

ALBERTA TRANSPORTATION AND
ECONOMIC CORRIDORS GRMP
PEACE REGION
(GRANDE PRAIRIE DISTRICT - NORTH)
INSTRUMENTATION MONITORING - SPRING 2025



Site Number	Location	Name	Hwy	km
PH037	Station 1+250 to 2+000	Dunvegan South	2:68	Km 15.7
Legal Description: 4-7-80-4 W6		UTM Co-ordinates		
		11U E 398593.62	N	6197597.09

Current Monitoring:	18~19-June-2025	Previous Monitoring	26-Sep-2024
Instruments Read By:	Mr. Niraj Regmi, G.I.T and Mr. Godfred Etiendem, of Thurber		

Instruments Read During This Site Visit			
Slope Inclinometers (SIs): SI54 SI58 SI59 SI61 SI09-1 SI09-7 SI18-4 SI18-5 SI18-7 SI18-8 SI18-9 SI18-10	Pneumatic Piezometers (PN): PN18-1, PN18-2, PN18-3, PN18-4, PN18-5B, PN18-6A, PN18-7A, PN18-7B, PN18-7C, PN18-8A, PN18-8B, PN18-9A, PN18-9B, PN18-9C, PN18-10A, PN18-10B, PN18-12B, PN18-14A and PN18-14B	Vibrating Wire Piezometers (VW):	Standpipe Piezometers (SP): SP09-6 SP09-8
Load Cell (LC):	Strain Gauges:	SAA's:	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:	Standpipe Piezometers: Heron dipmeter
Load Cell:	Strain Gauges:	SAA's:	Others:
Note *SI-55 was found to have been damaged and bent near the surface since the spring of 2024 readings. ** SI-56, and PN18-13A/B were destroyed during recent construction and were not read during the spring of 2025 readings *** SI-59 was damaged during construction ~0.6 m from the top of the casing, but the instrument is still readable			

Discussion	
Zones of New Movement:	None
Interpretation of Monitoring Results:	<p>The site is very large. To assist with interpretation the slope inclinometer results have been grouped into three zones: South, Central and North. Slope inclinometers are listed moving from south to north within each zone; offsets to the west represent SIs downslope of the highway while east offsets represent SIs upslope of the highway.</p> <p>South third of site:</p> <p>Slope inclinometer SI18-7 is just west of the highway and showed a rate of movement of 12.6 mm/yr along a distinct shear plane over 9.1 m to 11.6 m depth in a clay till layer. This movement rate has been steady since the SI was installed in 2018.</p>

	<p>SI18-4 is in the cut slope above the highway and shows no discernible movement throughout the 28 m length of the slope inclinometer pipe.</p> <p>SI18-5 is just east of the highway and shows a rate of movement of 6.3 mm/yr over a distinct shear zone between 17.2 m to 20.3 m depth within a clay layer. This movement rate has been steady since the SI was installed in 2018.</p> <p>SI09-7 is about 90 m west of the highway and has several zones of movement. This instrument showed no discernible movement over the movement zone from 3.9 m to 6.3 m depth and the total movement since 2009 is about 8 mm. A rate of movement of 0.3 mm/yr was measured over 18.5 m to 20.3 m depth. This rate of movement has been steady since 2009 and total recorded movements are about 5.6 mm.</p> <p>SI-59 is in the highway east ditch near the assumed backscarp north flank of the landslide that is affecting the highway. It showed a rate of movement of 11.9 mm/yr over 1.0 m to 7.1 m depth. This SI has moved 186 mm over this depth zone, since it was first installed in 1994. A slower moving, subtle shear zone at 13 m depth may be present.</p> <p>Middle third of site:</p> <p>SI18-8 is just west of the highway and showed a rate of movement of 3.5 mm/yr along a distinct shear plane over 14.5 m to 16.3 m depth in a clay layer. This movement rate has held steady since 2018 and total movement to date is about 26 mm.</p> <p>SI-58 is about 100 m east of the highway and showed a rate of movement of 6.3 mm/yr over 0.5 m to 3.6 m depth. The movement pattern at SI-58 is bending with no well-defined shear zone.</p> <p>SI18-9 is about 35 m west of the highway and showed a rate of movement of 2.8 mm/yr along a well-defined shear plane over 20.1 m to 22.0 m depth in a clay till layer.</p> <p>North third of site:</p> <p>SI18-10 is just west of the highway and showed no discernible movement over 0 m to 3.0 m depth and a rate of movement of 2.0 mm/yr over 21.3 m to 23.2 m depth. The upper movement is tilting within a clay layer while the lower zone is a slowly developing distinct shear within a different clay layer.</p> <p>Slope inclinometer SI-54 is about 70 m east of the highway and showed a rate of movement of 9.1 mm/yr over 0 m to 1.7 m depth since the fall of 2024 readings. Of more significance with this slope inclinometer is the lack of observed shear zones below the near ground surface movement zone.</p> <p>SI09-1 is just west of the highway and showed a rate of movement of 1.0 mm/yr over 0.3 m to 7.0 m, and rates of movement of 1.0 mm/yr, and 0.3 mm/yr at depths between 7.0 m to 13.1 m, and 13.1 m to 14.9 m, respectively, since the fall of 2024 readings.</p> <p>SI-61 is just west of the highway and just north of SI09-1; it showed a rate of movement of 1.5 mm/yr over 3.6 m to 10.3 m depth. The pattern of movement at SI-61 is best described as a bulge which is unusual for this site.</p> <p>Standpipe piezometers SP09-6 and SP09-8 continued to be dry.</p> <p>Most of the pneumatic piezometers generally showed relatively small changes in groundwater level compared to the fall of 2024, ranging from a decrease of 0.20 m in PN18-1 to an increase of 0.98 m in PN18-14A. PN18-4 showed a groundwater elevation of 453.90 m,</p>
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	which is the highest measured in the instrument since it was initialized in 2018.
Future Work:	The instruments should be read again in the fall of 2025. Another attempt should be made to read PN18-12B to confirm if it is not functioning.
Instrumentation Repairs:	SI-55 and SI-59 are both damaged and should be repaired. Both instruments are damaged near the ground surface and should be repairable by hand.
Additional Comments:	

Attachments:	<ul style="list-style-type: none"> • Table PH037-1 Spring 2025 – HWY 2:68 Dunvegan South, Slope Inclinator Reading Summary • Table PH037-2 Spring 2025 – HWY 2:68 Dunvegan South, Standpipe Piezometer Reading Summary • Table PH037-3 Spring 2025 – HWY 2:68 Dunvegan South, Pneumatic Piezometer Reading Summary • Statement for Use and Interpretation of Report • APPENDIX A - PH037-1 SPRING 2025 <ul style="list-style-type: none"> ○ Field Inspector's Report ○ Site Plan Showing Approximate Instrument Locations (Drawing No. 32123-PH037-1 and 32123-PH037-2) ○ SI Reading Plots ○ Figure PH037-1 (Standpipe Piezometric Elevations) ○ Figure PH037-2 (Standpipe Piezometric Depths) ○ Figure PH037-3 (Pneumatic Piezometric Elevations) ○ Figure PH037-4 (Pneumatic Piezometric 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.
Renato Clementino, Ph.D., P. Eng.
Principal | Senior Geotechnical Engineer

Bruce Nestor, M.Eng., P.Eng.
Geotechnical Engineer

Table PH037-1: Spring 2025 – HWY 2:68 Dunvegan South Slope Inclinometer Instrumentation Reading Summary

Date Monitored: June 18-19, 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)
South Third of Site								
SI18-7	February 21, 2018	91.9 mm over 9.1 m to 12.2 m depth in 269° direction	17.5 mm/yr in April 2018	Operational	September 26, 2024	9.2	12.6	-0.1
SI-66	Jan. 21, 1993	54.7 mm over 0.6 m to 6.7 m depth in 330° direction	10.4 mm/yr In June 1994	Sheared at 4.3 m	September 25, 2011	N/A	N/A	N/A
SI18-4	February 12, 2018	No discernible movement	N/A	Operational	September 26, 2024	N/A	N/A	N/A
SI09-9	Sept. 30, 2009	34.2 mm over 12.0 m to 15.1 m depth in 240° direction	8.7 mm/yr in May 2010	Sheared at 13.3 mBGS	May 25, 2015	N/A	N/A	N/A
SI18-5	February 16, 2018	50.4 mm over 17.2 m to 20.3 m depth in 303° direction	10.5 mm/yr in April 2018	Operational	September 26, 2024	4.6	6.3	1.1
SI09-5	Sept. 30, 2009	40.3 mm over 24.9 m to 27.3 m depth in 270° direction	10.3 mm/yr in June 2011	Sheared at 26.1 m	September 19, 2014	N/A	N/A	N/A
SI09-7	Sept. 30, 2009	7.9 mm over 3.9 m to 6.3 m depth in 311° direction	5.3 mm/yr in September 2011	Operational	September 26, 2024	No discernible movement	N/A	-0.7
		5.6 mm over 18.5 m to 20.3 m depth in 286° direction	1.1 mm/y in October 2017			0.2	0.3	0.2
SI-59	June 28, 1994	186.4 mm over 1.0 m to 7.1 m depth in 299° direction	16.4 mm/yr in March 1995	Operational	September 26, 2024	8.7	11.9	11.9

Drawings 32123-PH037-1 and 32123-PH037-2 in Appendix A provide sketches of the approximate locations of the monitoring instrumentation for this site.

Table PH037-1 – Continued... Spring 2025 – HWY 2:68 Dunvegan South Slope Inclinator Instrumentation Reading Summary

Date Monitored: June 18, 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)
South Third of Site Continued								
<i>SI18-6</i>	<i>February 15, 2018</i>	<i>42.6 mm over 32.1 m to 35.1 m depth in 307° direction</i>	<i>12.6 mm/yr in October 2020</i>	<i>Sheared off at 34.7 m depth</i>	<i>October 5, 2022</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
<i>SI09-4</i>	<i>Sept. 30, 2009</i>	<i>33.3 mm over 23.8 m to 26.3 m depth in 250° direction.</i>	<i>10.6 mm/yr in November 2009</i>	<i>Sheared at 24.4 m</i>	<i>September 19, 2014</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>

Drawings 32123-PH037-1 and 32123-PH037-2 in Appendix A provide sketches of the approximate locations of the monitoring instrumentation for this site.

Table PH037-1 – Continued... Spring 2025 – HWY 2:68 Dunvegan South Slope Inclinator Instrumentation Reading Summary

Date Monitored: June 18-19, 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)
Middle Third of Site								
SI18-8	February 12, 2018	25.6 mm over 14.5 m to 16.3 m depth in 266° direction	5.1 mm/yr in April 2018	Operational	September 26, 2024	2.6	3.5	-0.3
SI-58	Aug. 26, 1992	165.77 mm over 0.5 m to 3.6 m depth in 270° direction	41.7 mm/yr in October 1998	Operational	September 26, 2024	4.6	6.3	-4.3
SI-57	Aug. 26, 1992	193.3 mm over 0.0 m to 2.3 m depth in 283° direction	44.2 mm/yr in October 1998	Sheared at 3.7 m	September 19, 2015	N/A	N/A	N/A
SI-56	Aug. 26, 1992	73.8 mm over 0.0 m to 2.7 m depth in 12° direction	21.5 mm/yr in October 1998	Destroyed	September 26, 2024	N/A	N/A	N/A
SI-55	Aug. 27, 1992	57.6 mm over 1.3 m to 4.3 m depth in 281° direction	17.4 mm/yr in October 2021	Damaged	October 16, 2023	N/A	N/A	N/A
SI18-9	April 25, 2018	20.2 mm over 20.1 m to 22.0 m depth in 287° direction	3.2 mm/yr in October 2018	Operational	September 26, 2024	2.1	2.8	-0.7

Drawings 32123-PH037-1 and 32123-PH037-2 in Appendix A provide sketches of the approximate locations of the monitoring instrumentation for this site.

Table PH037-1 – Continued... Spring 2025 – HWY 2:68 Dunvegan South Slope Inclinator Instrumentation Reading Summary

Date Monitored: June 19, 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)
North Third of Site								
SI18-10	March 14, 2018	173.3 mm over 0.0 m to 3.0 m depth in 344° direction	675.3 mm/yr in June 2018	Operational	September 26, 2024	No discernible movement	N/A	-23.0
		12.7 mm over 21.3 m to 23.2 m depth in 319° direction	3.1 mm/yr in October 2021			1.4	2.0	0.2
SI-54	Mar. 6 1995	127.6 mm over 0.0 m to 1.7 m depth in 291° direction	36.1 mm/yr in March 1995	Operational	September 26, 2024	6.6	9.1	41.2
SI-62	Mar. 2, 1995	98.4 mm over 4.1 m to 10.8 m depth in 321° direction	43.8 mm/yr in October 2017	Sheared at 10.8 m below ground surface	July 4, 2019	N/A	N/A	N/A
		82.7 mm over 7.8 m to 10.8 m depth in 321° direction	38.7 mm/yr October 2017			N/A	N/A	N/A
SI09-2	Sept. 30, 2009	No discernible movement	No discernible movement	Broken at 0.3 mBGS	May 25, 2015	N/A	N/A	N/A

Drawings 32123-PH037-1 and 32123-PH037-2 in Appendix A provide sketches of the approximate locations of the monitoring instrumentation for this site.

Table PH037-1 – Continued... Spring 2025 – HWY 2:68 Dunvegan South Slope Inclinator Instrumentation Reading Summary

Date Monitored: June 19, 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)
North Third of Site Continued								
SI09-1	Sept. 30, 2009	49.6 mm over 0.3 m to 7.0 m depth in 216° direction	15.7 mm/yr in November 2009	Operational	September 26, 2024	0.7	1.0	-0.1
		22.4 mm over 7.0 m to 13.1 m depth in 216° direction	4.0 mm/yr in September 2015			0.7	1.0	0.2
		5.4 mm over 13.1 m to 14.9 m depth in 216° direction	1.0 mm/yr in September 2014			0.2	0.3	0.2
SI18-11	February 21, 2018	41.4 mm over 0.1 m to 6.2 m depth in 332° direction	280.1 mm/yr in April 2018	Sheared at 2.4 m depth	April 25, 2018	N/A	N/A	N/A
SI-61	Mar. 2, 1995	26.5 mm over 3.6 m to 10.3 m depth in 190° direction	7.2 mm/yr in October 1997	Operational	September 26, 2024	1.1	1.5	-1.4

Drawings 32123-PH037-1 and 32123-PH037-2 in Appendix A provide sketches of the approximate locations of the monitoring instrumentation for this site.

Table PH037-2: Spring 2025 – HWY 2:68 Dunvegan South Standpipe Piezometer Instrumentation Reading Summary

Date Monitored: June 19, 2025

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED WATER LEVEL BGS (m)	MEASURED WATER LEVEL BGS (m)	PREVIOUS READING (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
SP09-6	September 30, 2009	26.56	N/A	Active	26.21 on June 22, 2022	Dry	Dry	N/A
SP09-8	September 30, 2009	11.61	N/A	Active	N/A	Dry	Dry	N/A

Drawings 32123-PH037-1 and 32123-PH037-2 in Appendix A provide sketches of the approximate locations of the monitoring instrumentation for this site.

Table PH037-3: Spring 2025 – HWY 2:68 Dunvegan South Pneumatic Piezometer Instrumentation Reading Summary

Date Monitored: June 18-19, 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)
PN18-1	February 9, 2018	485.20	517.20	Operational	485.96 on September 26, 2024	5.5	485.76	485.96	-0.20
PN18-2	February 11, 2018	485.01	503.30	Operational	485.58 on June 9, 2018	4.1	485.43	485.53	-0.10
PN18-3	February 11, 2018	461.96	490.00	Operational	462.56 on June 21, 2022	2.8	462.25	462.32	-0.07
PN18-4	February 11, 2018	453.41	480.00	Operational	453.90 on June 18, 2025	4.8	453.90	453.73	0.17
PN18-5A	February 17, 2018	450.55	460.30	Malfunctioning	452.21 on July 4, 2019	N/A	N/A	452.21 (July 4, 2019)	N/A
PN18-5B	February 17, 2018	432.26	460.30	Operational	432.65 on June 9, 2018	1.9	432.45	432.53	-0.08
PN18-6A	February 19, 2018	436.96	446.10	Operational	437.95 on May 28, 2024	1.2	437.08	437.06	0.02
PN18-6B	February 19, 2018	388.19	446.10	Malfunctioning	389.03 on March 14, 2018	N/A	N/A	388.31 (Oct. 22, 2021)	N/A
PN18-7A	February 23, 2018	454.35	464.10	Operational	454.78 on June 9, 2018	2.8	454.64	454.65	-0.01
PN18-7B	February 23, 2018	447.64	464.10	Operational	448.13 on June 9, 2018	3.4	447.99	447.96	0.03
PN18-7C	February 23, 2018	438.19	464.10	Operational	438.60 on June 21, 2020	3.0	438.50	438.49	0.01
PN18-8A	February 22, 2018	444.50	450.60	Operational	445.16 on June 18, 2022	3.8	444.89	444.90	-0.01
PN18-8B	February 22, 2018	429.26	450.60	Operational	429.70 on Oct. 22, 2021	2.4	429.50	429.30	0.20

Drawings 32123-PH037-1 and 32123-PH037-2 in Appendix A provide sketches of the approximate locations of the monitoring instrumentation for this site.

Table PH037-3 – Continued... Spring 2025 – HWY 2:68 Dunvegan South Pneumatic Piezometer Instrumentation Reading Summary

Date Monitored: June 19, 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)
PN18-9A	February 19, 2018	433.18	440.80	Operational	440.88* on June 21, 2020	0.7	433.25	433.32	-0.07
PN18-9B	February 19, 2018	418.24	440.80	Operational	419.65 on June 21, 2020	2.9	418.54	418.53	0.01
PN18-9C	February 19, 2018	383.19	440.80	Operational	383.72 on June 9, 2018	1.1	383.30	383.36	-0.06
PN18-10A	February 21, 2018	433.56	442.70	Operational	434.1 on June 9, 2018	2.9	433.86	433.84	0.02
PN18-10B	February 21, 2018	410.54	442.70	Operational	411.0 on June 9, 2018	3.2	410.87	410.88	-0.01
PN18-11A	March 14, 2018	412.85	425.80	Destroyed	413.2 on April 25, 2018	N/A	N/A	413.20 (Apr. 25, 2018)	N/A
PN18-11B	March 14, 2018	392.73	425.80	Destroyed	393.8 on April 25, 2018	N/A	N/A	393.78 (Apr. 25, 2018)	N/A
PN18-12A	February 17, 2018	435.90	442.00	Malfunctioning	438.15 on June 9, 2018	N/A	N/A	435.95 (July 2, 2019)	N/A
PN18-12B	February 17, 2018	422.19	442.00	Malfunctioning	422.68 on June 9, 2018	N/A	N/A	422.57 (Sep. 26, 2024)	N/A
PN18-13A	February 15, 2018	430.36	439.50	Destroyed	430.92 on June 9, 2018	N/A	N/A	430.67 (Sep. 26, 2024)	N/A
PN18-13B	February 15, 2018	413.59	439.50	Destroyed	414.08 on June 9, 2018	N/A	N/A	413.87 (Sep. 26, 2024)	N/A

Drawings 32123-PH037-1 and 32123-PH037-2 in Appendix A provide sketches of the approximate locations of the monitoring instrumentation for this site.

* Indicates above-ground (artesian) groundwater level

Table PH037-3– Continued...Spring 2025 – HWY 2:68 Dunvegan South Pneumatic Piezometer Instrumentation Reading Summary

Date Monitored: June 19, 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)
PN18-14A	February 15, 2018	424.29	434.50	Operational	425.77 on March 14, 2018	13.6	425.68	424.70	0.98
PN18-14B	February 15, 2018	407.98	434.50	Operational	408.37 on October 4, 2018	3.6	408.35	408.32	0.03

Drawings 32123-PH037-1 and 32123-PH037-2 in Appendix A provide sketches of the approximate locations of the monitoring instrumentation for this site.

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 (CON0022165)
PEACE REGION (GRANDE PRAIRIE DISTRICT – NORTH)
INSTRUMENTATION MONITORING RESULTS**

SPRING 2025

**APPENDIX A
DATA PRESENTATION**

SITE PH037: HWY 2:68, DUNVEGAN SOUTH

**ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS
PEACE REGION (GRANDE PRAIRIE - NORTH DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH037)
SPRING 2025**

Location: Dunvegan South (HWY 2:68 C1 15.674)	Readout:
File Number: 32123	Extension:
Probe: RST SET 5R and 8R	Temp: 17
Cable: RST SET 5R and 8R	Read by: 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 (m)	Northing (m)					A+	A-	B+	B-			
SI-54	398593.62	6197597.09	19-Jun-25	0.73	62 to 2	5	230	-220	-591	575	5R/5R	3.34	***
SI-55	398503.91	6197504.55	19-Jun-25	0.56	66 to 2	15	-	-	-	-	8R/8R	3.34	see notes
SI-56	398540.17	6197496.24	19-Jun-25	0.91	76 to 2	350	-	-	-	-	8R/8R	3.34	see notes
SI-58	398626.26	6197479.42	18-Jun-25	0.71	64 to 2	0	-381	392	-462	463	5R/5R	3.34	***
SI-59	398528.72	6197362.9	19-Jun-25	0.87	76 to 2	40	184	-171	-796	798	8R/8R	3.34	see notes
SI-61	398521.45	6197719.36	19-Jun-25	0.67	62 to 2	345	95	-87	-943	923	5R/5R	3.34	*
SI09-1	398520.28	6197714.60	19-Jun-25	0.92	108 to 2	235	-118	126	469	-491	5R/5R	3.34	
SI09-7	398423.87	6197337.20	19-Jun-25	1	108 to 2	270	-278	285	-82	71	5R/5R	3.34	
SI18-4	398582.00	6197288.00	18-Jun-25	0.89	94 to 2	302	431	-430	-41	41	8R/8R	2.75	
SI18-5	398525.00	6197321.00	19-Jun-25	0.76	98 to 2	280	164	-156	371	-392	5R/5R	2.75	
SI18-7	398495.00	6197264.00	19-Jun-25	0.91	132 to 2	238	473	-513	-751	745	8R/8R	2.75	
SI18-8	398509.00	6197461.00	19-Jun-25	1.06	110 to 2	260	-1693	1644	1171	-1170	8R/8R	2.75	
SI18-9	398491.00	6197515.00	19-Jun-25	0.9	188 to 2	266	184	-167	221	-215	8R/8R	2.75	
SI18-10	398518.00	6197582.00	19-Jun-25	0.92	110 to 2	268	271	-267	-217	198	5R/5R	2.75	

INSPECTOR REPORT

*SI-61 Hard to pull from 26-24 ft, use dummy probe
*** Slope Direction is 270 degree
SI -59 Damaged during construction broken about 2.0ft from top of casing, can be repaired without mechanical assistance, this time SI read from 74.0 ft
SI-55 DAMAGED can be repaired without mechanical excavation, its broken at 1 foot below ground surface see photo
SI-56 Wiped out during construction, no trace of SI in ditch see photo

**ALBERTA TRANSPORTATION AND ECONOMIC CORRIDORS
PEACE REGION (GRANDE PRAIRIE - NORTH DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH037)
SPRING 2025**

Location: Dunvegan South (HWY 2:68 C1 15.674)
File Number: 32123

Readout:
Temp: 17RST PN C108 Unit 8/ DGSi Dipmeter
Read by: NKR/GE

STANDPIPE PIEZOMETER READINGS

SP#	GPS Location (UTM 11)		Date	Stick-up (m)	Reading below top of casing (m)	Bottom Pipe Depth (below top of casing (m)
	Easting (m)	Northing (m)				
SP09-6	398501.99	6197268.45	19-Jun-25	1.04	DRY	27.60
SP09-8	398461.37	6197336.32	19-Jun-25	0.69	DRY	12.30

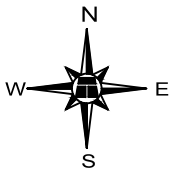
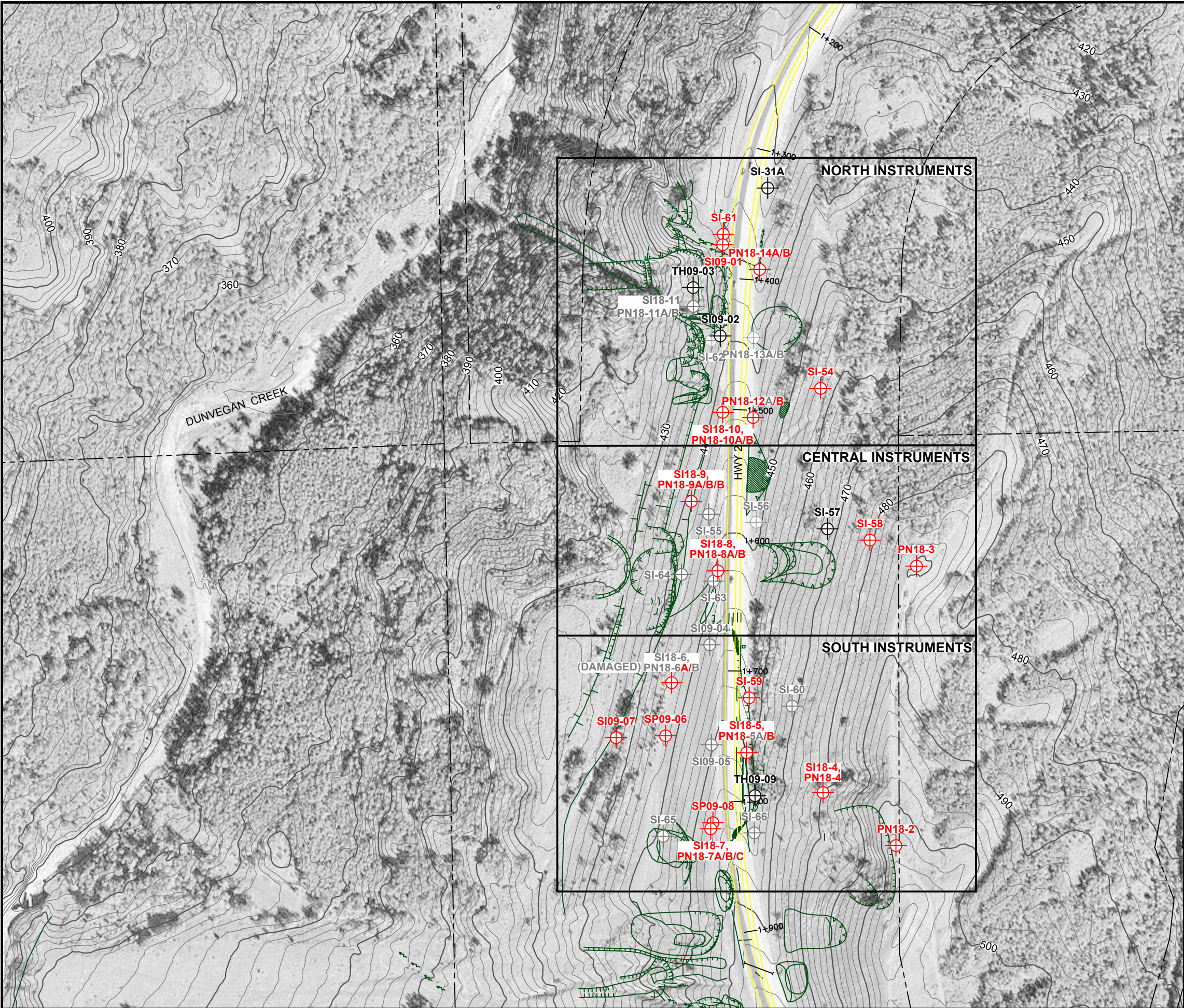
PNEUMATIC PIEZOMETER READINGS

PN#	GPS Location (UTM 11)		Date	Reading (kPa)	Identification Number
	Easting (m)	Northing (m)			
PN18-1	398691	6196979	18-Jun-25	5.5	37810
PN18-2	398636	6197245	18-Jun-25	4.1	37818
PN18-3	398661	6197458	18-Jun-25	2.8	37815
PN18-4	398582	6197288	18-Jun-25	4.8	37821
PN18-5B	398525	6197321	19-Jun-25	1.9	37817
PN18-6A	398470	6197377	19-Jun-25	1.2	37819
PN18-7A	398495	6197264	19-Jun-25	2.8	37826
PN18-7B	398495	6197264	19-Jun-25	3.4	37813
PN18-7C	398495	6197264	19-Jun-25	3	37807
PN18-8A	398509	6197461	19-Jun-25	3.8	37830
PN18-8B	398509	6197461	19-Jun-25	2.4	37811
PN18-9A	398491	6197515	19-Jun-25	0.7	37825
PN18-9B	398491	6197515	19-Jun-25	2.9	37808
PN18-9C	398491	6197515	19-Jun-25	1.1	37805
PN18-10A	398518	6197582	19-Jun-25	2.9	37827
PN18-10B	398518	6197582	19-Jun-25	3.2	37812
PN18-12B	398541	6197577	19-Jun-25	-	37820
PN18-13A	398544	6197638	19-Jun-25	-	37828
PN18-13B	398544	6197638	19-Jun-25	-	37814
PN18-14A	398551	6197690	19-Jun-25	13.6	37822
PN18-14B	398551	6197690	19-Jun-25	3.6	37816

INSPECTOR REPORT

PN18-12B Pressure keeps climbing, doesn't stabilize, must be pinched during ditch repair, contractor/ Thurber installed small protector,
PN 18-13A and PN18-13 B destroyed during construction

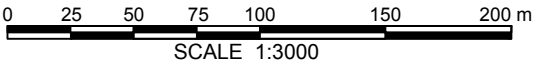
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LEGEND

- INSTRUMENT LOCATIONS
- INSTRUMENT NOT IN USE
- SI SLOPE INCLINOMETER
- PN PNEUMATIC PIEZOMETER
- SP STANDPIPE PIEZOMETER

NOTE:
PN18-1 IS SHOW N ON DRAWING PH037-1-1.



