

**GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION – PEACE-HIGH LEVEL
CALL-OUT INSPECTION (MAY 12, 2015)**



Site Number	Location	Name	Hwy	km
PH52	Dunvegan	Dunvegan North 10+800	2:68	10.80
Legal Description		UTM Co-ordinates		
SE¼ 16-080-04 W6M		11U E 402466	N 6199552	

	Date	PF	CF	Total
Previous Inspection:	11-Jun-2014	12	4	48
Current Inspection:	12-May-2015	14	4	56
Road AADT:	2910		Year:	2014
Inspected By:	Ed Szmata, TRANS		Shawn Russell, Thurber	
Report Attachments:	<input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans <input type="checkbox"/> Maintenance Items			

Primary Site Issue:	During the last week of April 2015, some additional settlement was noticed by Jennifer Powers (Alberta Transportation) in the north-bound (climbing) lanes of Hwy 2.	
Dimensions:	Arcuate cracking defines a slide that is approximately 22 m to 28 m wide at the road shoulder (Photos 1 to 4).	
Maintenance:		
Observations:	Description	Worsened?
<input checked="" type="checkbox"/> Pavement Distress	Cracks have up to 50 mm drops with openings as wide as 50 mm (Photos 2 and 3).	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	The slide affecting the highway continues to move, as made evident by the pronounced cracks and settlement of the asphalt pavement surface. Clay ripples are now visible through the grass covered toe bulge downslope of the highway. Open cracks now extend beyond the asphalt through the grass covered highway northbound lane sideslope (Photos 5 and 6).	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Erosion	Although the head of the eroded gully has not retrogressed significantly since 2009 (Photo 10), erosion within the gully has progressively worsened.	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Seepage	Seepage at the toe of the fill is likely occurring as noted by greener grass growth along the perimeter of the toe bulge below the highway (Photo 5 and 6).	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Bridge/Culvert Distress	The existing centerline culvert inlet and outlet are partially clogged (Photos 7 and 9). Sediment along the northbound lane pavement might be by-passing the clogged culvert inlet.	<input checked="" type="checkbox"/>
<input type="checkbox"/> Other		<input type="checkbox"/>

Instrumentation:

There are no instruments installed at this site.

Assessment:

Landslide cracking and settlement in the road continues and the toe bulge is slightly more apparent in the slope below the highway. This failure appears similar to the two other Dunvegan North (PH1N) failures that occurred previously to the west of this site, and so it is suspected that the failure is occurring in fill overlying rock or a native soil surface triggered by groundwater seepage.

Recent activity warrants that frequent visual inspections are to be carried out by the MCI and that the affected northbound lane should be closed at the first sign of additional movement.

Recommendations:**Cost**

A geotechnical investigation is required to assess the mechanism of failure and to design repair measures for this slide. Proposed test hole and test pit locations with selected instruments are shown on Figure 1.

\$ 60,000

Due to the recent activity at the site, it is recommended that the geotechnical investigation be implemented as soon as possible.

