



Ministry of
Transportation
and Infrastructure

Kicking Horse Canyon Project - Phase 4

COST REPORT

June 2019

TABLE OF CONTENTS

1.	PURPOSE	3
2.	BASIS FOR THE ESTIMATE	4
2.1.	SCOPE OF THE WORKS	4
2.2.	SCOPE OF CAPITAL COSTS	4
2.3.	DUE DILIGENCE REVIEW OF THE ESTIMATE	4
3.	PROCESS AND METHODOLOGY	5
3.1.	KEY ASSUMPTIONS	5
3.2.	PROJECT ELEMENTS	5
3.2.1.	Design-Build Contract Management.....	5
3.2.2.	Grade Construction	5
3.2.3.	Structural Construction.....	6
3.2.4.	Utility Construction	6
3.2.5.	CP Related Works.....	6
3.2.6.	Escalation	6
3.2.7.	Owner’s Project Management	6
3.2.8.	Indigenous Accommodation	6
3.2.9.	BCIB Administration	7
3.2.10.	Project Contingency	7
3.2.11.	Interest During Construction.....	7
4.	CAPITAL COST ESTIMATE	7

1. PURPOSE

This document details the preliminary cost estimate of the reference concept design for the Kicking Horse Canyon Project Phase 4: West Portal to Yoho Bridge (the Project). The purpose of this estimate is to inform the overall Project budget including contingency.

2. BASIS FOR THE ESTIMATE

2.1. SCOPE OF THE WORKS

The capital cost estimate for the Project is based on a scope of work required to design, construct, and implement the Project that meets current Ministry of Transportation and Infrastructure (the Ministry) standards. The Project is the last remaining unimproved segment of the 26 km Trans-Canada Highway corridor in Kicking Horse Canyon. Work includes approximately 4.8 km of four laning, alignment improvements to 100 km/hr, rock fall and avalanche protection measures, and wildlife safety features. It is the most challenging segment for the Trans-Canada Highway upgrading due to the extremely steep mountainous terrain, variable geotechnical conditions, and proximity to the Kicking Horse River and the CP railway mainline.

2.2. SCOPE OF CAPITAL COSTS

The estimate includes both the owner's and constructor's costs necessary to implement the Project. The estimate assumes that all the work is carried out as a single project, delivered using a Design-Build (DB) procurement model, and covers Project costs including:

- Project management;
- Preliminary design and technical investigations;
- Engagement and consultation;
- Procurement;
- Detailed Design;
- Construction;
- Risk and contingencies; and
- Interest during construction.

2.3. DUE DILIGENCE REVIEW OF THE ESTIMATE

The capital cost estimate was prepared by the Project's Owner's Engineer team. An independent cost estimate was prepared by a separate consultant using different estimating methods. This due diligence review of the capital cost estimate confirmed that the budget currently carried is reasonable for the Project scope.

3. PROCESS AND METHODOLOGY

3.1. KEY ASSUMPTIONS

The capital cost estimate was developed based on preliminary drawings, analysis and reports, as well as input and assumptions from subject-matter experts across multiple disciplines.

The cost estimate was prepared based on an estimate of quantities, unit prices and lump sum allowances, relying on historical knowledge and current pricing levels. Construction schedule and staging requirements were considered to estimate costs relating to traffic management, temporary detours, temporary works, and construction access.

The estimate covers all costs associated with the implementation of the Project from the period commencing with the setup of the Owner's Engineering team until total completion of the Project.

The construction, design and management costs included in the estimate are based on a Project schedule as follows:

- Issue RFQ: Summer 2019
- Issue RFP: Fall 2019
- Financial Close: Summer 2020
- Project Completion: Winter 2023/2024

Risk values and timing, retained by the owner and transferred to the contractor, are calculated as set out in the Risk Report. Risk values are reflected as a portion of overall contingencies.

3.2. PROJECT ELEMENTS

The project components are assumed to include the elements detailed below.

3.2.1. *Design-Build Contract Management*

The cost estimate includes contractor team project management, detailed design, quality management, mobilization, site offices, shops and laydown areas.

3.2.2. *Grade Construction*

The cost estimate includes all highway construction not associated with the major structures. The estimate includes significant rock excavation, road construction materials, drainage facilities, minor walls, avalanche containment ditches, rock slope improvements, rock fall attenuator mesh and upslope protection, wildlife fencing, revegetation, traffic management, temporary works and detours, construction access, paving construction, operational items (i.e. signs, barriers) and contractor completed environmental management.

3.2.3. *Structural Construction*

The cost estimate is based on construction of five conventional girder bridges, each split into separate westbound and eastbound superstructures:

- Some bridges are single span “half bridges” supporting eastbound traffic over gullies. The westbound traffic is supported on fills retained by pile-supported median walls.
- Some bridges are multi-span structures crossing deep gullies. The westbound structures are shorter than the eastbound as it is assumed, where competent foundation conditions are encountered, the westbound traffic is supported on fills retained by median walls.

