



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

FALL 2020

SECTION C

SITE PH064-1: HWY 64:02 CULVERT REHABILITATION SW OF WORSLEY

1. OBSERVATIONS

1.1 Field Program and Instrumentation Status

One slope inclinometer (SI09-1) and two standpipe piezometers (SP09-1 and SP09-4) were read at the Hwy 64:02 culvert rehabilitation site southwest of Worsley on October 19, 2020 by Mr. Niraj Regmi, G.I.T. and Mr. Long Le, both of Thurber Engineering Ltd.

The SI was read using an RST Digital Inclinometer probe with a 2 ft. wheelbase and a RST Pocket PC readout. Inclinometer reading depths were defined as per cable markings with respect to the top of the inclinometer casings. A Heron dipmeter was used to read the standpipe piezometers.

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. Standpipe piezometers results are also provided in Section D.

2.2 Zones of Movement

No zones of new movement were not observed in slope inclinometer SI09-1 since the previous reading in the spring of 2020.

Zones of movement are summarized in Table PH064-1-1 at the end of this report. This table also provides a historical account of the total movement that has occurred at this site since the initialization of the slope inclinometers, the depth of movement and the maximum rate of movement.

2.3 Interpretation of Monitoring Results

Slope inclinometer SI09-1 showed no discernible movement since the spring of 2020 readings.

Standpipe piezometers SP09-1 and SP09-4 showed decreases in groundwater level of 0.39 m and 3.24 m, respectively, since the spring of 2020 readings. The standpipe piezometer readings are summarized in Table PH064-1-2 below and are plotted by elevation and by depth in Figures PH064-1-1 and PH064-1-2, respectively, in Section D.

3. RECOMMENDATIONS

3.1 Future Work

The instruments should be read again in the spring of 2021.

3.2 Instrumentation Repairs

No instrumentation repairs are required at this time.

**TABLE PH064-1-1
FALL 2020 – HWY 64:02 CULVERT REHABILITATION SW OF WORSLEY
SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: October 19, 2020

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.)
SI09-1	November 8, 2009	99.0 mm over 0.7 m to 5.6 m depth in 6° direction	94.7 mm/yr. In June 2012	Operational	June 19, 2020	No discernible movement	N/A	-3.0
		12.3 mm over 6.8 m to 8.0 m depth in 6° direction	9.0 mm/yr. in Sept. 2011			No discernible movement	N/A	-0.3
SI09-2	November 8, 2009	1.0 mm over 4.8 m to 6.0 m depth	2.1 mm/yr. in January 2010	Destroyed	June 3, 2014	N/A	N/A	N/A
		7.5 mm over 9.1 m to 10.9 m depth	9.5 mm/yr in February 2010			N/A	N/A	N/A
SI09-3	November 8, 2009	28.5 mm over 0.3 m to 1.5 m depth	76.0 mm/yr In January 2010	Destroyed	June 2, 2013	N/A	N/A	N/A
		22.6 mm over 2.7 m to 6.4 m depth	13.2 mm/yr in June 2012			N/A	N/A	N/A
		7.4 mm over 7.0 m to 8.2 m depth	8.4 mm/yr in February 2010			N/A	N/A	N/A

Drawing 13351-PH064-1-1 in Section D provides a sketch of the approximate location of the monitoring instrumentation for this site.

**TABLE PH064-1-2
FALL 2020 – HWY 64:02 CULVERT REHABILITATION SW OF WORSLEY
STANDPIPE PIEZOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: October 19, 2020

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST MEASURED WATER LEVEL BGS (m)	MEASURED GROUNDWATER ELEVATION (m)	PREVIOUS GROUNDWATER ELEVATION (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
SP09-1	November 8, 2009	6.30	629.34	Active	628.23 m on October 6, 2016	627.75	628.14	-0.39
SP09-2	November 8, 2009	9.68	632.57	Destroyed	628.84 m on Oct. 2, 2012	N/A	N/A	N/A
SP09-3	November 8, 2009	9.86	634.18	Destroyed	627.24 m on June 13, 2012	N/A	N/A	N/A
SP09-4	November 8, 2009	14.50	633.78	Active	623.35 on June 19, 2020	620.11	623.35	-3.24
SP09-5	November 8, 2009	8.84	623.64	Damaged – cannot be repaired	619.89 m on May 16, 2010	N/A	N/A	N/A

Drawing 13351-PH064-1-1 in Section D provides a sketch of the approximate location of the monitoring instrumentation for this site.



