



**THURBER** ENGINEERING LTD.

October 26, 2022

File No.: 32122

Alberta Transportation  
Construction and Maintenance Division  
North Central Region  
Box 4596, 4513 – 62 Avenue  
Barrhead, Alberta  
T7N 1A5

Attention: Ms. Amy Driessen, P.Eng.

**ALBERTA TRANSPORTATION GRMP (CON0022163)  
NORTH CENTRAL (ATHABASCA AND FORT McMURRAY DISTRICTS)  
INSTRUMENTATION MONITORING RESULTS – FALL 2022**

**SECTION C**

**SITE NC087: HWY 63:02 FISCHER TRAIL (km 20.67)**

Dear Ms. Driessen:

This report provides the results of the bi-annual geotechnical instrumentation monitoring for the above-mentioned site as part of Alberta Transportation's Geohazard Risk Management Program for North Central – Athabasca and Fort McMurray Districts (CON0022163).

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.

**1. FIELD PROGRAM AND INSTRUMENTATION STATUS**

Three pneumatic piezometers (PN17-1, PN17-3 and PN17-5) and two standpipe piezometers (SP17-4 and SP17-6) were read at the Hwy 63:02 Fischer Trail site on September 21, 2022 by Mr. Niraj Regmi, G.I.T. and Mr. Kyle Crooymans, both of Thurber Engineering Ltd.

A site plan showing the approximate instrumentation locations is included in Appendix A.

The pneumatic piezometers were read using a RST C108 pneumatic piezometer reader. The standpipe piezometers were read using a DGSI dipmeter. An attempt was made to read PN17-1; however, no reading could be attained indicating that the instrument is likely damaged. An attempt will be made to read the instrument again in the spring of 2023.

**2. DATA PRESENTATION**

**2.1 General**

There are currently no operational SIs at this site and hence SI plots are not included in this report. The pneumatic piezometer results are included in Appendix A.



Zones of movement in the sheared off/damaged slope inclinometers are summarized in Table NC087-1 below for future reference. Table NC087-1 also provides a historical account of the total movement, the depth of movement and the maximum rate of movement that has occurred in the SIs since initialization.



**TABLE NC087-1  
FALL 2022 – HWY 63:02 FISCHER TRAIL (km 20.67)  
SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: September 21, 2022

<b>INSTRUMENT #</b>	<b>DATE INITIALIZED</b>	<b>TOTAL CUMULATIVE RESULTANT MOVEMENT AND DEPTH OF MOVEMENT TO DATE (mm)</b>	<b>MAXIMUM RATE OF MOVEMENT (mm/yr)</b>	<b>CURRENT STATUS OF SI</b>	<b>DATE OF PREVIOUS READING</b>	<b>INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)</b>	<b>CURRENT RATE OF MOVEMENT (mm/yr)</b>	<b>CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)</b>
SI17-1	September 15, 2017	37.9 over 6.9 m to 8.7 m depth in 230° direction	103.1 on October 18, 2017	Sheared at 8.1 m depth	May 26, 2018	N/A	N/A	N/A
SI17-2	September 15, 2017	46.3 over 5.0 m to 6.8 m depth in 240° direction	154.8 on October 18, 2017	Sheared at 6.6 m depth	May 26, 2018	N/A	N/A	N/A
		12.0 over 9.9 m to 11.7 m depth in 220° direction	22.4 on October 18, 2017		May 26, 2018	N/A	N/A	N/A
SI17-3	September 15, 2017	43.3 over 4.2 m to 6.0 m depth in 220° direction	133.2 on October 18, 2017	Sheared at 5.6 m depth	May 26, 2018	N/A	N/A	N/A
SI17-5	September 15, 2017	10.2 over 0.1 m to 1.3 m depth in 234° direction	54.6 on February 22, 2018	Damaged at 1.2 m below top of casing	May 27, 2019	N/A	N/A	N/A

Drawing 32122-NC087 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.



