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

THURBER

Site Number	Location	Name	Hwy	km
PH030	HWY 744:04 C1 57.4	Lookout Slide - Judah Hill	744:04	km 57.4
Legal Description:		**UTM Co-ordinates**		
8-20-83-21 W5		11U E 483185	N 6229488	

Current Monitoring:	25-Sep-2025	**Previous Monitoring**	10-Jun-2025
Instruments Read By:	Mr. Niraj Regmi, G.I.T and Mr. Angelo Castillo, of Thurber		

Instruments Read During This Site Visit			
Slope Inclinometers (SIs): SI10-1 SI10-2	**Pneumatic Piezometers (PN):** PN10-1 PN10-2	**Vibrating Wire Piezometers (VW):** N/A	**Standpipe Piezometers (SP):** N/A
Load Cell (LC): N/A	**Strain Gauges:** N/A	**SAAs:** N/A	**Others:**

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

Zones of New Movement:	None
Interpretation of Monitoring Results:	Both slope inclinometers (SI) SI10-1 and SI10-2 are located adjacent to slide areas near the Sagitawa Lookout at the south end of Judah Hill. Most movement zones are subtle and suggest several zones of movement may be occurring. The primary movement zone at the SI locations appears to be within an upper clay layer bounded above by sand and below by till. Since the spring of 2025 readings SI10-1 has shown no discernible movement over 1.4 m to 6.3 m depth in a clay layer, and a rate of movement of 0.5 mm/yr over 14.2 m to 15.4 m depth in a sand layer. The maximum cumulative displacement along the SI is about 42 mm at 2.3 m depth, over a period of 15 years. Since the spring of 2025 SI10-2 has shown a rate of movement of 0.3 mm/yr over 0.4 m to 4.1 m depth in the uppermost clay layer and a rate of movement of 9.7 mm/yr over 4.1 m to 8.3 m depth in a clay layer bounded above by sand and below by till. This corresponds to increases in rate of 6.6 mm/yr and 4.6 mm/yr over 0.4 m to 4.1 m depth and 4.1 m to 8.3 m respectively. The accelerating movement rate correlates with an observed increase in landslide related pavement damage. Pneumatic piezometers PN10-1 and PN10-2 showed increases in groundwater levels of 0.12 m and 0.03 m since the spring of 2025 readings. The groundwater level in PN10-2 has held within a narrow

	range since the spring of 2010 at elevation 520.79 m with a standard deviation of 0.046 m.
Future Work:	The instruments should be read again during the spring of 2026 program.
Instrumentation Repairs:	No instrument repairs are required at this time.
Additional Comments:	

Attachments:	▪ Table PH030-1: Fall 2025– Hwy 744:04 Judah Hill (Lookout Slide) Slope Inclinometer Instrumentation Reading Summary ▪ Table PH030-2: Fall 2025– Hwy 744:04 Judah Hill (Lookout Slide) Pneumatic Piezometer Instrumentation Reading Summary ▪ Statement for Use and Interpretation of Report ▪ APPENDIX A – PH030-1 FALL 2025 □ Field Inspector's report □ Site Plan Showing Approximate Instrument Locations (Drawing No.32121-PH030) □ SI Reading Plots □ Figure PH030-1 (Piezometric Elevations) □ Figure PH030-2 (Piezometric Depths)

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

November 27, 2025

PROFESSIONAL ENGINEER ALBERTA
DONALD PROUDFOOT
ID 51674
November 27, 2025

PERMIT TO PRACTICE
THURBER ENGINEERING LTD.
RM SIGNATURE: Don Proudfoot
RM APEGA ID #: 51674
DATE: November 27, 2025
PERMIT NUMBER: P005186
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Yasir Khan, E.I.T.
Geotechnical Engineer-In-Training

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Table PH030-1: Fall 2025 – Hwy 744:04 Judah Hill (Lookout Slide) Slope Inclinometer Instrumentation Reading Summary

Date Monitored: September 25, 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)	RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI10-1	March 26, 2010	14.1 mm over 1.4 m to 6.3 m depth in 271° direction	5.8 mm/yr in September 2018	Operational	June 10, 2025	No Discernible Movement	N/A	-2.6
		2.1 mm over 14.2 m to 15.4 m depth in 251° direction	0.9 mm/yr in September 2013			0.2	0.5	0.3
SI10-2	March 26, 2010	12.3 mm over 0.4 m to 4.1 m depth in 291° direction	11.1 mm/yr in June 2017	Operational	June 10, 2025	0.1	0.3	6.6
		41.2 mm over 4.1 m to 8.3 m depth in 291° direction	11.8 mm/yr In September 2024			2.9	9.7	4.6
SI10-3	*March 26, 2010*	*147.9 mm over 2.5 m to 5.6 m depth in 241° direction*	*264 mm/yr in June 2015*	*Sheared at 2.8 mBGS in August 2015*	*August 13, 2015*	*N/A*	*N/A*	*N/A*
		13.7 mm over 5.6 m to 8.0 m depth in 241° direction	*59.9 mm/yr in July 2015*			*N/A*	*N/A*	*N/A*
		5.8 mm over 8.0 m to 10.5 m depth in 241° direction	*32.2 mm/yr in July 2015*			*N/A*	*N/A*	*N/A*
		167.4 mm over 2.5 m to 10.5 m depth in 241° direction	*250.1 mm/yr in August 2015*			*N/A*	*N/A*	*N/A*

Drawing 32121-PH030 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.

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Table PH030-2: Fall 2025 – Hwy 744:04 Judah Hill (Lookout Slide) Pneumatic Piezometer Instrumentation Reading Summary

Date Monitored: September 25, 2025

INSTRUMENT #	DATE INITIALIZED	TIP ELEV. (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED WATER ELEVATION (m)	MEASURED PORE PRESSURE (kPa)	CURRENT WATER ELEVATION (m)	PREVIOUS WATER ELEVATION (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
PN10-1 (33093)	March 26, 2010	523.72	N/A	Operational	525.62 on June 3, 2016	2.6	523.99	523.87	0.12
PN10-2 (33095)	March 26, 2010	520.71	N/A	Operational	520.91 on October 9, 2023	1.1	250.82	520.79	0.03
PN10-3 (33096)	March 26, 2010	516.82	N/A	Destroyed	518.37 on July 4, 2015	N/A	N/A	N/A	N/A

Drawing 32121-PH030 in Appendix A provides a sketch of the approximate locations of the monitoring instrumentation for this site.

Notes:
PN - pneumatic piezometer.
BGS - below ground surface.

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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 TOTHE 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.