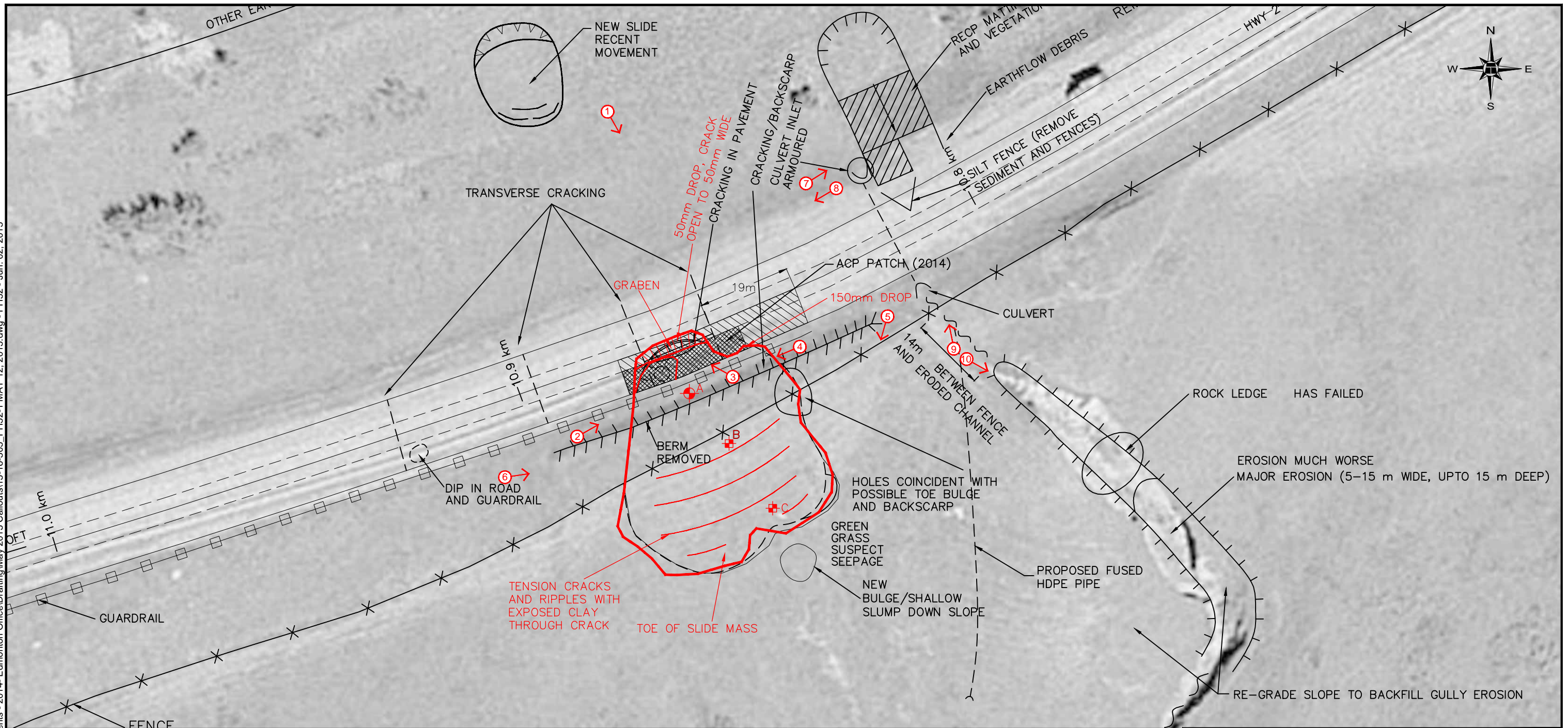
Potential long-term repair solutions include excavation to bedrock and replacement of fill with granular material and subdrains, similar to the repairs at PH1N, or installation of a pile wall. Failure depth will need to be established from the geotechnical investigation and instrument readings over a period of time. Drainage could be directed through a welded HDPE down-drain extending to the valley floor, and the gully backfilled.




\$1,000,000 to
\$2,000,000

The existing centerline culvert that crosses the highway immediately upslope of the landslide should be grouted and surface water should be directed along the existing southbound lane ditch the existing bridge culvert further downslope to the southwest if the downstream culverts and ditch can accommodate the extra flow. Alternatively, the culvert should be flushed out and the erosion gully repaired. The cost of repair and armoring the erosion gully could be in the order of \$500,000.

Investigation work should be completed as soon as possible to ensure a reliable depth to the failure surface can be determined.

H:\1516-305 PH Geohazard Assessments - 2014- Edmonton Office\Drafting\May 2015 Callouts\15-16-305 PH52-1 MAY 12, 2015.dwg - PH52 - Jun. 02, 2015



LEGEND:
 PROPOSED TEST HOLE LOCATION 
 PROPOSED TEST PIT LOCATION 
 DIRECTION AND NUMBER OF PHOTO 

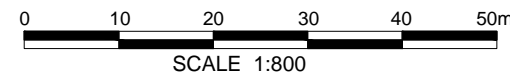
PROPOSED TEST HOLE/PIT INFORMATION

TH	DEPTH	INSTALLATIONS
A=	20 m	PIEZOMETER AND INCLINOMETER
B=	5 m	TEST PIT
C=	5 m	TEST PIT

NOTES:

1 LOCATION DATA RECORDED USING HAND HELD GPS RECEIVER. ALL LOCATIONS ARE APPROXIMATE AND ARE FOR ILLUSTRATIVE PURPOSES ONLY.

