THURBER ENGINEERING LTD.

November 16, 2022 File No.: 32121

Alberta Transportation
Provincial Building
9621-96 Avenue
Peace River, Alberta
T8S 1T4

Attention: Mr. Max Shannon

ALBERTA TRANSPORTATION GRMP (CON0022164)
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING RESULTS – FALL 2022

SECTION C

SITE PH071: HWY 986:01, DAISHOWA WEST HILL

Dear Mr. Shannon:

This report provides the results of the bi-annual geotechnical instrumentation monitoring for the above-mentioned site as part of Alberta Transportation's Geohazard Risk Management Program for Peace Region – Peace River District (CON0022164).

It is a condition of this letter report that Thurber's performance of its professional services will be subject to the attached Statement of Limitations and Conditions.

1. FIELD PROGRAM AND INSTRUMENTATION STATUS

Between January and July 2016, a 140 m long, reinforced concrete anchored tangent pile wall was constructed at the Hwy 986:01 Daishowa West Hill Site to mitigate a landslide that was affecting the highway. After the wall construction was completed, the highway road structure was rebuilt, and the area downslope of the new wall was graded between July 2016 and July 2017.

Three shape accelerometer arrays (SAA-P022, SAA-P060 and SAA-P097), nine vibrating wire load cells (VC1917 to VC1925), twenty-eight vibrating wire strain gauges (SGs) and six vibrating wire piezometers (VW16-1A, VW16-1B, VW16-1C, VW16-2A, VW16-2B and VW16-2C) were installed during construction and wired to a Campbell Scientific CR6 datalogger. Six additional vibrating wire piezometers (VW16-3A, VW16-3B, VW16-4A, VW16-4B, VW16-5A and VW16-5B) were installed and wired to three RST DT2055 dataloggers. There is also one active slope inclinometer (SI16-3) that was installed during construction.

SAA-P022, six of the twenty-eight strain gauges and VW16-5B stopped functioning before the end of construction. In addition, VW16-4B has not been functional since May 7, 2017, and SAA-P022 stopped functioning on September 13, 2016.

4127 Roper Road, Edmonton, AB T6B 3S5 T: 780 438 1460 F: 780 437 7125
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Slope inclinometer SI16-3 was read and the data from the RST DT2055 dataloggers was downloaded on September 27, 2022, by Mr. Niraj Regmi, G.I.T. and Mr. Kyle Crooymans, both of Thurber Engineering Ltd.

SI16-3 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 data from the DT2055 dataloggers was downloaded to a field laptop using RST DTLink software.

Prior to the spring of 2022 readings, the CR6 datalogger was downloaded manually at the site to a field laptop. Several upgrades were completed by Thurber to the datalogger station prior to the spring of 2022 readings to allow for automated readings of the pile wall instruments. The updates included replacing the 12-volt battery powering the logger with a new battery, installation of a new antenna and installation of a modem to allow remote connection to the datalogger. A computer was set up at Thurber's Edmonton office to automatically download the data once per day. The data from the automated readings for the CR6 datalogger is included in this report.

2. DATA PRESENTATION

2.1 General

SI and SAA plots for A and B directions are included in in Appendix A. Where movement has been recorded the resultant plot (X direction, if applicable) and rate of movement have also been provided. Piezometer and load cell reading plots are also included in Appendix A.

Slope inclinometer, SAA, vibrating wire strain gauge, vibrating wire piezometers, and vibrating wire load cells reading summary tables are provided below. These tables also include instruments deleted from the GRMP program, for reference.

2.2 Zones of Movement

Zones of new movement were not observed in the SIs or SAAs since the previous readings in the spring of 2022.

Zones of movements are summarized in Tables PH071-1 for the SIs and PH071-2 for the SAAs. These tables also provide a historical account of the total movement, the depth of movement and the maximum rate of movement that has occurred in the SIs and the SAAs since initialization.

TABLE PH071-1
FALL 2022 – HWY 986:01, DAISHOWA WEST HILL
SLOPE INCLINOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: September 27, 2022

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.)
SI16-3	December 2, 2017 (Re-initialized)	23.1 over 0.1 m to 3.8 m depth in 101° direction	9.9 in October 2020	Operational	June 12, 2022	0.5	1.7	-3.3
		3.6 over 9.3 m to 11.1 m depth in 136° direction	1.8 in October 2020			0.2	0.7	0.4
		2.4 over 14.1 m to 16.0 m depth in 101° direction	1.2 in October 2020			0.1	0.3	0.1
SI16-4	*September 6, 2016*	*9.7 over 10.4 m to 12.4 m depth*	*171.6 on September 15, 2016*	*Sheared at 11.4 m depth*	*September 30, 2016*	*N/A*	*N/A*	*N/A*
SI16-5	*August 30, 2016*	*64.5 over 8.0 m to 9.5 m depth*	*2404.8 on September 9, 2016*	*Sheared at 8.5 m depth*	*September 9, 2017*	*N/A*	*N/A*	*N/A*

Drawings 32121-PH071-1 and 32121-PH071-2 in Appendix A provide a sketch of the approximate location of the monitoring instrumentation for this site.

TABLE PH071-2
FALL 2022 – HWY 986:01, DAISHOWA WEST HILL
SHAPE ACCELEROMETER ARRAY INSTRUMENTATION READING SUMMARY

Date Monitored: September 27, 2022

<table>
<tr><th>INSTRUMENT #</th><th>DATE INITIALIZED</th><th>TOTAL CUMULATIVE RESULTANT MOVEMENT AT NOTED DEPTH SINCE INITIAL READING (mm)</th><th>CURRENT STATUS</th><th>DATE OF PREVIOUS READING</th><th>INCREMENTAL MOVEMENT SINCE PREVIOUS READING (mm)</th><th>AVERAGE RATE OF MOVEMENT SINCE PREVIOUS READING[1] (mm/yr.)</th><th>CHANGE IN AVERAGE RATE OF MOVEMENT SINCE PREVIOUS READING (mm/yr.)</th></tr>
<tr><td rowspan="2">SAA-P022</td><td rowspan="2">March 17, 2016</td><td>5.1 over 0 m to 29.5 m depth</td><td rowspan="2">Not functioning[2]</td><td rowspan="2">September 9, 2016</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>6.7 over 2.5 m to 29.5 m depth</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td rowspan="2">SAA-P060</td><td rowspan="2">March 17, 2016</td><td>18.1 over 2.5 m to 29.5 m depth</td><td rowspan="2">Operational</td><td rowspan="2">June 12, 2022</td><td>1.0</td><td>3.4</td><td>2.4</td></tr>
<tr><td>25.4 over 0.0 m to 29.5 m depth</td><td>1.0</td><td>3.5</td><td>2.0</td></tr>
<tr><td>SAA-P097</td><td>March 17, 2016</td><td>18.9 over 2.5 m to 29.5 m depth</td><td>Operational</td><td>June 12, 2022</td><td>1.2</td><td>4.0</td><td>2.9</td></tr>
</table>

Drawings: 32121-PH071-1 and 32121-PH071-2 in Appendix A provide a sketch of the approximate location of the monitoring instrumentation for this site.

Notes:
1. SAA readings are recorded once per day by the on-site datalogger. Average movement rates are compared to the previous reading event.
2. SAA-P022 stopped functioning on September 13, 2016

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TABLE PH071-3
FALL 2022 – HWY 986:01, DAISHOWA WEST HILL
VIBRATING WIRE STRAIN GAUGE INSTRUMENTATION READING SUMMARY

Date Monitored: September 27, 2022

DEPTH FROM TOP OF PILE P066 (m)	GAUGE #	TOTAL MICROSTRAIN (SEPT 28, 2022) (με)	CHANGE IN MICROSTRAIN SINCE PREVIOUS READING (JUNE 12, 2022) (με)	MEASURED TEMPERATURE (°c)	GAUGE #	TOTAL MICROSTRAIN (SEPT 28, 2022) (με)	CHANGE IN MICROSTRAIN SINCE PREVIOUS READING (JUNE 12, 2022) (με)	MEASURED TEMPERATURE (°c)
	UPSLOPE PILE FACE				**DOWNSLOPE PILE FACE**			
0.575	11	-99.3	-10.7	19.2	*16*	*N/A*	*N/A*	*N/A*
2.575	12	-47.6	-12.8	18.1	17	133.2	1.3	21.1
4.575	13	-50.2	-0.9	14.0	18	422.4	1.9	13.9
6.575	14	-36.3	-13.9	10.0	19	416.5	3.9	10.0
8.575	15	-28.2	-0.9	N/A	*20*	*N/A*	*N/A*	*N/A*
11.075	1	25.1	0.6	7.6	*6*	*N/A*	*N/A*	*N/A*
13.075	2	30.3	0.1	7.4	7	-81.4	0.4	*N/A*
15.075	3	33.3	-0.6	7.4	8	156.8	-0.4	7.5
17.075	4	39.8	-1.1	5.5	9	153.2	0.3	7.5
19.075	5	-0.8	-1.1	7.5	*10*	*N/A*	*N/A*	*N/A*
21.075	21	26.1	-0.2	N/A	22	181.7	-1.0	7.4
23.075	23	-23.6	-0.1	7.3	24	106.1	-0.8	7.4
25.075	25	15.0	-0.2	7.2	*26*	*N/A*	*N/A*	*N/A*
27.075	*27*	*N/A*	*N/A*	*N/A*	28	573.2	-0.5	7.1

Drawings 32121-PH071-1 and 32121-PH071-2 in Appendix A provide a sketch of the approximate location of the monitoring instrumentation for this site.
Note: Strain gauges number 6, 10, 16, 20, 26 and 27 are not functioning

TABLE PH071-4
FALL 2022 – HWY 986:01, DAISHOWA WEST HILL
VIBRATING WIRE PIEZOMETER INSTRUMENTATION READING SUMMARY

Date Monitored: September 27, 2022

INSTRUMENT	DATE INITIALIZED	TIP ELEV. (m)	GROUND ELEV. (m)	CURRENT STATUS	HIGHEST RECORDED GROUNDWATER ELEVATION (m)	CURRENT GROUNDWATER ELEVATION (m)	PREVIOUS GROUNDWATER ELEVATION (m)	CHANGE IN WATER LEVEL SINCE PREVIOUS READING (m)
VW16-1A	July 27, 2016	487.04	491.04	Active	488.24 on September 27, 2022	488.24	Below Tip Elevation (Dry)	N/A
VW16-1B	July 27, 2016	482.04	491.04	Active	485.45 on June 10, 2021	485.29	485.15	0.14
VW16-1C	July 27, 2016	473.04	491.04	Active	482.30 on May 26, 2021	482.13	482.10	0.03
VW16-2A	April 26, 2017	484.73	487.73	Active	484.82 on September 9, 2022	Below Tip Elevation (Dry)	Below Tip Elevation (Dry)	N/A
VW16-2B	April 26, 2017	478.73	487.73	Active	484.20 on September 9, 2022	484.04	483.50	0.54
VW16-2C	April 26, 2017	469.73	487.73	Active	482.07 on September 20, 2022	481.97	481.61	0.36
VW16-3A	September 7, 2016	477.49	482.99	Active	481.81 on May 9, 2021	481.37	481.35	0.02
VW16-3B	September 7, 2016	464.99	482.99	Active	470.25 on September 7, 2016	465.88	465.83	0.05
VW16-4A	August 30, 2016	470.99	481.43	Active	475.30 on June 18, 2020	Below Tip Elevation (Dry)	Below Tip Elevation (Dry)	N/A
VW16-4B	*August 30, 2016*	*457.24*	*481.43*	*Not functioning*	*Below Tip Elevation (Dry)*	*N/A*	*N/A*	*N/A*
VW16-5A	*August 30, 2016*	468.02	471.02	Active	470.09 on March 22, 2019	Below Tip Elevation (Dry)	Below Tip Elevation (Dry)	N/A
VW16-5B	*August 30, 2016*	*452.52*	*471.02*	*Not functioning*	*452.60 on September 12, 2016*	*N/A*	*N/A*	*N/A*

Drawings 32121-PH071-1 and 32121-PH071-2 in Appendix A provide a sketch of the approximate location of the monitoring instrumentation for this site.

