THURBER ENGINEERING LTD.

ALBERTA TRANSPORTATION
PEACE REGION (PEACE RIVER / HIGH LEVEL)
INSTRUMENTATION MONITORING RESULTS

FALL 2018

SECTION C

SITE PH047-1: HWY 690:02, DEADWOOD SLIDE

1. OBSERVATIONS

1.1 Field Program and Instrumentation Status

Two slope inclinometers (SI15-01 and SI15-02) were installed at the Hwy 690:02 Deadwood Slide site during construction in the fall of 2015. The majority of construction work was completed by the end of November 2015. The two SIs were read on September 30, 2018 by Mr. Niraj Regmi, G.I.T. and Mr. Eddy Mar, E.I.T., both of Thurber Engineering Ltd.

The SIs were read using two RST Digital Inclinometer probes with 2 ft. wheelbases and RST Pocket PC readouts. Inclinometer reading depths were defined as per cable markings with respect to the top of the inclinometer casings.

2. INTERPRETATION

2.1 General

SI plots with A and B directions are presented in Section D and are summarized below. Where movement has been recorded, the resultant plot (X direction, if applicable) and a rate of movement have also been provided.

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2.2 Zones of Movement

Zones of new movement were not observed in slope inclinometers SI15-01 and SI15-02 since the spring of 2018 readings.

Zones of movement are summarized in Table PH047-1-1 at the end of this report. This table also provides a historical account of the total movement, the depth of movement and the maximum rate of movement that has occurred at this site since the initialization of the slope inclinometers.

2.3 Interpretation of Monitoring Results

Slope inclinometer SI15-01 showed a rate of movement of 4.2 mm/yr over 5.6 m to 7.4 m depth since the spring of 2018 readings. SI15-02 showed a rate of movement of 2.2 mm/yr over 4.6 m to 5.8 m depth since the spring of 2018 readings.

Historical groundwater levels recorded in the piezometers are summarized in Tables PH047-1-2 and PH047-1-3 at the end of this report. All piezometers at this site were damaged prior to or during construction.

3. RECOMMENDATIONS

3.1 Future Work

The instruments should be read again during the spring of 2019.

3.2 Instrumentation Repairs

No instrumentation repairs are required at this time.

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TABLE PH047-1-1
FALL 2018 – HWY 690:02 DEADWOOD SLIDE
SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: September 30, 2018

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)
SI15-01	October 14, 2015	49.1 mm over 5.6 m to 7.4 m depth in 188° direction	650 in October 2015	Operational	June 18, 2018	1.2	4.2	2.1
SI15-02	October 14, 2015	59.2 mm over 4.6 m to 5.8 m depth in 157° direction	971 in October 2015	Operational	June 18, 2018	0.6	2.2	0.9

Drawing 13351-PH047-1-1 in Section D provides a sketch of the approximate locations of the monitoring instrumentation for this site.

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TABLE PH047-1-2
FALL 2018 – HWY 690:02 DEADWOOD SLIDE
STANDPIPE PIEZOMETER INSTRUMENTATION READING SUMMARY

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	MAXIMUM GROUNDWATER LEVEL BGS (m)	GROUNDWATER LEVEL BGS (m)
SP10-1	*November 4, 2010*	*9.66*	*559.54*	*Blocked at 1.7 mBGS*	*4.60 on November 4, 2010*	*4.69 (Sept. 25, 2013)*
SP10-3	*November 4, 2010*	*8.90*	*565.44*	*Destroyed*	*1.14 on May 27, 2011*	*1.89 (Oct. 1, 2012)*
SP10-5	*April 27, 2010*	*2.92*	*561.27*	*Damaged*	*0.63 on July 27, 2011*	*1.66 (Sept. 17, 2015)*

Drawing 13351-PH047-1-1 in Section D provides a sketch of the approximate locations of the monitoring instrumentation for this site.

TABLE PH047-1-3
FALL 2018 – HWY 690:02 DEADWOOD SLIDE
VIBRATING WIRE PIEZOMETER INSTRUMENTATION READING SUMMARY

INSTRUMENT	DATE INITIALIZED	TIP ELEV. (m)	GROUND ELEV. (m)	CURRENT STATUS	MAXIMUM GROUNDWATER ELEVATION (m)	GROUNDWATER ELEVATION (m)
VW10-1 (100D10918)	*April 27, 2011*	*553.50*	*562.00*	*Destroyed*	*560.60 m on May 23, 2015 (1.40 mBGS)*	*560.60 (May 23, 2015)*
VW10-2 (100D10917)	*April 27, 2011*	*555.17*	*560.96*	*Destroyed*	*558.96 m on June 2, 2014 (2.00 mBGS)*	*558.96 (June 2, 2014)*

Drawing 13351-PH047-1-1 in Section D provides a sketch of the approximate locations of the monitoring instrumentation for this site.

