



**RETURN BIDS TO:**  
**RETOURNER LES SOUMISSIONS À:**  
Public Works and Government Services Canada  
Telus Plaza North/Plaza Telus Nord  
10025 Jasper Ave./10025 ave. Jaspe  
5th floor/5e étage  
Edmonton  
Alberta  
T5J 1S6  
Bid Fax: (780) 497-3510

## INVITATION TO TENDER APPEL D'OFFRES

**Tender To: Public Works and Government Services  
Canada**

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out therefor.

### Soumission aux: Travaux Publics et Services Gouvernementaux Canada

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici et sur toute feuille ci-annexée, au(x) prix indiqué(s).

### Comments - Commentaires

**Vendor/Firm Name and Address**  
**Raison sociale et adresse du**  
**fournisseur/de l'entrepreneur**

### Issuing Office - Bureau de distribution

Public Works and Government Services Canada  
Telus Plaza North/Plaza Telus Nord  
10025 Jasper Ave./10025 ave Jasper  
5th floor/5e étage  
Edmonton  
Alberta  
T5J 1S6

<b>Title - Sujet</b> Parks Canada Trail Bridges Work	
<b>Solicitation No. - N° de l'invitation</b> E0209-142223/A	<b>Date</b> 2014-02-06
<b>Client Reference No. - N° de référence du client</b> PARKS - 20142223	<b>GETS Ref. No. - N° de réf. de SEAG</b> PW-\$PWU-011-10126
<b>File No. - N° de dossier</b> PWU-3-36321 (011)	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2014-02-28</b>	
<b>Time Zone</b> <b>Fuseau horaire</b> Mountain Standard Time MST	
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input checked="" type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Hugo (RPC), Tammey	<b>Buyer Id - Id de l'acheteur</b> pwu011
<b>Telephone No. - N° de téléphone</b> (780) 497-3917 ( )	<b>FAX No. - N° de FAX</b> (780) 497-3510
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b> DEPARTMENT OF PUBLIC WORKS AND GOVERNMENT SERVICES CANADA PROPERTY FACILITIES MGMT STE 1650 635-8TH AVE S.W. CALGARY ALBERTA T2P 3M3 Canada	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

<b>Delivery Required - Livraison exigée</b> See Herein	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> <b>Raison sociale et adresse du fournisseur/de l'entrepreneur</b>	
<b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/</b> <b>de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

Solicitation No. - N° de l'invitation

E0209-142223/A

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

pwu011

Client Ref. No. - N° de réf. du client

File No. - N° du dossier

CCC No./N° CCC - FMS No/ N° VME

PARKS - 20142223

PWU-3-36321

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Refer to the attached solicitation document.

## INVITATION TO TENDER

### IMPORTANT NOTICE TO BIDDERS

#### INSURANCE TERMS

The Insurance Terms have been amended. Refer to the Supplementary Conditions.

#### R2940D CLAUSE IS CANCELLED AND SECTION 3.8 OF R2830D IS MODIFIED

Following the repeal of the *Fair Wages and Hours of Labour Act*, R2940D clause will be non applicable for contracts awarded after January 1<sup>st</sup> 2014. For contracts awarded prior to that date the clause remains applicable.

As a result section 3.8 of R2830D has been modified as indicated in Supplementary Conditions SC05

## **TABLE OF CONTENTS**

### **SPECIAL INSTRUCTIONS TO BIDDERS (SI)**

SI01	Code of Conduct and certifications, related documentations
SI02	Bid Documents
SI03	Enquiries during the Solicitation Period
SI04	Optional Site Visit
SI05	Revision of Bid
SI06	Bid Results
SI07	Insufficient Funding
SI08	Bid Validity Period
SI09	Construction Documents
SI10	WCB and Safety Program
SI11	Web Sites

### **R2710T GENERAL INSTRUCTIONS TO BIDDERS (GI) (2013-06-27)**

The following GI's are included by reference and are available at the following Web Site <https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R>

GI01	Code of Conduct and Certification - Bid
GI02	Completion of Bid
GI03	Identity or Legal Capacity of the Bidder
GI04	Applicable Taxes
GI05	Capital Development and Redevelopment Charges
GI06	Registry and Pre-qualification of Floating Plant
GI07	Listing of Subcontractors and Suppliers
GI08	Bid Security Requirements
GI09	Submission of Bid
GI10	Revision of Bid
GI11	Rejection of Bid
GI12	Bid Costs
GI13	Procurement Business Number
GI14	Compliance With Applicable Laws
GI15	Approval of Alternative Materials
GI16	Performance Evaluation
GI17	Conflict of Interest-Unfair Advantage

### **SUPPLEMENTARY CONDITIONS (SC)**

SC01	Workplace Safety and Health
SC02	Insurance Terms
SC03	Labour

### **CONTRACT DOCUMENTS (CD)**

#### **BID AND ACCEPTANCE FORM (BA)**

BA01	Identification
BA02	Business Name and Address of Bidder
BA03	The Offer
BA04	Bid Validity Period
BA05	Acceptance and Contract
BA06	Construction Time
BA07	Bid Security
BA08	Signature

**APPENDIX 1 - COMPLETE LIST OF EACH INDIVIDUAL WHO ARE CURRENTLY DIRECTORS OF THE BIDDER**

**ANNEX A - CERTIFICATE OF INSURANCE FORM**

## **SPECIAL INSTRUCTIONS TO BIDDERS (SI)**

### **SI01 CODE OF CONDUCT AND CERTIFICATIONS - RELATED DOCUMENTATION**

By submitting a bid, the Bidder certifies that the Bidder and its affiliates are in compliance with the provisions as stated in Section 01 Code of Conduct and Certifications - Bid of Standard Instructions to Bidders R2710T (2013-06-27). The related documentation therein required will assist Canada in confirming that the certifications are true.

### **SI02 BID DOCUMENTS**

1. The following are the bid documents:

- a. Invitation to Tender - Page 1;
- b. Special Instructions to Bidders;
- c. General Instructions to Bidders, R2710T (2013-06-27)
- d. Clauses & Conditions identified in "Contract Documents";
- e. Drawings and Specifications;
- f. Bid and Acceptance Form and related Appendix(s); and
- g. Any amendment issued prior to solicitation closing.

Submission of a bid constitutes acknowledgement that the Bidder has read and agrees to be bound by these documents.

2. General Instructions to Bidders is incorporated by reference and is set out in the Standard Acquisition Clauses and Conditions (SACC) Manual, issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is available on the PWGSC Web site:

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R>

### **SI03 ENQUIRIES DURING THE SOLICITATION PERIOD**

1. Enquiries regarding this bid must be submitted in writing to the Contracting Officer named on the Invitation to Tender - Page 1 as early as possible within the solicitation period. Except for the approval of alternative materials as described in **GI15 of R2710T**, enquiries should be received no later than five (5) calendar days prior to the date set for solicitation closing to allow sufficient time to provide a response. Enquiries received after that time may not result in an answer being provided.
2. To ensure consistency and quality of the information provided to Bidders, the Contracting Officer shall examine the content of the enquiry and shall decide whether or not to issue an amendment.
3. All enquiries and other communications related to this bid sent throughout the solicitation period are to be directed **ONLY** to the Contracting Officer named on the Invitation to Tender - Page 1. Failure to comply with this requirement may result in the bid being declared non-responsive.

### **SI04 OPTIONAL SITE VISIT**

There will be a site visit on Tuesday, February 18, 2014 at 11:00 a.m.

The meeting location for Stanley Glacier is as follows:

The site is located km 65 on Hwy 93, Kootenay National Park, British Columbia. Km 0 is at the junction of Hwy 93 and the Trans Canada Highway. The bridge is located 0.1km from the trailhead and highway. We will meet in the parking lot at Stanley Glacier, then head down to the bridge as a group. Paint Pots bridge will be visited after Stanley Glacier. The site is located km 71 on Hwy 93, Kootenay National Park, B.C. The bridge is located 0.25km from the trailhead and highway. It is advised that those visiting the bridge sites wear snow shoes, as there tends to be a lot of snow this time of year.

### **SI05 REVISION OF BID**

A bid may be revised by letter or facsimile in accordance with GI10 of R2710T. The facsimile number for receipt of revisions is (780)497-3510.

#### **SI06 BID RESULTS**

1. A public bid opening will be held in the office designated on the Front Page "Invitation to Tender" for the receipt of bids shortly after the time set for solicitation closing.
2. Following solicitation closing, bid results may be obtained by calling No. (780)497-3917

#### **SI07 INSUFFICIENT FUNDING**

In the event that the lowest compliant bid exceeds the amount of funding allocated for the Work, Canada in its sole discretion may

- a. cancel the solicitation; or
- b. obtain additional funding and award the Contract to the Bidder submitting the lowest compliant bid; and/or
- c. negotiate a reduction in the bid price and/or scope of work of not more than 15% with the Bidder submitting the lowest compliant bid. Should an agreement satisfactory to Canada not be reached, Canada shall exercise option (a) or (b).

#### **SI08 BID VALIDITY PERIOD**

1. Canada reserves the right to seek an extension to the bid validity period prescribed in BA04 of the Bid and Acceptance Form. Upon notification in writing from Canada, Bidders shall have the option to either accept or reject the proposed extension.
2. If the extension referred to in paragraph 1. of SI08 is accepted, in writing, by all those who submitted bids, then Canada shall continue immediately with the evaluation of the bids and its approvals processes.
3. If the extension referred to in paragraph 1. of SI08 is not accepted in writing by all those who submitted bids then Canada shall, at its sole discretion, either
  - a. continue to evaluate the bids of those who have accepted the proposed extension and seek the necessary approvals; or
  - b. cancel the invitation to tender.
4. The provisions expressed herein do not in any manner limit Canada's rights in law or under GI11 of R2710T.

#### **SI09 CONSTRUCTION DOCUMENTS**

The successful Contractor will be provided with one paper copy of the sealed and signed drawings, the specifications and the amendments upon acceptance of the offer. Additional copies, up to a maximum of one (1), will be provided free of charge upon request by the Contractor. Obtaining more copies shall be the responsibility of the Contractor including costs.

#### **SI10 WCB AND SAFETY PROGRAM**

1.1 The recommended Bidder shall provide to the Contracting Authority, prior to Contract award:

- 1.1.1 a Workers Compensation Board Experience Rating - *British Columbia*;
- 1.1.2 a Workers Compensation Board letter of good standing, also listing covered Directors, Principals, Proprietor(s) or Partners who will be or who are anticipated to be present on the work site(s); and
- 1.1.3 a Certificate of Recognition (COR) or Registered Safety Plan (RSP) acceptable to the Authority Having Jurisdiction (AHJ). A health and safety policy and program, as required by the respective provincial/territorial Occupational Health and Safety Act, will be acceptable in lieu of a COR or RSP.

- 1.2 The recommended Bidder shall deliver all of the above documents to the Contracting Authority on or before the date stated (usually 3-5 days after notification) by the Contracting Authority. Failure to comply will result in a breach of promise/disqualification from the project, at which time the Contracting Authority will be free to approach the next lowest responsive/another Bidder.

## **SI11 WEB SITES**

The connection to some of the Web sites in the solicitation documents is established by the use of hyperlinks. The following is a list of the addresses of the Web sites:

Treasury Board Appendix L, Acceptable Bonding Companies

<http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=14494&section=text#appl>

Buy and Sell <https://www.achatsetventes-buyandsell.gc.ca>

Canadian economic sanctions <http://www.international.gc.ca/sanctions/index.aspx?lang=eng>

Contractor Performance Evaluation Report (Form PWGSC-TPSGC 2913)

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/2913.pdf>

Bid Bond (form PWGSC-TPSGC 504) <http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/504.pdf>

Performance Bond (form PWGSC-TPSGC 505) <http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/505.pdf>

Labour and Material Payment Bond (form PWGSC-TPSGC 506)

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/506.pdf>

Standard Acquisition Clauses and Conditions (SACC) Manual

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>

PWGSC, Industrial Security Services <http://ssi-iss.tpsgc-pwgsc.gc.ca/index-eng.html>

PWGSC, Code of Conduct and Certifications

<http://www.tpsgc-pwgsc.gc.ca/app-acq/cndt-cndct/index-eng.html>

PWGSC Consent to a Criminal Record Verification (PWGSC-TPSGC 229)

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/229.pdf>

Construction and Consultant Services Contract Administration Forms Real Property Contracting

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/formulaires-forms-eng.html>



## SUPPLEMENTARY CONDITIONS (SC)

### SC01 WORKPLACE SAFETY AND HEALTH

*For Work in the Province of British Columbia*

#### 1.EMPLOYER/PRIME CONTRACTOR

1.1 The Contractor shall, for the purposes of the Works Compensation Act, British Columbia, and for the duration of the Work of the Contract:

- 1.1.1 act as the Employer, where there is only one employer on the work site, in accordance with the Authority Having Jurisdiction;
- 1.1.2 accept the role of Prime Contractor, where there are two or more employers involved in work at the same time and space at the work site, in accordance with the Authority Having Jurisdiction; and
- 1.1.3 agree, in the event of two or more Contractors working at the same time and space at the work site, without limiting the General Conditions, to Canada's order \* to:
  - 1.1.3.1 accept, as the Prime Contractor, the responsibility for Canada's other Contractor(s); or
  - 1.1.3.2 accept that Canada's other Contractor is Prime Contractor and conform to that Contractor's Site Specific Health and Safety Plan.

\* "order" definition: after contract award, Contractor is ordered by a Change Order

#### 2. SUBMITTALS

2.1 The Contractor shall provide to Canada:

- 2.1.1 prior to the pre-construction meeting, a transmittal and copy of a completed Notice of Project form PWGSC - TPSGC 458 (form will be provided to the proposed contractor prior to award), as sent to the Authority Having Jurisdiction (AHJ); and
- 2.1.2 prior to commencement of work and without limiting the terms of the General Conditions:
  - 2.1.2.1 copies of all other necessary permits, notifications and related documents as called for in the scope of work/specifications and/or by the AHJ; and
  - 2.1.2.2 a site specific Health and Safety Plan as requested.

*NOTE: Please do not include any forms that include personal 3rd party information such as the names of the contractor's employees and their related claims information.*

#### 3. LABOUR AUTHORITY CONTACT:

*The contact below represents the Labour Authority in the jurisdiction (AHJ). They are not representatives of the Workers Compensation.*

Do not contact the people referenced below for issues pertaining to WCB or WCB Clearances. Those queries must be directed specifically to the WCB, and where the WCB has both a Labour and Compensation component, WCB issues must be directed to the Compensation/Employer Services sections.

#### BRITISH COLUMBIA

Workers Compensation Board of British Columbia 8100 Granville  
Avenue Richmond, BC, V6Y 3T6 Attention: Prevention Department  
Telephone:(604) 276-3100  
Facsimile:(888) 621-7233

Workers Compensation Board of British Columbia 1066 Vancouver  
Street Prince George, BC, V2L 5M4 Attention: Prevention  
Department  
Telephone:(250) 561 3700  
Facsimile:(250) 561-3710

## **SC02 INSURANCE TERMS**

- 1) Insurance Contracts
  - (a) The Contractor must, at the Contractor's expense, obtain and maintain insurance contracts in accordance with the requirements of the Certificate of Insurance. Coverage must be placed with an Insurer licensed to carry out business in Canada.
  - (b) Compliance with the insurance requirements does not release the Contractor from or reduce its liability under the Contract. The Contractor is responsible for deciding if additional insurance coverage is necessary to fulfill its obligation under the Contract and to ensure compliance with any applicable law. Any additional insurance coverage is at the Contractor's expense, and for its own benefit and protection.
- 2) Period of Insurance
  - (a) The policies required in the Certificate of Insurance must be in force from the date of contract award and be maintained throughout the duration of the Contract.
  - (b) The Contractor must be responsible to provide and maintain coverage for Products/Completed Operations hazards on its Commercial General Liability insurance policy, for a period of six (6) years beyond the date of the Certificate of Substantial Performance.
- 3) Proof of Insurance
  - (a) Before commencement of the Work, and no later than thirty (30) days after acceptance of its bid, the Contractor must deposit with Canada a Certificate of Insurance on the form attached herein.
  - (b) Upon request by Canada, the Contractor must provide originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the Certificate of Insurance.
- 4) Insurance Proceeds

In the event of a claim, the Contractor must, without delay, do such things and execute such documents as are necessary to effect payment of the proceeds.

- 5) Deductible

The payment of monies up to the deductible amount made in satisfaction of a claim must be borne by the Contractor.

## **SC03 LABOUR**

**Clause R2830D subsection GC3.8 has been modified as follows;**

1. Title has been changed from "Labour and Fair Wages" to "Labour".
2. Delete subsection 1.
3. Following subsections must be renumbered accordingly.

