



Public Works and Government Services Canada

Requisition No. E0276-141932/A

SPECIFICATIONS

For

West Coast Trail Bridges Repair

Pacific Rim National Park, Vancouver Island, BC

Project No. R.064182.001

November 2013



NOV 29 2013

APPROVED BY:

[Signature]
Regional Manager, A&E Services

Dec 2 / 2013
Date

[Signature]
Construction Safety Coordinator

2013-12-02
Date

TENDER:

[Signature]
Project Manager

13/12/02
Date

SPECIFICATIONS:

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- S-1 General Notes, Drawing Index and Key Plan
- S-2 Cheewhat Suspension Bridge Repair – Plan & Details
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APPENDIX A

- 1. Codes** .1 Perform work to CURRENT Codes, Construction Standards and Bylaws, including Amendments up to the TENDER closing date
- 2. Description of Work** .1 Work under this Contract covers a work on the following bridges and a crossing along West Coast Trail, Vancouver Island, B.C.:
- .1 **Bridge No. 19 - replacement**
 - .2 **Bridge No. 21 - repair**
 - .3 **Cheewhat Suspension Bridge - repair**
 - .4 **Cullite Cable Car Crossing - repair**
 - .5 **Bridge No. 96 - repair**
 - .6 **Bridge No. 97 - repair**
- More exact locations of the bridges and the crossing are shown on the key plan on the drawing S-1.
- .2 Work to be performed under this Contract includes, but is not limited to, the following items covered further in the Contract documents:
- .1 Replace with new and dispose out of site, the following bridge components - wood framing, wood sleepers, steel brackets and fasteners, connections of the bridge as shown on the drawings.
 - .2 At Cheewhat Suspension Bridge, replace wood stringers with steel stringers, steel ropes around tower columns and dispose the existing ones out of site, install concrete precast and cast-in-place protection wall around a pier wood crib.
 - .3 Excavate for installation of sleepers and dispose excavated material out of stream bed.
 - .5 At bridges 21 and 97, replace existing boardwalk with new and dispose the existing boardwalk out of site.
 - .6 At bridges 19, 21, 96, Cullite Cable Car Crossing and Cheewhat Suspension Bridge, where shown on the drawings, replace existing wood guardrails with new and dispose the existing out of site.
 - .7 At Cullite Cable Car Crossing and Cheewhat Suspension Bridge, tighten existing steel rope backup slings with additional clamps and install new steel rope back up slings.
 - .8 At Cullite Cable Car Crossing, replace with new and

dispose the following: existing ladder rungs and aluminum/stainless steel guide for pull rope on a cable car.

- .9 At bridge 19, replace with new and dispose existing components of wood bridge, excavate for and install new reinforced concrete foundations, dispose excavated material out of stream bed.

- .3 Adhere to waste reduction requirement for reuse or recycling of waste materials, thus diverting materials from landfill.

3. Contract Documents

- .1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of the work.
- .2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work.

4. Division of Specifications

- .1 The specifications are subdivided in accordance with the current 6-digit National Master Specifications System.
- .2 A division may consist of the work of more than 1 subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the work rests solely with the Contractor.
- .3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.

5. Time of Completion

- .1 Complete the project, crossing ready for use within 12 weeks after Contract Award.
- .2 Contractor to be aware Parks Canada opening season for West Coast Trail is between May 1st and September 30th each year and the repaired bridge shall be remain open or alternative crossing ladders and boardwalk to be provided by contractor.

6. Work Schedule

- .1 Carry on work as per indicated "PHASES" and as follows:
 - .1 Within 10 working days after Contract award, provide a "phasing bar chart" and a schedule showing anticipated progress stages and final completion of the work within the time period required by the Contract documents. Indicate the following:

- .1 Submission of shop drawings, product data, MSDS sheets and samples.
- .2 Commencement and completion of work of each section of the specifications or trade for each phase as outlined.
- .3 Final completion date within the time period required by the Contract documents.

- .2 Do not change approved Schedule - without notifying Departmental Representative.
- .3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative and schedule updated by Contractor in conjunction with and to approval of Departmental Representative.

7. Cost Breakdown

- .1 Before submitting the first progress claim, submit a breakdown of the Contract lump sum prices in detail as directed by the Departmental Representative and aggregating Contract price.

8. Codes, Bylaws, Standards

- .1 Perform work in accordance with the Canadian Highway Bridge Design Code CAN/CSA S6-06 and other codes and standards listed in the technical sections of the contract documents, Construction Standards and/or any other Code or Bylaw of local application.
- .2 Comply with applicable local bylaws, rules and regulations enforced at the location concerned.
- .3 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.
- .4 In any case of conflict or discrepancy, the most stringent requirements shall apply.

9. Documents Required

- .1 Maintain 1 copy each of the following at the job site:
 - .1 Contract drawings.
 - .2 Contract specifications.
 - .3 Addenda to Contract documents.
 - .4 Copy of approved work schedule.
 - .5 Reviewed/approved shop drawings.
 - .6 Change orders.
 - .7 Other modifications to Contract.
 - .8 Field test reports.
 - .9 Reviewed/approved samples.

- .10 Manufacturers' installation and application instructions.
- .11 One set of record drawings and specifications for "as-built" purposes.
- .12 CAN/CSA S6-06
- .13 Current construction standards of workmanship listed in technical Sections.
- .14 Building Safety Plan.
- .15 Any issued Permits.

10. Regulatory Requirements

- .1 Obtain and pay for - Building Permit, Certificates, Licenses and other permits required by regulatory municipal, provincial or federal authorities to complete the work.
- .2 Provide inspection authorities with plans and information required for issue of acceptance certificates.
- .3 Furnish inspection certificates in evidence that the work installed conforms with the requirements of the authority having jurisdiction.

11. Contractor's Use of Site

- .1 Use of site:
 - .1 Exclusive and complete for execution of work.
 - .2 Act as a Prime Contractor and assume responsibility for assigned premises for performance of this work.
 - .3 Be responsible for coordination of all work activities on site, including the work of other contractors engaged by the Departmental Representative.
- .2 Perform work in accordance with Contract documents. Ensure work is carried out in accordance with indicated phasing.
- .3 Do not unreasonably encumber site with material or equipment.

12. Examination

- .1 Recommended is to examine site and be familiar and conversant with existing conditions likely to affect work.
- .2 Recommended is to provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims.

13. Existing Services

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by the authorities having jurisdiction.

14. Setting Out of Work

- .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

- .2 Provide devices needed to lay out and construct work.
- .3 Supply such devices as templates required to facilitate Departmental Representative's inspection of work.

15. Acceptance of Substrates

- .1 Each trade shall examine surfaces prepared by others and job conditions which may affect his work, and shall report defects to the Departmental Representative. Commencement of work shall imply acceptance of prepared work or substrate surfaces.

16. Quality of Work

- .1 Ensure that quality workmanship is performed through use of skilled tradesmen, under supervision of qualified journeyman.
- .2 The workmanship, erection methods and procedures to meet minimum standards set out in the Canadian Highway Bridge Design Code CAN/CSA S6-06 and the Construction Standards listed in the contract documents.
- .3 In cases of dispute, decisions as to standard or quality of work rest solely with the Departmental Representative, whose decision is final.

17. Works Coordination

- .1 Coordinate work of subtrades:
 - .1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.
- .2 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required.
 - .1 Provide each subcontractor with complete plans and specifications for Contract, to assist them in planning and carrying out their respective work.
 - .2 Develop coordination drawings when required, illustrating potential interference between work of various trades and distribute to affected parties.
 - .3 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
 - .4 Publish minutes of each meeting.
 - .5 Plan and coordinate work in such a way to minimize quantity of service line offsets.

- .6 Submit copies of coordination drawings and meeting minutes to Departmental Representative for information purposes.
- .3 Submit shop drawings and order of prefabricated equipment or rebuilt components only after coordination meeting for such items has taken place.
- .4 Work cooperation:
 - .1 Ensure cooperation between trades in order to facilitate general progress of work and avoid situations of spatial interference.
 - .2 Ensure that each trade provides all other trades reasonable opportunity for completion of work and in such a way as to prevent unnecessary delays, cutting, patching and removal or replacement of completed work.
 - .3 Ensure disputes between subcontractors are resolved.
- .5 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate work.
- .6 Maintain efficient and continuous supervision.

18. Approval of Shop Drawings, Product Data and Samples

- .1 In accordance with Section 013300, submit the requested shop drawings, product data, MSDS sheets and samples indicated in each of the technical Sections.
- .2 **Allow 3 weeks for the following:**
 - .1 Review of product data.
 - .2 Approval of shop drawings.
 - .3 Review of re-submission.
 - .4 Ordering of approved material and/or products - refer to Section 016110 Product Requirements and Sections of Divisions 02 to 06.
- .3 **Allow 4 weeks for an in stream mitigation approval process:**
 - .1 Retaining of QP by contractor and preparation of ECO Plan (See Clause 26).
 - .2 Submission of ECO Plan to FDO for review and permit. (See Clause 26)

19. Relics and Antiquities

- .1 Relics and antiquities and items of historical or scientific interest shall remain property of Department. Protect such articles and request directives from Departmental Representative.
- .2 Give immediate notice to Departmental Representative if evidence of archeological finds are encountered during excavation/construction, and await Departmental Representative's written instructions before proceeding with work in this area.

20 Project Meetings

- .1 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.

21. Testing and Inspections

- .1 Particular requirements for inspection and testing to be carried out by testing service or laboratory approved by the Departmental Representative are specified in the technical sections.
- .2 The Contractor will appoint and pay for the services of testing agency or testing laboratory as specified, and where required for the following:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
- .3 Where tests or inspections by designated testing laboratory reveal work is not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as the Departmental Representative may require verification of acceptability of corrected work.
- .4 The Contractor shall furnish labour and facilities to:
 - .1 Notify Departmental Representative in advance of planned testing.
- .5 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .6 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.

- .7 The Departmental Representative may require, and pay for, additional inspection and testing services not included in Paragraph 21.1.
- .8 Provide Departmental Representative with 2 copies of testing laboratory reports as soon as they are available.
- .9 Ensure that work to be inspected is complete at the time of inspection and in accordance with the contract documents. Additional inspections required due to the incomplete work or poorly executed work, as judged by the departmental representative, as well as additional design or remedial work caused by deviations from these drawings, may be charged to the contractor.
- .10 A minimum 48 hours' notice shall be given to the departmental representative by the contractor for any inspection to be carried out.

22. As-Built Documents

- .1 The Departmental Representative will provide 2 sets of drawings, 2 sets of specifications, and 2 copies of the original AutoCAD files for "as-built" purposes.
- .2 As work progresses, maintain accurate records to show all deviations from the Contract documents. Note on as-built specifications, drawings and shop drawings as changes occur.

23. Cleaning

- .1 Daily conduct cleaning and disposal operations. Comply with local ordinances and anti-pollution laws. Refer to Section 017411 – Cleaning.
- .2 **Ensure cleanup of the work areas each day after completion of work.**
- .3 Keep bridge areas clean and continue cleaning on an as-needed basis until bridge is sufficiently completed or ready to be open to the public.
- .4 In preparation for interim and final inspections:
 - .1 Examine all sight-exposed surfaces.
 - .2 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight surfaces.

**24. General Requirements
For Waste Management
And Disposal**

- .1 All debris and deleterious substances generated during project activities shall be contained in the immediate work area, collected and appropriately disposed of in accordance with all applicable legislation, guidelines, and best management

practices or as prescribed in the list of mitigation measures.

