ALBERTA TRANSPORTATION
GEOHAZARD ASSESSMENT PROGRAM
NORTH CENTRAL REGION – ATHABASCA
2019 INSPECTION

THURBER ENGINEERING LTD.

Site Number	Location	Name	Hwy	km
NC 62	3.3 km south of the junction between Hwy 881:15 and 55:14	**SOUTH OF BEAVER RIVER**	881:16	29
Legal Description		**UTM Co-ordinates (NAD 83)**		
SE- 12-63-9-W4M		12 N 603423 E 480622		

	Date	PF	CF	Total
Previous Inspection:	May 9, 2018	9	4	36
Current Inspection:	June 12, 2019	10	4	40
Road AADT:	740		**Year:**	2018
Inspected By:	Tarek Abdelaziz, José Pineda (Thurber) Rishi Adhikari, Calvin Kissel, Arthur Kavulok (AT)			
Report Attachments:	☑ Photographs ☑ Plans ☐ Maintenance Items			

Primary Site Issue:	Appearance of cracks on the highway surface within the limits of the remediated portion of the highway side slope.
Dimensions:	About 120 m along the highway
Date of any remediation:	Re-construction of the failed slope and the highway section was undertaken in 2004
Maintenance:	Remediated highway section was paved in 2004; pavement overlay placed in November 2008; stepped gabion baskets over geotextile replaced the above-ground culvert in late 2008

Observations:	Description	Worse?
☑ Pavement Distress	Twist on Hwy surface between two sets of diagonal cracks	☑
☑ Slope Movement	10 - 50 mm landslide reflective cracks on the highway surface; up to 15 mm drop across the cracks; no signs of distress in the highway side slopes	☑
☑ Erosion	Creek scour between sub-drain 4 and 5 locations (above the beaver pond location) causing development of scarps near the toe	☐
☑ Seepage	Sub-drains 1, 2, 3, 4 and 5 were not located; steady flow with oxide stains from sub-drains 6 and 7	☐
☐ Bridge/Culvert Distress		☐
☑ Other	Beaver Dam 1 was removed in 2018; however, Beaver Dam 2 at the bottom of the slope continues to almost block creek flow; beaver pond extended to the south due to a new Beaver Dam 3	☑
Instrumentation: None		

Assessment (Refer to attached Figure):

The highway condition is slightly worse than in 2018. The rate of movement appears to have increased since 2018 as evidenced by further opening/extension of existing highway cracks, appearance of new cracks, and worsening of the twist developed within the middle section of the highway

The appearance of cracks on the highway surface is probably a reflection of continued creep movement of the repaired slope. Infiltration of surface water into open cracks and rise in groundwater levels within the embankment are likely the main causes for the observed movement.

The rise in groundwater levels within the embankment can be attributed to (a) partial or complete plugging of subdrain pipes located at the bottom of the slope, and (b) presence of a large beaver pond within the creek below the highway.

At present, the movement appears to have a moderate impact on the highway condition, except for the twist developed on the highway surface which creates a rough ride to motorists.

It is anticipated that the highway condition will continue to deteriorate progressively unless groundwater levels are reduced within the repaired slope area.

Recommendations:

It is recommended that the site be visited again in 2020.

In the short-term, the local MCI should undertake the following:

- Seal all open cracks in the highway surface to prevent surface water infiltration into the landslide mass.
- Watch closely for new cracks or extension of existing cracks.
- Place ACP patch at the twist location to provide a smooth ride to motorists
- Clear the beaver dam(s) and re-locate the beaver(s) to reinstate proper creek flow and avoid damming of water within the limits of the repaired slope area.
- Clean up the subdrains located at the toe of the slope.

The site appears to be moving at a higher rate than observed in the past and hence it is recommended to install geotechnical instruments to quantify slope movement rates. These instruments should be added to the Instrumentation Monitoring Program.