**TABLE NC087-2**  
**FALL 2022 – HWY 63:02 FISCHER TRAIL (km 20.67)**  
**PNEUMATIC PIEZOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: September 21, 2022

<b>INSTRUMENT #</b>	<b>DATE INITIALIZED</b>	<b>TIP DEPTH (m)</b>	<b>GROUND ELEV. (m)</b>	<b>CURRENT STATUS</b>	<b>HIGHEST MEASURED GROUNDWATER LEVEL BGS (m)</b>	<b>MEASURED PORE PRESSURE (kPa)</b>	<b>CURRENT GROUNDWATER LEVEL BGS (m)</b>	<b>PREVIOUS GROUNDWATER LEVEL BGS (m)</b>	<b>CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)</b>
PN17-1 (37672)	September 15, 2017	13.00	-	Damaged	-0.31 on February 22, 2018	N/A	N/A	0.86 (May 28, 2022)	N/A
PN17-3 (37673)	September 15, 2017	7.60	-	Operational	0.48 on September 20, 2020	65.20	0.95	0.98	0.03
PN17-5 (37671)	September 15, 2017	12.70	-	Operational	-5.09 on September 15, 2017	124.80	-0.02*	-0.21*	-0.19

Drawing 32122-NC087 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

\* Negative values correspond to an above-ground (artesian) groundwater level.



**TABLE NC087-3  
FALL 2022 – HWY 63:02 FISCHER TRAIL (km 20.67)  
STANDPIPE PIEZOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: September 21, 2022

<b>INSTRUMENT #</b>	<b>DATE INITIALIZED</b>	<b>TIP DEPTH (m)</b>	<b>GROUND ELEV. (m)</b>	<b>CURRENT STATUS</b>	<b>HIGHEST MEASURED GROUNDWATER LEVEL BGS (m)</b>	<b>CURRENT GROUNDWATER DEPTH BGS (m)</b>	<b>PREVIOUS GROUNDWATER DEPTH BGS (m)</b>	<b>CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)</b>
SP17-4	August 25, 2017	14.62	-	Operational	0.24 on October 18, 2017	1.29	0.58	-0.71
SP17-6	August 25, 2017	14.70	-	Operational	0.13 on October 18, 2017	0.99	0.68	-0.31

Drawing 32122-NC087 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.



### **3. INTERPRETATION OF MONITORING RESULTS**

The groundwater level in pneumatic piezometer PN17-3 increased by 0.03 m since the spring of 2022 readings. The groundwater level in pneumatic piezometer PN17-5 decreased by 0.19 m since the spring of 2022 readings. PN17-5 showed an above-ground (artesian) groundwater level of 0.02 m. The pneumatic piezometer readings are summarized in Table NC087-2.

Standpipe piezometers SP17-4 and SP17-6 showed decreases in groundwater level of 0.71 m and 0.31 m, respectively, since the spring of 2022 readings. The standpipe piezometer readings are summarized in Table NC087-3.

The piezometer readings are plotted on Figure NC087-1 in Appendix A.

### **4. RECOMMENDATIONS**

#### **4.1 Future Work**

The instruments should be read again in the spring of 2023.

#### **4.2 Instrumentation Repairs**

Pneumatic piezometer PN17-1 was found to be not functioning correctly. Another attempt to read PN17-1 will be made during the spring of 2023 reading event. No other instrument repairs are required at this time.



## 5. CLOSURE

We trust this report meets your requirements at present. If you have any questions, please contact the undersigned at your convenience.

