

ALBERTA TRANSPORTATION AND  
ECONOMIC CORRIDORS GRMP  
PEACE REGION – (PEACE RIVER DISTRICT)  
INSTRUMENTATION MONITORING - SPRING 2025



Site Number	Location	Name	Hwy	km
SH001	HWY 33:12 C1 9.432	Swan Hills Retaining Wall	33:12	Km 9.4
SH001A	HWY 33:12 C1 10.00			Km 10.0
<b>Legal Description:</b>		<b>UTM Co-ordinates</b>		
7-5-67-9 W5		11U E 607430	N	6070455

<b>Current Monitoring:</b>	20-June-2025	<b>Previous Monitoring</b>	16-May-2024
<b>Instruments Read By:</b>	Mr. Niraj Regmi, G.I.T., and Mr. Godfred Etiendem, Thurber		

Instruments Read During This Site Visit			
<b>Slope Inclometers (SIs):</b> SI-16, SI-20, SI18-5 SI18-6	<b>Pneumatic Piezometers (PN):</b> PN-1 to PN-4, PN01-2, PN18-4A, PN18-4B PN18-5A, PN18-5B PN18- 6A, PN18-6B PN18-7A, PN18-7B	<b>Vibrating Wire Piezometers (VW):</b> N/A	<b>Standpipe Piezometers (SP):</b> N/A
<b>Load Cell (LC):</b> N/A	<b>Strain Gauges:</b> N/A	<b>SAA:</b> N/A	<b>Others:</b>

Readout Equipment Used			
<b>Slope Inclometers:</b> Two RST Digital Inclometer probes with 2 ft. wheelbases and RST Pocket PC readouts	<b>Pneumatic Piezometers:</b> RST C108 pneumatic piezometer readout	<b>Vibrating Wire Piezometers:</b>	<b>Standpipe Piezometers:</b>
<b>Load Cell:</b>	<b>Strain Gauges:</b>	<b>SAA:</b>	<b>Others:</b>
<b>Note:</b> SI-18 was damaged and was not read; it appears to be repairable. PN-2 was found to be malfunctioning, and PN-3 showed a zero reading. These two piezometers are not considered to be reliable at this time.			

Discussion	
<b>Zones of New Movement:</b>	None
<b>Interpretation of Monitoring Results:</b>	<p>Slope inclinometers SI-16 and SI-20 are located about 120 m southwest of the pile wall, outside of the main slide area. SI-16 and SI-20 do not show discernible movement patterns.</p> <p>SI18-5 and SI18-6 are both installed between the highway and the pile wall. SI18-5 showed a rate of movement of 1.7 mm/yr over 7.9 m to 9.2 m depth since the spring of 2024 readings. This movement rate is within clay shale and is slightly below the long-term movement rate (since initialization) of 2.6 mm/yr (18.5 mm over the past 7 years). SI18-6 shows no discernible movement since installation other than some scatter in the upper 2 m.</p> <p>North of the pile wall, pneumatic piezometers PN-1 and PN-4 showed increases in groundwater level of 0.07 m since the spring of 2024 readings. PN01-2 showed a decrease in groundwater level of 1.09 m since the spring of 2024 readings. These instruments have shown overall stable groundwater levels for the past several reading cycles, and all of them show current groundwater levels within the historical levels in the instruments.</p>

	<p>Immediately south of the pile wall, pneumatic piezometer PN18-4A showed an increase in groundwater level of 0.97 m since the spring of 2024 reading. PN18-4B, PN18-5A, PN18-5B, PN18-6A and PN18-6B showed decreases in groundwater level of 1.23 m, 3.42 m, 4.94 m, 1.18 m, and 1.69 m, respectively, since the spring of 2024 readings. Overall, the groundwater levels in these instruments returned to readings within the historical ranges for the instruments.</p> <p>At SH001A, pneumatic piezometers PN18-7A and PN18-7B showed decreases in groundwater level of 2.19 m and 1.34 m, respectively, since the spring of 2024 readings. PN18-7A currently shows flowing artesian conditions with an above-ground groundwater level of 0.67 m. This instrument has shown artesian pressures since the spring of 2019 (about one year after installation). The groundwater level in both instruments are within historical ranges.</p> <p>Tables SH001-2 and SH001-3 summarize the pneumatic piezometer readings. The pneumatic piezometer results are plotted on Figures SH001-1, SH001-2, SH001-3, and SH001-4 in Appendix A.</p>
<b>Future Work:</b>	The instruments should be read again in the spring of 2026.
<b>Instrumentation Repairs:</b>	We recommend that repairs to slope indicator SI-18 be undertaken during the spring 2026 readings.
<b>Additional Comments:</b>	The groundwater levels at SH001A are very high. The site should be inspected for signs of seepage and increased slope deformation and pavement cracking.

<b>Attachments:</b>	<ul style="list-style-type: none"> <li>• Table SH001-1 Spring 2025 – HWY 33:12 Swan Hills Retaining Wall, Slope Inclinator Instrumentation Reading Summary</li> <li>• Table SH001-2 Spring 2025 – HWY 33:12 Swan Hills Retaining Wall, Pneumatic Piezometer Instrumentation Reading Summary</li> <li>• Table SH001-3 Spring 2025 – HWY 33:12 Swan Hills Retaining Wall, Pneumatic Piezometer Instrumentation Reading Summary (2018 Instruments)</li> <li>• Statement of Limitations and Conditions</li> <li>• APPENDIX A – SH001 SPRING 2025 <ul style="list-style-type: none"> <li>○ Field Inspector's report</li> <li>○ Site Plan Showing Approximate Instrument Locations (Drawings No. 32121-SH001-1 and 32121-SH001A-1)</li> <li>○ SI Reading Plots</li> <li>○ Figure SH001-1 (Pneumatic Piezometer Elevations)</li> <li>○ Figure SH001-2 (Pneumatic Piezometer Depths)</li> <li>○ Figure SH001-3 (Pneumatic Piezometer Depths – 2018 Instruments – SH001)</li> <li>○ Figure SH001-4 (Pneumatic Piezometer Depths – 2018 Instruments – SH001A)</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.  
Roger Skirrow, M.Sc., P.Eng.  
Senior Geotechnical Engineer

Lucas Green, P.Eng.  
Geotechnical Engineer

**Table Sh001-1 Spring 2026 – Hwy 33:12 Swan Hills Retaining Wall Slope InclinoMter Instrumentation Reading Summary**

Date Monitored: June 20, 2025

INSTRUMENT #	DATE INITIALIZED	TOTAL CUMULATIVE RESULTANT MOVEMENT AT NOTED DEPTH SINCE INITIAL READING (mm)	MAXIMUM RATE OF MOVEMENT (mm/yr)	CURRENT STATUS	DATE OF PREVIOUS READING	INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)	CURRENT RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI-16	September 20, 1994	No discernible movement	N/A	Operational	May 16, 2024	No discernible movement	N/A	N/A
SI-18	September 20, 1994	No discernible movement	N/A	Damaged	May 16, 2024	No discernible movement	N/A	N/A
SI-20	September 20, 1994	No discernible movement	N/A	Operational	May 16, 2024	No discernible movement	N/A	N/A
SI-21	September 20, 1994	24.0 mm over 4.2 m to 6.7 m in 14° direction	3.2 mm/yr between Sep 2001 and Oct 2001	Damaged	October 23, 2010	N/A	N/A	N/A

Drawings 32121-SH001-1 and 32121-SH001A-1 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

**Table Sh001-1 – Continued Spring 2025 – Hwy 33:12 Swan Hills Retaining Wall Slope InclinoMter Instrumentation Reading Summary**

Date Monitored: June 20, 2025

INSTRUMENT #	DATE INITIALIZED	TOTAL CUMULATIVE RESULTANT MOVEMENT AND DEPTH OF MOVEMENT TO DATE (mm)	MAXIMUM RATE OF MOVEMENT (mm/yr)	CURRENT STATUS OF SI	DATE OF PREVIOUS READING	INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)	CURRENT RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
<b>SH001</b>								
SI18-4	March 20, 2018	36.5 mm over 15.8 to 17.0 m depth in 346° direction	51.1 on September 25, 2019	Sheared at 17.7 m below top of casing	September 25, 2020	N/A	N/A	N/A
SI18-5	March 20, 2018	18.5 mm over 7.9 to 9.2 m depth in 329° direction	4.1 on September 25, 2019	Operational	May 16, 2024	1.9	1.7	-1.4
SI18-6	April 23, 2018	No discernible movement	N/A	Operational	May 16, 2024	N/A	N/A	N/A
<b>SH001A</b>								
SI18-7	April 23, 2018	50.1 mm over 6.1 to 7.9 m depth in 316° direction	79.2 on June 3, 2018	Sheared at 8.5 m depth	June 18, 2019	N/A	N/A	N/A

Drawings 32121-SH001-1 and 32121-SH001A-1 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

**Table Sh001-2 Spring 2025 – Hwy 33:12 Swan Hills Retaining Wall Pneumatic Piezometer Instrumentation Reading Summary**

Date Monitored: June 20, 2025

INSTRUMENT #	DATE INITIALIZED	TIP ELEV. (m)	GROUND ELEV. (m)	CURRENT STATUS	MAXIMUM GROUNDWATER ELEVATION (m)	MEASURED PORE PRESSURE (kPa)	CURRENT GROUNDWATER ELEVATION (m)	PREVIOUS GROUNDWATER ELEVATION (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
<b>SH001</b>									
PN-1	May 22, 1990	1135.56	1149.56	Operational	1136.78 in November 1993	2.6	1135.83	1135.76	0.07
PN-2	May 22, 1990	1146.06	1149.56	Not Operational (Spring 2024)	1148.21 in October 1997	N/A	N/A	N/A	N/A
PN-3	May 22, 1990	1136.15	1139.20	Not Operational (Spring 2024)	1137.56 in September 1991	N/A	N/A	N/A	N/A
PN-4	May 22, 1990	1132.20	1139.20	Operational	1137.61 in October 1991	29.3	1135.19	1135.12	0.07
PN01-1	June 20, 2001	1145.42	1159.10	Not Operational (Spring 2018)	1154.19 in May 2013	N/A	N/A	N/A	N/A
PN01-2	June 20, 2001	1145.82	1156.50	Operational	1154.85 in May 2024	77.9	1153.76	1154.85	-1.09