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PEACE REGION (PEACE RIVER / HIGH LEVEL)
INSTRUMENTATION MONITORING RESULTS

FALL 2018

SECTION D
DATA PRESENTATION

SITE PH047-1: HWY 690:02, DEADWOOD SLIDE

ALBERTA TRANSPORTATION
PEACE REGION (PEACE RIVER / HIGH LEVEL)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH047-1)
FALL 2018

Location:	Deadwood Slide (HWY 690:02 C1 2.431)	**Readout:**	
File Number:	13351	**Extension:**	3.34
Probe:	RST Set 8R and 5R	**Temp:**	-2°C
Cable:	RST Set 8R and 5R	**Read by:**	EM/NKR

SLOPE INCLINOMETER (SI) READINGS

SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of casing (ft)	Magn. North A+ Groove	Current Bottom Depth Readings				Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-	
SI15-01	462963.71	6288741.66	30-Sep-18	0.84	52 to 2	172	-19	26	-763	752	
SI15-02	462975.78	6288730.45	30-Sep-18	1.20	52 to 2	160	203	-181	-521	525	*

INSPECTOR REPORT

*USE DUMMY PROBE for next reading

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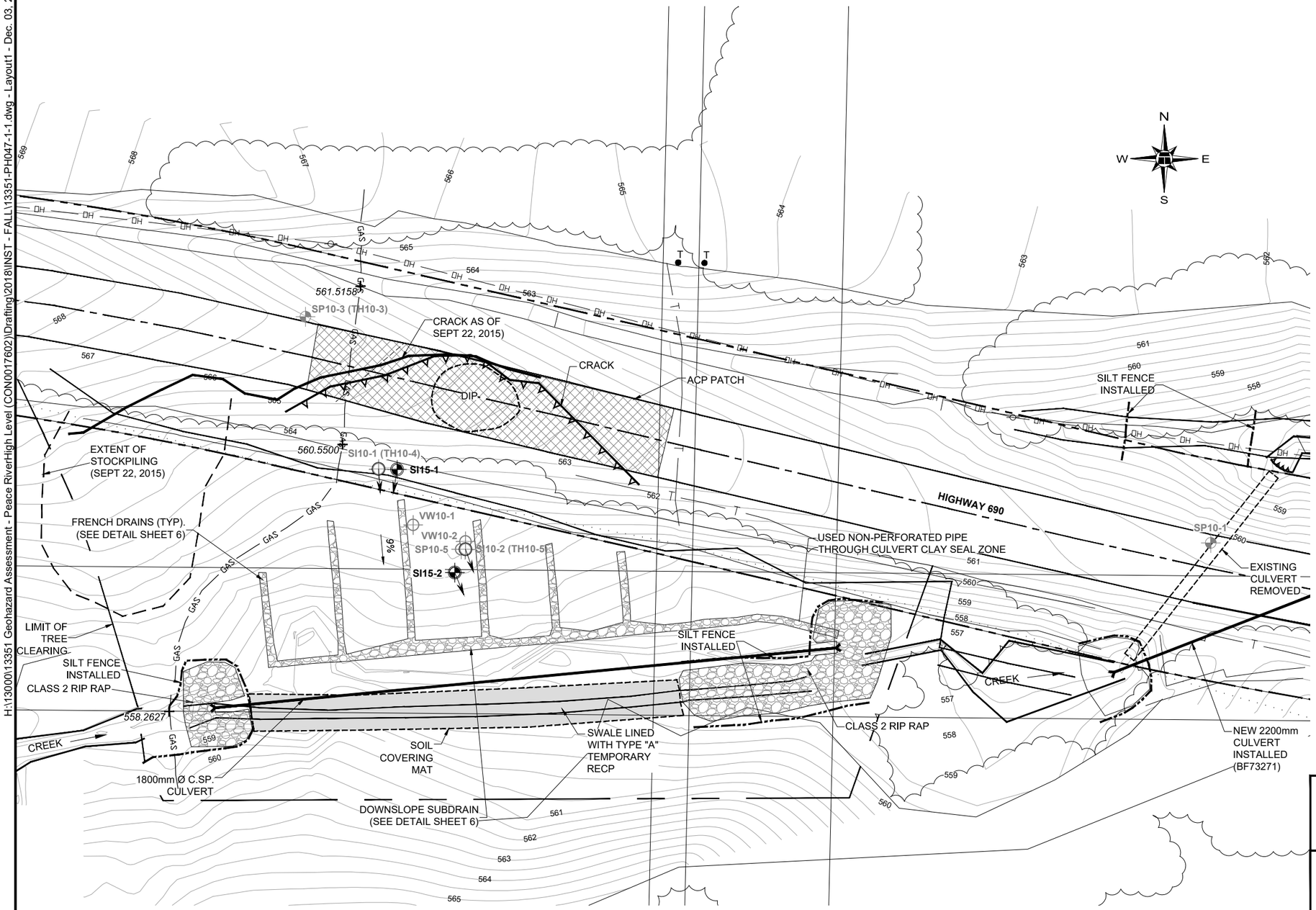

