

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



Site Number	Location	Name	Hwy	km
PH012	Judah Hill	Heart River Slides	744:04	57.114
Legal Description		UTM Co-ordinates (NAD 83)		
SE¼ 20-083-21 W5M		11V E 483284	N 6229209	

	Date	PF	CF	Total
Previous Inspection:	May 28, 2024	15	2	30 (Slide Risk Rating)
Current Inspection:	May 15, 2025	15	2	30 (Slide Risk Rating)
Road WAADT:	630		Year:	2024
Inspected By:	Don Proudfoot, Tyler Clay (Thurber). Rocky Wang (TEC)			
Report Attachments:	<input checked="" type="checkbox"/> Photographs		<input checked="" type="checkbox"/> Plans	<input type="checkbox"/> Maintenance

Primary Site Issue:	<p>Prior to 2014, there were four slide features on the east side of Hwy 744, adjacent to a layby (brake check lane).</p> <p>Slide 1 was previously repaired in March 1998.</p> <p>Slides 2, 3 and 4 were active and had retrogressed into the northbound layby lane. During the summer of 2011, the northbound layby lane was closed, and the guardrail was moved to the edge of the northbound lane (NBL). In 2013 and the Spring of 2014, Slides 2, 3 and 4 continued to retrogress, coalescing into a larger single landslide feature with the resulting backscarp encroaching into the southbound lane (SBL) of the highway.</p> <p>Slides 2, 3 and 4 were repaired by excavation and reconstruction with a uniaxial geogrid reinforced crushed gravel backfill under Contract 15153 during the summer of 2014.</p> <p>New landslide scarps have appeared between the location of Slide 1 and the former Slide 2 (referred to as 'Main Slide 1A'), and to the south of the sheet pile repair at former Slide 2. The "Y" connector to the solid pipe below the sheet pile wall became disconnected between 2017/2018. The sheet pile wall has deflected from slide movement / earth flows and is no longer effectively retaining the slope at its north end. Mud flow scour channels have appeared and continue to grow at the bases of former slides 2, 3 and 4.</p>
Dimensions:	Refer to attached Figure.
Date of any remediation:	A gravel road realignment was constructed in Fall 2022, moving Hwy 744 into the middle of the adjacent field midway between the Heart River and Peace River Valleys away from the current landslide hazards.
Maintenance:	None.

Observations:	Description:	Worsened?	
		Yes	No
<input type="checkbox"/> Pavement		<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Slope Movement	<p>Main Slide 1A (57+175) had approximately 0.5 m of retrogression along the flank and southern half of the main scarp at the time of the 2025 inspection. The main scarp was offset 35 m from the gravel realignment. Tension cracks were located approximately 0.8 m behind the current scarp. There was increased downslope movement of the disturbed slide mass within the upper slide bowl. (Photos 12-01 to 12-03)</p> <p>Main Slide 2 (north of the sheet pile wall) showed no major retrogression or increase in sheet pile wall deflection compared to the 2024 inspection (Photos 12-04 and 12-06). Slides 2.1 (south of the sheet pile wall) and 3 appeared similar to the 2024 inspection; both scarps are well vegetated (Photos 12-05 and 12-07). No signs of movement observed within the repaired area of former Slide 4 (Photo 12-08).</p> <p>At Main Slide 4, a new tension crack, first noted in the 2024 inspection, has developed 2 m upslope from the erosion gully headwall. (Photo 12-10).</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Erosion	<p>Scouring has been previously observed below the disconnected "Y" connector pipe below the sheet pile wall and is likely ongoing concurrently within disturbed slide materials and earth flow processes.</p> <p>An active scour channel south of former Slide 4 appeared to be in similar condition to the 2024 inspection (Photo 12-10).</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Seepage	A wet layer and white mineral deposits were observed in the scarp of Main Slide 1A in similar location to previous inspections. There was no ponded water at the top of the slide as has been observed previously.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Bridge/Culvert		<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Other	<p>The solid "Y" connector pipe is disconnected below the sheet pile wall.</p> <p>Grass coverage has improved in the disturbed soils of the old alignment and within the ditches of the new alignment. (Photo 12-09).</p> <p>Borrow pit area used for realignment work, located in field southwest of site, is now a low-lying area that will be susceptible to ponding.</p> <p>Potential risk for northbound traffic to follow the previous highway alignment at bend in gravel realignment near KM 56+000 to 57+000 (corner delineators are currently installed). (Photo 12-09)</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Instrumentation:

No instruments are currently installed at the site.

As part of the preliminary engineering assessment for Contract 15153, Thurber had previously installed five standpipe piezometers in June 2013 at locations shown on Drawing PH012-1. Some of these piezometers were destroyed by landslide movement and the remainder were removed as part of the excavation work for the landslide repair. Seepage was encountered in all the test holes at about 5 m to 6 m below the existing ground surface during drilling in 2013. The last water level readings taken in the standpipe piezometers (Fall 2013) varied between 1.1 m to 4.9 m below ground surface in standpipes installed to a depth of 10 m (SP13-1A, SP13-2A and SP13-3) and from 23.3 m to 25.2 m in standpipes (SP13-1 and SP13-2), installed to a depth of 26 m.