## CONTRACT DOCUMENTS (CD)

1. The following are the contract documents:
  - a. Contract Page when signed by Canada;
  - b. Duly completed Bid and Acceptance Form and any Appendices attached thereto;
  - c. Drawings and Specifications;
  - d. General Conditions and clauses

GC1 General Provisions	R2810D	(2013-04-25);
GC2 Administration of the Contract	R2820D	(2012-07-16);
GC3 Execution and Control of the Work	R2830D	(2010-01-11);
GC4 Protective Measures	R2840D	(2008-05-12);
GC5 Terms of Payment	R2850D	(2010-01-11);
GC6 Delays and Changes in the Work	R2860D	(2013-04-25);
GC7 Default, Suspension or Termination of Contract	R2870D	(2008-05-12);
GC8 Dispute Resolution	R2880D	(2012-07-16);
GC9 Contract Security	R2890D	(2012-07-16);
GC10 Insurance	R2900D	(2008-05-12);
Supplementary Conditions		
Allowable Costs for Contract Changes Under GC6.4.1	R2950D	(2007-05-25);
  - e. Any amendment issued or any allowable bid revision received before the date and time set for solicitation closing;
  - f. Any amendment incorporated by mutual agreement between Canada and the Contractor before acceptance of the bid; and
  - g. Any amendment or variation of the contract documents that is made in accordance with the General Conditions.
2. The documents identified by title, number and date above are incorporated by reference and are set out in the Standard Acquisition Clauses and Conditions (SACC) Manual, issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is available on the PWGSC Web site:  
<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>
3. The language of the contract documents is the language of the Bid and Acceptance Form submitted.

## BID AND ACCEPTANCE FORM (BA)

### BA01 IDENTIFICATION

Trail Bridges, Stanley Glacier and Paint Pots  
Kootenay National Park, BC  
Project Number: R.061077.001

### BA02 BUSINESS NAME AND ADDRESS OF BIDDER

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_ PBN: \_\_\_\_\_

### BA03 THE OFFER

The Bidder offers to Canada to perform and complete the Work for the above named project in accordance with the Bid Documents for the Total Bid Amount of

\$ \_\_\_\_\_ excluding applicable tax(es).  
(amount in numbers)

### BA04 BID VALIDITY PERIOD

The bid shall not be withdrawn for a period of (thirty) [ 30 ] days following the date of solicitation closing.

### BA05 ACCEPTANCE AND CONTRACT

Upon acceptance of the Contractor's offer by Canada, a binding Contract shall be formed between Canada and the Contractor. The documents forming the Contract shall be the contract documents identified in Contract Documents (CD).

### BA06 CONSTRUCTION TIME

The Contractor shall perform and complete the Work within [thirty five ] [35] weeks from the date of notification of acceptance of the offer.

### BA07 BID SECURITY

The Bidder is enclosing bid security with its bid in accordance with GI08 - Bid Security Requirements of R2710T - General Instructions to Bidders.

### BA08 SIGNATURE

\_\_\_\_\_  
Name and title of person authorized to sign on behalf of Bidder (Type or print)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**APPENDIX 1 - COMPLETE LIST OF EACH INDIVIDUALS WHO ARE CURRENTLY DIRECTORS OF THE BIDDER**

**NOTE TO BIDDERS**  
**WRITE DIRECTOR'S SURNAMES AND GIVEN NAMES**

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.



Travaux publics et  
Services gouvernementaux  
Canada

Public Works and  
Government Services  
Canada

# CERTIFICATE OF INSURANCE

Page 1 of 2

Description and Location of Work Parks Canada Trail Bridge Work, Stanley Glacier renovations and Paint Pots new construction Kootenay National Park, British Columbia		Contract No. E0209-142223
		Project No. R.061077.001

Name of Insurer, Broker or Agent	Address (No., Street)	City	Province	Postal Code
Name of Insured (Contractor)	Address (No., Street)	City	Province	Postal Code
Additional Insured				
<i>Her Majesty the Queen in Right of Canada as represented by the Minister of Public Works and Government Services</i>				

Type of Insurance (Required when Checked)	Insurer Name and Policy Number	Inception Date D / M / Y	Expiry Date D / M / Y	Limits of Liability		
<input checked="" type="checkbox"/> Commercial General Liability				Per Occurrence	Annual General Aggregate	Completed Operations Aggregate
<input checked="" type="checkbox"/> Umbrella/Excess Liability				\$	\$	\$
Builder's Risk / Installation Floater				\$		\$
<input type="checkbox"/> Pollution Liability				\$	<input type="checkbox"/> Per Incident <input type="checkbox"/> Per Occurrence	Aggregate \$
<input type="checkbox"/> Marine Liability				\$		
<input type="checkbox"/> Aviation Liability				\$	<input type="checkbox"/> Per Incident <input type="checkbox"/> Per Occurrence	Aggregate \$
<input type="checkbox"/>				\$		

I certify that the above policies were issued by insurers in the course of their Insurance business in Canada, are currently in force and include the applicable insurance coverages stated on page 2 of this Certificate of Insurance, including advance notice of cancellation / reduction in coverage.

Name of person authorized to sign on behalf of Insurer(s) (Officer, Agent, Broker)	Telephone Number
Signature	Date D / M / Y

<p><b>General</b></p> <p>The insurance policies required on page 1 of the Certificate of Insurance must be in force and must include the insurance coverages listed under the corresponding type of insurance on this page.</p> <p>The policies must insure the Contractor and must include Her Majesty the Queen in Right of Canada as represented by the Minister of Public Works and Government Services as an additional Insured.</p> <p>The insurance policies must be endorsed to provide Canada with not less than thirty (30) days notice in writing in advance of a cancellation of insurance or any reduction in coverage.</p> <p>Without increasing the limit of liability, the policies must protect all insured parties to the full extent of coverage provided. Further, the policies must apply to each Insured in the same manner and to the same extent as if a separate policy had been issued to each.</p>	<p><b>Commercial General Liability</b></p> <p>The insurance coverage provided must not be substantially less than that provided by the latest edition of IBC Form 2100.</p> <p>The policy must either include or be endorsed to include coverage for the following exposures or hazards if the Work is subject thereto:</p> <ul style="list-style-type: none"> <li>(a) Blasting.</li> <li>(b) Pile driving and caisson work.</li> <li>(c) Underpinning.</li> <li>(d) Removal or weakening of support of any structure or land whether such support be natural or otherwise if the work is performed by the insured contractor.</li> </ul> <p>The policy must have the following minimum limits:</p> <ul style="list-style-type: none"> <li>(a) <b>\$5,000,000</b> Each Occurrence Limit;</li> <li>(b) <b>\$10,000,000</b> General Aggregate Limit per policy year if the policy contains a General Aggregate; and</li> <li>(c) <b>\$5,000,000</b> Products/Completed Operations Aggregate Limit.</li> </ul> <p>Umbrella or excess liability insurance may be used to achieve the required limits.</p>	<p><b>Builder's Risk / Installation Floater</b></p> <p>The insurance coverage provided must not be less than that provided by the latest edition of IBC Forms 4042 and 4047.</p> <p>The policy must permit use and occupancy of any of the projects, or any part thereof, where such use and occupancy is for the purposes for which a project is intended upon completion.</p> <p>The policy may exclude or be endorsed to exclude coverage for loss or damage caused by asbestos, fungi or spores, cyber and terrorism.</p> <p>The policy must have a limit that is <b>not less than the sum of the contract value</b> plus the declared value (if any) set forth in the contract documents of all material and equipment supplied by Canada at the site of the project to be incorporated into and form part of the finished Work. If the value of the Work is changed, the policy must be changed to reflect the revised contract value.</p> <p>The policy must provide that the proceeds thereof are payable to Canada or as Canada may direct in accordance with GC10.2, "Insurance Proceeds" (<a href="https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R/R2900D/2">https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R/R2900D/2</a>).</p>
<p><b>Contractors Pollution Liability</b></p> <p>The policy must have a limit usual for a contract of this nature, but not less than <b>\$1,000,000</b> per incident or occurrence and in the aggregate.</p>	<p><b>Marine Liability</b></p> <p>The insurance coverage must be provided by a Protection &amp; Indemnity (P&amp;I) insurance policy and must include excess collision liability and pollution liability.</p> <p>The insurance must be placed with a member of the International Group of Protection &amp; Indemnity Associations or with a fixed market in an amount of not less than the limits determined by the <i>Marine Liability Act</i>, S.C. 2001, c. 6. Coverage must include crew liability, if it is not covered by the statutory requirements of the Territory or Province having jurisdiction over such employees.</p> <p>The policy must waive all rights of subrogation against Canada as represented by Public Works and Government Services Canada for any and all loss of or damage to the watercraft however caused.</p>	<p><b>Aviation Liability</b></p> <p>The insurance coverage shall Include Bodily Injury (including passenger Bodily Injury) and Property Damage, in an amount of not less than <b>\$5,000,000</b> per incident or occurrence and in the aggregate.</p>



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## **Basic Environmental Impact Analysis**

### **Paint Pots and Stanley Glacier Day Use Areas New Bridges**

**Kootenay National Park**

**December 12, 2013**







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Canada



1. PROJECT TITLE	Paint Pots and Stanley Glacier Day Use Areas- New Bridges	
2. PROJECT LOCATION (Park, Site, Canal, NMCA)	Kootenay National Park	
3. PROJECT SITE(S)	Paint Pots and Stanley Glacier trailheads	
4. PROPONENT	Parks Canada	
5. PROPONENT CONTACT INFORMATION	Dwayne Doucette, PCA Asset Manager	
6. PROJECT DATES	Commencement: 2014-05-01	Completion: 2014-11-30
7. INTERNAL PROJECT FILE #	2013-006K	

**8. PROJECT DESCRIPTION** (For help completing this section see instructions at end of document)

Parks Canada is proposing to construct new clear span pedestrian bridges at Paint Pots and Stanley Glacier Day Use Areas, which span the Vermilion River. A flood event in June 2012 completely destroyed the bridge at Paint Pots, and seriously compromised the bridge at Stanley Glacier. The bridge at Stanley Glacier has been temporarily re-opened after bank stabilization work was completed last fall to help withstand upcoming spring flows. Engineers, however, have indicated that additional permanent improvements must be made to the bridge for its safety.

The following work will be undertaken at the sites:

**Paint Pots:**

- Install a completely new clear span bridge consisting of steel trusses, decking and handrails.
- Excavate for installation of 2 new concrete abutments (approximately 3m from the banks).
- Drilling of micro piles.
- Construction of stairs leading up to the bridge decking.
- Rip rap replacement on both banks and vegetated riparian plantings.
- Boulder cluster spurs on the north bank to divert flows away from the highly eroded areas.

Bridge drawings are included in Appendix 1.

Access to the site is limited by a gravel trail from the Paint Pots Trailhead parking lot. The existing width of the trail is currently 1.2m to 1.7m between the railings at the trail entry point. These will be removed for ease of access on the existing trail to the bridge site. A bobcat is able to fit on the existing trail. Equipment will be required to haul in tools, construction materials and bridge components. Excavators and a small drill rig will be required on site for abutment, mini pile and rip rap installations. These will also need to ford the river to install bridge components on the opposite side of the river. Either a large crane or helicopter will need to place the bridge truss sections. If helicopters cannot be used to place the bridge trusses due to weight limitations and availability of appropriately sized helicopters, a temporary access route consisting of environmental mats will need to be established to the site through the riverflats area for equipment access. A bobcat or other equipment is required to transport bridge materials to site. A combination of equipment is required to bring materials to the opposite side of the river. These may include helicopters, boats and any equipment that can safely cross the new bridge in order to haul materials to the other side. To install the concrete abutments, a pump truck equipped with a boom (or other contained system) capable of reaching across the river will be required.

The main staging area will be located in the trailhead parking lot. A small onsite staging area may be set-up in the area impacted by bridge removal activities in 2012 (see Paint Pot photo summary in Appendix 2).





#### Stanley Glacier:

- Removal of existing retaining walls.
- Removal of existing concrete abutment (east side only).
- Installation of a new concrete east abutment, set further back on the bank (approximately 3m). New micro piles will also be drilled.
- Replacement of decking, girders and handrails. The new bridge will be longer and slightly wider than the existing bridge.
- Installation of new concrete walls.
- Construction of stairs leading up to the bridge decking to transition from the new bridge grade to the existing trail.
- Minor alteration of the existing trail (east side only) to transition from the new bridge to the existing trail. A section of the existing trail will be abandoned and reclaimed.
- New rip rap at the west abutment (approximately 10m in length), and rip rap enhancement at the east abutment.

Bridge drawings are included in Appendix 1.

Equipment needed to install the Stanley Glacier bridge includes an excavator to dig the abutments, a small drill rig for the mini piles, and loader or bobcat for transportation of construction materials. Access to the site is limited to the gravel trail from the Stanley Glacier Trailhead parking lot, which has a maximum width of 1.5 m at its narrowest point (see Appendix 3, Stanley Glacier photo summary). Any equipment proposed for use at the bridge site must be able to fit on the existing width of trail (i.e., no more than 1.5 m wheel/track width). The walking surface of the existing bridge deck is about 1m wide, therefore any equipment proposed for use on the bridge must be narrower than this width and its total weight, including any load carried, must be less than the bridge's design load for snow. In order for a piece of equipment to reach across the river to place the bridge trusses from the west bank, it would have to be able to reach over 12 m. Therefore a crane will need access to the site.

Rip rap may be placed either by hand, or by a small excavator that can reach from the trail or disturbed areas.

Staging and storage of materials and equipment is available at the paved parking lot. Limited staging is also possible on existing disturbed areas on either side of the trail near the west end of the bridge (old road bed and informal trail area – see Appendix 3, photo summary). Following completion of construction work, site rehabilitation will include reclamation of the former trail, re-vegetation of disturbed areas and repair of any damage to the trail and/or parking lot.

The main staging area will be located in the trailhead parking lot.

#### 9. ENVIRONMENTAL COMPONENTS LIKELY TO BE AFFECTED For help completing this section see instructions at end of document)

##### Vegetation

##### **Paint Pots Bridge:**

The plant community in the vicinity of the bridge on the level floodplain consisted of an open Engelmann spruce – lodgepole pine/ shrubby cinquefoil (*Potentilla fruticosa*) community that closely resembles the O6 forest type described in the Kootenay ELC (Achuff et al. 1994). This is an open floodplain plant community interspersed with wetlands and low-lying turfy areas. Adjacent to the bridge the shrub layer is dominated by smooth willow, rock willow (*Salix vestita*), short-fruited willow (*Salix brachycarpa*), shrubby cinquefoil, buffaloberry (*Shepherdia canadensis*) and common juniper (*Juniperus communis*). The ground cover is dominated by yellow mountain-avens (*Dryas drummondii*) with alpine sweet-vetch (*Hedysarum alpinum*), bearberry (*Arctostaphylos uva-ursi*), rush-like sedge (*Carex scirpoidea*), golden sedge (*Carex aurea*) and white camus (*Zigadenus elegans*) are also common. In the low-lying wet calcareous areas near the south and west corners of the bridge, common butterwort (*Pinguicula vulgaris*), mealy primrose (*Primula incana*), dwarf false asphodel (*Tofieldia pusilla*), and western false asphodel (*Triantha occidentalis*) are common (Avens Consulting, 2010).





A list of all plant species observed on site is located in Appendix 2 the Parks Canada Paint Pots Rare Plant 2013 Field Report prepared by Sage Ecological Research.

There is a moderate presence of non-native plant species along the Vermilion River to the bridge site. These include colonial bentgrass, flaxweed, red fescue, oxeye daisy and field pennycress (Page 2013). There are also a few scattered dandelions observed at the edge of the trail leading to the bridge. These weeds are a result of previous reclamation practices.

#### **Stanley Glacier Bridge:**

The plant community in the vicinity of the bridge on the level floodplain consisted of an open Engelmann spruce – lodgepole pine/ shrubby cinquefoil (*Potentilla fruticosa*) community. Adjacent to the bridge the shrub layer is dominated by buffaloberry (*Shepherdia Canadensis*) and willow species.

#### **Soils**

##### **Paint Pots Bridge:**

The Paint Pots bridge is located in the HCl3 ecosite, characterized by level floodplains and subtly terraced terrain bordering major streams (Achuff et al. 1984). The geology is fluvial with coarse stratified material. From a visual assessment of areas that have not been altered, it appears to have 50% coarse fragments ranging from 5 mm to 70 mm. The soil is imperfect to poorly drained, indicated by the moss and willows in areas that have not been disturbed. The south bank of the river is armoured with rip-rap (26 meters long) and the approaches consist of material placed on top of existing soils. The native soils have clay content and are generally calcareous. The soils are characterized by poor to imperfectly drained Rego Gleysols and Gleyed Cumulic Regosols.

A geotechnical investigation in winter 2013 consisted of one borehole on the south side of the former bridge and was advanced to a depth of 15m. The post drilling static water level, after five days, was ground surface minus 3.0m (Kucera, 2013). Soil conditions consisted of the surficial cobble strata ending at ground surface minus 1.5m. From ground surface minus 1.5m to minus 3.0m, moist inorganic silts with traces of clay and fine sand were encountered. Ground water was intersected at minus 3.0m. The balance of the subgrade strata encountered to the termination of the bore hole was a wet, slightly plastic inorganic clayey silt with traces of fine sand (Kucera, 2013).

##### **Stanley Glacier Bridge:**

Bank erosion on the east side of the bridge had resulted in significant loss of soil material around and undermining of the east abutment. Rock armouring of the east bank was undertaken in fall 2012 to help prevent further erosion (See Appendix 3, Stanley Glacier photo summary).

A geotechnical investigation in winter 2013 consisted of two boreholes located approximately 3m behind the existing bridge abutments on each side of the river. The boreholes were advanced to a depth of 15m and the static water level in both boreholes was approximately ground surface minus 3.0m (Kucera, 2013). Results identified existence of rock rich strata for the entire depth of the borehole. Kucera noted that when drilling advanced to a depth of approximately 4m from ground surface, there was an appearance of fines in the Vermilion River. Kucera noted that if mini piles or hollow stem anchor foundations component are installed, installation of grouting pressures will have to be closely monitored to prevent grout breakout in the Vermilion River (Kucera, 2013). However, grout breakout is next to impossible because the grout is installed below the river bed level. The only time the grout may seep into the river is from the top of the anchor (Chang, pers.comm).

