 Procedure to:
    - .1 Include description of removal sequences, method, equipment, tools, traffic restrictions, and containment measures.
    - .2 Account for change in superstructure restraint conditions and loads on temporary jacks.
    - .3 Include jacking plan/procedure.
    - .4 Identify task dependencies.
  - .2 Bearing Replacement Procedure to be stamped and signed by professional engineer registered or licensed in Province of Alberta.
- .3 Schedule of Demolition Activities:
  - .1 Coordinate with Section 01 32 16.19 - Construction Progress Schedule, and indicate the following:
    - .1 Detailed sequence of demolition and removal work, with starting and ending dates for each activity
    - .2 Interruption of utility services
    - .3 Coordination for shutoff, capping, and continuation of utility services
    - .4 Locations of temporary partitions and means of egress
- .4 Demolition Plan: Submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a professional engineer in accordance with requirements of Authority Having Jurisdiction.
- .5 Proposed Debris Containment Measures to prevent demolished material from falling: Include in EPP or Work Plan, statements and drawings that indicate the measures proposed for use, proposed locations, and proposed time frame for their operation.
- .6 Submit copies of certified receipts from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of Departmental Representative.
- .7 Submit deck surveys at locations above stringer bearings completed prior to and after stringer bearing replacement. Reference finished deck after Stage 1 deck joint replacement.

## 1.8 QUALITY ASSURANCE

- .1 Regulatory Requirements: Ensure Work is performed in compliance with applicable Provincial/Territorial and Municipal regulations.

- .1 Comply with hauling and disposal regulations of Authority Having Jurisdiction.
- .2 Standards: Comply with ANSI A10.6 and NFPA 241
- .2 Regulatory Requirements: Perform work of this Section in accordance with the following:
  - .1 Provincial Workers' Compensation Boards.
  - .2 Provincial Occupational Health and Safety Standards and Programs.

## **1.9 SITE CONDITIONS**

- .1 Environmental protection:
  - .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.
  - .2 The existing structure is wrapped with bird netting in the vicinity of the work areas. Refer to Section 01 35 43 – Environmental Procedures for related requirements.
  - .3 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
  - .4 Fires and burning of waste or materials is not permitted on site.
  - .5 Do not bury rubbish waste materials.
  - .6 Do not dispose of waste or volatile materials including but not limited to: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
  - .7 Ensure proper disposal procedures are maintained throughout project.
  - .8 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
  - .9 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction and as directed by Departmental Representative.
  - .10 Protect trees, plants and foliage on site and adjacent properties where indicated.
  - .11 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
  - .12 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.
  - .13 Demolished asphalt shall be disposed of immediately following removal. Stockpiling of demolished asphalt is not permitted on site.

## **1.10 EXISTING CONDITIONS**

- .1 Discovery of Hazardous Substances: Immediately notify Departmental Representative if materials suspected of containing hazardous substances are encountered and perform the following activities:
  - .1 Hazardous substances will be as defined in the Hazardous Products Act.
  - .2 Stop work in the area of the suspected hazardous substances.
  - .3 Take preventative measures to limit users' and workers' exposure, provide barriers and other safety devices and do not disturb.

- .4 It is assumed that the existing painted steel, including but not limited to the steel diaphragms at the pier caps, arch spandrel columns and arch ribs, is lead based. Removal of lead based paint from painted steel sections in accordance with Section 02 83 10 – Lead Base Paint Abatement Minimum Precautions is required.
- .5 Hazardous substances, other than lead based paint as identified in item 1.10.1.4 of this specification section, will be removed by Owner under a separate contract or as a change to the Work.
  - .1 Presence of lead based paint on the existing painted steel to be considered a known hazardous substance. No extra compensation will be made for schedule impact or work made necessary through the encountering of lead based paint.
  - .2 Proceed only after written instructions have been received from Departmental Representative.

## **Part 2 Products**

### **2.1 EQUIPMENT**

- .1 Leave equipment and machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

### **2.2 TEMPORARY SUPPORT STRUCTURES**

- .1 Design temporary support structures required for demolition work using a qualified professional engineer registered or licensed in Province of the Work.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Survey existing conditions and correlate with requirements indicated to determine extent of structure demolition required.
- .2 Review Project Record Documents of existing construction.
  - .1 Departmental Representative/Consultant does not guarantee that existing conditions are the same as those indicated in Project Record Documents.

### **3.2 PREPARATION**

- .1 Protect demolition work in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.
- .2 Temporary Erosion and Sedimentation Control:
  - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust into Nigel Creek and to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

- .2 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
- .3 Protection of in-place conditions:
  - .1 Work in accordance with Section 01 35 43 - Environmental Procedures.
  - .2 Prevent movement, settlement or damage of adjacent structures, services, paving, trees, adjacent grades and parts of existing structures to remain.
    - .1 Provide bracing and shoring as required.
    - .2 Repair damage caused by demolition as directed by Departmental Representative.
  - .3 Support affected structures and, if safety of structure being demolished, adjacent structures or services appear to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.
  - .4 Prevent debris from blocking surface drainage system.
- .4 Surface Preparation:
  - .1 Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.
  - .2 Do not disrupt active or energized utilities designated to remain undisturbed.

### 3.3 DEMOLITION

- .1 Execute demolition work in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .2 Blasting operations not permitted during demolition.
- .3 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.
- .4 Prior to start of Work remove contaminated or hazardous materials as defined by authorities having jurisdiction and as directed by Departmental Representative from site and dispose of at designated disposal facilities in safe manner and in accordance with TDGA and other applicable requirements. Refer Existing Conditions in PART 1.
- .5 Demolish parts of structures to permit construction of modifications as indicated on the Contract Drawings.
- .6 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
- .7 At end of each day's work, leave Work in safe and stable condition.
- .8 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.
- .9 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.
- .10 Use natural lighting to do Work where possible.

- .1 Shut off lighting except those required for security purposes at end of each day.

### 3.4 REPAIRS

- .1 General: Promptly repair damage to adjacent construction caused by structure demolition operations.
- .2 Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- .3 Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

### 3.5 REMOVAL AND REPLACEMENT OF STAGE 1 DECK JOINTS

- .1 Remove existing joints and concrete to create blockout as shown on the drawings.
  - .1 Existing reinforcement to be retained as identified on the drawings.
  - .2 Pneumatic hammers heavier than nominal 14 kg class and "Chipping Hammer" heavier than nominal 7 kg shall not be used within 150 mm of any existing concrete which is to remain in place. Only small chipping hammers shall be used for removal of concrete around reinforcing bars.
  - .3 Pneumatic hammers shall not contact reinforcing steel in a manner that will cause debonding of the reinforcing steel in the adjacent concrete areas that are not being removed.
  - .4 Limits of concrete removal shall be outlined by 20 mm deep saw cuts. All saw cuts shall be made straight and in accordance with the drawings or as directed by the Departmental Representative.
- .2 Supply and place additional rebar where greater than 20% section loss has occurred to the existing reinforcement.
- .3 Roughen new and existing construction joints as specified on the drawings and as directed by Departmental Representative.
- .4 High-pressure water blast (minimum 35 MPa/5000 psi) clean the joint blockout surfaces and reinforcement to be retained prior to placement of concrete to remove all bruised and fractured concrete, rust and foreign materials such as dirt, dust laitance, sand, grease, oil, concrete slurry and other deleterious materials to the satisfaction of the Departmental Representative.
- .5 Prevent detritus from falling beneath the bridge during roughening and cleaning process.
- .6 Contain all water, blast material and concrete debris during all stages of construction in accordance with Section 01 35 43 - Environmental Procedures.
- .7 Place reinforcing steel in accordance with Section 03 20 00 – Concrete Reinforcing.
- .8 Saturate existing concrete with water, with free standing water removed.
- .9 Place concrete in accordance with Section 03 30 00 Cast-in-Place Concrete and Section 03 31 23.13 – High-Performance Structural Concrete for Bridge Decks and as shown on the drawings.

### 3.6 REMOVALS (OTHERS)

- .1 Removals of concrete below stringer bearings and partial depth concrete removals.
  - .1 Survey and reference profile the existing deck prior to and after replacement of stringer bearings.
    - .1 Elevations are to be taken at centre of each stringer bearing.
    - .2 Reference profile survey of existing deck to be taken after Stage 1 deck joint replacement.
  - .2 Existing reinforcement to be retained as indicated.
  - .3 Pneumatic hammers heavier than nominal 14 kg class and "Chipping Hammer" heavier than nominal 7 kg shall not be used within 150 mm of any existing concrete which is to remain in place. Only small chipping hammers shall be used for removal of concrete around reinforcing bars.
  - .4 Pneumatic hammers shall not contact reinforcing steel in a manner that will cause debonding of the reinforcing steel in the adjacent concrete areas that are not being removed.
  - .5 Remove deteriorated, delaminated and all patch concrete to sound concrete.
  - .6 Limits of concrete removal shall be outlined by 25 mm deep saw cuts.
  - .7 All saw cuts shall be made straight and in accordance with the drawings or as directed by the Departmental Representative.
  - .8 Leave existing reinforcement intact as indicated.
  - .9 Do not damage existing reinforcing steel during the removal process.
  - .10 Repair or replace any reinforcing steel structurally compromised during the removal process, as determined by the Departmental Representative, at no extra cost.
  - .11 Trim or bend reinforcement as indicated to satisfy cover requirements.
  - .12 Partially exposed rebar shall be entirely exposed by removal of concrete to a depth of 25 mm around the bar.
  - .13 Expose all corroded reinforcement with section loss at edges of partial and full depth repair area.
  - .14 Do not damage existing stringers, girders or diaphragms during the removal process.
- .2 Existing reinforcement to be retained as identified on the drawings shall be high pressure cleaned to remove all loose concrete and laitance materials.
- .3 Supply and place additional rebar where greater than 20% section loss has occurred to the existing reinforcement. New rebar shall be of matching diameter or as directed by Departmental Representative.
  - .1 Use mechanical couplers acceptable to the Departmental representative or lap spliced in accordance with CSA S6:19 Clause 8.15.10.
  - .2 Mechanical couplers shall develop at least 125% of the specified yield strength of the bar.
- .4 Keep full and partial depth repair boundaries square or rectangular and avoid abrupt changes in width of a given repair area.

- .5 Abrasive blast (minimum 35 MPa/5000 psi) or high-pressure water blast (minimum 35 MPa/5000 psi) to clean the surfaces prior to the placement of new concrete to remove all bruised and fractured concrete and foreign materials such as dirt, dust laitance, sand, grease, oil, concrete slurry and other deleterious materials to the satisfaction of the Departmental Representative.
- .6 Thoroughly clean the roughened surface of existing concrete prior to placing new concrete with oil-free compressed air.
- .7 Prevent detritus from falling beneath the bridge during roughening and cleaning process.
- .8 Contain all water, blast material and concrete debris during all stages of construction in accordance with Section 01 35 43 - Environmental Procedures.
- .9 Place reinforcing steel in accordance with Section 03 20 00 – Concrete Reinforcing.
- .10 Saturate existing concrete with water, with free standing water removed.
- .11 Place concrete in accordance with Section 03 30 00 Cast-in-Place Concrete and as shown on the drawings.

### **3.7 WASTE DISPOSAL**

- .1 All demolished materials are considered waste and to be disposed of outside the National Parks at a certified construction waste landfill or appropriate recycling facility.
  - .1 Contractor to track and provide proof of tracking of number of material loads to recycling.
- .2 Demolished asphalt shall be disposed of immediately following removal. Stockpiling of demolished asphalt is not permitted on site.

### **3.8 CLEANING**

- .1 Waste Management: separate waste materials for recycling.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .2 Designate appropriate security resources / measures to prevent vandalism, damage and theft.
- .3 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project construction.

**END OF SECTION**

**Part 1        General**

**1.1        SUMMARY**

- .1        Comply with requirements of this Section when performing following Work for preparation of faying surfaces at existing steel members:
  - .1        Removal of lead-containing coatings with a chemical gel or paste and fibrous laminated cloth wrap.
  - .2        Removal of lead-containing coatings or materials using a power tool with an effective dust collection system equipped with a HEPA filter.
  - .3        Removal of lead-containing coatings or materials with non-powered hand tool, other than manual scraping and sanding.

**1.2        RELATED REQUIREMENTS**

- .1        Section 01 35 43 – Environmental Procedures.
- .2        Section 05 12 33 – Structural Steel for Bridges.
- .3        Section 09 91 13.23 – Exterior Painting of Structural Steel.

**1.3        MEASUREMENT AND PAYMENT**

- .1        Measurement Procedures.
  - .1        No measurement for payment will be made under this section for preparation of faying surfaces at existing steel members and removal and disposal of lead-base paint. Include costs in Section 05 12 33 – Structural Steel for Bridges.

**1.4        DEFINITIONS**

- .1        HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2        Authorized Visitors: Departmental Representative or designated representative.
- .3        Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects over cuts and tears, and elsewhere as required to provide protection and isolation. For protection of underlying surfaces from damage and to prevent lead dust entering in clean area.
- .4        Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.

- .5 Action level: employee exposure, without regard to use of respirators, to airborne concentration of lead of 50 micrograms per cubic metre of air ( $50 \text{ ug/m}^3$ ) calculated as 8-hour time-weighted average (TWA). Minimum precautions for lead abatement are based on airborne lead concentrations less than 0.05 milligrams per cubic metre of air for removal of lead based paint by methods noted in paragraph 1.1.
- .6 Competent person: individuals and Departmental Representative capable of identifying existing lead hazards in workplace taking corrective measures to eliminate them.
- .7 Lead dust: wipe sampling on vertical surfaces and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.
- .8 Application Specialist: An individual who performs surface preparation and application of protective coatings and linings to steel and concrete surfaces of complex structures.

## 1.5 REFERENCE STANDARDS

- .1 Department of Justice Canada
  - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .2 Health Canada
  - .1 Workplace Hazardous Materials Information System (WHMIS).
    - .1 Safety Data Sheets (SDS).
- .3 Human Resources and Social Development Canada (HRSDC)
  - .1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.
- .4 Transport Canada (TC)
  - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .5 United States Environmental Protection Agency (EPA)
  - .1 EPA 747-R-95-007- 1995, Sampling House Dust for Lead.
- .6 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)
  - .1 NIOSH 94-113 - NIOSH Manual of Analytical Methods (NMAM), 4th Edition (1994).
- .7 U.S. Department of Labour - Occupational Safety and Health Administration (OSHA) - Toxic and Hazardous Substances
  - .1 Lead in Construction Regulation - 29 CFR 1926.62.
- .8 Underwriters' Laboratories of Canada (ULC)

- .9 Province of Alberta
  - .1 Lead at Work Site, Occupational Health and Safety, November 2013.
- .10 The Society for Protective Coatings (SSPC)
  - .1 Commentary on Qualification Procedures (SSPC-QP COM).
- .11 NACE International
  - .1 ANSI/NACE No. 13/SSPC-ACS-1- 2016 -SG, Industrial Coating and Lining Application Specialist Qualification and Certification.