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TABLE PH071-5
FALL 2022 – HWY 986:01, DAISHOWA WEST HILL
LOAD CELL INSTRUMENTATION READING SUMMARY

Date Monitored: September 27, 2022

LOAD CELL SERIAL #	ANCHOR NUMBER	DESIGN LOAD / LOCK-OFF LOAD (kN)	MAXIMUM RECORDED LOAD (kN)	RECORDED LOAD(1) (SEP. 27, 2022) (kN)	PREVIOUS RECORDED LOAD(1) (JUNE 12, 2022) (kN)	CHANGE IN LOAD SINCE PREVIOUS READING (kN)
VC1924	P022A	230/184	281.69(2) on March 14, 2022	253.68(2)	258.92(2)	-5.24
VC1923	P022B	230/184	286.01(3) on March 19, 2022	272.53(3)	270.95(3)	1.58
VC1925	P022C	230/184	237.06 on January 31, 2022	231.14	228.81	2.33
VC1920	P060A	230/184	288.90 on February 3, 2022	265.83	270.67	-4.84
VC1922	P060B	230/184	301.83 on January 28, 2022	288.27	286.43	1.84
VC1921	P060C	230/184	236.76 on January 31, 2022	232.70	231.58	1.12
VC1917	P097A	230/184	303.66 on March 14, 2022	244.56	252.35	-7.79
VC1918	P097B	230/184	293.16 on March 9, 2022	255.51(4)	255.75(4)	-0.24
VC1919	P097C	230/184	227.06 on March 17, 2022	218.04	217.68	0.36

Drawings 32121-PH071-1 and 32121-PH071-2 in Appendix A provide a sketch of the approximate location of the monitoring instrumentation for this site.

Notes:

1) Load cell data is recorded daily with datalogger on site. Dataloggers are uploaded twice annually during instrumentation readings. See Figures PH071-3, PH071-4, and PH071-5 in Appendix A for combined historical instrument readings
2) As of September 16, 2021, only two vibrating wire channels are functional on load cell VC1924. The reported loads after this date are based on the average of the two functional channels and a projected reading for the now malfunctional channel.
3) As of October 4, 2021, only two vibrating wire channels are functional on load cell VC1923. The reported loads after this date are based on the average of the two functional channels, and a projected reading for the now malfunctional channel.
4) As of May 15, 2022, only two vibrating wire channels are functional on load cell VC1918. The reported loads after this date are based on the average of the two functional channels, and a projected reading for the now malfunctional channel.

3. INTERPRETATION OF MONITORING RESULTS

SI16-3 showed rates of movement of 1.7 mm/yr, 0.7 mm/yr and 0.3 mm/yr over 0.1 m to 3.8 m depth, 9.3 m to 11.1 m depth and 14.1 m to 16.0 m depth, respectively, since the spring of 2022 readings.

SAA-P060 showed an average rate of movement of 3.4 mm/yr in the downslope direction over the length of the pile and an average rate of movement of 3.5 mm/yr in the downslope direction over the combined length of the pile and waler, respectively, since the spring of 2022 readings. SAA-P060 has shown a cumulative pile head deflection of 18.1 mm to date in the downslope direction. SAA-P060 has shown an overall relatively stable trend of movement since the end of construction.

SAA-P097 showed an average rate of movement of 4.0 mm/yr in the downslope direction over the length of the pile since the spring of 2022 readings. SAA-P097 has shown a total pile head deflection of 18.9 mm in the downslope direction to date. SAA-P097 has shown an overall trend of steady downslope movement, with peaks of higher downhill movement rates during the winter months.

The strain gauge readings in Pile P066 are summarized in Table PH071-3. Overall, the strain gauges showed relatively small changes in microstrain value compared to the previous readings in the spring of 2022. The greatest change in microstrain was in strain gauge 14 at 6.6 m depth in the upslope face of the pile, which showed an increase in negative (compressive) microstrain of 13.9 compared to the spring of 2022 readings.

Vibrating wire piezometers VW16-1B, VW16-1C, VW16-2B, VW16-2C, VW16-3A and VW16-3B showed increases in groundwater level of 0.14 m, 0.03 m, 0.54 m, 0.36 m, 0.02 m, and 0.05 m, respectively, since the spring of 2022 readings. VW16-1A, VW16-2B and VW16-2C registered all-time high groundwater levels during September 2022. VW16-1A showed a groundwater elevation of 488.24 m, after having been dry during the spring of 2022 readings, indicating that the groundwater level increased by at least 1.20 above the tip elevation since the spring readings. VW16-2A had previously been dry since initialization, however it showed a groundwater level above the tip depth for a period between August 9, 2022 and September 21, 2022. The highest groundwater level measured in VW16-2A was 0.09 m above the piezometer tip on September 9, 2022. VW16-4A and VW16-5A were both dry during the current readings.

VW16-1A appears to follow an overall cyclical pattern, with groundwater levels registered above the tip elevation each year from late spring to early winter, while for the rest of the year the groundwater level remains below the tip. VW16-1B and VW16-3A appear to show stable overall groundwater levels for the past several years. VW16-1C, VW16-2B and VW16-2C appear to show an overall trend of slowly increasing groundwater levels over time. VW16-3B shows an unusual oscillating reading pattern, which might indicate that the instrument is damaged. VW16-4A and VW16-5A tend to remain dry except for brief periods that correspond to either higher than normal rainfall or spring thaw. The vibrating wire piezometer readings are summarized in Table PH071-4. The readings for VW16-1A, VW16-1B, VW16-1C, VW16-2A, VW16-2B and VW16-2C are plotted on Figure PH071-1 in Appendix A. The readings for VW16-3A, VW16-3B, VW16-4A, VW16-4B, and VW16-5A are plotted on Figure PH071-2 in Appendix A.

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The load cells generally showed a mix of small increases and decreases in measured load compared to the spring of 2022 readings, ranging from a decrease of 7.79 kN in VC1917 (anchor P097A) to an increase of 2.33 kN in VC1925 (anchor P022C). It should be noted that load cells VC1924 (anchor P022A), VC1923 (anchor P022B) and VC1918 (anchor P097B) have each lost the function of one vibrating wire channel. The loads that are now reported for these three load cells are based on the average of the two functional channels and projecting a reading for the now malfunctioning channel based on the last reading taken for that channel and the changes observed in the two functional channels since that time.

Since the end of construction, the load cells have generally shown an overall trend of increasing load, with the highest seasonal loads measured towards the end of each winter. The current loads measured in the upper two anchor rows at all three piles, as well as the lower row at P022, are above the design loads. The load cell readings are summarized in Table PH071-5. The load cell readings for piles P022, P060 and P097 are plotted on Figures PH071-3, PH071-4, and PH071-5, respectively, in Appendix A.

4. RECOMMENDATIONS

4.1 Future Work

The instruments should be read again in the spring of 2023. It is recommended to continue monitoring the deflections in the pile wall and the load cell readings to see if there are further increases in deflection or loads compared to the warning threshold values. If the deflections and or load cell readings continue to increase, it may become necessary to add additional anchors to the pile wall.

4.2 Instrumentation Repairs

No instrument repairs are required at this time.

5. CLOSURE

We trust this report meets your requirements at present. If you have any questions, please contact the undersigned at your convenience.

Yours very truly,
Thurber Engineering Ltd.
Don Proudfoot, M.Eng., P. Eng.
Principal | Senior Geotechnical Engineer

PROFESSIONAL ENGINEER ALBERTA
BRUCE W. NESTOR
ID 161284

November 21, 2022

PERMIT TO PRACTICE
THURBER ENGINEERING LTD.
RM SIGNATURE: Don Proudfoot
RM APEGA ID #: 51674
DATE: November 21, 2022
PERMIT NUMBER: P005186
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Bruce Nestor, P.Eng.
Geotechnical Engineer
/jf

Attachments:

- Statement of Limitations and Conditions
- Appendix A
  - Field Inspector's report
  - Site Plan Showing Approximate Instrument Locations (Drawings No. 32121-PH071-1 and 32121-PH071-2)
  - SI Reading Plots
  - SAA Reading Plots
  - Figure PH071-1 (Upslope Piezometer Elevations)
  - Figure PH071-2 (Downslope Piezometer Elevations)
  - Figure PH071-3 (Load Cell Data Pile P22)
  - Figure PH071-4 (Load Cell Data Pile P60)
  - Figure PH071-5 (Load Cell Data Pile P97)

STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.

d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

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ALBERTA TRANSPORTATION GRMP (CON0022164)
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING RESULTS

FALL 2022

APPENDIX A
DATA PRESENTATION

SITE PH071: HWY 986:01, DAISHOWA WEST HILL

ALBERTA TRANSPORTATION
PEACE REGION (PEACE RIVER DISTRICT)
INSTRUMENTATION MONITORING FIELD SUMMARY (PH071)
FALL 2022

Location:	Daishowa West Hill (Hwy 986:01 C1 28.474)	**Readout:**	
File Number:	32121	**Casing:**	3.34
Probe:	RST SI SET 8R	**Temp:**	10
Cable:	RST SI SET 8R	**Read by:**	NKR/KTC

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-		
SI16-3	485023	6245526	27-Sep-22	0.80	130 to 2	95	190	-174	35	-27	8R/8R	

VIBRATING WIRE PIEZOMETER (VW) READINGS

VW #	Serial #	GPS Location (UTM 11)		Datalogger Serial #	Date	Comment
		Easting (m)	Northing (m)			
VW16-3A	VW36116	485022.21	6245527.86	RST 4885	27-Sep-22	Downloaded
VW16-3B	VW36119	485022.21	6245527.86		27-Sep-22	Downloaded
VW16-4A	VW36118	485028.75	6245510.02	RST 4915	27-Sep-22	Downloaded
VW16-4B	*VW36121*	485028.75	6245510.02		27-Sep-22	*Not Working*
VW16-5A	VW36117	485047.91	6245458.47	RST 4916	27-Sep-22	Downloaded
VW16-5B	*VW36120*	485047.91	6245458.47		27-Sep-22	*Not Working*

INSPECTOR REPORT

CR6 datalogger is connected to a modem and does not need to be downloaded
Note: Download data from RST loggers. Do not take manual readings from VW16-4A/B

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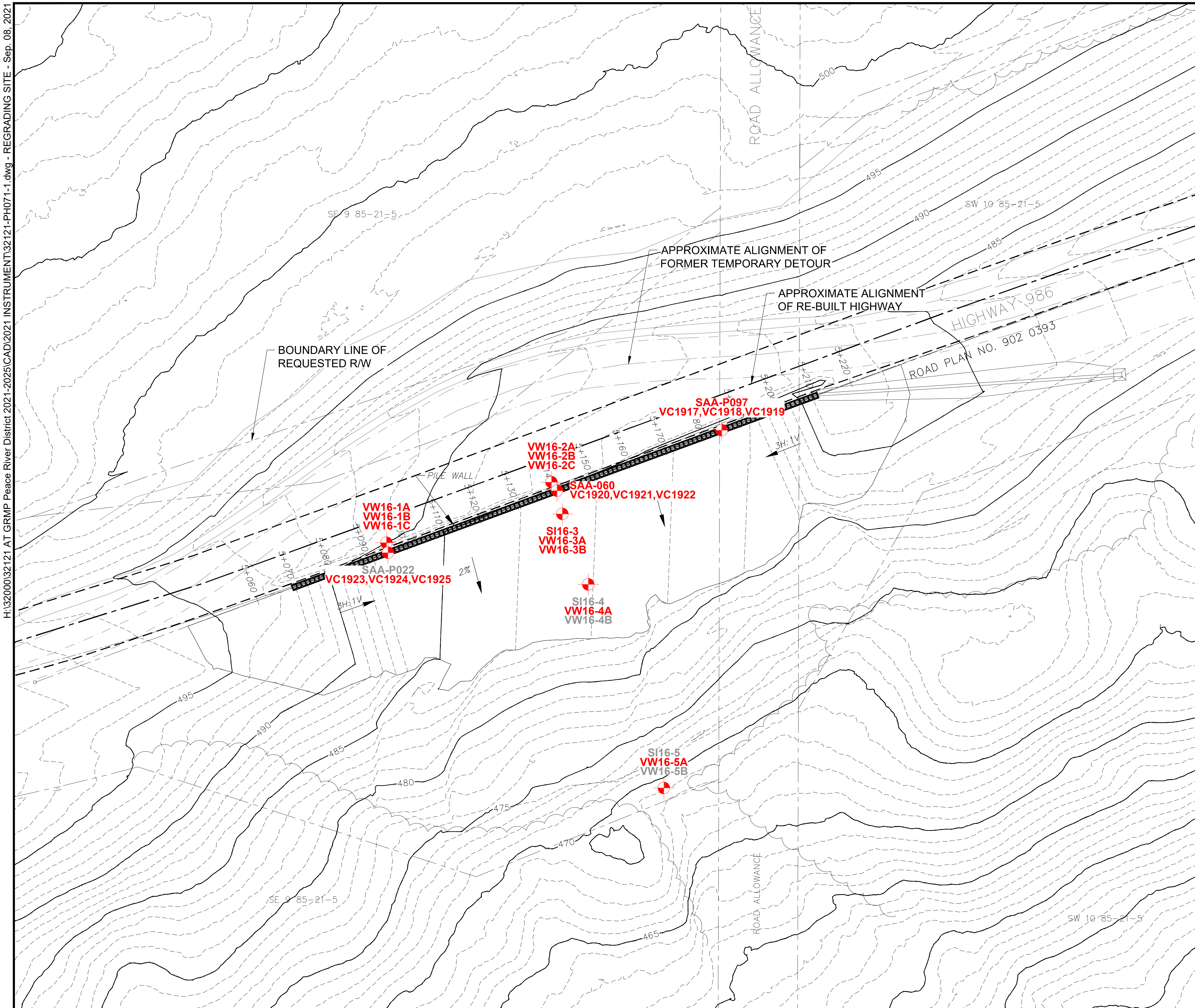