- .2 At no time shall any waste material be allowed to enter any watercourse associated with the works.
- .3 The Contractor/Operator shall be responsible for assuring that all reasonable efforts are implemented to eliminate or minimize waste production.
- .4 At work sites and camping locations all food wastes and discarded food items shall be stored in closed, leak-proof storage containers that prevents access by wildlife. All material which can be recycled, such as paper and cardboard products, glass bottles and plastic and metal containers will be recycled where possible. The Contractor/Operator is responsible for the proper collection, storage and transportation of garbage and recyclable waste to disposal facilities. (e.g., Tofino landfill and appropriate recycling facilities).
- .5 Open burning of waste is strictly prohibited, unless authorized by regulating bodies. For burning of untreated wood in metal containers, see Section 017411 – Cleaning.

24. Dust Control

- .1 Provide temporary dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of work and public.

25. Environmental Protection

- .1 Prevent extraneous materials from contaminating air beyond construction area, by providing temporary enclosures during work.
- .2 Do not dispose of waste or volatile materials into water courses, storm or sanitary sewers.
- .3 Ensure proper disposal procedures in accordance with all applicable territorial regulations.
- .4 As a minimum, adhere to Parks Canada regulations and guidelines for wildlife and the following DFO Pacific Region Operational Statements:
 1. Standards and Best Practices for Instream Works
 2. Temporary Ford Stream Crossing
 3. Bridge Maintenance
 4. Maintenance of Riparian Vegetation in Existing Rights-of-way
 5. Clear Span Bridges

- .5 Adhere to the document by Parks Canada Environment Review – Summary of Mitigation.

**26. Mitigation Measures
for Work in Streams**

- .1 Retain a Qualified Environmental Professional (QP) to provide an Environmental and Construction Operations plan (ECO) for mitigation methods, timing, work plan and monitoring of in-stream works. Before commencing work, submit the ECO plan to Departmental Representative for approval. Follow any permit issued for the project, issued by provincial and federal environmental authorities.
- .2 The mitigation methods provided by QP shall include the following components:
 - .1 Full time monitoring by QP during the instream work and sensitive activities
 - .2 Schedule of works to adhere to regional reduced risk timing windows to avoid works when species at risk are present
 - .3 Prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate or any other deleterious substance into water course or ravine
 - .4 Prevent release of concrete or cement into water course or ravine. Isolate cast-in-place concrete for min. 48 hours after pouring from water course or ravine.
 - .5 Emergency mitigation and clean-up measures.
 - .6 Isolation of work area from any flowing water.
 - .7 Salvage of fish and wildlife
 - .8 Erosion and sediment control
 - .9 Vegetation Management
 - .10 Site restorations
 - .11 Temporary diversions if applicable
- .3 Immediately report any spills of sediments, debris, concrete fines, wash or contact water of reportable quantities to the Provincial emergency program Environmental Emergency management plan Incident Reporting hotline 1-800-663-3456 and DFO's Observe, Record and Report Hotline 1-800-465-4336. Implement emergency mitigation and clean-up measures.

27. **Access, Delivery, Staging and Accommodation**
- .1 Approval from Parks Canada and Departmental Representative is required for access and delivery to the West Coast Trail
- .1 Maintain for duration of Contract.
- .2 Staging areas/truck access roads are recommended to use at the following locations:
- Bridge #19 and 21:
- On logging road near Michigan Creek outside of the park boundary.
 - Accessibility is by way of logging road that can be in very poor condition.
 - The park utilizes a ¾ ton 4x4 and trailer to travel on these roads when they are in fair condition.
 - May require a fuel drop for helicopter at the site depending on contractor's work schedule.
- Cheewhat suspension bridge, Cullite cable car crossing, Bridge #96 and #97:
- On logging road up what is known as "Big Ugly" above Camper Creek outside of the park boundary.
 - Accessibility is by way of logging road that is fairly well maintained. There is a gate for entry to the logging road with a key that can be obtained can be obtained by the contractor.
 - May require a fuel drop for helicopter at the staging area depending on contractor's work schedule.
- .3 Accommodations for construction crew is suggested at the following locations:
- Bridge #19 and 21:
- Michigan Tent Campsite at WCT kilometer 12 which is approximately 2.5km south of bridge #19.
 - Contractor must provide their own accommodations and food.
 - At all locations the contractor must follow bare campsite program requirements as found in the accompanying documents.
 - "Bear cache" food lockers are available at this campsite.
- Cheewhat suspension bridge:
- Contractor can use the yard that surrounds Cheewhat cabin for contractor camping.

- Contractor must provide their own accommodations, food and approved "Bear cache" food lockers.

Cullite cable car crossing:

- Contractor can use the yard that surrounds Cheewhat cabin for contractor camping or Cullite Cove Tent Campsite at kilometer 58 at the beach near the cable car or beach access "A" for contractor camping.
- Contractor must provide their own accommodations, food and approved "Bear cache" food lockers.

Bridge #96 and #97:

- Crew can utilize Camper Creek Tent Campsite at WCT kilometer 62, which is approximately 4.25km north of bridge #96 and 4.5km from bridge #97.
- Park to check if contractor can have the use of beach access "A" to reduce travel time each day.
- Contractor must provide their own accommodations and food.
- Park to check if "Bear cache" food lockers are available at the camper creek campsite.

.4 See below coordinates of staging areas and suggested camp sites and their air distance from crossings.

| Bridge (WCT location) | Longitude (W) | Latitude (N) | Site | Air distance from bridge (km) |
|-------------------------------------|--|--|--|-------------------------------|
| Bridge No. 19 (9.5km) | 125° 06.013' 125° 04.35' 125° 05.097' | 48° 43.502' 48° 43.42' 48° 44.383' | <u>Bridge Location</u> <u>Accomod:</u> Michigan Tent Camp <u>Staging:</u> Michigan Creek logging road | 2.0 NE 2.0 E |
| Bridge No. 21 (11.9km) | 125° 04.665' 125° 04.35' 125° 05.097' | 48° 43.465' 48° 43.42' 48° 43.383' | <u>Bridge Location</u> <u>Accomod:</u> Michigan Tent Camp <u>Staging:</u> Michigan Creek logging road | 0.6 S 1.7 NW |
| Cheewhat Suspension Bridge (35.9km) | 124° 48.720' 124° 48.59' 124° 44.995' 124° 33.26' | 48° 39.795' 48° 39.71' 48° 39.073' 48° 35.33' | <u>Bridge Location</u> <u>Accomod:</u> At Cheewhat Cabin <u>Staging #1</u> <u>Staging:</u> Big Ugly | 29.0 E 5.0 E |
| Cullite Cable Car (57.7 km) | 124° 35.855' 124° 35.89' 124° 33.26" | 48° 34.029' 48° 33.95' 48° 35.33' | <u>Bridge Location</u> <u>Accomod:</u> Cullite Camp (km 58) <u>Staging:</u> Big Ugly | 0.2 SE 4.7 N |
| Bridge No. 96 (66.25km) | 124° 30.55' 124° 35.88' 124° 33.26' | 48° 32.812' 48° 33.5' 48° 35.33' | <u>Bridge Location</u> <u>Accomod:</u> Camper Creek Tent Camp (km 62) <u>Staging:</u> Big Ugly | 3.4 W 6.0 NW |
| Bridge No. 97 (66.5km) | 124° 30.472' 124° 35.08' 124° 33.26' | 48° 32.805' 48° 33.5' 48° 35.33' | <u>Bridge Location</u> <u>Accomod:</u> Camper Creek Tent Camp <u>Staging:</u> Big Ugly | 3.4 W 6.0 NW |

- 28. Storage Facilities** .1 Storage space will be limited to the area of construction in the locations approved by Departmental Representative. No storage facility is available along the West Coast Trail.
- 29. Power** .1 Electrical power and lighting along the West Coast Trail is not available. Contractor is to provide his own source of power generators. Type and the locations to be approved by Departmental Representative.
- 30. Water Supply** .1 Fresh water supply along West Coast Trail is very limited and it is available only at Parks Canada building in Bamfield. Use of local fresh water from the streams for construction purposes is only allowed if approved by Departmental Representative.
- 31. Sanitary Facilities** .1 Existence of washroom facilities along the trail is limited. Existing designated washroom facilities - Outdoor compost toilets are available. Crew must bring wood shavings toilet paper etc. For the bridge # 96 and 97, Outdoor compost toilets are available at Camper Creek Tent Campsite only. Clean and stock washrooms daily and before final completion. Contractor is allowed to bring portable washrooms that shall be located in approved locations by Departmental Representative.
- 32. Scaffolding** .1 Construct and maintain scaffolding in rigid, secure and safe manner.
- 33. Additional Drawings** .1 The Departmental Representative may furnish additional drawings for clarification. These additional drawings have the same meaning and intent as if they were included with plans referred to in the Contract documents.
- .2 Upon request, Departmental Representative may furnish up to a maximum of 10 sets of Contract documents for use by the Contractor at no additional cost. Should more than 10 sets of documents be required the Departmental Representative will provide them at additional cost.
- 34. Measurement for Payment** .1 The metric system of measurement (SI) will be employed on this Contract.
- .2 The method of measurements for the classes of labour, plant or material constituting the work will be as follows:

Unit: A single lump sum for Work specified in Sections 01 11 55 and 01 35 33 including mobilization and

demobilization.

**35. Familiarization
with Site**

- .1 Before submitting tender, recommended is a site visit - as indicated in tender documents and become familiar with all conditions likely to affect the cost of the work.

**36. Submission of
Tender**

- .1 Submission of a tender is deemed to be confirmation of the fact that the Tenderer has analyzed the Contract documents and inspected the site, and is fully conversant with all conditions.

END OF SECTION

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- 1. Approvals** .1 Approval of shop drawings and samples: refer to Section 011155, Clause 18.
- 2. General** .1 This Section specifies general requirements and procedures for the Contractor's submissions of shop drawings, product data, samples and other requested submittals to Departmental Representative for review. Additional specific requirements for submissions are specified in individual technical sections.
- .2 Present shop drawings, product data and samples in SI Metric units.
- .3 Where items or information is not produced in SI Metric units, converted values are acceptable.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submissions.
- .5 Notify Departmental Representatives in writing at time of submission, identifying deviations from requirements of Contract documents and stating reasons for deviations.
- .6 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Departmental Representative's review of submission unless Departmental Representative gives written acceptance of specific deviations.
- .7 Make any changes in submissions which Departmental Representative may require consistent with Contract documents and resubmit as directed by Departmental Representative.
- .8 Notify Departmental Representatives in writing, when resubmitting, of any revisions other than those requested by Departmental Representative.
- .9 Do not proceed with work until relevant submissions are reviewed and approved by the Departmental Representative.
- 3. Submission Requirements** .1 Coordinate each submission with the requirements of the work and the Contract documents. Individual submissions will not be reviewed until all related information is available.
- .2 Allow two weeks for Departmental Representative's review of each submission, unless noted otherwise.

- .3 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.

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

- .5 After Departmental Representative's review, distribute copies.

4. Shop Drawings

- .1 Shop drawings: original drawings or modified standard drawings provided by Contractor to illustrate details of portions of work which are specific to project requirements.
- .2 Maximum sheet size: 850 x 1050 mm.
- .3 Submit 6 prints of shop drawings for each requirement requested in the specification sections and/or as requested by the Departmental Representative.
- .4 Cross-reference shop drawing information to applicable portions of the Contract documents.