## **1.6 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide proof satisfactory to Departmental Representative that suitable arrangements have been made to dispose of lead based paint waste in accordance with requirements of authority having jurisdiction.
- .3 Provide proof of Contractor's General and Environmental Liability Insurance.
- .4 Provide proposed layout of decontamination systems enclosures and barrier systems.
- .5 Quality Control:
  - .1 Provide Departmental Representative necessary permits for transportation and disposal of lead based paint waste and proof that lead based paint waste has been received and properly disposed of.
  - .2 Provide proof satisfactory to Departmental Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, and aspects of work procedures and protective measures.
- .6 Certificates:
  - .1 Submit certification for Application Specialists to demonstrate compliance to the requirements of SSPC-QP 2 Certification (Field Removal of Hazardous Coatings) or equivalent as per SSPC-QP COM.

## **1.7 QUALITY ASSURANCE**

- .1 Regulatory Requirements: comply with Federal, Provincial, Territorial and local requirements pertaining to lead paint, provided that in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Qualifications:
  - .1 Ensure that 50 % of industrial coating specialists, who perform concrete and steel surfaces preparation and coating applications, are certified by a recognized

Applicator Certification Agency, in accordance with NACE 13 /SSPC ACS-1, Applicator Certification Standard (ACS).

- .2 Maintain a current and valid ACS certification during project period.
  - .1 Application specialists who perform surface preparation and coating application work on this project must have a current ACS.
- .3 Notify Departmental Representative of any change in application specialist certification status.
  - .1 Any delays to the completion of the Project due to invalid certifications will not be considered, and liquidated damages shall not be waived for any non-performance by Contractor.
- .3 Health and Safety:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
  - .2 Safety Requirements: worker and visitor protection.
    - .1 Protective equipment and clothing to be worn by workers and visitors in work Area include:
      - .1 Respirator NIOSH approved and equipped with replaceable HEPA filter cartridges with an assigned protection factor of 10, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure. Provide sufficient amount of filters.
      - .2 Half mask respirator: half-mask particulate respirator with P – series or N - series filter, and 100 % efficiency could be provided.
    - .2 Eating, drinking, chewing, and smoking are not permitted in work area.
    - .3 Ensure workers wash hands and face when leaving work area. Facilities for washing are to be provided.
    - .4 Visitor Protection:
      - .1 Provide approved respirators to Authorized Visitors to work areas.
      - .2 Instruct Authorized Visitors on procedures to be followed in entering and exiting work area.

## 1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
- .2 Disposal of lead waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of lead waste in sealed double thickness 0.15 mm bags or leak proof drums. Label containers with appropriate warning labels.

- .3 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

## **1.9 EXISTING CONDITIONS**

- .1 Presence of lead based paint on the structural steel has not been confirmed but is anticipated based on the age of the structure. Contractor to test and verify prior to starting work.
- .2 Notify Departmental Representative of lead based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Departmental Representative.

## **1.10 SCHEDULING**

- .1 Not later than two days before beginning Work on this Project notify following in writing:
  - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
  - .2 Provincial Ministry of Labour.
  - .3 Disposal Authority.
- .2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.
- .3 Provide Departmental Representative copy of notifications prior to start of Work.

## **1.11 PERSONNEL TRAINING**

- .1 Provide Departmental Representative satisfactory proof that every worker has had instruction and training in hazards of lead exposure, in personal hygiene, in aspects of work procedures, and in use, cleaning, and disposal of respirators.
- .2 Instruction and training related to respirators includes, at minimum:
  - .1 Proper fitting of equipment.
  - .2 Inspection and maintenance of equipment.
  - .3 Disinfecting of equipment.
  - .4 Limitations of equipment.
- .3 Instruction and training must be provided by competent, qualified person.
- .4 Supervisory personnel to complete required training.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Polyethylene 0.15 mm thick unless otherwise specified; in sheet size to minimize joints.
- .2 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.
- .3 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual lead paint residue.
- .4 Lead waste containers: metal type acceptable to dump operator with tightly fitting covers and 0.15 mm thickness sealable polyethylene liners.
  - .1 Label containers with pre-printed bilingual cautionary **Warning Lead** clearly visible when ready for removal to disposal site.

## **Part 3 Execution**

### **3.1 SUPERVISION**

- .1 One Supervisor for every ten workers is required.
- .2 Supervisor must remain within work area during disturbance, removal, or handling of lead based paints.

### **3.2 PREPARATION**

- .1 Remove and store items to be salvaged or reused.
  - .1 Protect and wrap items and transport and store in area specified by Departmental Representative.
- .2 Work Area:
  - .1 Clean work area using HEPA vacuum. If not practicable, use wet cleaning method. Do not raise dust.
  - .2 Seal off openings with polyethylene sheeting and seal with tape.
  - .3 Protect floor surfaces covered from wall to wall with polyethylene sheets.
  - .4 Maintain emergency exits or establish alternatives satisfactory to Authority having jurisdiction.
  - .5 Where water application is required for wetting lead containing materials, provide temporary water supply appropriately sized for application of water as required. Contain and dispose of contaminated water in accordance with Section 01 35 43 – Environmental Procedures.

- .6 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical cables and equipment
- .3 Do not start work until:
  - .1 Arrangements have been made for disposal of waste.
  - .2 Tools, equipment, and materials waste containers are on site.
  - .3 Notifications have been completed and preparatory steps have been taken.

### 3.3 LEAD ABATEMENT

- .1 Removal of lead-containing coatings with a chemical gel or paste and fibrous laminated cloth wrap; or removal equipped with HEPA filters; or removal with using power tools non-powered hand tool, other than manual scraping and sanding.
- .2 Remove lead based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.
- .3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to staging area. Clean external surfaces thoroughly again by wet sponging. Wash containers thoroughly pending removal to outside. Ensure containers are removed by workers who have entered from uncontaminated areas dressed in clean coveralls.
- .4 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.
- .5 After wire brushing and wet sponging to remove visible lead based paint, and after encapsulating lead containing material impossible to remove, wet clean entire work area, and equipment used in process. After inspection by Departmental Representative apply coating in accordance with Section 05 12 33 – Structural Steel for Bridges and 09 91 13.23 – Exterior Painting of Structural. Steel .

### 3.4 INSPECTION

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by Departmental Representative will result in work stoppage, at no cost to Owner.
- .2 Departmental Representative will inspect work for:
  - .1 Adherence to specific procedures and materials.
  - .2 Final cleanliness and completion.
  - .3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

### **3.5 FINAL CLEANUP**

- .1 Following cleaning and when lead wipe surfaces sampling are below acceptable concentrations, proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

### **3.6 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS**

- .1 Repair or replace objects damaged in course of work to their original state or better, as directed by Departmental Representative.

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 03 20 00 – Concrete Reinforcing.
- .3 Section 03 30 00 – Cast-In-Place Concrete.
- .4 Section 03 31 23.13 – High-performance Structural Concrete for Bridge Decks.

**1.2 PRICE AND PAYMENT PROCEDURES**

- .1 No measurement will be made under this Section.
- .2 Include formwork costs in items of concrete work in Section 03 30 00 – Cast-In-Place Concrete.

**1.3 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
  - .1 CSA-A23.1 /A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CAN/CSA-O86, Engineering Design in Wood.
  - .3 CSA O121, Douglas Fir Plywood.
  - .4 CSA O151, Canadian Softwood Plywood.
  - .5 CSA O153, Poplar Plywood.
  - .6 CAN/CSA-O325.0, Construction Sheathing.
  - .7 CSA O437 Series, Standards for OSB and Waferboard.
  - .8 CSA S269.1, Falsework and Formwork.
  - .9 CAN/CSA-S269.3, Concrete Formwork.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in formwork liners and coatings and include product characteristics, performance criteria, physical size, finish, and limitations.
  - .2 Submit copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Submit shop drawings for formwork and falsework.
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.

- .2 Prepare Shop Drawings in accordance with CSA S269.1 for formwork and falsework.
- .3 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.
- .4 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts.
- .5 Indicate sequence of erection and removal of formwork and falsework.
- .6 Include the following information on falsework Shop Drawings:
  - .1 Longitudinal, lateral, vertical, dead, live and impact loads used in design.
  - .2 Safe bearing capacity of soil underneath mud sills.
  - .3 Maximum column, post and support loads.
  - .4 Deflection diagrams for beams with deflection of 10 mm or more.
  - .5 Deflection diagrams indicating initial and final elevation of deck surfaces, roofs and soffits.
  - .6 Grade of structural steel.
  - .7 Indicate steel posts, girders, beams, connections, bracing and welding, providing sufficient detail for safe performance of falsework.
  - .8 Fully detailed steel frame shoring.
  - .9 Species, grades and sizes of wood.
  - .10 Type and weight of equipment (moving or stationary) supported by falsework.
  - .11 Sequence, methods and rate of concrete placement.
  - .12 Proprietary equipment, adequately identified for checking purposes.
  - .13 Full details and locations of splices.

## **1.5 QUALITY ASSURANCE**

- .1 Quality Assurance: in accordance with Section 01 45 00- Quality Control.
- .2 Retain a professional engineer registered or licensed in Province of Alberta, Canada, with experience in formwork and falsework design of comparable complexity and scope, to perform following services as part of Work of this Section:
  - .1 Design of formwork and falsework.
  - .2 Review, stamp, and sign fabrication and erection Shop Drawings, design calculations and amendments.
  - .3 Conduct on-site inspections and prepare and submit inspection reports verifying this part of Work is in accordance with Contract Documents and reviewed Shop Drawings. Perform inspections a minimum of once per month.

## **1.6 DELIVERY, STORAGE AND HANDLING**

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

- .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect formwork from damages.
- .3 Replace defective or damaged materials with new.
- .3 Waste Management and Disposal:
  - .1 Separate waste materials for recycling.
  - .2 Place materials defined as hazardous or toxic in designated containers.
  - .3 Divert wood materials from landfill to a composting, recycling or reuse facility outside of the National Parks.
  - .4 Divert plastic materials from landfill to a reuse or recycling facility outside of the National Parks.
  - .5 Divert unused form release material from landfill to an official hazardous material collections site outside of the National Parks.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Formwork materials:
  - .1 Forms for unexposed surfaces are at the discretion of the Contractor subject to approval of the Departmental Representative.
  - .2 Forms for exposed surfaces shall be new materials, made of "Coated Formply", consisting of Douglas Fir substrate with resin-impregnated paper overlay and factory treated chemically active release agent.
  - .3 All form material for exposed surfaces shall be full-sized sheets, as practical.
  - .4 The re-use of any forms must have the acceptance of the Departmental Representative.
- .2 The minimum acceptable forming for all exposed concrete shall have 18 mm approved plywood, supported at 300 mm maximum on centres. Strong-backs or walers placed perpendicularly to the supports shall be employed to ensure straightness of the form.
- .3 Metal bolts or anchorages within the forms shall be so constructed as to permit their removal to a depth of at least 50 mm from the concrete surface.
- .4 Break-back type form ties shall have all spacing washers removed and the tie shall be broken back a distance of at least 20 mm from the concrete surface.
- .5 All fittings for metal ties shall be of such design that, upon their removal, the cavities which are left will be of the smallest possible size. Torch cutting of steel hangers and ties will not be permitted. Formwork hangers for exterior surfaces of decks and curbs shall be an acceptable break-back type with surface cone, or removable threaded type.
- .6 Cavities shall be filled with cement mortar and the surface left sound, smooth, even, uniform in colour.

- .7 Form release agent: Proprietary, non volatile material not to stain concrete or impair subsequent application of finishes or coatings to surface of concrete, derived from agricultural sources, non petroleum containing, non-toxic, low VOC, biodegradable.
- .8 Falsework material shall conform to CSA S269.1.

### **Part 3 Execution**

#### **3.1 FABRICATION AND ERECTION**

- .1 Verify lines, levels, and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.
- .3 Do not place shores and mud sills on frozen ground.
- .4 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .6 Align form joints and make watertight.
  - .1 Keep form joints to minimum.
- .7 Use 20 mm chamfer strips on external corners and/or 20 mm fillets at interior corners, joints, unless specified otherwise.
- .8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .9 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
  - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .10 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

#### **3.2 REMOVAL AND RESHORING**

- .1 Leave formwork in place for following minimum periods of time after placing concrete. If formwork is removed prior to the end of the curing period required by CSA-A23.1/A23.2, the exposed concrete surfaces shall be protected by other accepted method of curing as provided in CSA-A23.1/A23.2.
  - .1 Seven (7) days for slabs, decks and other structural members.
  - .2 Three (3) days for abutments, return walls and barriers.
- .2 Remove formwork when concrete has reached 70% of its 28 day design strength or minimum period noted above, whichever comes later.
- .3 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2 and approval of Departmental Representative.

**3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .3 Waste Management: separate waste materials for recycling.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 03 10 00 – Concrete Forming and Accessories.
- .3 Section 03 30 00 – Cast-In-Place Concrete.
- .4 Section 05 12 33 – Structural Steel for Bridges.

**1.2 PRICE AND PAYMENT PROCEDURES**

- .1 Measurement and Payment:
  - .1 Measure Grade 400W, black reinforcing steel in kilograms of steel incorporated into Work, computed from theoretical unit mass specified in CSA-G30.18 for lengths and sizes of bars as indicated or authorized in writing by Departmental Representative. Payment will be made under "**Unit Price Item – Reinforcing Steel – Grade 400W, Black**".
    - .1 Installation of black reinforcing bars drilled and anchored into existing concrete will not be measured but considered incidental to work.
    - .2 All labour and materials required for installation of reinforcing steel including but not limited to tie wire, bolsters, chairs and supports will not be measured but considered incidental to the works.
  - .2 No measurement for payment will be made under this section for reinforcing steel incorporated into new concrete below stringer bearings. Include costs in Section 05 12 33 – Structural Steel for Bridges.
  - .3 No measurement for payment will be made under this section for post-tensioning rods as part of the external Post-Tensioning assembly of the pier caps. Include costs in Section 05 12 33 – Structural Steel for Bridges.

**1.3 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2 ASTM A143/A143M, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
  - .3 ASTM A276/276M, Standard Specification for Stainless Steel Bars and Shapes
  - .4 ASTM A615/A615M, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
  - .5 ASTM A641/A641M, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

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- .6 ASTM A722/A722M, Standard Specification for High-Strength Steel Bars for Prestressed Concrete.
  - .7 ASTM A955/A955M, Standard Specification for Deformed and Plain Stainless Steel Bars for Concrete Reinforcement.
  - .8 ASTM A1022/A1022M, Standard Specification for Deformed and Plan Stainless Steel Wire and Welded Wire for Concrete Reinforcement.
  - .9 ASTM A1064/A1064M, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
  - .10 ASTM F2329/F2329M, Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.
- .2 CSA Group
    - .1 CSA S6:19, Canadian Highway Bridge Design Code.
    - .2 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
    - .3 CSA A283, Qualification code for concrete testing laboratories.
    - .4 CAN/CSA-A23.3, Design of Concrete Structures.
    - .5 CSA-G30.18, Carbon Steel Bars for Concrete Reinforcement.
    - .6 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
    - .7 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 Reinforcing Steel Institute of Canada (RSIC)
    - .1 RSIC, Reinforcing Steel Manual of Standard Practice.