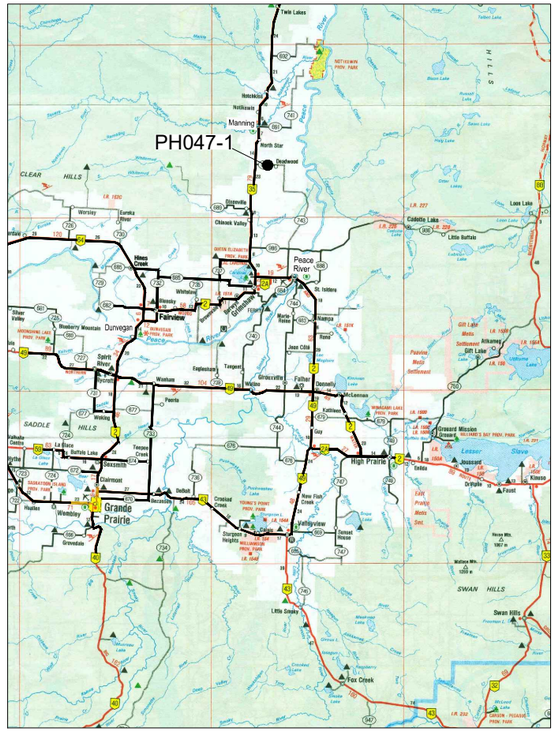

0 5 10 15 20 30m

SCALE 1:600

LEGEND:

- INSTRUMENT LOCATION
- INSTRUMENT NOT IN USE
- **SI** SLOPE INCLINOMETER
- SLOPE INCLINOMETER MOVEMENT DIRECTION

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PEACE REGION (PEACE RIVER/ HIGH LEVEL)

PH047-1: HWY 690:02 - DEADWOOD SLIDE INSTRUMENT LOCATIONS

DWG No. 13351-PH047-1-1

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	DWP
SCALE	1:600
LAST UPDATED	JULY 2018
FILE No.	13351

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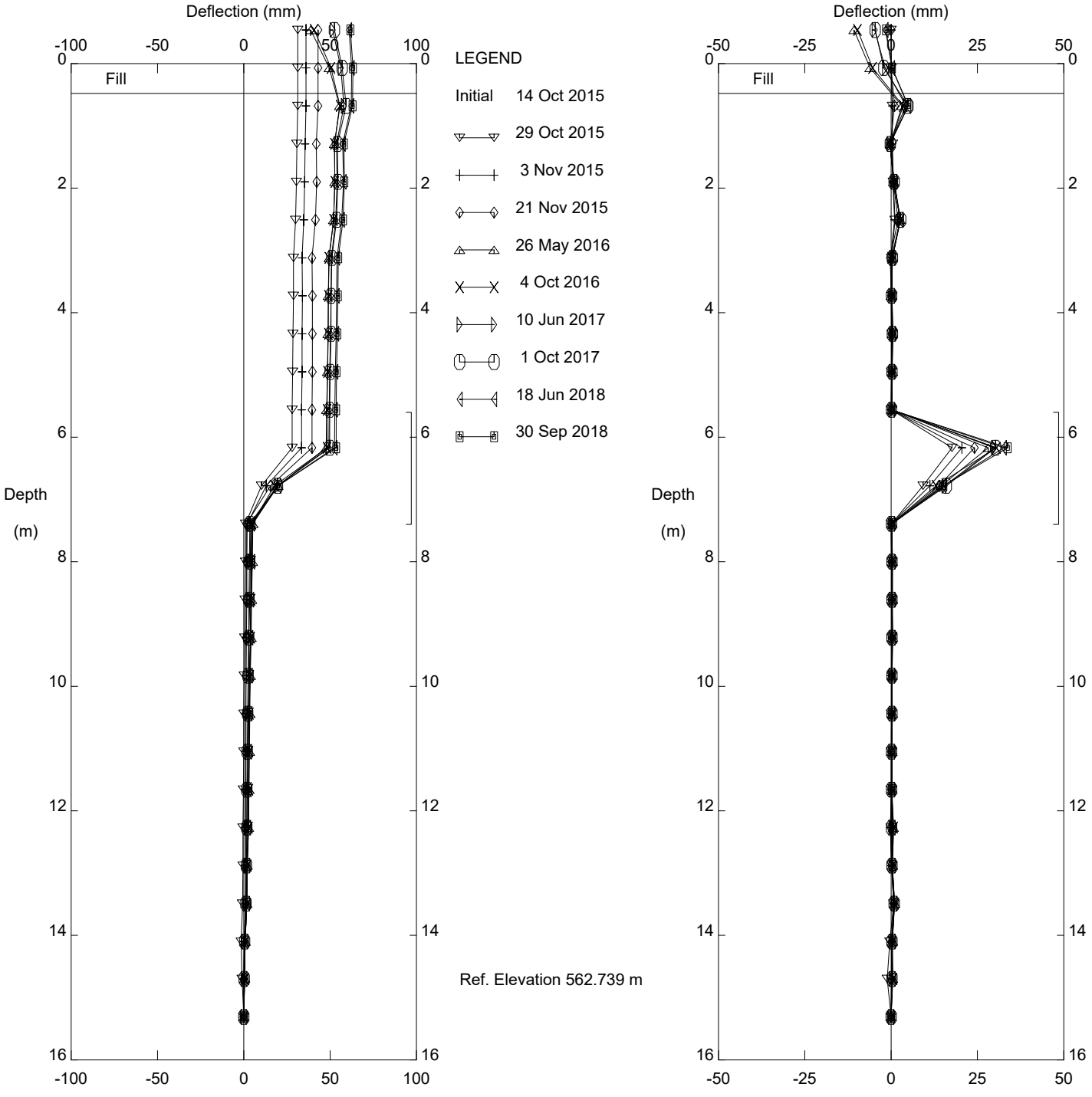

