



**ALBERTA TRANSPORTATION
PEACE REGION (GRANDE PRAIRIE)
INSTRUMENTATION MONITORING RESULTS**

FALL 2020

SECTION C

**SITE GP038-1: HWY 40:38, 2.0 km NORTH OF KAKWA RIVER BRIDGE
SITE GP038-2: HWY 40:38, CALLOUT SITE 1.6 km NORTH OF KAKWA
RIVER BRIDGE**

1. OBSERVATIONS

1.1 Field Program and Instrumentation Status

One slope inclinometer (SI17-1) and four pneumatic piezometers (PN17-1A, PN17-2A, PN17-2B and PN17-3B) were read at the Hwy 40:38 site, 2.0 km north of the Kakwa River bridge (GP038-1) on October 8, 2020 by Mr. Niraj Regmi, G.I.T. and Mr. Long Le, both of Thurber Engineering Ltd.

One standpipe piezometer (SP17-1) was read at the Hwy 40:38 Callout Site 1.6 km north of the Kakwa River bridge (GP038-2) on October 8, 2020 by Mr. Niraj Regmi, G.I.T. and Mr. Long Le, both of Thurber.

The SI was read using a 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 casing. The pneumatic piezometers were read using a RST C108 pneumatic piezometer readout. The standpipe piezometer was read using a Heron dipmeter.

2. INTERPRETATION

2.1 General

SI plots for 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 rate of movement have also been provided.

2.2 Zones of Movement

Zones of new movement were not observed in SI17-1 since the spring of 2020 readings.

Zones of movement are summarized in Table GP038-1-1 at the end of this report. This table also provides an 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 SIs.

2.3 Interpretation of Monitoring Results

2.0 km North of Kakwa River Bridge (GP038-1)

SI17-1 showed no discernible movement since the spring of 2020 readings.

Pneumatic piezometers PN17-1A, PN17-2A, PN17-2B, and PN17-3B showed decreases in groundwater level of 0.36 m, 0.04 m, 0.13 m, and 0.77 m, respectively, since the spring of 2020 readings. The pneumatic piezometer results are summarized in Table GP038-1-2 below and are plotted on Figures GP038-1-1 (by elevation) and GP038-1-2 (by depth) in Section D.

Callout Site 1.6 km North of Kakwa River Bridge (GP038-2)

Standpipe piezometer SP17-1 showed a decrease in groundwater level of 0.27 m since the spring of 2020 readings. The standpipe piezometer results for the Callout Site are summarized in Table GP038-2-1 below and are plotted on Figures GP038-2-1 (by elevation) and GP038-2-2 (by depth) 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 instrument repairs are required at this time.

**TABLE GP038-1-1
FALL 2020 – HWY 40:38, 2.0 km NORTH OF KAKWA RIVER BRIDGE
SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: October 8, 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)	CURRENT RATE OF MOVEMENT (mm/yr)	CHANGE IN RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr)
SI17-1	February 8, 2017	29.7 over 8.1 m to 12.3 m depth in 213° direction	30.4 on June 16, 2017	Operational	June 25, 2020	No discernible movement	N/A	-1.8
		2.2 over 14.2 m to 16.6 m depth in 213° direction	6.1 on March 2, 2017			No discernible movement	N/A	-0.8
SI17-2	February 8, 2017	49.8 over 11.2 m to 12.5 m depth in 257° direction	122.2 on June 16, 2017	Sheared at 12.2 m depth	June 16, 2017	N/A	N/A	N/A
SI17-3	February 8, 2017	19.6 over 9.9 m to 11.8 m depth in 227° direction	163.9 on June 16, 2017	Sheared at 11.0 m depth	June 16, 2017	N/A	N/A	N/A

Drawing 13353-GP038-1-1 in Section D provides a sketch of the approximate location of the monitoring instrumentation for this site.

**TABLE GP038-1-2
FALL 2020 – HWY 40:38, 2.0 km NORTH OF KAKWA RIVER BRIDGE
PNEUMATIC PIEZOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: October 8, 2020

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)
PN17-1A	February 4, 2017	837.46	844.70	Operational	844.39 on June 25, 2020	64.4	844.03	844.39	-0.36
PN17-1B	February 4, 2017	828.77	844.70	<i>Not functioning, likely pinched</i>	837.77 on April 20, 2017	N/A	N/A	N/A	N/A
PN17-2A	February 4, 2017	834.72	842.30	Operational	842.66 on June 21, 2018	74.8	842.35	842.39	-0.04
PN17-2B	February 4, 2017	829.69	842.30	Operational	841.86 on June 25, 2020	118.1	841.73	841.86	-0.13
PN17-3A	February 3, 2017	830.40	839.30	<i>Not functioning, likely pinched</i>	838.20 on June 16, 2017	N/A	N/A	N/A	N/A
PN17-3B	February 3, 2017	825.37	839.30	Operational	839.22 on June 21, 2018	119.7	837.58	838.35	-0.77

Drawing 13353-GP038-1-1 in section D provides a sketch of the approximate location of the monitoring instrumentation for this site.

**TABLE GP038-2-1
FALL 2020 – HWY 40:38, CALLOUT SITE 1.6 km NORTH OF KAKWA RIVER BRIDGE
STANDPIPE PIEZOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: October 8, 2020

INSTRUMENT #	DATE INITIALIZED	TIP ELEV. (m)	GROUND ELEV. (m)	CURRENT STATUS	MAXIMUM MEASURED WATER ELEVATION (m)	MEASURED WATER ELEVATION (m)	PREVIOUS WATER ELEVATION (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
SP17-1	February 3, 2017	811.44	821.80	Operational	820.76 on October 5, 2018	819.38	819.65	-0.27
SP17-2	February 2, 2017	807.36	822.30	Destroyed	817.07 on April 20, 2017	N/A	N/A	N/A

Drawing 13353-PH038-2-1 in Section D provides a sketch of the approximate location of the monitoring instrumentation for this site.



