ALBERTA TRANSPORTATION
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION – SWAN HILLS DISTRICT
2020 CALL OUT INSPECTION

THURBER ENGINEERING LTD.

Site Number	Location	Name	Hwy	km
Call Out	South of High Prairie	West Prairie River Oxbow Slide	749:02	20.2
Legal Description		**UTM Co-ordinates (NAD 83)**		
NW36-73-17-W5		11U N 6,136,115	E 532,715	

	Date	PF	CF	Total
Previous Inspection:				
Current Inspection:	June 18, 2020	13	4	52
Road AADT:	480		**Year:**	2019
Inspected By:	Don Proudfoot, Nicole Wilder (Thurber) Rodney Johnston (AT)			
Report Attachments:	☑ Photographs ☑ Plans ☐ Maintenance Items			

Primary Site Issue:	Landslide with a 1.3 m high backscarp in embankment fill on west side of highway 26 cm from pavement edge.	
Dimensions:	About ~35 m long by 25 m wide	
Date of any remediation:		
Maintenance:		
Observations:	**Description**	**Worse?**
☐ Pavement Distress	There are some cracks in the highway, but they do not appear to be related to the landslide.	☐
☑ Slope Movement	The landslide occurred within the west embankment fill and is retrogressing towards the highway. The slump appears to be a shallow retrogressive slide.	☐
☑ Erosion		☐
☑ Seepage	Water was found ponded in several locations within the landslide mass within several medial cracks.	☐
☐ Bridge/Culvert Distress		☐
☑ Other	The embankment slopes on either side of the landslide are relatively steep; however, currently no signs of cracks but the flanks of the landslide may retrogress laterally over time. A Telus communications cable that runs through the landslide broke on June 8 due to the slide movements.	☐

Instrumentation: None

Assessment:

The slide is approximately 35 m long by 25 m wide and located in a 12 m high embankment fill side slope. The soils exposed in the slide scarp appeared to consist of brown high plastic clay. The slide mass has slid down to the oxbow at the toe of the slope.

There was no pavement distress observed during the call-out visit, but there was relatively fresh sloughing and moist soil within the slide mass, which was marked with many small secondary scarps and tears further downslope, along with free ponding of water throughout.

It is anticipated that the slide is a relatively shallow, retrogressive slide that was triggered by water seepage and weathering leading to loss of cohesion in the embankment fill. Weak high plastic clay embankment materials and a relatively steep slope may also have contributed to causing the slide. The main scarp of the active landslide is retrogressing further back towards the highway and was measured

to be 26 cm from the pavement during our inspection; however, on July 2, 2020 a photograph was taken by the MCI and the slide has now retrogressed into the highway pavement and is expected to continue which may require partial closure of the highway.

The backslope slumping appears to be shallow based and is not anticipated to be connected to a deep-seated slide below the highway.

The pavement structure in the exposed edge of road was measured to be 230 mm of ACP over 200 mm of soil cement at this location.

Recommendations:

Investigation:
Drill one test hole above the main scarp on the west side of the highway to a depth of about 20 m. The test hole should be completed with a piezometer. This would provide information on the subsurface soil and groundwater conditions for inputs to a slope stability assessment to assess potential slope stabilization design measures.