BASE PLAN PROVIDED BY



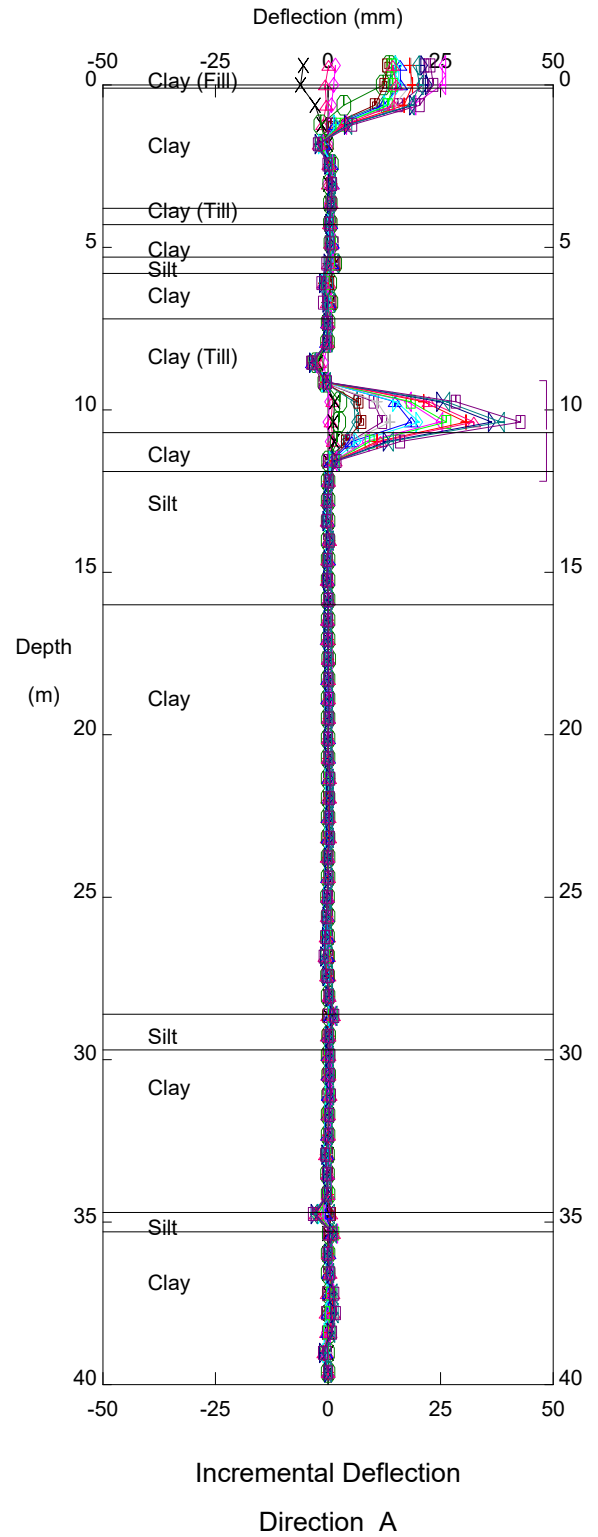
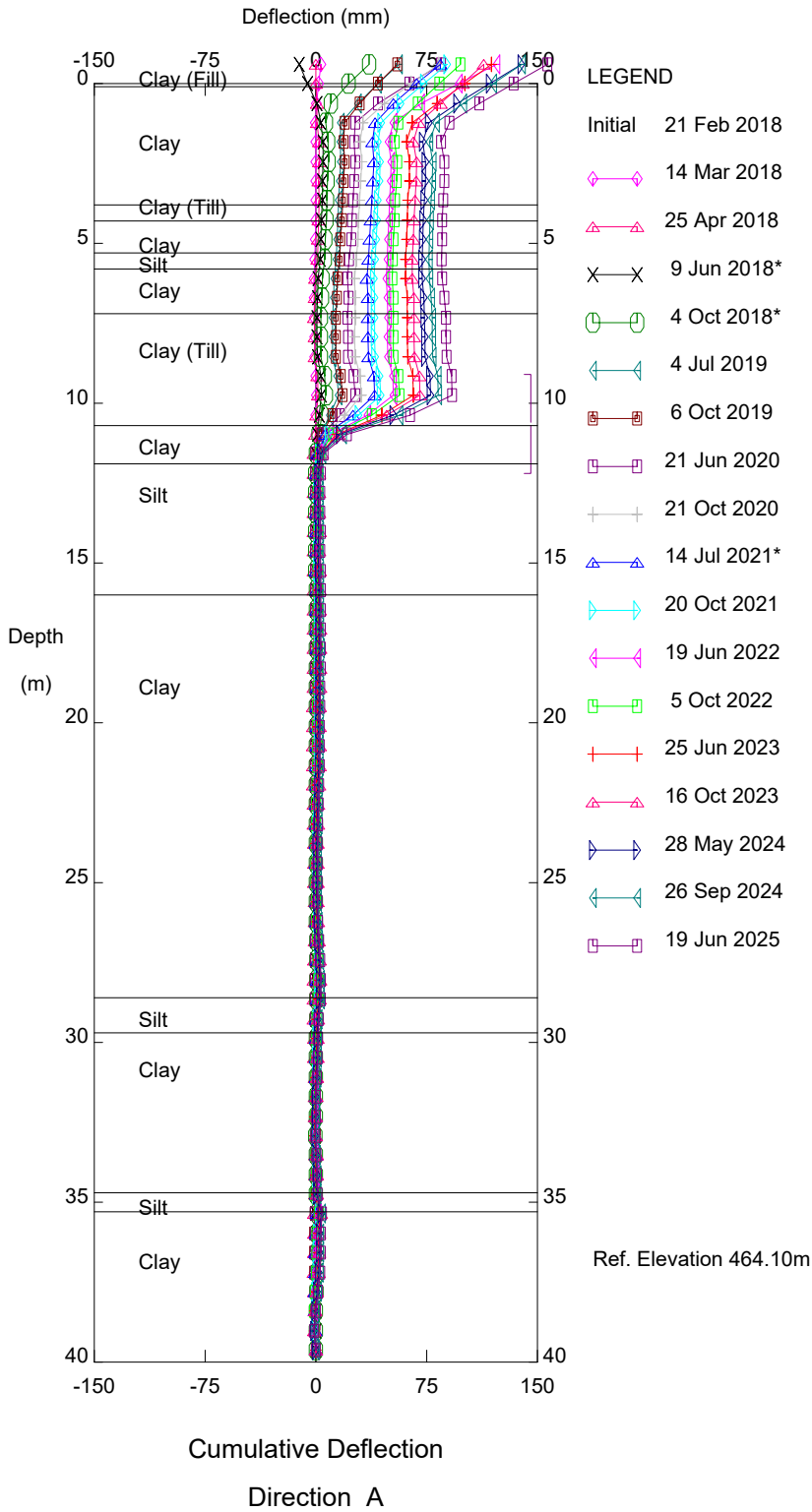
PEACE REGION
(GRANDE PRAIRIE DISTRICT NORTH)
PH037: DUNVEGAN SOUTH
INSTRUMENTATION LOCATIONS

DWG No. 32123-PH037-2

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	DWP
SCALE	1:3000
DATE	JULY 2025
FILE No.	32123



Thurber Engineering Ltd

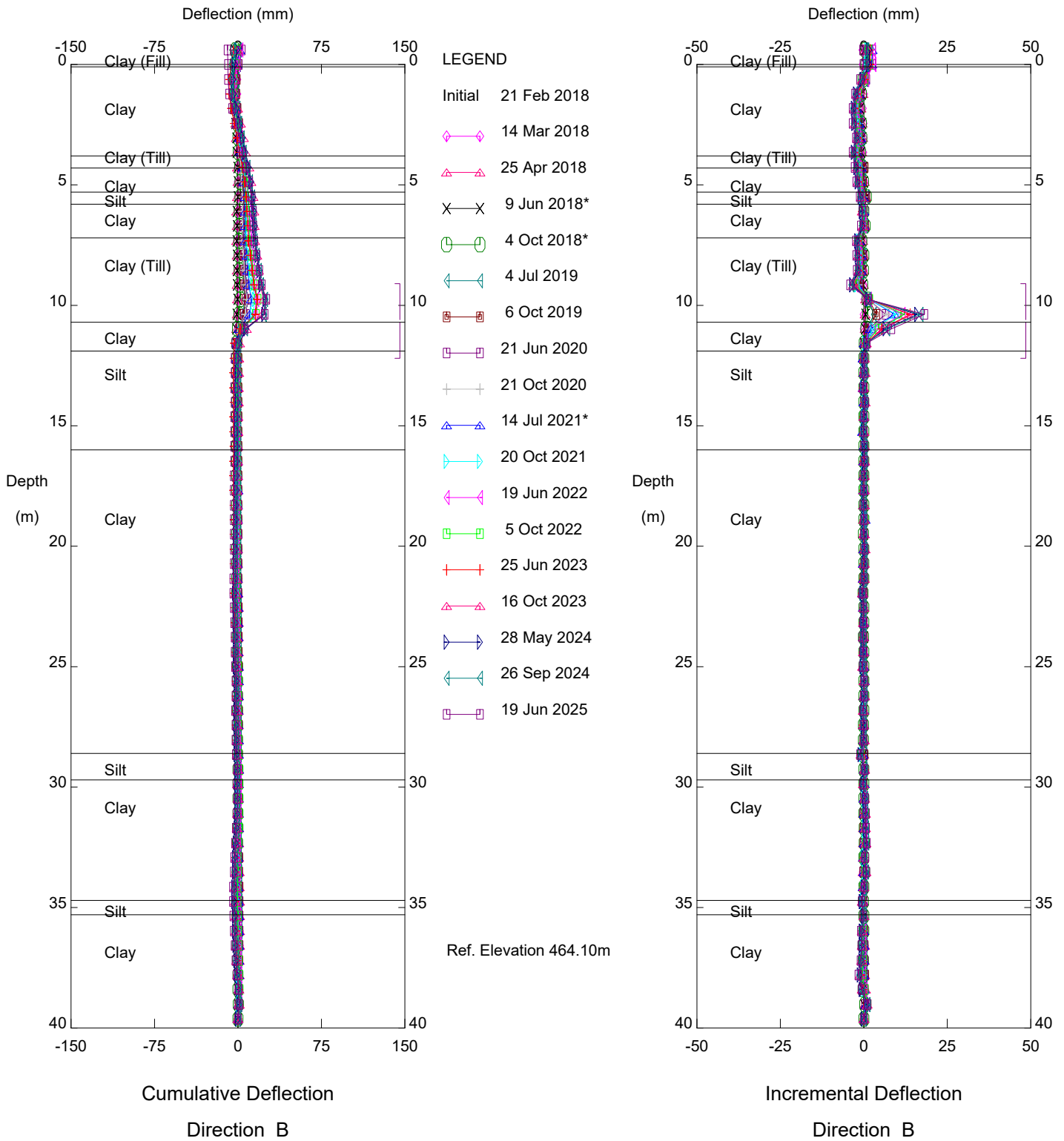


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Alberta Transportation

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Thurber Engineering Ltd

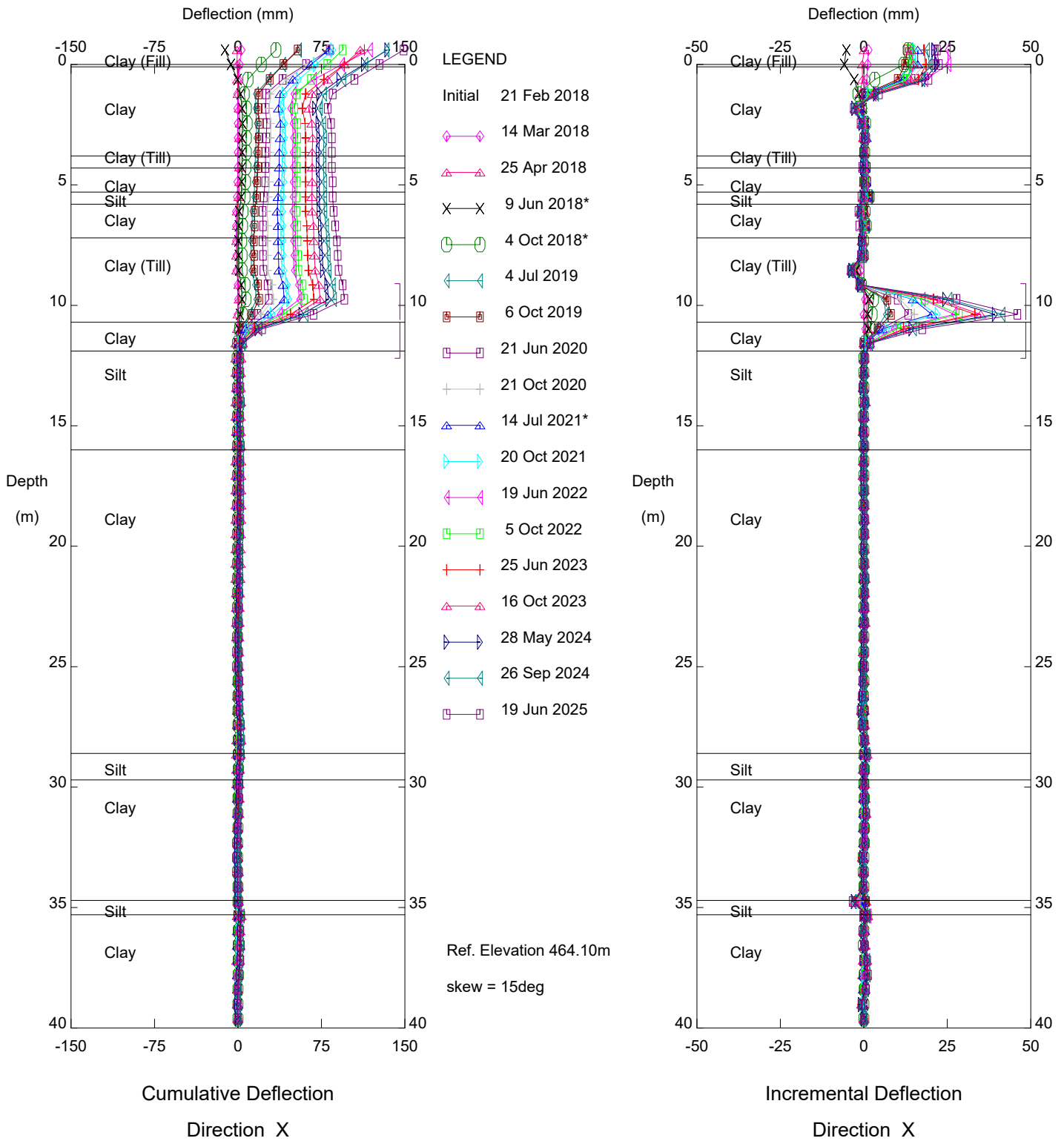


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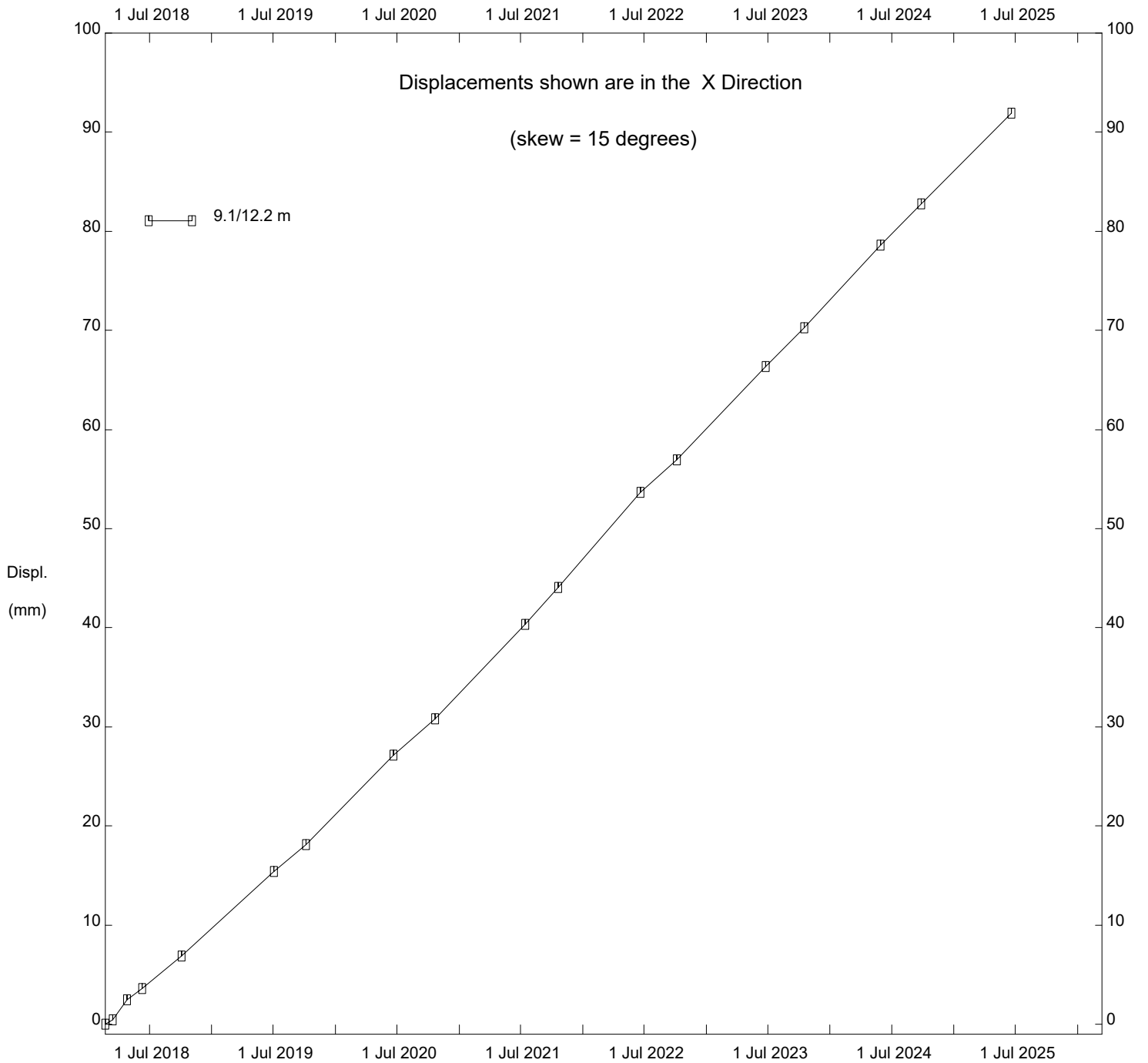


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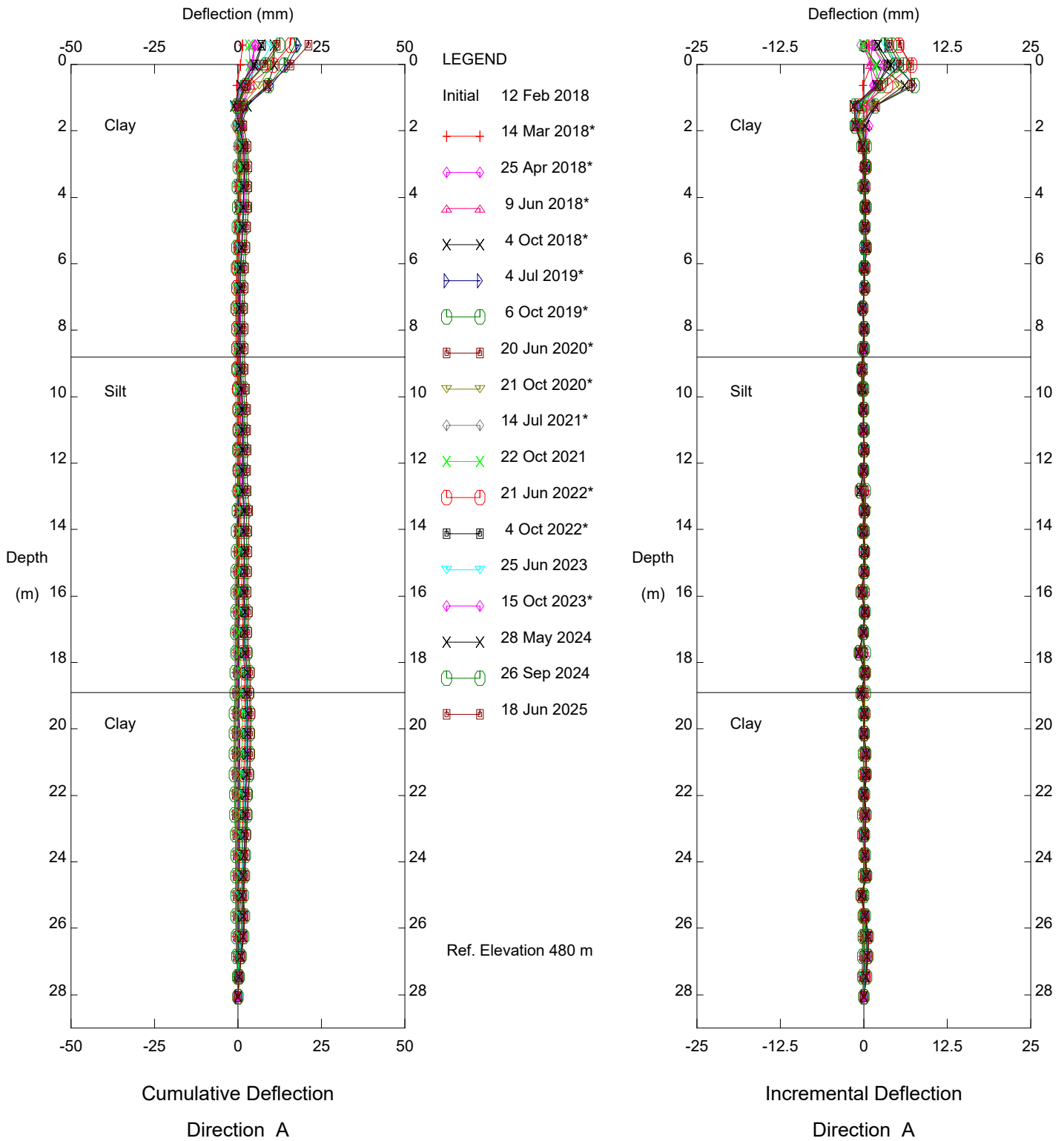
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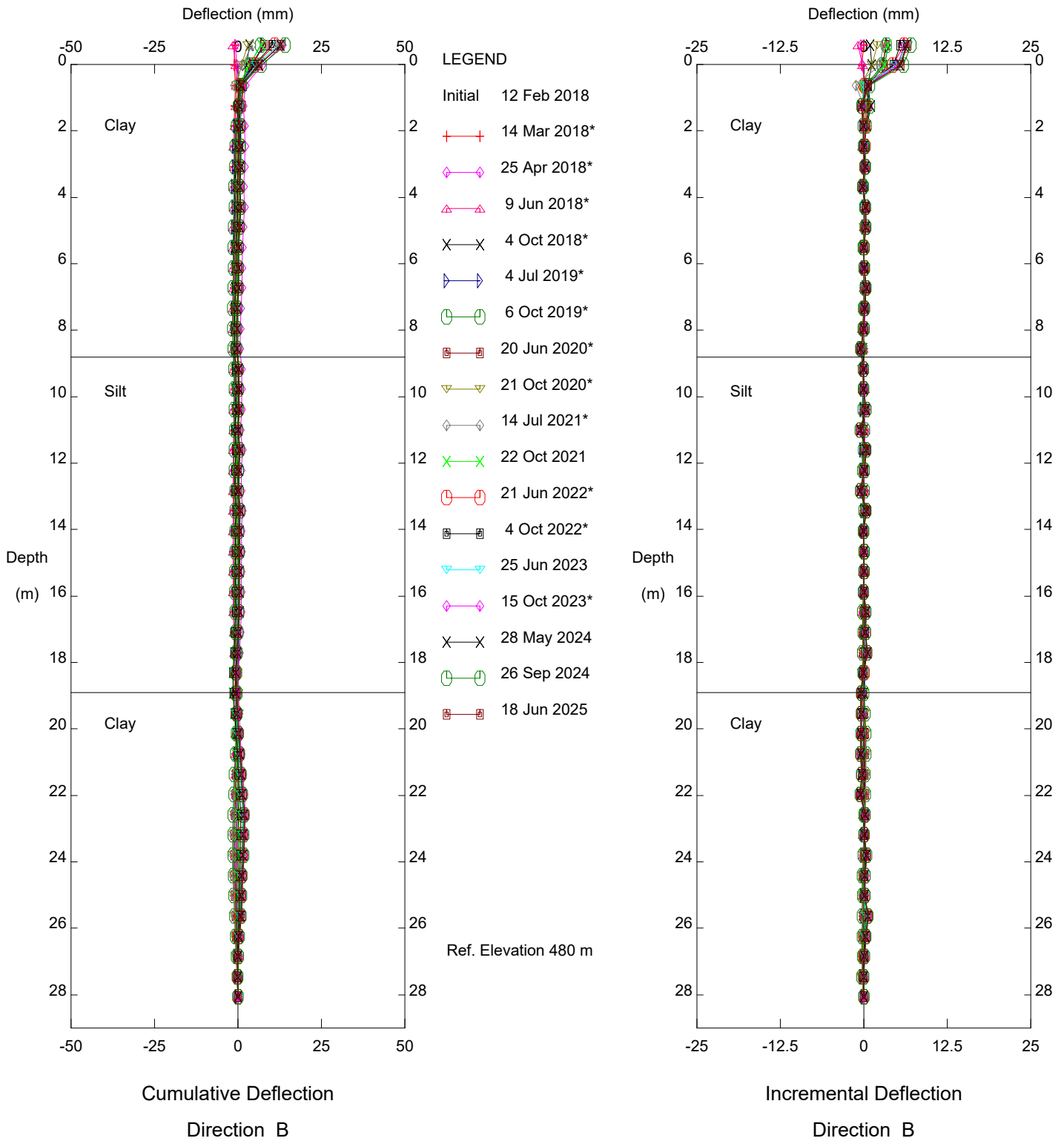


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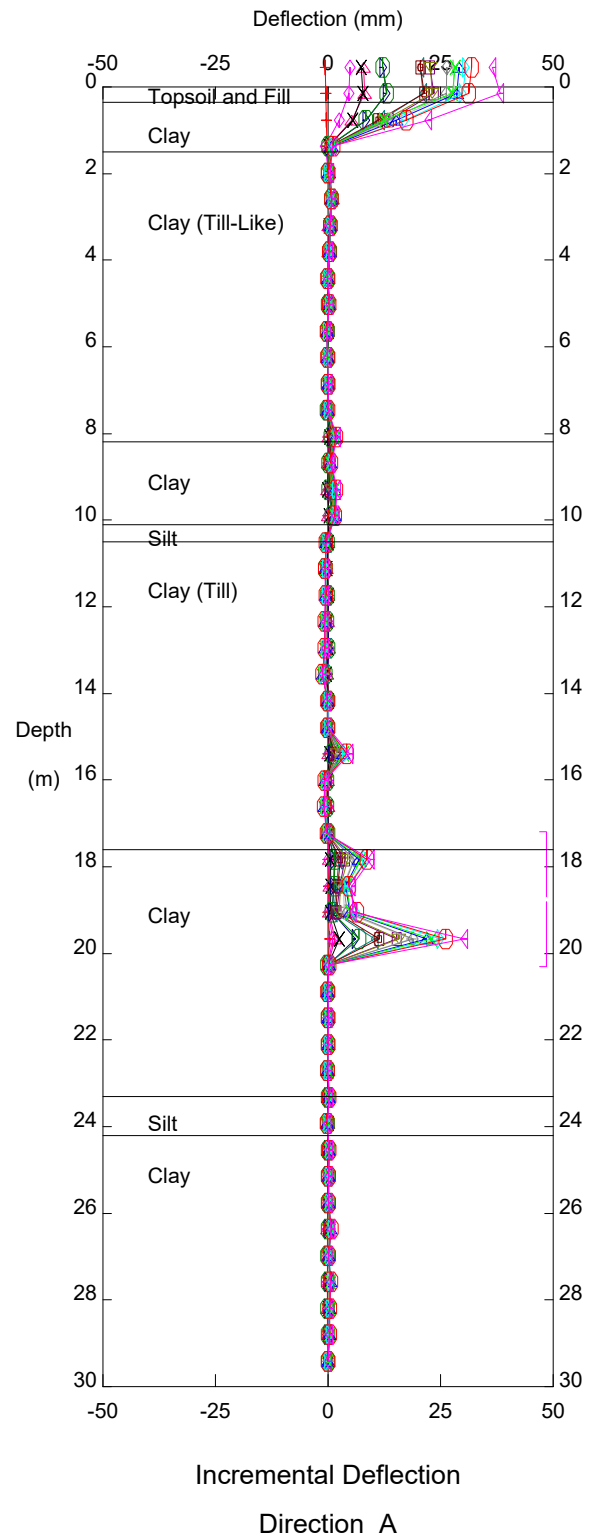
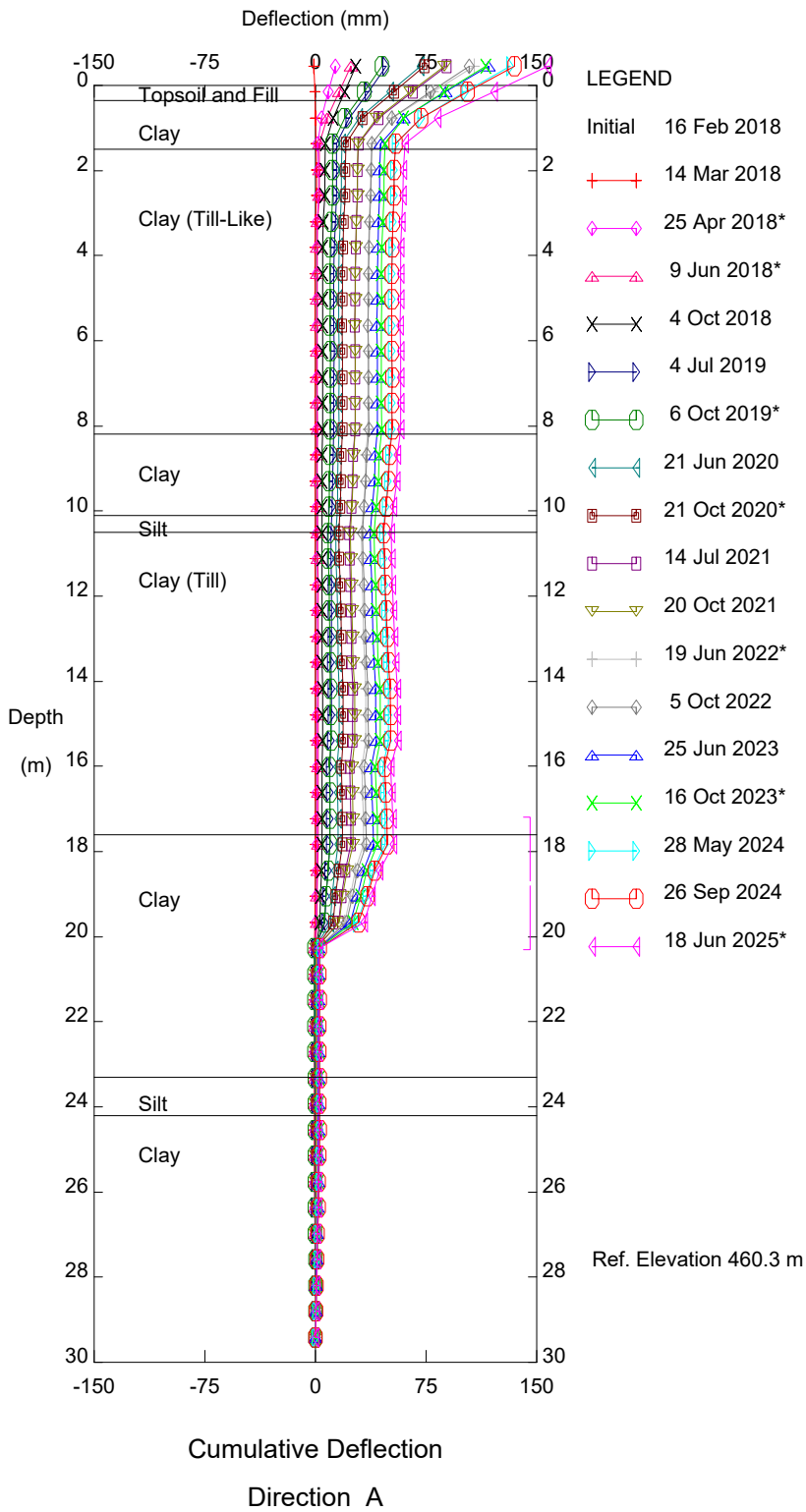


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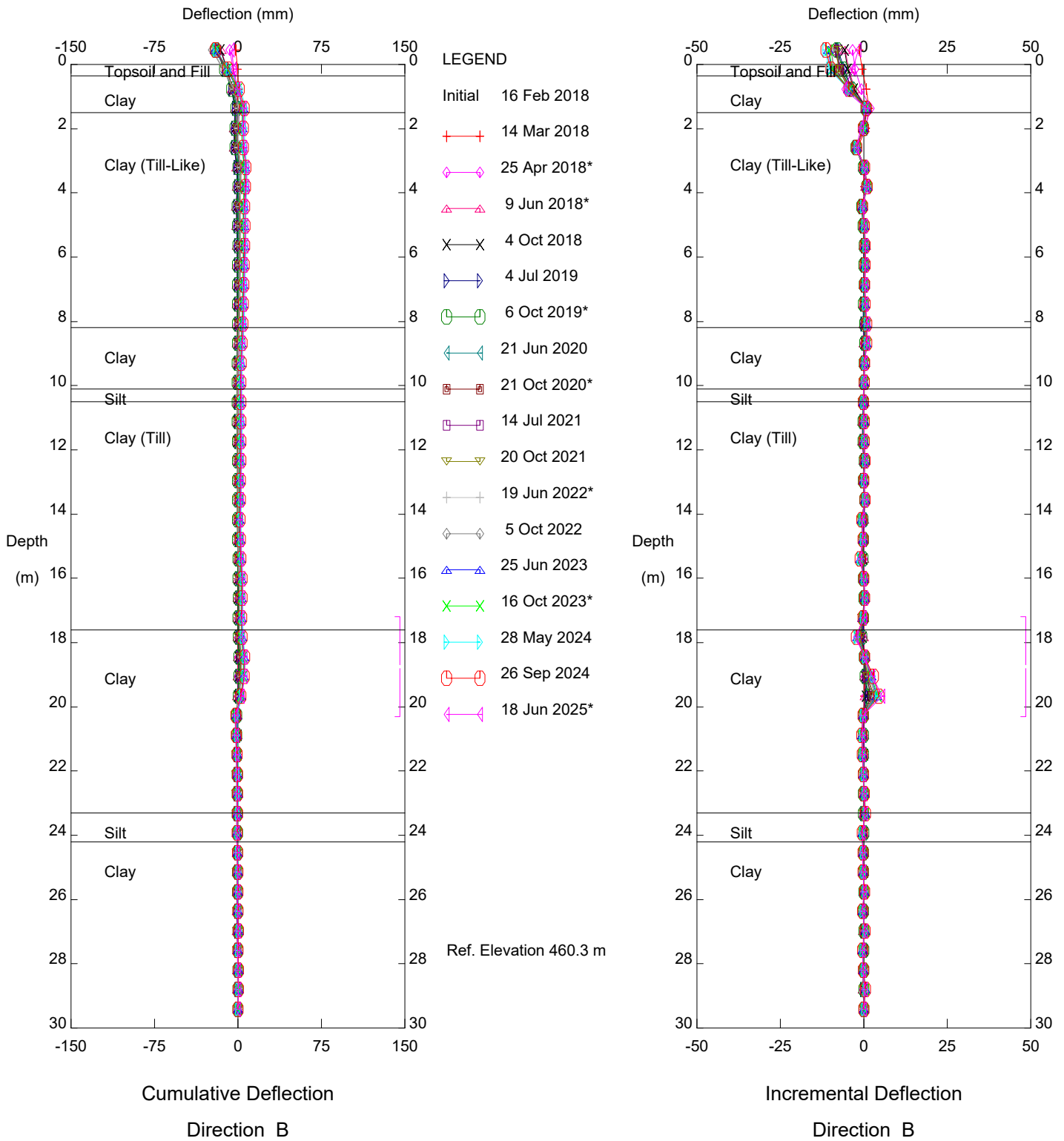