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: in accordance with Section 01 31 19 - Project Meetings, convene pre-installation meeting one week prior to beginning concrete works.
  - .1 Ensure key personnel, Departmental Representative attend.
    - .1 Verify project requirements.

#### 1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish, and limitations.
  - .2 When Chromate solution used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by Departmental Representative prior to its use.

- .3 Submit copies of WHMIS Safety Data Sheet (SDS) in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.
    - .1 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
    - .2 Indicate placing of reinforcement and:
      - .1 Bar bending details.
      - .2 Lists.
      - .3 Quantities of reinforcement.
      - .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.
      - .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
    - .3 Detail lap lengths and bar development lengths to CSA S6:19, unless otherwise indicated.
  - .4 Quality Assurance Submittals:
    - .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.
    - .2 Mill Test Report: submit to Departmental Representative certified copies of mill test reports of reinforcing steel and of prestressing steel, minimum 4 weeks prior to beginning reinforcing work.
    - .3 Submit in writing to Departmental Representative proposed source of reinforcement material.

## 1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

**Part 2 Products****2.1 MATERIALS**

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, Grade 400W, low alloy steel, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Stainless Reinforcing Steel: Shall be of the following designations as defined by the Unified Numbering System (UNS):
  - .1 S31653
  - .2 S31603
  - .3 S31803
  - .4 S30400
  - .5 S32304
- .4 Stainless reinforcing shall meet the requirements of ASTM A276 and ASTM A955/A955M (including Annex 1.2 or 1.3). The minimum yield strength shall be 420 MPa.
- .5 Unless otherwise specified, only one type of stainless reinforcing steel shall be supplied for use throughout the project.
- .6 Galvanized Post-Tensioning rods: to ASTM A722.
  - .1 Galvanizing: to ASTM A123/A123M.
- .7 Cold-drawn annealed steel wire ties: to ASTM A1064/A1064M.
- .8 Chairs, bolsters, bar supports, spacers: to CSA A23.1/A23.2.
- .9 Tie wire: 1.5 mm diameter annealed wire.
- .10 Mechanical splices: subject to approval of Departmental Representative.

**2.2 FABRICATION**

- .1 Fabricate reinforcing steel in accordance with CSA A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

**2.3 SOURCE QUALITY CONTROL**

- .1 Provide Departmental Representative with certified copies of mill test reports of reinforcing steel and of prestressing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
- .2 Inform Departmental Representative of proposed source of supplied material.

**Part 3 Execution****3.1 PREPARATION**

- .1 Galvanizing to include chromate treatment.
  - .1 Duration of treatment 1 hour per 25 mm of bar diameter.
- .2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

**3.2 FIELD BENDING**

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars, which develop cracks or splits.

**3.3 PLACING REINFORCEMENT**

- .1 Place reinforcing steel as indicated on placing drawings in accordance with CSA A23.1/A23.2.
- .2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .3 Maintain cover to reinforcement during concrete pour.

**3.4 FIELD TOUCH-UP**

- .1 Touch up damaged and cut ends of galvanized reinforcing steel with compatible finish to provide continuous coating.

**3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .3 Waste Management: separate waste materials for recycling.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 16 – Structure Demolition.
- .2 Section 03 10 00 – Concrete Forming and Accessories.
- .3 Section 03 20 00 – Concrete Reinforcing.
- .4 Section 03 31 23.13 – High-performance Structural Concrete for Bridge Decks.
- .5 Section 05 12 33 – Structural Steel for Bridges.

**1.2 PRICE AND PAYMENT PROCEDURES**

- .1 Measurement and Payment:
  - .1 Measure cast-in-place concrete in cubic metres calculated from neat dimensions as indicated. Payment will be made under the applicable item of "**Unit Price Item – Concrete – Class C-XL**".
    - .1 Concrete placed beyond dimensions indicated not measured.
  - .2 No deductions will be made for volume of concrete displaced by reinforcing steel, structural steel, or piles.
  - .3 No deductions will be made for volume of concrete less than 0.1 m<sup>2</sup> in cross sectional area displaced by individual drainage openings.
  - .4 Supply and installation of cast-in-place bolts, couplers, anchors, nuts, and anchor plates will not be measured but considered incidental to work.
  - .5 Supply and installation of joint fillers and joint sealers, Evazote, conduits, and junction boxes will not be measured but considered incidental to work.
- .2 No measurement for payment will be made under this section for new concrete below stringer bearings. Include costs in Section 05 12 33 – Structural Steel for Bridges.
- .3 No measurement for payment will be made under this section for new concrete for partial depth repairs. Include costs in Section 02 41 16 – Structure Demolition.
- .4 No measurement for payment will be made under this section for surface preparation. Include costs in Section 02 41 16 – Structure Demolition.

**1.3 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
  - .2 ASTM A307M, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.
  - .3 ASTM C 157/C157M Standard Test Method For Length Change of Hardened Hydraulic Cement Mortar and Concrete.

- .4 ASTM C260/C260M, Standard Specification for Air-Entraining Admixtures for Concrete.
  - .5 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
  - .6 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
  - .7 ASTM C 881/C881M, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
  - .8 ASTM C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
  - .9 ASTM C C1059/C1059M, Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete.
  - .10 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
  - .11 ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
  - .12 ASTM D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
  - .13 ASTM D1752, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
  - .14 ASTM F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- .2 CSA Group
- .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA A283, Qualification Code for Concrete Testing Laboratories.
  - .3 CSA A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
  - .4 CAN/CSA-G40.20/G20.21, General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.
  - .5 CSA S6, Canadian Highway Bridge Design Code.
  - .6 CSA W59, Welded Steel Construction (Metal Arc Welding)

## 1.4 ABBREVIATIONS AND ACRONYMS

- .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement types:
  - .1 GU, GUb and GUL - General use cement.
  - .2 MS and MSb - Moderate sulphate-resistant cement.
  - .3 MH, MHb and MHL - Moderate heat of hydration cement.
  - .4 HE, HEb and HEL - High early-strength cement.

- .5 LH, LHb and LHL - Low heat of hydration cement.
- .6 HS and HSb - High sulphate-resistant cement.
- .2 Fly ash types:
  - .1 F - with CaO content maximum 15%.
  - .2 CI - with CaO content 15 to 20%.
  - .3 CH - with CaO minimum 20%.
- .1 Other Supplementary Cementitious Materials (SCM) types:
  - .1 GGBFS - Ground, granulated blast-furnace slag.

## 1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: in accordance with Section 01 31 19 - Project Meetings, convene pre-installation meeting one (1) week prior to beginning concrete works.
  - .1 Ensure key personnel, site supervisor, Departmental Representative, speciality contractor - finishing, forming, concrete producer attend.
    - .1 Verify project requirements.

## 1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.
- .3 Site Quality Control Submittals:
  - .1 Provide testing results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters found.
  - .2 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - SITE QUALITY CONTROL.
  - .3 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete delivered to site of Work and discharged after batching.

## 1.7 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00- Quality Control.
- .2 Provide Departmental Representative, minimum four (4) weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.

- .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture meet specified requirements.
- .3 At least four (4) weeks prior to beginning Work, inform Departmental Representative of source of fly ash.
  - .1 Changing source of fly ash without written approval of Departmental Representative is prohibited.
- .4 Minimum four (4) weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:
  - .1 Falsework erection.
  - .2 Hot weather concrete.
  - .3 Cold weather concrete.
  - .4 Curing.
  - .5 Finishes.
  - .6 Formwork removal.
  - .7 Joints.
- .5 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

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

- .1 Delivery and Acceptance Requirements:
  - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
    - .1 Modifying maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2. is prohibited.
    - .2 Deviations submitted for review by Departmental Representative.
    - .3 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
- .2 Store cementitious products clear of earth or concrete floors, away from walls and in weatherproof enclosures in accordance with Section 01 61 00 – Common Product Requirements.
- .3 Packaging Waste Management: remove for reuse pallets, crates, padding, and packaging materials in accordance with Section 01 74 00 - Cleaning.

## **1.9 SITE CONDITIONS**

- .1 Placing concrete during rain or weather events that could damage concrete is prohibited.
- .2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2.
- .3 Cold weather protection:

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- .1 Maintain protection equipment, in readiness on Site.
- .2 Use such equipment when ambient temperature below 5°C, or when temperature may fall below 5°C before concrete cured.
- .3 Placing concrete upon or against surface at temperature below 5°C is prohibited.
- .4 Hot weather protection:
  - .1 Protect concrete from direct sunlight when ambient temperature above 27°C.
  - .2 Prevent forms of getting too hot before concrete placed. Apply accepted methods of cooling not to affect concrete adversely.
- .5 Protect from drying.

## **Part 2 Products**

### **2.1 DESIGN CRITERIA**

- .1 Alternative 1 - Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

### **2.2 PERFORMANCE CRITERIA**

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

### **2.3 MATERIALS**

- .1 Portland Cement: to CSA A3001, Type GU.
- .2 Blended hydraulic cement: Type GUB to CSA A3001.
- .3 Supplementary cementing materials: with maximum 15% Type F fly ash replacement, by mass of total cementitious materials to CSA A3001.
- .4 Water: to CSA A23.1.
- .5 Aggregates: to CSA A23.1/A23.2.
- .6 Admixtures:
  - .1 Air entraining admixture: to ASTM C260.
  - .2 Chemical admixture: to ASTM C494. Departmental Representative to approve all proposed admixtures, including accelerating or set retarding admixtures during cold and hot weather placing. Contractor to submit certified mix design that contains proposed admixture in proposed dosage. Submitted certification to include verification that the proportions selected will produce concrete of the performance specified.
- .7 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2.
  - .1 Compressive strength: 20 MPa after 48 hours, 45 MPa after 28 days.
  - .2 Net shrinkage at 28 days: maximum 0.01%.

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- .8 Curing compound: to CSA A23.1/A23.2.
- .9 Evaporation Retarder: to CSA A23.1/A23.2.
  - .1 Departmental Representative to approve use of evaporation retarder. Evaporation retarder will not be permitted to be used as a finishing aid or to be worked into the concrete surface.
- .10 Premoulded joint fillers:
  - .1 Bituminous impregnated fibre board: to ASTM D1751.
- .11 Epoxy Grout: as indicated.
- .12 Anchor Rods and Anchor Bolts: as indicated.
- .13 Sealant for barrier control joints: as indicated.
- .14 Sealant for barrier joints: as indicated.

## 2.4 MIXES

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
  - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
  - .2 Provide concrete mix to meet following plastic state requirements:
    - .1 Uniformity: as required by CSA A23.1/A23.2.
    - .2 Workability: free of segregation, surface blemishes, loss of mortar and colour variations.
  - .3 Provide concrete mix to meet following hard state requirements:
    - .1 Durability and class of exposure: C-XL.
    - .2 Compressive strength at 28 days age: 45 MPa minimum.
    - .3 Intended application: Bridge deck (including deck joint blockouts), sidewalk curbs, abutment back wall tops and barriers.
    - .4 Aggregate size:
      - .1 10 mm maximum for bridge deck (including deck joint blockouts), sidewalk curbs and back wall tops.
      - .2 20 mm maximum elsewhere.
  - .4 Provide concrete mix to meet following hard state requirements:
    - .1 Durability and class of exposure: C-1.
    - .2 Compressive strength at 28 days age: 35 MPa minimum.
    - .3 Intended application: new concrete below stringer bearings, substructure partial depth repairs
      - .1 Except for new concrete below stringer bearings at CL bridge. Concrete for these locations as specified on design drawing.
    - .4 Aggregate size:
      - .1 10 mm maximum for partial depth repairs.
      - .2 20 mm maximum elsewhere.

- .5 Shrinkage-compensating: for new concrete below stringer bearings and for partial depth repairs.
- .6 Dry mix concrete may be used for small concrete volumes if approved by Departmental Representative in writing.
- .5 Provide quality management plan to ensure verification of concrete quality to specified performance.
- .6 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

### **Part 3 Execution**

#### **3.1 PREPARATION**

- .1 Obtain Departmental Representative's written approval before placing concrete.
  - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00- Concrete Reinforcing.
- .3 During concreting operations:
  - .1 Development of cold joints not allowed.
  - .2 Ensure concrete delivery and handling facilitate placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Pumping of concrete is permitted only after approval of equipment and mix by Departmental Representative.
- .5 Disturbing reinforcement and inserts during concrete placement is prohibited.
  - .1 Anchor studs in concrete for new stringer bearings to be secured prior to concrete placement.
- .6 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing.
- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application for concrete finishes.
- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quantity of concrete placed, quality, workability, air content, temperature and test samples taken.
- .10 In locations where new concrete dowelled to existing work, drill holes in existing concrete.
  - .1 Holes shall be hammer drilled.
  - .2 No damage permitted to existing reinforcement during drilling. Use pachometer, or alternate method acceptable to the Departmental Representative, to locate existing reinforcement prior to drilling.
  - .3 Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and install in accordance with Manufacturer's instructions and hold dowels in positions as indicated.

- .11 Do not place load upon new concrete until authorized by Departmental Representative.

### 3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Sleeves and inserts:
  - .1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by Departmental Representative.
  - .2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
  - .3 Sleeves and openings greater than 100 x 100 mm not indicated, must be reviewed by Departmental Representative.
  - .4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Departmental Representative before placing of concrete.
  - .5 Confirm locations and sizes of sleeves and openings shown on drawings.
  - .6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts and rods:
  - .1 Set anchor bolts and rods to templates in co-ordination with appropriate trade prior to placing concrete.
- .4 Grout under base plates using procedures in accordance with manufacturer's recommendations which result in 100% contact over grouted area.
- .5 Finishing and curing:
  - .1 Finish concrete to CSA A23.1/A23.2.
    - Schedule:
      - .1 Concrete deck (including deck joint blockouts) – transverse tined
        - .1 The tining shall create transverse grooves 3 mm wide by 1.5 mm to 3 mm deep at 20 mm centre-to-centre spacing.
        - .2 Concrete deck shall have a steel trowel finish at the gutter, within 300 mm of the inside face of the barrier.
      - .2 Concrete deck at construction joint with cast-in-place barriers – surface to be kept rough as indicated.
      - .3 Bridge Sidewalk: Finish in accordance with Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.
      - .4 Soffit and fascia of concrete deck – smooth form finish.
      - .5 Sidewalk curb at bicycle railing:
        - .1 Inner surface – sack rubbed finished.
        - .2 Top surface – floated form finish.
        - .3 Outer surface -smooth form finish.