#### **Aquatics and Hydrology**

##### **Paint Pots Bridge:**

The overall channel morphology of the river in the vicinity of the bridge consisted of a series of riffles. There was some boulder





riprap under the bridge to prevent scouring and the river was slightly confined in this area. At the LDB upstream of the existing bank armoring a small scour area is present, creating a small pool area. Substrate material consisted primarily of cobble and gravel. The wetted width of the channel was approximately 20 m and the approximate wetted depths ranged between 0.8 and 1.5 m. Water quality characteristics recorded during a site visit on June 15, 2010 were: pH 9.2, Temperature 5.8 degrees, DO 11.4 mg/L and EC 186 us/cm (Avens Consulting, 2010).

Several streams are present in the riverflats area where access to the site is proposed. Streams are ground water fed and have direct connection to the Vermilion River in high water. A small-sized bull trout was observed in a pool located upstream of where the groundwater fed stream connects to the Vermilion (Summers, personal observation). Due to substrate conditions throughout the creek (i.e. areas of small gravels), it is possible that bull trout may be spawning in this tributary. There is also a small stream on the north side of the bank that flows into the Vermilion River just downstream of the bridge location. This is located within the general work site area on the north bank.

Overall, the fish habitat potential in the Vermilion River in the vicinity of the bridge was rated as moderate for migration and low for feeding, rearing and resting. The substrate material in the area provides limited potential spawning habitat for salmonids. Overwintering in the area is limited due to a lack of deep pools.

Fish species present in the Vermilion River include westslope cutthroat trout, Rocky Mountain whitefish, bull trout, brook trout, rainbow trout, Kokanee and sculpin. A barrier to fish migration has been identified in the system downstream at Numa Falls. Fish assessments have found that only bull trout and sculpins persist upstream of Numa Falls (Humphries, pers. comm. 2012/13; Paul and Dormer 2005). The in-stream work window for least risk to bull trout is June 1 to August 31.

A hydrotechnical analysis was conducted for the Paint Pots bridge in January 2013 by McElhanney (McElhanney, 2013). The maximum calculated average channel velocity in the Paint Pots reach is approximately 2.78 m/s which occurs downstream of the bridge about 26m. The 1:100 year return flood discharge for Paint Pots was estimated at 90.2 m<sup>3</sup>/s. The stage height associated with the 1:100 year flood is 1419.16m. It was recommended by McElhanney that the bottom of the Paint Pots bridge should not have an elevation less than 1420.68m to account for a minimum freeboard of 1.5m. It was also recommended that earth works at the bridge site should be armoured with rip rap of Class 50.

Groundwater is encountered at a depth of 3m below ground surface (Kucera, 2013).

#### **Stanley Glacier Bridge:**

The overall channel morphology in the vicinity of the bridge consists of a series of riffles (see Appendix 3, photo summary). Upstream of the bridge there is a riprap berm located along the RDB between the highway and the river (see Appendix 3, photo summary). Downstream of the bridge, a small island separates a short side channel from the main channel of the river. A small creek flows into the river at the upstream end of the side channel. Substrate material consists primarily of cobble and boulders. The wetted width of the channel in the vicinity of the bridge is approximately 6.5 m at low water and 8 m at high water. The current bridge itself is 11.5 m long and the total distance between the east and west abutment faces is 10 m. The channel is somewhat constricted by the east bridge abutment and rip rap, which is on the outside of a bend in the river. A flow velocity cross-section measurement was taken of the wetted width of the channel on October 3, 2012. The total wetted width was 6.75 m and measurements were taken at 1 m intervals starting at the east bank across to the west. The fastest velocity was near the middle of the channel and was 0.96 m/s.

A hydrotechnical analysis was conducted for the Stanley Glacier bridge in January 2013 by McElhanney (McElhanney, 2013). The maximum calculated average channel velocity in the Stanley Glacier reach is approximately 2.88 m/s which occurs at the bridge. The 1:100 year return flood discharge for Stanley Glacier bridge was estimated at 23.7 m<sup>3</sup>/s. The stage height associated with the 1:100 year flood is 1565.93. It was recommended by McElhanney that the bottom of the Stanley Glacier bridge should not have an elevation less than 1567.43m to account for a minimum freeboard of 1.5m. It was also recommended that earth works at the bridge site should be armoured with rip rap of Class 50.







Groundwater is encountered at a depth of 3m below ground surface (Kucera, 2013).

The Stanley Glacier bridge also crosses the Vermilion River, upstream of Paint Pots. Fish species present at this location are the same as the Paint Pots reach of the river (bull trout and sculpin). Numa falls, which acts as a fish barrier, is located 12 km downstream from the project site. The in-stream work window for least risk to bull trout is June 1 to August 31.

Overall, fish habitat potential in the Vermilion River in the vicinity of the bridge is considered to be moderate for migration and low for feeding, rearing and resting. Based on the relatively high gradient and velocity of the stream, continuous riffle and large substrate size, the potential for spawning habitat suitable for salmonids is considered very limited both at the bridge site and for a considerable distance downstream. Overwintering in the area is limited due to a lack of deep pools, although the stream does not freeze during the winter, a likely indication of strong groundwater influence. Fish habitat in the area includes limited large woody debris, undercut banks, shoreline vegetation and large in-stream boulders. Limited canopy cover is provided by the vegetation in the area. The nearest known spawning habitat for bull trout downstream of the site is located in Haffner Creek, a tributary to the Vermilion whose confluence with the Vermilion is located over 4 km downstream.

### **Species at Risk**

#### **Paint Pots Bridge:**

A boreal toad was observed on the lower portion of the trail in proximity to a small pond/wetland system within the proposed access route for equipment (N.Summers, pers. observation).

The boreal, or western, toad is listed as a species of “special concern” on Schedule 1 of SARA. This species is widely distributed in Western Canada and is one of only a few amphibians known to occur in alpine areas. Breeding occurs in the spring in waterbodies that are often very small or ephemeral. Boreal toads are highly philopatric; most males return to breeding sites annually whereas females return every one to three years. This toad was listed as a species of special concern due to population declines, particularly south of the border. Although it is locally abundant and widespread through most of its historic range in Canada, the western toad is relatively intolerant of urban expansion and conversion of habitat to agriculture, and has also been affected by introduced non-native predators and competitors and disease (Parks Canada, 2012).

### **Wildlife**

#### **Paint Pots and Stanley Glacier:**

The project is located in the Vermilion Valley, which contains a key wildlife movement corridor connecting Kootenay National Park to provincial lands to the west and the Bow Valley to the east. Low elevation, forested corridors provide particularly important links and this area is of high importance for large carnivore movement. The Paint Pots area has been identified as a major pinch point in the Vermilion-Wolverine-Dainard wildlife corridor. A pinch point is a portion of a wildlife corridor that becomes constrained within a very narrow section due to the topography of the natural landscape, or as a result of human development encroaching into the corridor.

Species that are known to use the landscape in the vicinity of the bridges include grizzly bear, black bear, lynx, moose, deer, elk, wolf, coyote, wolverine and porcupine. Buffaloberry and other berry producing shrubs throughout the project sites have the potential to attract bears during the berry season.

Bird nests were not noted on or under the Stanley Glacier bridge, however the vegetation surrounding the bridge site provides potential nesting habitat.





## 10. IMPORTANT EFFECTS IDENTIFIED (For help completing this section see instructions at end of document)

### **Wildlife**

The bridge sites are located on busy hiking trails that have high human use in the summer and fall months and are in close proximity to a busy highway. Project activities will result in an incremental increase in sensory disturbance and habitat avoidance for wildlife in the area for the duration of construction (approximately 2 months), particularly if helicopters are used to haul materials to the Paint Pots site.

The projects are scheduled to occur during the summer and fall when grizzly bears are active and feeding intensively. Impacts on bears will be greater if the construction period coincides with a ripe berry crop in proximity to the bridge sites.

The project may occur within the bird breeding season (May 1- July 31), which could result in damage to nests and/or disruption of nesting birds from equipment access and clearing of vegetation. There will also be a loss of habitat as a result of vegetation removal.

### **Aquatics and Hydrology**

A clearspan bridge design was chosen as part of the new bridge construction so that the entire structure would span the waterbodies and high water mark (HWM) including the approaches, abutments, and footings. The bridges have been designed according to the 1:100 year flood return and include a minimum freeboard of 1.5m from the bottom of the bridges to the water surface to help with floating debris striking the bridge span, as was evidenced during the 2012 floods.

While a clearspan bridge design will be employed, the project will require some minor in-stream work including fording of equipment, potential installation of an in-stream scaffold system at Paint Pots, removal of the existing in-stream abutment on the east side of the Stanley Glacier bridge and installation of rock armour.

### **Riparian Vegetation**

Clearspan bridge construction and access requirements have the potential to damage or destroy riparian habitat occurring adjacent to the watercourse. Much of the riparian vegetation on the south bank of the Paint Pots bridge, however, has been previously damaged or removed as a result of flooding and emergency bridge removal works. There will be some riparian vegetation removal as a result of equipment access and bridge installation at the bridge sites (see Appendix 2 and 3, photo summaries).

### **Fording**

The fording of waterbodies may increase erosion and disturbance of streambanks and streambeds, resulting in sedimentation of the water body. Fording may also release particles or liquids attached to the equipment and/or vehicles, potentially contaminating surface waters and wetlands with oils, grease, fuel and other automotive fluids, which can be toxic to aquatic organisms. Fording may increase erosion and disturbance of riparian vegetation, streambanks and streambeds, affecting water quality and habitat. Sedimentation can reduce the quality of aquatic habitat and can kill or affect the growth of developing fish eggs and fry. Fording may also physically damage or destroy aquatic organisms. Non-native aquatic species, such as foreign vegetation, seeds, small aquatic organisms and pathogens may also be released into the waterbody during fording, potentially influencing the health, populations and dynamics of the aquatic community.

### **Water Quality and Introduction of Deleterious Substances**

Works in and around water, (e.g. excavation, storage of construction materials, dewatering activities etc.), have the potential to release sediment into fish or amphibian habitat. Wet concrete or leachate from uncured concrete can come into contact with waterbodies and is toxic to fish and their prey due to its high alkalinity. Use of chemically treated wood in or adjacent to the aquatic environment has the potential to negatively impact fish and their habitat. Removal of the existing bridge at Stanley Glacier may also pose a risk to the Vermilion River if the existing decking, handrails or other bridge components are constructed with treated wood. Spills of deleterious substances (gas, hydraulic fluid, oils) from equipment use adjacent to and overtop of waterbodies can negatively impact water quality and aquatic life. Release of deleterious substances to fish habitat is prohibited





under Section 36(3) of the Fisheries Act.

#### **Habitat Loss/Alteration**

At the Paint Pots site, rip rap will be replaced on both banks. The flood resulted in complete loss of rip rap from the north bank, and the remaining intact smooth river rock rip rap (approx. 30m) on the south bank will be replaced with appropriate angular rock less likely to destabilize during a flood event. There will be no increase in the permanent footprint of rip rap erosion protection.

Proposed rip rap extent on the north bank is 25m long, and 30m long on the south bank. Additional live willow plant stakings will be installed 15m upstream and 25m downstream of the north bank rip rap and 15m downstream from the south bank rip rap (see attached drawings) to help stabilize the banks and improve riparian habitat.

At the Stanley Glacier site, approximately 10m of new angular rip rap will be installed at the west abutment. Existing rip rap will be enhanced at the east abutment by placing additional armoured rock on top of the existing rip rap for improved protection.

Installation of rock armour has the potential to negatively impact fish and fish habitat by introducing deleterious substances (primarily sediment) into the watercourse and reducing the area of the river accessible to fish. While these activities also have the potential to reduce the amount of riparian vegetation adjacent to the water course, the extent of armour will not be increased at the Paint Pots site, and be very limited at the Stanley Glacier site (west abutment). Willow staking is also proposed at the Paint Pots site to stabilize banks and enhance riparian vegetation. While riprap placement can also physically alter the quantity and type of aquatic substrate, fish habitat at the bridge sites is considered poor therefore impacts are expected to be minor.

Several boulder clusters (extending approximately 5m into the river) are also proposed on the north bank at Paint Pots to divert flow energy away from the eroding bank. This is expected to create some diversity for fish habitat and will not impede fish passage.

#### **Vegetation Resources**

##### **Loss or Damage to Native Vegetation**

There is potential for damage to and loss of native vegetation at the bridge sites and in areas that are used for construction staging and access.

The existing trail at Stanley Glacier is approximately 1.5m wide and will require a large crane to access the bridge site for placement of the bridge trusses. Select tree removal and cutting back of shrubs along the trail will be required for crane access and equipment fording.

The existing trail at Paint Pots is approximately 1.5m-1.7m wide. Large equipment will not be able to access the bridge site using the existing trail. Environmental mats used for alternative equipment access may result in damage to ground vegetation.

##### **Introduction of Non-Native Species**

A moderate presence of non-native plants was observed along the proposed access route for Paint Pots. Weed species also exist at the Paint Pots site at the south abutment area where bridge removal works were conducted in summer 2012. Unapproved topsoil was brought into the site for seeding which contained non-native species. The non-native species within the project area do not seem to be spreading into surrounding native plant communities and do not appear to be posing a high threat to conservation values in this area (Page 2013).

These weeds may spread with equipment use and additional disturbed soils as part of this project. Vegetation clearing has the potential to increase the habitat available to weeds. Additionally, machinery and environmental mats contaminated with seeds of non-native species and the application of weed infested topsoil or unapproved seed mixes could introduce weeds new to the areas.

##### **Rare Plants**

A rare plant survey has been conducted by a qualified botanist in summer 2013. Although there were no rare plants observed,







some of the plant community associations/habitat features are uncommon on the landscape (Page, 2013). A 'marl fen' wetland is located alongside the proposed alternate access route. It has been intersected by the decommissioned road bed (and proposed access route). These fens are considered to be potentially rare on the landscape and are known to support a large number of rare species in B.C., but have not been assigned a rarity rank (Page, 2013). The temporary access route through the Vermilion River flats therefore has the potential to damage or destroy rare or uncommon plant communities.

### **Soils and Landforms**

There is potential for soil damage, rutting and compaction as a result of equipment access to the bridge sites. Much of the bridge components and retaining wall for the raised hiking trails will be located on previously disturbed soils.

### **Species at Risk**

No impacts are expected on boreal toads provided mitigation measures are implemented.

### **Cultural Resources**

Brad Himour, Parks Canada archaeologist, was consulted on the new bridge construction projects to identify any cultural resource concerns.

Site 362T is located near the area of the Paint Pots and includes the area of the planned bridge work. Based on a review of the site on July 20th, 2010 (as part of a previous renovation project on the former bridge) it was determined that the area is comprised of heavy gravels and cobbles with almost no soil development in the proposed work area. Therefore, no concerns are identified at this time with regard to buried cultural components or archaeological features as part of the new bridge construction (Himour, pers.comm.). If any archaeological artifacts are uncovered, work in that area must stop and the Parks Canada archaeologist contacted immediately to have a look at the site for further guidance.

Due to the minimal amount of ground disturbance at the Stanley Glacier bridge for installation of the new abutment, no archaeological concerns were identified (Himour, pers comm.). It was noted however, that there may be some potential for archaeological components to be uncovered downstream where a small creek flows into the Vermilion River, but this is located outside of the proposed work area and will not be impacted by project activities (Himour, pers comm.). If construction plans are modified, Parks Canada's archaeologist Brad Himour will be notified and a site visit with shovel testing will likely be required prior to work proceeding in that area.

### **Aesthetics**

Disruption to park visitors due to changes in aesthetics as a result of installing long retaining walls to raise the trail heights.

## **11. MITIGATION MEASURES** (For help completing this section see instructions at end of document)

Standard Best Management Practices applicable to this project are listed in the *Environmental Effects and Mitigation Measures of Routine Frontcountry Projects*. Additional mitigation measures include the following:

The contractor will be responsible for developing and implementing an **Environmental Protection Plan (EPP)**. The plan will include:

- An access plan including access routes, type of equipment used for various construction phases, and lay down areas in order to prevent/minimize disturbance to vegetation and soils.
- Details on how the work limits will be marked and what procedures will be employed to ensure trespass outside these limits does not occur and to ensure that the environment is not impacted or damaged by workers or construction equipment beyond the work limits.
- An erosion and sediment control plan to prevent/minimize sedimentation and erosion into neighbouring watercourses and will outline appropriate dewatering and erosion and sediment control measures for the project.
- An emergency response plan that outlines procedures to follow in the case of a spill or other type of emergency (wildlife encounter, capsized, equipment malfunction/failure).
- A stream isolation plan if any in-stream works are conducted outside the fisheries timing window (e.g. east abutment





removal at Stanley Glacier, rip rap placement below HWM at Paint Pots).

### **Aquatics and Hydrology**

#### **Design:**

The project will meet all the requirements of the **Fisheries and Oceans Operational Statement for construction of clearspan bridges in British Columbia**, with the exception of rip rap placement below the HWM at the Paint Pots and Stanley Glacier bridge sites to prevent further erosion and protect the river bank from scour. Rip rap will be replaced at Paint Pots (no increased permanent footprint), and a limited amount of additional rip rap will be placed at Stanley Glacier to protect the abutments.