Drawings 32121-SH001-1 and 32121-SH001A-1 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

**Table Sh001-3 Spring 2025 – Hwy 33:12 Swan Hills Retaining Wall Pneumatic Piezometer Instrumentation Reading Summary (2018 Instruments)**

Date Monitored: June 20, 2025

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	CURRENT STATUS	MAXIMUM GROUNDWATER LEVEL (mBGS)	MEASURED PORE PRESSURE (kPa)	CURRENT GROUNDWATER DEPTH (mBGS)	PREVIOUS GROUNDWATER DEPTH (mBGS)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
<b>SH001</b>								
PN18-4A (37838)	March 20, 2018	8.5	Operational	4.00 on March 20, 2018	47.8	3.63	4.60	0.97
PN18-4B (37832)	March 20, 2018	15.0	Operational	6.20 on May 16, 2024	74.2	7.43	6.20	-1.23
PN18-5A (37836)	March 20, 2018	9.9	Operational	5.23 on May 16, 2024	12.3	8.65	5.23	-3.42
PN18-5B (37834)	March 20, 2018	17.7	Operational	10.66 on May 16, 2024	20.6	15.60	10.66	-4.94
PN18-6A (37835)	March 20, 2018	5.3	Operational	2.29 on May 16, 2024	17.9	3.47	2.29	-1.18
PN18-6B (37833)	March 20, 2018	12.2	Operational	6.82 on May 16, 2024	36.2	8.51	6.82	-1.69
<b>SH001A</b>								
PN18-7A (37837)	March 20, 2018	6.0	Operational	-2.86* on May 16, 2024	65.4	-0.67	-2.86*	-2.19
PN18-7B (37831)	March 20, 2018	12.0	Operational	9.91 on May 16, 2024	7.4	11.25	9.91	-1.34

Drawings 32121-SH001-1 and 32121-SH001A-1 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

\* Negative (-) values indicate an above ground (artesian) groundwater level. BGS = Below Ground Surface.

## 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.





**ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS GRMP (CON0022164)  
PEACE REGION (PEACE RIVER DISTRICT)  
INSTRUMENTATION MONITORING RESULTS**

**SPRING 2025**

**APPENDIX A  
DATA PRESENTATION**

**SITE SH001/SH001A: HWY 33:12 (SWAN HILLS RETAINING WALL)**

**ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS  
PEACE REGION (PEACE RIVER DISTRICT)  
INSTRUMENTATION MONITORING FIELD SUMMARY (SH001)  
SPRING 2025**

<b>Location:</b> Swan Hills Retaining Wall (HWY 33:12 C1 9.432)	<b>Readout:</b> RST PN C108 Unit 8
<b>File Number:</b> 32121	<b>Casing Size</b> 2.75", SI 16,18 and 20 3.34"
<b>Probe:</b> RST SET 5R and 8R	<b>Temp:</b> 15/ Rain
<b>Cable:</b> RST SET 5R and 8R	<b>Read by:</b> NKR/GE

**SLOPE INCLINOMETER (SI) READINGS**

SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of casing (ft)	Magn. North A+ Groove degree	Current Bottom Depth Readings				Probe/ Reel #	Size (")	Remarks
	Easting	Northing					A+	A-	B+	B-			
SI-16	607430	6070455	20-Jun-25	0.45	96 to 4	345	-35	52	-135	134	8R	3.34	
SI-18	607398	6070436	-	1.05	96 to 4	320	332	-313	-82	78	8R	3.34	* Did not read
SI-20	607371	6070420	20-Jun-25	0.72	96 to 4	345	480	-466	648	-647	8R	3.34	Read opposite
SI18-5	607536	6070521	20-Jun-25	0.90	82 to 2	301	-147	156	-13	-17	5R	2.75	
SI18-6	607554	6070532	20-Jun-25	1.07	52 to 2	265	1278	-1272	-274	247	5R	2.75	

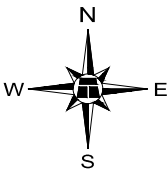
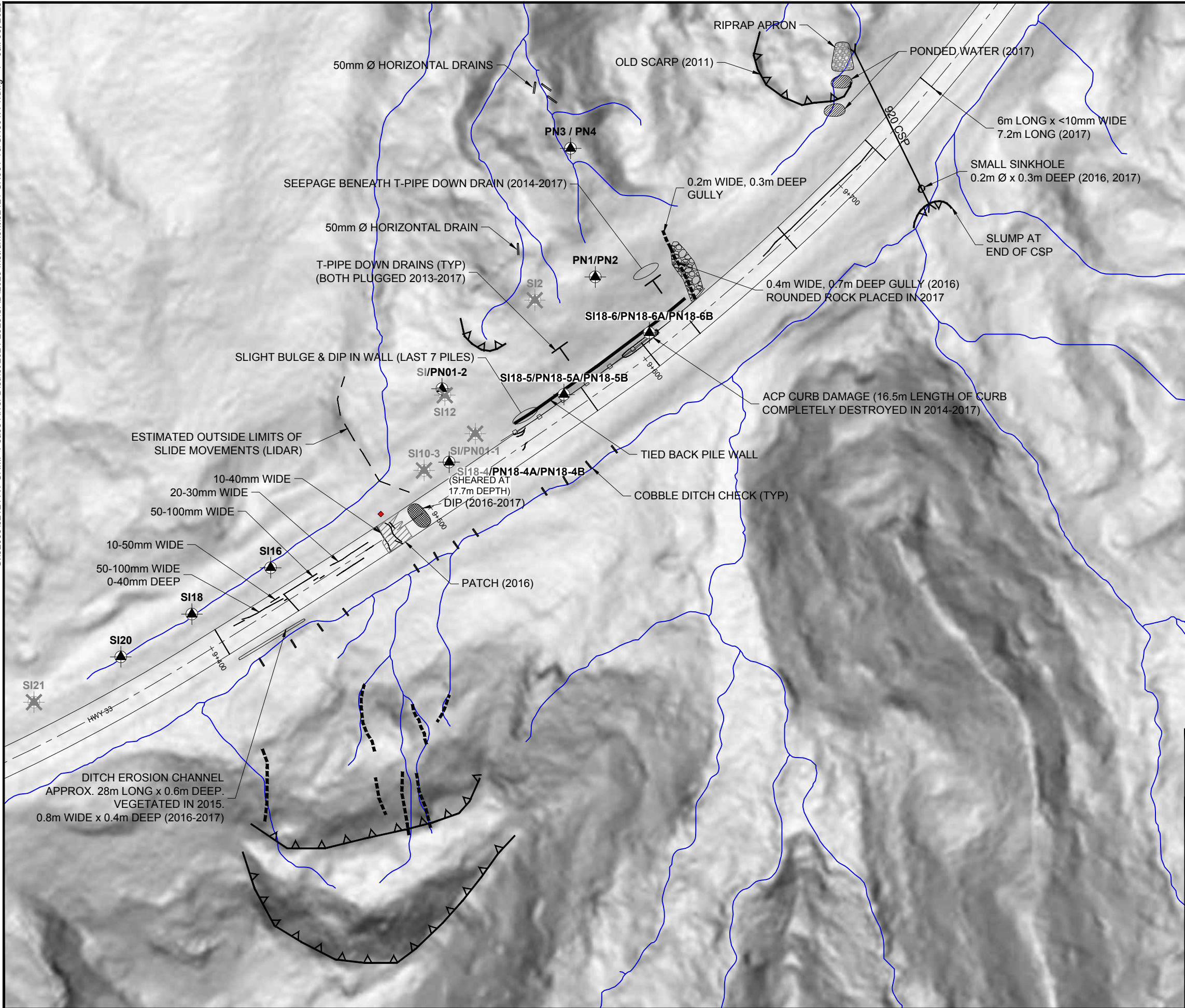
**PNEUMATIC PIEZOMETER (PN) READINGS**

PN#	GPS Location (UTM 11)		Date	Reading (kPa)	Identification Number
	Easting	Northing			
PN-1	607556	6070560	20-Jun-25	2.6	12871
PN-2	607556	6070560	20-Jun-25	**	12872
PN-3	607542	6070600	20-Jun-25	0.0***	12291
PN-4	607542	6070600	20-Jun-25	29.3	12305
PN01-2	607494	6070525	20-Jun-25	77.9	25973
PN18-4A	607498	6070498	20-Jun-25	47.8	37838
PN18-4B	607498	6070498	20-Jun-25	74.2	37832
PN18-5A	607536	6070521	20-Jun-25	12.3	37836
PN18-5B	607536	6070521	20-Jun-25	20.6	37834
PN18-6A	607554	6070532	20-Jun-25	17.9	37835
PN18-6B	607554	6070532	20-Jun-25	36.2	37833
PN18-7A	607829	6070861	20-Jun-25	65.4****	37837
PN18-7B	607829	6070861	20-Jun-25	7.4	37831

**DAILY INSPECTOR REPORT**

**SI-18 Run down by lawn mower, can be repaired without mechanical excavation
** Presuure keeps climbing , 300kpa and up doesn't stabilize.
*** Possibly damaged
**** Took reading twice

G:\32000\32121 AT GRMP Peace River District 2021-2025\CAD\2025 Instrument\32121-SH001-1 & SH001A-1.dwg - 1 - Jul. 03. 2025



LEGEND

- SCARP (INTERPRETED FROM LIDAR)
- APPROXIMATE INSTRUMENT LOCATION
- NON - OPERATIONAL INSTRUMENT
- PN PNEUMATIC PIEZOMETER
- SI SLOPE INCLINOMETER
- GULLY
- DRAINAGE PATHS (INTERPRETED FROM LIDAR)
- GUARDRAIL
- RED TEMPORARY HAZARD SIGN

NOTES

1. FEATURE LOCATIONS ARE APPROXIMATE.
2. LIDAR SHADED ACCORDING TO SLOPE FROM WHITE AT 0° TO BLACK AT 35° AND STEEPER.
3. 2021 INSPECTION OBSERVATIONS SHOWN IN BLACK.
4. DRAWING UPDATED IN 2017 USING LIDAR, SATELLITE IMAGERY, AND A MEASURING WHEEL.