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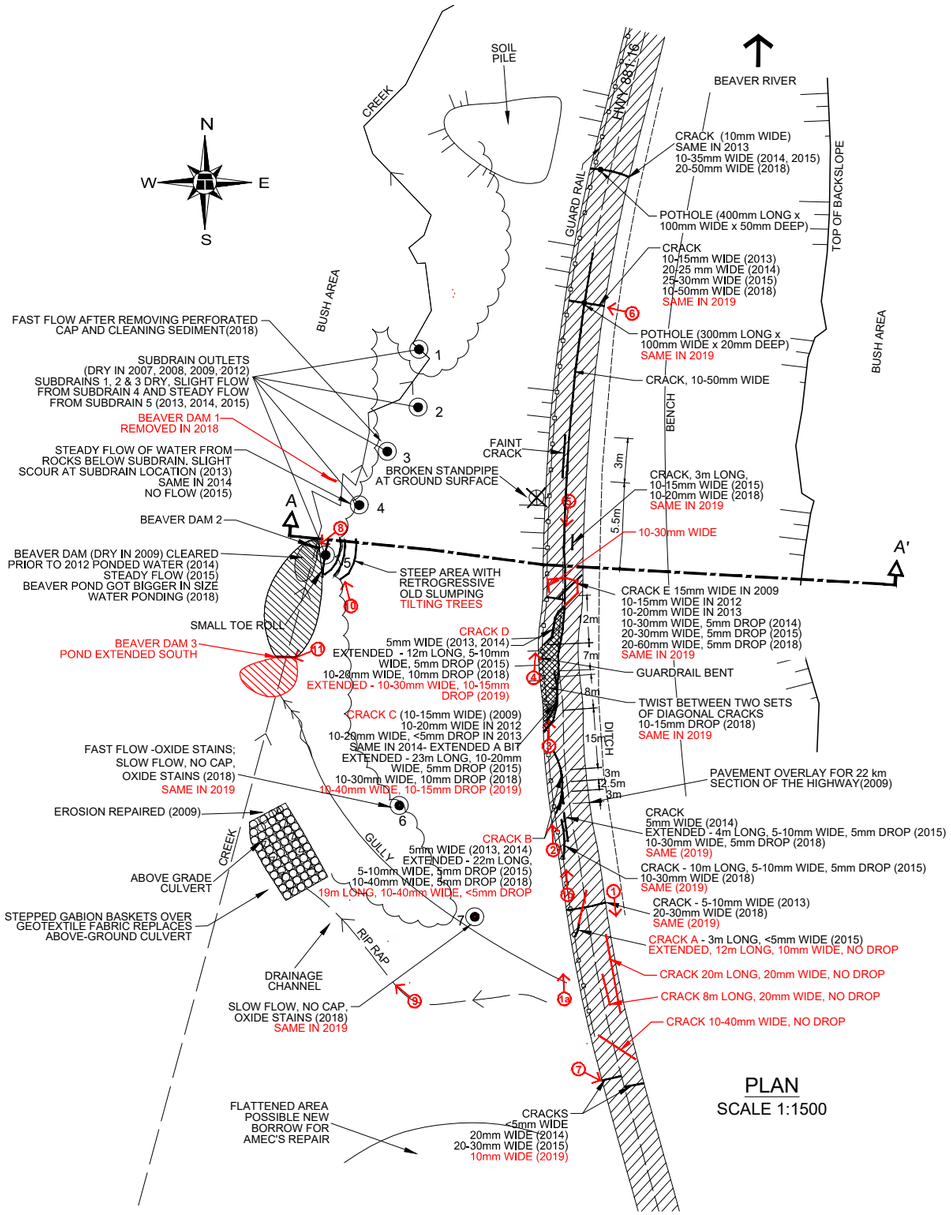


