



ALBERTA TRANSPORTATION NORTH CENTRAL REGION – ATHABASCA AREA INSTRUMENTATION MONITORING RESULTS

FALL 2020

SECTION C

SITE NC014-1: HWY 661:02 FORT ASSINIBOINE

1. OBSERVATIONS

1.1 Field Program and Instrumentation Status

Two slope inclinometers (SI06-6 and SI06-11) and fifteen standpipe piezometers (SP06-1 to SP06-5, SP06-9, SP06-10, SP06-13, SP6-14, SP06-18, SP06-19 and MW18-1 to MW18-4) were read at the Hwy 661:02 Fort Assiniboine site on October 1, 2020 by Mr. Niraj Regmi, G.I.T. and Mr. Long Le, both of Thurber Engineering Ltd.

The SIs were 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 standpipe piezometers were 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. Standpipe piezometer results are also provided in Section D.

2.2 Zones of Movement

No new zones of movement were observed in the SIs since the last set of readings recorded in the spring of 2020.

Historical zones of movement are summarized on Table NC014-1-1 at the end of this report. Table NC014-1-1 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 inclinometers SI06-6 and SI06-11 have recorded no discernible movements since initialization.

Standpipe piezometers SP06-1, SP06-2, SP06-3, SP06-9, SP06-10, SP06-13, SP06-14, SP06-18, SP06-19, MW18-1, MW18-2 and MW18-3 showed increases in groundwater level of 0.09 m, 0.05 m, 0.08 m, 0.07 m, 0.13 m, 0.07 m, 0.18 m, 0.05 m, 0.09 m, 0.10 m, 0.21 m and 0.11 m, respectively, since the spring of 2020 readings. SP06-4 and SP06-5 showed decreases in groundwater level of 0.03 m and 1.02 m, respectively, since the spring of 2020 readings. MW18-4 showed no change in groundwater level compared to the spring of 2020 readings. The current groundwater levels in SP06-2, SP06-13, SP06-19, MW18-1, MW18-2 and MW18-3 are the highest ever recorded in their respective instruments.

The standpipe piezometer readings are summarized in Table NC014-1-2 below. The standpipe piezometer readings are also plotted on Figures NC014-1-1 and NC014-1-2 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 needed at this time.

**TABLE NC014-1-1
FALL 2020 – HWY 661:02 FORT ASSINIBOINE
SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: October 1, 2020

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)
SI06-6	Mar. 31, 2006	No discernible movement	N/A	Operational	June 3, 2020	No discernible movement	N/A	N/A
SI06-11	Apr. 1, 2006	No discernible movement	N/A	Operational	June 3, 2020	No discernible movement	N/A	N/A
SI06-12	Mar. 30, 2006	4.3 over 6.4 m depth to 6.8 m depth in 193° direction	1.5 mm/yr between September 2010 and May 2011	Blocked/ Destroyed	May 13, 2011	N/A	N/A	N/A
SI06-15	Mar. 28, 2006	No discernible movement	N/A	Blocked	May 22, 2007	N/A	N/A	N/A
SI06-16	Mar. 29, 2006	4.0 over 4.6 m depth to 8.2 m depth in 183° direction	2.6 mm/yr between May 2007 and May 2008	Sheared off at 7.8 m	Sept. 28, 2009	N/A	N/A	N/A

Drawing 13357-NC014-1 in section D provides a sketch of the approximate location of the monitoring instrumentation for this site.

