Stantec

To:	Amy Driessen Transportation and Economic Corridors	From:	Leslie Cho and Lawrence Onwude Stantec Consulting Ltd.
File:	123315222	Date:	October 31, 2025

Reference: North Central Region, Edson, Site NC013 - Highway 633:02 Cattlepass West, Fall 2025 Instrumentation Monitoring Report

1.0 OBSERVATIONS

1.1 FIELD PROGRAM AND INSTRUMENTATION STATUS

The Fall 2025 reading cycle consisted of instrument readings of one slope inclinometer (SI17-02) and two vibrating wire piezometers (VW17-01 and VW17-02). SI05-01 was sheared below 10.5 m, fitting with where movement was previously observed in 2022. Also, SI17-01 was found damaged in 2022 and the remaining casing within the ground is full of debris. In Spring 2024, VW05-6 was found damaged. The site plan is shown on **Figure 1** attached. The instrument readings were taken by Akintola Fakinlede, GIT and Adham Zahr, Geotechnical EIT and on October 3, 2025.

The slope inclinometer (SI) was measured using an RST MEMS digital inclinometer probe with 0.5 m increments and handheld PC. Readings were taken based on cable marks in relation to the top of SI casing. The vibrating wire piezometers (VW) were read with a Slope Indicator VW Data Recorder PN 52613500.

GPS coordinates of all instruments were surveyed using a Garmin eTrex 10 handheld GPS unit.

2.0 INSTRUMENTATION READINGS

2.1 GENERAL

The SI plots are provided in the attachments and summarized in the following sections. Displacement-time plots in the resultant x-direction (i.e., slope movement direction) along with movement rates, total cumulative movement, maximum movement rates, and incremental movements since initializing each SI are provided in **Table NC013-1** and the attachments.

The groundwater levels from VW readings are plotted in the attachments and summarized in **Table NC013-2**.

2.2 ZONES OF MOVEMENT

No new zones of movement were observed in the one operational SI during the Fall 2025 reading cycle.

2.3 MONITORING RESULTS

2.3.1 Slope Inclinometers

SI17-02 has two movement zones being monitored, the upper movement zone is at 8.9 m to 10.4 m and the lower movement zone is at 12.9 to 14.9 m. The cumulative movement in each zone is 7 mm and 2 mm,

respectively. The current rate of movement for the upper zone from 8.9 m to 10.4 m is approximately 2 mm/yr and lower zone from 12.9 m to 14.9 m is less than 1 mm/yr.

2.3.2 PIEZOMETERS

VW05-6 was damaged and can no longer be read without repairs. Prior to becoming damaged in Fall 2023, water level in VW05-6 had shown a slight increase with each passing cycle. VW05-6 showed artesian groundwater levels prior to construction in 2011.

Water levels in VW17-01 and VW17-02 both decreased by about 0.1 m from their historic maximum piezometric elevations. VW17-01 and VW17-02 showed a current piezometric level of 0.9 m and 1.2 m bgs, respectively.

3.0 RECOMMENDATIONS

3.1 FUTURE WORK

It is recommended that additional SIs are installed to replace the damaged SIs (SI05-1 and SI17-01). All instruments should be read again during the Spring 2026 reading cycle.

3.1 INSTRUMENTATION REPAIRS

It is unlikely that SI05-1 and SI17-01 can be repaired. SI05-01 has shifted, rendering any readings baseless. SI17-01 has been destroyed above ground, possibly due to mowing equipment. The remaining casing below ground was inferred to have debris at the bottom since the SI probe could not travel the full distance down the casing.

VW05-6 was not responsive in spring 2024 upon attaching the cables to the readout box. The exposed portions of the cables do not show signs of damage suggesting the cable(s) may be damaged below ground surface. Depending on the depth of cable damage, the cables could be spliced to repair VW05-6.

Reference: **North Central Region, Edson, Site NC013 - Highway 633:02 Cattlepass West, Fall 2025 Instrumentation Monitoring Report**

Table NC013-1: Fall 2025 Slope Inclinometer Reading Summary

Instrument Name	Date Initialized	Coordinates (1) (UTM 11U, NAD1983) (m)		Total Cumulative Resultant Movement and Depth of Movement to Date (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) (2)
		Northing	Easting							
SI05-1	April 25, 2005	5942608	642213	110 over 2.1m to 8.1m depth in 345º direction	46 between Sept. 2011 and June 2012	Non-operational	May 06, 2022	Found damaged September 2022.		
				130 over 8.1m to 11.6m depth in 345º direction	48 between Sept. 2011 and June 2012					
SI17-01	November 24, 2017	5942648	642249	-	-	Non-operational	May 06, 2022	Found damaged September 2022.		
SI17-02	November 24, 2017	5942597	642215	7 over 8.9m to 10.4m depth in 35º direction	2.9 between May 2022 and Sep 2022	Operational	May 8, 2025	<1	1.8	1.8
				2 over 12.9 m to 14.9 m depth in 35º direction	1.6 between Jul 2021 and Sep 2021			<1	<1	<1

Note:
(1) Operational Instruments were updated October 3, 2025, with approximate accuracy of ± 3 m.
(2) Negative (-) indicates decrease in rate of movement and/or change in direction of movement.