LIDAR PROVIDED BY ALBERTA TRANSPORTATION (FLOWN 2007)



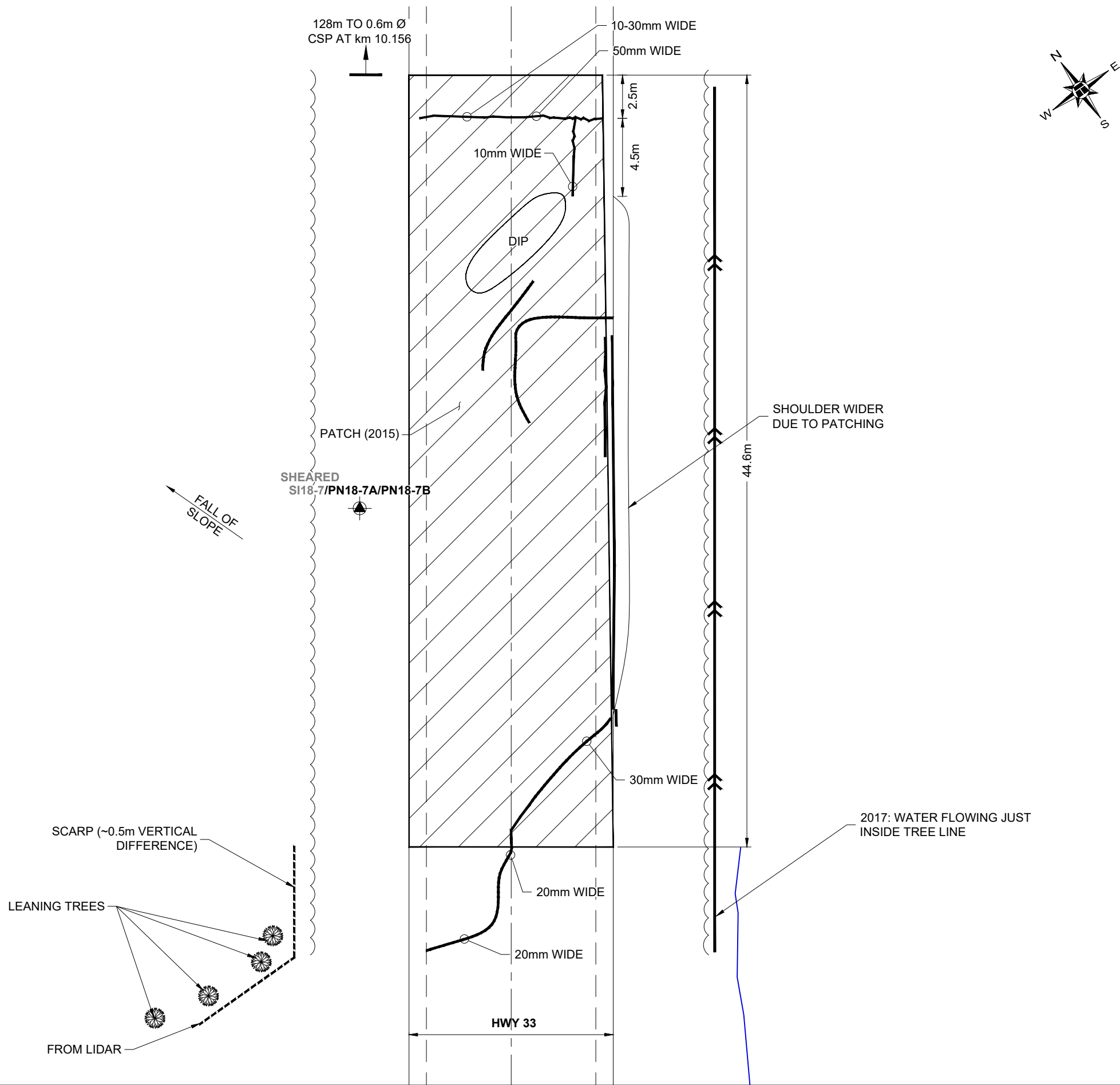
PEACE REGION (PEACE RIVER DISTRICT)

SH001: HWY 33:12 SWAN HILLS RETAINING  
SITE PLAN SHOWING APPROXIMATE  
INSTRUMENT LOCATIONS

DWG No. 32121-SH001-1

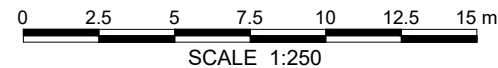
DRAWN BY	ML
DESIGNED BY	LRG
APPROVED BY	DWP
SCALE	1:1500
LAST UPDATED	JULY 2025
FILE No.	32121





- LEGEND
- CRACK
  - WATER COURSE
  - APPROXIMATE INSTRUMENT LOCATION
  - PN PNEUMATIC PIEZOMETER
  - SI SLOPE INCLINOMETER
  - APPROXIMATE TREE LINE

- NOTES
- FEATURE LOCATIONS ARE APPROXIMATE.
  - 2021 INSPECTION OBSERVATIONS SHOWN IN BLACK (2013-2015 FROM AMEC FIGURE 1, PROJECT EG10030, PROVIDED BY ALBERTA TRANSPORTATION).
  - CRACK PATTERN REMEASURED IN 2017 USING MEASURING WHEEL. PREVIOUS PATTERN REMOVED. DRAWING UPDATED USING HIGH RESOLUTION SATELLITE IMAGERY AND LIDAR (FLOWN 2007)



PEACE REGION (PEACE RIVER DISTRICT)

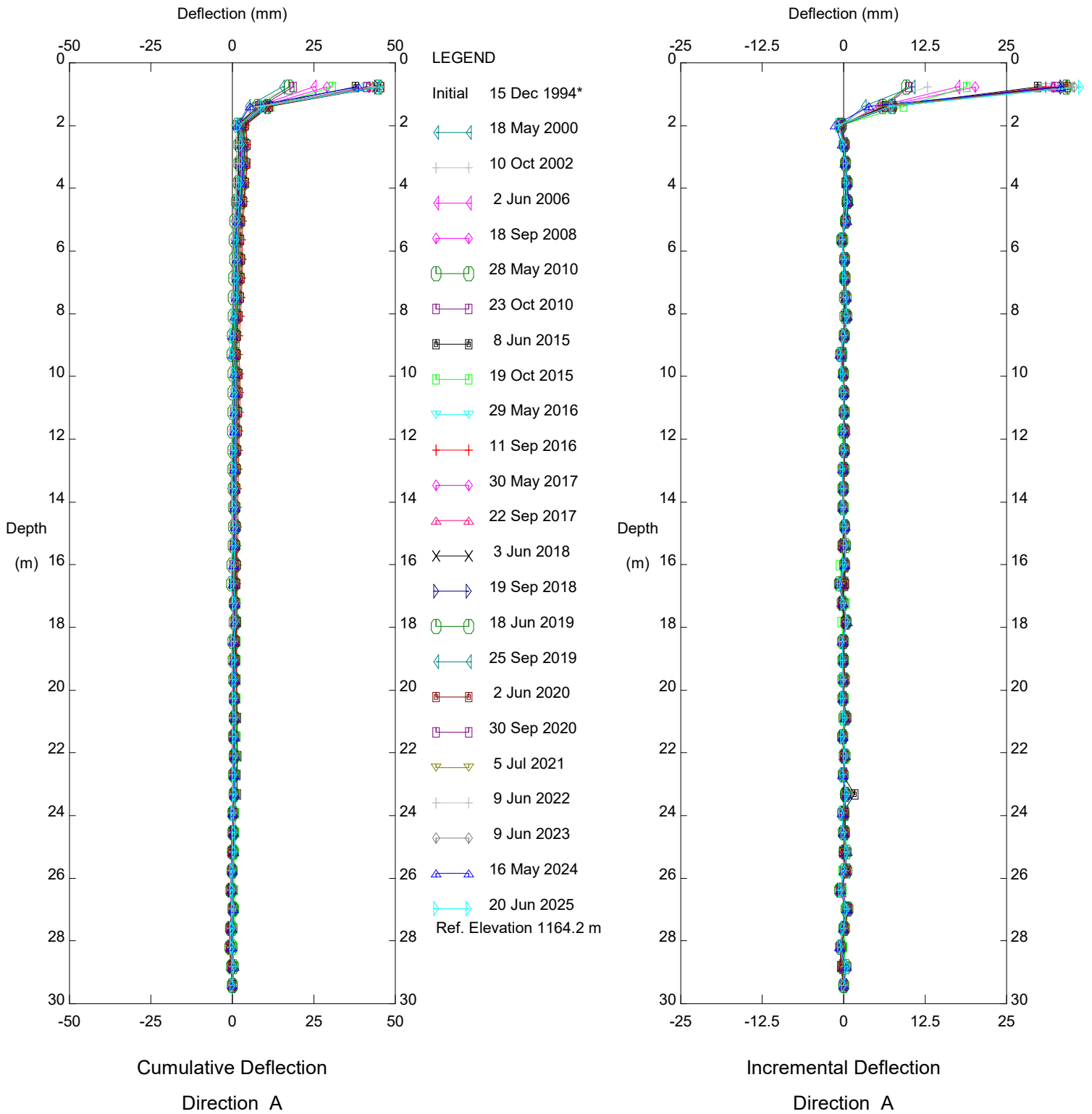
SH001A: HWY 33:12  
SITE PLAN SHOWING APPROXIMATE  
INSTRUMENT LOCATIONS

DWG No. 32121-SH001A-1

DRAWN BY	ML
DESIGNED BY	LRG
APPROVED BY	DWP
SCALE	1:250
LAST UPDATED	JULY 2024
FILE No.	32121

THURBER ENGINEERING LTD.

