

**ALBERTA TRANSPORTATION
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION – PEACE-HIGH LEVEL
2017 CALL OUT**



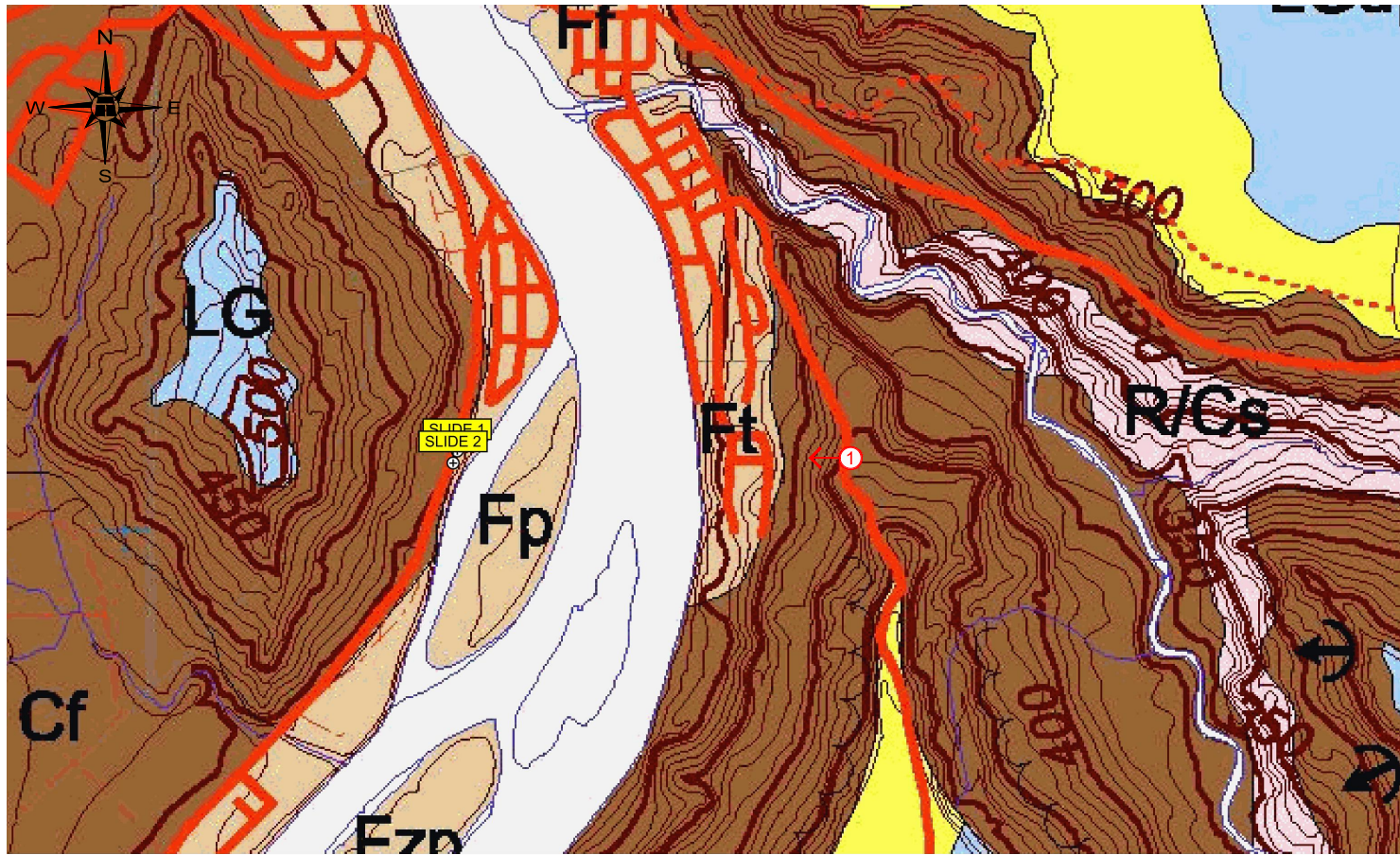
Site Number	Location	Name	Hwy	km
	Shafstbury Trail	Shafstbury Trail North Slides	684:02	28.4
Legal Description		UTM Co-ordinates		
NW¼ 19-083-021 W5M		11U E 481381	N 6230300	

	Date	PF	CF	Total
Previous Inspection:				
Current Inspection:	6-June-2017	11	4	44
Road AADT:	1670		Year:	2016
Inspected By:	Rocky Wang, TRANS Ed Szmata, TRANS		Don Proudfoot, Thurber Shawn Russell, Thurber	
Report Attachments:	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input checked="" type="checkbox"/> Maintenance Items			