**ALBERTA TRANSPORTATION
PEACE REGION (GRANDE PRAIRIE)
INSTRUMENTATION MONITORING RESULTS**

FALL 2020

**SECTION D
DATA PRESENTATION**

**SITE GP038-1: HWY 40:38, 2.0 km NORTH OF KAKWA RIVER BRIDGE
SITE GP038-2: HWY 40:38, CALLOUT SITE 1.6 km NORTH OF KAKWA
RIVER BRIDGE**

**ALBERTA TRANSPORTATION
PEACE REGION - GRANDE PRAIRIE AREA
INSTRUMENTATION MONITORING FIELD SUMMARY (GP038-1)
FALL 2020**

Location: GP38-1 & GP038-2: HWY 40:38, 2.0 km NORTH OF KAKWA RIVER BRID ⁰ File Number: 13353 Probe: RST Set 8R Cable: RST Set 8R	Readout: RST PN C108 Unit 6 Casing size: 2.75 Temp: 5 Read by: NKR/LL
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SLOPE INCLINOMETER (SI) READINGS

SI#	GPS Location (UTM 11)		Date	Stickup (m)	Depth from top of CASING (ft)	Azimuth of A+ Groove degree	Current Bottom Depth Readings				Probe/ Reel #	Remarks
	Easting (m)	Northing (m)					A+	A-	B+	B-		
SI17-1	398415	6033126	08-Oct-20	0.77	62 to 2	209	-769	784	-1410	1417	8R/8R	

PNEUMATIC PIEZOMETER (PN) READINGS

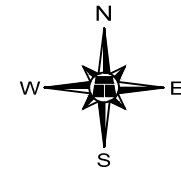
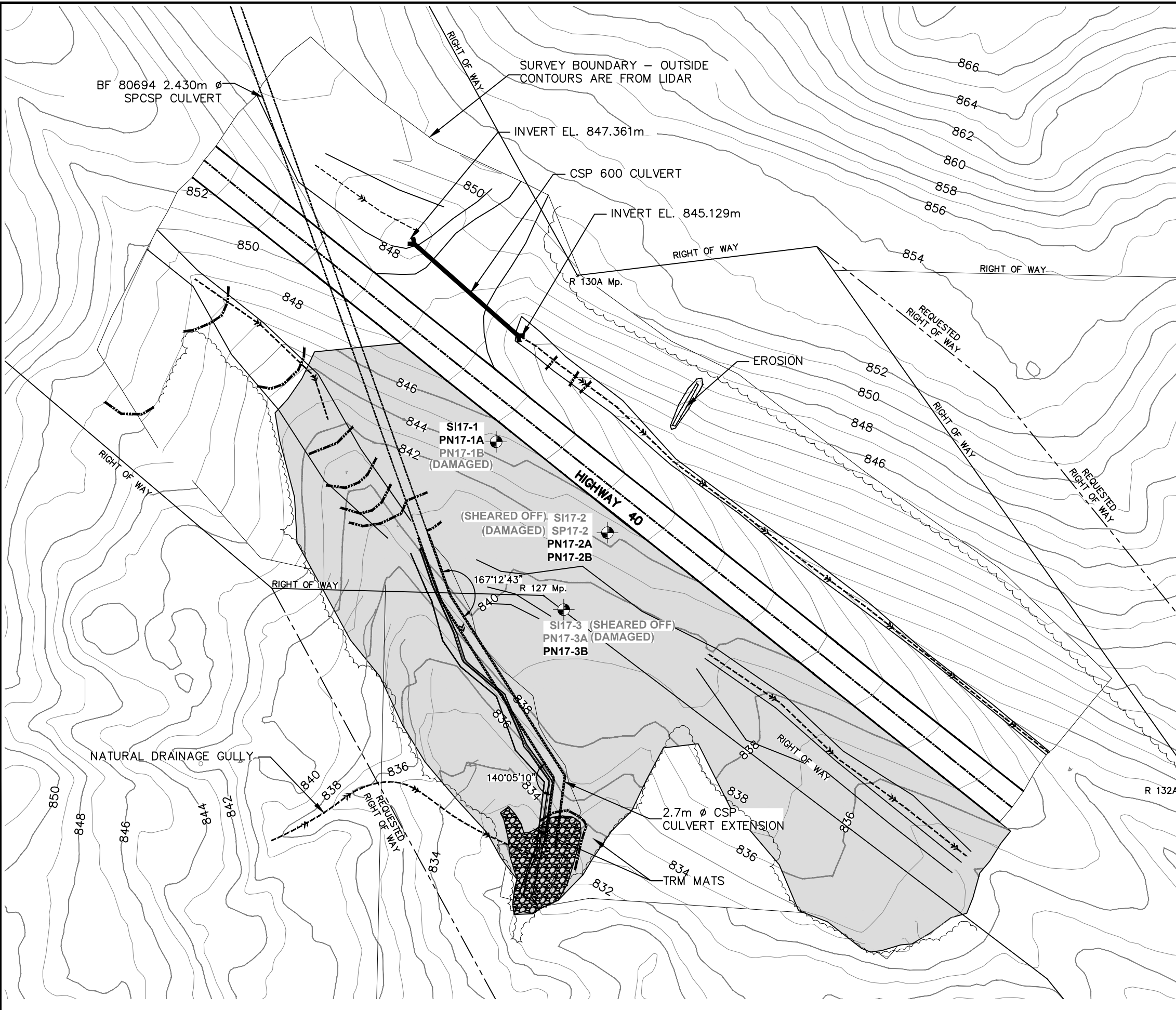
PN #	GPS Location (UTM 11)		Date	Reading (kPa)	Identification Number
	Easting (m)	Northing (m)			
PN17-1A	398415	6033126	8-Oct-20	64.4	37445
PN17-2A	398444	6033103	8-Oct-20	74.8	37447
PN17-2B	398444	6033103	8-Oct-20	118.1	37436
PN17-3B	398433	6033083	8-Oct-20	119.7	37438

