DRAWINGS:

Part 1 General

1.1 PROJECT LOCATION

.1 The project is located in Waterton Lakes National Park, Alberta. The project site is located on the access road to the Canyon Youth Camp which is about 3 km beyond the Crandell Mountain Campground entrance on the Red Rock Parkway. The project site access road is approximately 12 km from the Waterton Park Town site.

.2 The access road to the project site is closed to the public and will remain closed throughout the Work.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

.1 Demolition of the existing timber bridge and the construction of a new bridge crossing the Blakiston Creek. The replacement bridge is a single span structure, 23.5 metres long x 6.0 metres wide, supported on reinforced concrete spread footings, with steel girders, pre-cast concrete deck panels, combined traffic barriers and pedestrian railing.

The existing bridge is to be removed with only the original concrete pier foundations remaining. The main access to the laydown area and north abutment is via the Red Rock Parkway, and limited access to the south abutment is available through the Crandell Mountain Campground. The gravel approach roadways are to be re-graded to match new widened and raised bridge.

.2 Without limiting the scope of work, major scope items include: demolition and removal of the existing timber bridge, abutment excavation and cast-in-place concrete footings, fabrication, delivery and erection of steel girders and pre-cast concrete deck panels, bridge rail and guardrail installation and approach road re-grading.

1.3 CONTRACT METHOD

.1 Construct Work under Combined Price Form - Appendix 1.

1.4 SPECIFICATIONS

.1 All work and materials shall be in accordance with National Master Specification sections provided herein.

1.5 SCHEDULE

.1 A pre-construction meeting is tentatively scheduled for mid-June in Waterton Lakes.

.2 Contractor shall be mobilized and prepared to commence work no later than 30 days after award.

.3 The fabrication of major bridge elements such as the steel girders, pre-cast deck panels and galvanized bridge rails shall commence immediately upon award.

.4 Contract site cleanup and de-mobilization shall be complete by August 31, 2015.

1.6 WORK BY OTHERS

.1 The Contractor is advised that road Work on the Red Rock Parkway is scheduled to commence on September 1, 2015 under a separate contract. After this date the Contractor will no longer have access to the site and must ensure all work is complete by August 31, 2015.

1.7 DEFINITIONS

.1 None.

1.8 WORK SEQUENCE

.1 The Contractor shall schedule work progress to allow the Departmental Representative and/or Engineer unrestricted access to inspect all phases of the Work.

.2 The Contractor shall maintain fire and emergency access at both the north and south bridge approaches at all times.

.3 The Contractor shall demolish the existing bridge, followed by abutment construction, girder erection and pre-cast deck panel installation.

.4 Substantial Completion shall be achieved by August 21, 2015.

.5 Final Completion shall be achieved by August 30, 2015.

1.9 CONTRACTOR USE OF PREMISES

.1 The Contractor shall limit use of premises for Work, for storage, and for access, to Limits of Construction shown on drawings.

.2 The Contractor shall coordinate use of premises under direction of the Departmental Representative.

.3 The Contractor is to 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 Realty Services in the Waterton Lakes Park Administration building in the Waterton townsite, prior to commencement of the contract.

.5 All Contractor's business and private vehicles are required to display a vehicle work pass. These permits may be obtained free of charge from Realty Services in the Waterton Lakes Park Administration building in the Waterton townsite.

.6 The Contractor shall leave the site in a clean and safe manner at the end of each work day.

.7 The Contractor shall limit the use of the laydown area to the area identified on the site plan. The primary access to the site will be via the north access road. The north access road will be closed to the public.

.8 The Contractor shall sequence the Work at the south abutment accordingly as access through the Crandell Mountain Campground is limited and subject to approval for each activity.

1.10 CONSTRUCTION SIGNAGE

.1 No signs or advertisements, other than warning signs, are permitted on site.

.2 Signs and notices for safety and instruction shall be in both official languages. Signs shall be diamond grade and shall conform to CAN3-Z321.

.3 The Contractor shall 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.

.4 All temporary traffic control signs that are used for longer than one day shall be mounted on wood posts.

.5 If required, additional signage shall be coordinated with other Contractors.

1.11 SETTING OUT OF WORK

.1 The Engineer will provide survey control, including coordinates and elevations.

.2 The Contractor shall:

.1 Set additional control points as necessary.
.2 Set all work stakes necessary to complete work.
.3 Allow sufficient time for Departmental Representative and/or Engineer to take measurements for payment.
.4 Not damage geodetic benchmarks or control monuments unless authorized by Departmental Representative and/or Engineer.

.3 The Contractor shall receive no separate payment for setting out work, unless Departmental Representative and/or Engineer adjusts alignment in field and additional survey costs are incurred. Payment for additional survey required due to changes by Departmental Representative and/or Engineer to be paid for as part of Prime Cost Sum.

1.12 DOCUMENTS REQUIRED

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

1. Contract Documents
2. Specifications
3. Addenda
4. Reviewed Shop Drawings
5. Change Orders
6. Environmental Assessment
7. Environmental Protection Plan
8. Erosion and Sediment Control Plan
9. Copy of Approved Work Schedule
10. Health and Safety Plan and other related documents

Part 2 Products

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 00 11 00 - Summary of Work

.2 Section 01 32 18 - Construction Progress Schedule

.3 Section 01 35 43 - Environmental Procedures

1.2 ACCESS AND EGRESS

.1 The north access from Red Rock Pathway is available for use by the Contractor and will be closed to the public for the duration of the Contract. Access to the south bridge approach will be through the Crandel Mountain campground, with use subject to approvals.

1.3 USE OF THE SITE AND FACILITIES

.1 The Work Site as specified by Departmental Representative shall only be used for the purposes of the Work. The Work Site will be made available by Departmental Representative to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents.

.2 Contractor shall maintain adequate drainage at the Worksite.

.3 A office-tool trailer may be set up at the laydown area of the site.

.4 The Contractor shall keep the Work Site clean and free from accumulation of waste materials and rubbish regardless of source. Snow shall be removed by the Contractor as necessary and at no additional cost.

.5 The Contractor shall provide sanitary facilities for work force in accordance with governing regulations and the Environmental Procedures for this project. The Contractor shall post notices and take such precautions as required by local health authorities and keep area and premises in sanitary condition.

.6 Any damage to the Work Site caused by the Contractor shall be repaired by the Contractor at his expense.

.7 The bridge accessing the Crandell Mountain Campground is posted for weight restrictions under the following classifications:

.1	CS1	Truck	28 Tonne
.2	CS2	Traction Semi-Trailer	32 Tonne
.3	CS3	B-Train Tractor Semi-Trailer	43 Tonne

1.4 WORK CONDUCTED OVER OR ADJACENT TO WATERWAYS

.1 All components of the Work shall be conducted in accordance with Section 01 35 43 - Environmental Procedures.

.2 All components of the Work shall be conducted without equipment entering into wetlands, water bodies, streams or rivers.

.3 All waste materials from the Work shall be contained and collected in a manner to prevent any contact with the Blakiston Creek. 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. One “Bear Proof” garbage container will be provided by Departmental Representative.

1.5 ACCESS TO ADJACENT PROPERTIES

.1 Construction operations shall be conducted so as to cause minimal inconvenience to the Public, Canyon Youth Camp and Crandell Mountain Campground. The existing gravel roadway access to the Youth Camp and Crandell Mountain Campground shall be maintained throughout construction and reclaimed to equal or better condition following construction if damage has resulted from construction activities at no cost to Parks Canada.

1.6 UTILITIES

.1 There are no known utilities at the site, thus no utilities are shown on the Drawings. Nevertheless, the Contractor shall contact Alberta One Call to confirm prior to demolition excavation.

1.7 SURVEY OF EXISTING PROPERTY CONDITIONS

.1 Submission of tender is deemed to be confirmation that the Contractor has inspected the site and is conversant with all conditions affecting execution and completion of work.

.2 The Contractor shall regularly monitor the condition of the Work Site throughout the construction period, and shall immediately notify Departmental Representative if any deterioration in condition is detected. Such monitoring shall cover all pertinent features and property including, but not limited to, structures, roads, walls, fences, slopes and culverts.

.3 Departmental Representative may, but shall not be obligated to, survey and record the condition of the Work Site and of property on or adjoining the Work Site prior to the commencement of construction by the Contractor. If requested, the Engineer 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 Engineer for any area before commencing construction in that area.

.5 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.

.6 The provision of the records of a survey of existing conditions by the Engineer shall in no way limit or restrict the Contractor's responsibility to exercise proper care to prevent damage to all property within or adjacent to the Work Site, whether all such property is 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) including, but not limited to, WCB's Industrial Health and Safety Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.

.2 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site.

.3 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 Departmental Representative so directs, shall promptly reimburse to Departmental Representative the costs resulting from such loss or damage.

1.9 USE OF PUBLIC AREAS

.1 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas. 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. 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. Spills of materials in public areas shall be removed or cleaned immediately by the Contractor at no cost to Departmental Representative. 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 Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract. The following personnel shall be included in the list:

.1 Project Superintendent
.2 Safety Representative.

.2 The above personnel shall perform the following duties:

.1 The Project Superintendent shall be employed full time and shall be present on the Work Site each and every workday that Work is being performed, from the commencement to Substantial Completion of the Work;
.2 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence;
.3 The Safety Representative shall possess safety experience in general construction. Duties shall encompass all matters of safety activities from commencement to Substantial Completion of the Work.

1.11 MEETINGS

.1 The Work includes attending meetings between the Contractor and Departmental Representative. The meetings will be called and chaired by Departmental Representative or the Engineer as required. The Contractor shall be represented at such meetings to the satisfaction of Departmental Representative.

.2 Departmental Representative will schedule an initial meeting to be held on site after award notification. Senior representatives of Departmental Representative(s), the Engineer, Contractor, major Subcontractors, field inspectors and supervisors are to be in attendance.

.3 The Contractor will be requested to assemble his site staff and sub-contractors for an environmental briefing to be conducted by Departmental Representative. The briefing shall be approximately 1 hour in duration and held at initial project start-up. The Contractor shall ensure that all his current project staff is in attendance. Departmental Representative and the Contractor will co-operate in setting the most appropriate time and place for the briefing. Subsequent to the initial environmental briefing, additional environmental briefings will be arranged for new staff and sub-contractors showing up on the project.

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

1.12 WASTE DISPOSAL

.1 All surplus, unsuitable and waste materials shall be removed from the job site to approved sites outside Waterton Lakes National Park.

.2 Deposit of any construction debris into any waterway is strictly forbidden.

.3 Cost for Waste Disposal described above shall be considered incidental to the Bridge Demolition Unit Price and no additional payment will be made.

.4 Waste Disposal shall be completed in accordance with Section 01 35 43 - Environmental Procedures.

1.13 WORK STOPPAGE

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

Part 2 Products

.1 Not Used.

Part 3 Execution

.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, offices, supplies and incidentals to and from the project site.

.2 Any protective measures or movement of Contractor trailers necessitated by animal interactions and required by Departmental Representative 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 RELATED SECTIONS

.1 Section 00 11 00 - Summary of Work

1.3 MEASUREMENT AND PAYMENT

.1 Mobilization and Demobilization:

.1 Payment will be made under “Lump Sum Price - Mobilization and Demobilization” - Appendix 1.

.2 50% of Lump Sum Contract Price for Mobilization and Demobilization to be paid when mobilization to site is complete.

.3 The remainder of the Lump Sum Price for Mobilization and Demobilization to be paid when work is complete and all materials, equipment, offices, and other facilities have been removed from site and site cleaned and left in condition to the satisfaction of Departmental Representative.

.4 Payment of only 10% of the total price tendered will be scheduled as outlined above. If the amount bid for mobilization and demobilization is greater than 10% of the total price tendered, payment of the remainder of the amount will be authorized when the contract has been completed.

Part 2 Products

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 00 11 00 - Summary of Work

.2 Section 01 14 00 - Work Restrictions

1.2 MEASUREMENT AND PAYMENT

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

1.3 PRECEDENCE

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

1.4 DEFINITIONS

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

.2 Bar Chart (Gantt chart): A 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, 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 an activity or other Project element. Usually expressed as workdays or work weeks.

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

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

.8 Project Schedule: The planned dates for performing activities and the planned dates for meeting milestones. A 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 Departmental Representative to enable monitoring of project work in relation to established milestones.

1.5 REQUIREMENTS

.1 The Contractor shall develop and submit a Project Schedule that is practical and remains within specified Contract duration.

.2 The contractor shall include all Contract Work identified in the Project Schedule.

.3 The Contractor shall plan to complete Work in accordance with prescribed Project Schedule.

.4 Limit activity durations to maximum of approximately 14 working days, to allow for progress reporting.

.5 The Contractors schedule shall indicate the Award of Contract as the beginning date, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

.6 The Contractors schedule shall include the requirements of Section 01 14 00 - Work Restrictions and Section 01 35 43 – Environmental Procedures.

1.6 SUBMITTALS

.1 The Contractor shall 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.

1.7 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule. Completion of each Stage of Construction:

.1 The Contractor shall be mobilized and prepared to commence work no later than 30 days after the award of Contract.
.2 Final Completion shall be achieved by August 30, 2015.
.3 The bridge shall be open to traffic by August 31, 2015.

1.8 MASTER PLAN

.1 The Contractor shall 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 5 working days.

.3 The Contractor will revise impractical schedule and resubmit within 5 working days.

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

1.9 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:

- Award.
- Permits.
- Submittals:
- Project Schedule
- List of subcontractors, suppliers and Departmental Representative
- Contractor Chain of Command including Sub-Contractors and Departmental Representatives
- Prime Contractor / co-ordination with other Contractors Plan
- Work Plan
- Environmental Protection Plan
- Traffic Management Plan

- Site access / Detour Plan
- Emergency Response Protocol
- Site Specific Health and Safety Plan, incl. MSDS sheets
- On site Contingency and Emergency Response Plan
- Survey Plan
- Quality Control Plan
- Shop Drawings
- Concrete mix Designs
- Mobilization
- Detours / Site Access
- Additional Work as and when requested
- Quality Control
- Interim Inspection
- Site Clean-up / De-mobilization

Part 2 Products

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Not Used.