Reference: **North Central Region, Edson, Site NC013 - Highway 633:02 Cattlepass West, Fall 2025 Instrumentation Monitoring Report**

Table NC013-2: Fall 2025 Vibrating Wire Piezometer Reading Summary

Instrument Name	Date Initialized	Coordinates [1] (UTM 11U, NAD1983) (m)		Tip Elevation (m) (aMSL) [2]	Ground Elevation [1] (m) (aMSL)	Current Status	Maximum Piezometric Elevation (m)	Measured Piezometric Elevation (Fall 2025) (m)	Previous Piezometric Elevation (Spring 2025) (m)	Change in Water Level Since Previous Reading (m bgs) [3]
		Northing	Easting							
VW05-6 (79657)	May 6, 2005	5942601	642259	726.4	740.1	Non-Operational	740.8 on May 2013	-	-	N/A
VW17-01 (100D1700263)	Nov. 24, 2017	5942622	642252	730.3	739.8	Operational	739.0 on May 2025	738.9 (0.9 m bgs)	739.0 (0.8 m bgs)	-0.1
VW17-02 (100D1701604)	Nov. 24, 2017	5942597	642215	727.4	741.1	Operational	740.0 on May 2025	739.9 (1.2 m bgs)	740.0 (1.1 m bgs)	-0.1

Note:
(1) Updated October 3, 2025 with approximate accuracy of ± 3 m.
(2) aMSL = Above Mean Sea Level
(3) Negative (-) indicates decrease in water level

Reference: **North Central Region, Edson, Site NC013 - Highway 633:02 Cattlepass West, Fall 2025 Instrumentation Monitoring Report**

CLOSING

We trust this instrumentation report meets your requirements. If you have any questions, please do not hesitate to contact the undersigned.

Stantec Consulting Ltd.

PROFESSIONAL ENGINEER ALBERTA
LESLIE CHO
October 31, 2025
ID# 139079

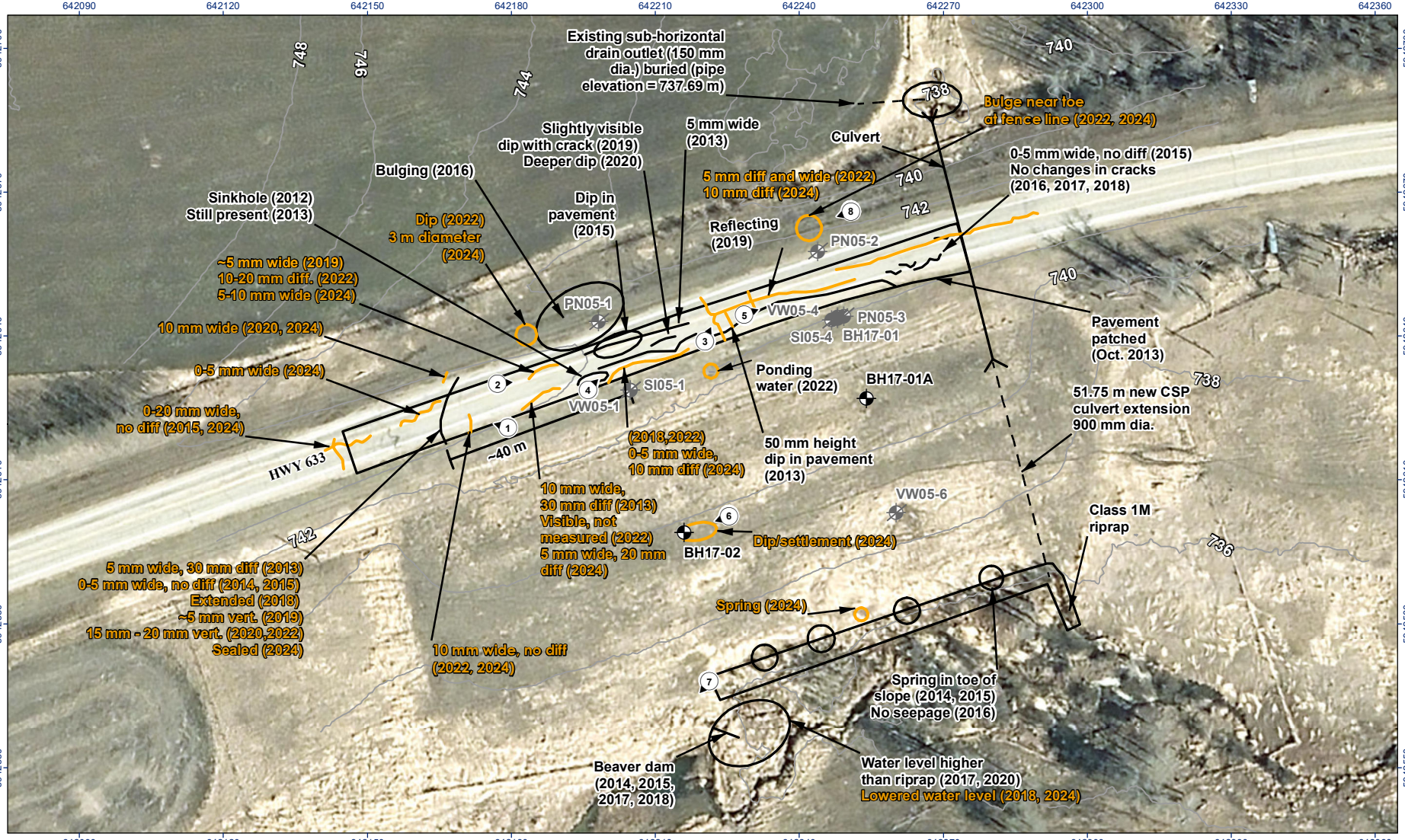
31-Oct-2025

Leslie Cho M.Eng., P.Eng.
Senior Associate, Geotechnical Engineer
Phone: 780-917-7403
leslie.cho@stantec.com

Lawrence Onwude M.Eng., P.Eng.
Senior Associate, Geotechnical Engineer
Phone: 780-969-2257
lawrence.onwude@stantec.com