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

FALL 2025

APPENDIX A
DATA PRESENTATION

SITE PH030: HWY 744:04, JUDAH HILL (LOOKOUT SLIDE)

ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH030)
FALL 2025

Location:	Lookout Slide - Judah Hill (HWY 744:04 C1 57.430)	**Readout:**	RST PN C108 Unit 8
File Number:	32121	**Casing:**	2.75
Probe:	RST SET 5R and 8R	**Temp:**	
Cable:	RST SET 5R and 8R	**Read by:**	

SLOPE INCLINOMETER (SI) READINGS

SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of casing (ft)	Azimuth of A+ Groove	Current Bottom Depth Readings				Probe/ Reel #	Size (")	Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-			
SI10-1	483185	6229488	25-Sep-25	0.75	100 to 4	260	-500	514	-299	310	8R/8R	2.75	
SI10-2	483176.58	6229515.56	25-Sep-25	1.1	102 to 4	260	-236	243	-1359	1342	5R/5R	2.75	

PNEUMATIC PIEZOMETER READINGS

PN#	GPS Location (UTM 11)		Date	Reading (kPa)	Identification Number
	Easting (m)	Northing (m)			
10-1	483185	6229488	25-Sep-25	2.6	33093
10-2	483176.58	6229515.56	25-Sep-25	1.1	33095

INSPECTOR REPORT

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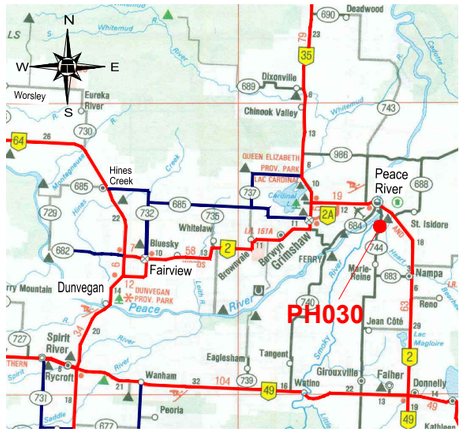
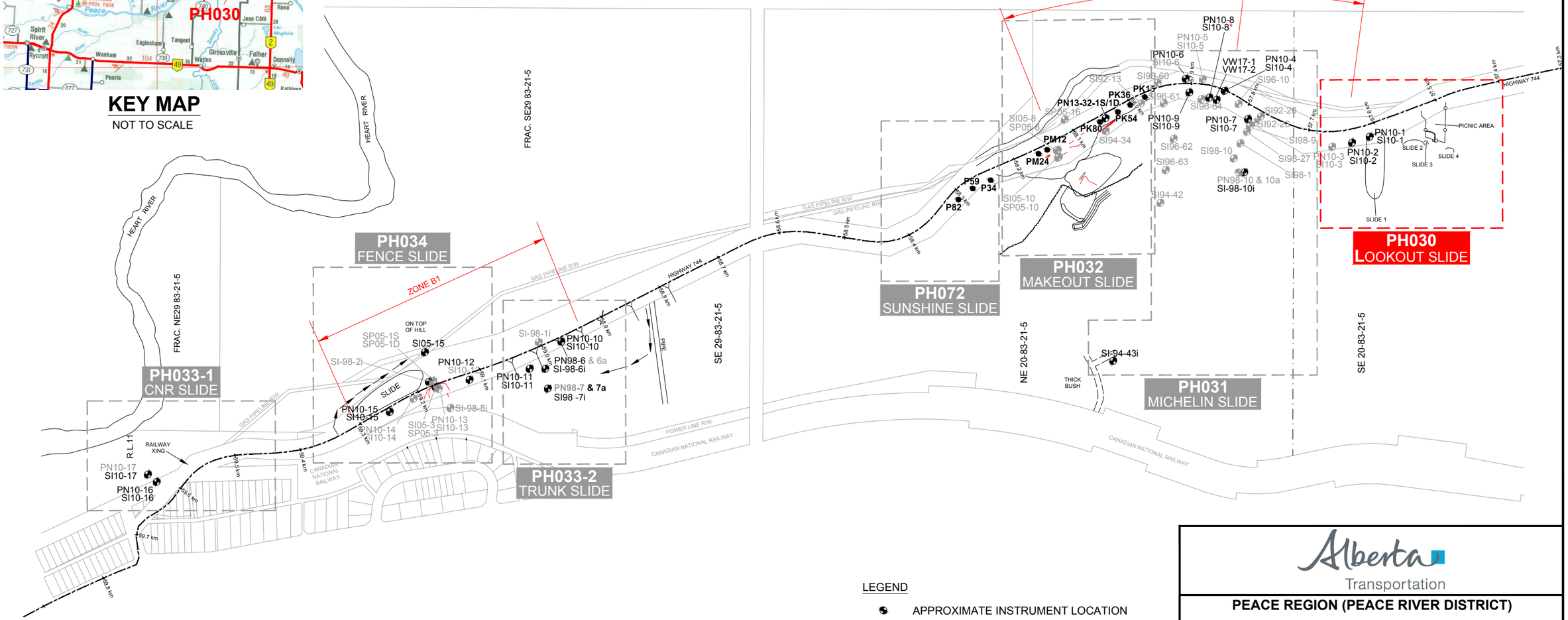


KEY MAP

NOT TO SCALE



LEGEND

- APPROXIMATE INSTRUMENT LOCATION
- INSTRUMENT NOT IN USE
- PN — PNEUMATIC PIEZOMETER
- SP — STANDPIPE PIEZOMETER
- SI — SLOPE INCLINOMETER
- VW — VIBRATING WIRE PIEZOMETER
- APPROXIMATE PILE LOCATION

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PEACE REGION (PEACE RIVER DISTRICT)

PH030: HWY 744:04 - JUDAH HILL (LOOKOUT SLIDE) INSTRUMENT LOCATIONS

DWG No. 32121-PH030-1

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	DWP
SCALE	APPROX. 1:6000
DATE	JULY 2025
FILE No.	32121

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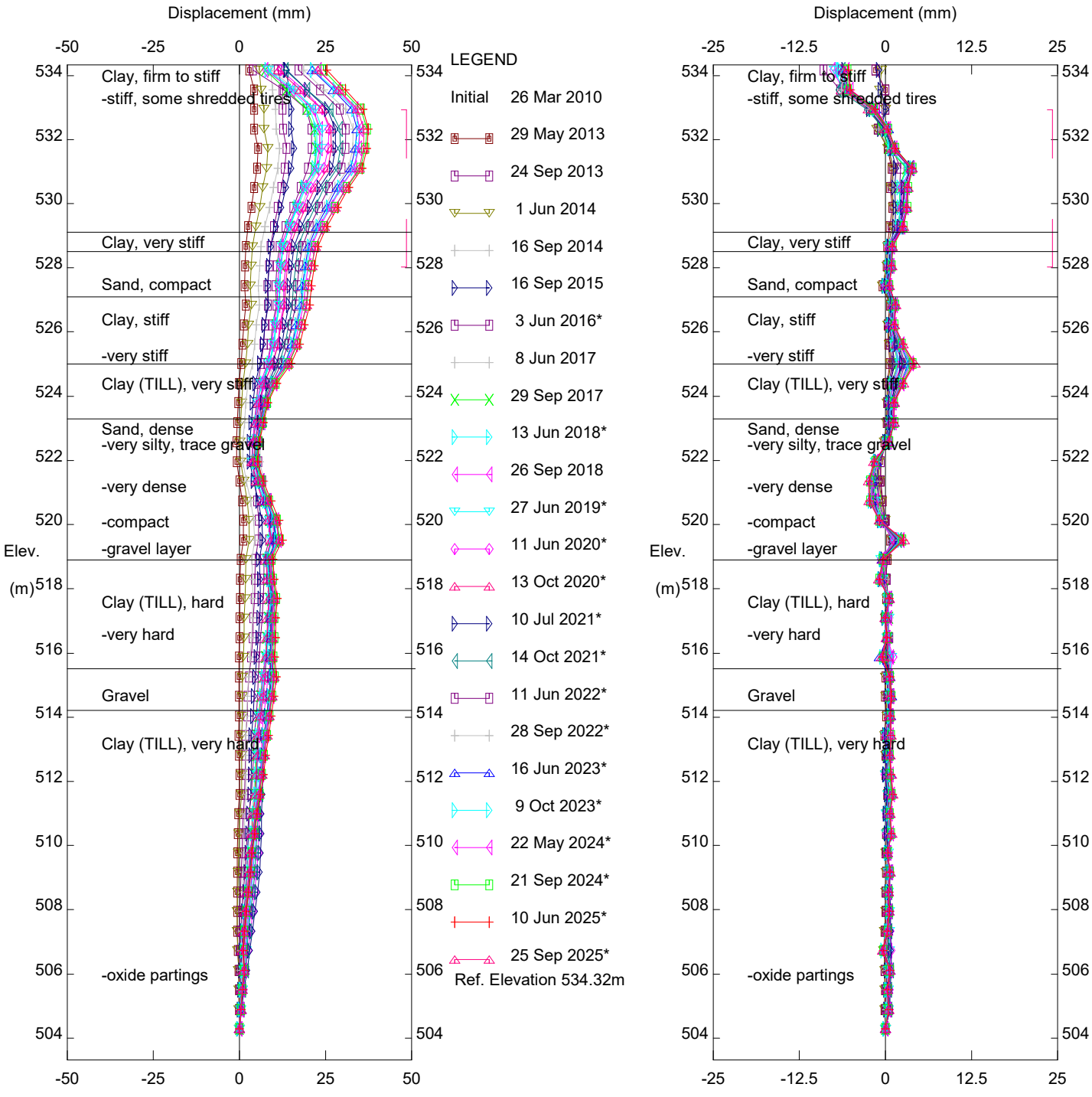