STANDPIPE PIEZOMETER (SP) READINGS

SP#	GPS Location (UTM 11)		Date	Stick-up (m)	Reading below top of casing (m)
	Easting (m)	Northing (m)			
SP17-1	398720	6032882	8-Oct-20	0.95	3.37

INSPECTOR REPORT

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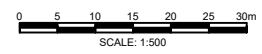



LEGEND

- APPROXIMATE INSTRUMENT LOCATION
 - LANDSLIDE SCARP CRACK
 - TREE LINE
 - HIGHWAY
 - DRAINAGE DITCH
 - SILT FENCE
 - TRIBUTARY CREEK
 - BARRIER
- RIGHT OF WAY = EXISTING HIGHWAY RIGHT OF WAY

NOTES:

1. BASE PLAN PROVIDED BY WSP, SITE SURVEYED ON FEBRUARY 1, 2017.
2. NAD83 UTM 11 COORDINATE SYSTEM.
3. CONTOUR INTERVALS 1.0m.
4. REMOVE EXISTING SILT FENCES LOCATED WITHIN TOE BERM FOOTPRINT.






PEACE REGION (GRANDE PRAIRIE)

**GP038-1: HWY 40:38 - km 25.5 TO 25.9
LANDSLIDE REPAIRS (GP38A)
INSTRUMENT LOCATIONS**

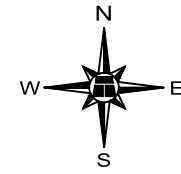
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DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	RVC
SCALE	1:500
DATE	AUGUST 2020
FILE No.	13353



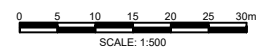
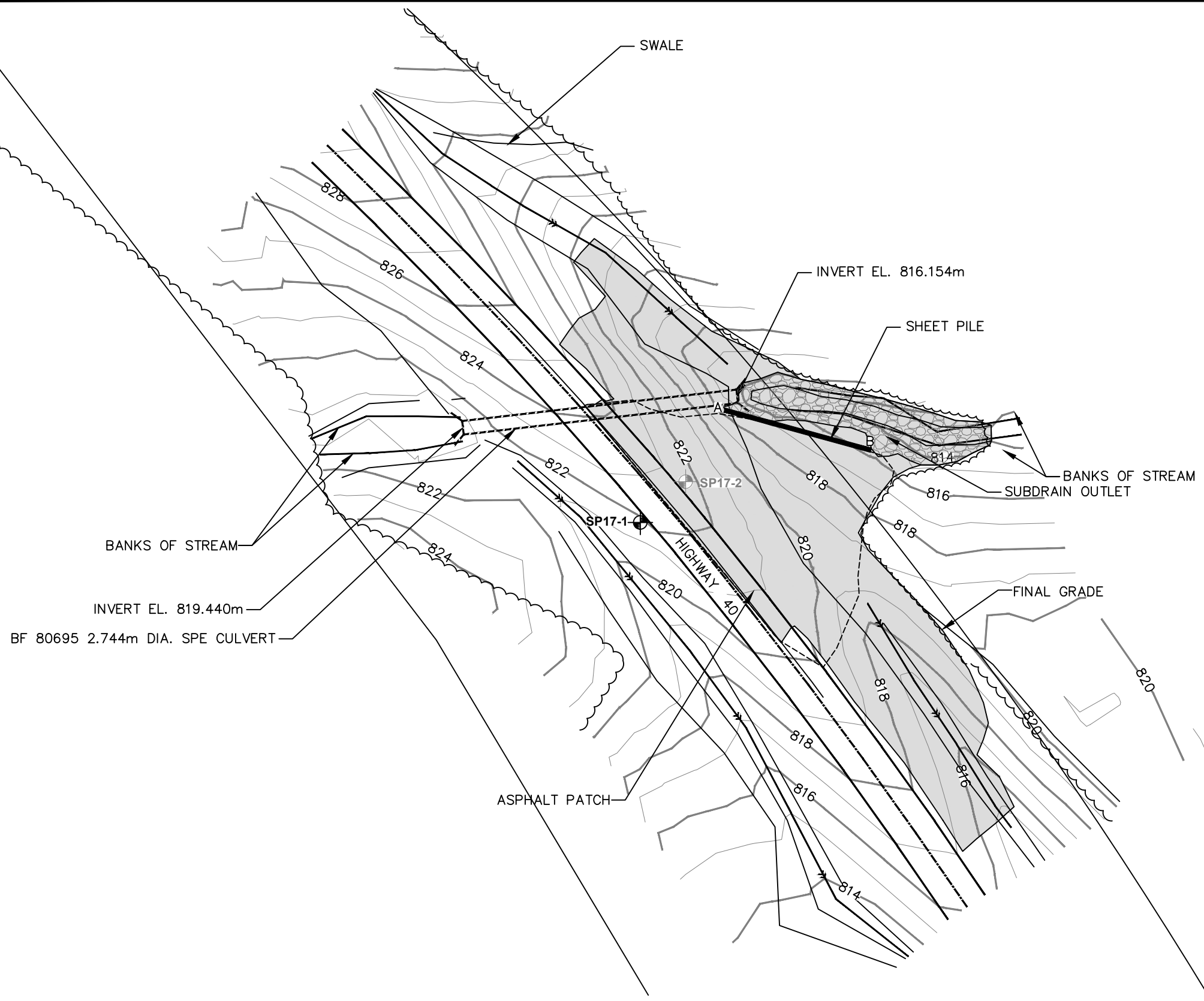
THURBER ENGINEERING LTD.


