

Description of Terrain	Geohazard Code	Unmitigated			Potential Protection, Mitigation and Management Measures ¹	Mitigated		
		Hazard Likelihood	Consequence Rating	Risk		Hazard Likelihood	Consequence Rating	Risk
<ul style="list-style-type: none"> Steep rock slopes on original route subject to rockfall. Steep slopes and construction grading would be at risk of shallow landslides. Deep seated rock toppling failure on steep alpine slopes into upper Hoult Creek on original route. Avalanche hazards from Nimbus Mountain area above original route through upper Hoult Creek. 	RF	5	3	15	<ul style="list-style-type: none"> Re-route to avoid alpine rockfall. Landslides avoided by routing. 	1	1	1
	SM	5	6	25	<ul style="list-style-type: none"> Rock toppling failure avoided by routing Avalanche hazard reduced by routing through tunnels and portal location selection. 	1	1	1
	DS	4	5	20		1	1	1
	AV	5	3	15		2	1	2

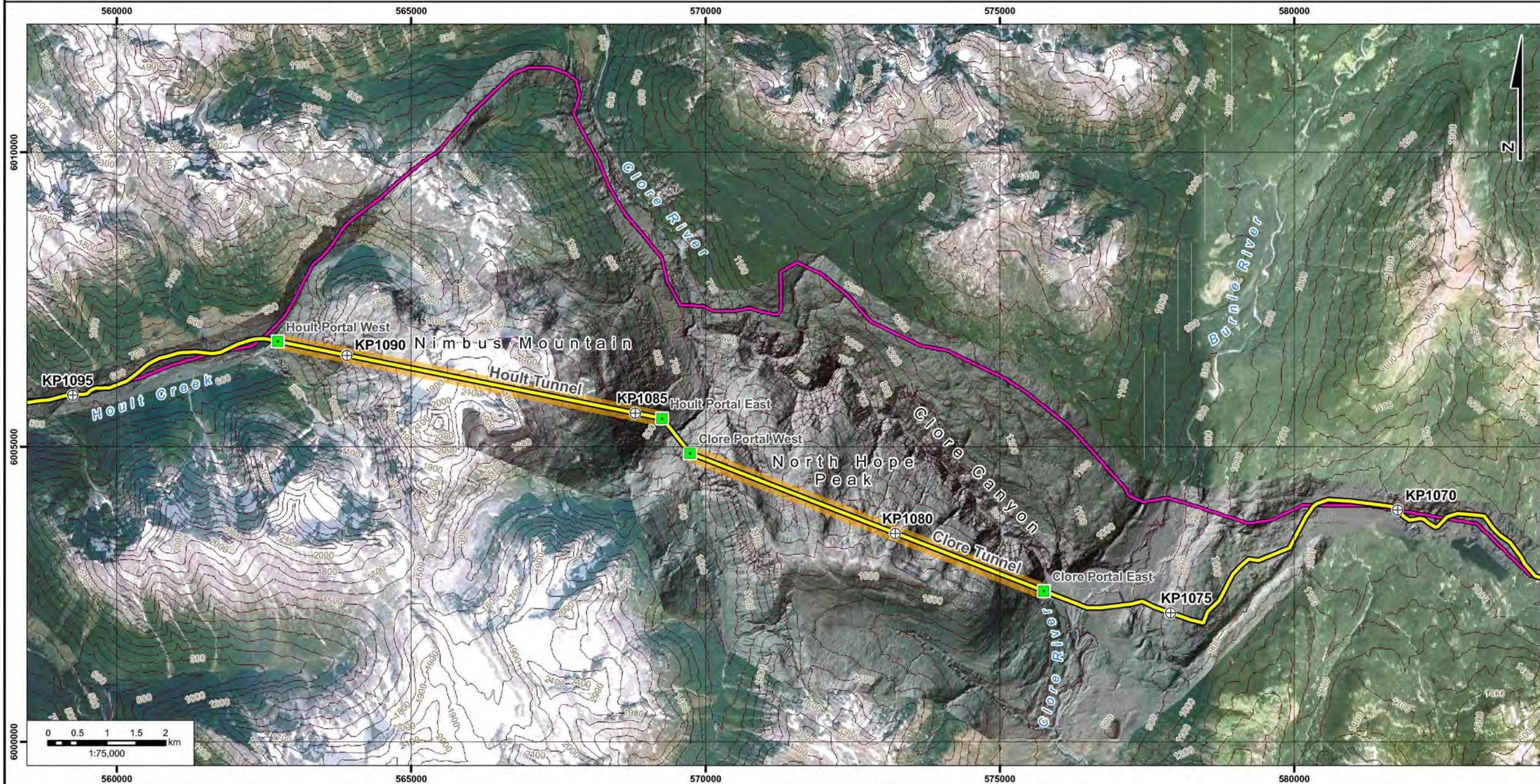
¹ Excerpt taken from Table C-1 included in Overall Geotechnical Report