Cumulative Displacement

Direction A

Incremental Displacement

Direction A

Judah Hill PH030, Inclinometer SI10-1

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

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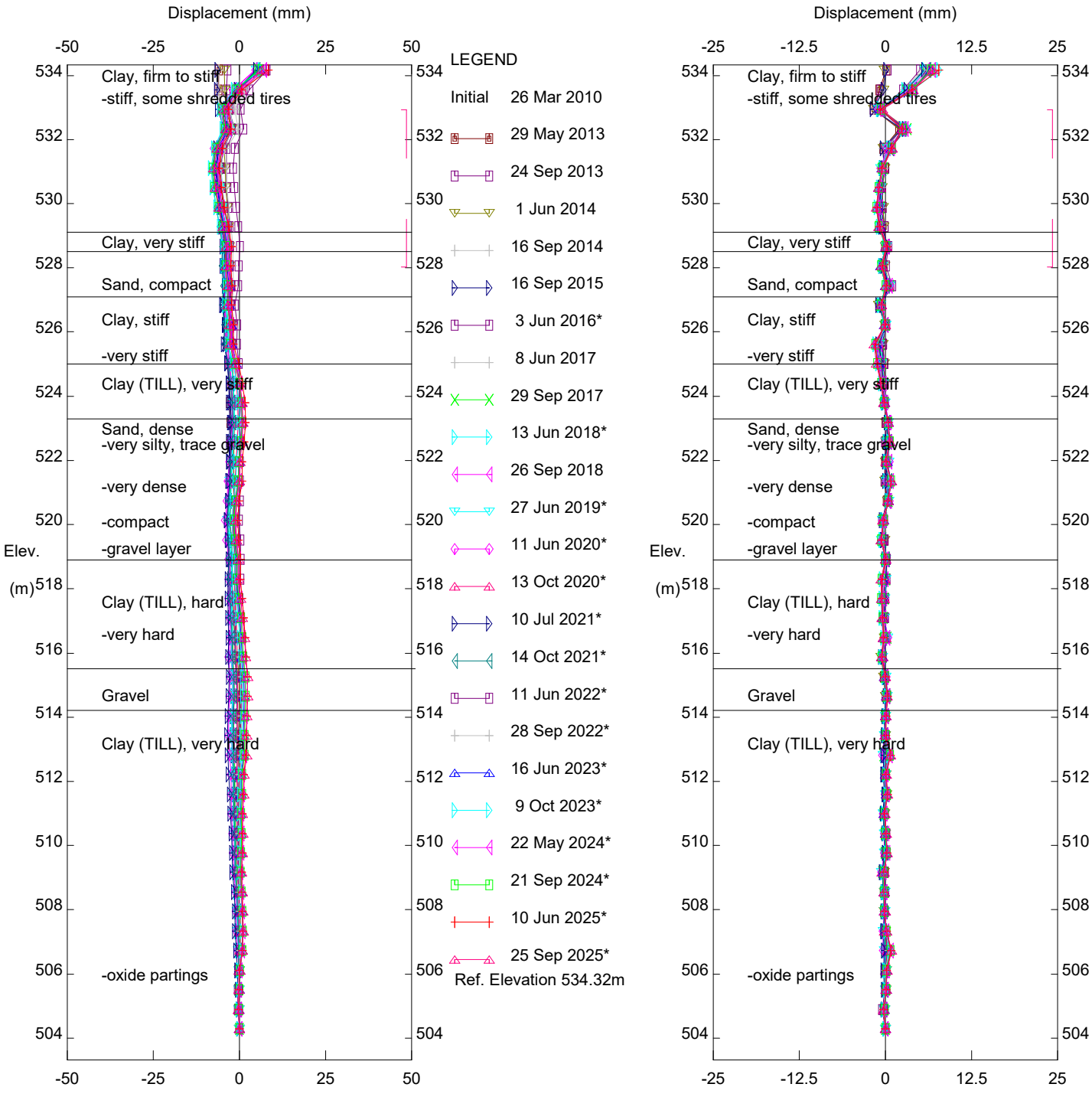

