

Site Number	Location	Name	Hwy	km
SH003	HWY 49:12 C1 0.678	Little Smoky River (N of Bridge)	49:12	Km 0.7
Legal Description:		UTM Co-ordinates		
14-34-74-21 W5		11U E 490629	N	6145958

Current Monitoring:	17-May-2024	Previous Monitoring	08-Oct-2023
Instruments Read By:	Mr. Niraj Regmi, G.I.T., and Mr. Nixson Mationg, Thurber		

Instruments Read During This Site Visit			
Slope Inclinometers (SIs): SI96-4 SI96-5 SI96-6 SI31a	Pneumatic Piezometers (PN): PZ01-1 PZ01-3	Vibration Wire Piezometers (VW): VW07-1 VW07-1A	Standpipe Piezometers (SP): N/A
Load Cell (LC): N/A	Strain Gauges: N/A	SAAs: N/A	Others:

Readout Equipment Used			
Slope Inclinometers: Two RST Digital Inclinometer probes with 2 ft wheelbases and RST Pocket PC readouts	Pneumatic Piezometers: RST C108 pneumatic piezometer readout	Vibration Wire Piezometers: GEOKON GK 404 vibrating wire readout	Standpipe Piezometers:
Load Cell:	Strain Gauges:	SAAs:	Others:
Note			

Discussion	
Zones of New Movement:	None
Interpretation of Monitoring Results:	<p>Slope inclinometers SI96-4, SI96-5, and SI96-6 continued to show no discernible movement patterns. Based on the readings from other sheared inclinometers, these SIs are likely too shallow to capture the main slide movements.</p> <p>SI31a sheared off at 22.5 m depth in September 1999. Readings were continued above this shear plane. SI31a showed a rate of movement of 0.5 mm/yr over 15.7 m to 16.9 m since the fall of 2023 readings which is consistent with movement rates since the fall of 2019.</p> <p>Pneumatic piezometers PZ01-1 and PZ01-3 showed slight increases in groundwater level of 0.05 m and 0.27 m, respectively, since the fall of 2023 readings. Pneumatic piezometer results are summarized in Table SH003-2 above and are plotted in Figure SH003-1 in Appendix A. Both of these pneumatic piezometers have been stable for the last decade.</p> <p>Vibrating wire piezometers VW07-1 and VW07-1A showed slight increases in groundwater level of 0.15 m and 0.12 m, respectively, since the fall of 2023 readings. The vibrating wire piezometer results are summarized in Table SH003 3 above and are plotted in Figure SH003-2 in Appendix A. Piezometer VW1 has shown a slight upward</p>

	trend over the last few years whereas VW07-1A had been stable until the last two readings.
Future Work:	The piezometers instruments should be read again in the fall of 2024. It is recommended that slope indicators readings be reduced to biennially unless movement zones develop. The next SI readings would be in spring of 2026.
Instrumentation Repairs:	No instrument repairs are required at this time.
Additional Comments:	

Attachments:	<ul style="list-style-type: none"> • Table SH003-1 Spring 2024 – HWY 49:12 Little Smoky River (North of Bridge), Slope Inclinator Instrumentation Reading Summary • Table SH003-2 Spring 2024 – HWY 49:12 Little Smoky River (North of Bridge), Pneumatic Piezometer Instrumentation Reading Summary • Table SH003-3 Spring 2024 – HWY 49:12 Little Smoky River (North of Bridge), Vibrating Wire Piezometer Instrumentation Reading Summary • Statement of Limitations and Conditions • APPENDIX A – SH003 SPRING 2024 <ul style="list-style-type: none"> ○ Field Inspector's report ○ Site Plan Showing Approximate Instrument Locations (Drawing No. 32121 SH003) ○ SI Reading Plots ○ Figure SH003-1 (Pneumatic Piezometer Elevations) ○ Figure SH003-2 (Pneumatic Piezometer Depths) ○ Figure SH003-3 (Vibrating Wire Piezometer Depths)
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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.
Don Proudfoot, M.Eng., P. Eng.
Partner | Senior Geotechnical Engineer

Lucas Green, P.Eng.
Geotechnical Engineer

Table SH003-1 Spring 2024 – Hwy 49:12 Little Smoky River (North Of Bridge) Slope Inclinometer Instrumentation Reading Summary

Date Monitored: May 17, 2024

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)
SI96-4	November 6, 1996; new initial reading of June 5, 2017, used	No discernible movement	N/A	Operational	October 8, 2023	N/A	N/A	N/A
SI96-5		No discernible movement	N/A	Operational	October 8, 2023	N/A	N/A	N/A
SI96-6		No discernible movement	N/A	Operational	October 8, 2023	N/A	N/A	N/A
SI31a	December 16, 1998; new initial reading of June 5, 2017, used	3.3 mm over 15.7 m to 16.9 m depth in 286°	2.9 mm/yr in September 2019	Operational (read from above shear plane at 22.5 m)	October 8, 2023	0.4	0.5	0.5
SI01-3	January 19, 2001	8.7 mm over 22.5 m to 24.9 m in 325° direction	-	Discontinued by Alberta Transportation in Spring 2014	October 22, 2013	N/A	N/A	N/A
		10.0 mm over 34.1 m to 39.0 m in 280° direction	-					
		52.0 mm over 48.1 m to 49.3 m in 310° direction	-					

Drawing 32121-SH003 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

Table SH003-2 Spring 2024 – Hwy 49:12 Little Smoky River (North Of Bridge) Pneumatic Piezometer Instrumentation Reading Summary

Date Monitored: May 17, 2024

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)
PZ01-1	January 20, 2001	528.33	542.96	Operational	543.44 in January 2001	114.9	540.05	540.00	0.05
PZ01-3	January 13, 2001	502.20	517.00	Operational	515.98 in January 2001	124.4	514.88	514.61	0.27

Drawing 32121-SH003 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.



Table SH003-3 Spring 2024 – Hwy 49:12 Little Smoky River (North Of Bridge) Vibrating Wire Piezometer Instrumentation Reading Summary

Date Monitored: May 17, 2024

INSTRUMENT	DATE INITIALIZED	TIP DEPTH (m)	CURRENT STATUS	MAXIMUM GROUNDWATER LEVEL (mBGS)	CURRENT GROUNDWATER DEPTH (mBGS)	PREVIOUS GROUNDWATER DEPTH (mBGS)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
VW07-1	March 27, 2007	35.60	Operational	13.33 in June 2014	13.92	14.07	0.15
VW07-1A	March 27, 2007	50.60	Operational	17.50 in May 2007	18.33	18.45	0.12
VW07-1B	March 27, 2007	66.10	Damaged	8.95 in May 2007	N/A	N/A	N/A

Drawing 32121-SH003 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

Note: BGS = below ground surface



STATEMENT OF LIMITATIONS AND CONDITIONS

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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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- 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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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.