N
W E
S

LEGEND

(symbol)	APPROXIMATE INSTRUMENT LOCATION
(line)	TREE LINE
490	GROUND CONTOURS
SI	SLOPE INCLINOMETER
VW	VIBRATING WIRE PIEZOMETER
VC	VIBRATING WIRE LOAD CELL
SAA	SHAPE ACCELEROMETER ARRAY

NOTES:
1. TOPOGRAPHIC SURVEY AND COORDINATE GEOMETRY INFORMATION AS OF DECEMBER 2015 AS SUPPLIED BY WSP.
2. CONTOUR LINES ARE AT 1 m INTERVALS, MAJOR CONTOURS ARE LABELED AT FIVE METRE INTERVAL UNLESS NOTED OTHERWISE.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

0 10 20 30 40 50 60m
SCALE 1:1000

BASE PLAN PROVIDED BY WSP

Alberta

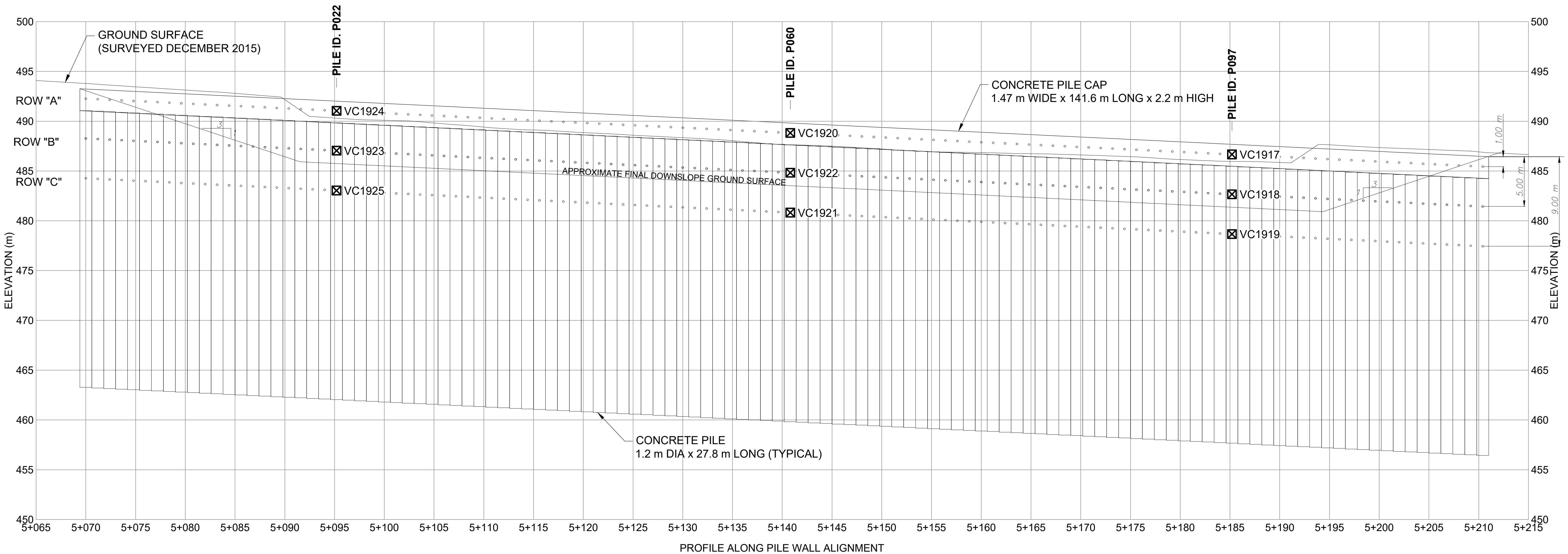
PEACE REGION (PEACE RIVER DISTRICT)

PH071: PEACE RIVER DIASHOWA WEST HILL INSTRUMENTATION READINGS

DWG No. 32121-PH071-1

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	DWP
SCALE	1:1000
DATE	SEPTEMBER 2021
FILE No.	32121

THURBER ENGINEERING LTD.



LEGEND

⊠ LOAD CELL LOCATION

Alberta

PEACE REGION (PEACE RIVER DISTRICT)

PH071: PEACE RIVER DIASHOWA WEST HILL INSTRUMENTATION READINGS

DWG No. 32121-PH071-2

DRAWN BY	ML
DESIGNED BY	BWN
APPROVED BY	DWP
SCALE	1:400
DATE	SEPTEMBER 2021
FILE No.	32121

THURBER ENGINEERING LTD.

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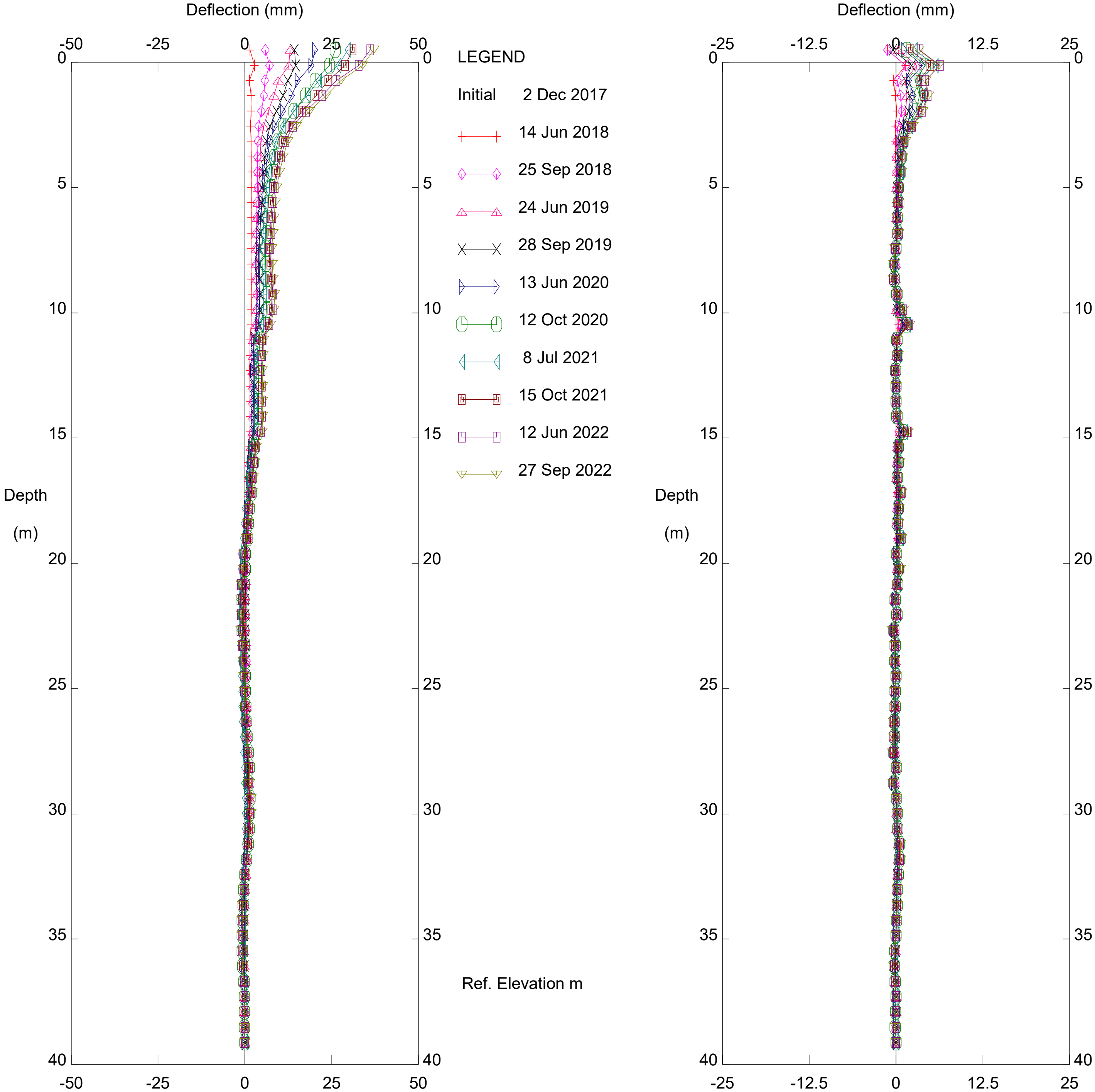

Cumulative Deflection

Direction A

Incremental Deflection

Direction A

PH071 Daishowa West, Inclinometer SI16-3

Alberta Transportation

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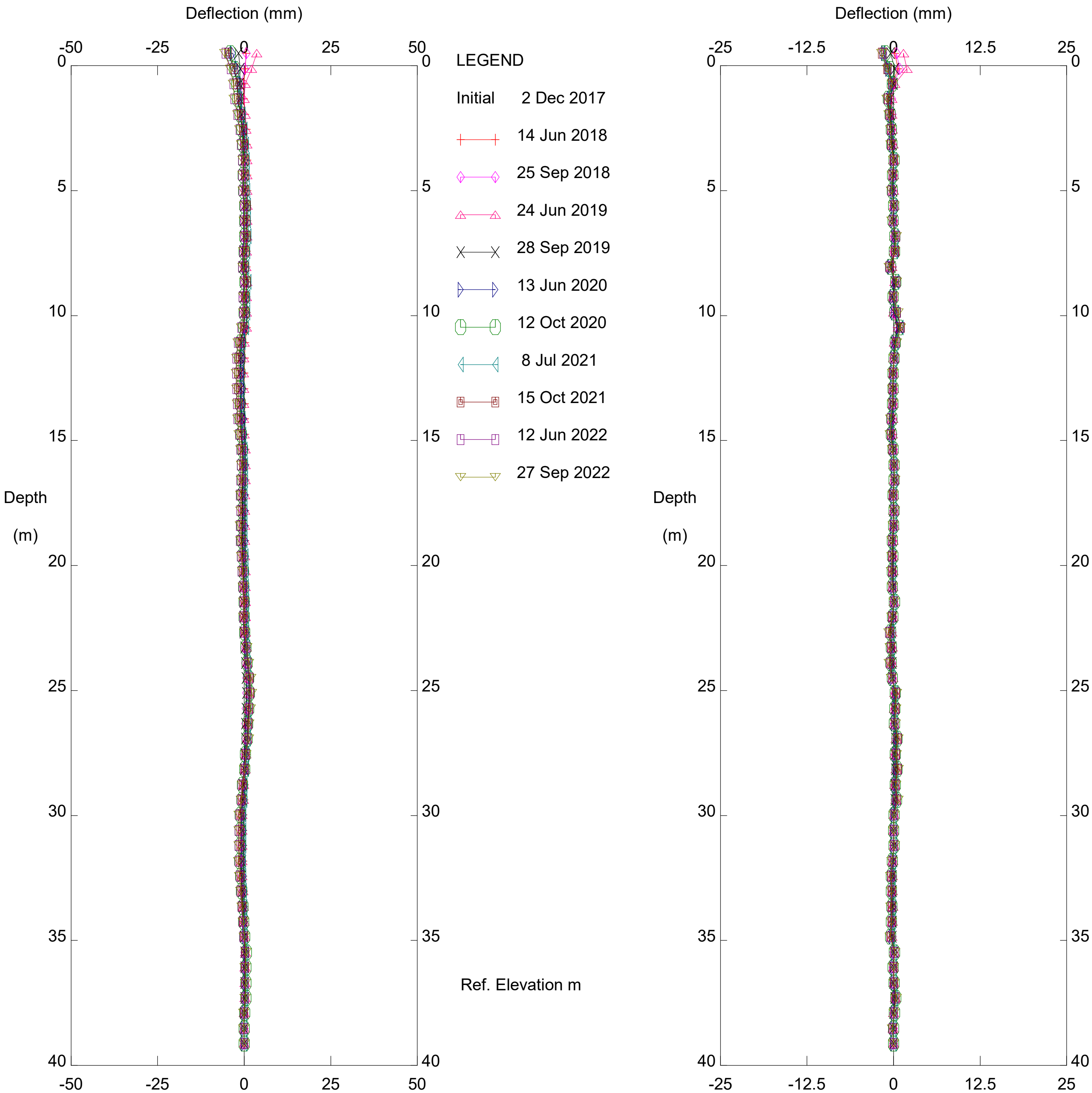

