STATE OF COLORADO

Cazier - DNR, Tim <tim.cazier@state.co.us>

Pikeview monitoring report

1 message

Kos, Paul <paul.kos@stantec.com> Mon, Apr 4, 2022 at 8:48 AM
To: "Tim Cazier, P.E. (Tim.Cazier@state.co.us)" <tim.cazier@state.co.us>
Cc: "Moore, David (Plano)" <David.Moore@stantec.com>

Tim,

Please find attached the Pikeview monitoring report for February. Let me know if you have any questions.

Paul Kos P.E., P.Eng.

Senior Geological Engineer

Mobile: 303 570-9163
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Stantec

Pikeview Monitoring Memo February.pdf
5393K

To:	Jerald Schnabel	From:	Paul Kos
	Continental Materials Corp.		Denver, CO 80222
File:	February 2022 Monitoring Summary	Date:	March 31, 2022

Reference: February 2022 Geotechnical Monitoring Summary Pikeview Quarry

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this February 2022 Geotechnical Monitoring Summary for the Pikeview Quarry. The Pikeview Quarry is situated along the foothills of the Rocky Mountains, northwest of Colorado Springs, Colorado. Continental Materials Corp. (CMC) operates the quarry, which is currently closed, pending reclamation. A geotechnical monitoring program was established to monitor reclamation activities which will affect the geotechnical performance of the existing and reclaimed slopes during and following reclamation grading. This report presents the geotechnical monitoring results for the slope reclamation activities at the site through the month of February 2022. Continuous monitoring by the robotic survey system began in 2010 and has continued through the month February 2022 uninterrupted. Visual inspections of the slopes were performed by CMC employees and Stantec engineers.

1.1 PURPOSE

The purpose of this report is to summarize the February 2022 geotechnical monitoring results and verify the geotechnical performance of the existing and reclaimed slopes with respect to the historical performance record. The goals of the geotechnical instrumentation monitoring program can be described as:

- Meet corporate risk management requirements,
- Provide ongoing slope monitoring and advance warning of any changed conditions that could pose a hazard to workers or to the public,
- Document the geotechnical performance of the slope, and
- Document monthly site grading activities and construction quality assurance.

1.2 MONITORING SUMMARY

Major components of the instrumentation monitoring program are listed in Table 1 and shown on Figure 1.

Table 1 Monitoring Frequency

Monitoring Type	Frequency
Visual inspection	Daily (CMC) and Monthly (Stantec)
Robotic theodolite/prism	Continuous
Drone inspection	Monthly
Compaction testing	Every 5,000 yd^3 (min.)

2.0 VISUAL INSPECTIONS

Inspections are completed daily by site personnel and monthly by Stantec personnel to document visual observations of slope conditions, including conditions of instability (i.e., cracking, slumping, over-steepened slopes, seeps, perched boulders, rock falls, erosion, and areas undercut by construction or maintenance activities). Certain areas of the landslide have been designated as safety exclusion zones, and these areas are inspected from adjacent locations.

When present, site operators inspect their work areas for signs of instability on a daily basis before starting work per site safety rules and regulations. The daily inspection starts by reviewing any prism alerts/alarms and inspecting those areas before work begins in that area. The daily inspection also includes visual observations of the quarry walls and floor for any changes. No changes to the quarry conditions were identified during daily inspections in February 2022. The notes from the daily inspections are included in Table A-1 in Appendix A.

Stantec conducted visual inspections of the Pikeview Quarry slopes on February 25, 2022. The engineering inspections were conducted by traversing each area of the mine and observing the uphill slope and the downhill slope for signs of instability, and areas in need of maintenance. Slopes that have been graded and are 2 horizontal (H):1 vertical (V) or shallower are also traversed on foot. The findings are listed below, and photographs of notable observations are included on Figure 2 in Appendix A.

- Reclamation grading began in February 2022.
- The temporary fill stockpile is being removed. The material is being spread by dozers and compacted in one-foot lift in accordance with the project specifications. (Photo 7)
- Fill material continues to be delivered to the central location on the production floor where it was temporarily placed. Future fill material will not be stockpiled; it will be directly placed, spread, and compacted (Photo 7)
- No cracking was observed on the native granite slopes above the extents of the disturbed area (Photos 1 and 6).
- Previously Observed Cracks: Previously observed tension cracks remain on the production floor and at the crest of fill slopes. These cracks appeared the same as in previous inspections (Photos 2-4).
- Older cracks and recent cracks are being monitored for changes. Currently the cracks are not growing in any of the areas on the slopes of the site. The hummocky field in the area immediately above the southern extent of the slide shows evidence of cracking but they are not fresh or active. No new or open cracks were found immediately inside or next to the slide area.
- Larger pieces of the slide continue break down into smaller pieces. (Photo 4)
- Several prisms were passed along the walking route and appeared to be in their original position and operating normally. Control points and most of the monitoring points are permanently cemented into the ground while some of the monitoring points are cemented into 5-gal buckets to be portable as needed. (Photo 5)
- The culvert remains cleared but mostly blocked inside. CMC has partially cleared the debris, but access limitations and supports within the culvert inhibit clearing all the debris. CMC has procured a pump and will begin pumping operations if any water collects behind the culvert. CMC inspects the culvert for ponded water following rain events, and should any water be observed, it will be removed using pumps. To date, no ponding has been observed.

- Visual inspections of the Pikeview Quarry did not reveal any evidence of large-scale instability outside of the landslide areas previously identified. No bulging, rippling, over-steepening, depressions, slumps, or dry slip-offs were observed in areas that have been graded and/or reclaimed.

3.0 PRISM SURVEY

A Leica Robotic station is used to continuously survey the prisms onsite to document slope movements. The station records the location of each prism every hour. In mid-February, the reading frequency was increased from every four hours to every hour in preparation of reclamation grading activities; the increased reading frequency can be observed in the data plots included in Appendix B. There are currently 20 prisms; 3 prisms are control points located outside the slope movement area, 13 prisms are located on the slopes surrounding the landslide area, and 4 prisms are located at the toe of the landslide. As the slope is backfilled and graded, additional prisms will be installed. The existing prism locations are shown on the current topography in Figure 3, and the proposed prism locations are shown on the reclamation topography in Figure 4. Both figures are included in Appendix B.

The monitoring software, GeoMos, has been programed to provide automatic alarms if there is a movement recorded that is greater than 0.35 feet or if a prism cannot be located. The alarm notes and actions taken are logged, and the alarms are summarized in Table 2. Following each alarm, CMC clears the area of concern until the data can be reviewed and the slope can be inspected. CMC made sure that there were no workers in the area before inspecting the slope. On February 10, 2022, a movement alarm was received from Prism P32; however, when the prism was inspected, there were no signs of slope movements. The subsequent readings returned to normal, and the alarm is assumed to be a data error related to weather conditions. On February 13, 2022, a movement alarm was received from Prism P25; however, when the prism was inspected, there were signs of wildlife and no signs of slope movements. There was a power outage that disrupted readings from February 20 to 25. All other alarms were determined to be caused by weather.

Table 2 Alarm Summary

Date(s)	Alarm	Cause/Actions taken	Issue Resolved
02/01/2022-02/03/2022	Several prisms could not be found on multiple scans	Fog, snow, wind blocked prisms	02/03/2022
02/03/2022-02/04/2022	Several prisms could not be found on multiple scans	Fog blocked prisms	02/04/2022
02/06/2022	Several prisms could not be found on multiple scans	Fog, snow, wind blocked prisms	02/06/2022
02/10/2022	P32 Limit Check Level 1 Exceeded	P32 spiked then returned to normal the next morning. Assumed to be data error related to weather.	02/10/2022
02/11/2022-02/12/2022	Several prisms could not be found on multiple scans	Cold and Frost blocked prisms	02/12/2022
02/13/2022	P25 Limit Check Level 1 Exceeded	Prism likely moved by sheep	02/13/2022
02/16/2022-02/17/2022	Several prisms could not be found on multiple scans	Snow and Fog blocked prisms	02/17/2022
02/18/2022	Several prisms could not be found on multiple scans	Snow blocked prisms	02/18/2022
02/20/2022-02/22/2022	Several prisms could not be found on multiple scans	Snow and Fog blocked prisms	02/22/2022

02/22/2022-02/23/2022	Several prisms could not be found on multiple scans	Snow and Fog blocked prisms	02/23/2022
02/24/2022	Several prisms could not be found on multiple scans	Snow and Fog blocked prisms	02/24/2022
02/25/2022	Several prisms could not be found on multiple scans	Snow, Fog and Frost blocked prisms	02/25/2022
02/27/2022	Several prisms could not be found on multiple scans	Snow and Fog blocked prisms	02/27/2022
02/27/2022	Several prisms could not be found on multiple scans	Snow and Fog blocked prisms	02/27/2022
02/28/2022	Several prisms could not be found on multiple scans	Snow and Fog blocked prisms	02/28/2022

The prism monitoring results for transverse and height displacements, monthly change, and cumulative change are summarized in Table 3 below. The transverse displacement measures the change in the horizontal distance from the robotic station to the prism; positive displacements indicate less distance between the station and prism (movement towards the total station). The height displacement measures the change in the vertical distance from the robotic station to the prism; positive displacements indicate upward movement. The values for the last reading in the month are included in Table 3. The monthly delta is the most recent reading cumulative delta displacement (horizontal, lateral, and vertical) subtracted from the last reading from the previous month. The cumulative delta values are a total displacement and are not associated with a direction. The transverse, height, and cumulative delta displacements are the total displacement over the life of the monitoring, which has been several years for all the prisms except P69. Prism P69 was moved on June 20, 2020, and the displacements included in Table 3 are the displacements since that date. According to Leica documentation, the survey accuracy is +/-4 mm+1.5 ppm for prisms located greater than 500m from the station; these equates to an accuracy of +/-0.016 ft.

The data show stable conditions with no movement for 15 of 20 prisms with recorded displacements limited to data scatter and not actual movements. As discussed above, Prism P25 was displaced by wildlife on February 13, 2022. There were no signs of movement in the areas of these prisms, and there were signs of wildlife in the area. Prisms P63 and TOE3 are located at the toe of the landslide, and these locations showed slope creep movements at slow velocities. Prisms NP2 and NP66 are located above the landslide, and these prism also recorded slope creep movements at slow velocity. This settlement is likely related to the landslide material consolidating under its own weight. Plots of the transverse and height displacements for each prism are included in Appendix B.

Table 3 Prism Summary

Prism ID	Cumulative Transverse Displacement (ft)	Cumulative Height Displacement (ft)	Monthly Delta (ft)	Cumulative Delta (ft)	Notes / Recommendations
CP1	0.000	-0.016	0.0009	0.3620	
CP2	-0.058	0.016	0.0010	0.4134	
CP3	0.289	-0.212	0.0001	0.3636	
NP1	0.647	-0.903	-0.0033	1.1110	
NP2	0.117	-0.072	0.0144	0.1933	Slope creep movements.
NP66	0.590	-0.751	0.0306	1.1889	Slope creep movements.
P1	0.359	-0.024	0.0009	0.3620	
P2	0.144	-0.006	0.0092	0.2259	
P25	-0.002	0.056	0.0220	0.1771	Wildlife interference.
P32	-0.057	-0.067	-0.0056	0.2964	
P33	-0.075	-0.013	0.0082	0.2206	
P35	0.043	-0.166	0.0128	0.4463	
P4	0.373	-0.105	0.0037	0.4907	
P5	0.401	-0.125	0.0119	0.6333	
P63	15.819	-6.459	0.0325	17.0872	Slope creep movements.
P69	0.000	-0.073	0.0041	0.6116	
P70	0.350	-0.300	0.0069	0.1752	
TOE1	0.157	0.044	0.0069	0.1752	
TOE2	0.670	-0.656	0.0004	0.9761	
TOE3	3.569	-1.799	0.0578	4.2578	Slope creep movements.

4.0 DRONE SURVEY

The site was flown for aerial imagery using an unmanned aircraft system (UAS or ‘drone’) on, February 15, 2022. The imagery was inspected for signs of instability and used to supplement the onsite visual inspections. Features noted in the aerial imagery review were inspected during Stantec’s engineering inspection and are summarized in Section 2 above. The imagery was also used to create site topography.

The January topography was also compared to the February topography to identify changes in the site topography. Comparison of the two surveys showed the continued importing of topsoil and fill material. No slope movements or other changes in topography were identified. The current imagery and topography are included in Figures 1 and 3, and the comparison surface is included as Figure 5 in Appendix C.

As previously reported in the September 2020 monitoring report, there are limitations with the method of comparing drone surveys from different months. The drone data indicate changes in the slopes along each of the reclamation benches, buildings, and areas with trees or shrubs. These areas are stable, and the changes are the result of survey limitations on or near vertical slopes.

5.0 COMPACTION TESTING

Fill placement started on February 25, 2022 with grading commencing by spreading the temporary fill stockpile. Fill is being placed in one-foot lifts, moisture conditioned as necessary, and compacted. At the end of February, approximately 20,000 yd^3 had been placed in a single lift. Compaction testing will commence in March 2022 and will occur at the rate of at least one test per 5,000 yd^3 placed.

6.0 RECLAMATION PROGRESS

CMC has initiated reclamation grading at the Pikeview Quarry and has contracted with Stantec to provide EPCM services through completion. As an updated feature of our monthly report, we will provide progress of activities, anticipated milestone schedule and a one month look ahead to better communicate project objectives. A phased or 'gated" approach will be used to complete the reclamation process going forward (See milestone schedule below)

Phase 1 - Value Engineering and issue RFP to qualified Contractors

Phase 2 - Commercial negotiations with successful contractor

Phase 3 - Execution planning and Contractor readiness review

Phase 4 - Site Construction execution

Phase 5 - Final revegetation (season 2)

Task/Milestone	Estimated Dates
Phase 1 – Issue RFP to Bidders	Completed June 2021
Phase 1 – RFP Evaluation & Recommendation	Completed July 2021
Phase 2 – Constructor Contract Award	Completed January 2022
Phase 3 – Project Kick-off with successful Contractor	Completed February 4, 2022
Phase 4 – Contractor Mobilization to Site	Initiated February 2022
Phase 4 – Reclamation Grading	Initiated February 2022
Phase 4 – Contractor Demobilize from Site	Summer 2023
Phase 5 – Final Revegetation season 2 Begins	2023 until acceptance

Progress of activities this month:

- Project kick-off meeting
- Contractor quality assurance document preparation, stormwater permitting, and readiness review
- Contractor mobilization to site
- Contractor initiated earth moving activities
- Importing fill material continued
- Processing of riprap continued
- Geotechnical monitoring continued

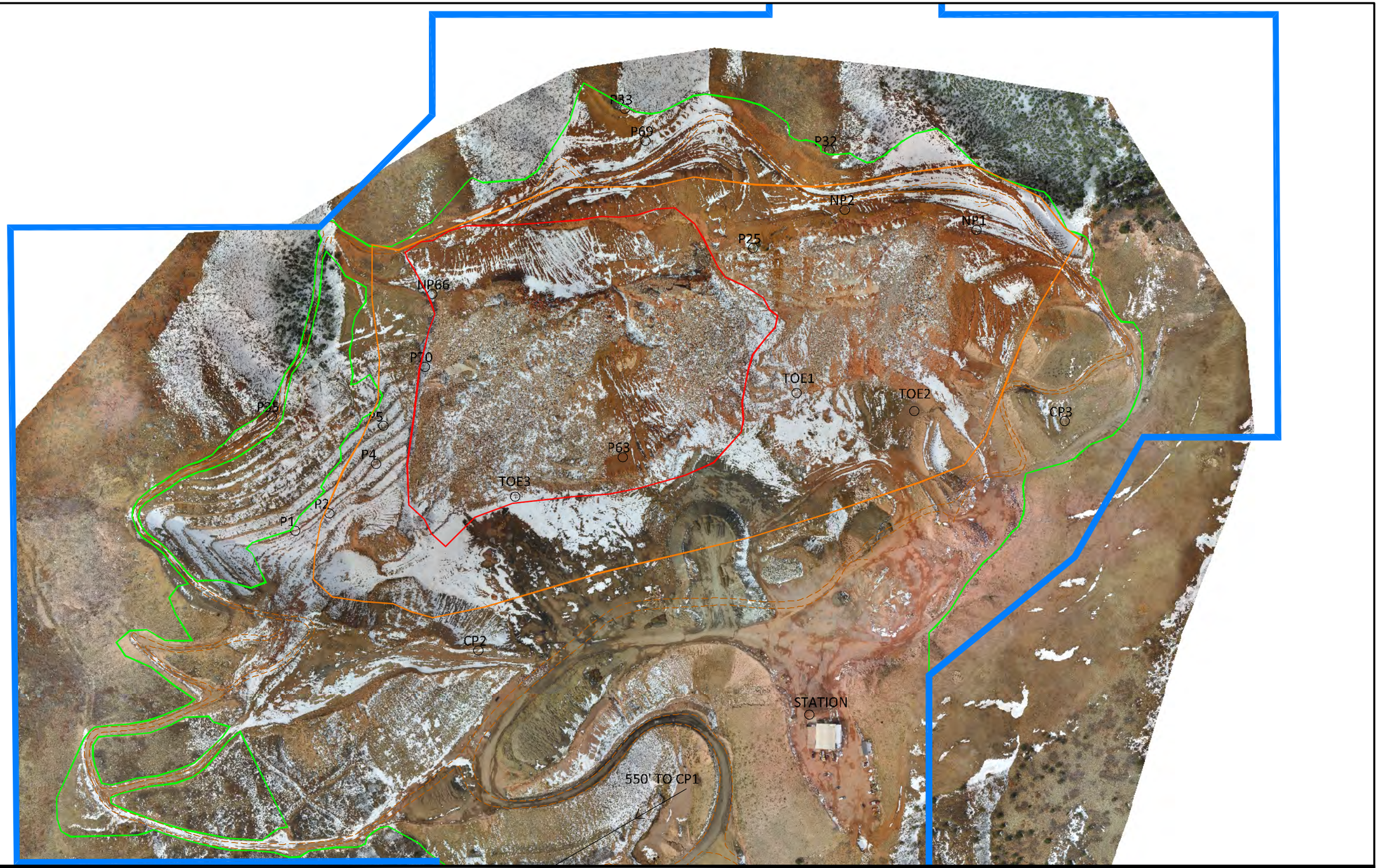
Work planned for next month includes:

- Begin compaction testing
- Mobilize additional equipment to site
- Continue reclamation grading
- Continue importing fill material
- Continue geotechnical monitoring
- Begin removal of existing prisms and replacement with new prisms. Prisms will be removed once the fill material blocks the line-of-sight from the total station to the prism.