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- 5. Shop Drawings Review**
- .1 Review of shop drawings by Public Works and Government Services Canada is for the sole purpose of ascertaining conformance with the general concept.
 - .2 This review shall not mean that Public Works and Government Services Canada approves the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same.
 - .3 This review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and Contract documents.
 - .4 Without restricting the generality of the foregoing, the Contractor is responsible for:
 - .1 Dimensions to be confirmed and correlated at the job site.
 - .2 Information that pertains solely to fabrication processes or to techniques of construction and installation.
 - .3 Coordination of the work of all sub-trades.
- 6. Product Data**
- .1 Product data: manufacturers' catalogue sheets, MSDS sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products or any other specified information.
 - .2 Delete information not applicable to project.
 - .3 Supplement standard information to provide details applicable to project.
 - .4 Cross-reference product data information to applicable portions of Contract documents.
 - .5 Submit 6 copies of product data.
- 7. Samples**
- .1 Samples submissions are not required.
- 8. Progress Schedule**
- .1 Submit work schedule and cost breakdown as required in Section 011155.
- 9. Test Results and Inspection Reports**
- .1 Submit in duplicate test results and inspection reports required by following Sections:
 - 03 20 00 – Concrete Reinforcing
 - 03 30 00 – Cast-in-Place Concrete

West Coast Trail Bridges Repair
Pacific Rim National Park, Vancouver Island, BC

013300

**SHOP DRAWINGS, PRODUCT
DATA AND SAMPLES**

Project No. R.064182.001

2013-11

03 41 00 – Precast Structural Concrete
05 12 33 – Structural Steel for Bridges
06 05 73 – Wood Treatment

END OF SECTION

1. References

- .1 Government of Canada.
 - .1 Canada Labour Code - Part II
 - .2 Canada Occupational Health and Safety Regulations.
- .2 National Building Code of Canada (NBC):
 - .1 Part 8, Safety Measures at Construction and Demolition Sites.
- .3 Canadian Standards Association (CSA) as amended:
 - .1 CSA S269, Falsework for Construction Purposes
 - .2 CSA S269.2, Access Scaffolding for Construction
 - .3 CSA S350, Code of Practice for Safety in Demolition of Structures
- .4 Fire Protection Engineering Services, HRSDC:
 - .1 FCC No. 301, Standard for Construction Operations.
 - .2 FCC No. 302, Standard for Welding and Cutting.
- .5 American National Standards Institute (ANSI):
 - .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
- .6 Province of British Columbia::
 - .1 Workers Compensation Act Part 3-Occupational Health and Safety.
 - .2 Occupational Health and Safety Regulation

2. Related Sections

- .1 Refer to the following sections as required:
 - .1 General Instructions Section 01 11 55
 - .2 Shop Drawings, Product Data and Samples Section 01 33 00
 - .3 Health & Safety Requirements Section 01 35 33
 - .4 Product Requirements Section 01 61 10
 - .5 Cleaning Section 01 74 11
 - .6 Structure Demolition Section 02 41 16
 - .7 Concrete Forming and Accessories Section 03 10 00
 - .8 Concrete Reinforcing Section 03 20 00
 - .9 Cast-in-Place Concrete Section 03 30 00
 - .10 Precast Structural Concrete Section 03 41 00
 - .11 Structural Steel for Bridges Section 05 12 33
 - .12 Wood Treatment Section 06 05 73
 - .13 Rough Carpentry Section 06 10 00
 - .14 Earthwork Section 31 0000.01

**3. Workers'
Compensation Board
Coverage**

- .1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.
- .2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

**4. Compliance with
Regulations**

- .1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.
- .2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

5. Submittals

- .1 Submit to Departmental Representative submittals listed for review in accordance with Section 013300.
- .2 Work effected by submittal shall not proceed until review is complete.
- .3 Submit the following:
 - .1 Health and Safety Plan.
 - .2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
 - .3 Copies of incident and accident reports.
 - .4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .5 Emergency Procedures.
- .4 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.
- .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 to Departmental Representative.

- .6 Submission of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:
 - .1 Be construed to imply approval by the Departmental Representative.
 - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
 - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

6. Responsibility

- .1 Act as a Prime Contractor and 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.

7. General Conditions

- .1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
- .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
 - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
 - .2 Secure site at night time as deemed necessary to protect site against entry.

**8. Project/Site
Conditions**

- .1 Refer to the drawing S-1 for project site locations and specific drawings for bridge deck elevations above streams. Refer to Section 011155 General Instruction for access and staging areas in order to develop Health and Safety Plan.

**9. Regulatory
Requirements**

- .1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.

- .2 In event of conflict between any provisions of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

10. Work Permits

- .1 Obtain specialty permits related to project before start of work.

11. Filing of Notice

- .1 The General Contractor is to complete and submit a Notice of Project as required by provincial authorities.
- .2 Provide copies of all notices to the Departmental Representative.

12. Health and Safety Plan

- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.
- .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
 - .1 Primary requirements:
 - .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 Committee/Representative procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and record keeping procedures.
 - .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
 - .3 List hazardous materials to be brought on site as required by work.

- .4 Indicate engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
- .5 Identify personal protective equipment (PPE) to be used by workers.
- .6 Identify personnel and alternates responsible for site safety and health.
- .7 Identify personnel training requirements and training plan, including site orientation for new workers.
- .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.
- .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
- .5 Departmental Representative's review: the review of Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.

13. Emergency Procedures

- .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:
 - .1 Designated personnel from own company.
 - .2 Regulatory agencies applicable to work and as per legislated regulations.
 - .3 Local emergency resources.
 - .4 Departmental Representative.
- .2 Include the following provisions in the emergency procedures:
 - .1 Notify workers and the first-aid attendant, of the nature and location of the emergency.
 - .2 Evacuate all workers safely.
 - .3 Check and confirm the safe evacuation of all workers.
 - .4 Notify the fire department or other emergency responders.
 - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
 - .6 Notify Departmental Representative.

- .3 Provide written rescue/evacuation procedures as required for, but not limited to:
 - .1 Work at high angles.
 - .2 Work in confined spaces or where there is a risk of entrapment.
 - .3 Work with hazardous substances.
 - .4 Underground work.
 - .5 Work on, over, under and adjacent to water.
 - .6 Workplaces where there are persons who require physical assistance to be moved.
- .4 Design and mark emergency exit routes to provide quick and unimpeded exit.
- .5 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

14. Hazardous Products

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labeling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
- .2 Where use of hazardous and toxic products cannot be avoided:
 - .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS.
 - .2 In conjunction with Departmental Representative, schedule to carry out work during "off hours" when tenants have left the building.
 - .3 Provide adequate means of ventilation.

15. Overloading

- .1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

16. Falsework

- .1 Design and construct falsework in accordance with CSA S269.1.

17. Scaffolding

- .1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA –S269.2 and B.C. Occupational Health and Safety Regulations.

18. Powder-Actuated Devices

- .1 Use powder-actuated devices in accordance with ANSI A10.3

only after receipt of written permission from the Departmental Representative.

19. Fire Safety and Hot Work

- .1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- .2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

20. Fire Safety Requirements

- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

21. Unforeseen Hazards

- .1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.

22. Posted Documents

- .1 Post legible versions of the following documents on site:
 - .1 Health and Safety Plan.
 - .2 Sequence of work.
 - .3 Emergency procedures.
 - .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshaling station, and the emergency transportation provisions.
 - .5 Notice of Project.
 - .6 Floor plans or site plans.
 - .7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
 - .8 Workplace Hazardous Materials Information System (WHMIS) documents.
 - .9 Material Safety Data Sheets (MSDS).
 - .10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.

- .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
- .3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

23. Meetings

- .1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

**24. Correction of
Non-Compliance**

- .1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.
- .3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

END OF SECTION

**1. Products/Material
and Equipment**

- .1 Use NEW products/material and equipment unless otherwise specified. The term "products" is referred to throughout the specifications.
- .2 Use products of 1 manufacturer for material and equipment of the same type or classification unless otherwise specified.
- .3 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .4 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions. Departmental Representative will designate which document is to be followed.
- .5 Provide metal fastenings and accessories in the same texture, colour and finish as base metal in which they occur.
 - .1 Prevent electrolytic action between dissimilar metals.
 - .2 Use hot dip zinc galvanized fasteners, anchors and spacers for securing exterior work.
- .6 Fastenings which cause spalling or cracking are not acceptable.
- .7 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .8 Use heavy hexagon heads, semi-finished unless otherwise specified.
- .9 Bolts may not project more than 1 diameter beyond nuts.
- .10 Types of nuts and washers as follows:
 - .1 Plain type washers: use on structural steel-to-steel.
 - .2 Double nut: use on hangers and where vibrations occur- steel plates against wood on a suspension bridge.
 - .3 Resilient washers: use with stainless steel.
- .11 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.
- .12 Prevent damage, adulteration and soiling of products during delivery, handling and storage. Immediately remove rejected products from site.
- .13 Store products in accordance with suppliers' instructions.
- .14 Touch up damaged factory finished surfaces to Departmental Representative's satisfaction.
 - .1 Use primer or enamel to match original.
 - .2 Do not paint over nameplates.

2. Quality of Products

- .1 Products, materials and equipment (referred to as products) incorporated into work shall be new, not damaged or defective, and of the best quality (compatible with the specifications) for the purpose intended. If requested, furnish evidence as to type, source and quality of the products provided.
- .2 Defective products will be rejected regardless of previous inspections.
 - .1 Inspection does not relieve responsibility, but is precaution against oversight or error.
 - .2 Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .3 Retain purchase orders, invoices and other documents to prove that all products utilized in this Contract meet the requirements of the specifications. Produce documents when requested by the Departmental Representative.
- .4 Should any dispute arise as to quality or fitness of products, the decision rests strictly with the Departmental Representative based upon the requirements of the Contract documents.
- .5 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item throughout the building.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

3. Availability of Products

- .1 Immediately upon signing the Contract, review product delivery requirements and anticipate foreseeable supply delays for any items.
- .2 If delays in supply of products are foreseeable, notify Departmental Representative of such in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of the work.
- .3 In event of failure to notify Departmental Representative at the start of work and should it subsequently appear that the work may be delayed for such reason, the Departmental Representative reserves the right to substitute more readily available products of similar character, at no increase in either the Contract price or the Contract time.

4. Manufacturer's Instructions

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

5. Contractor's Options for Selection of Products for Tendering

- .1 Products are specified by "Prescriptive" specifications: select any product meeting or exceeding specifications.
- .2 Products specified under "Acceptable Products": select any one of the indicated manufacturers, or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated Products.
- .3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard.
- .4 Products specified to meet particular design requirements or to match existing materials: use only material specified Approved Product. Alternative products may be considered provided full technical data is received in writing by Departmental Representative in accordance with "Special Instructions to Tenderers".
- .5 When products are specified by a referenced standard or by or Performance specifications, upon request of Departmental Representative obtain from manufacturer an independent laboratory report showing that the product meets or exceeds the specified requirements.

6. Substitution After Contract Award

- .1 No substitutions are permitted without prior written approval of the Departmental Representative.

- .2 **Proposals for substitution may only be submitted after Contract award.** Such request must include statements of respective costs of items originally specified and the proposed substitution.
- .3 Proposals will be considered by the Departmental Representative if:
 - .1 products selected by tenderer from those specified are not available;
 - .2 delivery date of products selected from those specified would unduly delay completion of Contract, or
 - .3 alternative product to that specified, which is brought to the attention of and considered by Departmental Representative as equivalent to the product specified, and will result in a credit to the Contract amount.
- .4 **Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on the project. Pay for design or drawing changes required as result of substitution.**
- .5 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative, and the Contract price will be reduced accordingly.

END OF SECTION

Part 1 General

- 1.1 Related Requirements** .1 Section 011155 - General Requirements.
- .2 Section 013533 - Health and Safety Requirements

- 1.2 References** .1 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions "C", In Effect as Of: May 14, 2004.

- 1.3 Project Cleanliness** .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Departmental Representative or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Burning of waste materials on site is prohibited, unless approved by Departmental Representative.
- .3 All equipment used on site must be clean and free of contaminants.
- .4 Equipment such as concrete mixers, wheel barrows, shovels, trowels and other tools used for cast in place concrete work shall only be cleaned in areas approved by engineer. Cleaning equipment in or directly adjacent to any watercourse or intertidal area is prohibited.