2 MAY 12, 2015 OBSERVATIONS SHOWN IN RED



PEACE REGION (PEACE RIVER/HIGH LEVEL)
 PH52 DUNVEGAN NORTH - HIGHWAY 2:68

PH52 CALLOUT INSPECTION PLAN
 MAY 12, 2015

FIGURE 1

DRAWN BY	KLW
DESIGNED BY	SGR
APPROVED BY	DWP
SCALE	1:800
DATE	MAY 2015
FILE No.	15-16-305





Photo 1.
Looking south across the highway from the SBL backslope. Cracks in the pavement surface and along the edge of the guardrail are visible along a 28 m length.



Photo 2.
Looking NE from the NBL guardrail. The drop of the graben within the landslide is at about 50 mm with cracks open to about 50 mm in width.

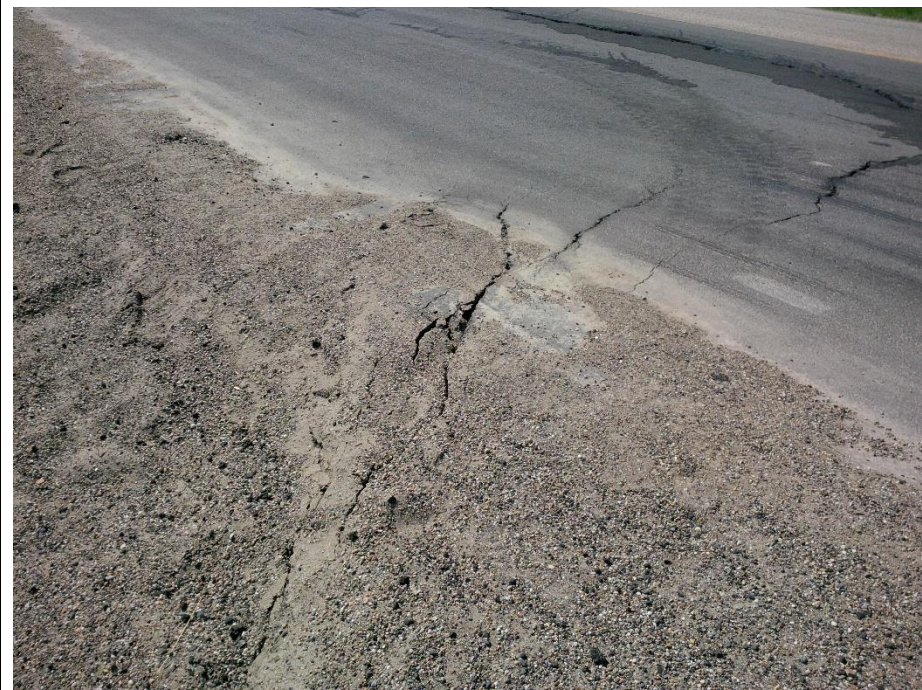


Photo 3.
Looking northwest at cracks from backscarp extending though the highway embankment shoulder. Cracks at the shoulder are open to about 40 mm in width.



Photo 4.
Looking west from the NBL shoulder. Cracking in the embankment shoulder extends 10 m to the east of the dip in the asphalt. Cracks in embankment shoulder extend about 8 m northeast past the edge of the paved shoulder in the sideslope with offset drops up to 150 mm and are open to about 75 mm.



Photo 5.
Looking south-westwards at the highway sideslope. Two lobe-shaped features were noted below highway with greener vegetation growing along the lower perimeter. This is likely a sign of water seepage. Ripples with tension cracks are visible in the surface at the base of the lobes and clay is exposed though the grass.



Photo 6.
Looking east across the toe bulge feature along the NBL sideslope. Tension cracks with exposed clay are predominant in the lower half of the bulge.



Photo 7.
Looking east at the inlet to the centerline culvert. The inlet is over half filled with sediment.



Photo 8.
Looking southwest along the SBL lane ditch. Sediment is accumulated along the shoulder downslope of the ditch block at the culvert inlet. Highway embankment material is rilled, moist and soft.



Photo 9.
Looking north at the outlet of the existing centerline culvert. The outlet is partially obstructed.



Photo 10.
There is ongoing erosion in the gully downstream, with steep gully sidewalls in the bedrock. The backscarp of the gully has not retrogressed since 2014.