

**ALBERTA TRANSPORTATION
GEOHAZARD ASSESSMENT PROGRAM
PEACE REGION – SWAN HILLS
2019 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: | 19-Jun-2018 | 13 | 3 | 52 |
| Current Inspection: | 10-Jun-2019 | 13 | 3 | 52 |
| Road AADT: | 530 | | Year: | 2019 |
| Inspected By: | Roger Skirrow, TRANS Ed Szmata, TRANS Gord Wolters, TRANS | | Ken Froese, Thurber Niels Rasmussen, 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: | None | |
| Maintenance: | 2016: ACP patching 2017: ACP patching 2018: ACP patching 2019: ACP patching | |
| Observations: | Description | Worsened? |
| <input checked="" type="checkbox"/> Pavement Distress | Longitudinal cracking over 245 m and subsidence of west half of SBL and shoulder. | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Slope Movement | Settlement of highway surface and bulging at toe of highway embankment. | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Erosion | | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> Seepage | Ponded water observed at some locations in west ditch. | <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 has increased in frequency, length, and width and an arc-shape crack in the SBL shoulder (see Photo 5) with a corresponding toe bulge was observed. Vertical displacements along the SBL have increased from last year despite a recent patch. Correspondence from AT personnel after the assessment visit documented additional subsidence in</p> | |

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 have increased noticeably since 2018. The highway embankment appears to be slumping toward both ditches.

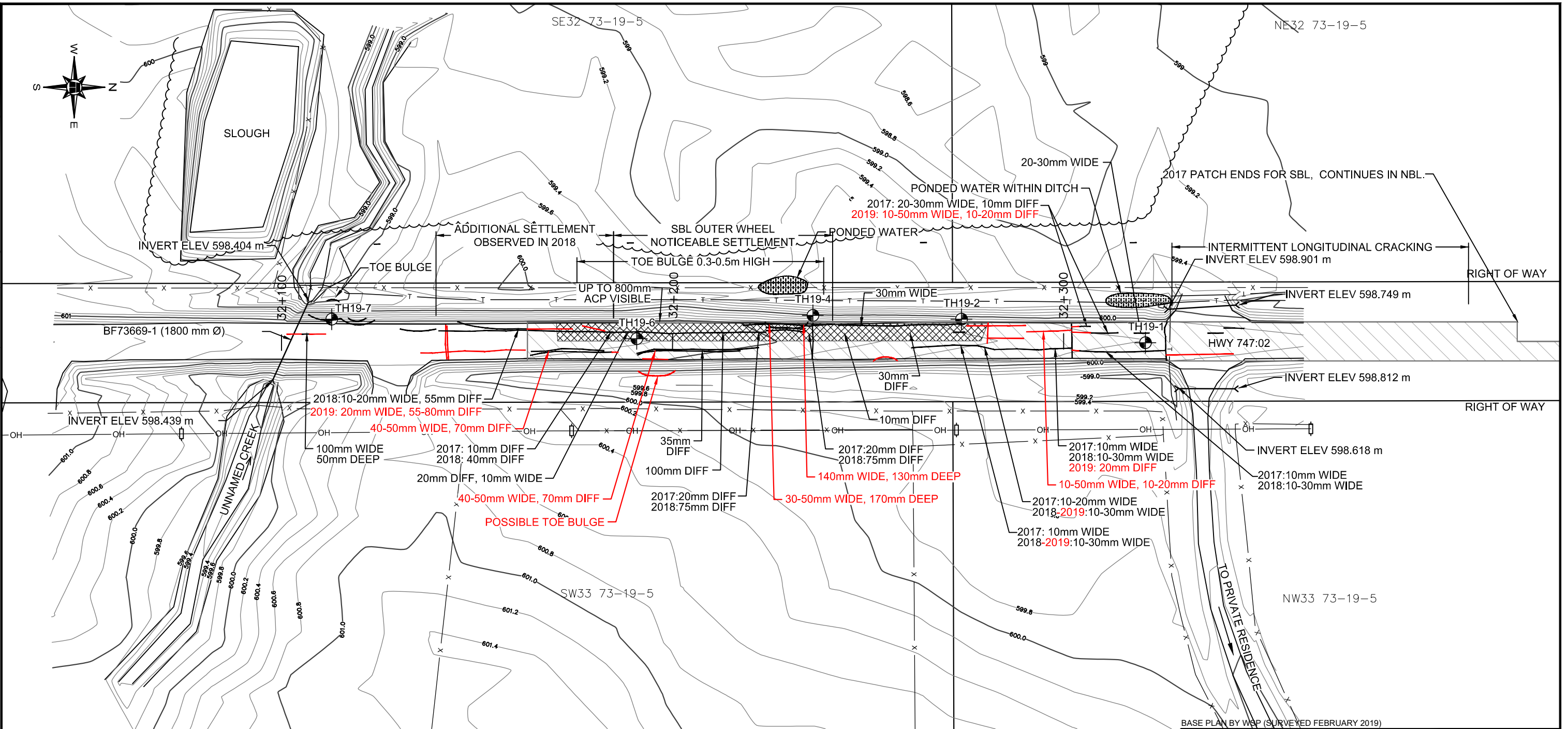
The Maintenance Contract Inspector (Bruce Henderson) related that when this portion of highway was constructed, he recalled that the subgrade had been soft. In addition, the typical construction methods of the time involved stripping and placing the topsoil and poorer materials in the centre of the embankment and covering with better borrow material. Based on this information and the observed distress, it appears that the sliding is 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. The tender has been developed for remediation of this site and will include construction of toe berms on both sides of the highway, an overlay of the highway surface, and regrading of both ditches to improve drainage along the site.