Cumulative Deflection

Direction A

Incremental Deflection

Direction A

PH047-1 Deadwood Slide, Inclinometer SI15-01

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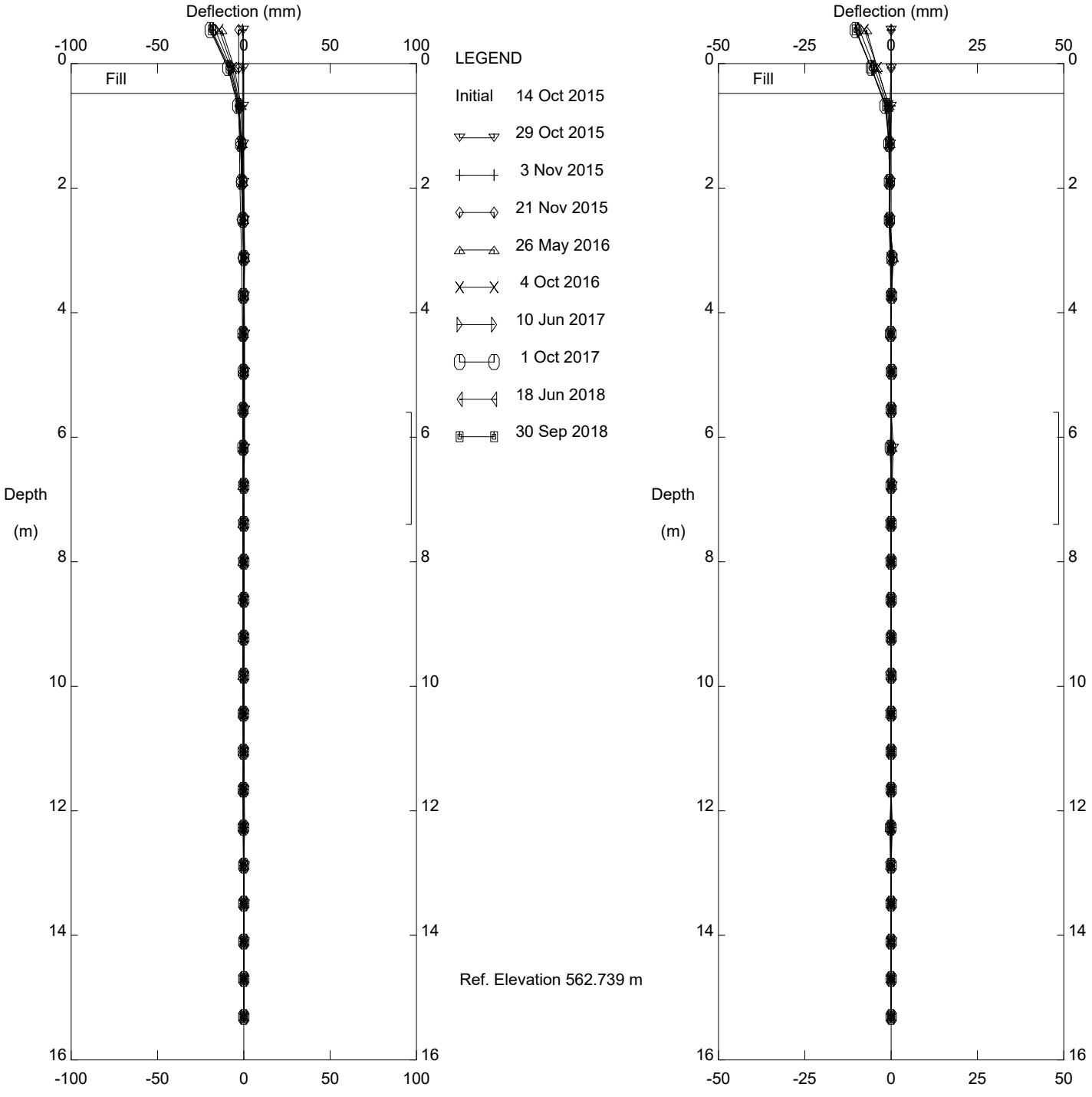