# Thurber Engineering Ltd.



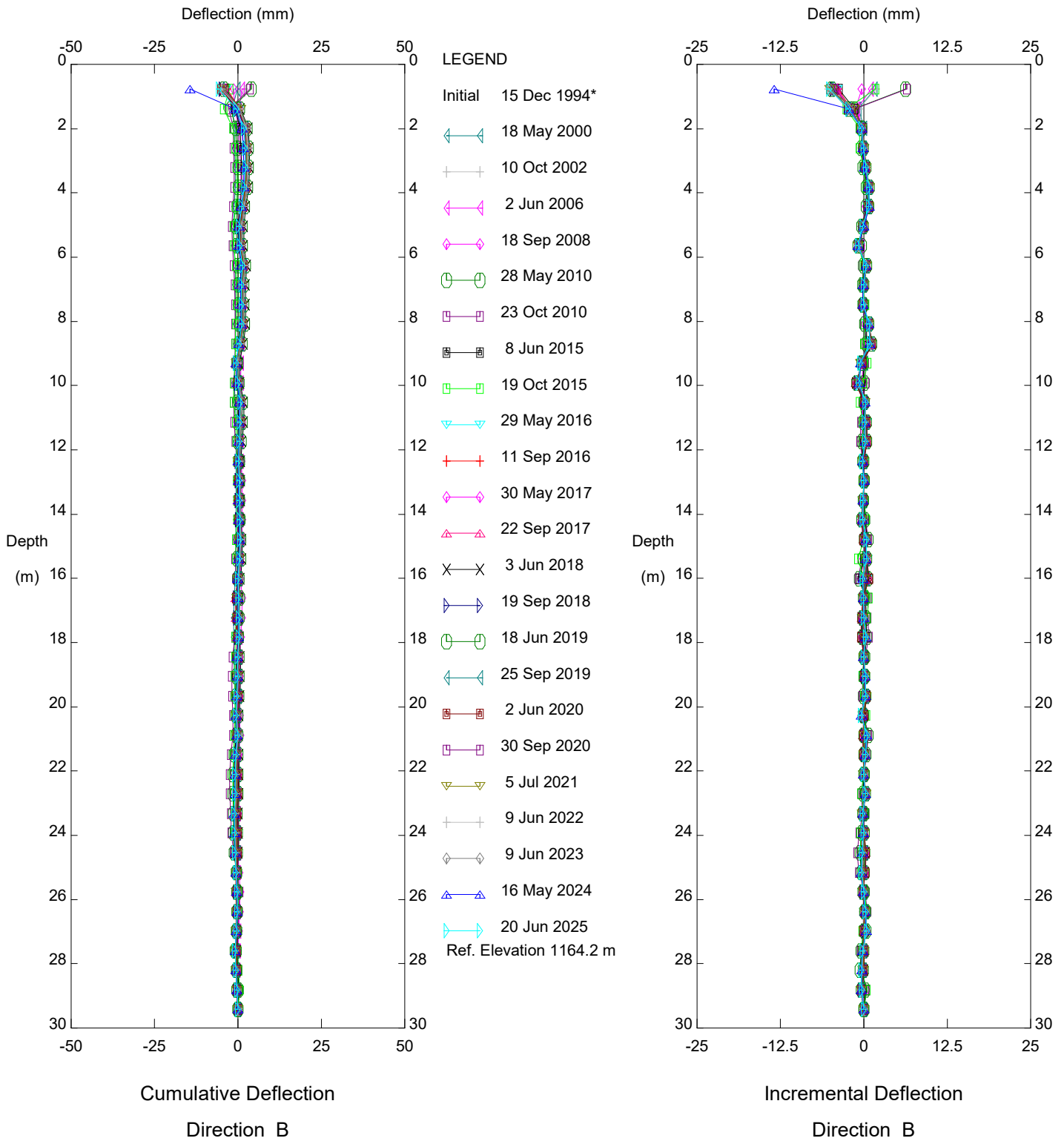
SH001 - Swan Hills Retaining Wall, Inclinometer SI 16

Alberta Transportation

Sets marked \* include zero shift and/or rotation corrections.



# Thurber Engineering Ltd.

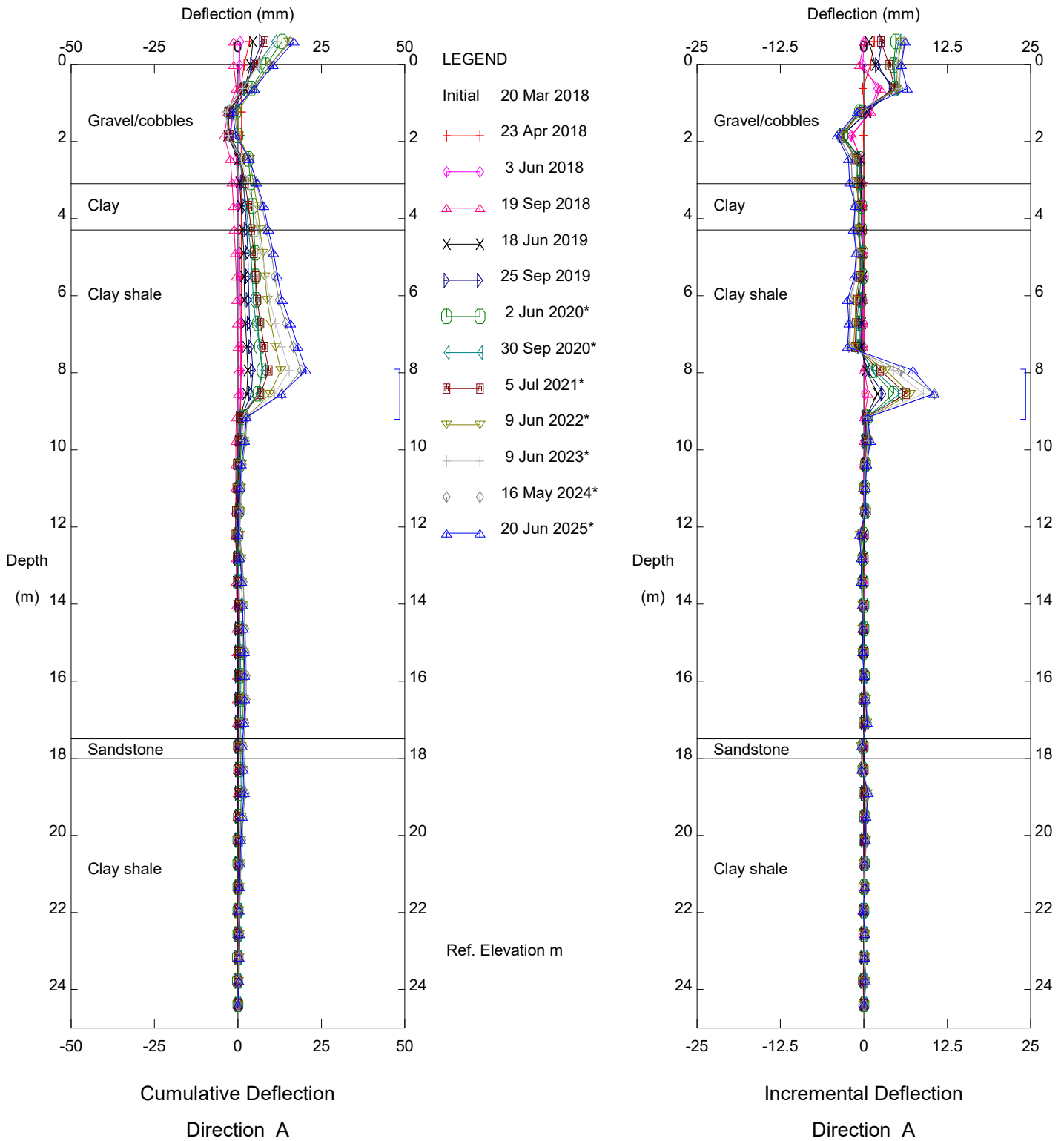


SH001 - Swan Hills Retaining Wall, Inclinator SI 16

Alberta Transportation

Sets marked \* include zero shift and/or rotation corrections.

# Thurber Engineering Ltd.

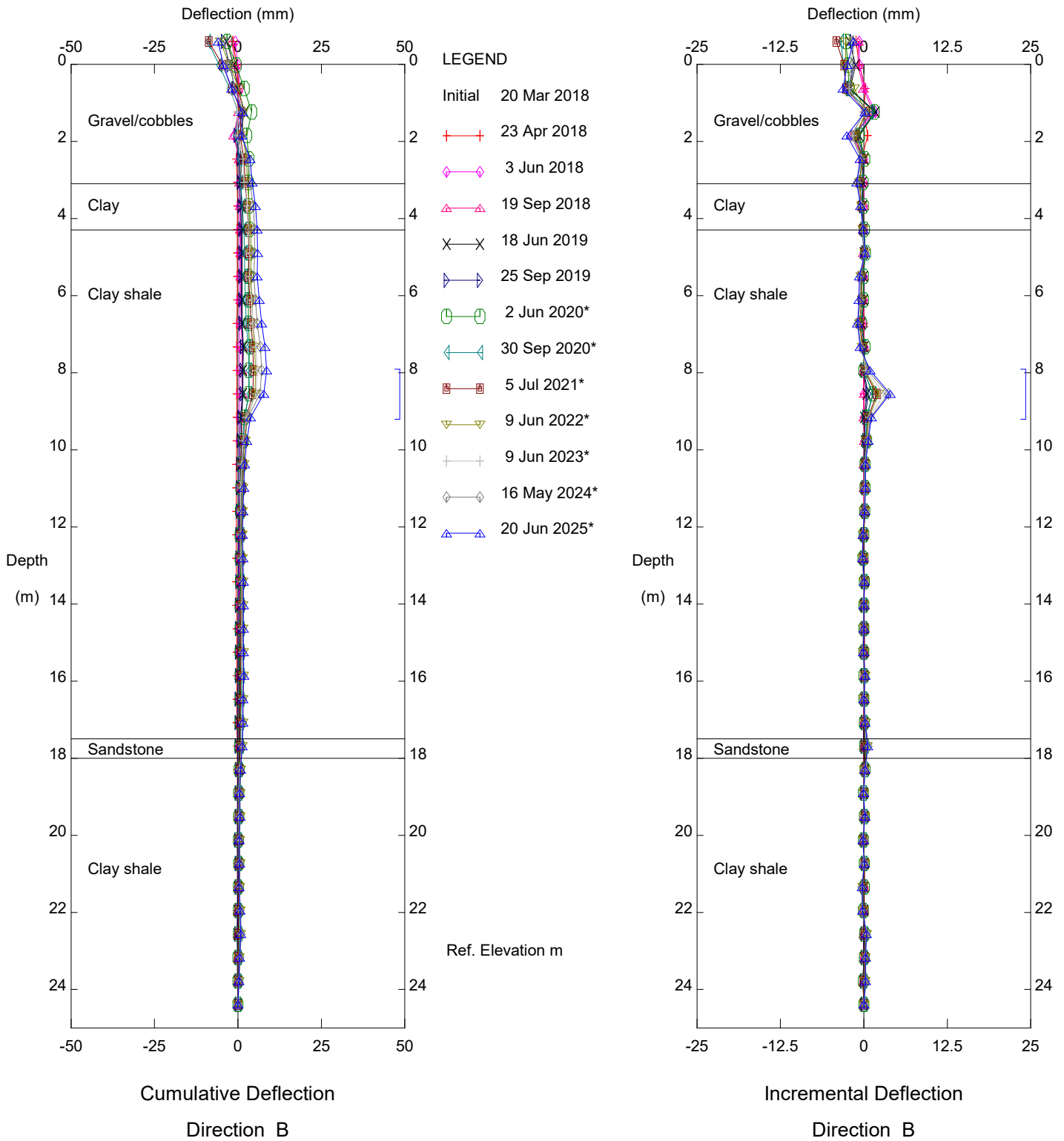


SH001 Retaining Wall, Inclinometer SI18-5

Alberta Transportation

Sets marked \* include zero shift and/or rotation corrections.