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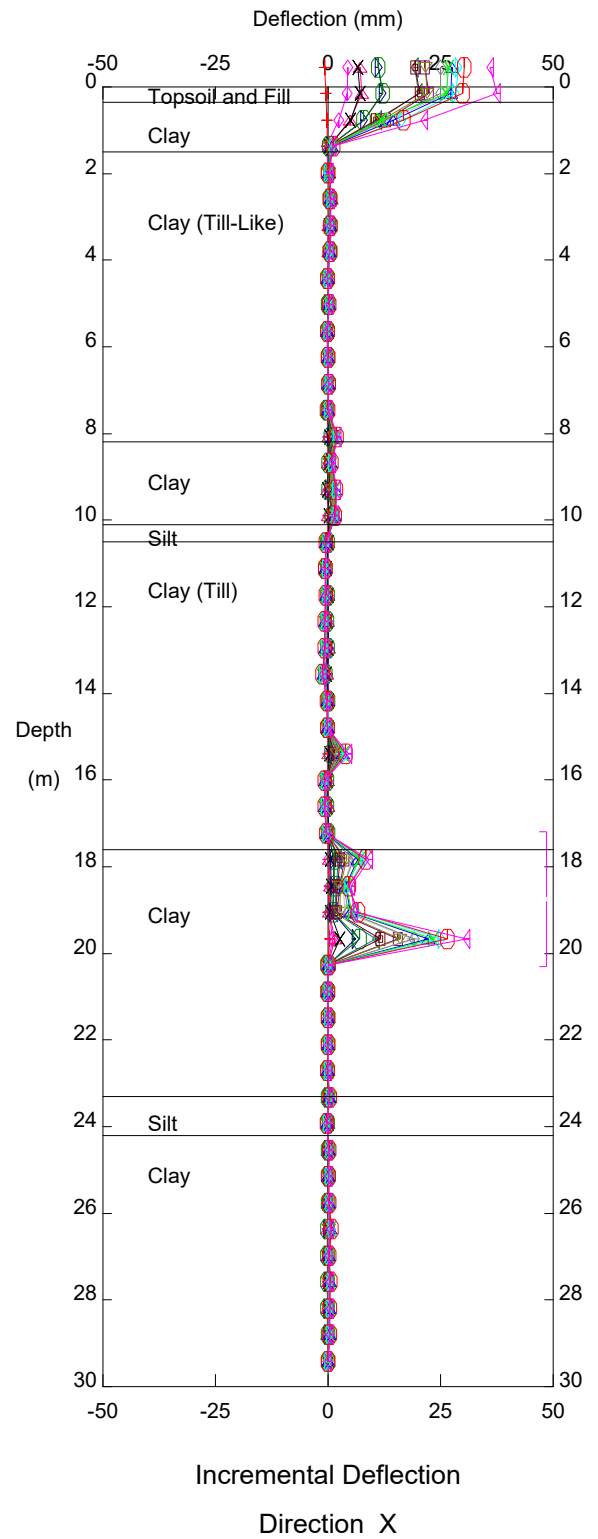
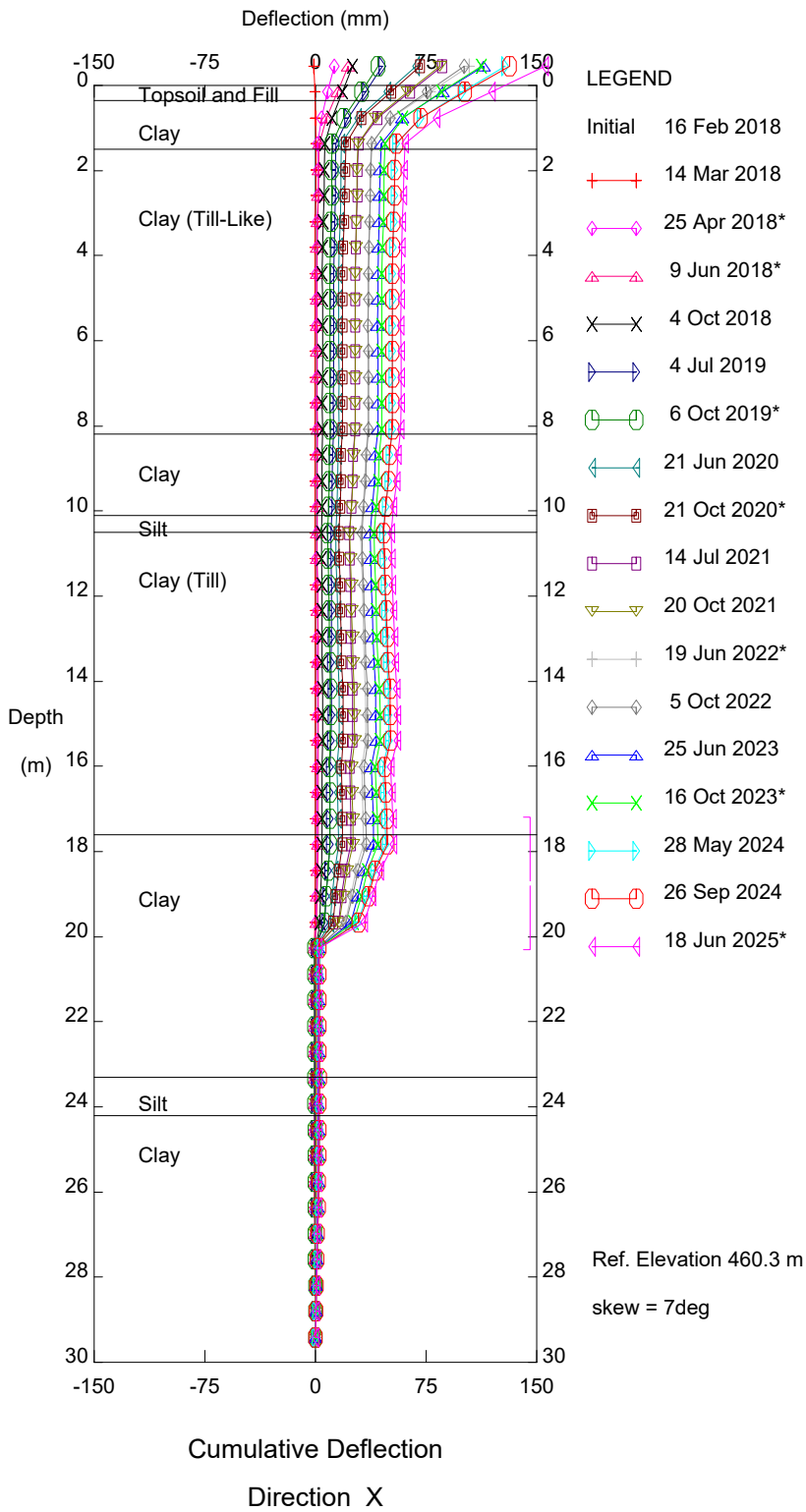


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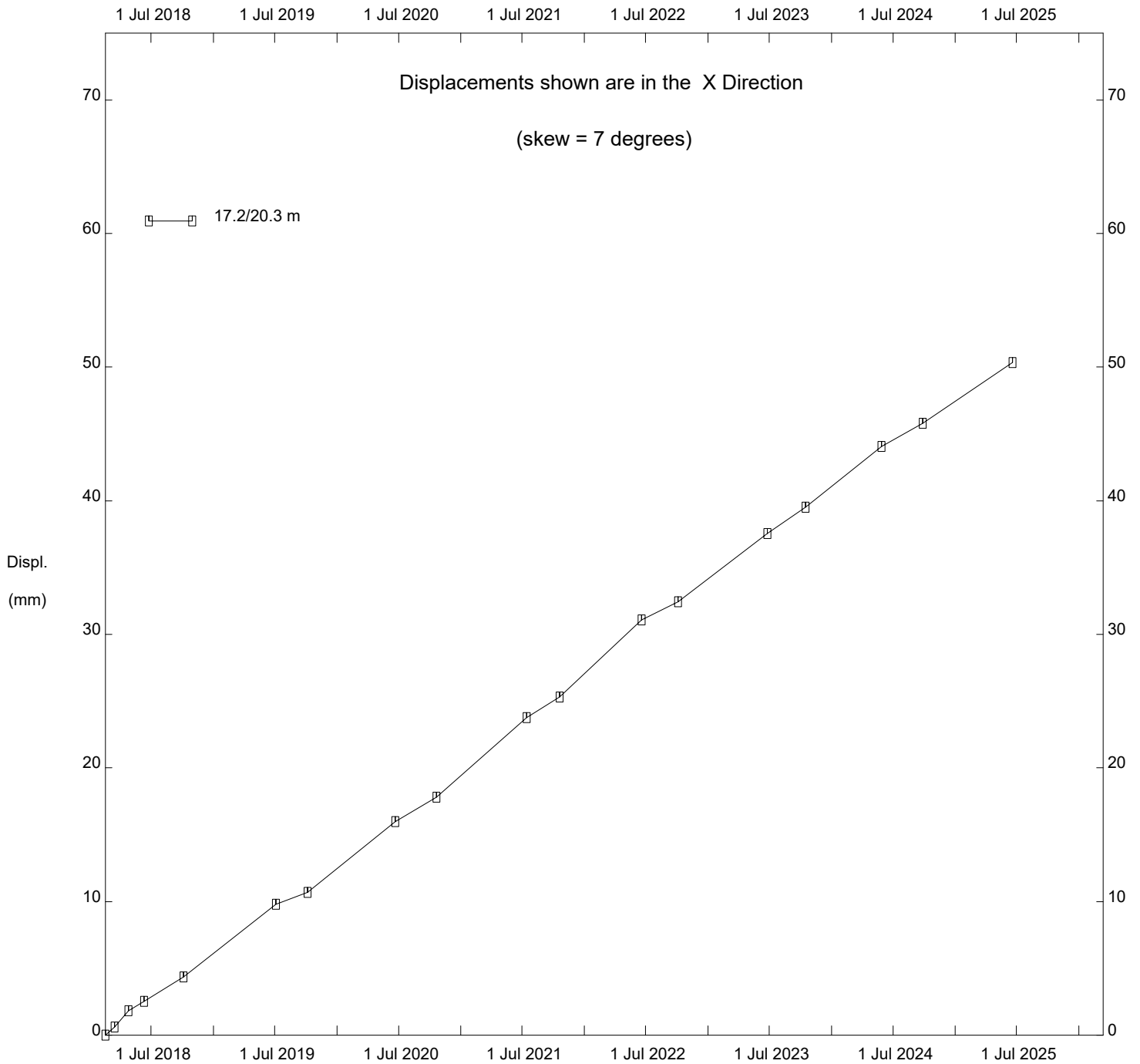


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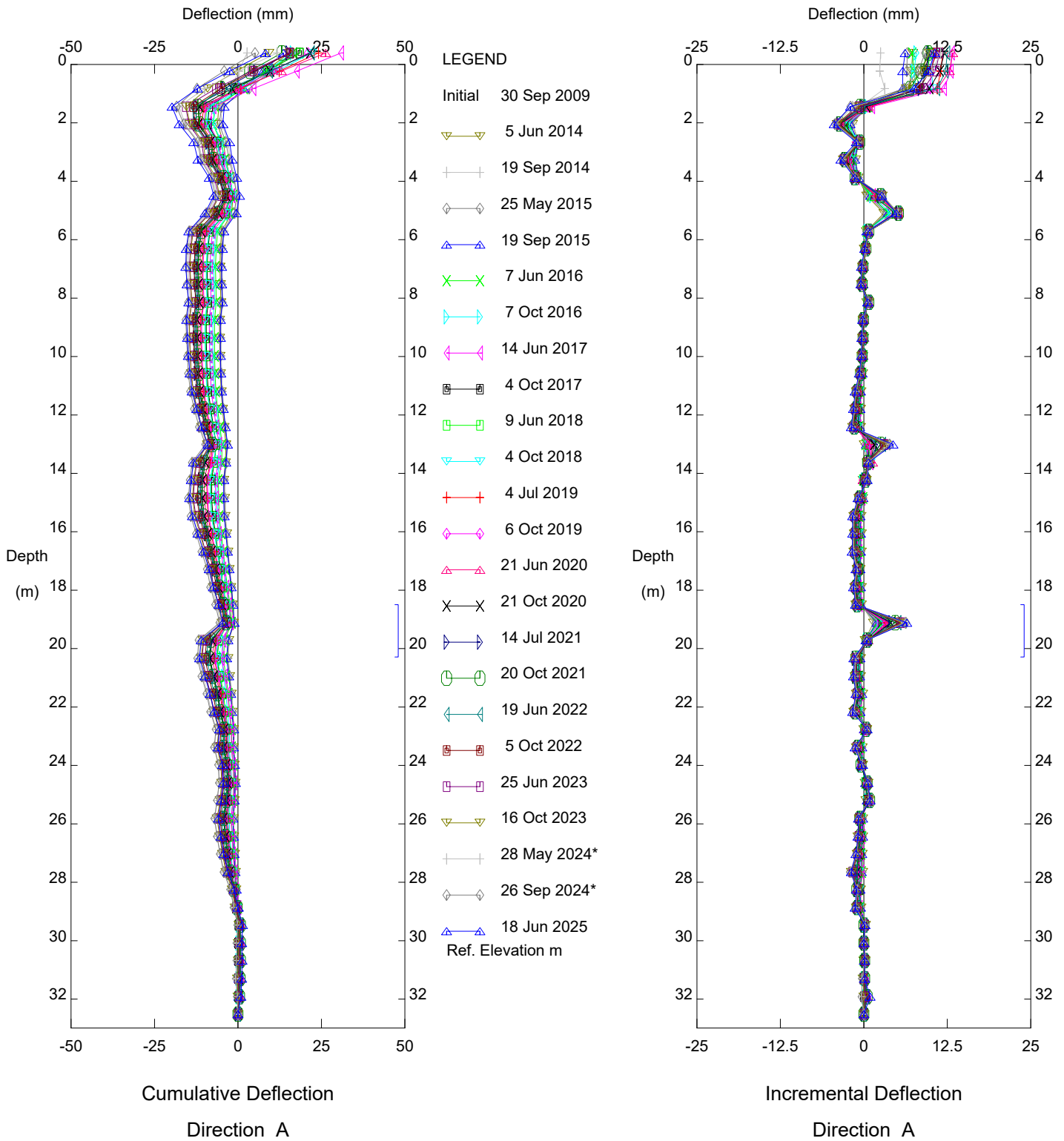
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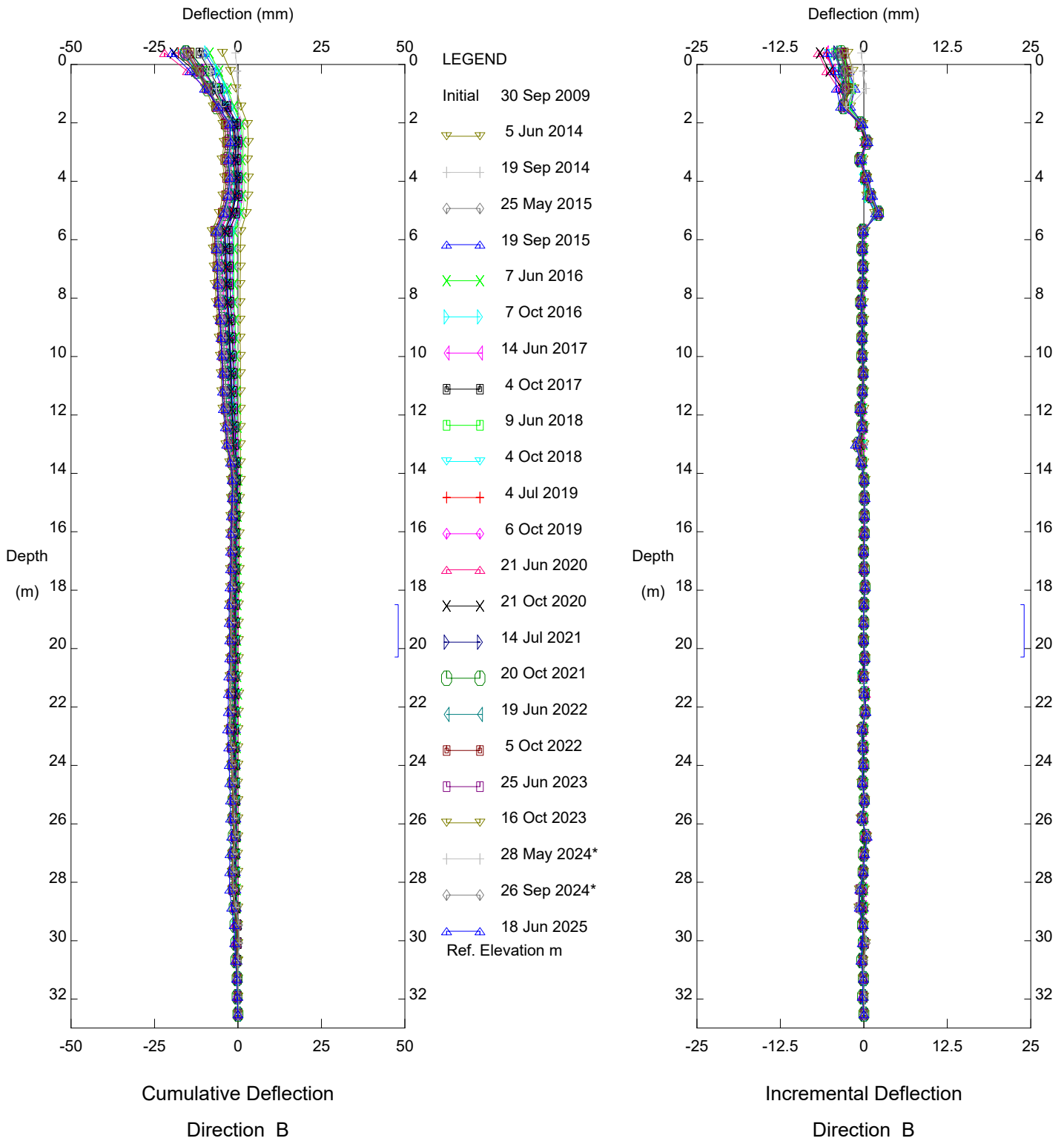


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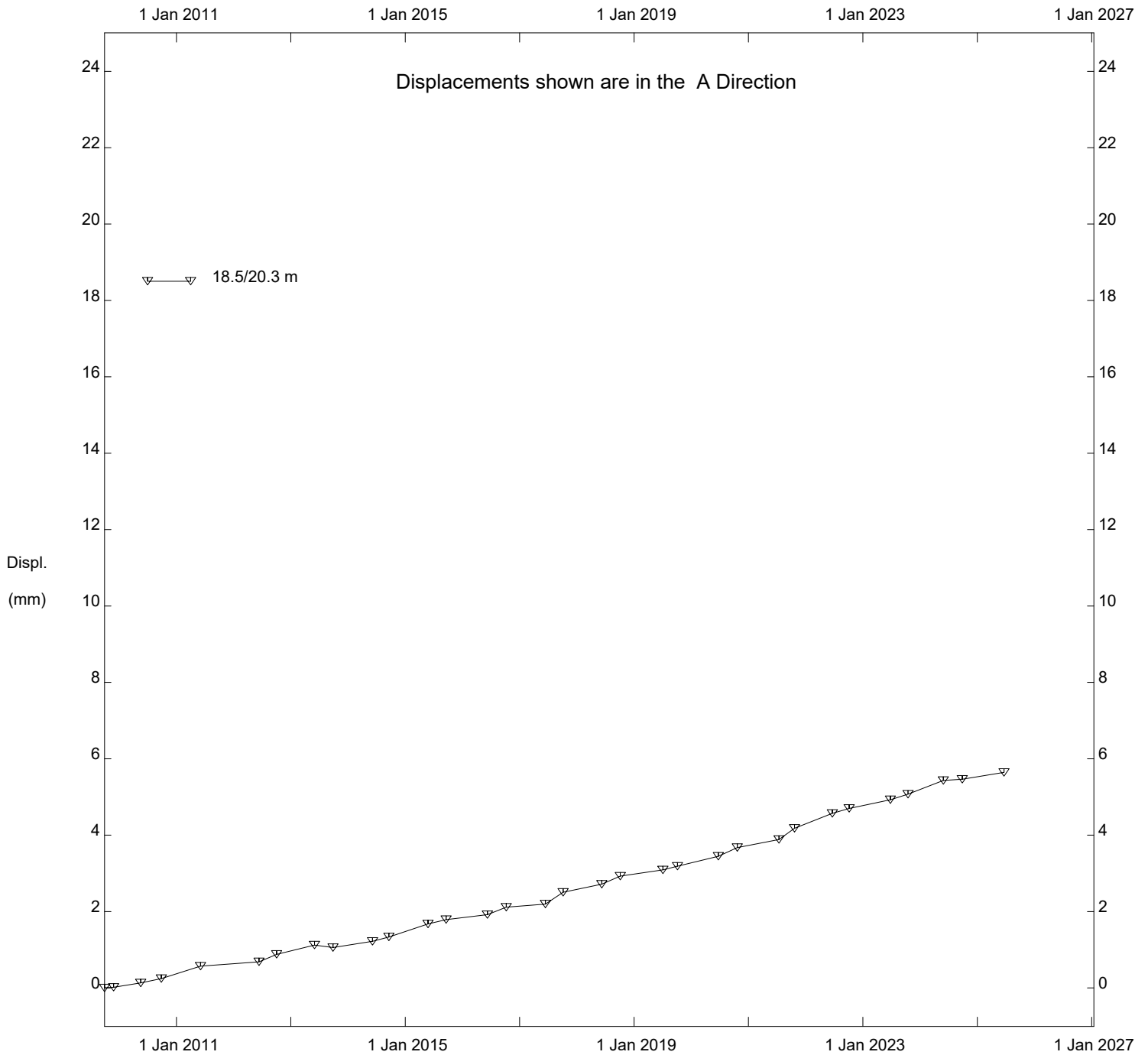


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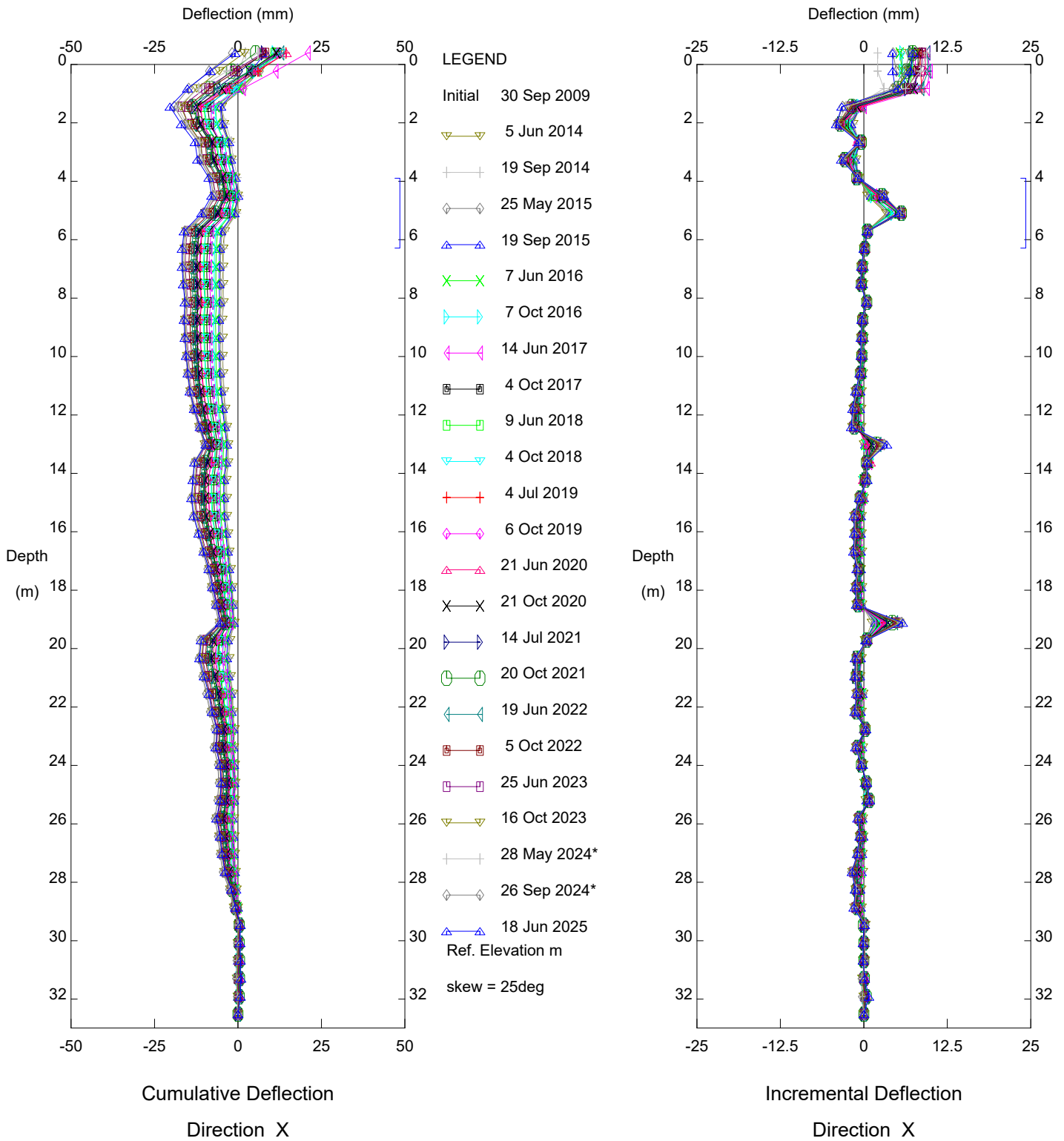
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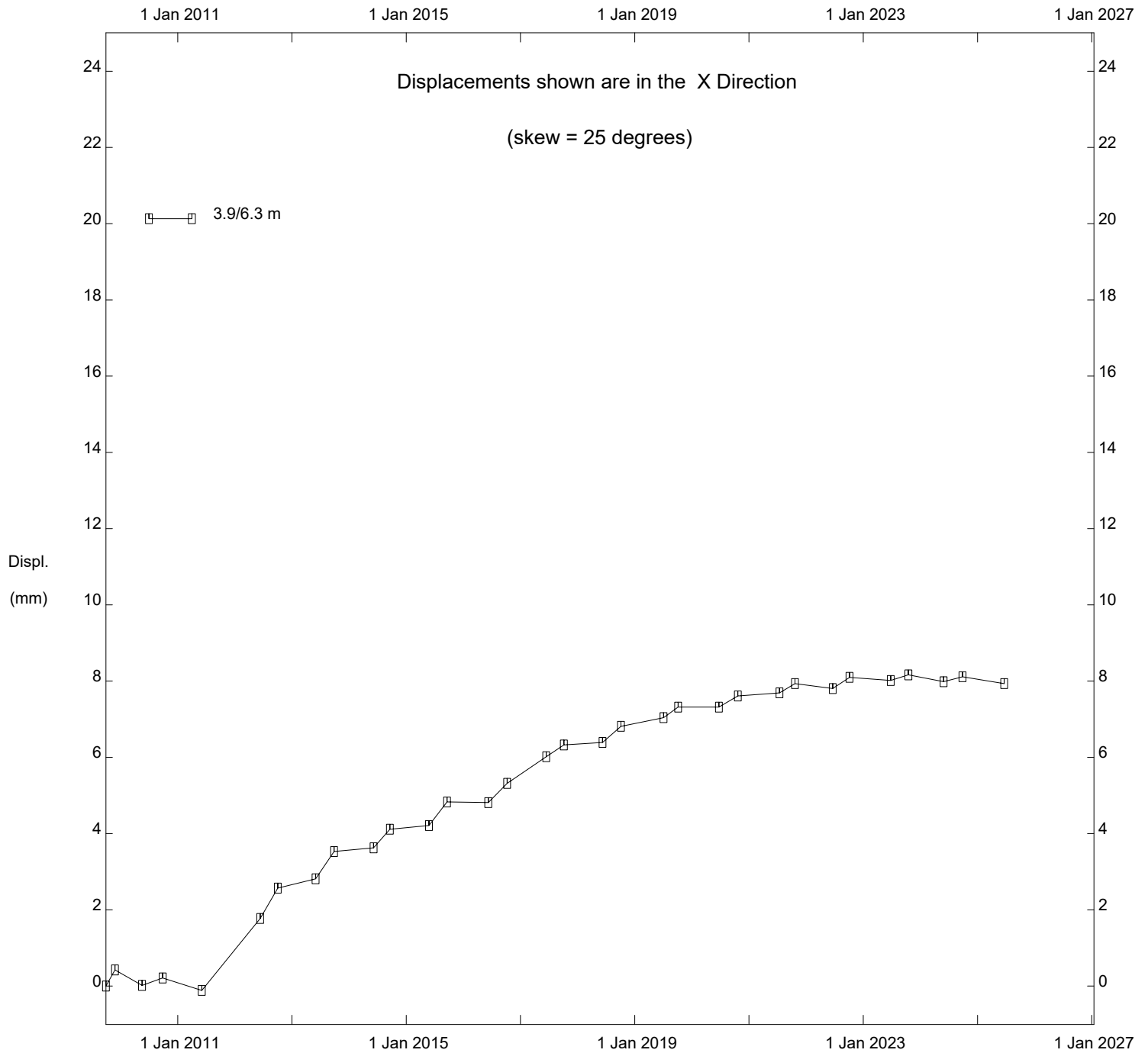