If concrete wash water is produced during clean-up activities, it shall be contained on site to allow sediment to settle out and to reach a neutral pH before being released to the environment (typically 48 hours).
- .5 Open burning is strictly prohibited, unless authorized by regulating bodies.
- .6 Burning of old bridge untreated wood components is permitted only off dry season and upon permission of Departmental Representative, provided the wood has not been treated in the past, and following the recycling of structurally sound wood. The fire should be built in a manner that doesn't require removal of ground cover vegetation to expose mineral soil or leave a fire ring scar. This can be accomplished by building the fire in the lid of a standard sized residential, metal garbage container or similar container. Cold ash may be disposed of on site.

- .7 Clear snow and ice from access to bridges/crossings, bank/pile snow in designated areas only.
- .8 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .9 Provide on-site leak proof containers for collection of waste materials and debris.
- .10 See Section 011155 - General Requirements for waste and food containers.
- .11 Provide and use marked separate bins for recycling. Refer to Section 011155 that includes General Requirements for Waste Management and Disposal.
- .12 Use local disposal facilities for waste materials and debris (e.g. Tofino landfill) and appropriate recycling facilities for recyclable items.
- .13 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .14 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.4 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 products and debris including that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. See clauses 1.3.5. and 1.3.6 above for burning wood on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Broom clean walks, steps and surfaces; rake clean other surfaces of grounds.
- .8 Remove dirt and other disfiguration from exterior surfaces.

.9 Remove snow and ice from bridges and access walkways.

**1.5 Waste
Management and
Disposal**

.1 Separate waste materials for recycling in accordance with Section 011155 that includes General Requirements for Waste Management and Disposal.

**1.6 Disposal of
Treated Wood**

.1 All cutting and other treated wood waste materials will be collected and disposed of at an approved landfill site in accordance with Provincial Waste Management and Environment Canada regulations. Burning of treated wood waste products is prohibited.

.2 Before use, all treated products must be visually inspected to ensure that excessive residual preservative is not present on the wood surface. Material with excessive residual product will not be used and will be removed from the work site at the earliest opportunity.

.3 Employ construction methods and purchase materials in sizes which minimize the number of timber saw cuts needing field treatment with wood preservative.

.4 If on-site treatment of wood is required, these activities will be conducted in a contained upland location when possible.

.5 All treated wood sawdust should be collected in a plastic bin (e.g. Rubbermaid) or tarpaulin and disposed of off-site.

.6 Sawing of treated wood should be avoided in locations that may expose workers, site staff and visitors to sawdust.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

| | | | |
|---------------------------------|----------------|----|--|
| Part 1 | General | | |
| 1.1 Related Requirements | | .1 | Section 01 35 33 – Health and Safety Requirements. |
| | | .2 | Section 01 74 11 – Cleaning |
| 1.2 References | | .1 | Reference standards: |
| | | .1 | CSA International |
| | | .1 | CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures. |
| 1.3 Quality Assurance | | .1 | Regulatory Requirements: Ensure Work is performed in compliance with applicable Provincial/Territorial and Municipal regulations. |
| 1.4 Site Conditions | | .1 | Environmental protection: |
| | | .1 | Ensure Work is done in accordance with Section 011155 General Instructions for 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, except untreated wood in metal containers as noted in Section 017411 – Cleaning. |
| | | .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, storm or sanitary sewers. |
| | | .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 | Control disposal or runoff of water containing suspended materials or other harmful substances in accordance as directed by Parks Surveillance Officer. |
| | | .8 | Protect trees, plants and foliage on site and adjacent properties where indicated. |
| | | .9 | Prevent extraneous materials from contaminating air beyond application area, by providing temporary |

enclosures during demolition work.

- .10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

1.5 Existing Conditions

.1 Structures to be demolished are based on their condition on date that tender is accepted.

- .1 Remove, protect and store salvaged items as directed by Departmental Representative. Salvage items as identified by Departmental Representative. Deliver to Departmental Representative as directed.

Part 2 Products

2.1 Equipment

.1 Equipment and heavy machinery:

- .1 On-road vehicles to: CEPA-SOR/2003-2, On-Road Vehicle and Engine Emission Regulations and CEPA-SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.
- .2 Off-road vehicles to: EPA CFR 86.098-10 and EPA CFR 86.098-11.

- .2 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 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: requirements of authorities having jurisdiction, specific to site.
- .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 011155 General

Instructions for Environmental Procedures.

- .2 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, adjacent grades, properties, parts of existing building to remain.
 - .1 Provide bracing, shoring and underpinning as required.
 - .2 Repair damage caused by demolition as directed by Departmental Representative.
- .3 Support affected structures and, if safety of structure being demolished adjacent structures appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.
- .4 Prevent debris from entering surrounding area surface drainage system.

3.2 Demolition

- .1 Provide Temporary Barriers and Enclosures for demolition work in accordance with Parks Canada and Regional regulations.
- .2 Blasting operations are not permitted.
- .3 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.
- .4 To permit construction as indicated.
- .5 Remove obstacles where required.
- .6 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.
- .7 Remove parts of structural framing that is being replaced by new framing as shown on the structural drawings.
- .8 Contain fibrous materials to minimize release of airborne fibres while being transported within facility.
- .9 Remove and dispose of demolished materials except where noted otherwise outside national park and in accordance with authorities having jurisdiction.
- .10 Use natural lighting to do Work where possible.
 - .1 Shut off lighting except those required for security purposes at end of each day.

- 3.3 Cleaning**
- .1 Waste Management: separate waste materials for recycling in accordance with Section 01 74 11 – Cleaning.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
 - .2 Divert excess materials from landfill to site approved Departmental Representative.
 - .3 Designate appropriate security resources / measures to prevent vandalism, damage and theft.
 - .4 Locate stockpiled materials convenient for use in new construction. Eliminate double handling wherever possible.
 - .5 Dispose of materials in accordance with applicable regulations.
 - .1 Written authorization from Departmental Representative is required to deviate from disposal facilities listed in Waste Reduction Workplan.

END OF SECTION

Part 1 General

- | | | |
|---|----|--|
| 1.1 Related Requirements | .1 | Section 03 20 00 - Concrete Reinforcing |
| | .2 | Section 03 30 00 - Cast-in-Place Concrete |
| | .3 | Section 03 41 00 - Precast Structural Concrete |
| | .4 | Section 01 74 11 - Cleaning |
| 1.2 References | .1 | Canadian Standards Association (CSA International) |
| | .1 | CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete. |
| | .2 | CSA-O86S1-05, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood. |
| | .3 | CSA O121-M1978 (R2003), Douglas Fir Plywood. |
| | .4 | CSA O151-04, Canadian Softwood Plywood. |
| | .5 | CAN/CSA-O325.0-92 (R2003), Construction Sheathing. |
| | .6 | CSA S269.1-1975 (R2003), Falsework for Construction Purposes. |
| | .7 | CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada |
| | .2 | Underwriters' Laboratories of Canada (ULC). |
| 1.3 Action and Informational Submittals | .1 | Submittals in accordance with Section 01 33 00 – Shop Drawings, Product Data, and Samples. |
| 1.4 Delivery, Storage and Handling | .1 | Waste Management and Disposal: |
| | .1 | Separate waste materials for recycling in accordance with 017411 Cleaning. |
| | .2 | Place materials defined as hazardous or toxic in designated containers. |
| | .3 | Divert wood materials from landfill to a recycling facility as approved by Departmental Representative. |
| | .4 | Divert plastic materials from landfill to a recycling facility as approved by Departmental Representative. |
| | .5 | Divert unused form release material from landfill to an official hazardous material collections site as approved by the Departmental Representative. |

Part 2 Products

- 2.1 Materials**
- .1 Formwork materials:
 - .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121 and CAN/CSA-O86.
 - .2 For concrete exposed to view use smooth, square edged plywood panels to clause 6.5 CSA-A23.1.
 - .3 Use sealed formwork to eliminate contamination of river with fresh concrete.
 - .2 Form ties:
 - .1 Use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
 - .3 Form liner:
 - .1 Plywood: medium density overlay, Douglas Fir to CSA O121, sanded grade, square edge, 17 mm thick.
 - .4 Form release agent: non-toxic, biodegradable, low VOC.
 - .5 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene.
 - .6 Falsework materials: to CSA-S269.1.

Part 3 Execution

- 3.1 Fabrication and Erection**
- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
 - .2 Obtain Departmental Representative's approval for use of earth forms and framing openings not indicated on drawings.
 - .3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
 - .4 Fabricate and erect falsework in accordance with CSA S269.1 and WorkSafe BC regulations.
 - .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 noted otherwise on the drawings.
 - .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.
- 3.2 Removal and Reshoring**
- .1 Leave formwork in place for following periods of time after placing concrete.
 - .1 As directed by shoring engineer retained by the contractor, but minimum 3 days.
 - .2 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

Part 1 General

- 1.1 Related Requirements**
- .1 Section 03 10 00 – Concrete Forming and Accessories.
 - .2 Section 03 30 00 – Cast-in-Place Concrete Short Form.
 - .3 Section 03 41 00 – Precast Structural Concrete
 - .4 Section 01 74 11- Cleaning
- 1.2 References**
- .1 CSA International
 - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3-04 (R2010), Design of Concrete Structures.
 - .3 CAN/CSA-A23.3-09, Precast Concrete – Materials and Construction
 - .4 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
 - .5 CSA-G40.20/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .6 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .7 CSA W186-M1990 (R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
 - .2 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.
- 1.3 Quality Assurance**
- .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.
 - .1 Mill Test Report: upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.
 - .2 Upon request submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

**1.4 Delivery,
Storage and Handling**

- .1 Deliver, store and handle materials in accordance with Section 01 61 10 - Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Develop Waste Reduction Workplan related to Work of this Section.

Part 2 Products

2.1 Materials

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Hot dip zinc galvanize reinforcing where shown on the structural drawings as per CAN/CSA-G164, minimum zinc coating of 600g/m². Conduct bending tests to verify galvanized bar fragility in accordance with ASTM.
 - .1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.
 - .2 If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.
 - .1 Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.
 - .3 If galvanized steels are at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.
 - .1 In this case, no restriction applies to temperature of solution.
 - .4 Chromate solution sold for this purpose may replace solution described above, provided it is of equivalent

effectiveness.

- .4 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .5 Mechanical splices: subject to approval of Departmental Representative.
- .6 Do not use plain round bars, wire ties, wire fabric or welded wire mesh.

2.2 Fabrication

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Departmental Representative weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 Source Quality Control

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
- .2 Upon request inform Departmental Representative of proposed source of material to be supplied.

Part 3 Execution

3.1 Field Bending

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

3.2 Placing Reinforcement

- .1 Place reinforcing steel as indicated on placing drawings in accordance with CSA-A23.1/A23.2.
- .2 Reinforcing to be free of grease, scale and other coatings, unless noted otherwise on structural drawings.
- .3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.

- .4 Ensure cover to reinforcement is maintained during concrete pour.
- 3.3 Cleaning**
- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .3 Waste Management: separate waste materials for recycling in accordance with Section 017411 -Cleaning.