# Thurber Engineering Ltd.



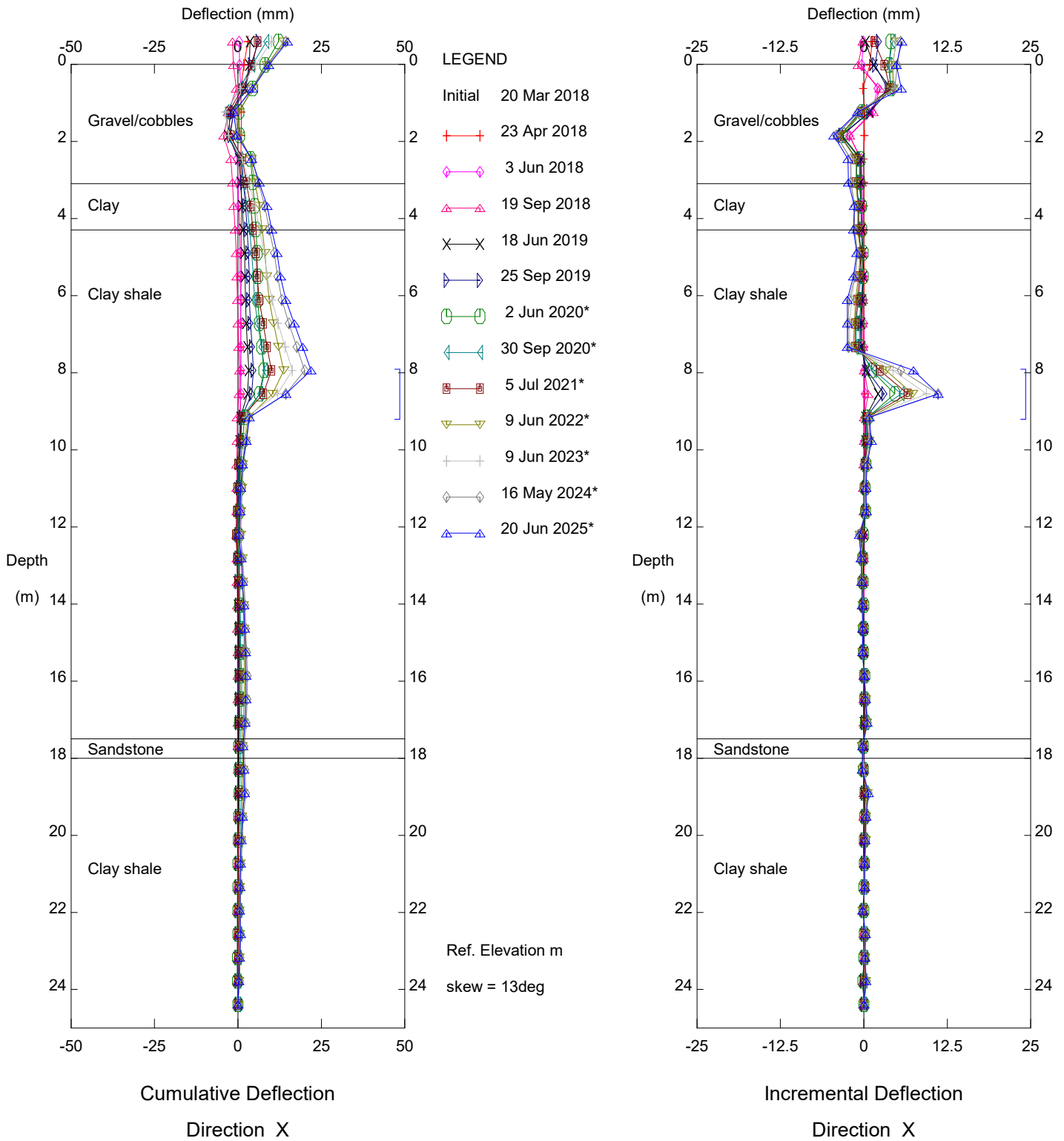
SH001 Retaining Wall, Inclinator SI18-5

Alberta Transportation

Sets marked \* include zero shift and/or rotation corrections.



# Thurber Engineering Ltd.

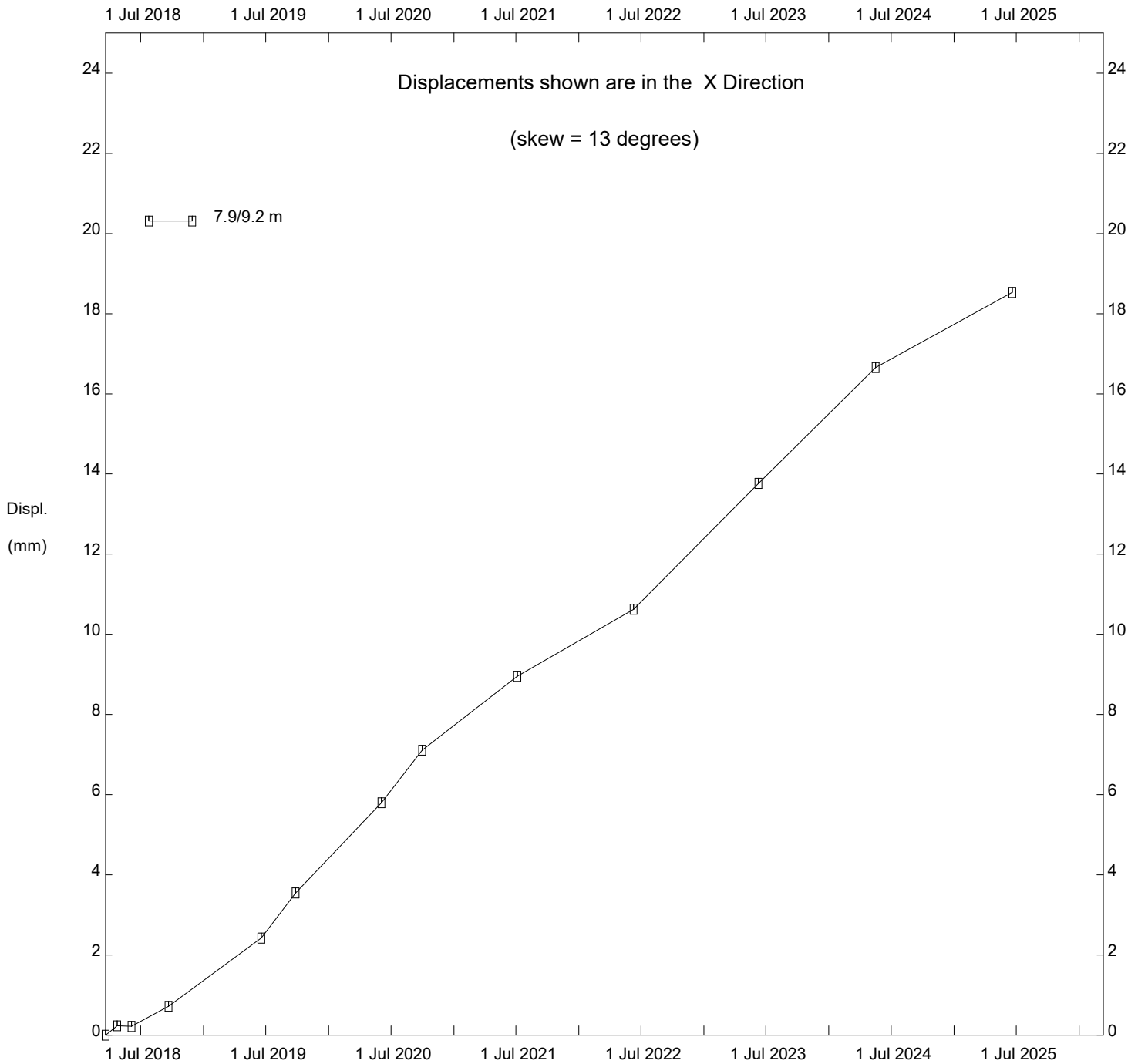


SH001 Retaining Wall, Inclinator SI18-5

Alberta Transportation

Sets marked \* include zero shift and/or rotation corrections.