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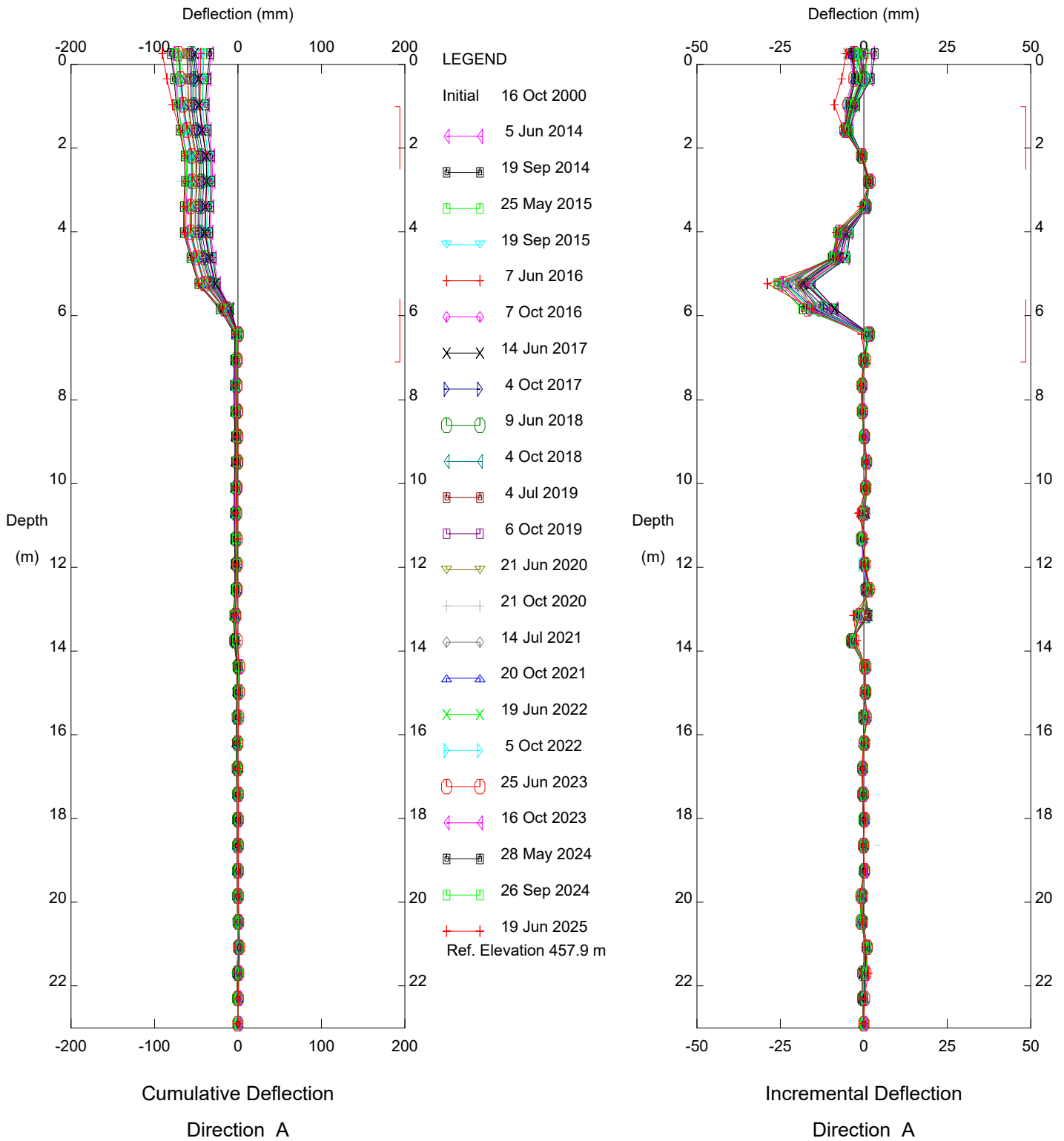
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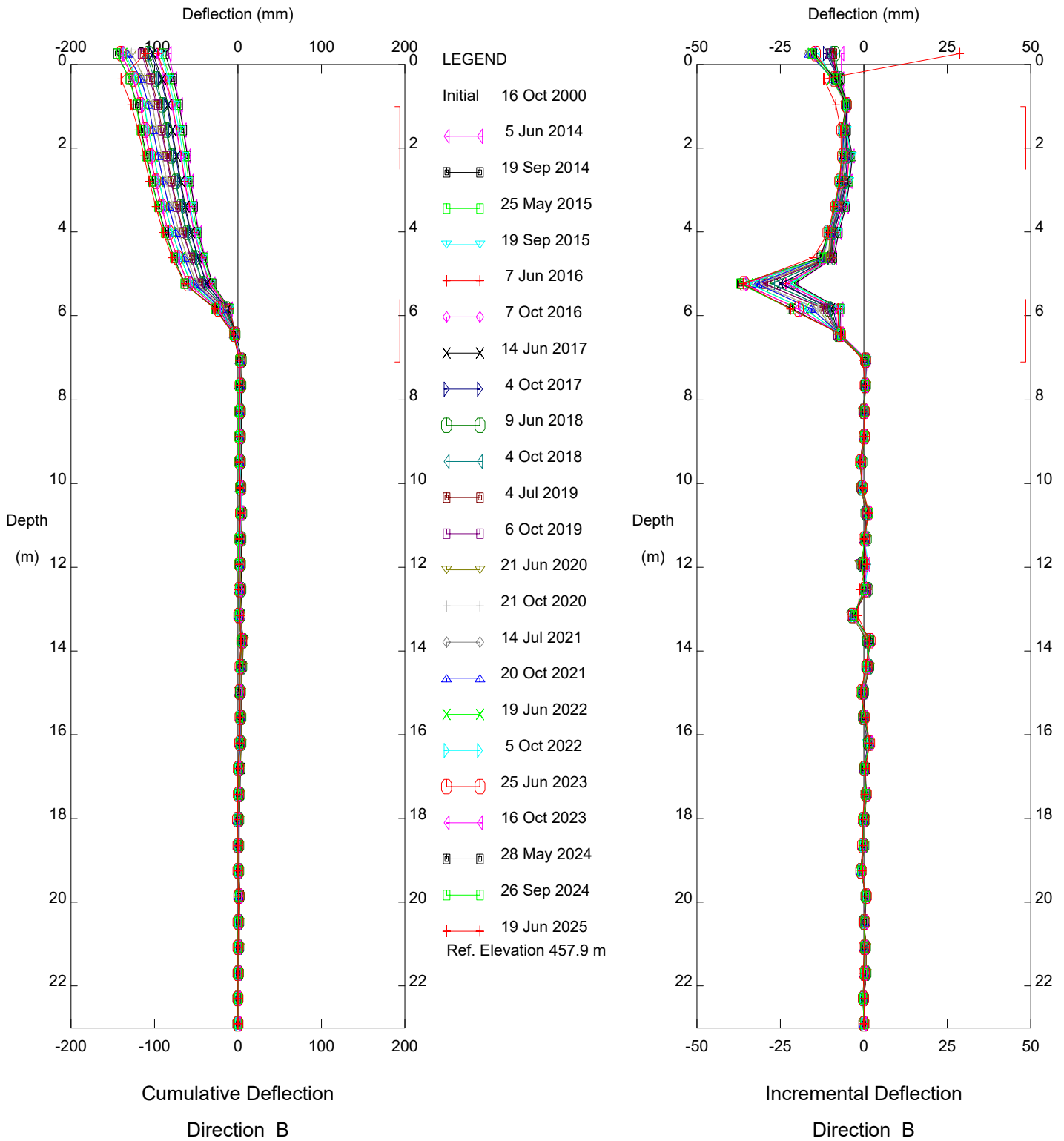
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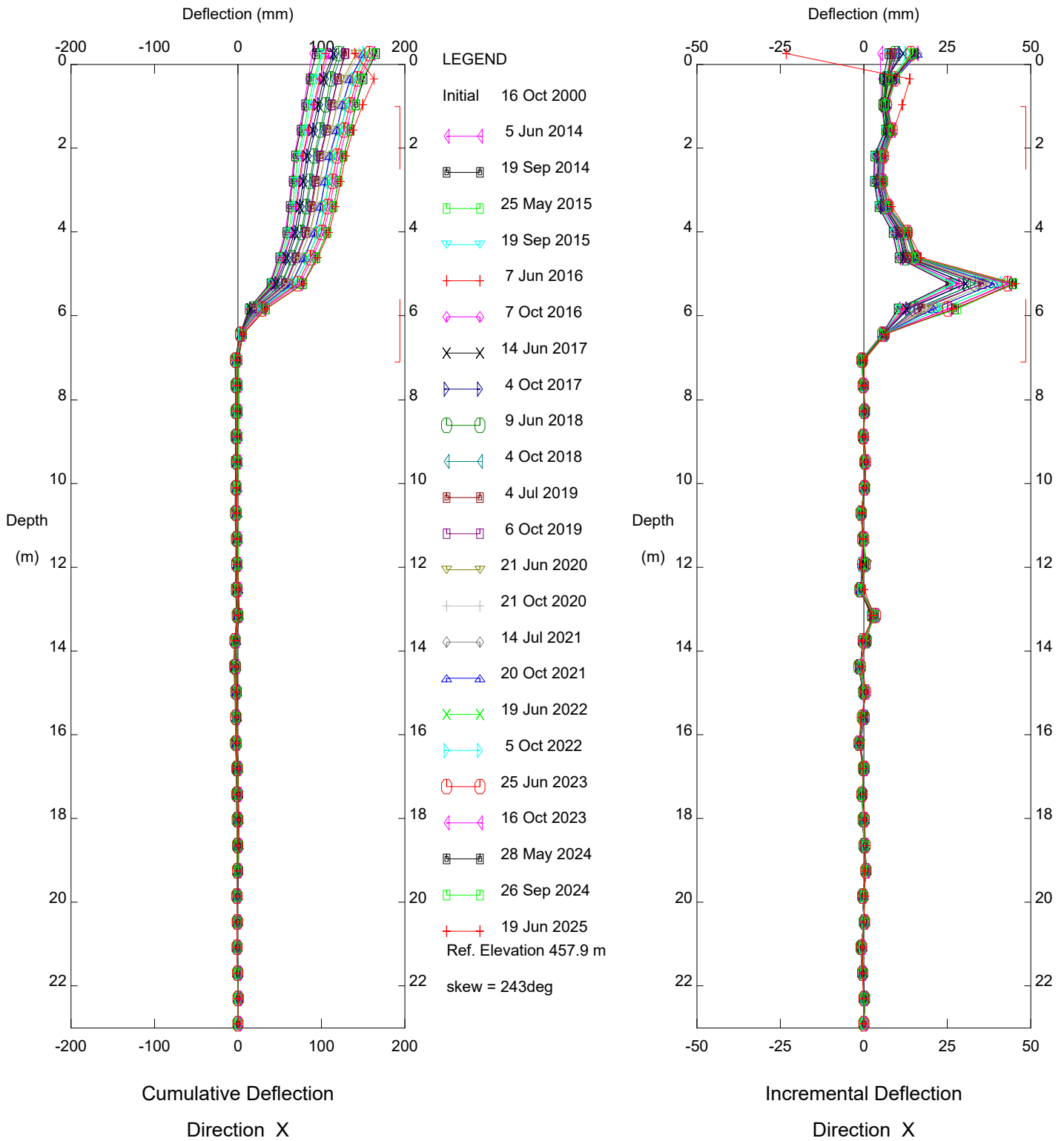
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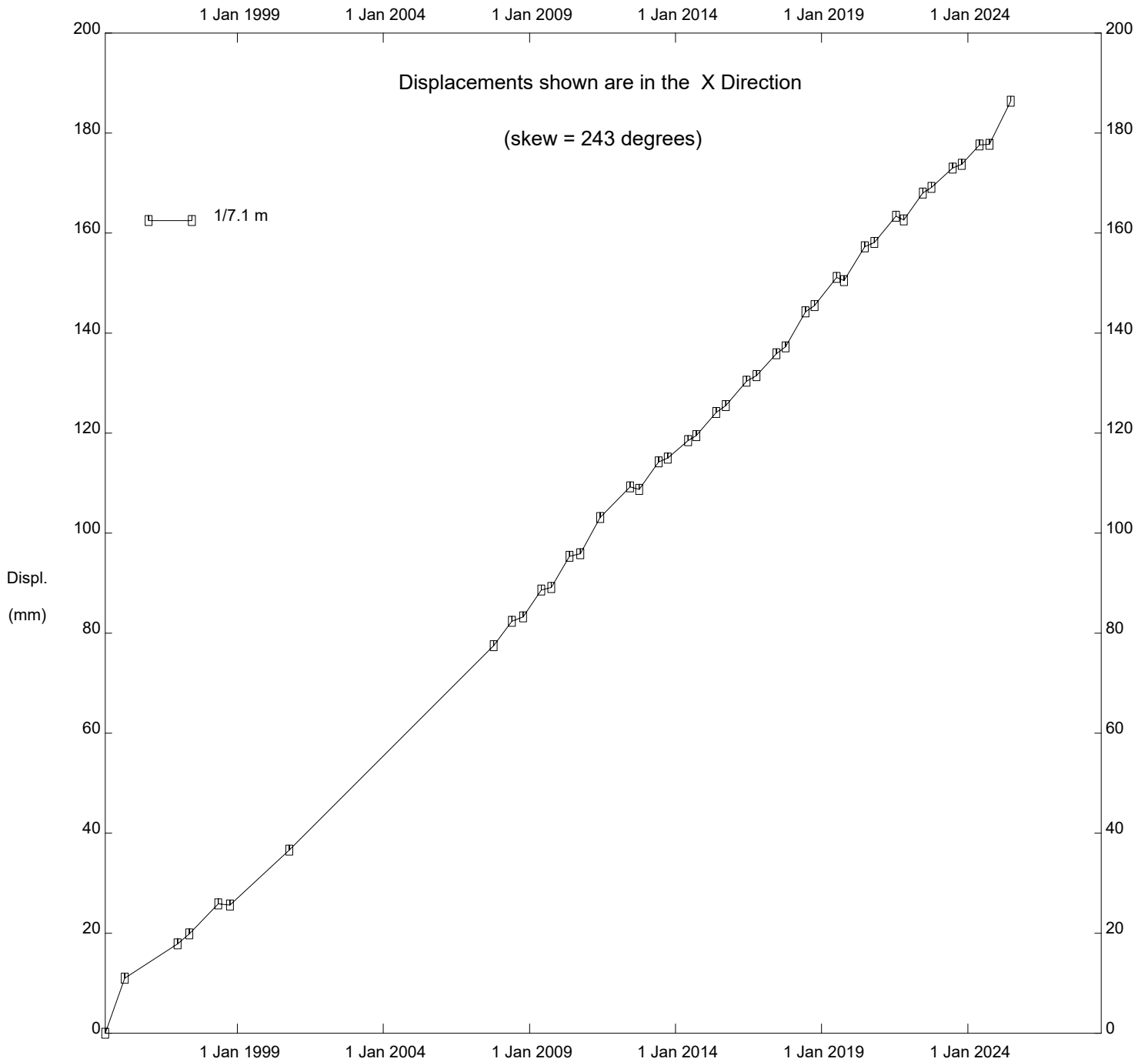
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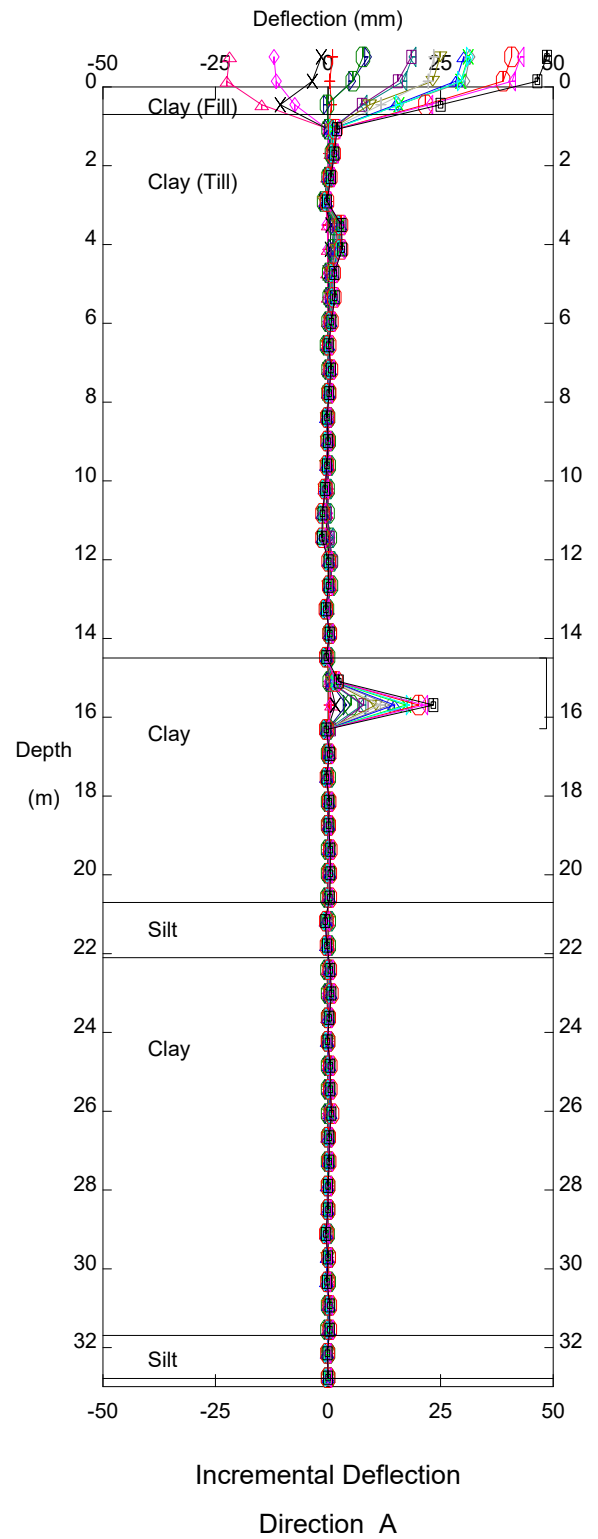
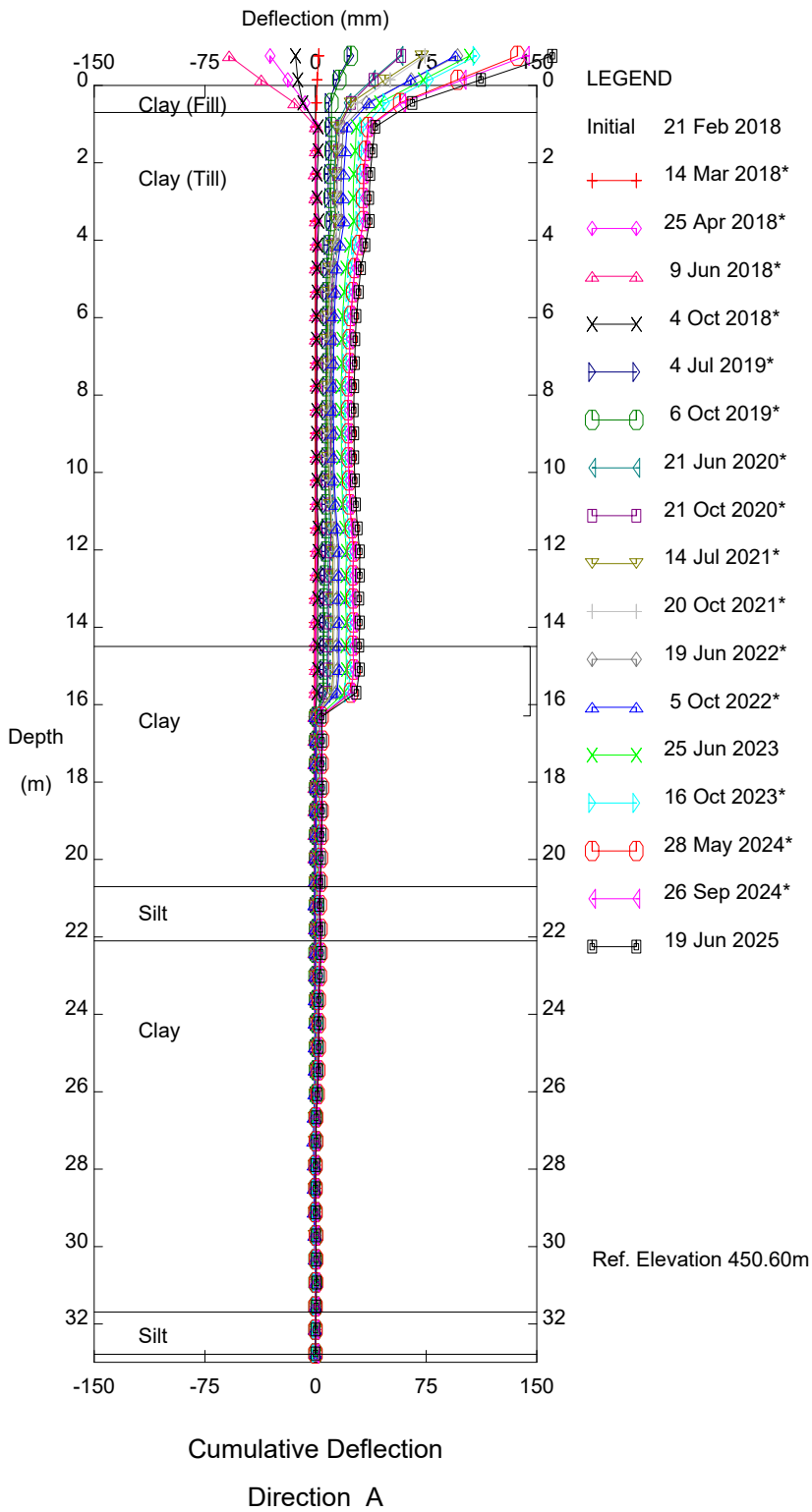
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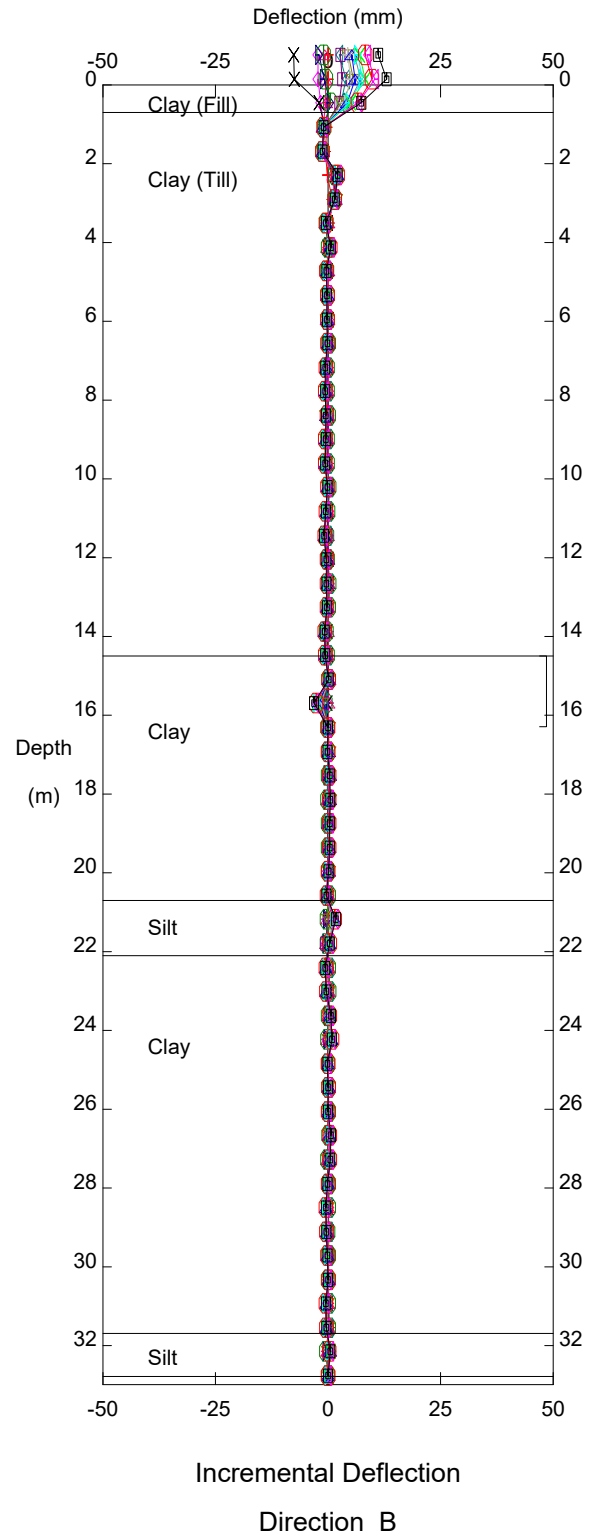
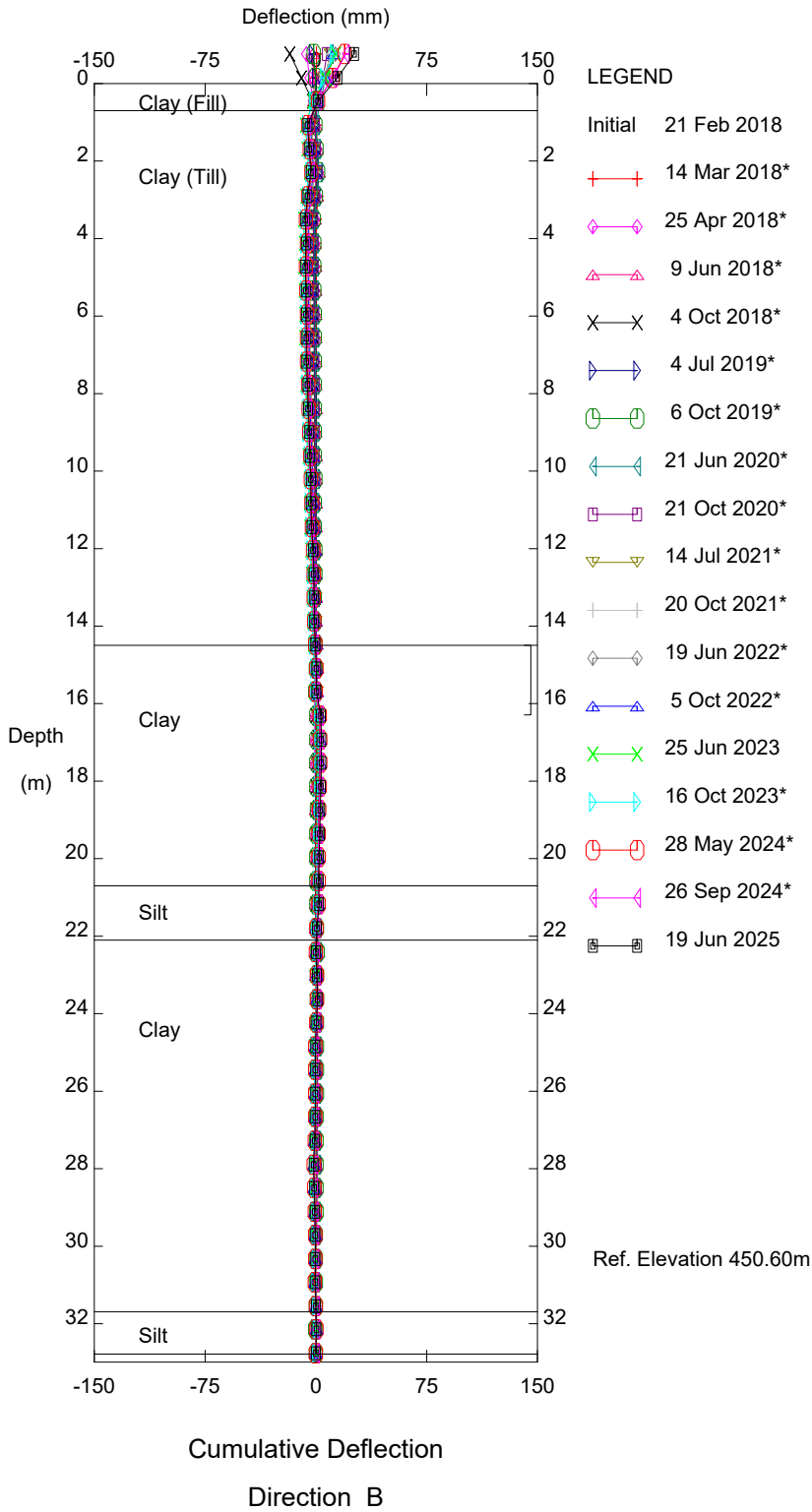


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Alberta Transportation

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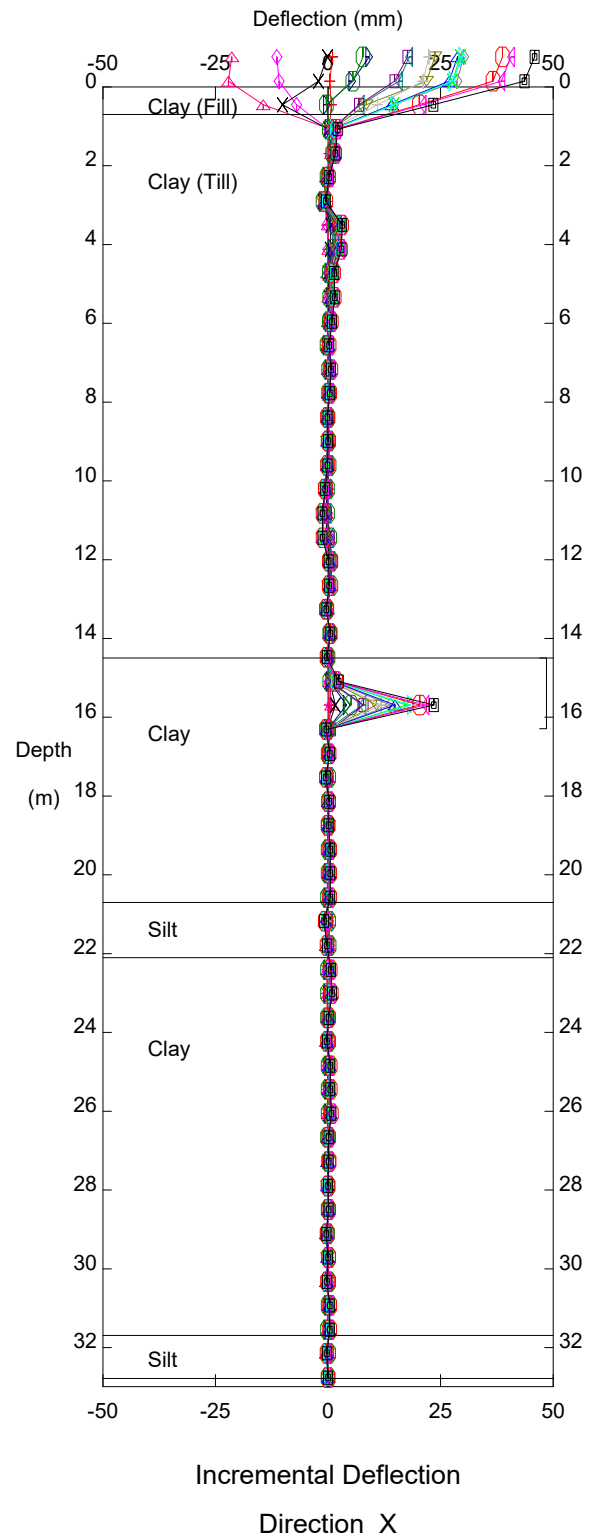
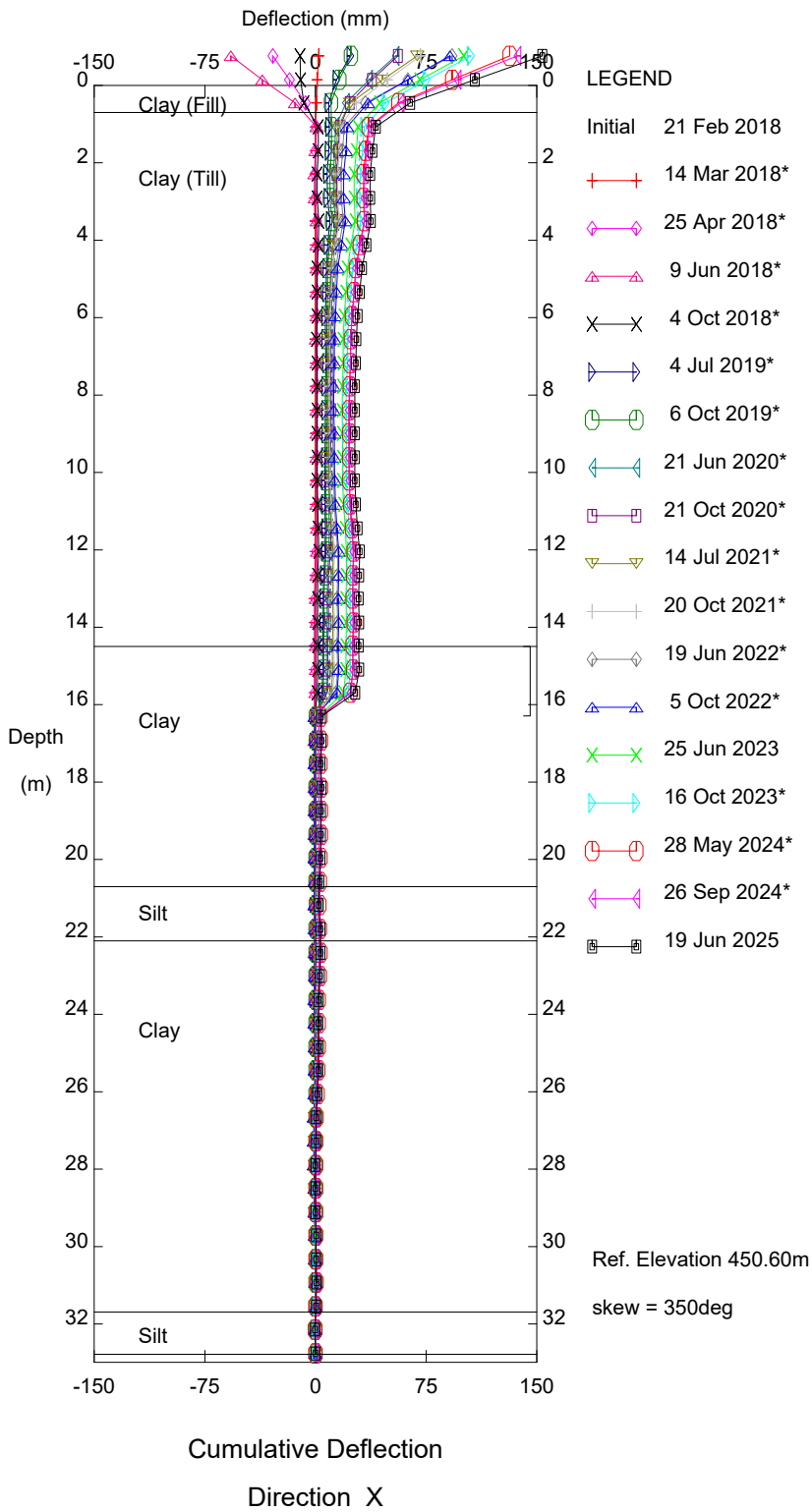


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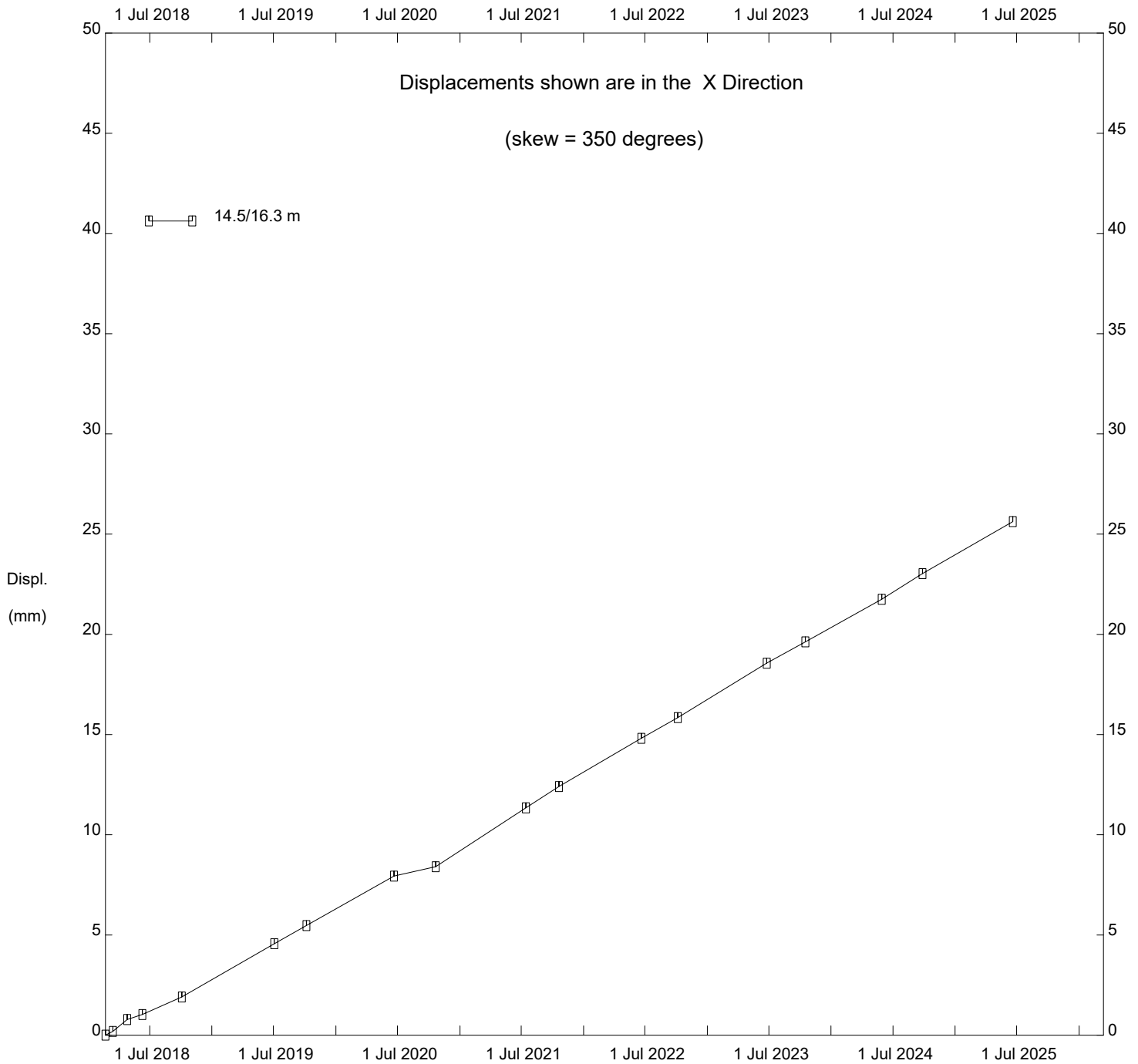