Assessment (Refer to Drawing PH012-1):

A combination of weathering, heavy precipitation, and active seepage beneath the old highway embankment fill, which was built through a slough, and surface water drainage in the ditch appears to have caused the retrogression of Slides 2, 3 and 4 before they were repaired. The previous repair at Slide 1 continues to perform well, although Main Slide 1A is now starting to expand into the previously repaired area. No new cracking noted on the slope above these slide areas has been observed to date.

The backscarp of Main Slide 1A (formed between Slide 1 and the former Slide 2) continues to retrogress but at a reduced rate since the large increment of movement that occurred in September 2020. The rate of retrogression will be highly dependent on groundwater and precipitation conditions. Signs of active seepage have been noted at the exposed scarp face and appear to be a driving factor in the loss of soil strength and rapid retrogression. The offset from the main scarp and toe of the new gravel realignment embankment observed during the 2024 inspection was approximately 35 m and therefore the consequence factor for this site has been reduced. The excavation of the slide material and construction of a gravel wedge in Slide 1A during Summer 2025 (after our annual inspection) should slow the rate of retrogression towards the realigned highway.

The sheet pile wall has been compromised from slope movements and is deflected and ineffective at its north end. Ongoing slide movement and loss of material upslope from the wall due to earth flows are expected in the following years. Loss of material here and further south of the sheet pile wall could begin to undermine the upslope repairs above former slides 2 and 3.

Scour in seepage zones in the till underlying the 2014-2015 repair from Contract CON0015153 continue to develop resulting in shallow earth flows on the colluvium slope below the locations of the former slides 2, 3 and 4.

Recommendations:**Monitoring:**

Annual inspections should continue with the next inspection occurring in the Spring of 2026.

Medium-term Measures:

Thurber had previously recommended buttressing the Main Slide 1A area with a gravel wedge to reduce the rate of retrogression. This repair was completed in the Summer 2025 under Contract 23098 in conjunction with paving the realigned gravel road. The landslide repair included excavating the failed upper slide bowl material, constructing a wedge of compacted 2-20 GBC within the excavation area, digging a gravel drainage trench at the base of the GBC wedge and capping with a clay cap, topsoil and Type B erosion control blanket. The effectiveness of the repair should be assessed during subsequent annual inspection.

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, P.Eng.
Principal | Senior Geotechnical Engineer

Tyler Clay, P.Eng.
Geological Engineer
Field Inspection

Bruce Nestor, P.Eng.
Geotechnical Engineer
Report Preparation

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 TO THE 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

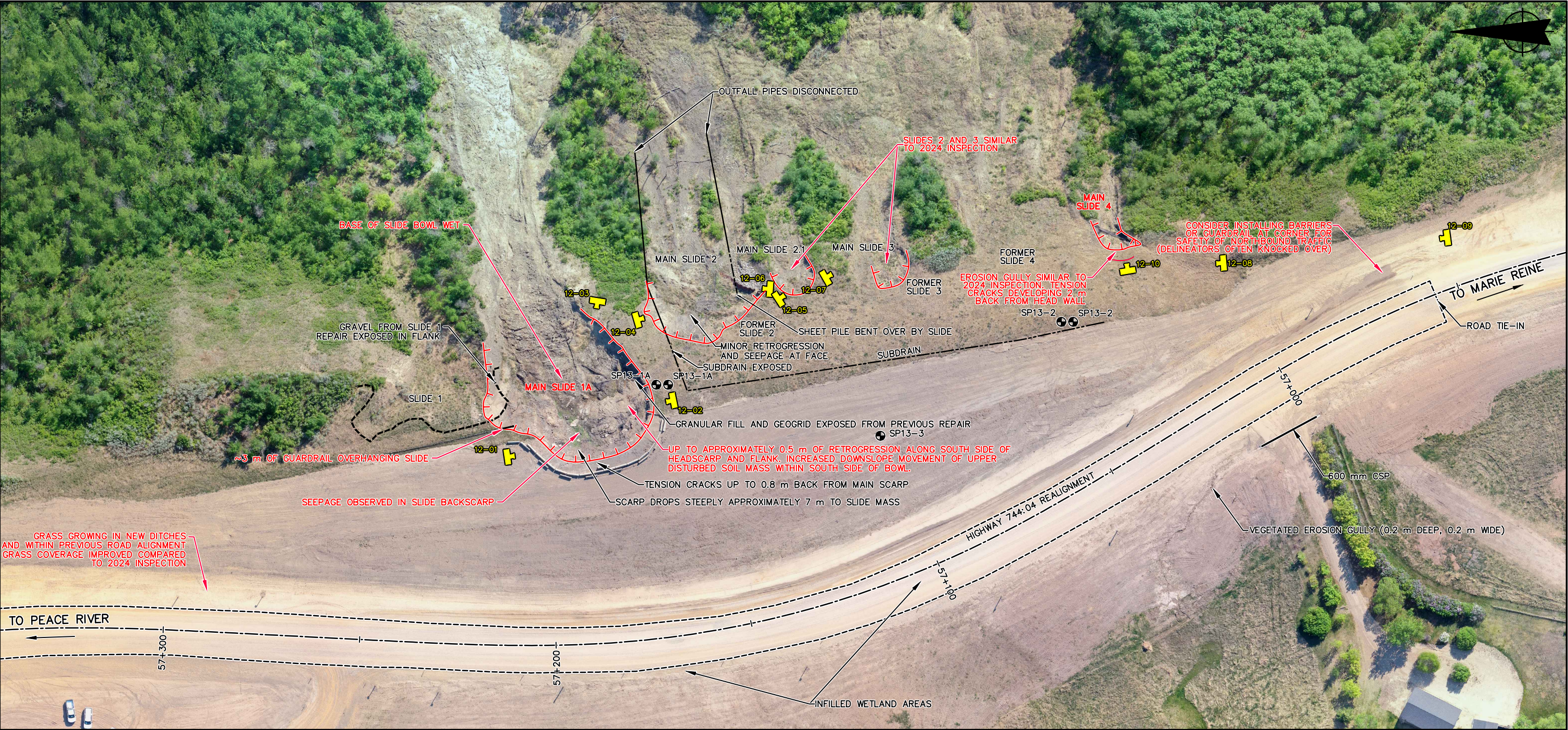
The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client for the development, design objectives, and/or purposes described to Thurber by the Client. **NO OTHER PARTY MAY USE OR RELY ON THE REPORT OR ANY PORTION THEREOF FOR 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