1.2 MEASUREMENT PROCEDURES

.1 This work shall be incidental to Contract and will not be measured for payment.

1.3 REFERENCES

.1 Not Used.

1.4 ADMINISTRATIVE

.1 Submit to the Engineer submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an 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 The contractor shall review submittals prior to submission to The Engineer. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.

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

.7 Verify field measurements and affected adjacent Work is consistent.

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

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

.10 Keep one reviewed copy of each submission on site

1.5 SHOP DRAWINGS, PRODUCT DATA AND MIX DESIGNS

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

.2 The term “mix design” means engineered design for proportioning materials in concrete including all supporting test results, materials properties.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of section under which adjacent items will be supplied and installed. Indicate cross-references to design drawings and specifications.

.4 Allow Seven (7) calendar, (5 business) days for the Engineer review of each submission.

.5 Adjustments made on shop drawings by the Engineer are not intended to change the Contract Price. If adjustments affect the value of Work, state such in writing to the prior to proceeding with the Work.

.6 Make changes in shop drawings as the the Engineer may require, consistent with the Contract Documents. When resubmitting, notify the Engineer in writing of any revisions other than those requested.

.7 Submit letter(s) of certification for the concrete mix design.

.8 Accompany submissions with a transmittal letter containing:

.1 Date.
.2 Project title and number.
.3 Contractor's name and address.
.4 Identification and quantity of each shop drawing, mix design, product and sample.
.5 Other pertinent data.

.9 Submissions shall include:

.1 Date and revision dates.
.2 Project title and number.
.3 Name and address of:
- Subcontractor,
- Supplier,
- Manufacturer.

.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with the Contract Documents.
.5 Details of appropriate portions of the Work as applicable:
- Fabrication,
- Performance characteristics,
- Standards.

.10 After the Engineer review, distribute copies.

.11 Submit one (1) electronic copy of the shop drawings or mix design for each requirement requested in the Specification Sections and as requested by the Engineer.

.12 Submit one (1) electronic copy of the product data sheets or brochures for requirements requested in the Specification Sections and as requested by the Engineer where shop drawings will not be prepared due to standardized manufacture of the product.

.13 Delete information not applicable to project.

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

.15 If upon review by the Engineer, 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.

.16 The review of shop drawings and mix designs by the Engineer is for the sole purpose of ascertaining conformance with general concept. This review shall not mean that the Engineer approves detail design inherent in shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of foregoing, the 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 all sub-trades.

1.6 SAMPLES

.1 Not Used.

1.7 MOCK-UPS

.1 Not Used.

1.8 CERTIFICATES AND TRANSCRIPTS

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

.2 Submit transcription of insurance immediately after award of Contract.

1.9 REQUIRED CONTRACTOR SUBMITTALS

.1 Construction Phase Submittals

.2 Weekly Progress Reports that outline the detailed Work (Contractor, subcontractors, suppliers, consultants) completed to date as well as the anticipated Work to be performed for the following week on a day-by-day basis. Work to be linked to activities in project schedule and to provide information on materials, equipment and manpower. Also, alternate Work to be identified if Work or a portion of, proposed cannot be done due to weather, equipment breakdown, delays in delivery, etc.

.3 Quality Control Inspection Reports - The Contractor shall maintain a daily inspection report that itemizes the results of all Quality Control inspections conducted by the Contractor. The reports shall be made available for review by the Engineer upon request. A summary of all Quality Control inspections conducted to date shall be submitted by the Contractor with each request for payment.

.4 Shop Drawings and Mix Designs - The Contractor shall submit all design drawings, shop drawings and mix designs required to fabricate and / or conduct the work a minimum 30 days prior to fabrication / production.

.5 Progress Photographs:

.1 Formats:
- Electronic: .jpg files, minimum three (3) mega pixels.

.2 Submission requirements: one (1) set of electronic files.
.3 Identification: name and number of project, description of photograph and date.
.4 Viewpoints: viewpoints determined by Construction Manager or the Engineer.
.5 Submission Frequency: prior to commencement of Work and weekly thereafter with progress statement, or as directed by Construction Manager or the Engineer.
.6 Submit CD with all electronic pictures as part of closeout package.

.6 Submit an electronic copy of Contractor's authorized representative's work site health and safety inspection reports to the Engineer.

.7 Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.

.8 Submit copies of incident and accident reports.

.9 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 Records - The Contractor shall submit a bound and itemized set of project quality control documentation.

.3 The Contractor shall not construe the Engineer'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.

Part 2 Products

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

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

1.2 REFERENCES

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

.2 Health Canada/Workplace Hazardous Materials Information System.

.1 (WHMIS).Material Safety Data Sheets (MSDS).

.3 Province of Alberta.

.1 Occupational Health and Safety Act, R.S.A. 2013.

1.3 SUBMITTALS

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

.2 Submit site-specific Health and Safety Plan: Within seven (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.
.12 Submit copies of Contractor’s authorized representative’s work site health and safety inspection reports to Departmental Representative, weekly.

.3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within ten (10) days after receipt of plan. The Contractor will revise the plan as appropriate and resubmit plan to Parks Canada within five (5) days after receipt of comments.

.4 Departmental Representative’s review of the 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.

.5 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.

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

1.4 FILING OF NOTICE

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

. .2 Provide Departmental Representative with copy of filing.

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.

.2 Departmental Representative recognizes that federal Occupational Health and Safety legislation places specific responsibilities upon Departmental Representative as owner of the work place. In order to meet those requirements, Departmental Representative has implemented a contractor safety regime to ensure roles and responsibilities assigned under Part II of the Canada Labour Code and the Canada Occupational Health and Safety Regulations are implemented and observed when involving contractor(s) to undertake work in Departmental Representative work places, including on Departmental Representative property. After contract award and prior to commencement of any work under the contract, the Project Manager will hold a health and safety meeting with the Contractor. At this meeting, the Contractor is required to complete and sign an Attestation to certify the Contractor will comply with the requirements set out in the Attestation and the terms and conditions of the contract.

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 Parks Canada 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 UNFORESEEN HAZARDS

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

1.12 HEALTH AND SAFETY COORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Co-ordinator must:

.1 Have minimum 2 years site-related working experience specific to activities associated with heavy civil 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 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 Parks Canada.

1.14 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction.

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

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

1.15 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

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED DIVISIONS

.1 Division 01 - General Requirements

.2 Division 02 - Existing Conditions

.3 Division 03 - Concrete

.4 Division 05 - Metals

.5 Division 09 - Finishes

.6 Division 31 - Earthwork

.7 Division 34 - Transportation

1.2 MEASUREMENT AND PAYMENT

.1 This Work shall be incidental to the Contract and will not be measured for payment.

1.3 DEFINITIONS

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

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.4 SUBMITTALS

.1 Prior to commencement of construction the Contractor must provide written confirmation that they have read and understood and will comply with environmental procedures as outlined in this section.

.2 The Contractor shall submit to the Departmental Representative in accordance with Section 01 33 00 Submittal Procedures.

1.5 ENVIRONMENTAL ASSESSMENT

.1 Prior to commencement of Work the Contractor must provide written confirmation that they have read and understood the environmental recommendations outlined in the Waterton Lakes National Park Canyon Church Camp Bridge Replacement Environmental Assessment (EA), April 2015.

.2 Potential impacts of Construction have been identified in the Environmental Assessment as well as mitigation measures.

.3 The Contractor shall ensure that all work is performed in accordance with the Waterton Lakes National Park Canyon Church Camp Bridge Replacement Environmental Assessment (EA) - April 2015.

1.6 ENVIRONMENTAL PROTECTION PLAN

.1 The Contractor must prepare a project and site-specific Environmental Protection Plan (EPP). The EPP must outline the applicable sections of the federal and provincial legalisation and the measures that will be implemented to ensure compliance with those regulations.

.2 The EPP must outline the proposed construction schedule, construction materials and methods to be used during construction activities. The EPP must identify the environmental sensitivities associated with the project location and proposed activities, including those addressed in the EA. The EPP must indicate the mitigation measures that will be implemented to prevent or minimize the potential impacts to the environment and will include a plan for contingency measures to be implemented in the event of mitigation measure failure.

.3 A site-specific Erosion and Sediment Control (ESC) plan must be included as part of the Contractor's EPP.

.4 A Spill Response Plan must be prepared by the Contractor and included as part of the Contractor's EPP submission. As a minimum, the spill response plan will outline procedures for:

- Containment,
- Elimination of source,
- Contacting necessary parties,
- Clean up and disposal,
- Reporting, and
- Incident review.

.5 The EPP will be reviewed by Departmental Representative for approval prior to commencing construction.

.6 The Contractor will ensure effective implementation of the EPP.

1.7 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 All Contractor's vehicles are required to display a vehicle work pass from Parks Canada. These permits may be obtained free of charge from Reality Services in the Waterton Lakes Park Administrator building in the Waterton townsite.

1.8 CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)

.1 Execution of the work is subject to the provisions within the Canadian Environmental Assessment Act (CEAA) Guidelines Order of 2012, subsequent amendments, and Parks Canada's Interim Directive on Implementation of the Canadian Environmental Assessment Act 2012.

.2 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.

1.9 MONITORING

.1 Parks Canada will have an Environmental Surveillance officer (ESO) attending the site to monitor the construction activity for conformance with the Environmental Procedures. The ESO will be allowed access to the construction site for the purposes of ensuring activities are completed in compliance with the applicable legislation and regulations, and the recommendations of the EA. The ESO or alternate designated Parks Canada staff member will present the "environmental briefing". The ESO's main duties are to monitor progress of the construction on an on-going basis to ensure compliance with the environmental protection measures, and to provide guidance through the Departmental Representative, in event of unanticipated environmental problems. Although the ESO has authority to enforce National Parks Act violation, direction to the Contractor will be the duty of the Departmental Representative.

.2 Notification

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's EPP. Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.2 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

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

1.10 CONSTRUCTION SITE ACCESS AND PARKING

.1 All private vehicles must be parked on Laydown Areas or on the north side of the Red Rock Parkway outside of the Canyon Church Camp access road. Generally, personal vehicles shall be parked at least 10 metres distance from any watercourse.

.2 The Contractor shall ensure that the environment either within and beyond the work limits is not negatively impacted or damaged by workers' vehicles or construction machinery. The Contractor shall instruct all workers of the project limits so that the "footprint" of the project is kept within defined boundaries.

1.11 PROTECTION OF WORK LIMITS

.1 The Contractor is to prepare an Environmental Protection Plan (EPP) which details how the work limits shall be marked and what procedures will be employed to ensure trespass outside these limits does not occur, to the satisfaction of the Departmental Representative.

.2 The Contractor shall prepare a construction site layout plan to be reviewed and approved by the Departmental Representative. The approved plan must indicate project site boundaries, the limits of clearing and excavation, in addition to equipment and material storage and vehicle parking locations. The plan must be reviewed by all crew members during the project Pre-Construction meeting and upon arrival to the project construction site.

1.12 EROSION AND SEDIMENT CONTROL

.1 Erosion control measures that prevent sediment from entering any waterway, water body or wetland in the vicinity of the construction site are a critical element of the project and shall be implemented by the Contractor.

.2 Erosion control measures that prevent the loss of salvaged topsoil are critical to the preservation of soils, native vegetation species and natural seed banks important for site reclamation.

.3 Erosion and sediment control measures must be constructed and functional prior to initiating construction activities.

.4 All ESC measures must be inspected daily prior to the start of construction activities, and immediately following periods of heavy precipitation or storm events.

.5 All ESC inspections shall be documented and any deficiencies or damaged ESC measures shall be repaired, amended or altered immediately. If the design of the ESC measures is not functioning effectively they are to be altered or alternative measures implemented. The Departmental Representative and ESO will monitor erosion control performance and must approve all amendments and alterations.

.6 Temporary ESC measures shall be implemented prior to the start of construction activities and shall remain in place until permanent ESC measures can be implemented, disturbed areas are reclaimed and stabilized, and or until vegetation growth has established to the satisfaction of the Departmental Representative.

.7 The site will be secured against erosion during any period of construction inactivity or shutdown.

1.13 POLLUTION CONTROL

.1 The Contractor shall prevent any deleterious and objectionable materials from entering streams, rivers, wetlands, water bodies or watercourses that would result in damage to aquatic and riparian habitat. Debris containment measures must be implemented during bridge removal and construction activities to prevent the release or deposition of waste material or debris into Blakiston Creek.

.2 The containment, storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the use of any hazardous or toxic products shall be in accordance with all applicable federal and provincial legislation. Hazardous products shall be stored no closer than 100 metres from watercourses banks and slope breaks.

.3 The Contractor shall provide spill kits at re-fuelling, lubrication, and repair locations that will be capable of dealing with 110% of the largest potential spill and shall be maintained in good working order on the construction site. The ESO and Departmental Representative prior to project start-up must approve these spill kits. The Contractor and site staff shall be informed of the location of the spill response kit(s) and be trained in its use.

.4 Spill kits must be present in all equipment and machinery used on site.

.5 Timely and effective actions shall be taken to stop, contain and clean-up spills as long as the site is safe to enter. Banff Dispatch will be contacted at (403) 762-1473 immediately of any spill. The Departmental Representative shall be notified following reporting to Banff Dispatch.

.6 In the event of a major spill, all work shall be stopped and all personnel devoted to spill containment and clean-up.

.7 The costs involved in a spill incident (the control, clean up, disposal of contaminants and site remediation to pre-spill conditions), shall be the responsibility of the Contractor. The site will be inspected to ensure completion to the expected standard and to the satisfaction of the Departmental Representative and ESO.

