SOUTHERN REGION GRMP

SITE INSPECTION FORM

SITE NUMBER AND NAME: **S055 East of Gleichen**	HIGHWAY & KM: 901:14, 9.2	PREVIOUS INSPECTION DATE: May 12, 2023	INSPECTION DATE: **May 28, 2025**
LEGAL DESCRIPTION: 02-12-022-22 W4M	NAD 83 COORDINATES: UTM 12 Northing 5634864 Easting 364825	RISK ASSESSMENT Slide: PF: 7 CF: 2 TOTAL: 14 Erosion: PF: 2 CF: 2 TOTAL: 4	
AVERAGE ANNUAL DAILY TRAFFIC (AADT): 300 (west), (Ref. No. 109170)		CONTRACTOR MAINTENANCE AREA (CMA): 521	

SUMMARY OF SITE INSTRUMENTATION:	INSPECTED BY:
There is no instrumentation at the S055 site. LAST READING DATE: N/A	Chris Gräpel (KCB) Jorge Rodriguez (KCB) Alex Frotten (TEC) Rishi Adhikari (TEC)

PRIMARY SITE ISSUE: There is slope instability in the south (eastbound) highway embankment slope even after being repaired in 2018, likely caused by the slope being over-steepened. There was erosion in the north (westbound) ditch before the slope drain was installed in 2018. The slope drain became blocked in spring 2019 due to grass buildup on the fine mesh screen (aperture size of 15 mm) fitted to the pipe inlet, leading to overtopping of the ditch block and erosion of the repaired surfaces. The erosion gully and slope drain on the north side were repaired in late 2019, including the replacement of the inlet trash rack.

APPROXIMATE DIMENSIONS: The highway embankment is approximately 15 m high and was constructed in a creek valley. A 900-mm-diameter CSP culvert was installed along the base of the embankment. The embankment side slopes are approximately 2H:1V, with the south (eastbound) highway embankment slope slightly steeper than the north slope.

DATE OF ANY REMEDIAL ACTION: 2012/2013 – A slide mass on the south (eastbound) highway embankment, near the west side of the site, was repaired by excavating the slide mass and replacing it with compacted gravel fill. Also, a gravel armoring and non-woven geotextile repair was completed on the northeast abutment ditch.

November 2018 – Slope failure in the south (eastbound) highway embankment slope was completed by excavating the slide mass and replacing it with compacted gravel fill; December 2018 – the erosion gully in the north (westbound) highway embankment slope and ditch was repaired by installing a buried HDPE slope drain. Riprap armouring was installed at the drain inlet and outlet. 2019 – the slope drain was cleared after becoming blocked in early2019.

ITEM	**CONDITION EXISTS**		**DESCRIPTION AND LOCATION**	**NOTICABLE CHANGE FROM LAST INSPECTION**	
	YES	NO		YES	NO
Pavement Distress		X	No cracking or settlement on the gravelled highway surface was observed during the 2025 inspection.		X
Slope Movement	X		Slide repairs completed in 2018 south of highway. In 2020, it was observed that the repair has partially failed. Shallow slope instability observed during the 2025 inspection.		X
Erosion	X		Rill erosion up to 50 mm deep on the south (eastbound) embankment slope, where slope is poorly vegetated. Erosion gully in north (westbound) ditch was repaired in 2018 and minor erosion observed upstream (east) of slope		X

			drain inlet.		
Seepage	X		Seepage in the south (eastbound) highway embankment slope previously observed where there is slope instability and poor vegetation cover.		X
Culvert Distress		X	N/A – none observed since the 2018 and 2019 repairs.		X

COMMENTS

South Side of Highway:

- During the 2025 inspection, no evidence of movement (cracking or settlement) along the crest of the slope or guardrail deflection was observed (Photo 1). The highway embankment slope is relatively steep, sloping close to 2H:1V.
- During the 2020 inspection, tension cracking was observed midslope on the east and west flanks (left and right, respectively) of the repaired area. The failed material is displacing the fence downslope, with one fence post leaning significantly. There are three discernible zones of slope instability, with the head scarps approximately 3 m upslope (north) from the fence line. The sloughing width ranges from approximately 2 m to 8 m (Photos 2 and 3).
- The vegetation coverage on the highway embankment slope is relatively poor and is primarily weeds (Photo 3). The embankment slope is steep, and the site is dry, which likely limits vegetation growth. KCB suspects that surface water runoff is contributing to ground infiltration and saturation, and that the granular fill is acting as a preferential flow pathway.
- Minimal change in the south (eastbound) highway embankment slope has been observed between the 2020 and 2025 inspections.