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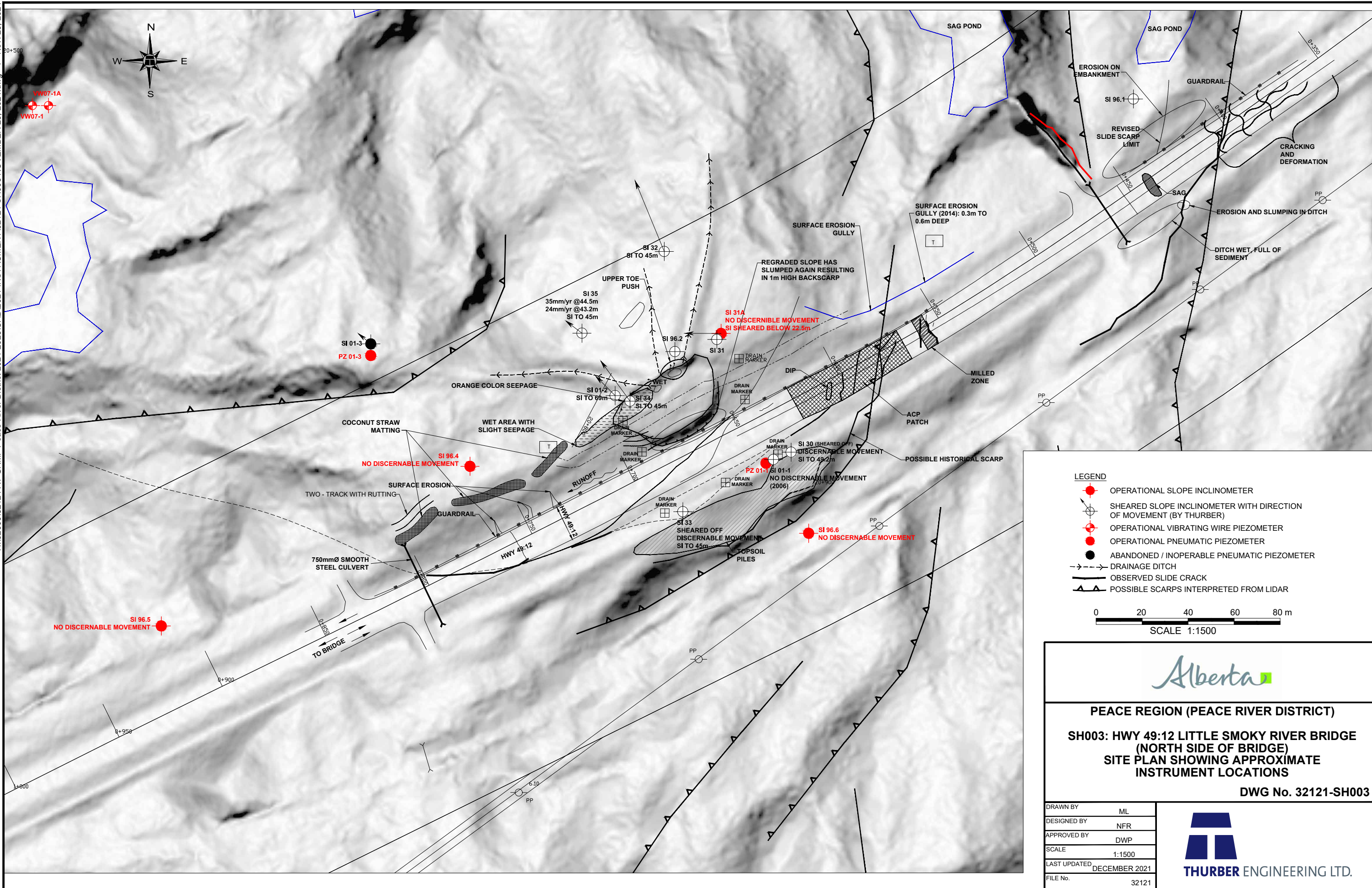
**ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS GRMP (CON0022164)
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING RESULTS**

SPRING 2024

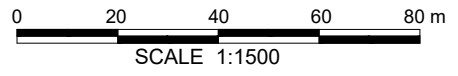
**APPENDIX A
DATA PRESENTATION**

SITE SH003: HWY 49:12, LITTLE SMOKY RIVER (NORTH OF BRIDGE)

H:\32000\32121 AT GRMP Peace River District 2021-2025\CAD\2021 INSTRUMENT\32121 SH003 NOVEMBER 29, 2021.dwg - 1 - Nov. 29, 2021



- LEGEND**
- OPERATIONAL SLOPE INCLINOMETER
 - SHEARED SLOPE INCLINOMETER WITH DIRECTION OF MOVEMENT (BY THURBER)
 - OPERATIONAL VIBRATING WIRE PIEZOMETER
 - OPERATIONAL PNEUMATIC PIEZOMETER
 - ABANDONED / INOPERABLE PNEUMATIC PIEZOMETER
 - DRAINAGE DITCH
 - OBSERVED SLIDE CRACK
 - POSSIBLE SCARPS INTERPRETED FROM LIDAR



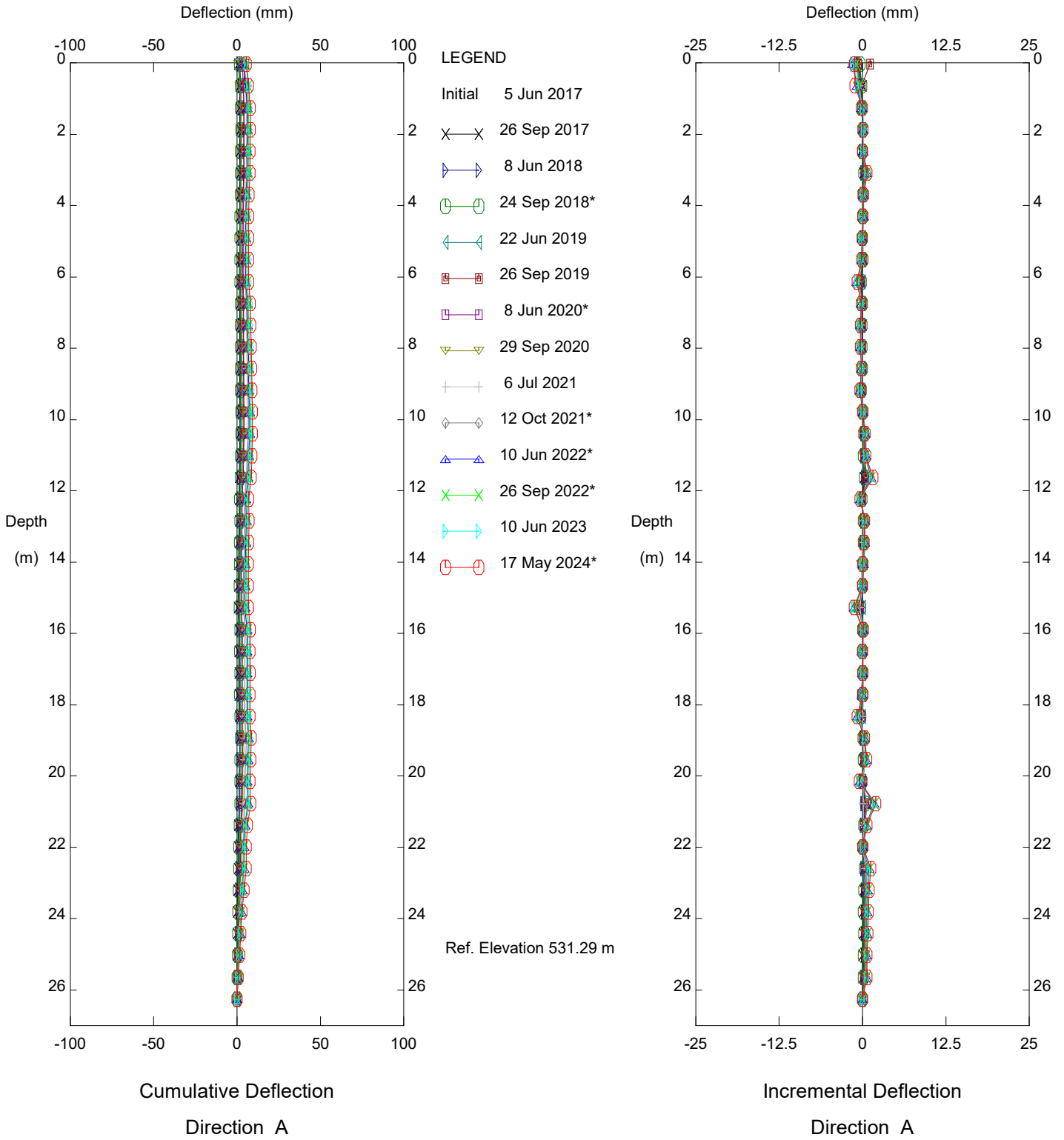
PEACE REGION (PEACE RIVER DISTRICT)
SH003: HWY 49:12 LITTLE SMOKY RIVER BRIDGE
(NORTH SIDE OF BRIDGE)
SITE PLAN SHOWING APPROXIMATE
INSTRUMENT LOCATIONS