- The bridges have been designed by engineers to address river and channel processes at flows above the HWM and the 1:100 year flood return. There will be a minimum freeboard of 1.5m to accommodate floods and debris passage. Stream crossings have been designed to be perpendicular to stream flow.

#### **Riparian Vegetation:**

- The project will follow the **Fisheries and Oceans guidance on Riparian Revegetation**.
- Measures will be undertaken to preserve the riparian vegetation. The Parks Canada environmental surveillance officer (ESO) will flag the selected trees and shrubs to be removed or cut back.
- For the one-time fording at Stanley Glacier, shrubs along the access route will be flush cut to the ground to allow excavator access.
- Trees and shrubs removed within 15m from the HWM or top of bank as a result of construction activities and equipment access shall be replaced with new plantings. For individual shrub replacement, two shrubs should be replanted for each shrub removed; no replacement of shrubs for trees. Once the site has been flagged for vegetation removal, an inventory of existing shrubs and trees species will be catalogued by the Parks Canada ESO to ensure appropriate numbers and species are replaced.
- Planting layout will be coordinated by the Parks Canada ESO and contractor.
- Purchased plant stock should be a minimum of 2 years old.
- Salvage native plants wherever possible for replanting of the disturbed area, which can also be counted as replacement vegetation.
- Stock should be planted in the fall (September to October) or spring (May/June) depending on local conditions.
- To ensure success of the transplants, at least 80% should survive within the first year of planting.
- Dedicated watering should be conducted to establish vigorous vegetative cover throughout the first year of growth. Otherwise replanting may be required.
- Construction of the new trail section at the Stanley Glacier site (east side of river) will follow Parks Canada Agency's Trail and Backcountry Facility Design Guidelines (2008). A typical trail width for high use semi-primitive hiking trails is between 1.2 and 2.5 meters. At the discretion of the Parks Canada ESO, waste material (brush, limbs, tops) may be dragged into the forest and dispersed to decompose, or hauled out of the park. Scarify the trail section to be abandoned and move vegetation and topsoil from new trail construction to rehabilitate the abandoned trail. Additional seeding will be required.
- Unofficial trails used for fording will be blocked off using downed woody debris, local rocks, shrubs or other vegetation as required by the re-vegetation requirements stated above.

#### **Habitat Loss/Alteration from Placement of Rock Armour:**

- Place appropriately sized (Class 50), clean rocks into the eroding areas (see rip rap detail drawings in Appendix 1). The extent of rip rap has been minimized to protect the bank against further erosion.
- Do not obtain rocks from below the HWM. Appropriate rock will be transported to site.
- Rip rap shall be clean and free of fine materials and debris prior to placing and not be acid containing rock or poor quality limestone rock that fractures or breaks down quickly when exposed to the elements.
- Install rock at a similar slope to maintain a uniform streambank and natural stream alignment.
- Carefully place rip rap either by hand (if feasible) or with machinery equipped with a thumb. Avoid dumping material





down the bank as rip rap should be keyed into soils.

- At Stanley Glacier, the rip rap will be placed with a small excavator working/reaching from the disturbed bridge sites to avoid additional damage to riparian vegetation.
- At Paint Pots, rip rap on the north side of the river will be placed by hand or smallest excavator possible to minimize damage/loss of riparian vegetation. No dense riparian or forested areas will be permitted to be cleared to access the site for rip rap installation.
- The armouring of banks at the bridge sites are to be completed in a manner that follows the existing contours of the banks and does not encroach on the existing downstream small tributaries within the project areas.
- Sources for boulder clusters at Paint Pots may be obtained from the existing, clean river rock rip rap on the south bank, if suitable.
- Machinery may not operate within the wetted portion of a watercourse (i.e., an excavator may sit on top of the bank and reach into the river to place rocks but may not sit in the river itself).
- Ensure rock does not interfere with fish passage or constrict the channel width. Ensure the channel at the Stanley Glacier site is not further constricted if placing additional rip rap on the bank once the east abutment is removed. Existing rip rap should be pulled back toward the bank as much as possible to reduce constriction of the river at this location.
- Install rip rap and boulder clusters during the fisheries timing windows (June 1- August 30). Alternatively, install rock at very low flows (i.e. late fall or winter conditions) in the dry or under frozen conditions, or with stream isolation techniques. The contractor must prepare a stream isolation and water quality monitoring plan, for approval by Parks Canada if rocks are placed outside of the fisheries work window or if the site is not dry or frozen.
- Willow staking will be implemented by hand at the Paint Pots site (see drawings for vegetated planting detail).

#### **Treated Lumber:**

- Treated lumber from decommissioning the Stanley Glacier bridge will be transported to an appropriate landfill outside the park for disposal.
- Pressure-treated wood for new bridge components (e.g. decking) are ACQ treated and preferably be BMP-stamped treated wood products.
- Lumber will be cut, sealed and stained off-site if possible; if on-site, these activities will occur in the main staging area at the parking lot. All sealed and stained lumber will be completely dry before being used near water.

#### **Boat Access (Paint Pots only):**

- A small boat shall be the preferred method over use of amphibious vehicle crossings for personnel and equipment/tools at the Paint Pots site.
- Ensure boats are equipped with appropriate safety equipment.
- Employ trained boat operators.
- Ensure workers wear protective equipment (i.e., life vests).
- Do not operate boats after dusk, during fog periods or severe weather events.
- Minimize boat movements and number of trips across the river.
- Store boats at designated locations on-site, approved by the Parks Canada ESO.

#### **Fording:**

The project will meet all the requirements of the **Fisheries and Oceans Operational Statement for temporary ford stream crossing in British Columbia** including:

- Machinery and vehicle fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) from May 15 to August 30. Depending on flow conditions, additional fording at Paint Pots with an amphibious vehicle from May 15 to August 30 may be permitted at the discretion of the Parks Canada ESO, however a boat will be the preferred option for personnel and equipment to cross the river at Paint Pots.
- Stream bank and bed protection methods (e.g., swamp mats, pads, logs) must be used to protect the river banks and beds when fording provided they do not constrict flows or block fish passage. Excavators should use their boom bucket on the





- opposite shore to elevate tracks and gently pull to take pressure off the tracks. Avoid equipment track spinning.
- Grading of the stream banks for the approaches is not permitted.
- Fording should occur under lower flow conditions and not when flows are elevated due to local rain events or seasonal flooding.
- Operators shall travel slowly so as to minimize disturbance to river beds and banks.
- Any part of equipment entering the water shall be free of fluid leaks, and extremely cleaned/degreased to prevent deleterious substances from entering the water.
- Crossings will not result in erosion and sedimentation of the stream, alteration of the bed and bank substrates or blockage of fish passage.
- Grubbing or uprooting of vegetation within 15m of the rivers will not be permitted at fording sites. Use of existing trails and disturbed areas have been selected for stream crossing sites. Shrubs will be pruned rather than removed to accommodate equipment access.
- Remove all protective materials introduced to the watercourse and rehabilitate the site to its original condition at the conclusion of the fording activities.

#### **Environmental Mats (Paint Pots only):**

- Water flows and fish passage must be maintained under the environmental mats at all times.
- Use of the temporary access route at Paint Pots should occur earlier or later in the fisheries timing window during lower flow conditions (e.g. May or August). Environmental mats are not to be used during high flow conditions when side channels have the potential to be in full flood.
- Site conditions of the access route will be closely monitored by the Parks Canada ESO and contractor to ensure no environmental issues are taking place. Access to the site using the alternative access route may need to be halted based on environmental conditions of the site.
- Re-grade any altered channels under dry conditions or within the fisheries timing windows (June 1 to August 30) to natural state and/or pre-existing conditions upon removal of the mats to the satisfaction of Parks Canada.

#### **Debris and Deleterious Substances:**

- Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks, invasive species and noxious weeds.
- Install effective sediment and erosion control measures before starting work to prevent the entry of sediment into the watercourses. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.
- All demolition, construction debris and other waste materials will be disposed of at an approved landfill facility outside the park. Surplus excavated soil and rip rap will be removed from the work areas and hauled to an off-site location to be selected by Parks Canada (for storage and future use by Parks Canada). The storage site will be a disturbed area, devoid of vegetation. Debris or spoil will not be disposed of within the HWM or within waterbodies.
- All hazardous and toxic materials shall be stored no closer than 100m from a watercourse. The main parking lots will be used as storage areas. The spill response plan will outline the containment, storage, handling and disposal of hazardous or toxic materials.
- The contractor shall provide drip and spill containment for portable generators and equipment used or parked overnight on site, as permitted by the ESO. Generators shall be stored 30m from the river with an impermeable containment.
- The contractor shall inspect equipment for fluid/leaks daily and maintained in good working order.
- There are no restrictions on timing for the construction of clear-span structures as they do not involve in-water work. However, if there are any activities with the potential to disrupt sensitive fish life stages (e.g., installation of in-stream scaffold system etc.), these shall adhere to appropriate fisheries timing windows of June 1 to August 30. The one-time ford event may occur as early as May 15 to facilitate crossing the river at lower flows.
- A containment system must be installed under the bridges to meet **Fisheries and Oceans Operational Statement for Bridge Maintenance** to prevent deleterious substances from entering the Vermilion River. The systems must be inspected and approved by the Parks Canada ESO. The containment system (shrouding) should be permeable to allow rain to pass







through. If welding is used, welding solder must be contained locally or a containment system capable of trapping welding solder used during welding activities.

- The containment system must be installed in such a way to prevent the shrouding from being inundated by the river. Water levels under the bridge should be monitored, at the discretion of the ESO, the containment system removed immediately and all work suspended if the system could be submersed by rising water levels.
- Operate machinery on land (above the HWM) and in a manner that minimizes disturbance to the banks of the watercourse.
- Wash, refuel and service machinery and store fuel and other materials for the machinery in the main parking lots with appropriate containment as required. Maintenance of equipment, such as oil changes, is not permitted in the park. Mobile fuel containers (slip tanks) shall remain in vehicles at all times. No waste petroleum, lubricants or other related materials shall be disposed of anywhere in the park, including garbage bins at picnic areas.
- Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
- In the event of a spill, containment and clean up shall be immediate and Parks Canada notified.
- Restore banks to original condition if any disturbance occurs.
- Use measures to prevent deleterious substances such as new concrete (i.e., it is pre-cast, cured and dried before use near the watercourse), grout, paint, ditch sediment and preservatives from entering the watercourse.
- The contractor is to prevent river water from seeping on top of the anchor area during grouting/ mini pile installations. Monitor for grout breakout during mini pile installations and take appropriate action to prevent/contain any breakouts.
- Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with preferably native grass or shrubs.
- Vegetate all disturbed areas by planting and seeding with native trees, shrubs and grasses. All seeding and/or planting trees should follow the DFO guidance on Riparian Revegetation. If there is insufficient time remaining in the growing season, the site should be stabilized and vegetated the following spring (see mitigations under Riparian Vegetation).
- Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.
- For placement of rip rap and for the removal of the east abutment at Stanley Glacier, work may need to be done when water levels are low, which will occur outside the fish work window. In order to prevent sedimentation of the river, isolation techniques (for example, a sandbag cofferdam dam reinforced with geotextile, poly or rubber tarp) will be required by the contractor to divert flows around the work area if work cannot be done entirely in the dry. The target is 0 mg/L of Total Suspended Solids (TSS) over background levels in the river. The threshold (as established by CCME 2006) that shall not be exceeded is: 1) During clear flows, maximum increase in TSS of 25 mg/L from background levels for any short-term exposure (e.g., 24 hour period). Maximum average increase in TSS of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 hour and 30 days); and 2) During high flows, maximum increase in TSS of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. No increase in TSS more than 10% of background levels when background is greater than 250 mg/L. Any fish present will be salvaged as the isolation area is drained. Isolation dams will be carefully removed by hand to minimize siltation.
- Maintain effective sediment and erosion control until re-vegetation of disturbed areas is achieved.

#### Soils and Landforms

- At the Paint Pots site, access to the site will either be by helicopter, using small equipment on the existing trail and new bridge deck, or using environmental mats for equipment access along an identified route on the Vermilion River flats to minimize damage and compaction to soils. The mats shall be placed along the entire proposed access route, which is approximately 329 meters long and 5 or 6m wide (depending on equipment size), starting from the clearing in the forest along the highway to the bridge site. A geotechnical engineer may be hired by the contractor to conduct soil compaction tests along the route to determine if mats are not required in certain areas. For example, if certain sections of the proposed access route have the soil density or level of compaction of a roadway, then environmental mats may not be required based on the written recommendation of the geotechnical engineer. If environmental mats are used to access the Paint Pots bridge site, the appropriate type and size of mats will be selected to withstand maximum loads to ensure soils are not compacted under the mats.





- Any excess soil and rip rap will be removed to an off-site, existing disturbed, location to be selected by Parks Canada (for storage and future use by Parks Canada).
- Any equipment proposed for use on the trails at the bridge sites must be able to fit on the existing width of trails. The only exception is the use of a crane at the Stanley Glacier bridge for removal and installation of bridge trusses. The crane access will be limited to 2 trips (to and from the site) to remove and place the trusses. The smallest possible crane will be used to minimize damage to soils/vegetation.
- Any staging or access locations proposed for use outside of the trailhead parking area and existing gravel pathway must be clearly delineated in consultation with the Parks Canada ESO.

#### **Vegetation Resources**

- The contractor shall ensure that all soil, seeds, and any other debris attached to construction equipment, environmental mats, or materials to be used on the project site shall be removed outside the park before delivery to the work site.
- The marl fen wetlands within the area are susceptible to disturbance and must be protected by project activities. Use of the existing road is not expected to pose a significant threat to the marl fen wetlands, as long as equipment is confined to the access route. No –go zones will be flagged around the marl fens. There are also some wet areas along the proposed access route that have potential to form into marl wetlands, but are not protected from flooding from the Vermilion River. Use of environmental mats should mitigate soil compaction and disturbance, however the Parks Canada ESO should monitor these areas closely throughout the project and particular attention should be made while removing mats and reclaiming these areas to minimize disturbance to these seepage areas. Additional measures may need to be implemented to protect or reclaim these seepage areas if disturbances are observed.
- Parks Canada may conduct spot treatment of weeds within the project area pre-construction, including the temporary access route along the riverflats at the Paint Pots site.
- The contractor shall ensure all construction activities remain within the established perimeter.
- Restore and re-vegetate temporary access roads, staging and storage areas and any other disturbed areas. Topsoil from outside the park is not be hauled into the sites. Re-vegetate with Parks Canada recommended seed mix. Contact the Environmental Assessment Office for the appropriate mix for the site. At the Paint Pots river flats, reseeding may not be required, depending on the level of site disturbance and at the discretion of the Parks Canada ESO.
- Parks Canada will monitor the site post construction to ensure that the re-vegetation standards are met and non-native plants are controlled.

#### **Species at Risk**

- Equipment access shall not damage or alter the pond located along the access route at the Paint Pots site. Drive and work during daylight hours.
- Minimize the time boreholes or test pits remain open in order to reduce small terrestrial wildlife mortality.
- Properly seal boreholes and fit PVC pipes.
- Investigate for presence of amphibians in the area before commencing work.

#### **Wildlife**


- If bears are known to be feeding in the direct vicinity of the project sites, this may result in short-term delays or stoppages of work in order to allow bears to feed undisturbed.
- Sweep the proposed Paint Pots access route for bird nests if environmental mats are placed during the breeding season (May 1-July 31). Avoid vegetation clearing during the bird breeding season. If vegetation clearing takes place during the bird breeding and nesting season, sweep for nests before commencing work. Young birds must be allowed to fledge before nests are disturbed.
- Keep site free of garbage and dispose of garbage in bear proof containers or remove daily. No food garbage to be disposed of in trade waste bins. The contractor will notify Banff Dispatch of wildlife encounters on or around the work site immediately. Avoid or terminate activities that attract or harass wildlife.





