

To: Jerald Schnabel
Continental Materials Corp.
File: April 2021 Monitoring Summary

From: Paul Kos
Denver, CO 80222
Date: May 31, 2021

Reference: April 2021 Geotechnical Monitoring Summary Pikeview Quarry

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this April 2021 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. 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 April 2021.

It is important to note that there is currently little activity at the Pikeview Quarry. Operations are limited to importing fill and preparing the growth medium, and no fill is being placed on the slopes. Continuous monitoring by the robotic survey system began in 2010 and has continued through the month of April 2021 uninterrupted. Visual inspections of the slopes were performed by Stantec engineers.

1.1 PURPOSE

The purpose of this report is to summarize the April 2021 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/Monthly
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 MSHA rules and regulations. The limited work performed in April 2021 resulted in the operator visual inspections being limited to stockpiles.

Stantec conducted visual inspections of the Pikeview Quarry slopes on April 21, 2021. 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.

- Due to the presence of fresh snow and wind, certain areas of the site usually visited on a monthly basis were only inspected from a distance during this month's site visit. The areas inspected from a distance during this visit will be inspected in-person the following month. (Note 2)
- The culvert remains cleared but partially blocked inside. Future storm events are expected to remove the remaining sediment, but CMC will use a water truck to clean out the inside of the culvert. (Note 1)
- Observed a new crack on the road on the north side of the quarry. The crack runs parallel to a fill slope and is likely the result of loose fill settling. The crack is not in the vicinity of the landslide and runs perpendicular to the landslide; therefore, it is not related to the landslide.
- Prisms: Several prisms were passed along the walking route and appeared to be in their original position and operating normally. Control points are permanently cemented into the ground while some of the monitoring points are cemented into 5-gal buckets to be portable as needed.
- Gullies and Rills: Gullies and rills have formed on the slopes above the slide area as well as in the burn areas above the quarry. (Note 8)
- Open Cracks: An open crack was observed during this visit. This feature is in an area where cracking is expected to occur as a result of ongoing slope settlement and relaxation. The edges of the crack have eroded suggesting it is not a new feature.
- Healed Cracks: A crack was observed on the slope adjacent to the slide where cracking had previously been observed. This crack runs parallel to the slide and appears to be "healed" and did not indicate any recent movement.
- Crack Free: No cracking was observed on the native granite slopes above the extents of the disturbed area. 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.
- Fill: Material is being imported and temporarily placed on the "production floor". During the visit, different types of material including mulch and general fill were being deposited here for future placement. (Note 4)
- 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 four hours. 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 March 29 a storm damaged and moved Prism NP2. The prism was repaired and placed back in its original position on April 3. On April 24 Prism CP3 was reported stolen; it was replaced on April 26. All other alarms were determined to be caused by rain, snow, or fog. There were no alarms caused by slope movements.

Table 2 Alarm Summary

Date	Notes	Actions taken	Issue Resolved
03/29/2021 to 04/03/2021	Storm damaged and moved NP2 Prism	NP2 Prism repaired and back in position	04/03/2021
04/06/2021	Multiple prisms missing after multiple scans	Rain	04/06/2021
04/07/2021	Multiple prisms missing after multiple scans	Rain	04/07/2021
04/21/2021	Prism P69 and Prism P33 not found	Snow	04/21/2021
04/24/2021 to 04/26/2021	Prism CP3 not found	Prism Stolen	04/26/2021

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. On April 12, a storm tripped a breaker on-site cutting communication between the computer and the station. Several days later power was restored, and communication between the computer and the