DWG No. 32121-SH003

DRAWN BY	ML
DESIGNED BY	NFR
APPROVED BY	DWP
SCALE	1:1500
LAST UPDATED	DECEMBER 2021
FILE No.	32121

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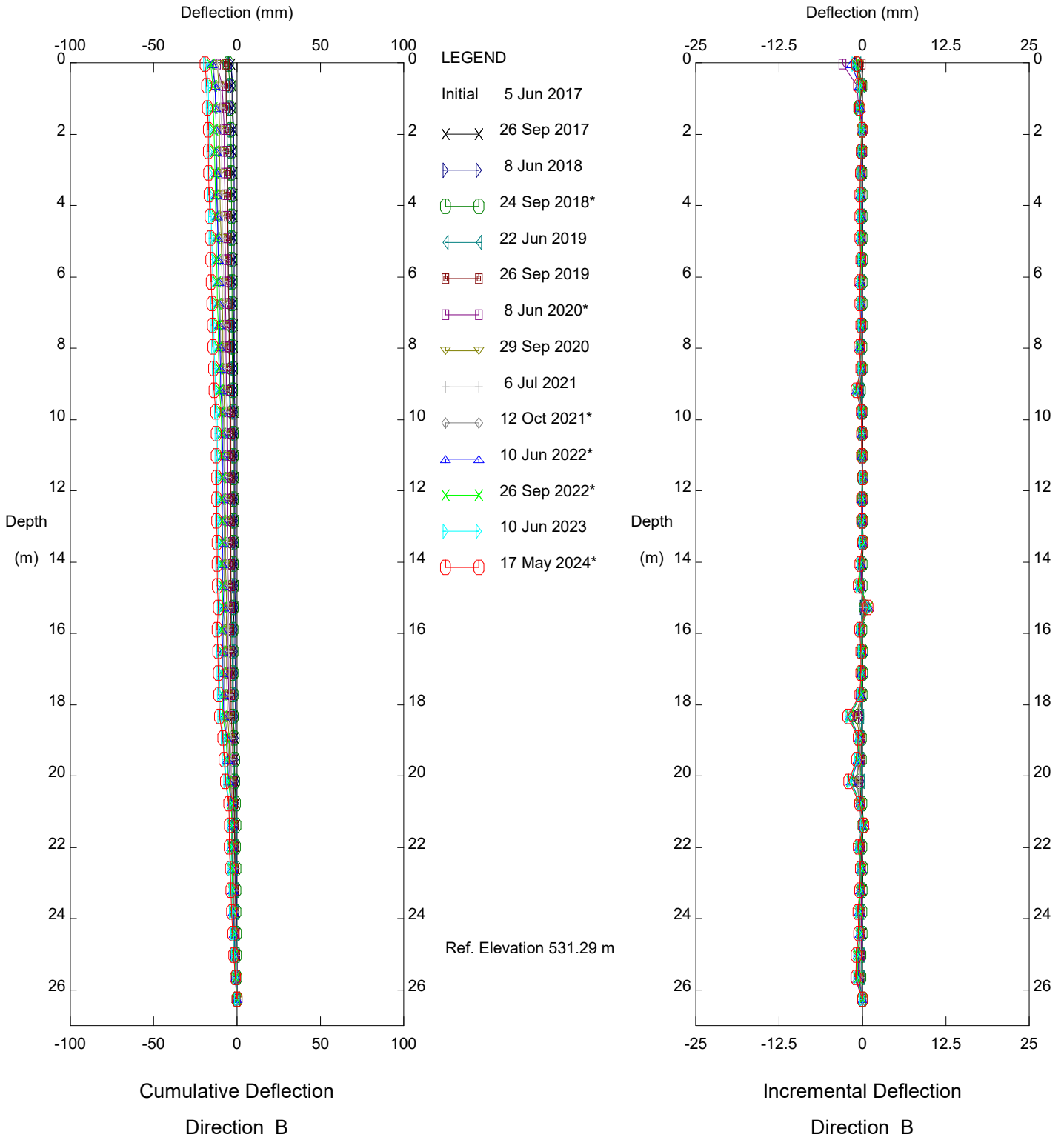


SH003, North of Little Smoky Bridge, Inclinometer SI 96-4

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

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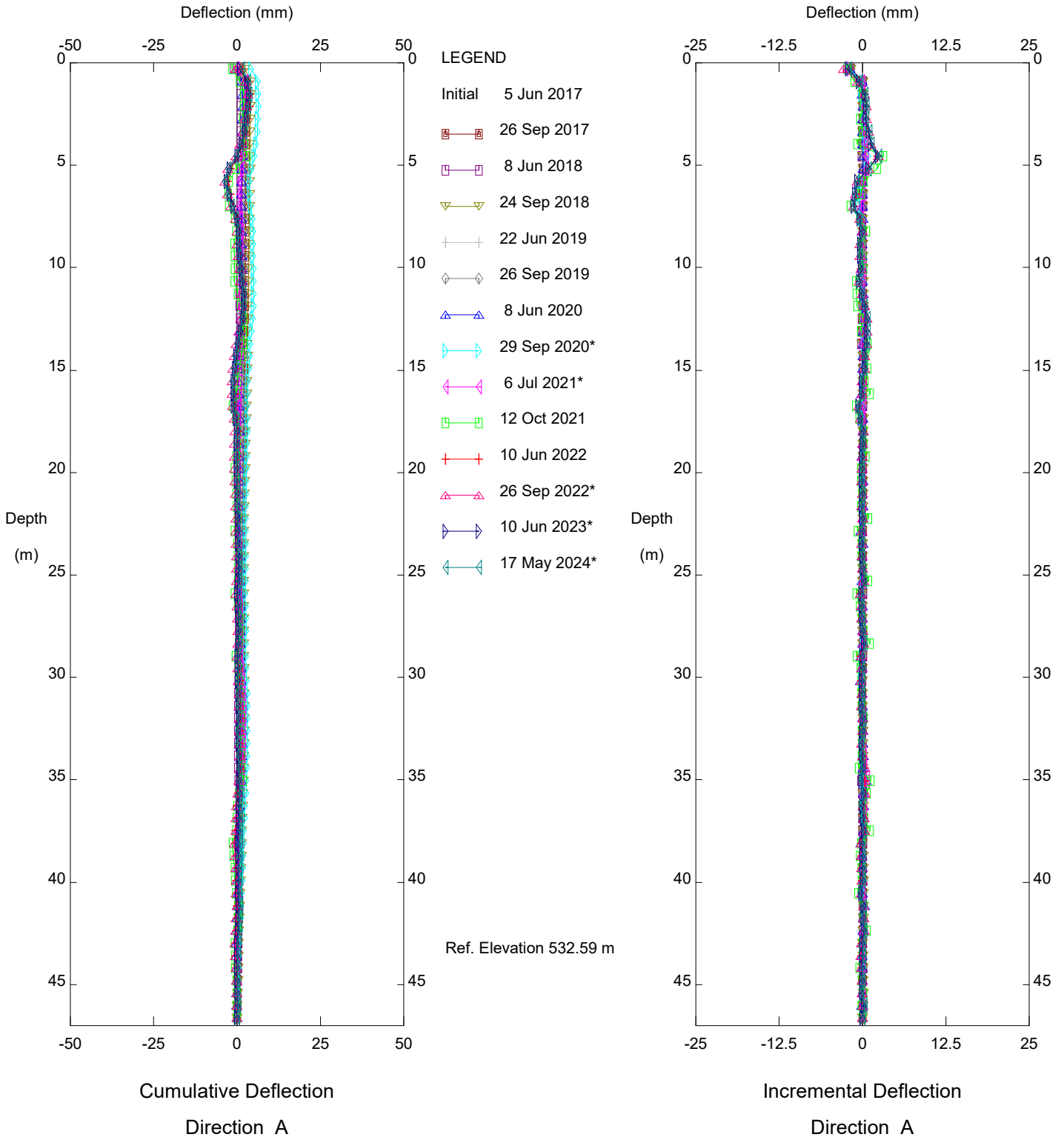


