



THURBER ENGINEERING LTD.

July 26, 2022

File No.: 32121

Alberta Transportation
Provincial Building
9621-96 Avenue
Peace River, Alberta
T8S 1T4

Attention: Mr. Max Shannon

**ALBERTA TRANSPORTATION GRMP (CON0022164)
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING RESULTS – SPRING 2022**

SECTION C

SITE SH006: HWY 33:14 (KLUMPH CREEK SLIDE)

Dear Mr. Shannon:

This report provides the results of the annual geotechnical instrumentation monitoring for the above-mentioned site as part of Alberta Transportation's Geohazard Risk Management Program (GRMP) for Peace Region – Peace River District (CON0022164).

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

Six slope inclinometers (SI18-30 through SI18-35), three standpipe piezometers (SP00-2, SP00-6A, and SP00-6B) and six pneumatic piezometers (PN18-30 through PN18-35) were read at the Hwy 33:14 Klumph Creek Slide site on June 9, 2022, by Mr. Niraj Regmi, G.I.T., and Mr. Jayden Del Cid, both of Thurber Engineering Ltd.

The SIs were read using an RST Digital Inclinometer probe with a 2 ft wheelbase and an RST Pocket PC readout. Inclinometer reading depths were defined as per cable markings with respect to the top of the inclinometer casing. The standpipe piezometers were read using a Heron dipmeter. The pneumatic piezometers were read using an RST C108 pneumatic piezometer readout.

During the previous site visit in the fall of 2021, some of the instruments could not be read due to a close encounter with a bear at the site. During the current readings, a third-party wildlife escort was provided by Bear Scare Ltd. to enable safe access to the instruments located further off the highway surface.



2. DATA PRESENTATION

2.1 General

SI plots for A and B directions are included in Appendix A. Where movement has been recorded the resultant plot (X direction, if applicable) and rate of movement have also been provided.

Slope inclinometer and piezometer reading summary tables are provided below. These tables also include instruments deleted from the GRMP program, for reference.

2.2 Zones of Movement

Zones of new movement were not observed in the SIs since the previous readings in the fall of 2021.

The zone of movement previously tracked over 8.8 m to 11.2 m depth in SI18-34, as well the zone of movement over 1.4 m to 3.8 m depth in SI18-35, have not shown a consistent trend of downslope movement for several reading cycles. This report will be the last report where these two zones are reported. These zones will be removed from future reports.

Zones of movements are summarized in Table SH006-1 below. Table SH006-1 below 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 SH006-1
 SPRING 2022 – HWY 33:14 KLUMPH CREEK SLIDE
 SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: June 9, 2022

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)
SI10	March 28, 1998	61.9 mm over 9.8 m to 11.7 m depth in 294° direction	15.3 mm/yr in September 2001	Sheared at 11.0 m (Spring 2021)	September 30, 2020	N/A	N/A	N/A
SI11	March 28, 1998	45 mm over 4.8 m to 6.6 m depth in 256° direction	19.3 mm/yr in May 2001	Damaged	September 18, 2011	N/A	N/A	N/A
SI00-5	March 24, 2000	108 mm over 8.1 m to 11.7 m depth in 267° direction	-	Sheared at 11.0 m (Spring 2012)	September 18, 2011	N/A	N/A	N/A
		103 mm over 9.9 m to 16.6 m depth in 267° direction	-					
SI00-6	March 24, 2000	42.1 mm over 14.7m to 16.5 m depth in 244° direction	17.6 mm/yr in October 2004	Blocked at 1.52 m (Spring 2008)	October 2, 2007	N/A	N/A	N/A

Drawing 32121-SH006 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.



**TABLE SH006-1 - CONTINUED
 SPRING 2022 – HWY 33:14 KLUMPH CREEK SLIDE
 SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: June 9, 2022

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)
SI18-30	March 20, 2018	22.2 mm over 13.0 to 14.8 m depth in 235° direction	14.8 on September 30, 2020	Operational	October 11, 2021	2.9	4.4	-6.3
SI18-31	March 20, 2018	20.1 mm over 12.3 to 14.2 m depth in 237° direction	10.1 on September 30, 2020	Operational	October 11, 2021	2.7	4.1	0.4
SI18-32	March 20, 2018	10.5 mm over 13.7 m to 17.3 m depth in 255° direction	12.0 on September 30, 2020	Operational	July 5, 2021	1.3	1.4	0.4
SI18-33	March 20, 2018	16.3 mm over 15.5 m to 17.3 m depth in 250° direction	14.4 on September 30, 2020	Operational	October 11, 2021	2.4	3.6	-7.3
SI18-34	March 20, 2018	0.8 mm over 8.8 m to 11.2 m depth in 285° direction	1.0 on September 25, 2019	Operational	July 5, 2021	0.1	0.1	0.3
SI18-35	March 20, 2018	3.6 mm over 1.4 to 3.8 m depth in 245° direction	29.7 on June 3, 2018	Operational	July 5, 2021	No discernible movement	N/A	-0.8
		4.6 mm over 4.5 to 6.3 m depth in 245° direction	3.2 on June 2, 2020			0.2	0.3	-0.9

Drawing 32121-SH006 in Appendix A provides a sketch of the approximate location of the monitoring instrumentation for this site.



**TABLE SH006-2
 SPRING 2022 – HWY 33:14 KLUMPH CREEK SLIDE
 STANDPIPE PIEZOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: June 9, 2022

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	MAXIMUM WATER ELEVATION (m)	MEASURED WATER ELEVATION (m)	PREVIOUS WATER ELEVATION (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
SP00-2	March 27, 2000	496.42	503.72	Operational	503.35 on July 5, 2021	503.33	503.35	-0.02
SP00-5	March 27, 2000	499.89	508.99	<i>Assumed destroyed (Spring 2013)</i>	<i>507.0 m in September 2008</i>	N/A	N/A	N/A
SP00-6A	March 27, 2000	492.92	504.22	Operational	503.44 on July 5, 2021	503.39	503.44	-0.05
SP00-6B	March 27, 2000	495.52	504.22	Operational	498.70 on June 9, 2022	498.70	498.57	0.13

Drawing 32121-SH006 in Appendix A provides a sketch of the approximate locations of the monitoring instrumentation for this site.



**TABLE SH006-3
 SPRING 2022 – HWY 33:14 KLUMPH CREEK SLIDE
 PNEUMATIC PIEZOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: June 9, 2022

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	CURRENT STATUS	MAXIMUM GROUNDWATER DEPTH (mBGS)	MEASURED PORE PRESSURE (kPa)	CURRENT GROUNDWATER DEPTH (mBGS)	PREVIOUS GROUNDWATER DEPTH (mBGS)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
PN18-30 (37804)	March 20, 2018	10.0	Operational	0.84 on June 2, 2020	85.6	1.27	1.66 (Oct. 11, 2021)	0.39
PN18-31 (37802)	March 20, 2018	10.5	Operational	0.53 on June 2, 2020	95.8	0.73	1.33 (Oct. 11, 2021)	0.60
PN18-32 (37801)	March 20, 2018	12.0	Operational	1.11 on June 2, 2020	95.5	2.26	2.12 (July 5, 2021)	-0.14
PN18-33 (37803)	March 20, 2018	11.0	Operational	2.31 on Sep. 25, 2019	77.4	3.11	3.88 (Oct. 11, 2021)	0.77
PN18-34 (37800)	March 20, 2018	12.0	Operational	4.60 on Sep. 25, 2019	56.7	6.22	5.61 (July 5, 2021)	-0.61
PN18-35 (37799)	March 20, 2018	12.5	Operational	4.61 on June 2, 2020	68.7	5.49	5.38 (July 5, 2021)	-0.11

Drawing 32121-SH006 in Appendix A provides a sketch of the approximate locations of the monitoring instrumentation for this site.



3. INTERPRETATION OF MONITORING RESULTS

Some of the instruments were not read during the previous site visit in the fall of 2021. As such, the readings for these instruments have been compared to the previous reading in the spring of 2021.

SI18-30 showed a rate of movement of 4.4 mm/yr over 13.0 m to 14.8 m depth since the fall of 2021 readings. SI18-31 showed a rate of movement of 4.1 mm/yr over 12.3 m to 14.2 m depth since the fall of 2021 readings. SI18-32 showed a rate of movement of 1.4 mm/yr over 13.7 m to 17.3 m depth since the spring of 2021 readings. SI18-33 showed a rate of movement of 3.6 mm/yr over 15.5 m to 17.3 m depth since the fall of 2021 readings.

SI18-34 showed a rate of movement of 0.1 mm/yr over 8.8 m to 11.2 m depth since the spring of 2021 readings. SI18-34 has shown only 0.8 mm of cumulative movement over this zone since it was initialized in 2018 and has not shown a consistent trend of downslope movement for several reading cycles, and hence will not be monitored going forward.

SI18-35 showed no discernible movement over 1.4 m to 3.8 m depth since the spring of 2021 readings. This zone appeared to show some downslope movement during the first few readings after it was initialized, however it has not shown a consistent trend of downslope movement for several readings cycles and has even shown apparent upslope movement. Therefore, this shallower zone in SI18-35 will not be monitored going forward. SI18-35 showed a rate of movement of 0.3 mm/yr over 4.5 m to 6.3 m depth since the spring of 2021 readings.

Overall, the SIs show rates of movement that are consistent to the rates observed during the readings taken during the spring and fall of 2021 reading cycles. The SIs at this site have historically shown a pattern of higher movement rates between the spring and fall readings cycles, with lower rates observed between the fall and spring readings cycles. The overall rates of movement have reduced since 2020 corresponding with the drop in groundwater levels observed in the fall of 2020. This is particularly evident at SI18-32, where the largest drop in groundwater level was observed at this location.

Standpipe piezometers SP00-2 and SP00-6A showed decreases in groundwater level of 0.02 m and 0.05 m, respectively, since the fall of 2021 readings. SP00-6B showed an increase in groundwater level of 0.13 m since the fall of 2021 readings and currently shows the highest groundwater level ever measured in the instrument. The standpipe piezometer results are plotted in Figure SH006-1 in Appendix A.

Pneumatic piezometers PN18-30, PN18-31 and PN18-33 showed increases in groundwater level of 0.39 m, 0.60 m, and 0.77 m, respectively, since the fall of 2021 readings. PN18-32, PN18-34 and PN18-35 showed decreases in groundwater level of 0.14 m, 0.61 m, and 0.11 m, respectively, since they were previously read in the spring of 2021. Table SH006-3 summarizes the pneumatic piezometer readings. The pneumatic piezometer results are plotted in Figure SH006-2 in Appendix A.



4. RECOMMENDATIONS

4.1 Future Work

It is planned that a third-party wildlife escort will be used on subsequent visits to this site due to the high risk of a bear encounter, particularly for the instruments located deeper in the treeline. As such, it has been agreed with AT that the reading frequency at this site will be reduced to once annually.

It has also been reported that the access trails to the instruments further off the highway have become quite overgrown with brush since the instruments were installed. Consideration should also be given to clearing some of the brush to easily access these instruments. The clearing could possibly be done by the maintenance contractor.

4.2 Instrumentation Repairs

No 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
/if

Attachments:

- Statement of Limitations and Conditions
- Appendix A
 - Field Inspector's report
 - Site Plan Showing Approximate Instrument Locations (Drawing No. 32121-SH006)
 - SI Reading Plots
 - Figure SH006-1 (Standpipe Piezometer Elevations)
 - Figure SH006-2 (Pneumatic Piezometer 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 (CON0022164)
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING RESULTS**

SPRING 2022

**APPENDIX A
DATA PRESENTATION**

SITE SH006: HWY 33:14 (KLUMPH CREEK SLIDE)

**ALBERTA TRANSPORTATION
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (SH006)
SPRING 2022**

Location: Klumph Creek Slide (HWY 33:14 C1 18.436)	Readout: RST PN C108 Unit 4
File Number: 32121	Extension: 2.75" except SI10
Probe: RST SET 8R	Temp: 21
Cable: RST SET 8R	Read by: NKR/JD

SLOPE INCLINOMETER (SI) READINGS

SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of casing (ft)	Mag North Azimuth of A+	Current Bottom Depth Readings				Probe/ Reel #	Remarks
	Easting	Northing					A+	A-	B+	B-		
SI18-30	608450	6107166	9-Jun-22	0.76	98 to 2	200	207	-195	-160	169	8R	
SI18-31	608518	6107038	9-Jun-22	0.76	98 to 2	200	37	-22	-390	397	8R	
SI18-32	608361	6107128	9-Jun-22	0.67	98 to 2	250	2	13	-163	168	8R	
SI18-33	608462	6106977	9-Jun-22	0.69	98to 2	240	425	-413	366	-361	8R	
SI18-34	608257	6107079	9-Jun-22	0.66	100 to 2	270	175	-160	189	-182	8R	
SI18-35	608380	6106890	9-Jun-22	0.73	98 to 2	230	13312	-117	-119	124	8R	

