SOUTHERN REGION GRMP
SITE INSPECTION FORM

SITE NUMBER AND NAME: **S008 Fisher Creek Pile Wall**	HIGHWAY & KM: 762:02, 2.125	PREVIOUS INSPECTION DATE: July 5, 2021	INSPECTION DATE: **May 16, 2022**
LEGAL DESCRIPTION: 09-10-21-04 W5M	NAD 83 COORDINATES: UTM 11 Northing 5627342 Easting 678866	RISK ASSESMENT: PF: 11 CF: 6 TOTAL: 66	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 720 (north) & 1420 (south) (Reference No. 65170 & 60180)		CONTRACTOR MAINTENANCE AREA (CMA): 27	

SUMMARY OF SITE INSTRUMENTATION:	INSPECTED BY:
5 slope inclinometers installed into the concrete pile wall. LAST READING DATE: May 2, 2022	Chris Morgan (KCB) Laura Assaad (KCB) Alex Frotten (AT) Roger Skirrow (AT)

PRIMARY SITE ISSUE: Settlement of the embankment slope downslope of the existing pile wall by up to 0.8 m, and development of a dip in the pavement north of the existing pile wall.

APPROXIMATE DIMENSIONS: Pre 2017: 130 m long slide area in an earth slope approximately 12 m high (embankment slopes vary from 3H:1V to 4H:1V). Previous reports indicated a sliding plane 5 m below the highway. The landslide was repaired with a concrete pile wall. In 2020, settlement and new pavement cracking was observed north of the previous slide and the site extents have therefore been extended 20 m northwards.

DATE OF ANY REMEDIAL ACTION: January 2017 – a concrete pile wall installed on west side of highway. The pile wall consists of cast-in-place, 1.2 m diameter and 18 m long concrete piles anchored in bedrock. Some piles encountered water bearing sand and gravel that required concrete to be tremied into place. Fall 2017 – pavement was resurfaced and the installation of a HTCB.

ITEM	CONDITION EXISTS		DESCRIPTION AND LOCATION	NOTICABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress	X		Pavement cracking is 6 m long and up to 22 mm wide in the northbound lane, approximately 18 m north of the existing pile wall		X
Slope Movement	X		Slope movement downslope of pile wall and sinkholes at individual pile locations.	X	
Erosion	X		Downstream slope is well vegetated with grass. Erosion is visible between the concrete piles where downstream slope has settled.	X	
Seepage		X	N/A – none observed		X
Culvert Distress		X	N/A – none observed		X

COMMENTS

A high-tension cable barrier (HTCB) is installed along the east (southbound) edge of the highway and extends across the whole length of the pile wall (Photo 1 through 4).

The height of the highway embankment is approximately 5 m to 6 m and well vegetated.

During the 2022 inspection, the east (upslope) ditch was well vegetated, dry, and in good condition.

There is negligible movement being recorded in the pile-wall slope inclinometers and no pavement cracking has been observed directly upslope of the pile wall. However, pavement cracking and settlement in the highway approximately 24 m north of the pile wall (15 m north of the HTCB) has been observed since 2020 (Photo 1 and 2). The pavement crack and settlement has increased in severity since 2020 (increased in length from 11 m to 16 m since 2021) and is up to approximately 25 mm wide. The pavement settlement is up to approximately 25 mm in the east (northbound) lane. Pavement cracking was within 400 mm of the white line on the east side of the highway (northbound lane).

The south extent of pavement cracking is likely to intersect with the north end of the pile wall. Settlement in the southbound lane was estimated to be up to 50 mm (Photo 2).

The pavement cracking and settlement north of the pile wall could indicate the slide has begun to outflank the pile wall.

In 2018, fill on the west side of the highway began settling around the concrete piles, creating tension cracking downslope of the pile wall and some localized sinkholes above the pile wall.

During the 2022 inspection, cracking and settlement of the embankment downslope of the pile wall was visible and the ground surface had dropped by up to 800 mm, creating a ledge that could potentially pond water, leading to increased infiltration (Photo 3 and 4).

Surface water runoff has enlarged existing sinkholes at the pile locations and contributed to embankment settlement downslope of the pile wall.

Maintenance/Repair/Monitoring Recommendations:

Short-Term

- The pavement cracks should be sealed to reduce surface water infiltration.
- The voids between the pile walls should be backfilled to reduce infiltration and potential erosion undermining the east (southbound) lane.
- The site should be regularly inspected as part of the Southern Region Section B inspections and instruments read as part of the Section C instrumentation monitoring.
- A borehole could be drilled through the pavement north of the pile wall and a slope inclinometer and piezometer(s) should be installed to monitor movement and groundwater conditions, respectively.

Long-Term

- The pile wall could be extended the north, so the slide doesn't outflank the existing pile wall; or
- Stabilize the highway embankment by excavating and replacing embankment fill with geogrid reinforced granular fill.

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September 27 2022
I.D. # 58463

Chris Gräpel, M.Eng., P.Eng.
Senior Civil Engineer, Associate

PERMIT TO PRACTICE
KLOHN CRIPPEN BERGER LTD.

RM SIGNATURE: _____

RM APEGA ID #: 187607

DATE: 28 Sep. 2022

PERMIT NUMBER: P009196
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Legend

- GPS Waypoint (May 16, 2022)
- Slope Inclinometer (SI)
- GPS Track (May 16, 2022)
- Crack
- Fence
- Site Extent

0 50 Metres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 11N
3. IMAGE SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS AND THE GIS USER COMMUNITY.

CLIENT: Alberta

Klohn Crippen Berger

PROJECT: SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE: Site Plan
S008 - Fisher Creek Pile Wall
Hwy 762.02, km 2.125

SCALE	PROJECT No.	FIG No.
1:1,500	A05116A03	1

File: Z:\AC\GY\Alberta\A05116A03 ABT Southern Region GRMP400 Drawings\2022\Section B\S008\S008.aprx Date: Time: Creator: : aharrison

Inspection Photographs

Photo 1 **Pavement cracking north of the pile wall (approximate location of the north end indicated by red arrow) crosses both lanes of the highway. The pavement cracking has increased since the 2021 inspection. Photo taken on May 16, 2022, facing south.**

Photo 2 **Pavement cracking in the northbound lane (WP 85) and pavement settlement (approximately 50 mm) in the west (southbound) lane pavement has increased since the 2021 inspection. Photo taken on May 16, 2022, facing south.**

Photo 3 **There has been approximately 800 mm of settlement of embankment fill downslope of the pile wall, which has formed a ledge downslope of the high-tension cable barrier (HTCB) (indicated by red arrow). Photo taken on May 16, 2022, facing south.**

Photo 4 **There has been approximately 600 mm of settlement of embankment fill downslope of the pile wall. Photo taken on May 16, 2022, facing north east.**