H:\13000\13353 Geohazard Assessment - Grand Prairie (CON0017603)\Drafting\2019\INS FALL\13353-GP038-2-1.dwg - 1TN - Aug. 28, 2019



LEGEND

- APPROXIMATE INSTRUMENT LOCATION
- SCARP CRACK
- TREE LINE
- HIGHWAY
- DRAINAGE DITCH
- SILT FENCE






PEACE REGION (GRANDE PRAIRIE)

**GP038-2: HWY 40:38 - km 25.5 TO 25.9
LANDSLIDE REPAIRS (GP38B)
INSTRUMENT LOCATIONS**

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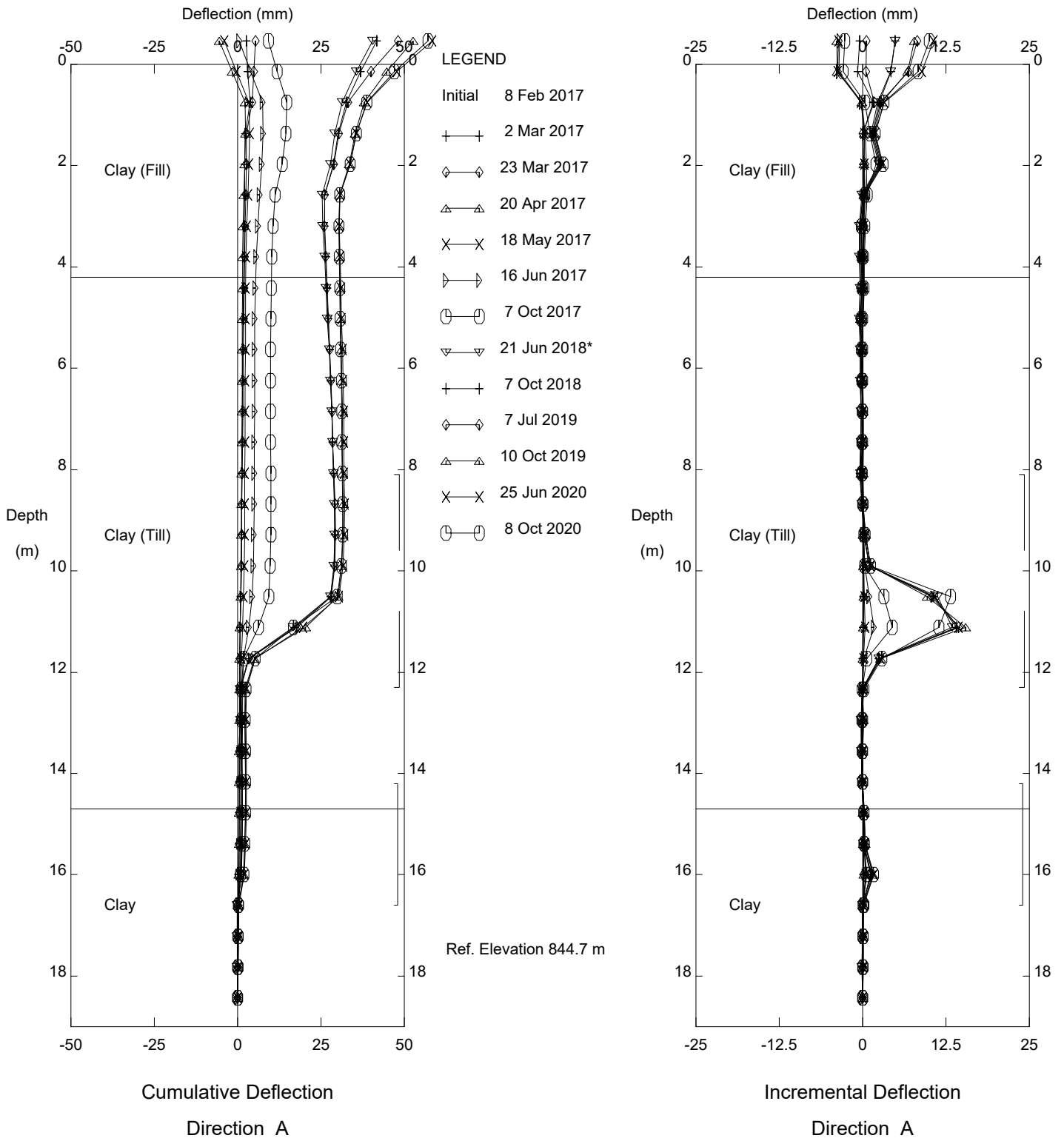
DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	RVC
SCALE	1:500
DATE	AUGUST 2020
FILE No.	13353



THURBER ENGINEERING LTD.

- NOTES:**
1. BASE PLAN PROVIDED BY WSP. SITE SURVEYED ON FEBRUARY 1, 2017. THE SLIDE HAS RETROGRESSION INTO THE HIGH WAY MORE SINCE THEN.
 2. NAD83 UTM 11 COORDINATE SYSTEM.
 3. CONTOUR INTERVALS 1.0m.