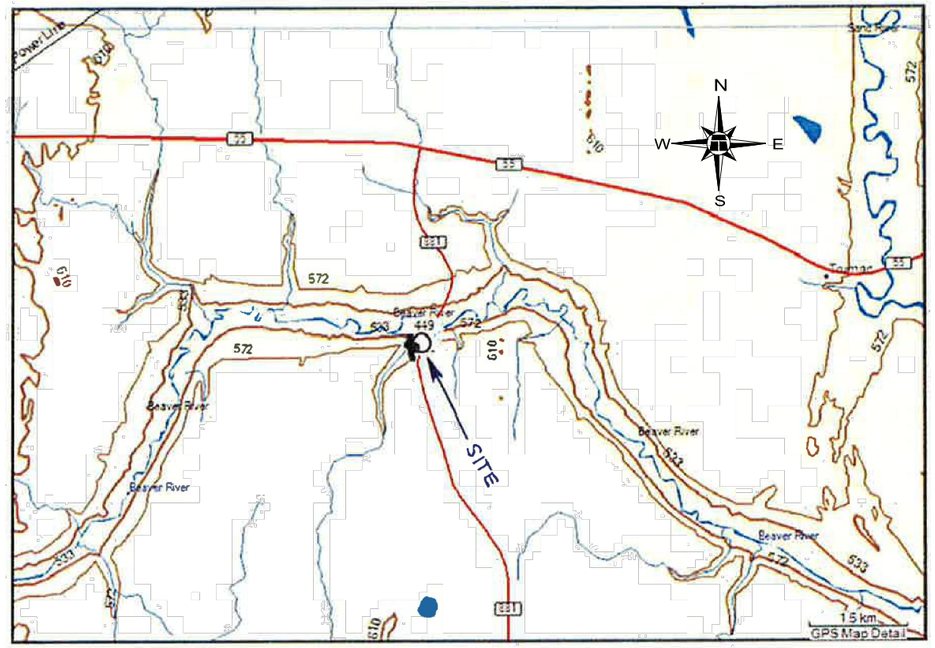
PLAN
SCALE 1:1500

LEGEND

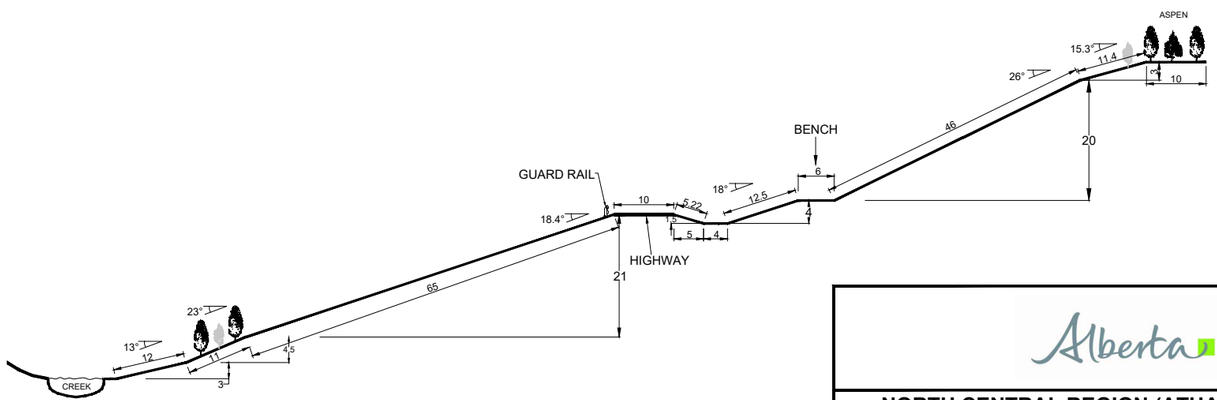
- 200mm HDPE PERFORATED SUBDRAIN OUTLET
- GUARDRAIL
- PAVEMENT OVERLAY
- CRACKS
- BUSH LINE
- PHOTOGRAPH NUMBER, AND APPROXIMATE LOCATION AND DIRECTION
- BEAVER POND

SUBDRAIN NO.	EASTING (m)	NORTHING (m)
1	480561	6034350
2	480560	6034336
3	480553	6034325
4	480546	6034311
5	480537	6034299
6	480556	6034236
7	480575	6034208

NOTE: JUNE 12, 2019 OBSERVATIONS SHOWN IN RED



LOCATION MAP
N.T.S.



SECTION A-A'
SCALE 1:1000

NOTE:

-ALL DIMENSIONS ARE IN METERS.

Alberta

NORTH CENTRAL REGION (ATHABASCA AREA)
2019 GEOHAZARD ASSESSMENT

NC 62: HWY 881: 16 SOUTH OF BEAVER RIVER (km 3.3)
SITE PLAN AND CROSS - SECTION

FIGURE NC62-1

DRAWN BY	ML
DESIGNED BY	TSA
APPROVED BY	DWP
SCALE	AS SHOWN
DATE	SEPTEMBER 2019
FILE No.	13357

THURBER ENGINEERING LTD.

Photo No.1 - Looking south from the southern limit of the site at new longitudinal cracks on the southbound lane

Photo No.1a - Looking south from the southern limit of the site at 10 mm wide diagonal crack A

Photo No.1b - Looking north from the southern limit of the site at 10 -30 mm wide diagonal Crack B

Photo No.2 - Looking north at a 10-40 mm wide arc-shaped reflective Crack B

Photo No.3 - Looking north at a 10-40 mm wide arc-shaped reflective Crack C on the highway surface

Photo No.4 - Looking north at a 10-30 mm wide arc-shaped reflective Crack D

Photo No.5 - Looking south at a 10 to 15 mm wide reflective crack along the highway centerline

Photo No.6 - Looking west at a 10 to 50 mm wide transverse crack near the northern limit of the site

Photo No.7 – Looking east at 10 mm wide transverse crack near the southern limit of the site

Photo No.8 - Looking south at Beaver Dam 2

Photo No.9 - Looking west at the gabion basket channel

Photo No.10 – Looking west at an old slump above Beaver Dam 2

Photo No.11 - Looking south at Beaver Dam 3