GEOHAZARD ASSESSMENT PROGRAM

NORTH CENTRAL REGION – ATHABASCA

2010 INSPECTION

Government of Alberta ■ Transportation

THURBER ENGINEERING LTD.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS

Site Number	Location	Name	Hwy	km
NC 24	8 km north of Hwy 29 (north of Elk Point)	**KEHIWIN LAKE**	41:23(previously 28:16)	8.0
Legal Description		**UTM Co-ordinates (NAD 83)**		
NW-27-56-5-W4M		12 N 5988511 E 506780.8		

	Date	PF	CF	Total
Previous Inspection:	June 22, 2009	7	2	14
Current Inspection:	May 25, 2010	7	2	14
Road AADT:	1490		**Year:**	2009
Inspected By:	Tarek Abdelaziz, Don Proudfoot (Thurber) Roger Skirrow, Neil Kjelland, Arthur Kavulok, Calvin Kissel (TRANS)			
Report Attachments:	☑ Photographs ☑ Plans ☐ Maintenance Items			

Primary Former Site Issue:	Slide movement on the west side slope causing distress of the highway roadway surface along the north and south bound lanes.	
Dimensions:	About 140 m along the west edge of the highway	
Date of any remediation:	Construction of a 148 m long cantilever pile wall, consisting of 1.8 m in diameter- 15 m deep concrete piles with center to center spacing of 3.6 m. The pile wall construction was completed in June 9, 2009. Highway was overlaid before June 22, 2009.	
Maintenance:	N/A	
Observations:	**Description**	**Worse?**
☑ Pavement Distress	-Reflective faint cracks in the highway surface	☐
☑ Slope Movement	-Reflective faint cracks on the highway surface.	☐
☐ Erosion		☐
☐ Seepage		☐
☐ Bridge/Culvert Distress		☐
☑ Other	Vegetation grew in areas disturbed by construction	☐

Instrumentation: (6SIs, 3SPs)

No discernable movement was noted in SI02-5, SI06-3 since the date of initialization. The recorded movement of the pile wall SIs in September 2009 are:

- SI09-1 = 4.2 mm pile head movement over 0.4 to 15.1 m depth
- SI09-2 = 3.9 mm pile head movement over 0.6 to 15.2 m depth
- SI09-3 = 2.9 mm pile head movement over 0.7 to 15.3 m depth

The groundwater elevation level decreased in SP02-2 by 0.28 m and increased in SP02-3 and SP02-5 by 0.11 m and 1.25 m, respectively.

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

The reflective slide cracks noted on the highway surface are consistent with the downslope wall movement. The top of the wall moved by about 2 mm between September 2009 and May 2010. The downslope wall movement is expected to continue until the pile wall mobilizes the total force required to stabilize the slide mass upslope of the wall. Until the wall mobilizes the stabilizing force, more reflective cracks and/or minor depressions are anticipated to appear on the highway surface.

There was no evidence of ongoing slide movement downslope of the wall.

Recommendations:

As discussed on site, this site will be removed from the Geo-hazard visual assessment program. However, semi-annual instrumentation monitoring will be continued to appraise the effectiveness of the remedial measure. The local MCI should continue to monitor and record the development of open cracks/depressions on the highway paved surface.

Open cracks should be sealed to prevent the infiltration of surface water into the slide mass. The NBL surface could be milled where roughness was detected to provide a smooth ride to travellers. A pavement overlay may be required in the future (probably within the next 2 to 3 years) to enhance the quality of ride.