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**SECTION D
DATA PRESENTATION**

SITE PH064-1: HWY 64:02 CULVERT REHABILITATION SW OF WORSLEY

**ALBERTA TRANSPORTATION
PEACE REGION (PEACE RIVER / HIGH LEVEL)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH064-1)
FALL 2020**

Location: West of Worsley Slide (HWY 64:02 C1 52.801) File Number: 13351 Probe: RST Set 10 Cable: RST Set 10	Readout: RST PN C108 Unit 6 Casing Size: 2.75 " Ø Temp: -10 Read by: LL / NKR
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SLOPE INCLINOMETER (SI) READINGS

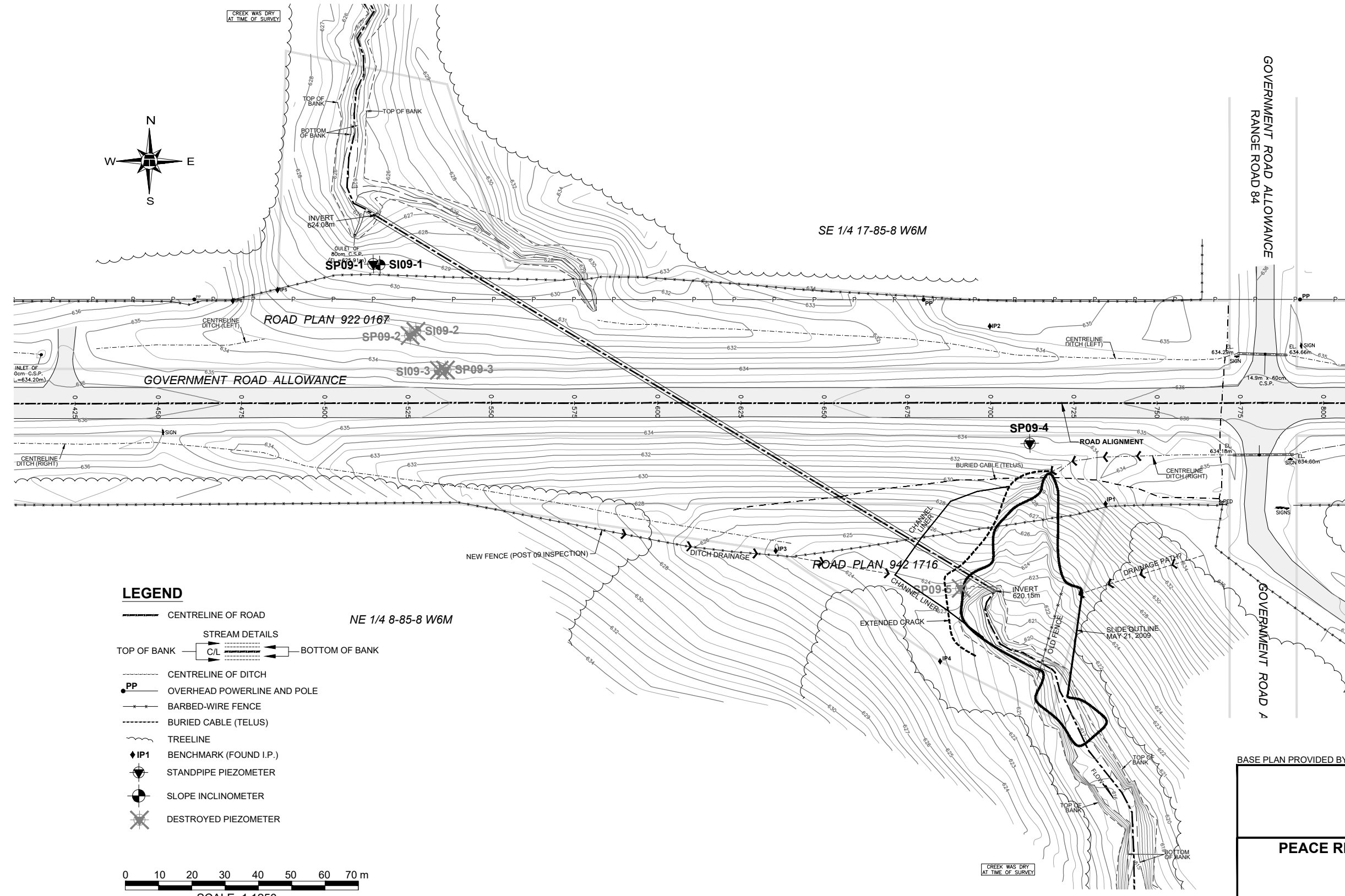
SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth From Top of Casing (ft)	Magn. North A+ Groove °	Current Bottom Depth Readings				Probe/ Reel #	Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-		
SI09-1	362989.17	6248815.79	19-Oct-20	0.85	34 to 4	325	-111	60	459	-465	10/10	*