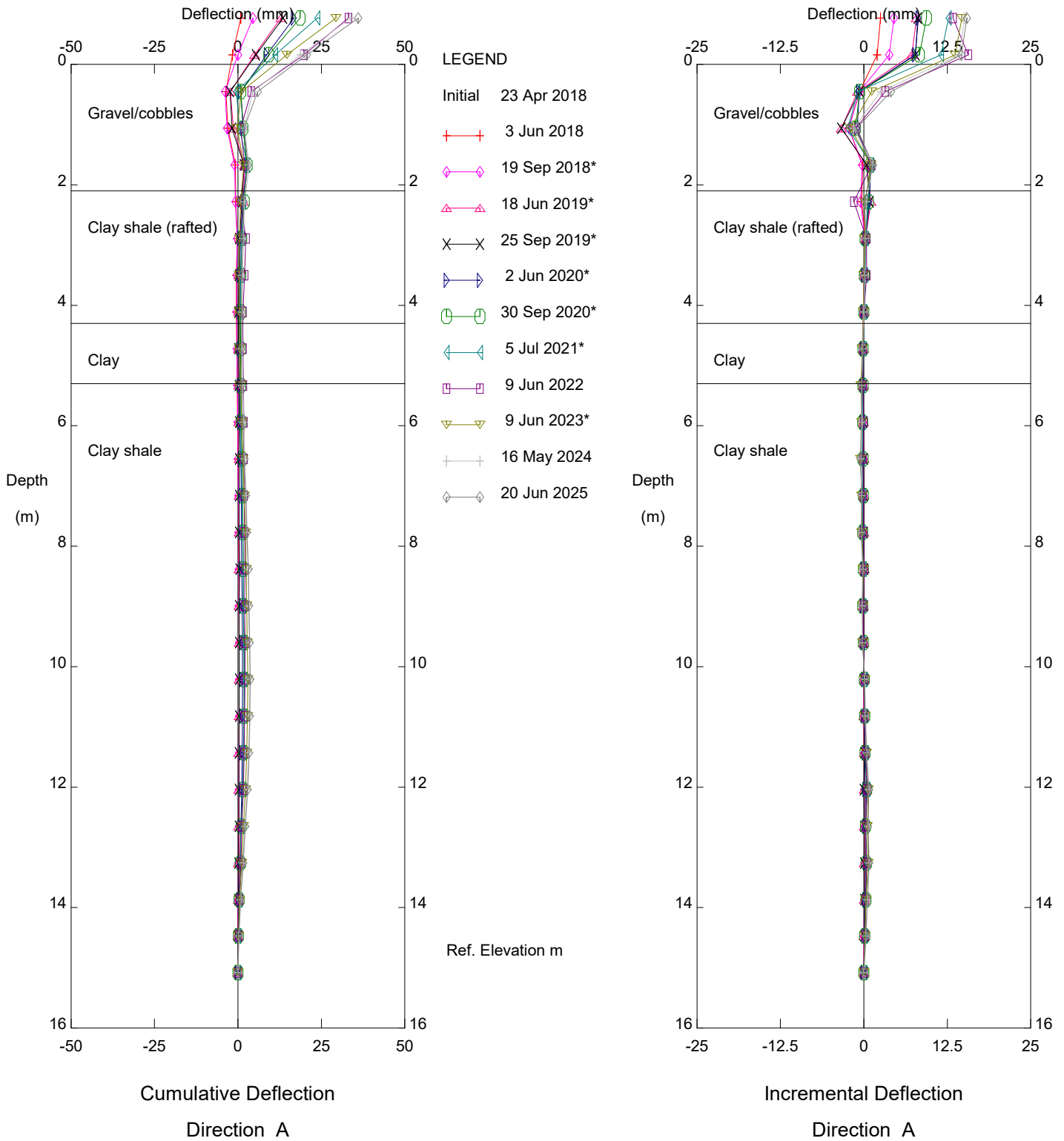
Thurber Engineering Ltd.