PNEUMATIC PIEZOMETER (PN) READINGS

PN#	GPS Location (UTM 11)		Date	Reading (kPa)	Identification Number
	Easting	Northing			
PN18-30	608450	6107166	9-Jun-22	85.6	37804
PN18-31	608518	6107038	9-Jun-22	95.8	37802
PN18-32	608361	6107128	9-Jun-22	95.5	37801
PN18-33	608462	6106977	9-Jun-22	77.4	37803
PN18-34	608257	6107079	9-Jun-22	56.7	37800
PN18-35	608380	6106890	9-Jun-22	68.7	37799

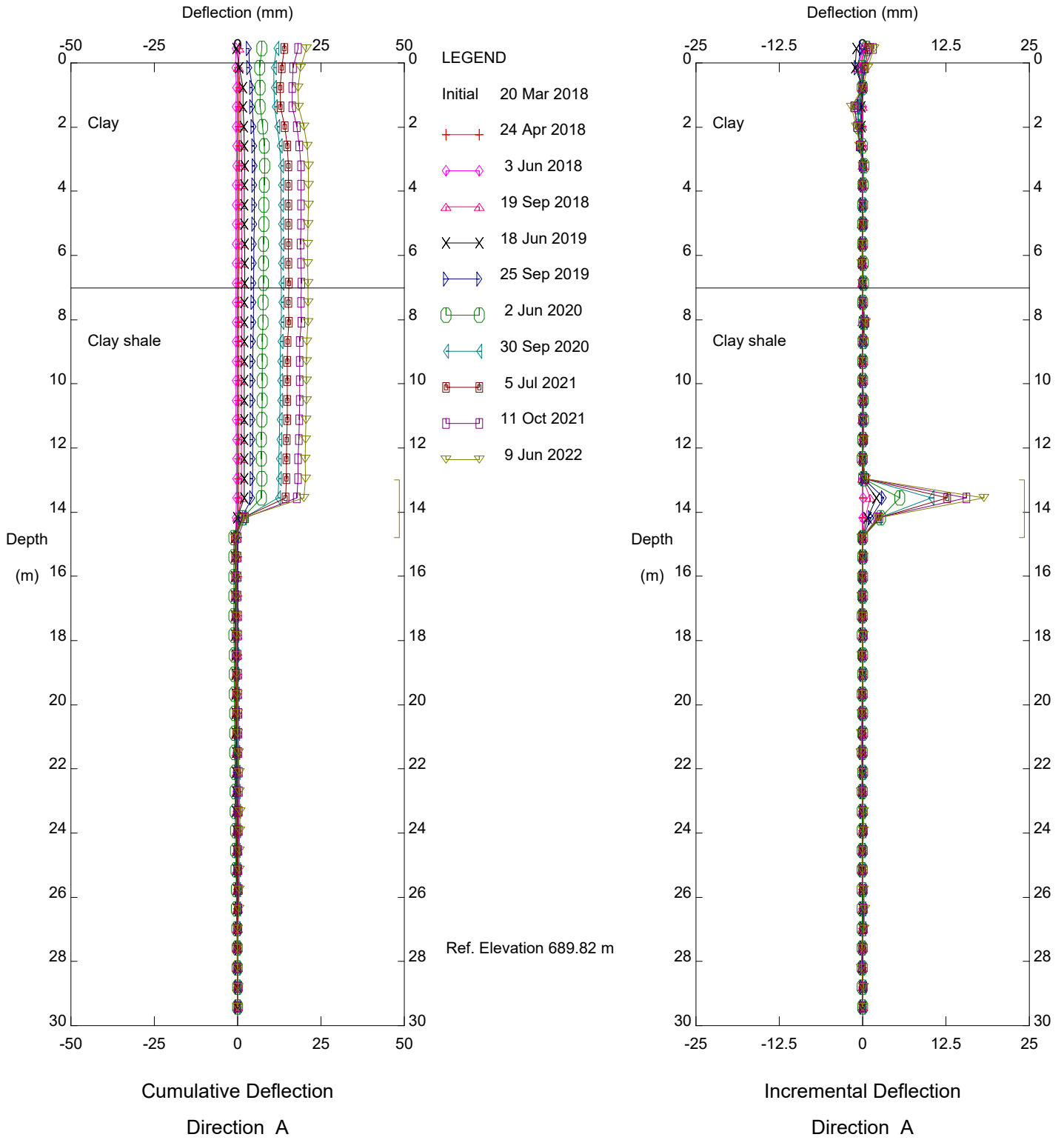
STANDPIPE PIEZOMETER READINGS

SP#	GPS Location (UTM 11)		Date	Stick-up (m)	Reading below top of pipe (m)	Bottom Pipe Depth (below ground (m))
	Easting	Northing				
SP00-2	608534	6106814	9-Jun-22	1.03	1.42	8.12
SP00-6A	608438	6107044	9-Jun-22	0.87	1.70	11.50
SP00-6B	608438	6107044	9-Jun-22	0.88	6.40	8.80

INSPECTOR REPORT

SP00-6A and 6B nested standpipe in same hole

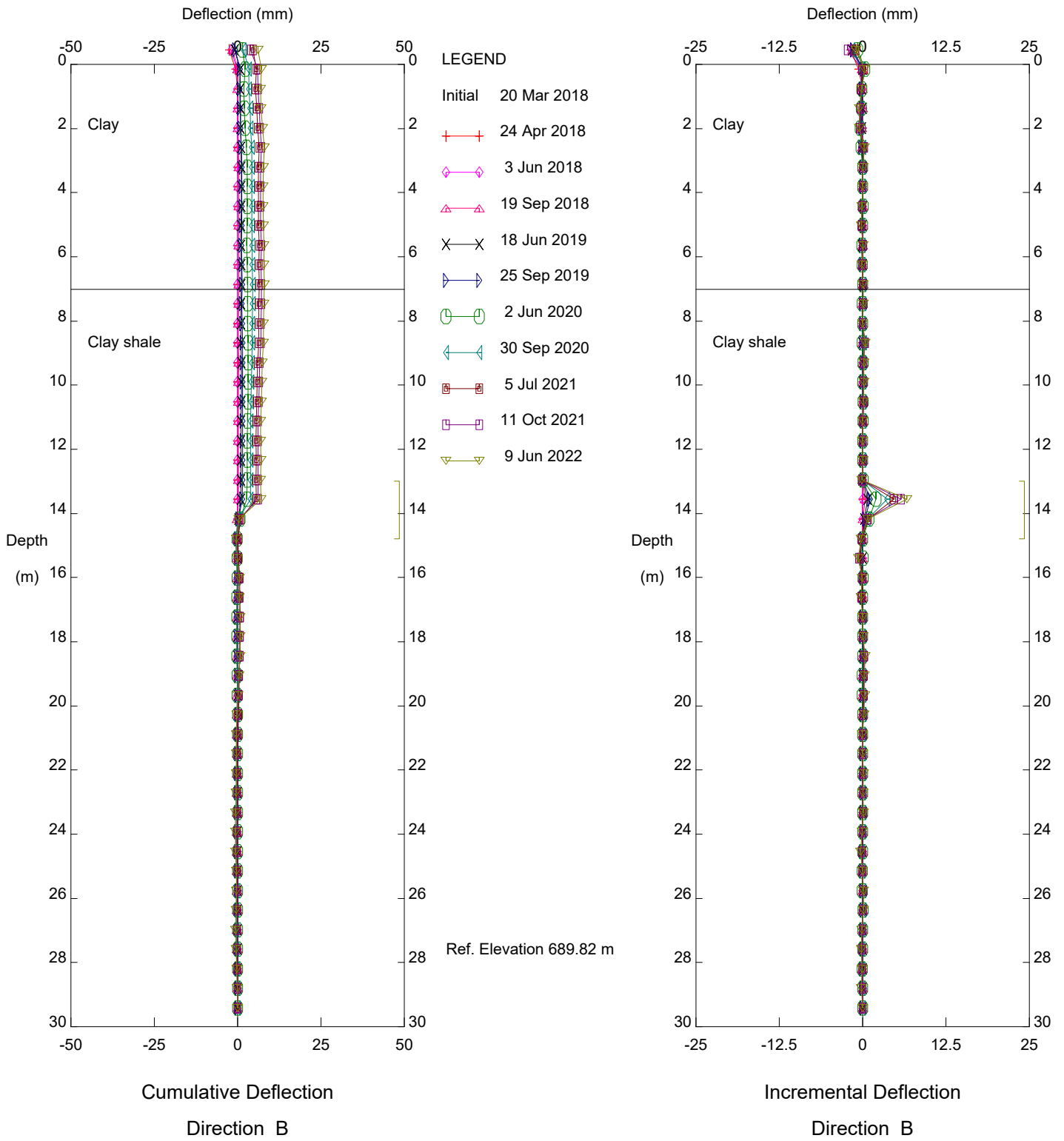
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SH006, Klumph Creek Slide, Inclinometer SI18-30

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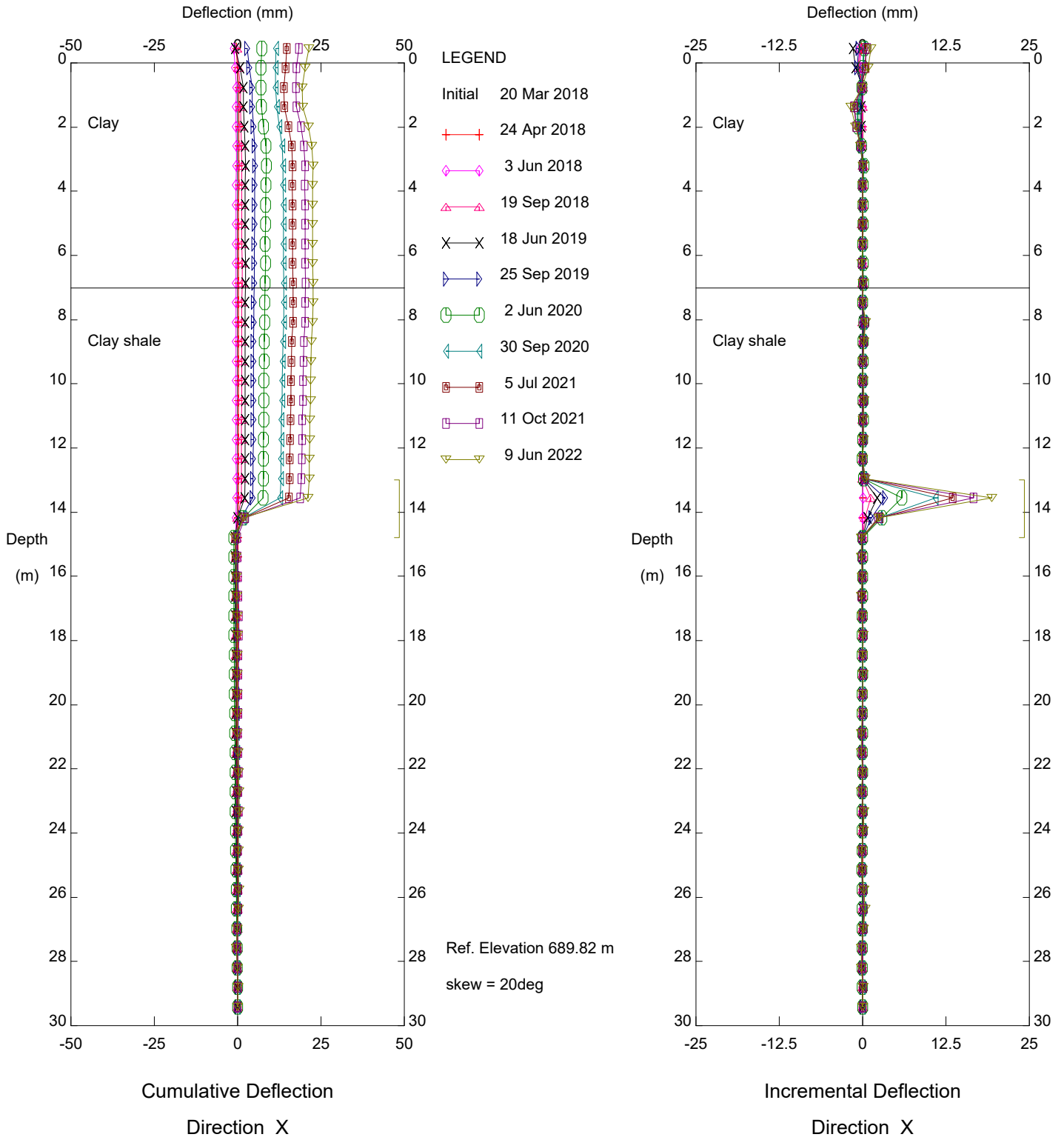
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SH006, Klumph Creek Slide, Inclinometer SI18-30