Cumulative Displacement

Direction B

Incremental Displacement

Direction B

Judah Hill PH030, Inclinometer SI10-1

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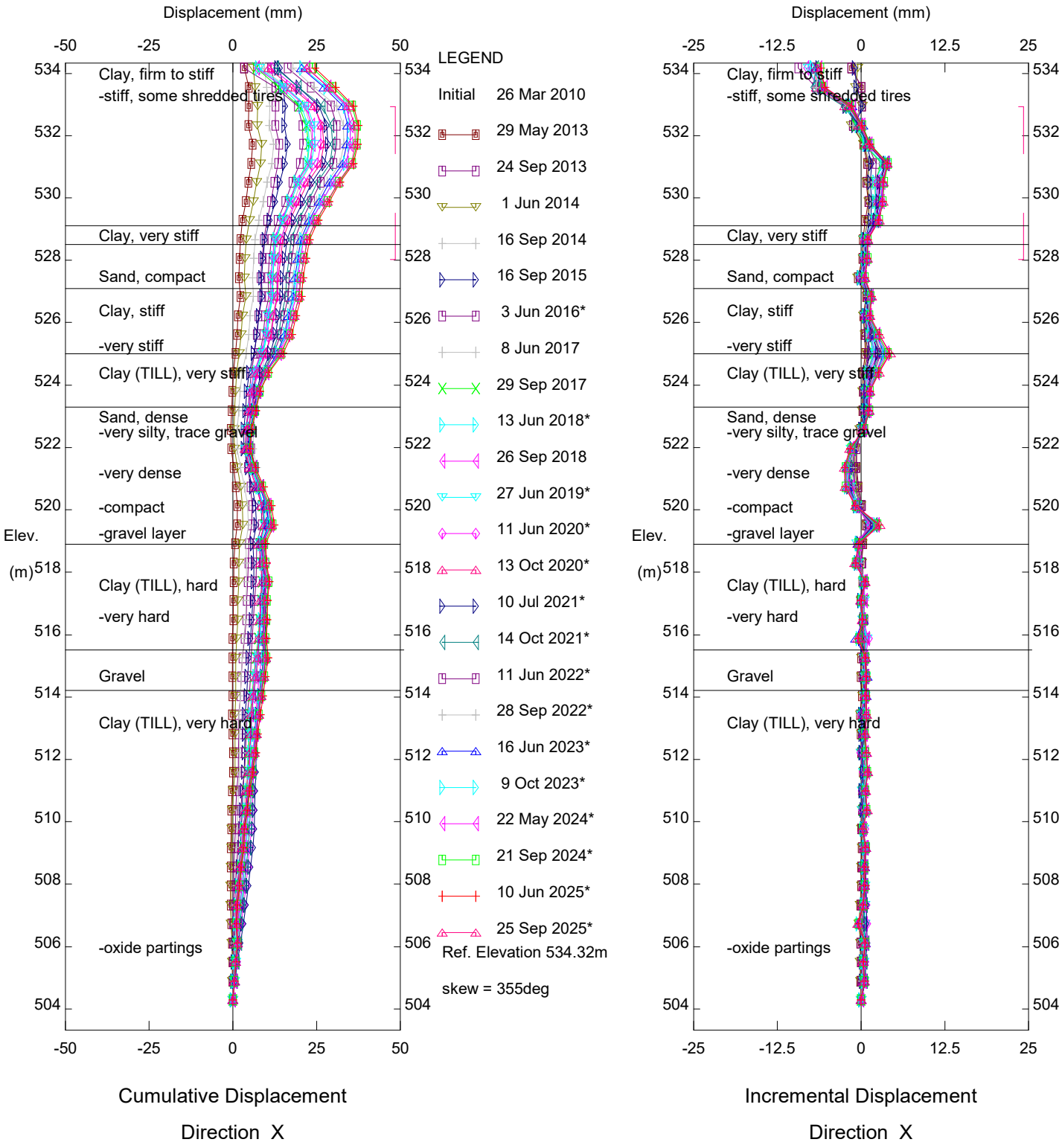

Cumulative Displacement

Direction X

Incremental Displacement

Direction X

Judah Hill PH030, Inclinometer SI10-1

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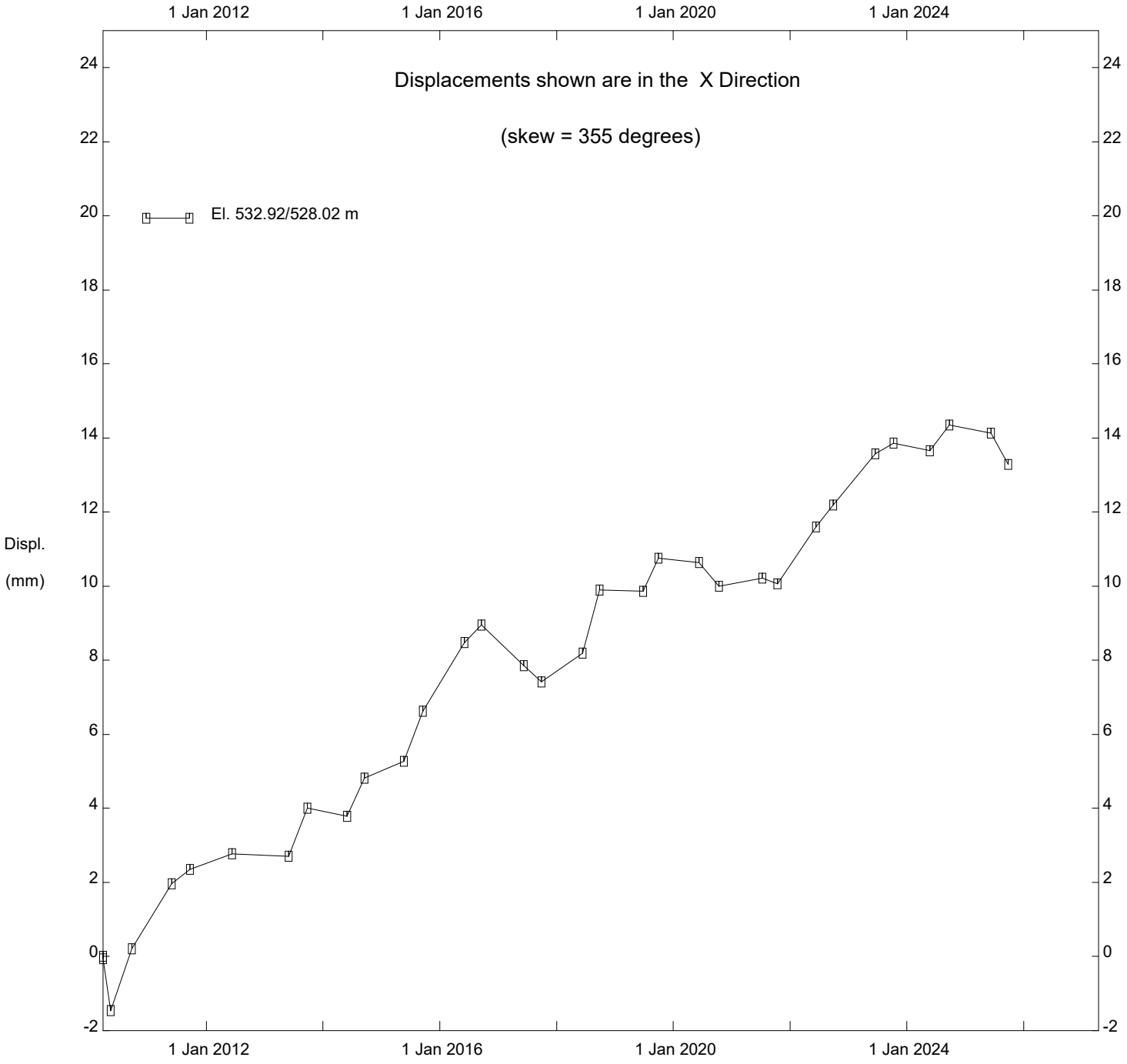