7.0 CONCLUSIONS

None of the data collected in February 2022 indicate evidence of any large-scale movements that increase risk to workers or to the public. The landslide area continues to show slope creep movements with slow velocities. Shallow surface erosion continues to occur requiring ongoing maintenance and cleanup.

- Restricted access to the ungraded landslide slopes should continue.
- All monitoring should continue at current frequencies.
- All alarms shall continue to be taken seriously even if data errors are suspected.



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LEGEND

- Permit/Affected Lands Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Existing Prism
- Proposed Prism

N

0 300' 600'

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
227419041

Title
SITE MAP

Revision
#

Date
2022.03.31

Drawn By
PK

Figure No.
1

Appendix A

Visual Inspections

6. View of South Peak from haul road.

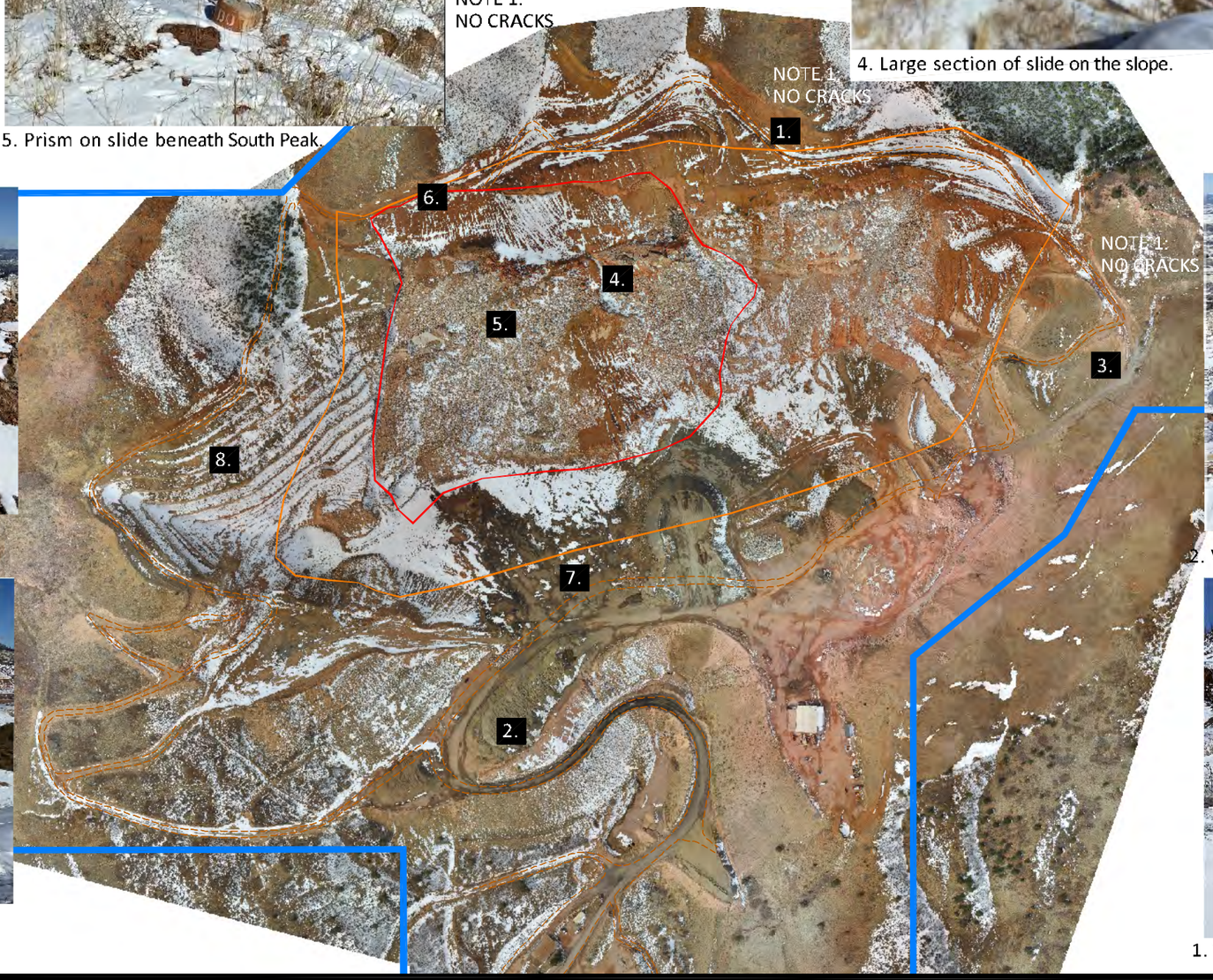
5. Prism on slide beneath South Peak.

4. Large section of slide on the slope.

3. View to the northeast from top of haul road.

7. Material in pit is being spread by dozer. Snow was removed prior to placing fill.

8. Reclamation benches on south-end.



2. View to the southeast from top of haul road.

1. View of Middle Peak from haul road.

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LEGEND
- Permit/Affected Lands Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Observed Crack

NOTES
1. NO CRACKS OBSERVED IN THIS AREA.
2. ALL PHOTOS TAKEN FEBRUARY 25, 2021.

N

0 400' 800'

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
227419041

Title
OBSERVATIONS FROM FEBRUARY INSPECTION

Revision
#

Date
2022.03.31

Drawn By
PK

Figure No.
2

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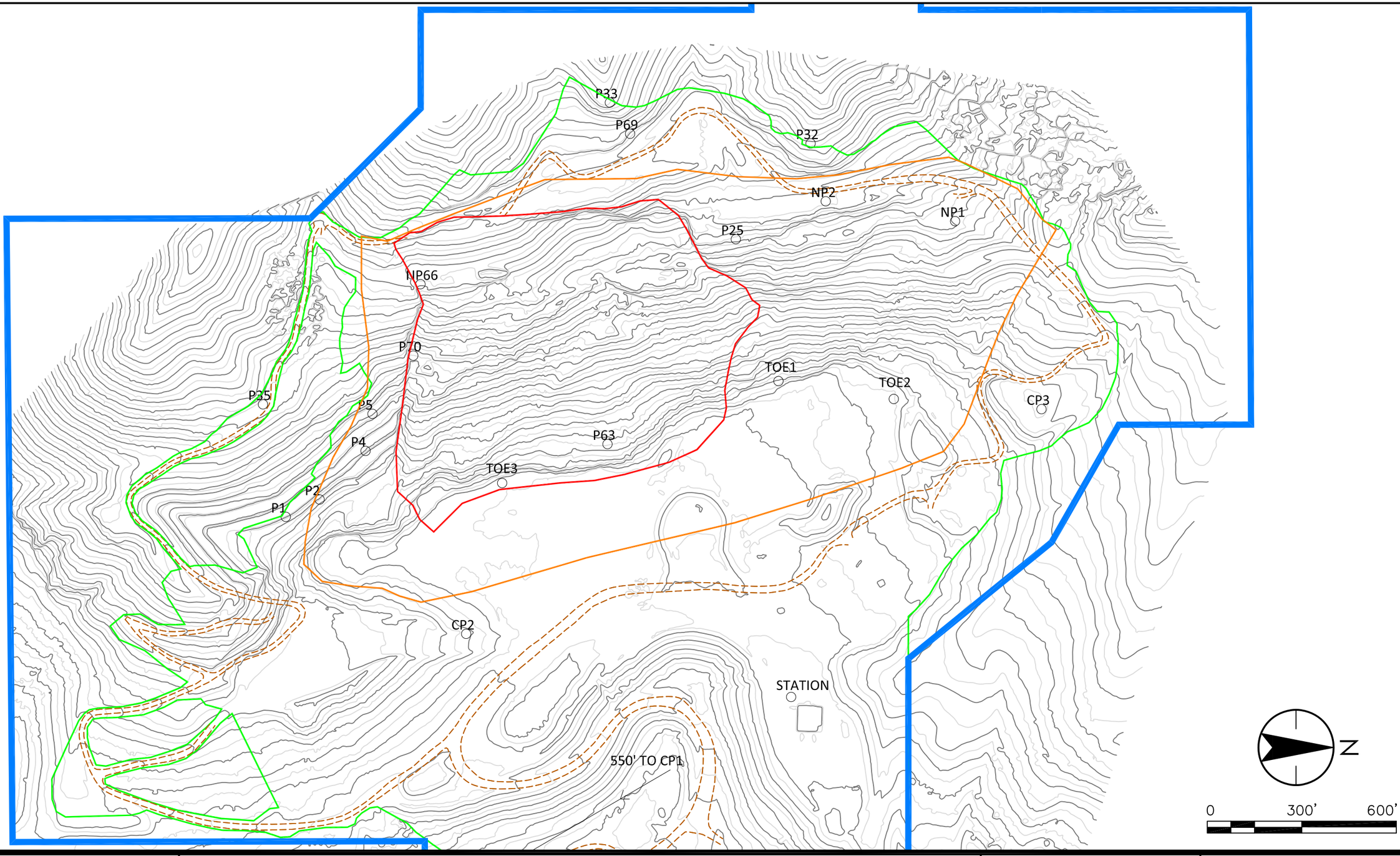
Table A-1 Summary of Daily Inspecitons

Date	Notes	Inspection By
February 1, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 2, 2022	Light Snow and Frost conditions.	Jerald Schnabel
February 3, 2022	Fog overhead and light snow.	Jerald Schnabel
February 4, 2022	Snow and Frost conditions. No Movement.	Jerald Schnabel
February 5, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 6, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 7, 2022	Frost observed on some prisms. No movement.	Jerald Schnabel
February 8, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 9, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 10, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 11, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 12, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 13, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 14, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 15, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 16, 2022	Snow onsite. No Movement observed.	Jerald Schnabel
February 17, 2022	Continued Snow Onsite.	Jerald Schnabel
February 18, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 19, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 20, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 21, 2022	Electrical outage at the shop. No movement observed.	Jerald Schnabel
February 22, 2022	Heavy Snow and 3 phase power problems continue.	Jerald Schnabel
February 23, 2022	Temporary Power restored. Temporary Drop Changed Level.	Jerald Schnabel
February 24, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 25, 2022	Power line repaired. Instrument not communicating.	Jerald Schnabel
February 26, 2022	No Movement observed. 9pin Cable not functioning.	Jerald Schnabel
February 27, 2022	No Movement observed. Good to proceed.	Jerald Schnabel
February 28, 2022	No Movement observed. Cable being tested, none locally available.	Jerald Schnabel

Appendix B

Prism Survey



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LEGEND

- Permit/Affected Lands Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Existing Prism
- Proposed Prism

1. GRADING AND MOVEMENT OF STATION WILL BE EXTENDED AS LONG AS POSSIBLE.
2. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
3. ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.
4. TOPOGRAPHY FROM FEBRUARY 15, 2022 DRONE SURVEY.
5. CONTOUR INTERVAL IS 10 FEET

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
227419041

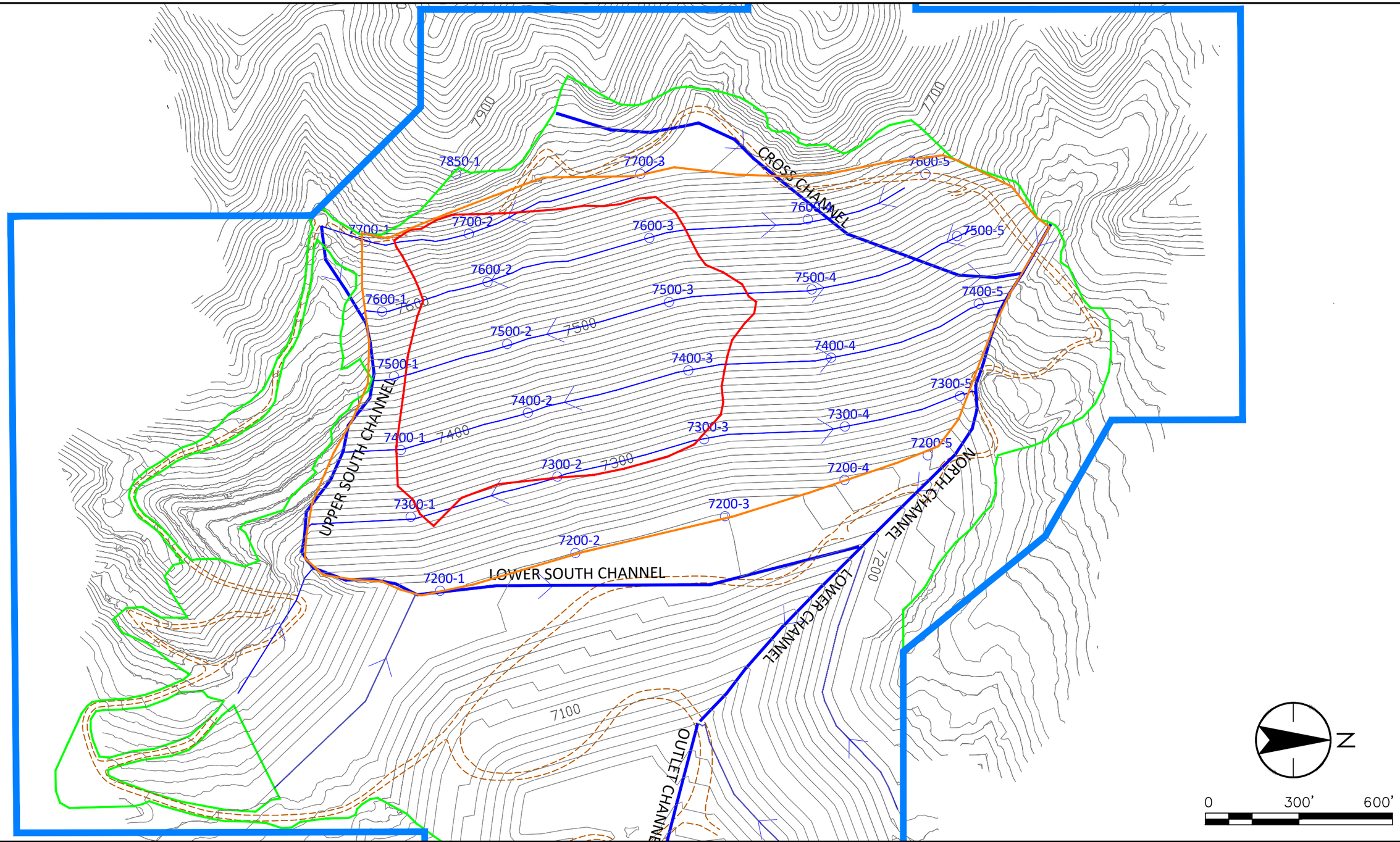
Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision
#

Date
2022.03.31

Drawn By
PK

Figure No.
3



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LEGEND

- Permit/Affected Lands Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- ○ Proposed Prism

NOTES

1. GRADING AND MOVEMENT OF STATION WILL BE EXTENDED AS LONG AS POSSIBLE.
2. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
3. ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.

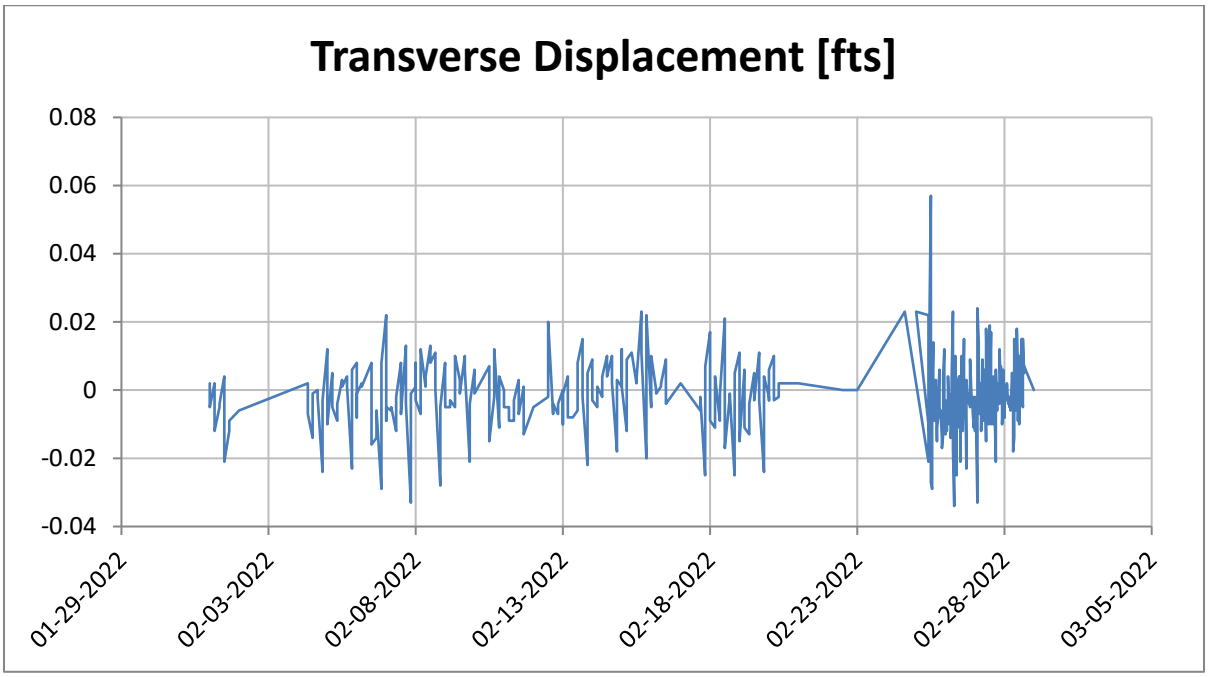
Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

