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

THURBER

Site Number	Location	Name	Hwy	km
PH075-1 PH075-2	North of Peace River	Whitemud River (km 44.4) Whitemud River (km 44.8)	743:02	44.4 44.8
Legal Description		**UTM Co-ordinates**		
NE2-88-21-W5M		11U E 486,395 486,112	N	6,273,737 6273,982

	Date	PF	CF	Total
Previous Inspection:	16-May-2023	PH075-1: 13 PH075-2: 8	4 6	52 48
Current Inspection:	13-May-2025	PH075-1: 13 PH075-2: 8	4 6	52 48
Road AADT:	180		**Year:**	2025
Inspected By:	Rocky Wang, TEC		Don Proudfoot, Thurber Ken Froese, Thurber	
Report Attachments:	☒ Photographs	☒ Plans	☐ Maintenance Items	

Primary Site Issue:	PH075-1: Creek bank erosion and slumping of over-steepened slope above culvert inlet. PH075-2: Retrogressive landslide scarp through both lanes	
Dimensions:	PH075-1: 40 m of creek bank erosion PH075-2: 55 m wide along the shoulder, approx. 275 m wide at the creek and 160 m long from the highway to the creek.	
Date of Remediation:	2009: Culvert replaced and sideslopes rebuilt.	
Maintenance:	Highway closed on Jul 13, 2020, until detours opened in Fall 2020.	
PH075-1 Observations:	**Description**	**Worsened?**
☒ Pavement Distress	Highway is gravel-surfaced.	☐
☒ Slope Movement	Slump above culvert regressed significantly in 2018 and continues to move. There is major bank slumping upstream of the culvert and minor bank slumping downstream of the outlet.	☒
☒ Erosion	Slump on the west side of the creek at the inlet has continued to retrogress since 2015; erosion at end of north ditch channel relatively stable. Erosion occurring in east ditch sporadically over 200 m length between km 44.3 to 44.1 south of PH075-1.	☐
☐ Seepage		☐
☒ Bridge / Culvert	No signs of distress in the culvert itself; however, slide movements are obstructing flow at the inlet and sediment is accumulating at the outlet.	☐
☐ Other		☐
PH075-2 Observations:	**Description**	**Worsened?**
☒ Pavement Distress	Cracks and dip in gravel road surface are being maintained through routine grading.	☐
☒ Slope Movement	The dip encompasses the entire roadway surface and trees at the toe are leaning	☐
☐ Erosion		☐
☐ Seepage		☐
☐ Bridge / Culvert		☐
☐ Other		☐

Instrumentation:

None.

Assessment:

PH075-1 (Drawing 32121-PH075-1)

Significant landslide movements on both sides of the valley closed the highway in July 2020 until detours where in place in Fall 2020. This site is located on a relatively flatter section of the roadway and was unaffected by these other movements.

The creek bank at the culvert inlet began to regress significantly due to heavy runoff in Spring 2018. The spring of 2020 also had significant runoff and there was an ice jam at this site that year (reported by MCI). The scarps above the culvert have formed into numerous slump blocks and have continued to retrogress from 8.85 m away in 2018 to 2.2 m in 2023. In 2025, the offset was reduced to 0.7 m; however, recent grading practices appear to have pushed the edge of the roadway closer to the slope edge as well. Slumping continues to worsen along the west bank of the creek moving further into the slope since first mapped in 2017. The slumping of the riverbank is undermining the embankment and is causing instability which will impact the highway and has started to impact the culvert obstructing the inlet slightly.

The embankment slope above the riprap was about 2H:1V which is steeper than usual for a slope constructed using clay in this area. This steeper slope will likely result in more rapid retrogression if the channel experiences similar water flows. The ongoing slumping on the west side at the culvert inlet has displaced much of the riprap apron which increases the vulnerability of the slope to future highwater events. Furthermore, the point bar forming on the east side of the channel also concentrates flow into the west bank. This point bar had increased in size noticeably in 2020 and started to vegetate in 2021 and became denser in 2023. In general, the east and west banks appear to be stabilizing; however, the retrogression at the headslope above the culvert is still progressing.