SH001 Retaining Wall, Inclinator SI18-5

Alberta Transportation

# Thurber Engineering Ltd.

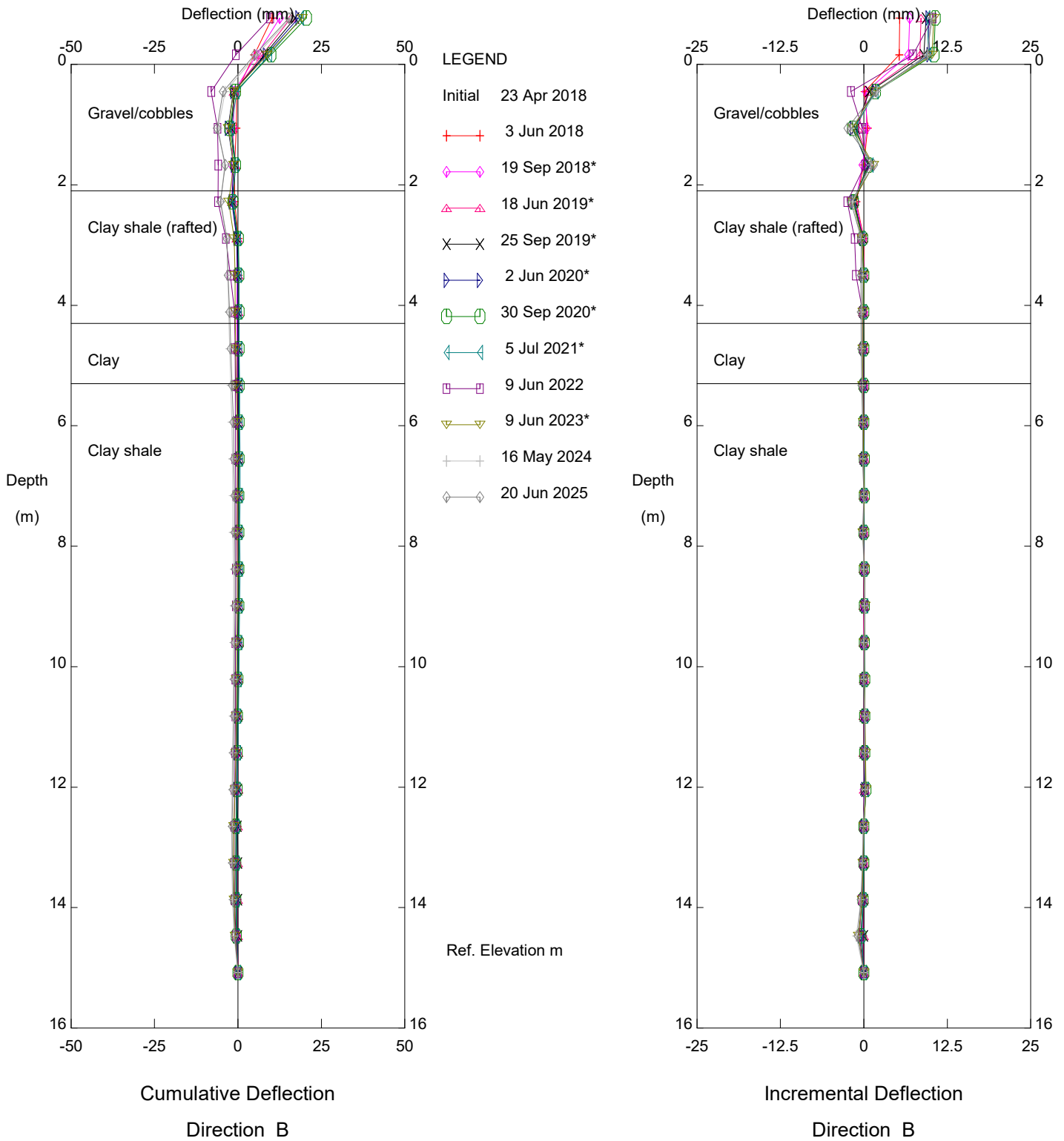


SH001 Retaining Wall, Inclinator SI18-6

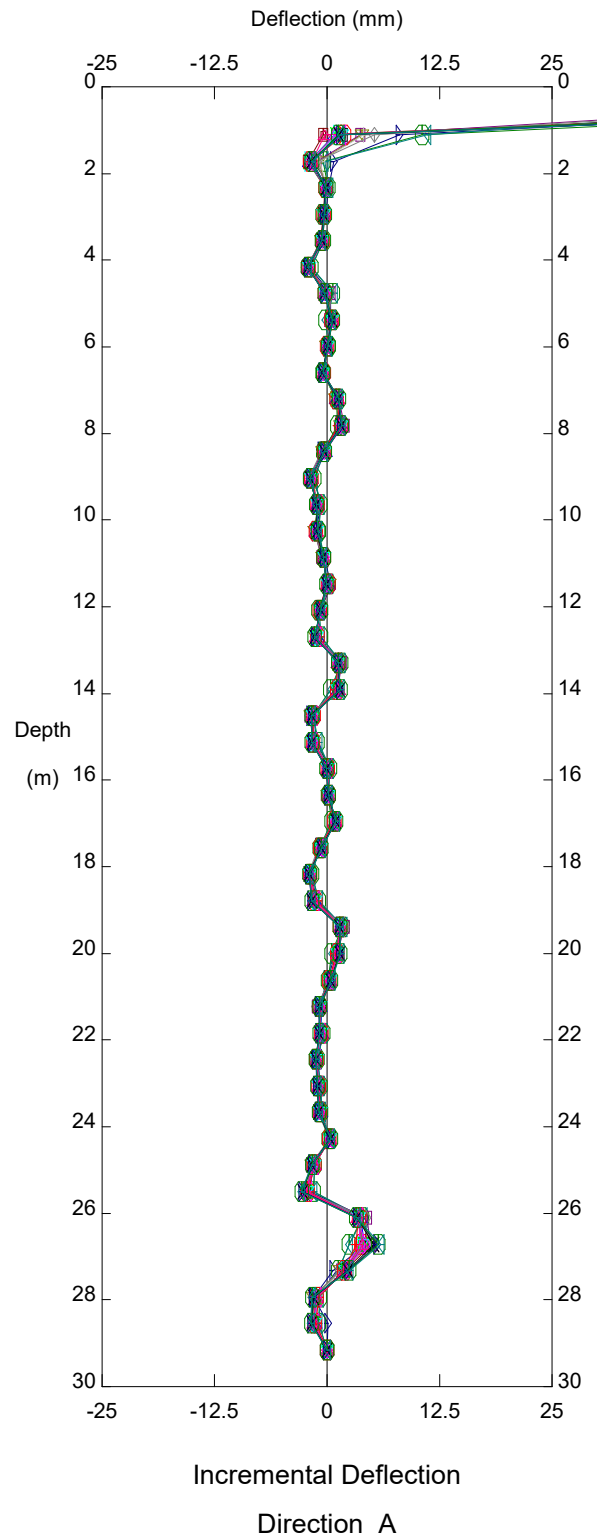
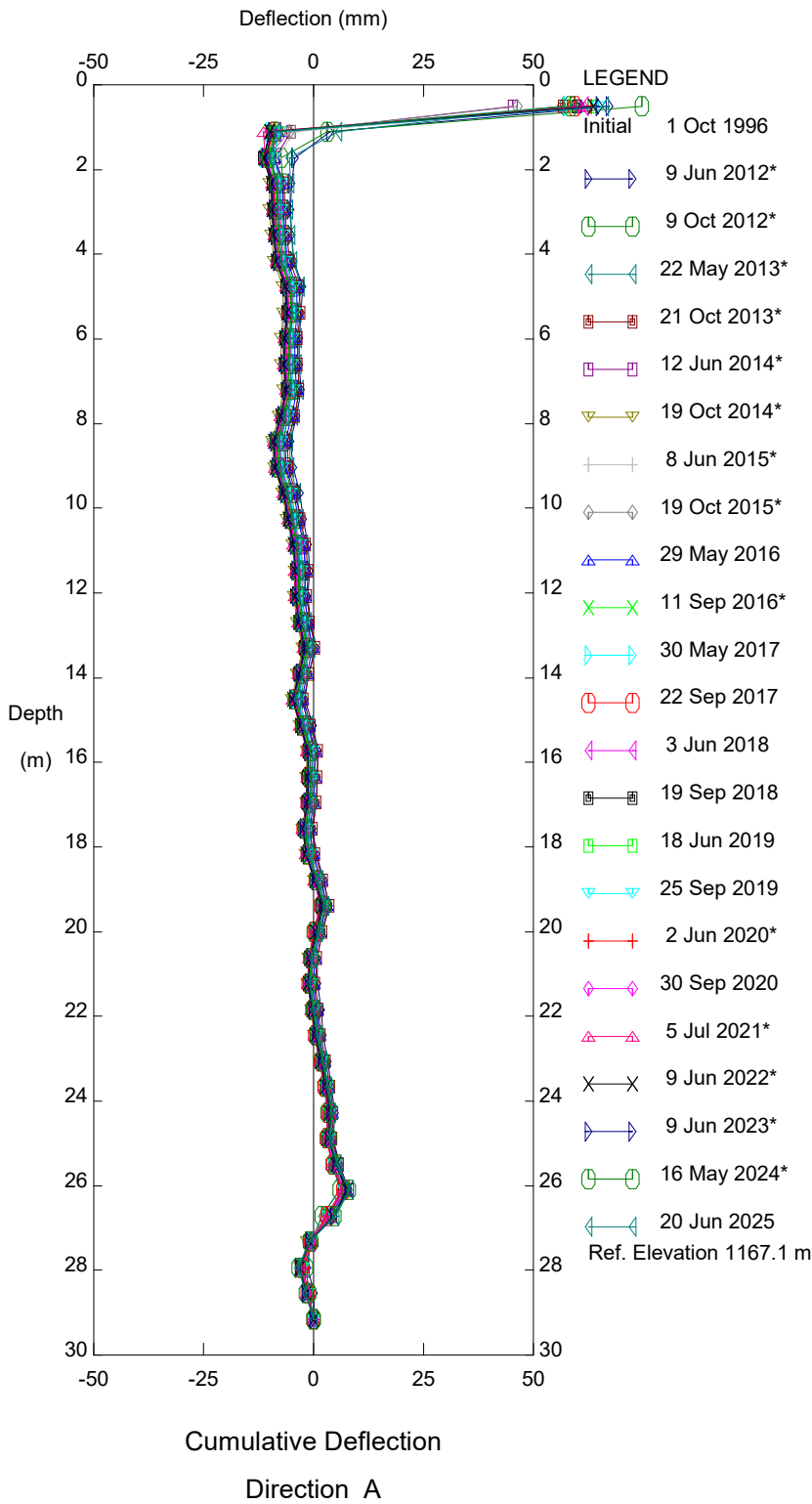
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Sets marked \* include zero shift and/or rotation corrections.

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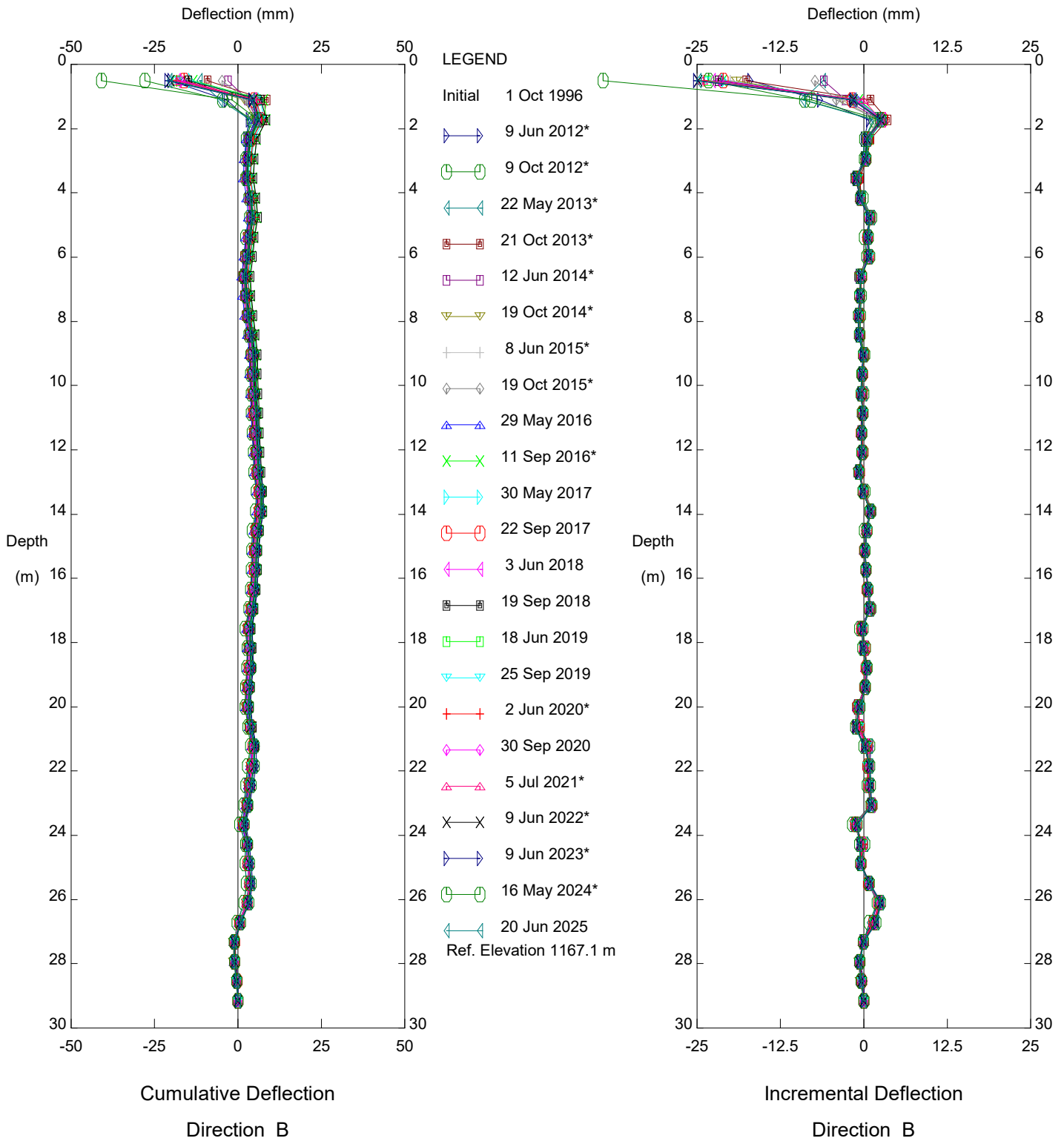


Swan Hills - SH001 Retaining Wall, Inclinometer SI 20

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Sets marked \* include zero shift and/or rotation corrections.

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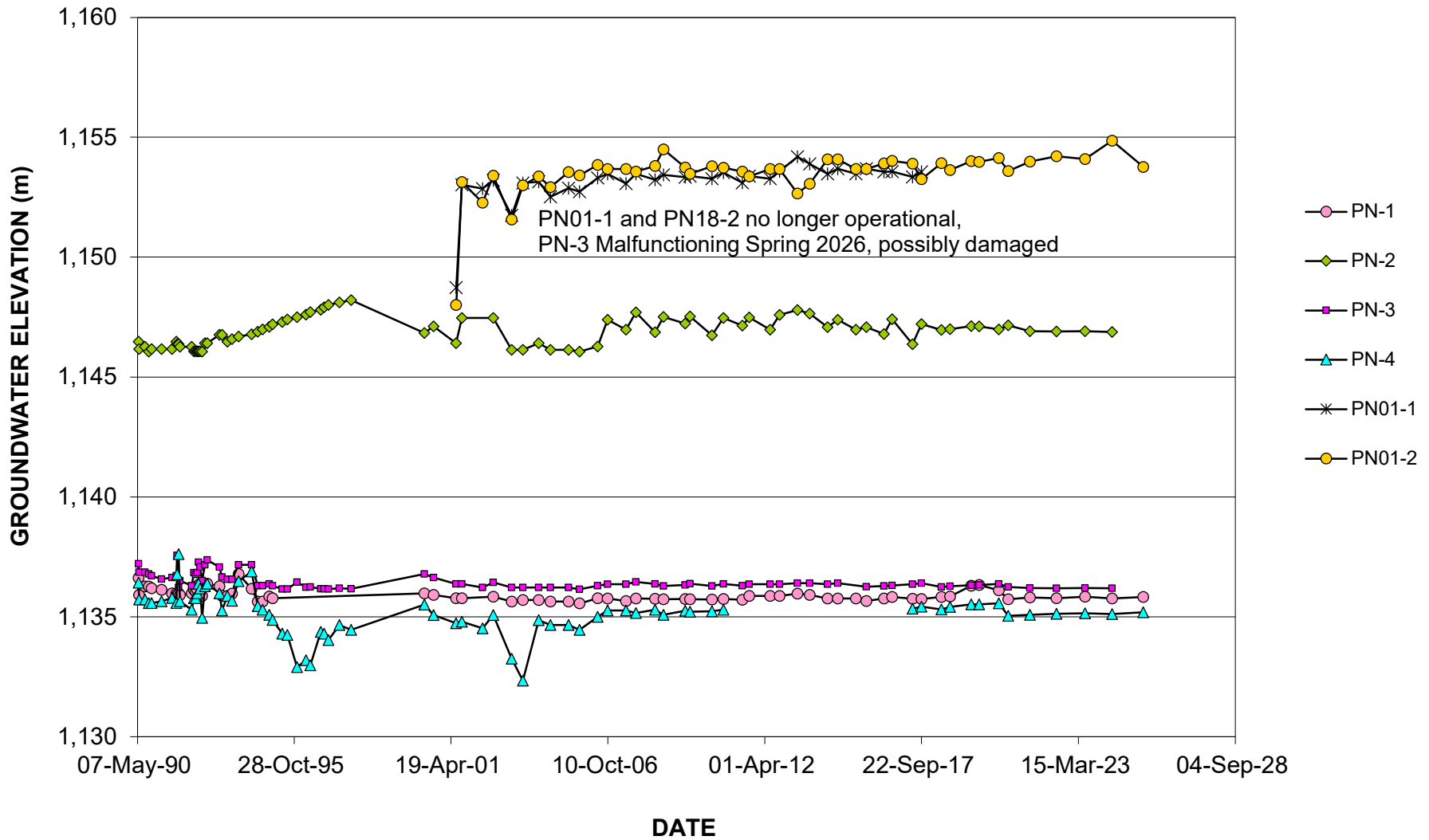


