ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS
GEOHAZARD RISK MANAGEMENT PROGRAM
PEACE REGION (PEACE RIVER DISTRICT)
2025 INSPECTION

Site Number	Location	Name	Hwy	km
SH014-1	Northeast of High Prairie	Salt Creek Slide	750:02	30.57
Legal Description		**UTM Co-ordinates**		
NE34-76-14-W5		11U E 558,308	N 6,165,584	

	Date	PF	CF	Total
Previous Inspection:	5-Jun-2024	9	5	45
Current Inspection:	28-May-2025	9	5	45
Road AADT:	570		**Year:**	2024
Inspected By:	Kristen Tappenden, TEC		Mark Gallego, Thurber Roger Skirrow, Thurber	
Report Attachments:	☒ Photographs	☒ Plans	☐ Maintenance Items	

Primary Site Issue:	A landslide affects both lanes of the highway and extends along the adjacent cut slope. The slide was initiated when a 7.5 m high sidehill embankment fill was placed. A toe berm was placed which appears to have controlled the rate of movement to a manageable level.	
Dimensions:	40 m along highway on west side	
Date of Remediation:	1988: 120 m long by 9 m wide by 3 m high toe berm with two 150 mm-diameter subdrains installed against west side of highway embankment; a 5 m deep subdrain was also installed in east ditch.	
Maintenance:	Crack sealing and patching, as required. 115 m long patch done in mid-2010s. 2019: 40 m long patch in SBL and portion of NBL Fall 2022: Overlay	
Observations:	**Description**	**Worsened?**
☒ Pavement Distress	The main scarp crack is approximately 35 m long affecting the SBL has reflected through since 2022 overlay. Portions of the NBL was patched prior to 2024 inspection.	☐
☒ Slope Movement	Back-tilt of the top of the toe berm may indicate rotational failure of embankment. The resulting crack pattern has partially re-established through the 2022 overlay. The east backslope of highway is also slumping over 90 m length with toe rolls near the bottom of the east ditch. The extent of backslope slumping is likely unchanged since 2024 inspection.	☐
☒ Erosion	50 m long gully at the north side of existing berm and ditch on west side of highway.	☐
☒ Seepage	Seepage and wet area exist near the CSP outlets and along part of the fence on the west side of the highway. Subdrains at north end of toe berm were dry; terrain beyond wet and soft.	☐
☒ Bridge/Culvert	BF09208 appears unaffected by slide movement.	☐
☒ Other	Possible intermediate scarps, or old equipment ruts, exist near crest of toe berm downslope edge	☐

Instrumentation (Spring 2025):	
Damaged/ Destroyed	SI02-2 sheared in 2005 at 4.7 m in clay below fill. SI02-4, paved over in 2005, was moving at 5.2 m in native clay just below fill. SP02-4 damaged.
SP02-3	At fence line on top of berm: Water level at 2.1 m BGL in Spring 2025. It was previously 1.87 m BGL in Spring 2024 and 2.15 m BGL in Fall 2024.
SI23-1	SI23-1 has a rate of movement of 2 mm/yr over 0 m to 2.4 m depth since the Fall 2024 readings. This corresponds to an incremental movement of 1.5 mm, and a change in the rate of movement of 15.6 mm/yr.

Assessment:

This landslide site has a long history of slope instability. In 1988, a 80 m wide slide occurred on the west side of the highway on an approximate 7.5 m high embankment fill. Following a test pit investigation, a 120 m long by 9 m wide by 3 m high toe berm was constructed to remediate the slide. The repair effort included installation of two 150 mm diameter subdrains. Cracks and movements in the pavement and downslope area were documented soon after the completion of the remedial measures. In 2002, a geotechnical investigation and instrumentation installation was undertaken. In 2008, a preliminary engineering report was prepared that outlined potential repair options. This site was annually inspected as part of the GRMP from 2001 until 2013.

After being dormant for several years, slide crack/dip re-appeared in the roadway in the spring of 2019. A call-out inspection was undertaken in June 2019, followed by an annual Geohazard inspection in June 2020, and a second call-out was undertaken in July 2020 after which the site has been inspected annually.

The 2002 geotechnical investigation encountered up to 4.5 m of fill (predominant clay fill containing organics and organic layers), overlying a 2 m to 4 m thickness of highly plastic clay, overlying clay till containing extensive sand layers.

Based on previous information, the slide appears to be moving at two levels. There is a shallow upper block sliding within high plastic clay that is moving out onto the top of the toe berm and pushing out the fence. There is also a lower deep-seated block, also in high plastic clay, that extends below the toe berm potentially to the creek. The overall weight of the highway embankment and toe berm fills is too great for the existing relatively weak and wet clay foundation soils and has resulted in the current slide conditions. Ingress of water into the slide mass via open cracks and impeded drainage can also influence the rate of slide movement.

The inclinometer movement vectors shown on Drawing 32121-SH014-1 indicate the slide is moving along an azimuth of about 242 degrees, nearly perpendicular to the general creek alignment and at a 50° skew to the highway.