**TABLE NC014-1-2
FALL 2020 – HWY 661:02 FORT ASSINIBOINE
STANDPIPE PIEZOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: October 1, 2020

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (mBGS)	GROUND ELEV. (m)	CURRENT STATUS	MAXIMUM GROUNDWATER LEVEL (mBGS)	MEASURED GROUNDWATER LEVEL (mBGS)	PREVIOUS READING (mBGS)	CHANGE IN GROUNDWATER LEVEL SINCE PREVIOUS READING (m)
SP06-1	Apr. 2, 2006	9.13	N/A	Active	Sept. 12, 2016 (1.25)	1.29	1.38	0.09
SP06-2	Apr. 2, 2006	9.12	N/A	Active	October 1, 2020 (4.69)	4.69	4.74	0.05
SP06-3	Apr. 2, 2006	25.00	N/A	Active	May 27, 2015 (3.72)	4.60	4.68	0.08
SP06-4	Mar. 31, 2006	15.21	N/A	Active	June 3, 2020 (8.27)	8.30	8.27	-0.03
SP06-5	Mar. 31, 2006	25.00	N/A	Active	Apr. 2, 2006 (9.46)	15.05	14.03	-1.02
SP06-9	Apr. 1, 2006	15.24	N/A	Active	Apr. 2, 2006 (4.46)	5.55	5.62	0.07
SP06-10	Apr. 2, 2006	25.00	N/A	Active	Sept. 23, 2017 (5.97)	6.25	6.38	0.13
SP06-13	Apr. 2, 2006	9.95	N/A	Active	October 1, 2020 (6.85)	6.85	6.92	0.07
SP06-14	Mar. 28, 2006	9.16	N/A	Active	May 30, 2017 (6.61)	6.74	6.92	0.18

Drawing 13357-NC014-1 in section D provides a sketch of the approximate location of the monitoring instrumentation for this site.

**TABLE NC014-1-2 – CONTINUED...
FALL 2020 – HWY 661:02 FORT ASSINIBOINE
STANDPIPE PIEZOMETER INSTRUMENTATION READING SUMMARY**

Date Monitored: October 1, 2020

INSTRUMENT #	DATE INITIALIZED	TIP DEPTH (mBGS)	GROUND ELEV. (m)	CURRENT STATUS	MAXIMUM GROUNDWATER LEVEL (m)	MEASURED GROUNDWATER LEVEL (mBGS)	PREVIOUS READING (mBGS)	CHANGE IN GROUNDWATER LEVEL SINCE PREVIOUS READING (m)
SP06-17	Apr. 2 2006	8.83	N/A	Destroyed	September 27, 2011 (6.12)	N/A	N/A	N/A
SP06-18	Apr. 2, 2006	9.43	N/A	Active	Sept. 12, 2016 (1.85)	2.22	2.27	0.05
SP06-19	Apr. 2, 2006	7.95	N/A	Active	October 1, 2020 (6.26)	6.26	6.35	0.09
A11	N/A	N/A	N/A	Destroyed	May 28, 2006 (6.70)	N/A	N/A	N/A
MW18-1	June 2, 2018	9.10	634.97	Active	October 1, 2020 (7.03)	7.03	7.13	0.10
MW18-2	July 16, 2018	35.60	633.68	Active	October 1, 2020 (24.91)	24.91	25.12	0.21
MW18-3	June 2, 2018	13.60	656.84	Active	October 1, 2020 (5.51)	5.51	5.62	0.11
MW18-4	June 2, 2018	25.20	656.84	Active	June 3, 2020 (10.17)	10.17	10.17	0.00

Drawing 13357-NC014-1 in section D provides a sketch of the approximate location of the monitoring instrumentation for this site.