1.14 EQUIPMENT MAINTENANCE, FUELLING AND OPERATION

.1 The Contractor shall ensure that all soil, seeds, and any debris attached to construction equipment to be used on the project site shall be removed (e.g. power washing) outside the Waterton Lakes National Park before delivery to the work site. The Departmental Representative and ESO will have the right to refuse equipment or vehicle entry to the Park and project site if equipment and vehicles are not clean and free of dirt and debris.

All equipment or vehicles rejected by the Departmental Representative due to presence of dirt, soil weeds or grease or fluid leaks will be removed from the Park immediately. All costs incurred to clean or fix leaks of equipment and vehicles will be borne by the Contractor.

.2 Equipment fuelling sites will be identified by the Contractor and approved by the Departmental Representative and the ESO. Except for chain saws, any fuelling closer than 100 metres from any streams, wetlands, water bodies, waterways and slope breaks shall require the authorization and oversight of the Departmental Representative.

.3 Mobile fuel containers (e.g. slip tanks, small fuel carboys) shall remain in the service vehicle at all times. Protection and containment of approved fuel storage site is addressed in #2 and #3 of Pollution Control above.

.4 The Contractor is to ensure that unnecessary idling of vehicles is avoided.

.5 Oil changes, lubricant changes, greasing and machinery repairs shall be performed at locations approved by the Departmental Representative. Waste lubrication products (e.g. oil filters, used containers, used oil, etc.) shall be secured in spill-proof containers and properly recycled or disposed of at an approved facility. No waste petroleum, lubricant products or related materials are to be discarded, buried or disposed of in borrow pits, turnouts, picnic areas viewpoints, etc. anywhere within Waterton Lakes National Park.

.6 The Contractor shall ensure that all equipment is inspected daily for fluid/fuel leaks and maintained in good working order. Equipment and Machinery inspections must be documented each day and a record of the inspection kept with each piece of equipment.

.7 Fuel containers and lubricant product shall be stored only in secure locations specified by the Departmental Representative. Fuel tanks or other potentially deleterious substance containers shall be secured to ensure they are tamper proof, bear proof, and cannot be drained by vandals when left overnight in Waterton Lakes National Park. Alternatively, the Contractor may hire a security person employed to prevent vandalism.

1.15 OPERATION OF EQUIPMENT

.1 Equipment movements shall be restricted to the "footprint" of the construction area. The work limits shall be identified by stake and ribbon or other methods approved by the Departmental Representative. Unless authorized by the Departmental Representative activities beyond the work limits are not permitted. No machinery will enter, work in or cross over streams, rivers, wetlands, water bodies or watercourses, nor damage aquatic and riparian habitat or trees and plant communities outside of the permitted project limits.

.2 The Contractor shall instruct workers to prevent pushing, placement, raveling, storage or stockpiling of any materials (e.g. slash, rock, fill or topsoil) in the trees bordering the approved laydown areas or into watercourses or water bodies.

.3 When, in the opinion the Departmental Representative, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic features beyond the designated work area, the Contractor shall be responsible, at his or her expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of the Departmental Representative and ESO.

.4 If weeds are identified on site the Departmental Representative will flag the infested areas and restrict vehicle, equipment and construction crew access through the area.

.5 Construction materials (gravel and aggregate fill) source pits will be inspected by a Parks Canada Environmental Officer before being approved and or transported to the project. The Contractor needs to give 10 calendar days notice to inspect the source pits.

.6 Additional project boundary restrictions may be required if sensitive wildlife species, their nests or habitats are identified in the project footprint during construction activities. The Departmental Representative will identify and mark the revised project limits if required.

1.16 FIRE PREVENTION AND CONTROL

.1 A fire extinguisher shall be carried and available for use on each machine and at locations within office trailers and equipment storage in the event of fire. Basic firefighting equipment will be stored on-site in laydown and material storage areas and in pick-up trucks. Basic equipment includes 2 shovels, 2 Pulaski's, and 20 litre backpack pumps.

.2 Construction equipment shall be operated in a manner and with all original manufacturers' 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 the accidental ignition of any flammable material is prevented. Designated smoking locations will be established and smoking will be restricted to these locations or inside vehicle cabs. Designated smoking areas will be equipped with fire extinguishers.

.4 In case of fire, Banff Dispatch shall be contacted at (403) 762-1473 immediately. The Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so.

.5 Fires or burning of waste materials is not permitted.

1.17 WILDLIFE

.1 During the Pre-Construction meeting all personnel shall be instructed by the Departmental Officer or ESO on procedures to follow in the event of wildlife appearance near or within the work site and any other wildlife concerns.

.2 Construction activities will take place during daylight hours and, if necessary, the construction activity may be scheduled around important wildlife windows.

.3 No pets are allowed on site or in any vehicles or laydown areas.

.4 All site workers will observe posted speed limits and avoid or terminate activities on site that attract or disturb wildlife. Workers will vacate the area and stay away from the immediate location if bears, cougars, wolves, elk or moose display aggressive behaviour or persistent intrusion and shall notify Dispatch immediately. Extra care to control materials that might attract wildlife (e.g. lunches and food scraps) must be exercised at all times. All waste material will be stored in sealed, bear-proof containers and not in the back of pick-up trucks

.5 The Contractor will ensure that the work site is properly secured during non-work hours with excavations fenced and covered as required to prevent injury to wildlife.

.6 Banff Dispatch will be contacted at (403) 762-1473 immediately about dens, litters, nests, carcasses (road kills), bear activity or encounters on or around the site. Other wildlife-related encounters are to be reported within 24 hours. Notify the Departmental Representative following reporting to Banff Dispatch.

1.18 VEGETATION

.1 During the Pre-Construction meeting all personnel shall be instructed by the Departmental Officer or ESO on procedures to follow for the management and or removal of the existing vegetation. The project limits and vegetation to be cleared or removed will be clearly marked prior to construction.

.2 Vegetation will be cleared and or felled away from watercourses, water bodies and wetlands.

.3 Riparian vegetation must be preserved. Riparian vegetation must be pruned or topped to retain root system and maintain bank stability if clearing is required to complete construction activities.

.4 If required, topsoil or sod removed from riparian areas will be salvaged and stockpiled separately and be used later during reclamation.

.5 Disturbed areas must be reclaimed immediately following construction activities. All site workers will observe posted speed limits and avoid or terminate activities. The approved seed mix (Part 2, Section 2.1) will be used on-site to reclaim all disturbed areas.

1.19 RELICS OR ANTIQUITIES

.1 Artifacts, relics, antiquities and items of historical interest such as cornerstones, commemorative plaques, inscribed tablets and similar objects found on the work site shall be reported to the ESO or the Departmental Representative immediately. The Contractor and workers shall wait for instruction before proceeding with their work.

.2 All historical or archaeological objects found in Waterton Lakes National Park are protected under the National Parks Act and Regulations and are the property of Parks Canada. The Contractor and workers shall protect any articles found and request direction for the ESO or the Departmental Representative.

1.20 WASTE MATERIALS STORAGE AND REMOVAL

.1 The Contractor and workers shall dispose of hazardous wastes in conformance with the Environmental Contaminants Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.

.2 All wastes originating from construction, trade, hazardous and domestic sources, shall not be mixed, but will be kept separate.

.3 Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried or discarded at the construction site or elsewhere in Waterton Lakes National Park. These wastes shall be contained and removed in a timely and approved manner by the Contractor and workers, and disposed of at an appropriate waste landfill site located outside the park. Construction waste storage containers, provided by the Contractor, shall be emptied by the Contractor when 90% full. Waste containers will have sealed, bear-proof lids, and waste shall be covered while being transported.

.4 A concerted effort shall be made by the Contractor and workers to reduce reuse and recycle materials.

.5 All efforts to prevent wildlife from obtaining food, garbage or other domestic wasts shall be made by the Contractor and contract staff while undertaking their work in Waterton Lakes National Park. Such wildlife attractants shall not be stored at the work site overnight. Lunches, coolers and food products, including waste food products, shall be securely stored away from access by animals. Daily removal of food scraps, food wrappers, pop cans or other attractive products to bear-proof containers is mandatory.

.6 The Contractor and workers shall immediately report any circumstances related to food/garbage (e.g. overflowing container or strong smell) and wildlife to Banff Dispatch at (403) 762-1473 and report the details.

.7 Sanitary facilities, such as portable container toilet, shall be provided by the Contractor and maintained in a clean condition.

1.21 MISCELLANEOUS SITE MANAGEMENT CONTINGENCIES

.1 If required, a Contractor's office and work headquarters material laydown, equipment parking and storage area will be permitted at the work site.

.2 The National Park Act regulation prohibits anyone working within Waterton Lakes National Park from camping in non-designated areas.

Part 2 Products

2.1 SEED MIX

.1 The primary purpose of revegetation of the project area is to provide soil stabilisation and, by using a native grass mixture, reduce the amount of invasive plant establishment. The site should be prepared by reducing compaction leaving surface rough and loose with small woody debris loosely spread around then hydroseeded.

.2 The recommended species below do not represent a naturally-occurring community of plants, but all are native to the park and are believed to grow successfully from seed in reclamation projects. Criteria for inclusion are: 1) naturally occurring in WLNP, 2) grass sp, 3) known to have some success germinating and establishing by seeding, and 4) known to establish in reclamation sites (bare soil). They must be native collected seeds and not cultivars or ecovar variants.

Scientific Name	Common Name	Percentage
Pseudoroegnaria spicata	Bluebunch wheatgrass	40
Calamagrostis rubescens	Pine grass	20
Festuca campestris	Rough Fescue	20
Elymus trachycaulus	slender wheatgrass	20

Part 3 Execution

.1 Not Used

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 77 00 - Closeout Procedures

.3 Section 01 78 00 - Closeout submittals

1.2 MEASUREMENT AND PAYMENT

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

1.3 DEFINITIONS

.1 Quality Control (QC): The process of checking specific product 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) 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.

1.4 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.

.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.

.7 The Contractor must facilitate any independent Quality Assurance checks by representatives designated by the Departmental Representative. 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.

1.5 TESTING

.1 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 structural concrete, reinforcing steel, granular material and compaction, structural elements (torque testing - bolted splice) and metals 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.

.2 The quality control testing proposed and testing frequency shall at a minimum, achieve the requirements of the following:

.1 The testing requirements in the 2010 Alberta Transportation Standard Specifications for Highway Construction Manual and subsequent updates or Alberta Transportation - Standard Specification for Bridge Construction 2013.
.2 Wherever standard specifications refer to standards (e.g., CSA, ASTM, and others) the minimum testing frequencies in these standards shall be utilized.
.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.

.3 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.

.4 Approval of tested samples will be for characteristics or use named in such approval and shall not change or modify any Contract requirements.

.5 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.

.6 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.

.7 The Contractor shall be responsible for third party testing of materials incorporated into the works.

.8 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.

.9 Provide labour and facilities to obtain and handle samples and materials on site.

1.6 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 may order any 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, the Contractor shall correct such Work and pay costs of examination and correction.

1.7 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, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. The Contractor shall correct the defect and irregularities as advised by the Departmental Representative at no cost to the Departmental Representative.

Part 2 Products

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 01 14 00 - Work Restrictions

.2 Section 01 77 00 - Closeout Procedures

1.2 MEASUREMENT AND PAYMENT

.1 This work is considered incidental to the Work and shall not be measured for payment.

1.3 REFERENCES

Not Used.

1.4 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

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

.4 Provide on-site containers for collection of waste materials and debris.

.5 Dispose of waste materials and debris at designated dumping areas outside of the National Park.

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

.7 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall into watercourse or be blown by wind.

1.5 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

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

.6 Remove dirt and other disfiguration from exterior surfaces.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Not Used

Part 2 Products

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 78 00 - Closeout Submittals

1.2 MEASUREMENT AND PAYMENT

.1 This work shall be incidental to Contract and will not be measured for payment.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.2 Substantial Performance Inspection:

.1 Notify the Departmental Representative in writing when Work is considered ready for Substantial Performance and request the Departmental Representative's inspection.
.2 Accompany the Departmental Representative on preliminary inspection to determine items listed for completion or correction.
.3 Comply with the Departmental Representative’s instructions for correction of items of Work listed in executed certificate of Substantial Performance and those determined in the final inspection.
.4 Notify the Departmental Representative of completion of items of Work listed in executed certificate of Substantial Performance and those determined in the final inspection.

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

.1 Work: completed and inspected for compliance with Contract Documents.
.2 Defects: corrected and deficiencies have been completed.
.3 Work: complete and ready for final inspection.

.4 Final Inspection:

.1 When completion tasks noted above have been completed, request final inspection of Work by the Departmental Representative and Contractor. If Work is deemed incomplete by the Departmental Representative, complete outstanding items and request re-inspection.

1.4 DEFINITIONS

.1 Undertake a final cleaning of the site at project completion:

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.
.2 All disturbed areas shall be returned to their original condition.

Part 2 Products

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 77 00 - Closeout Procedures

1.2 MEASUREMENT AND PAYMENT

.1 This work shall be incidental to Contract and will not be measured for payment.

1.3 AS-BUILT DOCUMENTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for the 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 the Departmental Representative.

1.4 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of black line opaque drawings.

.2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

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

- .1 Measured locations 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 shown on original Contract Drawings.
- .5 References to related shop drawings and modifications.

.4 Specifications: legibly 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 manufacturer's certifications, inspection certifications, and field test records required by individual specifications sections.

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

1.5 WARRANTIES AND BONDS

.1 Warranty period for all bridge bearings and assemblies shall be five (5) years from the date of final acceptance as determined by the Departmental Representative.

.2 Unless otherwise specified, all materials incorporated into the work must be new and undamaged. Both workmanship and materials must be of the quality specified in the Contract Documents.