Yours very truly,  
Thurber Engineering Ltd.  
Tarek Abdelaziz, Ph.D., P.Eng.  
Principal | Senior Geotechnical Engineer

Bruce Nestor, P.Eng.  
Geotechnical Engineer  
*/sf*

### Attachments:

- Statement of Limitations and Conditions
- Appendix A
  - Field Inspector's report
  - Site Plan Showing Approximate Instrument Locations (Drawing No. 32122-NC087)
  - Figure NC087-1 (Piezometric Depths)



## 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.





**ALBERTA TRANSPORTATION GRMP (CON0022163)  
NORTH CENTRAL (ATHABASCA AND FORT McMURRAY DISTRICTS)  
INSTRUMENTATION MONITORING RESULTS**

**FALL 2022**

**APPENDIX A  
DATA PRESENTATION AND SITE PLANS**

**SITE NC087: HWY 63:02 FISCHER TRAIL (km 20.67)**

ALBERTA TRANSPORTATION  
 NORTH CENTRAL REGION - ATHABASCA AND FORT McMURRAY DISTRICTS  
 INSTRUMENTATION MONITORING FIELD SUMMARY (NC087)  
 FALL 2022

<b>Location:</b> HWY 63:02 (km 20.666) - Fischer Trail <b>File Number:</b> 32122 <b>Probe:</b> <b>Cable:</b>	<b>Readout:</b> RST PN C108 Unit 1/DGSI Dipmeter <b>Casing Diameter:</b> 2.75" <b>Temp (deg C):</b> 12 <b>Read by:</b> NKR/KTC
---	---

**PNEUMATIC PIEZOMETER (PN) READINGS**

PN #	Serial	GPS Location ( UTM 12)		Location	Date	Reading (kPa)	Comments
		Northing	Easting				
PN17-1	37672	404119	6094128	Attached to SI17-1	21-Sep-22		Pressure continued rising up to 600 kPa, most likely damaged. Reading doesn't stabilize
PN17-3	37673	404181	6094051	Attached to SI17-3	21-Sep-22	65.2	
PN17-5	37671	404173	6094098	Attached to SI17-5	21-Sep-22	124.8	

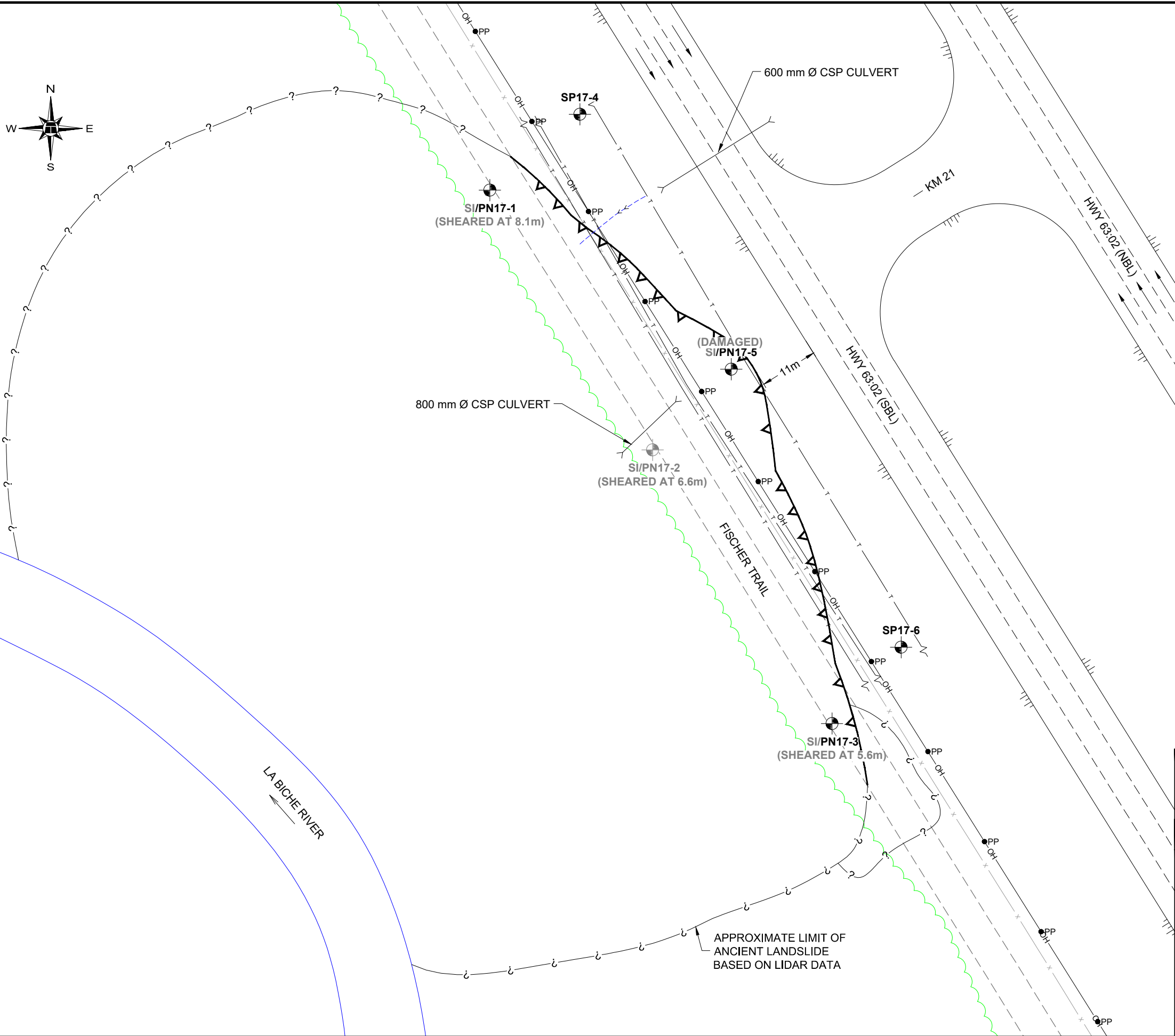
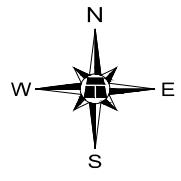
**STANDPIPE PIEZOMETER (SP) READINGS**

