Government of Alberta ■
Transportation

STONY PLAIN REGION
GEOHAZARD RISK ASSESSMENT
SITE INSPECTION FORM

SITE NUMBER AND NAME:	HIGHWAY AND KM:	PREVIOUS INSPECTION DATE:	INSPECTION DATE:
NC 23 – Landslide near Greenwood Lake Road	Hwy 39:06, km 13.08	June 2, 2009	May 20, 2010
LEGAL DESCRIPTION:	**NAD 83 COORDINATES:**	**RISK ASSESSMENT:**	
NE 4-49-5-W5M	-44710 E, 5896868 N	PF: 8 CF: 4 **TOTAL: 32**	

SUMMARY OF SITE INSTRUMENTATION:	INSPECTED BY:
Slope Inclinometers: 6 Pneumatic Piezometers: 11 Standpipe Piezometers: 3	Adam Gmeinweser, P. Eng. (EBA) Chris Gräpel, P. Eng. (EBA) Sabhago Oad, P. Eng. (TRANS) Wilf Cousineau (TRANS) Fred Cheng, P. Eng. (TRANS)

LAST READING DATE: May 10, 2010

PRIMARY SITE ISSUE: Highway situated on a large historic landslide; lower west flank portion continues to move causing pavement distress

APPROXIMATE DIMENSIONS: 350 m long extending to the crest of the valley slope

DATE OF REMEDIAL ACTION: Westbound climbing lane constructed 2007, resulted in overlaying cracks in pavement.
French drains installed during 2007 construction to prevent blocking seepage.
Horizontal drainage galleries and gabion wall along Modeste Creek installed in 2005.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Pavement dip and cracking located on west flank of landslide area		X
Slope Movement	X		Lower portion of landslide experiencing movement		X
Erosion	X		Rill erosion present from rainwater drainage and culvert	X	
Seepage	X		Moisture observed from French drains.		X
Culvert Distress		X			

COMMENTS:
North slope filled and re-graded in 2007 during construction of the new passing lane.
Location and site plan shown on Figure NC-23.
Site conditions shown in Photos 1 to 6.
Risk level unchanged from 2009.

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SITE OBSERVATIONS:

- The north slope was filled and re-graded during the construction of the new passing lane in 2007. Vegetation is slowly and naturally being established on the fill slope. The fill slope was not topsoiled or seeded after completion of construction.
- The highway is super-elevated slightly to the south towards this slope. As such, rainwater falling on the highway slope is draining onto the unvegetated slope face and is causing rill erosion.
- A culvert located at approximate km 13.1 discharges onto a small armoured splash pad on the slope face. However, the water drains over un-vegetated fill to the toe of the embankment. A shallow gully is beginning to form in the place of the rill erosion observed in 2008. The inlet of this culvert is elevated approximately 0.15 m above depth base. This will promote ponding and infiltration of surface runoff.
- One wet and dark fill area was noted and may be the location of a buried drain. Weeping tile was observed at one of the French drain locations along the base of the embankment.
- The east drainage gallery for the horizontal drains was opened and inspected. This gallery did not have any flow entering it. The west gallery could not be opened but the sound of running water could be heard.
- The gabion basket structure that supports and armours the drainage gallery discharge was in good condition. Some minor erosion was noted on the west flank.
- The side slope in the vicinity of the culvert extension at km 13.1 was observed to be locally steeper than the surrounding side slopes, a condition noted in previous inspections.

RECOMMENDATIONS:

- The existing landslide should be continuously monitored through instrumentation and annual inspection to assess the response to the newly constructed passing lane.
- All toe drains beneath the passing lane fill should be exposed to ensure drainage is not reduced by the fill; they should be extended and backfilled with free drainage gravel to ensure proper drainage. A proposal has been submitted to TRANS for this work.
- The side slope near the culvert at km 12.9 should be flattened to minimize reactivation of the historic movements. The culvert will need to be extended.
- The upper portion of the south embankment should be hydroseeded to improve vegetation to help reduce rill erosion.
- The south inlet of the culvert on the east portion of the slide area is too high to collect drainage. Regrading consisting of minor fill placement into ditch at the inlet should be implemented to permit drainage into the culvert and prevent ponding. Rip-rap armouring at the inlet should be salvaged and replaced upon completion of grading.
- The silt fence following the outlet swale in the north ditch should be cleared of debris and repaired.
- The drill pad used on the north ditch in the fall of 2009 requires regrading and seeding.
- The rip-rap splash pad on the outfall side of the culvert should be extended to the base of the embankment to reduce erosion occurring on the slope.

- Effects of erosion should be repaired at the west flank of the gabion structure adjacent to the drainage galleries; additional fill and grading should be implemented to direct surface water drainage to reduce the potential for reoccurrence.
- The beaver dam at Modeste Creek should be removed.
- EBA is preparing a proposal for the steam cleaning of the horizontal drains. This should improve drainage of ponding water and groundwater from upslope to the drainage galleries located at the toe of the embankment near Modeste Creek.