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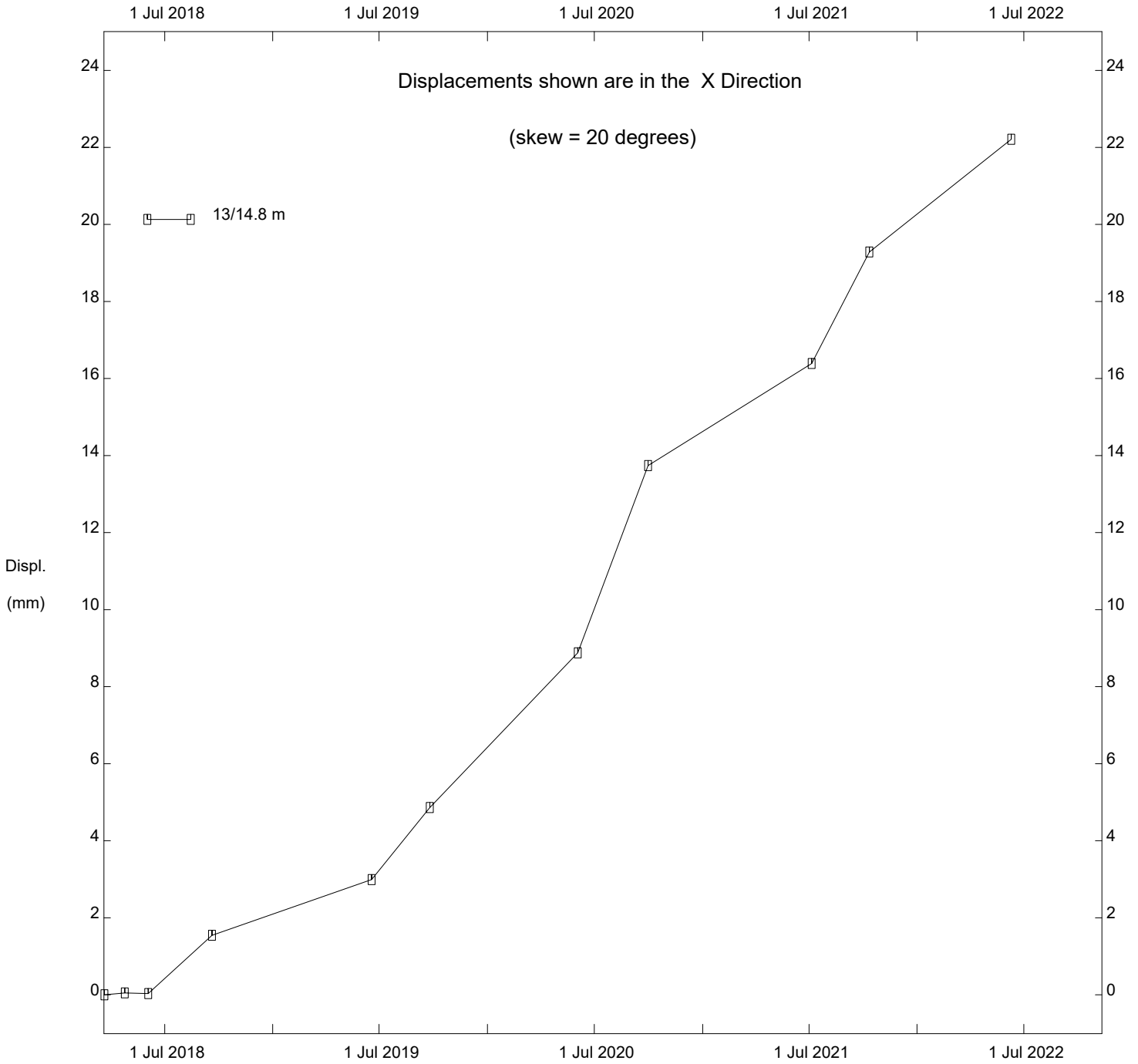
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SH006, Klumph Creek Slide, Inclinometer SI18-30

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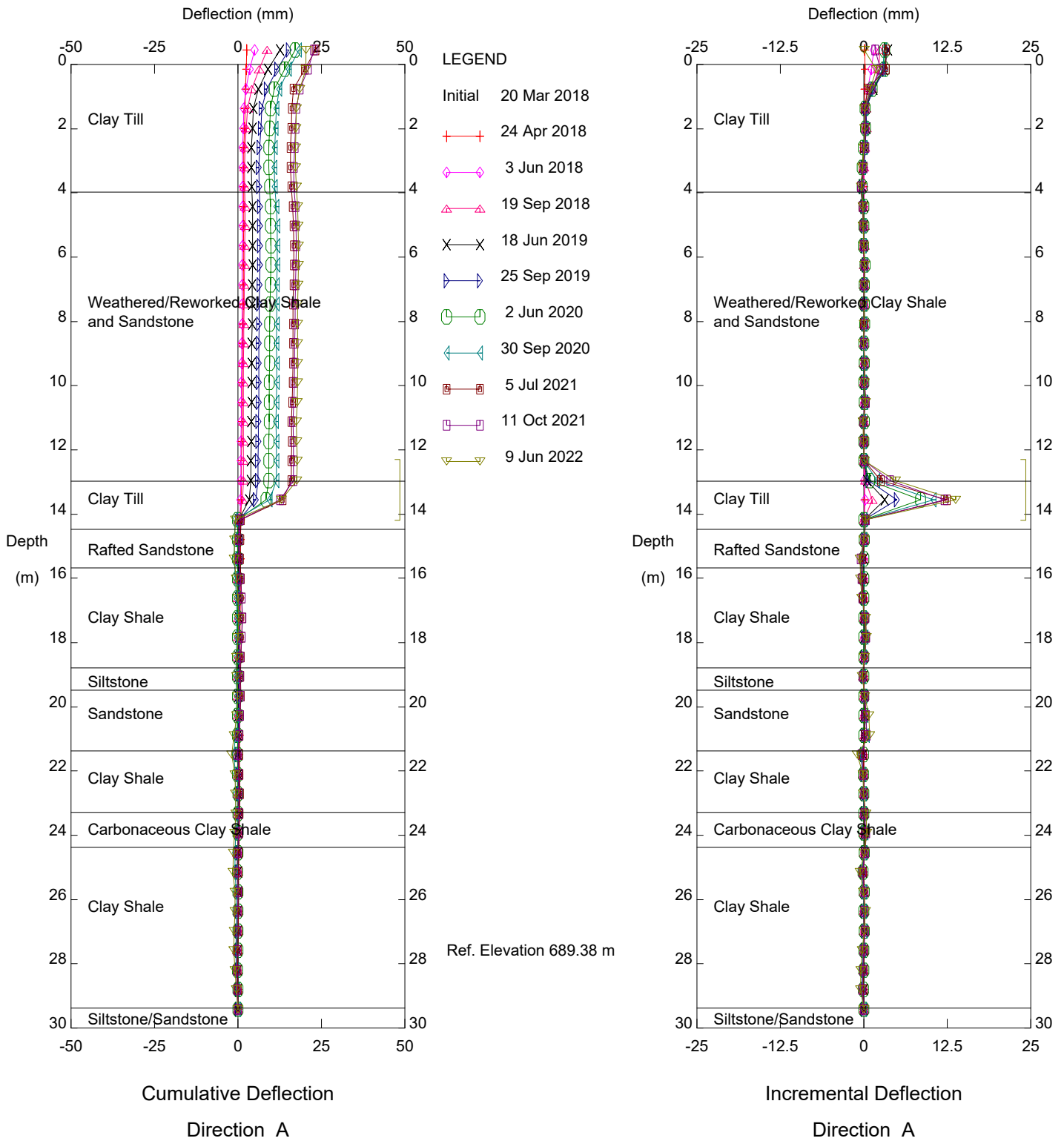
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SH006, Klumph Creek Slide, Inclinator SI18-30

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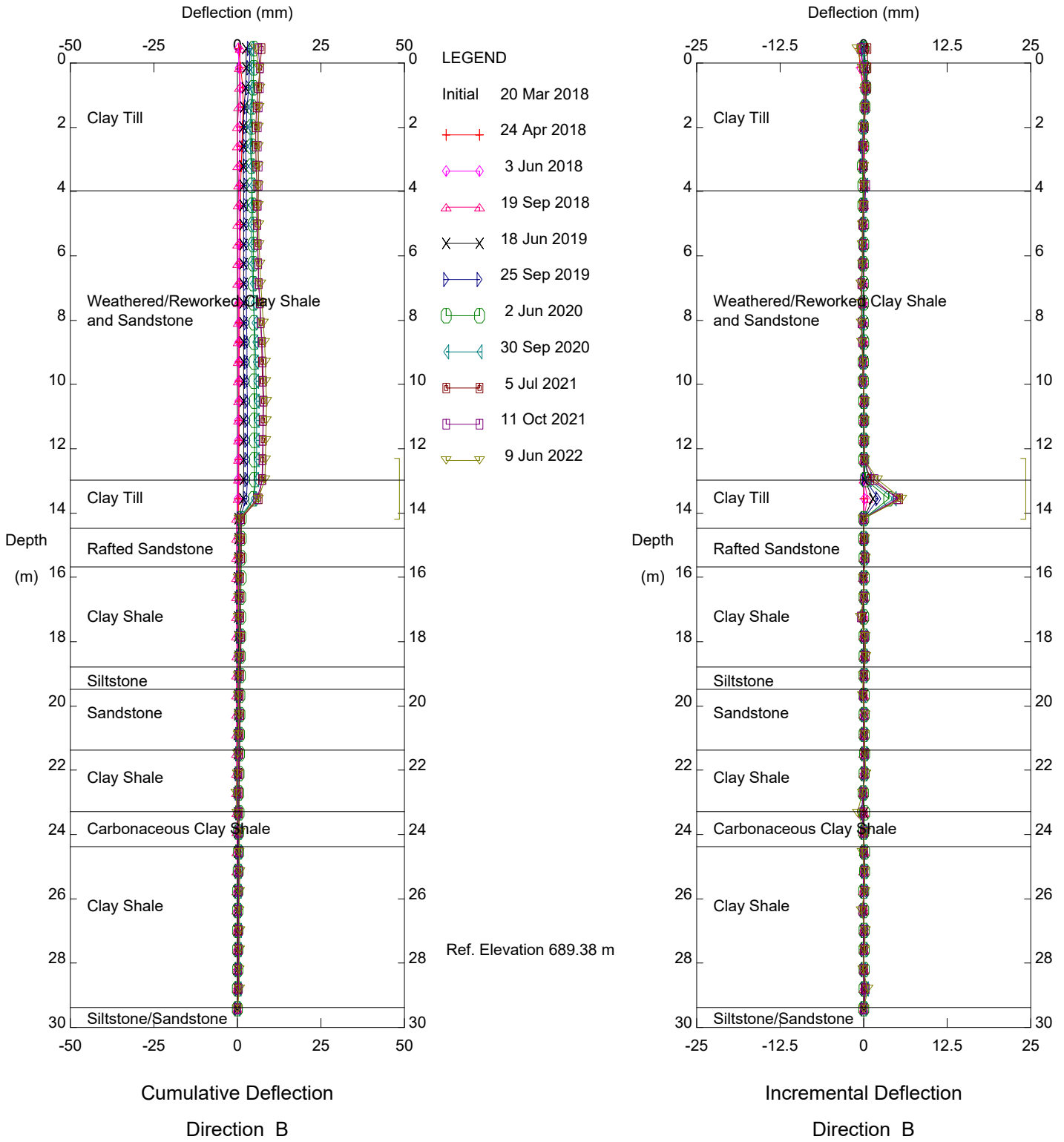
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SH006, Klumph Creek Slide, Inclinometer SI18-31