The dominant crack was about 33 m in length with an approximately 20 m long dip on the west side of the crack that had dropped about 30 mm. Crack widths were typically 20 mm to 30 mm wide. These cracks were mostly obscured by the 2022 overlay. The main crack reappeared and was 15 mm wide and had 10 mm of vertical displacement. The movements were attributed to the upper, shallower slide block. There is some concern that the extent of the overall slide may be larger than previously thought and affecting a greater length of paved roadway. This was evidenced by a previous 115 m long full width pavement patch that spans from the north approach to 30 m south of the extent of the main crack. During the 2024 inspection, there were smaller patches within this area, north of the main crack. It is possible that movement on the lower slide block may be contributing to this greater extent. There were a few long patches observed along the northbound lane, south of the main crack during the 2024 inspection. There was a linear feature just below the crest of the toe berm that appeared somewhat indicative of a forming scarp. However, it could also be related to equipment rutting. During the 2025 inspection, observed conditions downslope of the highway embankment were similar to the previous inspection.

Scarps and tension cracks have formed along the top of the east backslope. The main scarp was 1.9 m from the fence and a tension crack upslope of the main scarp was 0.5 m from the fence. The fence appears to be leaning slightly. The power pole was previously observed to be vertical, however, it was observed to have a 2.2 degree tilt to the west during the 2025 inspection. It is not clear if the east backslope movements are linked to the movements at and below the roadway or if the two areas of

movement are responding to the same trigger. There appeared to be more movement observed during the 2024 inspection with more tension cracks developing and scarps widening. Observed conditions of the backslope during the 2025 inspection were similar to 2024.

Higher-than average rainfalls in the area over the last two or three years prior to 2020 have likely contributed to the more active landslide movements by raising the local water table(s) and reducing the effective stress in the foundation soils, highway embankment, and toe berm. The Spring 2024 water level in SP02-3 was higher compared to Fall of 2023, where it had been stable since 2016. Recent water level readings in Fall 2024 and Spring 2025 have come back down since, and are similar to the water levels prior to the Spring 2024 reading.

The smaller shallow-based landslide will continue to move, and the rate of movement is predominantly dependent on rainfall and groundwater levels, and the slide may become larger with time. Further investigation (including installation of additional instrumentation), observation and monitoring is required to verify:

- The overall slide extent at this site (which may be in the order of 150 m long measured parallel to the highway).
- Whether the backslope movements are linked to the slide movements or separate.

Recommendations:

Short-Term:

- The MCI should regularly monitor this area for further movements or enlargement. Crack sealing and patching should be undertaken as required. Consideration should be given to filling and sealing the open cracks present along the east backslope. These cracks capture rain and snow melt which increases the water tables and encourages more slide movement.

Long-Term:

- As per 2008 preliminary engineering report, dewatering with slope flattening or increased toe berm options are less-effective options. The feasible repair option at this site (as described in more detail in the 2019 call-out report) may include: (a) the installation of a cast-in-place concrete cantilever retaining wall (estimated cost of $1.6M), or (b) the construction of a shear key along with slope regrading (estimated cost of $1M). However, the shear key option has significant regulatory hurdles (see Spencer Environmental assessment included the Preliminary Engineering Report prepared in 2009) as Salt Creek is classified as a fish-bearing stream in addition to potential impacts to migratory birds, wildlife, and navigable waters.

Ongoing Investigation:

- It is recommended that the annual Geohazard inspection should continue as scheduled.
- A test hole was drilled downslope of the highway in the west ditch to install a slope inclinometer in 2022 as summarized in a data report. A topographic survey of the site was also carried out during this phase. Additional test holes would be needed for detailed design of selected option and to determine if the east backslope movements are linked to the downslope side and to confirm if the extent of the deep-seated slide block has expanded since 2007. Slope inclinometers and piezometers should be installed in the test holes to determine the depths of movement(s) and ground water conditions. LiDAR should also be obtained, and detailed slope stability analyses carried out to further investigate potential remedial measures.

Closure:

It is a condition of this letter report that Thurber's performance of its professional services will be subject to the attached Statement for Use and Interpretation of Report.

Roger Skirrow, P.Eng.
Senior Geotechnical Engineer

October 9, 2025

Mark Gallego, P.Eng.
Geotechnical Engineer

PERMIT TO PRACTICE
THURBER ENGINEERING LTD.
RM SIGNATURE: _____
RM APEGA ID #: 51674
DATE: October 10, 2025
PERMIT NUMBER: P005186
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

THURBER

STATEMENT FOR USE AND INTERPRETATION OF REPORT

1. STANDARD OF CARE

This Report has been prepared in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances at the same time and in the same or similar locality and in compliance with all applicable laws.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment, including this Statement For Use and Interpretation of Report, are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT, AS DESCRIBED ABOVE. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TOTHE WHOLE OF THE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives, and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client for the development, design objectives, and/or purposes described to Thurber by the Client. **NO OTHER PARTY MAY USE OR RELY ON THE REPORT OR ANY PORTION THEREOF FOR OTHER THAN THE CLIENT'S BENEFIT IN CONNECTION WITH THE PURPOSES DESCRIBED IN THE REPORT**. Any use which a third party makes of the Report is the sole responsibility of such third party and is always subject to this Statement for Use and Interpretation of Report. Thurber accepts no liability or responsibility for damages suffered by any third party resulting from use of the Report for purposes outside the reasonable contemplation of Thurber at the time it was prepared or in any manner unintended by Thurber.