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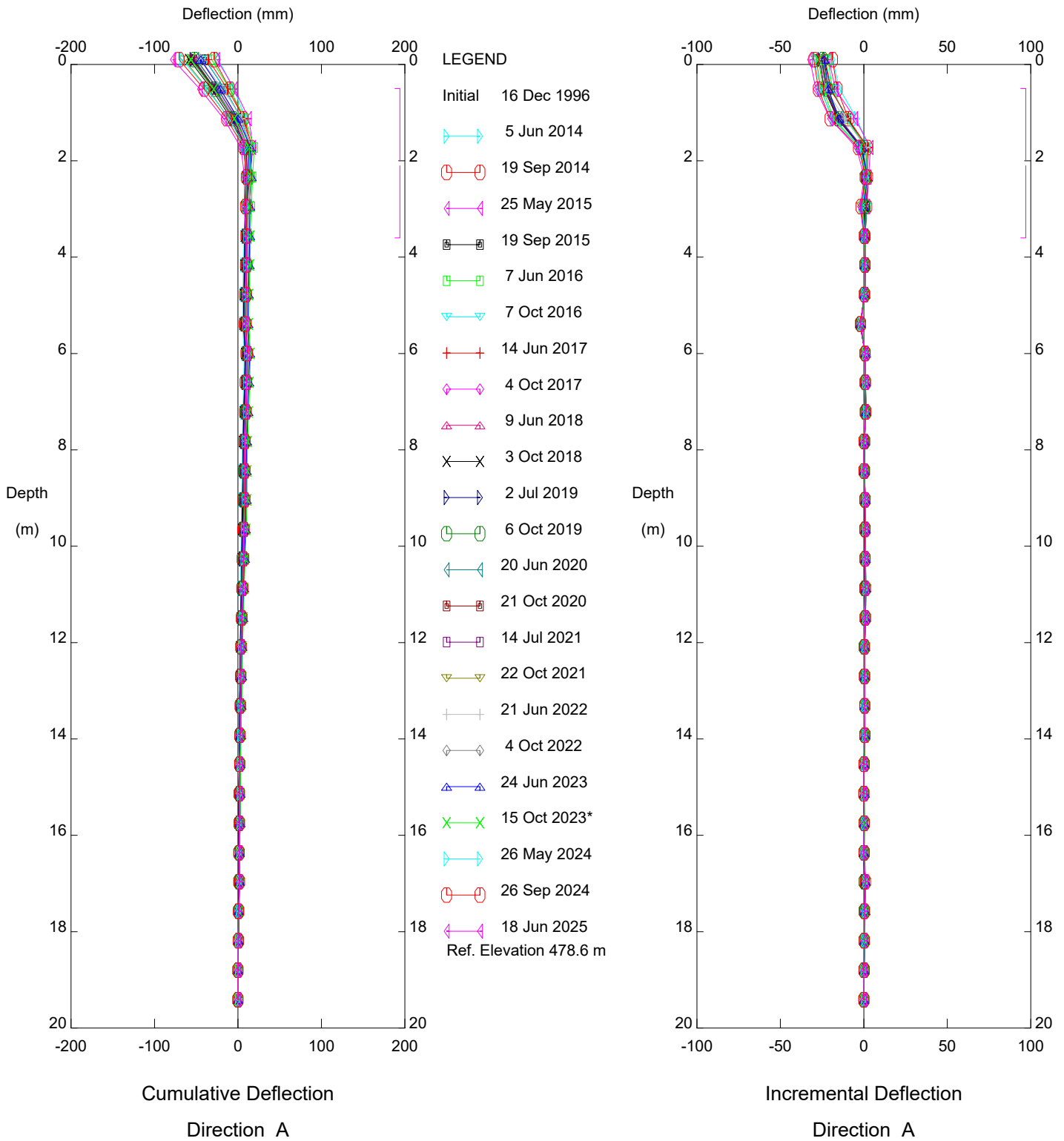
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Alberta Transportation

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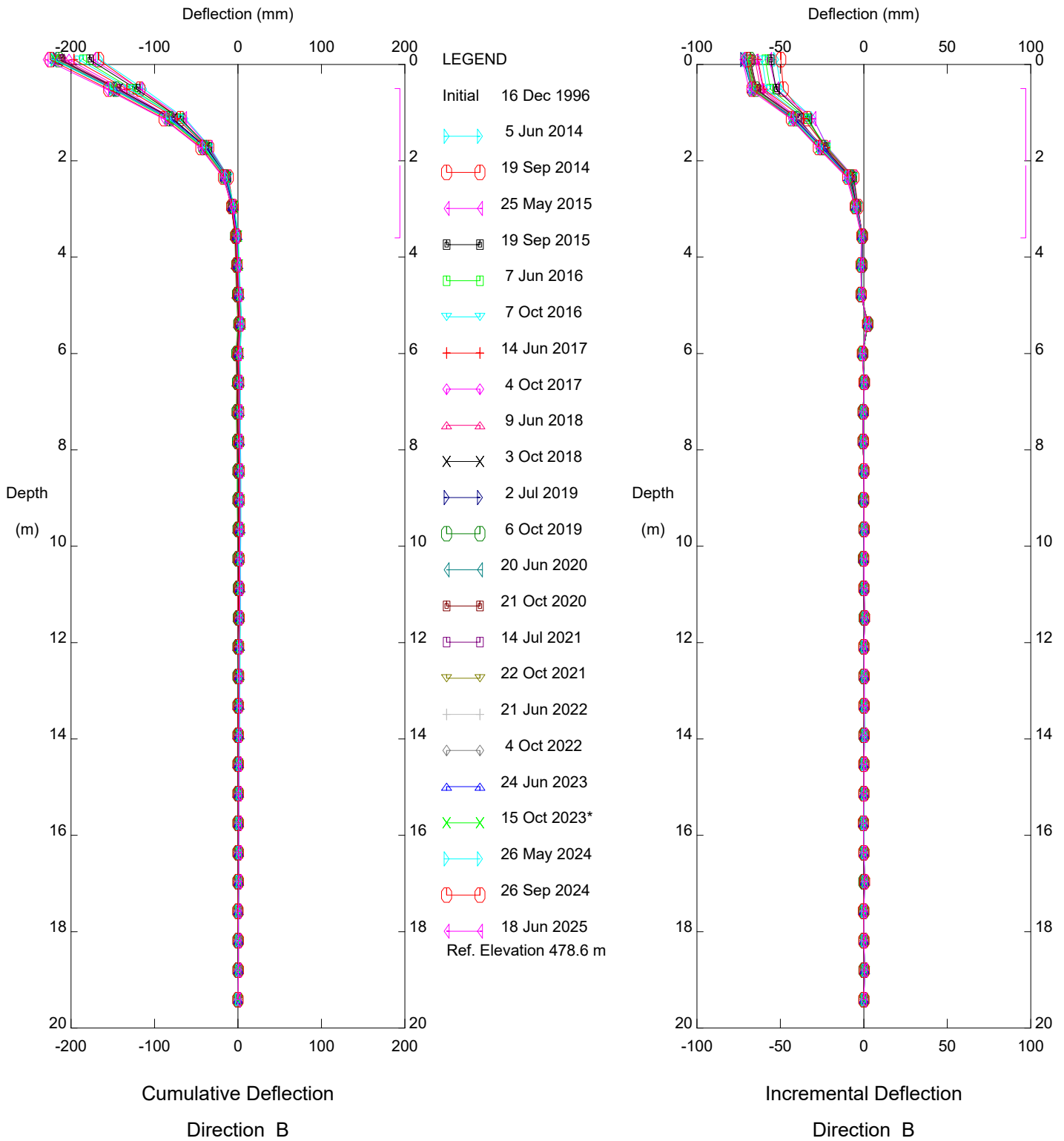


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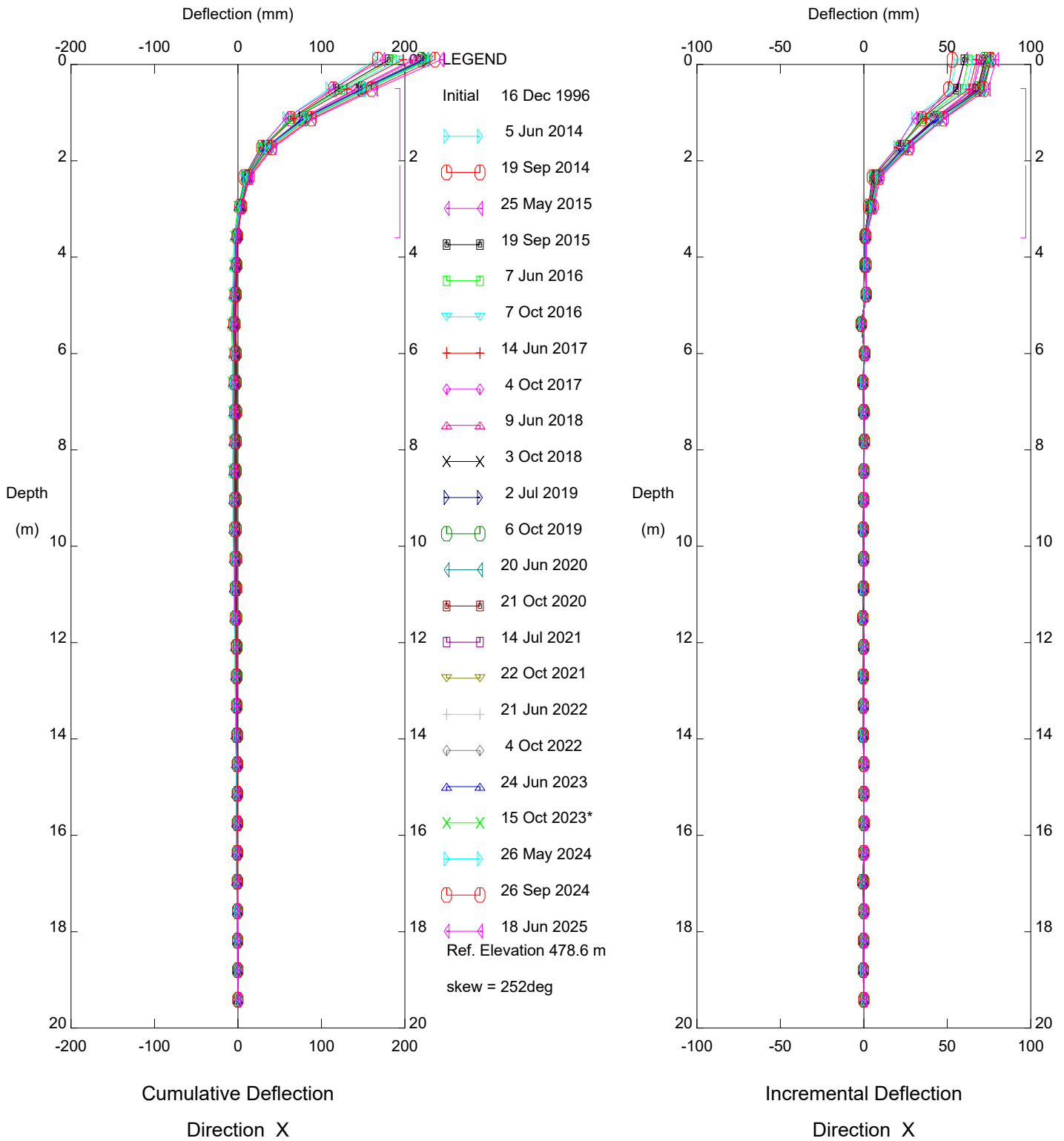


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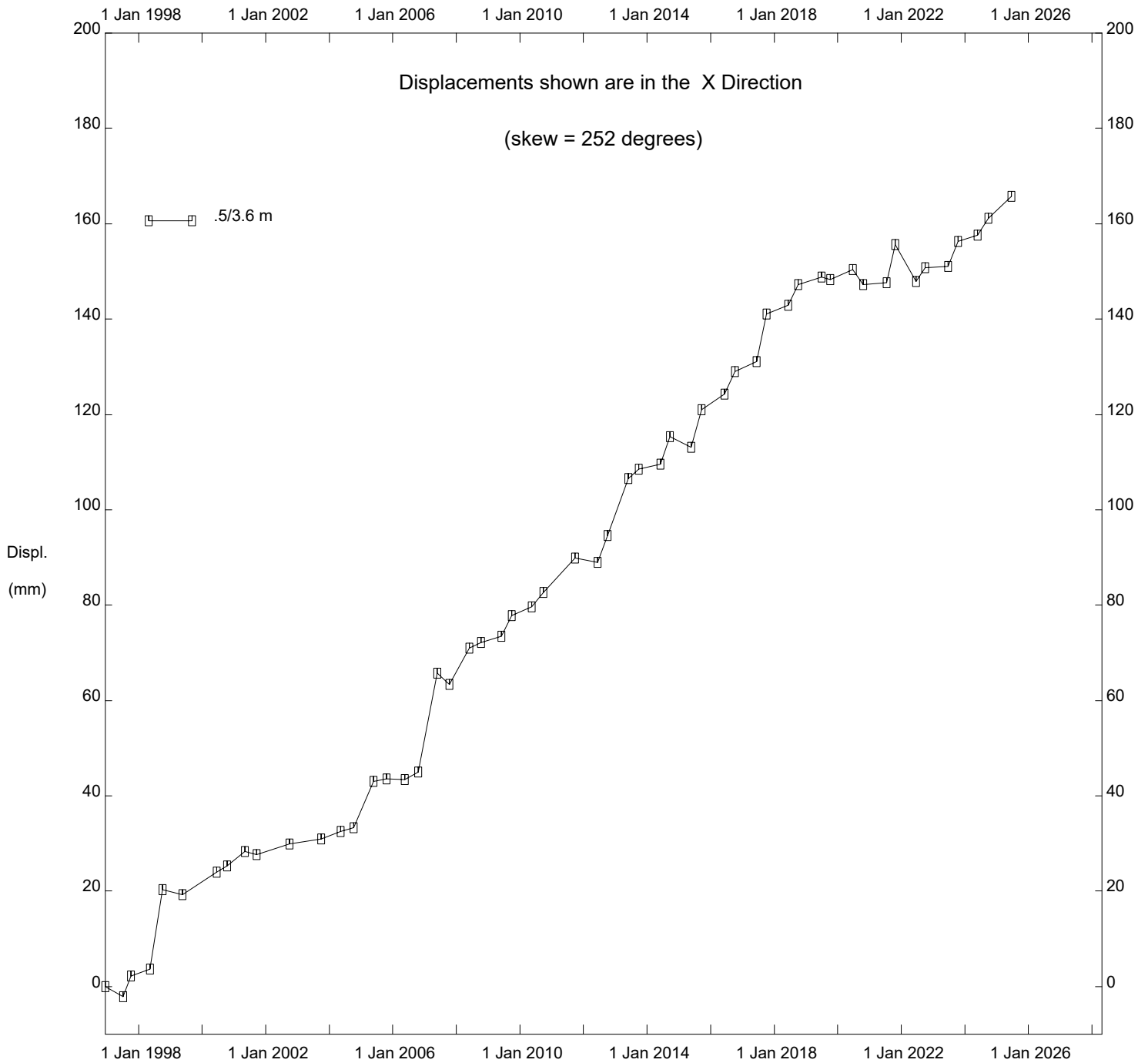


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Alberta Transportation

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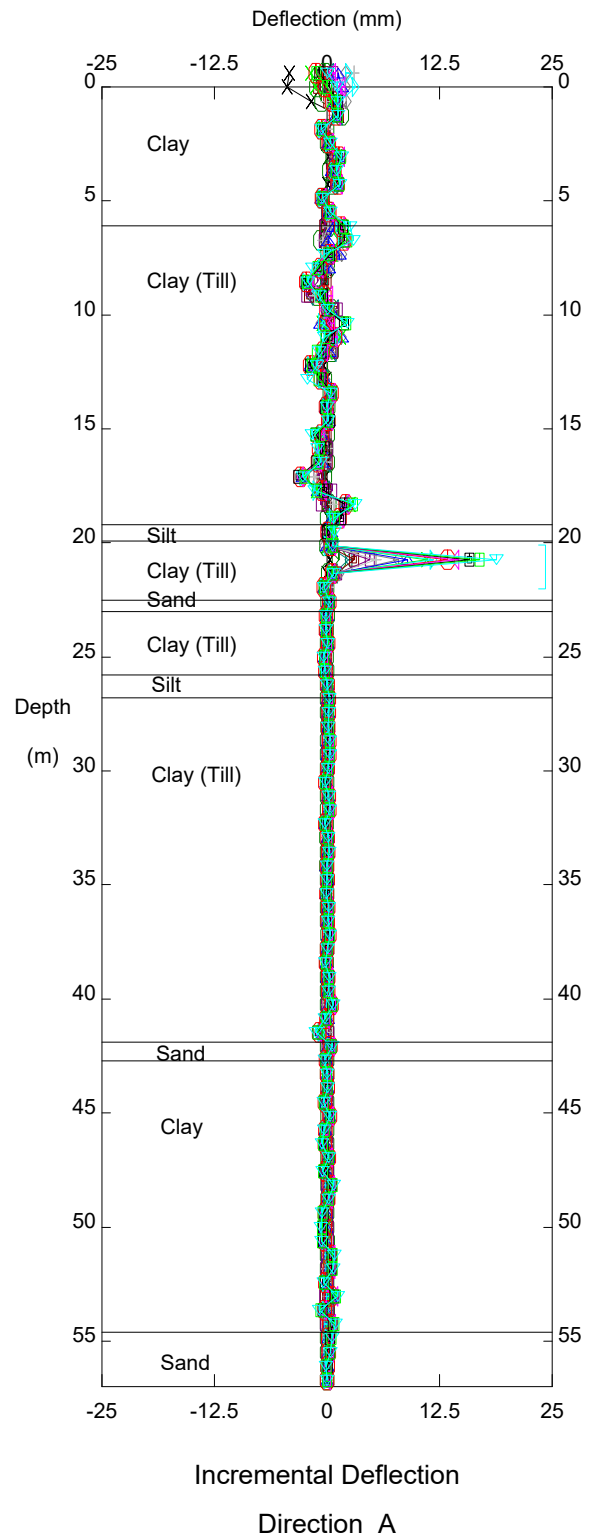
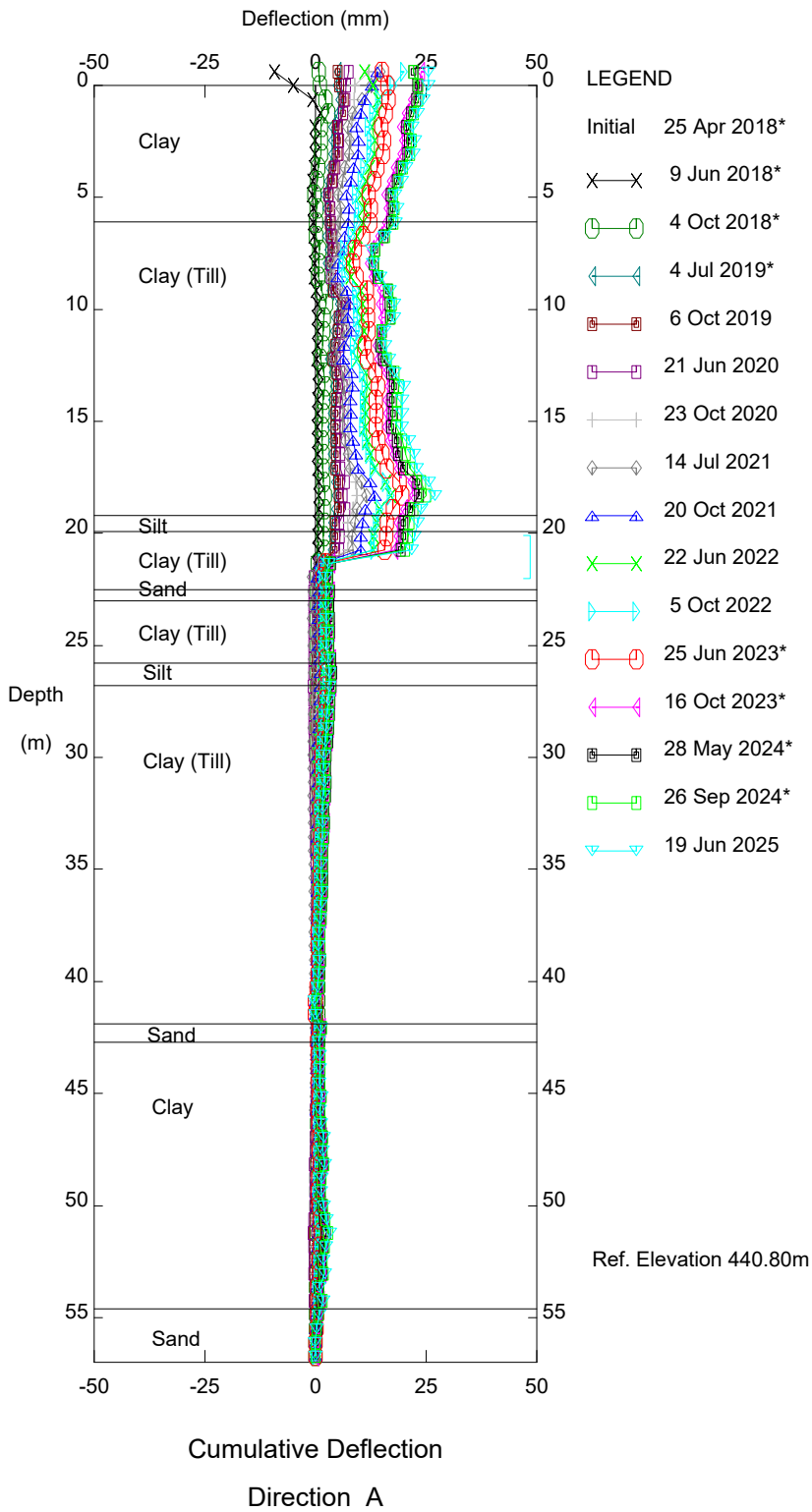
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Alberta Transportation

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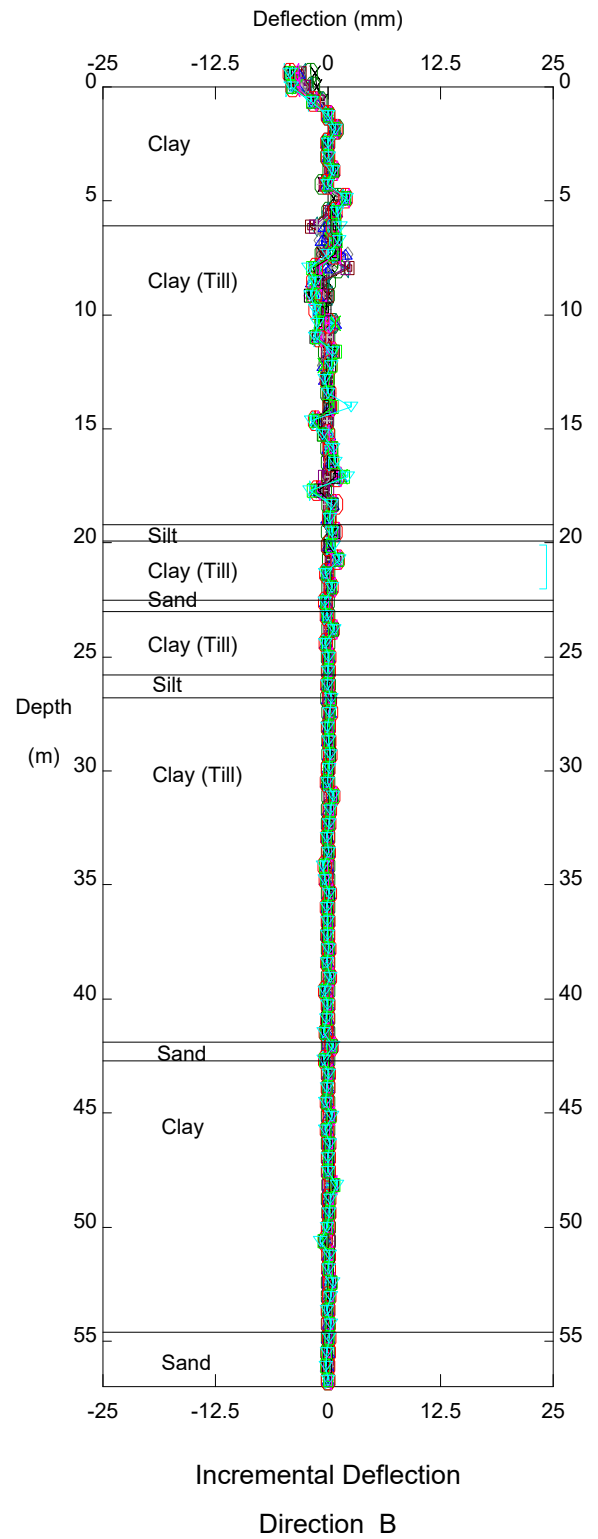
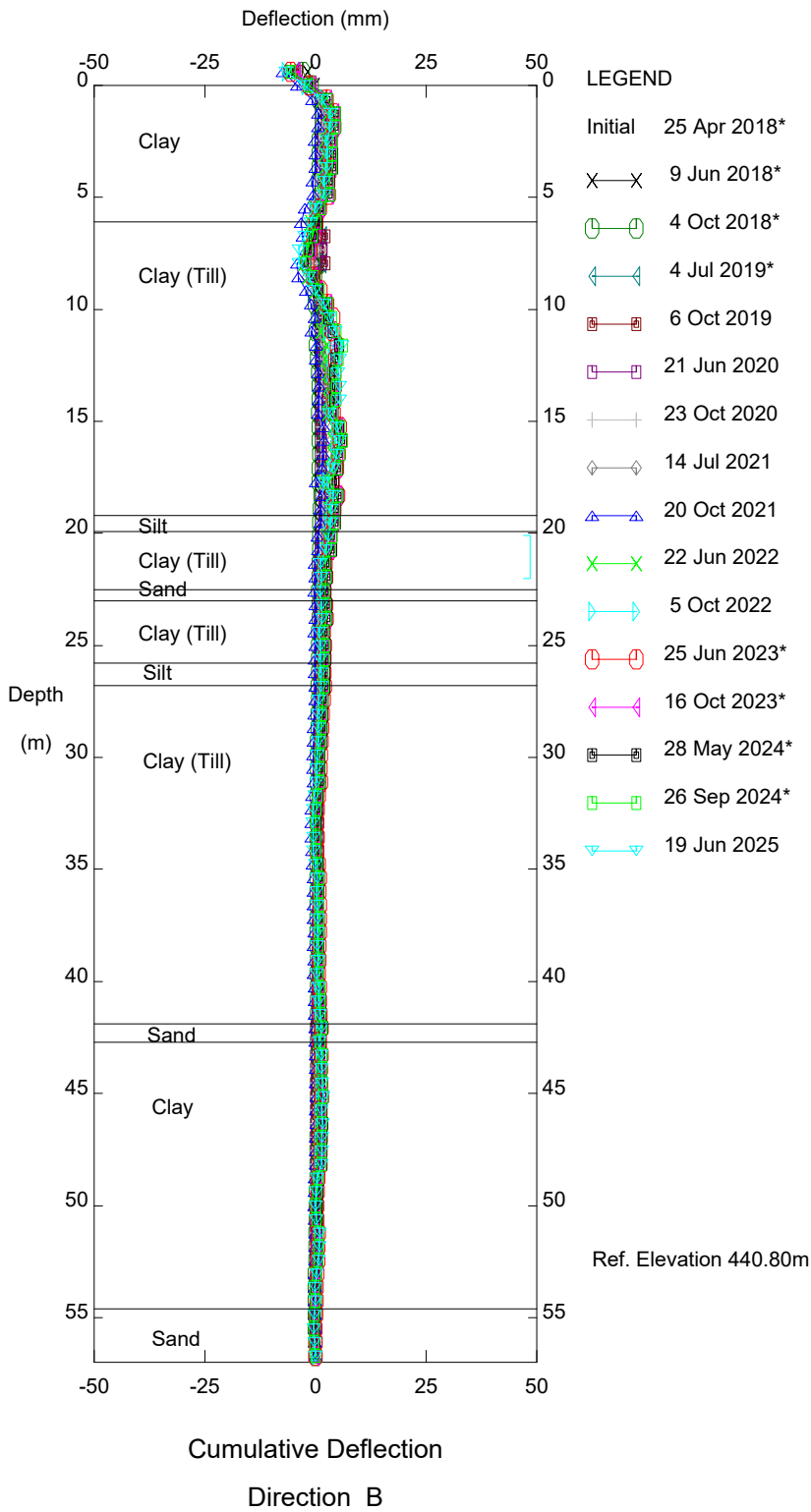


HWY 2:68 (PH037), Inclinator SI18-9

Alberta Transportation

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Thurber Engineering Ltd

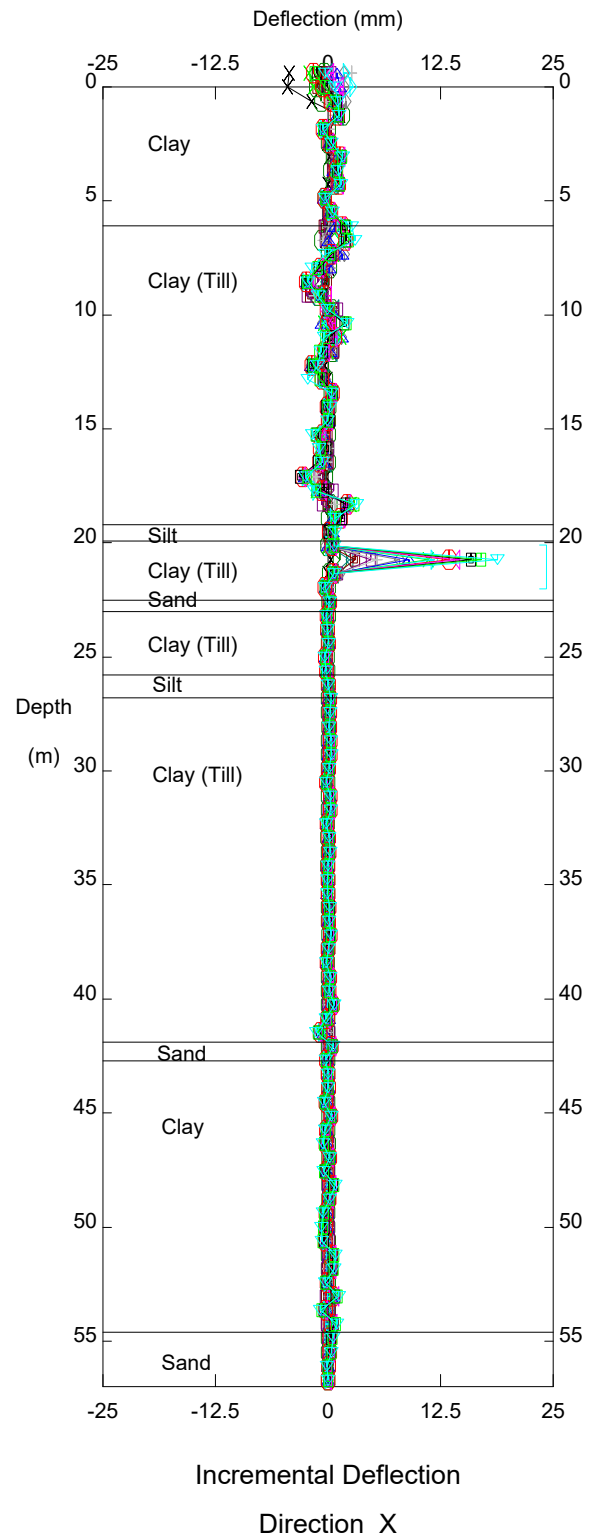
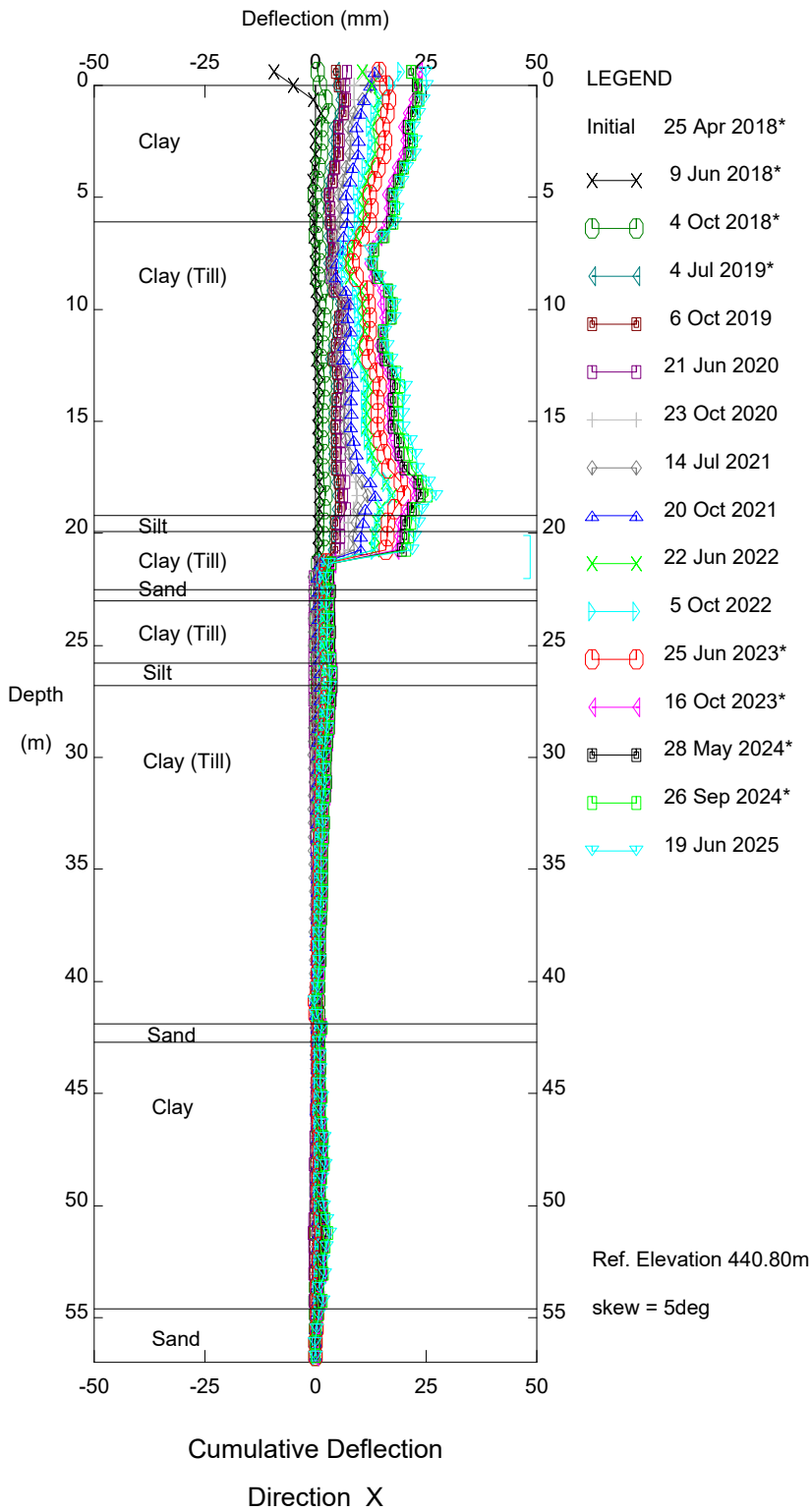


