SECTION A – FILE REVIEW

Site Location

- This site is located at Km 29.45 of Highway 3:08, on the east side of the Oldman River valley near Monarch, AB. At this location Highway 3 transitions from a large through-cut in the upper portion of the east Oldman River valley slope to the east approach to the Oldman River bridge. The east valley slope curves from a west-facing aspect to the north of the highway to a north-facing aspect to the south of the highway because it formed along the left bank of a former meander in the Oldman River channel.
- SW-6-10-23-W4
- UTM coordinates: 349267E 5517353N (NAD 83, Zone 12)
- NTS mapsheet 82 H/14

Chronological Background

Table A1 provides a chronological background of this site.

Site Geology, Hydrogeologic and Geomorphologic Setting

No geotechnical investigations have been performed to characterize the site geology. Based on published geological maps[1,2], the site is expected to be composed of glaciolacustrine silt and clay overlying bedrock of the St. Mary River (non-marine sandstone/siltstone/mudstone), Blood River (shoreline sandstone), or Bearpaw Formations (marine shale/sandstone with bentonitic beds). The site is located within the Monarch Fault Zone.

No hydrogeographic information was obtained for the site.

Air photos form 1977 (prior to the current highway alignment construction) show that the segment of the valley slope that was later excavated in the through-cut for the highway was highly dissected by gullies and appeared similar to the valley slope to the south of the current highway. There are no visible signs of significant or recently active slope instability based on the 2001 air photos.

An old, inactive landslide is located along an approximately 500 m long segment of the valley slope north of the current highway right of-way. The landsliding appears to be multi-block, retrogressive slumping of the valley slope with the base of movement seated in the bedrock around the elevation of the toe of the valley slope. The southern limit of this apparent landsliding is offset approximately 100 m from the north edge of the current highway and it does not appear to be traceable across the current highway right-of-way. It appears that this landsliding formed along the upstream portion of the outside of a meander bend in the Oldman River channel when the river channel was flowing along the toe of the valley slope in this area. This is judged to have occurred many decades or more ago, based on the current position and elevation of the river channel (approximately 1 km west of and 7 to 10 m lower than the toe of the slope, respectively).

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1 Alberta Geological Survey, Map, *Surficial Geology, Lethbridge, Alberta, NTS 82H/I,* 1981.
2 Alberta Geological Survey, Map, *Geological Map of Alberta,* 1999.

Table A1 – S25 – KM 29.45 – Chronological Background

Date	Description
1994/1995	Current four lane alignment constructed.
2002 and 2006	Subtle vertical displacement noted at site area by AMEC and AT personnel during annual site inspection tours.
2007	Complaint by member of the public regarding vertical displacement of the road surface.
March 9, 2007	Call-out inspection performed. Observed vertical displacement of the road surface and recent overlays. Recommended Risk Level = 5 Recommended that site continue to be treated as a maintenance issue. Proposal for borehole drilling recommended. Probable cause of vertical displacement of the road surface was attributed to post-construction settlement.
2008-2011	Inspections as part of the Southern Region Annual Tour.
June 2012	Inspection as part of the Southern Region Annual Tour. Observed continued deformation of the road surface and recent overlays. Recommended Risk Level = 5 Recommended that site continue to be treated as a maintenance issue. Proposal for borehole drilling and instrument installation has been submitted to better understand the cause of the damage to the road surface.

Refer to the attached call-out inspection report for further details.

Description of Past Site Problems
Settlement of the road surface has been identified since 2002. Refer to Table A1 for the chronological background of the site.

The settlement of the road surface is near the cut/fill transition at the westbound end of the through-cut and roughly coincides with the former valley slope face position. This suggests that the settlement may be due to one or a combination of the following factors:

- Reactivation or ongoing creep of landsliding of the natural valley slope that existed before the construction of the highway.
- New landsliding due to the new highway alignment.
- Settlement of fill in previous gullies.
- Movement along the Monarch Fault.

The cause of the damage to the highway surface has not been identified as of May 2013.

Description of Past Investigations
There are no records of past geotechnical investigations performed at this site.

Description of Mitigative Measures Implemented
There are no records of mitigative measures implemented at this site. Based on the site appearance, it is inferred that numerous patches and overlays have been placed in order to temporarily mitigate the effects of the settlement and cracking.