END OF SECTION

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|---------------|--|----|---|
| Part 1 | General | | |
| 1.1 | Related Requirements | .1 | Section 03 10 00 – Concrete Forming and Accessories |
| | | .2 | Section 03 20 00 – Concrete Reinforcing |
| | | .3 | Section 01 74 11 - Cleaning |
| 1.2 | References | .1 | Canadian General Standards Board (CGSB) |
| | | .1 | CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound. |
| | | .2 | CSA International |
| | | .1 | CSA-A23.1/A23.2-2009, 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). |
| 1.3 | Action and Informational Submittals | .1 | Provide submittals in accordance with Section 01 33 00 – Shop Drawings, Product Data, and Samples. |
| | | .2 | At least 4 weeks prior to beginning Work, inform Departmental Representative of source of fly ash. |
| | | .1 | Do not change source of fly ash without written approval of Departmental Representative. |
| | | .3 | Provide testing reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found. |
| | | .4 | Concrete hauling time: provide for review by Departmental Representative 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 Departmental Representative, 4 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete. |
| | | .1 | Quality Control Plan: provide written report to Departmental Representative 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, unless concrete retardants approved by the concrete agency are used.
 - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by the Departmental Representative.
 - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
 - .3 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, packaging materials in accordance with Section 01.7411 Cleaning and Appendix A.
- Part 2 Products**
- 2.1 Design Criteria** .1 Alternative 1 – Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.
- 2.2 Performance Criteria** .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.
- 2.3 Materials** .1 Cement: to CSA A3001, Type HS for severe sulphate exposure.
- .2 Supplementary cementing materials: As specified in section 2.4.1.2., below.
 - .3 Water: To clause 4.2.2 and to table 9 limits for chlorides and alkalis CSA A23.1/A23.2.
 - .4 Aggregate: normal density fine and coarse aggregate to clause 4.2.3 including clause 4.2.3.5 on deleterious reactions.
 - .5 Other concrete materials: to CSA A23.1/A23.2.
- 2.4 Mixes** .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.

- .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION.
- .2 Provide concrete mix to meet following hard state requirements:
Cheewhat Bridge Pier:
 - .1 Durability and class of exposure: C-1 and S-3 (severe sulphate exposure) with chloride resistivity below 1000 Coulombs tested prior to construction.
 - .2 Supplementary cementing materials: with minimum 15% fly ash replacement, and 8% silica fume by mass of total cementitious materials to CAN/CSA A3001.
 - .3 Entrainment air of 5-8%.
 - .4 Maximum water/cement ratio of 0.4.
 - .5 Compressive strength at 28 day: 35 MPa minimum.
 - .6 Intended application: pier crib scour protection wall.
 - .7 Aggregate size 20 mm maximum.
 - .8 Curing type 3- wet curing for 7 days (refer to Table 20 of CSA A23.1 for additional requirements)Bridge 19 foundation:
 - .1 Durability and class of exposure: S-3.
 - .2 Supplementary cementing materials: as per CAN/CSA A3001.
 - .3 Entrainment air of 4-7%.
 - .4 Maximum water / cement ratio of 0.5.
 - .5 Compressive strength at 28days: 30MPa minimum.
 - .6 Intended application: footings.
 - .7 Aggregate size 20 mm maximum.
 - .8 Curing type 1- curing for 3 days $\geq 10^{\circ}\text{C}$ as per table 20 of CSA A23.1
- .3 Concrete supplier's certification.
- .4 Provide quality management plan to ensure verification of concrete quality to specified performance.

Part 3 Execution

- 3.1 Preparation .1 Provide Departmental Representative 24 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 re-handling, and without damage to existing structure or Work.
- .4 Protect previous Work from staining.
- .5 Clean and remove stains prior to application of concrete finishes.

3.2 Installation/application

- .1 Provide and have the Departmental Representative review mitigation measures as per Section 011155 when placing near river bed or stream
- .2 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.
- .3 Protect concrete: for hot weather conditions when air temperature is 27°C or higher as per clause 7.4.2.4. Protect concrete for cold weather conditions when air temperature is 5°C or lower (or likely to fall below 5°C within 24 hours of placing) as per clause 7.4.2.5.
- .4 Provide minimum concrete cover: over principal reinforcing steel unless noted otherwise on the structural drawings: 75mm
- .5 Horizontal wall reinforcing shall be continuous around corners and hooked at wall. Lap lengths are as follows:

| <u>bar size</u> | <u>vertical lap</u> | <u>horizontal lap</u> |
|-----------------|---------------------|-----------------------|
| 10M | 500mm [20"] | 650mm [26"] |
| 15M | 600mm [24"] | 800mm [32"] |
| 20M | 750mm [30"] | 1000mm[40"] |
| 25M | 1200mm [48"] | 1550mm [60"] |

- .6 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 Departmental Representative.

- 3.3 Finishes** .1 Formed surfaces exposed to view: smooth-form 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 designated and paid for by Departmental Representative. Chloride penetration tests (prior to construction) and compression tests (sample taken at each pour) are required.
- .2 Send electronic photos of completed work to Departmental Representative for review, as follows: reinforcing before pour and once a week send progress photos of completed concrete elements as a minimum.
- .3 Schedule site visits:
- .1 Upon completion of the Work, after cleaning is carried out.
- 3.5 Cleaning** .1 Clean in accordance with Section 01 74 11 - Cleaning.
- .2 Use trigger operated spray nozzles for water hoses.
- .3 Designate cleaning area for tools to limit water use and runoff.
- .4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 11 - Cleaning.
- .1 Divert unused concrete materials from landfill to local facility after receipt of written approval from Departmental Representative.
- .2 Provide appropriate area on job site where concrete trucks and be safely washed.
- .3 Divert admixtures and additive materials from landfill to approved official hazardous material collections site after receipt of written approval from Departmental Representative.
- .4 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 Related
Requirements**

- .1 Section 03 10 00 – Concrete Forming and Accessories.
- .2 Section 03 20 00 – Concrete Reinforcing.
- .3 Section 01 33 00 – Shop Drawings, Product Data and Samples

1.2 References

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.
- .2 CSA International
 - .1 CSA-A23.1/A23.2-2009, 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 CSA-A23.3-04, Design of Concrete Structures.
 - .4 CSA-A23.4-09, Precast Concrete - Materials and Construction.
 - .5 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .6 CSA S16-09, Design of Steel Structures.
 - .7 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.
 - .8 CSA W59-03(R2008), Welded Steel Construction, (Metal Arc Welding).
 - .9 CSA-W186-M1990 (R2012), Welding of Reinforcing Bars in Reinforced Concrete Construction.

**1.3 Design
Requirements**

- .1 Design precast elements to CSA-A23.3/CSA-A23.4 to carry handling stresses.
- .2 Design precast elements and its connections to carry selfweight
- .3 Provide detailed calculations and design drawings for typical precast elements and connections as described in Section 01 33 00.

**1.4 Performance
Requirements**

- .1 Tolerance of precast elements to CSA-A23.4.

1.5 Action and Informational Submittals

- .1 Submittals in accordance with Section 01 33 00 – Shop Drawings, Product Data and Samples.
- .2 Submit shop drawings in accordance with CSA-A23.3 and CSA-A23.4 and include following items:
 - .1 Design calculations for handling design designed by manufacturer, including the transport by a helicopter.
 - .2 Details of members, reinforcement and their connections.
 - .3 Methods of handling and erection.
 - .4 Openings, sleeves, inserts and related reinforcement.
- .3 Submit detailed calculations and design drawings for typical precast elements and connections for review by Departmental Representative 3 weeks prior to manufacture.

1.6 Quality Assurance

- .1 Quality Control Plan: submit written report, as described in PART 3 - VERIFICATION, to Departmental Representative verifying compliance that concrete provided meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.7 Qualifications

- .1 Products Fabricate and erect precast concrete elements by manufacturing plant certified in appropriate category according to CSA-A23.4
- .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 category, Structural.
- .3 Only precast elements fabricated in such certified plants to be acceptable to Departmental Representative and plant certification to be maintained for duration of fabrication, erection until warranty expires.
- .4 Welding companies certified to CSA-W47.1.

**1.8 Delivery,
Storage and Handling**

- .1 Deliver, handle and store precast units according to manufacturer's instructions.
- .2 Protect unit corners contacting earth to prevent from staining.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 017411 Cleaning.

1.9 Warranty

- .1 Contractor warrants that precast element will not spall or show visible evidence of corrosion of embedded steel and cracking, except for normal hairline shrinkage cracks, in accordance with General Conditions (GC), but for 5 years.
- .2 Contractor warrants that precast elements will not spall or show visible evidence of cracking, except for normal hairline shrinkage cracks, in accordance with subsection of General Conditions "C", but for 12 months warranty period, which is extended to 60 months.

Part 2 Products

2.1 Materials

- .1 Cement to CAN/CSA-A3001, Type HS.
- .2 Water: to CSA-A23.1/A23.2.
- .3 Reinforcing steel: to CAN/CSA-G30.18.
- .4 Hardware and miscellaneous materials: to CSA-A23.1/A23.2.
- .5 Forms: to CSA-A23.4.
- .6 Anchors and supports: to CAN/CSA-G40.21 Type 300 W galvanized .
- .7 Welding materials: to CSA W48.
- .8 Welding electrodes: to CSA W48 grade E49XX certified by Canadian Welding Bureau.
- .9 Galvanizing: hot dipped galvanizing with minimum zinc coating of 610 g/m² to CAN/CSA-G164.
- .10 Air entrainment admixtures: to ASTM C260.
- .11 Chemical admixtures: to CSA-A23.1/A23.2.
- .12 Shims: plastic.
- .13 Weephole tubes: purpose made plastic.

- 2.2 Mixes** .1 Concrete:
- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria in accordance with CAN/CSA-A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION.
 - .2 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-1 and S-3 with chloride resistivity below 1000 Coulombs tested prior construction. Supplementary cementing materials: with minimum 15% fly ash replacement, and 8% silica fume by mass of total cementitious materials to CAN/CSA A3001.
 - .2 Entrainment air of 5-8%.
 - .3 Maximum water/cement ratio of 0.4.
 - .4 Compressive strength at 28 day: 35 MPa minimum.
 - .5 Intended application: pier crib scour protection wall.
 - .6 Aggregate size 20 mm maximum.
 - .7 Surface texture: steel trowel finish.
 - .8 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .9 Concrete supplier's certification.
- 2.3 Manufactured units** .1 Manufacture units in accordance with CSA-A23.4.
- .2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast on part of unit not be exposed.
 - .3 Provide hardware suitable for handling elements.
 - .4 Hot dip galvanize steel embedments after fabrication and touch up with zinc-rich primer after welding.

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| 2.4 | Finishes | .1 | Finish units to commercial grade to CSA-A23.4. |
| 2.5 | Source Quality Control | .1 | Provide Departmental Representative with certified copies of quality control tests related to this project as specified in CSA-A23.4 and CSA-G279. |
| | | .2 | Provide records from in-house quality control programme based upon plant certification requirements to Departmental Representative for inspection and review. |
| | | .3 | Upon request, provide Departmental Representative 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, and provide to Departmental Representative for review upon request. |
| | | | |
| Part 3 | Execution | | |
| 3.1 | Erection | .1 | Provide and have the Departmental Representative review mitigation measures as per Section 011155 when placing into or near river bed or stream. |
| | | .2 | Do precast concrete work in accordance with CSA-A23.4, CSA-A23.3 and CAN/CSA-S6. |
| | | .3 | Do welding in accordance with CSA-W59, for welding to steel structures and CSA-W186, for welding of reinforcement. |
| | | .4 | Erect precast elements within allowable tolerances to CSA-A23-4. |
| | | .5 | Non-cumulative erection tolerances in accordance with CSA-A23-4. |
| | | .6 | Set elevations and alignment between units to within allowable tolerances before connecting units. |
| | | .7 | Fasten precast units in place as indicated on the structural drawings. |
| | | .8 | Secure with bolts using turn-of-the-nut method and shim with galvanized shims. |
| | | .9 | Use gravel to align elevations of surfaces at joints. |

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| <u>3.2 Field Quality Control</u> | .1 | Send electronic photos of completed work to Departmental Representative once a week as a minimum. |
| <u>3.3 Verification</u> | .1 | Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established in PART 2 - PRODUCTS, by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE. |
| <u>3.4 Cleaning</u> | .1 | Use cleaning methods as reviewed by Departmental Representative before cleaning soiled precast concrete surfaces. |

END OF SECTION

Part 1 General

- 1.1 Related Requirements** .1 Section 06 10 00 – Rough Carpentry.
- 1.2 References** .1 ASTM International
- .1 ASTM A325M-09, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength Metric.
- .2 CSA International
- .1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA S16-09, Design of Steel Structures.
- .4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.
- .5 CSA W59-03(R2008), Welded Steel Construction, (Metal Arc Welding).
- 1.3 Action and Informational Submittals** .1 Submit in accordance with Section 01 33 00 – Shop Drawings, Product Data, and Samples.
- .2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for structural steel and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 43 - Health and Safety Requirements.
- .3 Shop Drawings:
- .1 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners and welds. Indicate welds by CSA W59, welding symbols.
- .2 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.
- .3 Submit description of methods, temporary bracing and

strengthening, sequence of erection and type of equipment proposed for use in erecting structural steel.