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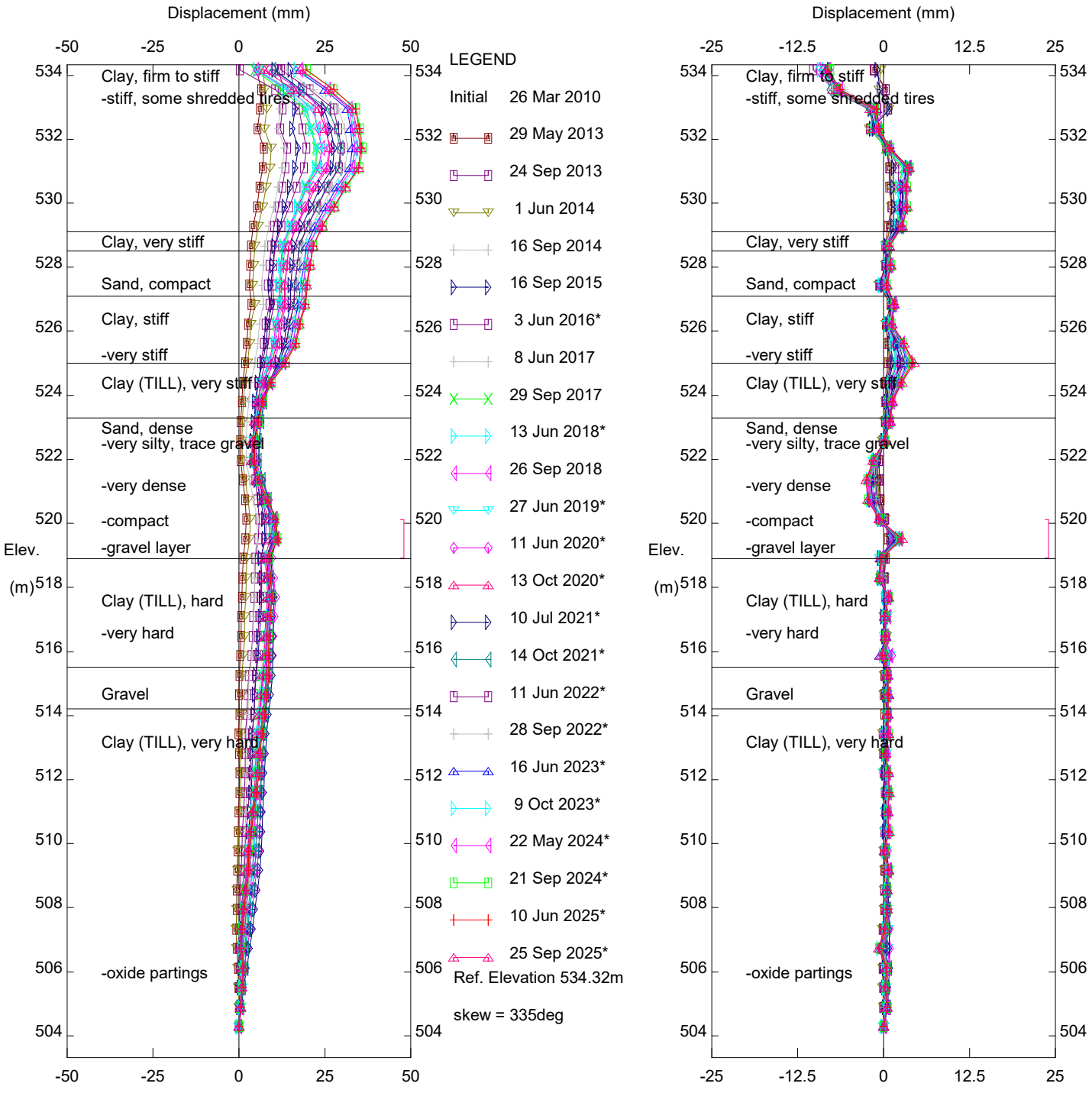

Cumulative Displacement

Direction X

Incremental Displacement

Direction X

Judah Hill PH030, Inclinometer SI10-1

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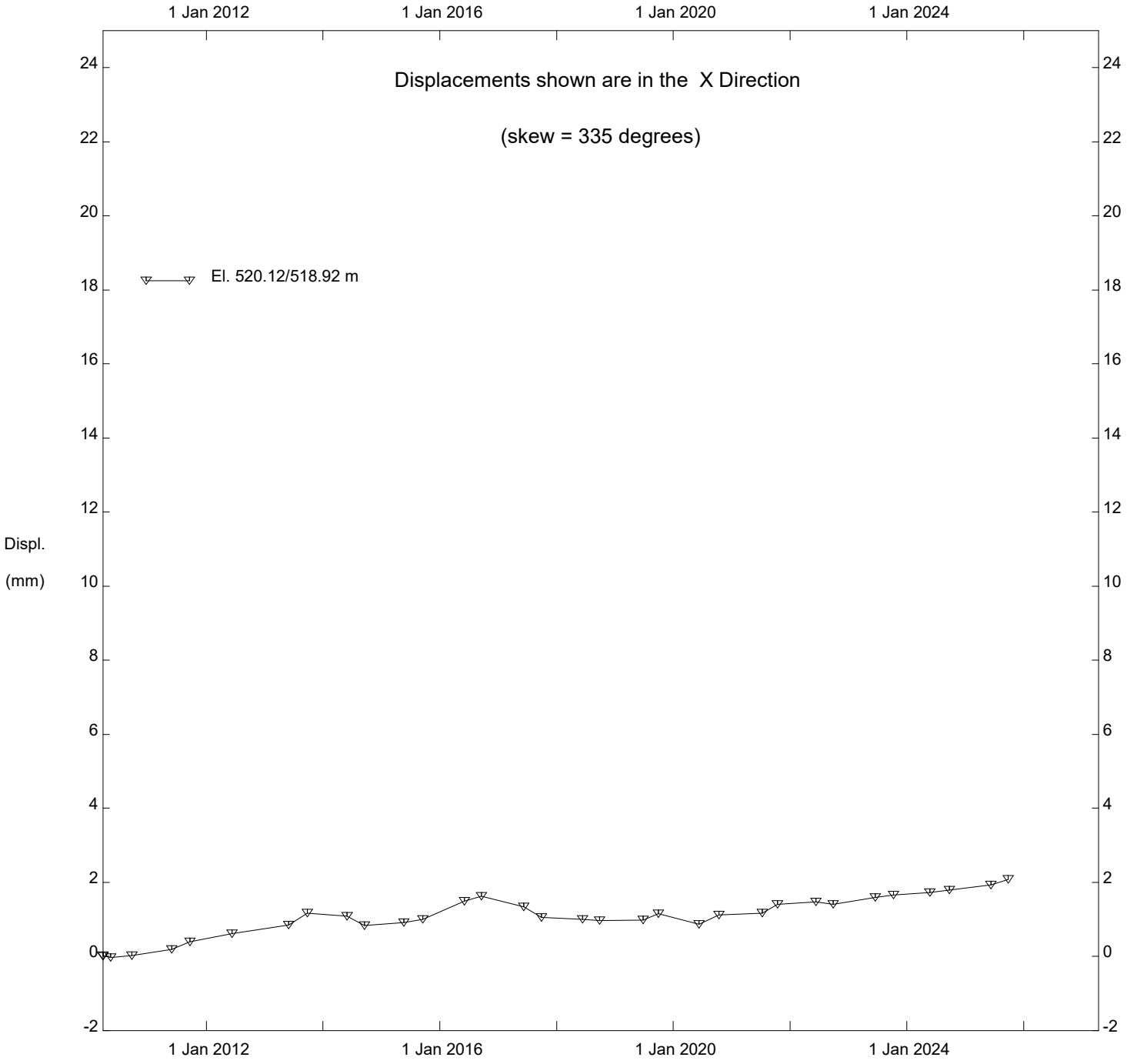