<b>12. IMPACT SIGNIFICANCE</b> (For help completing this section see instructions at end of document)	
<b>13. SITE INSPECTION</b> (For help completing this section see instructions at end of document)	
<input type="checkbox"/>	Site inspection not required
X	Site inspection required
Site Inspection program details	
A Parks Canada Environmental Surveillance Officer will provide periodic site inspections and monitoring.	
<b>14. EXPERTS CONSULTED (Including PCA Experts)</b>	
Department/Agency/Institution	Parks Canada Agency
Contact Information	Shelley Humphries, Aquatic Specialist
Date of Request	2013-06-14
Expertise Requested	Aquatic issues
Response	Recommended mitigations written into report
Department/Agency/Institution	Department of Fisheries and Oceans
Contact Information	Chantelle Caron, Fisheries Protection Biologist
Date of Request	November 29, 2013
Expertise Requested	Fish and fish habitat protection
Response	See Response Letter on file
<b>15. PUBLIC PARTICIPATION</b> X No <input type="checkbox"/> Yes	
<b>16. DECISION</b>	
Taking into account implementation of mitigation measures outlined in the analysis, the project is:	
X	Not likely to cause significant adverse environmental effects.
<input type="checkbox"/>	Likely to cause significant adverse environmental effects.
<b>SIGNATURES AND APPROVAL</b>	
<b>EA Author</b>	
Name: Noelle Summers	Title: Environmental Assessment
Signature <i>Noelle Summers</i>	Date <i>Dec 12, 2013</i>
<b>DECISION APPROVAL</b>	



Name: Alex Kolesch	Title: Manager, Integrated Land Use Planning and Policy
Signature 	Date Dec 13/13
<b>17. REFERENCE LIST</b>	
<p>Avens Consulting. 2010. Repair of Helmet Creek, Paint Pots and Takakkaw Falls Pedestrian Bridges in the Mountain National Parks: CEAA Environmental Screening Report.</p> <p>Fisheries and Oceans Canada. Guidance on Riparian Revegetation <a href="http://www.pac.dfo-mpo.gc.ca/habitat/reveg/index-eng.htm">http://www.pac.dfo-mpo.gc.ca/habitat/reveg/index-eng.htm</a></p> <p>Fisheries and Oceans Canada. Pacific Region Operational Statement on Clearspan Bridges.</p> <p>Fisheries and Oceans Canada. Pacific Region Operational Statement on Fording.</p> <p>Fisheries and Oceans Canada. Pacific Region Operational Statement on Bridge Maintenance.</p> <p>Kucera Engineering Inc. 2013. Geotechnical Report for Paint Pots and Stanley Glacier bridge sites in Kootenay National Park.</p> <p>McElhanney Consulting Ltd. 2013. Hydrotechnical Report for Paint Pots and Stanley Glacier bridge sites in Kootenay National Park.</p> <p>Page, H. Sage Ecological Research. 2013. Parks Canada Paint Pots Bridge Rare Plant 2013 Field Report.</p> <p>Parks Canada. 2012. Model Class Screening for Routine Projects in Frontcountry Areas of Lake Louise, Yoho and Kootenay National Parks.</p> <p><b>Personal Communications:</b></p> <p>Chang, D. Engineer. Public Works and Government Services Canada.</p> <p>Himour, B. Senior Terrestrial Archaeologist. Parks Canada Agency. Calgary, AB.</p> <p>Humphries, S. Aquatic Specialist. Parks Canada Agency. Lake Louise, Yoho and Kootenay Field Unit.</p>	
<b>18. ATTACHMENTS LIST</b>	
<p>Appendix 1- Bridge Construction Drawings for Paint Pots and Stanley Glacier Day Use Areas</p> <p>Appendix 2- Paint Pots Bridge Site Photo Summary</p> <p>Appendix 3- Stanley Glacier Bridge Site Photo Summary</p> <p>Appendix 4- Fisheries and Oceans Canada. Pacific Region Operational Statement on Fording and Clearspan Bridges.</p>	
<b>19. ADDITIONAL CONSIDERATIONS / COMMENTS</b>	
<p>Fisheries and Oceans Canada was consulted and determined that an Authorization was not required for the project. No other concerns or advice were identified.</p> <p>Standard Best Management Practices for Routine Projects in Frontcountry Areas in Lake Louise, Yoho and Kootenay National Parks 2012 apply and are listed below.</p>	









## Appendix 1 Drawings







**Appendix 2**  
**Paint Pots Site Photos**

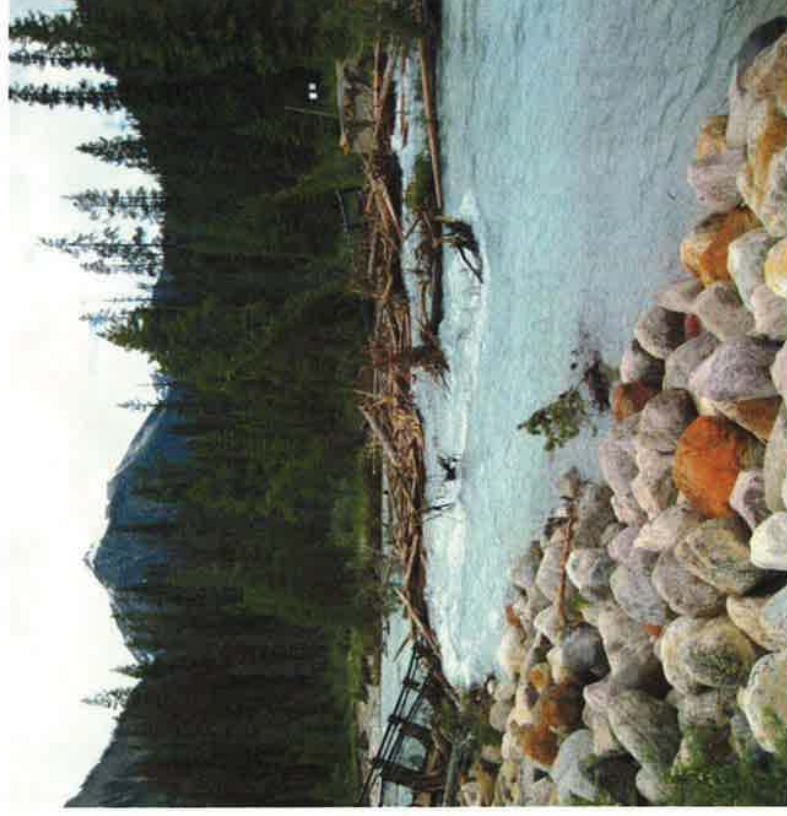




# Vermilion River at Paint Pots Bridge

## Photo Summary

View of former collapsed bridge



View of former collapsed bridge



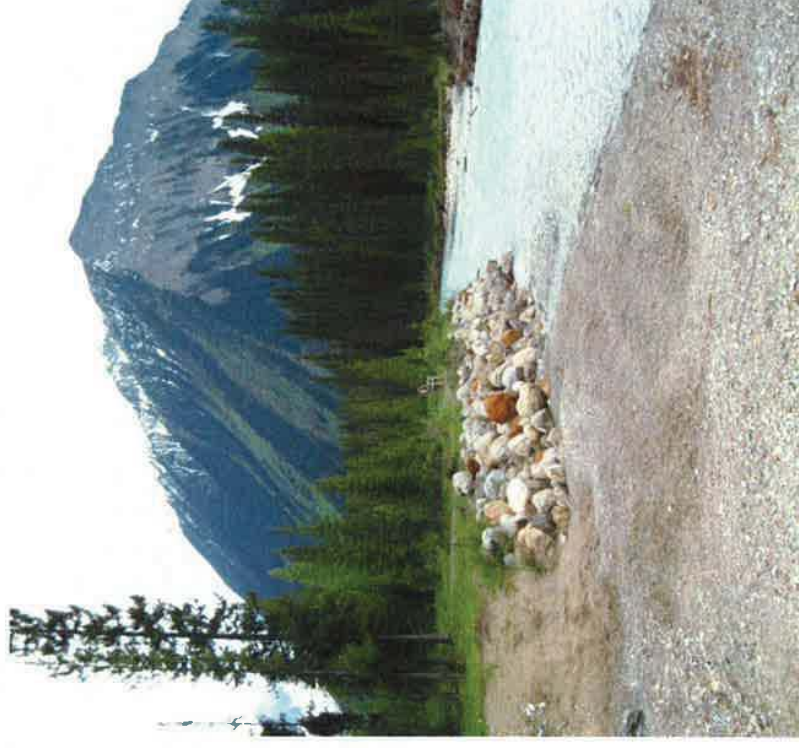
# Vermilion River at Paint Pots Bridge

## Photo Summary

**Current view of bridge site (after 2012 emergency bridge removal)**



**Current view of existing rip rap (30m long) on south side of river (intact)**





# Vermilion River at Paint Pots Bridge

## Photo Summary

View of bank on north side of river. Some re-armouring required downstream of new bridge





# Vermilion River at Paint Pots Bridge

## Photo Summary

**View of on-site staging area**



**View of on-site staging area**

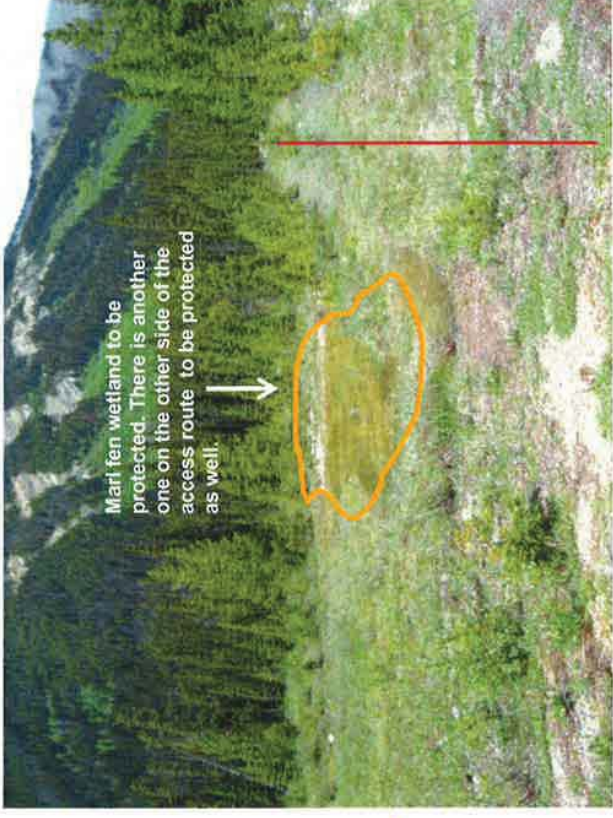
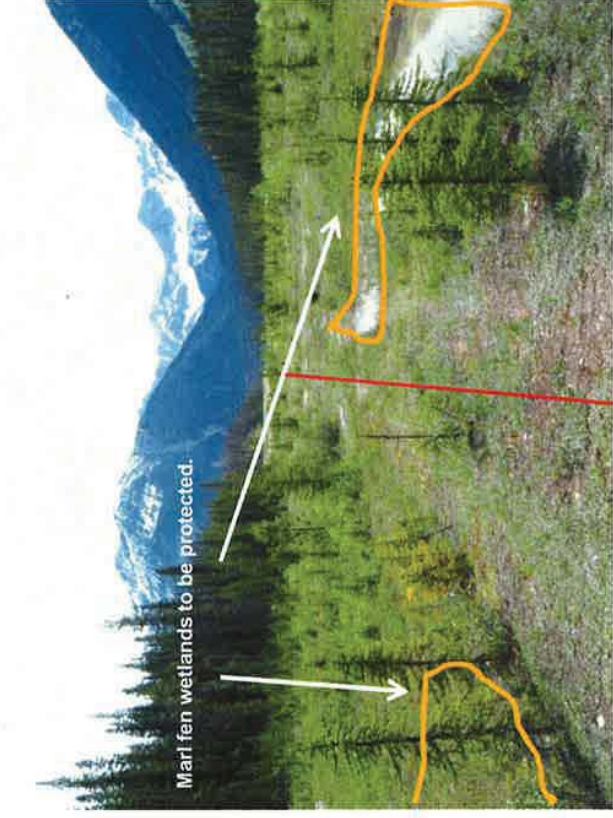


# Vermilion River at Paint Pots Bridge

## Photo Summary

View of proposed access route along river flats-looking west toward highway site

View of proposed access route along river flats-looking east toward bridge site





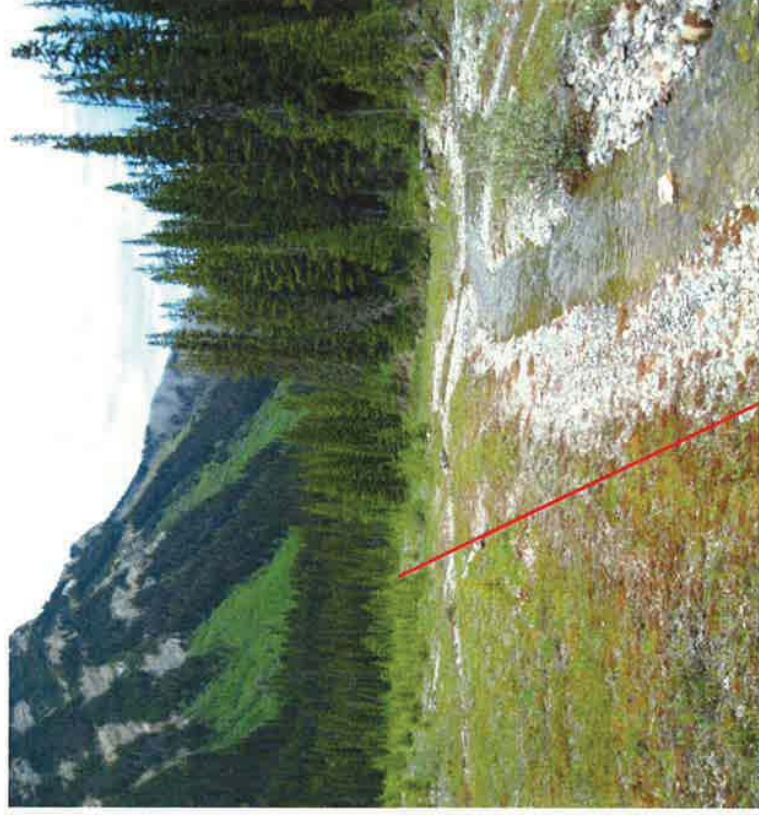
# Vermilion River at Paint Pots Bridge

## Photo Summary

**View of proposed access route along  
river flats-looking west toward highway**



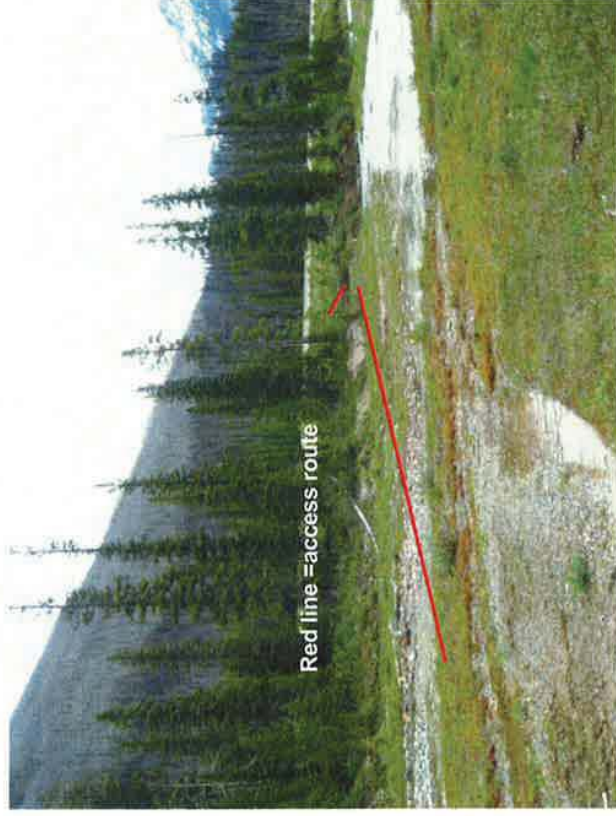
**View of proposed access route along  
river flats-looking east toward bridge**



# Vermilion River at Paint Pots Bridge

## Photo Summary

**View of spring-fed creeks flowing into  
Vermilion River in proposed access route**



**Spring-fed creek emanating from  
treeline**





# Vermilion River at Paint Pots Bridge

## Photo Summary

**View of spring-fed creek flowing into riverflats area**



**View of ponded area of spring-fed creek flowing into riverflats area**



## Paint Pots Site Photos

View of access route from highway to river flats

Access route along highway toward  
riverflats

Looking east toward bridge





# Vermilion River at Paint Pots Bridge

## Photo Summary

View of access route along highway.



View of access route from highway





### Appendix 3 Stanley Glacier Site Photos







# Vermilion River at Stanley Glacier Bridge

## Photo Summary

1) Looking upstream from the bridge – the old track alignment was presumably for installing the berm.



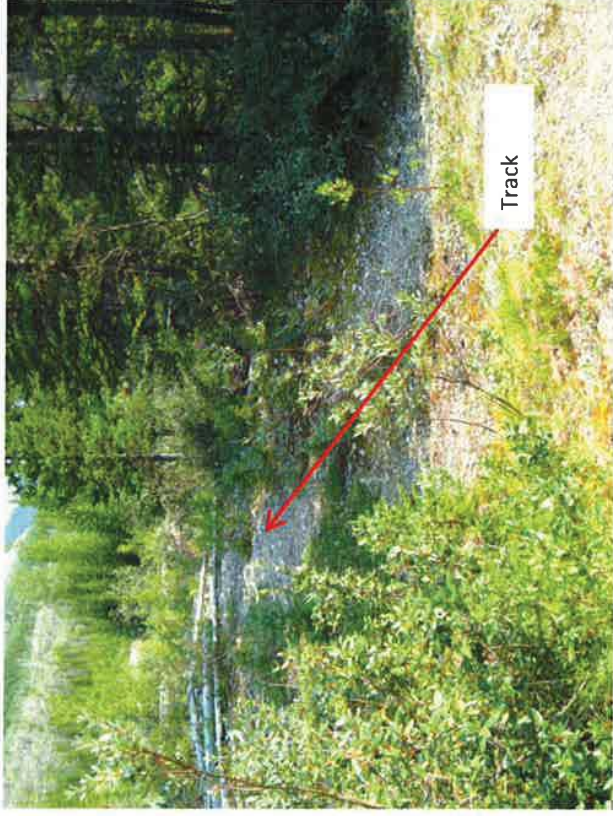
2) Looking downstream at the bridge.