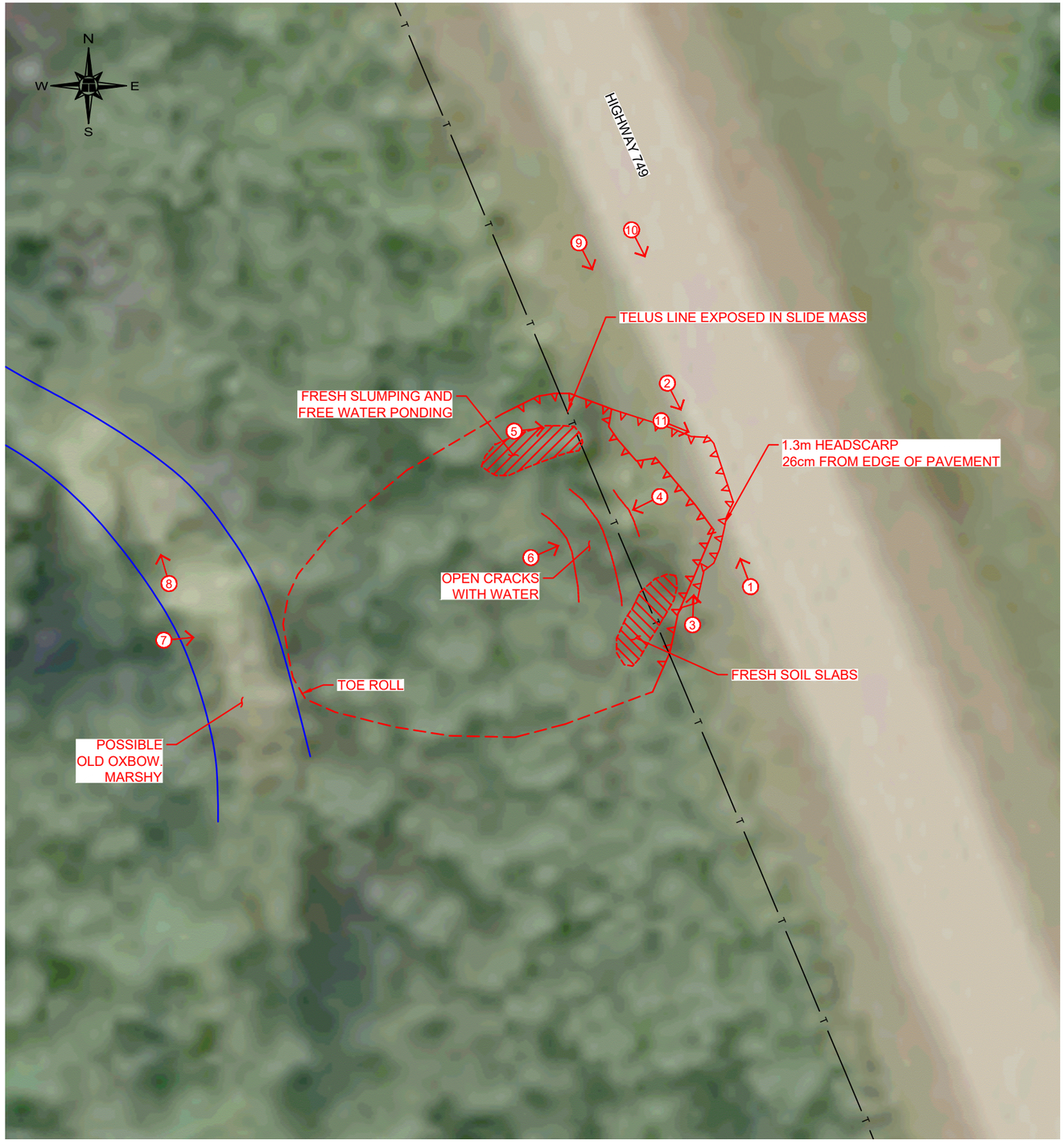
Short Term:
In the short term, the slide should be regularly monitored for regression of the slide scarp. The southbound lane may need to be closed if retrogression continues and more signage/barricades placed.

Medium to Long Term:

The recommended repair for this project is to sub-excavate the failed slide mass down to intact foundation soil and rebuild the slope with imported 6-80 gravel to a slightly flatter 3H:1V inclination. The excavation for the gravel wedge would likely need to extend to about the centreline of the highway, however this should be confirmed by the slope stability assessment. The new fill material should be placed and compacted in thin horizontal lifts, benched into the intact slope surface, utilizing a gravel shear key (if required) to stabilize the slide area. Some of the more suitable excavated material could be used to provide a covering layer overtop the gravel as the finished slope surface to shed runoff, with any excess removed from site. A subdrain should be installed along the base of the slide excavation to drain any subsurface water that may enter the new fill zone.

An alternate option would be to construct a toe berm within the oxbow/marsh area, flatten the slope and rebuild the slope with granular fill. However, this may not be a feasible option if the area is considered a wetland.

Ballpark Cost ~$0.5 Million



SITE PLAN
SCALE 1:400

0 5 10 15 20 25m
SCALE 1:400

SITE LOCATION PLAN
SCALE 1:7500

0 100 200 300 400 500m
SCALE 1:7500

LEGEND

- SCARP CRACK
- T APPROXIMATE TELUS LINE LOCATION
- 1 DIRECTION AND NUMBER OF PHOTO

SATELLITE IMAGE FROM ESRI WORLD IMAGERY (DOWNLOADED 2020-07-06)

Alberta

PEACE REGION (SWAN HILLS)
HWY 749:02, KM 20.2

JUNE 18, 2020 CALLOUT PLAN

FIGURE 1

DRAWN BY	KLW
DESIGNED BY	NPW
APPROVED BY	DWP
SCALE	AS SHOWN
DATE	JULY 2020
FILE No.	13355

THURBER ENGINEERING LTD.

	**Photo 1.** Looking north at backscarp retrogression towards highway.
	**Photo 2.** Looking south at backscarp.

THURBER

	**Photo 3.** Looking northeast towards backscarp and slabs of soil that have fallen downslope.
	**Photo 4.** Looking west downslope at slide mass.

THURBER

	**Photo 5.** Looking southeast towards backscarp and slabs of soil.
	**Photo 6.** Looking east towards highway and landslide backscarp.

	**Photo 7.** Looking east towards landslide from oxbow.
	**Photo 8.** Looking north towards oxbow.

THURBER

	**Photo 9.** Looking south at landslide scarp retrogressing close to the highway pavement.
	**Photo 10.** Looking south at highway 749.

THURBER

Photo 11.
Looking south at landslide scarp that has retrogressed further cutting into pavement taken after call out inspection on July 2, 2020.