.3 The Contractor shall maintain, at no cost to Parks Canada, the work and every part thereof in reasonable working order and complete repair during the period of two (2) years from the date of written acceptance. Notwithstanding the generality of the foregoing, the Contractor will not be liable for:

.1 Damage caused by parties who are strangers to the Contract, or

.2 Damage resulting from malicious acts of other parties, or

.3 Damage for which Parks Canada has specifically assumed responsibility in writing, or

.4 Any condition which in the opinion of the Departmental Representative results from normal wear and tear, or

.5 Acts or omissions which in the opinion of the Departmental Representative are beyond the control of the Contractor

Where in each case the damage or condition arose subsequent to the issuance of acceptance of work.

.4 The Contractor, upon being so directed by the Departmental Representative by a notice in writing during the maintenance period, shall repair or replace any defect in or failure of any part of the work within the time set out in and according to the notice, to the satisfaction of the Departmental Representative. If the Contractor fails to repair or replace the defect or failures as required by any such notice, Parks Canada may proceed to have the repair or replacement made and may charge the Contractor with the cost thereof and at Parks Canada’s option deduct the amount from any amount due to the Contractor by Parks Canada either under the Contract or any other contract or otherwise or may collect the same from the Contractor by any lawful means available to Parks Canada. At the end of the maintenance period, after all defects and failures have been corrected to the satisfaction of the Departmental Representative, or if there are not any defects or failures in the work, the Departmental Representative will issue a written final acceptance and Parks Canada shall release the performance bond with respect thereto.

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

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

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

.8 Co-execute submittals when required.

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

.10 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.

Part 2 Products

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Work includes the complete removal of the existing bridge superstructure (Deck and Rails), piers and concrete abutments. In-stream concrete pier footings are to remain. Protective measures are required to prevent all demolished and/or removed elements, and debris from entering the Creek. All demolished material shall be removed from the Park.

1.2 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures

.2 Section 01 35 43 – Environmental Procedures

1.3 MEASUREMENT AND PAYMENT

.1 **Measurement and Payment** for this Work will be made at the lump sum bid price from Appendix 1 for **STRUCTURE DEMOLITION.** This payment will be the full compensation for completing the Work including all labour, materials, and equipment necessary to complete the Work.

1.4 REFERENCES

.1 Definitions:

.1 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or materials that endanger human health or environment if handled improperly.

.2 Reference Standards:

.1 CSA International

.1 CSA S350-[M1980(R2003)], Code of Practice for Safety in Demolition of Structures.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Pre-demolition Meeting:

.1 A pre-demolition meeting will be scheduled one [1] week prior to beginning the demolition and removal of the existing bridge, with the Contractor and the Departmental Representative to:

.1 Verify project and demolition requirements.

.2 Verify existing site conditions adjacent to demolition work.

.2 The contractor’s key personnel, and the demolition subcontractor are expected to attend.

.2 Scheduling:

.1 The Contractor shall employ all necessary means to meet project time lines without compromising the specified environmental and safety requirements.

.1 In event of unforeseen delay notify Departmental Representative in writing.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Prior to commencing bridge demolition, the Contractor shall submit a detailed demolition plan in accordance with Section 01 33 00 - Submittal Procedures. As a minimum, the demolition plan should include:

- .1 Descriptions of and anticipated quantities of materials to be salvaged reused, recycled and landfilled.
- .2 Schedule of selective demolition.
- .3 Number and location of dumpsters.
- .4 Name and address of waste facilities.

.2 The Contractor shall submit copies of certified receipts from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of the Departmental Representative.

.3 Shop Drawings:

- .1 Submit for review and approval demolition drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning.
- .2 Submit demolition drawings stamped and signed by professional engineer registered or licensed in the Province of Alberta, Canada.

1.7 SITE CONDITIONS

.1 Environmental protection:

- .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .3 Fires and burning of waste or materials is not permitted on site.
- .4 Do not bury rubbish waste materials.
- .5 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.
  - .1 Ensure proper disposal procedures are maintained throughout project.
- .6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- .7 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .8 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- .9 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

1.8 EXISTING CONDITIONS

.1 The Contractor is to take over the existing bridge structure based on its condition on the date the tender is accepted.

Part 2 Products

2.1 EQUIPMENT

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

Part 3 Execution

3.1 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 The Contractor shall provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to surrounding area and watercourse, according to Section 01 35 43 Environmental Procedures.

.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.

.2 Protection of in-place conditions:

.1 Work in accordance with Section 01 35 43 - Environmental Procedures, Erosion and Sedimentation Control Plan.

.2 Support affected structures and, if safety of structure being demolished appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.

3.2 DEMOLITION

.1 Demolish and/or remove the existing bridge railing system, superstructure [deck planks, and stringers], piers and concrete abutments.

.2 Crush concrete generated due to demolition of foundations to size suitable for transport and disposal.

.3 Demolish concrete abutments completely, leaving original concrete pier footings in place.

.4 At end of each day's work, leave Work in safe and stable condition.

.5 Demolish to minimize dust. Keep materials wetted.

.6 Remove and dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction.

END OF SECTION

Part 1 General

1.1 MEASUREMENT & PAYMENT

.1 This work is considered incidental to the Work and shall not be measured for payment.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

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

.2 CAN/CSA-S269.3, Concrete Formwork, National Standard of Canada

Part 2 Products

2.1 MATERIALS

.1 Formwork materials:

.1 Forms for exposed surfaces:

.1 Use 18 mm Coated Formply consisting of Douglas Fir substrate with resin-impregnated paper overlay and factory treated chemically active release agent.

.2 Use full-sized sheets as practical.

.3 Obtain approval of Engineer prior to the reuse of any form.

.4 Support pours less than 1.5 m height at 300 mm maximum on centres.

.5 Support pours greater than 1.5 m height at 200 mm maximum on centre.

.6 Use strong-backs or walers placed perpendicular to supports to ensure straightness of form.

.7 Construct metal bolts or anchorages within the form so as to allow their removal to a depth of at least 20 mm from the concrete surface.

.8 Remove plastic sleeves for a distance of 100 mm from the face of the concrete and fill cavity with a non-shrink grout approved by the Consultant to 75 mm from the surface. Fill remaining 75 mm with an approved concrete patching material.

.2 Forms for unexposed surfaces:

.1 15 mm plywood supported at 400 mm maximum on centre.

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 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.

.3 Fabricate and erect falsework in accordance with CSA S269.1.

.4 Refer to drawings for required finishes.

.5 Do not place shores and mud sills on frozen ground.

.6 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.7 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.

.8 Align form joints and make watertight.

.1 Keep form joints to minimum.

.9 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.

.10 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.11 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.

.12 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

.1 **Measurement and Payment** for the supply and installation of **CONCRETE REINFORCING** from Appendix 1 will be made on the basis of the unit price bid per kilogram acceptably placed. This payment will be full compensation for completing the Work as shown on the drawings and described in this section, for the supply and acceptably placed reinforcing steel, including all labour, materials, and equipment necessary to complete the Work.

1.2 REFERENCES

.1 CSA International

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

.2 CAN/CSA-A23.3, Design of Concrete Structures.

.3 CSA-G30.18, Carbon Steel Bars for Concrete Reinforcement.

.4 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.5 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

.2 Reinforcing Steel Institute of Canada (RSIC)

.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.

.3 Shop Drawings:

.1 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 the Engineer, with identifying code marks to permit correct placement without reference to structural drawings.

.2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.

.4 When Chromate solution is used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by the Engineerprior to its use.

1.4 QUALITY ASSURANCE

.1 Submit in accordance with Section 01 45 00 - Quality Control.

.1 Mill Test Report: provide the Engineer with certified copy of mill test report of reinforcing steel, as part of the shop drawing submission.

.2 Upon request submit in writing to the Engineer proposed source of reinforcement material to be supplied.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.2 Storage and Handling Requirements:

.1 Store materials 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 the Engineer.

.2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.

.3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.

.4 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.

.5 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.

.6 Mechanical splices: subject to approval of the Engineer.

.7 Plain round bars: to CSA-G40.20/G40.21.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2

.2 Obtain the Engineer'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 Upon request, provide the Engineer with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 2 weeks prior to beginning reinforcing work.

.2 Upon request inform the Engineer of proposed source of material to be supplied.

Part 3 Execution

3.1 PREPARATION

.1 Not Used.

3.2 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by the Engineer.

.2 When field bending is 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 the Engineer's approval of reinforcing material and placement.

.3 Ensure cover to reinforcement is maintained during concrete pour.

3.4 CLEANING

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

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

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

END OF SECTION

Part 1 General

1.1 MEASUREMENT PROCEDURE

.1 **Measurement and Payment** for the supply and installation of **CAST-IN-PLACE CONCRETE** from Appendix 1 will be made on the basis of the actual volume within the neat lines of the abutments as shown on the drawings or revised as a result of site conditions. All revisions shall be agreed upon with the Departmental Representative prior to the commencement of concrete Work. Deductions will not be made for concrete displaced by reinforcing steel or other voids and chamfers.

.2 The concrete footings will be set on rock, where excavation is made wider than the neat lines of the abutment as shown; the Contractor shall supply and place the excess volume of concrete at his own expense.

.3 The payment for concrete shall include full compensation for the cost of furnishing all material, tools, equipment, forms, bracing, curing, heating necessary to complete the Work, including a basic surface finish.

1.2 REFERENCES

.1 CSA International

.1 CSA-A23.1/A23.2-[2004], Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA A3000-[08], Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.3 CAN/CSA-G30.18, Billet-Steel Bars for Concrete Reinforcement.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings:

.1 Submit placing drawings prepared in accordance with plans to clearly show size, shape, location and necessary details of reinforcing.

.3 Provide testing results for review by the Engineer and do not proceed without written approval when deviations from mix design or parameters are found.

.4 Concrete hauling time: provide for review by the Engineer deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.

1.4 QUALITY ASSURANCE

.1 Provide to the Engineer, 2 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.

.1 Quality Control Plan: provide written report to the Engineer verifying compliance that concrete in place meets performance requirements.

1.5 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 Do not modify maximum time limit without receipt of prior written agreement from the Engineer and concrete producer as described in CSA A23.1/A23.2.

.2 Deviations to be submitted for review by the Engineer.

.2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

Part 2 Products

2.1 MATERIALS

.1 Cement: to CSA A3001, Type GU.

.2 Water: to CSA A23.1/A23.2.

.3 Reinforcing bars: to CAN/CSA-G30.18, Grade 400.

.4 Aggregates: Fine and coarse aggregates: to CAN/CSA-A23.1, stockpiled separately.

.5 Water reducing agents and superplasticizers: to ASTM C494.

.6 Air entraining agents: to ASTM C260

2.2 MIXES

.1 Submit a concrete mix design including applicable material test reports for the Engineer's review a minimum of 2 weeks before concrete placement.

.1 Mix designs:

.1 Prepared by Concrete Testing Laboratory or Supplier:

.1 Laboratory certified to CAN/CSA-A283

.2 Required mix properties:

.1 Minimum specified compressive strength at 28 days: 35 MPa

.2 Nominal maximum aggregate size: 20 to 5 mm

.3 Range of slump: 100±30 mm

.4 Total air content: 5-8 %

.5 Maximum water/cementing materials ratio: 0.40

.3 Material tests:

.1 Fine and coarse aggregate sieve: CAN/CSA-A23.2-2A within 90 days

.2 Amount of material finer than 80µm in aggregate: CAN/CSA-A23.2-5A within 90 days

.3 Organic impurities in sands for concrete: CAN/CSA-A23.2-7A within 90 days

.4 Results of deleterious substances and physical properties of aggregates: Table 12, CAN/CSA-A23.1; A23.2-3A, A23.2-4A, A23.2-23A, A23.2-24A, A23.2-29A within 180 days

.5 Potential expansivity of aggregates: CAN/CSA A23.2-14A within 24 months

.6 Detection of alkali-silica reactive aggregate by accelerated expansion of mortar bars: CAN/CSA A23.2-25A within 12 months

Part 3 Execution

3.1 PREPARATION

.1 Provide the Engineer 48 hours notice before each concrete pour.

.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 facilitates placing with minimum of rehandling, and without damage to existing structure or Work.

.4 Protect previous Work from staining.

3.2 INSTALLATION/APPLICATION

.1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.

.2 Sleeves and inserts:

.1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in.

.2 Sleeves and openings greater than 100 mm x 100 mm not indicated, must be reviewed by the Engineer.

3.3 FINISHES

.1 After formwork removal, all fins and irregular projections shall be removed from all exposed surfaces. On all surfaces, cavities formed by form ties, surface voids, broken edges and other defects shall be chipped, prepared and filled with a cement mortar.

.2 Prior to concrete finishing the exposed concrete abutment shall be cleaned, including the removal of stains or marks transferred from the forms.

.3 Formed surfaces exposed to view: sack rubbed finish in accordance with CSA A23.1/A23.2.

3.4 FIELD QUALITY CONTROL

.1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory approved by the Engineer and paid for by Contractor.

3.5 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning and Section 01 35 43 - Environmental Procedures.

.2 Use trigger operated spray nozzles for water hoses.

.3 Designate cleaning area for tools to limit water use and runoff.

.4 Cleaning of concrete equipment to be done in accordance with Section 01 35 43 Environmental Procedures.

.1 The washing out of concrete mixer trucks will not be permitted within the Park.

.2 Divert admixtures and additive materials from landfill to approved official hazardous material collections site after receipt of written approval from Departmental Representative.

.3 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

.1 **Measurement and Payment** for this Work will be made at the lump sum bid price from Appendix 1 for **PRE-CAST STRUCTURAL CONCRETE.** This payment will be the full compensation for completing the Work as shown on the drawings and described in this Section, including all material, fabrication, finishes, labour, delivery, installation and equipment necessary to acceptably complete the Work.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

- .1 ASTM A 775/A 775M, Specification for Epoxy-Coated Reinforcing Steel Bars.
- .2 ASTM D 412, Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
- .3 ASTM D 2240, Test Method for Rubber Property - Durometer Hardness.