SH003, North of Little Smoky Bridge, Inclinometer SI 96-4

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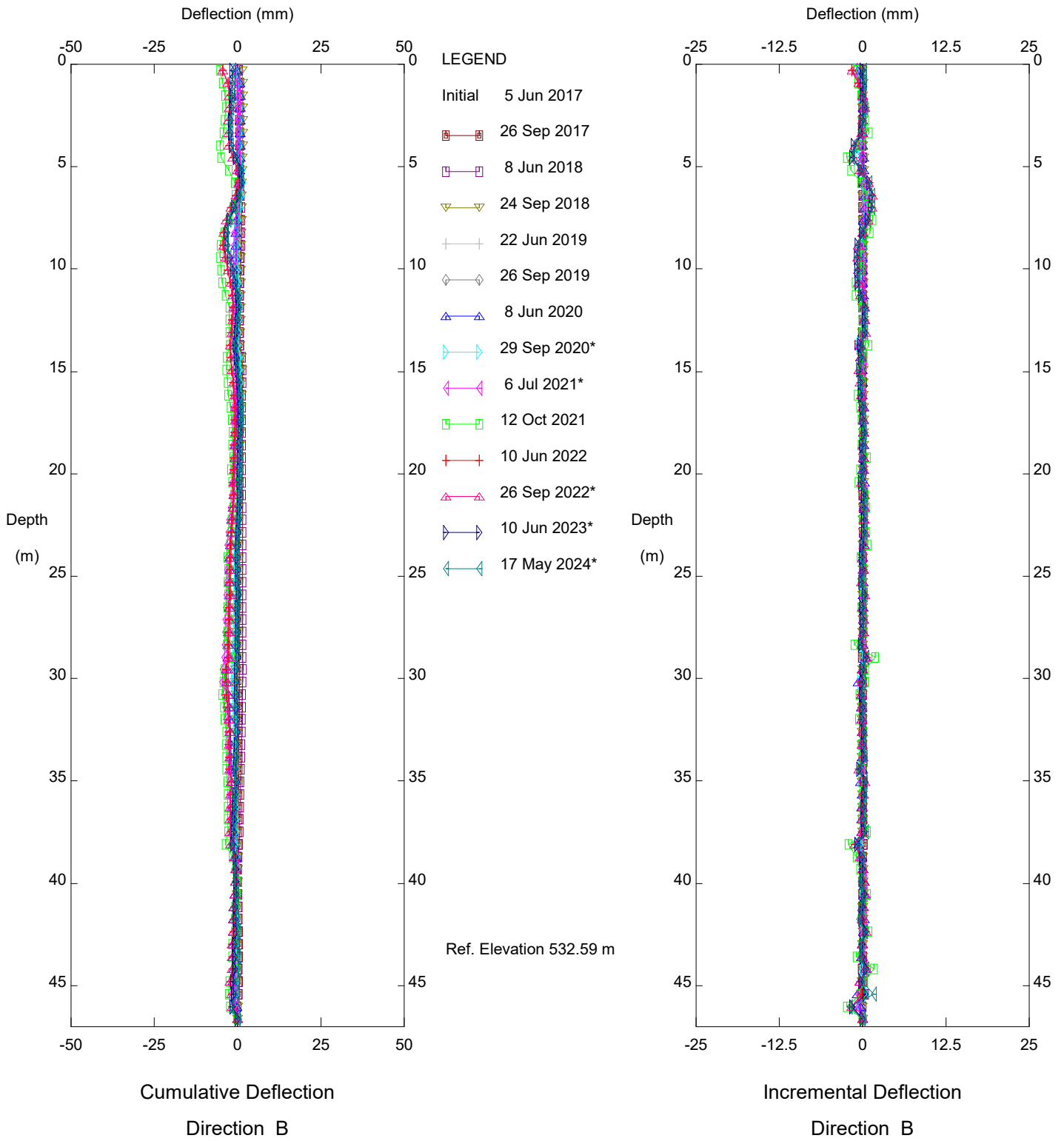


SH003, North of Little Smoky Bridge, Inclinometer SI 96-5

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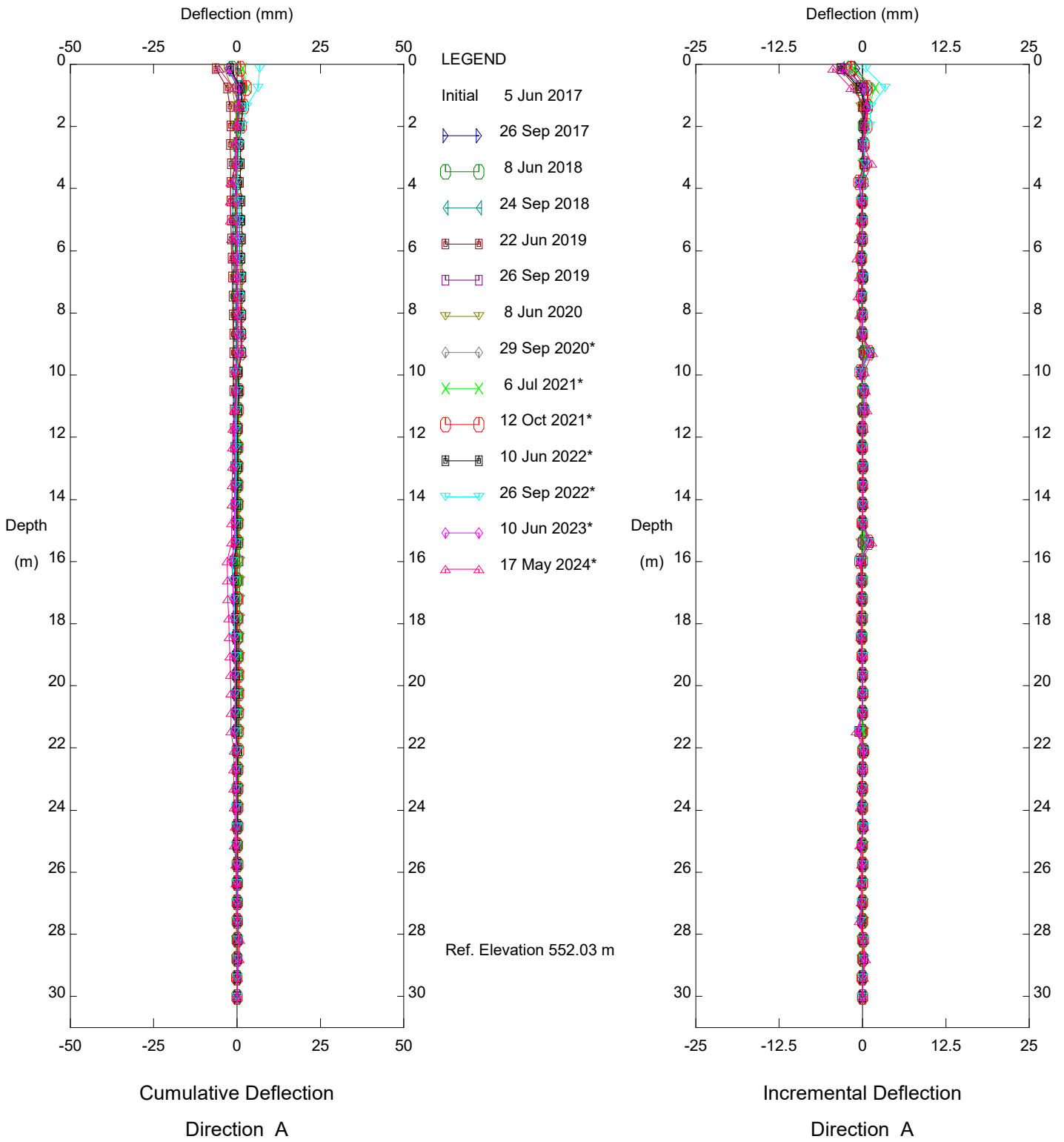