5. INTERPRETATION OF THE REPORT

a) **Nature and Exactness of Soil and Contaminant Description:** Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors is inherently judgement-based. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other parties making use of such documents or records with or without our express written consent need to be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other parties. Some conditions are subject to change over time and those making use of the Report need to be aware of this possibility and understand that the Report only presents the interpreted conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client must disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) **Reliance on Provided Information:** The evaluation and conclusions contained in the Report have been prepared based on conditions in evidence at the time of site inspections and based on information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report resulting from misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other parties providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) **Design Services:** The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber is recommended to be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design need to be reported to Thurber immediately so that Thurber can address potential conflicts.

d) **Construction Services:** During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions to confirm and document that the site conditions do not materially differ from those conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or other parties who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes, but is not limited to, decisions made to develop, purchase, or sell land, unless such decisions expressly form part of the stated purpose of the Report as described in Paragraph 3.

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NE 34–76–14–5

RUTTING, WITH SOFT BOTTOM
70 - 90mm DEEP, 900mm WIDE;
2024: STILL SOFT BUT STABLE AND GRASS GROWING
FENCE BOWED OUT
EROSION GULLY OR
DRAINAGE CHANNEL
TELUS CABLE HANGING ON FENCE
WET AND SOFT
2 x 150mm CSP (DRY IN 2007, 2020)
FENCE PUSHED WEST
THROUGH SLIDE AREA
APPROXIMATE DOWNSLOPE
CREST OF TOE BERM (~15°);
LEANING TREES
UPPER TOE PUSH OR SECONDARY
SCARP <0.3m HIGH EXCEPT 0.6m HIGH
AT NORTH END OUTSIDE FENCE
TREE
TELUS
PEDESTAL
WET
SPRING
(SI)
TH23-1
2m HIGH
TOE ROLL
FIP (TYP.)
BC
TRIBUTARY TO
SALT CREEK
LOW
AREA
WET
TH02-1
P02-3
SI02-2
P02-4/SI02-4
700mm WIDE,
1.5m DEEP
0.8m HIGH
TOE ROLL
1.5m HIGH
CP
PP
7m LONG
400mm DEEP, 800mm WIDE
INFILLED, NOW 200mm x 200mm (2022)
70-90mm DEEP, 900mm WIDE,
SOFT BOTTOM (2022, 2024)
700mm ACP HEIGHT AT SHOULDER (2020, 2024)
2019: MAIN CRACK PATTERN BEFORE OVERLAY;
2024: REAPPEARED: 15mm WIDE, 10mm DIFF
2020: 800mm HIGH SCARP AT 3.7m FROM
FENCE, SECONDARY SCARP 0.25m HIGH,
0.7m FROM FENCE; MORE MOVEMENT,
200mm WIDE (2021);
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FENCE, 250mm WIDE; 300mm WIDE 2025
VERTICAL (2020), 3° TILT TO WEST (2024),
2.2° TILT TO WEST (2025)
SCARP <0.5m HIGH ALONG TOP OF
CUT BACKSLOPE, 1m HIGH (2022)
SLUMP OUTLINE STILL VISIBLE
0.9m HIGH (2019-2020)
1.9m TO FENCE (2022);
1.9m TO MAIN SCARP, 0.5m TO
TENSION CRACK (2024, 2025)
FENCE LEANING (2024, 2025)
MAJORITY OF BACKSLOPE AFFECTED BY
SLIDE - MANY INTERMEDIATE OPEN
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LAST INSPECTION. DANGEROUS TO
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400mm HIGH (2020);
MORE MOVEMENT, 200mm WIDE (2021)
FRESH MOVEMENT (2022)
TENSION CRACKS DEVELOPING IN
BACKSLOPE: UP TO 0.3m WIDE, 0.3m
DEEP, 3-10m LONG (2024, 2025)
OLD BACK SCARP (2007)
NEW PHONE LINE TRENCH (2020)
PP
TREES
3510mm Ø SPE CULVERT (BF09208-0)

LEGEND

- SCARP
- TOE ROLL
- TENSION CRACK
- APPROXIMATE INSTRUMENT LOCATION
- MOVEMENT VECTOR DIRECTION
- (SI) SLOPE INCLINOMETER
- PP POWER POLE
- FENCE
- ① DIRECTION AND NUMBER OF PHOTO

NOTES:

1. SITE FEATURES ARE APPROXIMATE AND DRAWING WAS RESET IN 2024. CONSULT 2023 DRAWING FOR HISTORICAL INFORMATION
2. SITE SURVEY PERFORMED BY EXH ENGINEERING IN APRIL, 2006.
3. MAY 2025 OBSERVATIONS SHOWN IN RED
4. HWY 750 WAS OVERLAID FALL 2022 (40% RAP MIX)
5. 2024 ORTHOMOSAIC DERIVED FROM UAV IMAGERY FLOWN BY THURBER IN MAY 2024

0 10 20 30 40 50 60m
SCALE 1:1000

Alberta

PEACE REGION (PEACE RIVER DISTRICT)

SH014-1: HWY 750:02 SALT CREEK SLIDE
2025 SITE INSPECTION PLAN

DWG No. 32121-SH014-1-1

DRAWN BY	ML
DESIGNED BY	MG
APPROVED BY	RKS
SCALE	1:1000
DATE	SEPTEMBER 2025
FILE No.	32121

THURBER

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Alberta

PEACE REGION (PEACE RIVER DISTRICT)