.2 Canadian Standards Association (CSA)

- .1 CAN/CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
- .2 CAN/CSA-23.3,Design of Concrete Structures
- .3 CAN/CSA-A23.4, Precast Concrete - Materials and Construction.
- .4 CSA-A251, Qualification Code for Manufacturers of Architectural and Structural Precast Concrete.
- .5 CSA-G30.15, Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
- .6 CAN/CSA-G30.18,. Billet-Steel Bars for Concrete Reinforcment of precast elements to CAN3-A23.4, Section 10.
- .7 CAN/CSA-G40.21, Structural Quality Steels.
- .8 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .9 CSA-G279, Steel for Prestressed Concrete Tendons.
- .10 CSA-W48.1, Carbon Steel Covered Electrodes for Shielded Metal Arc Welding.
- .11 CSA-W59, Welded Steel Construction (Metal Arc Welding).
- .12 CSA-W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.3 DESIGN REQUIREMENTS

.1 Design precast elements to CAN/CSA-A23.3 and CAN/CSA-A23.4 to carry handling stresses.

.2 Design precast elements to carry loads specified by Engineer.

1.4 PERFORMANCE REQUIREMENTS

.1 Tolerance of precast elements to CAN/CSA-A23.4, Section 12.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures, and in accordance with CAN/CSA-A23.3 and CAN/CSA-A23.4.

.2 Include the following items:

.1 Details of prestressed and non-prestressed members, reinforcement and their connections.

.2 Camber.

.3 Finishing schedules.

.4 Methods of handling and erection.

.5 Openings, sleeves, inserts and related reinforcement.

1.6 QUALIFICATIONS

.1 Precast concrete elements to be fabricated and erected by manufacturing plant certified by Canadian Standards Association in appropriate categories according to CSA-A251.

.2 Precast concrete manufacturer to be certified in accordance with CSA's certification procedures for precast concrete plants prior to submitting tender and to specifically verify as part of tender that plant is currently certified in appropriate categories, Structural.

.3 Only precast elements fabricated in such certified plants to be acceptable to the Engineer, and plant certification to be maintained for duration of fabrication, erection until warranty expires.

.4 Welding companies certified to CSA-W47.1, Division 1, 2 or 3.

Part 2 Products

2.1 MATERIALS

.1 Cement, aggregates, water, admixtures: to CAN/CSA-A23.1 and CAN/CSA-A23.4.

.2 Reinforcing steel: to CAN/CSA-G30.18.

.3 Prestressing steel tendons and bars: to CAN/CSA-S6 and CSA-G279.

.4 Welded wire fabric: to CSA-G30.15.

.5 Hardware and miscellaneous materials: to CAN/CSA-A23.1.

.6 Forms: to CAN/CSA-A23.4.

.7 Welding materials: to CSA-W48.1.

.8 Welding electrodes: to CSA-W48.1 and certified by Canadian Welding Bureau.

.9 Galvanizing: hot dipped galvanizing with minimum zinc coating of 600 g/m^2 to CAN/CSA-G164.

.10 Steel primer: to CAN/CGSB-1.40.

.11 Zinc-rich primer: to CAN/CGSB-1.181.

.12 Air entrainment admixtures to ASTM C260.

.13 Chemical admixtures to ASTM C494.

.14 Shims: Plastic

2.2 MIXES

.1 Concrete

.1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, Alternative 1, to give the following properties for all concrete as indicated:

.1 Cement: use Type Portland cement.

.2 Minimum compressive strength at 28 days: 35 MPa.

.3 Class of exposure: C1.

.4 Nominal size of coarse aggregate: 20 mm.

.5 Water cement ratio: 0.4.

.6 Air content: 5 to 8%.

.7 Slump at time and point of discharge: 40 to 80 mm.

.2 Grout

.1 Minimum compressive strength: 35 MPa.

.2 Grout for levelling pads: "Target-Traffic Patch Coarse" with fine aggregate or as approved

2.3 MANUFACTURED UNITS

.1 Manufacture units in accordance with CAN/CSA-A23.4, and CSA-A251.

.2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast on part of unit which will not be exposed.

.3 Provide hardware suitable for handling elements

2.4 FINISHES

.1 Finish surfaces with wood float.

.2 Deck: Transverse broomed finish.

2.5 SOURCE QUALITY CONTROL

.1 Provide Engineer with certified copies of quality control tests related to this project as specified in CAN/CSA-A23.4 and CSA-G279.

.2 Provide records from in-house quality control programme based upon plant certification requirements to Engineer for inspection and review.

.3 Upon request, provide Engineer with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.

.4 Precast plants should keep complete records of supply source of concrete material, steel reinforcement, prestressing steel and provide to Engineer for review upon request.

.5 Store precast elements to CAN/CSA-A23.4, Section 30.

Part 3 Execution

3.1 ERECTION

.1 Transport precast concrete work in accordance with CAN/CSA-A23.4, Section 31.

.2 Weld in accordance with CSA-W59, for welding to steel structures and CSA-W186, for welding of reinforcement.

.3 Install precast elements to CAN/CSA-A23.4, Section 32.

.4 Non-cumulative erection tolerances in accordance with CAN/CSA-A23.4.

.5 Set elevations and alignment between units to within allowable tolerances before connecting units.

.6 Repairs to precast concrete panels in accordance with CAN/CSA-A23.4, Section 33. CAN/CSA-A23.4 distinguishes between repairs and damage, the Contractor shall be responsible for the repairs and damage at no additional cost to Parks Canada.

3.2 CLEANING

.1 Obtain approval of cleaning methods from Engineer before cleaning soiled precast concrete surfaces.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 The Work in this specification consists of the supply, fabrication, delivery and erection of the steel bridge girders including but not limited to, temporary works for erection, bearing assemblies, bracing and miscellaneous hardware necessary to complete the Work.

1.2 MEASUREMENT AND PAYMENT

.1 **Measurement and Payment** for this Work will be made at the lump sum bid price from Appendix 1 for **STRUCTURAL STEEL FOR BRIDGES.** This payment will be the full compensation for completing the Work as shown on the drawings and described in this Section, including all material, fabrication, finishes, labour, delivery, installation and equipment necessary to complete the Work.

1.3 REFERENCES

.1 American Association for State Highway and Transportation Officials (AASHTO)

.1 AASHTO Standard Specifications for Highway Bridges.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM A 325M, Specification for Structural Bolts, Steel, Heat Treated 120/105ksi Minimum Tensile Strength.

.2 ASTM A 490M, Specification for High-Strength Steel Bolts, Classes10.9 and for Structural Steel Joints.

.3 Canadian Standards Association (CSA)

.1 CAN/CSA-G40.20, General Requirements for Rolled or Welded Structural Quality Steel.

.2 CAN/CSA-G40.21, Structural Quality Steels.

.3 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.

.4 CAN/CSA-S6, Design of Highway Bridges.

.5 CAN/CSA-S16.1, Limit States Design of Steel Structures.

.6 CSA S269.1, Falsework for Construction Purposes.

.7 CSA W48 Series, Electrodes.

.8 CSAW59, Welded Steel Construction, (Metal Arc Welding).

1.4 SUBMISSIONS

.1 Submit erection diagrams, shop details, welding procedures, and erection procedure drawings to the Engineer in accordance with Section 01 33 00 - Submittal Procedures.

.2 Erection procedure drawings to bear signature and stamp of qualified professional engineer registered or licensed in Alberta, Canada.

.3 Drawings showing details of connections designed by the Contractor shall bear the signature and stamp of qualified professional engineer registered or licensed in Alberta, Canada.

.4 Erection diagrams are general-arrangement drawings showing or indicating the principal dimensions of the bridge, piece marks, the sizes of all members, field-welding requirements, the sizes and types of bolts, and bolt installation requirements.

.5 Shop drawings to show total camber diagram to be used as web cutting profile including allowance for welding distortion if required. .

.6 Shop Details will provide:
- .1 Full detail dimensions and sizes of all component parts of the structure. These dimensions will make allowance for changes in shape due to weld shrinkage, camber, and any other effects that cause finished dimensions to differ from initial dimensions.
- .2 All necessary specifications for the materials to be used.
- .3 Identification of areas requiring special surface treatment.
- .4 Identification of fracture: critical and primary tension members and component parts.
- .5 Bolt installation requirements.
- .6 Details of all welds.

.7 Welding procedures are to comply with CSA W47.1.

.8 The erection procedure drawings are to indicate the proposed method of erection, including the sequence of erection, the weights and lifting points of the members, and the location and lifting capacities of the cranes used to lift them. Show details of temporary bracing and bents to be used during construction.

.9 The symbols for welding and non-destructive testing on shop drawings are to be in accordance with CSA-W59.

.10 Welding procedure specifications, data sheets and repair procedures shall be available for review by the Engineer.

.11 Provide Engineer prior to fabrication with copy of steel producer certificates.

.12 Provide Engineer with copy of certified test reports for Charpy V-notch tests. Results on a per heat basis.

Part 2 Products

2.1 MATERIALS

.1 Steel: To CAN/CSA G40.21, grade and types as indicated on drawings. Substitution of steel members or components for size and grade will not be permitted unless approved by Engineer. All steel is to be new. Acceptance of any material by an inspector will not preclude subsequent rejection of the material if it is found defective.

.2 High-Strength Bolts, Nuts, and Washers: Ship nuts and bolts together as an assembly. ASTM A 325/A 325M or ASTM A 490/A 490M high-strength bolts for use with unpainted corrosion-resistant steel are to be Type 3 unless corrosion-protection is provided by an approved protection system. ASTM A 490 bolts are not to be galvanized or plated. Overtap the nuts of galvanized fasteners by the minimum amount required for assembly and lubricate with a lubricant containing a visible dye. The use of a mechanically deposited zinc coating will require prior approval from Engineer.

.3 Electrodes: The selection, supply, and storage of electrodes and fluxes are to be in accordance with Clause 5 of CSA W59. Only controlled hydrogen (CH) designation electrodes shall be used for the flux-cored welding process. The weld metal in fracture critical and primary tension members is to meet the Charpy V•notch energy requirements specified in CAN/CSA-S6. As required by CSA W59, weld metal used with corrosion

resistant steels is to have corrosion resistance and be of a colour similar to that of the base metal.

.4 Shear Connectors: To be of a headed stud type in accordance with Appendix H of CSA W59.

.5 Hot dip galvanizing: To CAN/CSA-G164, minimum zinc coating of 600 g/m^2

.6 Anchor bolts, washers and nuts: To CAN/CSA-G40.21.

.7 Bearings: To CAN/CSA-S6 as indicated.

.8 Shrinkage compensating grout: Pre-mixed compound consisting of non-metallic aggregate, Portland cement, water reducing agents and plasticizing agents.

Part 3 Execution

3.1 FABRICATION

.1 Quality of Work

.1 The standards for quality of work and finish are to comply with the best modern practices for steel bridge fabrication (with particular attention to the appearance of parts exposed to view).

.2 Store plain or fabricated structural steel above the ground on skids or other supports and keep free from dirt and other foreign matter. Adequately support long members to prevent excessive deflection.

.3 All visible girder faces to be brush off blast cleaned (SSPC SP6) to remove mill scale and create uniform appearance.

.2 Plates

.1 Unless otherwise shown on the Drawings, steel plates for main members (and their splice plates) are to be cut so that the primary direction of rolling is parallel to the direction of tensile or compressive stress.

.2 Plane, mill sheared edges of plates more than 16 mm thick and carrying calculated tension, or grind to a minimum depth of 3 mm. Oxygen cutting of structural steel is to be done by machine, except that hand-guided cutting is allowed for copes, blocks, and similar cuts where machine cutting is impracticable. Re-entrant corners are to be free from notches and have a fillet of the largest practical radius, but not less than 25 mm. The quality and repair of the cut edges are to comply with Clause 5 of CSA W59. All cut edges that are not to be welded are to have a surface roughness not greater than 1000, as specified by CSA B95.

.3 Cut webs to the prescribed camber, with allowance for shrinkage due to cutting and subsequent welding.

.3 Bent Plates

.1 Load-carrying, rolled steel plates to be bent are to be cut from the stock plates so that the bend line is at right angles to the direction of rolling, except as otherwise approved by Engineer for orthotropic decks; and have their corners lightly chamfered by grinding in the region of the bend before bending.

.2 Carry out cold bending so that no cracking or tearing of the plate occurs. Minimum bend radii, measured to the concave face of the metal, are to be as shown in CAN/CSA-S6, Table 10.17.

.3 Hot bending at a plate temperature not greater than 600C is to be used to form radii less than those specified for cold bending. Use accelerated cooling using

compressed air or water for a hot bent component only when its temperature is below 300C.

.4 Straightening Material

.1 All steel is to be flat and straight before being worked. Steel with sharp kinks or bends may be rejected. Attempts to straighten sharp kinks or bends will require approval.

.2 Rolled plates, sections, and built-up members may be straightened using mechanical means or by the application of a controlled heating procedure in accordance with Clause 5.10.5 of CSA W59. After straightening of a bend or buckle, examine the surface of the steel for evidence of fracture or other damage and take corrective action if necessary.

.5 Bolt Holes

.1 Drill or ream all holes to the finished diameter, except that punched holes will be allowed in material up to 16 mm thick. When shown on the Drawings, oversize or slotted holes meeting the following requirements are permitted.

.1 Oversize holes shall not be more than 4mm larger than bolts 22mm or less in diameter, not more than 6mm larger than bolts 24mm in diameter, and not more than 8mm larger than bolts 27mm or more in diameter. Oversize holes used in any piles of connections shall be provided with hardened washers under heads or nuts adjacent to plies containing oversize holes.

.2 Short slotted holes shall not be more than 2mm wider than the bolt diameter and shall not have a length that exceeds the oversize diameter requirements of item (a) by more than 2mm. When used in any piles of connections, hardened washers shall be provided under heads or nuts adjacent to plies containing slotted holes.

