

SITE NUMBER AND NAME: NC083 – West of Wildhay River	HIGHWAY AND KM: 40:30, km 37.368	PREVIOUS INSPECTION: July 17, 2022	CURRENT INSPECTION: May 30, 2023
LEGAL DESCRIPTION: SE-08-53-27-W5	NAD83 COORDINATES: UTM11U 5935069N, 437757E		RISK ASSESSMENT: PF: 11 CF: 5 Total: 55
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 1,690 (2022)		CONTRACTOR MAINTENANCE AREA (CMA): 508	

SUMMARY OF INSTRUMENTATION: Three slope inclinometers and three vibrating wire piezometers functional	INSPECTED BY: Stantec: Leslie Cho, Sonja Pharand TEC: Rocky Wang, Amy Driessen, Dave Farr
LAST READING DATE: May 10, 2023	
PRIMARY SITE ISSUE: Embankment failure due to shallow groundwater levels and weak foundation soils.	
APPROXIMATE DIMENSIONS: 75 m wide. Unclear where the toe is.	
DATE OF ANY REMEDIAL ACTION: Southbound lane (SBL) patched in 2016. SBL patched with 25 tonnes of asphalt in summer 2017.	


ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICEABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Cracking over both lanes at intersection with gravel pit access road. Pavement breaks with rutting around entrance to gravel pit.	X	
Slope Movement	X		Toe bulging along south slope. Semi-circular crack along SBL from BH17-02 to BH17-03. Pavement crack with vertical displacement at shoulder of SBL northwest of BH17-03, with a new semi-circular crack a couple of meters to the north. SBL cracking has extended southeast past the culvert.	X	
Erosion	X		Erosion at Hwy 40 centerline (C/L) culvert outlet. Severe erosion near timber stockpile. Erosion at the east corner of the entrance to the gravel access road.	X	
Seepage	X		Seepage on south slope near culvert and at vehicle tracks. Seepage at Hwy 40 C/L culvert inlet.		X
Bridge/Culvert Distress		X			

COMMENTS
<ul style="list-style-type: none"> • No significant changes to site conditions were observed. • Pavement crack pattern appeared to have worsened in comparison to the previous inspection and consisted of: <ul style="list-style-type: none"> – Diagonal crack across all 3 lanes at the entrance to the gravel pit access road (Photos 1 and 2). – Semi-circular crack along SBL between BH17-02 and BH17-03 – 50 mm high crack along SBL shoulder northwest of BH17-03, extending past the C/L culvert crossing.

- Reflecting diagonal crack along SBL shoulder northwest of BH17-03, northwest of the crack noted above (Photo 3).
- 20 mm wide pavement crack along the alignment of the C/L culvert (Photo 5).
- Both culverts at the site appear to be in good condition. An erosion channel about 400 mm wide and deep was observed at the C/L culvert outlet, which is blocked by vegetation (Photos 6 and 7).
- An erosion channel was observed at the entrance to the gravel access road, where it followed the highway and entered the east ditch where it had eroded. The edge of pavement at this location was also broken over several meters (Photo 4).
- The south slope appeared to have a “hummocky” appearance and was soft and spongy to traverse (Photo 9).
- Significantly more erosion features with ponded water were observed near the timber stockpile (Photo 10).
- Seepage was observed at the south slope in the previously observed vehicle tracks (Photo 8).
- All three SIs at the site continues to show movement with movement rates ranging from less than 1 mm/year to 6 mm/year. Piezometric levels remain high ranging from 0.4 m to 0.8 m below ground surface.

RECOMMENDATIONS

- All pavement cracks should be sealed to reduce surface water infiltration into the landslide.
- Riprap or gravel should be placed at the C/L culvert outlet. If the erosion is left unchecked, it could lead to further channeling and embankment movement.
- A French drain along the north ditch from west of the gravel access road extending for about 250 m could be considered for stabilizing this section of the highway. The high-level cost of construction is \$200,000 to \$300,000 excluding engineering.
- It is understood that this section of the highway is planned to be widened, and that slope stabilization will be included with the highway widening works. Remediation options could include installing a pile wall along the south edge of pavement or constructing a gravel toe berm south of the highway and/or considering light weight fill for the highway widening work. Any remediation measures undertaken should include drainage measures such as trench drains or drainage blanket underneath the embankment to reduce pore pressure build-up.
- The site should continue to be inspected annually.
- Instrumentation monitoring should continue semi-annually.

PREPARED BY: Sonja Pharand, P.Eng.	PREPARED BY: Leslie Cho, M.Eng., P.Eng.
	
REVIEWED BY: Xiteng Liu, M.Sc., P.Eng., PMP	PERMIT TO PRACTICE

2023 Site Inspection Photos at NC083



Photo 1: Pavement cracking in SBL near BH17-02. Looking southeast.



Photo 2: Pavement cracking in NBL near BH17-02. Looking northwest.

2023 Site Inspection Photos at NC083



Photo 3: Pavement cracking in SBL between BH17-02 and BH17-03. Looking southeast.



Photo 4: Surface water eroding gravel and edge of pavement at east corner of entrance to gravel pit. Looking southeast.

2023 Site Inspection Photos at NC083



Photo 5: Pavement crack along C/L culvert alignment. Looking northeast.