- .6 Abutments:
    - .1 Top surface of return wall tops - floated surface finish.
    - .2 Vertical surfaces of abutment modifications - smooth form finish.
  - .7 Barrier surfaces (all) – sack rubbed finish.
  - .8 Pier cap:
    - .1 Vertical surfaces - smooth form finish.
    - .2 Top surface – ordinary surface finish (rough).
  - .9 Partial depth repairs:
    - .1 Vertical surfaces - smooth form finish.
  - .2 Use procedures as reviewed by Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface not damaged.
  - .3 Cure concrete in accordance with CSA A23.1/23.2.
  - .6 Joint fillers:
    - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative.
    - .2 When more than one piece required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
    - .3 Locate and form construction and expansion joints as indicated.
    - .4 Install joint filler.
- 3.3 SURFACE TOLERANCE**
- .1 Concrete tolerance to CSA A23.1 to tolerance schedule as indicated.
    - .1 Deck, abutment modifications and barriers: less than 3mm gap under a 3m straightedge.
- 3.4 SITE QUALITY CONTROL**
- .1 Site tests: conduct tests as follows in accordance with Section 01 45 00- Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
    - .1 Concrete pours.
    - .2 Slump.
    - .3 Air content.
    - .4 Compressive strength at 7 and 28 days.
    - .5 Air and concrete temperature.
    - .6 Linear shrinkage at 35 days (for shrinkage-compensating concrete only).
    - .7 Other.
  - .2 Inspection and testing of concrete and concrete materials carried out by testing laboratory designated by Departmental Representative for review to CSA A23.1/A23.2.
    - .1 Ensure testing laboratory certified to CSA A283.

- .3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.
- .4 Frequency of testing compressive strength:
  - .1 Not less than two (2) tests for every 30m<sup>3</sup> concrete placed, with no fewer than two (2) tests for each class of concrete placed on any one day.
  - .2 A compressive strength test shall consist of a minimum of four standard test specimens, sampled, made, cured, and tested in accordance with CSA Standards.
    - .1 One cylinder shall be tested at 7 days.
    - .2 The 28 day test results shall be the average of the strengths of the remaining three specimens.
- .5 Take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .6 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.
- .7 Frequency of testing for slump, air content, and concrete temperature:
  - .1 Test every load unless approved otherwise by Departmental Representative.
- .8 Frequency of testing for linear shrinkage:
  - .1 Test every load of shrinkage-compensating concrete unless approved otherwise by Departmental Representative.
- .9 Inspection or testing by Consultant not to augment or replace Contractor quality control nor relieve Contractor of contractual responsibility.

### 3.5 PROTECTION

- .1 Protection and curing for high-performance structural concrete shall be in accordance with Section 03 31 23.13 – High Performance Structural Concrete for Bridge Decks.
- .2 Protection and curing for all other concrete shall be in accordance with this section.
- .3 Protection and curing shall comply with CSA A23.1/A23.2.
- .4 Unformed surfaces: cure with burlap and water.
  - .1 Place two layers of damp burlap on surface of concrete.
  - .2 Overlap each strip by minimum 75 mm and secure against displacement by wind.
  - .3 Maintain burlap in place and keep thoroughly wet for seven days after placement.
- .5 Formed surfaces:
  - .1 No additional curing will be required if formwork is left in place for seven days or more.
  - .2 If formwork removed in less than seven days, cure in manner specified for unformed surfaces for remainder of seven day period.
- .6 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.

- .7 Protection and curing for concrete placed between October 01 and May 01 shall comply with following requirements in addition to cold weather requirements of CSA A23.1/A23.2.
- .1 Protect concrete with windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete.
  - .2 Do not let walls of shelter touch formwork.
  - .3 Provide sufficient space for removal of formwork for finishing.
  - .4 Use heating equipment approved by Departmental Representative.
  - .5 Vent products of combustion outside protective shelter: equipment to be capable of keeping inside air at constant temperature sufficiently high to maintain concrete at following curing temperatures:
    - .1 For initial 3 days: minimum temperature of 15 degrees C, maximum of 27 degrees C at concrete surfaces.
    - .2 For concrete piers, abutments and footings: cure at 10 degrees C for additional 4 days.
  - .6 Keep concrete surfaces continually moist while protected.
  - .7 Provide fogging equipment to allow for mist spray curing before start of deck pour.

### 3.6 CLEANING

- .1 Clean in accordance with Section 01 74 00- Cleaning.
- .2 Waste Management: separate waste materials for recycling.

**END OF SECTION**

**Part 1 General**

**1.1 HIGH-PERFORMANCE STRUCTURAL CONCRETE FOR BRIDGE DECKS**

- .1 Includes:
  - .1 Concrete deck joint blockouts, sidewalk curbs and cast-in-place concrete for barriers.

**1.2 RELATED REQUIREMENTS**

- .1 Section 03 10 00 – Concrete Forming and Accessories.
- .2 Section 03 20 00 – Concrete Reinforcing.
- .3 Section 03 30 00 – Cast-in-Place Concrete.

**1.3 MEASUREMENT PROCEDURES**

- .1 No measurement will be made under this section.
  - .1 Include costs of items in Section 03 30 00 - Cast-in-Place Concrete.

**1.4 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
  - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

**1.5 ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for recycling.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Divert unused plasticizers, water-reducing agents and air-entraining agents materials from landfill to official hazardous material collections site as reviewed by the Departmental Representative.
- .4 Unused plasticizers, water-reducing agents and air-entraining agents materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

**Part 2 Products****2.1 MATERIALS**

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Reinforcing steel: in accordance with Section 03 20 00- Concrete Reinforcement.

**Part 3 Execution****3.1 PREPARATION**

- .1 Deck Preparation:
  - .1 Removal of existing Stage 1 deck joints in accordance with Section 02 41 16 - Structure Demolition.

**3.2 CONSTRUCTION**

- .1 Do concrete Work in accordance with Section 03 30 00 - Cast-in-Place Concrete and this section.
- .2 Place concrete at temperatures limits to CSA-A23.1/A23.2.
- .3 Do not place concrete:
  - .1 When air temperature is above 22 degrees C.
  - .2 During rain or excessive wind or dust.
  - .3 When conditions, as reviewed by Departmental Representative seem detrimental to concrete.
- .4 When air temperature falls below 5 degrees C, comply with cold weather requirements.
- .5 Maintain temperature of concrete during discharge between 10 degrees C and 18 degrees C unless permitted otherwise by Departmental Representative.
  - .1 Maintain temperature of mix below maximum temperature of 18 degrees C by adding ice to mix which does not alter design water-cement ratio.
- .6 Thoroughly clean the roughened surface of existing concrete prior to placing new concrete with oil-free compressed air.
- .7 Immediately prior to placing concrete, thoroughly wet down substrates with clean water with no standing water left prior to placement of concrete.
- .8 Consolidate deck concrete with mechanical vibration even when vibratory drum type finishing machines are used.
- .9 Cast and finish deck with mechanical bridge deck finisher, approved by Departmental Representative.
- .10 Ensure that rate of placing is sufficient to complete proposed placing, finishing and curing operations within scheduled time.

- .11 Ensure that experienced finishing machine operators and concrete finishers are provided to finish deck.
- .12 Immediately prior to placing, check falsework and make necessary adjustments.
- .13 Immediately after concrete has been placed and consolidated, strike off surface.
  - .1 Correct immediately improper adjustment and operation which results in unsatisfactory consolidation and smoothness.
  - .2 Unsatisfactory performance may be cause for rejection of equipment and removal of concrete in place.
- .14 Following completion of strike off by hand methods, float roadway slab surface longitudinally to smooth uniform surface with hand-operated wood float boards 3.5 to 5 m long, minimum 25 mm thick, minimum 200 mm wide, ribbed and trussed as necessary to provide rigid float, and equipped with adjustable handles at each end.
  - .1 Provide adjusting screws spaced at maximum 600 mm centres between float board and rib.
  - .2 Maintain float board true to line and free of twist.
- .15 Use floats to remove roughness and minor irregularities left by strike board or finishing machine and to seal concrete surface to approval of Departmental Representative.
- .16 Finishing bridge deck slab:
  - .1 When concrete has hardened sufficiently to prevent dislodgement of coarse aggregate particles, give surface uniform transverse tined finish free from porous spots, irregularities, depressions, small pockets or rough spots.
  - .2 Tine freshly placed pavement as soon as practicable after floating.
- .17 Finishing bridge sidewalk slab:
  - .1 Float finish as necessary to produce a smooth surface. The surface shall not vary more than 3mm under a 3m long straight edge.
  - .2 After the concrete has set sufficiently, give surface transverse broomed finish using a coarse broom to produce regular corrugations to a maximum depth of 2mm.
  - .3 Use bronze edging tool at all edges and expansion joints.

### 3.3 PROTECTION

- .1 Protection and curing shall comply with CSA-A23.1/A23.2, including Annex I.
- .2 Unformed surfaces: cure with burlap and water.
  - .1 Burlap must be presoaked by immersing it in water for a period of at least 24 h immediately prior to placing.
  - .2 Place two layers of damp burlap on surface of concrete.
  - .3 Overlap each strip by minimum 150 mm and secure against displacement by wind.
  - .4 Maintain burlap in place and keep thoroughly wet for seven days after placement.

- .3 Formed surfaces:
  - .1 No additional curing will be required if formwork is left in place for seven days or more.
  - .2 If formwork is removed in less than seven days, cure in manner specified for unformed surfaces for remainder of seven day period.
- .4 During curing period, only uncover areas needed for finish treatment. Re-cover and continue curing.
- .5 Protection and curing for concrete placed between October 01 and May 01 shall comply with following requirements in addition to cold weather requirements of CSA-A23.1/A23.2.
  - .1 Protect concrete with windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete.
  - .2 Do not let walls of shelter touch formwork.
  - .3 Provide sufficient space for removal of formwork for finishing.
  - .4 Use heating equipment approved by Departmental Representative.
  - .5 Vent products of combustion outside protective shelter: equipment to be capable of keeping inside air at constant temperature sufficiently high to maintain concrete at following curing temperatures:
    - .1 For initial 3 days: minimum temperature of 15 degrees C, maximum of 27 degrees C at concrete surfaces.
    - .2 For superstructure (including concrete deck overlay, partial depth deck patch repairs, deck joint blockouts, sidewalk curbs and cast-in-place concrete for barriers): maintain concrete at 10 degrees C for additional 14 days.
  - .6 Keep concrete surfaces continually moist while protected.
  - .7 Provide fogging equipment to allow for mist spray curing before start of bridge deck pour.

**END OF SECTION**

**Part 1            General****1.1                RELATED REQUIREMENTS**

- .1        Section 02 41 16 – Structure Demolition.
- .2        Section 02 83 10 – Lead Base Paint Abatement – Minimum Precautions.
- .3        Section 03 10 00 – Concrete Forming and Accessories.
- .4        Section 03 20 00 – Concrete Reinforcing.
- .5        Section 03 30 00 – Cast-in-Place Concrete.
- .6        Section 03 31 23.13 – High-Performance Structural Concrete for Bridge Decks.
- .7        Section 09 91 13.23 – Exterior Painting of Structural Steel.

**1.2                PRICE AND PAYMENT PROCEDURES**

- .1        Measure delivery, and installation of deck edge protection angle, including studs, in linear metres. Payment will be made under "**Unit Price Item –Stage 1 Deck Edge Protection Angle**".
- .2        Measure supply, fabrication, delivery and installation of steel plow protection plate at barriers, including studs and anchors in linear metres. Payment will be made under "**Unit Price Item –Steel Plow Protection Plate at Stage 1 Barrier Expansion Joints**".
- .3        Measure delivery and installation of barrier expansion joint cover plates in number of cover plates incorporated into Work, including embedded plates, bolts, studs and anchors. Payment will be made under "**Unit Price Item –Stage 1 Barrier Expansion Joint Cover Plate**".
  - .1        Removal and disposal of existing temporary Stage 1 barrier expansion joint cover plates will not be measured but considered incidental to work.
  - .2        Sealing of existing Stage 1 barrier joints and barrier control joints will not be measured but considered incidental to work.
- .4        Measure delivery and installation of new roadway deck joints at piers and at abutments in metres of joint incorporated into Work, including neoprene seal, nuts, bolts, washers and studs. Payment will be made under "**Unit Price Item –Stage 1 Roadway Deck Joints**".
  - .1        Cleaning of existing Stage 2 roadway deck joints from debris accumulation and checking of existing partially installed joint seal for damages will not be measured but considered incidental to work.
  - .2        Field splicing of Stage 1 roadway deck joints to previously installed Stage 2 roadway deck joints in accordance with manufacturers requirements and deck joint shop drawings will not be measured but considered incidental to work.
  - .3        Completion of joint seal install in one continuous length will not be measured but considered incidental to work.

- .5 Measure delivery and installation of new sidewalk deck joints in metres of joint incorporated into Work, including neoprene seal, nuts, bolts, washers and studs. Payment will be made under "**Unit Price Item –Stage 1 Sidewalk Deck Joints**".
- .1 Include delivery and installation of hinged deck joint cover plates into unit price of Stage 1 sidewalk deck joint.
  - .2 Include supply, delivery and installation of specified concrete anchors for joint cover plate into unit price of Stage 1 sidewalk deck joint.
- .6 Measure delivery and installation of sidewalk curb expansion joint cover plate in number of cover plates incorporated into Work, including embedded plates, bolts, and studs. Payment will be made under "**Unit Price Item –Stage 1 Sidewalk Curb Cover Plate**".
- .1 Include curb cover plates at abutments and curb cover plates along pier pylons into unit price of Stage 1 sidewalk curb cover plate.
  - .2 Include supply, delivery and installation of specified concrete anchors for sidewalk curb cover plates into unit price of Stage 1 sidewalk curb cover plate.
- .7 Measure delivery and installation of railing gap filler profiles (HSS 102x51x3.2) at the piers (Stage 1) in number of railing gap filler profiles incorporated into Work, including anchors, nuts, bolts and washers. Payment will be made under "**Unit Price Item –Stage 1 Installation of Railing Gap Filler Profile at Piers**".
- .1 Include supply, delivery and installation of specified concrete anchors into unit price of railing gap filler profile.
  - .2 Include closing railing holes at all pier pylon end post assemblies and painting of all end post assemblies of former railing at pier pylon into unit price of railing gap filler profile.
- .8 Measure delivery and installation of main span diaphragm modifications at piers in number of modifications incorporated into Work, including beveled washers. Payment will be made under "**Unit Price Item – Installation of Diaphragm Modifications at Piers**".
- .1 Unit Price to Include:
    - .1 Preparation of faying surfaces at existing diaphragm as described in PART 3 - Preparation.
    - .2 Zinc metallizing of faying surfaces at existing diaphragm in accordance with ASTM B833.
    - .3 Supply, delivery and installation of specified nuts, bolts, and washers.
- .9 Measure supply, fabrication, delivery and installation of shear key assemblies in number of shear key assemblies incorporated into Work, including anchors, nuts, bolts, washers, stainless steel plates and PTFE pads. Payment will be made under "**Unit Price Item – Supply and Installation of new Shear Key Assemblies at Pier Caps**".
- .1 Unit Price to Include:
    - .1 Preparation of faying surfaces at existing diaphragm as described in PART 3 - Preparation.
    - .2 Zinc metallizing of faying surfaces at existing diaphragm in accordance with ASTM B833.