.3 Long slotted holes shall not be more than 2mm wider than the bolt diameter and shall not be greater than 2.5 times the bolt diameter.

.4 Structural plate washers or a continuous bar not less than 8mm thick shall cover long slots that are in the outer plies of joints after installation.

.5 When ASTM A 490 or ASTM A 490M bolts larger than 26mm in diameter are used in oversize or slotted holes in outer plies, the hardened washers shall be at least 8mm thick and comply with ASTM F 436.

.6 The requirements for the nominal diameter of a hole shall not preclude the use of the following bolt diameters and hole combinations:

.1 A ¾ in bolt or an M20 bolt in a 22mm diameter hole;

.2 A 7/8 bolt or an M22 bolt in a 24mm diameter hole; and

.3 A 1 in bolt or an M24 bolt in a 27mm diameter hole.

.2 The diameter of a punched hole is not to be more than 2 mm larger than the nominal diameter of the bolt unless oversize holes are specified. The diameter of the die is not to exceed the diameter of the punch by more than 2 mm. Holes are to be clean cut and without ragged or torn edges, but the lightly conical hole that results from clean cutting is acceptable. Holes may be reamed to admit fasteners.

.3 Holes that are to be reamed to final diameter are to be first sub-drilled or sub-punched to 4 mm smaller than the nominal bolt diameter of the bolt. With the connecting parts assembled and securely held, ream the holes to 2 mm larger than the nominal diameter of the bolts. Match-mark the parts before disassembly.

.4 Holes that are drilled full-size shall be 2 mm larger than the nominal diameter of the bolt unless oversize holes have been specified. They are to be accurately located by using suitable numerically controlled drilling equipment, or by using a steel template carefully positioned and clamped to the steel. The accuracy of the holes prepared in this manner, and their locations, are to be such that like parts are identical and require no match marking. The holes for any connection may be drilled full-size when the connecting parts are assembled and clamped in position, in which case match-mark the parts before disassembly.

.5 Pins and rollers are to be accurately turned to the dimensions and finish shown on the Drawings and be straight and free from flaws. Forge and anneal pins and rollers more than 175 mm in diameter. Pins and rollers 175 mm or less in diameter may be either forged and annealed or of cold-finished carbon-steel shafting. Bore holes for pins to the specified diameter and finish at right angles to the axis of the member. The diameter of the pinhole is not to exceed that of the pin by more than 05 mm for pins 125 mm or less in diameter or more than 0.75 mm for larger pins. Bore pinholes on completion of the assembly of built-up members.

3.2 WELDED CONSTRUCTION

.1 All welding procedures, including those related to quality of work, techniques, repairs, and qualifications, are to comply with CSA W59, except where modified by this specification.

.2 Process with limited application: The electroslag and electrogas welding processes specified in Clause 5 of CSA W59 is not to be used for welding quenched and tempered steels or for welding components of members subject to tension stress or stress reversal.

.3 Members and components of members designated primary-tension or fracture-critical are to meet the requirements of this specification in addition to the requirements of CSA W59. The use of heat to alter the sweep or camber of fracture-critical girders will require approval from the Engineer.

.4 Any company undertaking welded fabrication in accordance with this Section is to be certified to Division 1 or 2 of CSA W47.1.

.5 Complete joint penetration groove welds are to meet the requirements of Clauses 10 and 12.4 of CSA W59. Unless produced with the aid of a steel backing, they are to have the root of the initial weld gouged, chipped, or otherwise removed to sound metal before welding of the other side is started. Provide runoff tabs or extension bars so that groove welds terminate on the tab. Place the welds that attach the tabs to the piece being welded inside the joint so that they are incorporated into the final weld.

.6 Where practicable, make web to flange fillet welds continuous by machine or automatic welding. Welds may be repaired using either a semi-automatic or manual process, but the repaired weld is to blend smoothly with the adjacent welds.

3.3 BOLTED CONSTRUCTION

.1 These clauses specify requirements for bolted steel construction using ASTM A325/A325M or ASTM A490/A 490M high-strength bolts.

.2 Assembly

.1 When assembled, all joint surfaces, including those adjacent to bolt heads, nuts, and washers, are to be free from loose scale, burrs, dirt, and foreign material that would prevent the solid seating of the parts. Prepare the faying surfaces of connections as follows:

.1 For clean mill scale, the surfaces are to be free from oil, paint, lacquer, or any other coating in all areas within the bolt pattern and for a distance beyond the edge of the bolthole that is the greater of 25 mm or the bolt diameter.

.2 For Class A and B surfaces, surfaces shall be cleaned to remove mill scale per SSPC-SP6. Coated joints are not to be assembled before the coating has cured for the minimum time used in the tests to determine the mean slip coefficient.

.3 For Class C hot-dip galvanizes the surfaces in accordance with CAN/CSA-G164 and subsequently roughened by hand wire brushing. Power wire brushing shall not be used.

.3 Hardened Washers

.1 Apply the following requirements to hardened washers:

.1 Provide hardened washers as follows under the element turned (head or nut) during installation:

.1 As required by this specification.

.2 For ASTM A490/A 490M bolts.

.2 Hardened washers will also be required:

.1 For oversize or slotted holes that meet the requirements of Clause 3.1.5.

.2 Under the head and nut of ASTM A490/A490M bolts when used with steel with a specified minimum yield strength of less than 280 MPa.

.3 When ASTM A490/A 490M bolts of greater than 26 mm diameter are used in oversize or slotted holes. The washers in this case are to have a minimum thickness of 8 mm.

.4 Use beveled washers to compensate for lack of parallelism where, in the case of ASTM A 325/A 325M bolts, an outer face of bolted parts has more than a 5% slope with respect to a plane normal to the bolt axis. In the case of ASTM A 490/A 490M bolts, use beveled washers to compensate for any lack of parallelism due to the slope of outer faces.

.5 Turn-of-Nut Tightening

.1 Tighten pre-tensioned bolts using the turn-of-nut method to at least 70% of the minimum tensile strength specified in the applicable ASTM Standard.

.2 After the holes in a joint are aligned, place a sufficient number of bolts and bring to a snug-tight condition to ensure that the parts of the joint are brought into full contact with each other. Following the initial snugging operation, place bolts in any remaining open holes and bring to snug-tightness. Re-snugging may be necessary in large joints. When all bolts are snug tight, further tighten each bolt in the joint by the applicable amount of relative rotation specified in CAN/CSA-S6 Table 10.18, with tightening progressing systematically from the most rigid part of the joint to its free edges. During this operation, there is to be no rotation of the part not turned by the wrench unless the bolt and nut are match-marked to enable the amount of relative rotation to be determined.

.6 Inspection

.1 The Engineer will determine whether the requirements of this specification have been met. Installation of bolts will be observed to ascertain that a proper tightening procedure is employed including visually examining the turned element of all bolts for evidence that they have been tightened. When properly installed, the tip of the bolt is to be flush with or outside the face of the nut. Tensions in

bolts installed by the turn-of-nut method exceeding the applicable ASTM standard will not be cause for rejection. When there is disagreement concerning the results of an inspection of bolt tension, the following arbitration procedure will be adopted:

.1 The Engineer will use an inspection wrench that is a manual or power torque wrench capable of indicating a selected torque value.

.2 Place three bolts of the same grade and diameter as those under inspection and representative of the lengths and conditions of those in the bridge individually in a calibration device capable of measuring bolt tension. A washer will be under the part turned if washers are so used in the bridge or, if no washer is used, the material abutting the part turned is to be of the same specification as that in the bridge.

.3 When the inspection wrench is a manual wrench, tighten each bolt specified in the previous paragraph in the calibration device by any convenient means to an initial tension of approximately 15% of the required fastener tension, and then to the minimum tension specified for its size. Tightening beyond the initial condition should not produce greater nut rotation beyond that permitted by CAN/CSA-S6 Table 10.18. Apply the inspection wrench to the tightened bolt and the average torque necessary to turn the nut or head 5 degrees in the tightening direction is to be determined. The average torque measured in these tests of three bolts will be taken as the job inspection torque to be used in the manner specified in Item 5. The job inspection torque is to be established at least once each working day.

.4 When the inspection wrench is a power wrench, first apply it to produce an initial tension of approximately 15% of the required fastener tension and then adjust it so that it will tighten each bolt specified in Item 2 to a tension of at least 5%, but not more than 10% greater than the minimum bolt tension specified for its size in the applicable ASTM standard. This setting of the wrench will be taken as the job inspection torque to be used in the manner specified in Item 5. Tightening beyond the initial condition is not to produce greater nut rotation than that permitted by CAN/CSA-S6 Table 10.18. Establish the job inspection torque at least once each working day.

.5 The owner's designated representative will inspect bolts represented by the sample specified in Item 2 that have been tightened in the bridge shall be inspected by applying, in the tightening direction, the inspection wrench and its job inspection torque to 10% of the bolts (but not fewer than two bolts) selected at random in each connection. If no nut or bolt head is turned by this application of the job inspection torque, the connection shall be accepted as being properly tightened. If any nut or bolt head is turned by the application of the job inspection torque, this torque shall be applied to all of the bolts in the connection, and all of the bolts whose nut or head is turned by the job inspection torque shall be retightened and re-inspected. Alternatively, the fabricator or erector, at his or her option, may retighten all of the bolts in the connection and then resubmit the connection for inspection.

.7 Do not reuse ASTM A490/A 490M and galvanized ASTM A325/A 325M bolts once they have been fully tightened. Other ASTM A 325/A 325M bolts may be reused up to two times, provided that proper control on the number of reuses can be established. Touch-up of pre-tensioned bolts in a multi-bolt joint will not constitute a reuse unless a bolt becomes substantially unloaded as other parts of the joint are bolted.

.8 Pre-assemble girders and other main components in the shop in order to prepare or verify the field-splices. Support components in a manner consistent with the finished geometry of the bridge, as specified on the Drawings, with allowance for any camber required to offset the effects of dead load deflection. Holes in the webs and flanges of main components are to be reamed or drilled to final size while in assembly. The components are to be pinned and firmly drawn together by bolts before reaming or drilling. Drifting done during assembly shall be sufficient only to align the holes and not to distort the steel. If necessary, use reaming to enlarge holes. When a number of sequential assemblies are necessary because of the length of the bridge, the second and subsequent assemblies are to include at least one section from the preceding assembly to provide continuity of alignment. Trial assemblies will be required whether the field-splices are bolted or welded. Check each assembly for camber, alignment, accuracy of holes, and fit-up of welded joints and milled surfaces. Corrective work, if necessary, will be carried out at no cost to the Owner.

.9 As an alternative to the trial assembly when the bolt holes have been prepared by numerically controlled drilling or using a suitable template, the accuracy of the drilling may be demonstrated by a check assembly consisting of the first components of each type to be made. If the check assembly is satisfactory, further assemblies of like components will not be required. If the check assembly is unsatisfactory for any reason, the work is to be redone or repaired in a manner acceptable to the Engineer. Further check assemblies will be required, as specified by the Engineer, to demonstrate that the required accuracy of fit-up has been achieved.

.10 Match-mark connecting parts that are assembled in the shop for reaming or drilling holes. Prepare a drawing to show how the marked pieces should be assembled in the field to replicate the shop assembly.

3.4 TOLERANCES

.1 Structural members consisting of a single rolled shape are to meet the straightness tolerances of CSA G40.20, except that columns are not to deviate from straight by more than 1/1 000 of the length between points of lateral support. A variation of 1 mm from the detailed length will be permissible in the length of members that have both ends finished for contact bearing. Other members without finished ends may have a variation from the detailed length of not more than 2 mm for members 10 m or less in length, and not more than 4 mm for members over 10 m in length.

.2 When compression members are butted together to transmit loads in bearing, mill or saw cut the contact faces. The completed joint is to have at least 75% of the entire contact area in full bearing, defined as not more than 0.5 mm separation, and the separation of the remainder will not exceed 1 mm. At joints where loads are not transferred in bearing, the nominal dimension of the gap between main members will not exceed 10 mm.

.3 The surface finish of bearing surfaces that are in contact with each other or with concrete are to meet the roughness requirements specified in CSA B95 and CAN/CSA-S6 Table 10.19. Surfaces of flanges that are in contact with bearing sale plates are to be flat within 0.5 mm over an area equal to the projected area of the bearing stiffeners and web. Outside this area, a 2 mm deviation from flat is acceptable. The bearing surface is to be perpendicular to the web and bearing stiffeners.

.4 Bearing Plates shall meet the following requirements:

.1 Rolled steel bearing plates 50 mm or less in thickness may be used without planing if a satisfactory contact bearing is obtained.

.2 Rolled steel bearing plates more than 50 mm thick but not more than 100 mm thick may be straightened by pressing or by planing on all bearing surfaces to obtain a satisfactory contact bearing.

.3 Plane rolled steel-bearing plates more than 100 mm thick on all bearing surfaces, except for those surfaces that are in contact with concrete foundations and are grouted to ensure full bearing.

.5 The tolerances for welded components are to comply with Clause 5.4 of CSA W59. The dimensional tolerances of welded structural members are to be those specified in Clauses 5.8 and 12.5.3 of CSA W59. Built-up, bolted structural members are to comply with the straightness tolerances specified in CSA G40.20 for rolled wide-flanged shapes. Bearing stiffeners fitted to bear are to have a minimum bearing contact area of 75% and a maximum separation of 1 mm over the remaining area. Fitted intermediate stiffeners are to have a minimum bearing contact area of 25% and a maximum separation of 2 mm.

.6 Miscellaneous steel incorporated into the structure shall be fabricated to within 2 mm of the dimensions shown on the drawings unless approved by the Engineer.

3.5 QUALITY CONTROL

.1 The Contractor shall retain and pay for an independent qualified inspection company to complete in-plant fabrication inspection. The inspection company will:

.1 Verify that the correct materials are incorporated into the structure.

.2 Complete all non-destructive weld testing.

.3 Complete fabrication inspections to verify the geometry conforms to the drawings and specifications.