STANDPIPE PIEZOMETER READINGS

SP#	GPS Location		Date	Stick-up (m)	Reading below top of casing (m)	Bottom Pipe depth ground (m)
	Northing	Easting				
SP09-1	362989.17	6248815.79	19-Oct-20	0.91	2.50	8.58
SP09-4	363182.07	6248758.33	19-Oct-20	0.99	14.66	

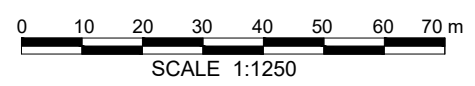
INSPECTOR REPORT

SI casing Slanted. Hard to push @4-6 ft



LEGEND

- CENTRELINE OF ROAD
- STREAM DETAILS
- TOP OF BANK — C/L — BOTTOM OF BANK
- CENTRELINE OF DITCH
- PP — OVERHEAD POWERLINE AND POLE
- BARBED-WIRE FENCE
- BURIED CABLE (TELUS)
- TREELINE
- ◆ IP1 — BENCHMARK (FOUND I.P.)
- ◆ — STANDPIPE PIEZOMETER
- ◆ — SLOPE INCLINOMETER
- ✕ — DESTROYED PIEZOMETER



NOTES

1. SURVEY BY AD/RS OF MQT DATA - NOV 16 AND 17, 2009.
2. COORDINATES ARE UTM NAD83 (+/- 2m) ESTABLISHED WITH GPS.
3. CONTOUR INTERVAL = 0.5 m
4. R/W INFORMATION FROM ROAD PLANS 922 0167 AND 942 1716.
5. APPROXIMATELY 20 cm OF SNOW AT TIME OF SURVEY.
6. DOWNSTREAM SLIDE OUTLINE AND OTHER FEATURES SURVEYED WITH HAND-HELD GPS BY THURBER ON MAY 21, 2009.

BASE PLAN PROVIDED BY MPA ENGINEERING LTD.