Attachment:
Figure 1 – Site Plan
SI17-02 Slope Inclinometer Plots
Vibrating Wire Piezometer Depth vs Time Plot
Vibrating Wire Piezometer Elevation vs. Time Plot

PERMIT TO PRACTICE
STANTEC CONSULTING LTD.
Signature ID# 74389
Date 6-Nov-2025
PERMIT NUMBER: P 0258
The Association of Professional Engineers and Geoscientists of Alberta



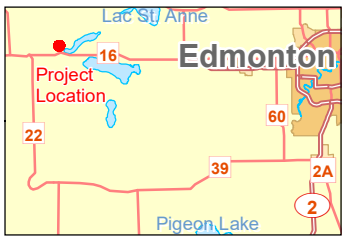


Photo Number and Direction
Borehole Location
Non-Operational Instrument
Previous Observation
2024 Observation
Ground Elevation Contours (m AMSL, LiDAR Nov. 2014)

N

0 10 20 metres
(At original document size of 8.5x11)
1:1,200

Notes
1. Coordinate System: NAD 1983 UTM Zone 11N
2. Data Sources: Geogratis, ©Department of Natural Resources Canada, All rights reserved.
3. Background: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Stantec

Project Location
Hwy 633
Parkland County, Alberta

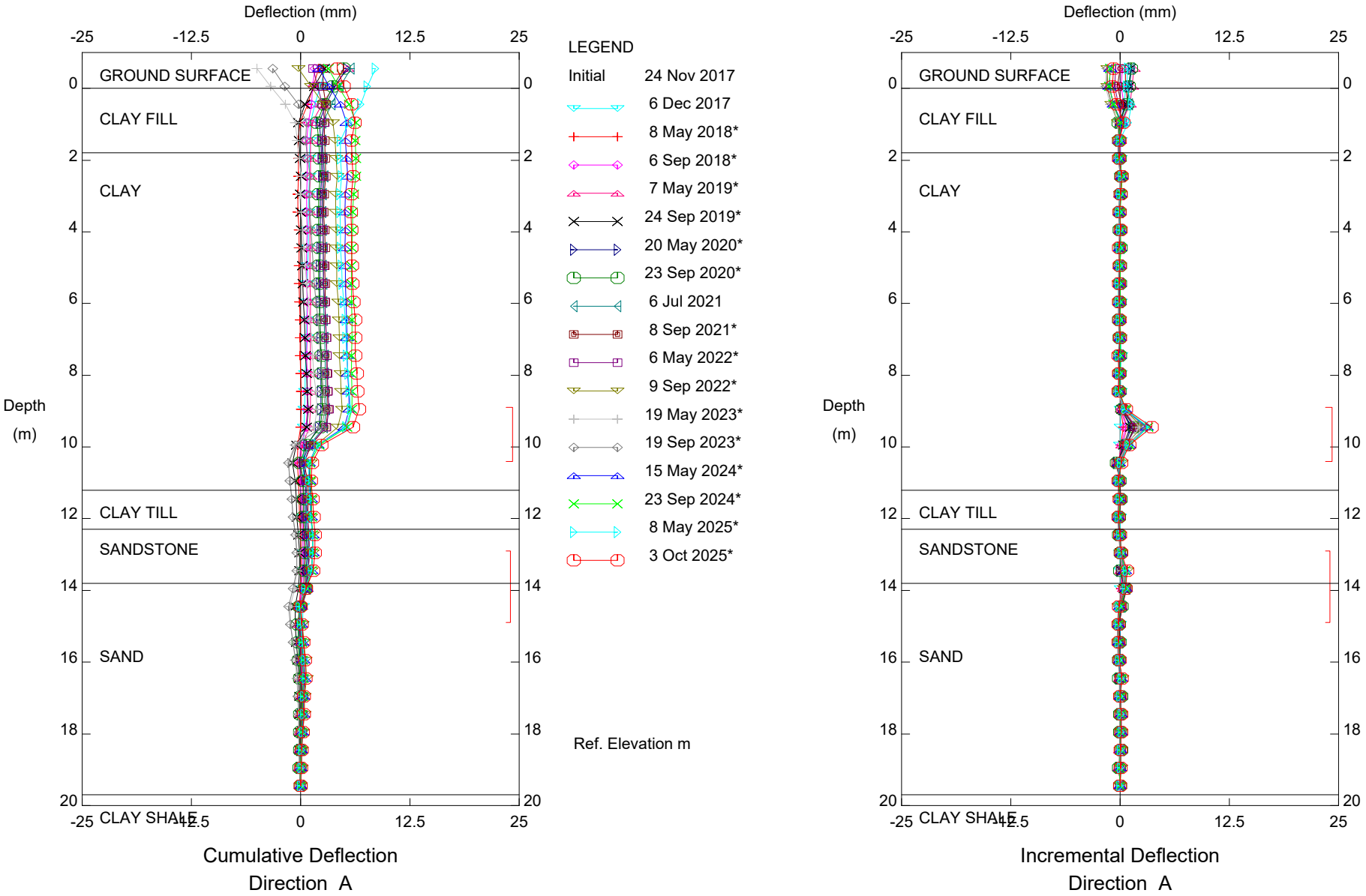
Prepared by SP on 2024-08-13
Quality Review by LC on 2024-08-14
Independent Review by XL on 2024-08-14

Client/Project
123315222
Alberta Transportation
Geohazard Monitoring Program
NC13 Cattle Pass West