station resumed. During this time, the station was working, but it was not able to communicate with the computer to record the data. As a result of this power loss a “jump” can be seen on each of the prism plots for the month of April representing the time during which data was not transmitted. According to Leica documentation, the survey accuracy is $\pm 4 \text{ mm} + 1.5 \text{ ppm}$ for prisms located greater than 500m from the station; these equates to an accuracy of $\pm 0.016 \text{ ft}$. The data show stable conditions with no movement for 18 of 20 prisms with recorded displacements limited to data scatter and not actual movements. Prisms P63 and TOE3 are located at the toe of the landslide, and these locations show slope creep movements at slow velocities ($< 0.001 \text{ feet per day}$). 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)	Needs / Recommendations
CP1	-0.001	-0.015	-0.0364	0.0170	
CP2	-0.057	-0.007	0.0155	0.4031	
CP3	0.348	-0.060	0.0070	0.3550	
NP1	0.167	-0.039	0.0236	0.2285	
NP2	0.048	-0.190	0.0230	0.4472	Prism was moved to replace damaged glass
NP66	0.370	-0.129	0.0190	0.4881	
P1	0.401	-0.152	0.0238	0.6252	
P2	0.362	-0.317	0.0191	0.6052	
P25	0.159	-0.256	0.0375	0.3791	
P32	15.301	-6.261	0.0208	16.5326	
P33	-0.090	-0.052	-0.0112	0.2018	
P35	-0.023	-0.027	0.0078	1.9793	
P4	-0.007	0.024	0.0073	0.1452	
P5	-0.071	-0.096	-0.0224	0.2565	
P63	-0.004	-0.070	-0.0028	0.0984	Prism at toe of slide. Movements are within expected range.
P69	0.059	-0.009	0.0096	0.0640	
P70	0.275	-0.220	0.0075	0.3574	
TOE1	0.309	0.048	0.0136	0.4837	
TOE2	0.032	-0.019	-0.0062	0.0373	
TOE3	0.148	-0.012	0.0392	0.1488	Prism at toe of slide. Movements are within expected range.



4.0 DRONE SURVEY

The site was flown for aerial imagery using an unmanned aircraft system (UAS or 'drone') on, April 22, 2021. 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 create site topography.

The March topography was also compared to the April topography to identify changes in the site topography. Comparison of the two surveys showed that approximately 2443 yd³ of fill had been imported and temporarily placed. 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

No fill was permanently placed at the quarry in April. Once fill placement starts, the fill will be placed in one-foot lifts, moisture conditioned as necessary, and compacted. Compaction testing will commence at the rate of at least one test per 5,000 yd³ placed.

Per CMC, imported material is being stockpiled onsite for placement at a later date. The material will be tested for compaction level and areas failing compaction testing will either be further compacted until the specification is met or removed and replaced in a compacted manner.

6.0 RECLAMATION PROGRESS

CMC is actively working towards reclaiming 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
Project kickoff	10 May-2021
Phase 1 – Issue RFP to Bidders	30-June-2021
Phase 1 – RFP Evaluation & Recommendation	22-July-2021
Phase 2 – Constructor Contract Award	30-July-2021
Phase 3 – Project Kick-off with successful Contractor	5-Aug-2021
Phase 4 – Contractor Mobilization to Site	7-Sept-2021
Phase 4 – Contractor Demobilize from Site	31-Dec-2022
Phase 5 – Final Revegetation season 2 Begins	20-April-2022- until acceptance

Progress of activities April 2021

- Stantec awarded EPCM contract
- Preliminary development of Construction RFP begins in preparation for June 30th issue to bidders
- Importing fill material continued
- Geotechnical monitoring continued
- Processing of Growth Medium for use as topsoil continued
- Stantec submitted the Grading and Erosion Control Plan and Construction Stormwater Plan to the City of Colorado Springs

Work planned for next month includes:

- CDRMS site inspection scheduled for May 21, 2021
- Detailed engineering and construction-level design plan kick off meeting scheduled for May 10
- Planting test plots to demonstrate Growth Medium viability
- Continue importing fill material
- Continue geotechnical monitoring
- Continue processing of Growth Medium