SH003, North of Little Smoky Bridge, Inclinometer SI 96-5

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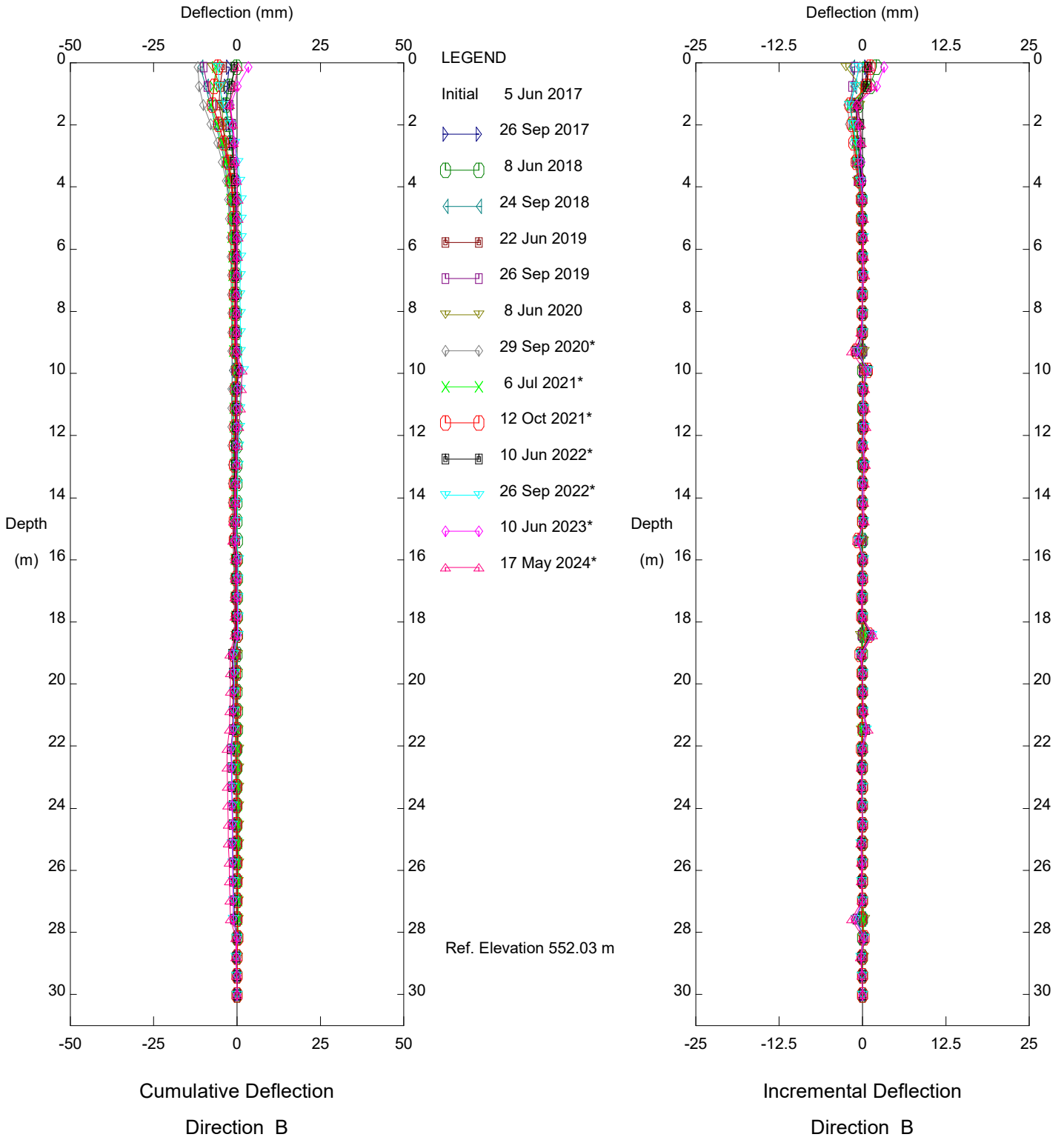