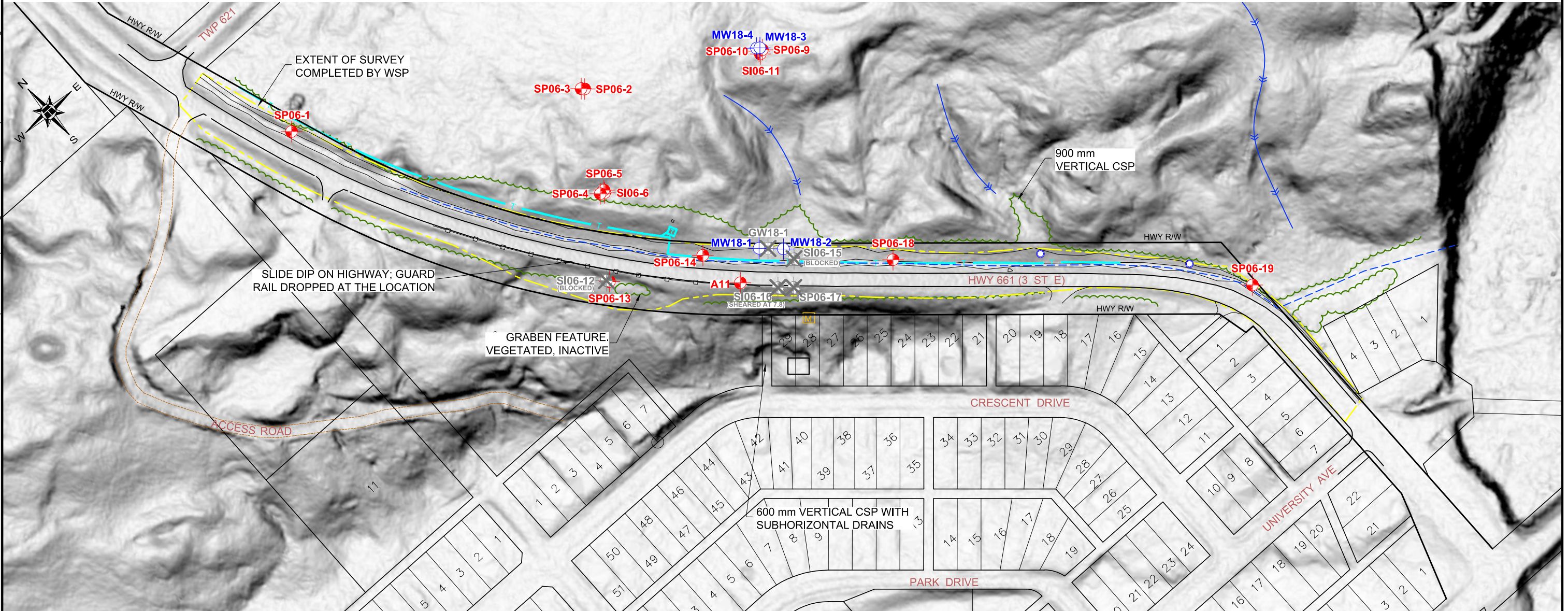


**ALBERTA TRANSPORTATION
NORTH CENTRAL REGION – ATHABASCA AREA
INSTRUMENTATION MONITORING RESULTS**













FALL 2020

**SECTION D
DATA PRESENTATION**

SITE NC014-1: HWY 661:02 FORT ASSINIBOINE

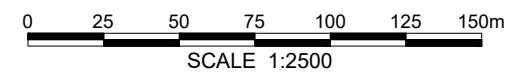


LEGEND

-  MONITORING WELL LOCATION
-  GRAVITY WELL LOCATION
-  APPROXIMATE INSTRUMENT LOCATION
-  (SP) STANDPIPE PIEZOMETER
-  (SI) SLOPE INCLINOMETER
-  DAMAGED / SHEARED OFF INSTRUMENT
-  VERTICAL CSP FILLED WITH COBBLES
-  TREELINE
-  [M] METAL BOX (POSSIBLY WITH SUBHORIZONTAL DRAINS)
-  TELUS LINE
-  GUARD RAIL
-  GULLY

NOTES:

1. SURVEY CONDUCTED ON JUNE 13, 2017 BY WSP
2. LIDAR, AS RECENT AS 2015, USED TO AUGMENT WSP SURVEY



NORTH CENTER REGION - ATHABASCA AREA

**NC014-1: FORT ASSINIBOINE
SITE PLAN SHOWING INSTRUMENT LOCATIONS**

DWG No. 13357-NC014-1

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	TSA
SCALE	1:2500
DATE	JUNE 2019
FILE No.	13357