# Vermilion River at Stanley Glacier Bridge

## Photo Summary

3) View of old track from the trail as you approach the bridge from the parking lot



4) Looking upstream at bermed area from the end of the track alignment





# Vermilion River at Stanley Glacier Bridge

## Photo Summary

5) Looking downstream from bridge (August 29, 2012)



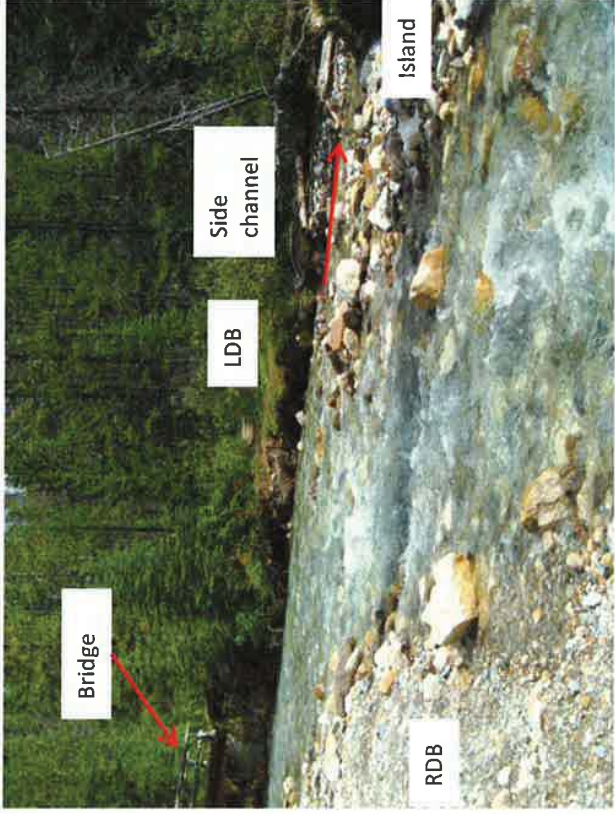
6) View of bridge at high water (June 20, 2013)



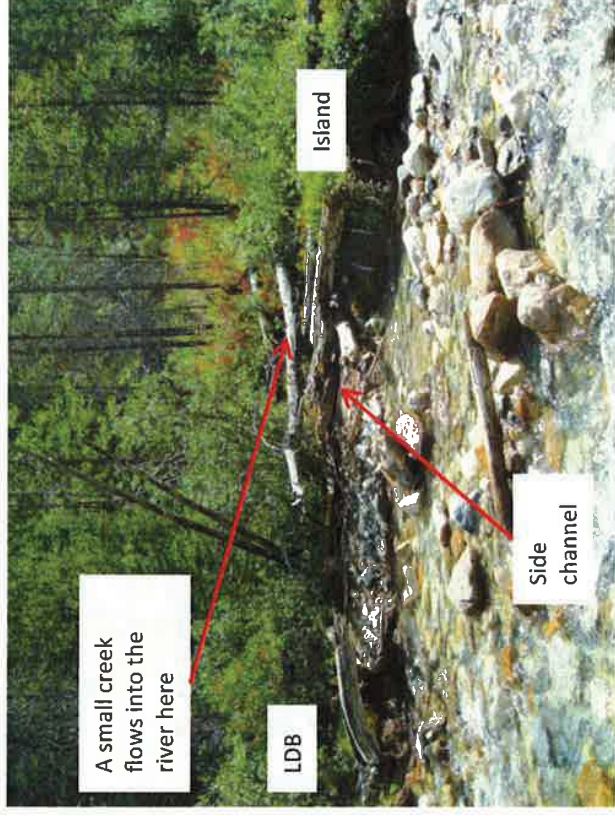
# Vermilion River at Stanley Glacier Bridge

## Photo Summary

7) Looking upstream towards bridge



8) A small creek flow into the Vermilion at the start of the side channel downstream of the bridge.

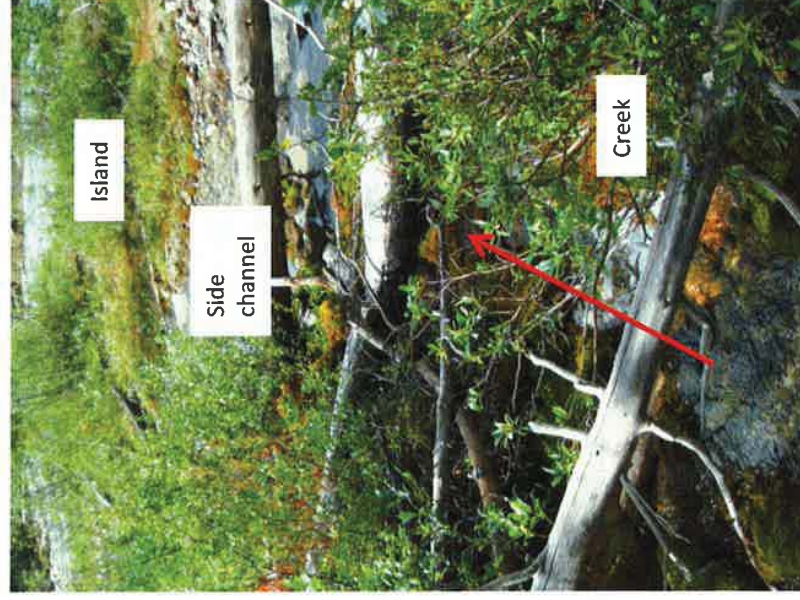




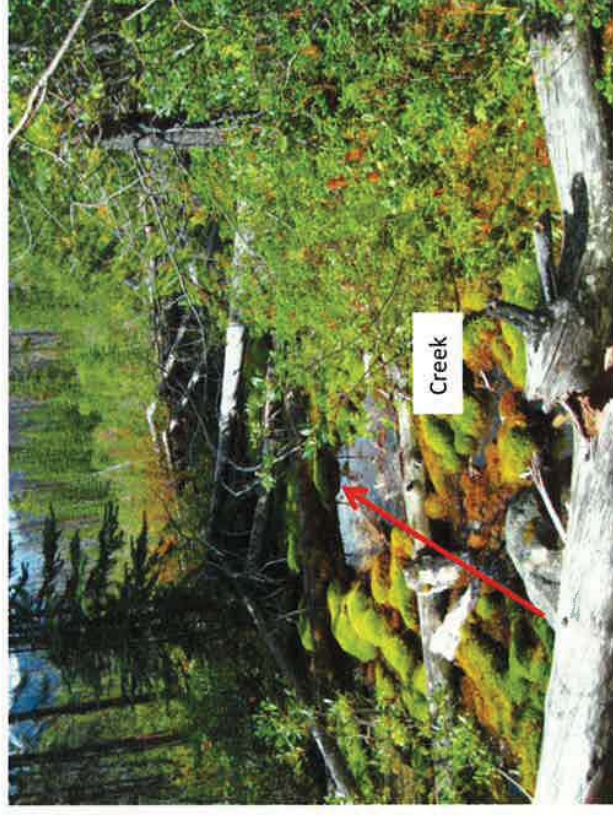
# Vermilion River at Stanley Glacier Bridge

## Photo Summary

9) Outlet of creek into the side channel of the Vermilion



10) A view looking downstream at the creek just upstream from its outlet to the Vermilion





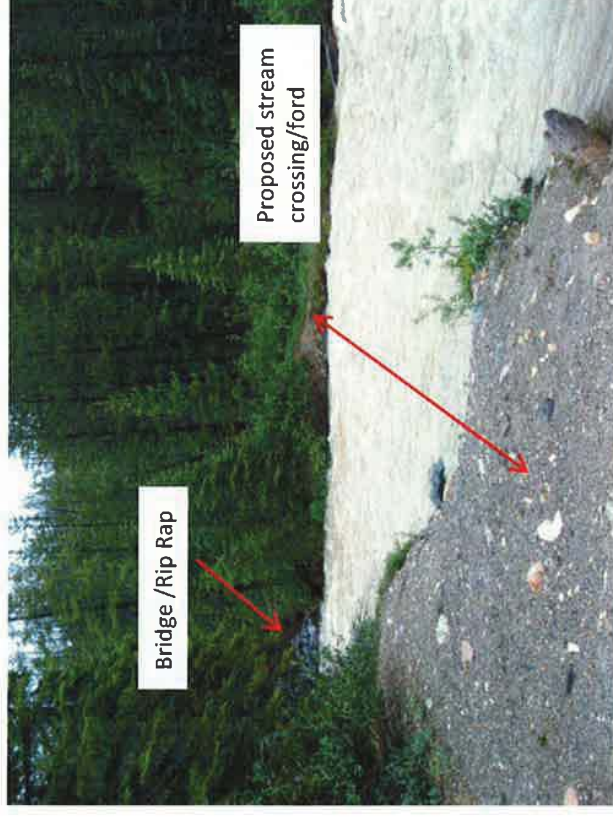
# Vermilion River at Stanley Glacier Bridge

## Photo Summary

11) View of proposed stream crossing/ford located downstream of bridge in lower water conditions (photo taken August 29, 2012)



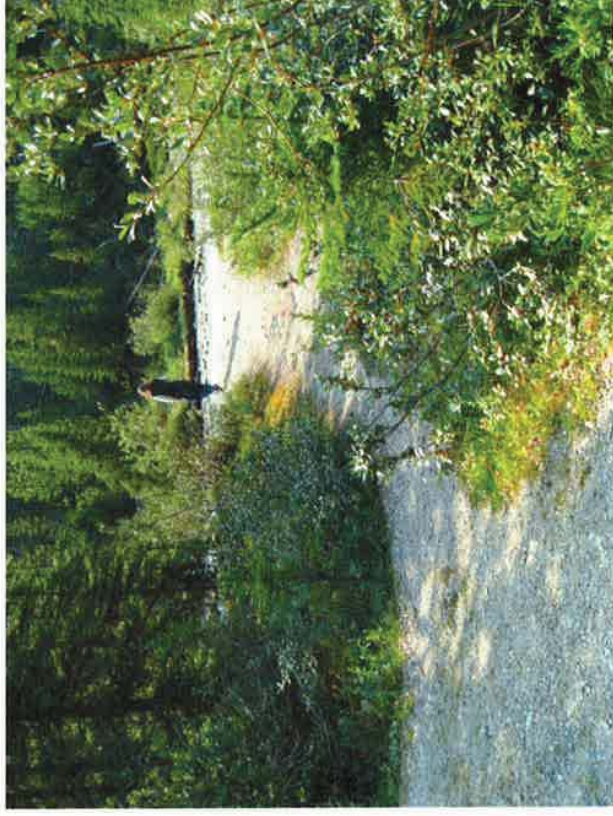
12) View of proposed stream crossing/ford located downstream of bridge (taken June 20, 2013)



# Vermilion River at Stanley Glacier Bridge

## Photo Summary

13) Foot path from hiking trail to proposed stream crossing/ford location-west side river



14) Foot path from river at proposed stream crossing/ford location-east side of river





# Vermilion River at Stanley Glacier Bridge

## Photo Summary

15) View of new east abutment area



16) View of new trail section for new bridge approach – east side of river. Existing trail section to be decommissioned





**Appendix 4**  
**Fisheries and Oceans Canada**  
**Pacific Region Operational Statement on Fording and Clearspan Bridges**







## TEMPORARY FORD STREAM CROSSING

Fisheries and Oceans Canada  
Pacific Region Operational Statement

Version 1.0

A temporary ford stream crossing consists of i) a one-time ford in flowing waters, or ii) a seasonally dry streambed ford. Temporary ford stream crossings are employed for short term access across a watercourse by construction vehicles and equipment when an existing crossing is not available or practical to use. They are not intended for prolonged use (e.g., forest or mining haul roads). DFO prefers use of temporary bridges or dry fording over fording in flowing waters due to the reduced risk of damaging the bed of the watercourse and generation of downstream sedimentation caused by vehicles. *Pacific Region Operational Statements* (<http://www.pac.dfo-mpo.gc.ca/habitat/os-eo/Index-eng.htm>) are available for Ice Bridges and Snow Fills for temporary access during the winter. As Best Management Practices for other temporary bridges are under development, consult your local DFO Area office for advice.

The risks to fish and fish habitat associated with temporary ford stream crossings include the potential for destabilization of stream banks, compaction of stream beds and spawning habitats, changes to channel morphology and hydrology, release of sediments and other deleterious substances (e.g., fuel, oil leaks), loss of riparian habitat, and direct harm or disruption to sensitive fish life stages.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your temporary ford stream crossing project without a DFO review when you meet the following conditions:

- the work does not include realigning, dredging, infilling, grading, or excavating the channel or stream bank, or diverting the watercourse,
- crossing sites avoid known fish spawning sites (e.g. tails of pools),
- fording of vehicles and equipment involves a one time event (over and back),
- the crossing will not result in erosion and sedimentation of the stream, alteration (e.g., compaction or rutting) of the bed and bank substrates, or blockage of fish passage.
- the crossing does not involve installation of a temporary culvert, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Carrying Out a Temporary Ford Stream Crossing* listed below.

**If you cannot meet all of the conditions listed above and/or cannot incorporate all of the measures listed below** then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact the DFO office in your area if you wish to obtain DFO's opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

**You are required to comply with all municipal, provincial, territorial and federal legislation that applies to the work being carried out in relation to this Operational Statement.** In British Columbia, please contact the *Water Stewardship Division, Ministry of Environment* ([http://www.env.gov.bc.ca/wsd/water\\_rights/licence\\_application/section9/index.html](http://www.env.gov.bc.ca/wsd/water_rights/licence_application/section9/index.html)) for information on the *Provincial Water Act Regulation* notification requirements when planning to conduct a temporary ford stream crossing in or around BC waters. In Yukon, please contact the Yukon Government (Department of Energy Mines and Resources: Land Use <http://www.emr.gov.yk.ca/lands/index.html> or Mining <http://www.emr.gov.yk.ca/mining/>; Yukon Water Board <http://www.yukonwaterboard.ca/>; and/or Department of Highways and Public Works [http://www.hpw.gov.yk.ca/trans/maintenance/permits.html#highway\\_permits](http://www.hpw.gov.yk.ca/trans/maintenance/permits.html#highway_permits)) to determine whether your project requires assessment under the Yukon Environmental and Socio-economic Assessment Act (<http://www.yesab.ca/>) and for information on regulatory requirements you may need when planning to conduct a temporary ford stream crossing in or around Yukon waters.

The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act*. For general information on aquatic SARA species visit the following web site: <http://www.dfo-mpo.gc.ca/species-especes/regions/Pac/pacific-index-eng.htm> and/or contact DFO by email at: [SARA@pac.dfo-mpo.gc.ca](mailto:SARA@pac.dfo-mpo.gc.ca)

If you have questions regarding this Operational Statement, please refer to the list of *Frequently Asked Questions* (<http://www.pac.dfo-mpo.gc.ca/habitat/os-eo/faq-eng.htm>) or contact DFO Regional Headquarters at 1-866-845-6776.

Canada



Please notify DFO, preferably 10 working days before starting your work, by filling out and sending the Pacific Region Operational Statement **notification form** directly to DFO Regional Headquarters. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement. It is recommended that you keep a copy of the Operational Statement at the work site to demonstrate to Habitat and Fishery Officer staff that the conditions and measures, as outlined in the OS, are being followed.

#### Area of Application

This Operational Statement applies to the province of British Columbia and Yukon Territory freshwater systems only.

### Measures to Protect Fish and Fish Habitat when Carrying Out a Temporary Ford Stream Crossing

1. Locate crossings at straight sections of the stream with low gradient banks, perpendicular to the bank. Avoid crossing on meander bends, braided streams, alluvial fans, or any other area that is inherently unstable and may result in the erosion and scouring of the stream bed. Avoid locations directly upstream of wetlands and sensitive fish rearing and spawning areas. Also plan activities and routes such to minimize the number of crossing sites required to reach your destination.
2. Minimize disturbance to riparian vegetation (i.e. vegetation that occurs adjacent to the watercourse) by using existing trails, winter roads or cut lines wherever possible and prevent soil compaction.
3. Select a site with early stage forest or shrub and grass riparian vegetation. Avoid thick riparian canopies and mature growth.
4. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum and within the road or utility right-of-way. Vegetation should be pruned or topped. Grubbing or uprooting vegetation within 15 m of a stream is not permitted.
5. Generally, there are no restrictions on timing for fording seasonally dry streambeds that do not support fish spawning, as this does not involve in-water work or driving over fish eggs and alevins. However, if there is risk of any activities disrupting sensitive fish life stages (e.g., any uncertainty that the site does not support fish spawning) adhere to appropriate fisheries **timing windows** (<http://www.pac.dfo-mpo.gc.ca/habitat/timing-periodes/Index-eng.htm>).
6. Fording a flowing watercourse to bring vehicles and equipment required for construction to the opposite side is limited to a one-time event (over and back) and is to occur only if an existing crossing at another location or temporary bridge is not available or practical to use.
  - 6.1. To exercise this option, the stream bed at the fording site must be comprised of stable material such as gravel or bedrock and the stream banks must be low and stable.
  - 6.2. If minor rutting is likely to occur, use stream bank and bed protection methods (e.g., geogrids, logs, swamp pads, rubber tire mats – see Measure 8.1), provided they do not constrict flows or block fish passage. Maintain protection as required and maintain fish passage.
  - 6.3. Grading of the stream banks for the approaches is not permitted.
  - 6.4. If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then use a temporary bridge in order to protect these areas.
  - 6.5. Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to fisheries **timing windows** (see Measure 5).
  - 6.6. Ford only under low flow conditions, and not when flows are elevated due to local rain events or seasonal flooding.
  - 6.7. Ford only when water depth is sufficiently shallow to allow passage of vehicle/equipment, maintain crossing speed at a very slow and steady pace throughout the crossing and avoid rapid acceleration while on approaches or in the water.
7. Install effective sediment and erosion control measures before starting work to prevent the entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.
8. Operate equipment in a manner that minimizes disturbance to the watercourse bed and banks.
  - 8.1. Protect entrances at equipment access points and establish single site entry and exit. e.g. place a large log tight to each bank to minimize pressure on the bank from the tracks. Excavators should use their boom bucket on the opposite shore and elevate the front tracks and gently pull to take pressure off the tracks. Operators should travel slowly so as not spin tracks and thereby avoid moving the logs, tearing the stream bank or cycling dirt into the watercourse. While large logs flat cut on the bottom are preferred, small swamp mats may also be used.
  - 8.2. Equipment is to arrive on site in a clean condition (mud and etc. removed) and is to be maintained free of fluid leaks, invasive species and noxious weeds.
  - 8.3. Wash, refuel and service equipment and store fuel and other materials for the equipment away from the water to prevent deleterious substances from entering the water.
  - 8.4. Keep an emergency spill kit on site in case of fluid leaks or spills from equipment.
9. No debris is to remain within the **high water mark (HWM)** (<http://www.pac.dfo-mpo.gc.ca/habitat/Glossary-glossaire-eng.htm#HWM>) or placed into a stream. On conclusion of the work activity, remove all protective

materials introduced to the watercourse and rehabilitate the site to its original condition.