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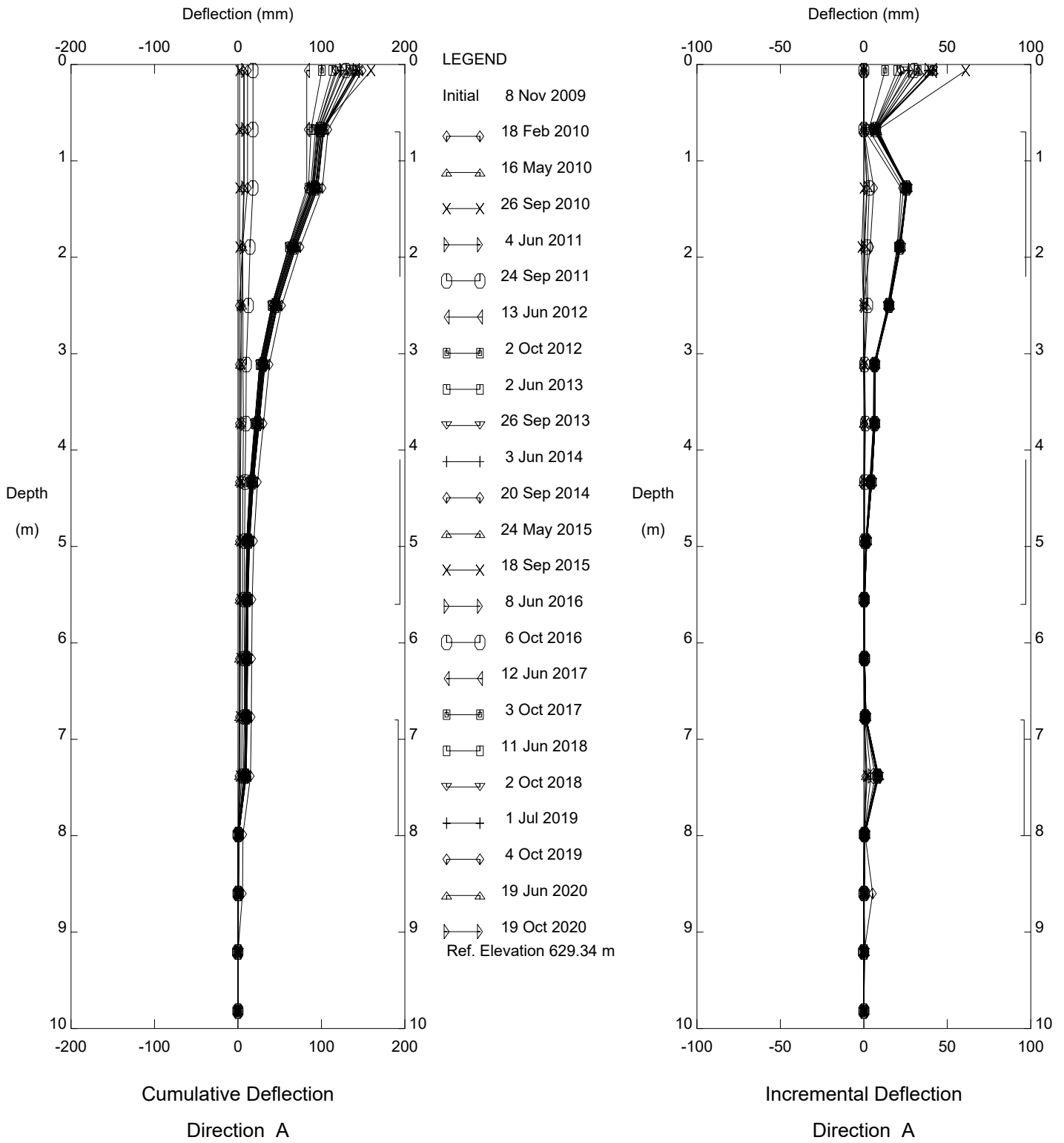
PH064-1: SITE PLAN SHOWING INSTRUMENT LOCATIONS

DWG No. 13351-PH064-1-1

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	DWP
SCALE	1:1250
DATE	NOVEMBER 2019
FILE No.	13351