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

PH071 Daishowa West, Inclinometer SI16-3

Alberta Transportation

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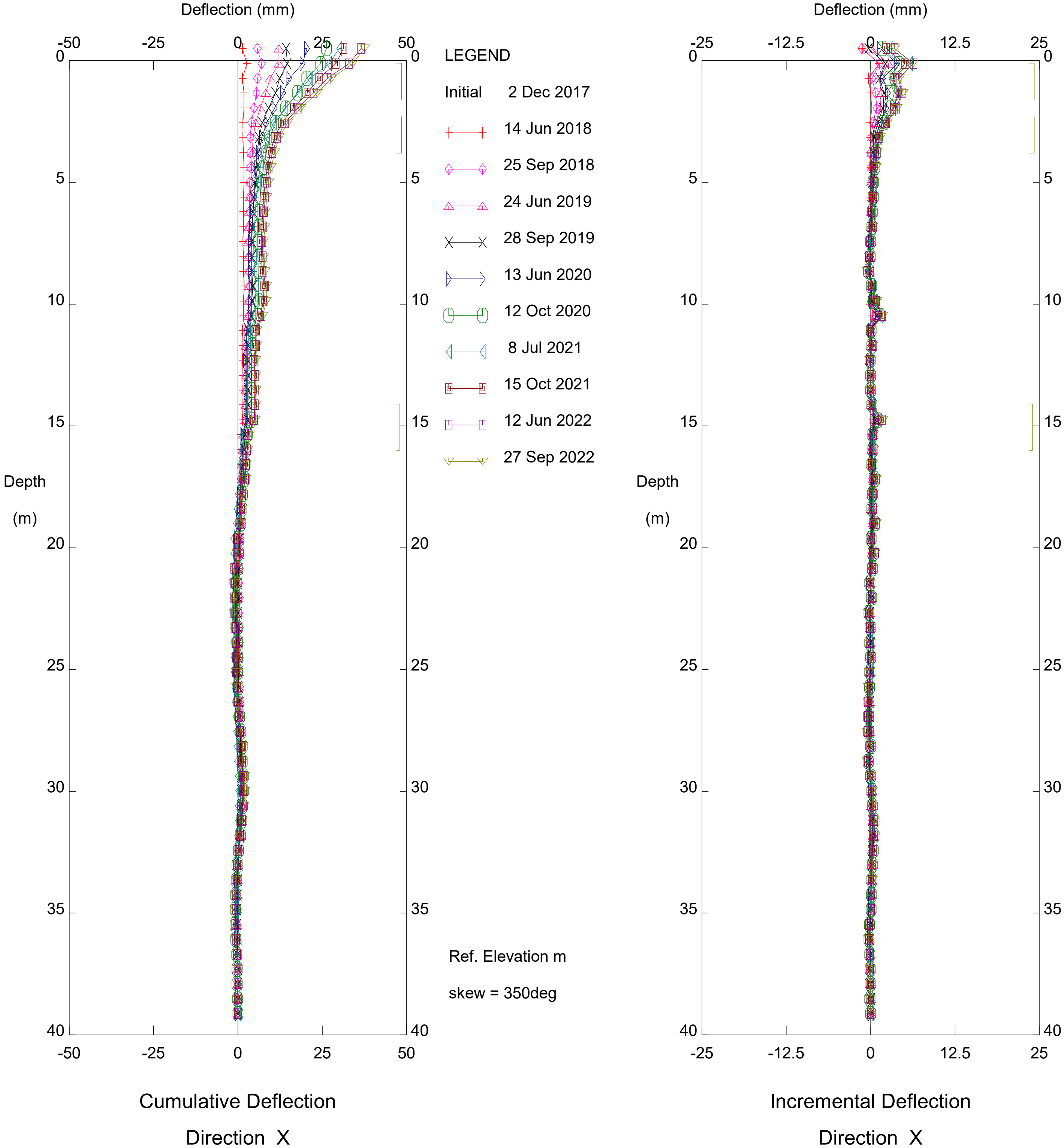

PH071 Daishowa West, Inclinometer SI16-3

Alberta Transportation

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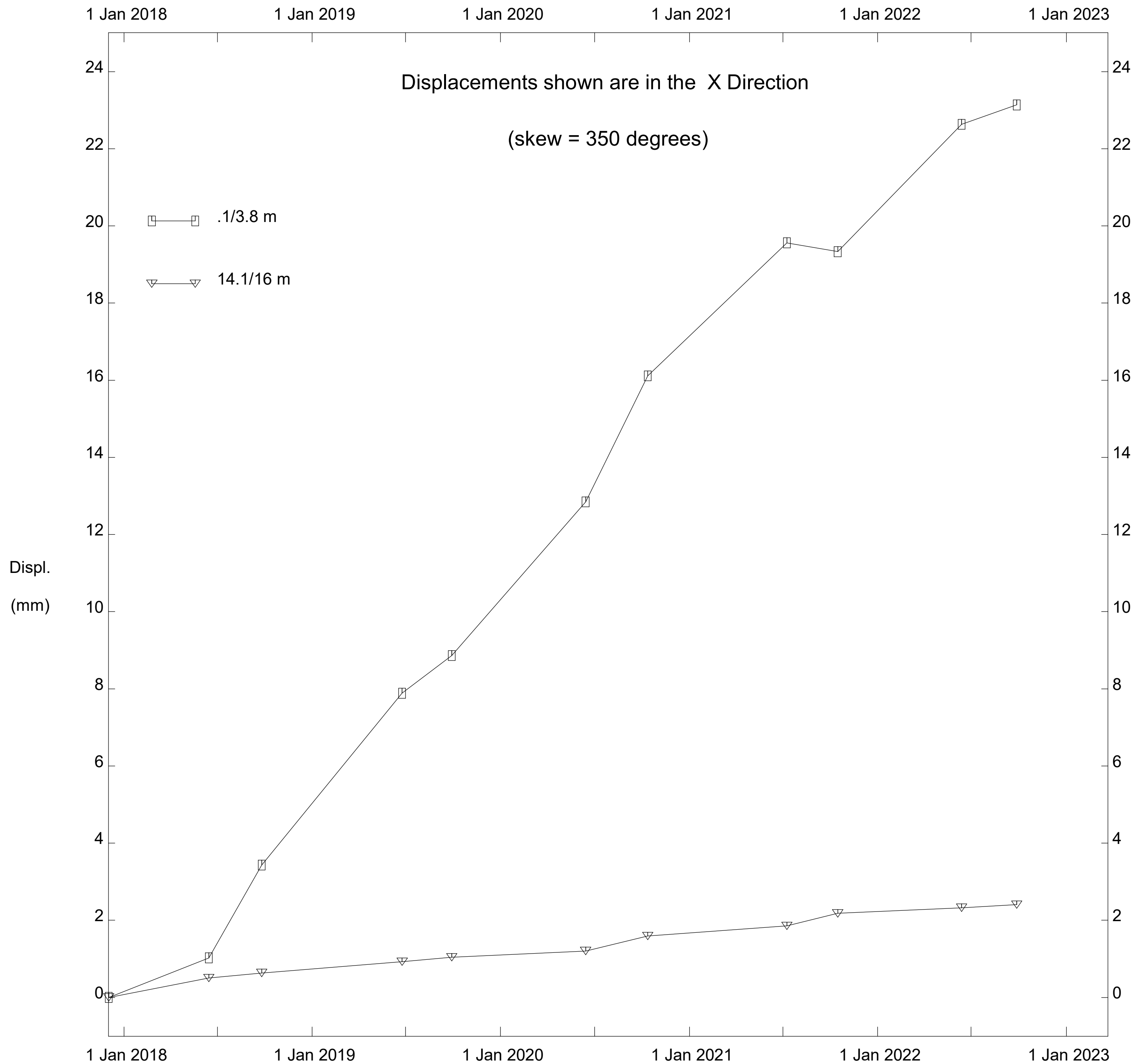

PH071 Daishowa West, Inclinometer SI16-3

Alberta Transportation

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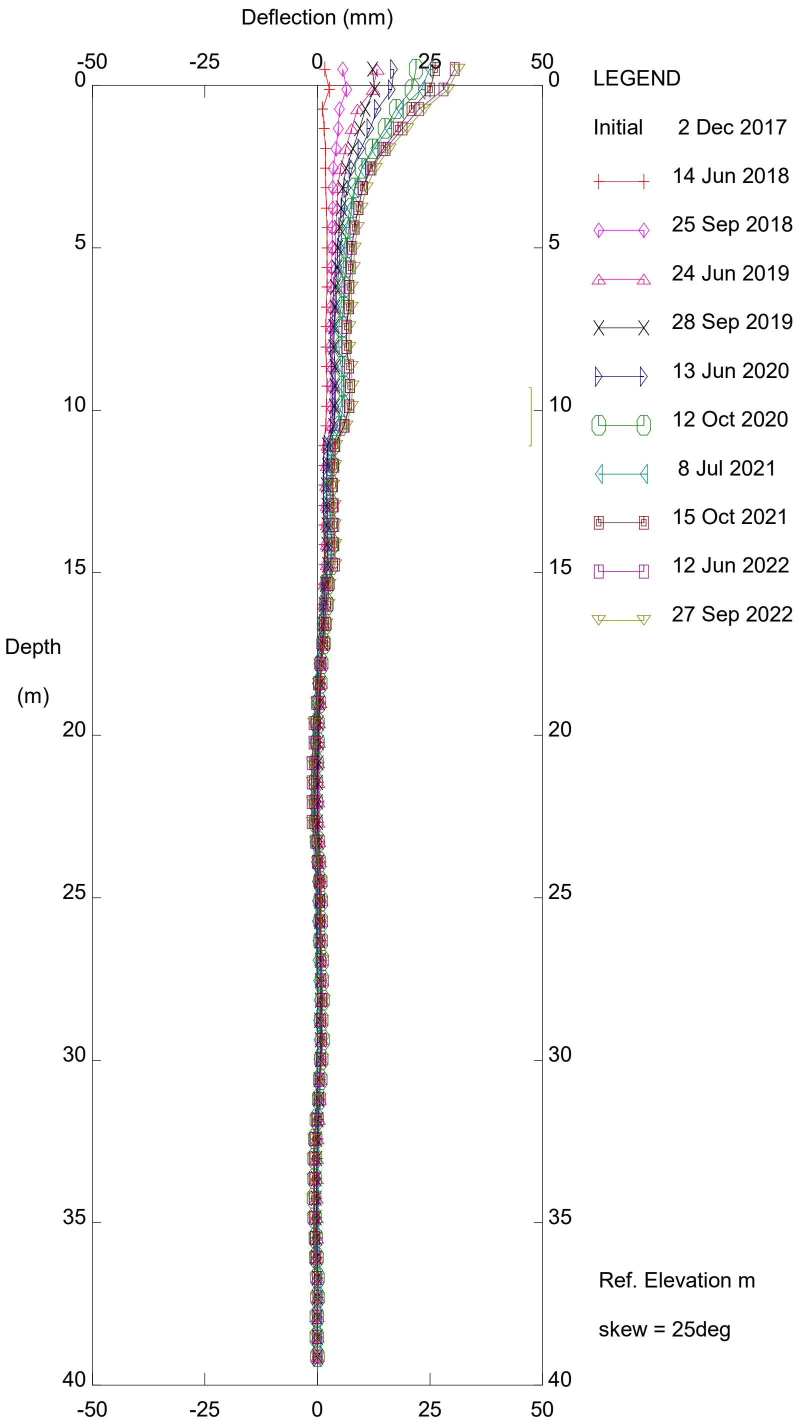