10. Stabilize any waste materials removed from the work site to above the HWM and prevent them from entering any watercourse. This could include covering spoil piles with biodegradable mats or planting them with preferably native grass or shrubs.
11. Revegetate any disturbed areas by planting and seeding with native trees or shrubs and grasses and cover such areas with mulch or other suitable organics to prevent soil erosion and to help seeds germinate. Follow the DFO guidance on **Riparian Revegetation** (<http://www.pac.dfo-mpo.gc.ca/habitat/reveg/index-eng.htm>) for all seeding and/or planting trees. If there is insufficient time remaining in the growing season, stabilize the site (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and revegetate the following spring.
  - 11.1. Maintain effective sediment and erosion control measures until revegetation of disturbed areas is achieved.
12. Ensure banks are stabilized, restored to original shape, adequately protected from erosion and revegetated with native shrub or tree species.

## DFO REGIONAL HEADQUARTERS

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*Aussi disponible en français*

[http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index\\_f.asp](http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp)





## CLEAR SPAN BRIDGES

Fisheries and Oceans Canada  
Pacific Region Operational Statement

Version 3.0

This Operational Statement applies to the construction of small-scale bridge structures that completely span a watercourse without altering the stream bed or bank, and that are a maximum of two lanes wide. The bridge structure (including bridge approaches, abutments, footings, and armouring) is built entirely above the **high water mark (HWM)**. A clear-span bridge is preferred to a culvert as no structures are placed on the stream bed and therefore there is no alteration of natural channel processes.

Clear-span bridge construction has the potential to negatively affect riparian habitat. Riparian vegetation occurs adjacent to the watercourse and directly contributes to fish habitat by providing shade, cover and areas for spawning and food production. Only the vegetation required to accommodate operational and safety concerns for the crossing structure and approaches, within the right-of-way, should be removed. Stormwater run-off and the use of machinery can introduce deleterious substances to the water body and result in erosion and sedimentation.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat and maintain passage of fish. You may proceed with your clear-span bridge project without a DFO review when you meet the following conditions:

- the bridge is placed entirely above the high water mark (HWM), (<http://www.pac.dfo-mpo.gc.ca/habitat/Glossary-glossaire-eng.htm#HWM>),
- there is no alteration of the stream bed or banks or infilling of the channel,
- the bridge is no greater than two vehicle lanes in width, does not include sidewalks and biking lanes and does not encroach on the natural channel width by the placement of abutments, footings or rock armouring below the **HWM**,
- the work does not involve the clearing of riparian vegetation – removal of select plants with the road right-of-way can occur to meet operational and/or safety needs,
- your project does not require multiple bridge crossings over the same watercourse, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Constructing Clear-Span Bridges* listed below in this Operational Statement.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact the DFO office in your area if you wish to obtain DFO's opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

**You are required to comply with all municipal, provincial, territorial and/or federal legislation that applies to the work being carried out in relation to this Operational Statement.** In British Columbia, please contact the Water Stewardship Division, Ministry of Environment ([http://www.env.gov.bc.ca/wsd/water\\_rights/licence\\_application/section9/index.html](http://www.env.gov.bc.ca/wsd/water_rights/licence_application/section9/index.html)) for information on the Provincial *Water Regulation* notification requirements when planning to construct clear-span bridges in or around BC waters.

The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act*. For general information on aquatic SARA species visit the following web site: <http://www.dfo-mpo.gc.ca/species-especes/regions/Pac/pacific-index-eng.htm> and/or contact DFO by email at: [SARA@pac.dfo-mpo.gc.ca](mailto:SARA@pac.dfo-mpo.gc.ca)

If you have questions regarding this Operational Statement, please refer to the list of **Frequently Asked Questions** (<http://www.pac.dfo-mpo.gc.ca/habitat/os-eo/faq-eng.htm>) or contact DFO Regional Headquarters at 1-866-845-6776.

Please notify DFO 10 working days before starting your work by filling out and sending the Pacific Region Operational Statement **notification form** directly to DFO Regional Headquarters. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement. It is recommended that you keep a copy of the Operational Statement at the work site to demonstrate to Habitat and Fishery Officer staff that the conditions and measures, as outlined in the OS, are being followed.

### Area of Application

This Operational Statement applies to the province of British Columbia and Yukon Territory freshwater systems only.

### Measures to Protect Fish and Fish Habitat when Constructing Clear-Span Bridges

1. Minimize the riparian area temporarily disturbed by access activities along the adjacent upland property. Use existing trails, roads, or cut lines wherever possible to avoid disturbance to the riparian vegetation.



2. Avoid building on meander bends, braided streams, alluvial fans, active flood plains, or any other area that is inherently unstable and may result in the alteration of natural stream functions or erosion and scouring of the bridge structure.
3. While this Operational Statement does not apply to the clearing of riparian vegetation, the removal of select plants within the road right-of-way (ROW) may be required to meet operational and/or safety concerns for the crossing structure and the approaches. This removal should be kept to a minimum and within the road right-of-way. When practicable, prune or top the vegetation instead of uprooting.
4. Ensure that the clear span bridge is properly designed to address river and channel processes at flows above the ordinary high water mark.
5. Design and construct approaches so that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation.
6. Design the bridge so that stormwater runoff from the bridge deck, side slopes and approaches is directed into a retention pond or vegetated area to remove suspended solids, dissipate velocity and prevent sediment and other deleterious substances from entering the watercourse.
7. Generally there are no restrictions on timing for the construction of clear-span structures as they do not involve in-water work. However, if there are any activities with the potential to disrupt sensitive fish life stages (e.g., crossing of watercourse by machinery), these should adhere to appropriate fisheries **timing windows** (<http://www.pac.dfo-mpo.gc.ca/habitat/timing-periodes/Index-eng.htm>).

Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Ford Stream Crossings* Operational Statement is also available.

- 7.1. To exercise this option, the stream bed at the fording site must be comprised of stable gravel or bedrock and the stream banks must be low and stable.
- 7.2. If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
- 7.3. Grading of the stream banks for the approaches is not permitted.
- 7.4. If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
- 7.5. Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries **timing windows**.
- 7.6. Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.
8. Install effective sediment and erosion control measures before starting work to prevent the entry of sediment into

the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

9. Operate machinery on land (above the **HWM**) and in a manner that minimizes disturbance to the banks of the watercourse.
  - 9.1. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks, invasive species and noxious weeds.
  - 9.2. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
  - 9.3. Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
  - 9.4. Restore banks to original condition if any disturbance occurs.
10. Use measures to prevent deleterious substances such as new concrete (i.e., it is pre-cast, cured and dried before use near the watercourse), grout, paint, ditch sediment and preservatives from entering the watercourse.
11. No debris to remain within the high-water mark or placed into a stream.
12. Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with preferably native grass or shrubs.
13. Vegetate any disturbed areas by planting and seeding with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. All seeding and/or planting trees should follow the DFO guidance on **Riparian Revegetation** (<http://www.pac.dfo-mpo.gc.ca/habitat/revveg/index-eng.htm>). If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.
  - 13.1. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

## DFO REGIONAL HEADQUARTERS

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## ATTACHMENT 1

**Table 5.3 Environmental Effects and Mitigation Measures of Routine Frontcountry Projects by Physical Activity: General Activities – APPLIES TO ALL PROJECTS**

Environmental Component	Code	Description of Effect	Mitigation
Air Quality and Noise	A-1	Decreased ambient air quality	<ul style="list-style-type: none"> <li>• Minimize idling of vehicles.</li> <li>• Stabilize soil and other material storage piles against wind erosion.</li> <li>• Cover and contain fine particulate materials during transportation to and from the site and during storage.</li> <li>• Minimize vehicle traffic on exposed soils.</li> <li>• Wet down exposed soil and dry areas.</li> </ul>
	A-2	Increased ambient noise levels	<ul style="list-style-type: none"> <li>• Confine "noise" activities to daylight hours.</li> </ul>
	S-2	Soil compaction and rutting	<ul style="list-style-type: none"> <li>• Use existing roadways or disturbed areas to access and travel within the site.</li> <li>• Identify and avoid soils susceptible to compaction (e.g. fine textured and organic soils).</li> <li>• In sensitive areas, use equipment of low bearing weight, low PSI (Pounds per Square Inch) tires or tracked vehicles.</li> <li>• Store construction materials in one area of the site. Flag clearly to reduce the area of disturbance and limit soil compaction.</li> </ul>
Soils and Topography	S-4	Loss of topsoil, topsoil and subsoil mixing, soil erosion, slope instability	<ul style="list-style-type: none"> <li>• Avoid equipment operation on steep or unstable slopes.</li> <li>• Keep site clearing to a minimum to maintain vegetative cover.</li> <li>• Phase work to minimize exposure of disturbed areas.</li> <li>• Direct runoff and overland flow away from working areas and areas with exposed soils.</li> <li>• If a prolonged period of exposure is expected, protect exposed soils with temporary cover (e.g. mulch, gravel, erosion blanket, vegetative cover)</li> <li>• Halt activity on exposed soils during periods of high rainfall and runoff</li> <li>• Assess site for erosion control requirements and implement control measures as required (e.g. tarps, straw bales, erosion blankets, silt fencing)</li> <li>• Store topsoil separately from subsoil and other construction materials.</li> <li>• Cover stockpiles of soil with polyethylene sheeting, tarps or vegetative cover.</li> </ul>



Environmental Component	Code	Description of Effect	Mitigation
<b>Soils and Topography</b> <i>continued</i>	S-5	Loss of organic matter/soil sterilization due to intense burning	<ul style="list-style-type: none"> <li>• Salvage as much timber as possible for other uses (e.g. firewood).</li> <li>• Locate burn piles on previously disturbed areas.</li> <li>• Limit size of burn piles to reduce intensity of fire.</li> </ul>
	S-6	Soil contamination due to leaks or accidental spills	<ul style="list-style-type: none"> <li>• Ensure machinery is in good working order and free of leaks.</li> <li>• Identify and handle all toxic/hazardous materials as required under the Canadian Environmental Protection Act, Transportation of Dangerous Goods Act and Workplace Hazardous Materials Information Service.</li> <li>• Prepare an appropriate Spill Response Plan.</li> <li>• Ensure spill containment equipment is on hand and personnel are trained in its use.</li> <li>• Report all spills to Banff Dispatch at (403) 762-1473/1470.</li> <li>• Store fuel and hazardous materials in a berm or secondary containment designed to contain 125% of the product's volume. Ensure other materials are stored appropriately to prevent spills.</li> <li>• Designate refuelling areas on hardened surfaces at least 100 m away from water bodies.</li> <li>• Clean up all spills immediately, as per the Spill Response Plan. If contamination is found, cease work and inform the site supervisor or environmental surveillance officer.</li> <li>• Dispose of contaminated soil at provincially certified disposal sites outside of the field unit. Documentation confirming proper disposal must be provided to Parks Canada.</li> <li>• Remove waste oil-based paints from the park in accordance with the federal and provincial <i>Transportation of Dangerous Goods Act</i> and Regulations.</li> </ul>
<b>Hydrological and Aquatic Resources</b>	H-1	Adverse modifications to surface drainage patterns	<ul style="list-style-type: none"> <li>• Locate staging areas away from drainage features.</li> </ul>
	H-3	Reduced water quality and clarity due to increased erosion, sedimentation, transport of debris, point or non-point sources of pollution	<ul style="list-style-type: none"> <li>• To minimize site run-off, control overland flow up gradient and down gradient of exposed areas (i.e. using diversion ditches, vales, vegetative filter strips and/or sediment traps).</li> <li>• Store stockpiles (covered) a minimum of 2 m from embankments, slumps and water bodies to prevent material loss or degradation.</li> <li>• Filter or settle out sediment before the water enters any drainage pathway.</li> <li>• Periodically inspect erosion control structures for effectiveness. If not effective, will be replaced by different mitigation measure.</li> <li>• Halt activity on exposed soil during events of high rainfall and runoff.</li> </ul>

Environmental Component	Code	Description of Effect	Mitigation
<b>Hydrological and Aquatic Resources</b> <i>continued</i>	H-3 <i>continued</i>	Reduced water quality and clarity due to increased erosion, sedimentation, transport of debris, point or non-point sources of pollution <i>continued</i>	<ul style="list-style-type: none"> <li>• Refuel at least 100 m from all waterbodies (including wetlands).</li> <li>• Do not store fuels, oils, solvents, and other chemicals overnight within 100 m of a waterbody.</li> <li>• Ensure cleared vegetation does not enter watercourses.</li> <li>• See spill control measures under S-6.</li> <li>• Do not place or allow to disperse any rock, silt, cement, grout, asphalt, petroleum product, lumber, vegetation, domestic waste, or any deleterious substance into any waterbody, stormwater system or sanitary sewer.</li> </ul>
	H-4	Introduction of nutrients into waterbodies	<ul style="list-style-type: none"> <li>• Locate burn piles a minimum of 30 m from watercourses.</li> </ul>
	H-5	Physical alteration of waterbody substrates	<ul style="list-style-type: none"> <li>• Store stockpiles (covered) a minimum of 2 m from water bodies to prevent material loss.</li> </ul>
	V-1	Damage to and/or removal of vegetation	<ul style="list-style-type: none"> <li>• Operate machines carefully to avoid damaging surrounding vegetation.</li> <li>• Ensure excavated material does not damage or bury plant material that is to be retained on the site or in adjacent areas. Store excavated soils and construction materials in a well-defined area. Use tarps and/or snow fences to limit damage to vegetation.</li> <li>• Install fencing around trees to be retained beyond the trees' drip line.</li> <li>• Reclaim and revegetate the site (including temporary access roads, staging and storage areas) as soon as possible following the project.</li> <li>• Identify and avoid areas with rare plants or valued vegetation features.</li> </ul>
	V-2	Introduction of non-native invasive plant species	<ul style="list-style-type: none"> <li>• Clean construction equipment before entering the park.</li> <li>• Revegetate with Parks Canada recommended seed mix. Contact the Environmental Assessment Office for the appropriate mix for the ecosite.</li> </ul>
<b>Wildlife</b>	W-1	Sensory disturbance causing displacement/habitat avoidance	<ul style="list-style-type: none"> <li>• Limit activities to daylight hours.</li> <li>• Limit activities during critical foraging times (dusk and dawn) particularly post hibernation when bears and cubs are leaving dens in the spring (April/May) and prior to hibernation (July to September).</li> </ul>

Environmental Component	Code	Description of Effect	Mitigation
Wildlife <i>continued</i>	W-1 <i>continued</i>	Sensory disturbance causing displacement/habitat avoidance <i>continued</i>	<ul style="list-style-type: none"> <li>• Avoid work during sensitive times for bighorn sheep in the Sinclair Canyon. Sheep use in the Sinclair Canyon is usually highest from mid-April through mid-June, when the ewes are migrating from the low country below the canyon to lambing sites in the high country. Overall, the best times for work in the canyon to avoid conflicts with sheep are July through mid-September and, to a lesser extent, January and February.</li> <li>• Lighting is to respect a dark sky concept by not being overly bright or causing light pollution. Lighting is to be directed downwards and kept to a minimum without compromising safety.</li> </ul>
	W-2	Wildlife habituation/attraction to artificial food sources	<ul style="list-style-type: none"> <li>• Keep site free of garbage and dispose of garbage in bear proof containers or remove daily from the site.</li> <li>• Educate workers that wildlife harassment or feeding is not permitted.</li> <li>• Communicate potential problem and/or habituated wildlife to Parks Canada at (403) 762-1473.</li> <li>• Store hazardous chemicals (e.g. antifreeze) that might be attractants in animal proof containers.</li> </ul>
	W-4	Loss of habitat	<ul style="list-style-type: none"> <li>• Retain vegetation where possible, especially trees and shrubbery.</li> </ul>
	W-6	Decreased wildlife abundance due to direct mortality	<ul style="list-style-type: none"> <li>• Observe local speed limits.</li> </ul>
	SE-1	Disruption to park visitors, residents and businesses due to increased noise and traffic, changes in air, water quality and aesthetics, including lighting	<ul style="list-style-type: none"> <li>• Evaluate site layout, access routes and construction activities to minimize their visual impact.</li> <li>• Limit noise-producing activities to daylight hours.</li> <li>• Outline traffic control measures and assess the need for flagging personnel.</li> <li>• Store materials within the confines of the work site.</li> <li>• Lighting is to respect a dark sky concept by not being overly bright or causing light pollution. Lighting is to be directed downwards and kept to a minimum without compromising safety.</li> </ul>
Socio-Economic Conditions			