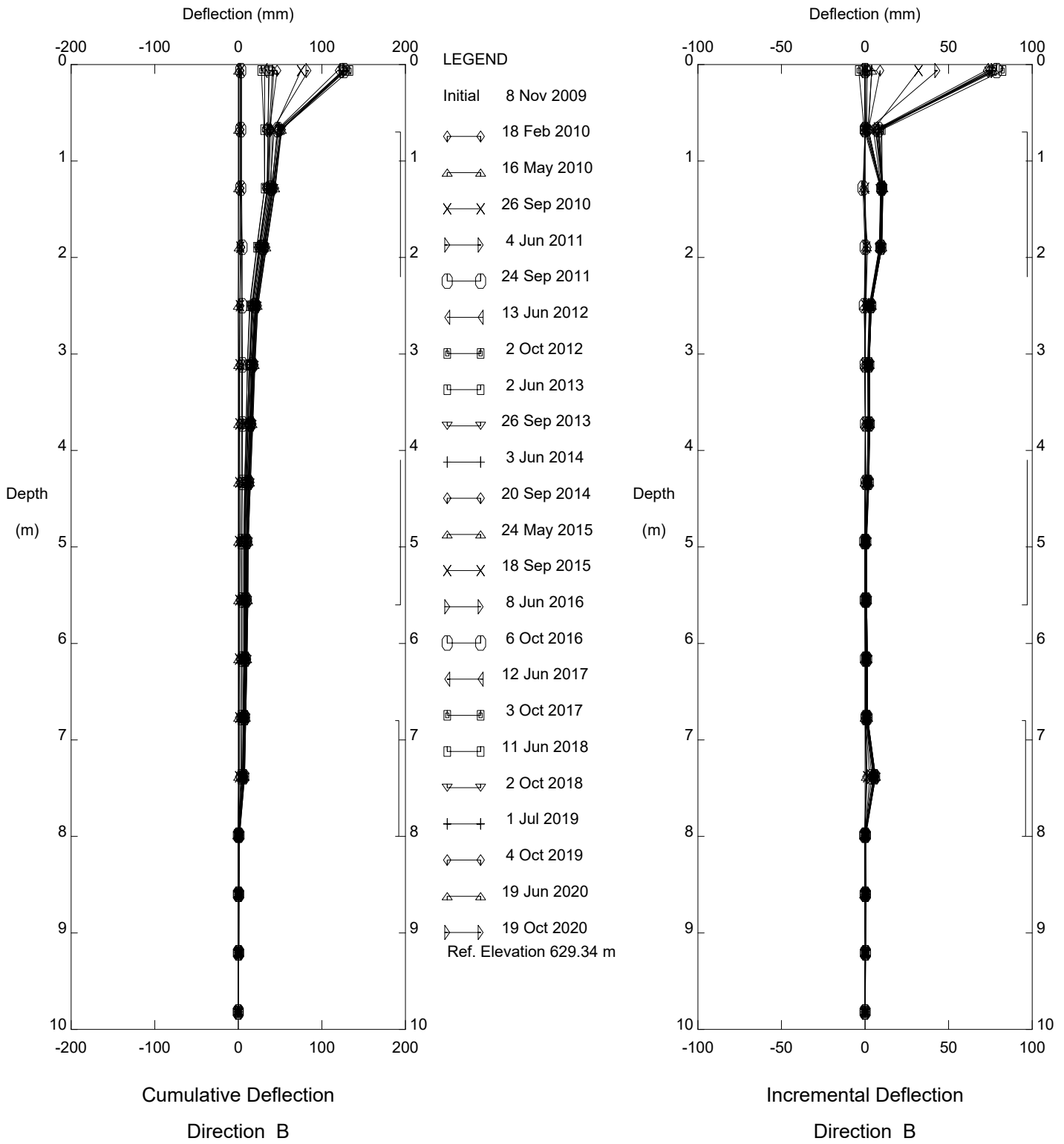
Thurber Engineering Ltd.