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Alberta Transportation

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Thurber Engineering Ltd

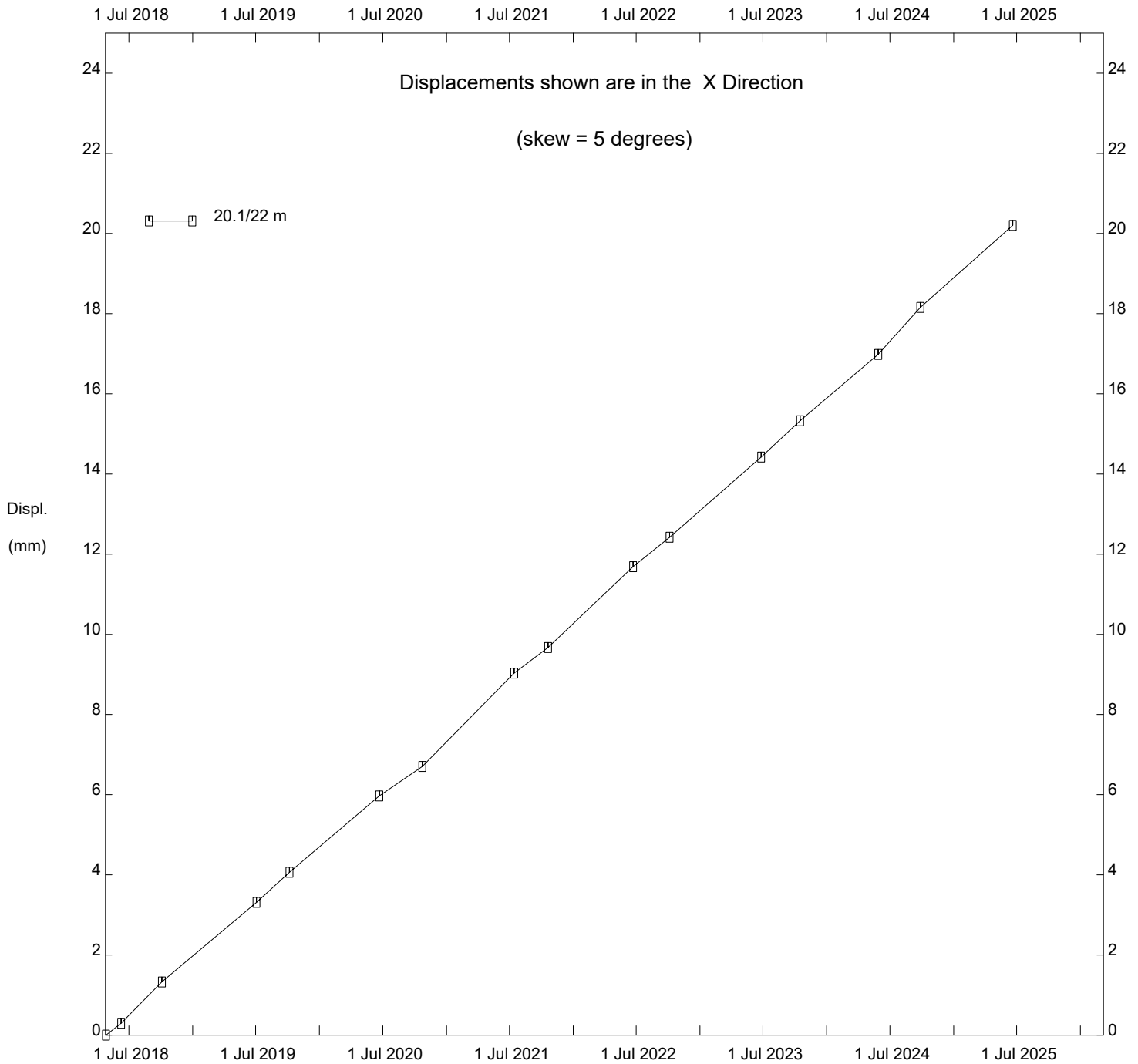


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Alberta Transportation

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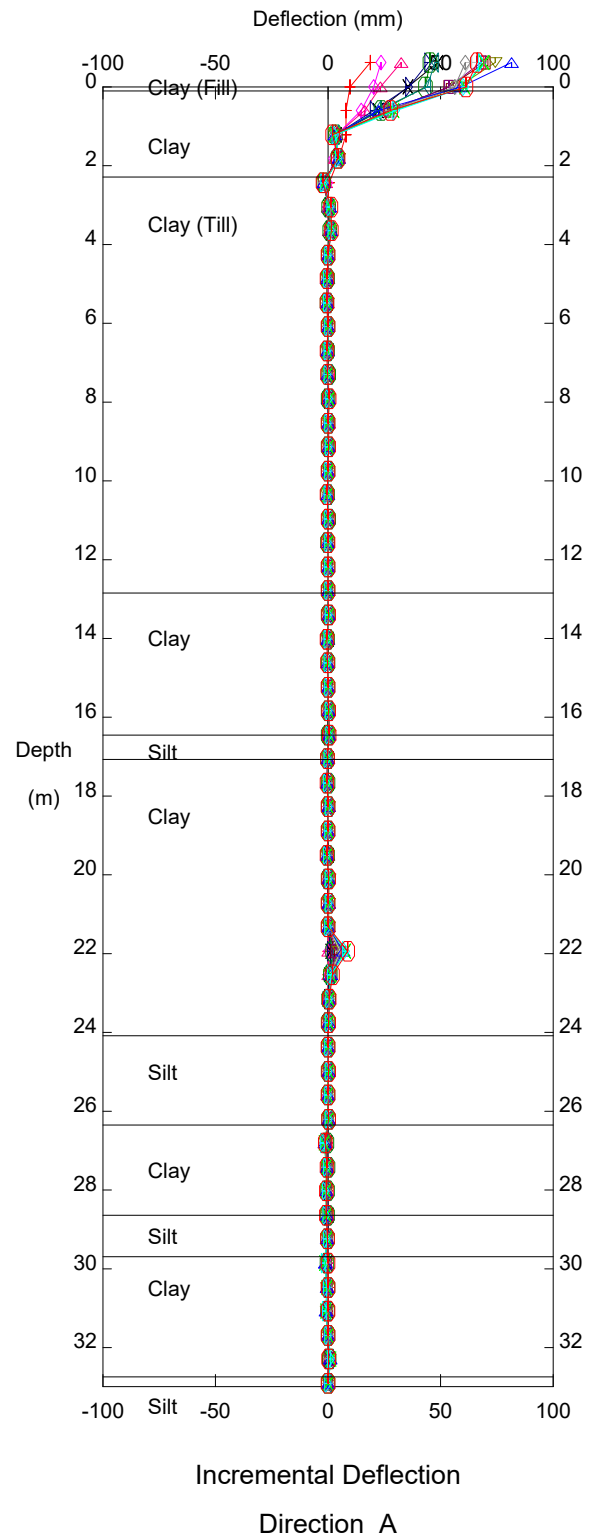
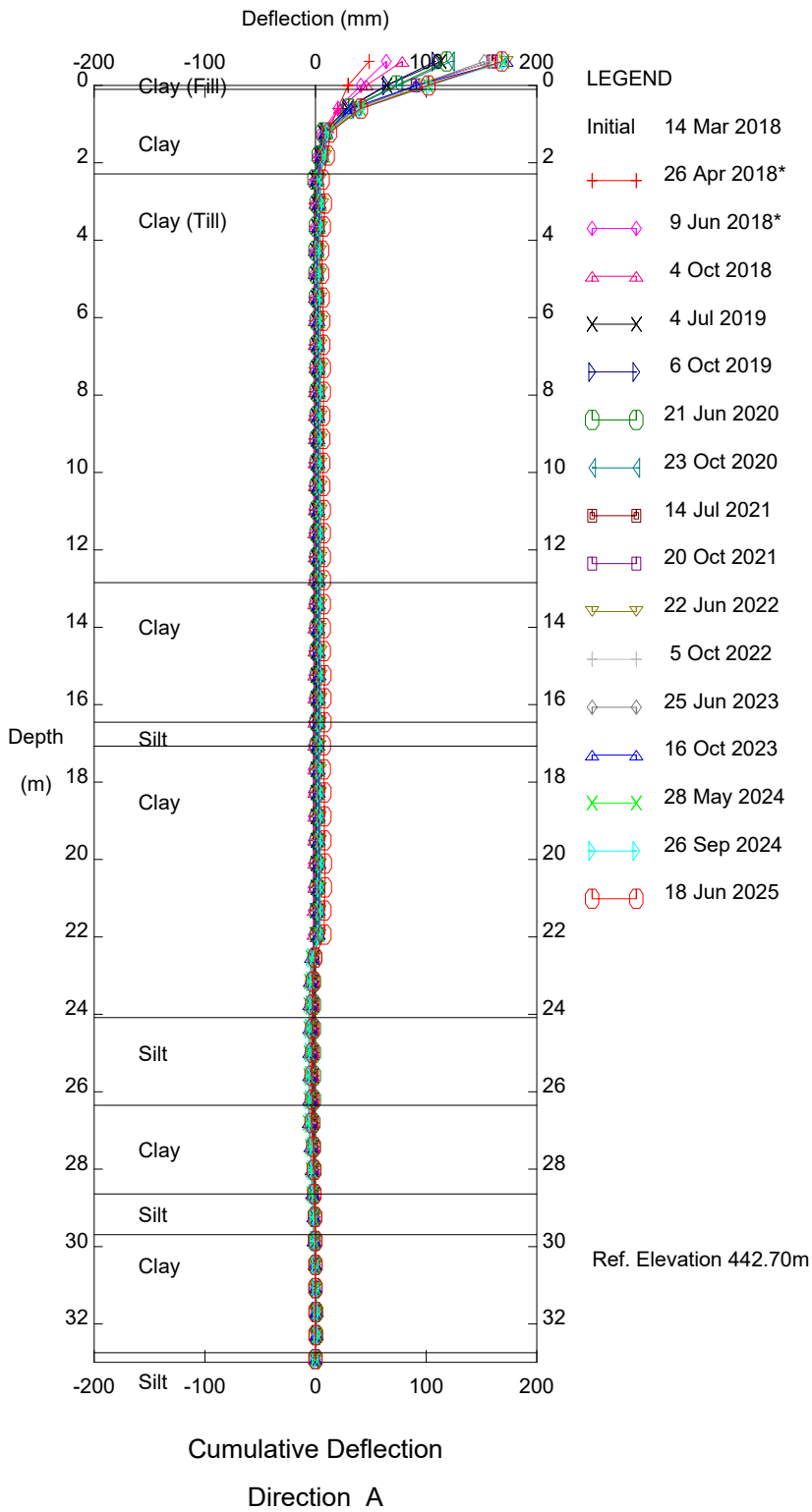
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HWY 2:68 (PH037), Inclinator SI18-9

Alberta Transportation

Thurber Engineering Ltd

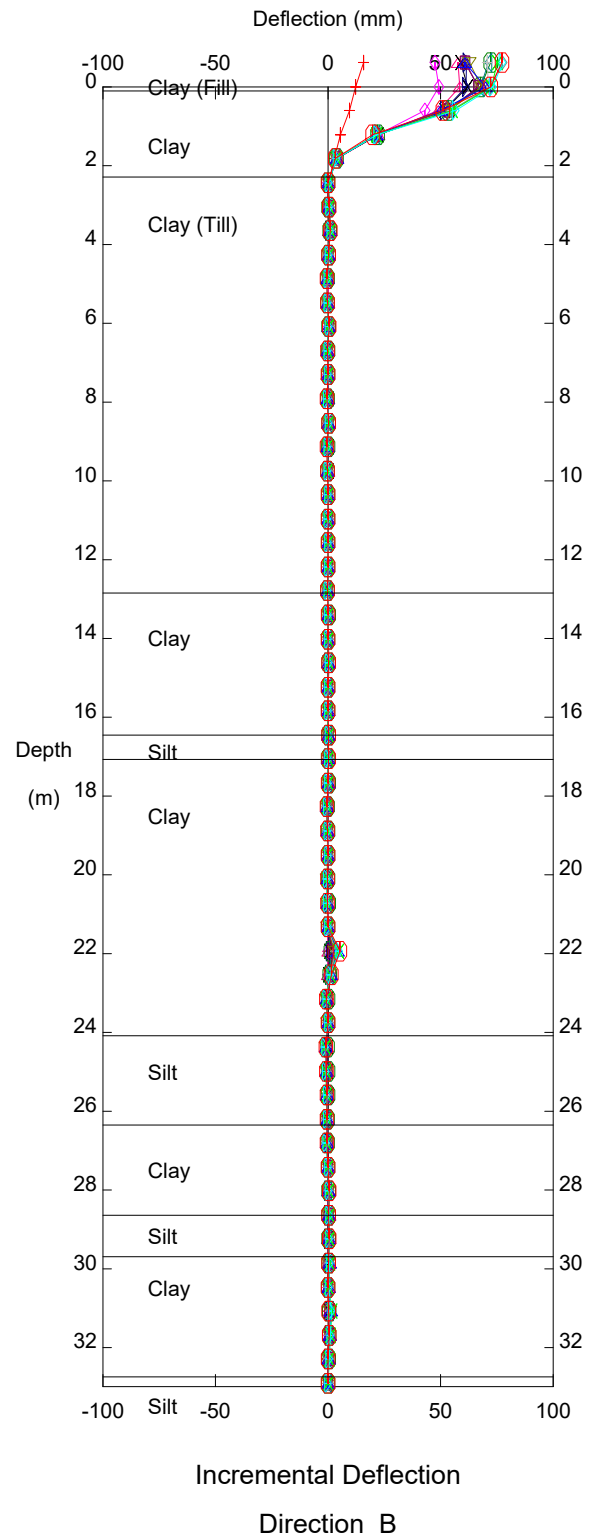
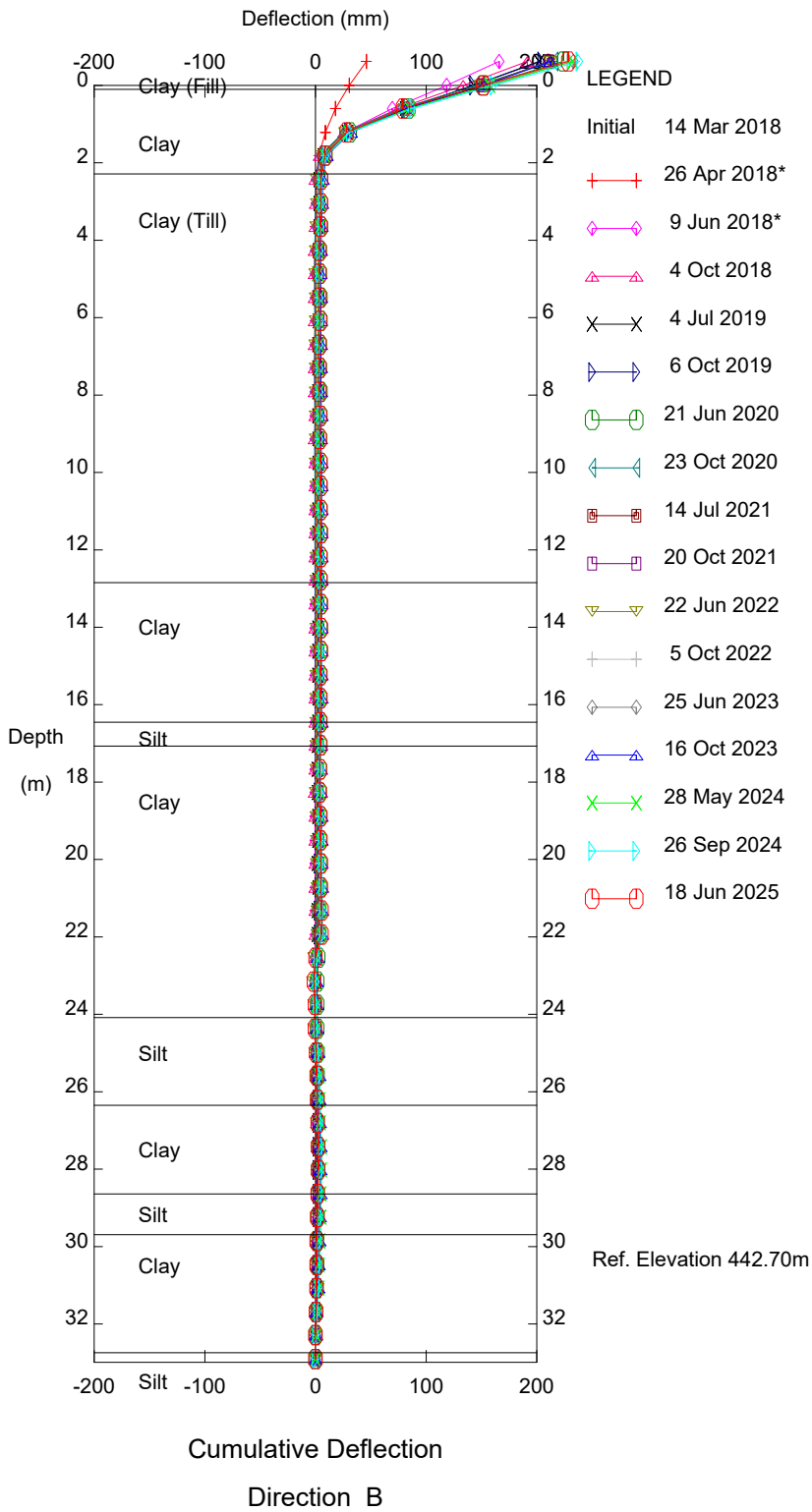


HWY 2:68 (PH037), Inclinometer SI18-10

Alberta Transportation

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

Thurber Engineering Ltd

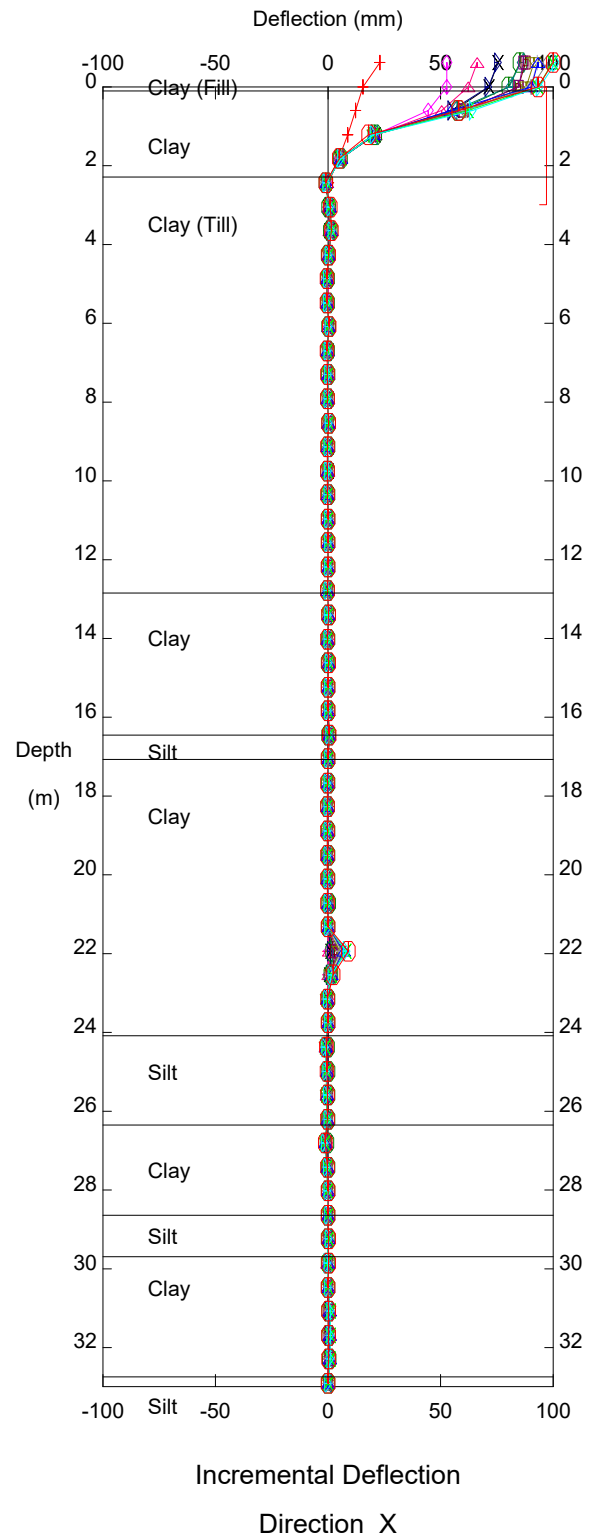
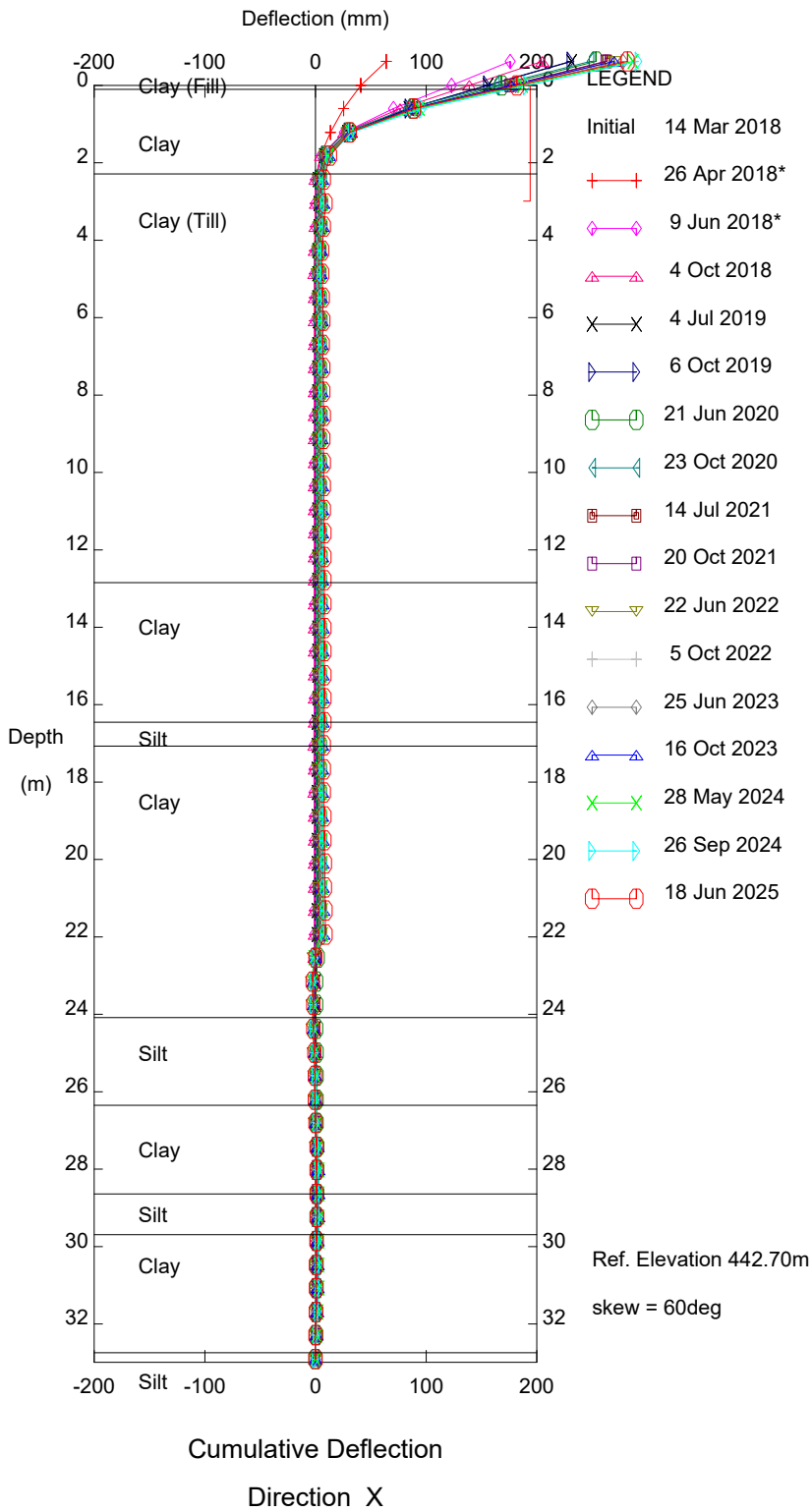


HWY 2:68 (PH037), Inclinometer SI18-10

Alberta Transportation

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

Thurber Engineering Ltd

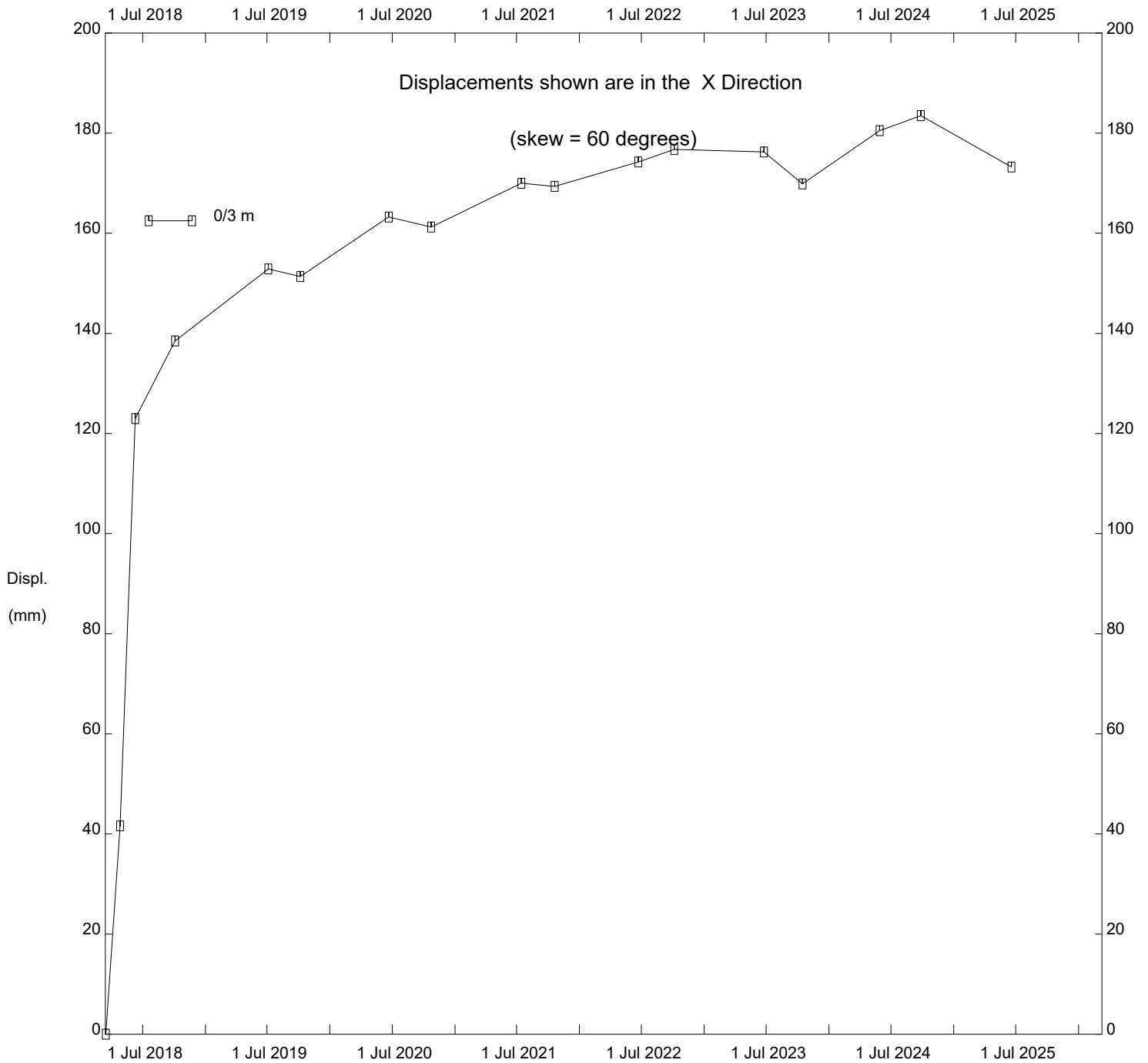


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Alberta Transportation

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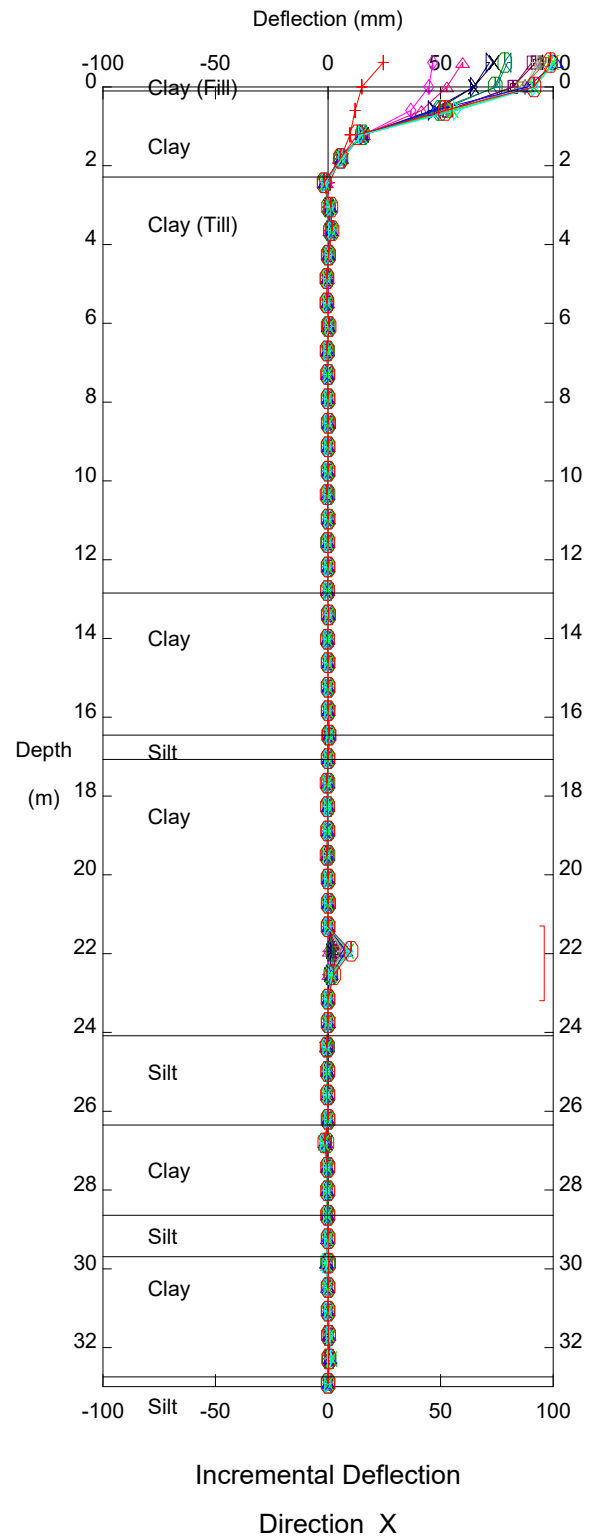
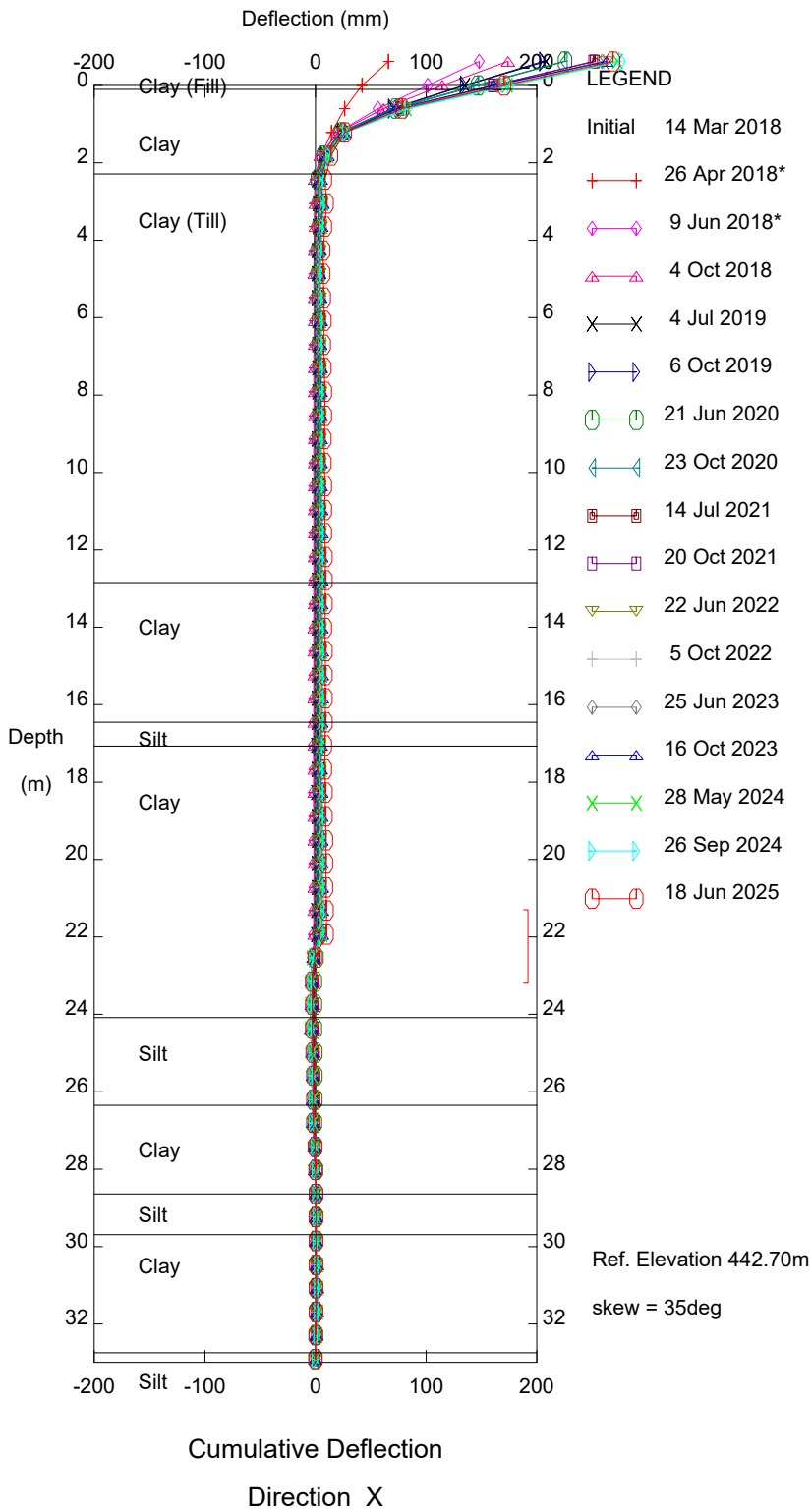
Thurber Engineering Ltd