SP#	GPS Location (UTM 12)		Date	Stick-up (m)	Water level below top of pipe (m)	Comments
	Northing	Easting				
SP17-4	404145	6094147	21-Sep-22	0.97	2.26	
SP17-6	404205	6094050	21-Sep-22	0.95	1.94	

**INSPECTOR REPORT**

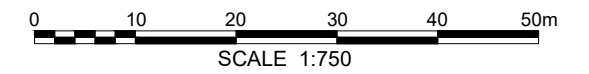
Call James Fischer at 780-623-8637 to enter private property


H:\32000\32122 AT GRMP Athabasca and Fort McMurray Districts 2021-2025\CAD\32122 INSTRUMENT 2021\32122-NC087.dwg - 1 - Jul. 29, 2021



**LEGEND**

- HEADSCARP CRACK
- TREE LINE (APPROXIMATE)
- FENCE LINE (APPROXIMATE)
- POWERPOLE (APPROXIMATE)
- OVERHEAD POWER LINE (APPROXIMATE)
- BURIED TELUS LINE (APPROXIMATE)
- APPROXIMATE INSTRUMENT LOCATION
- SI SLOPE INCLINOMETER
- PN PNEUMATIC PIEZOMETER
- SP STANDPIPE PIEZOMETER






**NORTH CENTRAL  
(ATHABASCA AND FORT MCMURRAY DISTRICTS)**

**NC087: HWY 63:02 FISCHER TRAIL SLIDE  
SITE PLAN SHOWING APPROXIMATE  
INSTRUMENT LOCATIONS**

DWG No. 32122-NC087

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	TSA
SCALE	1:750
DATE	JULY 2021
FILE No.	32122



**THURBER ENGINEERING LTD.**

**FIGURE NC087-1  
PIEZOMETER DATA FOR HWY 63:02 - FISCHER TRAIL**