Figure No.
1

Title
Site Plan

Stantec Consulting Ltd - Edmonton



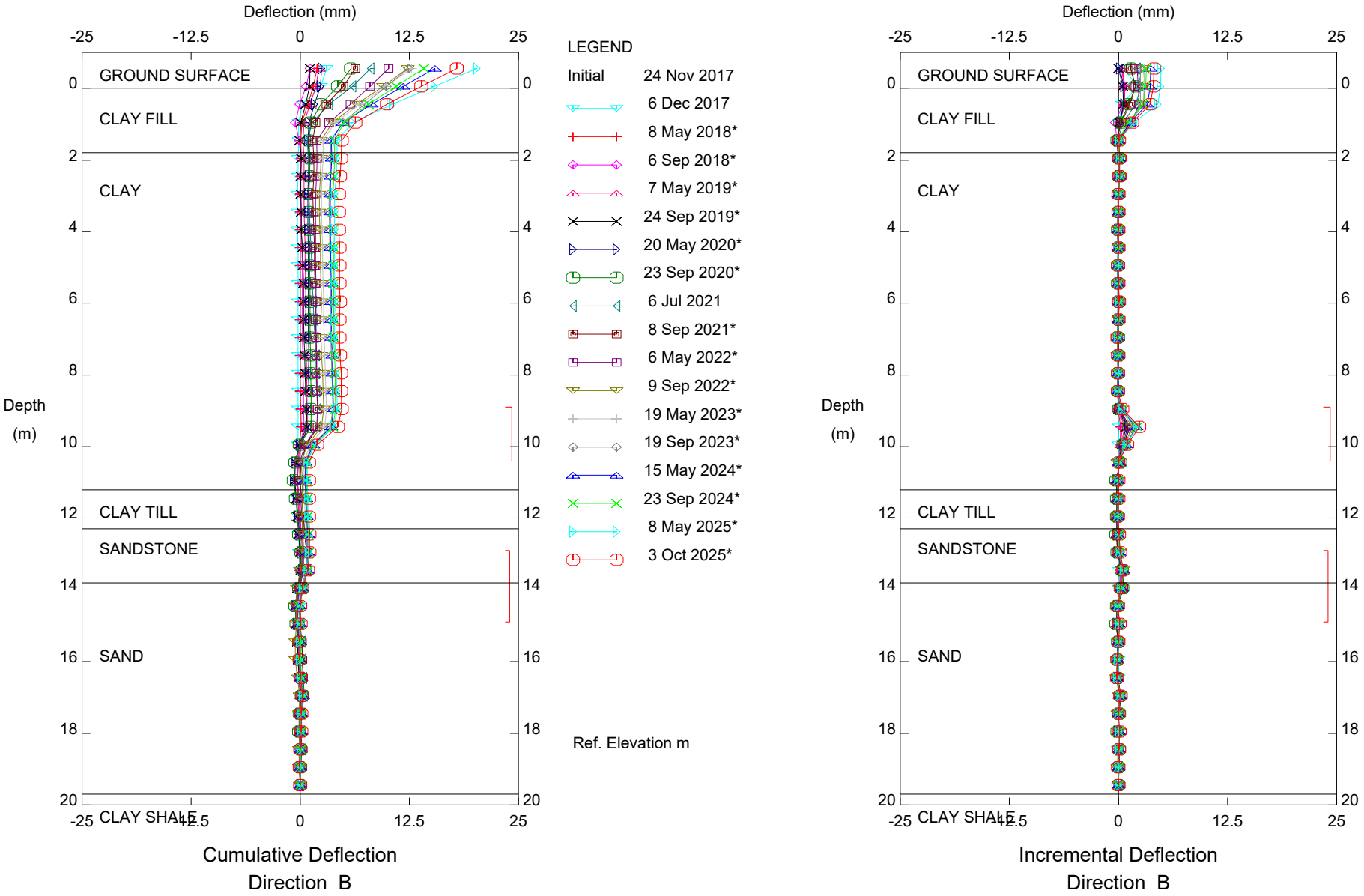
NC13, Inclinometer SI17-02

Transportation & Economic Corridors

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

V:\1233\active\123315222\03_data\field\instrumentation\NC013\SI\SI17-02\2025_Fall\NC013SI17-02_S2025.gtl

