

SITE NUMBER AND NAME: <b>S060 Lost Knife Creek</b>		HIGHWAY & KM: 40:14, 34.480	PREVIOUS INSPECTION DATE: May 18, 2022	INSPECTION DATE: <b>May 8, 2023</b>
LEGAL DESCRIPTION: 15-29-19-05 W5M	NAD 83 COORDINATES: UTM Northing Easting 11 5612799 665797		RISK ASSESSMENT: PF: 10 CF: 7 TOTAL: 70	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 279 (north) & 382 (south) (Reference No. 00401450)			CONTRACTOR MAINTENANCE AREA (CMA): 28	

SUMMARY OF SITE INSTRUMENTATION:  There is no instrumentation at the S060 site.  LAST READING DATE: N/A	INSPECTED BY: Chris Grapel (KCB) Peter Roy (KCB) Renato Macciotta (U of A) Roger Skirrow (AT) Alex Frotten (AT) Syed Siddeque (AT)
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**PRIMARY SITE ISSUE:** Erosion channel / slope failure on the east side of the highway. The culvert under the highway at the centre of the slide mass has disconnected at a joint; however, it is unknown whether slope movement led to culvert separation, or whether culvert separation led to the erosion feature.

**APPROXIMATE DIMENSIONS:** Head scarp is approximately 8.0 m wide (5.8 m in 2022) at the crest of a 30 m to 40 m high slope above an unnamed creek (possibly Lost Knife Creek).

**DATE OF ANY REMEDIAL ACTION:** Jersey barriers installed around failure since 2022.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress		X	Gravel road. Backscarp is undermining the east (northbound) lane	X	
Slope Movement	X		Slope failure on east side of highway undermining the guardrail.	X	
Erosion	X		Erosion from ditch and highway runoff into slide area.	X	
Seepage	X		Groundwater seepage previously observed below culvert invert and approximately 6 m below highway elevation.	X	
Culvert Distress	X		Existing 800 mm diameter CSP culvert under highway has disconnected at a joint and has been undermined by approximately 3.5 m (from the end of the CSP).	X	

**COMMENTS**

The site is on a gravel surfaced road, oriented roughly southeast to northwest at the site.

Surface water runoff has undermined approximately 8.0 m of the east (northbound) guardrail, an increase from the previously measured 5.8 m in 2022. The erosion has retrogressed approximately 1.3 m past the guardrail and has undermined 2 guardrail posts. This measurement was unchanged from 2022. Slope erosion will likely continue to undermine the guardrail and further encroach past the guardrail on the highway surface.

Surface water runoff, snow melt, culvert discharge, and groundwater seepage through the embankment are contributing to ongoing erosion and sloughing of embankment material, undermining of the culvert, and retrogression of the erosion feature laterally and longitudinally. Sloughing material is accumulating on top of the culvert. The erosion channel downstream of the culvert is approximately 5 m to 6 m deep and is discharging sediment into a fish bearing creek (potentially Lost Knife Creek). The sloughing is worse at the left (north) flank.

Water in the ditch on the west side of the highway is discharging into the culvert and draining onto the slide area. Active seepage and slope retrogression of the saturated embankment side slope is occurring.

Four black Telus utility cables (one broken) were exposed and observed in the gully.

North of the site, the east (northbound) ditch narrows until it is non-existent.

Maintenance/Repair/Monitoring Recommendations:

- Embankment stabilization including; (i) reconstruction of the embankment slope with granular fill, construction of a slope drain, and armouring the toe of the embankment and creek channel downstream of the culvert inlet; (ii) installation of a gabion basket retaining wall and rebuilding the embankment with granular fill and repairing the CSP culvert; or
- Realigning the highway to the west.

KCB is currently working on a design to repair the site, potentially in 2024. Work is planned to be carried out by the maintenance contractor.

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<p>Peter Roy, P.Eng. Civil Engineer</p>	
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**Legend**

- Flow Direction
- Guardrail
- Scarp
- Barrier
- Culvert



NOTES:  
 1. HORIZONTAL DATUM: NAD83  
 2. GRID ZONE: UTM ZONE 11N  
 3. IMAGE SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS AND THE GIS USER COMMUNITY.

CLIENT

PROJECT SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM		
TITLE Site Plan S060 - Lost Knife Creek Hwy 40:14, km 34.480		
SCALE 1:1,250	PROJECT No. A05116A03	FIG No. 1



**Photo 1** Head scarp on east side of Hwy 40. Erosion extends approximately 1.3 m into the highway. Photo taken facing north on May 8, 2023.



**Photo 2** View from highway down the erosion gully and separated culvert. Photo taken facing east on May 8, 2023.





**Photo 3** Two undermined guardrail posts on the highway. Slumping visible on the right and left flanks due to ongoing erosion. Culvert extrudes over 3.5 m from slope. Photo taken facing west on May 8, 2023.



**Photo 4** Barriers placed around the erosion into the road. Photo taken facing south on May 8, 2023.