HWY 2:68 (PH037), Inclinometer SI18-10

Alberta Transportation

Thurber Engineering Ltd

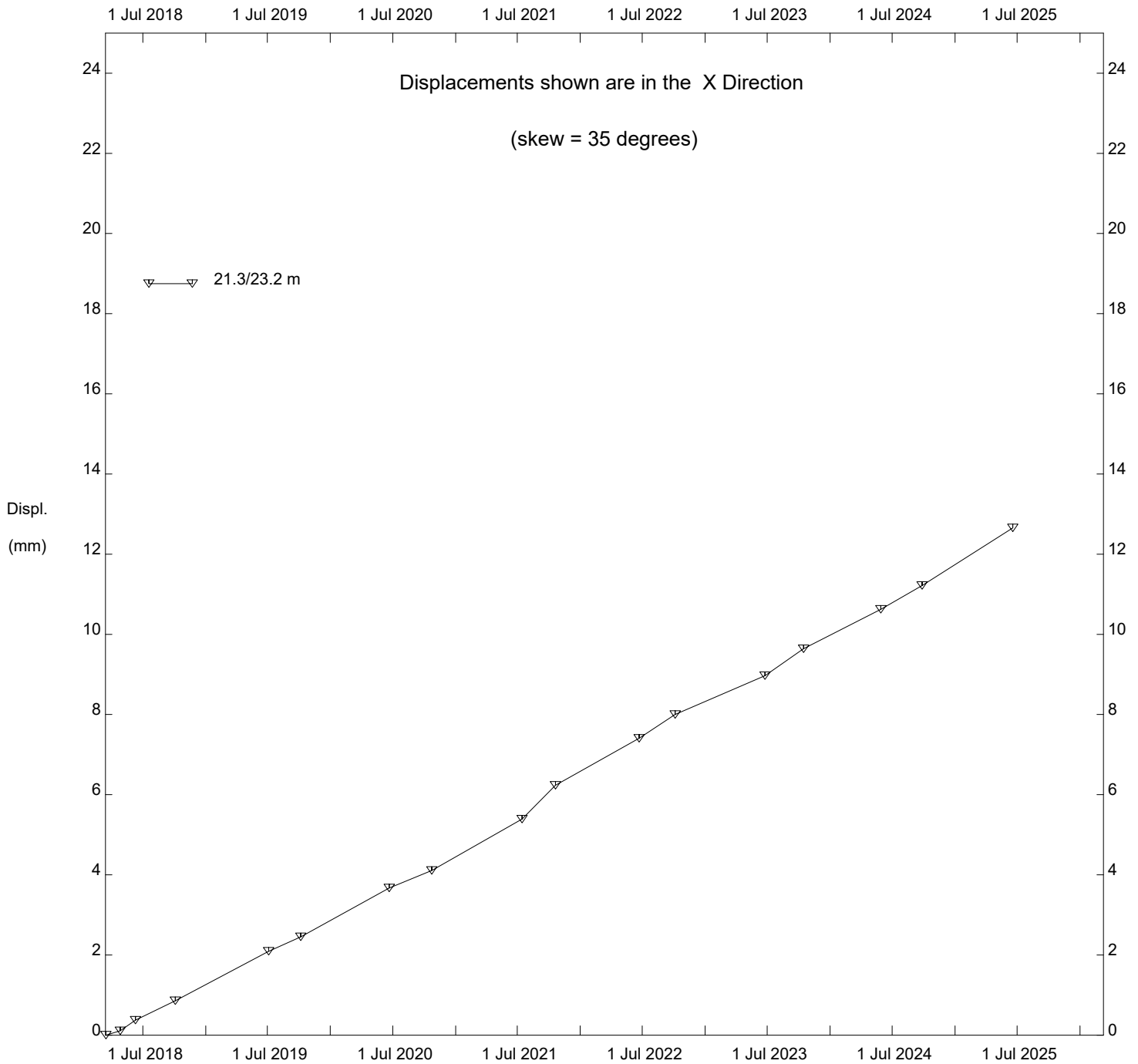


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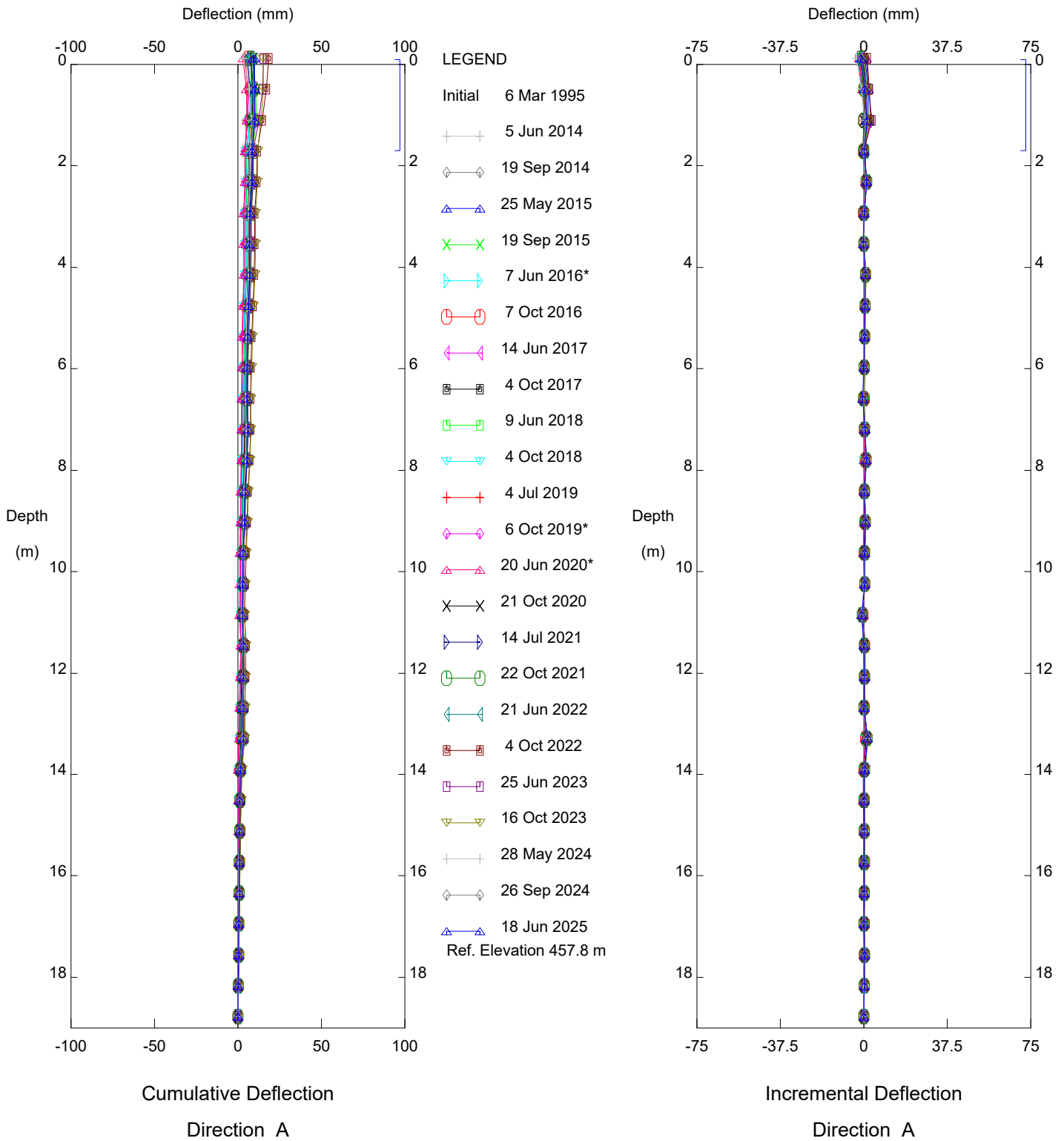
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Alberta Transportation

Thurber Engineering Ltd

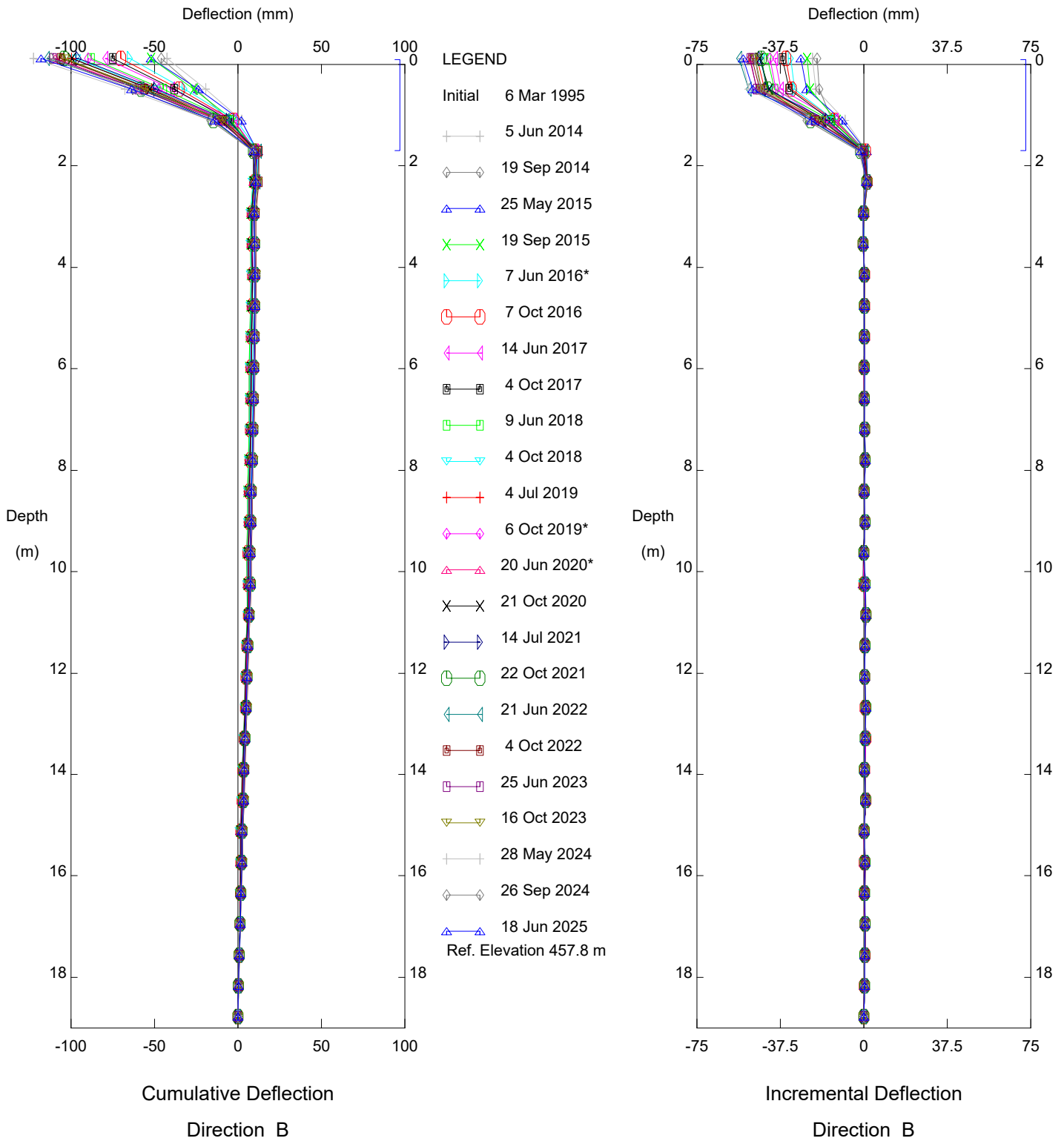


HWY 2:68 (PH037), Inclinometer SI-54

Alberta Transportation

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

Thurber Engineering Ltd

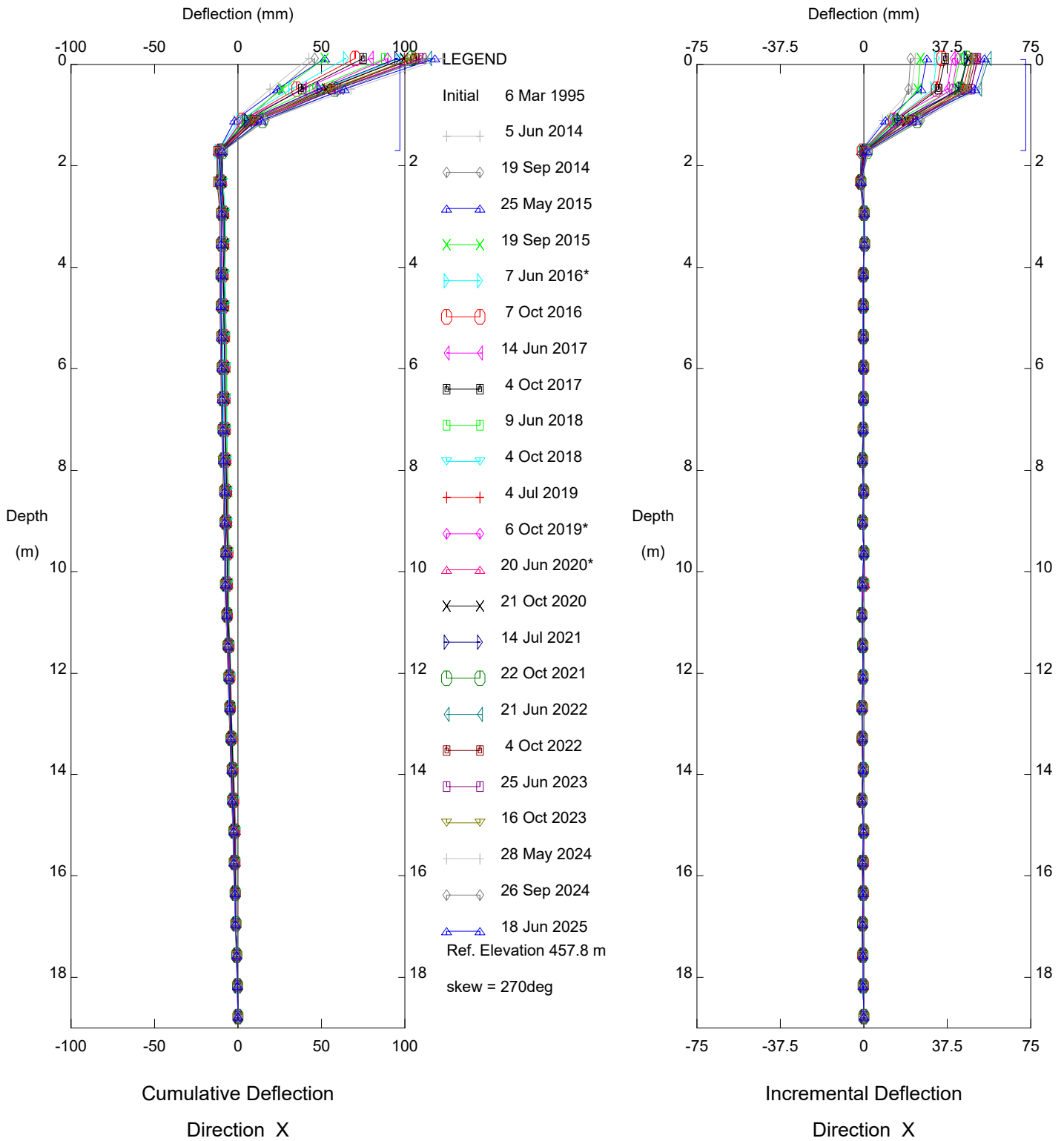


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Alberta Transportation

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

Thurber Engineering Ltd

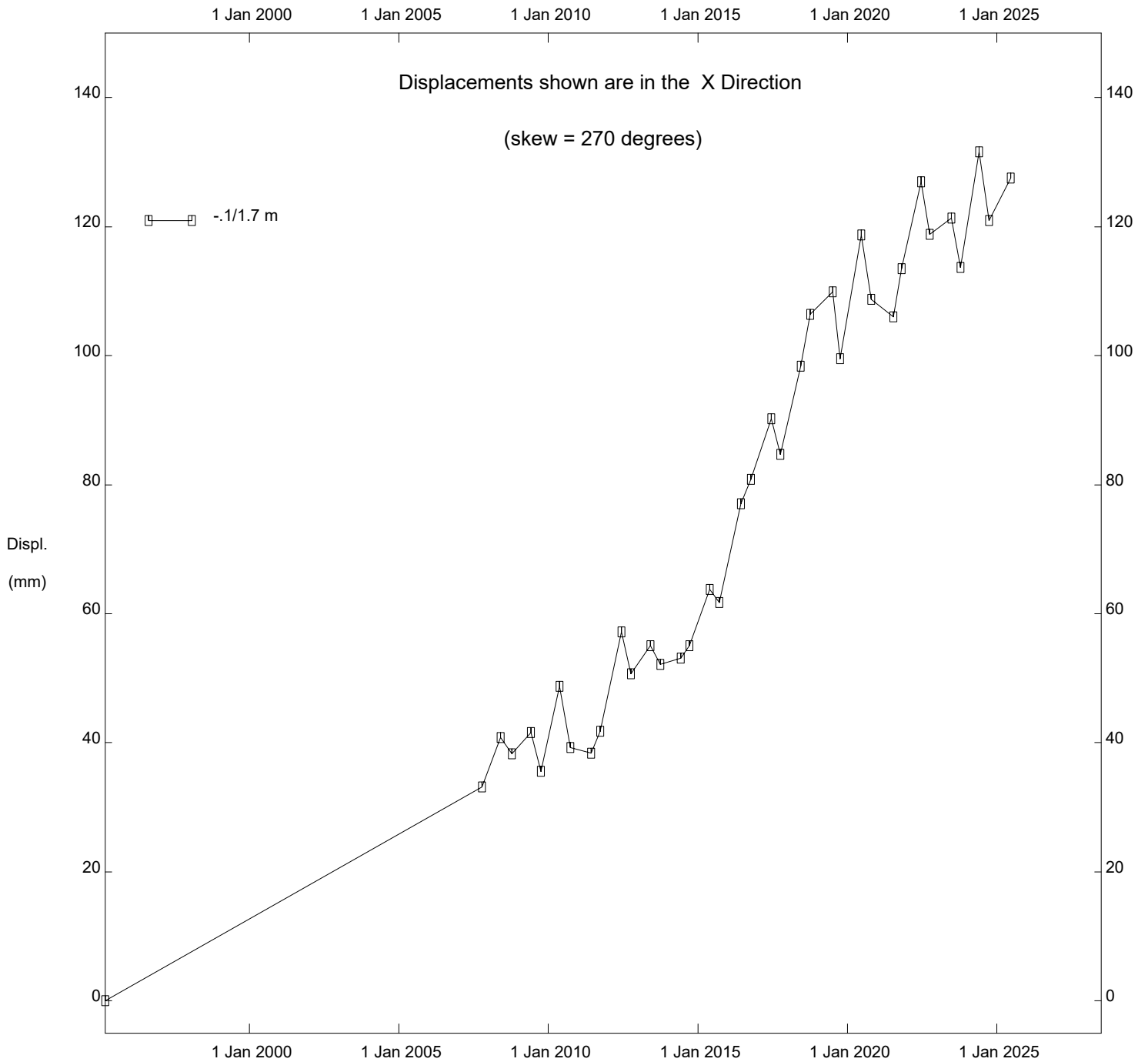


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Alberta Transportation

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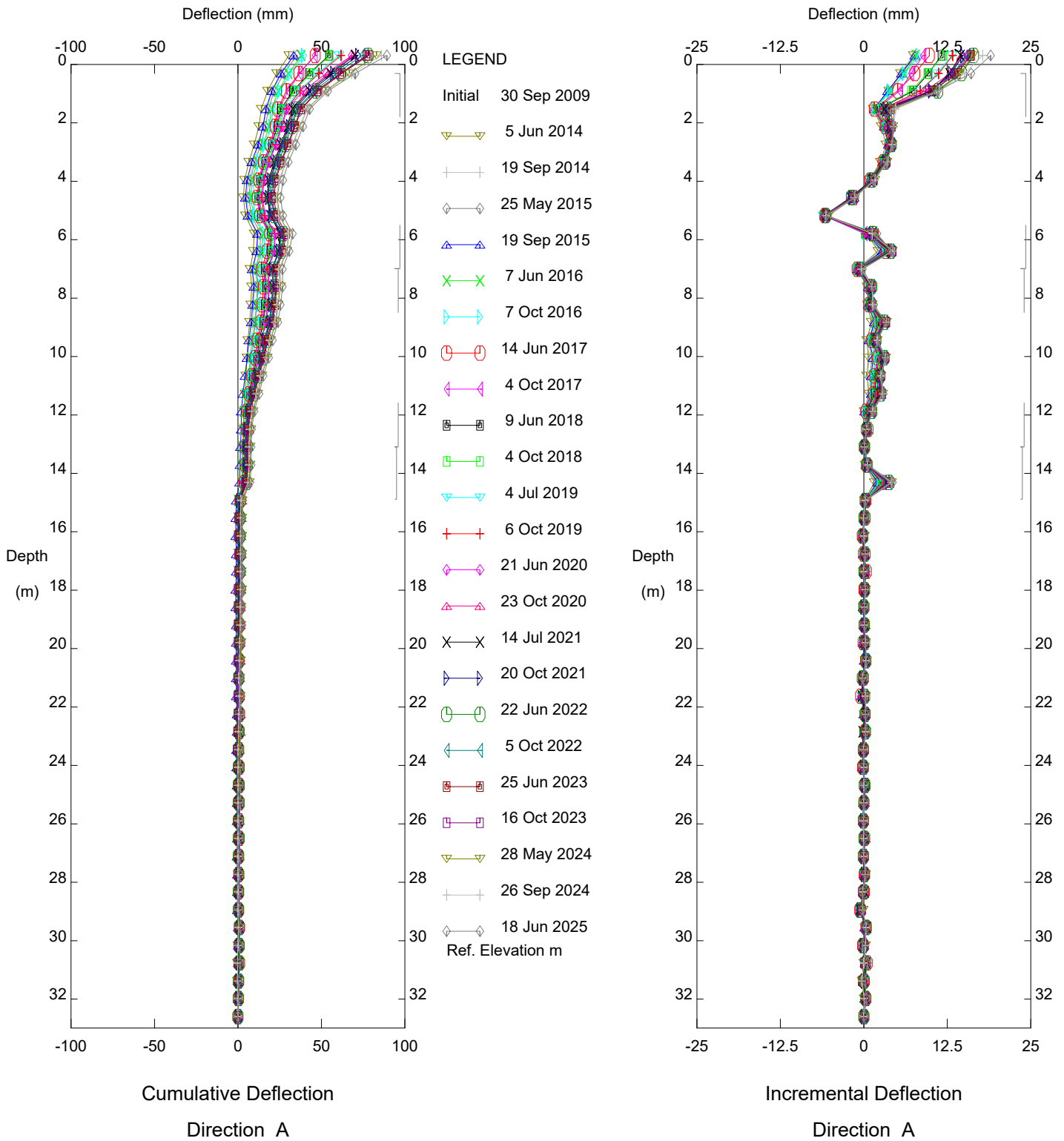
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Alberta Transportation

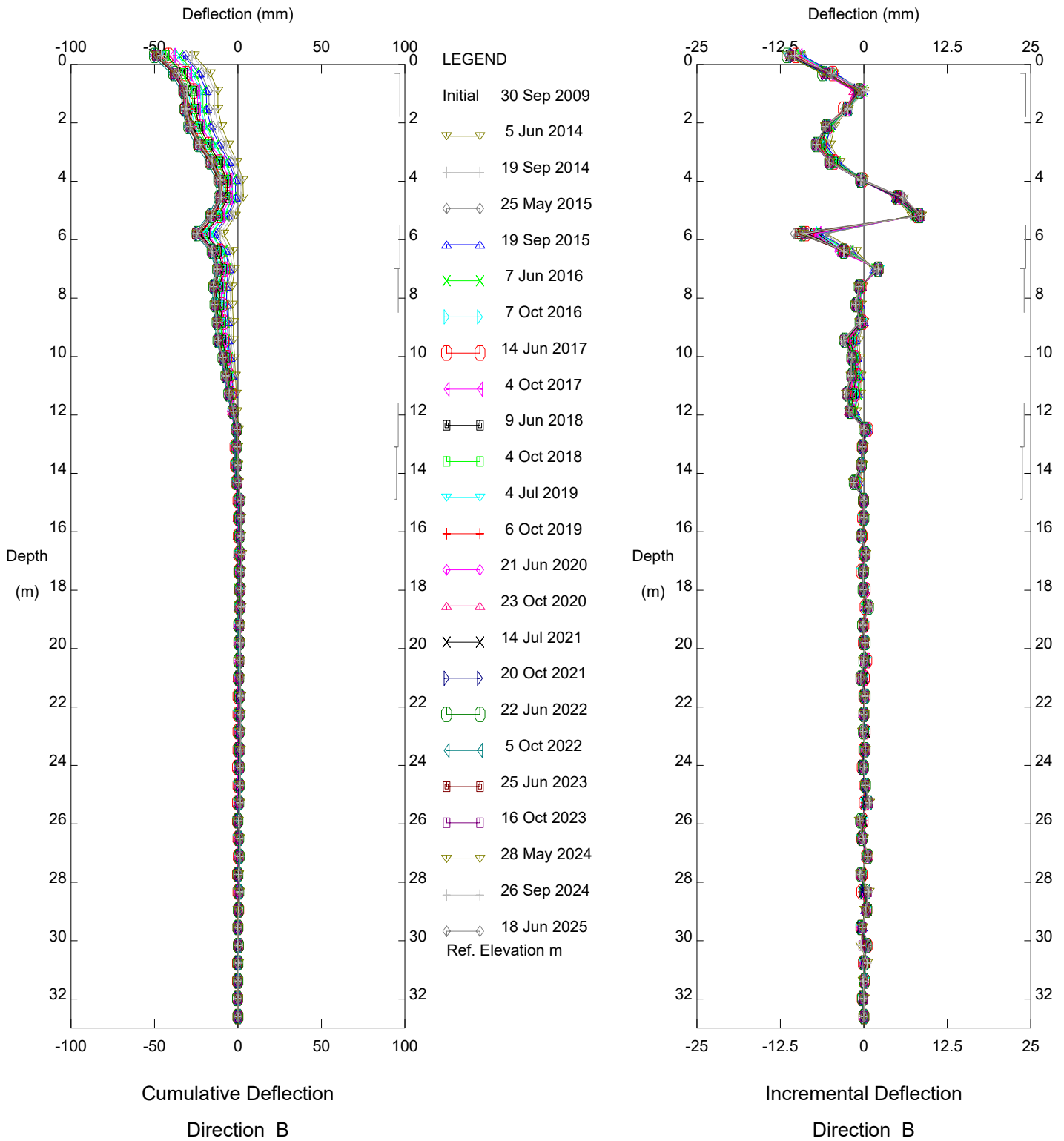
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HWY 2:68 (PH037), Inclinometer SI09-1