Primary Site Issue:	<p>Two landslide features are developing to the east of Hwy 684:02 in the crest of the steep high riverbank slope above an arm in the Peace River. The backscarps have sharp 3 m drop offs and are retrogressing towards the highway to the west and are now encroaching into the highway right-of-way (Photos 1, 2 and 8).</p> <p>Both landslides have failed down to the sandy till ledge which is about 5 m below the existing ground surface.</p> <p>There is a marked gas utility pipeline at the backscarp of Slide 1.</p>	
Dimensions:	<p>Slide 1 is about 12 m wide, with a 3 m drop off along the backscarp which is about 4.8 m east of the NBL guardrail.</p> <p>Slide 2 is about 14 m wide, with a 3 m drop off along the backscarp which is about 7.5 m east of the NBL guardrail.</p>	
History and Date of any Remediation:	It is not known when the landslides began to occur	
Maintenance:	No maintenance has been recently performed at the sites to date.	
Observations:	Description	Worsened?
<input type="checkbox"/> Pavement Distress	There are no signs of any cracking in the current pavement structure of Hwy 684:02 above the two landslides.	<input type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	Active slumping is occurring at both landslides with bare backslopes and raveling slide masses.	<input checked="" type="checkbox"/>
<input type="checkbox"/> Erosion		<input type="checkbox"/>
<input checked="" type="checkbox"/> Seepage	Seepage and saturated soils were observed at the base of the backscarp along the top of a sandy till layer at both slide locations (Photos 3 and 4).	<input checked="" type="checkbox"/>
<input type="checkbox"/> Bridge/Culvert Distress		<input type="checkbox"/>
<input checked="" type="checkbox"/> Other	There is a marked natural gas utility pipeline that appears to cross beneath the highway from west	<input checked="" type="checkbox"/>



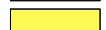

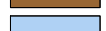

	to east at the south end of Slide 1 and could possibly be affected by Slide 1 (Photos 2, 5 and 6). Thurber did not find any record of the Pipeline	
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Instrumentation: There are no instruments currently installed at the site.	
Assessment:	
Both landslides features have shown recent signs of activity and could continue to retrogress toward the highway.	
It is possible that the landslides are cause by fluctuations in a perched groundwater table that is within the alluvial terrace soils that sit above of the harder sandy till layer, combined with softening and weathering of the very steep river bank slope.	
Recommendations:	Cost
<u>Short Term</u>	Maintenance
Regularly inspect the road and crest of the riverbank to check for cracks and possible backscarp retrogression. Post slide warning signs and be prepared to build an emergency detour in the upslope ditch if the landslides retrogress closer to within a few meters of the NBL of the highway.	
Perform a geotechnical investigation and provide a preliminary engineering assessment with repair options and "A" estimates for the same. The minimum investigation would consist of a borehole with piezometer on each side of the highway at each landslide.	Investigation
<u>Long Term</u>	\$1 Million
Given the proximity of the highway to the steep riverbank slope, and the presence of private residences on the west side of the highway, the most feasible long term remedial solution is likely a pile wall at each location to protect the road from the landslides.	