Erosion was previously noted where the north ditch contacts the west bank north of the culvert inlet. The rate of downcutting has slowed with only an additional 0.1 m deeper and wider since 2017. A significant amount of sediment has accumulated at the culvert inlet in 2021 which may be from the progressive downcutting and toe erosion that triggered the slide movements at PH039 and elsewhere in the valley.

The shallow gully that formed at the west side of the top of the outlet riprap has vegetated and did not appear to have increased in size since 2017. This gully has likely formed due to surface runoff short-cutting out of the ditch channel. It was also observed that the displaced riprap from the culvert outlet apron is mounded in the centre of the channel forcing flow around causing the increasing undercut on the east bank. The length of affected bank was slightly longer in 2020 but unchanged in 2021 and 2023.

PH075-2 (Drawing 32121-PH075-2)

The slide at PH075-2 was first noticed during a callout inspection of other sites on Hwy 743 on August 4, 2020, shortly after significant slope movements elsewhere in the valley closed the highway. The site is located on a sidehill alignment ascending the valley slope of a tributary to the Whitemud River. LiDAR provided by TEC shows that the valley slope has been affected by historic landslide movements. Similar to the other sites along this highway that moved during the summer of 2020, it was likely that higher groundwater levels re-activated a large slide block which affected about 55 m of the road surface. The highway is located about 25 m vertically above the creek. The valley slope surface, as shown by the cross-section on Dwg. No.13351-PH075-2, is hummocky, indicating the presence of several retrogressive slide blocks between the creek and the road. The dip encompasses the entire roadway surface at this location and trees at the toe of the embankment are being to tilt. Similar to 2023, ongoing grading has obscured the cracks in the highway although the main scarp is still visible beyond the roadway on both sides of the highway.

Recommendations:

Short Term:

- The maintenance contractor and/or MCI should review these sites frequently, particularly after significant rainfall events, to ensure that the highway is not impacted by further slumping.
- At Site 1, consideration should be given to installing a guardrail as the original sideslope inclination was 2H:1V and the proximity of the headscarp to the edge of the roadway.
- At Site 2, the cracks and dip are limited in extent and can be managed with routine grading so the road can still be used. Slide warning and speed reduction signs should be considered at this site.

Medium-Term:

- Site 1: A localized realignment to the southwest by about one lane width (up to approximately 6 m) would allow for slope flattening to the northeast. A slight drop in the vertical profile could also be considered to facilitate the slope flattening. Reconstruction of the headslope will be necessary with geogrid reinforced gravel and additional riprap protection at the toe.
- Site 1: Riprap along the west bank at the inlet could be used to reconstruct the channel and force it back to the original alignment.
- Site 1: The mound of riprap downstream of the outlet should be redistributed to create a flow path down the centre of the channel rather than the unprotected sides.
- Site 2: A localized realignment to the west of the roadway around the slide could be carried out if the slide accelerates and the road condition becomes unsafe.
- Site 2: A driven steel pile or sheet pile wall might also be considered to provide temporary support to the road but might become distorted over time if the larger slide blocks move again.

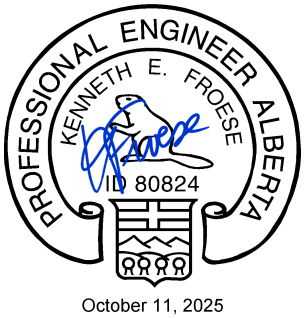
Ongoing Inspections:

- It is recommended that the annual Geohazard inspection should continue as scheduled every two years.

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.

Don Proudfoot, M.Eng., P.Eng.
Partner | Senior Geotechnical Engineer



October 11, 2025

PERMIT TO PRACTICE
THURBER ENGINEERING LTD.
RM SIGNATURE: Don Proudfoot
RM APEGA ID #: 51674
DATE: October 12, 2025
PERMIT NUMBER: P005186
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Ken Froese, M.Eng., P.Eng.
Senior Associate | Senior Geotechnical Engineer

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.