- 1.4 Delivery, Storage and Handling**
- .1 Deliver, store and handle materials in accordance with Section 01 61 10 - Product Requirements and with manufacturer's written instructions].
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Ensure Departmental Representative has delivery schedules 7 days minimum prior to shipping.
 - .3 Storage and Handling Requirements:
 - .1 Provide protective blocking for lifting, transportation and storing.
 - .1 Exercise care during fabrication, transportation and erection of girders, beams and trusses.
 - .2 Do not notch edges of members.
 - .3 Do not cause excessive stresses.
 - .2 Mark mass on members weighing more than 590kg (1300lbs).
 - .3 Protect unpainted weathering steel, before erection, with waterproof covering.
 - .4 Ensure that no portion of steel comes into contact with ground.
 - .1 Replace defective or damaged materials with new.
 - .4 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan in accordance with Section 017411 Cleaning.
- 1.5 Quality Assurance**
- .1 Preconstruction Testing:
 - .1 Provide suitable facilities and cooperate with inspection organization and Departmental Representative in carrying out inspection and tests required.
- Part 2 Products**
- 2.1 Materials**
- .1 Structural steel: to CSA G40.20/G40.21, grade and types 350AT Category 2, ASTM A588, ASTM A847; 1770 grade for galvanized wire ropes.

- .1 Hot dip zinc galvanize all steel and connection material including threaded rods, wire ropes, lag screws, bolts, nuts and washers.
 - .2 High strength bolts, nuts and washers: to ASTM A325M approved by Departmental Representative.
 - .3 Anchor bolts, lag screws, threaded rods, washers and nuts: to CSA G40.20/G40.21, grade 300W or grade A36 to ASTM F1554.
 - .4 Welding electrodes: E49XX to CSA W48 series.
 - .5 Hot dip galvanizing: to CAN/CSA G164, minimum zinc coating of 600 g/m².
 - .6 Field applied paint is prohibited, unless approved in writing by the Departmental Representative. Field applied paint to achieve galvanic protection, the dry extract to have a zinc concentration of at least 95%. The paint to resist expansion and shrinking once applied to the metal due to temperature variations. Paint to be approved by Departmental Representative.
- 2.2 Source Quality Control**
- .1 Steel producer qualifications: certified in accordance with CSA G40.20/G40.21.
 - .2 Submit Departmental Representative 2 copies of certified test reports for Charpy V-notch test.
 - .3 Provide suitable facilities and co-operate with inspection organization and Departmental Representative in carrying out inspection and tests required.
- Part 3 Execution**
- 3.1 Examination**
- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for structural steel installation in accordance with manufacturer's written instructions.
 - .1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 3.2 Preparation**
- .1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.

- .2 Verify location of substructure units, elevations of bearing seats and location of anchor bolts before erection of structural steel; report discrepancies to Departmental Representative.
- .3 Work near river banks or embankments in accordance with written instructions from Departmental Representative.
- .4 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any unit.
 - .1 Enlarge holes if necessary by reaming only after receipt of written approval from Departmental Representative.
 - .2 Ensure reamed holes are 2 mm maximum larger than bolt size used.
- .5 Place anchor lag screws at elevations and locations indicated.

3.3 Installation

- .1 Do falsework in accordance to CSA S269.1.
- .2 Do fabrication and erection of structural steel in accordance with CAN/CSA S6, Design of Highway Bridges.
- .3 Do welding in accordance with CSA W59, except where specified otherwise.
 - .1 For CSA G40.20/G40.21, grade 350AT steel, deposited weld metal to have Charpy V-Notch value not lower than that of steel.
 - .2 Do welding in shop unless otherwise permitted by Departmental Representative.
 - .3 Weld only at locations indicated.
- .4 High strength bolting: in accordance with CAN/CSA S6. Use 'turn-of-nut' tightening method.
- .5 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.
- .6 Allowable tolerance for bolt holes:
 - .1 Matching holes for bolts to line up so that dowel 2 mm less in diameter than hole passes freely through assembled members at right angles to such members.
 - .2 Finish holes not more than 2 mm in diameter larger than diameter of rivet or bolt unless otherwise specified by Departmental Representative.
 - .3 Centre-to-centre distance between any two holes of group to vary by not more than 1 mm from dimensioned distance

- between such holes.
- .4 Centre-to-centre distance between any two groups of holes to vary not more than maximum of the following:
- | Centre-to-Centre distance in metres | Tolerance in plus or minus mm |
|-------------------------------------|-------------------------------|
| less than 10 | 1 |
| 10 to 20 | 2 |
| 20 to 30 | 3 |
- .5 Correct misspunched or misdrilled members only as directed by Departmental Representative.
- .7 Span length tolerances:
- .1 Girders and beams: plus or minus 6 mm
- .2 Centre-to-centre of bearing stiffeners and bearing plates: plus or minus 3 mm.
- .8 Shop splices:
- .1 Use complete joint penetration groove welds finished flush.
- .2 Details of butt joints to CSA W59.
- .3 Use only as approved by Departmental Representative.
- .9 Shop erection:
- .1 Support each girder on its bearing points and measure and record deflection at same points indicated for measurement of camber.
- .2 Measure deflections in plane of girder web.
- .3 Submit diagram to Departmental Representative showing deflection measurements for each girder or truss before delivery.
- .4 Shop erection is not required for single span girders with no field splices.
- .10 Mark members in accordance with CSA G40.20/G40.21.
- .1 Do not use die stamping.
- .2 Place marking at locations hidden when viewed from exterior after erection when steel is to be left in unpainted condition.
- .11 Match marking: shop mark bearing assemblies and splices.
- .12 Paint field welds or field cut ends with zinc rich paint, see 2.1.6. Grind galvanized area off the connection before welding.

- 3.4 Field Quality Control** .1 **Manufacturer's Field Services:**
- .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, protecting and cleaning of steel.
 - .2 Submit manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Ensure manufacturer's representative is present before installation, during critical periods of installation and during construction of field joints and testing.
 - .4 Send electronic photos of completed work to Departmental Representative for review once a week as a minimum.
 - .5 Schedule site visits:
 - .1 Upon completion of the Work after cleaning is carried out.
- 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 **Waste Management:** separate waste materials for recycling in accordance with Section 011155. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

| Part 1 | General | | |
|---------------|--|----|--|
| 1.1 | Related Requirements | .1 | Section 06 10 00 – Rough Carpentry |
| | | .2 | Section 01 11 55 - General Instructions |
| | | .3 | Section 01 74 11 - Cleaning |
| 1.2 | References | .1 | Canadian Standards Association (CSA International) |
| | | .1 | CSA O80 Series 08(R2012) Wood Preservation. |
| 1.3 | Action and Informational Submittals | .1 | Submit in accordance with Section 01 33 00 – Shop Drawings, Product Data, and Samples. |
| | | .2 | Quality assurance submittals: |
| | | .1 | For products treated with preservative by pressure impregnation submit following information certified by authorized signing officer of treatment plant: |
| | | .2 | Information listed in AWPA M2 and revisions specified in CSA O80 Series, Supplementary Requirement to AWPA M2 applicable to specified treatment |
| | | .3 | Moisture content after drying following treatment with water-borne preservative. |
| 1.4 | Quality Assurance | .1 | Plant inspection of products treated with preservative by pressure impregnation will be carried out by designated testing laboratory to AWPA M2, and revisions specified in CSA O80 Series, Supplementary Requirements to AWPA M2. |
| | | .2 | Each piece of pressure treated to be identified by CSA O322 certified stamp. |
| | | .3 | Inspection and testing of insert materials will be carried out by a Testing Laboratory designated and retained by Departmental Representative. |
| 1.5 | Delivery, storage and Handling | .1 | Waste Management and Disposal: |
| | | .1 | Separate waste materials for recycling in accordance with the Section 011155 General Instructions. |

Part 2 Products

- 2.1 Materials** .1 Alkaline Copper Quaternary (ACQ).
Preservative: to CSA-O80 Series, water-borne, colour range green to brown. **Lumber treated with creosote, pentachlorophenol, copper naphthenate, or copper 8-quinolinolate, and chromated copper arsenate (CCA) are unacceptable.**
- .2 **Site Applied Wood Preservative: Not acceptable.**
- .3 Preservatives: maximum VOC limit 350 g/L.
- .4 Flame Spread Classification and Smoke development to CSA O80.20.
- .5 Visually inspect wood before use. If treatment residues present, dispose wood as per with Section 01 74 2.

Part 3 Execution

- 3.1 Application: Preservative** .1 Treat Douglas Fir lumber to CSA O80 using ACQ preservative to obtain minimum net retention of 4.0 kg/m³ of wood.
- .2 Following water-borne preservative treatment, dry material to maximum moisture content of 17%.
- .3 Wear gloves and long sleeve shirt when handling treated wood. Wear dust masks when sawing, sanding and shaping treated wood. Wear dust masks and goggles to avoid touching or inhaling the dust.
- .4 Always cut treated wood outdoors or in adequately ventilated area.
- .5 After completing work with treated wood, wash your hands, especially before eating, drinking or smoking.
- .6 During and after construction, all remaining scraps, cuttings, wood chips and sawdust must be collected efficiently and in a timely manner. All wood waste must be disposed of in accordance with manufacturer's guidelines, local, provincial regulations and as per Section 017411 Cleaning.
- 3.2 Field Application of Wood Preservative Treatment** .1 If exposed, cut ends shall be protected with the preservative as per 2.1.1. applied in accordance with manufacturer's instructions, preferably in a protected cutting area and before installation.
- .2 If the chemical solution is accidentally spilled while ends are being treated, the spill shall be cleaned up immediately with a

disposable absorbent substance (soil, sawdust, forest litter or rags). Dispose of the contaminated absorbent material safely, in accordance with local and provincial regulations.

- .3 The use of cleaning and bleaching products containing sodium hypochlorite, sodium hydroxide, sodium percarbonate or citric or oxalic acid on treated wood shall be avoided.