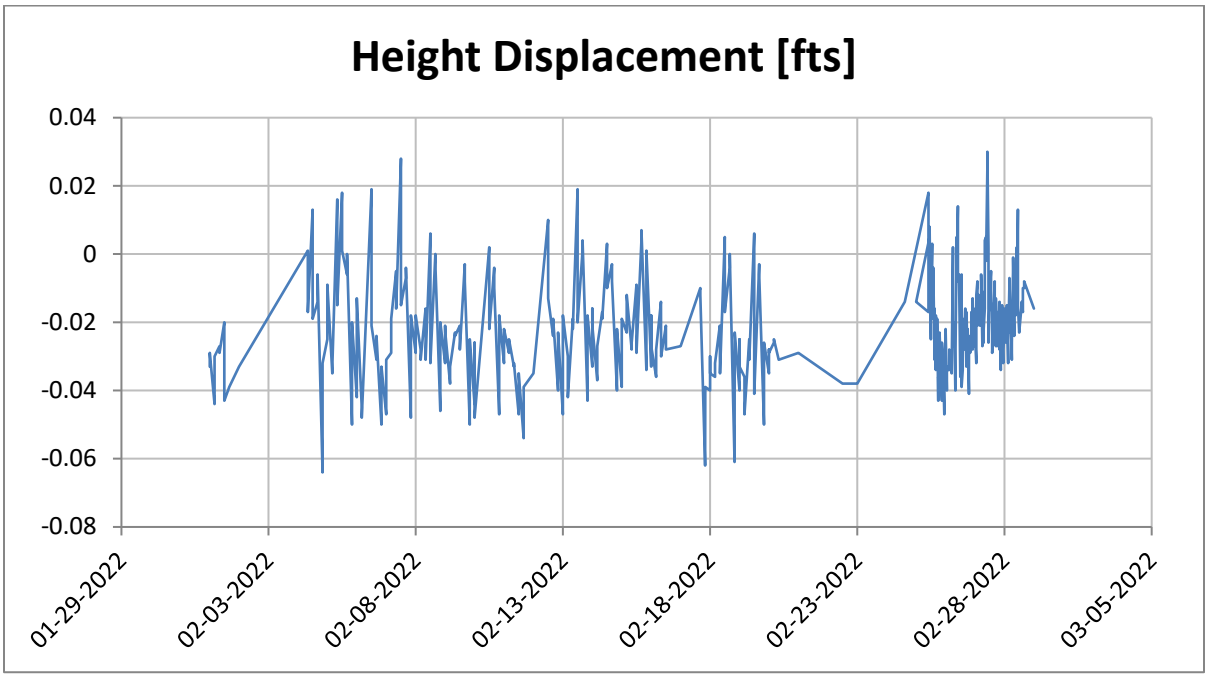
Project No.
227419041

Title
PROPOSED PRISMS WITH RECLAMATION SURFACE

Revision	Date
#	2022.03.31
Drawn By	Figure No.
PK	4

Prism CP1

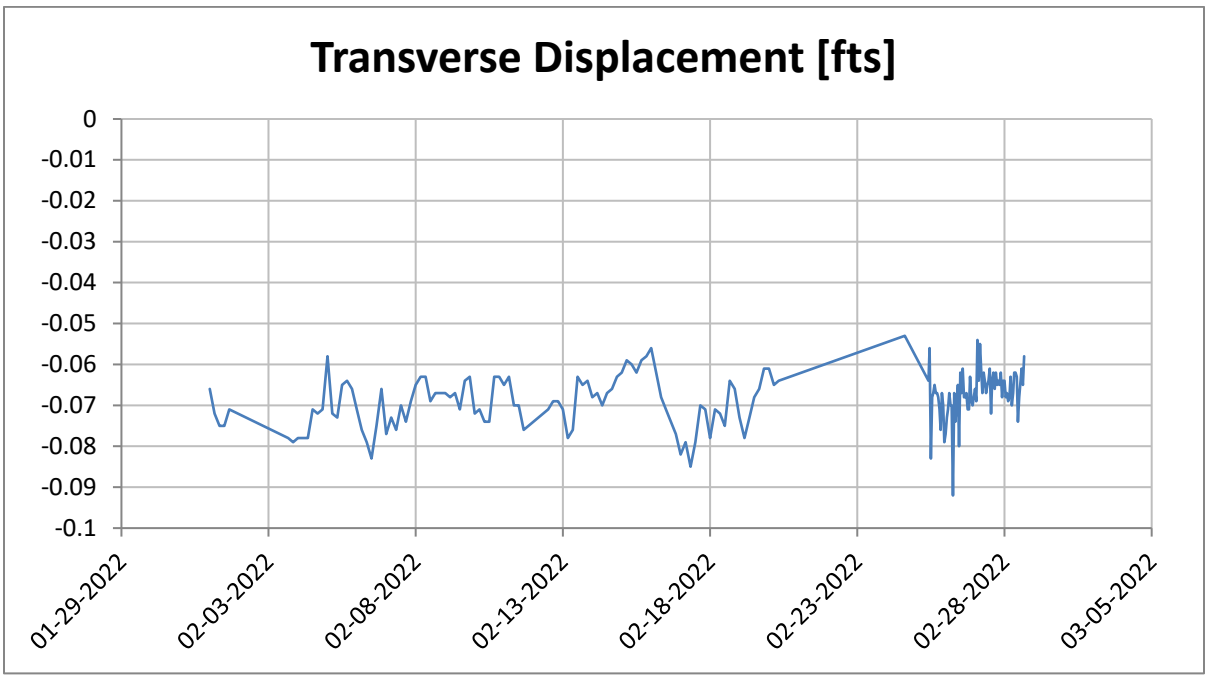


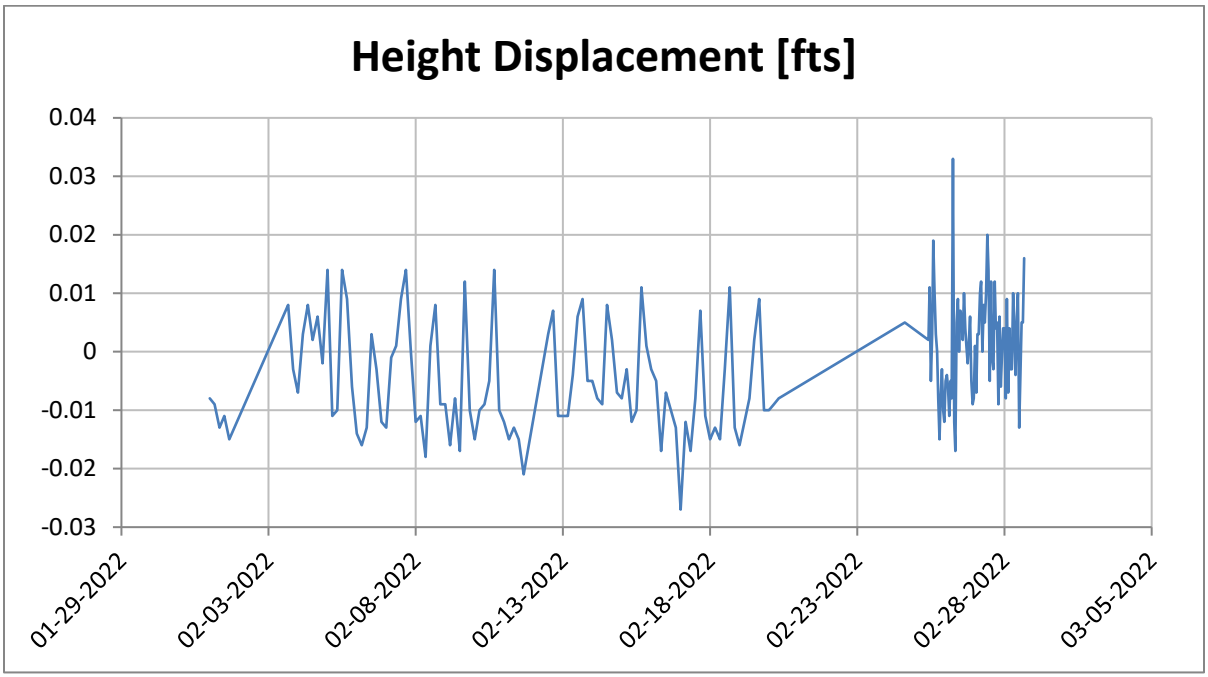


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

Prism CP2





Notes:

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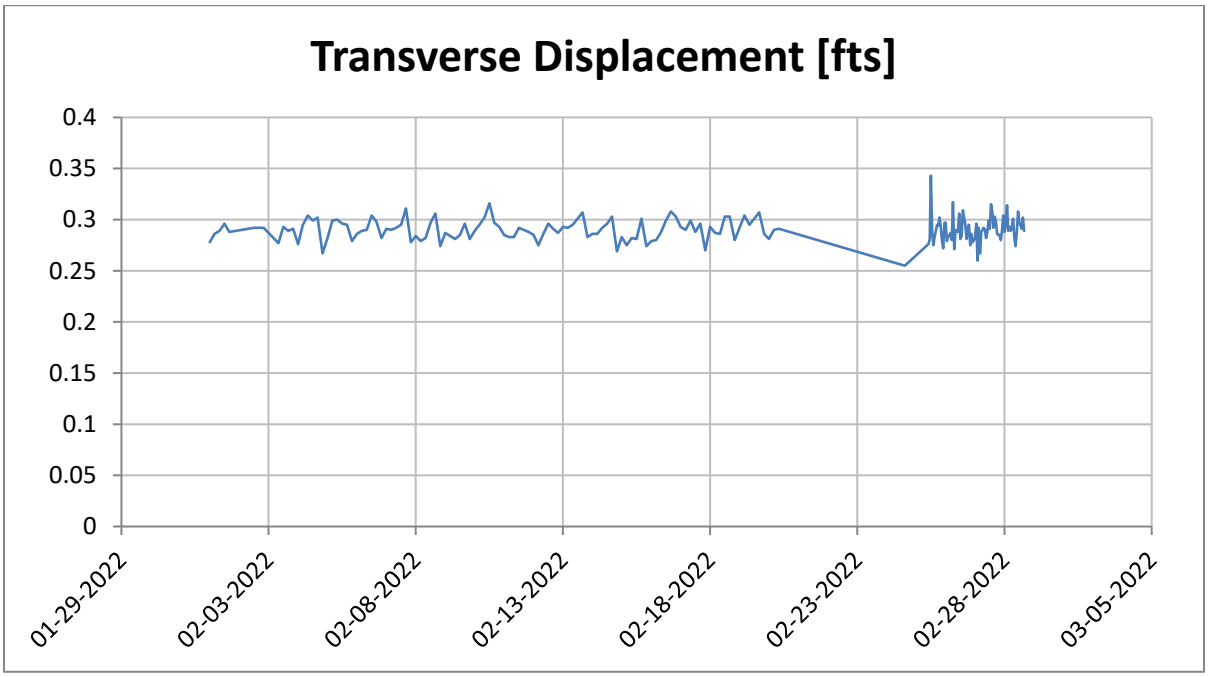
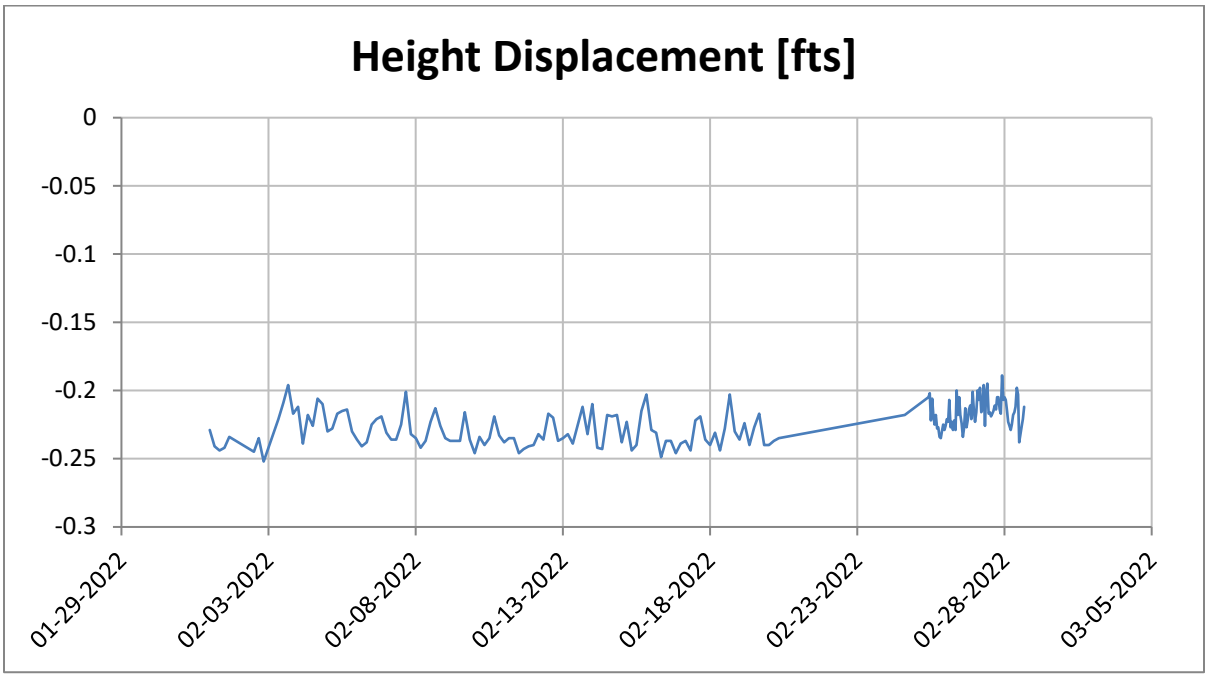
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

Prism CP3





Notes:

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3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

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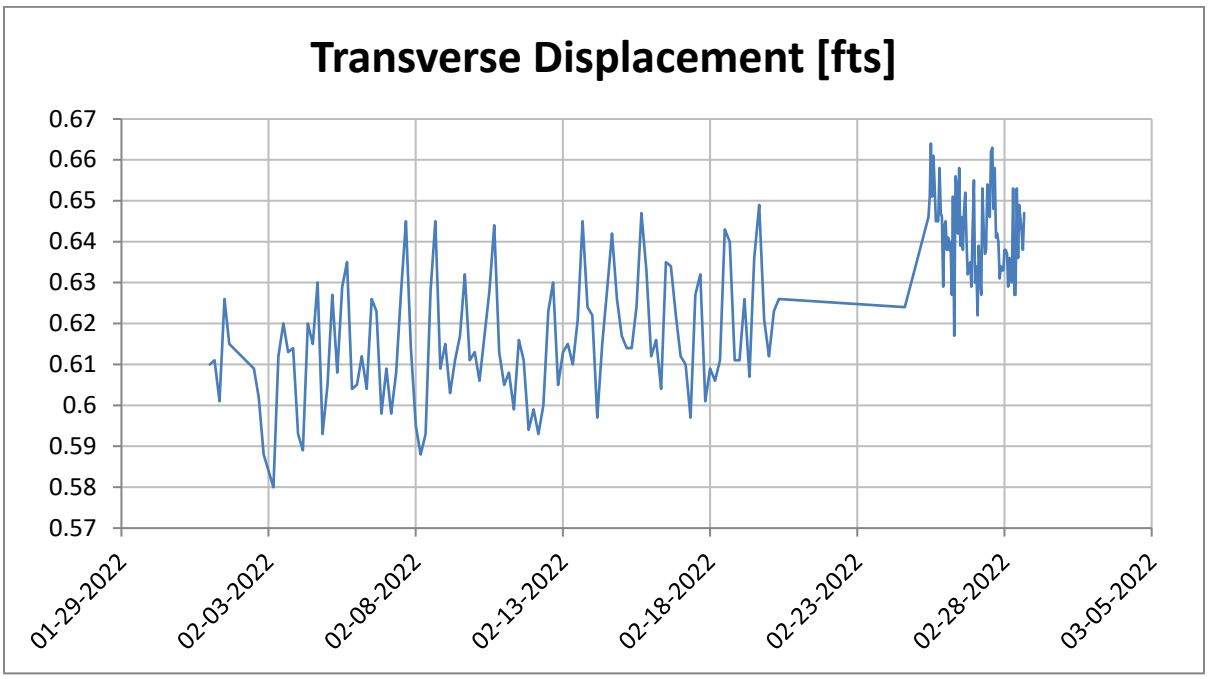
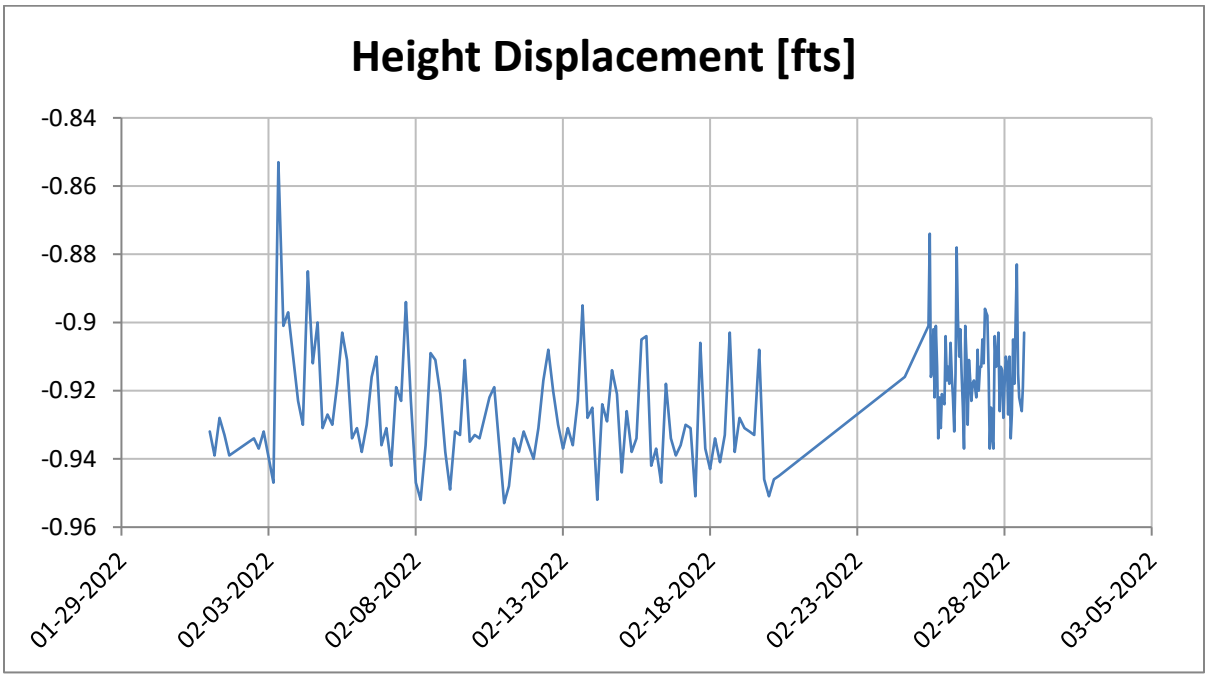
Prism NP1

