GEOHAZARD ASSESSMENT PROGRAM

NORTH CENTRAL REGION – ATHABASCA

2011 INSPECTION

Government of Alberta ■ Transportation

THURBER ENGINEERING LTD.

Site Number	Location	Name	Hwy	km
NC 14	Northeast boundary of the Town of Fort Assiniboine	**Fort Assiniboine**	661:02	1.8
Legal Description		**UTM Co-ordinates (NAD 83)**		
NW-1-62-6-W5M		11 N 6023391 E 644779		

	Date	PF	CF	Total
Previous Inspection:	May 28, 2010	8	4	32
Current Inspection:	May 4, 2011	8	4	32
Road AADT:	1090		**Year:**	2010
Inspected By:	Tarek Abdelaziz, Don Proudfoot (Thurber) Roger Skirrow, Rick Ellwein, Arthur Kavulok (TRANS)			
Report Attachments:	☑ Photographs ☑ Plans ☐ Maintenance Items			

Primary Site Issue:	Slope creep movements causing pavement distress to a sidehill alignment due to seasonal high ground water levels	
Dimensions:	About 250 m long	
Date of any remediation:	None recently	
Maintenance:	None	
Observations:	**Description**	**Worse?**
☑ Pavement Distress	Slight dip in SBL of Mid-Hill section.	☐
☑ Slope Movement	Cracks up to 30 mm wide with up to 20 mm differential height across cracks in the Mid-Hill slope section	☐
☐ Erosion		☐
☑ Seepage	▪ **MH#1:** Water ponding around the manhole. Approximately 1 m thick silt layer existed at the bottom of the manhole and the drain outlets are submerged under water. Water levels dropped in the manhole by 0.4 m since last year ▪ **MH#2:** Manhole was almost dry; one drain was barely dripping into the manhole ▪ A metal cover was located on the top of the slope above MH#2. Seepage noted around the existing metal cover	☐
☐ Bridge/Culvert Distress		☐
☐ Other		☐

Instrumentation: (3SIs, 12 SPs, 3LLs, and 2 VWs)

No discernable movement in SI06-6 and 06-11; creep movement at a rate of 1.5 mm/yr between 6.4 and 6.8 m depth in SI06-12. Water levels fluctuated in the majority of the standpipes by +/-0.2 m. Water levels increased by 0.5 m in SP06-1 and decreased by 0.5 m in SP06-10. Seasonal fluctuations in water levels were noted in the level loggers and vibrating wire piezometers.

Assessment (Refer to attached Figure)**:**

The site observations and the instrument readings indicate that the site continued to show creep movements due to seasonal fluctuations in water levels. The highway condition didn't change noticeably since last year.

The accumulated silt inside manhole #1 may have caused partial plugging of the sub-horizontal drain outlets and the outflow pipe (if any). The natural gully upslope of the manhole drains into the manhole. The outlet pipe of the manhole could be connected to the manhole covered with cobbles, located downslope of MH #1.

Manhole #2 was dry, suggesting that the drains might be plugged.

The existing metal cover upslope of MH#2 is probably a cover for a third drainage collection system. It was not possible to fully remove the cover during the site visit, but significant amount of water flowed out from below the cover when it was disturbed, indicating the existence of a plugged drainage collection system below the metal cover.

Recommendations:

In the short term, it is recommended to seal all open cracks in the pavement to prevent surface water infiltration into the slide cracks.

As mentioned previously, the sub-horizontal drains in both manholes will need to be flushed and maintained on a periodic basis to maintain the drainage characteristics of the slope.

Flushing MH #1 drains will first require hydrovacing the accumulated silt inside the manhole to expose the drain outlets. To flush both manhole drains, it is better to dig down around the manholes to expose the drain pipes, cut-off the flexible hose connecting the PVC drain pipes to the manholes, flush the solid drain pipes, install solid connection pipes and backfill the excavation. Otherwise, a field person will need to enter the manholes, which would be difficult considering the small diameter manhole (MH#2, 0.6 m in diameter).

Ideally, both manholes should be excavated out and replaced with bigger diameter manholes complete with inside ladders for future access and flushing. The excavations around new manholes should be backfilled with washed rock enveloped in a non-woven geotextile fabric. A screened inlet will be required for MH #1 to drain the surface water from the existing creek into the manhole.

With regard to the existing metal cover above MH#2 location, it is recommended to remove the cover to check the source of water. If a third manhole exists below the cover, it is recommended as a minimum to pump the trapped water, hydrovac the silt (if any) inside the manhole, and flush the drains (if possible). If it is required to replace the manhole at this location, equipment access could be very challenging due to the steepness of the treed slope.

Although we completed Part A for this site, we could not find any details about the drain pipes and the drainage collection manholes. Any existing plans showing the implemented drainage scheme will be extremely beneficial for future planning of drainage improvement.

During our site visit we photographed a utility plan at the water treatment plan (Photo 13) that indicates the presence of a catch basin in Crescent Drive into which MH#2 and the water trapped below the metal cover could possibly be drained with an underground connecting pipe.