The cost estimate for bridges includes all costs relating to bridge construction including foundations substructure and superstructure but does not include median and abutment return walls that are included in the bridge walls and stand-alone walls section.

The cost estimate includes all bridge and stand-alone walls, located both up and downslope of the highway. Bridge walls are located at each end of each bridge and include abutment and median walls. Wall construction includes mechanically stabilized earth (MSE), anchored cast-in-place concrete, anchored shotcrete and extended steel pipe piles.

3.2.4. *Utility Construction*

The cost estimate includes relocation and/or replacement of BC Hydro and TELUS infrastructure.

3.2.5. *CP Related Works*

The cost estimate includes contractor costs for railway flagging, railway protection and potential rail traffic delay penalties.

3.2.6. *Escalation*

The cost estimate includes both the (a) construction cost increase from the time the cost estimate was developed to the expected date for financial close; and (b) the increase in cost for labour, service and consumable items (i.e. fuel, tools) through project delivery to substantial completion.

3.2.7. *Owner’s Project Management*

The cost estimate includes direct costs incurred by the project team for project management and the Owner’s Engineer team. Additional costs include office space, IT support, travel, signage, procurement stipends, environmental and archaeological assessments and property.

3.2.8. *Indigenous Accommodation*

The cost estimate includes Indigenous legal fees, consultation, investigations and studies, monitoring, employment and training.

3.2.9. *BCIB Administration*

The cost estimate includes costs for fees by BC Infrastructure Benefits Inc. (BCIB) the crown corporation that will supply labour and manage payroll and benefits as the employer under the Community Benefits Agreement.

3.2.10. *Project Contingency*

The cost estimate includes a contingency to address risk associated with the design-build delivery, including engineering, archeology, construction and traffic management activities.

3.2.11. *Interest During Construction*

The estimated interest during construction (IDC) consists of interest on funds borrowed for the Province's share of the project costs (i.e. the total project costs minus the portion recovered from the federal funding contribution). The project cash flow is used to determine the annual interest paid for the duration of construction.

4. CAPITAL COST ESTIMATE

The total estimated Project cost is \$601 million. Of this amount, the Design-Build contract is expected to be valued at approximately [REDACTED], while the owner's portion is estimated at approximately [REDACTED]. The project contingency is estimated at [REDACTED] and interest during construction is estimated at \$23 million. Capital costs are summarized in Table 1.

Cash flow expectations during planning, procurement, and implementation of the Project are summarized in Table 2. These estimates highlight anticipated costs on an annual basis by fiscal year ending March 31. Contingencies are shown to accrue through construction and be reconciled toward the end of the construction period. This presentation is consistent with experience on prior projects. Values shown in years beyond project completion in 2023/24 represent estimates of contract holdback release and costs related wrapping up the project, including close out reporting.

Table 1 – Project Cost Estimate Summary

CONTRACTOR ESTIMATED COSTS	
DESIGN-BUILD CONTRACT MANAGEMENT	██████████
GRADE CONSTRUCTION	██████████
STRUCTURAL CONSTRUCTION	██████████
UTILITY CONSTRUCTION	██████████
CP RELATED WORKS	██████████
TOTAL CONTRACTOR COSTS (without contingency)	██████████
OWNER'S RELATED COSTS	
OWNER'S PROJECT MANAGEMENT	██████████
INDIGENOUS ACCOMMODATION	██████████
BCIB ADMINISTRATIION	██████████
TOTAL OWNER'S COSTS (without contingency)	██████████
ESTIMATED CONTINGENCY COSTS	
PROJECT CONTINGENCY	██████████
SUBTOTAL PROJECT COST	██████████
INTEREST DURING CONSTRUCTION	
INTEREST DURING CONSTRUCTION (IDC)	23,000,000
TOTAL PROJECT COST	600,788,886

Table 2 – Project Cash Flow

	Past	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	Total
Ministry Costs										
Project Management										
Indigenous Accommodation	-							-	-	
BCIB Administration Costs										
Design Build Contract	-	-	-					-	-	
Design-Build Contractor Management	-	-	-					-	-	
Grade Construction	-	-	-					-	-	
Structural Construction - Bridges	-	-	-					-	-	
Structural Construction - Walls	-	-	-					-	-	
Utility Construction	-	-	-					-	-	
CP Related Works								-	-	
Contingency	-	-	-					-	-	
IDC								-	-	23,000,000
Total										600,788,886
Federal Contribution							-	-	-	215,198,500
Provincial Contribution										385,590,386