North Side of Highway:

- The north (westbound) highway embankment slope and ditch are well vegetated and appear to be performing well (Photos 4 and 5).
- Erosion (up to 0.15 m deep and 0.5 m wide) was observed upstream (east) of the HDPE slope drain inlet.
- The riprap placed at the HDPE slope drain inlet and outlet was in good condition (Photos 4 through 7).
- The HDPE slope drain inlet was open, and the trash rack was in good condition (Photo 6). No evidence of flow overtopping the berm at the inlet of the slope drain was observed.
- No new erosion or sinkholes were observed above the HDPE slope drain. The lower portion of the HDPE slope drain was covered with straw matting during construction and is now well vegetated.
- The HDPE slope drain outlet is elevated above the riprap apron (150 mm minus particles). No evidence of erosion was observed, and the riprap apron has vegetation growing between the riprap particles (Photos 7 and 8). The vegetation was very tall downstream of the riprap apron (Photo 8).
- In 2020, it was estimated that outflows from the HDPE slope drain were less than flow in the ditch, possibly due to leakage. In 2021, it was observed that the final joint at the downstream end of the HDPE pipe had separated, leading to leakage at the joint, minor erosion of riprap, and settlement of the geotextile on the south side of the pipe. No significant changes have been observed between the 2021 and 2025 inspections.
- The V-shaped ditch downstream of the HDPE slope drain outlet has been partially eroded but is still functional. A culvert beneath the highway at the toe of the embankment remains infilled with sediment as a result of the spring 2019 ditch block overtopping. The sediment plug restricts flow to the south, which also impedes flow from the CSP culvert under the CP Rail line.

Maintenance/Repair/Monitoring Recommendations:

General:

- The site should be regularly inspected by the Maintenance Contract Inspector (MCI).
- TEC could consider retiring the site from the GRMP or continue the inspection once per contract as part of the Southern Region GRMP Section B inspections.

North Side of the Highway:

- Clean out the CSP culverts to restore full flow capacity and to improve drainage from the agricultural land north of the CP Rail line (north of the site).
- Install geofabric at the inlet to the slope drain to direct all ditch flow into the HDPE pipe. A custom “boot” is recommended around the HDPE pipe to provide a full seal around the pipe.

South Side of the Highway:

- If slope instability continues that impacts the highway surface, the following repair work could be completed:
  - Improve highway drainage to limit surface water runoff into the sloughing zone (e.g., construct a berm on the south side of the highway or grade the highway surface);
  - Install an erosion control product on the embankment surface to reduce infiltration and erosion; and
  - Stabilize the slope (e.g., geogrid-reinforced granular fill, constructing or toe berm, or an active ground anchoring solution).

This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the exclusive use of Alberta Transportation (Client) for the specific application to the Southern Region Geohazard Risk Management Program (Contract No. CON0022161) and it may not be relied upon by any other party without KCB's written consent.

KCB has prepared this report in a manner consistent with the level of care, skill and diligence ordinarily provided by members of the same profession for projects of a similar nature at the time and place the services were rendered. KCB makes no warranty, express or implied.

Use of or reliance upon this instrument of service by the Client is subject to the following conditions:

1. The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report.
2. The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time.
3. The report is based on information provided to KCB by the Client or by other parties on behalf of the client (Client-supplied information). KCB has not verified the correctness or accuracy of such information and makes no representations regarding its correctness or accuracy. KCB shall not be responsible to the Client for the consequences of any error or omission contained in Client-supplied information.
4. KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.
5. This report is electronically signed and sealed and its electronic form is considered the original. A printed version of the original can be relied upon as a true copy when supplied by the author or when printed from its original electronic file.

PROFESSIONAL ENGINEER ALBERTA
JORGE RODRIGUEZ NAVARRO
ID 222669
2025 Oct. 10
LICENSED TO PRACTICE

Jorge Rodriguez, Ph.D., M.Sc., P.Eng.
Geotechnical Engineer

PERMIT TO PRACTICE
KLOHN CRIPPEN BERGER LTD.

RM SIGNATURE: Pamela Jones
RM APEGA ID #: 187607
DATE: 10 Oct. 2025

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

Legend

- Failure Material
- Tension Crack
- Fence
- Culvert
- Main Scarp

0 50 Metres

NOTES:
1. HORIZONTAL DATUM: NAD83
2. GRID ZONE: UTM ZONE 12N
3. IMAGE SOURCE: MAXAR 2025

CLIENT: Alberta

Klohn Crippen Berger

PROJECT: SOUTHERN REGION GEOHAZARD RISK MANAGEMENT PROGRAM

TITLE: Site Plan
S055 - East of Gleichen Slide
Hwy 1:14, km 40.353

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

File: Z:\AC\GY\Alberta\A05116A03 ABT Southern Region GRMP\400 Drawings\2023\01_ProFile\Section B\ABT_Southern_SectionB_230713\ABT_Southern_SectionB_230717.aprx Date: Time: Creator: : NMirhadi

Inspection Photographs

Photo 1 **South (eastbound) highway embankment slope was relatively well vegetated, and no ground cracks or guardrail settlement were observed. Photo taken May 28, 2025, facing east.**

Photo 2 **Small slide (red dashed line) was observed in the south (eastbound) highway embankment slope that is impacting the fence (red arrow). Photo taken May 28, 2025, facing west.**

Photo 3 **Slide in the south (eastbound) highway embankment that is impacting the fence. Photo taken May 28, 2025, facing east.**

Photo 4 **The north (westbound) highway embankment slope was relatively vegetated and appears to be performing well after the 2018 repair. Photo taken May 28, 2025, facing east.**

Photo 5 **Highway embankment slope and ditch upslope (east) of the HDPE culvert slope drain is well vegetated. Photo taken May 28, 2025, facing east.**

Photo 6 **The HDPE culvert inlet appeared to be in good condition. Photo taken May 28, 2025, facing west.**

Photo 7 **The HDPE culvert outlet appeared to be in good condition. Photo taken May 28, 2025, facing southeast.**

Photo 8 **The ditch downstream of the HDPE culvert outlet was well vegetated and appeared to be performing well. Photo taken May 28, 2025, facing east.**