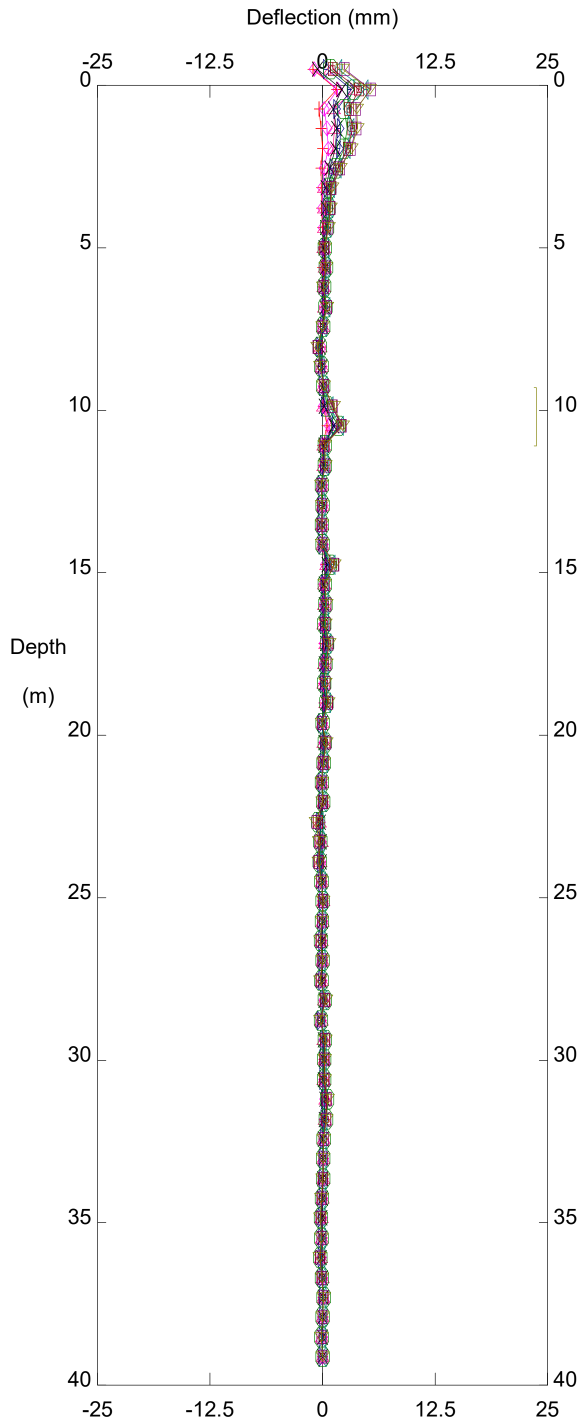

PH071 Daishowa West, Inclinometer SI16-3

Alberta Transportation

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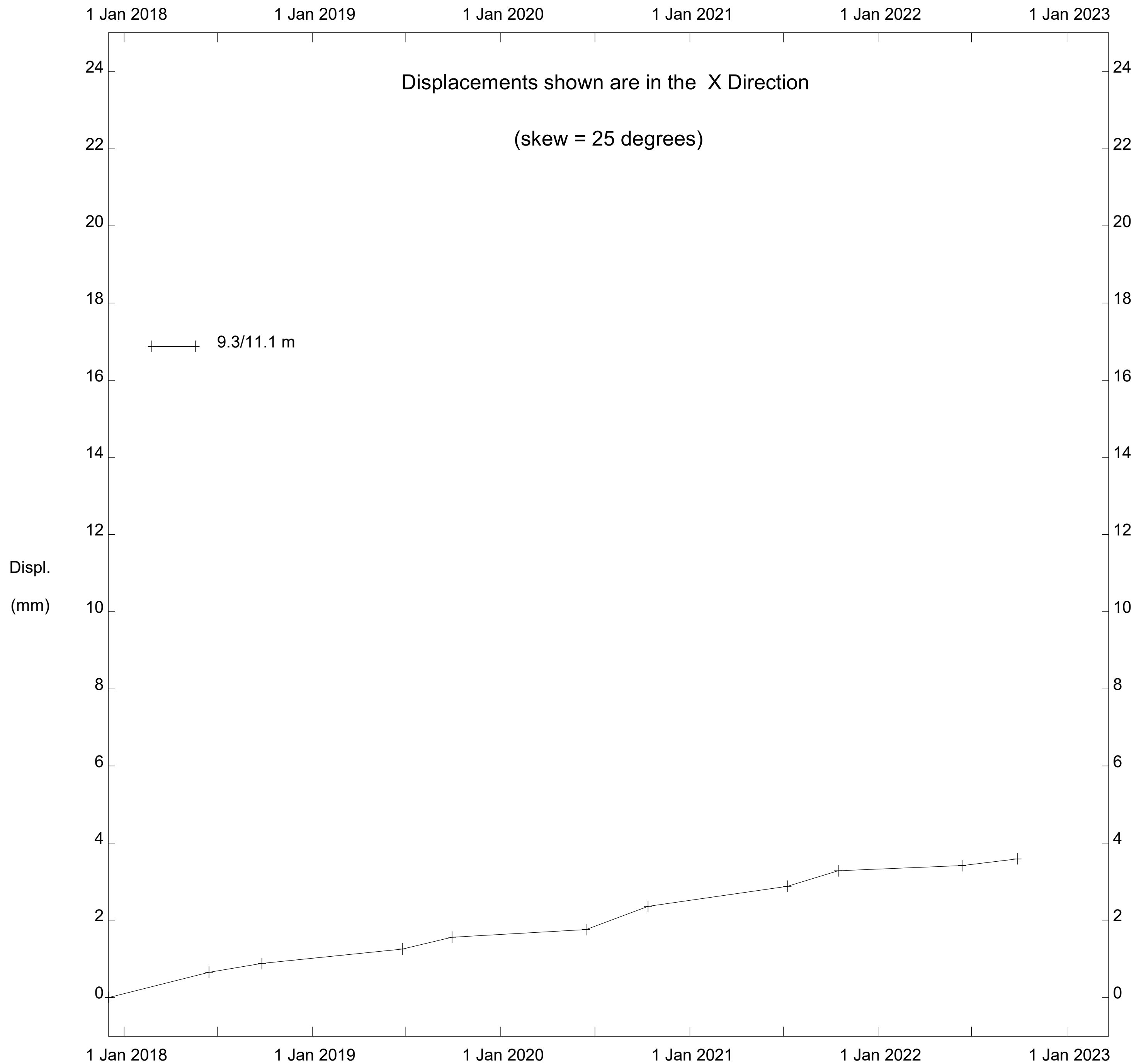
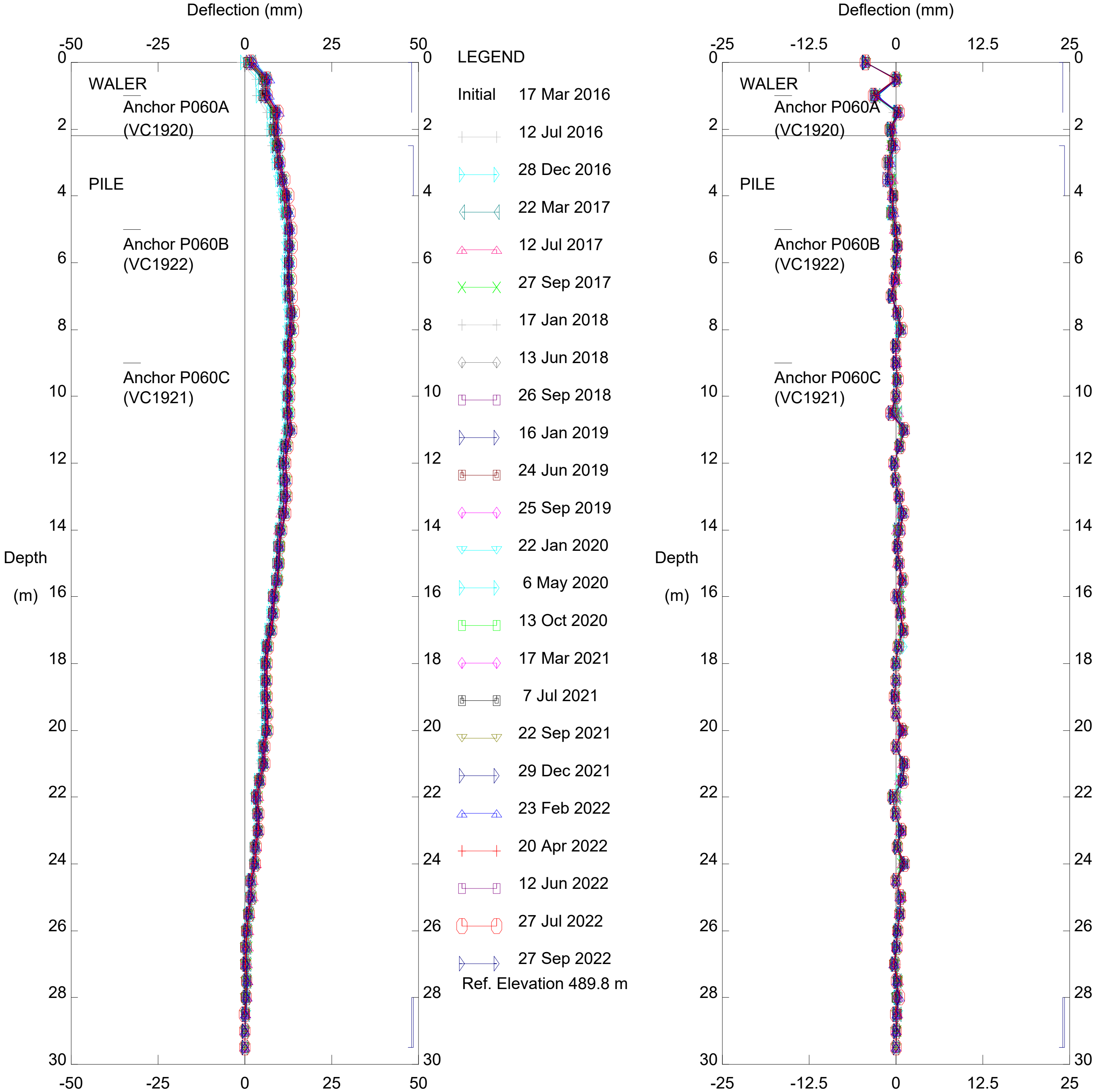


PH071 Daishowa West, Inclinometer SI16-3

Alberta Transportation

Thurber Engineering Ltd



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

Hwy 986:01 Daishowa West, Inclinometer SAA-P060

Alberta Transportation

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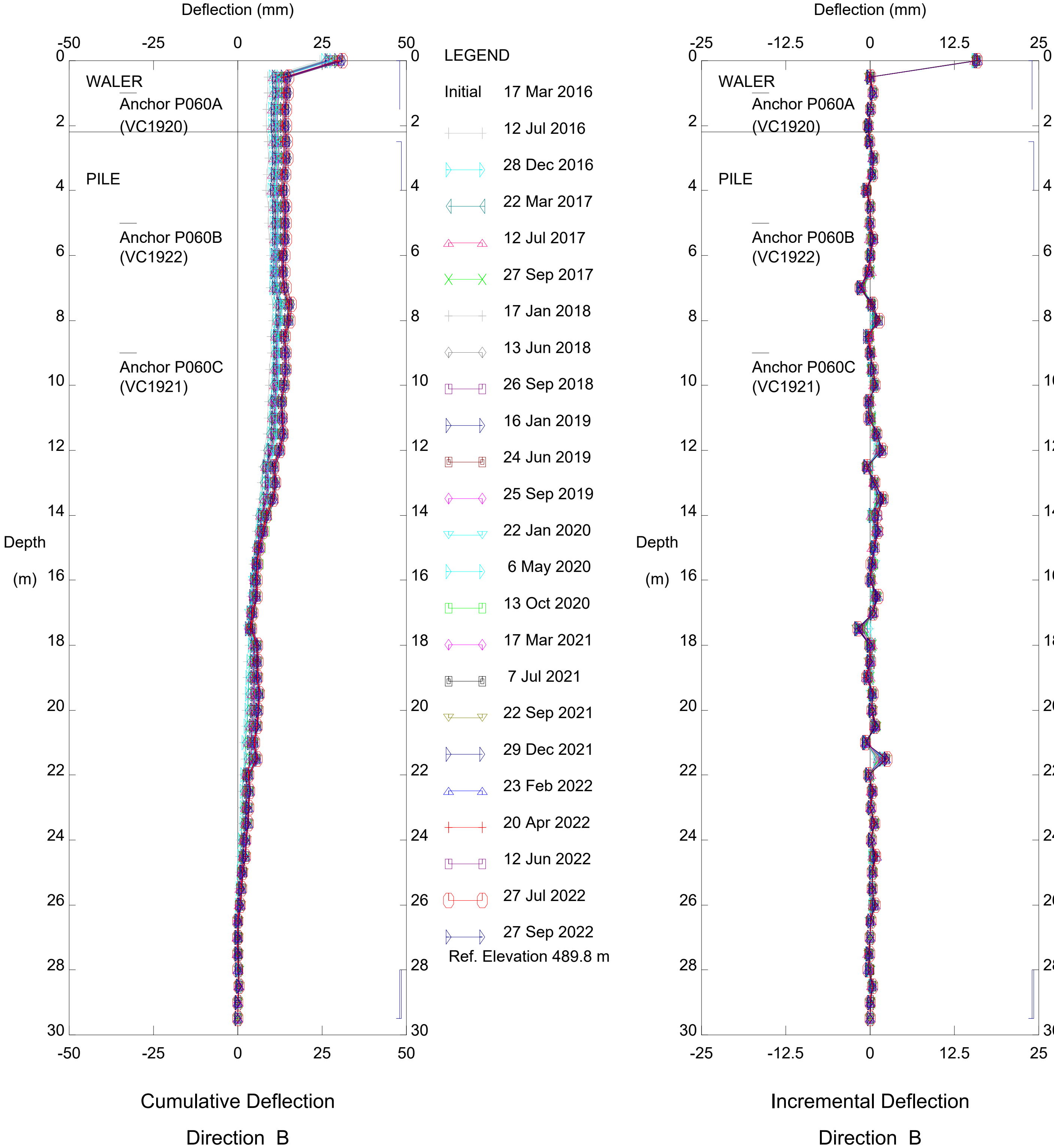