- .10 Measure supply, fabrication, delivery and installation of stringer bearings in number of bearing assemblies incorporated into Work, including plates, bars, anchors, studs, nuts, bolts and washers. Payment will be made under "**Unit Price Item – Supply and Installation of new Stringer Bearings at North and South Piers**".
- .1 Unit Price to Include:
- .1 Local demolition, removal and disposal of concrete below stringer bearings, including surface preparation for new concrete.
  - .2 Removal and disposal of existing stringer bearings, including removal and disposal of top end of existing anchor rods.
  - .3 Surface preparation of underside of stringer flange in contact area with new bearing sole plate.
  - .4 Supply and placement of new concrete, including formwork, supply and placement of additional reinforcement, and installation of anchor studs.
  - .5 Surface preparation for field welding.
  - .6 Supply and placement of grout underneath the base plate.
  - .7 Survey of deck elevations above stringer bearings prior to and after stringer bearing replacement.
- .11 Measure supply, fabrication, delivery and installation of pier cap Post-Tensioning assemblies in number of pier caps with Post-Tensioning assemblies incorporated into Work, including Post-Tensioning rods, nuts, washers and anchor plates. Payment will be made under "**Unit Price Item –Supply and Installation of External Post-Tensioning at Pier Caps**".
- .12 Measure supply, fabrication, delivery and installation of spandrel column modifications in number of spandrel columns modified, including nuts, bolts and washers. Payment will be made under "**Unit Price Item –Supply and Installation of Spandrel Column Modifications**".
- .1 Unit Price to Include:
- .1 Coating of new steel components as described in Section 09 91 13.23 – Exterior Painting of Structural Steel.
  - .2 Preparation of faying surfaces at existing spandrel columns as described in PART 3 - Preparation.
  - .3 Coating of faying surfaces at existing spandrel columns as described in Section 09 91 13.23 – Exterior Painting of Structural Steel.
- .13 Measure supply, fabrication, delivery and installation of arch rib modifications in number of arch rib segments modified, including nuts, bolts and washers. Payment will be made under "**Unit Price Item –Supply and Installation of Arch Rib Modifications**".
- .1 Unit Price to Include:
- .1 Coating of new steel components as described in Section 09 91 13.23 – Exterior Painting of Structural Steel.
  - .2 Preparation of faying surfaces at existing arch ribs as described in PART 3 - Preparation.
  - .3 Coating of faying surfaces at existing arch ribs as described in Section 09 91 13.23 – Exterior Painting of Structural Steel.

**1.3 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  - .2 ASTM A143, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
  - .3 ASTM A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
  - .4 ASTM A722/A722M, Standard Specification for High-Strength Steel Bars for Prestressed Concrete.
  - .1 ASTM A780M, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
  - .2 ASTM F1554, Standard Specification for Anchor Bolts, Steel 36, 55, and 105-ksi Yield Strength.
  - .3 ASTM F3125/F3125M, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
  - .4 ASTM A449M, Standard Specification for Hex Cap Screws, Bolts and Studs Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use (Metric).
  - .5 ASTM B833, Specification for Zinc and Zinc Alloy Wire for Thermal Spraying (Metallizing) for the Corrosion Protection of Steel.
  - .6 ASTM D2240, Standard Test Method for Rubber Property—Durometer Hardness.
  - .7 ASTM D4894, Standard Specification for Polytetrafluoroethylene (PTFE) Granular Molding and Ram Extrusion Materials
- .2 CSA International
  - .1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CSA S6, Canadian Highway Bridge Design Code.
  - .4 CSA S16, Design of Steel Structures.
  - .5 CSA S269.1, Falsework and formwork.
  - .6 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
  - .7 CSA W59, Welded Steel Construction, (Metal Arc Welding).
- .3 Alberta Transportation Standard Specifications for Highway Construction (latest edition), referred herein as AT Standard Specifications.
- .4 British Columbia Ministry of Transportation Standard Specifications for Highway Construction (latest edition), referred to herein as BC MoTI Standard Specifications.

- .5 American Architectural Manufacturers Association (AAMA) 2605 (latest edition).
- .6 The Society for Protective Coatings (SSPC)
  - .1 SSPC/NACE Joint Surface Preparation Standard-2012, Waterjet Cleaning of Metals SSPC-SP WJ-4/NACE WJ-4 Light Cleaning.
  - .2 SSPC-QP 6, Standard Procedure for Evaluating the Qualifications of Contractors Who Apply Thermal Spray (Metallizing) for Corrosion Protection of Steel and Concrete Structures.
  - .3 SSPC-SP 11, Power Tool Cleaning to Bare Metal.
  - .4 SSPC Commentary on Qualification Procedures (SSPC-QP COM).
- .7 AWS C2.23M/C2.23:2018, NACE NO.12, SSPC CS-23, Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminum, Zinc, and Their Alloys and Composites for the Corrosion Protection of Steel.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-Installation Meetings:
  - .1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installation, with Departmental Representative in accordance with Section 01 31 19 - Project Meetings to:
    - .1 Verify project requirements.
    - .2 Review installation and substrate conditions.
    - .3 Co-ordination with other building subtrades.
    - .4 Review written installation instructions and warranty requirements.
  - .2 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work.
  - .3 Hold project meetings every week.
  - .4 Ensure key personnel attend.
  - .5 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.
  - .6 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work.

#### **1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit the following items in accordance with Section 01 33 00 - Submittal Procedures:
  - .1 Written evidence of that the fabricator's qualifications for steel fabrication meet the requirements of CSA W47.1, Division 1 or 2 approved by Canadian Welding Bureau (CWB), in accordance with CSA S6, Canadian Highway Bridge Design Code.
  - .2 Written evidence of that the thermal spray zinc applicator has SSPC-QP 6 Certification (Contractor Metallizing Accreditation) or equivalent as per SSPC-QP COM.

- .3 Submit detailed stringer bearing replacement sequence to Departmental Representative before commencing works.
- .3 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for structural steel (including mill certificates) and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .4 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta, Canada.
  - .2 Shop drawings to include pertinent dimensions, quantities, weights, material grades, fabrication details, connection details, lifting and erection devices, unit identification marks, finishes and erection details.
  - .3 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, rivets and welds. Indicate welds by CSA W59, welding symbols.
  - .4 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.
  - .5 Prepare and submit a written procedure for installation of shear key assembly, stringer bearing replacement, external pier cap post-tensioning, spandrel column modification and arch rib modifications at least two (2) weeks prior to commencement of Work.
    - .1 Include traffic restrictions.
    - .2 Include staging.

## 1.6 QUALIFICATIONS

- .1 Welding companies shall be certified to CSA-W47.1 (Division 1 or 2) in accordance with CSA S6, Canadian Highway Bridge Design Code.
- .2 Thermal spray zinc applicator shall be certified to SSPC-QP6 or equivalent.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .1 Ensure Departmental Representative has delivery schedules 7 days minimum prior to shipping.
- .3 Storage and Handling Requirements:
  - .1 Provide protective blocking for lifting, transportation and storing.
  - .2 Exercise care during fabrication, transportation and erection as not to damage fabricated members.

- .1 Do not notch edges of members.
- .2 Do not cause excessive stresses.
- .3 Mark mass on members weighing more than 3 tonnes.
- .4 Protect unpainted weathering steel, before erection, with waterproof covering.
- .5 Ensure that no portion of steel comes into contact with ground.
  - .1 Replace defective or damaged materials with new.

## 1.8 QUALITY ASSURANCE

- .1 Preconstruction Testing:
  - .1 Provide suitable facilities and cooperate with Departmental Representative in carrying out inspection and tests required.

## 1.9 CERTIFICATIONS AND GUARANTEES

- .1 In accordance with Section 01 78 00 – Closeout Submittals.

## Part 2 Products

### 2.1 MATERIALS

- .1 Structural steel: to CSA G40.20/G40.21, grade and types as indicated on the Contract Drawings or as noted following:
  - .1 Leave atmospheric corrosive resistant steel and connections material in unpainted state, include bolts, nuts, washers and weld deposits of compatible weathering characteristics.
- .2 High strength bolts, nuts and washers: to ASTM F3125/F3125M, Grade A325. Bolts to ASTM F3125, Grade 490 shall be approved by Departmental Representative.
- .3 Anchor bolts, washers and nuts: as indicated.
- .4 Post-Tensioning rods: to ASTM A722.
- .5 Threaded studs: as indicated.
- .6 Stud shear connectors: to CSA W59, Section 6 and Annex H.
- .7 Welding electrodes: to CSA W48 series.
- .8 Hot dip galvanizing: to ASTM A123/A123M or CSA G164 unless noted otherwise, minimum zinc coating of 600g/m<sup>2</sup>.
- .9 Zinc metallizing (faying surfaces of existing deck diaphragm): to ASTM B833
  - .1 Thickness of zinc metallizing as indicated.
- .10 Concrete anchors: as indicated.
- .11 Elastomer: as indicated.
- .12 Steel laminae: as indicated.
- .13 Stainless steel: to ASTM A240/A240M.

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- .14 Sheet PTFE: as indicated.
- .15 Coatings: as indicated.
- .16 Shrinkage compensating grout: as indicated.
- .17 Epoxy Adhesive: as indicated.

## **2.2 SOURCE QUALITY CONTROL**

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 Steel producer qualifications: certified in accordance with CSA G40.20/G40.21.
- .3 Provide Departmental Representative with certified copies of quality control tests related to this project as specified in CAN/CSA G40.21.
- .4 Provide records from in-house quality control programme based upon plant certification requirements to the Departmental Representative for inspection and review.
- .5 Provide suitable facilities and co-operate with Departmental Representative in carrying out inspection and tests required.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for structural steel installation in accordance with manufacturer's written instructions.
  - .1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 PREPARATION**

- .1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.
- .2 Verify location of substructure units, elevations of bearing seats and location of anchor bolts before erection of structural steel; report discrepancies to Departmental Representative.
- .3 Work near river banks or embankments in accordance with Section 01 35 29.06 – Health and Safety Requirements.
- .4 Surface preparation of faying surfaces (spandrel column and arch rib modifications):
  - .1 Test surfaces of existing steel members for lead based paint.
  - .2 Clean surfaces of existing steel members according SSPC-SP11. Comply with Section 02 83 10 – Lead Base Paint Abatement – Minimum Precautions.

- .3 Clean and surfaces of new steel as described in Section 09 91 13.23 – Exterior Painting of Structural Steel.
- .5 Metallizing of faying surfaces (existing deck diaphragm): as indicated.
- .6 Coating of faying surfaces (spandrel column and arch rib modifications): as indicated and in accordance with Section 09 91 13.23 – Painting of Structural Steel.
- .7 Surface preparation of contact areas between stringer flanges and new bearing sole plates:
  - .1 Test surfaces of existing steel members for lead based paint.
  - .2 Clean surfaces at underside of stringer flange according SSPC-SP15. Comply with Section 02 83 10 – Lead Base Paint Abatement – Minimum Precautions.
  - .3 Coating of contact areas at underside stinger flanges: as indicated and in accordance with Section 09 91 13.23 – Painting of Structural Steel.
- .8 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any unit.
  - .1 Enlarge holes if necessary by reaming only after receipt of written approval from Departmental Representative.
  - .2 Ensure reamed holes are 2 mm maximum larger than bolt size used.
- .9 Fabricate and install bearings as indicated.
- .10 Place anchor bolts, anchor rods and anchor studs (threaded studs) at elevations and locations indicated.
  - .1 Anchor studs (threaded studs) in concrete for new stringer bearings to be secured prior to concrete placement.
  - .2 Protect holes against entry of water and foreign material.
  - .3 Provide heating and protection as directed by Departmental Representative and completely fill space around anchor bolts with concrete or grout as specified.
- .11 Prepare areas for field welding in accordance with CSA W59.

### 3.3 INSTALLATION

- .1 Do falsework in accordance to CSA S269.1.
- .2 Survey deck elevations above stringer bearings prior to and after stringer bearing replacement.
- .3 Do fabrication and erection of structural steel in accordance with CSA S6, Canadian Highway Bridge Design Code.
- .4 Do welding in accordance with CSA W59, except where specified otherwise.
  - .1 For CSA G40.20/G40.21, grade 350A steel, deposited weld metal to have Charpy V-Notch value not lower than that of steel.
  - .2 Do welding in shop unless otherwise permitted by Departmental Representative or specifically indicated.
  - .3 Weld only at locations indicated.

- .4 Welding of galvanized steel not permitted. Fabricate prior to galvanizing or remove galvanizing where welding will occur. Repair areas damaged by welding by metallizing per ASTM A780, method A3.
- .5 High strength bolting: in accordance with CSA S6. Use 'turn-of-nut' tightening method.
- .6 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.
- .7 Allowable tolerance for bolt holes:
- .1 Matching holes for bolts to line up so that dowel 2 mm less in diameter than hole passes freely through assembled members at right angles to such members.
  - .2 Finish holes not more than 2 mm in diameter larger than diameter of bolt unless otherwise specified by Departmental Representative.
  - .3 Centre-to-centre distance between any two holes of group to vary by not more than 1 mm from dimensioned distance between such holes.
  - .4 Centre-to-centre distance between any two groups of holes to vary not more than maximum of the following:
- | Centre-to-Centre distance in metres | Tolerance in plus or minus mm |
|-------------------------------------|-------------------------------|
| less than 10                        | 1                             |
| 10 to 20                            | 2                             |
| 20 to 30                            | 3                             |
- .5 Correct mispunched or misdrilled members only as directed by Departmental Representative.
- .8 Shop splices:
- .1 Use complete joint penetration groove welds finished flush.
  - .2 Details of butt joints to CSA W59.
  - .3 Use only when approved by Departmental Representative.
- .9 Camber and Sweep:
- .1 Maximum permissible variation in straightness of welded T-section for spandrel column modification after fabrication:  $L/1000$
  - .2 Record measurements of camber and sweep.
  - .3 Advise Departmental Representative immediately when camber or sweep of fabricated member is greater than specified tolerances.
  - .4 Submit proposal for corrective measures.
  - .5 Undertake remedial measures as approved by Departmental Representative.
- .10 Mark members in accordance with CSA G40.20/G40.21.
- .1 Do not use die stamping.
  - .2 Place marking at locations hidden when viewed from exterior after erection when steel is to be left in unpainted condition.
- .11 Match marking: shop mark bearing assemblies.
- .12 Deck Joints:
- .1 Recess deck joints and barrier joint cover plates as shown on the drawings.

- .2 Install deck joints in accordance with manufacturer recommendations and as directed by the Departmental Representative.
- .3 Splice Stage 1 deck joint to previously installed Stage 2 deck joint in accordance with manufacturer recommendations and deck joint shop drawings.
- .4 Leak test deck joints following installation to the satisfaction of the Departmental Representative.

### **3.4 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
  - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, protecting and cleaning of steel.
  - .2 Submit manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
  - .3 Ensure manufacturer's representative is present before installation, during critical periods of installation and during construction of field joints.
  - .4 Schedule site visits:
    - .1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.
    - .2 Upon completion of the Work, after cleaning is carried out.

### **3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .3 Waste Management: separate waste materials for recycling.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General****1.1 RELATED REQUIREMENTS**

- .1 Section 02 83 10 – Lead Base Paint Abatement – Minimum Precautions.
- .2 Section 05 12 33 – Structural Steel for Bridges.