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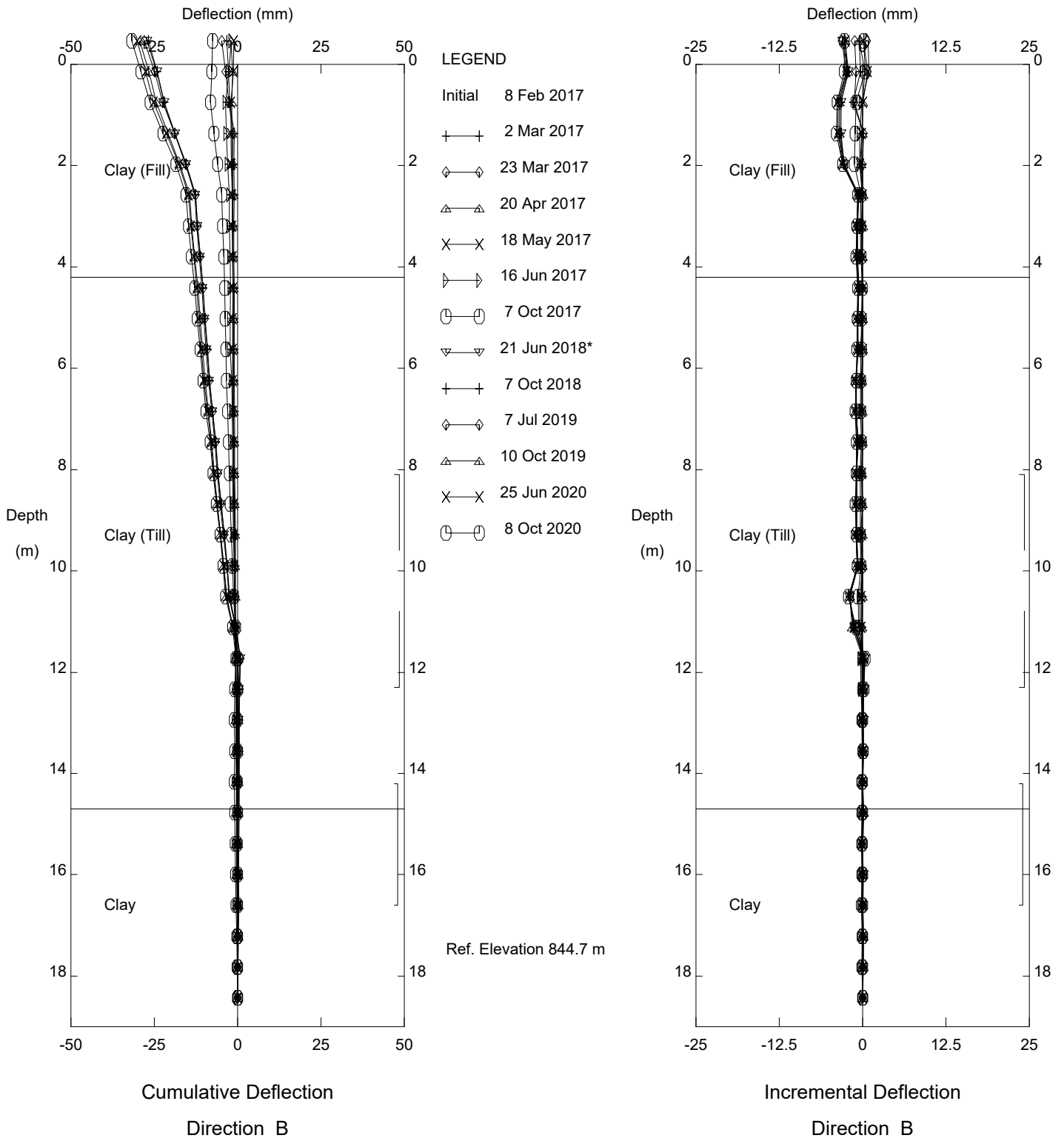


GP38 Kakwa River Bridge, Inclinometer SI17-1

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

Thurber Engineering Ltd.