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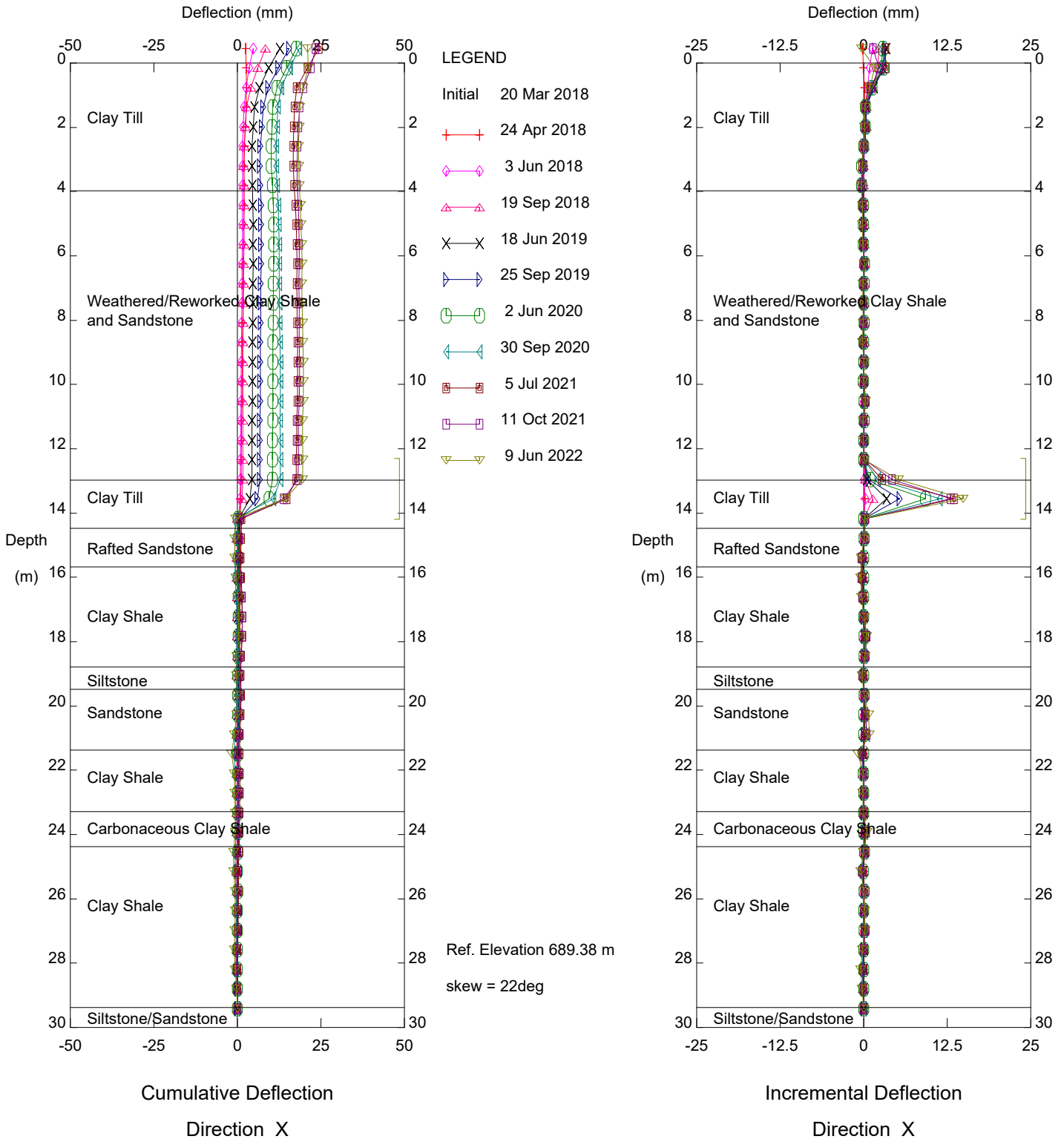
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SH006, Klumph Creek Slide, Inclinometer SI18-31

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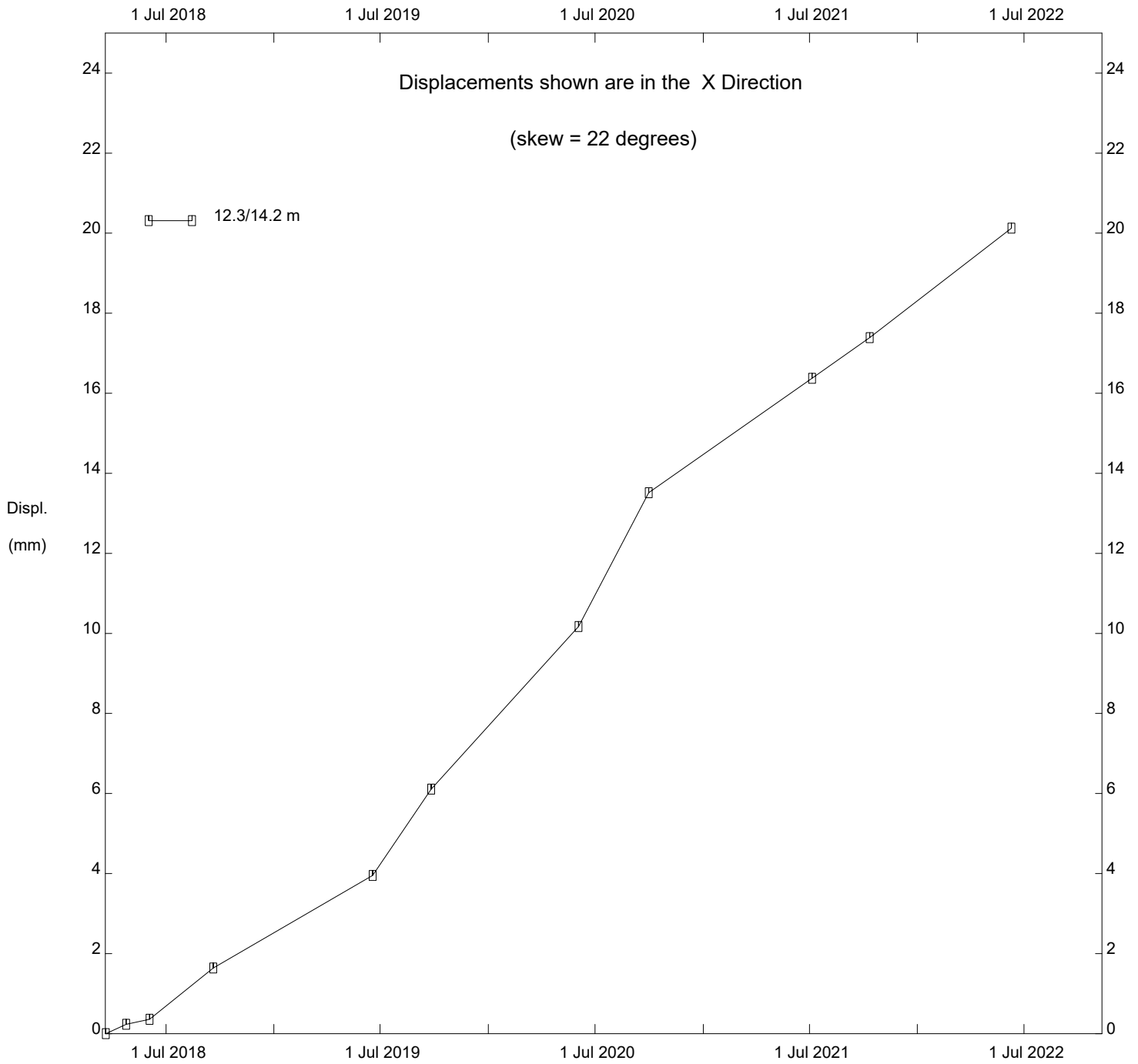
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SH006, Klumph Creek Slide, Inclinometer SI18-31

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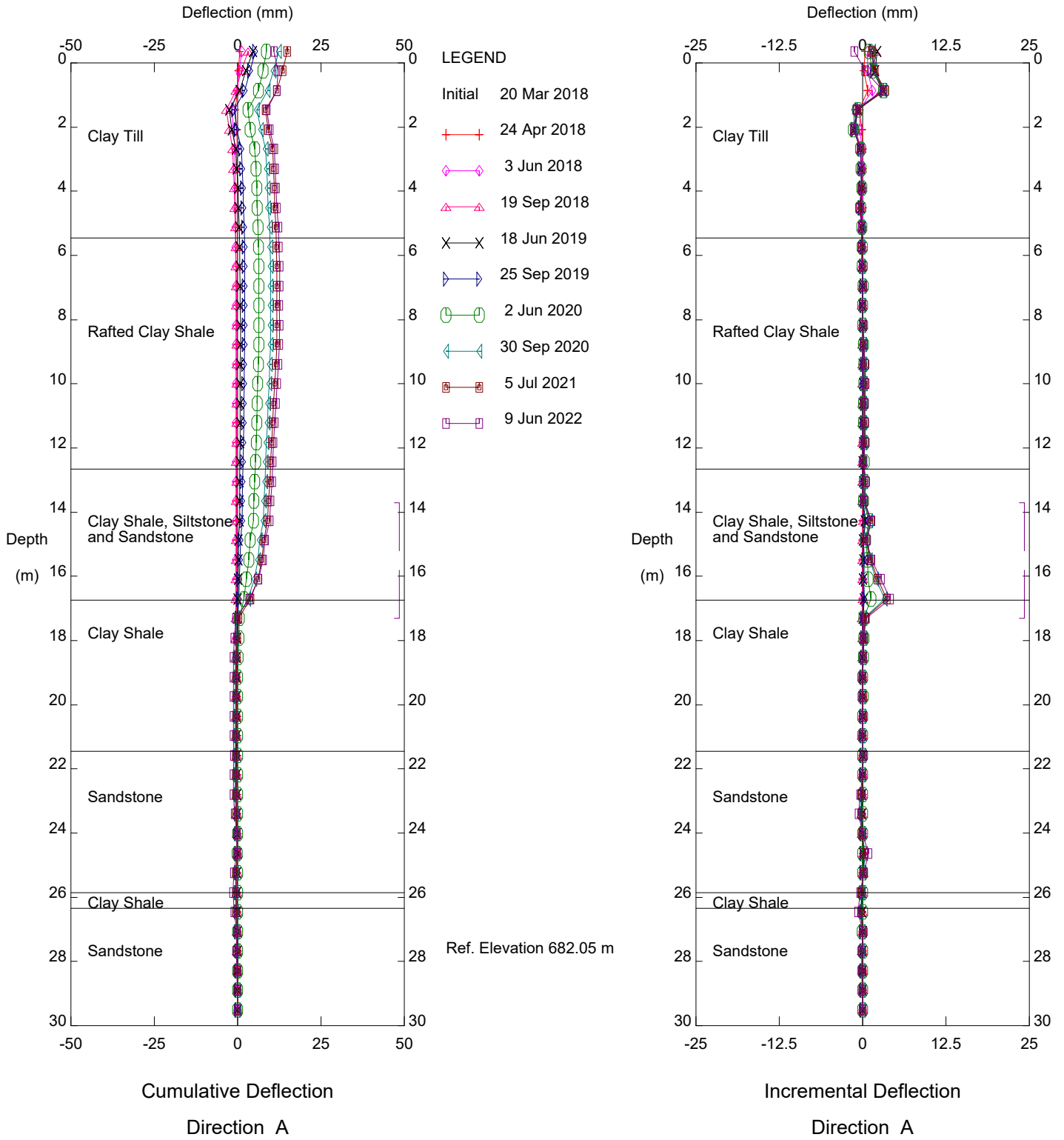
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SH006, Klumph Creek Slide, Inclinator SI18-31

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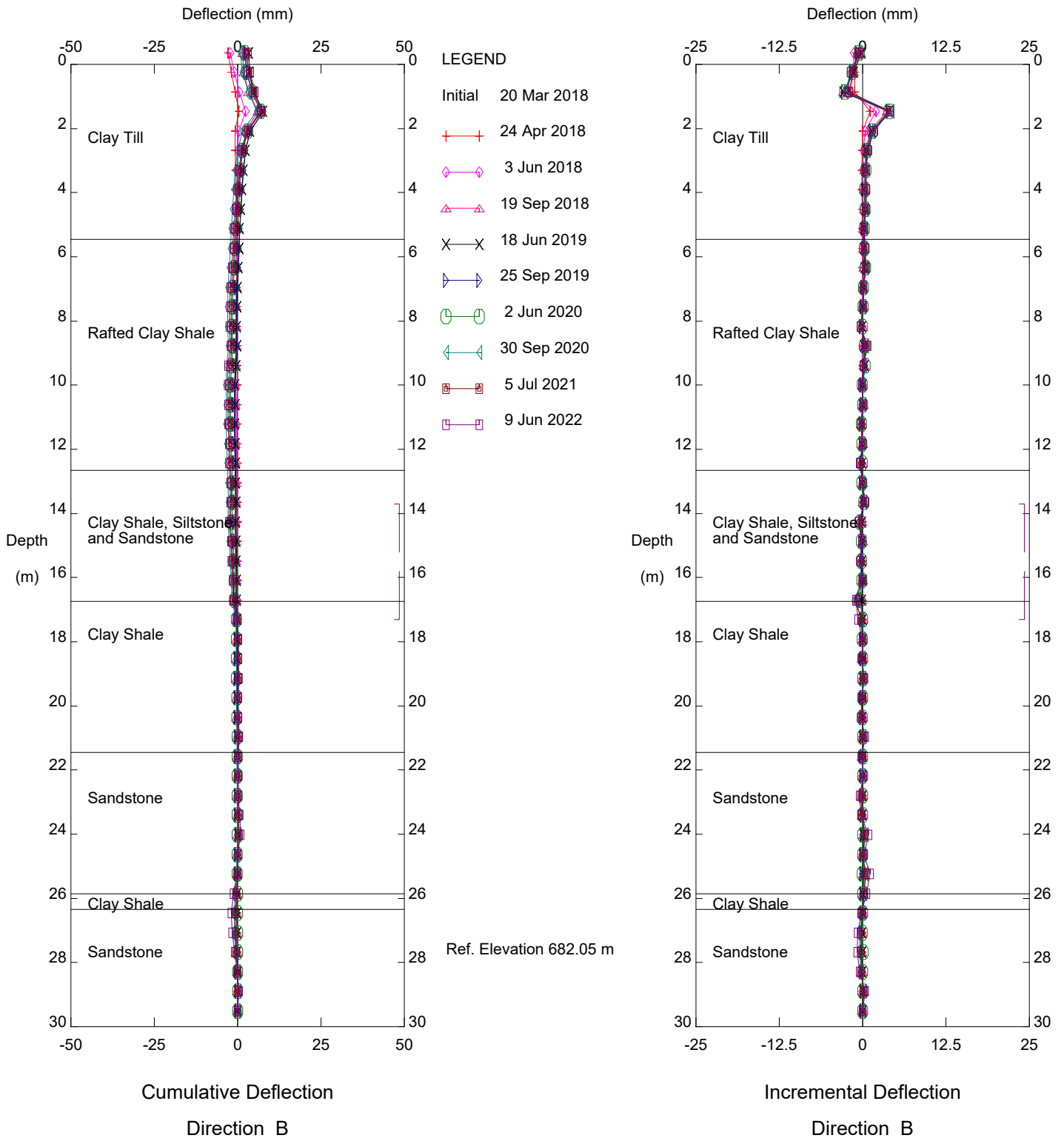
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SH006, Klumph Creek Slide, Inclinometer SI18-32