SH014-1: HWY 750:02 SALT CREEK SLIDE
2025 SITE INSPECTION PLAN

DWG No. 32121-SH014-1-2

DRAWN BY	ML
DESIGNED BY	MG
APPROVED BY	RKS
SCALE	1:1000
DATE	SEPTEMBER 2025
FILE No.	32121

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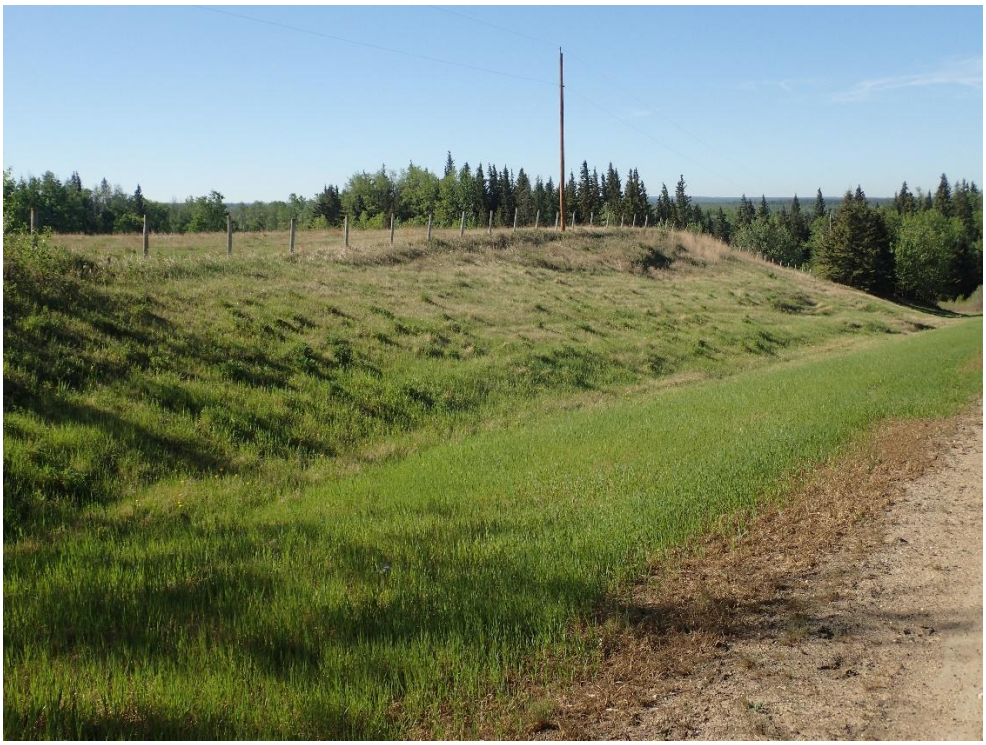


Photo 1 – Looking southeast at east backslope slumps.