**1.2 PRICE AND PAYMENT PROCEDURES**

- .1 No measurement for payment will be made under this section for cleaning and preparation of structural steel and components, supply of paint, application of paint, shop painting and field painting. Include costs in Section 05 12 33 – Structural Steel for Bridges.

**1.3 DEFINITIONS**

- .1 Application Specialist: An individual who performs surface preparation and application of protective coatings and linings to steel and concrete surfaces of complex structures.

**1.4 REFERENCE STANDARDS**

- .1 The Master Painters Institute (MPI)
  - .1 Exterior Structural Steel and Metal Fabrications,
    - .1 EXT 5.1D, Alkyd.
    - .2 EXT 5.1G, Polyurethane, Pigmented (over epoxy zinc rich primer and high build epoxy).
  - .2 Environmental Choice Program (ECP)
    - .1 CCD-047, Architectural Surface Coatings.
    - .2 CCD-048, Surface Coatings - Recycled Water-borne.
  - .3 Federal Standard (FS)
    - .1 FED-STD-595B, Colours Used in Government Procurement.
  - .4 The Society for Protective Coatings (SSPC)
    - .1 SSPC-SP 1, Solvent Cleaning.
    - .2 SSPC-SP 2, Hand Tool Cleaning.
    - .3 SSPC-SP 3, Power Tool Cleaning.
    - .4 SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning.
    - .5 SSPC-SP 7/NACE No. 4, Brush-off Blast Cleaning.
    - .6 SSPC-Vis-1, Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs) Editorial Changes September 1, 2000 (Steel Structures Painting Manual, Chapter 2 - Surface Preparation Specs.).

- .7 SSPC-SP 10/NACE No. 2, Near White Blast Cleaning.
- .8 SSPC-SP 11, Power Tool Cleaning to Bare Metal.
- .9 SSPC-PA 2, Measurement of Dry Coat Thickness with Magnetic Gauges.
- .10 SSPC Good Painting Practices, Volume 1, 4th Edition.
- .11 SSPC Commentary on Qualification Procedures (SSPC-QP COM).
- .5 NACE International
  - .1 NACE International
    - .1 ANSI/NACE No. 13/SSPC-ACS-1-SG, Industrial Coating and Lining Application Specialist Qualification and Certification.

## 1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Provide manufacturer's instructions, printed product literature and data sheets for painting exterior metal surfaces and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit 2 copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Samples:
  - .1 Provide for review and acceptance of each unit.
    - .1 Provide 1L sample for review and acceptance of each unit two weeks prior to application.
  - .2 Samples will be returned for inclusion into work.
  - .3 Paints that do not appear on MPI Approved Products List must be approved by Departmental Representative before use on project. When it is proposed to use non-qualified paint, provide 2 L sample of paint to Departmental Representative at least 16 weeks prior to commencement of painting for analysis and acceptance. Mark samples with name of project, its location, paint manufacturer's name and address, name of paint, MPI standard number and manufacturers paint code number.
    - .1 Color of second coat to match colour of existing structure. Colours according to FS-595B. Submit to Departmental Representative for review.
  - .4 Enable Departmental Representative to take 1 L samples of each paint delivered to site, one sample from manufacturer's containers and one sample from painters' pot.
- .4 Certificates:
  - .1 Provide product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
    - .1 Include test certificates for each coating used on a faying surface.

- .2 Submit certification for Application Specialists to demonstrate compliance to the requirements of SSPC-QP 1 Certification (Field Application to Complex Industrial and Marine Structures) or equivalent as per SSPC-QP COM.
- .3 Submit certification for Application Specialists to demonstrate compliance to the requirements of SSPC-QP 3 Certification (Shop Painting Accreditation Program) or equivalent as per SSPC-QP COM.
- .5 Test Reports:
  - .1 Provide test reports showing compliance with specified performance characteristics and physical properties and in accordance with Section 01 45 00 - Quality Control.

## 1.6 QUALITY ASSURANCE

- .1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Qualifications:
  - .1 Ensure that 50% of industrial coating specialists, who perform concrete and steel surfaces preparation and coating applications, are certified by a recognized Applicator Certification Agency, in accordance with NACE 13 /SSPC ACS-1, Applicator Certification Standard (ACS).
  - .2 Maintain a current and valid ACS certification during project period.
    - .1 Application specialists who perform surface preparation and coating application work on this project must have a current ACS.
  - .3 Notify Departmental Representative of any change in application specialist certification status.
    - .1 Any delays to the completion of the Project due to invalid certifications will not be considered, and liquidated damages shall not be waived for any non-performance by Contractor.

## 1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

## Part 2 Products

### 2.1 MATERIALS

- .1 Paint:
  - .1 Sustainability Characteristics:

- .1 VOC limit: to CCD-047 and CCD-048.
- .2 Ensure paint does not contain chemical restrictions to CCD-047 and CCD-048.
- .2 New metal surfaces, excluding faying surfaces:
  - .1 Primer MPI #19: primer, exterior for steel – Shop Applied:
    - .1 Primer for second coat: tinted sufficiently off finish colour of first coat to show where second coat is applied.
    - .2 Tinting material: compatible with primer and not detrimental to its service life.
  - .2 Primer MPI #20: primer, exterior for steel – Field Applied.
    - .1 Primer for second coat: tinted sufficiently off finish colour of first coat to show where second coat is applied.
    - .2 Tinting material: compatible with primer and not detrimental to its service life.
  - .3 Second coat MPI #108: epoxy, high built, low gloss, exterior for steel
    - .1 Colour to match colour of existing structure. Colours according FS-595B.
- .3 Faying surfaces of both new and existing metal surfaces:
  - .1 Class A coating according S6:19, Tab. 10.8 or better.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for painting exterior metal surfaces installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Carry out tests to determine existence of lead base paint on existing exterior metal surfaces.
  - .3 Presence of lead is anticipated. Refer to Section 02 83 10 – Lead Base Paint Abatement – Minimum Precautions.
  - .4 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .5 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

#### **3.2 PREPARATION**

- .1 Remove existing loose and rusted paint from exterior metal surfaces.
- .2 New metal surfaces:

- .1 Clean surfaces of new metal to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and foreign substances in accordance with the following:
  - .1 Near White Blast Cleaning: to SSPC-SP 10 / NACE No. 2
- .3 Metal surfaces to be repainted:
  - .1 Applies to faying surfaces of existing members for spandrel modifications and arch rib modifications. Excludes faying surfaces of bolted connections for new shear key at pier cap which is to be metallized.
  - .2 Clean surfaces by removing paint, rust, mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with following.
    - .1 Power tool cleaning to bare metal: to SSPC-SP 11
  - .3 Scrape edges of old paint back to sound material where remaining paint is thick and sound, feather exposed edges.
- .4 Compressed air to be free of water and oil before reaching nozzle.
- .5 Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, by blowing with clean dry compressed air, or by vacuum cleaning.
- .6 Apply paint after prepared surfaces have been accepted by Departmental Representative.
- .7 Prior to starting paint application ensure degree of cleanliness of surfaces is to SSPC-Vis 1.
  - .1 Apply primer, paint, or pretreatment after surface has been cleaned and before deterioration of surface occurs.
  - .2 Clean surfaces again if rusting occurs after completion of surface preparation.
- .8 Mixing paint:
  - .1 Do not dilute or thin paint for brush application.
  - .2 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.
  - .3 Do not mix or keep paint in suspension by means of air bubbling through paint.
  - .4 Thin paint for spraying according to manufacturer's written instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.
- .9 Number of paint coats:
  - .1 New metal surfaces.
    - .1 Shop: primer coat to minimum dry film thickness according to manufacturer's instructions.
    - .2 Field: second coat to minimum dry film thickness according to manufacturer's instructions. Field painting to be completed after erection.
  - .2 Faying Surfaces (new and existing metal surfaces):

- .1 Coating system applied in accordance with manufacturer's instructions.

### 3.3 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Apply paint by spraying, brushing, or combination of both. Use sheepskins or daubers when no other method is practical in places of difficult access.
- .3 Use dipping or roller coating method of application when specifically authorized by Departmental Representative in writing.
- .4 Caulk open seams at contact surfaces of built up members with material approved by Departmental Representative, before second coat is applied.
- .5 Where surface to be painted is not under cover, do not apply paint when:
  - .1 Air temperature is below 5 degrees C or when temperature is expected to drop to 0 degrees C before paint has dried.
  - .2 Temperature of surface is over 50 degrees C unless paint is specifically formulated for application at high temperatures.
  - .3 Fog or mist occur at site; it is raining or snowing; there is danger of rain or snow; relative humidity is above 85%.
  - .4 Surface to be painted is wet, damp or frosted.
  - .5 Previous coat is not dry.
- .6 Supply cover when paint must be applied in damp or cold weather. Supply, shelter, or heat surface and surrounding air to comply with temperature and humidity conditions specified. Protect until paint is dry or until weather conditions are suitable.
- .7 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
- .8 Apply each coat of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .9 Brush application:
  - .1 Work paint into cracks, crevices and corners and paint surfaces not accessible to brushes by spray, daubers or sheepskins.
  - .2 Brush out runs and sags.
  - .3 Remove runs, sags and brush marks from finished work and repaint.
- .10 Spray application:

- .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
  - .2 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.
  - .3 Keep paint ingredients properly mixed in spray pots or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
  - .4 Apply paint in uniform layer, with overlapping at edges of spray pattern.
  - .5 Brush out immediately runs and sags.
  - .6 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray. In areas not accessible to spray gun, use brushes, daubers or sheepskins.
  - .7 Remove runs, sags and brush marks from finished work and repaint.
- .11 Shop painting:
- .1 Do shop painting after fabrication and before damage to surface occurs from weather or other exposure.
  - .2 Spray paint contact surfaces of field assembled, bolted, friction type joints with primer coat only. Do not brush primer after spraying.
  - .3 Do not paint metal surfaces which are to be embedded in concrete.
  - .4 Paint metal surfaces to be in contact with wood with either full paint coats specified or three shop coats of specified primer.
  - .5 Do not paint metal within 50 mm of edge to be welded. Give unprotected steel one coat of boiled linseed oil or other approved protective coating after shop fabrication is completed.
  - .6 Remove weld spatter before painting. Remove weld slag and flux by methods as specified in paragraph 3.2.3 Metal Surfaces to be Repainted.
  - .7 Protect machine finished or similar surfaces that are not to be painted but that do require protection, with coating approved by Departmental Representative.
  - .8 Copy previous erection marks and weight marks on areas that have been shop painted.
- .12 Field painting:
- .1 Paint steel structures as soon as practical after erection.
  - .2 Touch up metal which has been shop coated with same type of paint and to same thickness as shop coat. This touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.
  - .3 Field paint surfaces (other than joint contact surfaces of new steel) which are accessible before erection but which are not to be accessible after erection.
  - .4 Apply final coat of paint after work is completed or as directed by Departmental Representative. If other operations damage paint, clean and repaint damaged area. Remove concrete spatter and droppings before paint is applied.

.5 Where painting does not meet with requirements of specifications, and when so directed by Departmental Representative remove defective paint, thoroughly clean affected surfaces and repaint in accordance with these specifications.

.13 Handling painted metal:

- .1 Handle painted metal after paint has dried, or when necessary for handling for painting or stacking for drying.
- .2 Scrape off and touch up paint which is damaged in handling, with same number of coats and kinds of paint as were previously applied to metal.

### **3.4 FIELD QUALITY CONTROL**

.1 Site Tests, Inspections:

- .1 Upon completion of the painting procedures test for dry film reading and evaluate the results as per SSPC-PA 2.

### **3.5 CLEANING**

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

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

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

### **3.6 PROTECTION**

.1 Protect painted surfaces from damage during construction.

.2 Protection of surfaces:

- .1 Protect surfaces not to receive paint.
- .2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.
- .3 Protect cleaned and freshly painted surfaces from dust to approval of Departmental Representative.

.3 Repair damage to adjacent materials caused by painting exterior metal surface application installation.

**END OF SECTION**

**Part 1 General****1.1 DESCRIPTION**

- .1 Supply and installation and of permanent regulatory and custom traffic signs as required to complete the Work as specified in the Contract Documents and as directed by the Departmental Representative.

**1.2 REFERENCES**

- .1 Parks Canada Exterior Signage Standards and Guidelines (latest edition)
- .2 ASTM A276, Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
- .3 ASTM B209M, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .4 ASTM B210M, Specification for Aluminum-Alloy Drawn Seamless Tubes.
- .5 ASTM B211M, Specification for Aluminum and Aluminum-Alloy Bar, Rods and Wire.
- .6 CAN/CSA-G40.21 Structural Quality Steels.
- .7 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .8 CAN/CSA-O80 Series, Wood Preservation.
- .9 CSA O121M, Douglas Fir Plywood.
- .10 CSA W47.2, Certification of Companies for Fusion Welding of Aluminum.
- .11 CGSB1-GP-12c-65, Standard Paint Colours:
- .12 CAN/CGSB-1.28, Alkyd, Exterior House Paint.
- .13 CAN/CGSB-1.59, Alkyd, Exterior Gloss Enamel.
- .14 CAN/CGSB-1.94-M89, Xylene Thinner (Xylol).
- .15 CAN/CGSB-1.99-92, Exterior and Marine Phenolic Resin Varnish.
- .16 CAN/CGSB-1.104-M91, Semigloss Alkyd Air Drying and Baking Enamel.
- .17 CAN/CGSB-1.132-M90, Zinc Chromate Primer, Low Moisture Sensitivity.
- .18 CGSB 1-GP-189M-78, Primer, Alkyd, Wood, Exterior.
- .19 CGSB 31-GP-3M-88, Corrosion Preventive Compound, Cold Application, Soft Film.
- .20 CGSB 62-GP-9M-80, Prefabricated Markings, Positionable, Exterior, for Aircraft Ground Equipment and Facilities.
- .21 CGSB 62-GP-11M-78, Marking Material, Retroreflective, Enclosed Lens, Adhesive Backing.
- .22 AT – Standard Specifications for Highway Construction (latest edition).

**1.3 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Measure for payment for supply and installation of signs and posts will be based on each complete unit installed in accordance with the Contract Documents and accepted by the Departmental Representative.
  - .1 Payment will be made under “**Unit Price Item – Traffic Signage – Supply and Install Cyclist Signage**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
  - .2 Items considered incidental to the Work include but are not limited to:
    - .1 Survey and layout.
    - .2 Hot-dipped galvanizing of all miscellaneous hardware.
    - .3 Bilingual signage requirements as detailed in the Contract Documents.
    - .4 Locating utilities prior to commencing the Works.
    - .5 Landscaping around sign bases.
    - .6 Disposal of damaged items as directed by the Departmental Representative.

**1.4 SUBMITTALS**

- .1 In accordance with Section 01 33 00 Submittal Procedures.

**1.5 QUALITY CONTROL**

- .1 In accordance with Section 01 45 00 - Quality Control.