NOTE: LARGE ICE JAM IN SPRING 2020

NE 2-88-21W5M

N
W E
S

FLOW

BOTTOM OF BANKS

EXPOSED RAVELLING SLOPE

EROSION SCOUR

EROSION CONTROL SOIL COVERING
TYPE C AS PER DETAIL BELOW

BARE SLAKING BANK

1m HIGH
SLUMP CRACKS

C CREEK

WILLOWS

0.7m DEEP (2023, 2025)

CRACK 0.8 m HIGH, 0.7 m DISPLACEMENT

VEGETATED POINT BAR DEFLECTING FLOW
TOWARDS OPPOSITE BANK ~ 1m HIGH, 2-3m WIDE

RIPRAP SLUMPED INTO CREEK CHANNEL

SILT DEPOSIT

SLUMP CRACKS 0.8 m HIGH AT SILT FENCE

TH06-2A

POSSIBLE TOE OF ANCIENT LANDSLIDE

1.1m SLUMP

TOE OF SLIDE PARTIALLY BLOCKING CULVERT

44+400

0.7m DROP (2023, 2025)

SOME ICE INSIDE CULVERT (MAY 2025)

HWY 743

0.7 m TO CRACK, 0.75 m HIGH (2025)

SLUMP CRACKS

TH06-1A

R.O.W.

BF77272-2 (2009)
3.67m Ø, 84.25m LONG

EROSION CONTROL
SOIL COVERING TYPE C
AS PER DETAIL BELOW

TH06-3A

1.0m VERTICAL AND 6.2m LONG (2020); SAME (2021, 2023, 2025)
-LIKELY CAUSED BY DISPLACED ROCK FROM APRON

CLASS 2 ROCK RIPRAP

BOTTOM OF BANKS

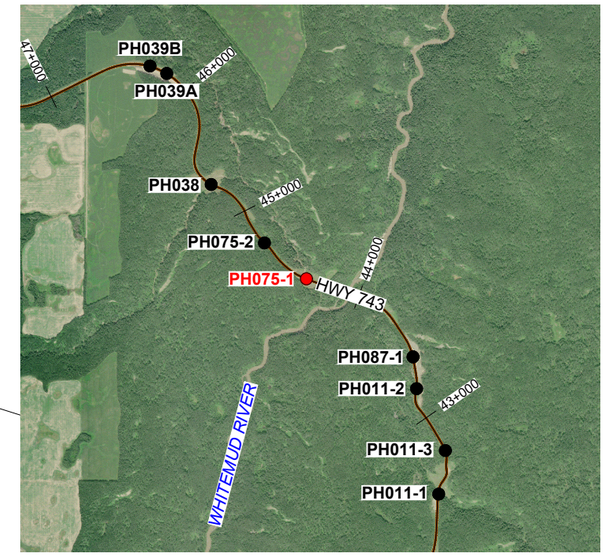
TOP OF BANK

TOP OF BANK

C CREEK

SHALLOW GULLY 0.9m WIDE, 0.3m DEEP (2023, 2025)

RIPRAP DISPLACED FROM APRON
BUNCHED IN CENTER OF CHANNEL



KEY PLAN
SCALE 1:40 000

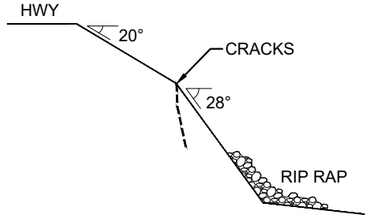
LEGEND :

- PHOTO AND DIRECTION
- DITCH
- SILT FENCE
- APPROXIMATE TEST HOLE LOCATION

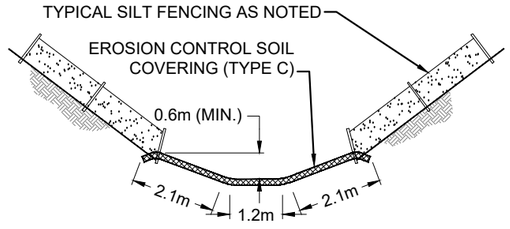
NOTES :

1. FEATURE LOCATIONS ARE APPROXIMATE
2. PREVIOUS OBSERVATIONS SHOWN IN BLACK
3. MAY 2025 OBSERVATIONS SHOWN IN RED

UAV ORTHOIMAGE FLOWN BY THURBER 2020



SECTION A-A'
N.T.S.



