

**ALBERTA TRANSPORTATION
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION (PEACE RIVER DISTRICT)
2023 INSPECTION**



| Site Number | Location | Name | Hwy | km |
|---------------------------|---------------------------|-------------------------|--------|-------------|
| SH031-1 | Southwest of High Prairie | Road Gear Ranch | 747:02 | 32.1-32.3 |
| Legal Description | | UTM Co-ordinates | | |
| NE&SE32/NW&SW33-73-19-W5M | | 11U E 508,043 | | N 6,135,622 |

| | Date | PF | CF | Total |
|-----------------------------|--|----|--|-------|
| Previous Inspection: | 29-Jun-2021 | 4 | 3 | 12 |
| Current Inspection: | 5-Jun-2023 | 4 | 3 | 12 |
| Road AADT: | 481 | | Year: | 2023 |
| Inspected By: | Kristen Tappenden, TEC Rodney Johnston, TEC Max Shannon, TEC | | Ken Froese, Thurber Mark Gallego, Thurber | |
| Report Attachments: | <input checked="" type="checkbox"/> Photographs <input checked="" type="checkbox"/> Plans | | <input type="checkbox"/> Maintenance Items | |

| | | |
|---|---|-------------------------------------|
| Primary Site Issue: | Longitudinal cracking and subsidence of SBL lane and shoulder. | |
| Dimensions: | 200 m long and embankment heights between 1.5 m and 2 m. | |
| Date of Remediation: | 2020: Constructed earth fill toe berms on both sides of highway; remove and replace approach culverts; install new ACP | |
| Maintenance: | 2016: ACP patching 2017: ACP patching 2018: ACP patching 2019: ACP patching | |
| Observations: | Description | Worsened? |
| <input checked="" type="checkbox"/> Pavement Distress | Transverse and longitudinal cracks noted in the middle portion of the site. | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Slope Movement | Slow creep movement significantly reduced with placement of toe berm | <input type="checkbox"/> |
| <input type="checkbox"/> Erosion | Previously observed defective erosion matting along the east ditch near the fence was fixed. | <input type="checkbox"/> |
| <input type="checkbox"/> Seepage | | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> Bridge/Culvert Distress | 1800 mm culvert at south end of site – in good condition. | <input type="checkbox"/> |
| <input type="checkbox"/> Other | | <input type="checkbox"/> |
| Instrumentation: | None | |
| Assessment: | <p>Landslide activity was noted at this location in June 2016 following a period of higher-than-average rainfall in the preceding weeks. The significant thickness of asphalt through this portion of road would indicate that frequent patching was required in the past prior to the significant movements observed in 2016. At the time of the 2017 assessment, there were several parallel longitudinal cracks along the SBL and shoulder with vertical displacements up to 100 mm and crack widths up to 30 mm. At the time of the 2018 assessment, the longitudinal cracking had increased in frequency, length, and width and an arc-shape crack in the SBL shoulder with a corresponding toe bulge was observed. Vertical displacements along the SBL have increased from 2017 despite a recent patch. Correspondence</p> | |

from AT personnel after the assessment visit documented additional subsidence in the SBL. There was additional patching undertaken at this location in Spring 2019 which covered up many of the cracks in the SBL. Patching was not undertaken on the NBL, and crack widths, lengths, and differential had increased noticeably since 2018. The highway embankment appeared to be slumping toward both ditches.

The Maintenance Contract Inspector at the time (Bruce Henderson) related that when this portion of highway was constructed, he recalled that the subgrade had been soft. In addition, the typical construction methods of the time involved stripping and placing the topsoil and poorer materials in the centre of the embankment and covering with better borrow material. Based on this information and the observed distress, it appeared that the sliding was relatively shallow and likely occurring along the base of the embankment fill and the weaker material in the core of the embankment.

In 2019, the site was drilled during engineering design (see Thurber Project 22188). The test holes drilled through the highway (locations shown on the drawings) encountered about 1.5 m to 3.8 m of gravel and clay fill overlying stiff, high plastic native clay which was underlain by clay till at about 6 m below ground surface.

In 2020, the site was remediated by constructing earth fill toe berms on both sides of the highway. Fill was placed on the embankment sideslopes to flatten the slopes and the ditches were regraded to improve drainage along the site. Existing approach culverts at the north end of the site were removed and replaced with new culverts. The site was then finished with an ACP overlay. Based on the 2021 and 2023 inspections the repairs seem to be performing well with no noted instability occurring. The cracks that have appeared could be related to settlement of fills placed during construction or small movements that can occur before the toe berms begin to resist the slide.

Recommendations:

Maintenance:

- It is understood that an overlay is scheduled for this highway (km 0 to km 44) in August 2023.

Inspection:

This site has been scheduled for Geohazard inspection every two years on the current contract. This seems reasonable so that the cracks that reflected through from 2023 inspections can be monitored.

Closure

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

Tarek Abdelaziz, Ph.D., P.Eng.
Partner | Senior Geotechnical Engineer

Mark Gallego, M.Eng., P.Eng.
Geotechnical Engineer



STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment 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. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE 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. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

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 are judgmental in nature. 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 persons making use of such documents or records with our express written consent should 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 persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should 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 on the basis of conditions in evidence at the time of site inspections and on the basis of 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 as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons 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 should 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 detailed in the contract documents should 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 in order to confirm and document that the site conditions do not materially differ from those interpreted 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.