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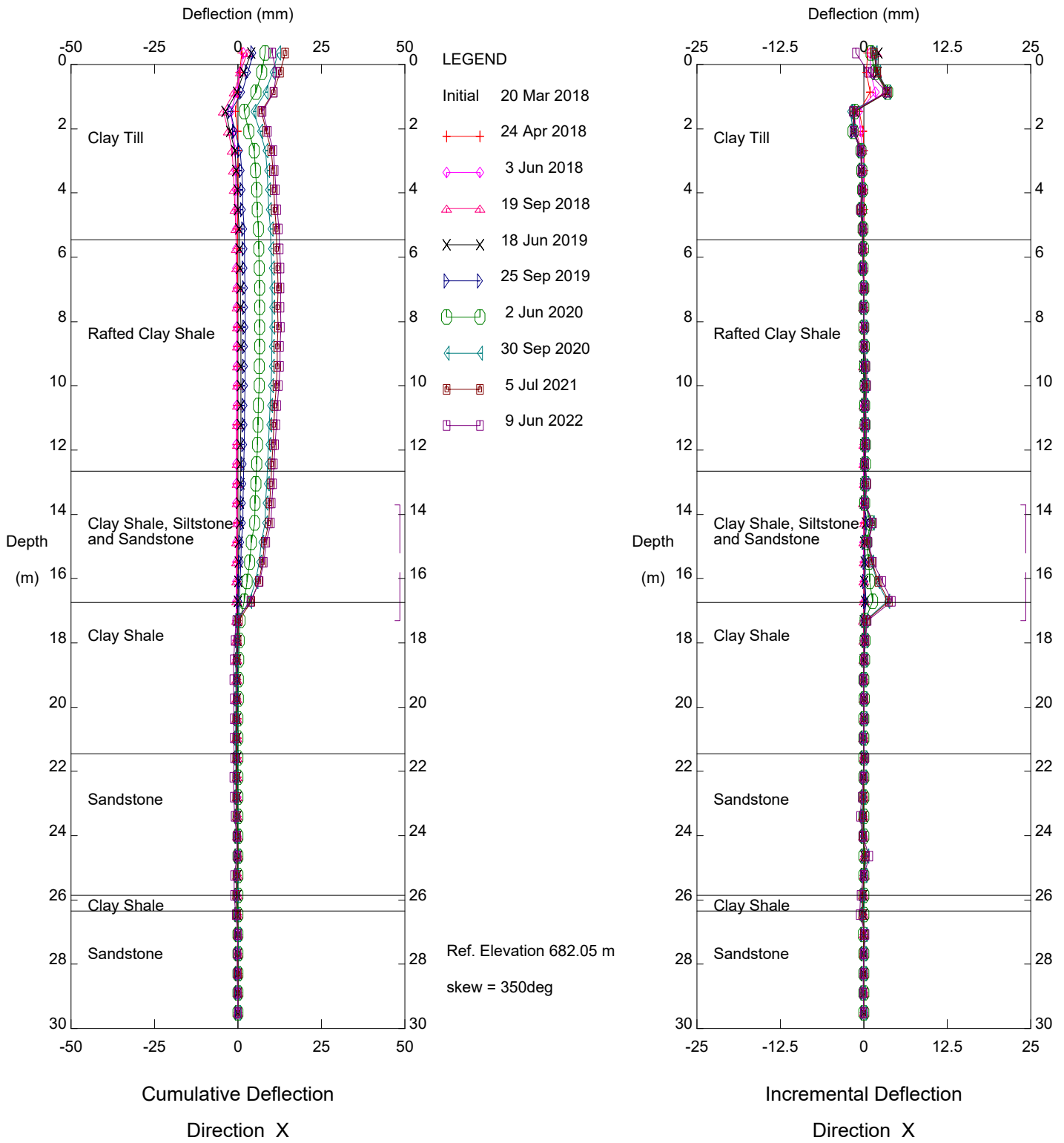
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SH006, Klumph Creek Slide, Inclinometer SI18-32

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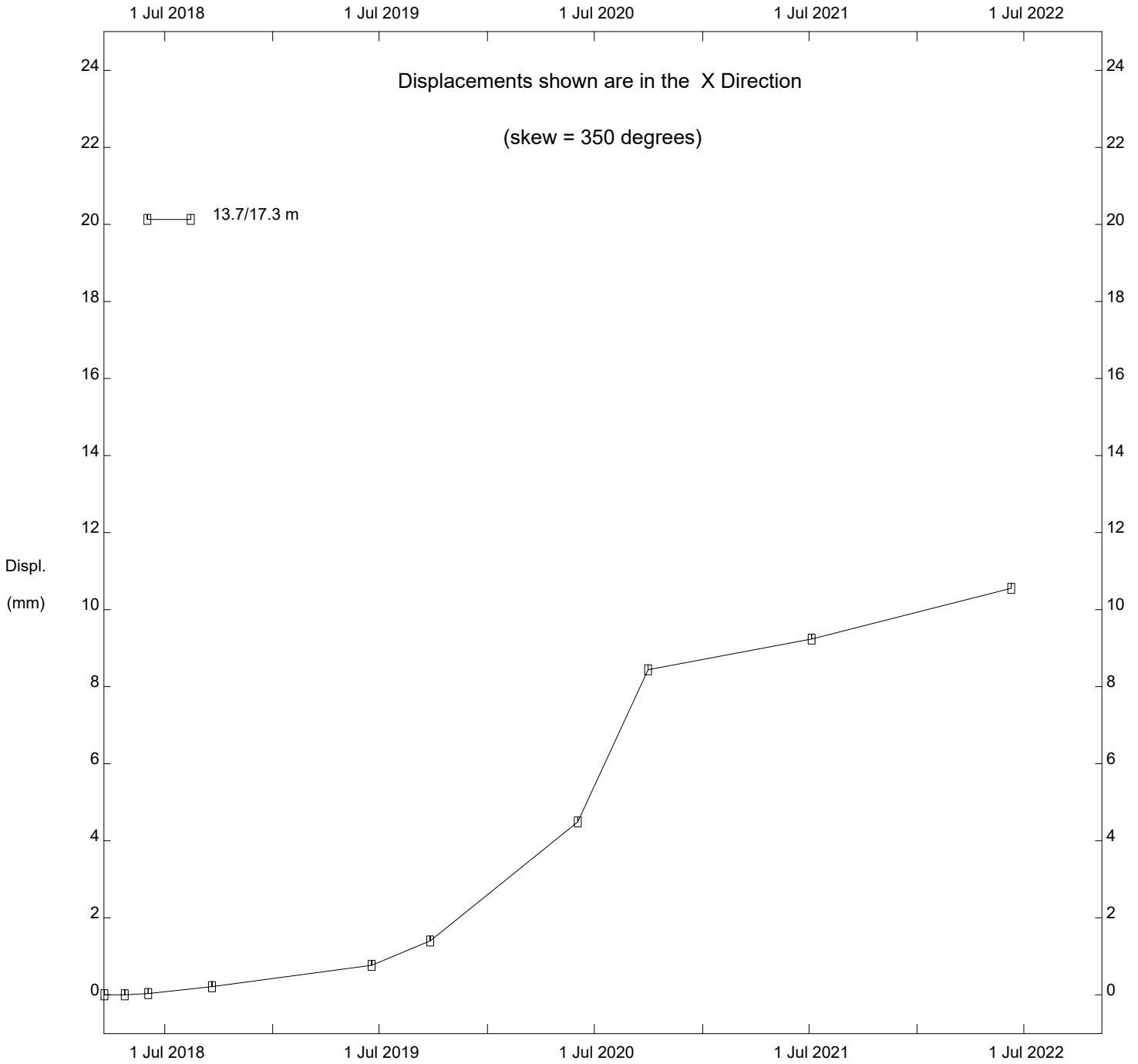
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SH006, Klumph Creek Slide, Inclinometer SI18-32

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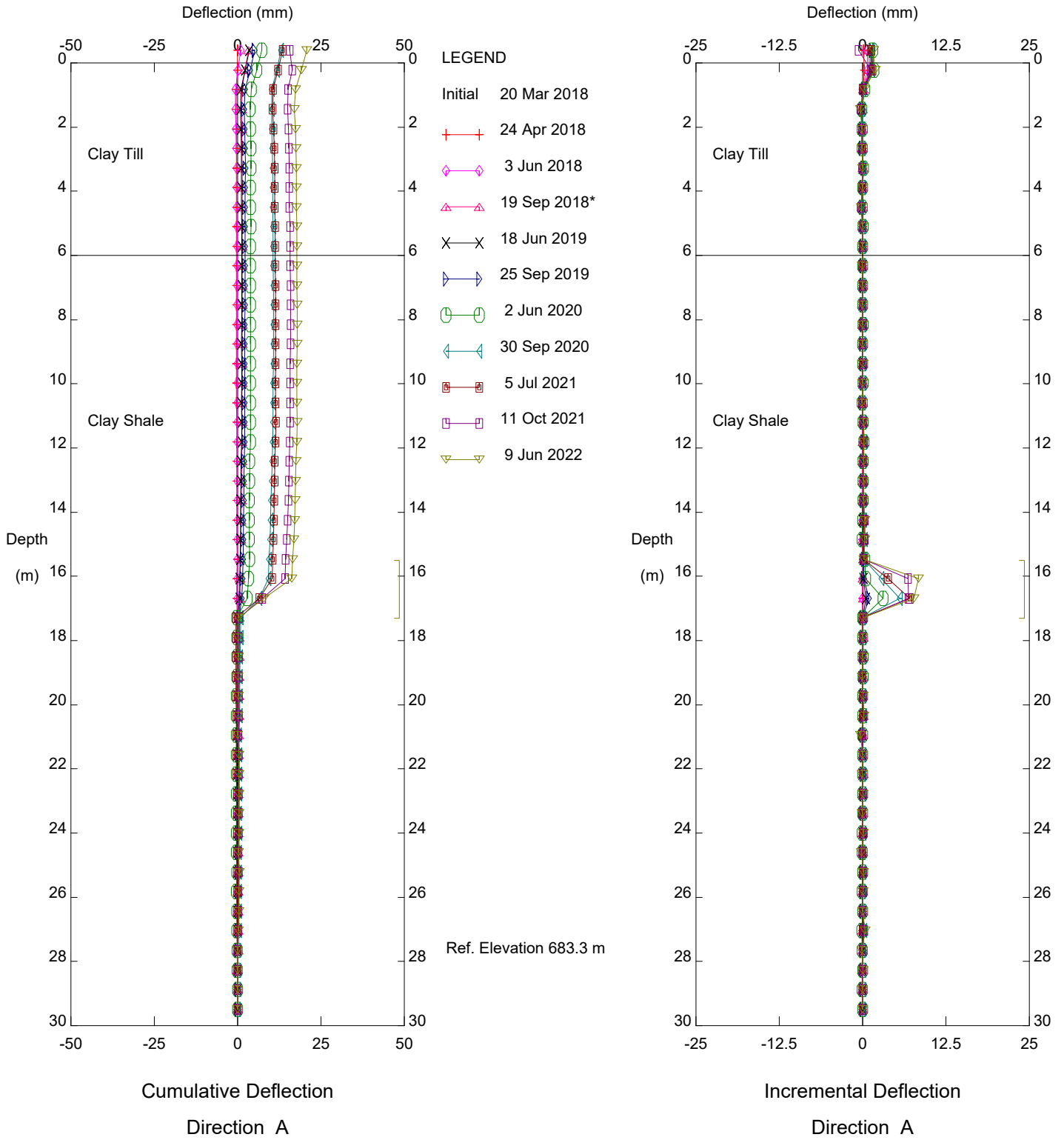
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SH006, Klumph Creek Slide, Inclinator SI18-32