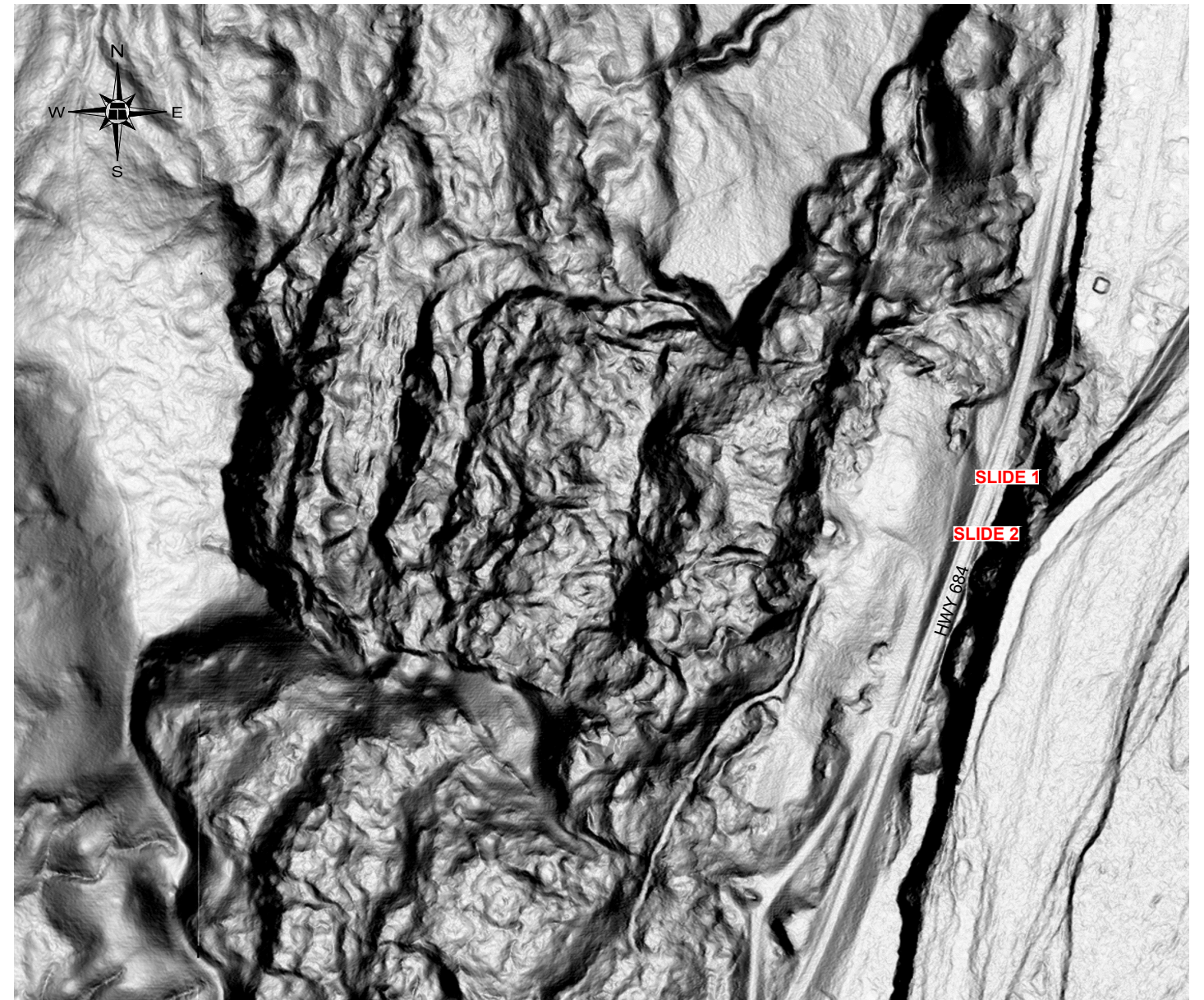
SURFICIAL GEOLOGY MAP
APPROX. SCALE 1:30000

LEGEND

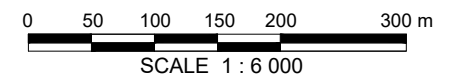
-  ROAD, PAVED
-  FLUVIAL DEPOSITS
-  AEOLIAN DEPOSITS
-  COLLUVIAL DEPOSITS
-  GLACIOLACUSTRINE DEPOSITS
-  DIRECTION AND NUMBER OF PHOTO

REFERENCE:

R.C. Paulen, Map 291, Surficial Geology of the Grimshaw Area (NTS 84C/SW), 2004, Alberta Geological Survey/Alberta Energy and Utilities Board. 1:100,000 Scale.



