

SITE NUMBER AND NAME: S048 Castle Back Slope Failures		HIGHWAY & KM: 3:04, 23.708	PREVIOUS INSPECTION DATE: June 9, 2020	INSPECTION DATE: July 8, 2021
LEGAL DESCRIPTION: 15/06-12-007-01 W5M	NAD 83 COORDINATES: UTM Northing Easting 11 5492157 715695		RISK ASSESMENT: PF: 9 CF: 3 TOTAL: 27	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 3,860 (west), 4,140 (east), (Ref. No. 78050)			CONTRACTOR MAINTENANCE AREA (CMA): 26	

SUMMARY OF SITE INSTRUMENTATION: None present LAST READING DATE: N/A	INSPECTED BY: Chris Morgan (KCB) Margot Lederman (KCB) Alex Frotten (AT) Roger Skirrow (AT)
PRIMARY SITE ISSUE: Multiple slope failures on the south bank of the highway into the ditch extending up to 4 m onto private land. The slope failures are coalescing to form larger backslope failure areas and toe rolls are blocking the ditch.	
APPROXIMATE DIMENSIONS: Approximately 200 m length of 6 m to 10 m high back slope. The slope is approximately 3H:1V.	
DATE OF ANY REMEDIAL ACTION: No recent remedial measures have been undertaken.	

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress		X	Failures are not affecting the highway.		X
Slope Movement	X		Slope above the highway has failed in multiple locations.		X
Erosion	X		Some erosion of the failed material in the ditch.		X
Seepage	X		Some moist soil in the slide areas.		X
Culvert Distress		X	None observed.		X

COMMENTS

During the 2021 inspection, the lateral extents of the slope failure appeared similar to 2020. In the slide zones, the exposed back scarp is up to 1.8 m high. Tension cracking near the crest indicates ongoing slope movement and slide retrogression. Failure zones are coalescing.

Slide zones are located over approximately 200 m length on the south side of the highway. Slides appear to be a result of groundwater and precipitation leading to saturation of the slope south of the highway. The north-facing aspect of the slide will decrease evapo-transpiration from the slope surface and promote a longer duration of snow cover in the spring. The highest stable slope is 5.5 m, located at the east end of the north facing backslope.

The field located at the top of the slope failure is mostly graded towards the river and crop furrows are parallel to the fence line meaning that surface runoff is likely to drain away from the highway.

The barbed wire fence at the crest of the slope to private farmland is being undermined by the slope failures at 4 separate locations. Other sections of fence appear relatively straight along the crest of the slope. Three fence posts are undermined and failing at WP 150.

Zones of accumulation at the toe of the slide are blocking the ditch over the length of the failure. Areas of ponded water were noted along the length of the ditch.

A Shaw utility line is located approximately a quarter of the way up the slope. The utility cable is marked with a sign.

The south-facing backslope north of the highway is stable.

Recommended Mitigation Measures:

Short Term:

- The drainage ditch should be regraded to allow for positive surface water drainage, this will require the removal of the slide toe materials from the ditch. Materials removed should be kept to the minimum required to re-establish drainage without initiating additional slope movements.

Long Term:

- Flatten the slope to 4H:1V or 5H:1V, which would require moving the fence line back on the slope crest. A preliminary design should be prepared to assess slope flattening and the area of land required should be assessed. KCB could prepare the preliminary design without investigation, with AT putting the investigation costs into land purchase. AT land agents should contact the owner of the land at the crest of the backslope and start discussions on land procurement.
- Material excavated during slope flattening could be stockpiled in low area to the southwest of the site, levelling the area for possible future use by the farmer. The stockpile/fill placement should consider the potential for destabilizing the Oldman River slope near the Hwy 3 bridge.