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Alberta Transportation

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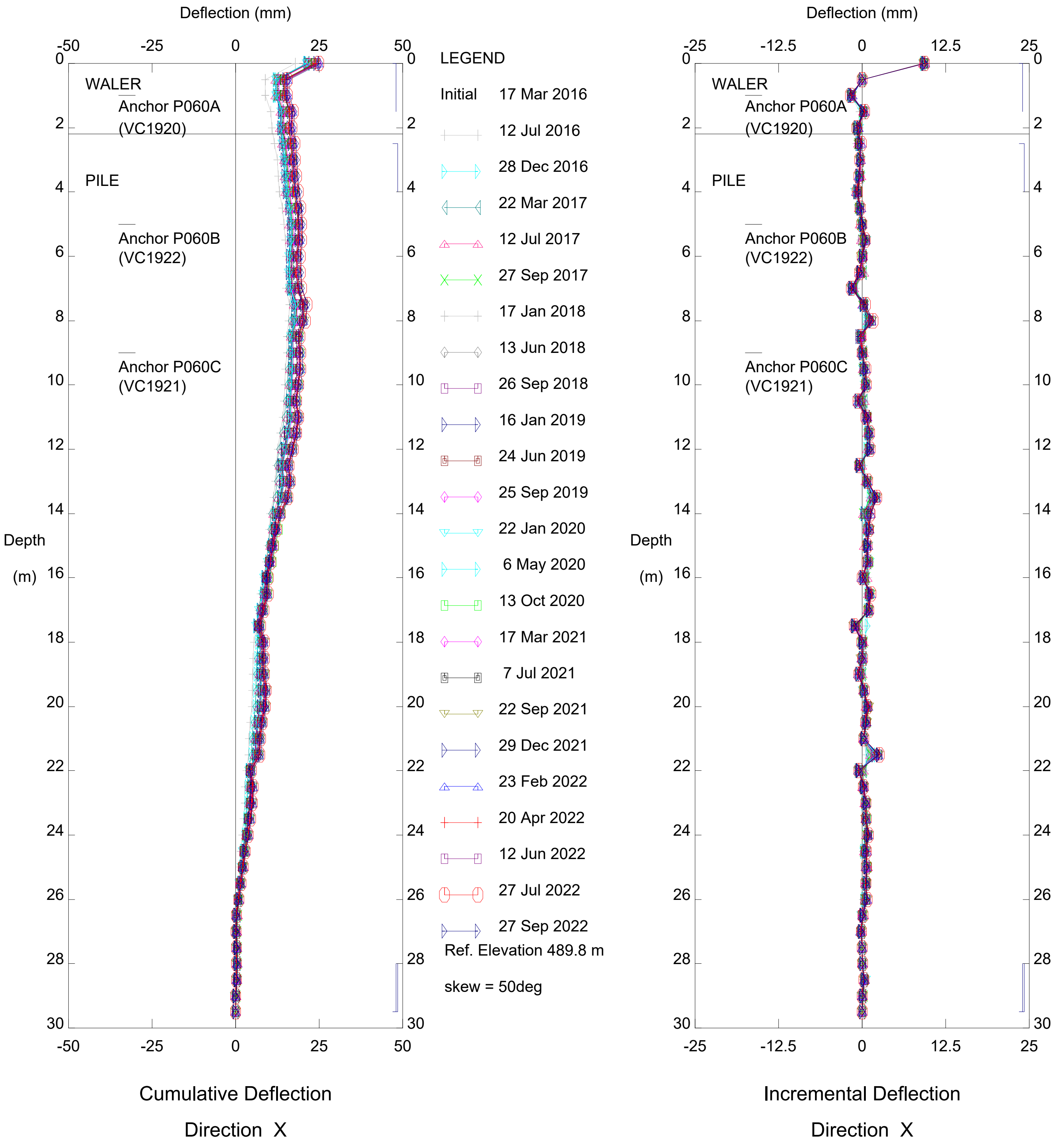

Hwy 986:01 Daishowa West, Inclinometer SAA-P060

Alberta Transportation

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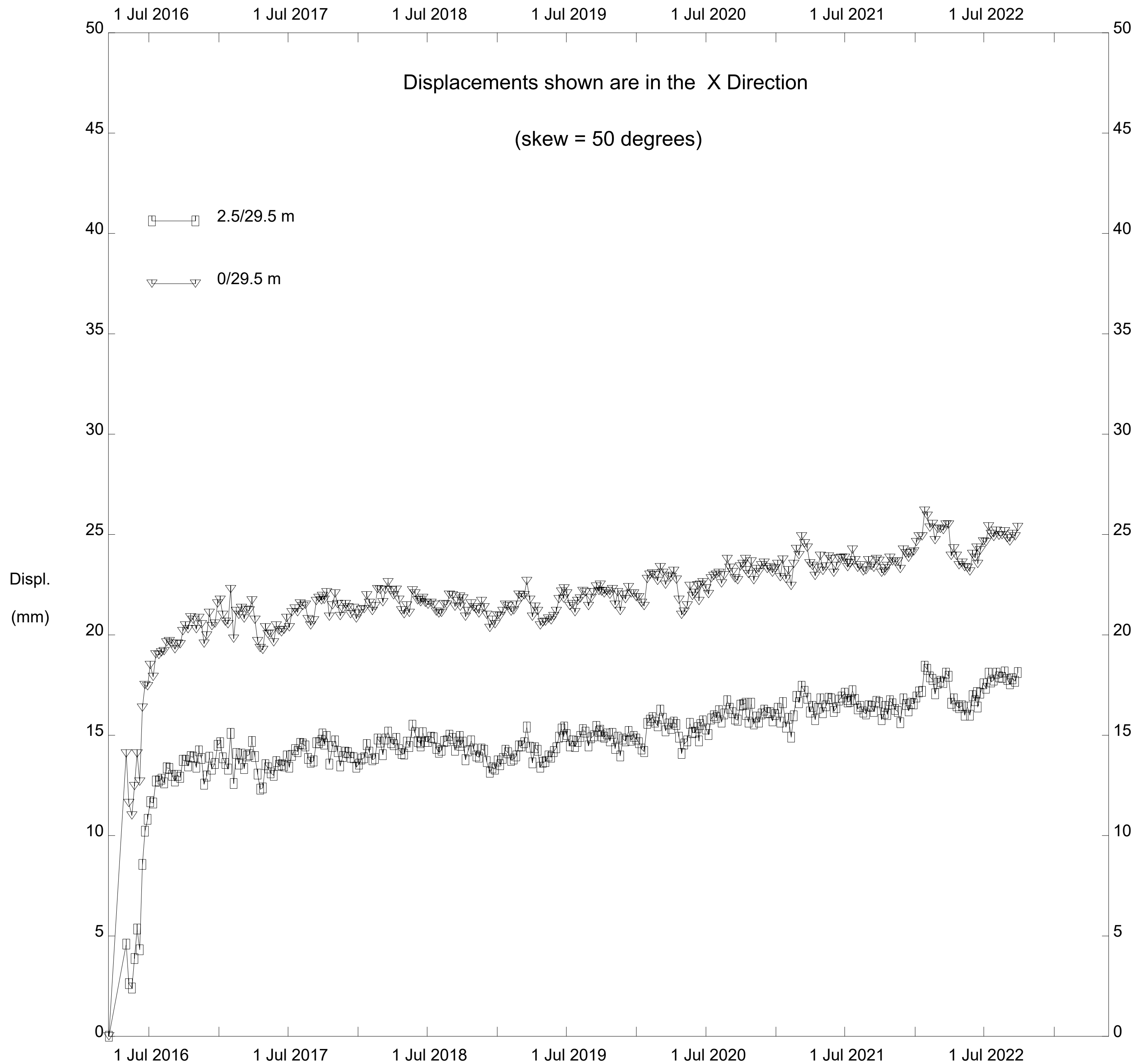

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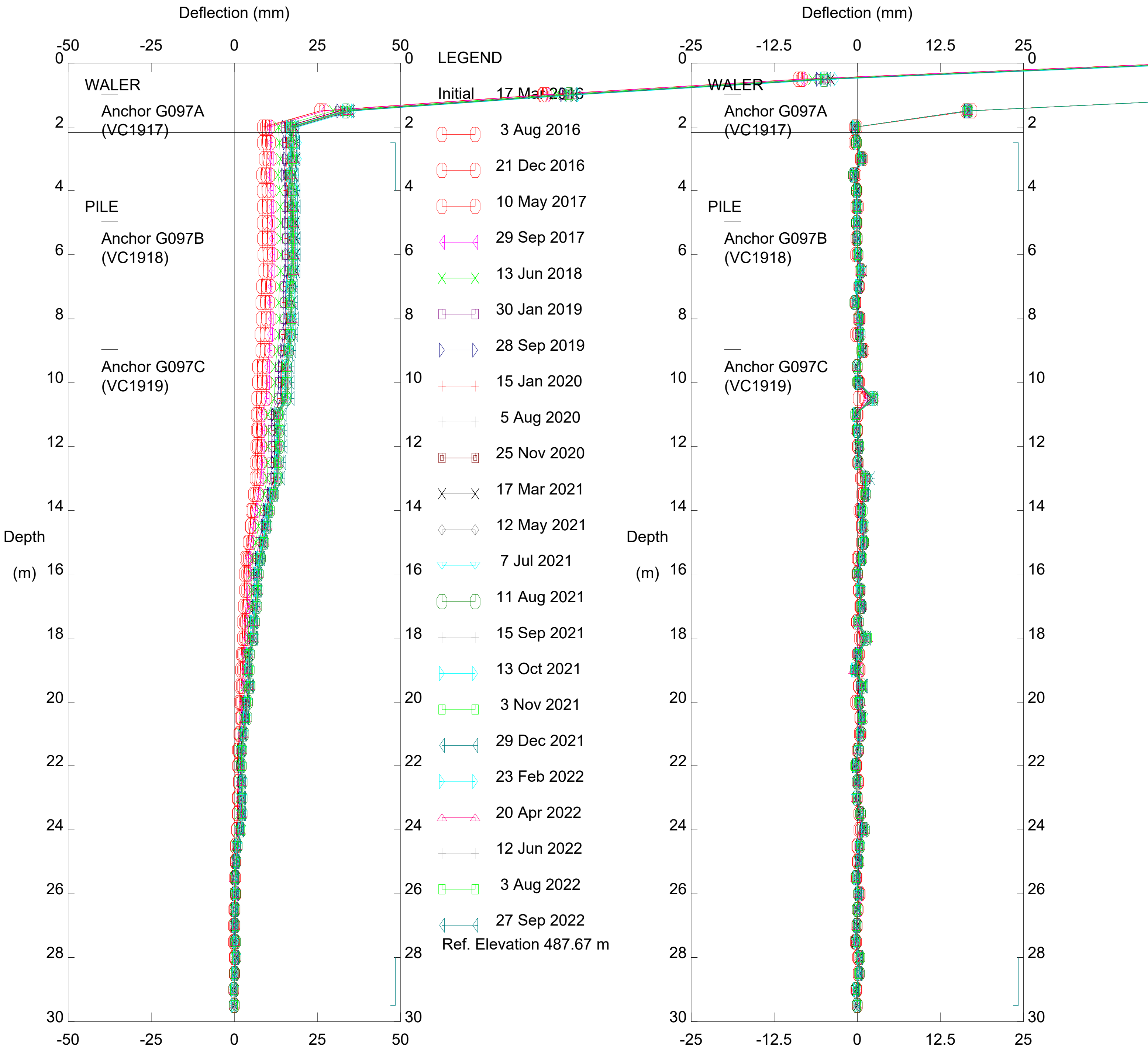
Alberta Transportation