**1.6 DELIVERY, STORAGE, AND HANDLING**

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

**1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

**Part 2 Products****2.1 MATERIALS**

- .1 The Contractor is responsible for supplying all materials associated with the installation of signage.
- .2 Traffic signs and posts shall be supplied and installed in accordance with AT Standard Specification for Highway Construction (latest edition), unless specified otherwise in the Contract Documents.
- .3 Signs posts and other requirements to be in accordance with the Contract Documents.
- .4 All custom signs to be accepted by the Departmental Representative prior to ordering.
  - .1 Pictorial sign: B-R-101-2.
  - .2 'CYCLIST STOP AND DISMOUNT' sign: B-R-101-Tb.

- .5 All signs (permanent and temporary) shall be in both English and French. Translations to be accepted by the Departmental Representative prior to ordering.

### **Part 3 Execution**

#### **3.1 INSTALLATION**

- .1 In accordance with AT Standard Specification for Highway Construction (latest edition).
- .2 Load, haul and install supplied single post and aluminum signs in the following manner:
  - .1 Locating power / telephone / gas lines / services / utilities at all proposed sign locations.
  - .2 Perform layout and verify measurements to ensure signs are installed as per the Contract Documents.
  - .3 Adjust the post height, as required, by using a pipe cutter or cut off saw in accordance with AT Standard Specification for Highway Construction (latest edition). The Contractor will measure existing elevations at each site and calculate the cuts needed.
  - .4 The Contractor is responsible for hauling all materials to and from each work site.
  - .5 Landscape so the top of the base is flush or 50 mm above finished grade.
  - .6 Remove all excess material from site, including boulders larger than 100 mm.
- .3 All signs are to be covered until the Departmental Representative advises to uncover.

**END OF SECTION**

**Part 1 General****1.1 DESCRIPTION**

- .1 Supply and application of a liquid asphalt to an absorbent surface to waterproof and promote bonding between the surface being primed and the Asphalt Concrete Pavement in accordance with the Contract Document and as directed by the Departmental Representative.

**1.2 REFERENCES**

- .1 AT - Standard Specifications for Highway Construction (latest edition)
- .2 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM D140, Standard Practice for Sampling Bituminous Materials.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-16.1-M89, Cutback Asphalts for Road Purposes.
  - .2 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

**1.3 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 If required, supply, delivery and application of asphalt prime, as directed by Departmental Representative, will not be measured separately and will be incidental to “**Unit Price Item – Asphalt Concrete Pavement (EPS)**” and shall include all labour, equipment and material to satisfactorily complete this item of work.

**1.4 SUBMITTALS**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two 1 L samples of asphalt prime proposed for use in new, clean, air tight sealed, wide mouth, bottles made with plastic, to Departmental Representative, at least 2 weeks prior to commencing work.
- .3 Sample asphalt prime coat materials in accordance with ASTM D140.
- .4 Provide access on tank truck for Departmental Representative to sample asphalt material to be incorporated into Work, in accordance with ASTM D140.

**1.5 QUALITY CONTROL**

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 Upon request from Departmental Representative, submit manufacturer's test data and certification that asphalt prime material meets requirements of this Section.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

**1.7 DELIVERY, STORAGE AND HANDLING**

- .1 In accordance with Section 01 61 00 - Common Product Requirements.

- .2 Deliver, store and handle materials to ASTM D140.
- .3 Provide, maintain and restore asphalt storage area.

## **Part 2 Products**

### **2.1 MATERIAL**

- .1 Asphalt material: to CAN/CGSB-16.1 grade: RM-20, MC-30, MC-250.  
CAN/CGSB-16.2 grade: SS-1.
- .2 Sand blotter: clean granular material passing 4.75 mm sieve and free from organic matter or other deleterious materials.
- .3 Water: clean, potable, free from foreign matter.

### **2.2 EQUIPMENT**

- .1 Pressure distributor to be:
  - .1 Designed, equipped, maintained and operated so that asphalt material can be:
  - .2 Maintained at even temperature.
  - .3 Applied uniformly on variable widths of surface up to 5 m.
  - .4 Applied at controlled rates from 0.2 to 5.4 L/m<sup>2</sup> with uniform pressure, and allowable variation from any specified rate not exceeding 0.1 L/m<sup>2</sup>.
  - .5 Distributed in uniform spray without atomization at temperature required.
  - .6 Equipped with meter registering metres of travel per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
  - .7 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
  - .8 Equipped with easily read, accurate and sensitive device that registers temperature of liquid in reservoir.
  - .9 Equipped with accurate volume measuring device or calibrated tank.
  - .10 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
  - .11 Equipped with nozzle spray bar, with operational height adjustment.
  - .12 Cleaned if previously used with incompatible asphalt material.

## **Part 3 Execution**

### **3.1 APPLICATION**

- .1 Asphalt prime is not required unless otherwise directed by Departmental Representative.
- .2 Materials and application of asphalt prime to granular base surface prior to asphalt paving where approved by the Departmental Representative.

- .3 Obtain Departmental Representative's acceptance of granular base surface and authorization to apply before applying asphalt prime.
- .4 Cutback asphalt:
  - .1 Heat asphalt prime to a temperature for pumping and spraying as recommended by the supplier.
  - .2 Apply asphalt prime to granular base at rate recommended by the supplier and accepted by the Departmental Representative.
  - .3 Apply on dry surface unless otherwise directed by Departmental Representative.
- .5 Anionic emulsified asphalt:
  - .1 Dilute asphalt emulsion with clean water at 1:1 ratio for application.
  - .2 Mix thoroughly by pumping or other method approved by Departmental Representative.
  - .3 Apply diluted asphalt emulsion at rate recommended by the supplier and approved by the Departmental Representative.
  - .4 Apply diluted asphalt emulsion on damp surface unless otherwise directed by Departmental Representative.
- .6 Apply asphalt prime only on unfrozen surface.
- .7 Do not apply prime when air temperature is less than 10 degrees C or when rain is forecast within 2 hours.
- .8 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt prime material.
- .9 Where traffic is to be maintained, treat no more than one-half width of surface in one application.
- .10 Prevent overlap at junction of applications.
- .11 Do not prime surfaces that will be visible when paving is complete.
- .12 Apply additional material to areas not sufficiently covered as directed by Departmental Representative.
- .13 Keep traffic off primed areas until asphalt prime has set.
- .14 Permit prime to set before placing asphalt paving.

### **3.2 USE OF SAND BLOTTER**

- .1 If asphalt prime fails to penetrate within 24 hours, spread sand blotter material in amounts required to absorb excess material.
- .2 Allow sufficient time for excess prime to be absorbed.
- .3 Apply second application of sand blotter as required.

**END OF SECTION**

**Part 1 General****1.1 DESCRIPTION**

- .1 Supply and application of a liquid asphalt to ensure a bond between the surface being paved and the Asphalt Concrete Pavement lift, in accordance with the Contract Document and as directed by the Departmental Representative.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM D140, Standard Practice for Sampling Bituminous Materials.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.
- .1 AT - Standard Specifications for Highway Construction (latest edition)

**1.3 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Supply, delivery and application of tack coat will not be measured separately and will be incidental to “**Unit Price Item – Asphalt Concrete Pavement (EPS)**” and shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.

**1.4 SUBMITTALS**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two 1 L samples of asphalt tack coat material proposed for use in new, clean, airtight, sealed, wide mouth bottles made with plastic to Departmental Representative, at least 2 weeks prior to beginning Work.
- .3 Sample asphalt tack coat material to: ASTM D140.
- .4 Provide access on tank truck for Departmental Representative to sample asphalt material to be incorporated into Work, in accordance with ASTM D140.

**1.5 QUALITY CONTROL**

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 Upon request by Departmental Representative, submit manufacturer's test data and certification that asphalt tack coat material meets requirements of this Section.

**1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with ASTM D140.
- .2 Provide, maintain and restore asphalt storage area.

**1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

- .2 Divert unused asphalt materials to facility capable of recycling materials outside of the National Parks.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Anionic emulsified asphalt: to CAN/CGSB-16.2, grade: SS-1.
- .2 Water: clean, potable, free from foreign matter.

### **2.2 EQUIPMENT**

- .1 Pressure distributor to be designed, equipped, maintained and operated so that asphalt material can be:
  - .1 Maintained at even temperature.
  - .2 Applied uniformly on variable widths of surface up to 5 m.
  - .3 Applied at readily determined and controlled rates from 0.2 to 5.4 L/m<sup>2</sup> with uniform pressure, and with an allowable variation from any specified rate not exceeding 0.1 L/m<sup>2</sup>.
  - .4 Distributed in uniform spray without atomization at temperature required.
  - .5 Equipped with meter, registering metres of travel per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
  - .6 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
  - .7 Equipped with an easily read, accurate and sensitive device that registers temperature of liquid in reservoir.
  - .8 Equipped with accurate volume measuring device or calibrated tank.
  - .9 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
  - .10 Equipped with nozzle spray bar, with operational height adjustment.
  - .11 Cleaned if previously used with incompatible asphalt material.

## **Part 3 Execution**

### **3.1 APPLICATION**

- .1 Obtain Departmental Representative's approval of surface before applying asphalt tack coat.
- .2 Apply asphalt tack coat only on clean and dry surface.
- .3 Dilute asphalt emulsion with water at 1:1 ratio for application.
  - .1 Mix thoroughly by pumping or other method accepted by Departmental Representative.

- .4 Apply asphalt tack coat evenly to pavement surface at rate as directed by Departmental Representative, of 0.5 L/m<sup>2</sup> plus or minus 0.2 L/m<sup>2</sup>.
- .5 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt tack coat material.
- .6 Do not apply asphalt tack coat when air temperature is less than 10 degrees Celsius or when rain is forecast within 2 hours of application.
- .7 Apply asphalt tack coat only on unfrozen surface.
- .8 Evenly distribute localized excessive deposits of tack coat by brooming as directed by Departmental Representative.
- .9 Where traffic is to be maintained, treat no more than one half of width of surface in one application.
- .10 Keep traffic off tacked areas until asphalt tack coat has set.
- .11 Re-tack contaminated or disturbed areas as directed by Departmental Representative.
- .12 Permit asphalt tack coat to set before placing asphalt pavement.

**END OF SECTION**

**Part 1 General****1.1 DESCRIPTION**

- .1 Work shall consist of supplying, loading, hauling and placing AT Mix Type H1 (16mm) Asphalt Concrete Pavement (EPS) as per the Contract Documents, or as directed by the Departmental Representative
- .2 For the asphalt mix, asphalt aggregate used shall consist of AT Designation 1 Class 16 (16mm) Aggregate in accordance with AT - Standard Specifications for Highway Construction (latest edition)
- .3 Asphalt Cement used shall be 150-200A in accordance with AT- Standard Specifications for Highway Construction (latest edition)
- .4 Recycled Asphalt Pavement (RAP) will be permitted to a maximum of 10% in the asphalt pavement mix design in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition).
- .5 Perform mix designs for AT Mix Type H1 Asphalt Concrete Pavement using Asphalt Cement 150-200A and 16mm Asphalt Aggregate. Perform additional mix designs where RAP is included, if applicable. Mix design is subject to acceptance by the Departmental Representative.
- .6 Milled Rumble Strips are not included in this Contract.
- .7 Existing delineator posts to be retained and replaced as directed by the Departmental Representative.
- .8 The edge of pavement shall have sloped paved shoulders following the existing side slope for the length of the paving limits, except where there is guardrail or concrete barrier, and shall be constructed in conjunction with all lifts of ACP, as shown on the IFC Drawings or as directed by the Departmental Representative. Payment for this Work to be incidental to asphalt Unit Price items.
- .9 Acceptance and/or rejection of all placed Asphalt Concrete Pavement shall be determined in accordance with the AT End Product Specification (EPS). The Contractor shall be fully responsible for the removal and replacement of rejected materials.

**1.2 REFERENCES**

- .1 AT - Standard Specifications for Highway Construction (latest edition)

**1.3 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Accepted asphalt concrete pavement will be measured in tonnes by scale ticket and paid under **“Unit Price Item – Asphalt Concrete Pavement (EPS)”**. Payment shall be compensation in full for supply of asphalt concrete mix including all materials, supply of asphalt cement and aggregate, crushing of aggregate, processing, plant mixing, loading, hauling, supply and application of prime/tack coat, paver laying, compacting, finishing surface, raking, quality control testing, survey and layout, safety and maintenance, labour and equipment to complete the Work in accordance with the Contract Documents.

- .2 AT Designation 1 Class 16 Asphalt Aggregate is to be supplied from outside the Park or produced, in whole or in part, from suitable material excavated from within the roadway cuts and structure excavations.
- .3 Supply of outside sourced material will be incidental to **“Unit Price Item – Asphalt Concrete Pavement (EPS).”**
- .4 Level Course shall not be measured separately for payment but will be paid under **“Unit Price Item - Asphalt Concrete Pavement (EPS)”**.
- .5 Applicable payment adjustments (additions or subtractions as applicable) shall be in accordance with AT – Standard Specifications for Highway Construction Section 3.50 – Asphalt Pavement Construction (EPS). Payments shall be made under **“Lump Sum Item – Prime Cost Sum”**
  - .1 Smoothness testing to be arranged by the Departmental Representative
- .6 Preparing asphalt mix designs, in accordance with Section 01 45 00 – Quality Control and Section 01 33 00 – Submittal Procedures, shall be considered incidental to **“Unit Price Item – Asphalt Concrete Pavement (EPS)”** and no additional payment will be made.
- .7 Cleaning of existing pavement prior to paving is incidental to the Works and no additional payment will be made.
- .8 No overhaul will be considered for payment under this Contract.
- .9 Supply and delivery of asphalt cement shall be incidental to **“Unit Price Item – Asphalt Concrete Pavement (EPS).”**
- .10 Anti-stripping agent(s) and other additives shall be considered incidental to **“Unit Price Item – Asphalt Concrete Pavement (EPS)”** and no additional payment will be made.
- .11 Use of processed Reclaimed Asphalt Pavement (RAP) material in hot mix asphalt construction is permitted to maximum 10% in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition) and as approved by the Departmental Representative. Any costs associated with this process including labour, equipment or materials shall be considered incidental to **“Unit Price Item – Asphalt Concrete Pavement (EPS)”**.
- .12 Cleaning of existing pavement shoulder, whether by sweeping or other methods, is considered incidental to the Work and no additional payment will be made.
- .13 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item - Traffic Control”** and no separate payment will be made to the Contractor.
- .14 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item – Mobilization / Demobilization”** and no separate payment will be made to the Contractor.
- .15 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures, for the Work in this Section shall be incidental to the Contract and no separate payment will be made to the Contractor.