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

PH047-1 Deadwood Slide, Inclinometer SI15-01

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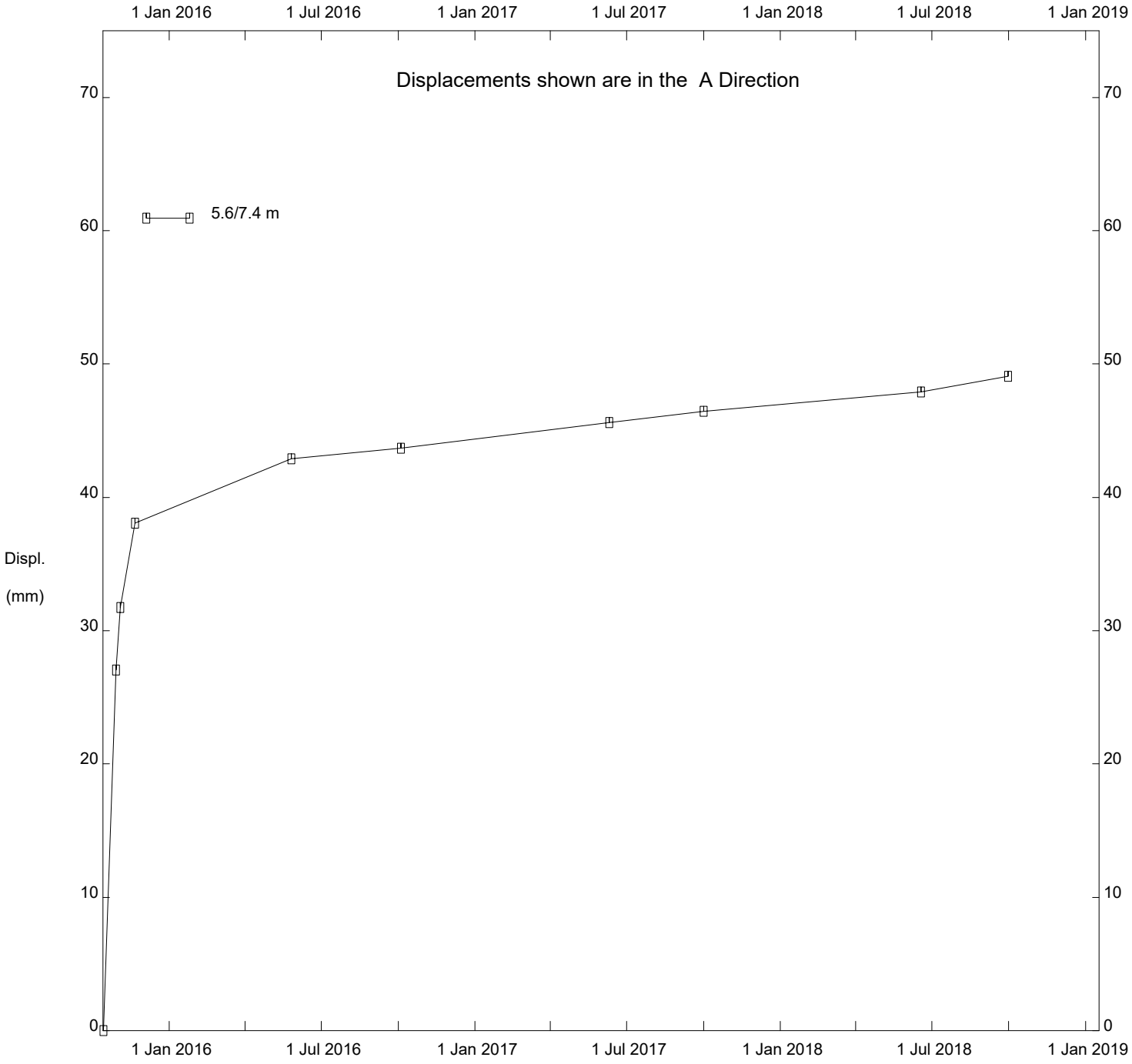