.2 Upon completion of the fabrication, the inspection company shall provide a report summarizing the work completed including summaries of all inspection work completed.

.3 The Owner, at their discretion, may complete independent quality assurance inspections. The Contractor shall facilitate suitable access to allow these inspections to be completed included moving and supporting components as required. The Owner will attempt to schedule non-destructive testing so as not to interfere with the progress of the work. The Contractor shall bear the cost of re-inspection after defects are repaired.

.4 Welding inspectors are to be qualified by the CWB to the requirements of CSA WI78.2.

.5 Perform, as a minimum, the following non-destructive testing of welds:

.1 Visual inspection of all welds.

.2 Radiographic or ultrasonic inspection of groove welds in flanges and webs of built-up girders, as follows:

.1 Flange splices in tension or stress reversal zones: 100%.

.2 Flange splices in compression zones: 25%.

.3 Web splices: 100% for one-half of the depth from the tension flange and 25% for the remainder of the web.

.3 Magnetic particle inspection of web-to-flange fillet welds, as follows:

.1 Submerged-arc welds: 25%.

.2 Semi-automatic welds: 50%.

.3 Manual welds: 100%.

.4 Magnetic particle inspection of fillet welds, as follows, for connection plates and stiffeners to which cross bracing or diaphragms are attached:

.1 For one-half of the depth from the tension flange: 100%.

.2 Transverse welds on tension flanges: 100%.

.5 Perform radiographic and ultrasonic testing before assembly of the flanges to the webs.

.6 The acceptance standards for dynamically loaded structures specified in CSA W59 of Clause 12.5.4 are to apply to weld defects. Remove welds that do not meet the acceptance standards of this specification and re-weld and retest. Perform repairs and non-destructive testing of fracture-critical and primary-tension members in accordance with this specification.

.7 Welded shear studs shall be tested in accordance with Appendix H of CSA W59.

.8 In the fabricator's plant, the specification and grade of steel used for main components are to be identified by use of suitable markings or recognized colour coding. Cut pieces that are identified by piece mark and contract number need not continue to carry specification identification markings when it has been established that such pieces conform to the required material specifications. Keep records to identify the heat number of the material and the corresponding mill test report for each component of a fracture-critical or primary tension member.

3.6 TRANSPORTATION AND DELIVERY

.1 Load structural steel for shipping, transport, unloading, and storing clear of the ground at its destination without being excessively stressed, deformed; or otherwise damaged.

3.7 ERECTION

.1 Lift and place components using appropriate lifting equipment, temporary bracing, guys or stiffening devices so that they are not overloaded or unstable. Additional permanent material may be provided, if approved, to ensure that the member capacities are not exceeded during erection.

.2 Design, furnish, maintain and remove all falsework, including necessary foundations, required for the safe erection. Do not use any of the material intended for use in the finished structure for temporary purposes during erection, unless such use is approved.

.3 Remove temporary bracing or guys when no longer required for the stability of the bridge, unless otherwise approved.

.4 Erect the bridge to the proper alignment on plan and in elevation, taking into account the specified dead load camber.

.5 Assemble parts following the piece marks shown on the erection drawings and match-marks. Main girder splices and field connections are to have half their holes filled with fitting-up bolts and drift-pins (half bolts and half pins) before the installing and tightening of the balance of the connection bolts. The fitting-up bolts may be the same high-strength bolts used in the installation. The pins are to be 1 mm larger in diameter than the bolts. Excessive drifting that distorts the metal and enlarges the holes is not allowed, although reaming up to 2 mm over the nominal hole diameter is permitted, except for oversize or slotted holes.

.6 When cantilever erection is used, fully bolt slices that support the cantilevering member before the cantilever is further extended or loaded.

.7 With the exception of splices of main material, the correction of minor misfits involving minor amounts of reaming, cutting and shimming is permitted. The correction of other ship fabrication, or any deformation resulting from handling or transportation that prevents the proper assembly and fitting of the parts, will require approval from the Engineer/Consultant.

.8 Any company undertaking field welding in accordance with this section has to be certified to Division 1 or 2 of CSA W27.1.

.9 Do not use tack welds intended to be used for attachments or for any other purpose unless they subsequently become a part of the welds shown on the Drawings. Tack welds that are not part of the welds shown on the Drawings are not to be used on any portion of the girders.

.10 Protection of the Substructure against Staining: Protect the substructure against rust staining by water runoff from the bridge.

3.8 WELDING OF FRACTURE-CRITICAL AND PRIMARY TENSION MEMBERS

.1 Except as permitted by this specification, use only welding consumables with Charpy V-notch toughness requirements in compliance with CAN/SCA-S6 Table 10.14 and certified by the Canadian Welding Bureau to CAN/CSA-W48. In the absence of an applicable CAN/CSA-W48 requirement, use the applicable Standard(s) in the American Welding Society A5 series of Standards. In groove welds connecting two different grades of steel, the classification of consumables used, including Charpy V-notch impact requirements, are to be that applicable to the grade with the lower ultimate tensile strength.

.2 For groove welds in fracture-critical and primary tension members using certified consumables where the Charpy V-notch test temperature required by CAN/CSA-S6 Table 10.14 is lower than the test temperature required by CAN/CSA-W48 or the applicable Standard(s) in the American Welding Society AS series of Standards, or where these Standards are not applicable, welding consumables are to be approved by the Canadian Welding Bureau and qualified using a verification test assembly to establish the impact properties of the weld metal. The test procedures are to be those specified in CAN/CSA-W48 or the applicable American Welding Society Standard, except that only Charpy V-notch tests are required and welding is to be carried out using the preheat and the maximum heat input to be used in practice. The Charpy V-notch results are to meet the requirements of CAN/CSA-S6 Table 10.14. Qualification is required for each electrode diameter used and for the consumables supplied by each manufacturer. The qualification is to be valid for consumables for all groove weld procedures that use a heat input the same as or lower than that used in the qualification test.

.3 Do not use tack welds on fracture-critical or primary tension members unless they are incorporated into the final weld. Do not use temporary welds on fracture-critical or primary tension members, or on flange material in compression, unless approved.

3.9 WELDING CORRECTIONS AND REPAIRS TO FRACTURE-CRITICAL MEMBERS

.1 Except as required by this specification, document repairs to base metal and to welded joints. Include in the documentation all of the details required by this specification. Welding repair procedures are to be approved by the Engineer in accordance with this specification.

.2 Repair of base metal by welding at the producing mill is not permitted.

.3 Repair welding may be performed using any appropriate welding procedure approved by the CWB for the fabrication of fracture-critical members and primary tension members. All repair welding is subject to non-destructive tests as specified in this specification.

.4 Approval for Non-Critical Repairs

.1 Prepare written repair procedures for non-critical repairs as specified and submit them to the Engineer for prior approval. These procedures are to apply to shop repair of discontinuities identified during fabrication. Such approved repair procedures are to be employed after the Engineer has verified that the

discontinuity to be repaired as described in the approved procedures. Repairs that may receive prior approval include the following:

.1 Repairs of welds because of rollover, undercut, or insufficient throat that does not require excavation.

.2 Repairs of welds requiring excavation of defects (including porosity, slag, and lack of fusion), repair of arc strikes, and removal of tack welds not incorporated into a final weld.

.3 Visually detected planar and laminar discontinuities as specified in Table 5.2 of CSA W59, but not deeper than 25 mm or one-half the thickness of the edge of the cut plate, whichever is less. Such discontinuities are not to be within 300 mm of a tension groove weld. There is also to be no visible planar or laminar discontinuity on any prepared face of a tension groove joint prior to welding.

.4 Occasional gouges exceeding 5 mm, but not more than 10 mm deep on edges not to be welded, which may be repaired by welding. The procedures specified in Clause 5.3.4 of CSA W59 is to be followed.

.5 Gouges not more than 5 mm deep on otherwise satisfactory cut or roiled surfaces that can be repaired by machining or grinding without welding do not require prior approval. Follow the procedures specified in Clause 5.3.4 of CSA W59.

.5 Repair procedures beyond those described in this specification will be considered critical and be approved individually before repair welding can begin.

.6 Repair procedures are to include sketches or full-size drawings, as necessary, to adequately describe the deficiencies and the proposed method of repair. Critical repair procedures are to include the location of the discontinuity.

.7 Minimum Steps for Repair

.1 Repair procedures, except in cases meeting the requirements of Clause 3.9.4.1 of these specifications is to include at least the following steps, which are to be performed in the following order:

.1 Clean and/or grind surfaces, as necessary, to aid visual and non-destructive tests to enable the constructor and Engineer to identify and quantify the discontinuities.

.2 Draw the discontinuities as they appear from visual inspection and non-destructive testing.

.3 Arc-air gouging, when necessary, is to be part of the approved welding procedure.

.4 Use magnetic particle inspection, or another inspection method approved by the Engineer, to determine whether the discontinuities were removed as planned.

.5 Grind all air-carbon-arc gouged and oxygen-cut surfaces that form a boundary for a repair weld to form a smooth, bright surface. Do not use oxygen gouging.

.6 Show in detail, all required runoff tabs and backup bars.

.7 Preheat and interpass temperatures are to be in accordance with CAN/CSA-S6 Table 10.15. Maintain preheat and interpass temperatures without interruption until the repair is completed.

.8 The repair procedures are to refer to the applicable welding procedure specification and the related data sheet. If both of these were approved by the Canadian Welding Bureau before fabrication, they need not be

qualified by test for the specific method of repair unless a change in essential variables has been made or unless otherwise required by the Engineer.

.9 If the geometry of the repair joint or of the excavation is similar to the geometry of a pre-qualified joint preparation as specified in CSA W59 and permits good access to all portions of such joints or excavations during the proposed sequence of welding, it does not require qualification by test unless required by the Engineer.

.10 Describe peening in detail, when required and obtain approval from the Engineer. Peening equipment is not to contaminate the joint.

.11 Employ post-heat and continue without interruption from the completion of repair welding to the end of the minimum specified post-heat period. Post-heat of the repair area is to be between 200 and 260□C and is to continue for at least 1 h for each 25 mm of weld thickness, or for 2 h, whichever is less.

.12 Grind flush faces of repairs with the plate or blended to the same contour and throat dimension as the remaining sound weld.

.13 If stress-relief heat treatment is required, describe in detail. Perform final acceptance non-destructive testing after stress relief is complete.

.14 Examine repairs of groove welds in fracture-critical members by ultrasonic testing [radiographic testing]. Examine fillet weld repairs by magnetic particle testing. Radiographic testing is to comply with Clause 7.4.2 of CSA W59 and may be performed as soon as the weldment has cooled to ambient temperature. Ultrasonic testing and magnetic particle testing are to comply with Clause 7.4.3 and 7.4.4, respectively, of CSA W59. Final acceptance testing by magnetic particle and ultrasonic methods are not to be performed until the steel weldments have been at ambient temperature for at least the elapsed time specified in CSA/CAN-S6 Table 10.16.

.8 Perform all repair welding and non-destructive testing as described in the approved repair procedure.

.9 Retain approved critical repair procedures as part of the project records.

.10 The use of Cobalt 60 as a radiographic source in quality control will be permitted only when the steel being tested is more than 75 mm thick. Maintain documentation of all visual and non-destructive testing for review and confirmation by the Engineer. Submit the documentation to the Engineer on completion of the project.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

.1 The Work covered in this specification includes the supply, fabrication, delivery and installation of the bridge rails. Galvanizing and Powder Coating of the rail system is included in this specification.

1.2 MEASUREMENT & PAYMENT

.1 **Measurement and Payment** for this Work will be made at the lump sum bid price from Appendix 1 for **METAL FABRICATION.** This payment will be the full compensation for completing the Work as shown on the drawings and described in this section including all material, fabrication, finishes (Powder Coating over galvanizing), labour, delivery, installation and equipment necessary to complete the Work.

1.3 REFERENCES

.1 CSA International

- .1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA S16, Design of Steel Structures.
- .4 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
- .5 CSA W59, Welded Steel Construction (Metal Arc Welding) Metric.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings:

- .1 Submitted shop drawings shall reflect bridge rail layout to match bridge deck panels.
- .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.5 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Steel sections and plates: to CSA G40.20/G40.21, Grade 350W.

.2 Welding materials: to CSA W59.

.3 Welding electrodes: to CSA W48 Series.

.4 Bolts and anchor bolts: to ASTM A307.

2.2 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Where possible, fit and shop assemble work, ready for erection.

.3 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

.1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m^2 to CAN/CSA-G164.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative/Engineer.

.2 Inform the Engineer of unacceptable conditions immediately upon discovery.

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

3.2 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to the Engineer such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Supply components for work by other trades in accordance with shop drawings and schedule.

.6 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.3 CLEANING

.1 Progress Cleaning.

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

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

Part 1 General

1.1 DESCRIPTIONS

.1 For the provision of powder coating of galvanized steel bridgerails components as illustrated and identified on the drawings.

1.2 RELATED WORK IN OTHER SECTIONS

.1 Submittal Procedures: Section 01 33 00

.2 Metal Fabrication: Section 05 50 00

1.3 MEASUREMENT AND PAYMENT

.1 Payment for powder coating is included in the lump sum price for Metal Fabrication - Section 05 50 00.

1.4 REFERENCE DOCUMENTS

.1 American Architectural Manufacturer's Association:

.1 AAMA #2604: Specification for Architectural Powder Coat.

1.5 QUALIFICATIONS

.1 The Work in this Section shall be applied by an experienced applicator with at least 5 years' experience, who is approved by the supplier with the application of powder coat materials, and who can provide documentation detailing 3 projects of similar size and components (not necessarily bridge-related).

1.6 SAMPLE

.1 The Contractor shall provide a sample of one of the components (as identified by the Departmental Representative) showing the colour, finish and gloss as specified following, prior to the finishing of the remainder of the components.