Stantec Consulting Ltd - Edmonton



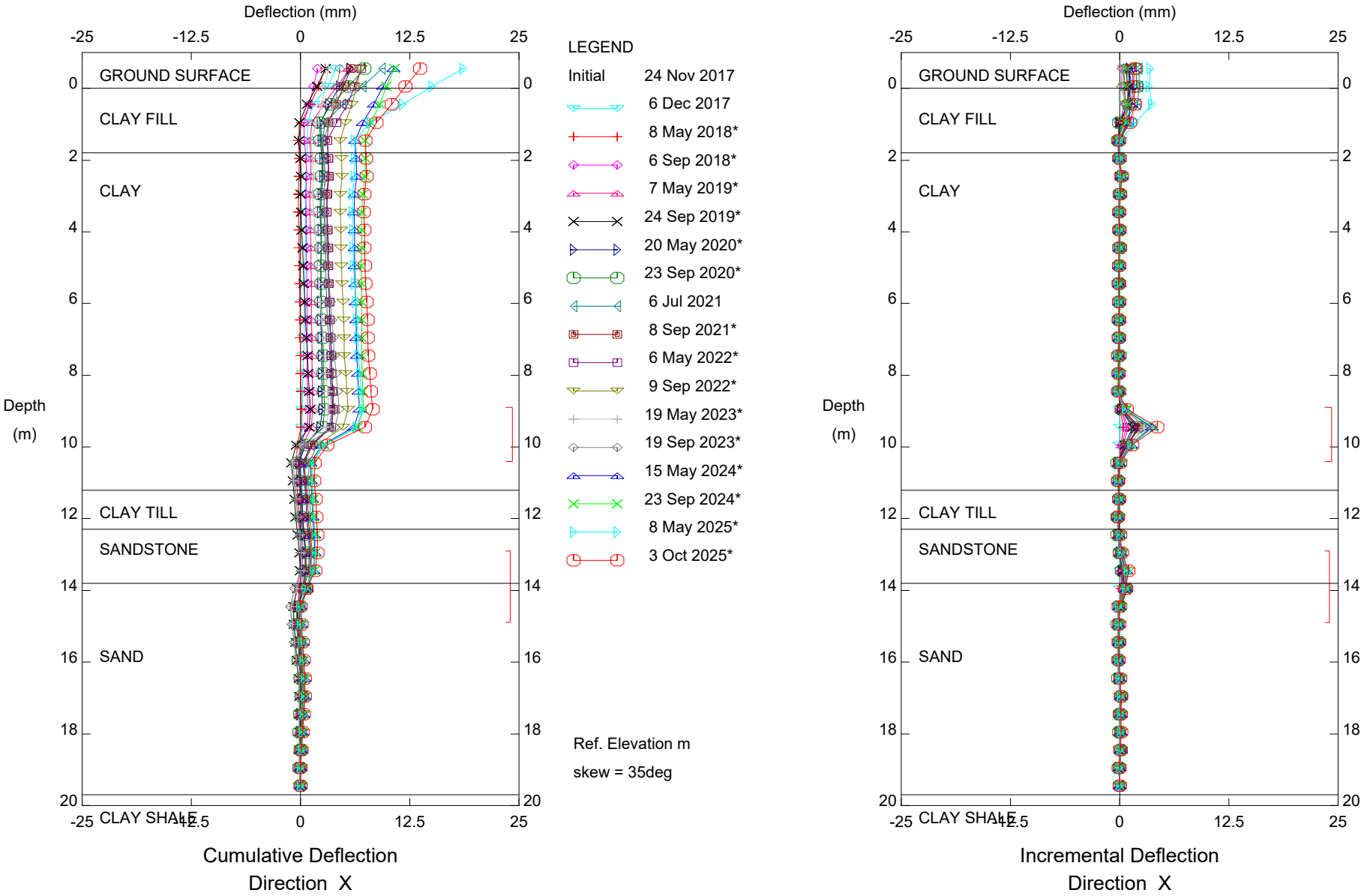
NC13, Inclinometer SI17-02

Transportation & Economic Corridors

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

V:\1233\active\123315222\03_data\field\instrumentation\NC013\SI\SI17-02\2025_Fall\NC013SI17-02_S2025.gtl