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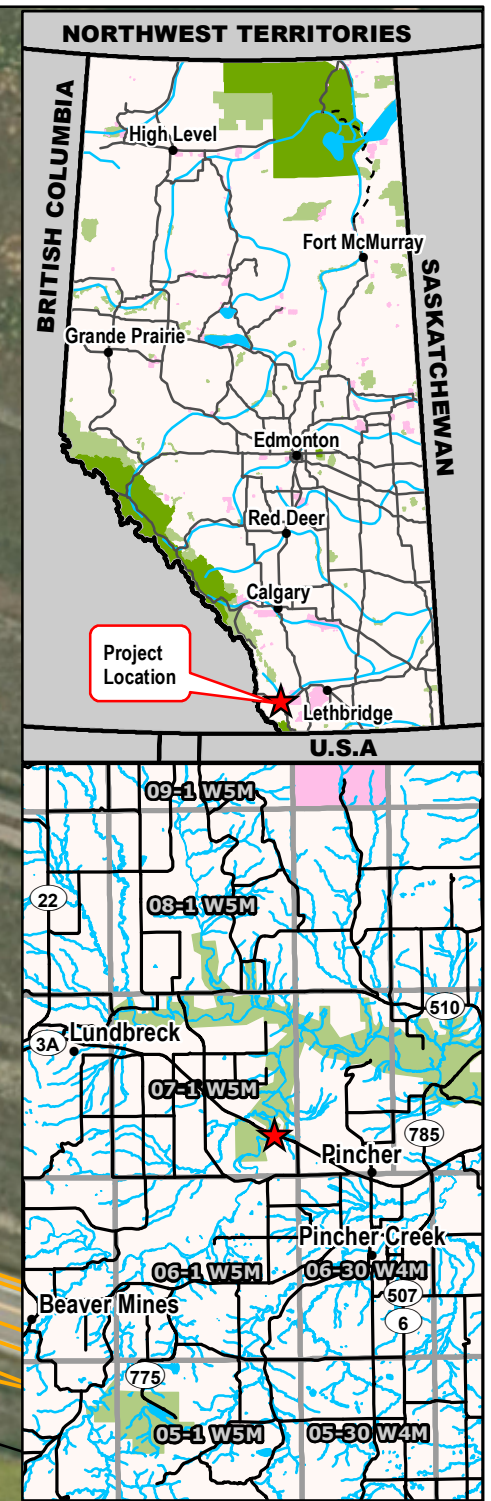
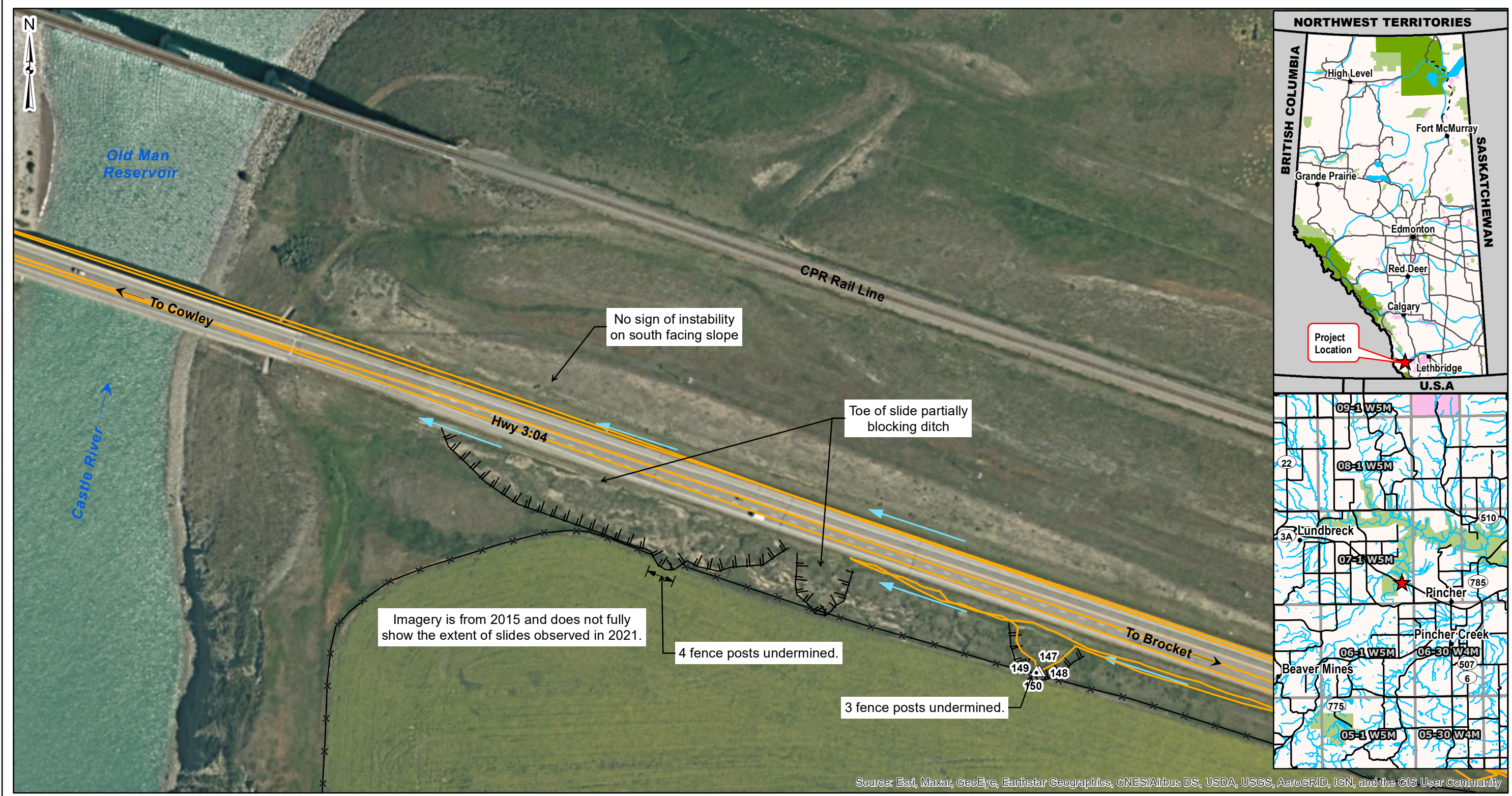
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- KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.



2021-11-24

Chris Morgan, M.Sc., P.Eng.
Senior Geotechnical Engineer

Time: 15:48:23 PM
 Date: October 14, 2021
 File: Z:\AUCSY\Alberta\A05116A03\ABT_Southern Region GRMP\400 Drawings\2021\Section B figures\MXD\SP048_211014.mxd



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

- GPS Waypoint (July, 8 2021) Flow Direction
- GPS Track (July 8, 2021)
- Main Scarp
- Fence

NOTES:
 1. HORIZONTAL DATUM: NAD83
 2. GRID ZONE: UTM Zone 11N
 3. IMAGE SOURCE: World Imagery from ESRI
 ArcGIS Online. Source date January 15, 2015

CLIENT

PROJECT SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM		
TITLE Site Plan S048 - Castle Back Slope Failures Hwy 3:04, km 23.708		
SCALE 1:1,700	PROJECT No. A05116A03	FIG No. 1

Photo 1 Looking south at the north-facing failing back slope. Photo taken on July 8, 2021.



Photo 2 Toe rolls coalescing and blocking the ditch. Photo was taken facing west on July 8, 2021.



Photo 3 Toe rolls blocking the ditch. Photo was taken facing west on July 8, 2021.