PH047-1 Deadwood Slide, Inclinometer SI15-01

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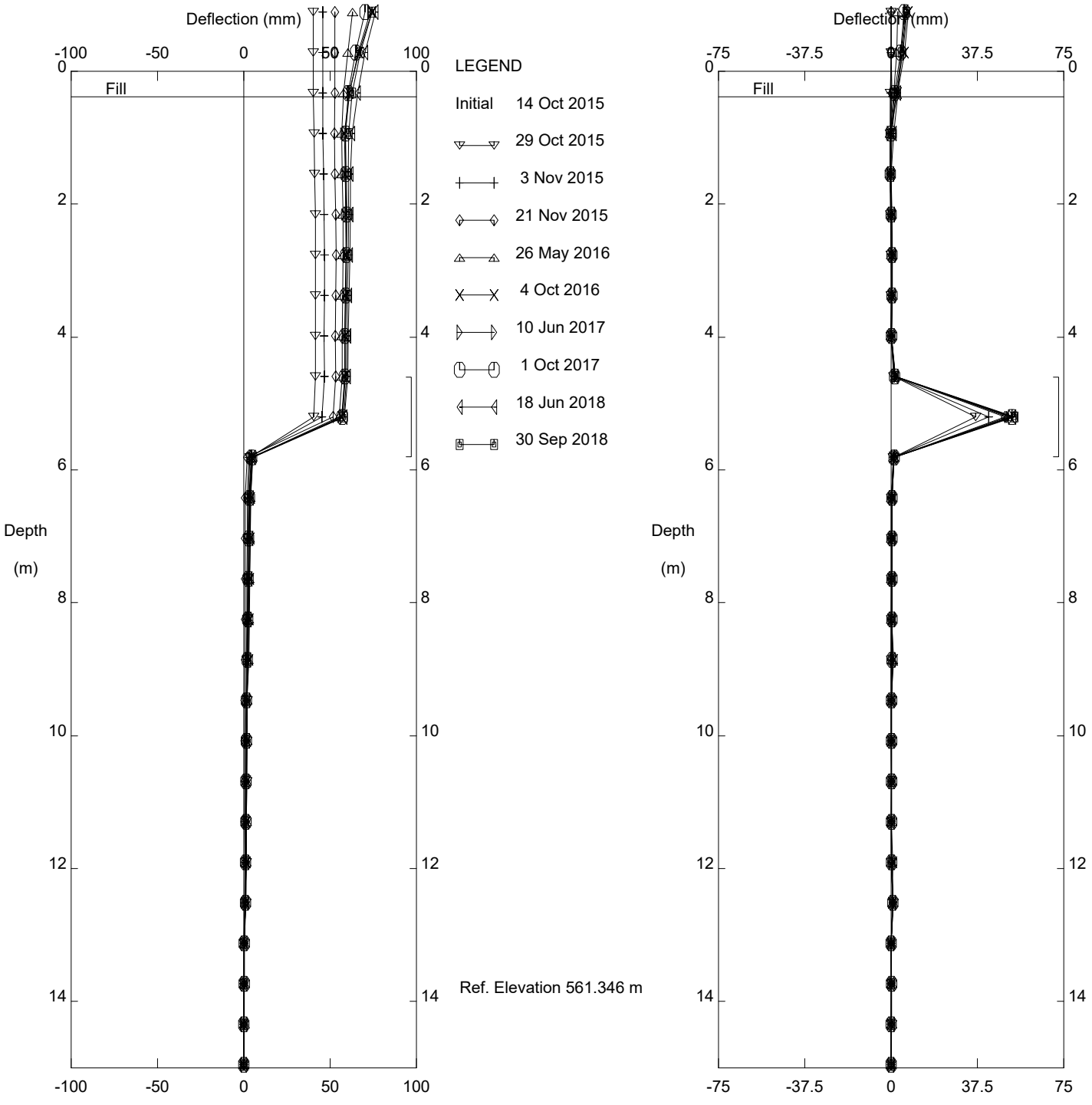

Cumulative Deflection

Direction A

Incremental Deflection

Direction A

PH047-1 Deadwood Slide, Inclinometer SI15-02

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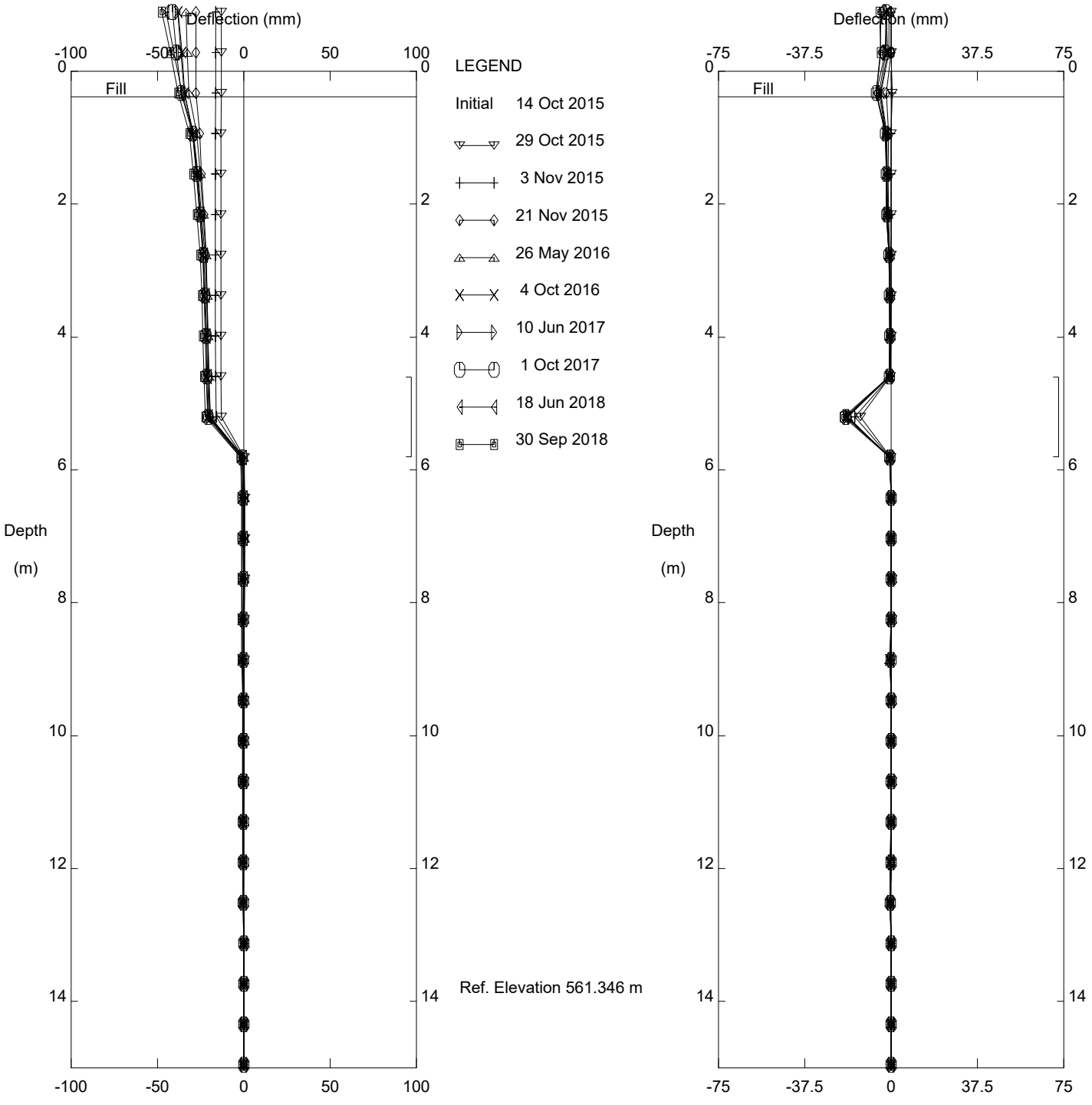