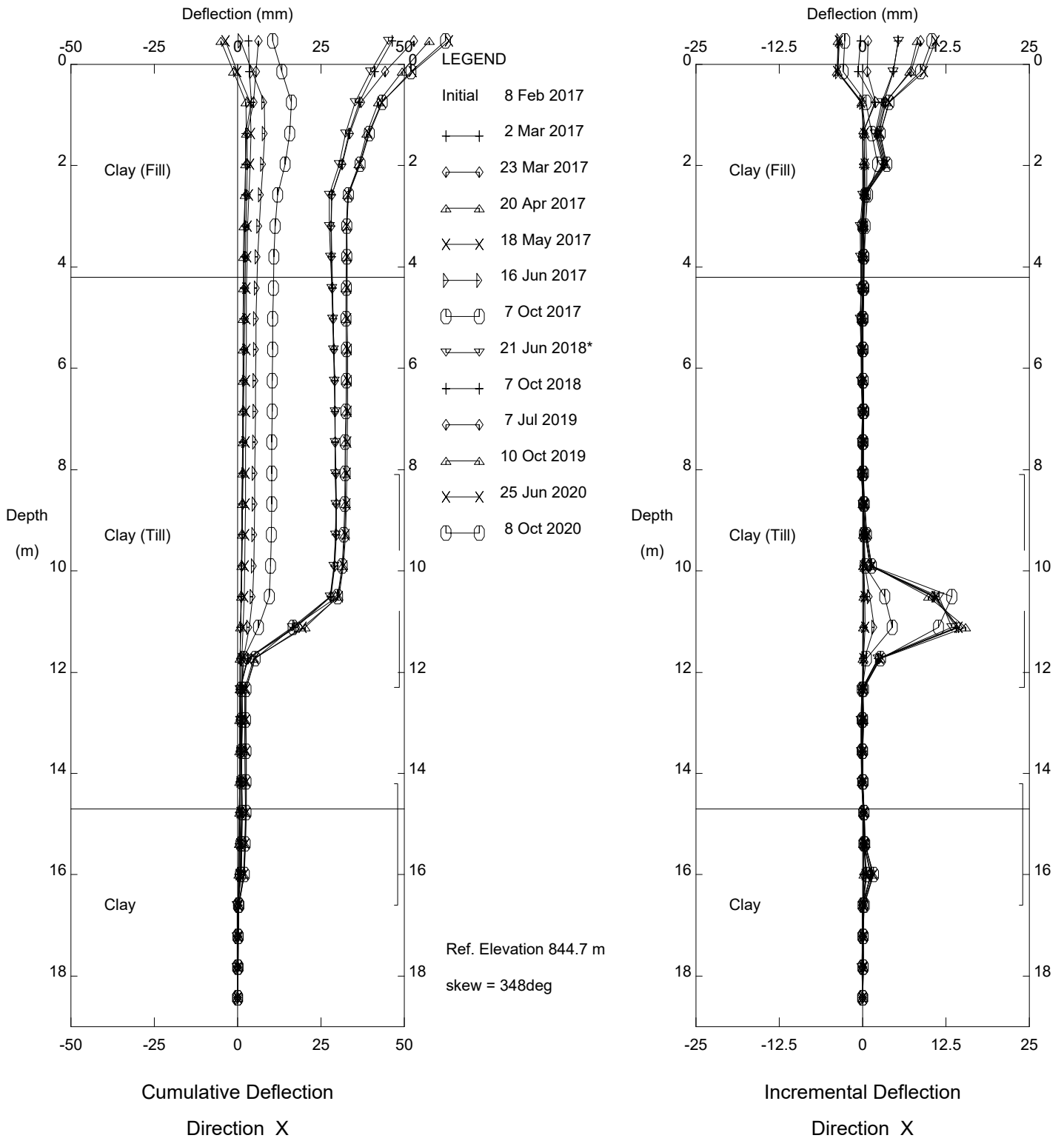


GP38 Kakwa River Bridge, Inclinometer SI17-1

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Thurber Engineering Ltd.

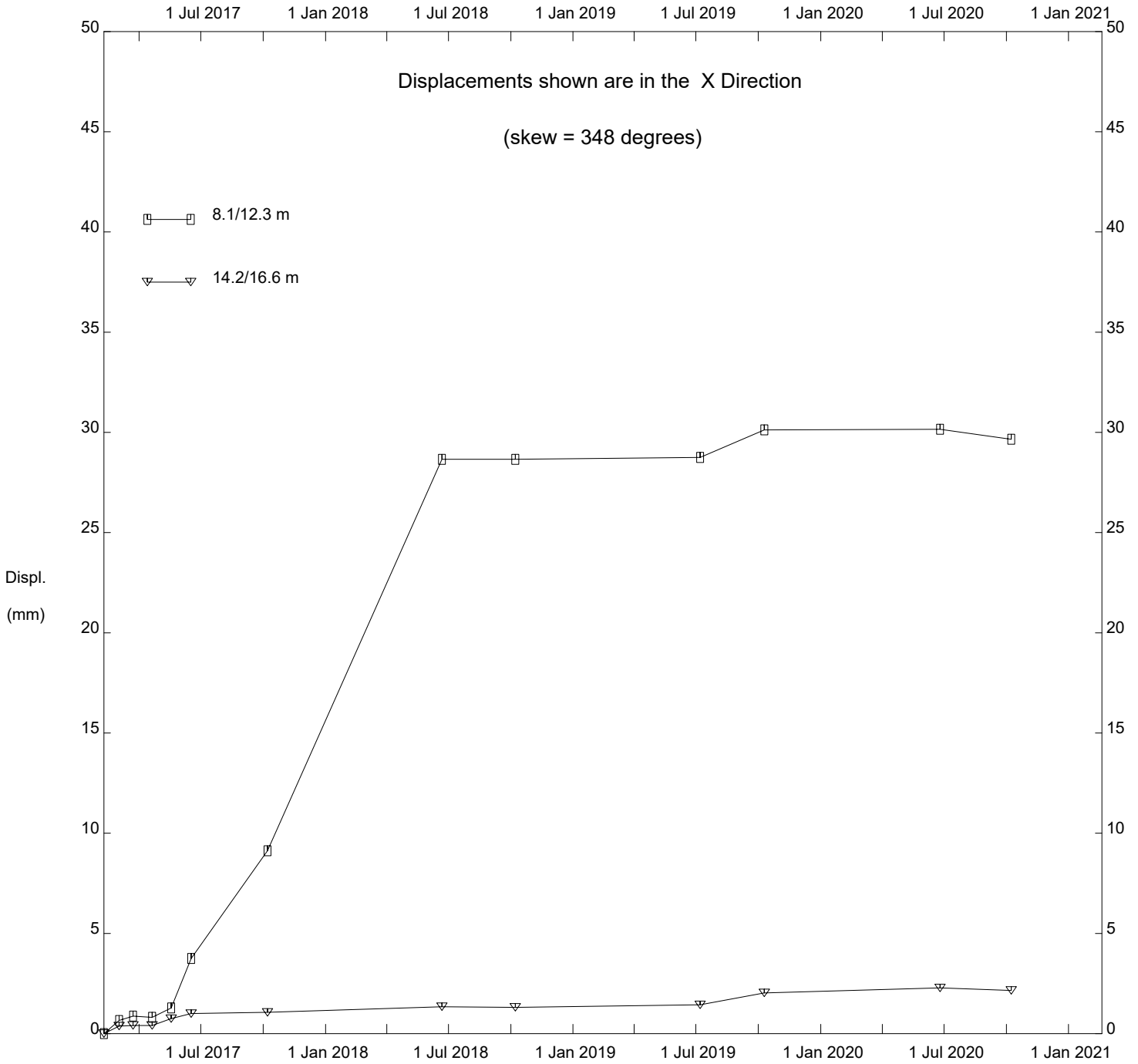


GP38 Kakwa River Bridge, Inclinometer SI17-1

Alberta Transportation

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

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GP38 Kakwa River Bridge, Inclinator SI17-1