END OF SECTION

Part 1 General

| | | | |
|--|--|--|--|
| 1.1 Related Requirements | | | .1 Section 05 12 00 – Structural Steel for Bridges .2 Section 06 10 00 – Wood Treatment .3 Section 01 74 11 – Cleaning |
| 1.2 References | | | .1 ASTM International .1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products. .2 CSA International .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples. .2 CSA O121-08, Douglas Fir Plywood. .3 CSA O141-05(R2009), Softwood Lumber. .4 CSA O86-09 Engineering Design in Wood .5 CSA O325-07, Construction Sheathing. .3 National Lumber Grades Authority (NLGA) .1 Standard Grading Rules for Canadian Lumber 2010. |
| 1.3 Action and Informational Submittals | | | .1 Submit in accordance with Section 01 33 00 – Shop Drawings, Product Data, and Samples. .2 Product Data: .1 Submit manufacturer's instructions, printed product literature and data sheets for wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations. .3 Sustainable Design Submittals: .1 Construction Waste Management: .1 Submit project Waste Management Plan highlighting recycling and salvage requirements. |
| 1.4 Quality Assurance | | | .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board. .2 Plywood in accordance with CSA and ANSI standards. |

**1.5 Delivery,
Storage and Handling**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wood from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section.
- .5 Packaging Waste Management: remove for and return of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 11 55.

Part 2 Products

**2.1 Framing
Structural And Panel
Materials**

- .1 Lumber: Pressure Treated Douglas Fir NLGA No. 2 or better grade or Natural Untreated Rough Red Cedar, NLGA No. 2 or better grade, as shown on drawings; S4S, moisture content 19% (S-dry) or less in accordance with following standards:
 - .2 CSA O141.
 - .3 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .3 Canadian softwood plywood (CSP): to CSA O151, standard construction.

2.2 Accessories

- .1 Nails and spikes: to CSA B111. Nails to be common nails. Gun nails to be the same size as common nails, with round heads (no notches). Staples or furring nails are not acceptable.
- .2 Bolts (steel-to-wood and wood-to-wood): 19 mm diameter unless indicated otherwise, complete with nuts and washers, to ASTM A307.
- .3 Lag screws: 12 mm diameter unless noted otherwise, to CSA B34.

- .4 Self-drilling wood screws to be 6mm diameter 75mm long with hexagonal heads, unless noted otherwise, with minimum factored lateral capacity of 1.6kN against D.Fir 38mm side plate and factored withdrawal capacity of 2.6mm from D.Fir member.
- .5 Fastener Finishes:
 - .1 Galvanizing: to ASTM A123/A123M, use hot dip zinc galvanized fasteners.
- .6 Wood Preservative: per Section 06 05 73 – Wood Treatment.

Part 3 Execution

3.1 Examination

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

3.2 Installation

- .1 Install members true to line, levels and elevations, square and plumb.
- .2 Construct continuous members from pieces of longest practical length.
- .3 Install spanning members, if warped, with "crown-edge" (not "cup-edge") up.
- .4 Select exposed framing for appearance. Install panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
- .5 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.
- .6 Install sleepers as indicated.
- .7 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .8 Countersink bolts only where shown on the structural drawings.

- .9 Pre-drill holes in the timbers for lag screws. Make hole diameters 75% of the lag screw shank diameter. Hole/shank to be as follows: 9mm/13mm, 12mm/16mm and 14mm/19mm.

- 3.3 Field quality control**
 - .1 Send electronic photos of completed work to Departmental Representative for review, as follows: framing and connections before covering up but once a week as a minimum.
 - .1 Schedule site visits:
 - .1 Upon completion of the Work, after cleaning is carried out.

- 3.4 Cleaning**
 - .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .3 Waste Management: separate waste materials for recycling in accordance with Section 01 1155.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

- 3.5 Protection**
 - .1 Protect installed products and components from damage during construction.
 - .2 Repair damage to adjacent materials caused by rough carpentry installation.

END OF SECTION

Part 1 General

- 1.1 References** .1 ASTM International
- .1 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .2 CSA International
 - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CSA A3000-08, Cementitious Materials Compendium.
 - .3 Appendix A of this specification
 - .4 Section 01 74 11 - Cleaning
- 1.2 Action And Informational Submittals** .1 Site Quality Control Submittals: submit in accordance with Section 013300 Shop Drawings, Product data and Samples.
- .1 Submit condition survey of existing conditions as described in EXISTING CONDITIONS article.
 - .2 Submit testing and inspection reports as described in PART 3 - FIELD QUALITY CONTROL.
- .2 Sustainable Design Submittals:
- .1 Erosion and Sedimentation Control: submit erosion and sedimentation control plan in accordance with authorities having jurisdiction.
 - .2 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements..

Part 2 Products

- 2.1 Materials** .1 Use excavated site inorganic soil as a foundation and sleeper backfill, only where shown on drawings and where acceptable by in-stream work mitigation guidelines.

Part 3 Execution

- 3.1 Examination** .1 Evaluation and Assessment:
- .1 Before commencing work verify requirements for

lifts: add water as required to achieve specified density.

- .5 Compaction: compact each layer of material to following densities for material to ASTM D698:
 - .1 To underside of base courses: 95%.
 - .2 Base courses: 100%.
- .6 Against foundations: excavated material or imported material with no stones larger than 200 mm diameter within 600 mm of structures.
- .7 Backfilling any excavations with concrete is acceptable only where shown on drawings and concrete to be poured into watertight membrane, spillage of fresh concrete onto the ground is prohibited.

3.6 Grading

- .1 Grade so that water will drain away from walls to disposal areas approved by Departmental Representative.

3.7 Cleaning

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Dispose of cleared and grubbed material off site daily.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 1155.

END OF SECTION

Environmental Review – Summary of Mitigations
By Parks Canada



Parks
Canada

Parcs
Canada



ENVIRONMENTAL REVIEW — SUMMARY OF MITIGATIONS
BASIC IMPACT ASSESSMENT

WEST COAST TRAIL BRIDGE AND STRUCTURES RECAPITALIZATION PROJECTS: 2013-2014

PACIFIC RIM NATIONAL PARK RESERVE OF CANADA

DRAFT

Summary of mitigations only!

OCTOBER 2013

Canada

Environmental Assessment, West Coast Trail Bridge Recap. Projects 2013-2014, Pacific Rim National Park Reserve

LIST OF ACRONYMS

| | |
|------------|--|
| BMP | Best Management Practice |
| CDC | Conservation Data Centre |
| CEAA | Canadian Environmental Assessment Act (the Act) |
| CEAR | Canadian Environmental Assessment Registry (the Registry) |
| COSEWIC | Committee on the Status of Endangered Wildlife in Canada |
| DFO | Department of Fisheries and Oceans |
| EA | Environmental Assessment |
| EC | Environment Canada |
| EI | Ecological Integrity |
| FA | Federal Authority |
| FN | First Nation |
| HADD | Harmful Alteration, Disruption, or Destruction (of fish habitat) |
| PMP | Park Management Plan |
| PRNPR | Pacific Rim National Park Reserve |
| RA | Responsible Authority |
| SAR | Species at Risk |
| SARA | Species at Risk Act |
| The Act | The Canadian Environmental Assessment Act |
| The Agency | The Canadian Environmental Assessment Agency |
| VEC | Valued Ecosystem Component |
| WCT | West Coast Trail |

1.0 INTRODUCTION

1.1 OVERVIEW OF THE PROJECT AND RATIONALE

- REMOVED -

Table 1. Significance criteria description.

| Criterion | Low (Negligible) | Moderate (Minor) | High (Significant) |
|----------------------|---|--|---|
| Magnitude | Effect results in disturbance which is small in area or intensity and is well below the threshold of leaving permanent impacts There is little discernable change from the background conditions | Effect results in damage Change is above background conditions, but within thresholds and range of natural variability | Effect results in destruction Change exceeds thresholds and causes changes beyond range of natural variability |
| Geographic Extent | Impact is restricted to site Effect is limited to the activity footprint and adjacent areas | Impacts extend beyond site, but remain within local area Effect is likely to have impacts at an ecosystem scale | Impact extends beyond local area. Effect is likely to have impacts at a regional scale |
| Frequency | Occurs once | Occurs more than once or intermittently | Occurs often or continuously. |
| Duration of Activity | Impacts limited to construction period | Impacts extend beyond construction period | Impact occurs for the operation lifetime of the facility/installation. |
| Reversibility | Effects are reversible, (VEC's can recover from the disturbance) over a short period of time, without active management | Effects are reversible, with active management, over a short period of time; or if active management is not possible, effects are reversible over a season | Effects are reversible with active management over an extended period of time; or if active management is not possible, effects are permanent |

Table 3. Potential environmental effects from routine trail modification and vegetation management projects.

| VECs | POTENTIAL ENVIRONMENTAL EFFECTS | | SIGNIFICANCE OF EFFECT (Before Mitigations) |
|------------------------------------|---|---|--|
| Air Quality and Noise | <ul style="list-style-type: none"> Decreased ambient air quality Increased ambient noise levels | #19,# 21 Cheewhat Cullite #96, #97 | Low (Negligible) |
| Soils and Topography | <ul style="list-style-type: none"> Soil compaction and rutting Increased soil erosion and decreased slope stability Reduced stability of escarpment Soil contamination due to leaks or accidental spills or contamination with hazardous materials (treated wood components) | #19,# 21 Cheewhat Cullite #96, #97 | Low (Negligible) |
| Hydrological and Aquatic Resources | <ul style="list-style-type: none"> Adverse modifications to surface drainage patterns Reduced surface quality and clarity due to increase erosion, sedimentation, debris transport, point or non-point sources of pollution (cast in place concrete pour). Loss of spawning or breeding habitat and/or changes in abundance and diversity of aquatic flora and fauna due to decreased water quality and physical drainage to aquatic habitat | #19,# 21 Cheewhat Cullite #96, #97 | Low (Negligible) |
| Vegetation | <ul style="list-style-type: none"> Damage to and/or removal of vegetation Introduction of non-native and invasive plant species or expansion of existing non-native plant populations Impacts on rare plants and valued vegetation features (species at risk). Damage to old growth trees, tree roots or other sensitive vegetation features | #19,# 21 Cheewhat Cullite #96, #97 | Low (Negligible) |
| Wildlife | <ul style="list-style-type: none"> Disruption to wildlife nesting and rearing Sensory disturbance causing displacement/habitat avoidance Loss of habitat Decreased wildlife abundance due to direct mortality Impacts on rare or endangered species Wildlife habituation, or food conditioning - attraction to artificial food sources | #19,# 21 Cheewhat Cullite #96, #97 | Moderate (Minor) |
| Cultural Heritage | <ul style="list-style-type: none"> Loss or disruption of heritage, archaeological and paleontological features Loss of historic structure | #19,# 21 Cheewhat Cullite #96, #97 | Moderate (Minor) |

| | | | |
|-------------------------|---|--|------------------------------------|
| Visitor Experience | <ul style="list-style-type: none"> • Reduced quality of visitor experience • Loss of educational opportunities | <p>#19,# 21 Cheewhat Cullite #96, #97</p> | <p>Low (Negligible)</p> |
| Human Health and Safety | <ul style="list-style-type: none"> • Injuries to public and workers • Exposure to hazardous material (Chemicals from treated wood, sawdust from treated wood) • Risk to health and safety by working, hiking, camping in remote wilderness setting (Topographic hazards, uneven or slippery trails, exposure to inclement weather, wildlife) | <p>#19,# 21 Cheewhat Cullite #96, #97</p> | <p>Low (Negligible)</p> |

3.6 MITIGATIONS

Mitigations are those measures identified as a means of eliminating, reducing or controlling adverse environmental effects resulting from project activities. The replacement of bridge structures on the WCT has environmental effects that can be avoided or minimized using proven mitigation measures.

Mitigation measures that should be incorporated into a project were identified to eliminate, reduce or control potential adverse environmental effects on identified VECs. Adherence to the following mitigation measures will eliminate or significantly reduce the potential environmental effects.