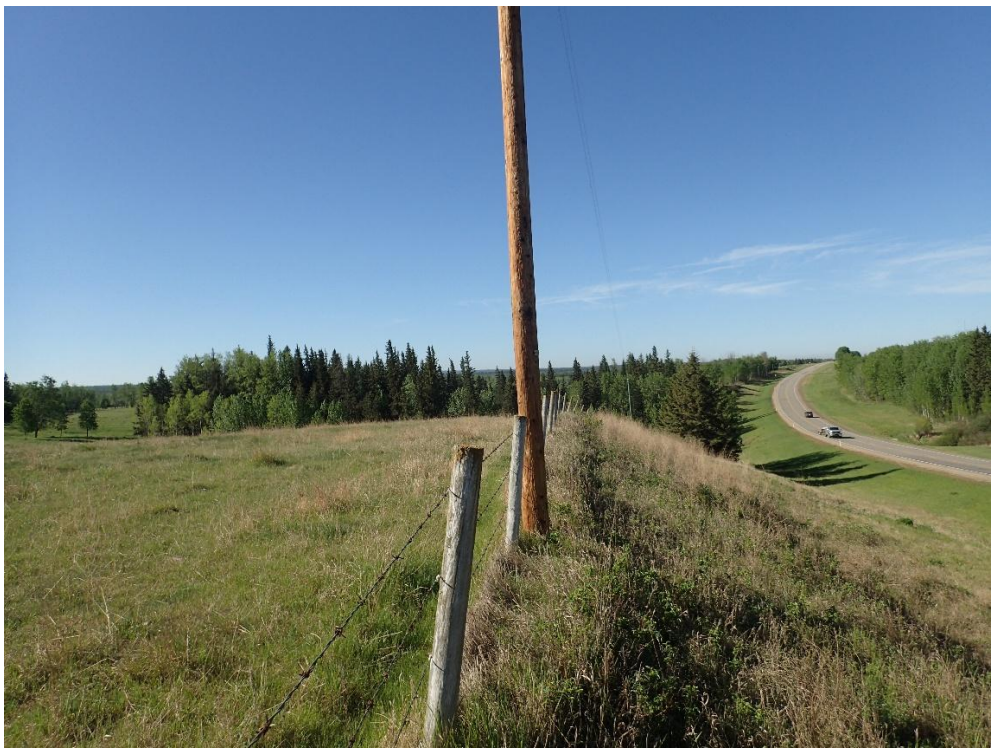
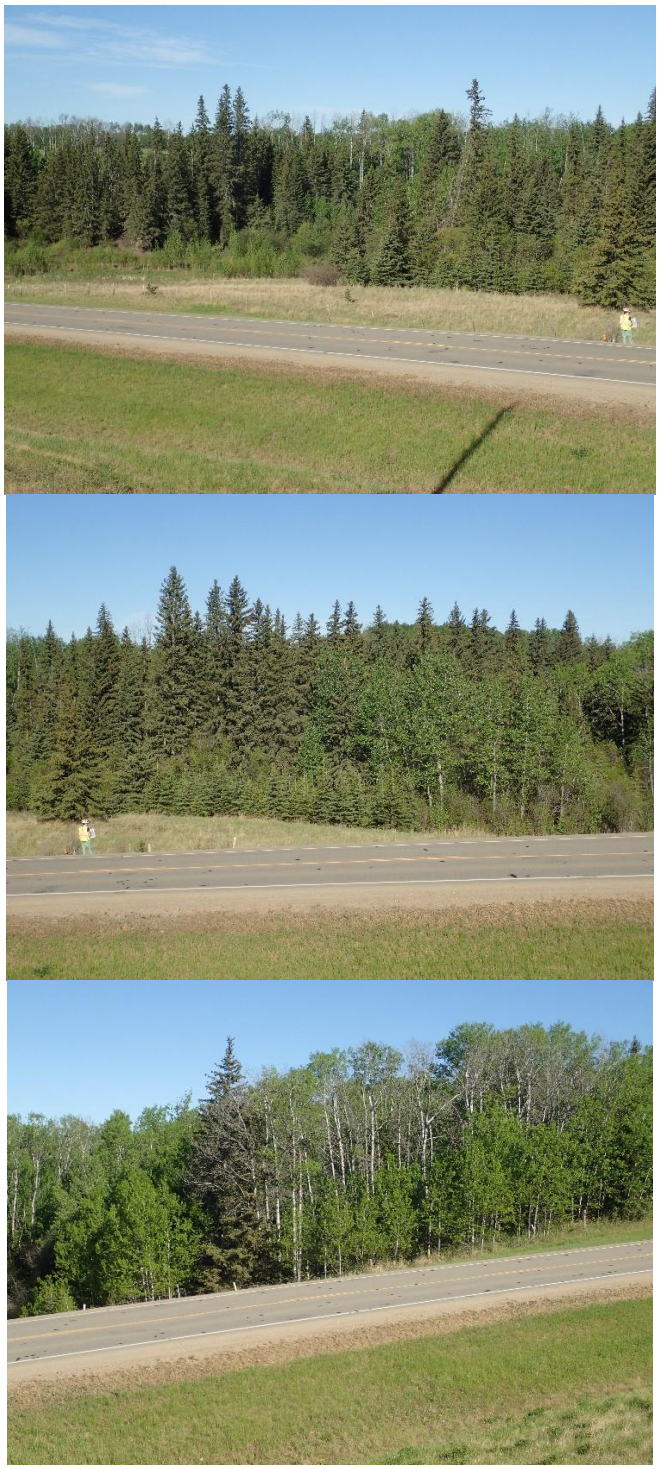


Photo 2 – Looking south at tilted power pole on east backslope.



Photos 3-5 – Looking east from east backslope at the highway surface where main scarp was previously observed.

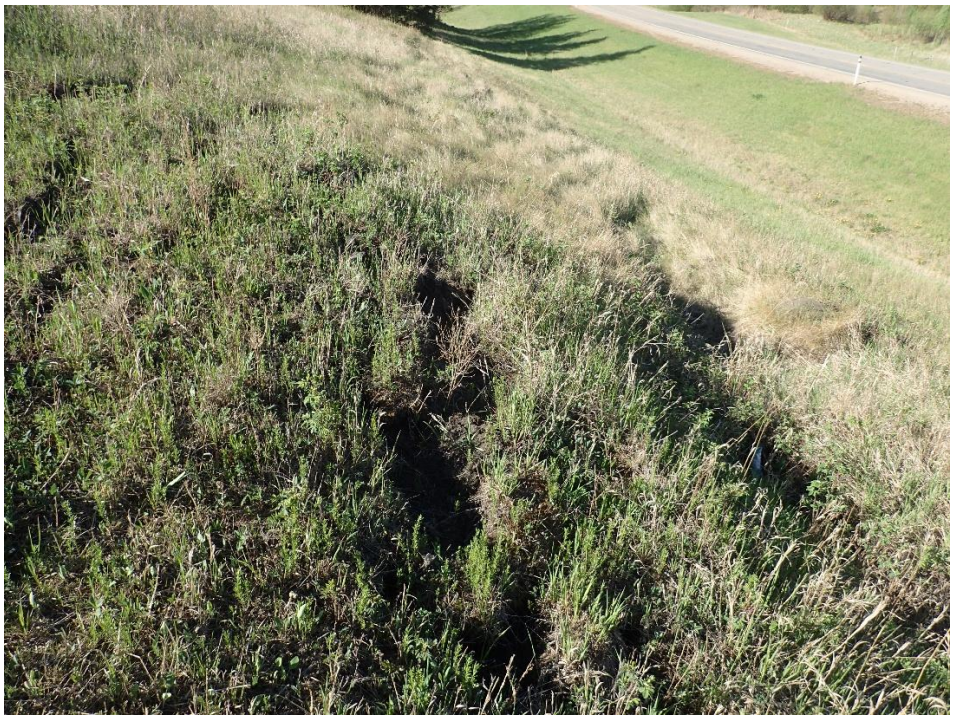


Photo 6 – Looking southwest at lower backslope slumps.