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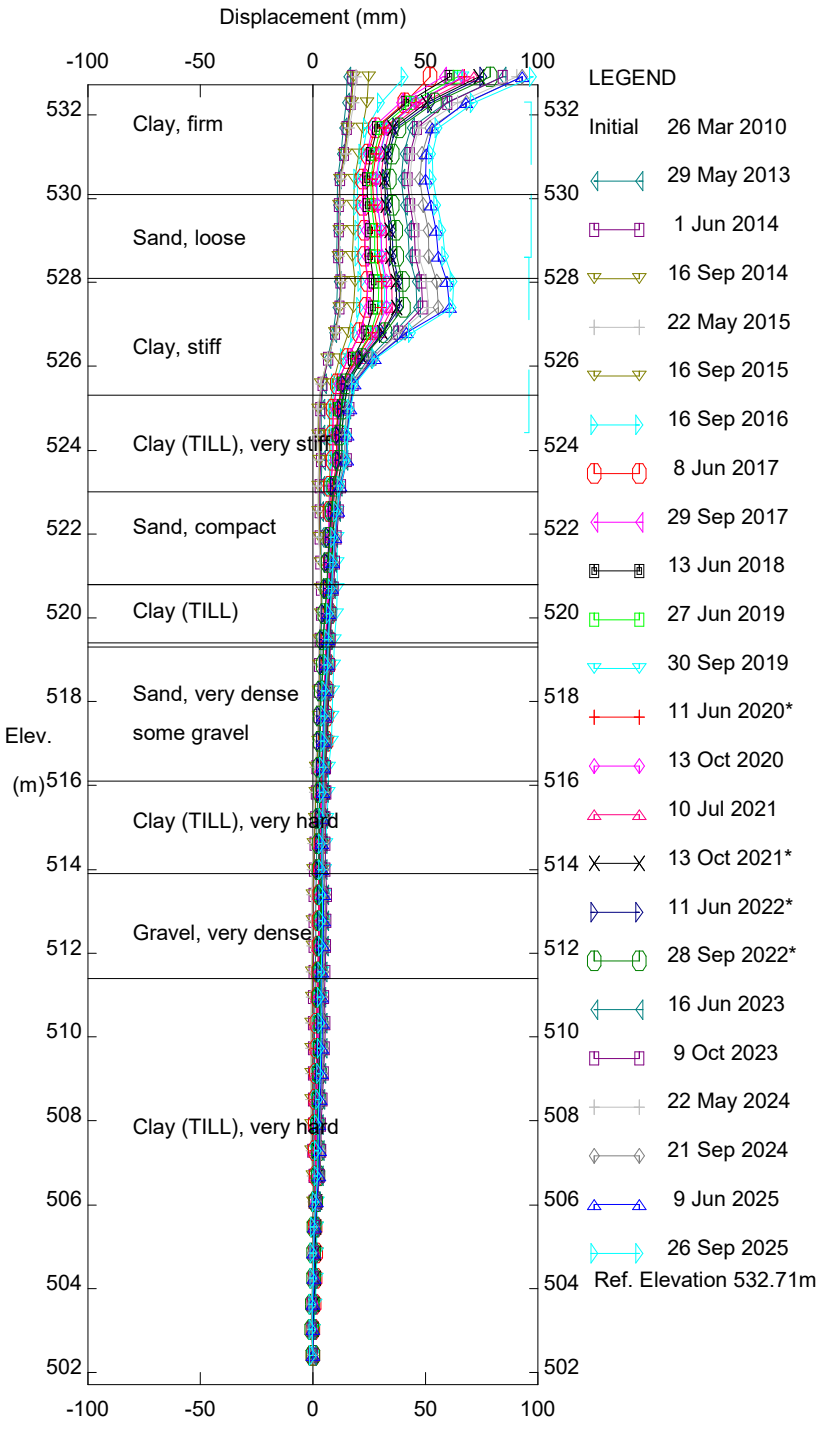
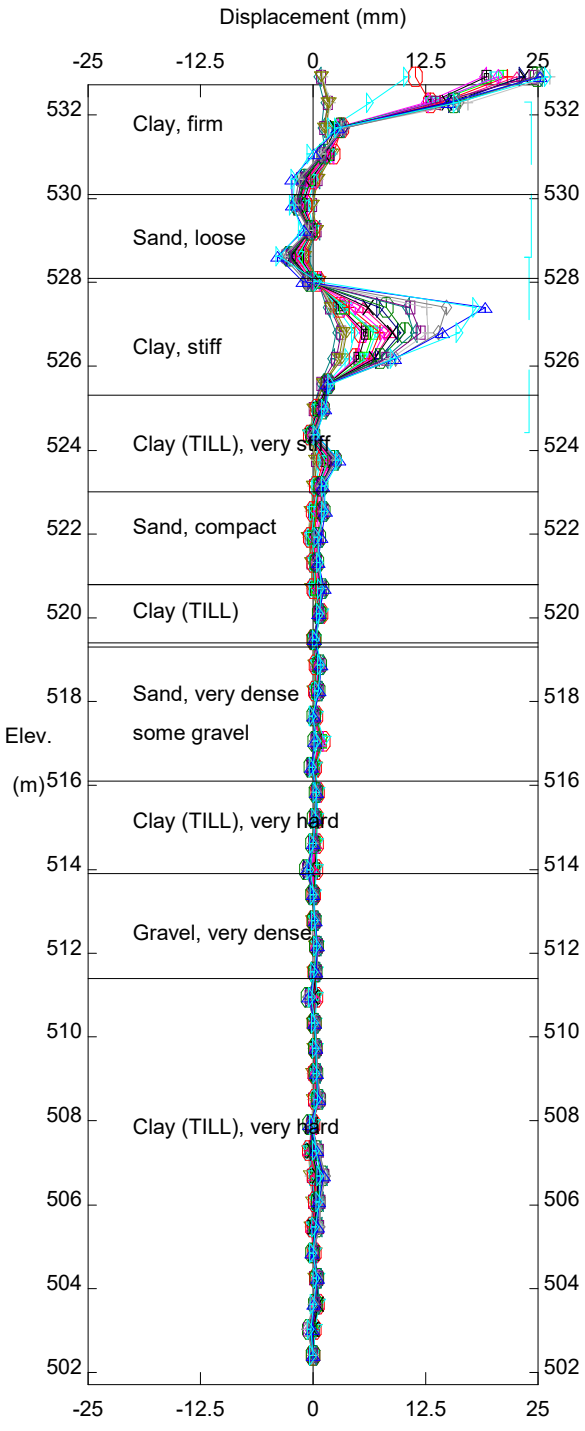


