

ALBERTA TRANSPORTATION AND  
ECONOMIC CORRIDORS GRMP  
NORTH CENTRAL (ATHABASCA AND FORT  
McMURRAY DISTRICTS)  
INSTRUMENTATION MONITORING- SPRING 2024



Site Number	Location	Name	Hwy	km
NC096	HWY 63:04 R1 2.845	Wandering River Bridge	63:04	Km 2.8
<b>Legal Description:</b> 11-12-73-17 W4		<b>UTM Co-ordinates</b>		
		12U E 405804	N	6130385

<b>Current Monitoring:</b>	08-June-2024	<b>Previous Monitoring</b>	1-Oct-2023
<b>Instruments Read By:</b>	Mr. Niraj Regmi, G.I.T and Mr. Nixson Mationg, of Thurber		

Instruments Read During This Site Visit			
<b>Slope Inclinometers (SIs):</b> N/A	<b>Pneumatic Piezometers (PN):</b> N/A	<b>Vibration Wire Piezometers (VW):</b> VW20 1A, VW20-1B, VW20-3A and VW20-3B	<b>Standpipe Piezometers (SP):</b> SP20-2 and SP20-4
<b>Load Cell (LC):</b> N/A	<b>Strain Gauges:</b> N/A	<b>SAs:</b> N/A	<b>Others:</b>

Readout Equipment Used			
<b>Slope Inclinometers:</b>	<b>Pneumatic Piezometers:</b>	<b>Vibration Wire Piezometers:</b> GEOKON GK-404 vibrating wire readout	<b>Standpipe Piezometers:</b> DGSI dipmeter
<b>Load Cell:</b>	<b>Strain Gauges:</b>	<b>SAs:</b>	<b>Others:</b>

<b>Notes:</b>
<ul style="list-style-type: none"> <li>- A site plan showing instrument locations is included in Appendix A.</li> <li>- A plot showing the standpipe and vibrating wire piezometer readings is included in Appendix A.</li> <li>- Historical slope inclinometer readings are summarized in Table NC096-3, attached.</li> <li>- Standpipe piezometer readings are summarized in Table NC096-2, attached.</li> <li>- Vibrating wire piezometer readings are summarized in Table NC096-3, attached.</li> </ul>

Discussion	
<b>Zones of New Movement:</b>	None
<b>Interpretation of Monitoring Results:</b>	<p>Standpipe piezometers SP20-2 and SP20-4 showed decreases in groundwater level of 1.02 m and 0.35 m, respectively, since the fall of 2023 readings.</p> <p>Vibrating wire piezometers VW20-1A, and VW20-1B showed decreases in groundwater level of 1.13 m and 1.11 m, respectively, since the fall of 2023 readings. VW20-3B and VW20-3B showed increases in groundwater level of 0.44 m and 0.16 m, respectively, since the fall of 2023 readings. VW20-3B shows an above-ground (artesian) groundwater level of 3.27 m, which is the highest measured in the instrument since initialization. VW20-3B has shown a trend of gradually increasing groundwater level since March 2021.</p>

<b>Future Work:</b>	The instruments should be read again in the fall of 2024.
<b>Instrumentation Repairs:</b>	No instrument repairs are required at this time.
<b>Additional Comments:</b>	

<b>Attachments:</b>	<ul style="list-style-type: none"> <li>• Table NC096-1 Spring 2024 – HWY 63:04 Wandering River Bridge South Approach Fill Landslides (BF7573IN), Inclinator Instrumentation Reading Summary</li> <li>• Table NC096-2 Spring 2024 – HWY 63:04 Wandering River Bridge South Approach Fill Landslides (BF7573IN), Standpipe Piezometer Instrumentation Reading Summary</li> <li>• Table NC096-3 Spring 2024 – HWY 63:04 Wandering River Bridge South Approach Fill Landslides (BF7573IN), Vibrating Wire Piezometer Instrumentation Reading Summary</li> <li>• Statement of Limitations and Conditions</li> <li>• APPENDIX A – NC096-1 SPRING 2024 <ul style="list-style-type: none"> <li>○ Field Inspector’s report</li> <li>○ Site Plan Showing Approximate Instrument Locations (Drawing No. 32122-NC096)</li> <li>○ Figure NC096-1 (Piezometric Depths)</li> </ul> </li> </ul>
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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.  
Partner | Senior Geotechnical Engineer