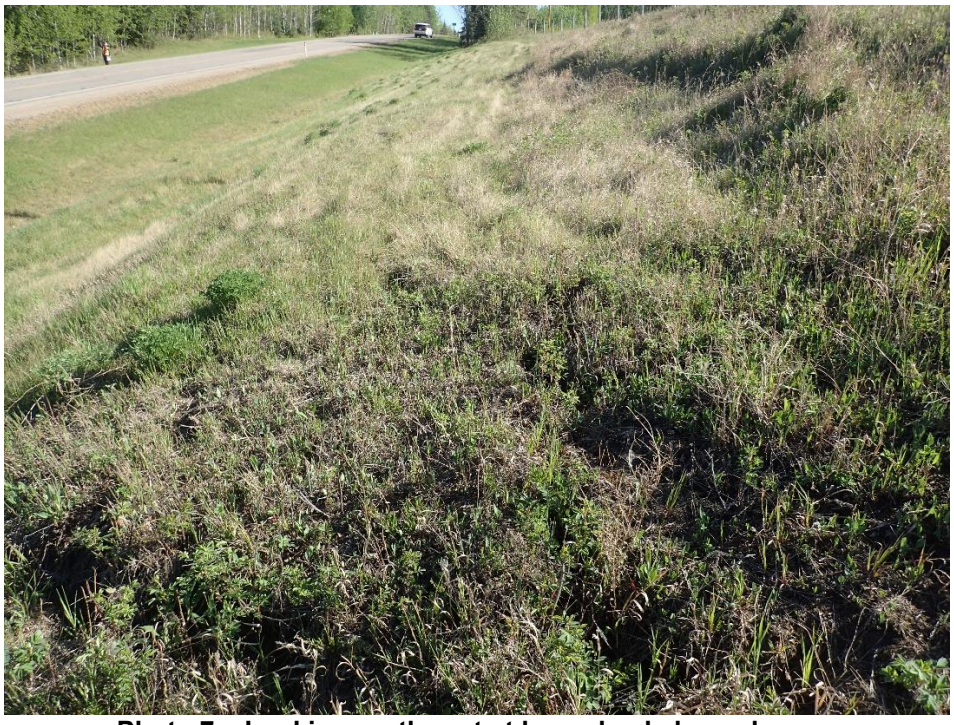


Photo 7 – Looking northwest at lower backslope slumps.

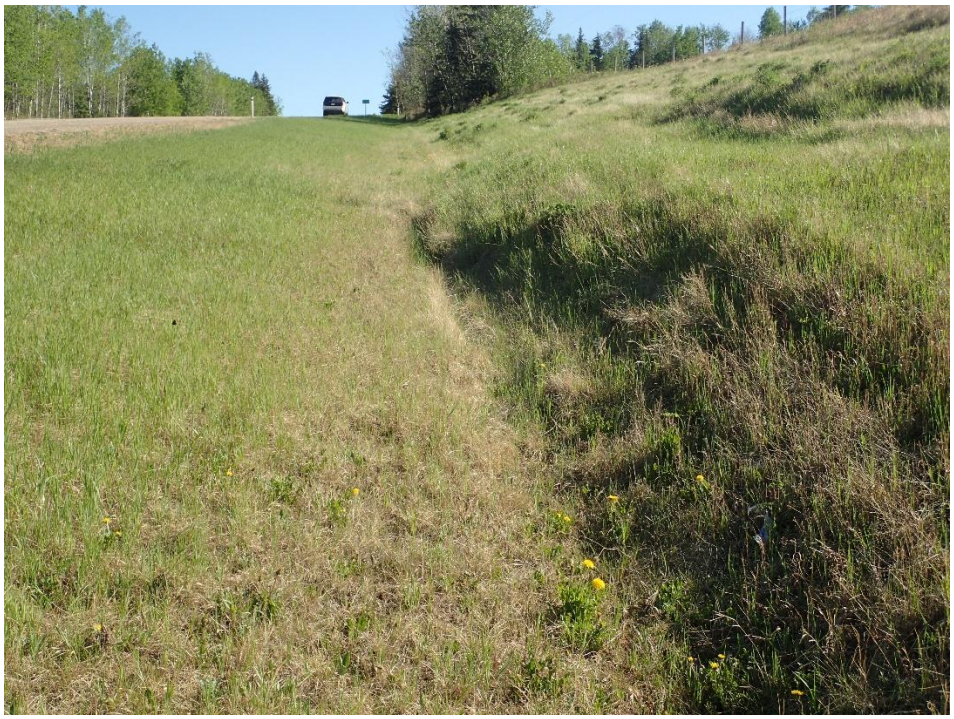


Photo 8 – Looking north at toe roll of backslope slumps.

Photo 9 – Looking south at toe roll of backslope slumps.