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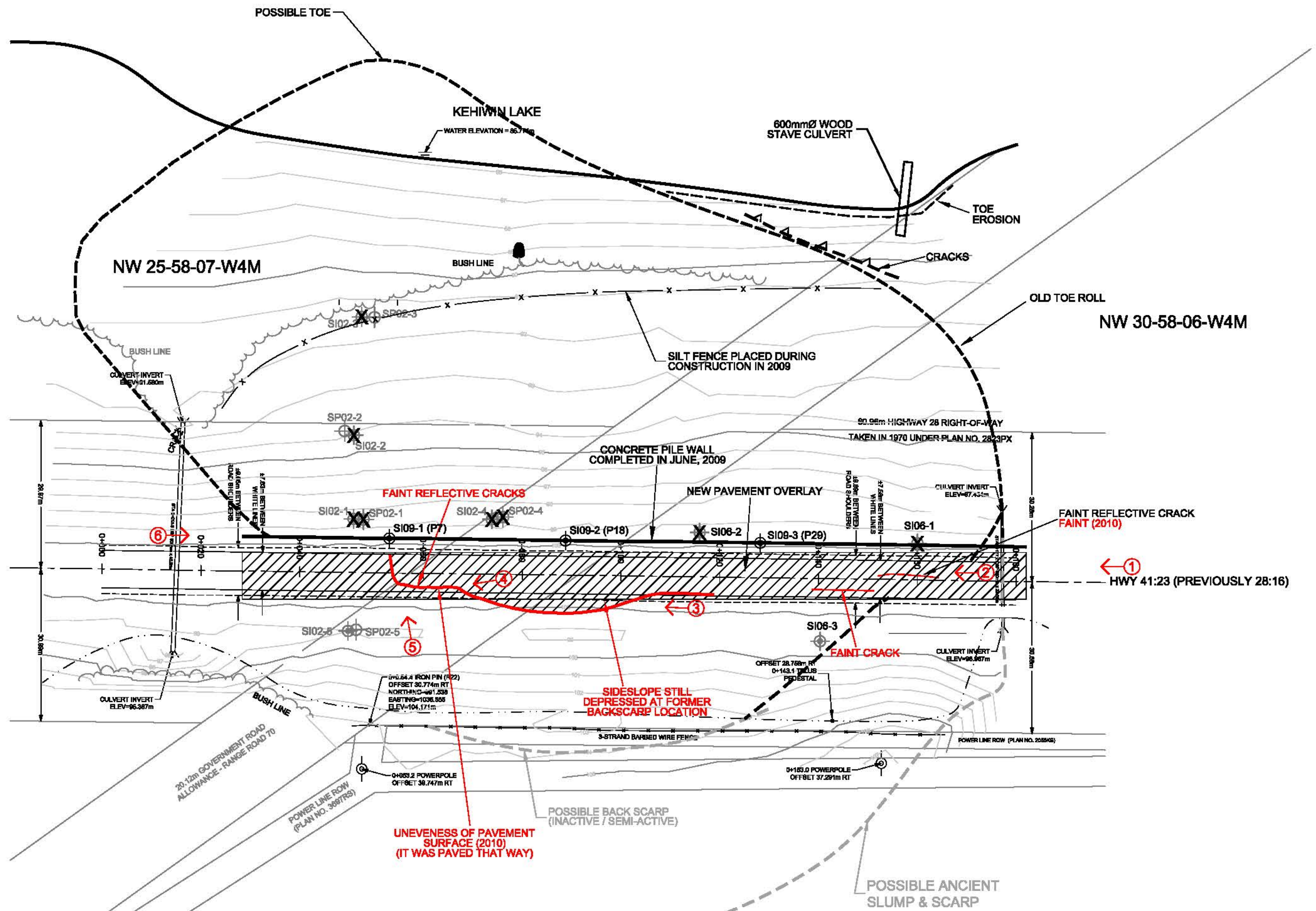

LEGEND

- SI — SLOPE INCLINOMETER (OPERATIONAL)
- SI — SLOPE INCLINOMETER (SHEARED OFF)
- SP — STANDPIPE PIEZOMETER
- SP — STANDPIPE PIEZOMETER (DAMAGED)
- BUSH LINE
- TELUS CABLE (APPROX. ONLY)
- CRACK IN PAVEMENT SURFACE
- ① APPROXIMATE PHOTOGRAPH LOCATION AND DIRECTION (MAY 25, 2010)
- ESTIMATED LIMITS OF SLIDE

NOTES :

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. PREVIOUS OBSERVATIONS SHOWN IN BLACK
3. MAY 25, 2010 OBSERVATIONS SHOWN IN RED

FIGURE NC24-1 SITE PLAN
NC24 - HWY 41:23 (PREVIOUSLY 28:16) Km 8 KEHIWIN LAKE
NE 25-58-7 W4M

SCALE 1:1000
MAY, 2010
THURBER PROJECT #15-16-246

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Photo #1 General view of highway surface at the slide repair location (looking south)

Photo #2 Looking south towards a reflective faint crack on the highway surface

Photo #3 Looking south. There is a depression area along the former back scarp of the slide

Photo #4 Looking south at reflective faint cracks on the highway NBL surface. The feathered end of the recent pavement patch is rough at this location

Photo #5 Transverse reflective crack at the southern limit of the slide area (looking west)

Photo #6 Looking at the highway side slope where the wall was constructed; note the growth of vegetation on the highway side slope (looking north)