Hazard Likelihood Category

Very low annual likelihood of occurrence and much less likely to occur over the life of the Project.	Unlikely to happen in any given year and less likely over that life of the Project.	It could happen (likely as not) over the life of the Project.	Probably will happen over the life of the Project.	Will likely happen regularly over the life of the Project.
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Consequence Category

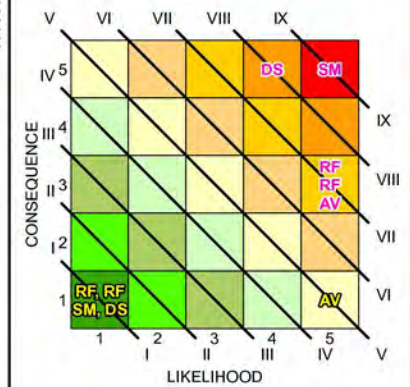
Minor incident or inefficiency of little or no consequence.	Minor incident or inefficiency that may require engineering review but is easily and predictably remediated.	Moderate event requiring mitigation and certainly engineering review/input.	Significant event that can be addressed but with great effort.	Major event with extremely costly and difficult remediation.
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Geohazard Codes

- Mass Wasting**
- DS Deep-seated slides
 - SM Shallow to moderately deep slides
 - DF Debris Flow
 - RF Rock Fall
 - AV Avalanches
 - LS Lateral Spreading
 - SE Stream Erosion & sedimentation
 - ER Wind & shallow stream or overland erosion
- Settlement**
- CS Consolidation Settlement
 - KS Karst induced Settlement or displacement
- Seismic**
- EQ Seismic Motion
 - LQ Liquefaction
- Tsunamis**
- TS Tsunamis
- (#) Number of occurrences of Geohazard that fit in that square of the Risk Matrix

Risk Matrix



- Legend**
- RF Risk Before Mitigation
 - RF Risk After Mitigation
 - ⊕ Proposed Gateway Pipeline KP (Route Rev T)
 - Proposed Gateway Pipeline Route (Route Rev T)
 - Former Proposed Gateway Pipeline Route (Route Rev A)
 - TRIM Contour

Notes:

- Data sources: Imagery - Google Earth Pro (2003); LIDAR hillshade.



CLIENT:
NORTHERN GATEWAY PIPELINES INC.

AMEC Earth & Environmental
3456 Opie Crescent
Prince George, BC, CANADA V2N 2P9

DWN BY: BB
CHK'D BY: SK

DATUM: NAD 83
PROJECTION: UTM Zone 9
SCALE: 1:75,000

CLORE RIVER TO HOULT CREEK CORRIDOR (TUNNELS)

GEOTECHNICAL ENGINEERING RISK-BASED DESIGN APPROACH
ENBRIDGE NORTHERN GATEWAY PROJECT

DATE: MARCH 2011
PROJECT NO.: EG0926008.2001.100
REV NO.: A
FIGURE C-6