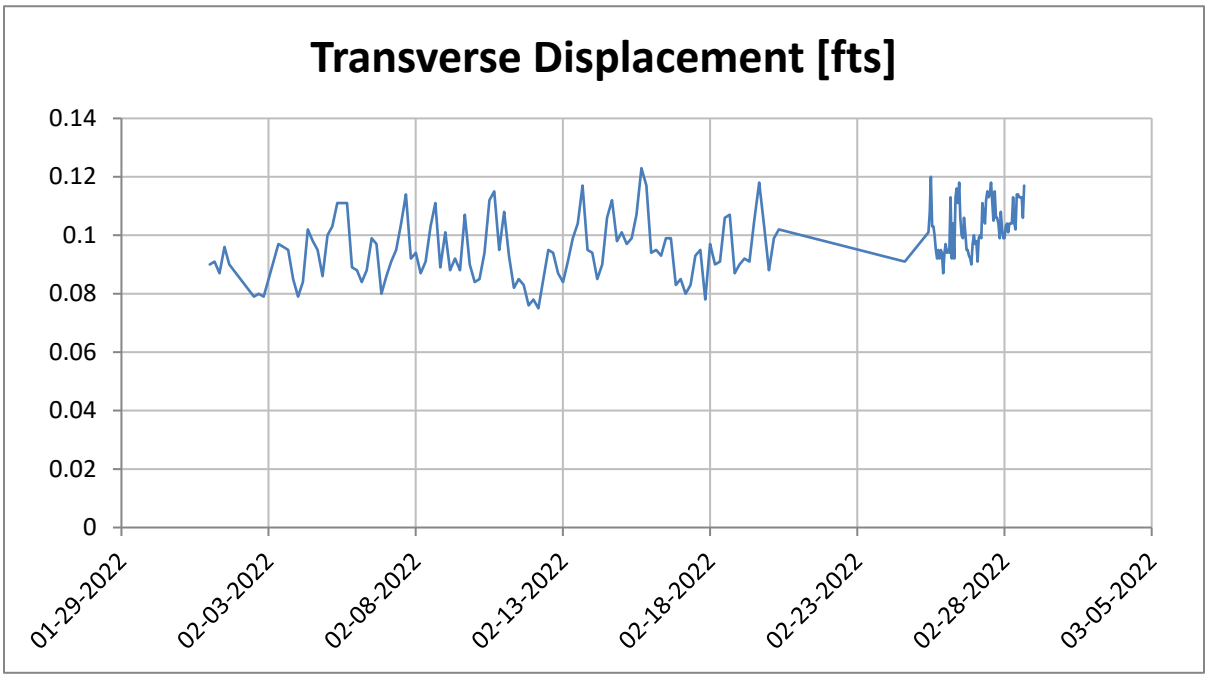


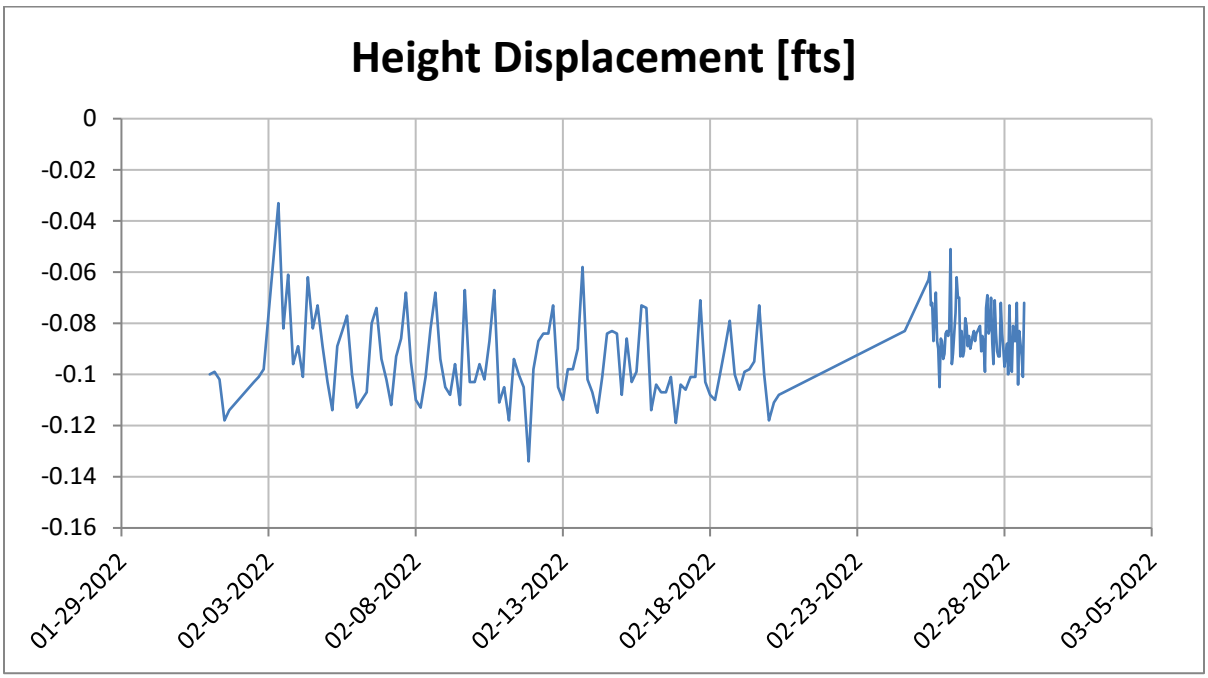


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

Prism NP2

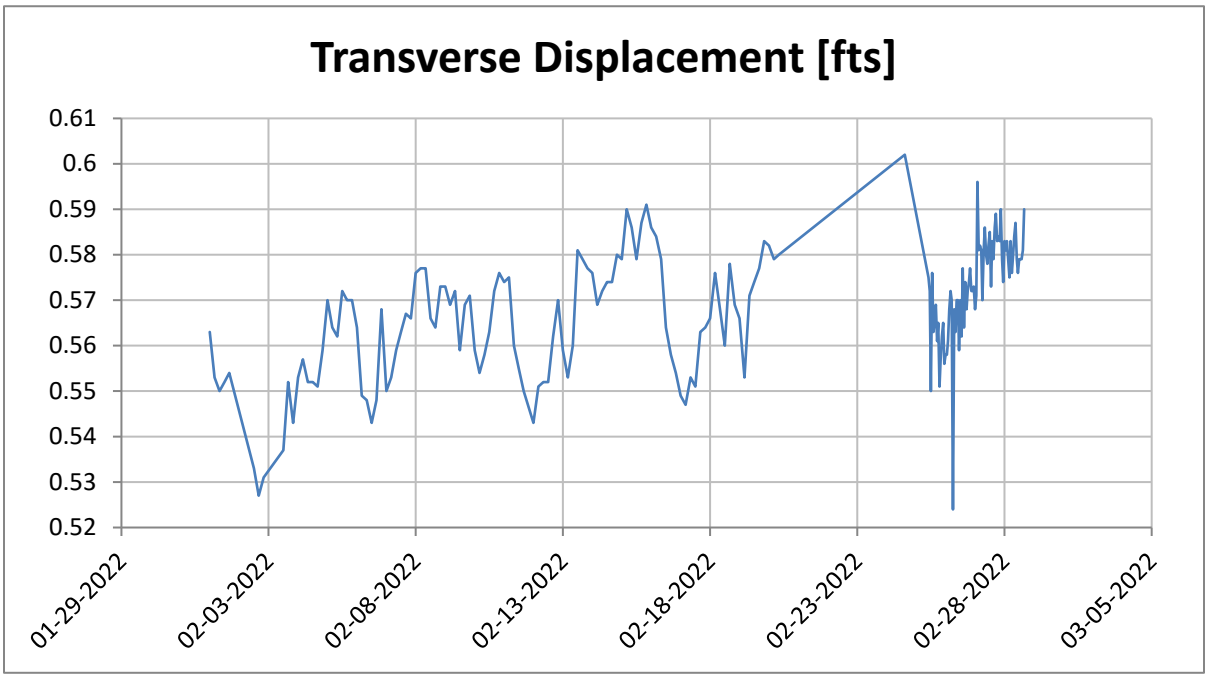


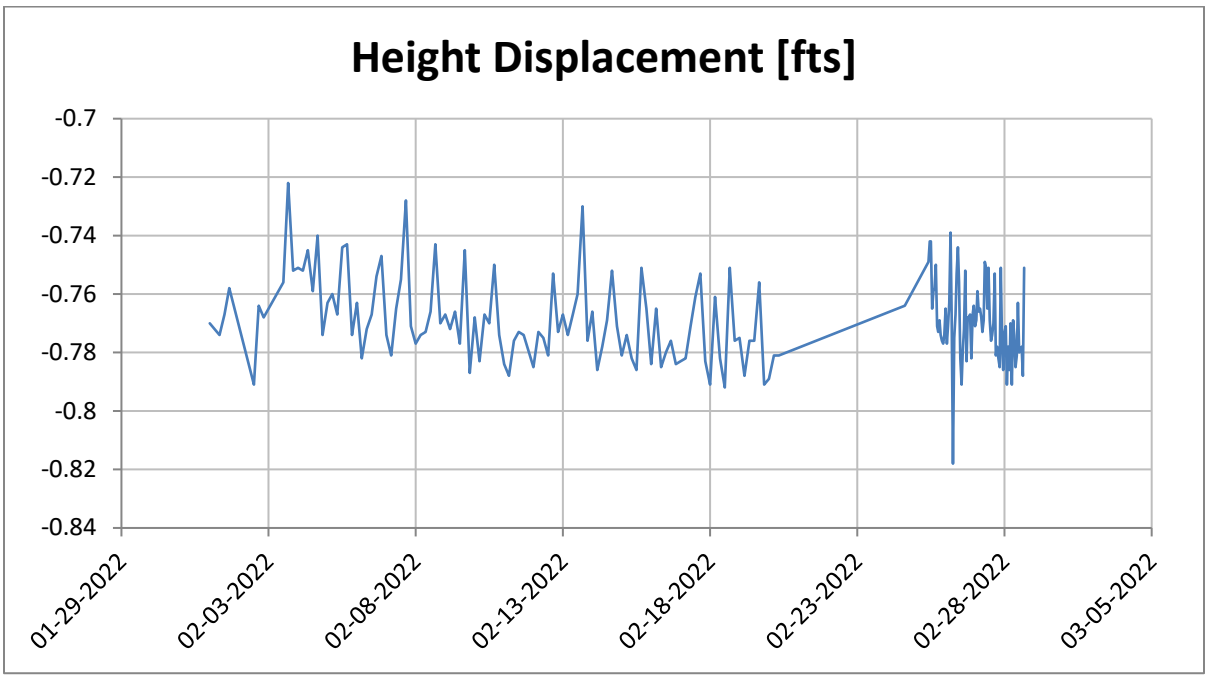


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism records slope creep movements with slow velocity.
6. Reading interval increased from four hours to one hour.

Prism NP66

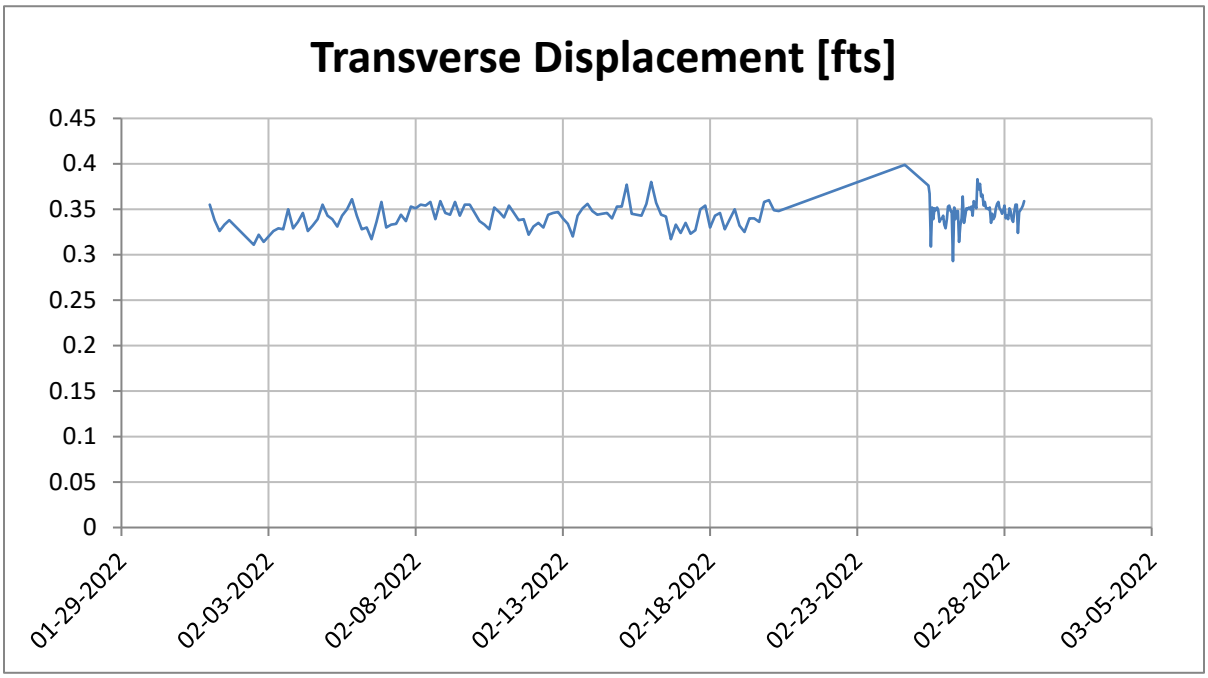


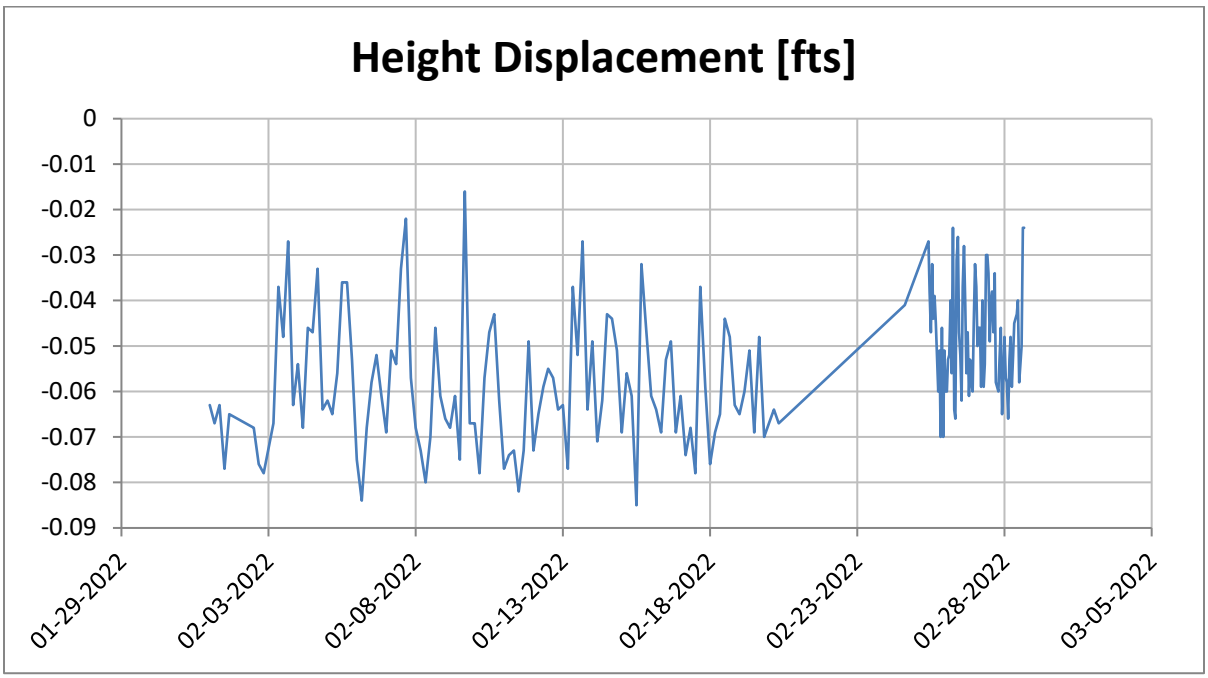


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism records slope creep movements with slow velocity.
6. Reading interval increased from four hours to one hour.