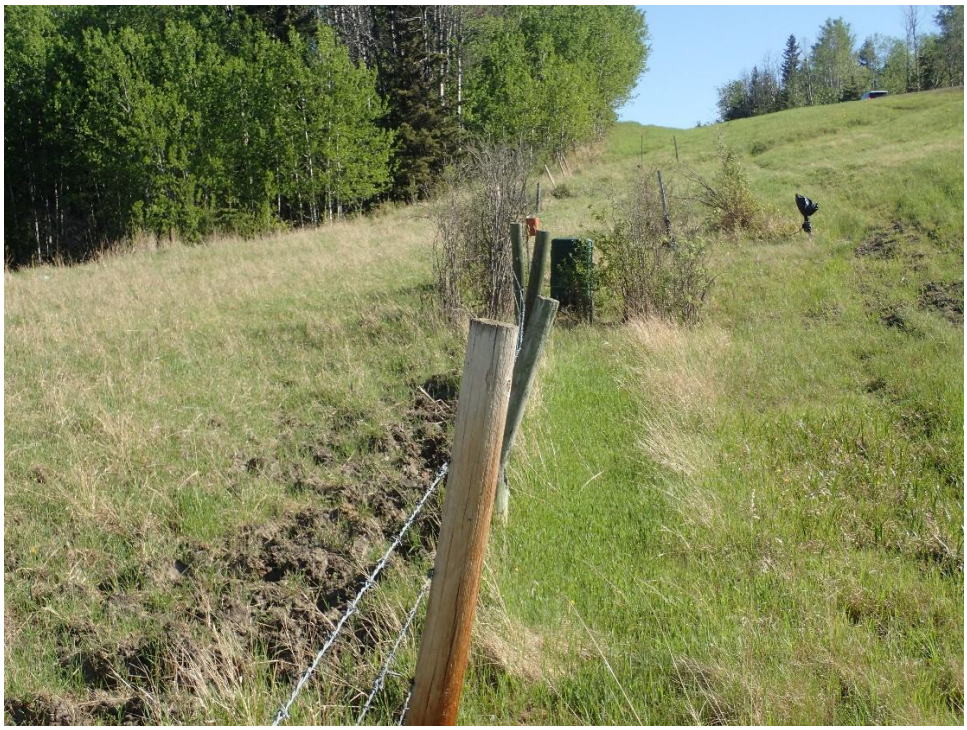


Photo 10 – Looking north along fence line downslope of highway.

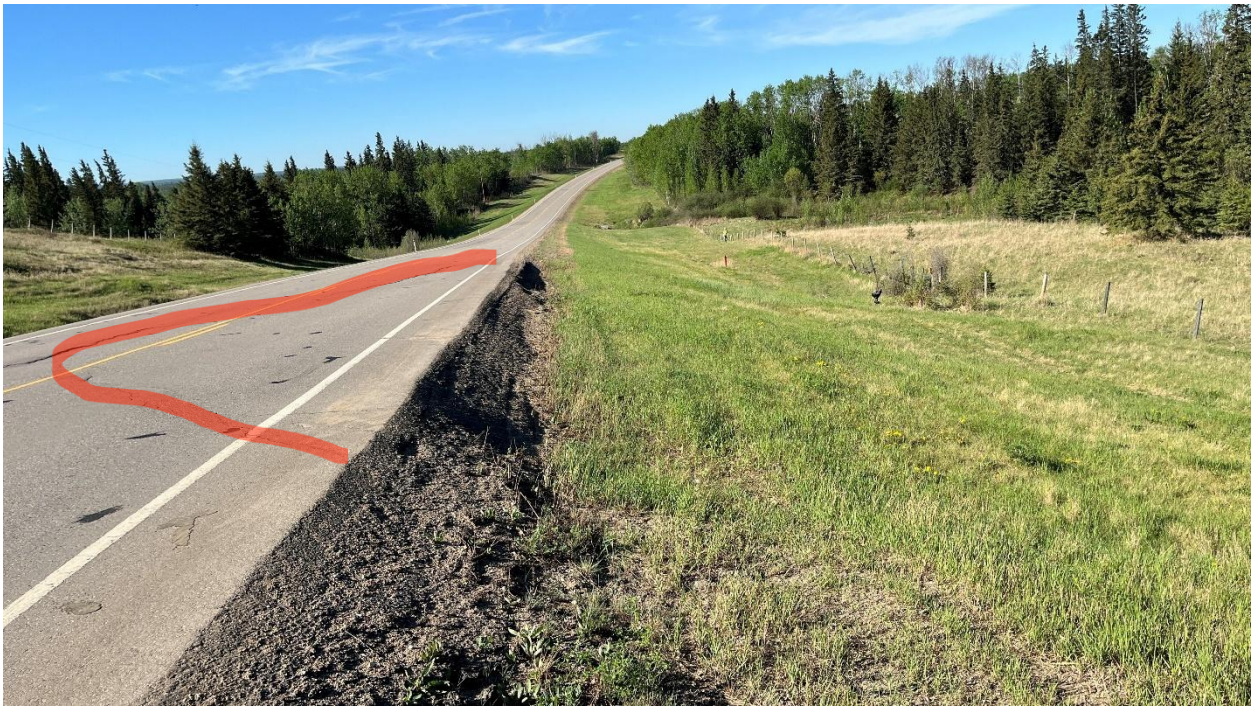


Photo 11 – Looking south at main crack (highlighted in red) near the north end of the site.