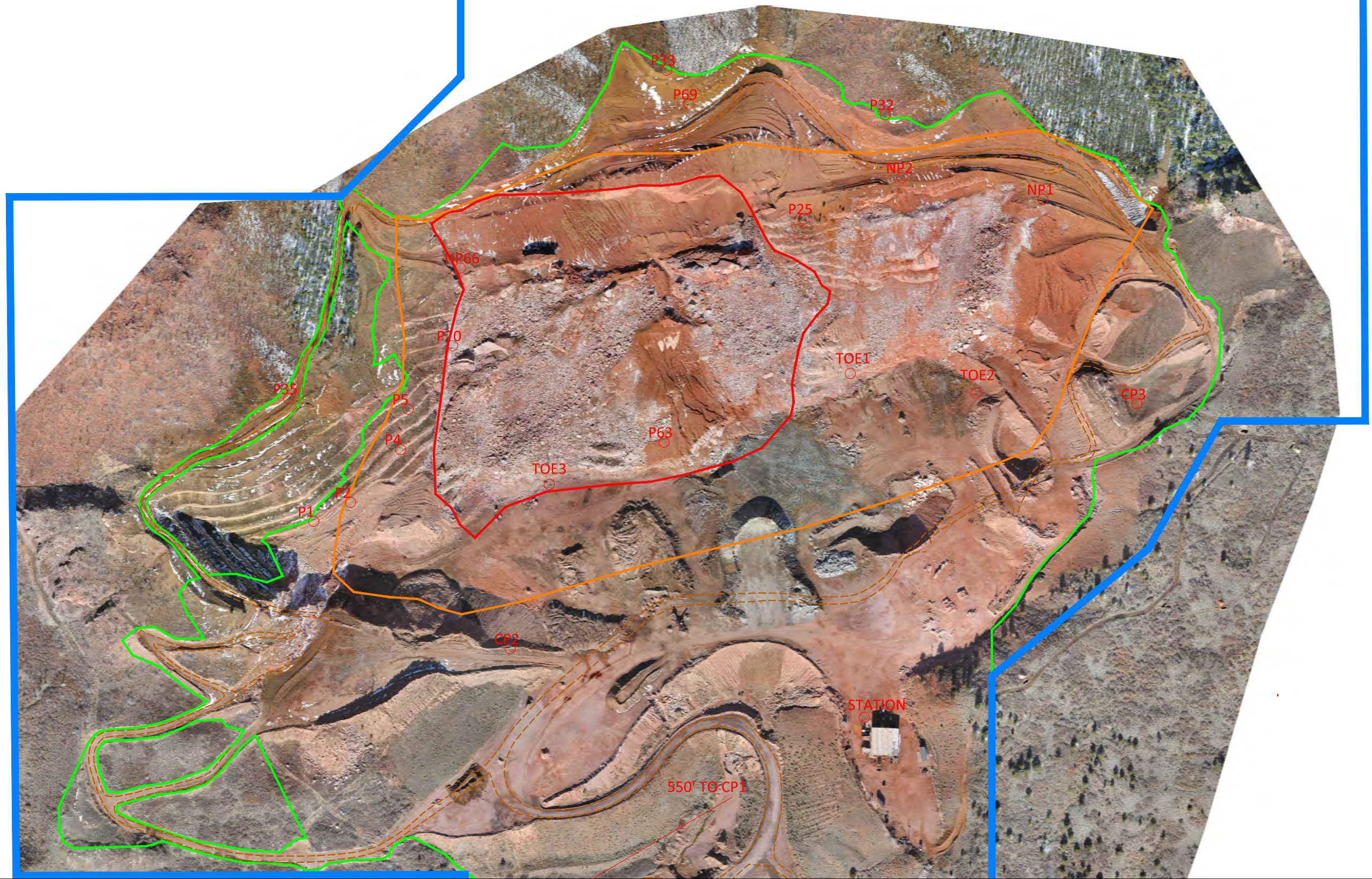
7.0 CONCLUSIONS

None of the data collected in April 2021 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.



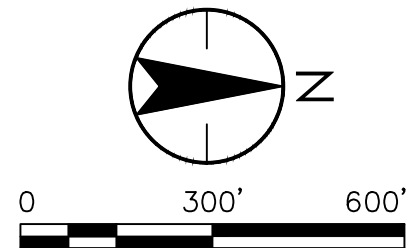
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LEGEND