Prism P1

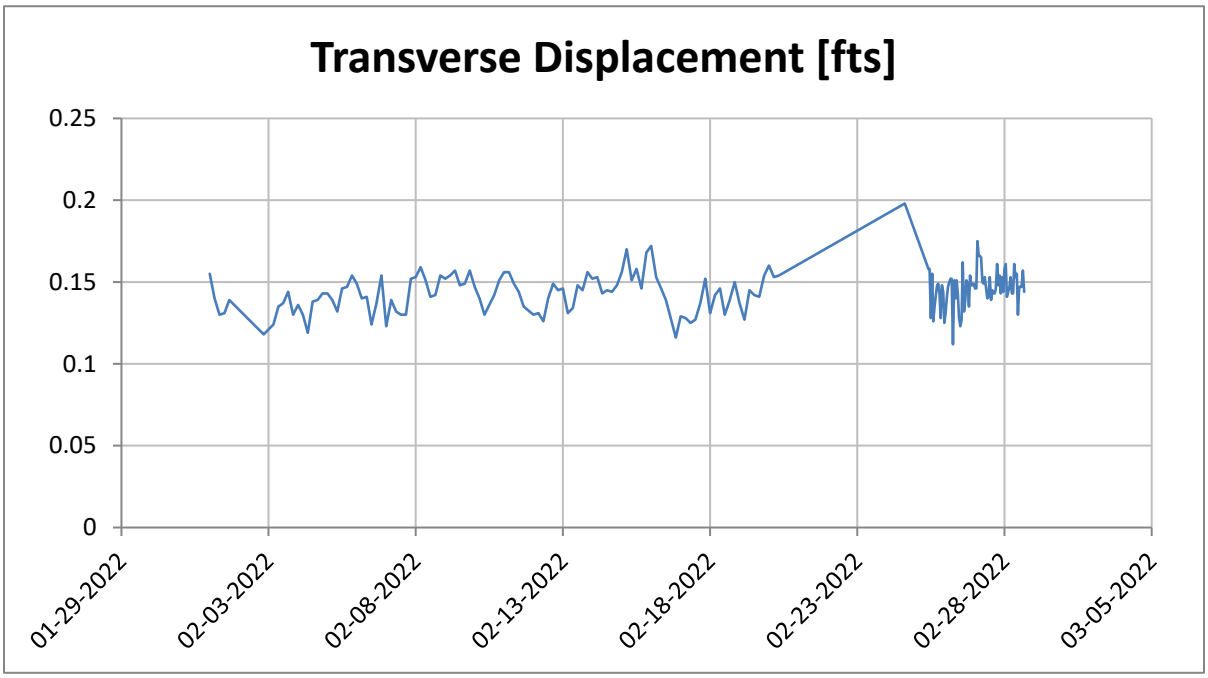


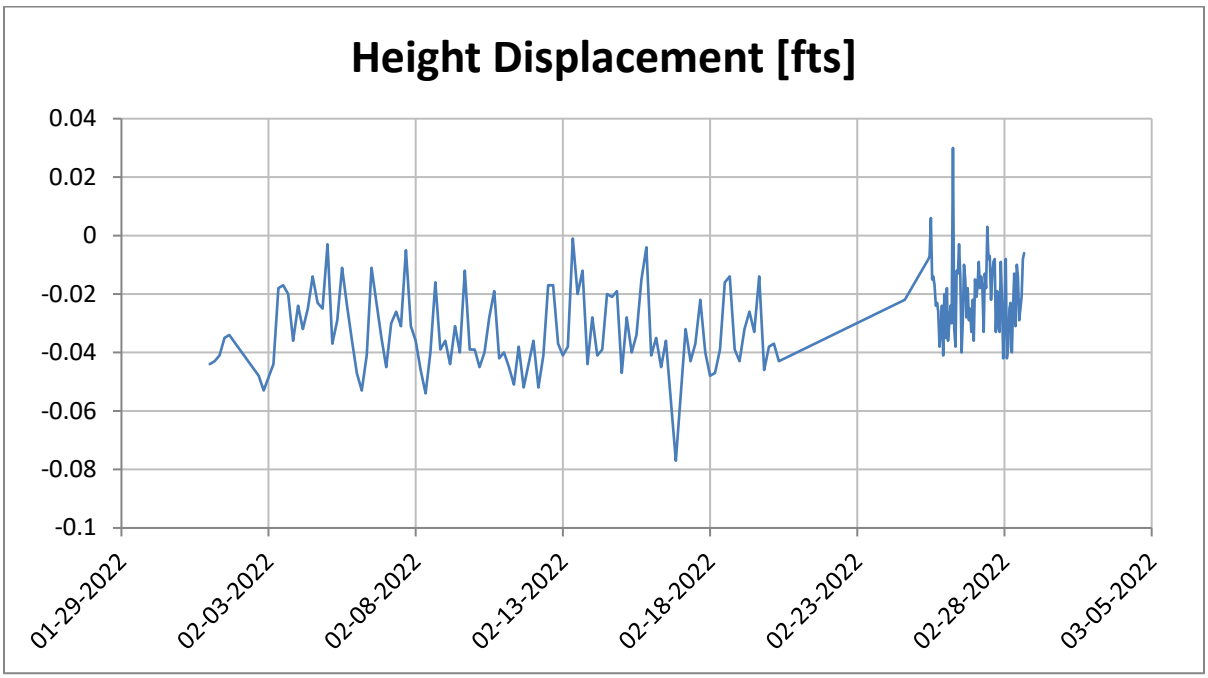


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

Prism P2

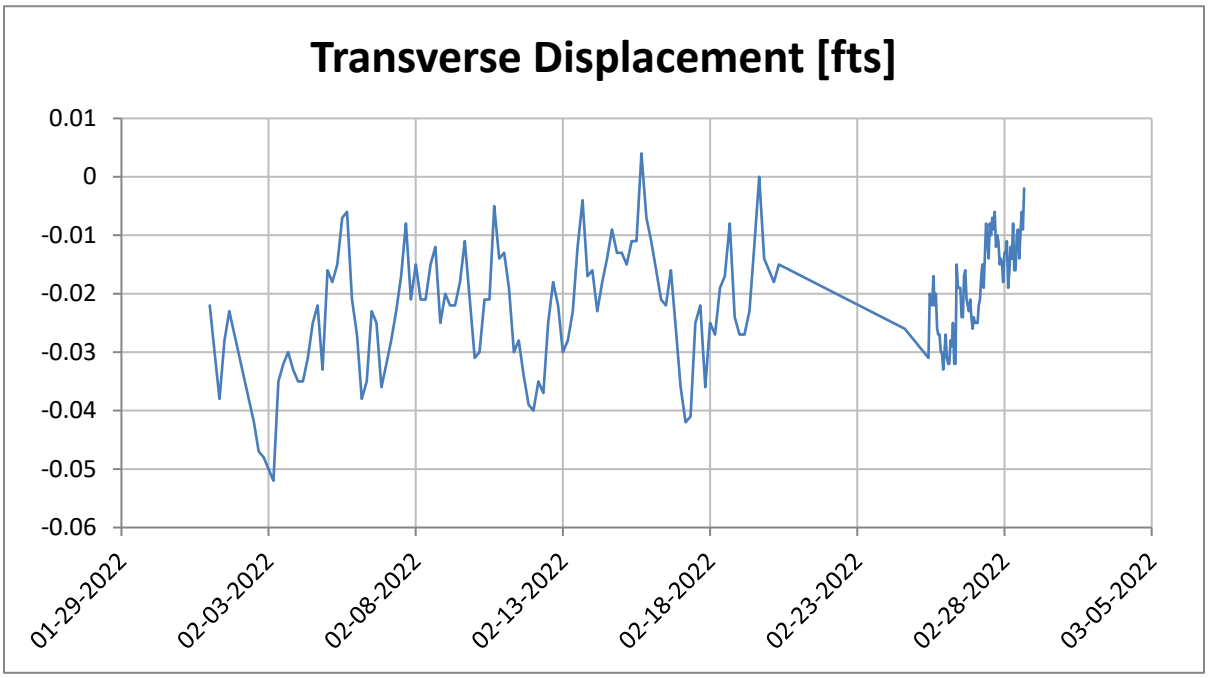


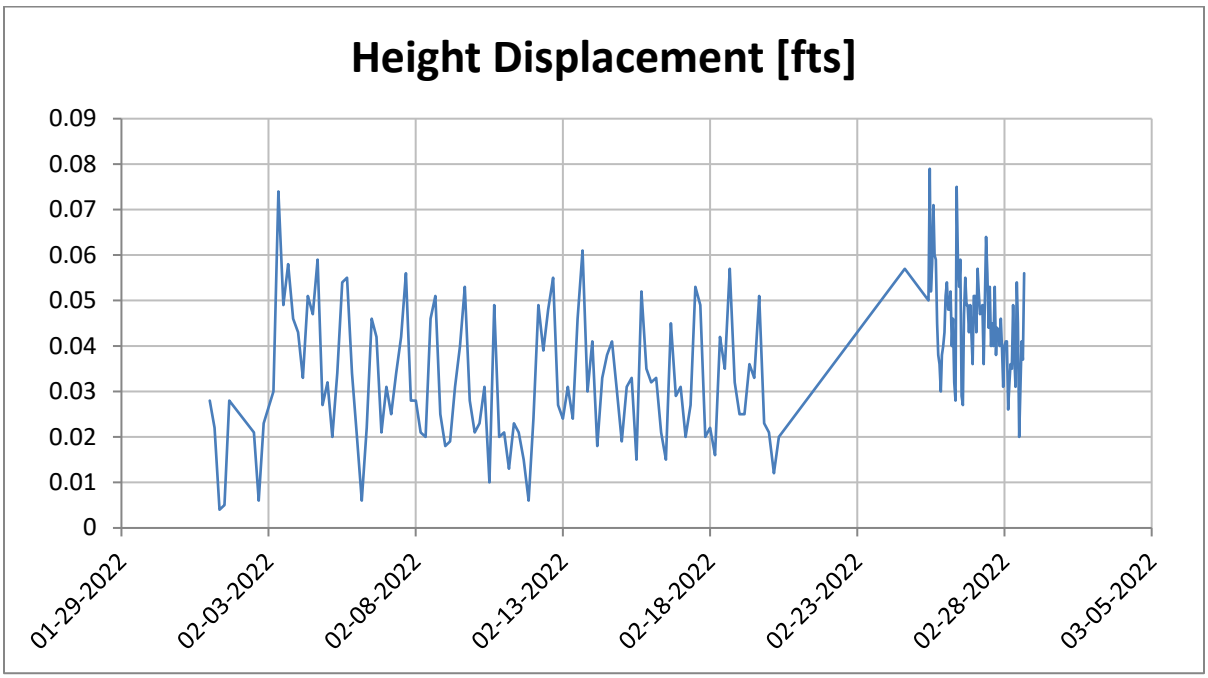


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

Prism P25

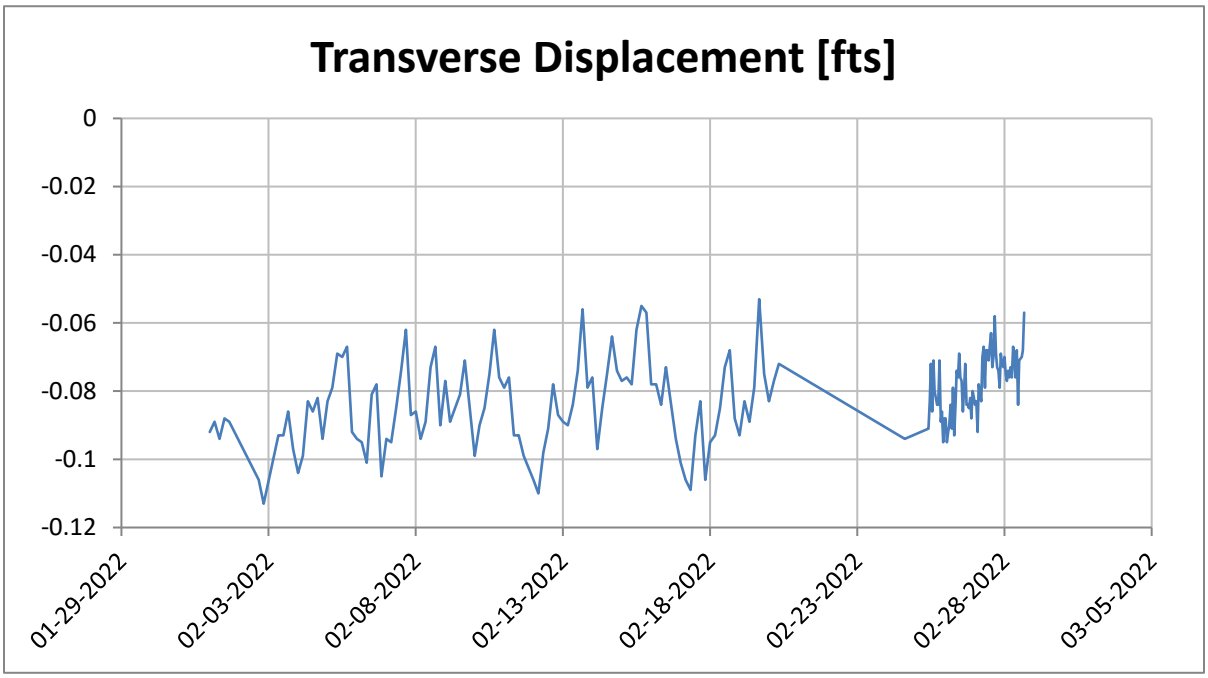


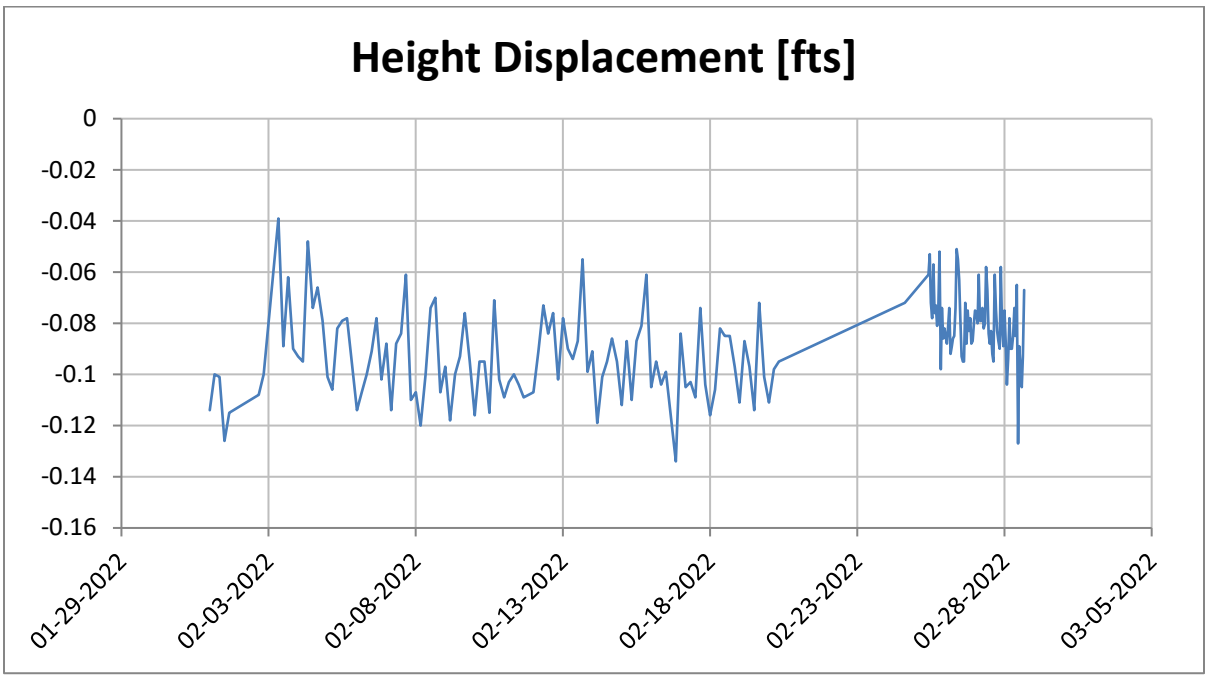


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Alarm recorded on February 13, 2022. Attributed to wildlife in the area.
6. Reading interval increased from four hours to one hour.

Prism P32

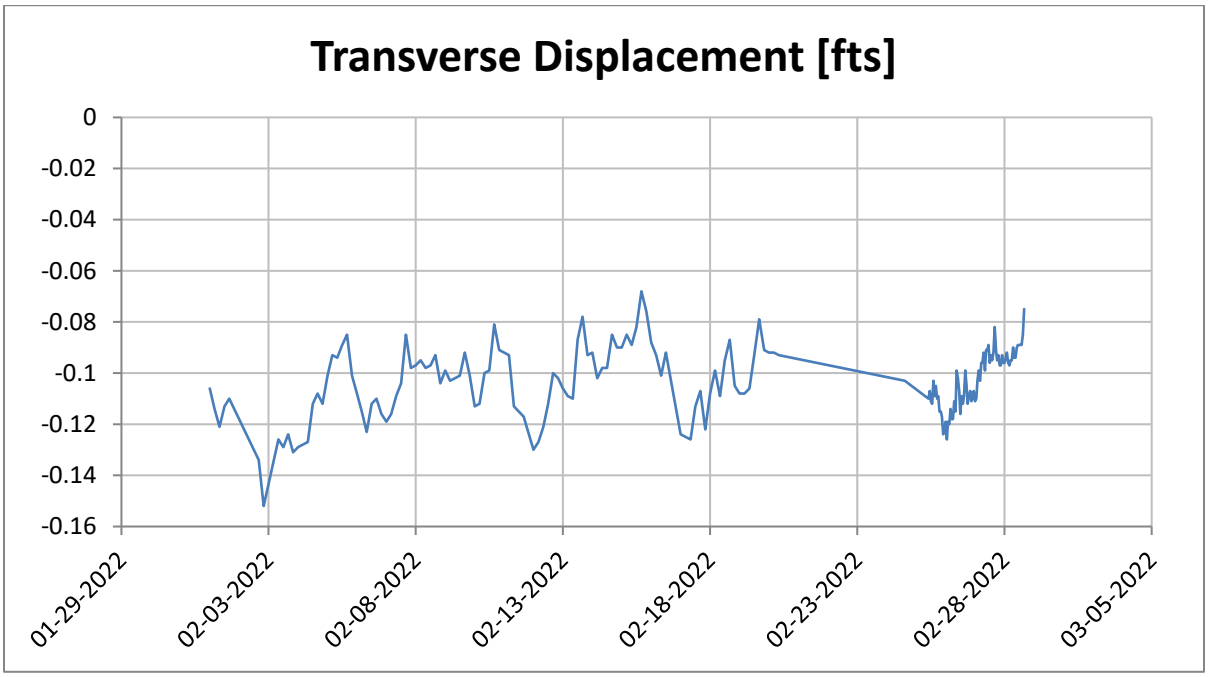


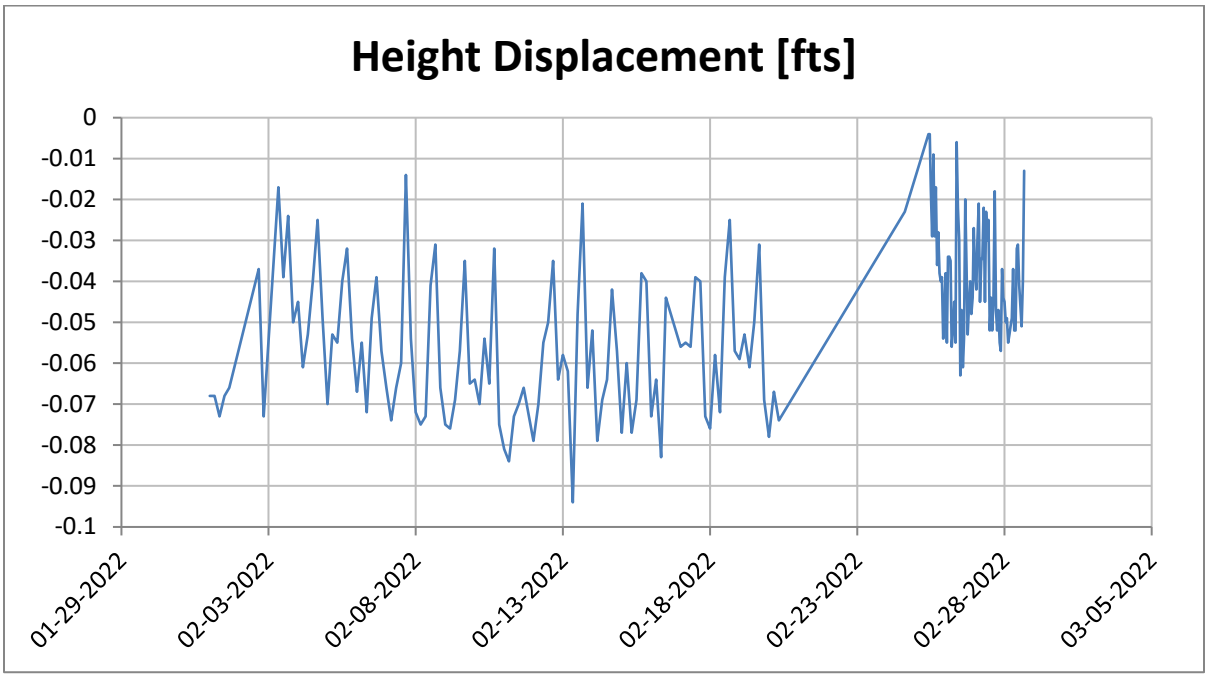


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Alarm recorded on February 10, 2022. Assumed to be data error from inclement weather.
6. Reading interval increased from four hours to one hour.