Photo 6: North ditch at C/L culvert inlet. Looking southwest.

2023 Site Inspection Photos at NC083



Photo 7: Vegetation blocking C/L culvert outlet. Looking southeast.



Photo 8: Seepage in vehicle track. 300 mm deep track. Looking northeast.

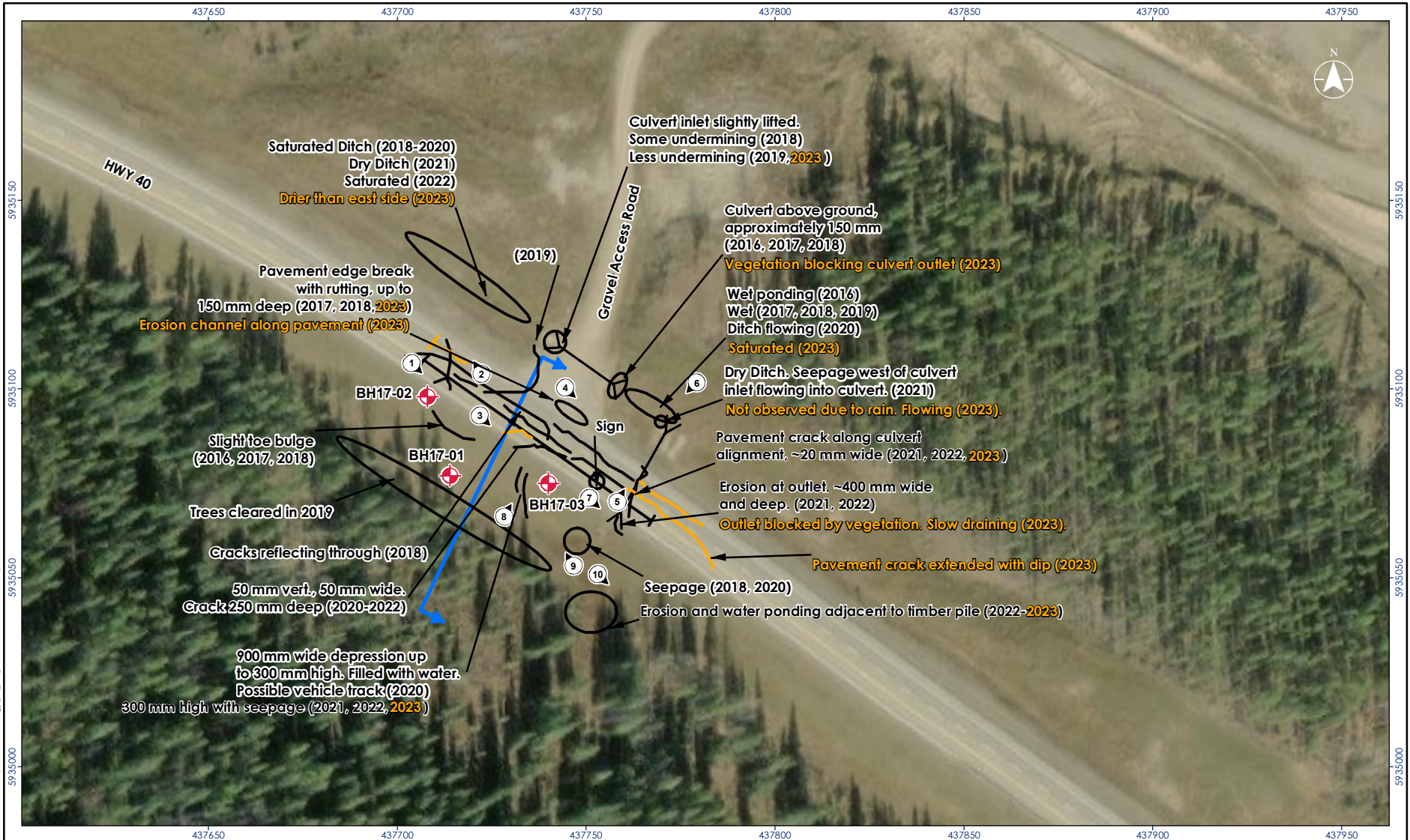
2023 Site Inspection Photos at NC083



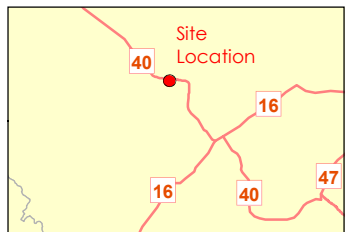
Photo 9: Overall view of south slope. Looking northwest.



Photo 10: Erosion and ponded water in tree clearing area. Looking southeast.



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 59350000 59350050 59351000 59351500



- Borehole Location
- Approximate Culvert Location
- Previous Observation
- 2023 Observation
- Cross Section Location



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 11 N
 2. Base features: Geogratis, ©Department of Natural Resources Canada. All rights reserved.
 3. Imagery: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Project Location: SE 8-53-27 WSM, Yellowhead County, Alberta
 Prepared by DR on 2023-07-25
 Quality Review by LC on 2023-07-25
 Independent Review by XL on 2023-07-25

Client/Project: Transportation and Economic Corridors
 Geohazard Monitoring Program
 NC83 – West of Wildhay River

Figure No.: 1
 Title: **Site Plan**