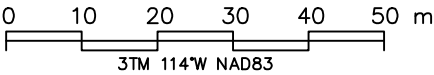
- a) **Nature and Exactness of Soil and Contaminant Description:** Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification 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.



- LEGEND:**
- 2013 TEST HOLE (INSTRUMENTS NO LONGER ACTIVE)
- DIRECTION AND NUMBER OF PHOTO
- 150 mm DIA. PERFORATED SUBDRAIN
- 150 mm DIA. OUTFALL PIPE
- NOTES:**
- 1 FIGURE MUST BE USED IN CONJUNCTION WITH THE ATTACHED REPORT REFERENCE 32121 DATED MAY 2024 AND IS SUBJECT TO ANY LIMITATIONS DESCRIBED THEREIN.
- 2 LOCATION DATA RECORDED USING HAND HELD GPS RECEIVER. ALL LOCATIONS ARE APPROXIMATE AND ARE FOR ILLUSTRATIVE PURPOSES ONLY.
- 3 MAY 15, 2025 OBSERVATIONS SHOWN IN RED.
- 4 BASE PHOTO FROM MAY 17, 2023 THURBER DRONE IMAGERY.
- 5 HIGHWAY REALIGNMENT PAVED SUMMER 2025



PEACE REGION (PEACE RIVER DISTRICT)

PH012 JUDAH HILL HEART RIVER SLIDES
2025 SITE INSPECTION PLAN

FIGURE PH012-1

DRAWN BY	DLA
DESIGNED BY	BWN / TTC
APPROVED BY	DWP
SCALE	1:1000
DATE	SEPTEMBER 2025
FILE No.	32121-PH012-1


Photo 12-01.

Looking south from north side of Main Slide 1A. There is ongoing retrogression and erosion primarily within the southern half of the main scarp and south flank. Main scarp offset from the edge if the gravel realignment is approximately 35 m (unchanged from 2024).


Photo 12-02.

Looking north towards the main scarp of Main Slide 1A. Disturbed slide mass within the upper slide bowl appeared to have increased downslope movement relative to the 2024 condition. Note dark seepage horizon visible in the main scarp and white mineral buildup.


Photo 12-03.

Looking upslope towards the west at the main scarp and slide runout area of Main Slide 1A from the lower south flank.


Photo 12-04.

Looking south at Main Slide 2 and 2.1 from the north end of Heart River Landslide repair excavation (Former Slide 2). Ongoing downslope movement and minor scarp erosion but no major retrogression / expansion of the scarp relative to the 2024 condition.


Photo 12-05.

Looking south at Main Slide 2.1 south of the sheet pile wall. No major retrogression of the scarp at this location since 2024.


Photo 12-06.

Looking north at the former Slide 2 area with ongoing downslope slide movement and erosion of the upper scarp. No major changes observed since 2024. Deflection of the sheet piles appears similar to the 2024 condition.


Photo 12-07.

Looking south at earth flow at Main Slide 3. No significant retrogression or expansion of the main scarp since 2024.


Photo 12-08.

Looking north from south end of the former Slide 4 repair area. Overall repairs from 2014 are performing well. Overall slope is well vegetated and with no visible indications of new slide development within the granular backfill slope. Old highway alignment at crest of slope has increased grass development since 2024.


Photo 12-09.

Standing at the right shoulder of the gravel realignment looking north from the south end of the site. Barriers or a guardrail should be considered at the road bend here (KM 56+000 to 57+000) for northbound traffic to reduce potential for drivers to maintain a course into the old alignment.


Photo 12-10.

Active gully erosion within the top of Main Slide 4. Erosion damage at the gully headwall appeared similar relative to the 2024 condition. Tension crack had previously developed 2 m upslope from the gully headwall.