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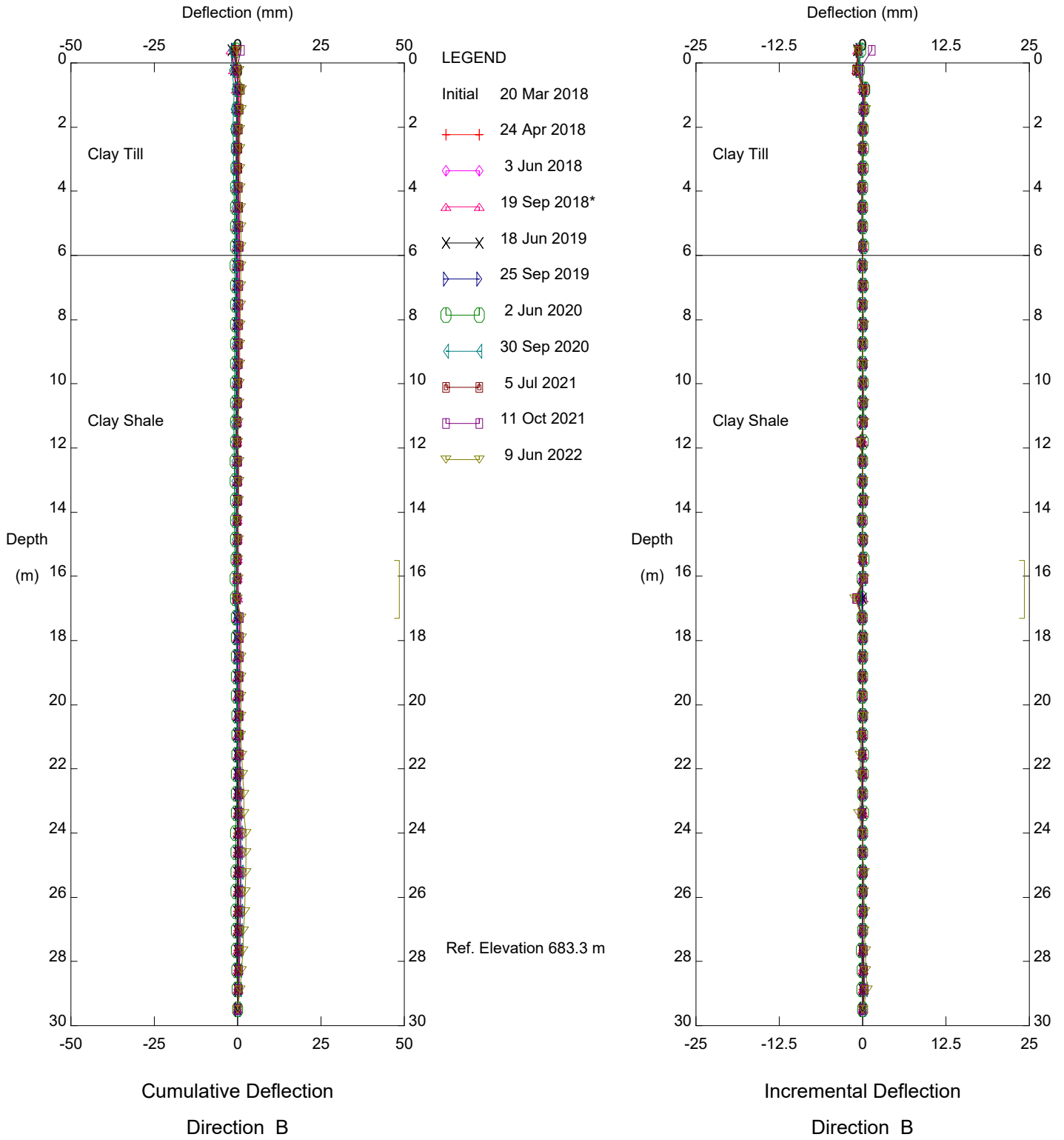


SH006, Klumph Creek Slide, Inclinometer SI18-33

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

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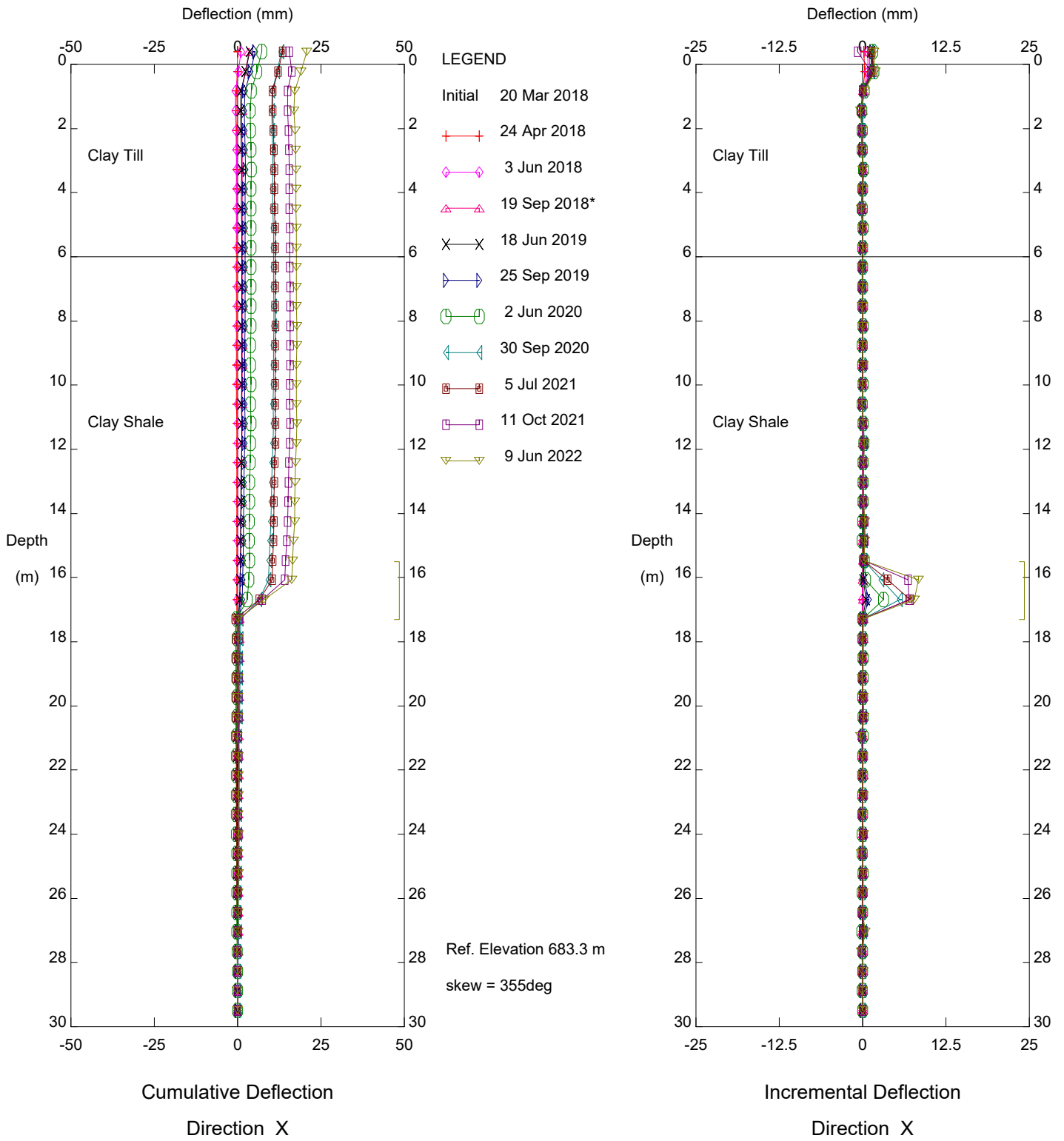


SH006, Klumph Creek Slide, Inclinometer SI18-33

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

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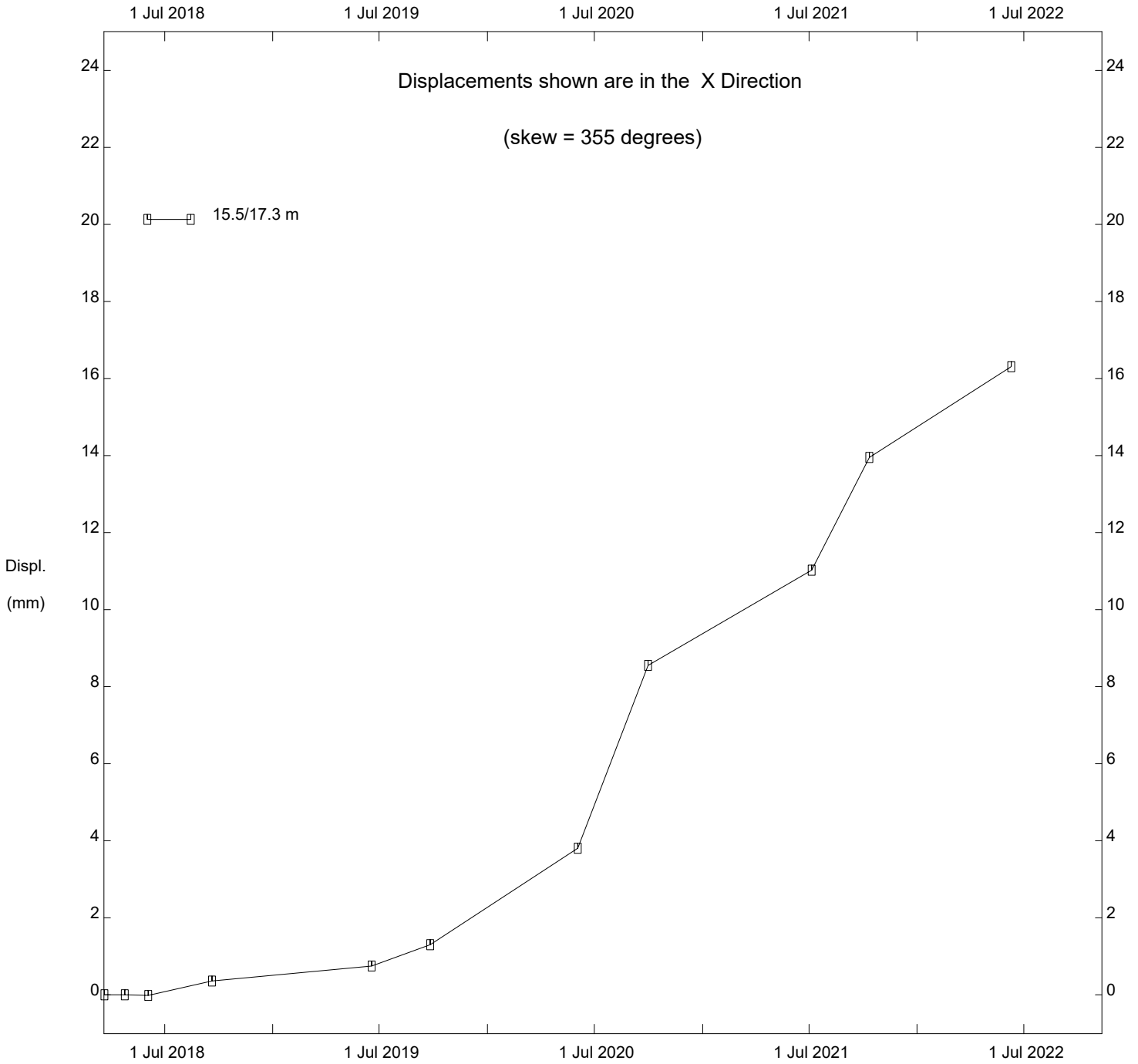