Prism P33

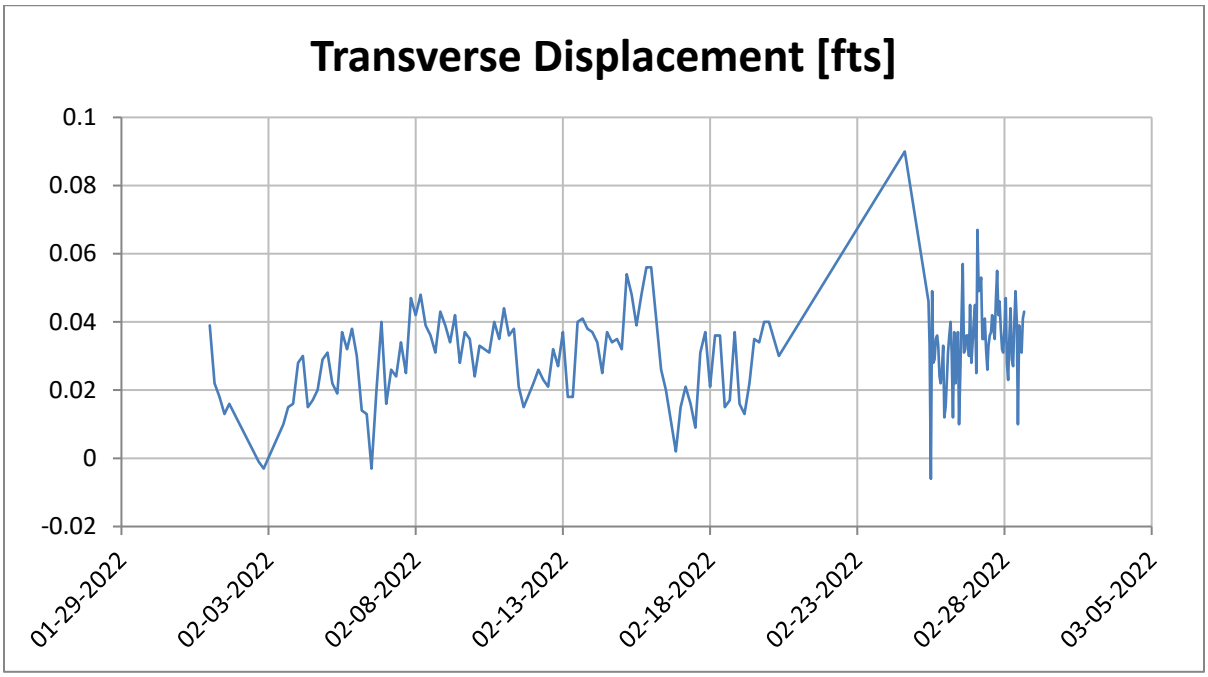


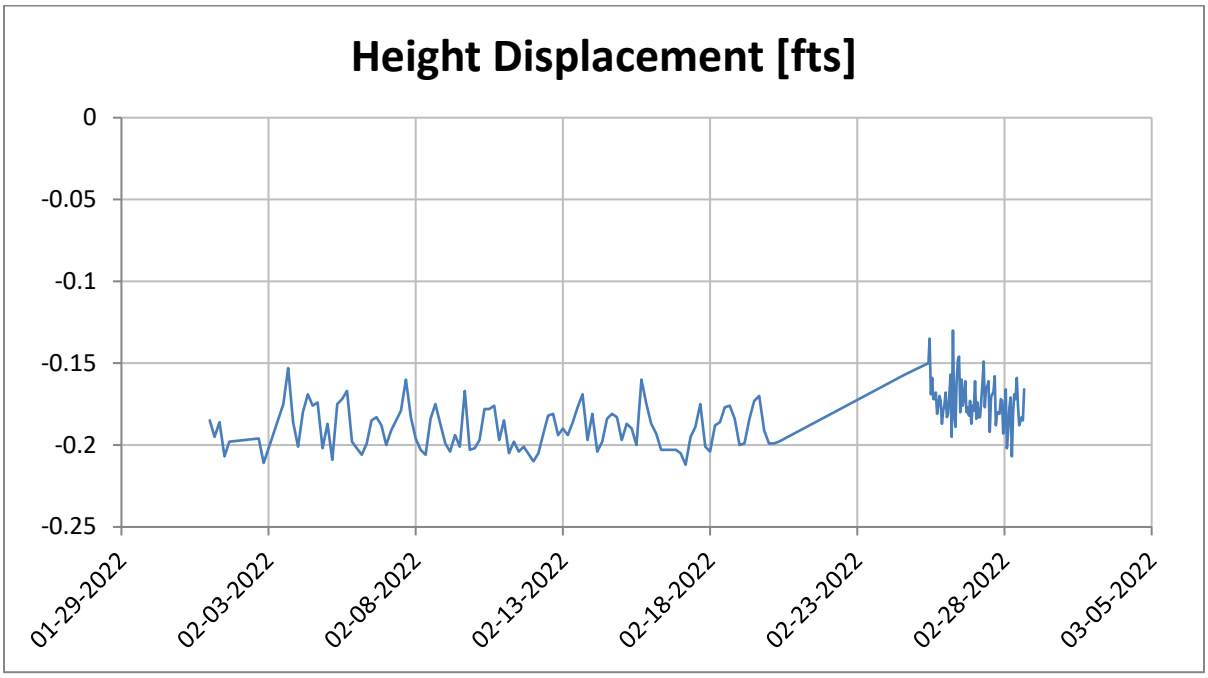


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

Prism P35

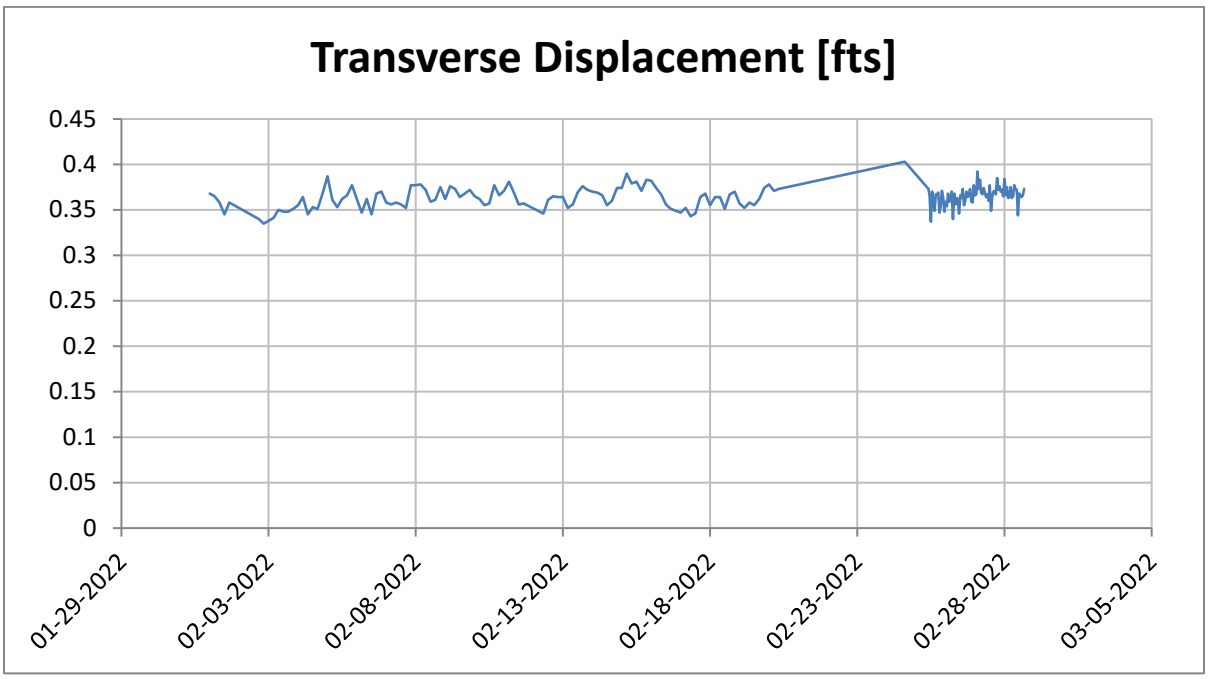


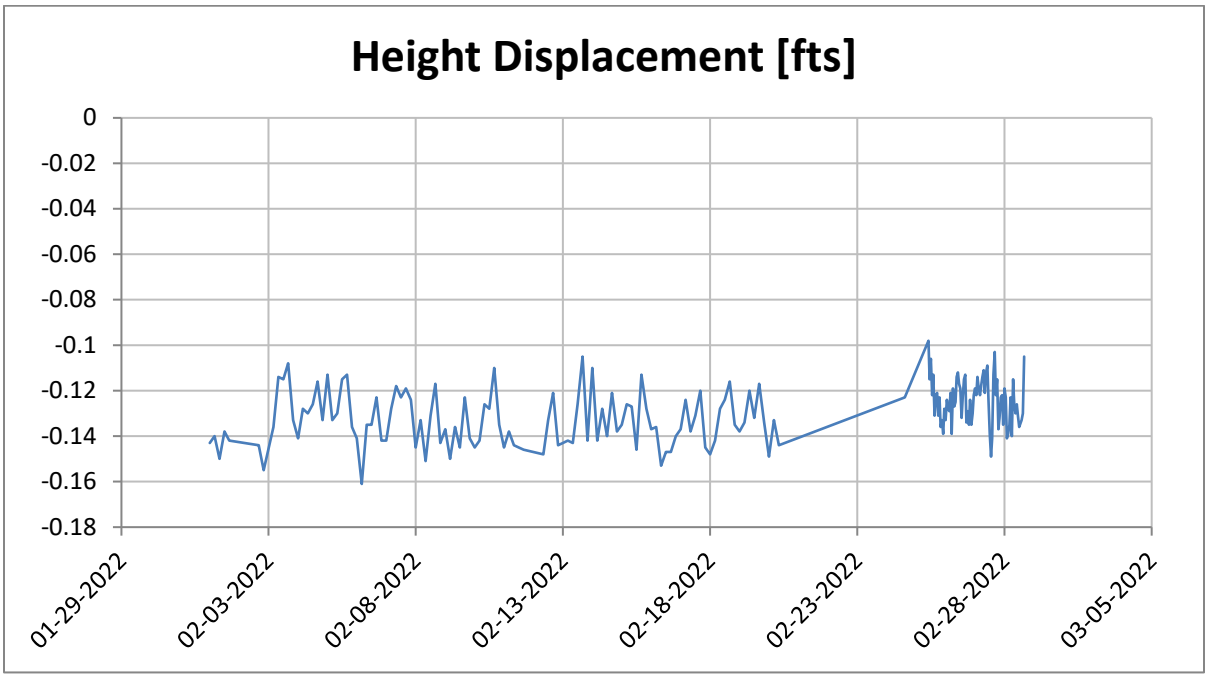


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

Prism P4

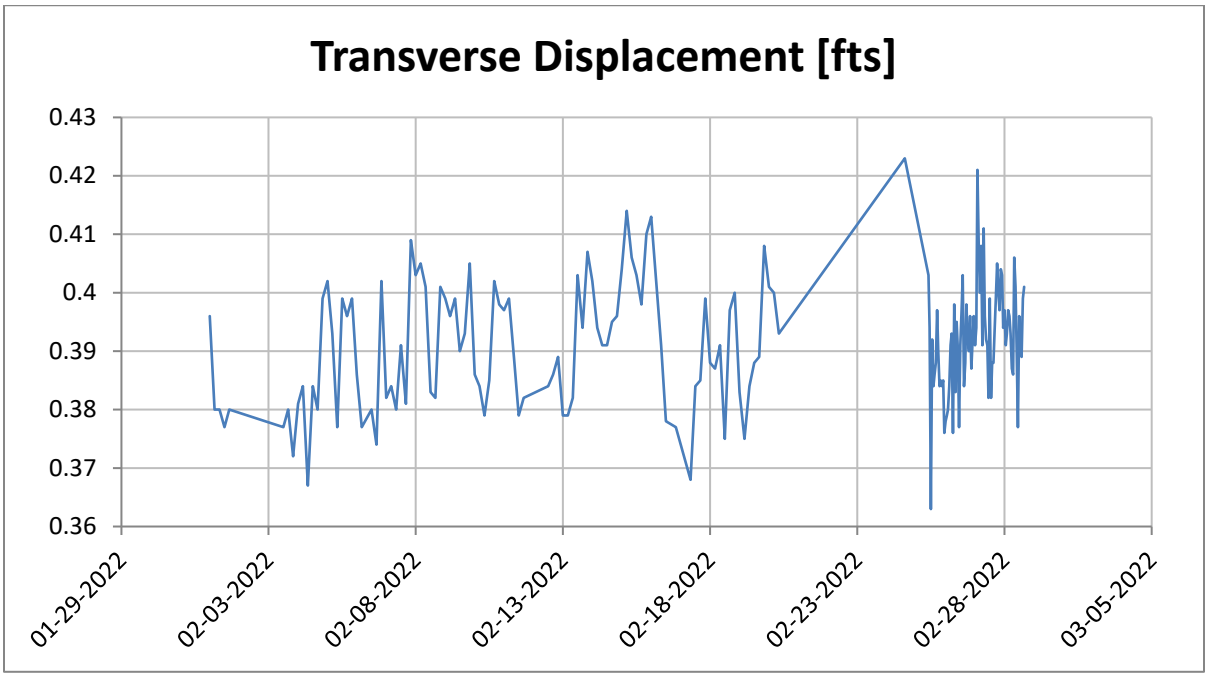


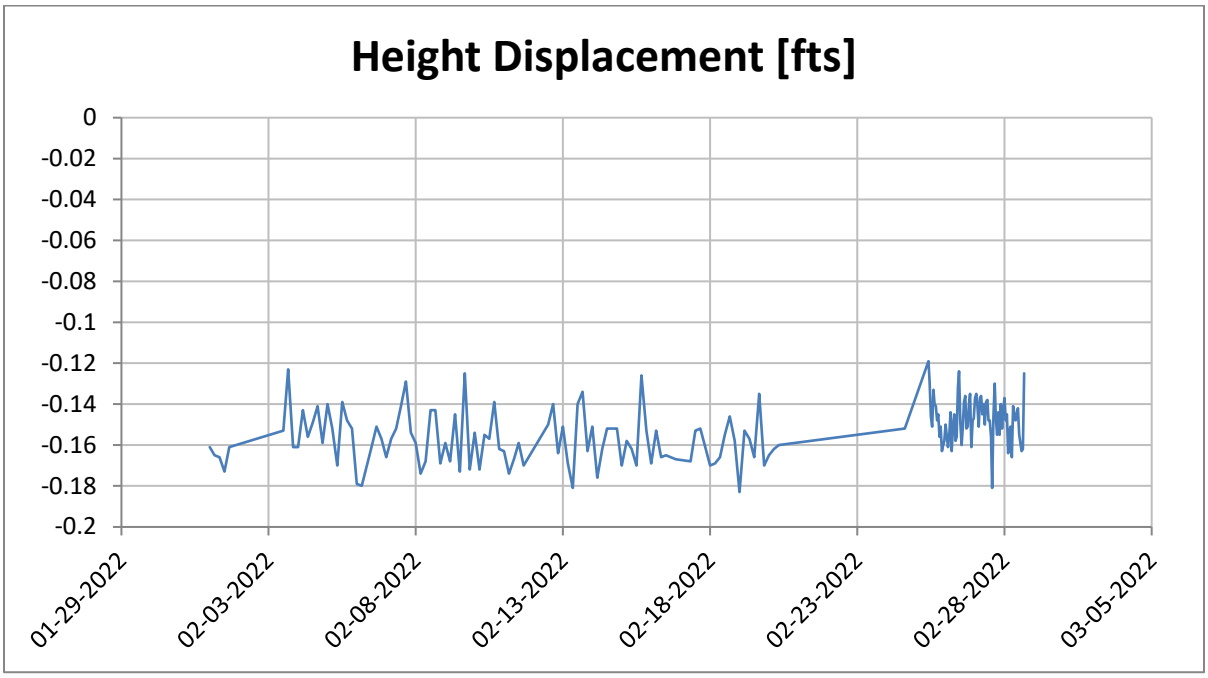


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