SH003, North of Little Smoky Bridge, Inclinometer SI 96-6

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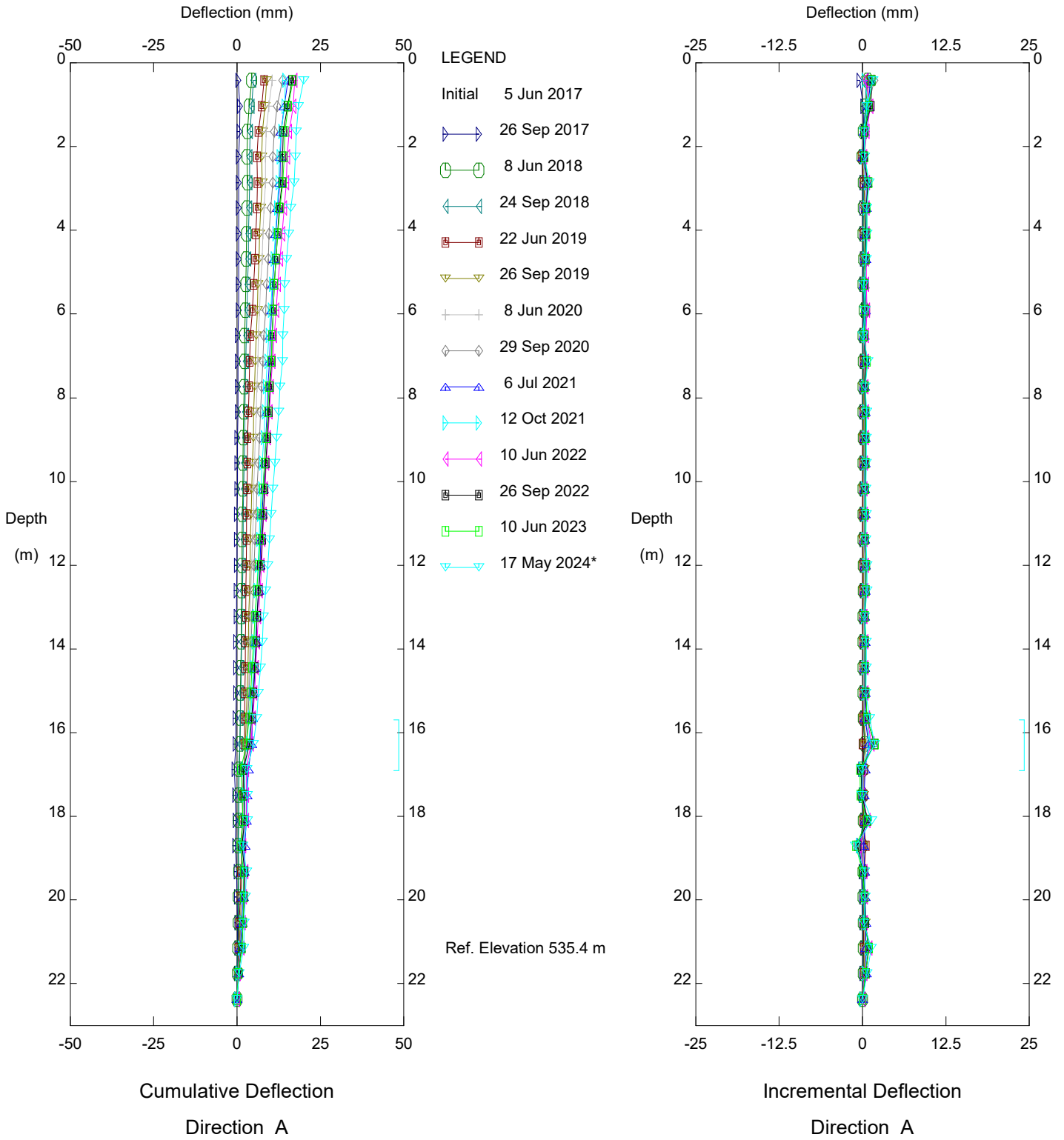


SH003, North of Little Smoky Bridge, Inclinometer SI 96-6

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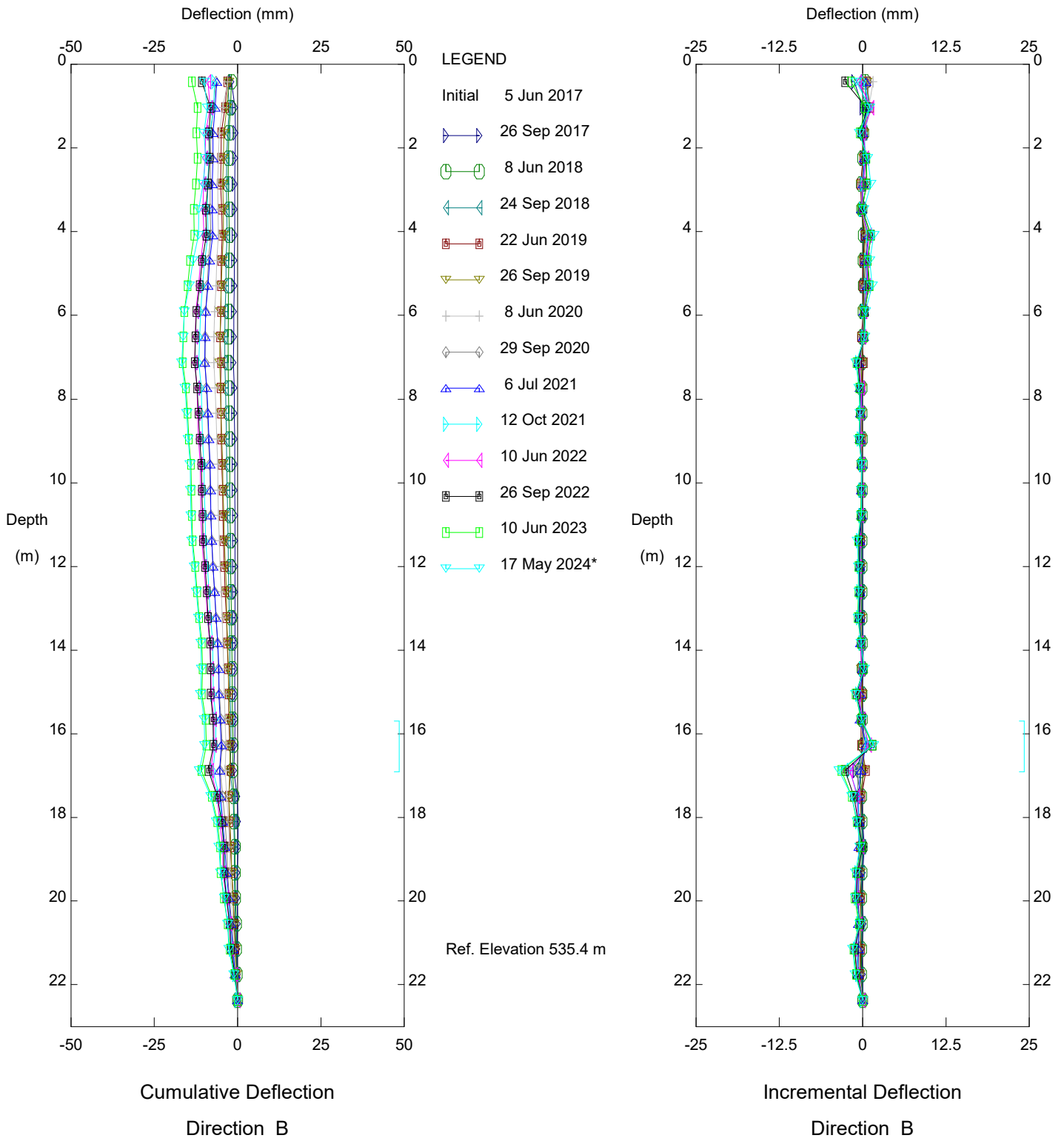