Swan Hills - SH001 Retaining Wall, Inclinometer SI 20

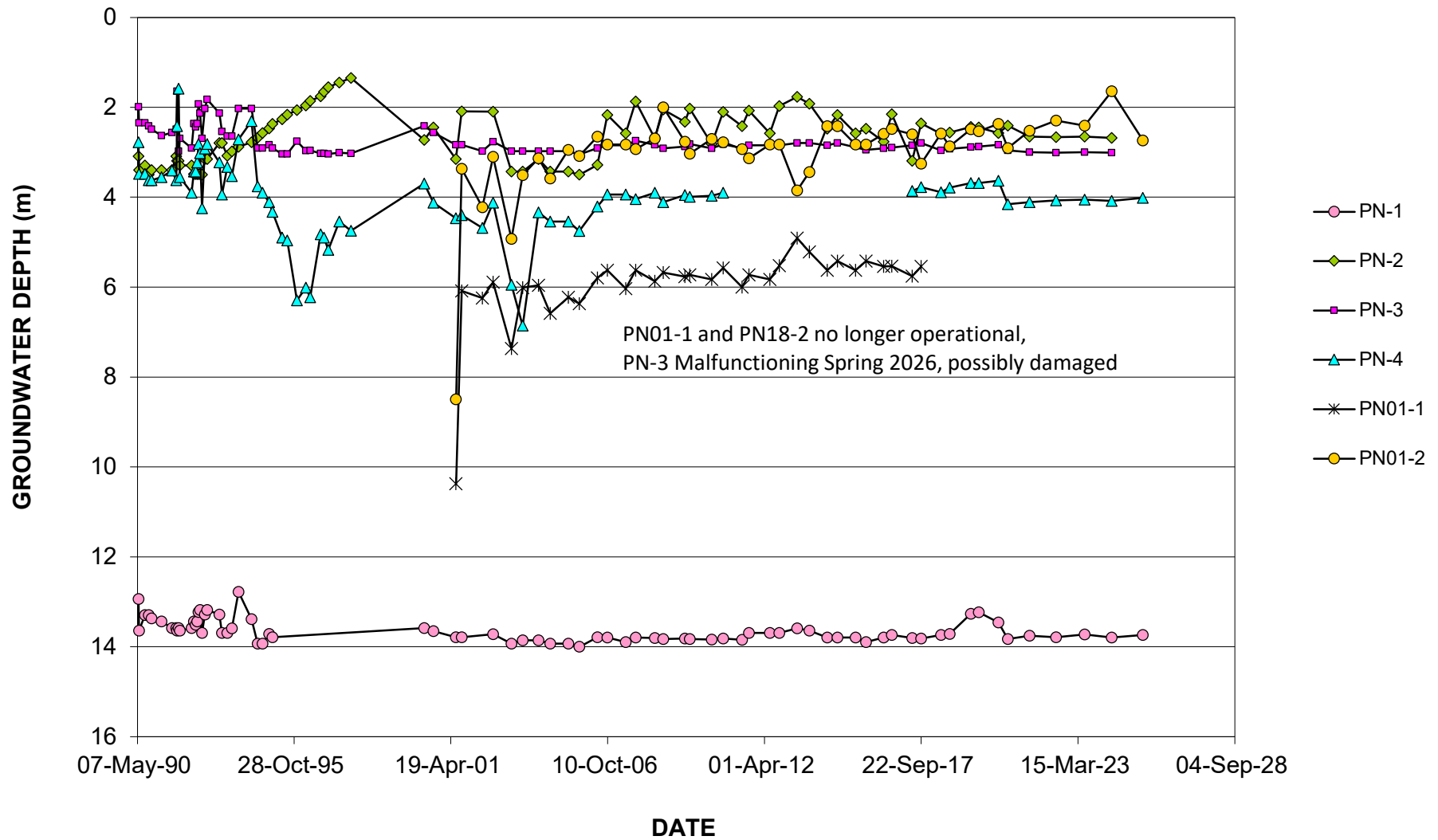
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Sets marked \* include zero shift and/or rotation corrections.

**FIGURE SH001-1**  
**PNEUMATIC PIEZOMETER ELEVATIONS FOR**  
**HWY 33:12 (SWAN HILLS RETAINING WA**

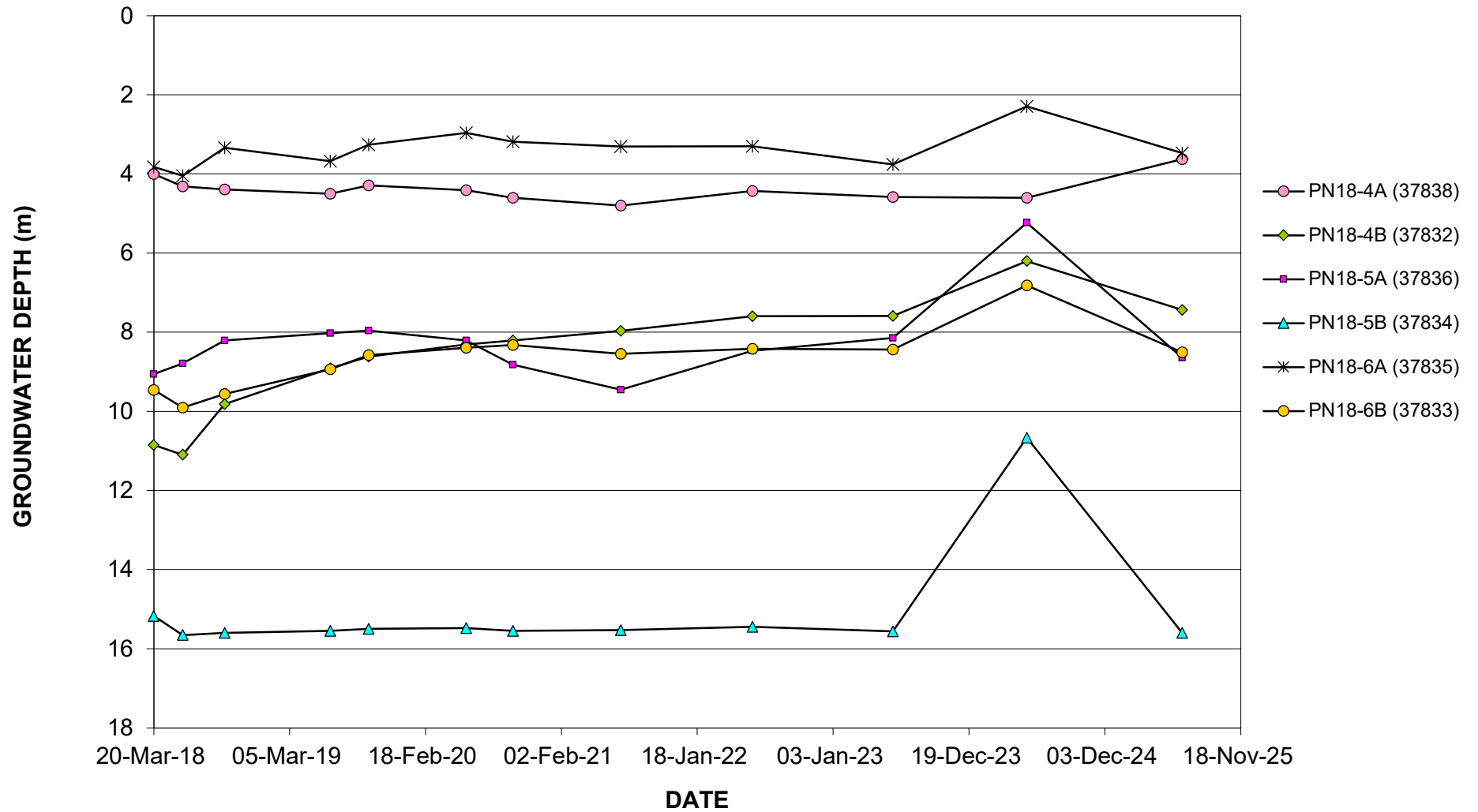


**FIGURE SH001-2**  
**PNEUMATIC PIEZOMETER DEPTHS FOR**  
**HWY 33:12 (SWAN HILLS RETAINING WALL -**





**FIGURE SH001-3**  
**PNEUMATIC PIEZOMETER DEPTHS FOR**  
**HWY 33:12 (SWAN HILLS RETAINING WALL - 2018 INSTRUMENTS)**



**FIGURE SH001-4  
PNEUMATIC PIEZOMETER DEPTHS FOR  
HWY 33:12 (SWAN HILLS SITE 1A - 2018 INSTRUMENTS)**