#### 1.4 SUBMITTALS

- .1 In accordance with Section 01 33 00 - Submittal Procedures.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

**Part 2 Products****2.1 MATERIALS**

- .1 150 – 200A Asphalt Cement shall be used on Hwy 93N
- .2 Asphalt Aggregate:
  - .1 Materials used shall be in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition), as applicable.
  - .2 AT Designation 1 Class 16 Asphalt Aggregate is to be supplied from outside the Park or produced, in whole or in part, from suitable material excavated from within the roadway cuts and structure excavations.
- .3 Reclaimed Asphalt Pavement (RAP):
  - .1 RAP to be processed by crushing and/or screening into a consistent material with uniform gradation, AC content and other properties prior to being utilized in accordance with the AT Standard Specifications for Highway Construction Section 3.50 (latest edition).
  - .2 Use of processed Reclaimed Asphalt Pavement (RAP) material in hot mix asphalt construction is permitted to maximum 10% in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition) and as approved by the Departmental Representative.
  - .3 Only RAP sourced from Highway 93N shall be considered. Only Classified RAP will be permitted.
  - .4 RAP testing is required in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition).
  - .5 The Contractor shall process and crush the RAP so as to ensure compliance with all gradation requirements of their approved Job Mix Formula.
- .4 All additives (including anti-stripping agents) to be in accordance with the Approved Products List as published by AT.

**Part 3 Execution****3.1 QUALITY CONTROL**

- .1 In accordance with Section 01 45 00 - Quality Control.
- .2 Contractor is responsible for all Quality Control required in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition) and Section 01 45 00 – Quality Control.
- .3 Contractor is to provide a full time Road Checker during all times of asphalt placement that shall be responsible for providing a daily Road Checker's Summary in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition).

- .4 The Road Checker's Summary shall be provided to the Departmental Representative no less than 24 hrs after the relevant shift end.
- .5 To assist in the Road Checker's role, the Contractor shall layout and stake stations at the appropriate intervals to achieve the desired accuracy throughout the Work Site. All survey and marking stakes shall be removed prior to completion of the Works.
- .6 The method of tests for asphalt appeal samples shall be the same method of tests conducted as during Quality Control / Quality Assurance testing.

### 3.2 METHODOLOGY

- .1 ACP placement:
  - .1 Asphalt concrete mix shall not be placed when the air temperature is below 4°C, or when rain is forecasted.
  - .2 Asphalt concrete mix shall be placed only on clean, dry, and unfrozen surfaces.
  - .3 Unless otherwise shown on the plans, the asphalt concrete mix shall be placed in the following lift thicknesses:
    - .1 in a single lift when the design compacted total thickness is 75 mm or less.
      - .1 in two or more lifts when the design compacted total thickness is greater than 75 mm. The lift thickness selection shall be determined by the Contractor except that:
        - .1 the maximum thickness of any lift shall be 75 mm.
        - .2 the minimum thickness of a final lift shall be 45 mm.
        - .3 On widenings, the thickness of asphalt concrete mix up to 75 mm may be placed in one lift. Over 75 mm thickness, the asphalt concrete shall be placed in two or more lifts.
      - .2 A pickup machine shall be used for all mainline highway lane paving.
  - .2 The edge of pavement shall have sloped paved shoulders following the existing side slope for the length of the paving limits, except where there is guardrail or concrete barrier, and shall be constructed in conjunction with all lifts of ACP, as shown in the Contract Documents or as directed by the Departmental Representative.

### 3.3 EQUIPMENT, PLANT, AND MIXING REQUIREMENTS

- .1 Execution of the Work shall be in accordance with AT Standard Specifications for Highway Construction Section 3.50 (latest edition).
- .2 The Contractor will not be permitted to setup a Mobile Asphalt Plant or use a Stationary Asphalt Plant within the Parks for this Project.
- .3 Asphalt plant to be used on this project, regardless of location, shall be a minimum of 200 tonne per hour production plant, equipped with a dry bag system for pollution control, in addition to, or in replacement of standard cyclone dust collectors, to effectively eliminate emissions of dust and smoke pollutants into the atmosphere. Use of secondary dust collection systems, requiring discharge of dust polluted water into settling

ponds or drainage system will not be permitted. In addition, Asphalt plant must comply with all environmental pollution control regulations applicable in the asphalt plant area. The plant operator must make daily inspections of the emission control components, to ensure proper working order and provide the most recent stack monitoring results for viewing by the Departmental Representative or their designate.

**END OF SECTION**

**Part 1 General****1.1 DESCRIPTION**

- .1 Supply and installation of Pavement Markings in areas in accordance with the Contract Document and as directed by the Departmental Representative.
- .2 The Contractor shall complete a survey of the pre-existing pavement markings prior to their disturbance to ensure their ability to re-instate them accurately.

**1.2 REFERENCES**

- .1 CAN/CGSB-1.5-M99 Low Flash Petroleum Spirits Thinner.
- .2 CGSB1-GP-12C-83 Standard Paint Colours.
- .3 CGSB1-GP-71-83 Method, of Testing Paints and Pigments.
- .4 CAN/CGSB 1.74-01 Alkyd Traffic Paint.
- .5 U.S. FED-STD-595B, 1989 – Colours Used in Government Procurement.
- .6 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .7 AT Standard Specification for Highway Construction (current edition)
- .8 AT Design Bulletin #18/2003
- .9 AT Typical Drawings
  - .1 CB6-3.52M1
  - .2 CB6-3.52M3
  - .3 CB6-3.52M4

**1.3 MEASUREMENT AND PAYMENT PROCEDURES**

- .1 Measure for payment for final line painting shall be in linear metres along the centre of the paint line regardless of width or line-gap ratio in accordance with the Contract Documents and accepted by the Departmental Representative.
- .2 Double center lines are to be measured as one line.
  - .1 Payment will be made under “**Unit Price Item – Pavement Marking - Line Painting**” and the price(s) bid shall be full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to complete the work as specified in the Contract Documents.
- .3 Items considered incidental to the Work include, but are not limited to:
  - .1 Environmental mitigations required in accordance with Section 01 35 43 – Environmental Procedures.
  - .2 Survey and layout.
  - .3 Repair or removal and replacement of incorrect pavement markings as directed by the Departmental Representative shall be completed at the Contractor’s cost.

- .4 Final design Pavement Marking layout by string line, surveyor or other methods accepted by the Departmental Representative.
- .5 Temporary Pavement Marking in accordance with Section 01 35 31 - Special Procedures for Traffic Control.
- .4 Traffic Control required for this Work shall be incidental to **“Lump Sum Price Item - Traffic Control”** and no separate payment will be made.
- .5 Mobilization and demobilization required for this Work shall be incidental to **“Lump Sum Price Item – Mobilization / Demobilization”** and no additional payment will be made.

#### 1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative following material sample quantities in accordance with Section 01 33 00 – Submittal Procedures.
  - .1 Two samples of each type of paint.
  - .2 One sample of glass beads.
  - .3 Sampling to CGSB1-GP-71.
- .3 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, CGSB specification number and formulation number and batch number.

#### 1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 In accordance with Section 01 35 43 - Environmental Procedures.

### Part 2 Products

#### 2.1 MATERIALS

- .1 Paint:
  - .1 To CGSB 1.74-2001-CAN/CGSB, alkyd traffic paint.
  - .2 Colour: to FED-STD-595B, yellow 33538 and white 37925.
  - .3 Upon request, Departmental Representative will supply a qualified product list of paints applicable to work. Qualified paints may be used but Departmental Representative reserves right to perform further tests.
- .2 Thinner: to CAN/CGSB-1.4-2000.
- .3 Glass beads:
  - .1 Overlay type: to CGSB1-GP-74M.

#### 2.2 DELIVERY, STORAGE, AND HANDLING

- .1 Storage and handling shall meet the requirements of Section 01 35 43 - Environmental Procedures and Section 02 81 01 - Hazardous Materials.

- .2 The Contractor shall make all arrangements for the supply and delivery of paint and glass beads and shall provide the Departmental Representative with records of all materials received and/or returned, on a daily basis.
- .3 The Contractor shall provide, maintain and reclaim all material storage sites.
- .4 No paint formulation shall be diluted or mixed with a different formulation or with any other material, without the specific approval of the Departmental Representative.
- .5 The Contractor shall take all necessary steps to prevent contamination of the materials. Paint shall be protected from freezing.
- .6 The Contractor shall be responsible for the proper clean-up of waste or spilled material, and the proper disposition of containers.

### **Part 3 Execution**

#### **3.1 TEMPORARY MARKINGS**

- .1 The Contractor shall supply and place temporary line markings on newly constructed hard surfaces (pavement, sealcoat, etc.) throughout the project, re-establishing centreline and all lane-dividing lines prior to being opened to traffic, and shall maintain such markings until the earlier of the Actual Completion Date or the date Permanent markings have been placed. Temporary line markings are not required for lane edge lines (fog lines) unless otherwise directed by the Departmental Representative.
- .2 Temporary line markings must be placed on an offset from the permanent lane marking and must be removed once permanent markings are in place.
- .3 Centreline of undivided highway shall be marked throughout as “no passing” unless otherwise directed by the Departmental Representative.
- .4 Painted temporary lines are not permitted on the final surface.
- .5 Pavement markings for traffic detours shall be in accordance with Part 2 Products.

#### **3.2 PERMANENT MARKINGS**

- .1 Prior to any work affecting pavement markings, the Contractor shall pick-up survey all key control points of existing markings at intersections, turn slots, exit tapers and similar features and, upon completion of the final hard surfacing, re-establish those points, unless shown otherwise in the Contract Documents or directed by the Departmental Representative.
- .2 Further to the key control pick-up, the Contractor shall also pick-up survey all Transverse and Chevron and Crosshatch Pavement Markings and upon completion of the final hard surfacing, re-establish those points, unless shown otherwise on the IFC drawings or directed by the Departmental Representative.
- .3 All layout markings shall be done with white or yellow centreline paint which will be clearly visible after exposure to all Site Conditions for a minimum period of two (2) months past the Actual Completion Date.
- .4 Key control points shall be marked at their design location within tolerances of  $\pm 50\text{mm}$  transversely and  $\pm 100\text{mm}$  longitudinally. Longitudinal tolerances for intermediate points, when required, are  $\pm 10\text{mm}$ .

- .5 Permanent pavement markings are to be reinstated within two (2) weeks of paving completion, or earlier as acceptable to the Departmental Representative.

### 3.3 TOLERANCE

- .1 All painted lines shall not exceed a dimensional width of 110 mm for specified 100 mm wide line. No tolerance below 100 mm is allowed for the specified 100 mm wide line.
- .2 All painted lines shall not exceed a dimensional width of 210 mm for specified 200 mm wide line. No tolerance below 200 mm is allowed for the specified 200 mm wide line.
- .3 All painted direction dividing, lane dividing or continuity lines shall not exceed a maximum dimensional length deviation of +/- 100 mm for specified 3 m length of line.
- .4 All spaces between painted direction dividing, lane dividing or continuity lines shall not exceed a maximum dimensional length deviation of +/- 100 mm for specified 6 m or 3 m length of space.
- .5 All paint shall be applied at the proper locations in accordance with the Contract Documents or as directed by the Departmental Representative.
- .6 All paint and glass beads shall be uniformly applied.
- .7 All painted lines shall be uniform in thickness and free of tire tracking, with no splatter, excessive overspray or other defects.
- .8 Remove incorrect markings as directed by the Departmental Representative at Contractor's cost.
  - .1 Blackout painting for incorrect lane marking will not be permitted. Incorrect paint work must be eradicated and re-painted by method approved by the Departmental Representative.

### 3.4 EQUIPMENT REQUIREMENTS

- .1 Paint applicator to be an approved pressure type mobile distributor capable of applying paint in single, double and dashed lines. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off.
- .2 Distributor to be capable of applying reflective glass beads as an overlay on freshly applied paint.

### 3.5 CONDITION OF SURFACES

- .1 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

### 3.6 APPLICATION

- .1 Pavement markings to be laid out by Contractor.
- .2 Apply paint only when air temperature is above 10°C, wind speed is less than 60 km/h and no rain is forecast within next 4 h.
- .3 Apply traffic paint evenly at rate of 3 L/m<sup>2</sup>.
- .4 Do not thin paint.

- .5 Paint lines to be of uniform colour and density with sharp edges.
- .6 Thoroughly clean distributor tank before refilling with paint of different colour.
- .7 Apply glass beads at rate of 200 g/m<sup>2</sup> of painted area immediately after application of paint.

### **3.7 REMOVAL, REPAIR OR REPLACEMENT OF UNACCEPTABLE PAVEMENT MARKINGS**

- .1 All painted lines that do not meet the requirements of the Contract Documents shall be removed and correctly applied or repaired by the Contractor.
- .2 In cases where the paint is "tracked" by vehicles tires, the lines may be repaired by reapplying paint and glass beads to the damaged areas.
- .3 In cases where incorrectly painted lines need to be removed, the Contractor shall use methods and equipment that will totally eliminate the pattern of the lines without damaging the integrity of the pavement surface. The methods and equipment used for such work shall be reviewed and accepted by the Departmental Representative prior to their use. Obliterating incorrectly painted lines through the sole use of paint, liquid asphalt, slurry seal or other similar materials will not be permitted.

### **3.8 QUALITY CONTROL**

- .1 In accordance with Section 01 45 00 – Quality Control.
- .2 The Contractor is responsible for quality control inspection throughout every stage of the Work to ensure that materials and workmanship comply with the requirements of the Contract Documents.
- .3 The Contractor to include in the Quality Control Plan actions to address all the elements that affect the quality of the line painting including, but not limited to:
  - .1 Paint Application Rates.
  - .2 Glass Bead Application Rates.
  - .3 Pavement Surface and Atmospheric Conditions.
  - .4 Line Widths, Line Lengths and Space Lengths.

### **3.9 HIGHWAY OPERATION**

- .1 Highway operation shall be in accordance with the Contractor's accepted Traffic Management Plan and shall meet the following requirements:
  - .1 General
    - .1 Painting shall be carried out in accordance with Section 01 14 00 - Work Restrictions and Section 01 35 31 - Special Procedures for Traffic Control.
    - .2 Operation of the painting truck against the flow of traffic will not be permitted.
    - .3 Loading glass beads or paint onto the painting truck is not permitted on a roadway surface.
  - .2 Operation of Companion Vehicles

- .1 When the roadway to be painted is open to public traffic, the Contractor shall operate a crash attenuator vehicle and a pilot vehicle in conjunction with the painting truck during the painting of all longitudinal lines. Companion vehicle operators shall not attempt to control traffic from inside the vehicle.
- .2 The actual operating parameters of the companion vehicles will be determined by the Contractor to safely accommodate traffic and will be based on site specific conditions such as sight distances, highway geometrics and traffic patterns and volumes. Typical operating parameters are as follows:
  - .1 The crash attenuator vehicle shall be equipped with a crash attenuator that meets National Cooperative Highway Research Program, Report 350 Test Criterion. Test Level 3 for 100 km/hr. The vehicle shall follow behind the painting truck at a distance of 50 to 400 m.
  - .2 The pilot vehicle shall be driven in the same travel lane as the paint machine, following it at a constant distance of approximately two kilometres.
  - .3 The crash attenuator vehicle, pilot truck and the painting truck are to display the same message at all times. The painting truck and the companion vehicles shall be equipped with a two-way radio for communication and overhead revolving beacon with an amber lens of a minimum 180 mm high and 180 mm wide.

### **3.10 PROTECTION OF COMPLETED WORK**

- .1 Protect pavement markings until dry.

**END OF SECTION**