Stantec Consulting Ltd - Edmonton



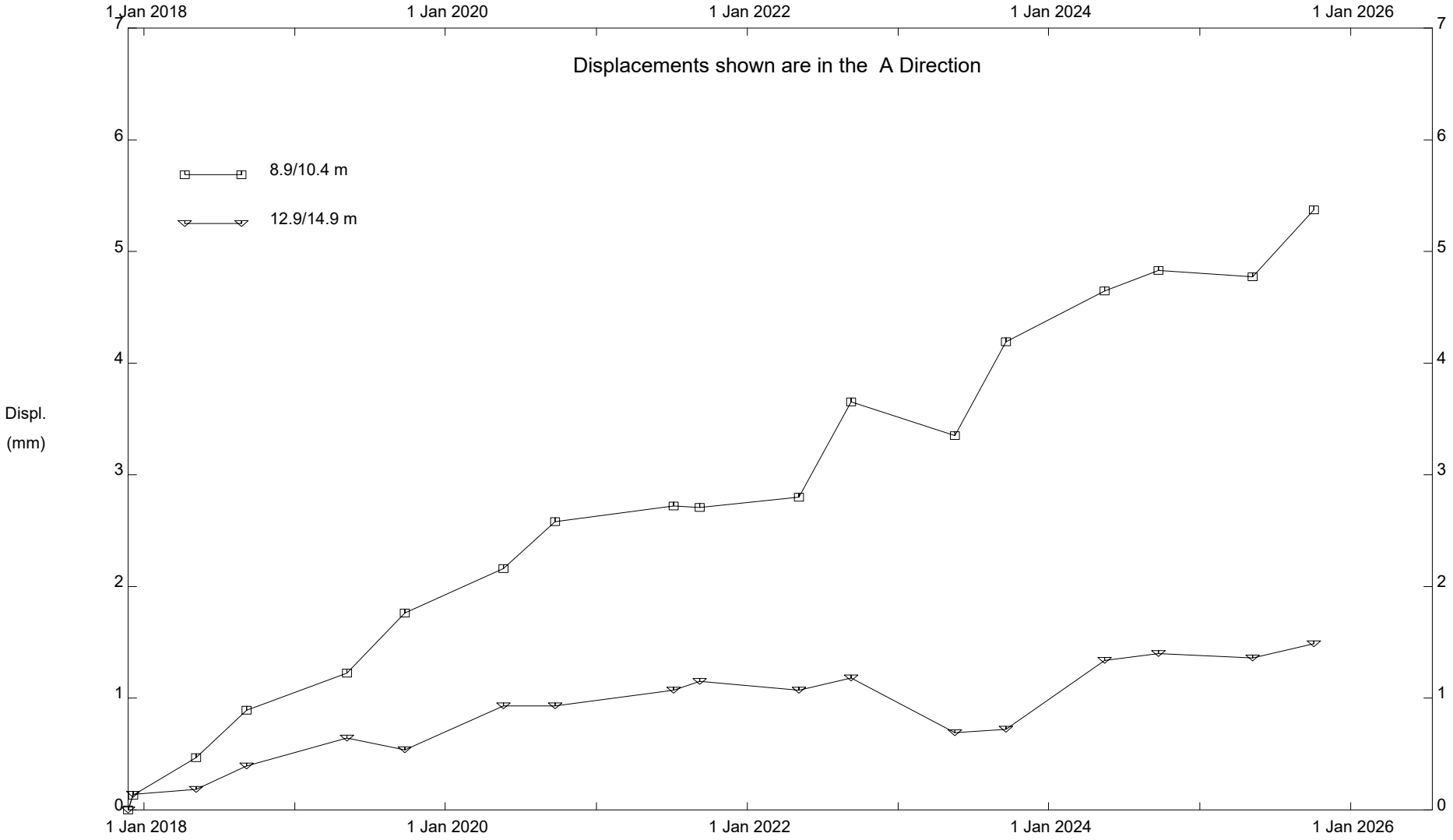
NC13, Inclinometer SI17-02

Transportation & Economic Corridors

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

V:\1233\active\123315222\03_data\field\instrumentation\NC013\SI\SI17-02\2025_Fall\NC013SI17-02_S2025.gtl