Alberta Transportation

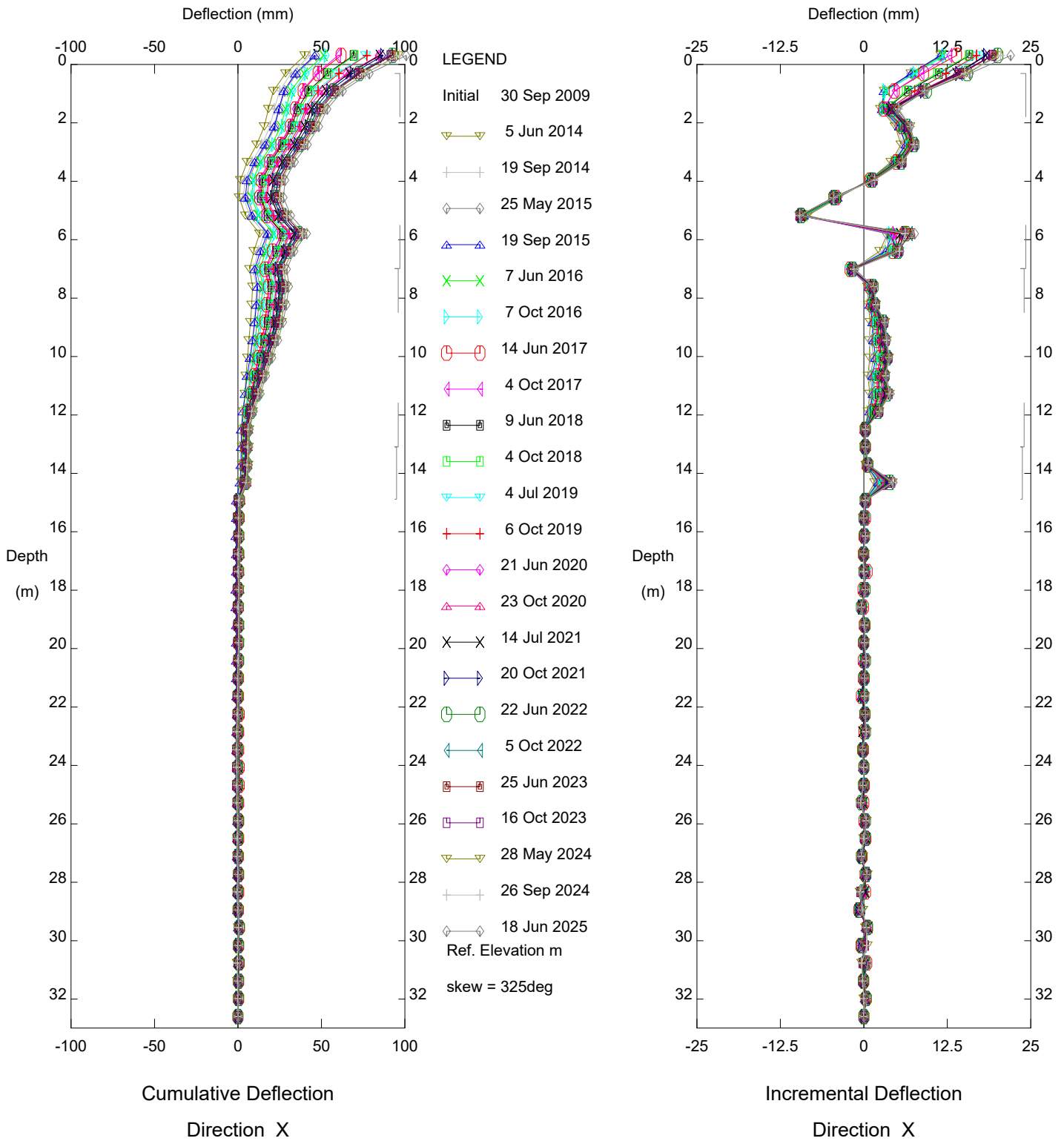
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Alberta Transportation

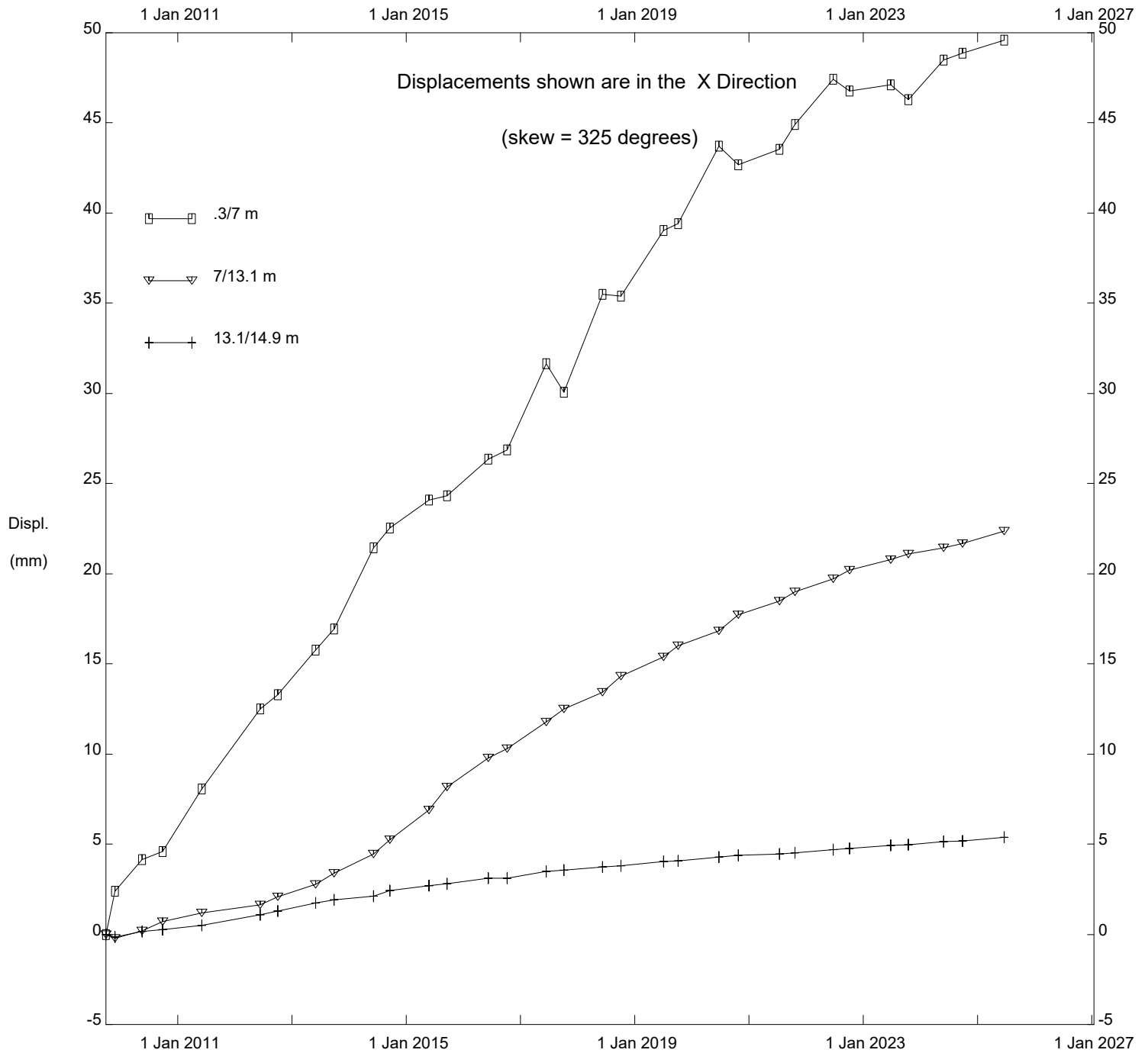
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Alberta Transportation

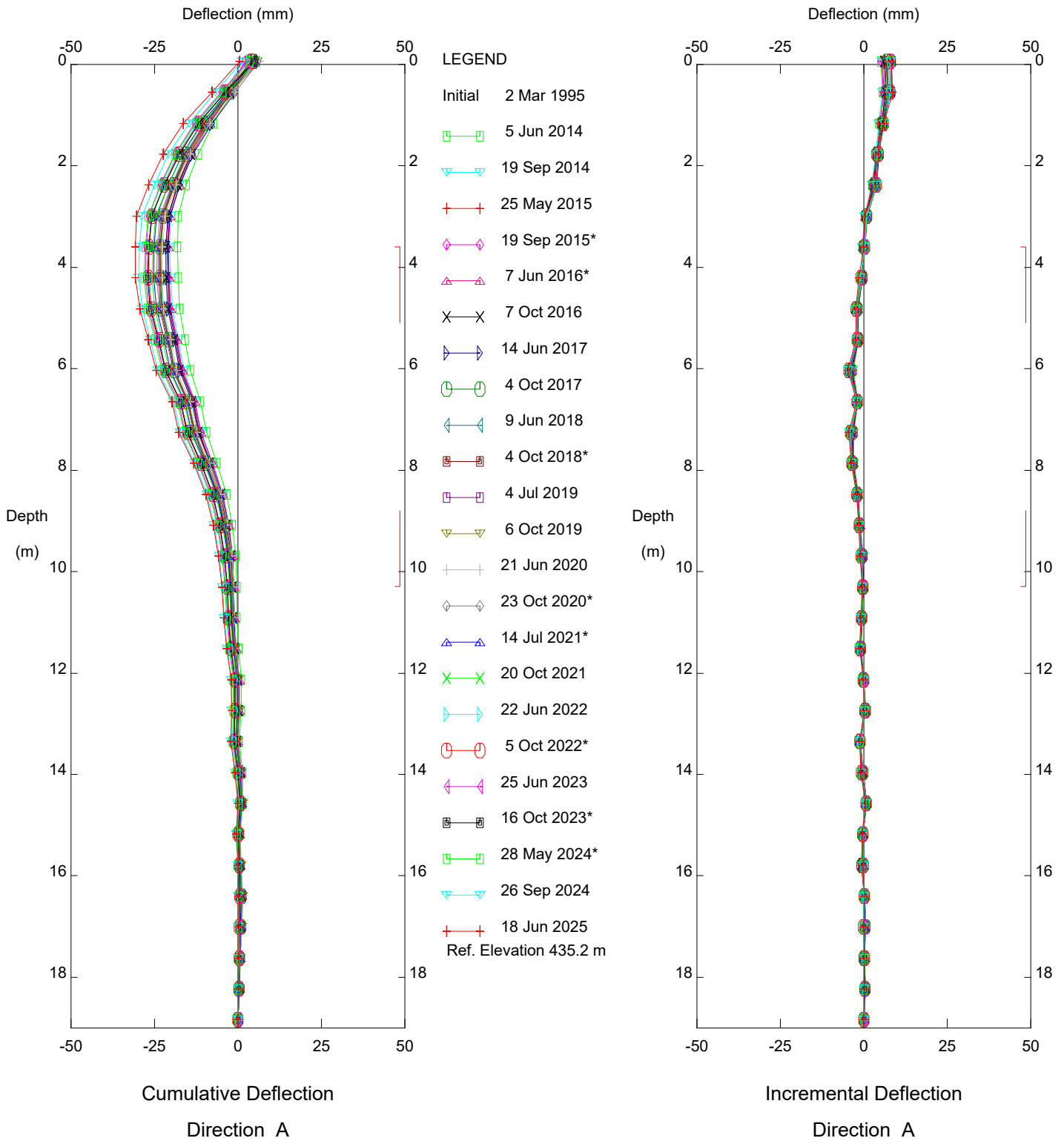
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Alberta Transportation

Thurber Engineering Ltd

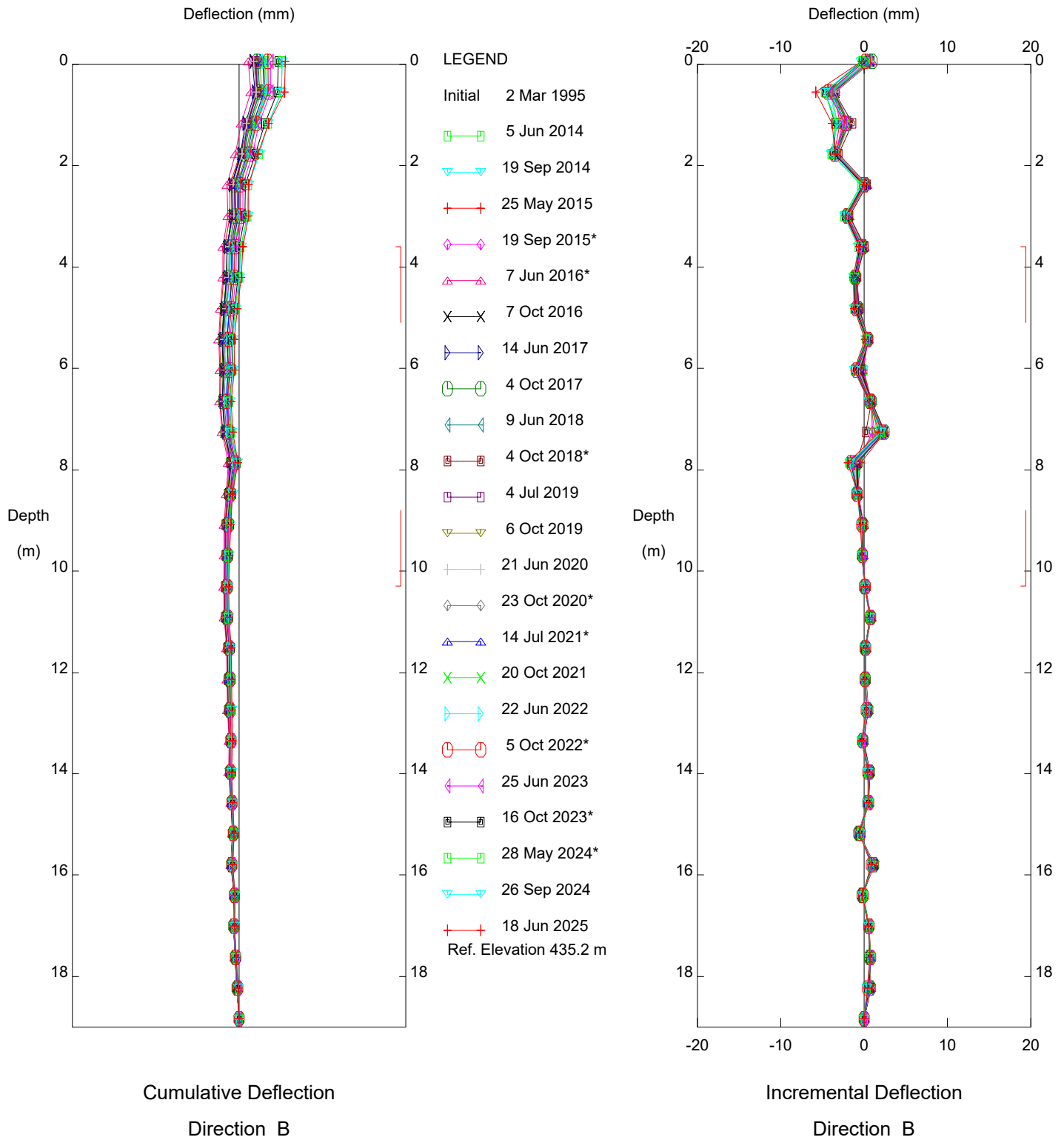


HWY 2:68 (PH037), Inclinometer SI-61

Alberta Transportation

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

Thurber Engineering Ltd

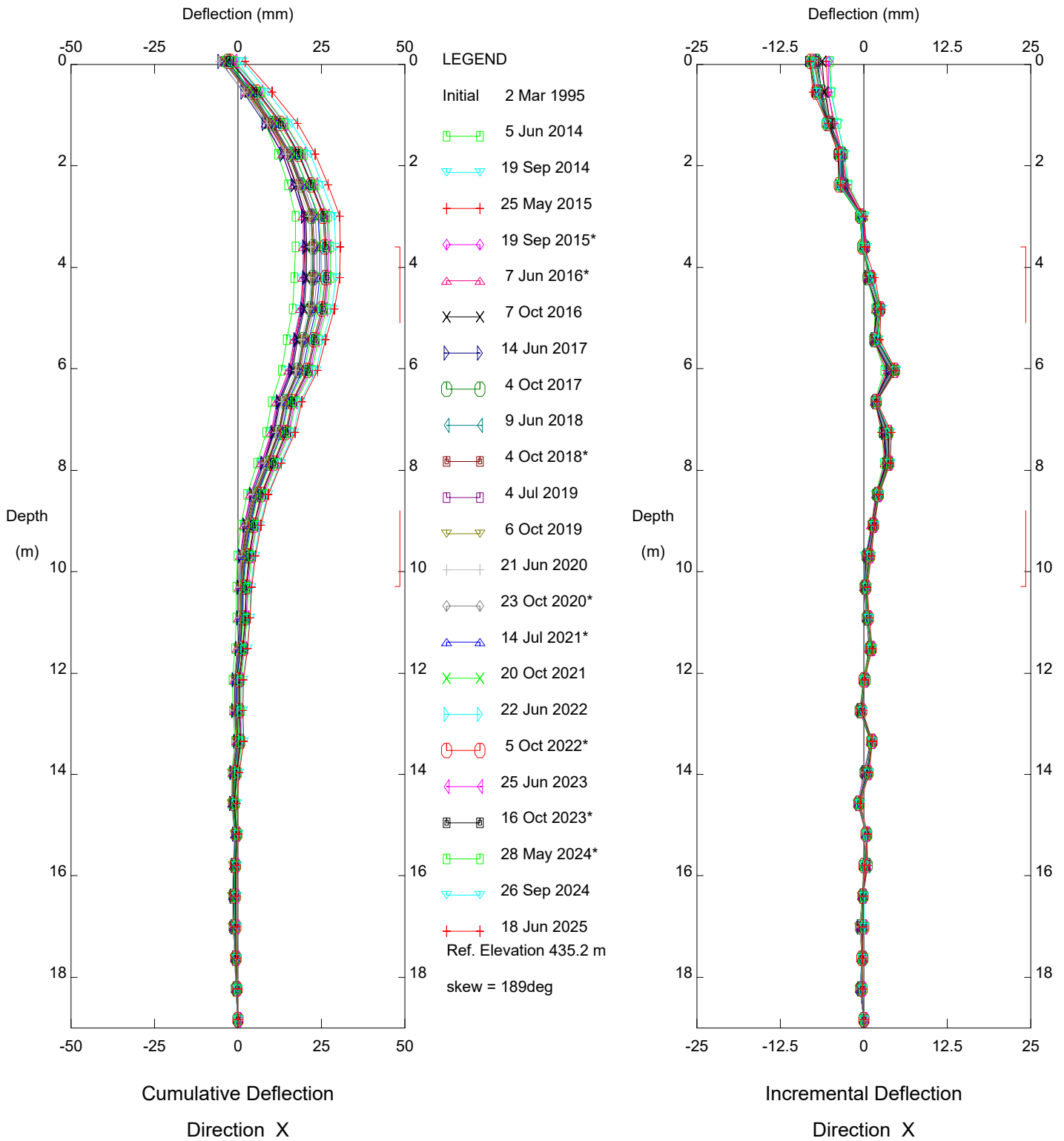


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Alberta Transportation

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Thurber Engineering Ltd

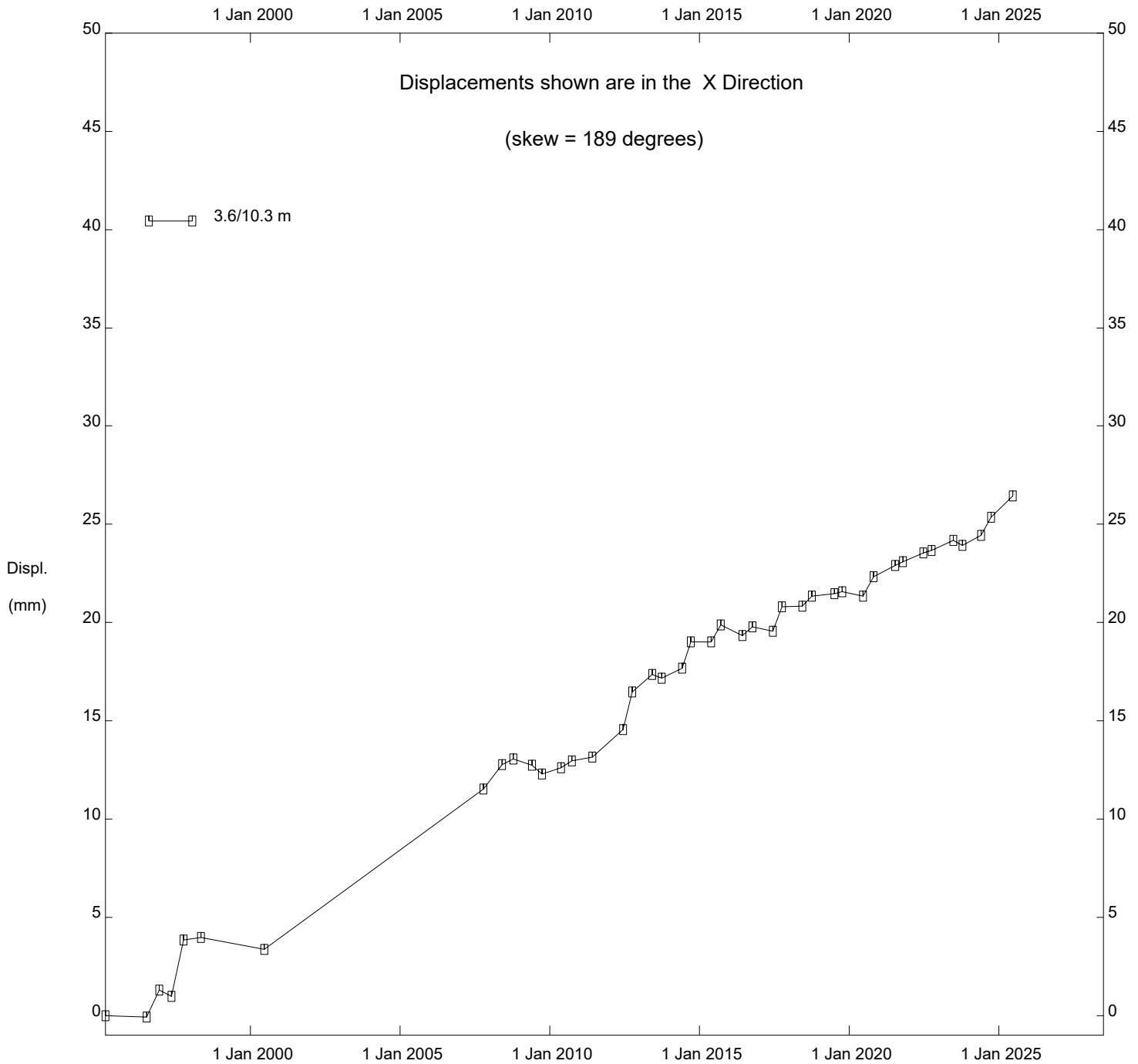


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Alberta Transportation

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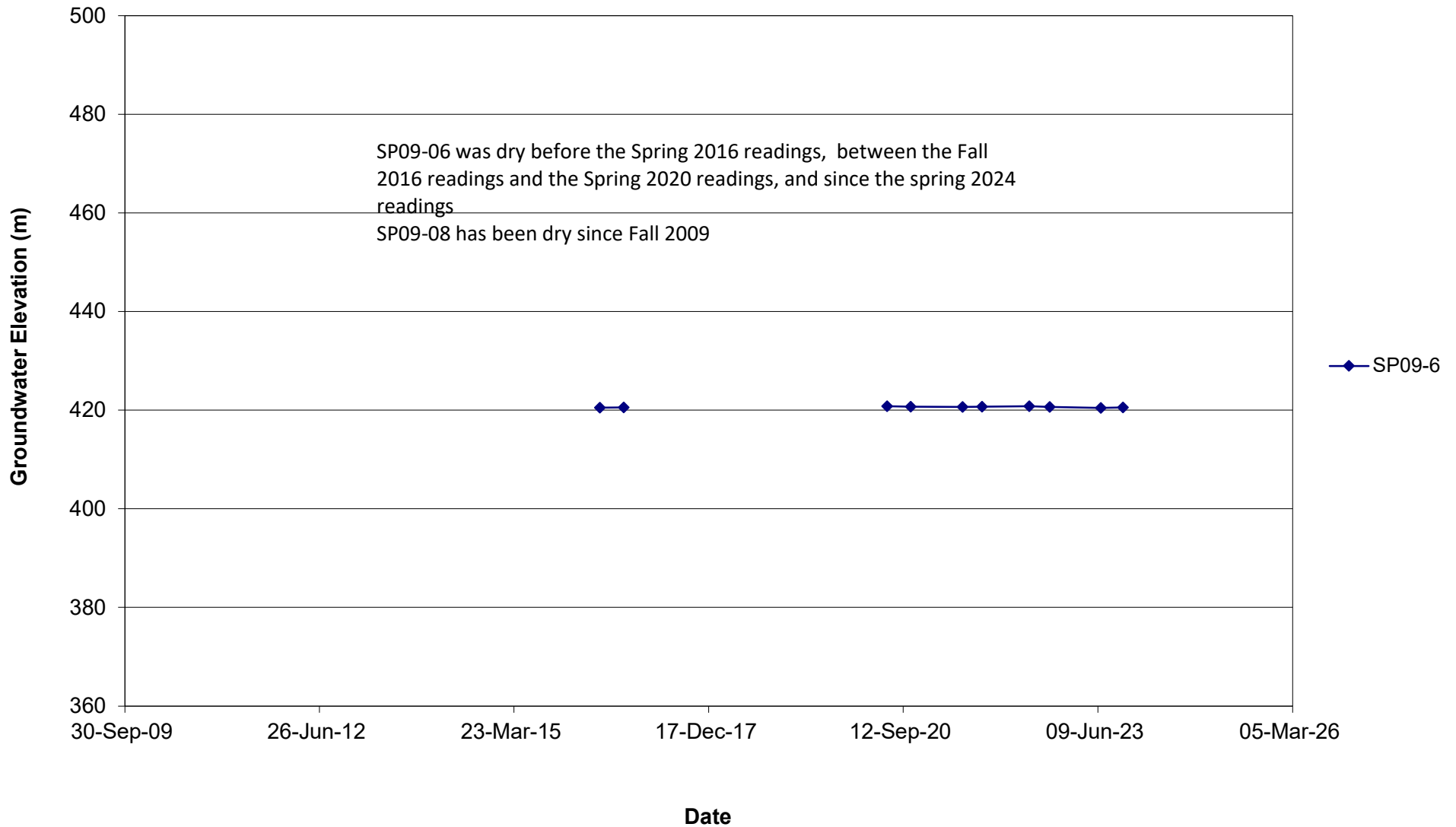
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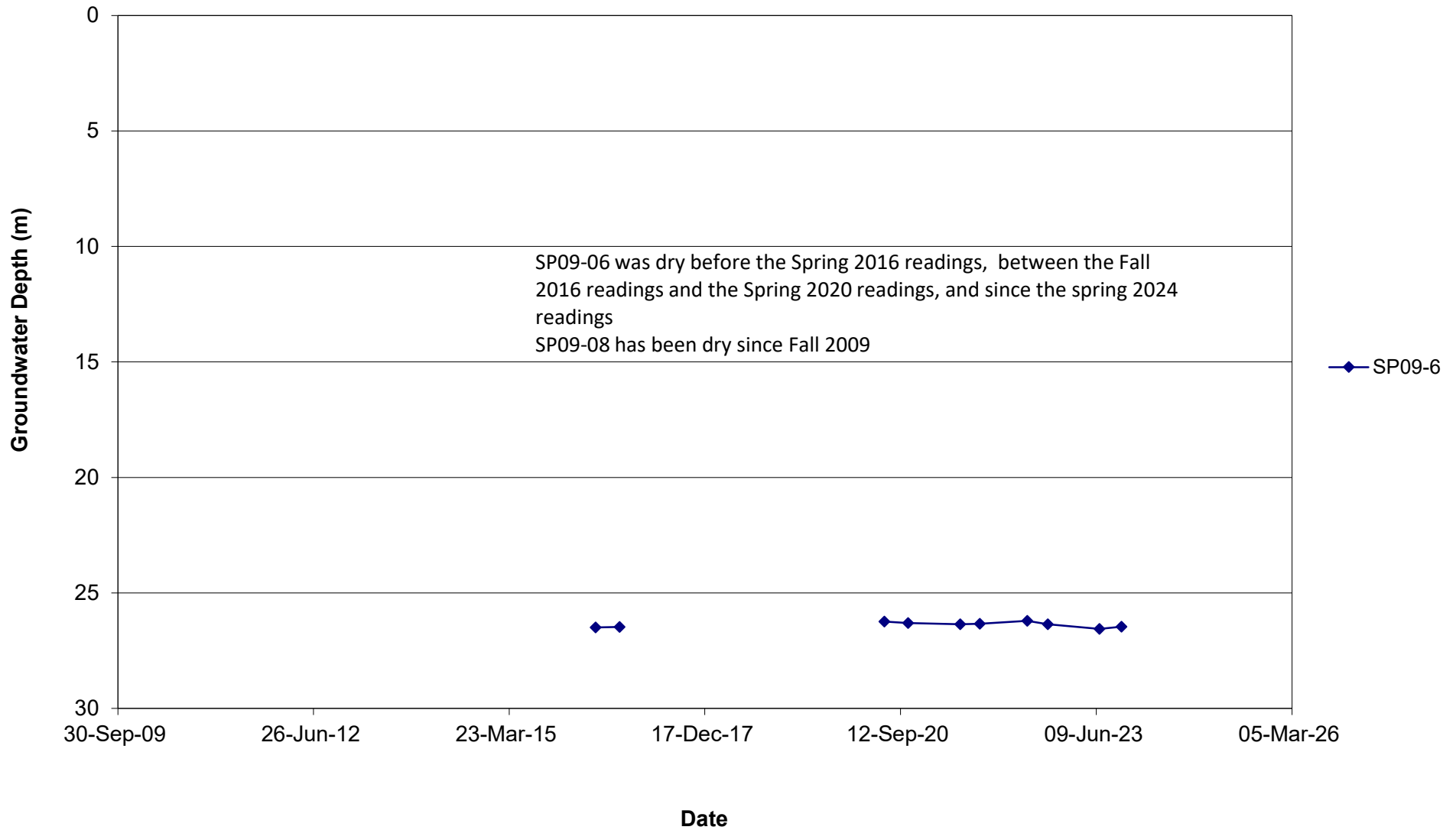
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Alberta Transportation

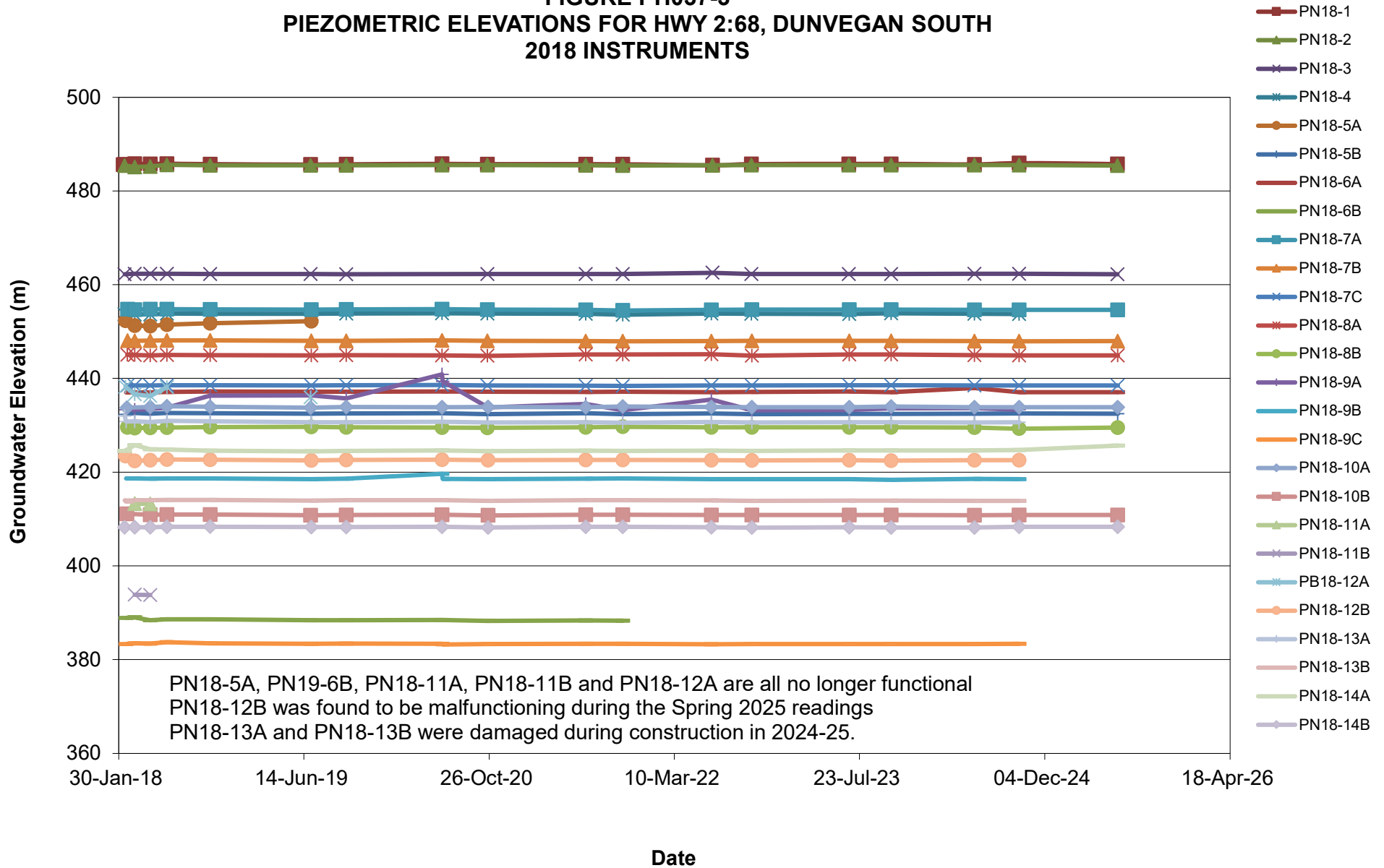
FIGURE PH037-1
PIEZOMETRIC ELEVATIONS FOR HWY 2:68, DUNVEGAN SOUTH
2009 INSTRUMENTS



**FIGURE PH037-2
PIEZOMETRIC DEPTHS FOR HWY 2:68, DUNVEGAN SOUTH
2009 INSTRUMENTS**



**FIGURE PH037-3
PIEZOMETRIC ELEVATIONS FOR HWY 2:68, DUNVEGAN SOUTH
2018 INSTRUMENTS**



**FIGURE PH037-4
PIEZOMETRIC DEPTHS FOR HWY 2:68, DUNVEGAN SOUTH
2018 INSTRUMENTS**