SH006, Klumph Creek Slide, Inclinometer SI18-33

Alberta Transportation

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

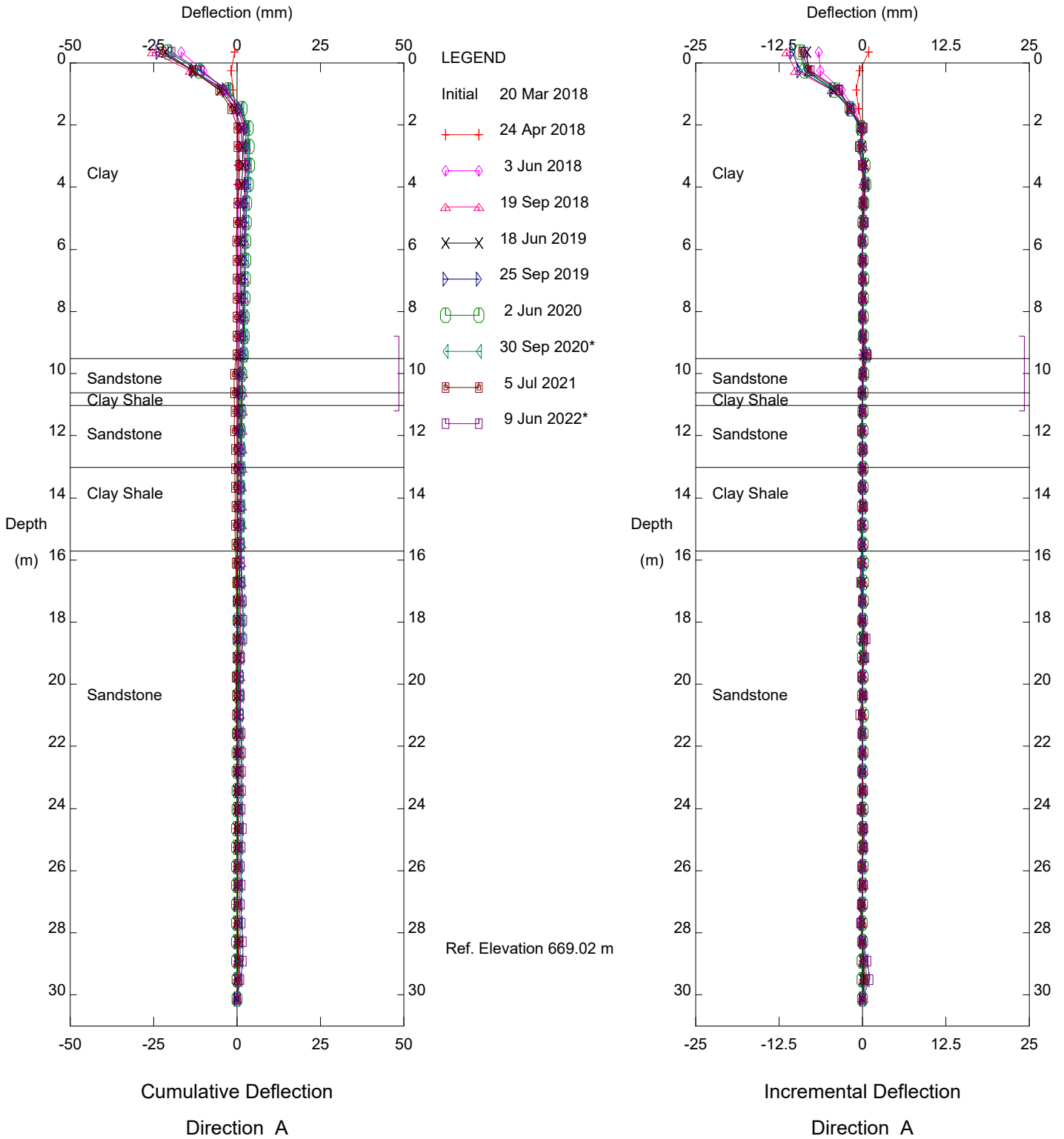
Thurber Engineering Ltd



SH006, Klumph Creek Slide, Inclinator SI18-33

Alberta Transportation

Thurber Engineering Ltd

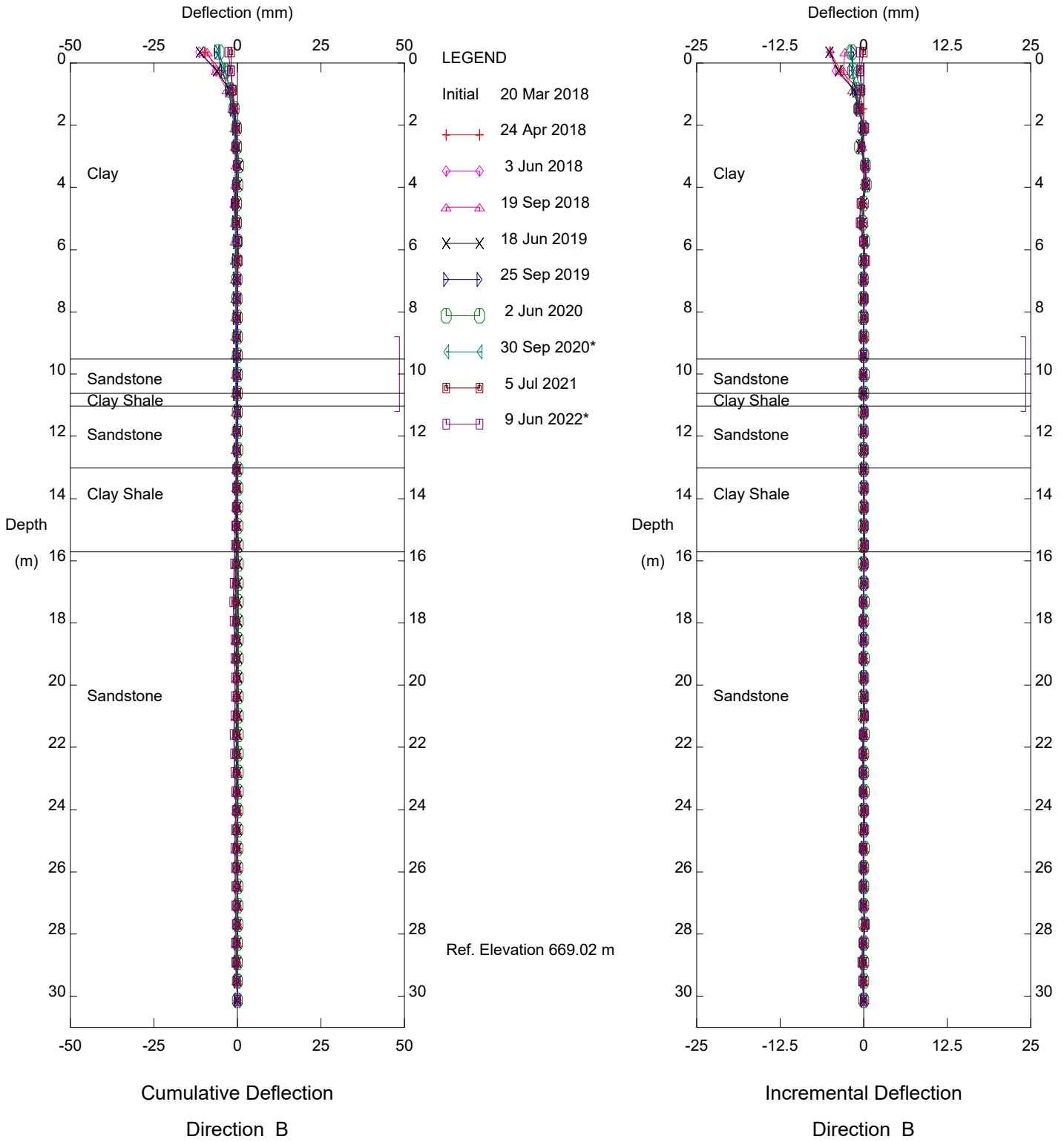


SH006, Klumph Creek Slide, Inclinometer SI18-34

Alberta Transportation

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

Thurber Engineering Ltd

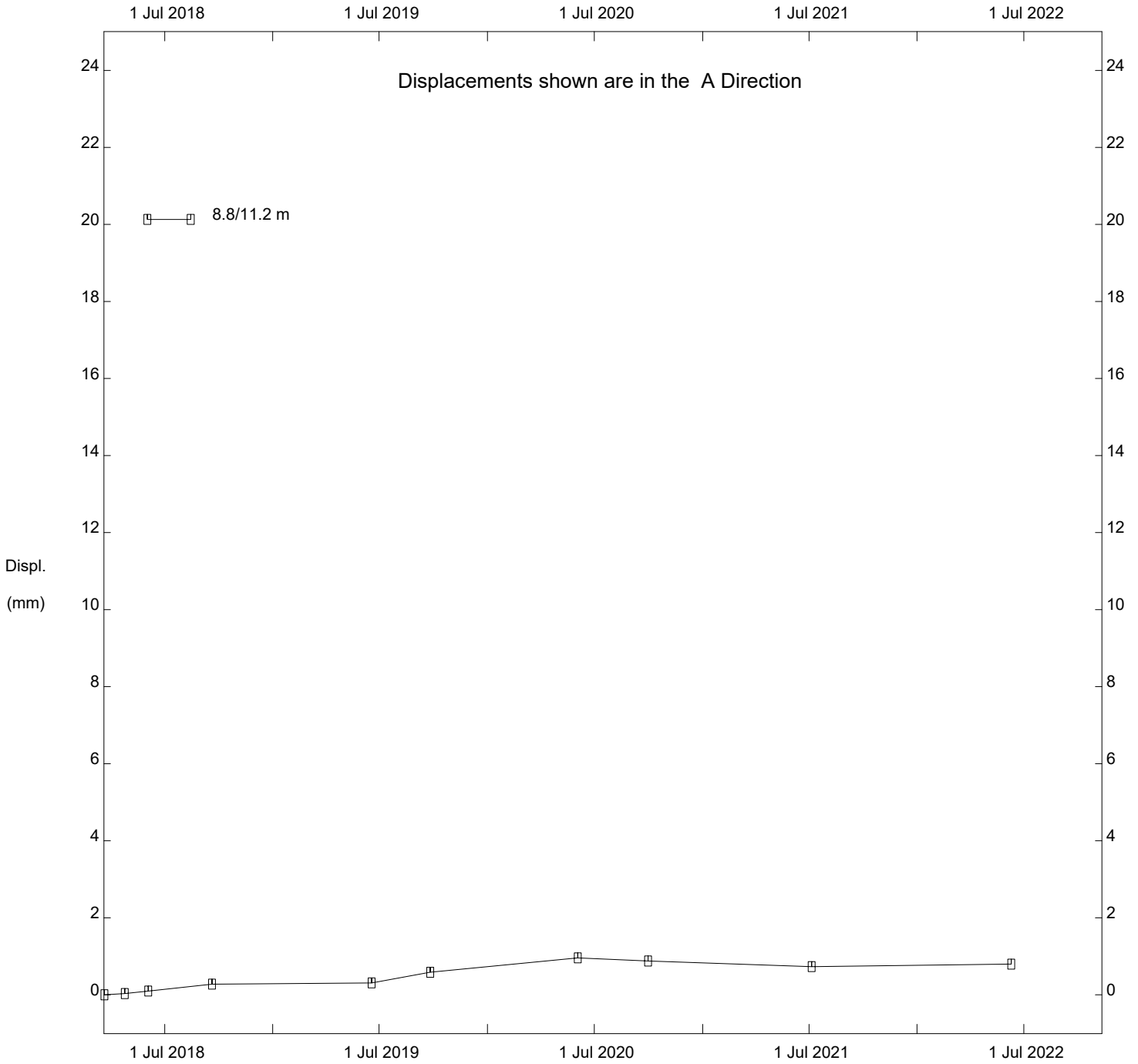


SH006, Klumph Creek Slide, Inclinometer SI18-34

Alberta Transportation

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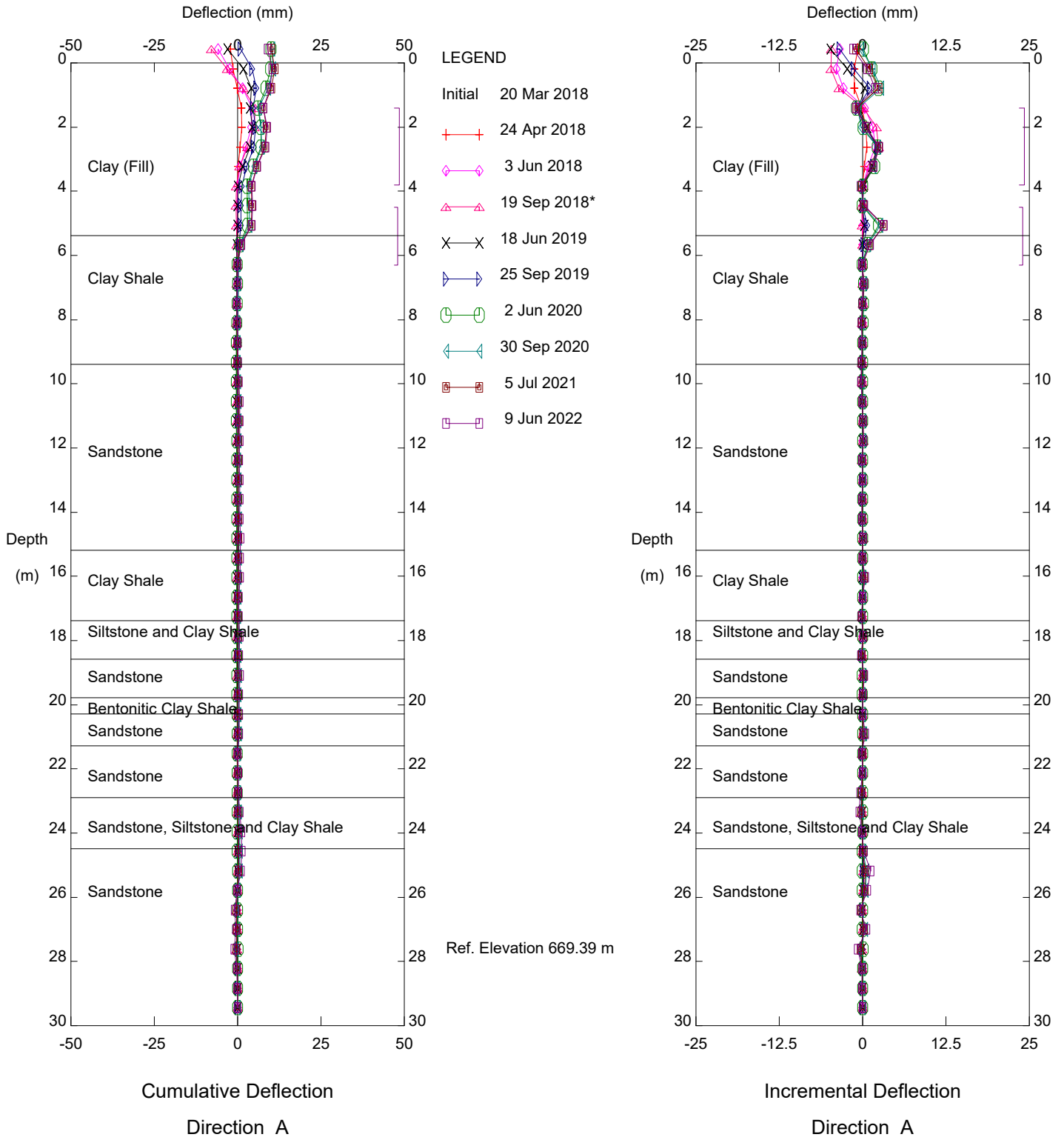
Thurber Engineering Ltd