Lucas Green, P.Eng.  
Geotechnical Engineer



**Table NC096-1: Spring 2024 – Hwy 63:04 Wandering River Bridge South Approach Fill Landslides (BF75731N) Inclinator Instrumentation Reading Summary**

Date Monitored: Not monitored

<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>
SI20-1	December 6, 1996	100.9 over 0.1 m to 1.9 m depth in 348° direction	292.0 in June 25, 2021	Sheared off at 2.4 m below top of casing	June 25, 2021	N/A	N/A	N/A
SI20-3	December 21, 2021	20.2 over 0.7 m to 2.5 m depth in 51° direction	103.1 in February 2021	Sheared off at 3.0 m below top of casing	March 9, 2021	N/A	N/A	N/A

Drawing 32122-NC096 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.



**Table NC096-2: Spring 2024 – Hwy 63:04 Wandering River Bridge South Approach Fill Landslides (BF75731N) Standpipe Piezometer Instrumentation Reading Summary**

Date Monitored: June 8, 2024

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED GROUNDWATER LEVEL BGS (m)	CURRENT GROUNDWATER DEPTH BGS (m)	PREVIOUS GROUNDWATER DEPTH BGS (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
SP20-2	November 29, 2020	14.78	-	Operational	1.47 on October 1, 2023	2.49	1.47	-1.02
SP20-4	December 1, 2020	14.70	-	Operational	3.28 on June 25, 2021	4.06	3.71	-0.35

Drawing 32122-NC096 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.



**Table NC096-3: Spring 2024 – Hwy 63:04 Wandering River Bridge South Approach Fill Landslides (BF75731N) Vibrating Wire Piezometer Instrumentation Reading Summary**

Date Monitored: June 8, 2024

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED GROUNDWATER LEVEL BGS (m)	CURRENT GROUNDWATER DEPTH BGS (m)	PREVIOUS GROUNDWATER DEPTH BGS (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
VW20-1A (70924)	December 21, 2020	5.03	-	Operational	1.08 on June 25, 2021	2.32	1.19	-1.13
VW20-1B (70925)	December 21, 2020	12.04	-	Operational	0.53 on June 25, 2021	1.66	0.55	-1.11
VW20-3A (70923)	December 21, 2020	5.03	-	Operational	0.81 on December 21, 2020	0.87	1.31	0.44
VW20-3B (70926)	December 21, 2020	12.04	-	Operational	-3.27 on June 8, 2024	-3.27	-3.11	0.16

Drawing 32122-NC096 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

Note: Negative (-) groundwater level indicates above-ground (artesian) groundwater condition.



## 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.

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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.

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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.

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### 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.

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**THURBER** ENGINEERING LTD.

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

**SPRING 2024**

**APPENDIX A  
DATA PRESENTATION AND SITE PLANS**

**SITE NC096: HWY 63:04 WANDERING RIVER BRIDGE SOUTH APPROACH FILL  
LANDSLIDES (BF75731N)**

**ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS  
 NORTH CENTRAL REGION - ATHABASCA AND FORT McMURRAY DISTRICTS  
 INSTRUMENTATION MONITORING FIELD SUMMARY (NC096)  
 SPRING 2024**

<b>Location:</b> Wandering River Bridge (Hwy 63:04 R1 2.845) <b>File Number:</b> 32122	<b>Readout:</b> DGSi Dipmeter/GK 404 S/N 364 <b>Casing Diameter:</b> 2.75" <b>Temp:</b> 8 <b>Read by:</b> NKR/NRM
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**STANDPIPE PIEZOMETER (SP) READINGS**

SP#	GPS Location (UTM 12)		Date	Stick-up (m)	Reading below top of casing (m)	Bottom Pipe Depth (below top of casing (m))
	Northing	Easting				
SP20-2	6130385	405804	08-Jun-24	0.96	3.45	4.51
SP20-4	6130380	405766	08-Jun-24	0.99	5.05	15.67