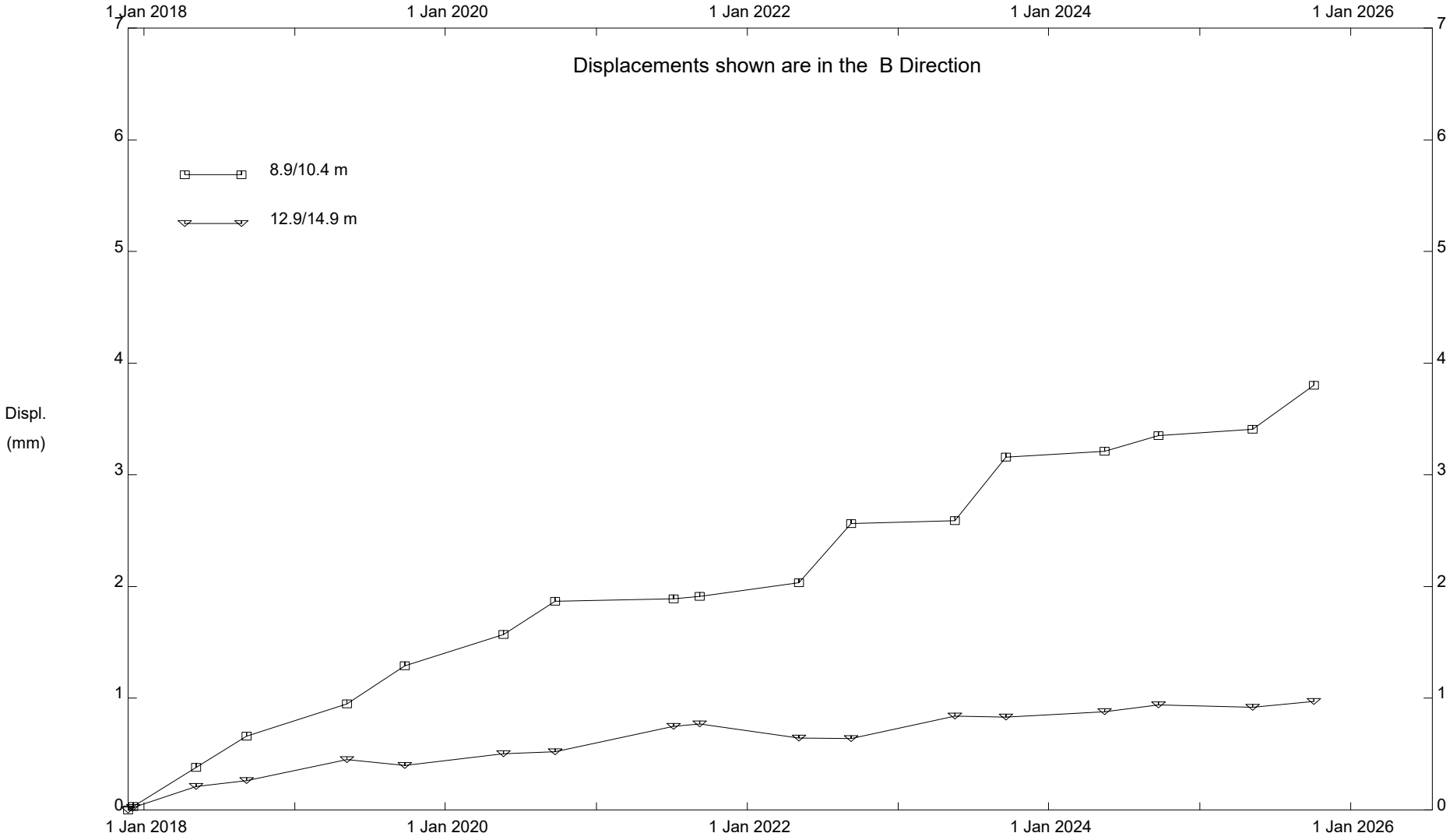
Stantec Consulting Ltd - Edmonton



NC13, Inclinometer SI17-02

Transportation & Economic Corridors

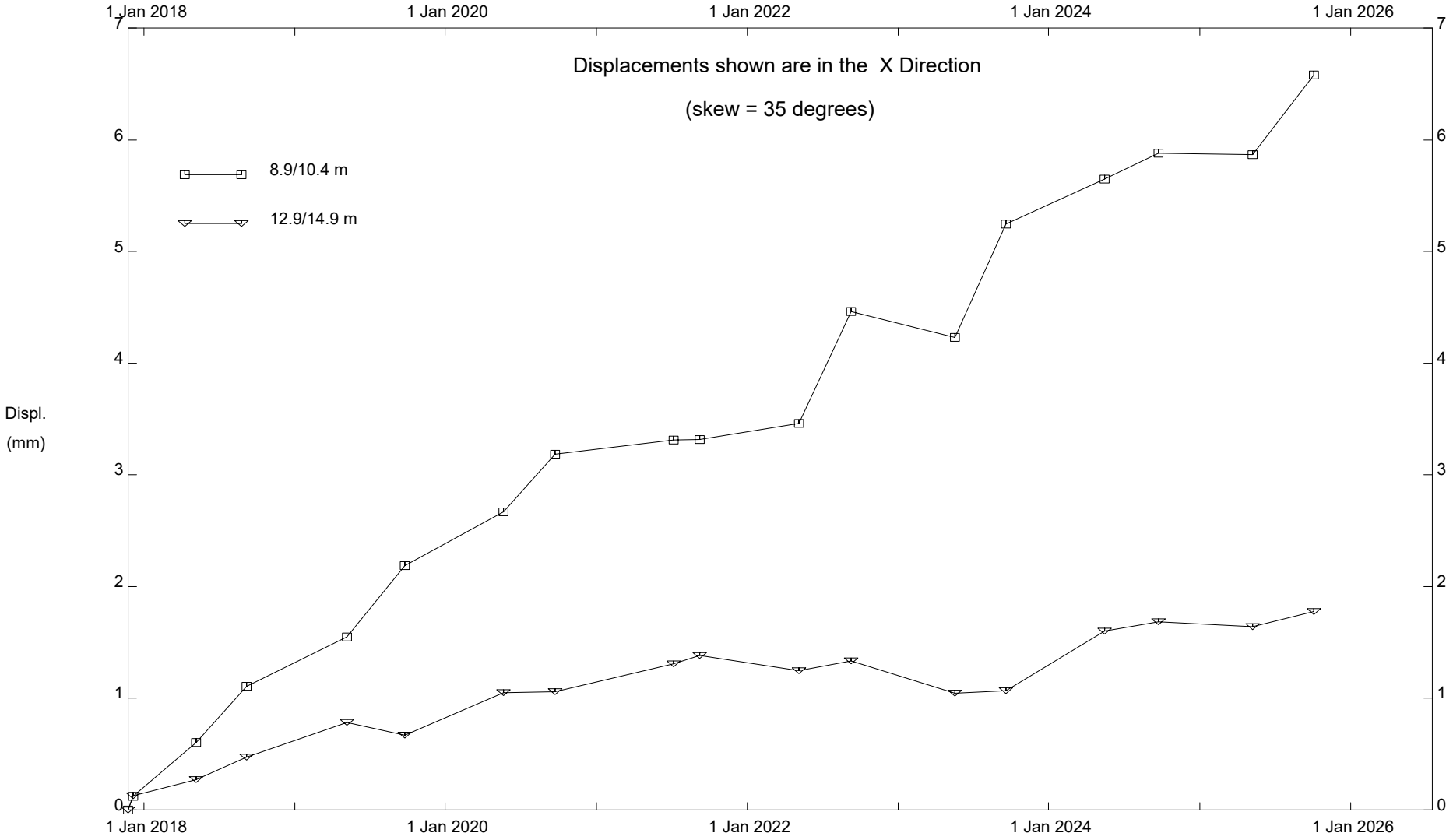
Stantec Consulting Ltd - Edmonton



NC13, Inclinometer SI17-02

Transportation & Economic Corridors

