

SITE NUMBER AND NAME: S039-I & -II Brocket Slides		HIGHWAY & KM: 3:06, 12.952 & 13.062	PREVIOUS INSPECTION DATE: June 9, 2020	INSPECTION DATE: July 8, 2021
LEGAL DESCRIPTION: 09/10-07-007-28 W4M	NAD 83 COORDINATES: UTM Northing Easting 12 5491976 298990		RISK ASSESSMENT: PF: 11 CF: 3 TOTAL: 33 (Site I)	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 4,700 (west), 4,780 (east), (Ref. No. 84050)			CONTRACTOR MAINTENANCE AREA (CMA): 24	

SUMMARY OF SITE INSTRUMENTATION: 3 slope inclinometers and 2 vibrating wire piezometers LAST READING DATE: June 15, 2021	INSPECTED BY: Chris Morgan (KCB) Margot Lederman (KCB) Alex Frotten (AT) Roger Skirrow (AT)
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PRIMARY SITE ISSUE: Natural slope landslide encroaching on west lane of highway.

APPROXIMATE DIMENSIONS:
S039-I: Landslide approximately 45 m wide at edge of westbound lane (undermining edge of pavement), overall width of slide zone is approximately 135 m. Landslide slope sloped at 1H:1V to 1.5H:1V for upper 3 m below edge of pavement, flattens to 2H:1V to a mid-slope bench. Overall slope of 2H:1V from crest to toe. Slope greater than 50 m high.
S039-II: A smaller slide on upper 10 m of natural slope, head scarp 2 m to 3 m high and approximately 110 m wide, head scarp located approximately 10 m from edge of pavement. Natural slope adjacent to slide sloped at approximately 2H:1V.

DATE OF ANY REMEDIAL ACTION: Pavement patching, crack filling, and installation of a curb to limit pavement runoff from flowing onto Site I in 2015. Gravel has been dumped over the guard rail onto the head of the slide to reduce the height of the head scarp. Instruments were installed in November 2016 and additional patching and curb repairs were carried out in 2017.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Cracks extending 3.8 m from guard rail into westbound lane over a 20 m length.		X
Slope Movement	X		Ongoing movement, cracks opening at crest of slide, in slide mass, and along west flank. Slide extends downslope, failure block/bench at mid slope height.		X
Erosion	X		Runoff from highway is causing erosion near head of slide and on non-vegetated surfaces.		X
Seepage	X		Seepage noted on left (west) flank of slide and dense vegetation noted on right (east) flank of slide.		X
Culvert Distress		X			X

COMMENTS
Site I (main slide)
 No significant changes to the site in 2021 when compared to 2020 and 2019 observations.

Slide movements have impacted the highway. The cracks are a several inches wide and deep, and partially collapsed. The 2017 asphalt patching has cracked.

Cracking of highway surface indicates that retrogression of head scarp into the highway lanes will continue. Water flow off the highway is eroding the placed gravel. Ongoing need for patching and asphalt curb repair.

Seepage inferred at Site I based on dense vegetation zone at east flank. Seepage observed on the access road constructed for drilling investigation.

Bench in slide mass is located approximately mid-slope and appears to be the location of the failure plane just above the elevation of bedrock outcrops on natural slopes on the flanks of the slide zone, with the slide mass falling to the toe of the natural slope.

No significant changes to the slide mass were observed in 2021. Vegetation (shrubs, grass) are present except where cattle trails, landslide cracking and scarps are present. Numerous tension cracks and scarps are present on the slide mass. The access roads constructed for drilling have revegetated. Cattle trails on slide are obscuring some of the tension cracks.

Site II (slide)

The second site (S039-II) is located to the east of the main slide and was reviewed in 2020.

A small slide is located on the upper slope and extends into the ditch, causing runoff to flow onto the slide area. One fence post is undermined.

Recommendations

In the short-term, the asphalt curb at Site I should be reestablished to limit pavement drainage onto the slide zone. The curb may need to be protected from snowplows by HTCB.