All work practices will adhere to the requirements set out in Federal and Provincial best management practices, operational guidelines and policy directives including the following*:

- *Canada National Parks Act and Regulations (CNPA),*
- *Parks Canada Guidelines for the Use, Handling and Disposal of Treated Wood (2009),*
- *Parks Canada Environmental Management Directive- Clean air, clean water, sustainable land use -March 2009*
- *Canadian Environmental Protection Act (CEPA),*
- *Species at Risk Act (SARA),*
- *Canadian Federal Fisheries Act.*
- *DFO Standard Mitigation Measures for Bridge Repair or Replacement (Version 1.0)*
- *DFO operational statements for instream works, clear span bridges, bridge maintenance*
**Where the standards differ the more stringent mitigations will be applied. Parks Canada applies a "meet-or-beat" approach to applying directives and legislation.*

- The contractor must make contact with the in-park project representative from Parks Canada in advance of crews arriving in the national park. The contractor must confirm the timing of the projects, when workers will be arriving, staying and departing the construction work sites and camping locations.
- Parks Canada may send an on-site monitor to confirm that mitigations are being applied and are effective.
- Pre-approval of the work plan and extent of ground disturbance may be required for work at Chewat bridge location due to cultural resource concerns.

GENERAL

- Keep the footprint of worksite disturbance as small as possible (E.g. Clear minimum area necessary. Where possible leave roots and stumps in place).
- No Additional clearing of vegetation will be permitted for campsites or cooking areas.
- Clearly mark work area with stakes, flagging tape or other means to identify areas that are off limits. Clearly flag one area where construction materials will be stored to minimize disturbance.

- As much as possible, use existing roadways, trails or disturbed areas to access and travel within the site.
- Stage work and stockpile materials on the existing trail surface, a previously disturbed area or another site with high resiliency.
- Schedule noisy construction activities to minimize impacts to wildlife and visitors.
- On site project surveillance will be conducted to ensure that prescribed mitigation measures are implemented and achieving the expected results.
- Work crews will be briefed upon the importance of adhering to the mitigation measures at a pre-construction meeting.
- A copy of the mitigation measures will be kept at the work site.
- Pacific Rim National Park should provide pre-trip and on-site arrival information stating that construction activities will be taking place at this site.
- All equipment used on the job must be clean and free from contaminants.
- Equipment will be run at low idle or shutdown when not in active use to reduce noise levels and levels of particulate matter from exhaust emissions.
- Operate equipment carefully to avoid damaging surrounding vegetation.
- Excavated material should not be placed so it damages or buries intact vegetation.

CONSTRUCTION TIMING

- All in-stream work must be completed in adherence with Fisheries and Oceans Canada general fisheries timing window for in-stream work on Vancouver Island (conduct work between June 15th - September 15th). Additional information is available at http://www.env.gov.bc.ca/wsd/regions/vir/wateract/terms_conditions_vir.pdf

DEMOLITION

- Demolition and removal of the existing bridge structures will be undertaken in a manner that minimizes the impacts to the environment in which it is located.
- All components of the old bridge will be either salvaged for re-use as appropriate, burnt on site (see conditions for burning in Garbage and General Waste section below), or removed from the site (treated wood, chemicals, paints).

AQUATIC RESOURCES, EXCAVATION AND SEDIMENT CONTROL

The Cheewhat river system is of high value to salmonid fish species (inventories indicate presence of Coho, Chum and sockeye species). Cullite creek may also provide habitat for salmonids.

The stream systems under bridge crossings at #19 and #21, #96 & #97 have received incomplete surveys for fish presence. These smaller systems have low likelihood of supporting salmon species, but may contain trout species.

- Minimize changes to the ground surface and vegetation that affect its infiltration and runoff characteristics.
- Make all responsible efforts to minimize extent and duration of work within the creek channel and bank areas.
- Assess site for erosion control requirements and implement control measures as required (e.g. tarps, straw bales, erosion blankets, silt fencing) to prevent the dispersal of sediments outside the construction zone and to protect fish from detrimental effects of gill abrasion due to sediment-laden water.
- Periodically inspect erosion control structures for effectiveness. If not operating effectively, adjust or replace with different mitigation measure.
- Place stockpiled (covered) materials a minimum of 2 m from water bodies.

- Refuel at least 30 m from all water bodies (including wetlands).
- Restore riparian areas to preconstruction conditions to the extent possible.
- Areas requiring excavation (new bridge abutment) must be clearly marked with stakes, flagging tape or other means prior to commencement of digging.
- Where possible, halt activities on exposed soils during periods of high rainfall and runoff.
- If clearing is required on steep slopes, hand clear whenever possible.

CAST IN PLACE CONCRETE

- Raw or uncured waste concrete must not be disposed of on site.
- If pour-in-place concrete work is required, it will be completely contained so that raw concrete cannot enter fish habitat.
- Equipment such as concrete mixers, wheel barrows, shovels, trowels and other tools used for cast in place concrete work should only be cleaned in areas pre-approved by Parks Canada environmental assessment representative.
- **Cleaning equipment in or directly adjacent to any watercourse or intertidal area is prohibited.**
- If concrete wash water is produced during clean-up activities, it should be contained on site to allow sediment to settle out and to reach a neutral pH before being released to the environment (typically 48 hours).

TREATED WOOD

The use of treated wood on a project within a National Park will be in compliance with the national policy (See Parks Canada Guidelines for the Use, Handling and Disposal of Treated Wood, 2009).

As per the Parks Canada directives on use of treated wood (Parks Canada, 2009) :

3.3 Appropriateness and Justification of the Use of Treated Wood

- 1. Project proponents should be able to determine the most appropriate products and should be able to justify their use.*
- 2. Treated wood should only be used when it is important that the wood be protected (risk of decay, attack by insects or contact with water or damp soil). Wood treatment should not be a substitute for good construction design.*
- 3. Use treated wood that has undergone a fixation or stabilization process*

- Treated wood will not be used in the design of structures where it would be in direct contact with soil or water nor in locations where there is high human physical contact (e.g. on handrails). Western red cedar may be considered as a suitable alternative in these instances.
- All cuttings and other treated wood waste materials will be collected and disposed of at an approved landfill site in accordance with Provincial Waste Management and Environment Canada regulations. Burning of treated wood waste products is prohibited.
- Before use, all treated products must be visually inspected to ensure that excessive residual preservative is not present on the wood surface. Material with excessive residual product will not be used and will be removed from the work site at the earliest opportunity.
- Employ construction methods and purchase materials in sizes which minimise the number of timber saw cuts needing field treatment with wood preservative.
- If on-site treatment of wood is required, these activities will be conducted in a contained upland location when possible.

- Treated wood sawdust has a high surface area to volume ratio and is the most direct means of introducing treated wood contaminants (typically heavy metals) into the receiving environment. Good housekeeping practices must be employed to minimize the amount and distribution of treated wood sawdust. All treated wood sawdust should be collected in a plastic bin (e.g. Rubbermaid) or tarpaulin and disposed of off-site.
- Sawing of treated wood should be avoided in locations that may expose workers, site staff and visitors to sawdust.

APPLICATION OF PAINT, SEALANT OR END CUT TREATMENTS

- Plastic drip tarps will be placed to ensure paint drips and spray does not contaminate the stream or surrounding stream banks.
- All transfer of paint or other sealants from storage and mixing containers into application containers or devices shall be conducted in a location that minimizes the risks of accidentally spilled product entering the receiving environment.
- Secondary containment vessels with minimum holding capacity of 120% of the paint containing vessel are an effective means of minimizing the risk of spillage.
- Cleaning of painting equipment will be conducted in a secure upland or other location which minimizes the risk of paint and solvents entering the receiving environment.
- All waste paint and paint - solvent solutions must be disposed of in accordance with applicable federal, provincial, and municipal legislation. No disposal of waste paint or solvent - paint mixtures is permitted at the project site.
- If paint will be applied by spray, equipment must be adjusted to minimize spray drift.
- Workers will carry minimum quantities of paints and solvents in the work area.
- Contractor and sub-contractor staff must be trained in spill response and reporting procedures including containment methods.
- Enough spill cleanup equipment should be available on-site to adequately handle potential spill volumes and types.

FUEL STORAGE AND FUELLING OPERATIONS

- Fuelling of equipment such as chainsaws and portable generators will be conducted in a manner which restricts the potential release of petroleum products into a watercourse, or the receiving environment.
- A spill contingency response capability including an adequate amount of absorbent material and berms to contain the volume of stored fuel will be available on site.

GARBAGE AND GENERAL WASTE

- All debris and deleterious substances generated during project activities shall be contained in the immediate work area, collected and appropriately disposed of in accordance with all applicable legislation, guidelines, and best management practices or as prescribed in this list of mitigation measures.
- At no time shall any waste material be allowed to enter any watercourse associated with the works.
- The Contractor/Operator shall be responsible for assuring that all reasonable efforts are implemented to eliminate or minimize waste production.
- At work sites and camping locations all food wastes and discarded food items shall be stored in closed, leak-proof storage containers that prevents access by wildlife. All material which can be recycled, such as paper and

cardboard products, glass bottles and plastic and metal containers will be recycled where possible. The Contractor/Operator is responsible for the proper collection, storage and transportation of garbage and recyclable waste to disposal facilities (e.g., Tofino landfill and appropriate recycling facilities).

- Open burning of waste is strictly prohibited, unless authorized by regulating bodies.
- Burning of old bridge wood components is permitted (but must be approved in advance by PCA staff), provided the wood has not been treated in the past, and following the recycling of structurally sound wood. The fire should be built in a manner that doesn't require removal of ground cover vegetation to expose mineral soil or leave a fire ring scar. This can be accomplished by building the fire in the lid of a standard sized residential, metal garbage container or similar container. Cold ash may be disposed of on site.

SANITARY WASTES

- At overnight camping locations project staff will have access to the sanitary facilities (composting privies) provided by Parks Canada.
- Plans for providing sanitary facilities for project staff at worksites occupied for a week or longer should be pre-approved by Parks Canada trail crew staff. Where possible small portable chemical toilets may be used, provided they have sufficient capacity to contain all produced wastes and are managed so as to not permit discharge of wastes to the receiving environment at the project site. Where permitted by PCA staff, the contractor may install pit privies for temporary use.

WILDLIFE

- *Species at risk in area – See Report : Sara listed – Dromedary jumping-slug (Hemphillia dromedaries), and in Cheewhat beach area – Pink Sand Verbena (Abronia umbellata var. breviflora).*
- No foodstuffs or food wastes will be left unattended and/or accessible to wildlife.
- Food and food preparation materials must at all times, be stored in a secure location that prevents animals accessing these items. (Food and food preparation items must be stored inside bear proof bins – not in soft sided tents or tent trailers).
- Report any wildlife encounter, especially if it involves large carnivores – Bears Cougars Wolves, to the Parks Canada project contact as soon as possible.
- Report any bird nest, wildlife den site or other areas of wildlife habitation within the project footprint to the Parks Canada Contact, or Project Manager immediately.

CULTURAL RESOURCES

- On-site project staff will be required to attend the safety start up meeting and receive a briefing on cultural resources in PRNPR.
- The area of highest cultural significant for the 2013-2014 WCT recapitalization proposals is the Cheewhat Bridge location. The shoreline areas contain significant cultural deposits. Further information on-the workplans including information on access & egress, equipment staging and materials stockpiles is required in order to determine the extent/potential for disturbance of cultural resources. The PRNPR CRM manager may wish to be on-site for the start-up of work at this location.
- If any black greasy, shell-bearing sediment or any culturally modified trees are encountered, development will be immediately halted and the materials subject to more detailed archaeological assessment.
- Work will stop immediately if cultural resource materials are uncovered and will only recommence upon the instruction of an archaeologist or other cultural resource expert.
- The collection or disturbance of artifacts of possible historic significance by project employees is strictly prohibited under the *Canada National Parks Act and Regulations*.

RESTORATION

- Disturbed surfaces outside the trail tread should be planted with native vegetation as soon as feasible to prevent soil erosion and/or establishment of weed species.