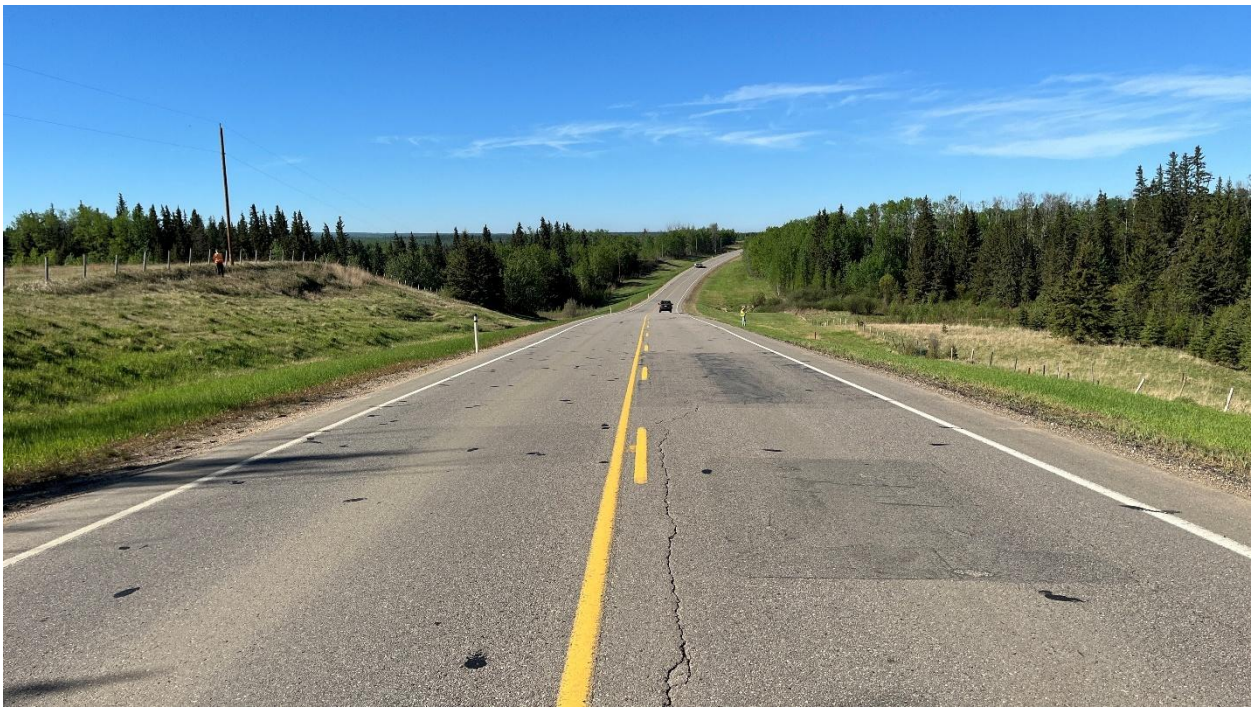


Photo 12 – Looking south at the highway surface from the northern limit of the site.

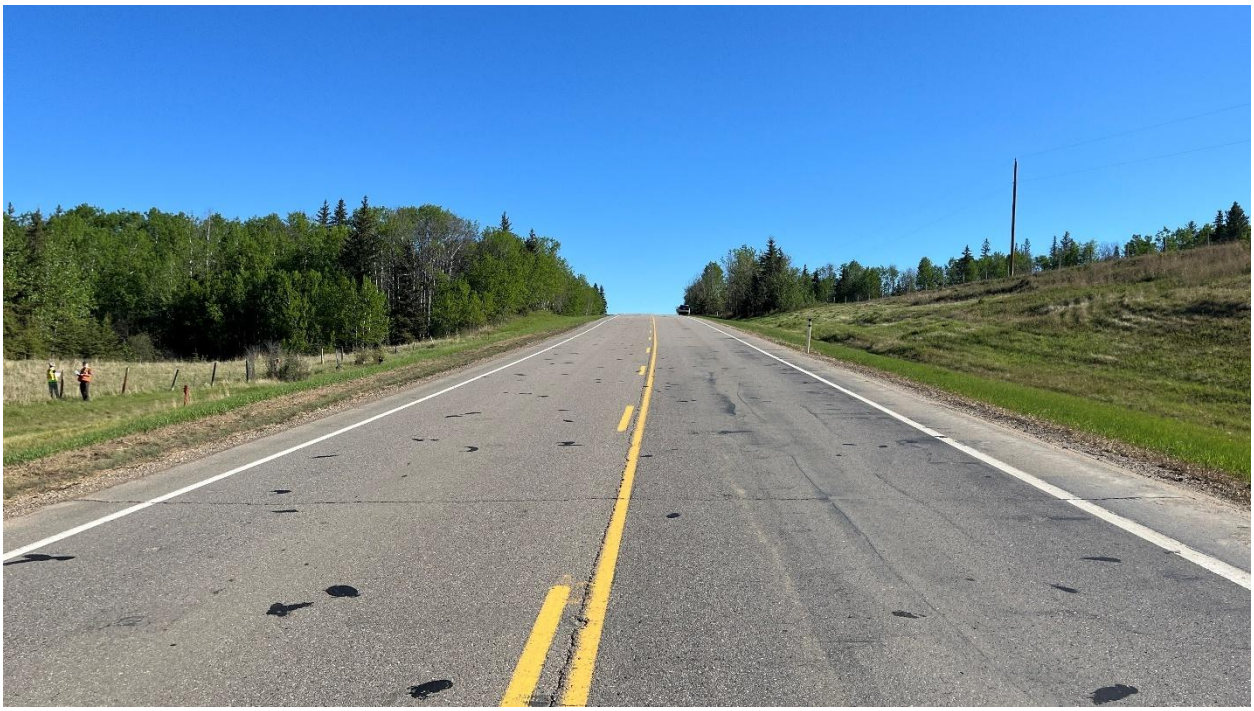


Photo 13 – Looking north at the highway surface from the south area of the site.