SITE LOCATION PLAN
SCALE 1:6000



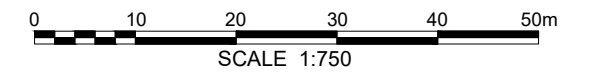
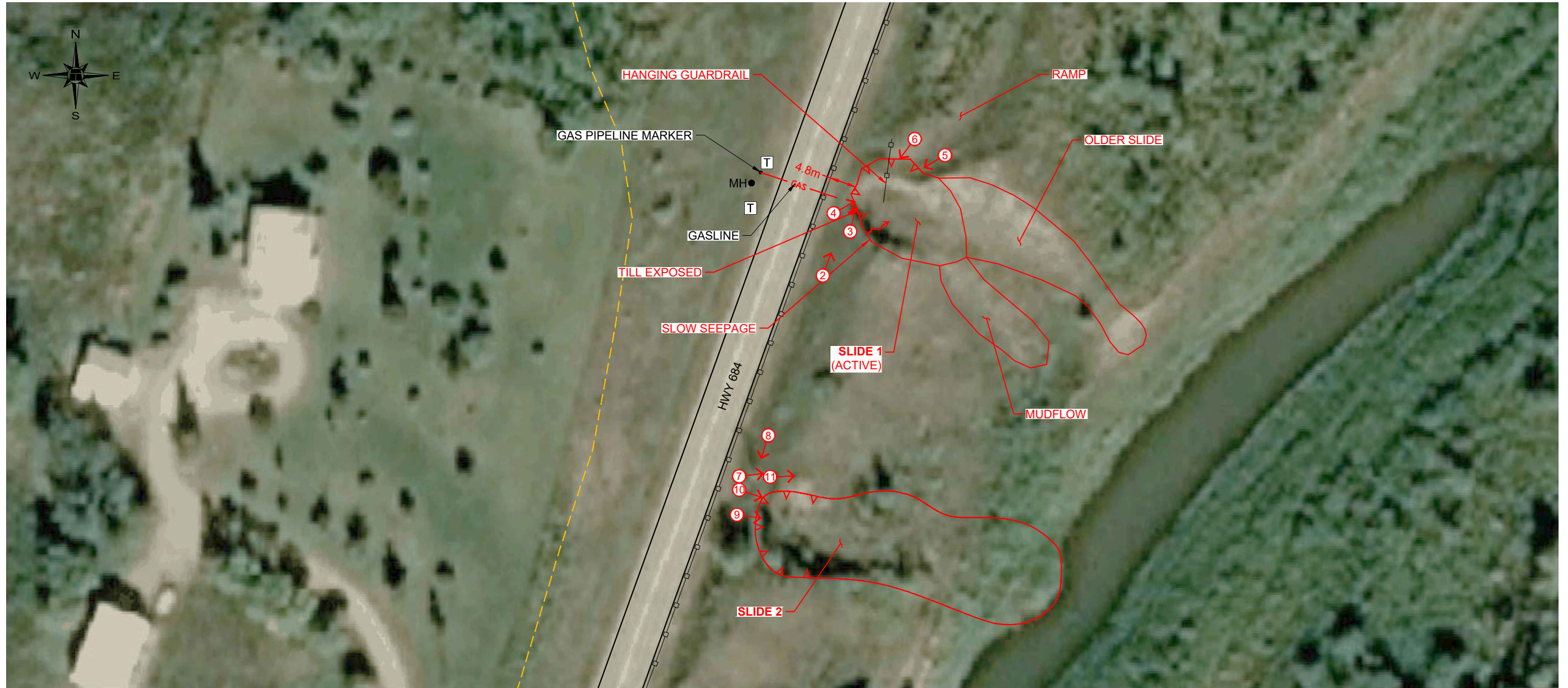
PEACE REGION (PEACE RIVER/HIGH LEVEL)
CALLOUT: HWY 684:02, km 28.4

JUNE 6, 2017 CALLOUT PLAN

DWG No. 13351-684:02 CALLOUT-1







DRAWN BY	KLW
DESIGNED BY	SGR
APPROVED BY	DWP
SCALE	AS SHOWN
DATE	JUNE 2017
FILE No.	13351





SATELLITE IMAGERY FROM ESRI WORLD IMAGERY (DOWNLOADED 2016-12-21)

LEGEND

-  DIRECTION AND NUMBER OF PHOTO
-  TOP OF BACKSLOPE
-  GUARDRAIL
-  TELUS PEDESTAL
-  MANHOLE
-  SEEPAGE

NOTES :

1. FEATURE LOCATIONS ARE APPROXIMATE



**PEACE REGION (PEACE RIVER/HIGH LEVEL)
CALLOUT: HWY 684:02, km 28.4**

JUNE 6, 2017 CALLOUT PLAN

DWG No. 13351-684:02 CALLOUT-2

DRAWN BY	KLW
DESIGNED BY	SGR
APPROVED BY	DWP
SCALE	1:750
DATE	JUNE 2017
FILE No.	13351





Photo 1.
Looking
West from the east
valley slope of the
Peace River towards
the two slides on Hwy
684:02.



Photo 2.
Looking northeast
from the south side of
Slide 1. Note hanging
guardrail.



Photo 3.
Looking northeast from the south side of Slide 1 down into the slide bowl. Some slow seepage and recent mud flow can be observed in the base of the bowl.



Photo 4.
Looking northeast from the south side of Slide 1. Some fresh slide debris and seepage can be seen below the till ledge is the base of the upper slide bowl.



Photo 5.
Looking southwest from the north side of Slide 1. The upper layer above the till surface is actively retrogressing.



Photo 6.
Looking southwest from the north side of Slide 1. The upper layer above the till surface is actively retrogressing towards Hwy 684:02.



Photo 7.
Looking northeast
from the center of
Slide 2.



Photo 8.
Looking southwest from the north side of Slide 2. The backscarp is currently at 7.5 m from the guardrail along Hwy 684:02.



Photo 9.
Looking southeast from the center of Slide 2. The south flank of the backscarp has been recently active with fresh debris accumulating below.



Photo 10.
Looking east along
the center of the
backscarp of Slide 2.
The backscarp is
about 14 m wide
along the crest of
valley the slope.