PH064-1 HWY 64:02, Inclinometer SI09-1

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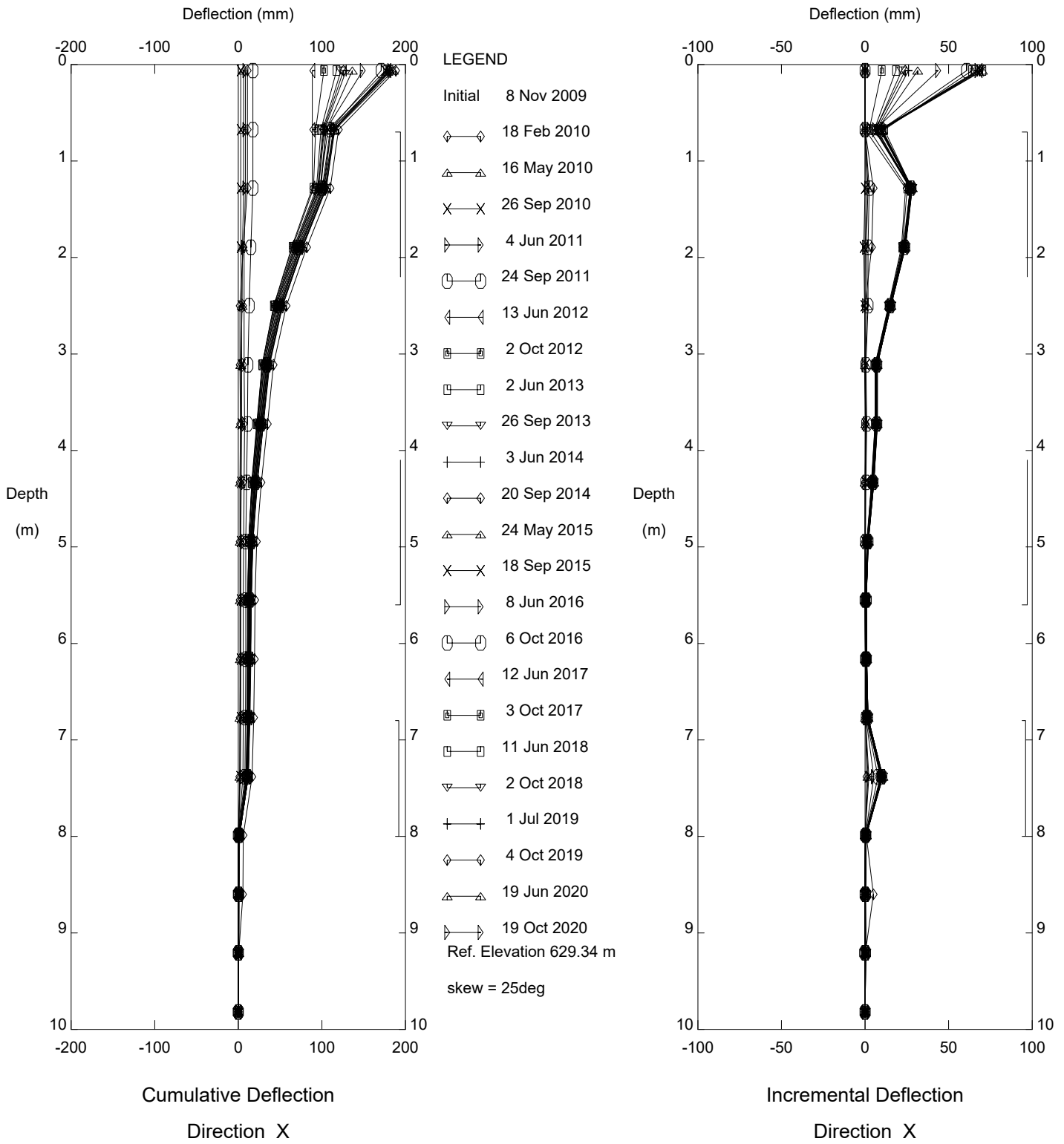
Thurber Engineering Ltd.