Prism P5

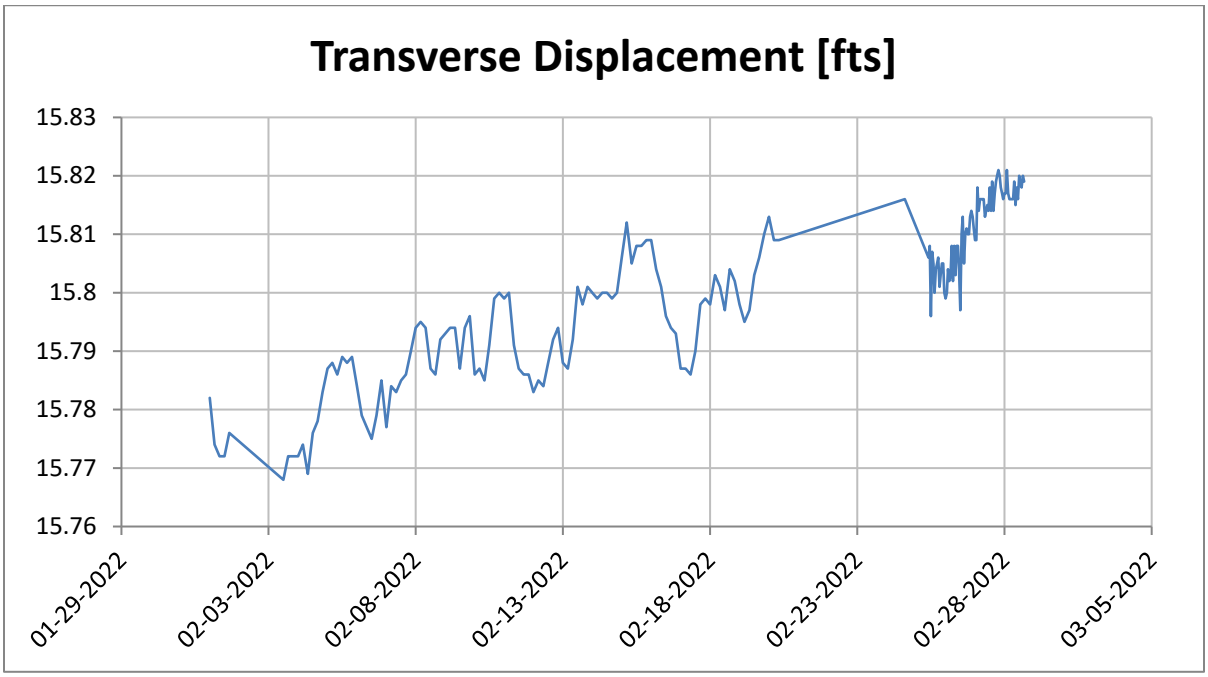


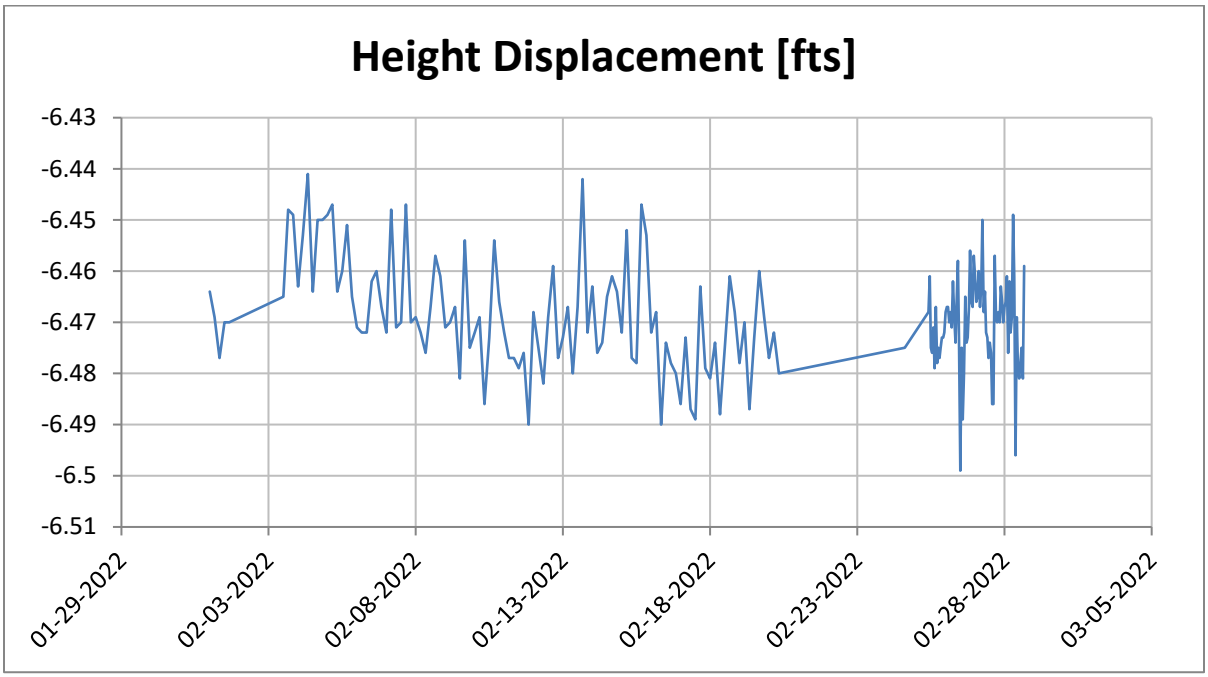


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

Prism P63

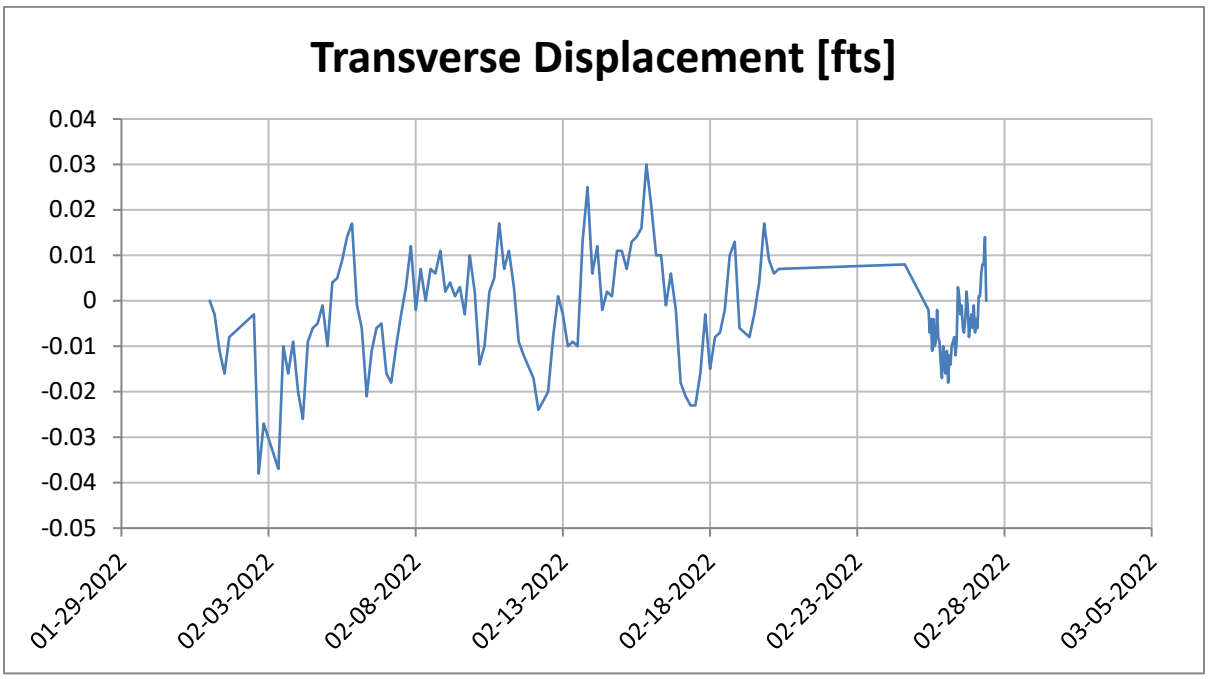


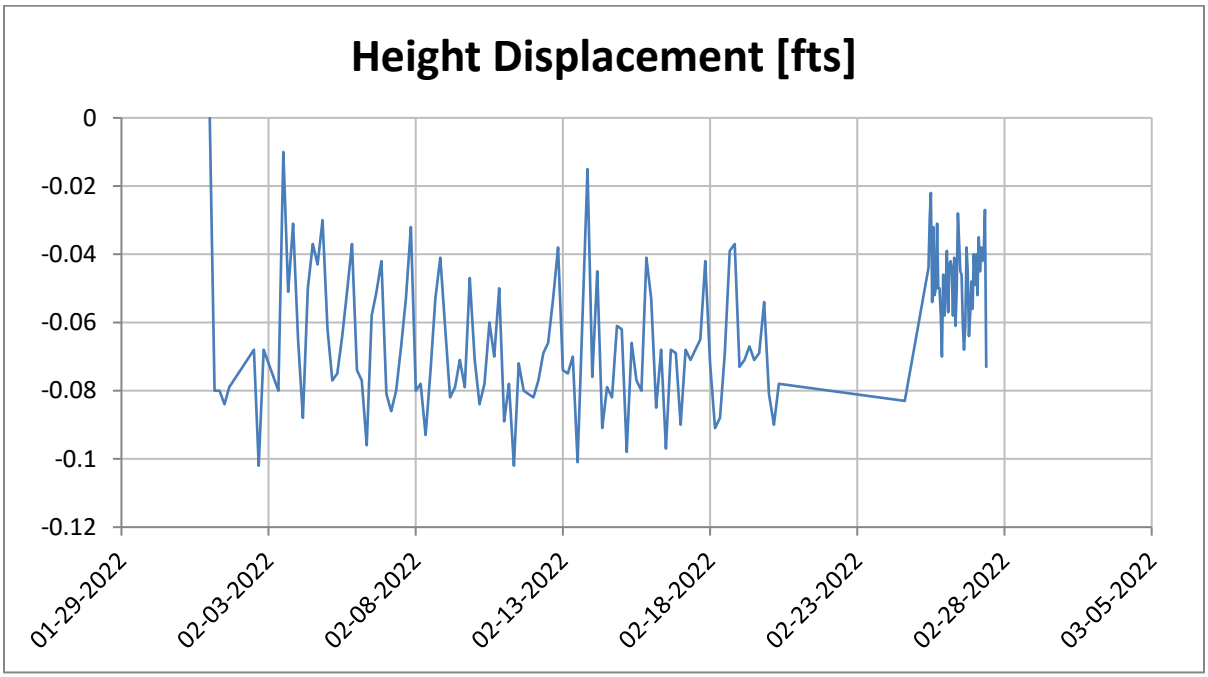


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism records slope creep movements with slow velocity.
6. Reading interval increased from four hours to one hour.