Thurber Engineering Ltd



Cumulative Deflection

Direction A

Incremental Deflection

Direction A

Hwy 986:01 Daishowa West, Inclinometer SAA-P097

Alberta Transportation

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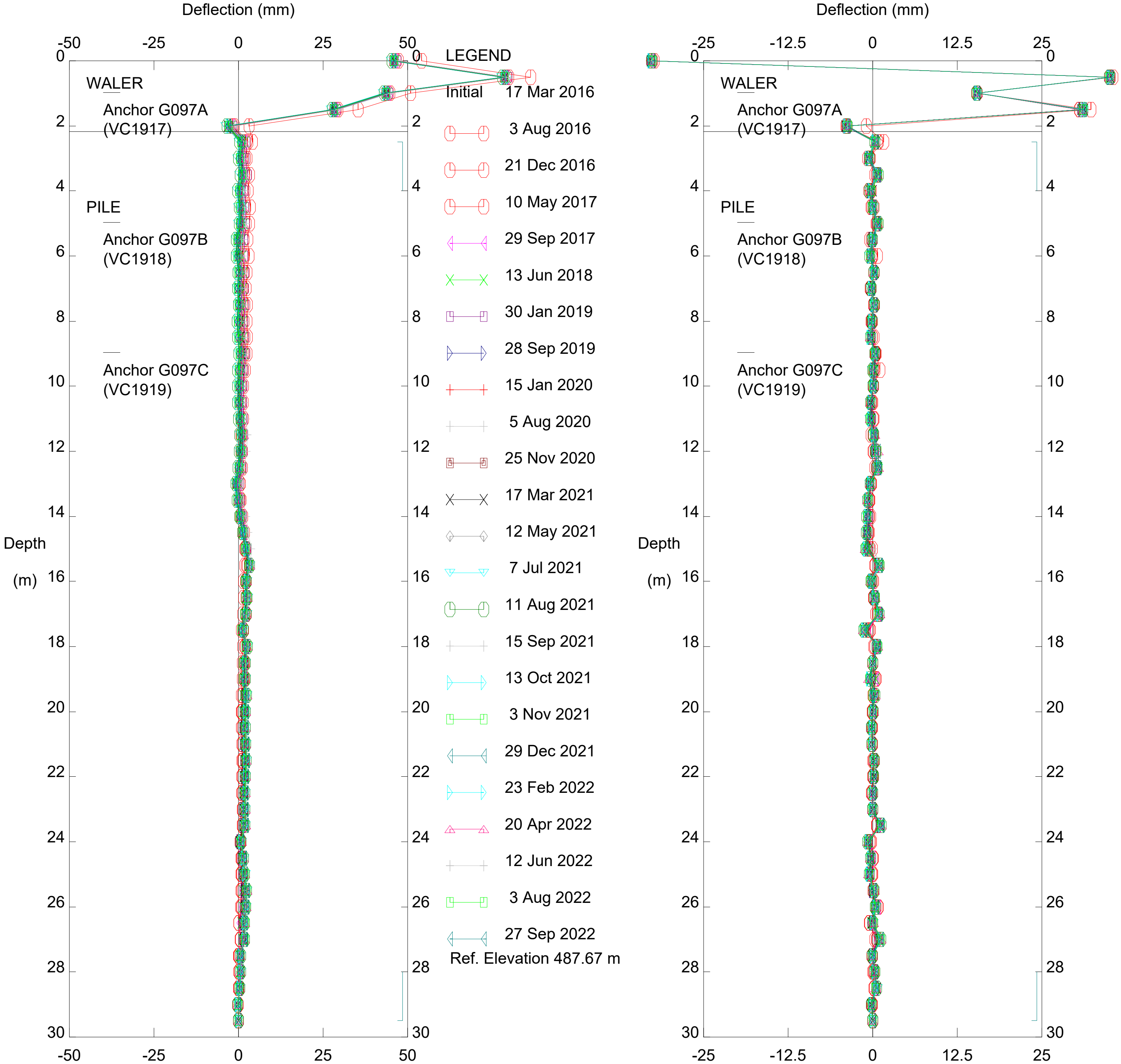

Cumulative Deflection

Direction B

Incremental Deflection

Direction B

Hwy 986:01 Daishowa West, Inclinometer SAA-P097

Alberta Transportation

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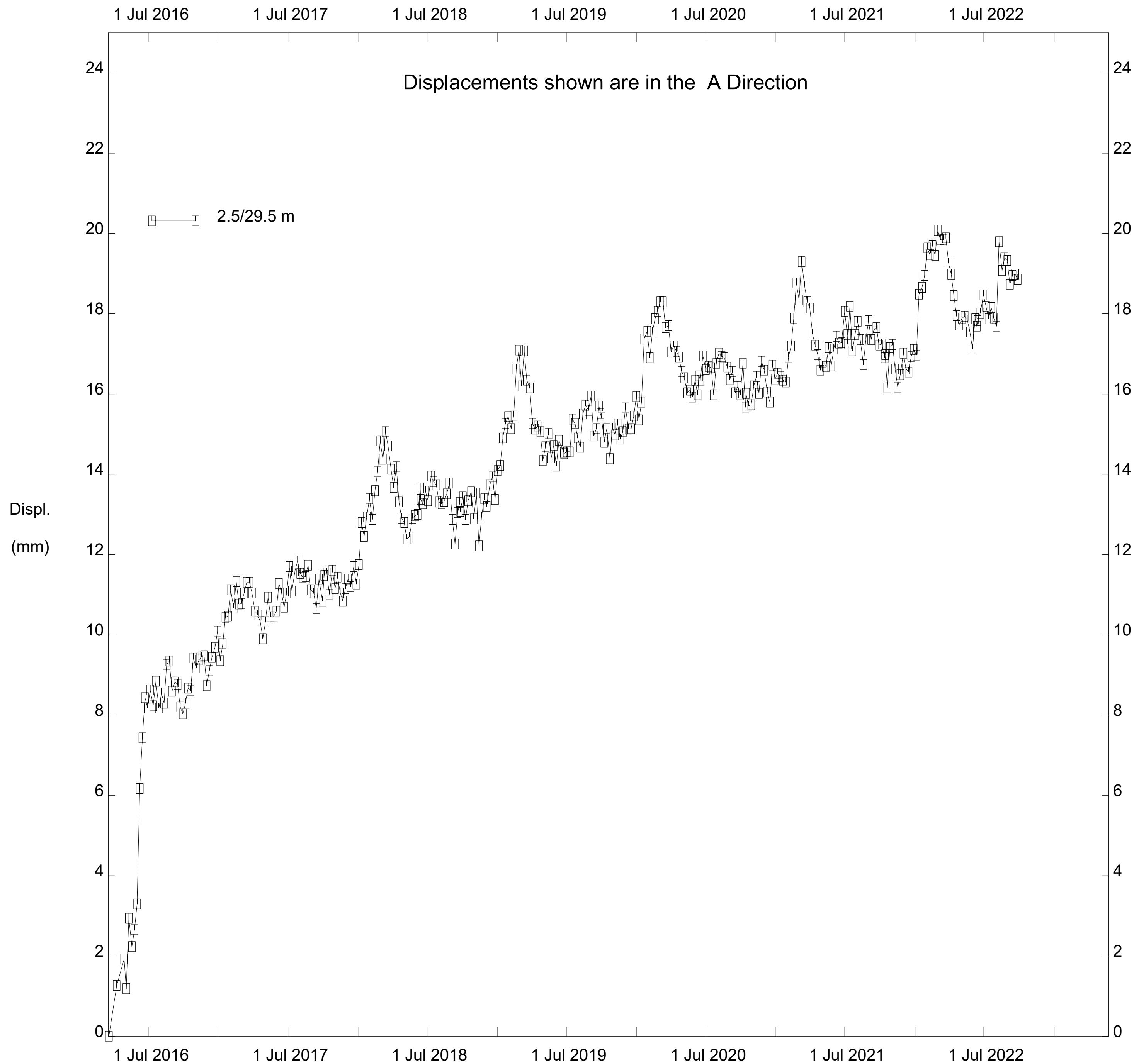

Hwy 986:01 Daishowa West, Inclinometer SAA-P097

Alberta Transportation

FIGURE PH071-1
PIEZOMETRIC ELEVATION FOR HWY 986:01, DAISHOWA WEST HILL
(UPSLOPE PIEZOMETERS)

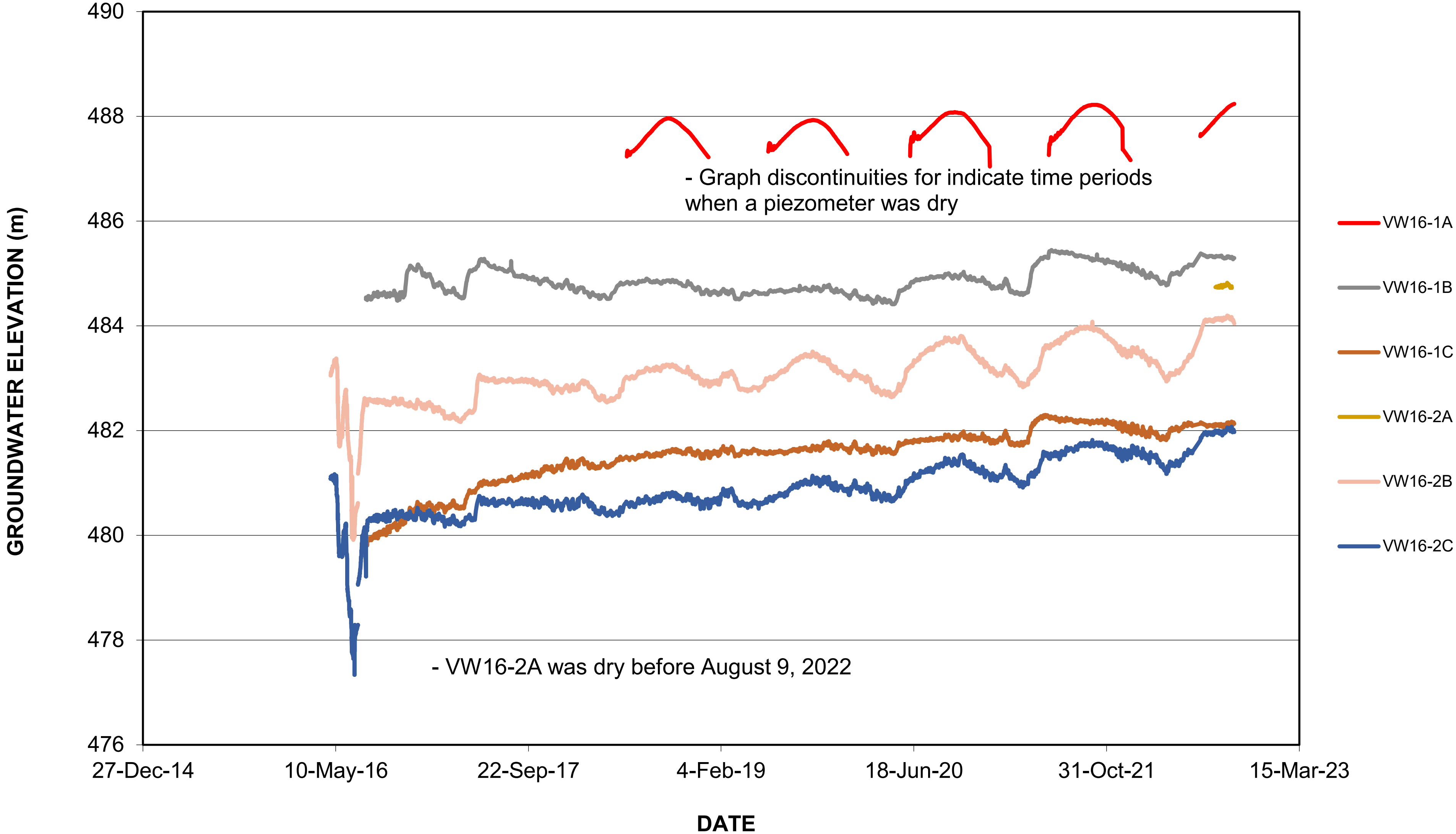

FIGURE PH071-2
PIEZOMETRIC ELEVATIONS FOR HWY 986:01, DAISHOWA WEST HILL
(DOWNSLOPE PIEZOMETERS)