**VIBRATING WIRE READINGS**

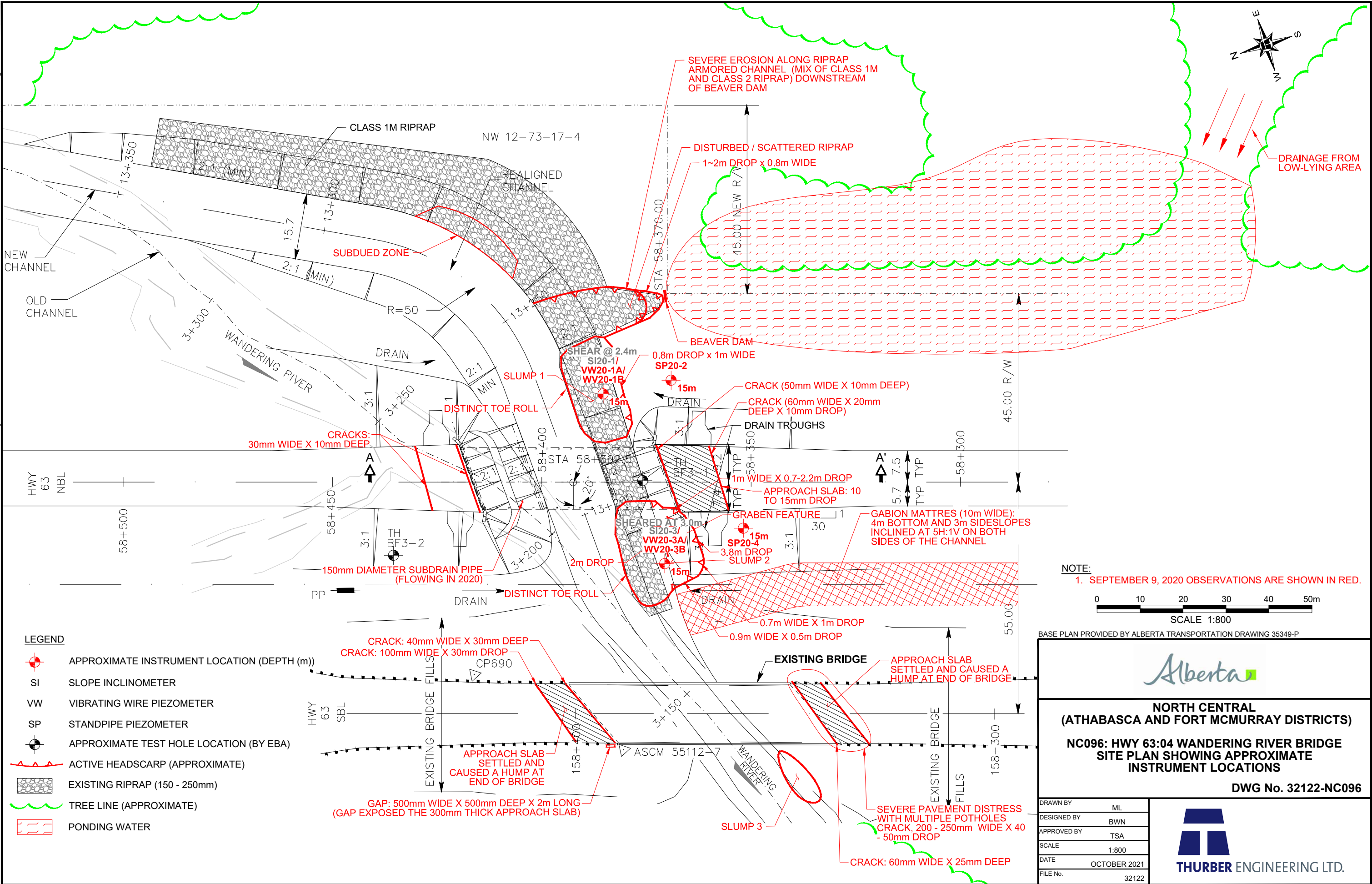
VW	Serial	GPS Location		Date	Reading B(units)	Temp degree C
		Northing	Easting			
VW20-1A	70924	6130401	405806	08-Jun-24	8749.3	3.1
VW20-1B	70925	6130401	405806	08-Jun-24	8025.6	4.4
VW20-3A	70923	6130400	405764	08-Jun-24	8567.3	2.7
VW20-3B	70926	6130400	405764	08-Jun-24	7241.7	4.5

**INSPECTOR REPORT**

Site is km marker 57 on Hwy 63 NBL



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**FIGURE NC096-1**  
**NC96: HWY 63:04 WANDERING RIVER BRIDGE (BF75731N)**  
**VIBRATING WIRE AND STANDPIPE PIEZOMETER DATA**