Recommendations:

Short-term road maintenance, primarily ACP patching, will be required to maintain the driving surface until the project has been tendered and repaired. The GeoHazard assessment should continue annually as scheduled. It is recommended that the repairs be undertaken as soon as practical as, now that the movement has been triggered, it will continue and the added weight of asphalt patching will add driving force to the slide.

H:\13000\13355 Geohazard Assessment - Swan Hills (CON0017604)\Drafting\2019\KEF13355 SH031-1.dwg - Layout1 - Dec. 19, 2019



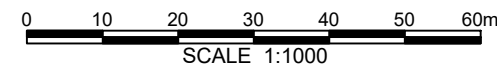
BASE PLAN BY WSP (SURVEYED FEBRUARY 2019)

LEGEND

- TEST HOLE LOCATION
- 2018 ACP PATCH
- 2017 ACP PATCH
- FENCE
- OVERHEAD POWER LINE AND POWER POLE
- TELUS LINE
- TREE LINE

NOTES

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. PREVIOUS OBSERVATIONS SHOWN IN BLACK.
3. JUNE 2019 OBSERVATIONS SHOWN IN RED.
4. SITE PLAN RESET IN 2019 USING SURVEY INFORMATION.



PEACE REGION (SWAN HILLS)

**SH031: HWY 747:02 km 32.1 to km 32.3
2019 SITE INSPECTION PLAN**

DWG No. 13355-SH031-1

| | |
|-------------|---------------|
| DRAWN BY | KLW |
| DESIGNED BY | KEF |
| APPROVED BY | DWP |
| SCALE | 1:1000 |
| DATE | DECEMBER 2019 |
| FILE No. | 13355 |



THURBER ENGINEERING LTD.



Photo 1 – Looking north along (west) shoulder of SBL just north of 1800 mm dia. culvert where there is a slight bulge along the embankment.



Photo 2 – Looking north at south end of main crack.



Photo 3: Looking south at new cracking in outer wheel path of NBL and shoulder.



Photo 4: Looking south at previous location of significant cracking in SBL and shoulder.



Photo 5: Looking south at main crack and previous void in the shoulder of the SBL.



Photo 6 – Looking south at typical SBL cracking near residence approach.