SH003, North of Little Smoky Bridge, Inclinometer SI31a

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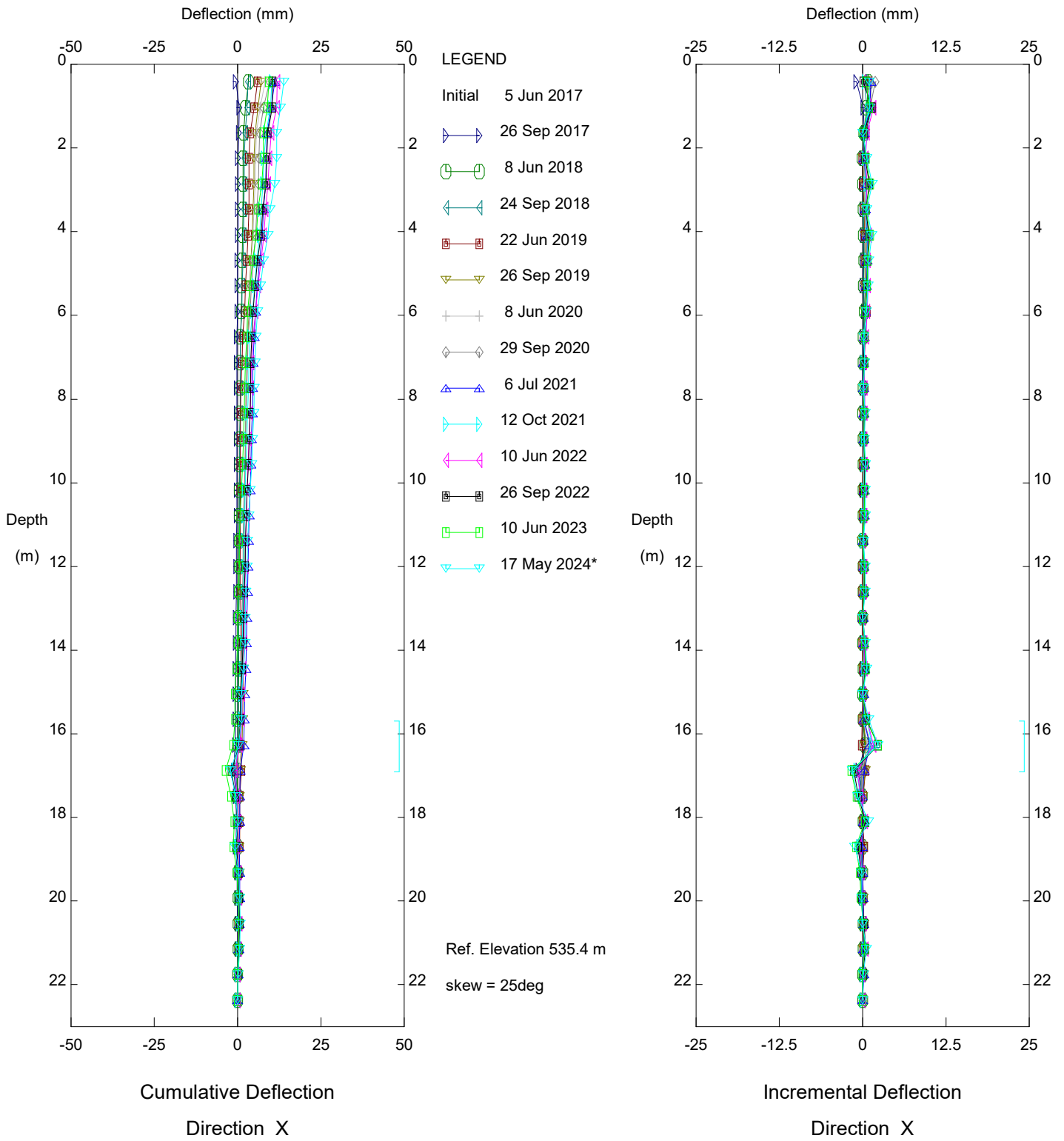


SH003, North of Little Smoky Bridge, Inclinometer SI31a

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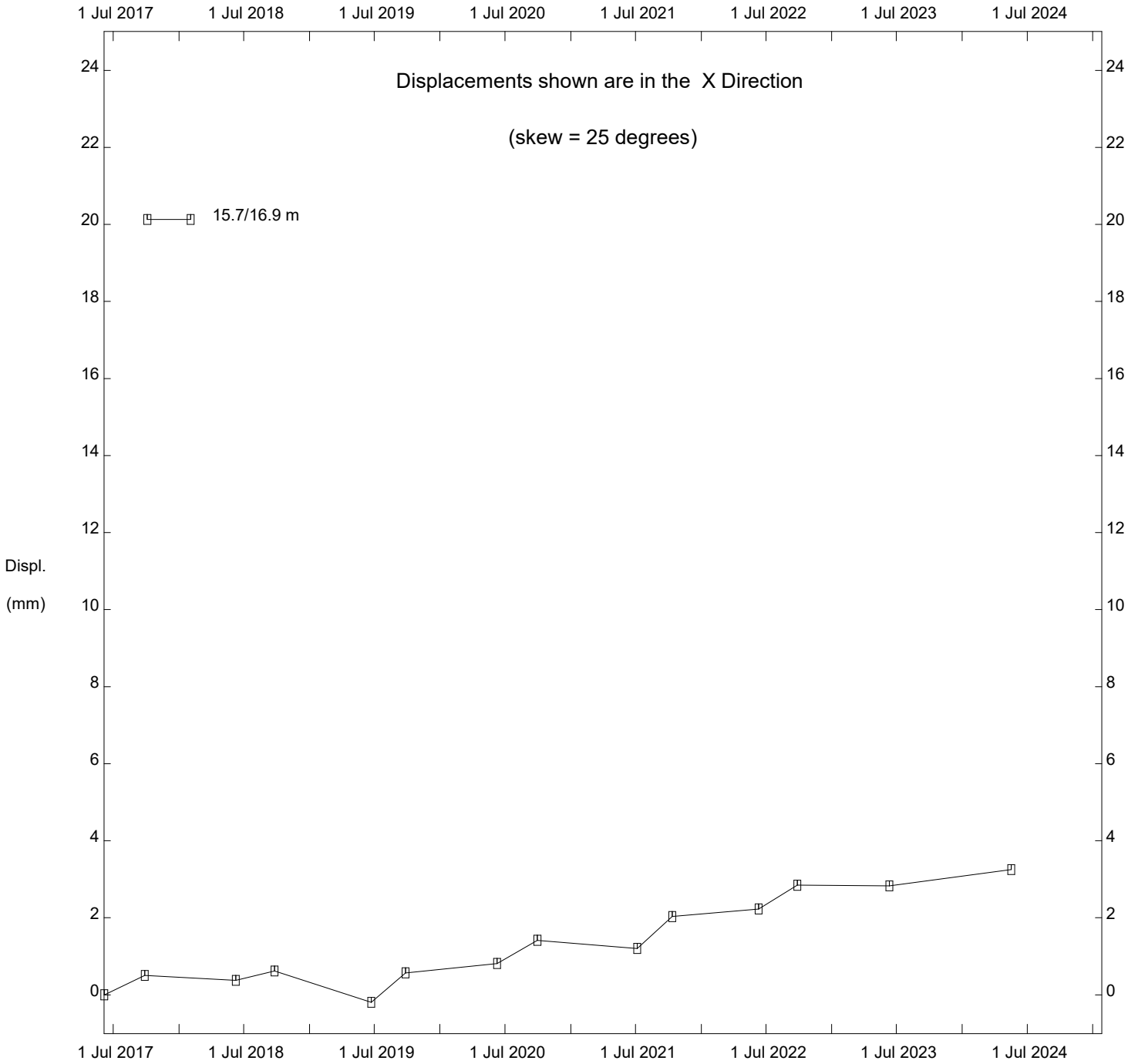