PH064-1 HWY 64:02, Inclinometer SI09-1

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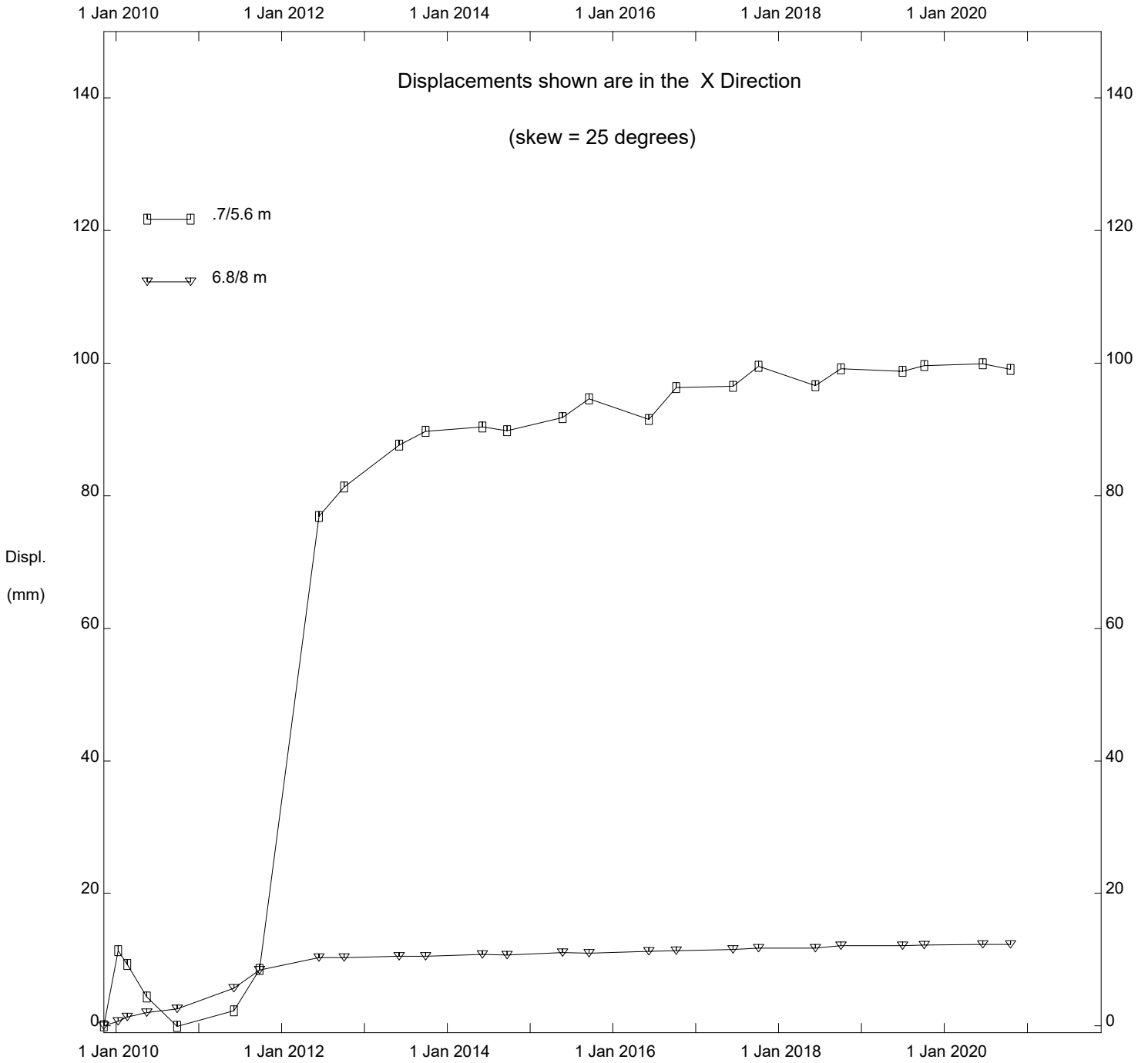
Thurber Engineering Ltd.