Cumulative Displacement

Direction A



Incremental Displacement

Direction A

Judah Hill PH030, Inclinometer SI10-2

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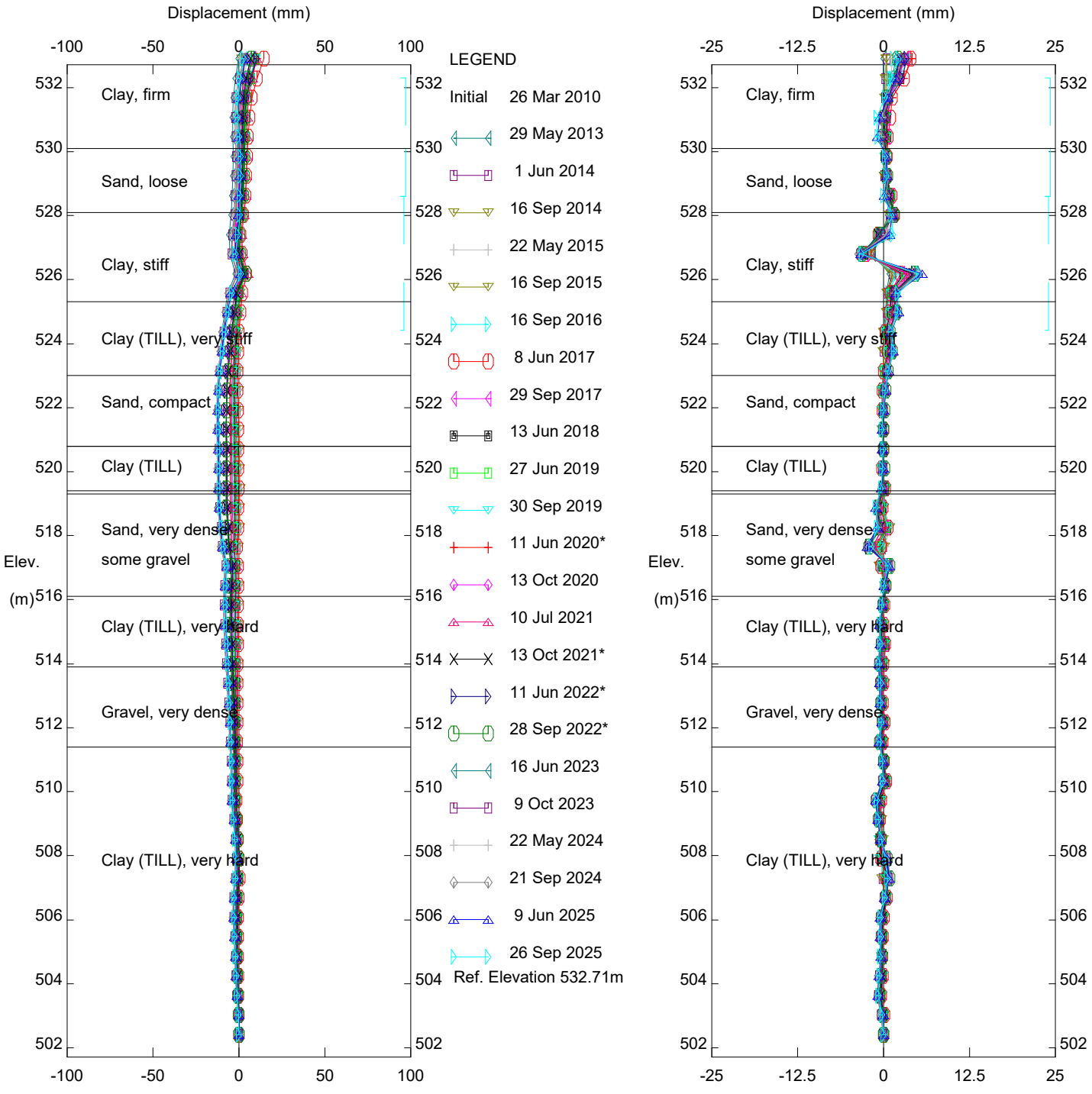

Cumulative Displacement

Direction B

Incremental Displacement

Direction B

Judah Hill PH030, Inclinometer SI10-2

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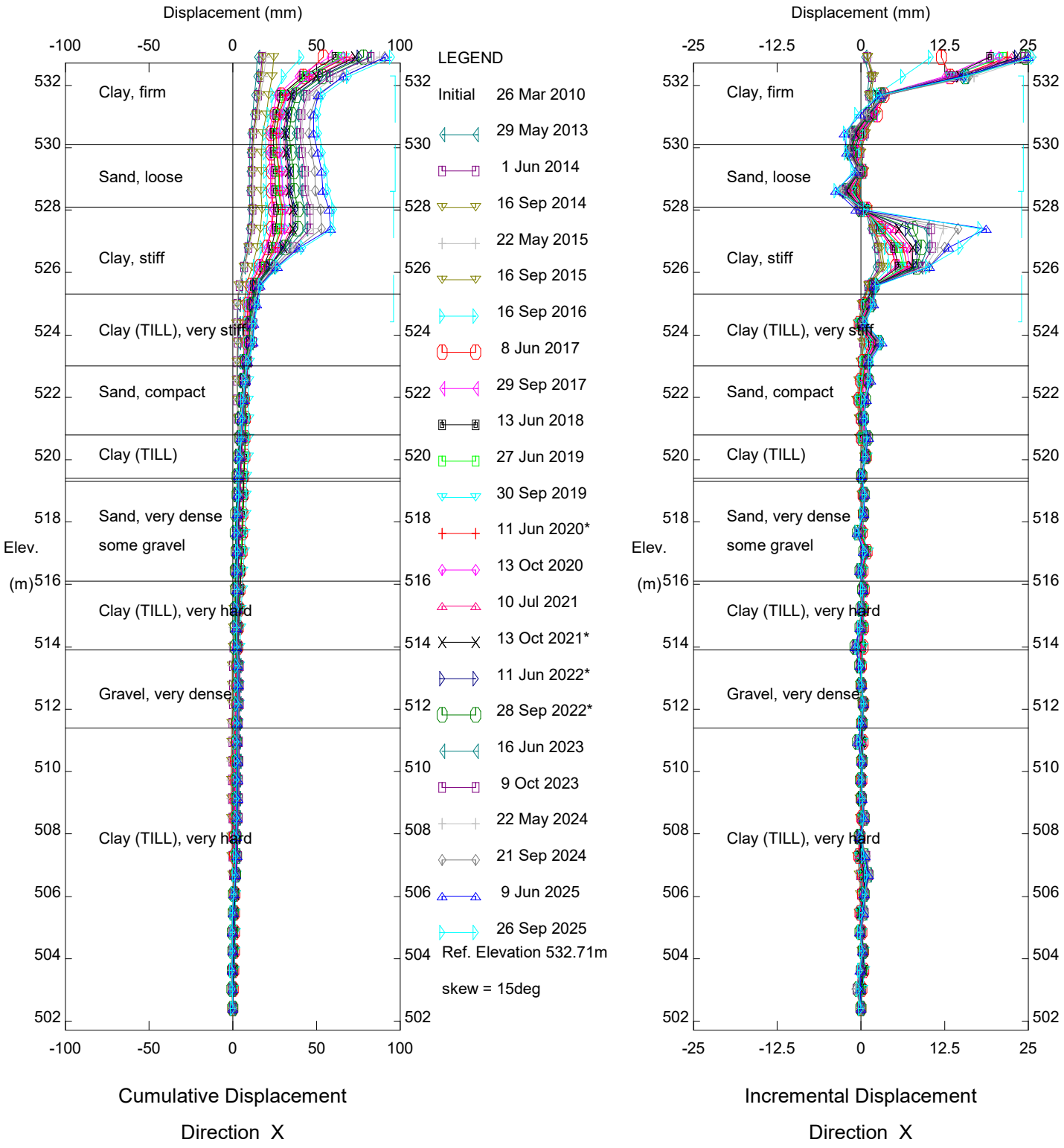