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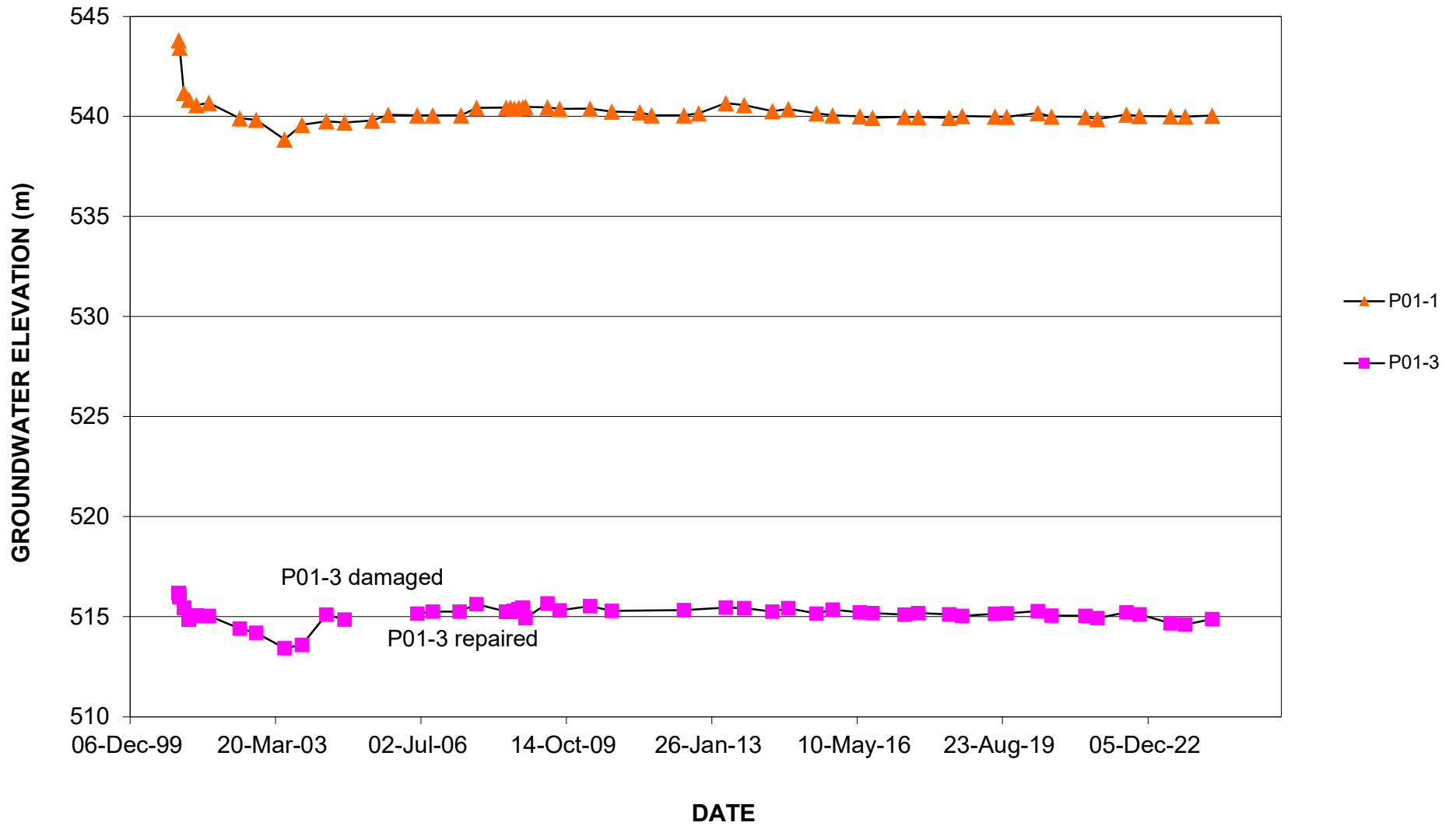
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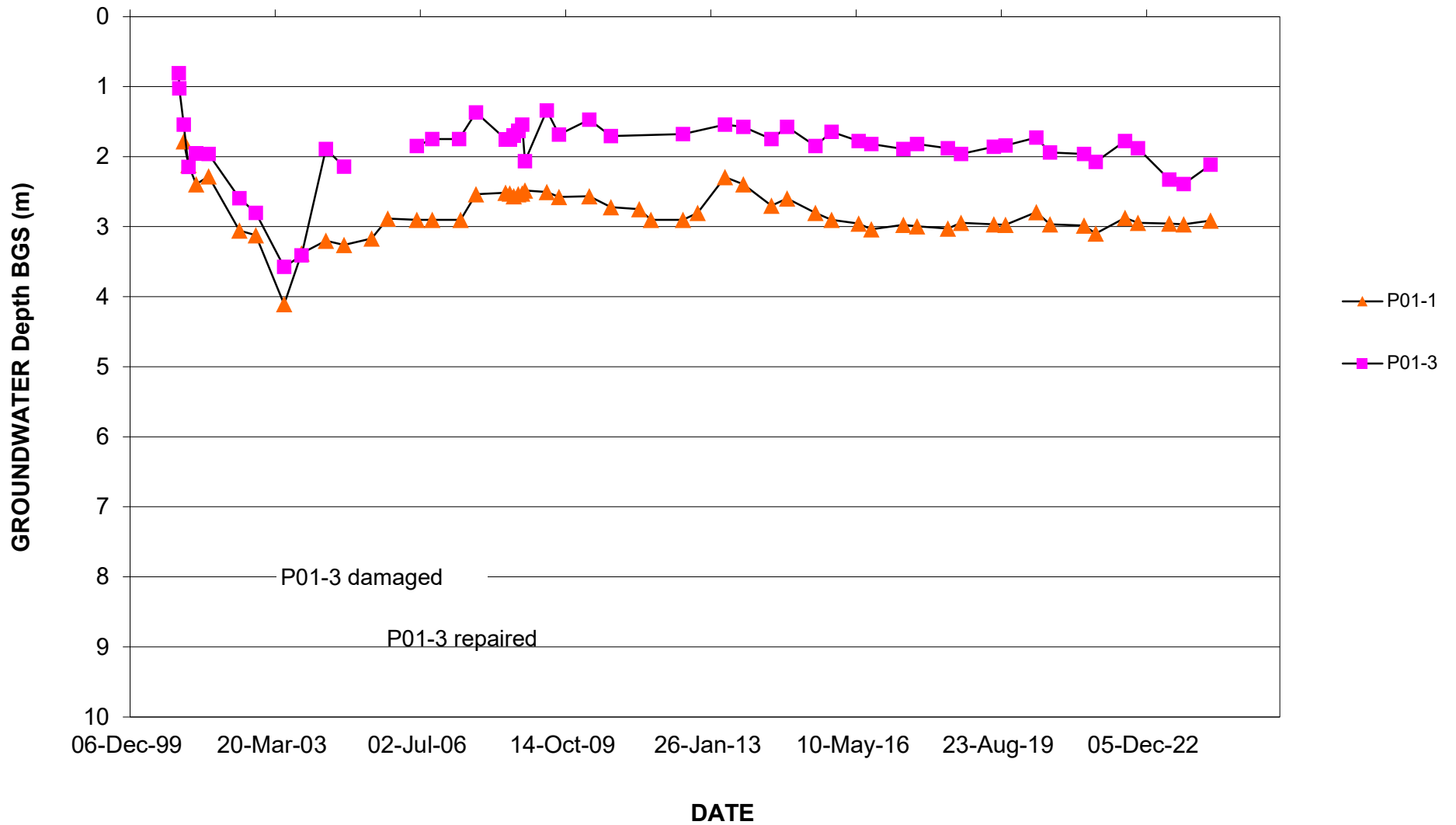
SH003, North of Little Smoky Bridge, Inclinator SI31a

Alberta Transportation

FIGURE SH003-1
HWY 49:12 LITTLE SMOKY RIVER (NORTH OF BRIDGE)
PNEUMATIC PIEZOMETER READINGS



**FIGURE SH003-2
HWY 49:12 LITTLE SMOKY RIVER (NORTH OF BRIDGE)
PNEUMATIC PIEZOMETER READINGS**



**FIGURE SH003-3
HWY 49:12 LITTLE SMOKY RIVER (NORTH OF BRIDGE)
VIBRATING WIRE PIEZOMETER READINGS**