**Table 5.4 Environmental Effects and Mitigation Measures of Routine Frontcountry Projects by Physical Activity: Site Preparation**

<b>Environmental Component</b>	<b>Code</b>	<b>Description of Effect</b>	<b>Mitigation</b>
<b>Air Quality and Noise</b>	A-1	Decreased ambient air quality	<ul style="list-style-type: none"> <li>• Avoid site preparation during dry and windy periods.</li> </ul>
	A-2	Increased ambient noise levels	<ul style="list-style-type: none"> <li>• Confine "noise" activities to daylight hours.</li> </ul>
	S-1	Changes in slopes, landforms and landscape diversity	<ul style="list-style-type: none"> <li>• Assess slope stability (based on slope length, soil texture, steepness, soil depth). Adjust activities to avoid these areas if possible (particularly where slopes are 15 degrees or greater and where soils are shallow and likely to move with disturbance).</li> <li>• Hand clear on steep slopes that do not require grading. Wait to clear steep slopes until immediately before scheduled construction and reclaim immediately afterwards.</li> <li>• Use appropriate geo-technical control measures to stabilize slopes.</li> </ul>
	S-4	Loss of topsoil, topsoil and subsoil mixing, soil erosion, slope instability	<ul style="list-style-type: none"> <li>• Clear minimum area necessary. Where possible, leave stumps and roots in place.</li> <li>• Stabilize slopes as appropriate for local site conditions. Possible methods include: armor stones, crib walls, erosion control blankets, etc.</li> <li>• Create interceptor swales to divert runoff from the top of erodable slopes.</li> <li>• Minimize the amount of time that excavations and trenches remain open.</li> <li>• Dewater all excavations, but not directly into a waterbody.</li> </ul>
	S-6	Soil contamination due to leaks or accidental spills	<ul style="list-style-type: none"> <li>• If any contamination is uncovered during excavation, investigate and identify the source, properly remove the contaminated soil and dispose of it in a certified landfill.</li> </ul>
<b>Hydrological and Aquatic Resources</b>	H-1	Adverse modifications to surface drainage patterns; stormwater runoff volumes and rate of runoff; stream or shoreline morphology; water flow volumes, levels and rates	<ul style="list-style-type: none"> <li>• Properly seal boreholes as per provincial standards.</li> <li>• Maintain effective surface drainage upon completion of the project, which may include re-establishment of, or improvement to, the original site drainage.</li> <li>• Minimize changes to the ground surface that affect its infiltration and runoff characteristics.</li> <li>• Retain vegetated buffer around waterbodies.</li> </ul>
	H-2	Changes in groundwater flow patterns, recharge and levels	<ul style="list-style-type: none"> <li>• Avoid intercepting aquifers when drilling or excavating.</li> <li>• Maintain surface drainage, ponding, existing soil and groundcover conditions in groundwater recharge areas.</li> </ul>



<b>Environmental Component</b>	<b>Code</b>	<b>Description of Effect</b>	<b>Mitigation</b>
<b>Hydrological and Aquatic Resources</b> <i>continued</i>	H-3	Reduced water quality and clarity due to increased erosion, sedimentation, transport of debris, point or non-point sources of pollution	<ul style="list-style-type: none"> <li>• Dewatering directly into a waterbody, sanitary or stormwater system is not permitted. Sediment must settle out or be filtered before water from an excavation is allowed to enter a drainage pathway.</li> <li>• Dewatering onto vegetated areas is permitted provided that water velocity is controlled to dissipate energy, prevent soil erosion and allow for infiltration, and dewatering structures are continuously monitored to ensure no damage is being done to soil or vegetation.</li> <li>• Minimize clearing, grubbing and grading near water bodies.</li> </ul>
	V-1	Damage to and/or removal of vegetation	<ul style="list-style-type: none"> <li>• During grubbing and stripping, minimize damage to trees and roots on the edge of the cleared area.</li> <li>• Minimize area cleared. Clearly mark area to be cleared with flagging tape and/or temporary fencing.</li> <li>• Salvage and replant shrubs and small trees.</li> <li>• Cut trees so that they fall within the cleared perimeter.</li> <li>• Retain vegetation where possible, especially trees and shrubbery.</li> </ul>
<b>Wildlife</b>	W-4	Loss of habitat (food and cover)	
	W-5	Damage to nests and/or disruption of nesting birds, disruption of denning animals or breeding bats	<ul style="list-style-type: none"> <li>• Conduct any clearing outside of the bat breeding and/or nesting season for migratory and resident birds known to breed in the area. Owls and corvids may begin nesting from February onwards. Songbirds generally nest from May until mid-July. Some migratory raptors (e.g. osprey) rear their young well into August. The little brown myotis is typically active from May through September.</li> <li>• If clearing takes place during the breeding and nesting season, sweep for bird nests before commencing work. Young birds must be allowed to fledge before nests are disturbed.</li> <li>• Check the area for dens and bats before commencing work. Active dens and breeding bats (nursery colonies) must not be disturbed.</li> <li>• If any active dens, nests or bats are located, contact the Environmental Assessment Office.</li> </ul>

<b>Environmental Component</b>	<b>Code</b>	<b>Description of Effect</b>	<b>Mitigation</b>
<b>Wildlife</b> <i>continued</i>	W-6	Decreased wildlife abundance due to direct mortality from physical activities	<ul style="list-style-type: none"> <li>• Observe local speed limits. Drive during daylight hours.</li> <li>• Minimize the time boreholes or test pits remain open in order to reduce small terrestrial wildlife mortality. Properly seal boreholes and fit PVC pipes.</li> <li>• Fence excavations to prevent injury to wildlife.</li> <li>• Investigate for presence of amphibians in manholes before commencing work.</li> </ul>
<b>Cultural Heritage</b>	P-1	Loss or disruption of heritage, archaeological and paleontological features	<ul style="list-style-type: none"> <li>• If any artefacts are uncovered, stop work until a Parks Canada archaeologist is consulted.</li> </ul>
<b>Human Health</b>	HH-1	Injuries to public and workers arising from a change in the environment and/or improper handling of hazardous materials	<ul style="list-style-type: none"> <li>• All trenches or ditches left unattended overnight must be fenced.</li> <li>• Identify and handle all toxic/hazardous materials as required under the Canadian Environmental Protection Act, Transportation of Dangerous Goods Act and Workplace Hazardous Materials Information Service.</li> </ul>

**Table 5.5 Environmental Effects and Mitigation Measures of Routine Frontcountry Projects by Physical Activity:**  
Buildings

<b>Environmental Component</b>	<b>Environmental Code</b>	<b>Description of Effect</b>	<b>Mitigation</b>
<b>Soils and Topography</b>	S-6	Soil contamination	<ul style="list-style-type: none"> <li>When building demolition is required, check for the presence of hazardous materials (e.g. asbestos, PCB's, etc.). Identify and handle all toxic/hazardous materials as required under the Canadian Environmental Protection Act, Transportation of Dangerous Goods Act and Workplace Hazardous Materials Information Service.</li> </ul>
	H-3	Reduced water quality and clarity due to increased erosion, sedimentation, transport of debris, point or non-point sources of pollution	<ul style="list-style-type: none"> <li>Backfill and compact excavations as soon as possible. Optimize degree of compaction to minimize erosion and allow for revegetation.</li> <li>New privy vaults must be located a minimum of 30 m from the nearest water body and 15 m from the nearest water well. Vaults must be leak tested prior to installation.</li> <li>Water treatment units (the cisterns in particular) will be located at least 30 meters away from the nearest waterbody to prevent chlorinated water from entering water should an accidental discharge occur. All cisterns will be located within a locked enclosure to protect storage tanks from damage or tampering. Filters and chemical pumps will be housed in a steel box with a padlock.</li> </ul>
	H-4	Introduction of nutrients to waterbodies	<ul style="list-style-type: none"> <li>Wastewater disposal systems must meet the Alberta Private Sewage Systems Standard of Practice (2009).</li> </ul>
<b>Wildlife</b>	W-3	Impeded/alterd wildlife movement due to encroachment on wildlife movement corridors	<ul style="list-style-type: none"> <li>Evaluate the need for permanent fences.</li> <li>Construct fences and orient in such a manner to reduce impacts on wildlife movement.</li> <li>Consult Wildlife Specialist to determine appropriate fence design and location.</li> </ul>
	P-1	Loss or disruption of heritage, archaeological and paleontological features	<ul style="list-style-type: none"> <li>All buildings over 40 years old, including picnic shelters, must be reviewed by FHBRO prior to disposal or renovation.</li> <li>Replacement should only occur when the major part of an element is decayed beyond repair.</li> <li>The substitution of maintenance-free materials such as aluminium, fibreglass or vinyl for existing materials is not recommended.</li> <li>The design of additions or alterations to a building must respect its heritage character.</li> <li>Where the integrity of the relationship between a building and its associated landscape is relatively unaltered, strong efforts should be made to retain this relationship and the materials that contribute to it.</li> <li>Consult the FHBRO Code of Practice for complete details.</li> </ul>

Environmental Component	Code	Description of Effect	Mitigation
Human Health	HH-1	Injuries to public and workers arising from a change in the environment and/or improper handling of hazardous materials	<ul style="list-style-type: none"> <li>• All trenches or ditches left unattended overnight must be fenced.</li> <li>• Identify and handle all toxic/hazardous materials as required under the Canadian Environmental Protection Act, Transportation of Dangerous Goods Act and Workplace Hazardous Materials Information Service.</li> </ul>

**Table 5.6 Environmental Effects and Mitigation Measures of Routine Frontcountry Projects by Physical Activity: Utilities**

Environmental Component	Code	Description of Effect	Mitigation
Soils and Topography	S-3	Ground subsidence from soil thaw, poor excavation and backfilling practices; ground surface mounding/structure movement	<ul style="list-style-type: none"> <li>• Ensure backfilling is undertaken using suitable materials free of ice and frozen soils and that adequate soil compaction is conducted to avoid ground subsidence.</li> <li>• Provide additional backfill where subsidence has occurred.</li> <li>• In areas with high groundwater levels, ensure that soils susceptible to frost heave (generally fine sands to silty soils) are not used for backfill.</li> </ul>
	S-4	Loss of topsoil, topsoil and subsoil mixing, soil erosion	<ul style="list-style-type: none"> <li>• Install trench breakers of impervious material to direct groundwater seepage to the surface.</li> <li>• Minimize the length of exposed trench and the exposure time.</li> <li>• Use interceptor ditches or berms (bales) upgradient of construction to divert overland flow around exposed soil surfaces.</li> <li>• Line steep ditches with filter fabric, rock or polyethylene lining to prevent channel erosion.</li> <li>• Delay trenching until just prior to pipe installation.</li> </ul>
Hydrological and Aquatic Resources	H-2	Changes in groundwater flow patterns, recharge and levels	<ul style="list-style-type: none"> <li>• Pipes to be abandoned must be pressure tested for leaks and sealed with no part of the line exposed above the surface.</li> </ul>



**Table 5.7**      **Environmental Effects and Mitigation Measures of Routine Frontcountry Projects by Physical Activity: Roads, Parking Lots, Sidewalks and Trails**

<b>Environmental Component</b>	<b>Code</b>	<b>Description of Effect</b>	<b>Mitigation</b>
<b>Soils and Topography</b>	S-6	Soil contamination	<ul style="list-style-type: none"> <li>• Do not use oil-based dust suppressants.</li> <li>• Paints with minimal amounts of potentially harmful substances, particularly water soluble organic chemicals, lead and other metals, are preferred. Rust inhibiting paints should be chosen over barrier types of paints do reduce the total volume of paint required over the long-term.</li> <li>• Hand painting is preferred over spray painting. Where sprayers are used, they must be properly adjusted and shielded to minimize the amounts of paint lost to overspray.</li> <li>• Do not spray in high winds.</li> <li>• Apply seal coat to dry surface only and not prior to (within 24 hours) or during rainfall.</li> </ul>
<b>Hydrological and Aquatic Resources</b>	H-3	Reduced water quality and clarity due to increased erosion, sedimentation, transport of debris, point or non-point sources of pollution	

**Table 5.8 Environmental Effects and Mitigation Measures of Routine Frontcountry Projects by Physical Activity: Vegetation Management**

<b>Environmental Component</b>	<b>Code</b>	<b>Description of Effect</b>	<b>Mitigation</b>
<b>Soils and Topography</b>	S-1	Changes in slopes, landforms and landscape diversity	<ul style="list-style-type: none"> <li>Assess slope stability (based on slope length, soil texture, steepness, soil depth). Adjust activities to avoid these areas if possible (particularly where slopes are 15 degrees or greater and where soils are shallow and likely to move with disturbance).</li> </ul>
	S-5	Loss of organic matter/soil sterilization due to intense burning	<ul style="list-style-type: none"> <li>Salvage as much timber as possible for other uses (e.g. firewood).</li> <li>Locate burn piles on previously disturbed areas.</li> <li>Limit size of burn piles to reduce intensity of fire.</li> </ul>
<b>Hydrological and Aquatic Resources</b>	H-1	Adverse modifications to surface drainage patterns; stormwater runoff volumes and rate of runoff; stream or shoreline morphology; water flow volumes, levels and rates	<ul style="list-style-type: none"> <li>Retain vegetated buffer around waterbodies.</li> <li>Locate staging areas away from drainage features.</li> </ul>
	H-3	Reduced water quality and clarity due to increased erosion, sedimentation, transport of debris, point or non-point sources of pollution	<ul style="list-style-type: none"> <li>Hazard trees will be felled away from any watercourses or wet areas.</li> </ul>
<b>Vegetation</b>	V-1		<ul style="list-style-type: none"> <li>Minimize the area of vegetation removal. Clearly mark the area to be cleared with flagging tape and/or temporary fencing.</li> <li>Hazardous tree assessments must be undertaken by Certified Wildlife/Danger Tree Assessors.</li> <li>Trees will be felled toward existing cleared/hardened areas as much as possible.</li> <li>In areas where public access should be restricted to avoid use of unofficial trails or to better delineate a specific area (e.g., a campsite), trees may be felled into the forest and strategically placed. These trees will be limbed and laid flat.</li> <li>Vegetative material is disposed on-site and/or removed, depending on quantity and location, and may be limbed and bucked to lie flat, processed for firewood, chipped and/or burned. Appropriate disposal is determined on a case-by-case basis in consultation with the Environmental Assessment Office.</li> </ul>
		Damage to and/or removal of vegetation	

<b>Environmental Component</b>	<b>Code</b>	<b>Description of Effect</b>	<b>Mitigation</b>
<b>Wildlife</b>	W-4	Loss of habitat (food and cover)	<ul style="list-style-type: none"> <li>• Maintain forest structural attributes such as wildlife trees, coarse woody debris, rock outcrops, and boulder fields/talus.</li> <li>• Minimize disturbance to understory plants and soil.</li> </ul>
	W-5	Damage to nests and/or disruption of nesting birds, disruption of denning animals or breeding bats	<ul style="list-style-type: none"> <li>• Conduct any clearing outside of the bat breeding and/or nesting season for migratory and resident birds known to breed in the area. Owls and corvids may begin nesting from February onwards. Songbirds generally nest from May until mid-July. Some migratory raptors (e.g. osprey) rear their young well into August. The little brown myotis is typically active from May through September.</li> <li>• If clearing takes place during the breeding and nesting season, sweep for bird nests before commencing work. Young birds must be allowed to fledge before nests are disturbed.</li> <li>• Check the area for dens and bats before commencing work. Active dens and breeding bats (nursery colonies) must not be disturbed.</li> <li>• If any active dens, nests or bats are located, contact the Environmental Assessment Office.</li> </ul>
<b>Socio-Economic Conditions</b>	SE-1	Disruption to park visitors, residents and businesses due to increased noise and traffic, and changes in aesthetics	<ul style="list-style-type: none"> <li>• Retain and limit damage to vegetation where possible, especially trees and shrubbery.</li> <li>• All stumps are to be cut flush to the ground where possible.</li> <li>• Parks Canada will authorize burning of slash piles only when optimum smoke venting conditions are present.</li> </ul>
<b>Human Health</b>	HH-1	Injuries to public and workers arising from a change in the environment and/or improper handling of hazardous materials	<ul style="list-style-type: none"> <li>• All tree falling must be undertaken by Certified Fallers.</li> <li>• While tree falling is taking place, all workers on-site must wear the proper Personal Protective Equipment (PPE) for their assigned tasks.</li> </ul>

**Table 5.9      Environmental Effects and Mitigation Measures of Routine Frontcountry Projects by Physical Activity: Site Restoration/Reclamation**

<b>Environmental Component</b>	<b>Code</b>	<b>Description of Effect</b>	<b>Mitigation</b>
<b>Hydrological and Aquatic Resources</b>	H-4	Introduction of nutrients to waterbodies	<ul style="list-style-type: none"> <li>• Limit use of fertilizer to re-establish groundcover.</li> <li>• Avoid use of fertilizer in proximity to, or where runoff may enter a waterbody or drainage pathway.</li> </ul>
<b>Vegetation</b>	V-2	Introduction of non-native invasive plant species	<ul style="list-style-type: none"> <li>• Use certified weed free topsoil. If clean topsoil is not available, monitor the site for three years following landscaping and control for weeds.</li> <li>• Revegetate with Parks Canada recommended seed mix. Contact the Environmental Assessment Office for the appropriate mix for the ecosite.</li> </ul>