Cumulative Displacement

Direction X

Incremental Displacement

Direction X

Judah Hill PH030, Inclinometer SI10-2

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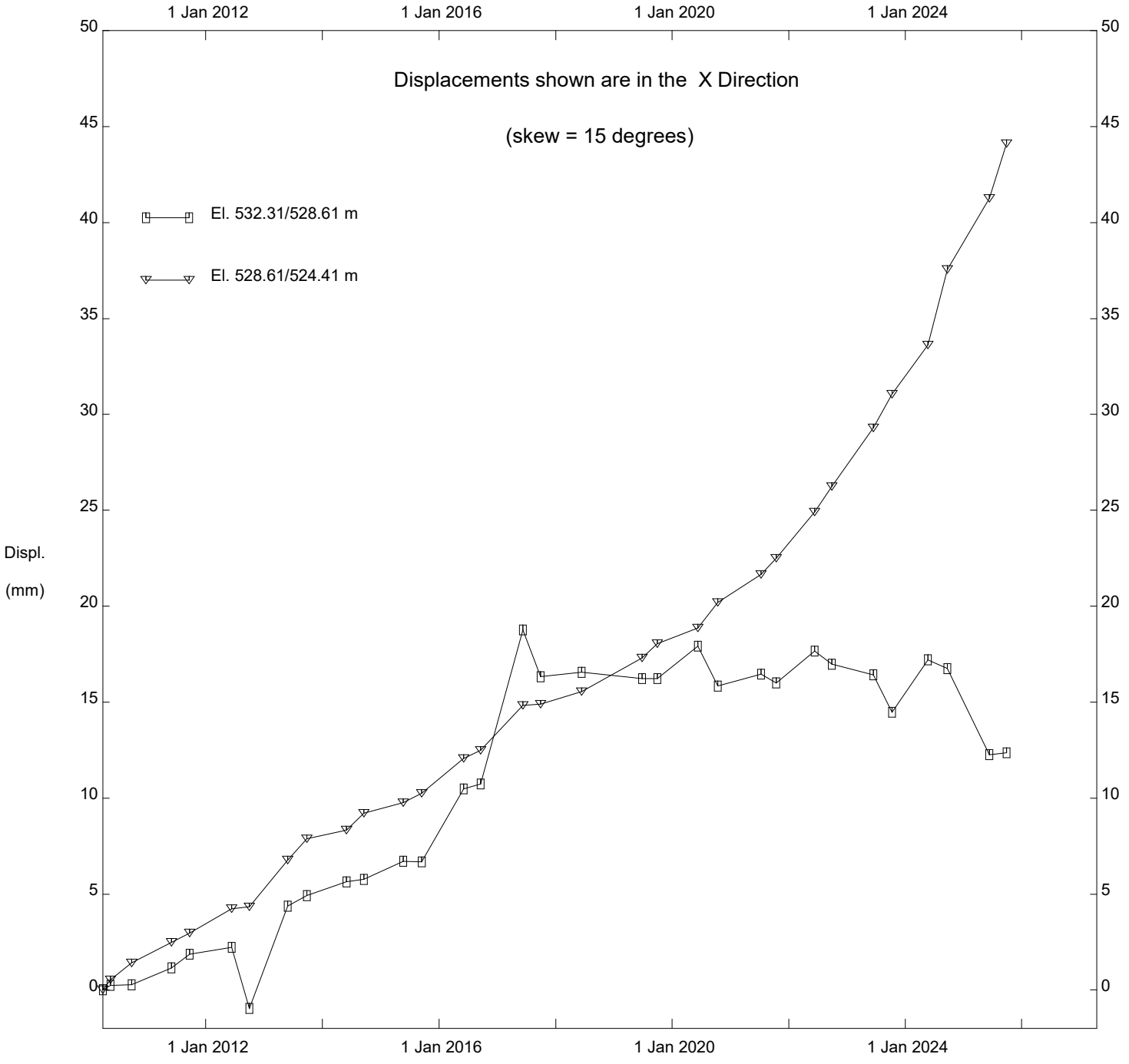

Judah Hill PH030, Inclinometer SI10-2

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FIGURE PH030-1
PIEZOMETRIC ELEVATIONS FOR HWY 744:04: JUDAH HILL (LOOKOUT SLIDES)

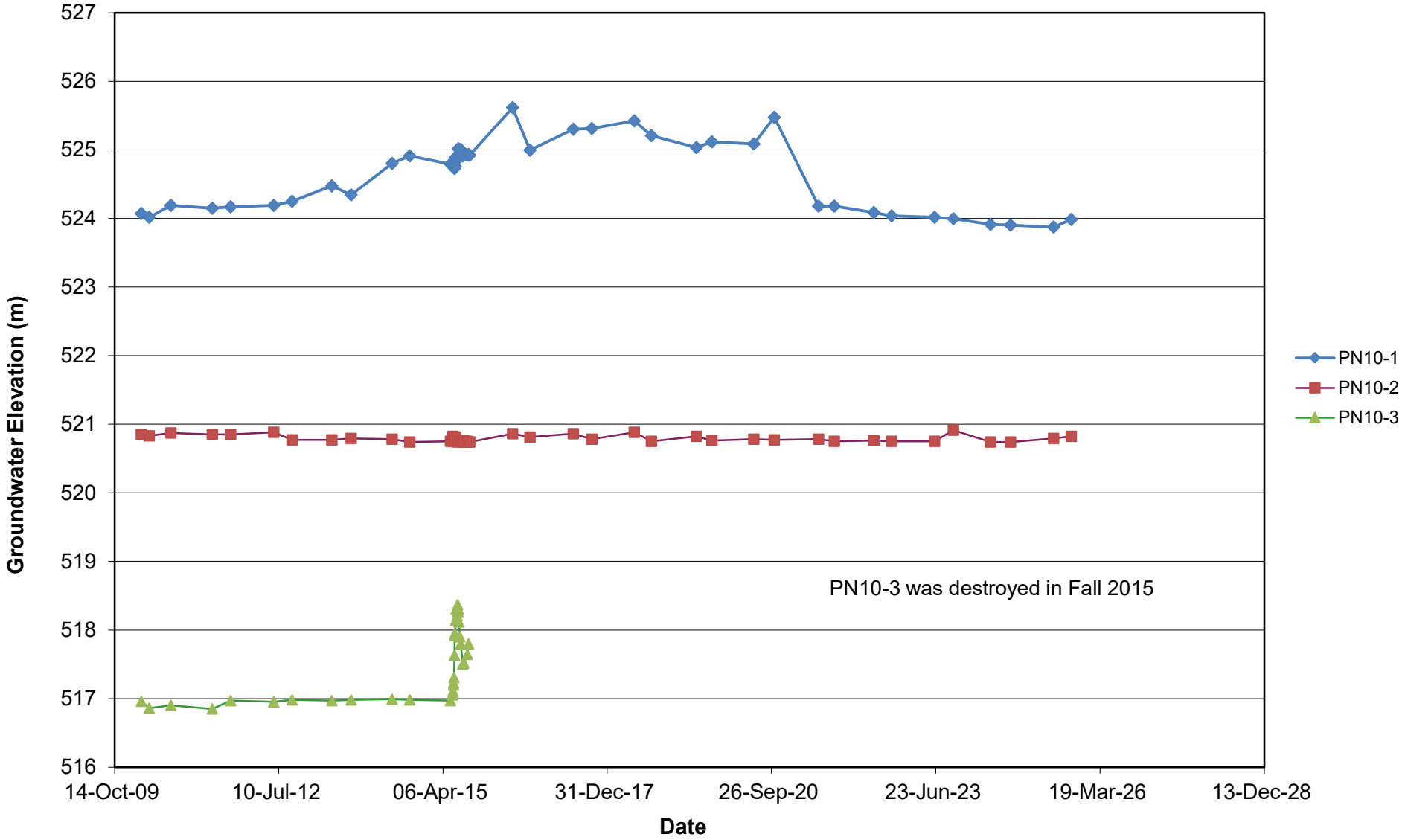

FIGURE PH030-2
PIEZOMETERIC DEPTHS FOR HWY 744:04: JUDAH HILL (LOOKOUT SLIDES)