SH006, Klumph Creek Slide, Inclinator SI18-34

Alberta Transportation

Thurber Engineering Ltd

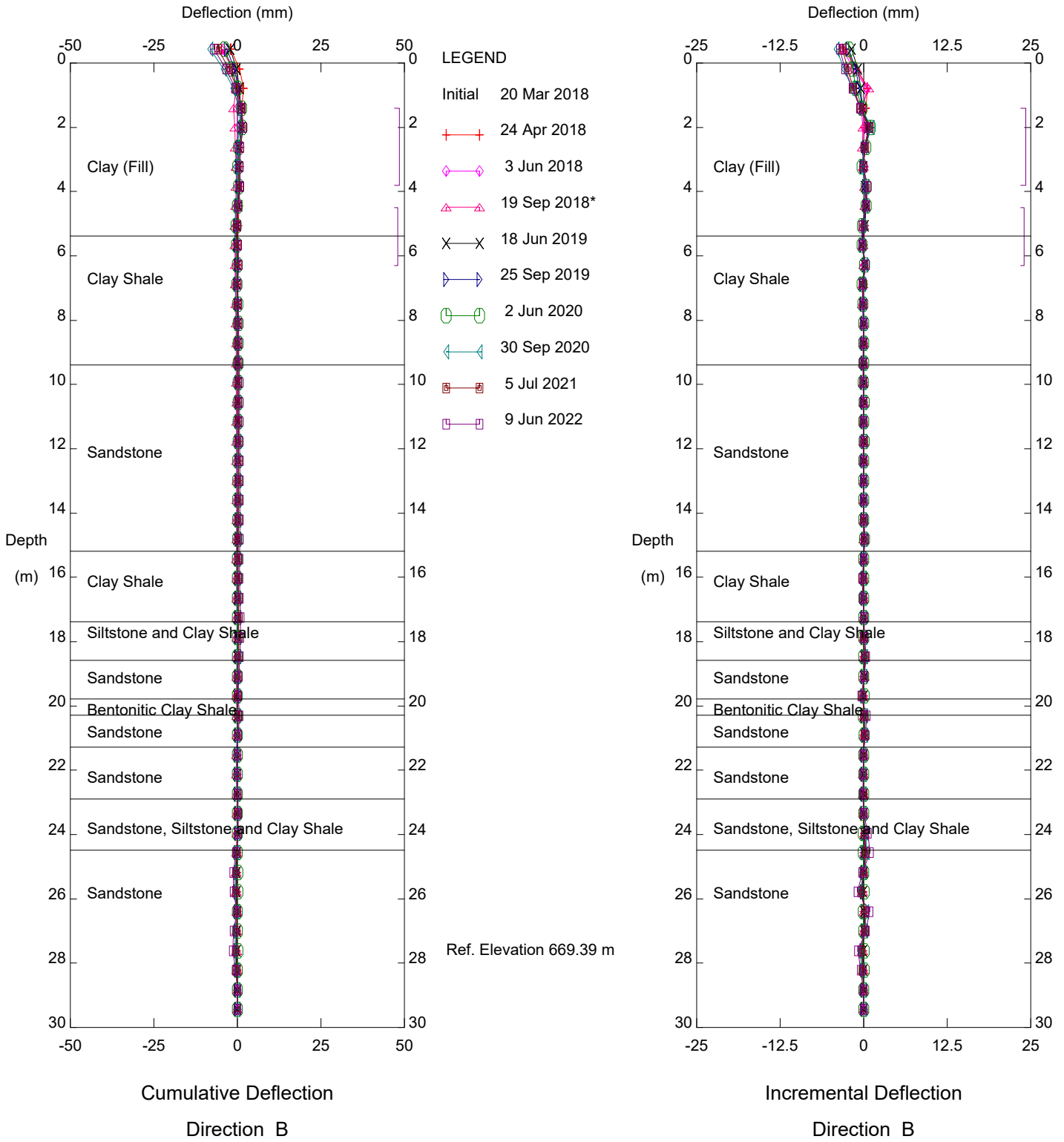


SH006, Klumph Creek Slide, Inclinometer SI18-35

Alberta Transportation

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Thurber Engineering Ltd

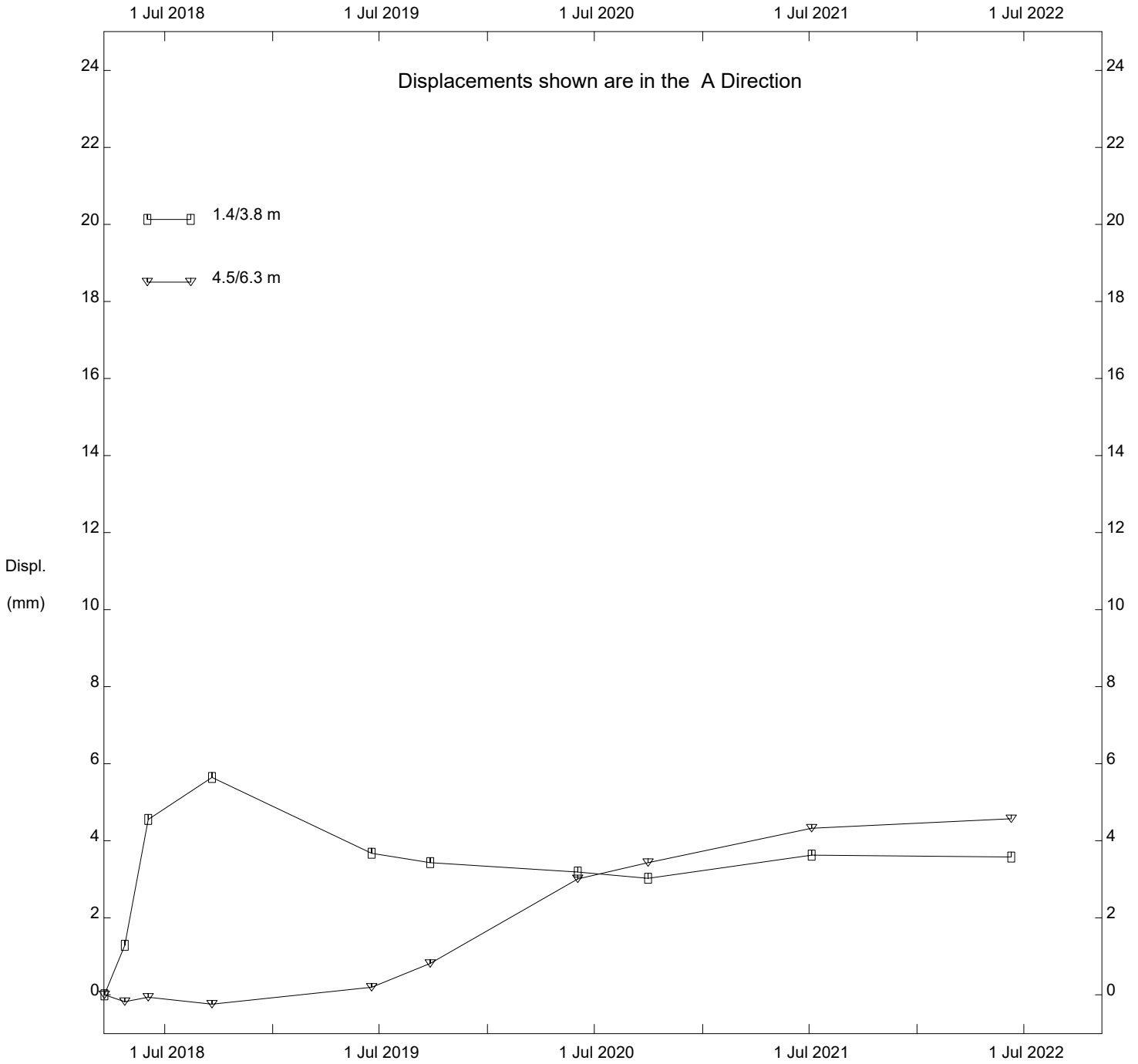


SH006, Klumph Creek Slide, Inclinometer SI18-35

Alberta Transportation

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

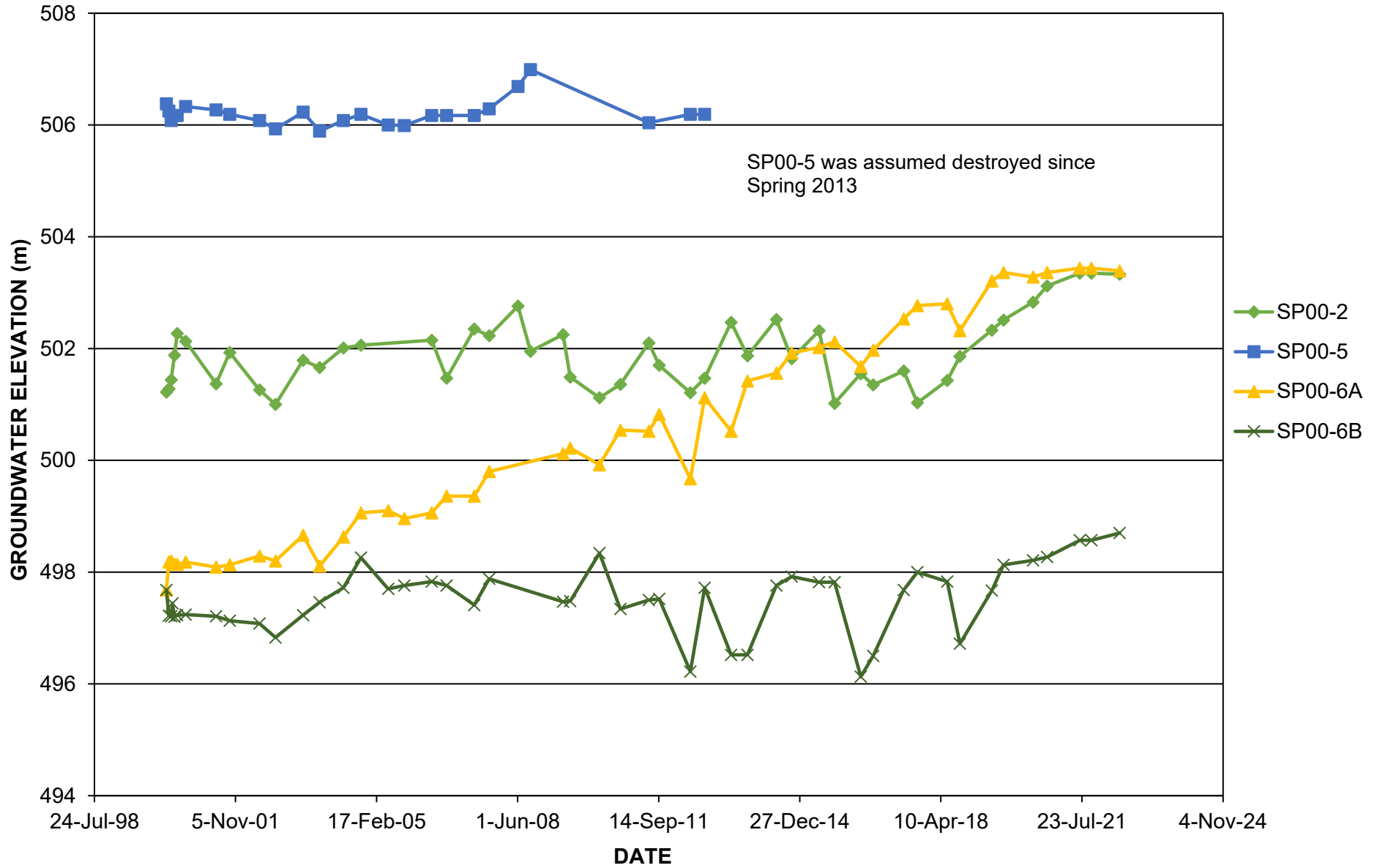
Thurber Engineering Ltd



SH006, Klumph Creek Slide, Inclinator SI18-35

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FIGURE SH006-1
KLUMPH CREEK STANDPIPE PIEZOMETER DATA



**FIGURE SH006-2
KLUMPH CREEK PNEUMATIC PIEZOMETER DATA (2018 INSTRUMENTS)**