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



Client/Project
CONTINENTAL MATERIALS
CORP.
PIKEVIEW QUARRY SLOPE
MONITORING

Project No.
227419041

Title
SITE MAP

Revision

Drawn By
PK

Date
2021.05.31
Figure No.
1

Appendix A

Visual Inspections



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6. AREA ABOVE THE SLIDE



5. VIEW TO THE NORTH ALONG THE RIDGE



4. FILL DEPOSITED AT TOE OF SLIDE AREA



3. PRODUCTION FLOOR AND GRAVEL SCREENER



2. VIEW TOWARD SOUTH PEAK



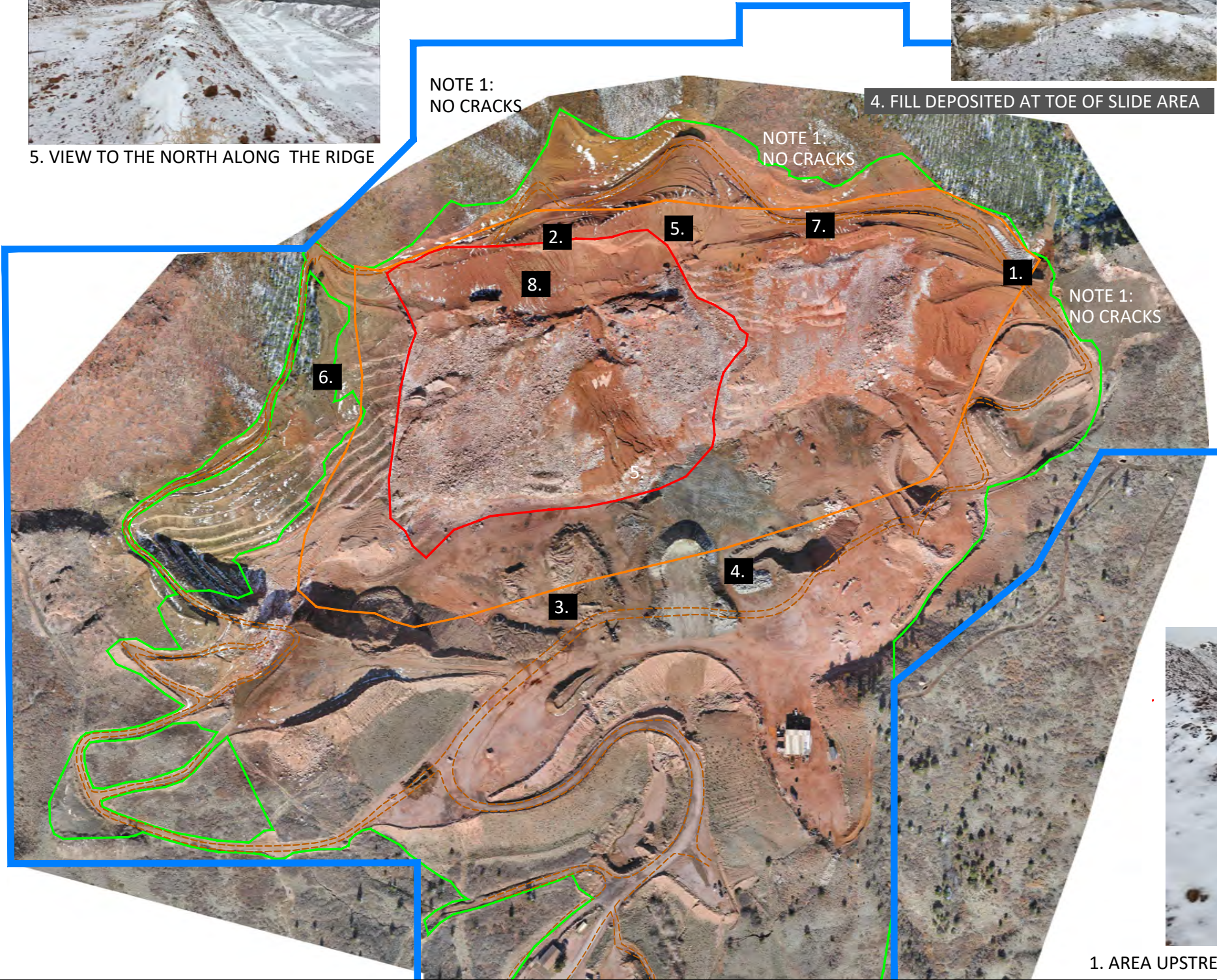
1. AREA UPSTREAM OF CULVERT GETTING CLEARED OF DEBRIS



7. VIEW TOWARD NORTH PEAK



8. RILLS ON SLOPE UNDER PEAK

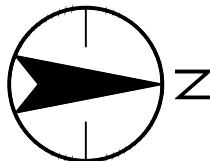


LEGEND

- Blue line: Permit/Affected Lands Boundary
- Green line: Proposed Disturbance Limit
- Red line: Landslide Extent
- Orange line: Buttress Fill Extent

NOTES

1. NO CRACKS OBSERVED IN THIS AREA.
2. ALL PHOTOS TAKEN APRIL 21, 2021.



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Client/Project

CONTINENTAL MATERIALS
CORP.
PIKEVIEW QUARRY SLOPE
MONITORING

Project No.

227419041

Title

OBSERVATIONS FROM APRIL
INSPECTION

Revision

#

Drawn By

PK

Date

2021.05.31

Figure No.