DETAIL
N.T.S.

PLAN
SCALE 1:1000 (APPROX.)

Alberta

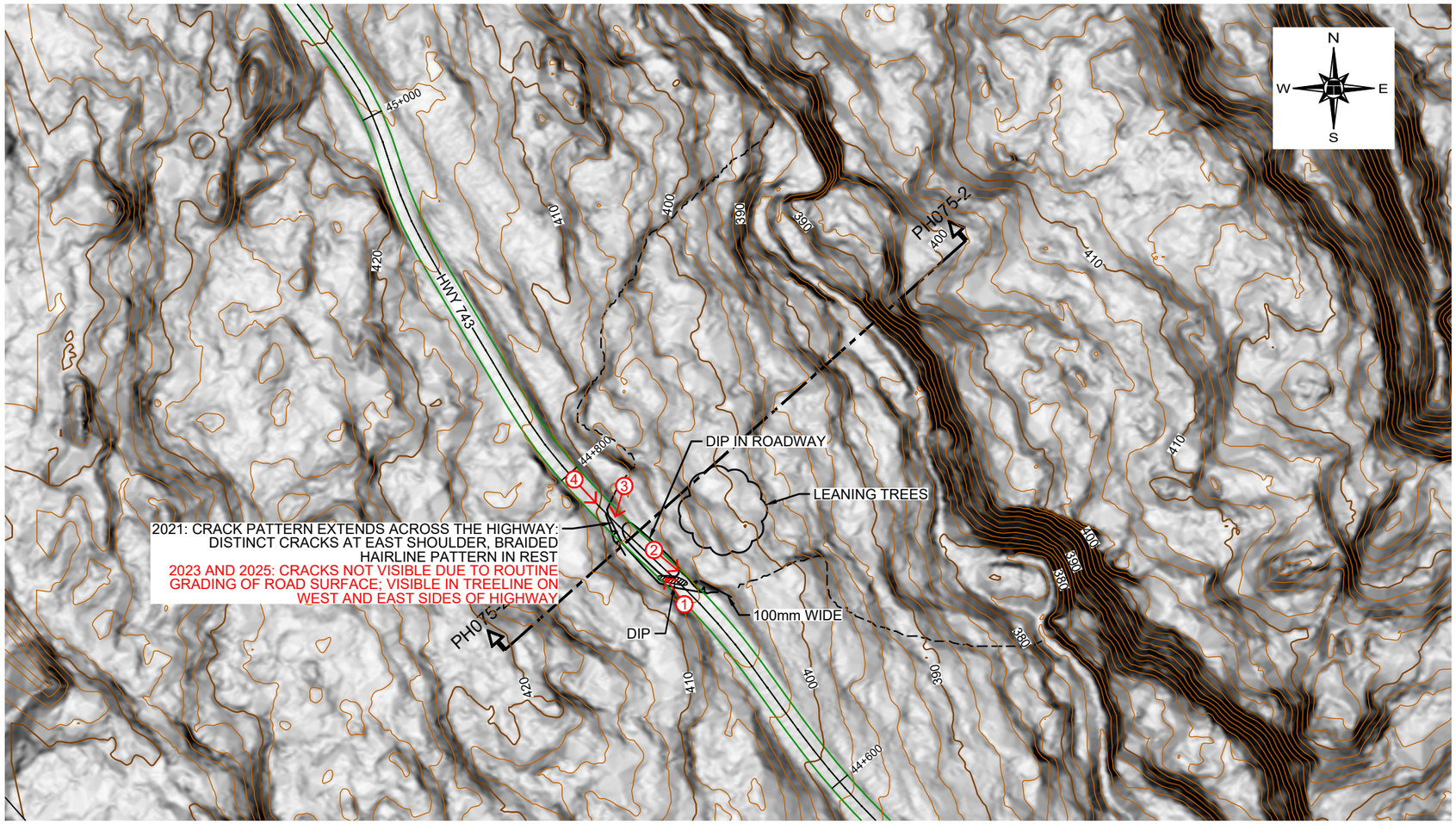
PEACE REGION (PEACE RIVER DISTRICT)