.2 Once reviewed and approved by the Departmental Representative and the powder-coat manufacturer, this component will serve as the standard of quality and finish for the remainder of the components of the project and may be installed as a finished component.

.3 A sample rejected for any reason by the Departmental Representative and the powder-coat manufacturer shall be returned for refinishing and re-submittal.

1.7 DELIVERY, STORAGE, HANDLING

.1 Delivery of the components to be powder-coated to the coatings shop, and the delivery of the finished components to the Project site, will be the Contractors responsibility.

.2 The Contractor is responsible for the protective packaging of each finished component to assure safe delivery to the Project site.

1.8 MATERIALS

.1 Polyester TGIC powder-coat compliant with AAMA #2604, to provide high performance durability for architectural exterior service.

.2 Source: Tiger Drylac Powder Coatings or approved equivalent:

- Series 38: conforming to AAMA #2604
- Standard Colour #38/60018, Koko Brown
- Satin finish (gloss level 30+5)

.3 Primer: Tiger 69-90701 Zinc Rich Primer or approved equivalent.

1.9 EXAMINATION

.1 The Contractor is to carefully examine all components to ensure that all final welding, grinding, and other finishing work has been completed and that all hot-dip galvanized surfaces are intact and free of missing, chipped or otherwise incomplete areas. Further working of the basic steel components will not be allowed after galvanizing and finishing is completed.

1.10 PREPARATION / APPLICATION

.1 Apply primer (as specified by the powder-coat manufacturers) to all previously reviewed galvanized steel surfaces.

.2 Apply the finishing coating in the specified colour over all primed surfaces: a single finishing coating over the bare galvanized surface is not acceptable.

.3 All work shall be completed in strict accordance with the powder manufacturer's application and finishing standards and with reference to the finished sample specified in Section 1.5 above.

Part 2 Products

.1 Not Used

Part 3 Execution

.1 Not Used

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

.1 The work in the Section will be incidental to the Contract and no separate payment will be made.

1.2 DEFINITIONS

.1 Flush cutting consists of cutting trees, stumps or vegetative growth to within 100 mm of the ground, leaving the root structure undisturbed and disposing of felled trees, previously uprooted trees, stumps and clearing wood debris as specified.

.2 Clearing consists of cutting trees and brush vegetative growth to within 300 mm of the ground and disposing of felled trees, previously uprooted trees, stumps, and clearing wood debris as specified. Clearing may also include the removal of other surface appurtenances that impede earthworks operations.

.3 Grubbing consists of excavation and disposal of stumps, roots and wood debris as specified.

.4 Chipping consists of chipping wood debris, except merchantable timber, into wood chips. Finished wood chip material shall be able to pass through a 100 mm by 100 mm screen.

.5 Merchantable timber is all timber with butt diameter in excess of 150 mm and top down to 100 mm.

1.3 QUALITY CONTROL

.1 Not Used.

1.4 PROTECTION

.1 Prevent damage to trees, natural features, bench marks, existing pavement, water courses and root systems of trees that are to remain.

.2 Repair any damaged items to approval of Departmental Representative.

.3 Replace any trees designated to remain, if damaged, as directed by Departmental Representative.

Part 2 Products

.1 Not Used

Part 3 Execution

3.1 PREPARATION

.1 Inspect site and verify with Departmental Representative, items designated to remain.

3.2 CLEARING

.1 Clear as directed by Departmental Representative by cutting trees and vegetative growth.

.2 Cut off branches and cut down trees overhanging area cleared as directed by Departmental Representative.

.3 Cut off unsound branches on trees designated to remain as directed by Departmental Representative.

.4 All clearing shall be felled in such a manner that surrounding vegetation is preserved along the construction limits. Stumps remaining within 3.0 metres of cleared perimeter are to be cut flush with ground and vegetative mat left undisturbed.

3.3 GRUBBING

.1 Grub out stumps and wood debris including roots and embedded logs to not less than 200 mm below ground surface.

.2 Grubbing ripper teeth depth shall be kept as shallow as possible to minimize contamination of topsoil with subsoils. This may require individual ripping of stumps in some locations. In addition, while removing stumps, roots or embedded logs, the Contractor shall shake them on site to remove as much soil as possible.

3.4 REMOVAL AND DISPOSAL

.1 All grubbed wood materials shall be hauled and disposed of at Alberta Landfill as directed by the Departmental Representative.

3.5 FINISHED SURFACE

.1 In areas of grubbing, leave ground surface in condition suitable for stripping of topsoil to approval of Departmental Representative.

.2 In areas of flush cutting, leave stumps cut flush with ground elevation and root structure undisturbed.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

.1 Excavation is the removal of all material (Rock and/or granular) necessary for the construction of the bridge abutment foundations, and the preparation of the native base in accordance with the drawings or as determined by the Engineer. Excavation shall include the construction of any temporary works necessary to maintain the stability of the adjacent slope, the protection and maintenance of the excavations and the removal and disposal of unsuitable backfill material as determined by the Engineer.

.2 Backfill shall include all material required to fill excavations adjacent to the bridge abutments and the re-shaping of the bridge headslopes and approaches to suit a wider replacement bridge. Backfill shall include the supply and placing of materials necessary for the construction of roadway approach fill and roadway embankments and stormwater runoff ditches.

.3 Excavation and backfill consists of all the removal, supply and replacement of materials in conformity with the grades and dimension as directed by the Departmental Representative and Engineer, and includes:

.1 Bridge abutment(s) foundation excavation.

.2 Removal and disposal of waste materials from excavation, ditches, embankments.

.3 Bridge abutment backfill and reshaping the headslopes to suit the surrounding topography.

.4 Construction of approaches, roadway ditches, and other earthworks necessary for the construction of the works.

.5 Transportation of excavated materials, supply of backfill material.

.6 Final grading of approach roadway surfaces and slopes.

1.2 MEASUREMENT PROCEDURES

.1 **Measurement and Payment** for this Work will be made at the lump sum bid price from Appendix 1 for **EXCAVATION AND BACKFILL.** This payment will be the full compensation for completing the Work as shown on the drawings and described in this Section, including all material, fabrication, finishes, labour, delivery, installation and equipment necessary to complete the Work.

.2 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

.3 No measurement payment will be made for:

.1 Excavating unnecessarily beyond lines established by Departmental Representative.

.2 Removing and disposing of roots, stumps and other materials excavated during waste operation.

.4 Removing and disposal of unsuitable material from embankment attributable to negligence.

.5 Watering, drying or compacting.

.6 Compaction of material (150 mm) below subgrade horizon in areas of cut.

1.3 REFERENCES

.1 Alberta Transportation - Specification for Bridge Construction, May 2013

.1 Section 1 for Excavation.

.2 Section 2 for Backfill.

1.4 DEFINITIONS

.1 Excavation shall include topsoil stripping, and all other rock and/or granular materials.

.2 Rock excavation shall include the excavation of:

.1 Material from solid masses of igneous, sedimentary or metamorphic rock that, prior to removal, was integral with parent mass. Material that cannot be removed by means of heavy duty mechanical excavation equipment with 0.95m³ bucket or equivalent to be considered integral with parent mass.

.2 Boulder or rock fragments measuring 1.5 cubic metres or more in volume.

.3 Backfill: Native or imported material meeting the requirements for structure. The processing of native material from trench or foundation excavations for use a structure or trench backfill will be permitted provided it meets the applicable specifications for backfill, and recompaction of native material to 98% SPD.

.4 Waste Material: material unsuitable for backfill, trench foundation or material surplus to requirements.

1.5 QUALITY CONTROL

.1 Regulatory Requirements set out in Section 01 35 43 – Environmental Procedures and Section 01 45 00 Quality control.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 35 43 - Environmental Procedures.

.2 Dispose of waste off-site at location provided by Contractor.

Part 2 Products

2.1 MATERIALS

.1 Alberta Transportation - Specification for Bridge Construction, May 2013, Section 2 - Backfill.

Part 3 Execution

3.1 EXCAVATING

.1 Excavate to lines, grades, elevations and dimensions as indicated on the drawings.

.2 Do not disturb soil within branch spread of trees or shrubs that are to remain.

.1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.3 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.

.4 Restrict vehicle operations directly adjacent to open excavators.

.5 Dispose of surplus and unsuitable excavated material off site.

.6 Do not obstruct flow of surface drainage or natural watercourses.

.7 Bottoms of excavations to be undisturbed rock, level, free from loose, soft or organic matter.

.8 Notify Engineer when bottom of excavation is reached.

.9 Obtain Engineers approval of completed excavation.

.10 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Engineer.

.11 Hand trim, make firm and remove loose material and debris from excavations.

.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

.2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.

3.2 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:

.1 The Engineer has inspected and approved installations.

.2 Inspection, testing, approval, and removal of concrete formwork.

.3 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations:

.1 Place bedding and surround material as specified on Drawings.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed Work to equalize compaction loading. Difference not to exceed 500 mm.

.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from the Engineer.

.6 Install drainage system in backfill as indicated on Drawings.

3.3 EMBANKMENTS

.1 Not Used

3.4 SUBGRADE COMPACTION

.1 Break material down to sizes suitable for compaction and mix for uniform moisture to full depth of layer.

.2 Each layer shall be brought to its required degree of compaction throughout its entire width before successive layers are placed.

.3 Add water or dry as required to bring moisture content of materials to level required to achieve specified compaction.

.4 For rock placed as fill, compact with large steel wheeled or tracked equipment of sufficient size to break larger particles. Compact until rock fill is stable under compaction equipment and all voids are filled.

3.5 PROOF ROLLING

.1 Proof roll using a loaded tandem truck with tires inflated to normal operation pressures.

.2 Proof roll subgrade.

.3 Make sufficient passes with proof roller to subject surface to three separate passes of loaded tire. Departmental Representative to determine level of proof rolling.

.4 Where proof rolling reveals areas of defective subgrade:

.1 Remove subgrade material to depth and extent as directed by the Departmental Representative.

.2 Backfill excavated subgrade with common material and compact in accordance with Section 31 23 33.01 - Excavation and Backfill.

.5 Where proof rolling reveals areas of defective subgrade, remove and replace in accordance with the appropriate sections. Removal of defective subgrade material shall be the Contractor’s responsibility.

3.6 FINISHING

.1 Shape approach roadbed to within 50 mm of design elevations.

.2 Round top of back slope as shown on the Drawings.

.3 Remove rocks over 150 mm in dimension from slopes and ditch bottoms.

.4 Trim between constructed slopes and edge of clearing to provide drainage.

3.7 PROTECTION

.1 Maintain finished surfaces in condition conforming to this section until acceptance by the Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 05 50 00 - Metal Fabrication.

1.2 MEASUREMENT AND PAYMENT

.1 Measure and Payment will be made on the basis of the lump sum price bid from Appendix 1 for **VEHICLE W-BEAM GUARDRAIL.** This payment shall for the supply, deliver and acceptably installed steel W-beam guardrail, which price shall include full compensation for the cost of furnishing all labour, materials, equipment, tools and incidentals necessary to supply the guardrail and all associated hardware.

1.3 REFERENCES

.1 American Association of State Highway and Transportation Officials (AASHTO)

.1 AASHTO M180, Standard Specification for Corrugated Sheet Steel Beams for Highway Guardrails.

.2 CSA International

.1 CAN/CSA O80, Wood Preservation.

.3 Alberta Transportation

.1 Unless otherwise specified in this specification, the W-Beam guardrails shall conform to the requirements of the Alberta Transportation – Standard Specification for Bridge Construction, May 2013, Section 14 - Guardrail.

1.4 QUALITY ASSURANCE

.1 Sustainable Standards Certification:

.1 Wooden posts and blocks shall be pressure treated in accordance with the current requirements of CSA Standard O80.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original packaging, labelled with manufacturer's name and address.

.2 Storage and Handling Requirements:

.1 Store materials off ground, and in accordance with manufacturer's recommendations.

.2 Store and protect steel elements from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Steel W-beam guide rail as indicated and as follows:

.1 Steel rail and terminal sections: to AASHTO M180, class A Type 1 zinc coated.

.2 Bolts, nuts and washers: to ASTM A307, hot dip galvanized to ASTM A123/A123M.

.2 Sawn timber posts and offset blocks:

.1 Species: Douglas Fir, Hemlock, Lodgepole Pine.

.2 Type: pressure treated in accordance with CAN/CSA-O80.

.3 Grade: No. 1 Structural Posts.

.4 Dimensions: as shown on drawings.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections are acceptable for W-beam guard rail installation in accordance with manufacturer's instructions and this specification.

.1 Visually inspect substrate in presence of Departmental Representative and Engineer.

.2 Inform the Engineer of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative and/or Engineer.

3.2 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent watercourse, according to sediment and erosion control plan, specific to site, that complies with Section 01 35 43 Environmental Procedures.

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

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

3.3 ERECTION

.1 Set posts by instrument for alignment, and locations as indicated and as directed by the Engineer.

.2 Excavate post holes to depths as indicated and to diameter of 360 mm plus or minus 20 mm.

.1 Compact bottom to provide firm foundation.

.2 Set post plumb and square in hole.

.3 Backfill around posts using suitable granular material and compact using pneumatic tampers in uniform layers not exceeding 150 mm compacted thickness.

.4 Worker protection: ensure workers wear the appropriate safety masks, eye protection and protective clothing when handling, drilling, sawing, cutting or sanding preservative treated wood and applying preservative materials.

.5 Erect steel W-beam components to details as indicated. Guardrail laps shall be in the direction of traffic flow.

.1 Tighten nuts to [100] N.m torque.

.1 Maximum protrusion of bolt [12] mm beyond nut.

3.4 TOUCH UP

.1 Galvanized steel-touch up:

.1 Clean damaged surfaces with wire brush removing loose and cracked coatings.

.1 Apply 2 coats of zinc-rich paint to damaged areas in accordance with manufacturer's written recommendations for zinc-rich paint.

3.5 CLEANING

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

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

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

3.6 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by guide rail installation.

END OF SECTION