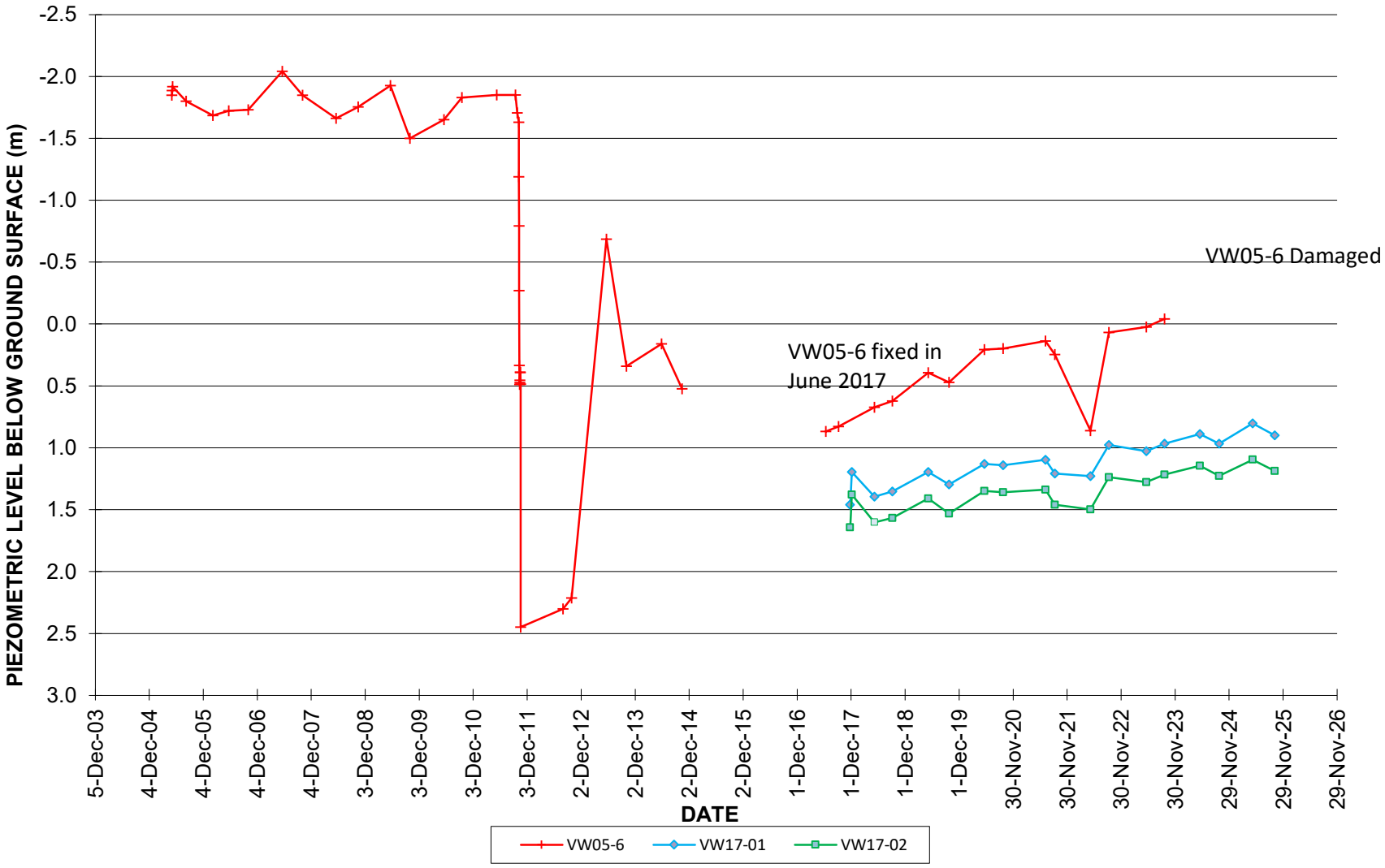
Stantec Consulting Ltd - Edmonton



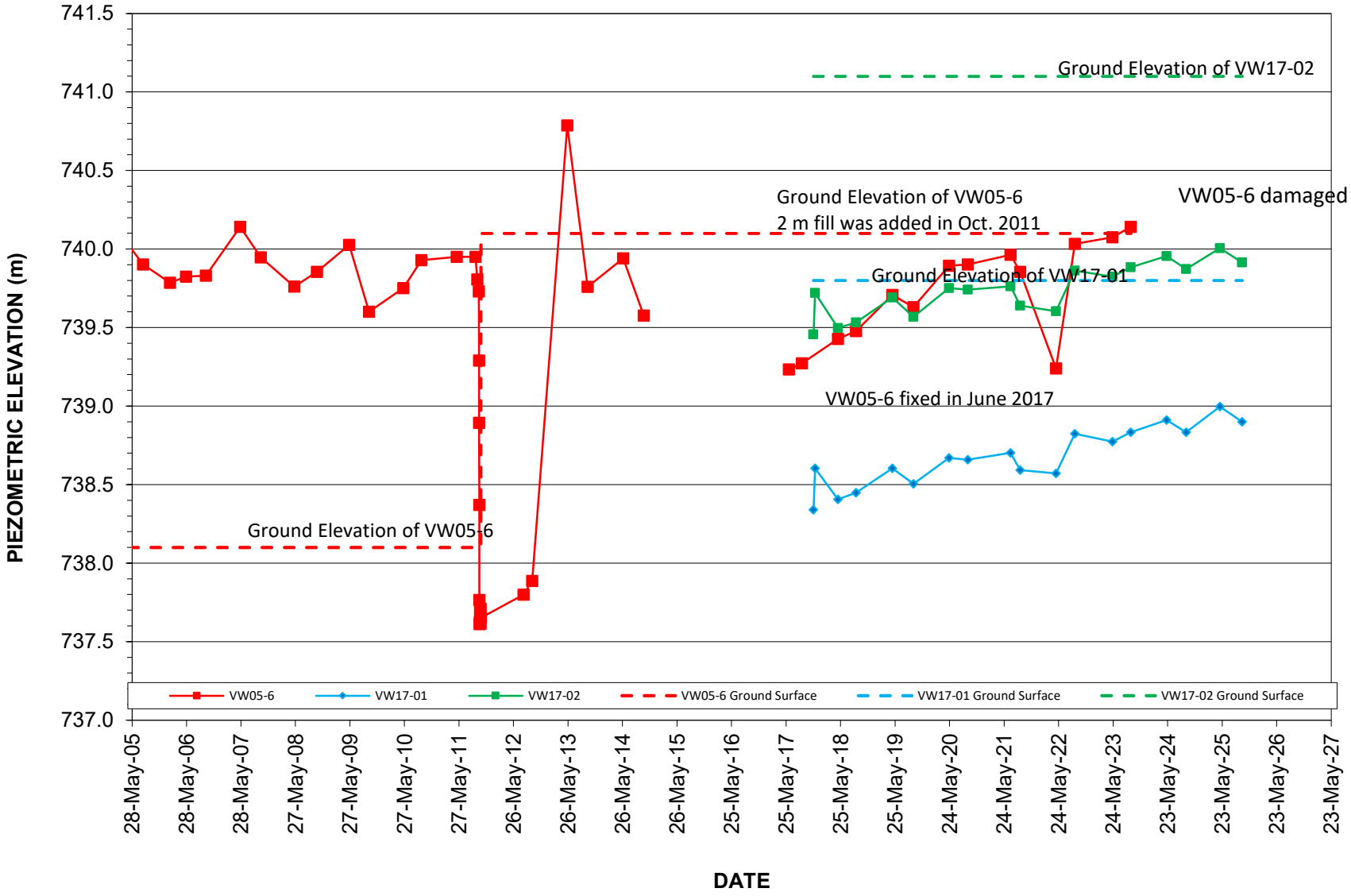
NC13, Inclinometer SI17-02

Transportation & Economic Corridors

PIEZOMETER DATA
NC13: HWY633:02, Cattlepass West



PIEZOMETER DATA
NC13: HWY633:02, Cattlepass West



Stantec