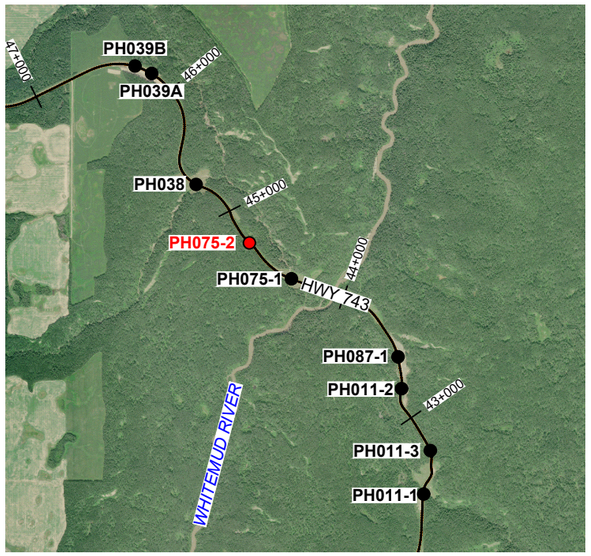
PH075-1: HWY 743:02 AT km 44.4
2025 SITE INSPECTION PLAN

DWG No. 32121-PH075-1-1

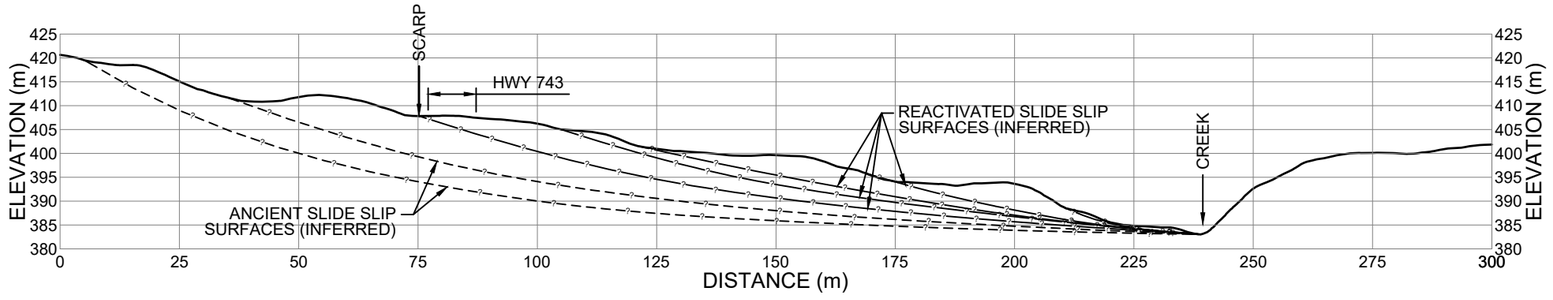
DRAWN BY	DLA
DESIGNED BY	KEF
APPROVED BY	DWP
SCALE	APPROX. 1:1000
DATE	SEPTEMBER 2025
FILE No.	32121

THURBER





KEY PLAN
SCALE 1:40 000



SECTION
SCALE 1:1250

LEGEND

- ACTIVE LANDSLIDE SCARP
- ANCIENT LANDSLIDE SCARP
- PHOTOGRAPH NUMBER AND DIRECTION

NOTES

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. MAY 2025 OBSERVATIONS SHOWN IN RED.