PH064-1 HWY 64:02, Inclinometer SI09-1

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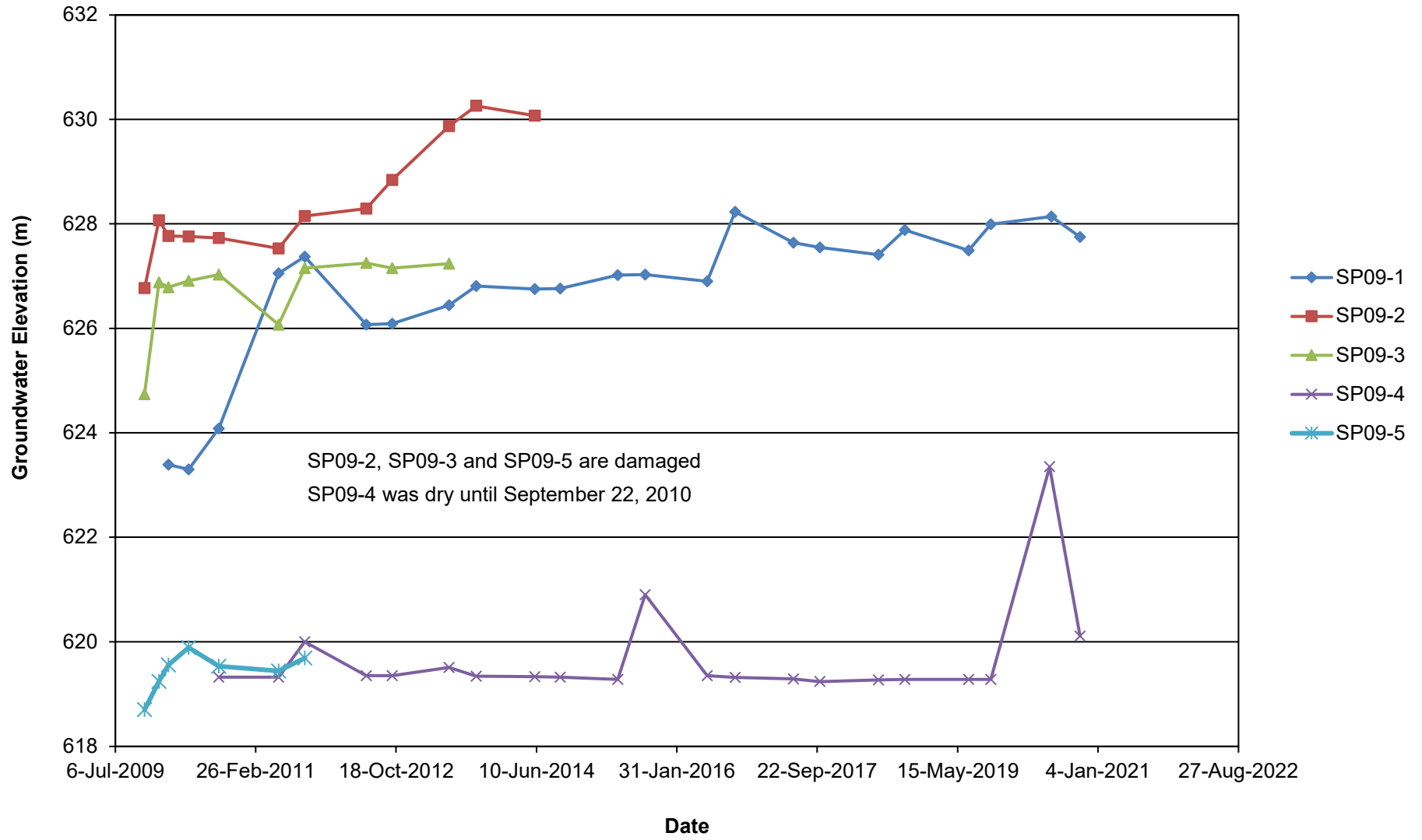
Thurber Engineering Ltd.



PH064-1 HWY 64:02, Inclinator SI09-1

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**FIGURE PH064-1-1
PIEZOMETRIC ELEVATIONS FOR HWY 64:02 CULVERT REHABILITATION**



**FIGURE PH064-1-2
PIEZOMETRIC DEPTHS FOR HWY 64:02 CULVERT REHABILITATION**