Prism P69

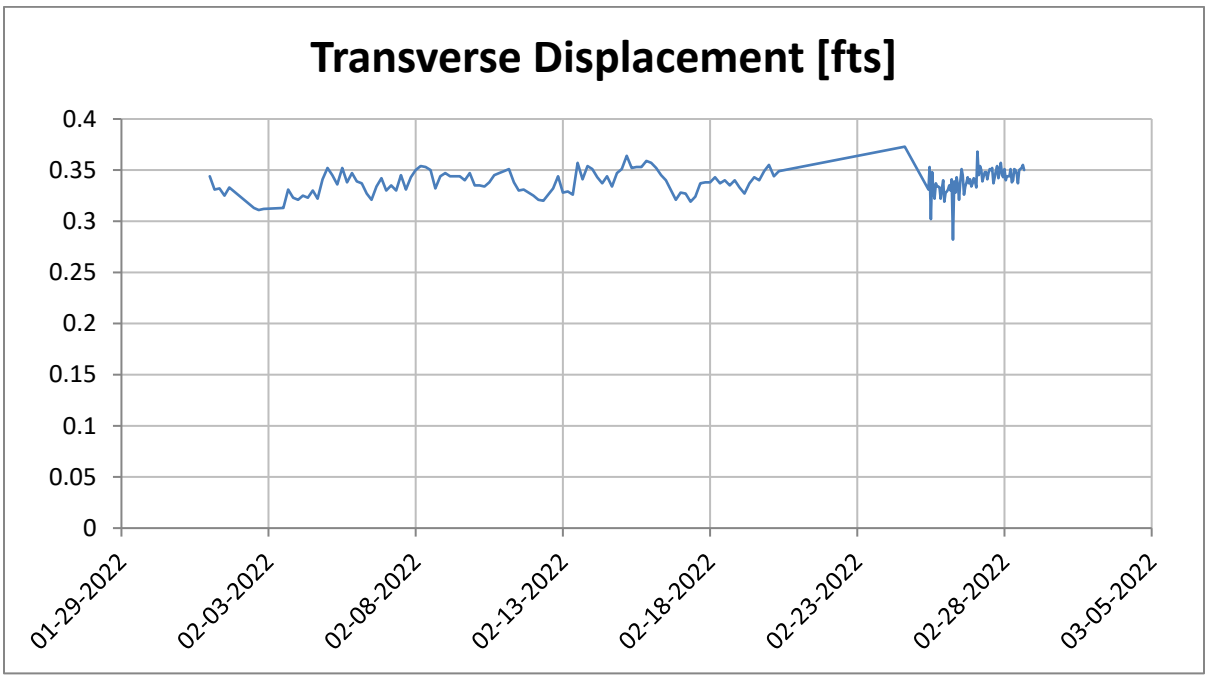


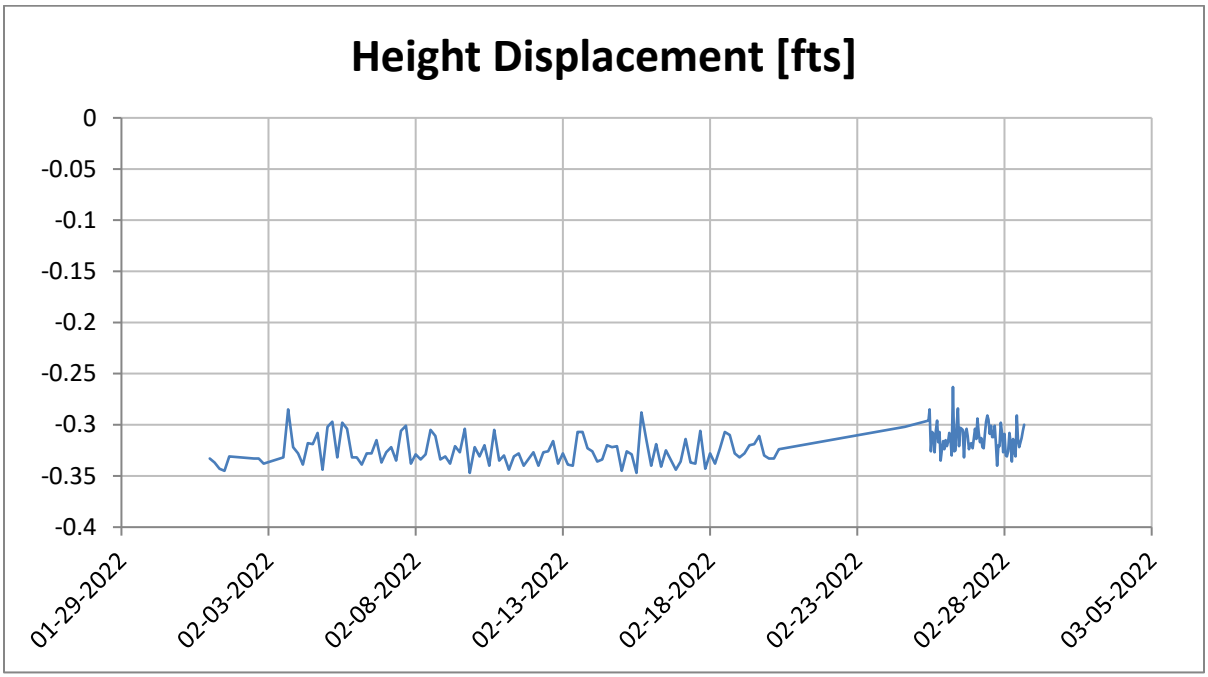


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

Prism P70





Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

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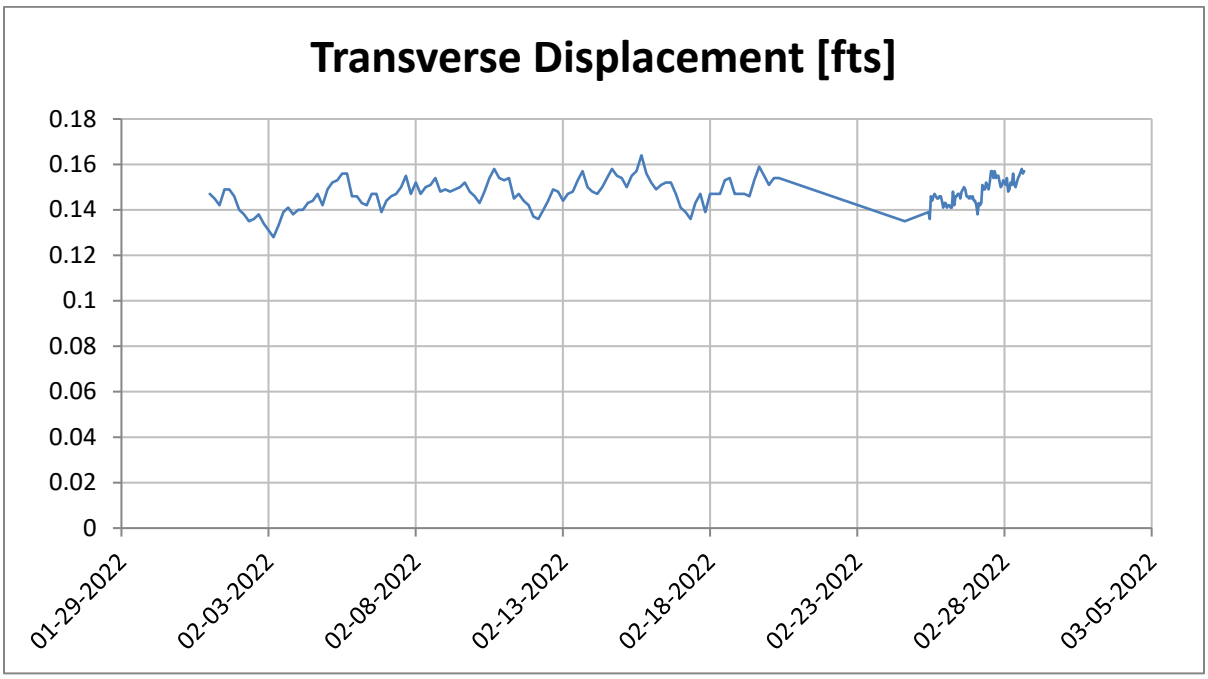
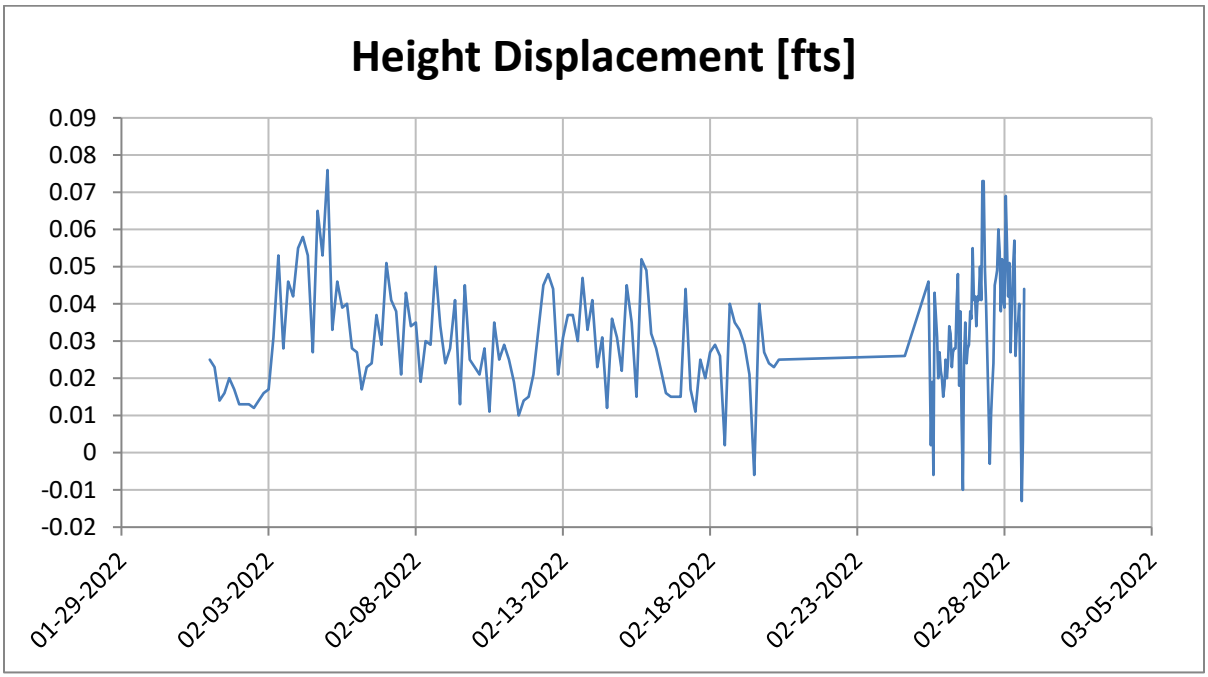
Prism TOE1

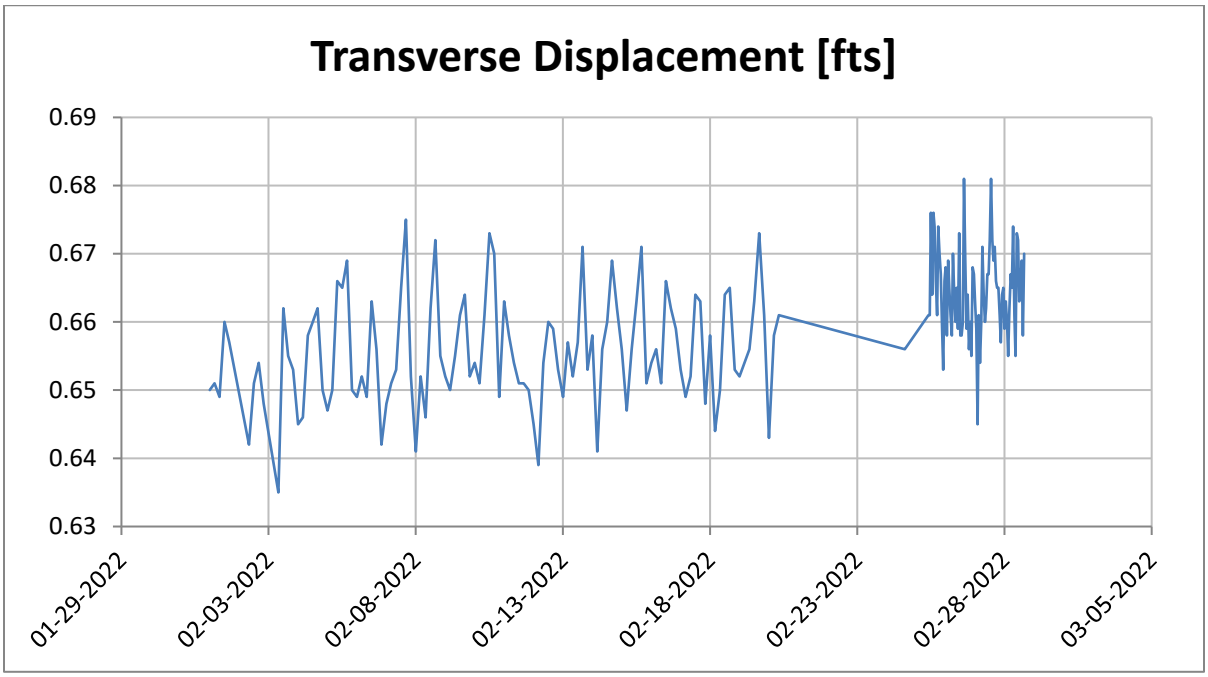


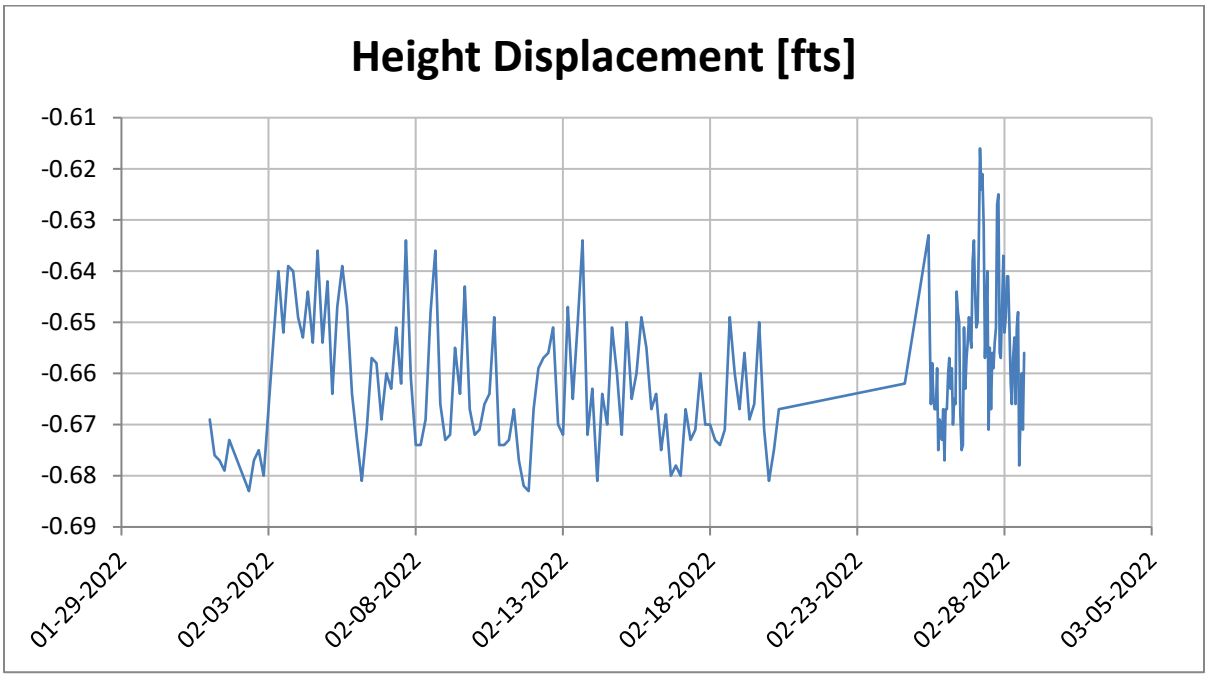


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

Prism TOE2

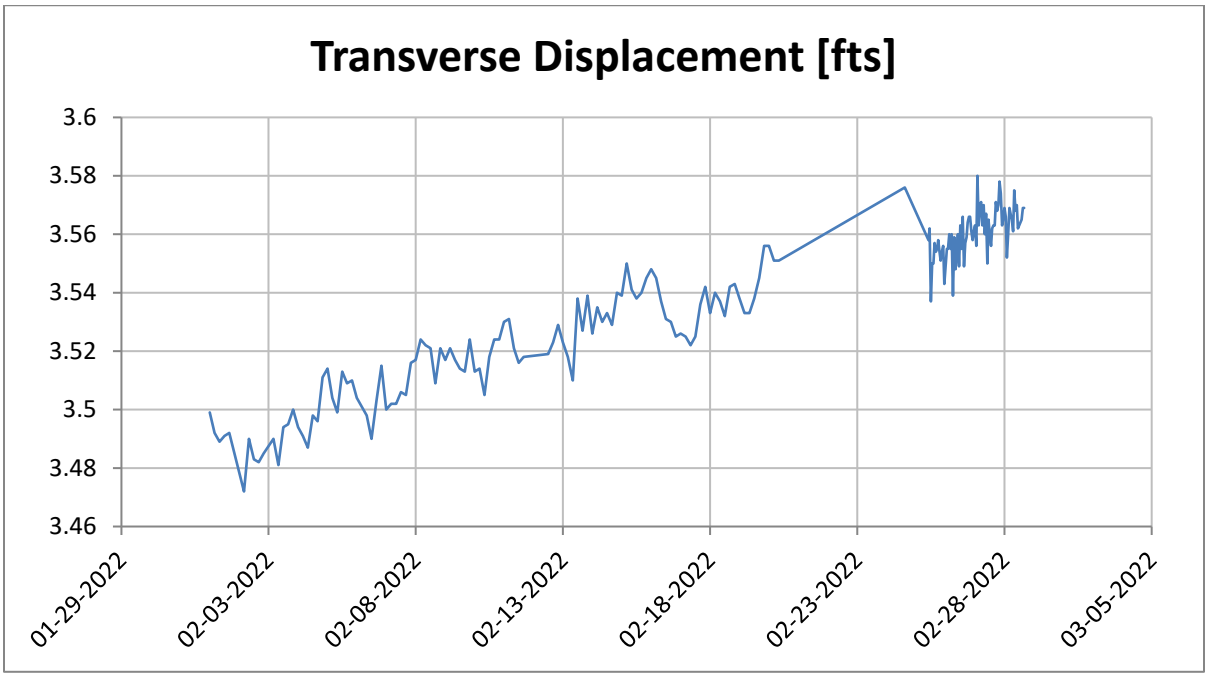


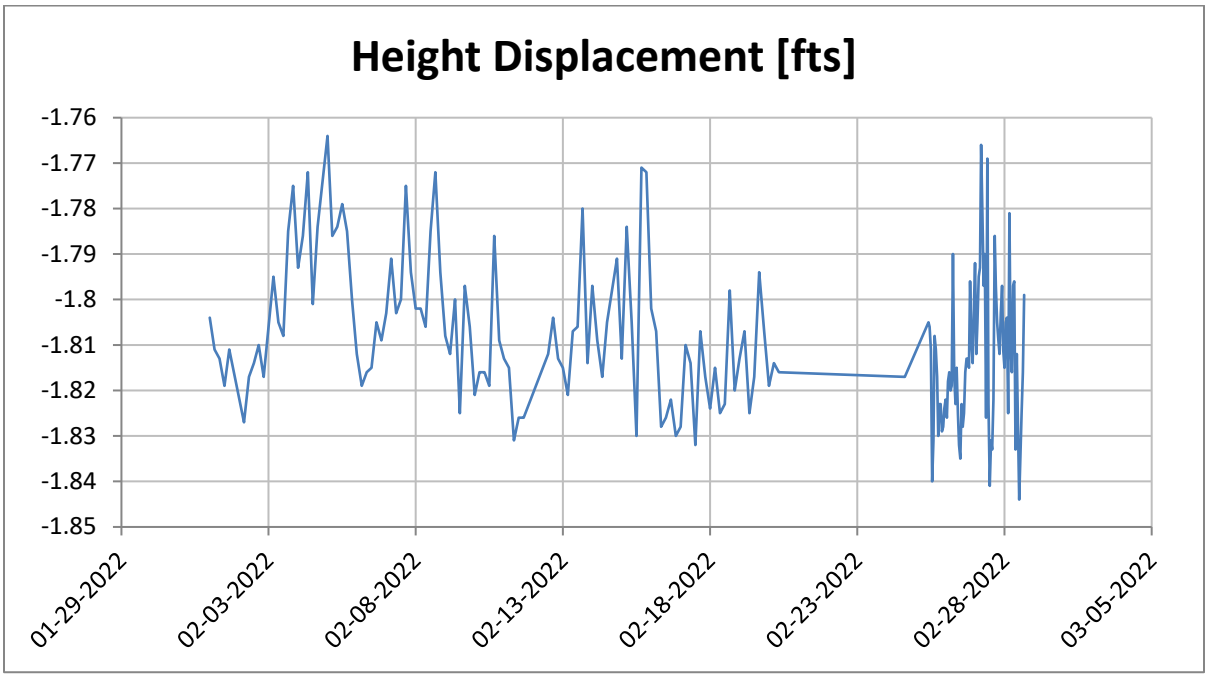


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Reading interval increased from four hours to one hour.

Prism TOE3



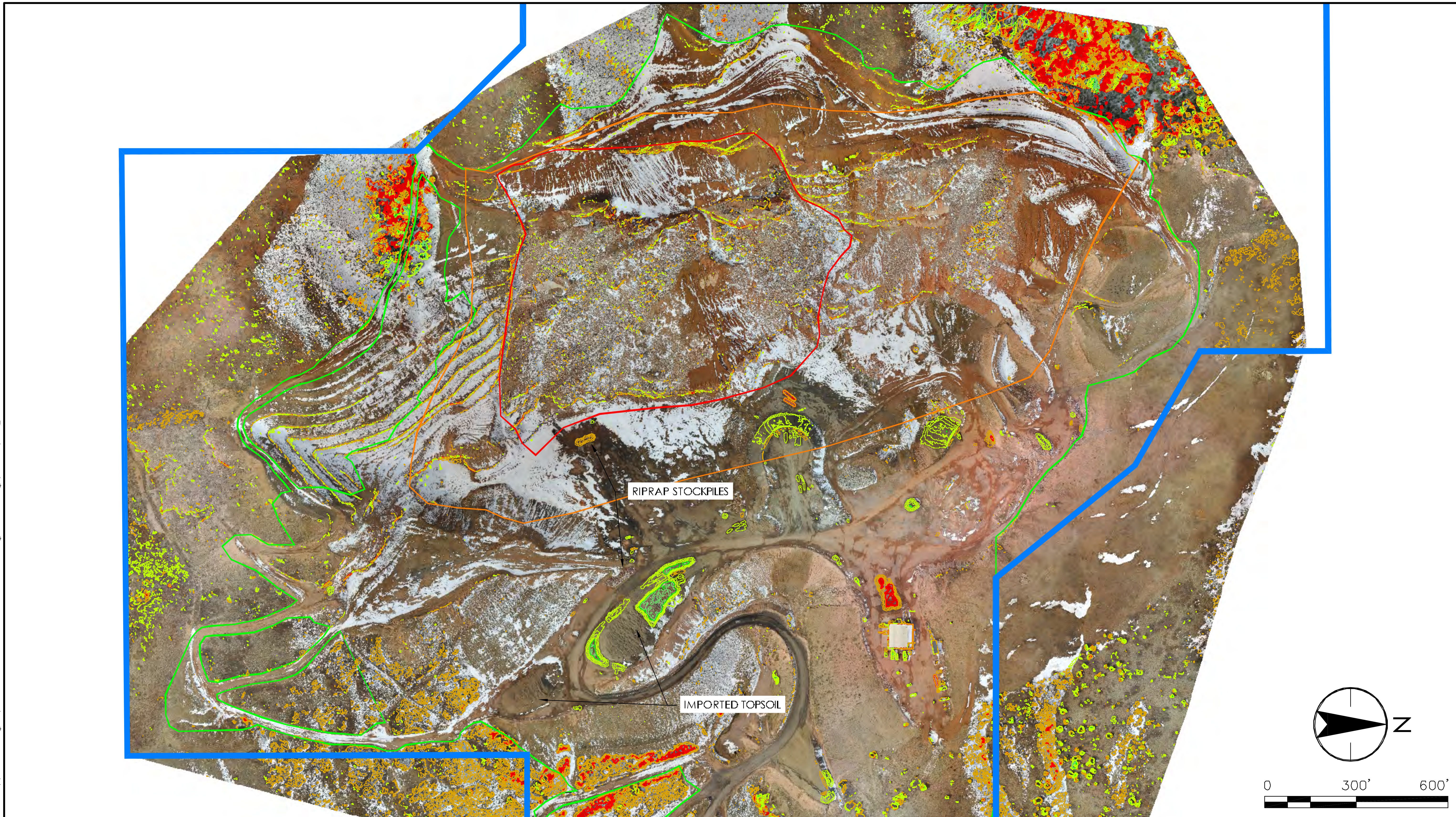


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alarm threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism located at toe of slide where ongoing slope creep movements at slow velocity are expected.
6. Reading interval increased from four hours to one hour.

Appendix C

Drone Survey



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Denver CO 80222-7933
Tel: (303) 758-4058
www.stantec.com

LEGEND

- Permit/Affected Lands Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Comparison Contour. Increase in elevation. (CI=2')
- Comparison Contour. Decrease in elevation. (CI=2')

1. COMPARISON OF DRONE FLIGHTS FROM 01/13/2022 and 02/15/2022.

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
227419041

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision	Date
#	2022.03.31
Drawn By	**Figure No.**
PK	5