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

PH047-1 Deadwood Slide, Inclinometer SI15-02

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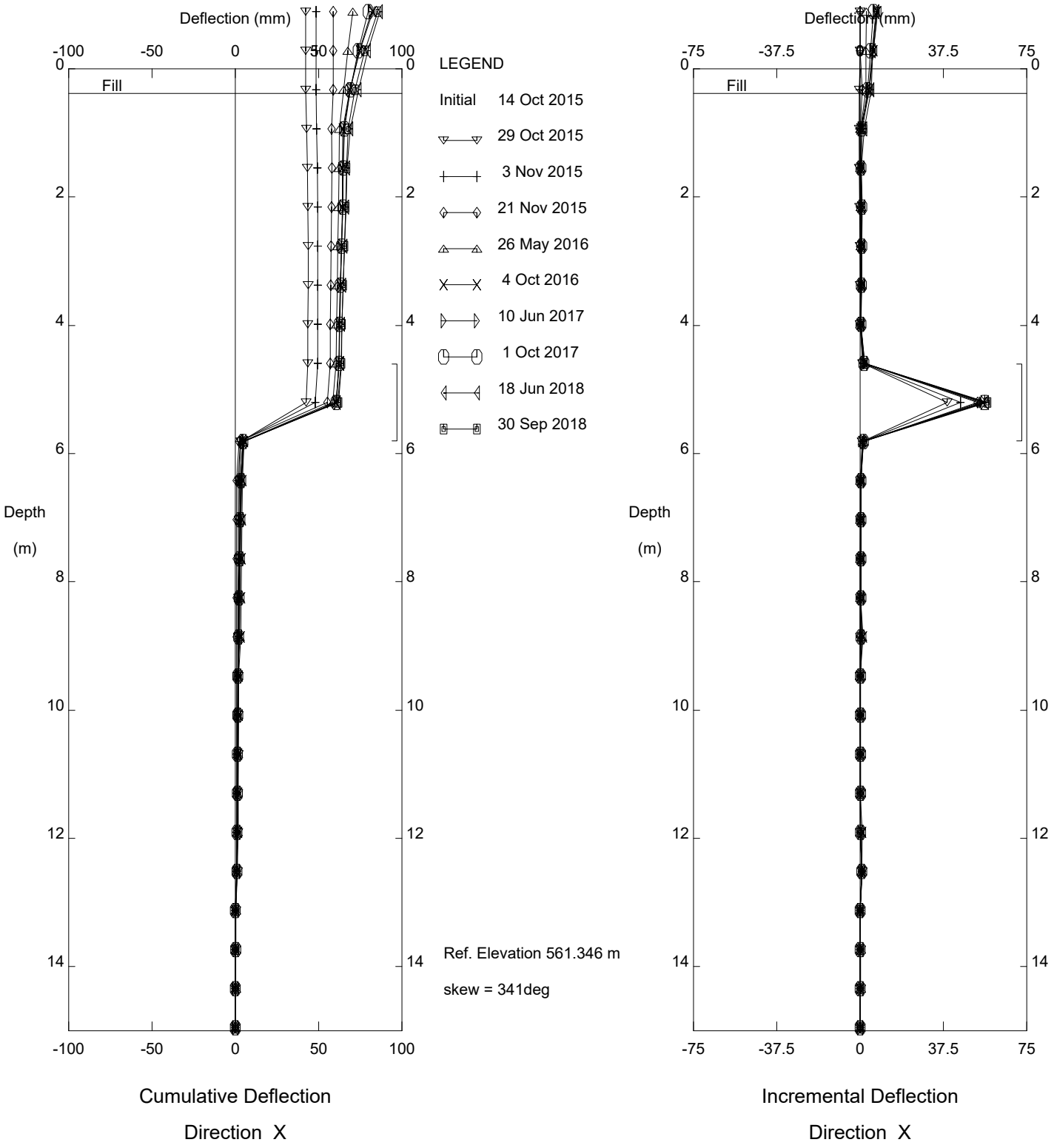