Alberta Transportation

FIGURE GP038-1-1
PIEZOMETRIC ELEVATIONS FOR HWY 40:38 1.6 km NORTH OF KAKWA RIVER

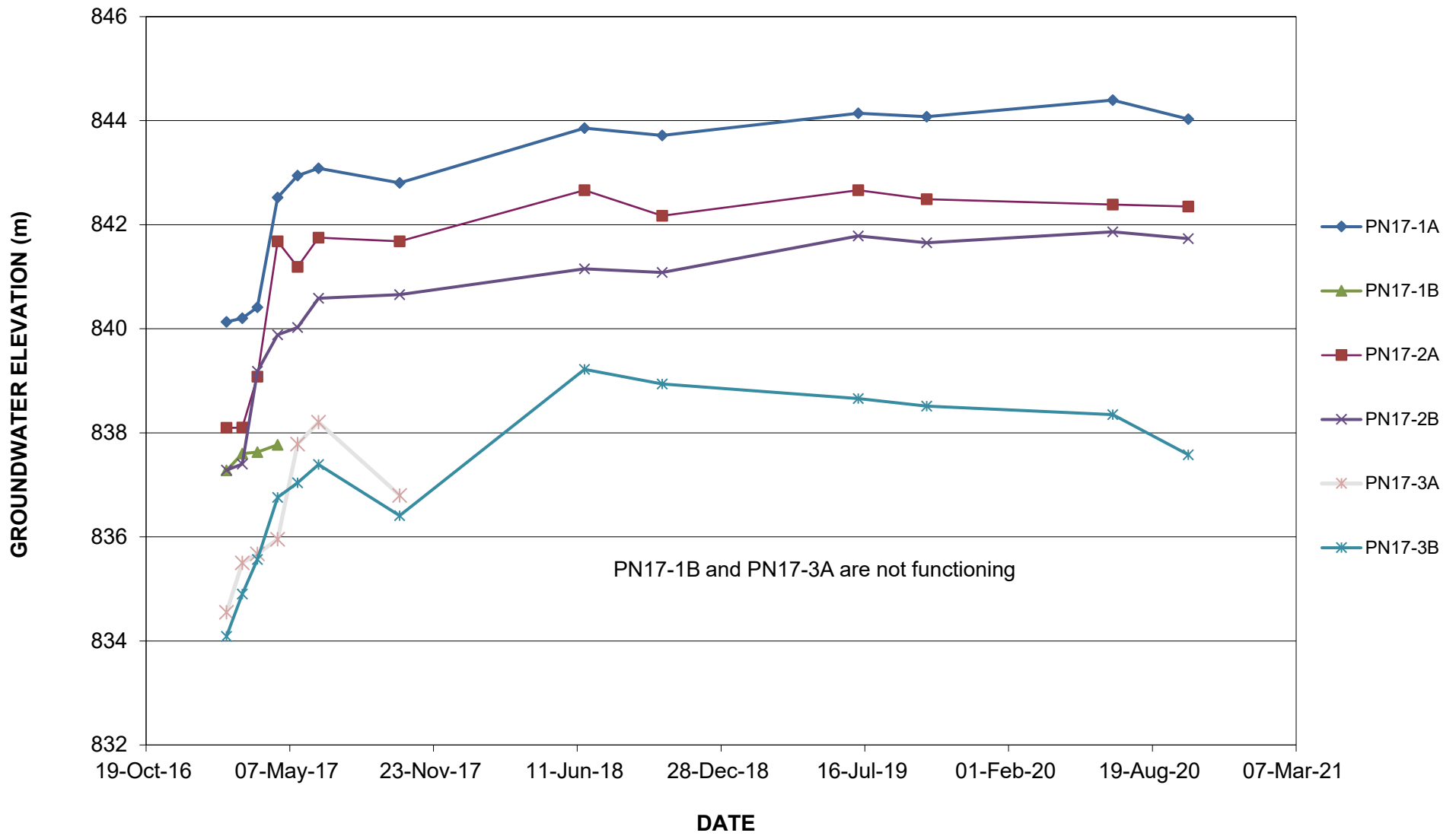
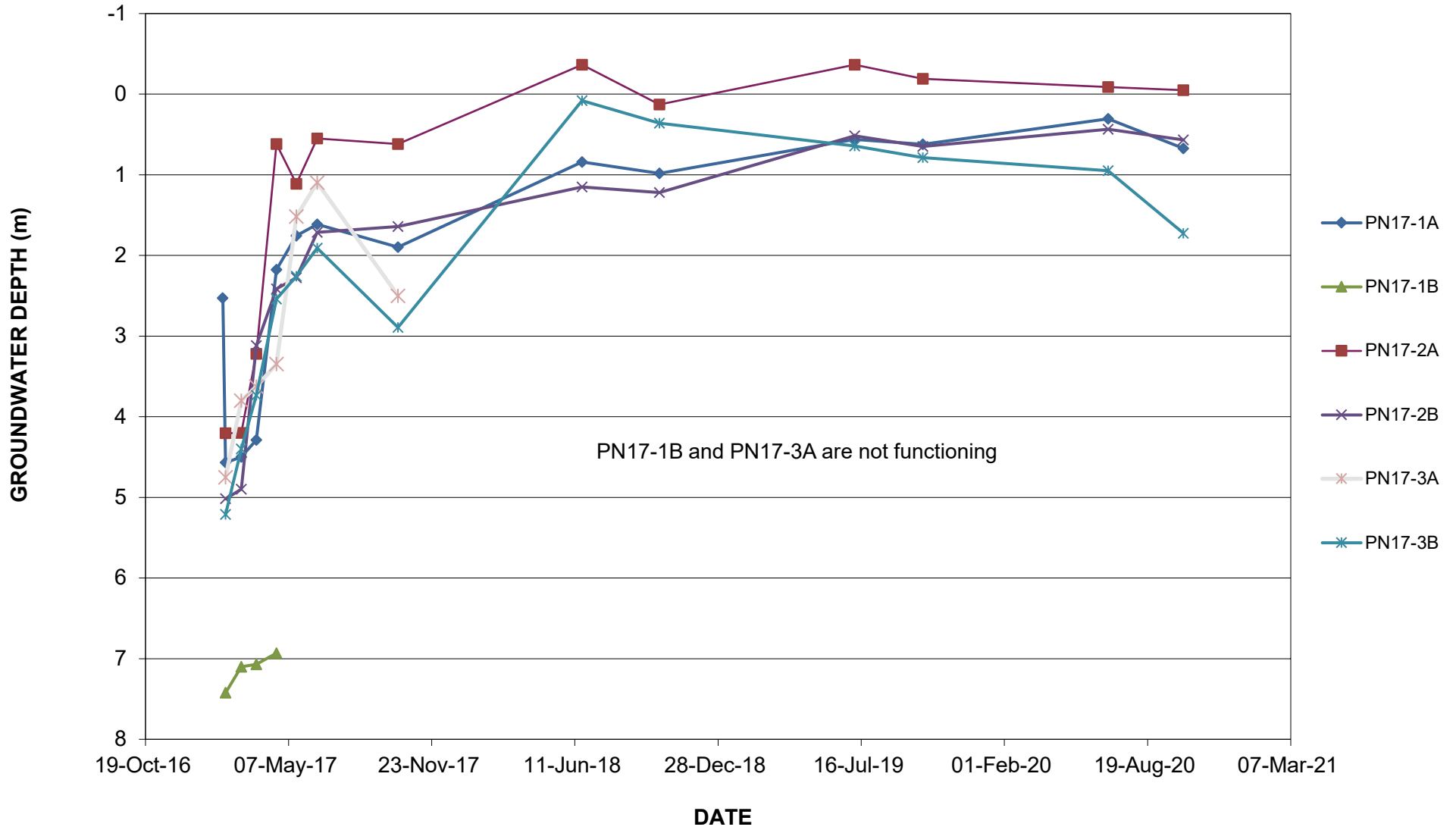