0 25 50 75 100 125 150m
SCALE 1:2500

LIDAR PROVIDED BY ALBERTA TRANSPORTATION

Alberta

PEACE REGION (PEACE RIVER DISTRICT)

PH075-2: HWY 743:02
2025 SITE INSPECTION PLAN

DWG No. 32121-PH075-2

DRAWN BY	DLA
DESIGNED BY	KEF
APPROVED BY	DWP
SCALE	1:2500
DATE	SEPTEMBER 2025
FILE No.	32121

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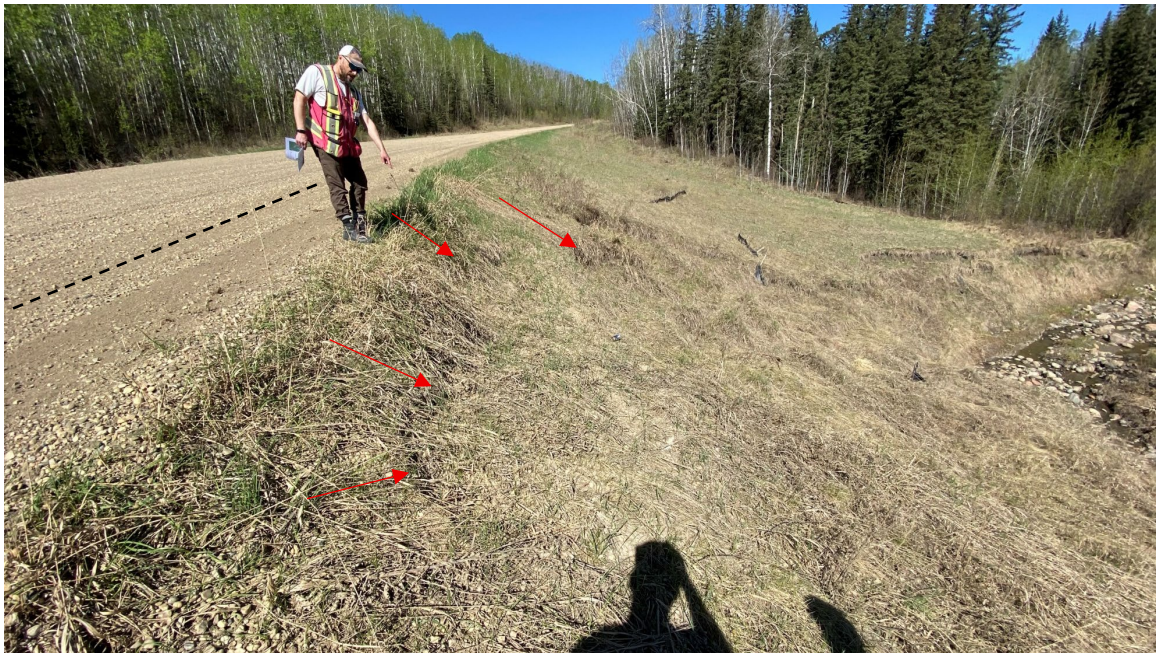
Site 1, Photo 1 – Looking west at north sideslope.

Site 1, Photo 2 – Looking southeast at creek bank slumping upstream of the culvert inlet.

Site 1, Photo 3 – Looking north at creek bank slumping upstream of the culvert inlet.



Site 1, Photo 4 – Looking west at the tension crack (red arrows) proximity to the shifted gravel edge (the dashed line is the approximate previous roadway edge).

Site 1, Photo 5 – Looking south at culvert outlet. Much of the riprap has been displaced downstream and the accumulated sediment noted in 2023 at the outlet of the culvert has been washed away.

2020 UAV Image of slumping around Site 1 culvert inlet.

Site 2, Photo 1 – Looking northeast along highway where scarp cracks had previously been visible (since graded over).

Site 2, Photo 2 – Looking southeast where scarp crack is visible on the east side of the highway.

Site 2, Photo 3 – Looking south where scarp continues on the west side of the highway.

Site 2, Photo 4 – Looking southeast from north end of the site at the sag in the highway where it crosses the slide mass. The visible scarps are shown with red lines.