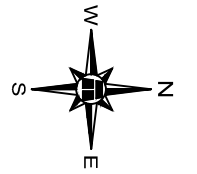
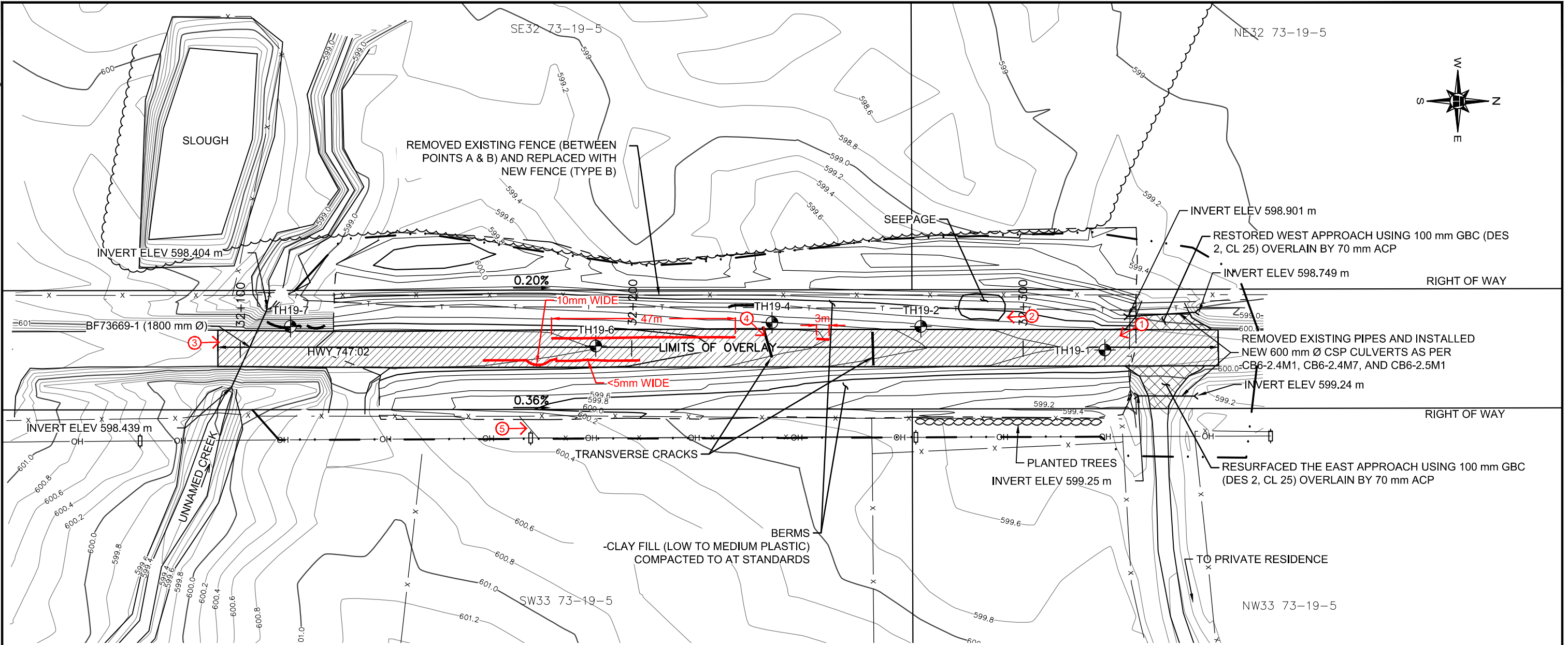
6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.










7. 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 others 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.

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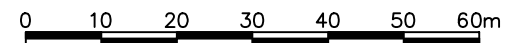


LEGEND

-  TEST HOLE LOCATION
-  CRACK
-  LIMITS OF 2019 ACP OVERLAY (70 mm THICK)
-  FENCE
-  OVERHEAD POWER LINE AND POWER POLE
-  TELUS LINE
-  TREE LINE
-  TEMPORARY CONSTRUCTION LIMITS
-  DIRECTION AND NUMBER OF PHOTO

NOTES:

1. ORIGINAL SURVEY COMPLETED BY WSP ON FEBRUARY 5, 2019
2. AS-BUILT SURVEY COMPLETED BY WSP ON JULY 25, 2020
3. ALL DISTURBED AREAS COVERED WITH SALVAGED TOPSOIL AND SEEDED
4. JUNE 2023 OBSERVATIONS SHOWN IN RED.



PEACE REGION (PEACE RIVER DISTRICT)

**SH031-1: HWY 747:02 km 32.1 TO km 32.3
2023 SITE INSPECTION PLAN**

DWG No. 32121-SH031-1

| | |
|-------------|----------------|
| DRAWN BY | ML |
| DESIGNED BY | MG |
| APPROVED BY | TSA |
| SCALE | 1:1000 |
| DATE | SEPTEMBER 2023 |
| FILE No. | 32121 |





Photo 1 – Looking southeast along SBL at the north end of the site.



Photo 2 – Looking south along SBL.



Photo 3: Looking north from the south end of the site near the 1800 mm diameter culvert.



Photo 4: Looking northeast at transverse cracking on the pavement at the middle portion of the site.



Photo 5: Looking north along east ditch.