FIGURE GP038-1-2
PIEZOMETRIC DEPTHS FOR HWY 40:38 1.6 km NORTH OF KAKWA RIVER



**FIGURE GP038-2-1
PIEZOMETRIC ELEVATIONS FOR HWY 40:38 NORTH OF KAKWA RIVER
(CALLOUT SITE)**

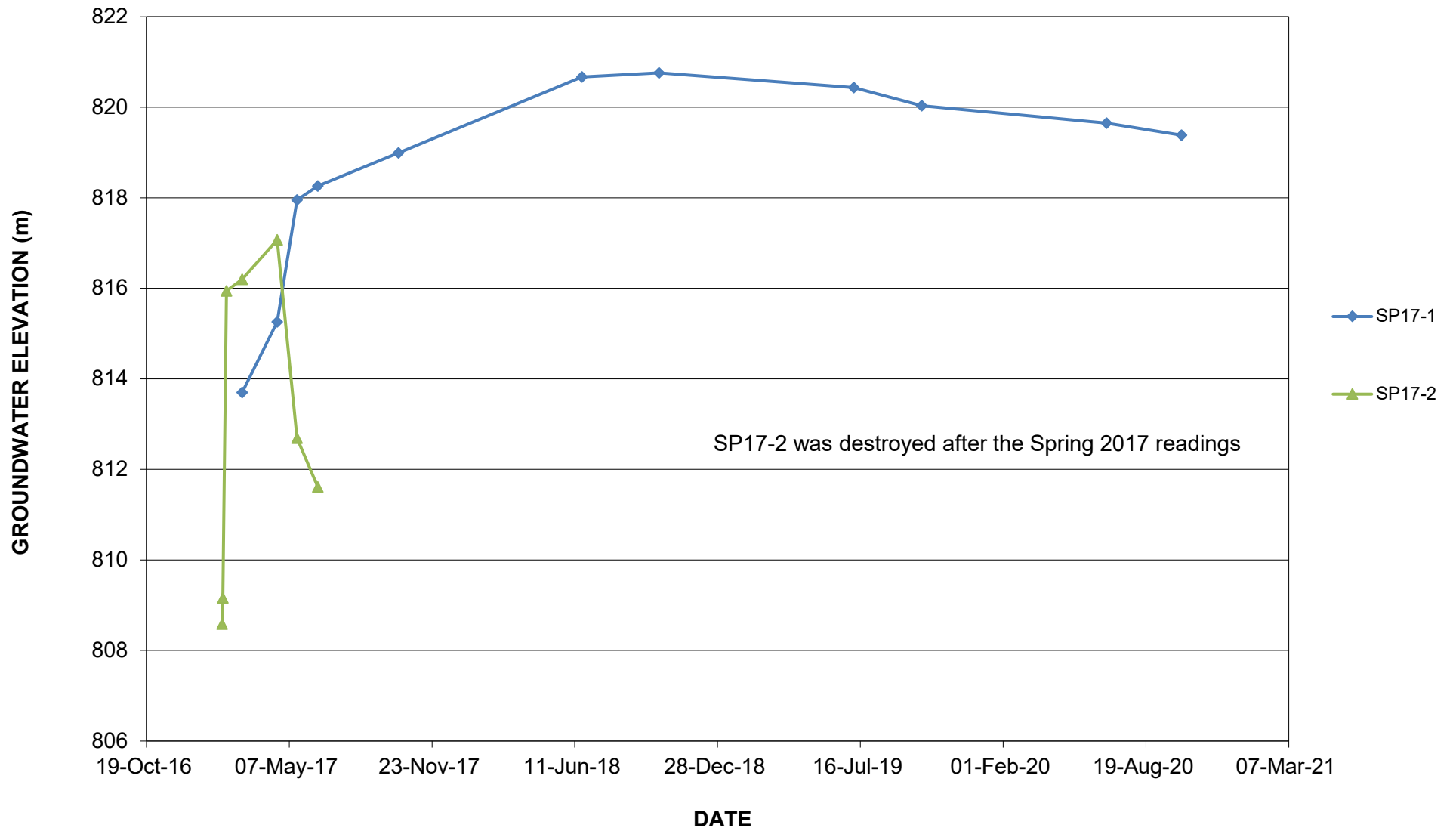


FIGURE GP038-2-2
PIEZOMETRIC DEPTHS FOR HWY 40:38 NORTH OF KAKWA RIVER
(CALLOUT SITE)