Design of remedial measures and preparation of tender documents for Site I has been completed by KCB. The repair solution includes soil nails and surface mesh to stabilize the highway embankment. Construction is slated for 2022

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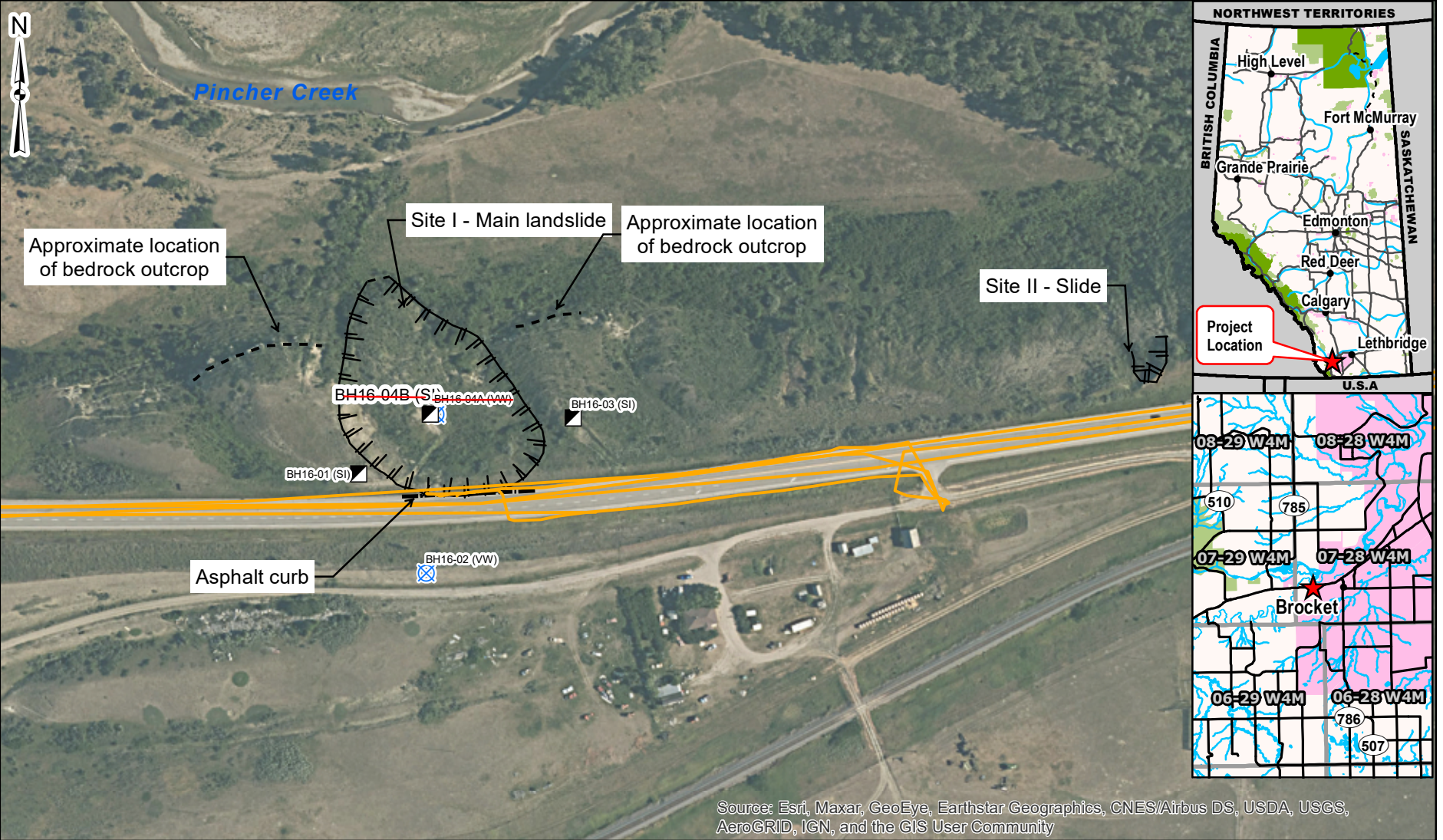
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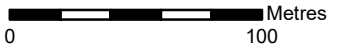
2021-11-24

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Time: 14:11:54 PM
 Date: October 14, 2021
 File: Z:\ACG\YAlberta\A05116A03\ABT Southern Region GRMP\400 Drawings\2021\Section B figures\MXD\S039_211014.mxd Date: October 14, 2021 Time: 14:11:54 PM Creator: aharrison



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



Legend	
	Vibrating Wire Piezometer
	Slope inclinometer
	GPS Track (July 8, 2021)
	Slide
	Flow Direction

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

CLIENT

PROJECT SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM		
TITLE Site Plan S039 - Brocket Slides Hwy 3:06; km 12.952		
SCALE 1:3,000	PROJECT No. A05116A03	FIG No. 1

Photo 1 **Site I – Transverse pavement cracking east of the slide. Photo was taken facing south on July 8, 2021.**



Photo 2 **Site I - Head scarp impacting the highway. The 2017 patching has cracked and settled. Photo was taken facing east on July 8, 2021.**



Photo 3 **Site I - Instrumentation installed on a bench constructed mid slope in the middle of the slide area (red circle). Photo was taken facing northwest on July 8, 2021.**