Cumulative Deflection

Direction X

Incremental Deflection

Direction X

PH047-1 Deadwood Slide, Inclinometer SI15-02

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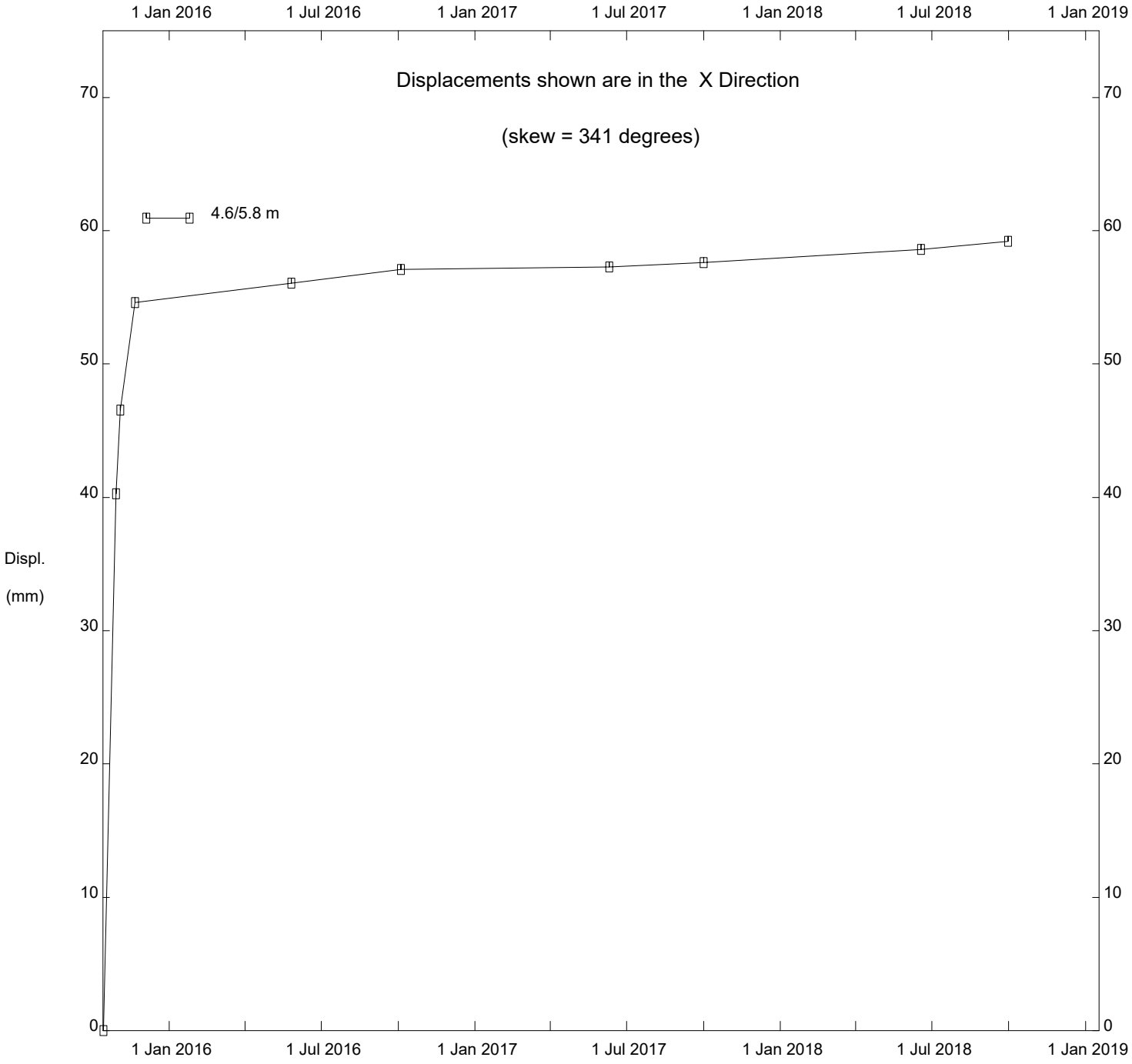

PH047-1 Deadwood Slide, Inclinometer SI15-02

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