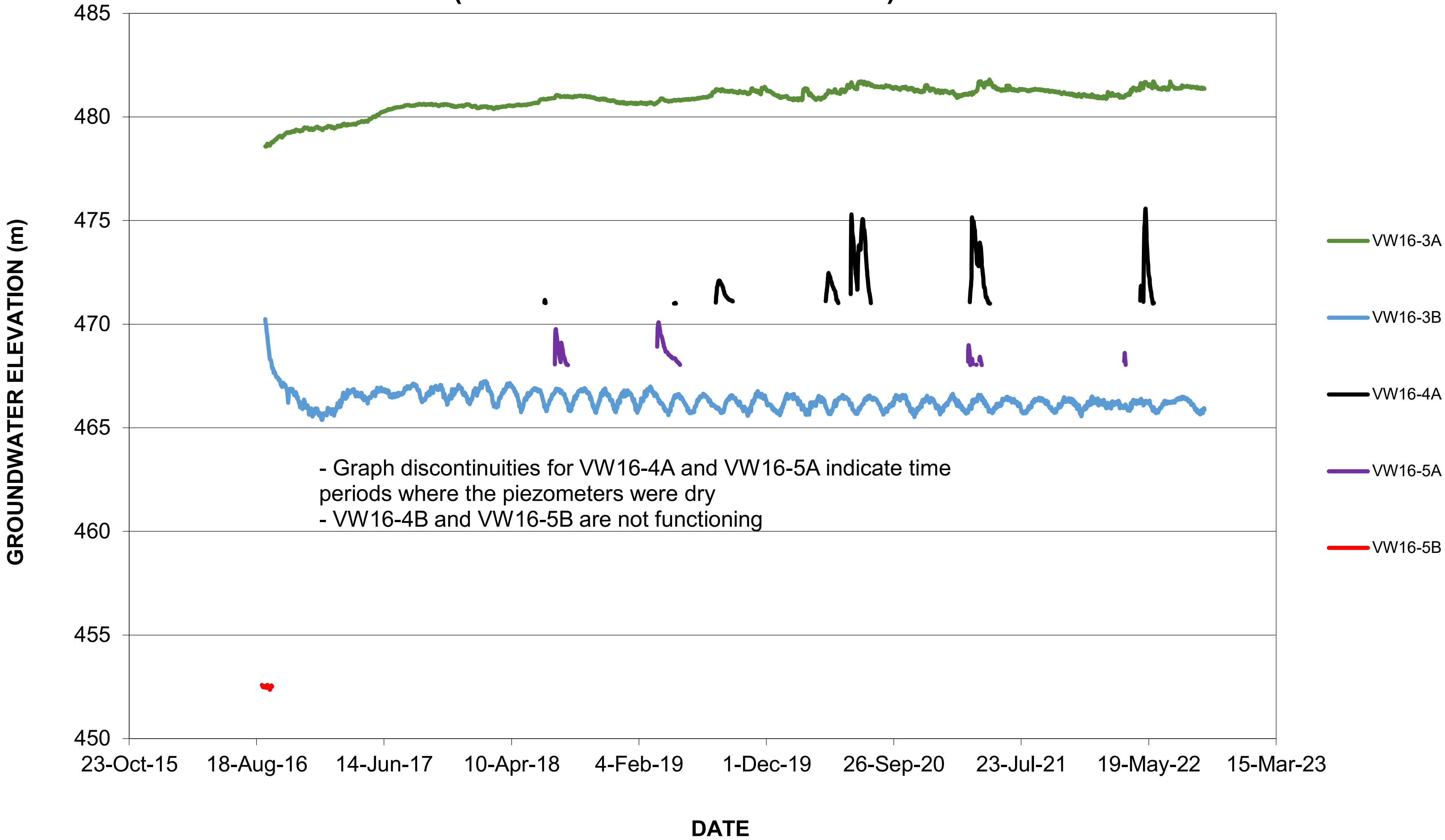

FIGURE PH071-3
LOAD CELL DATA FOR HWY 986:01, DAISHOWA WEST (PILE P022)

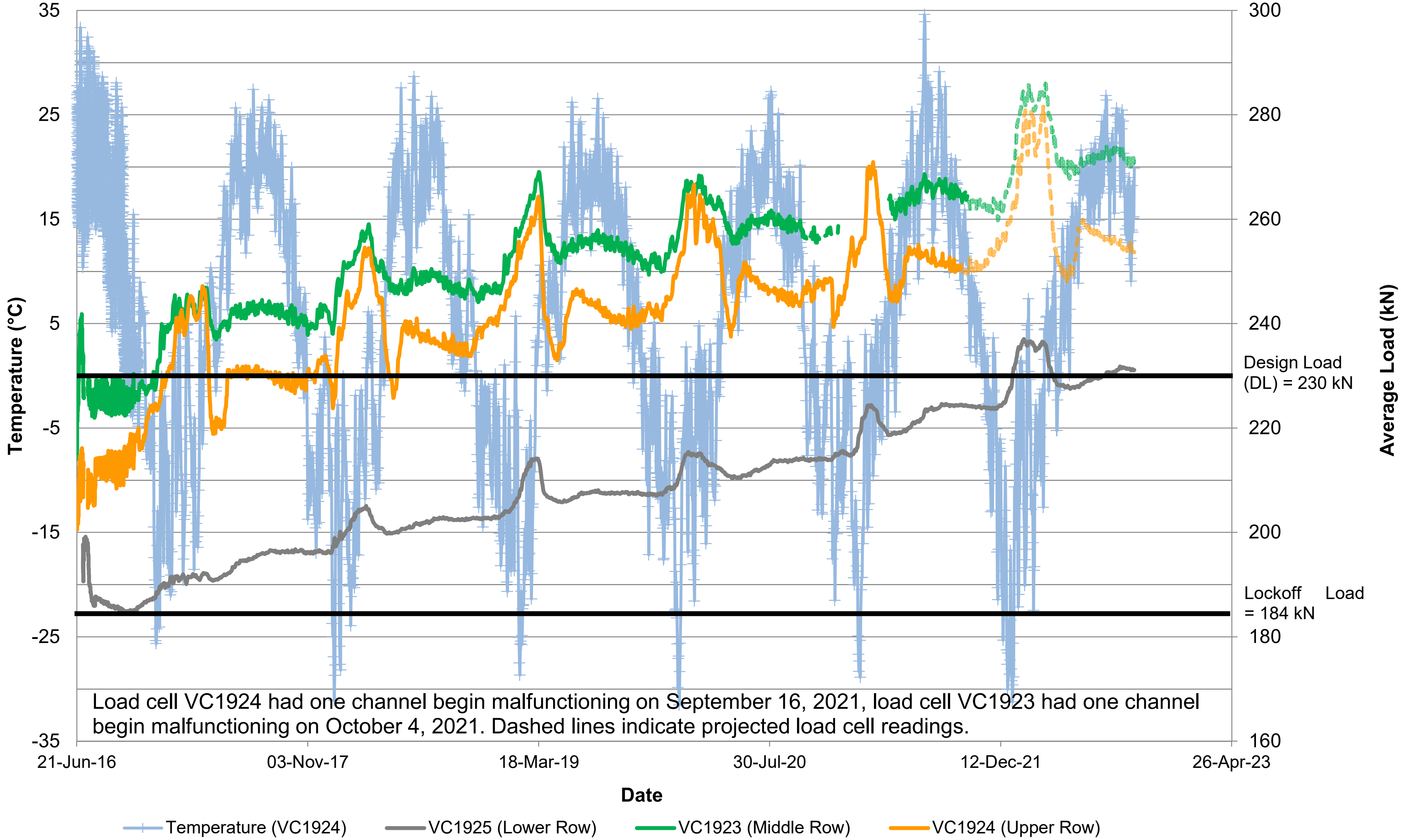

FIGURE PH071-4
LOAD CELL DATA FOR HWY 986:01, DAISHOWA WEST (PILE P060)

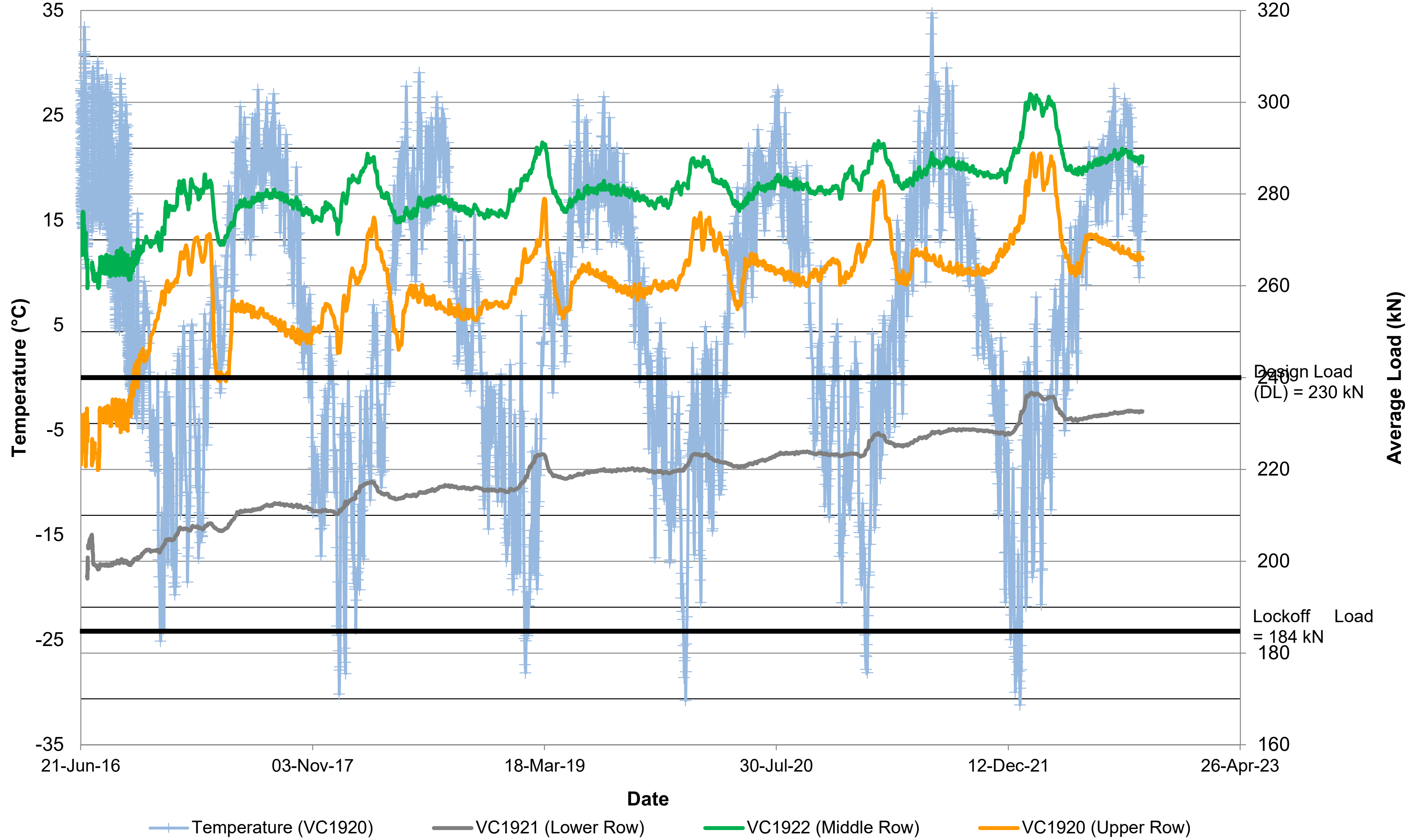

FIGURE PH071-5
LOAD CELL DATA FOR HWY 986:01, DAISHOWA WEST (PILE P097)