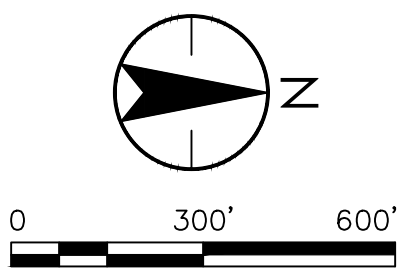
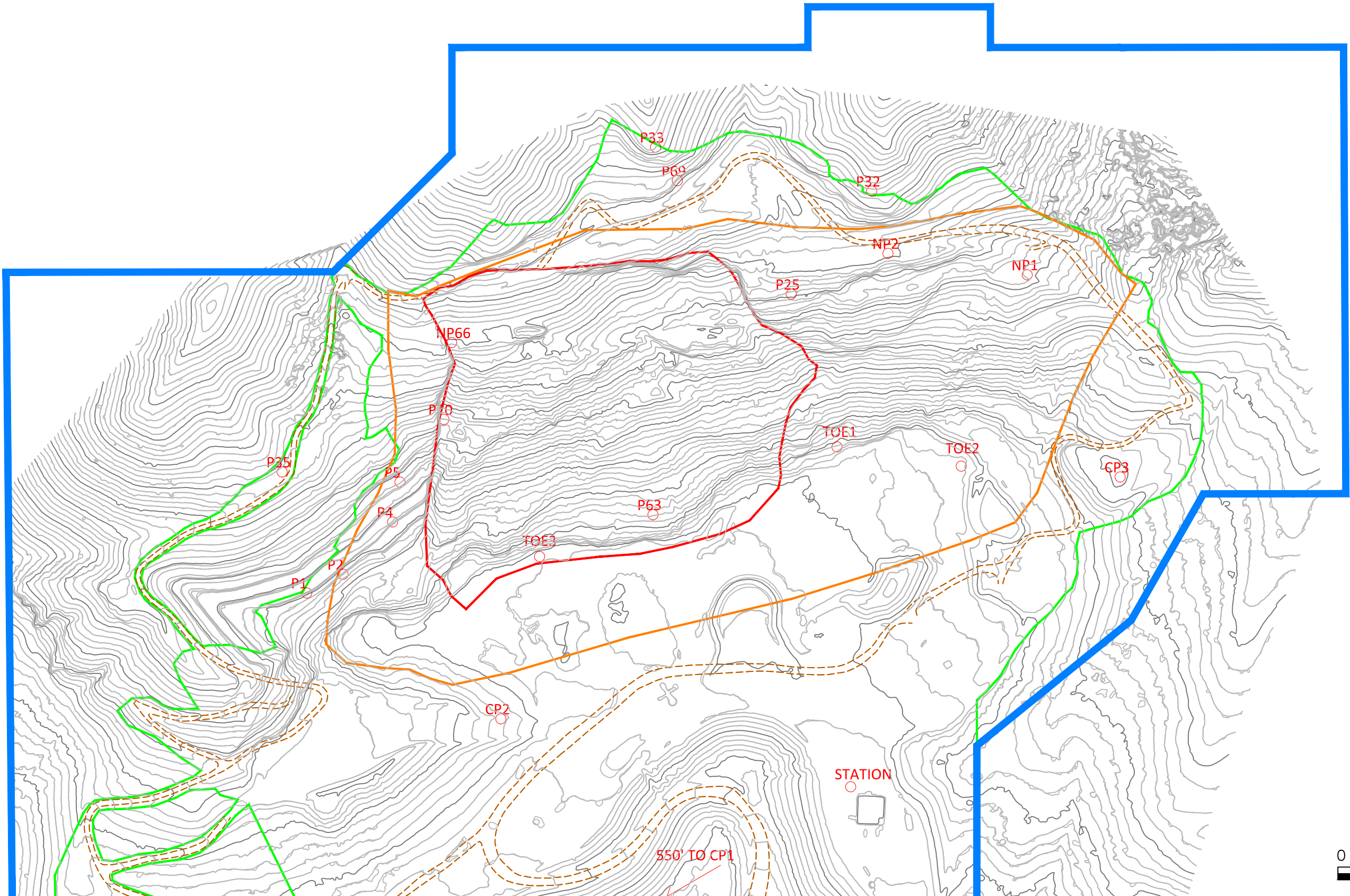
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Appendix B

Prism Survey



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LEGEND

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

- GRADING AND MOVEMENT OF STATION WILL BE EXTENDED AS LONG AS POSSIBLE.
- PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
- ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.
- TOPOGRAPHY FROM APRIL 22, 2021 DRONE SURVEY.
- CONTOUR INTERVAL IS 10 FEET

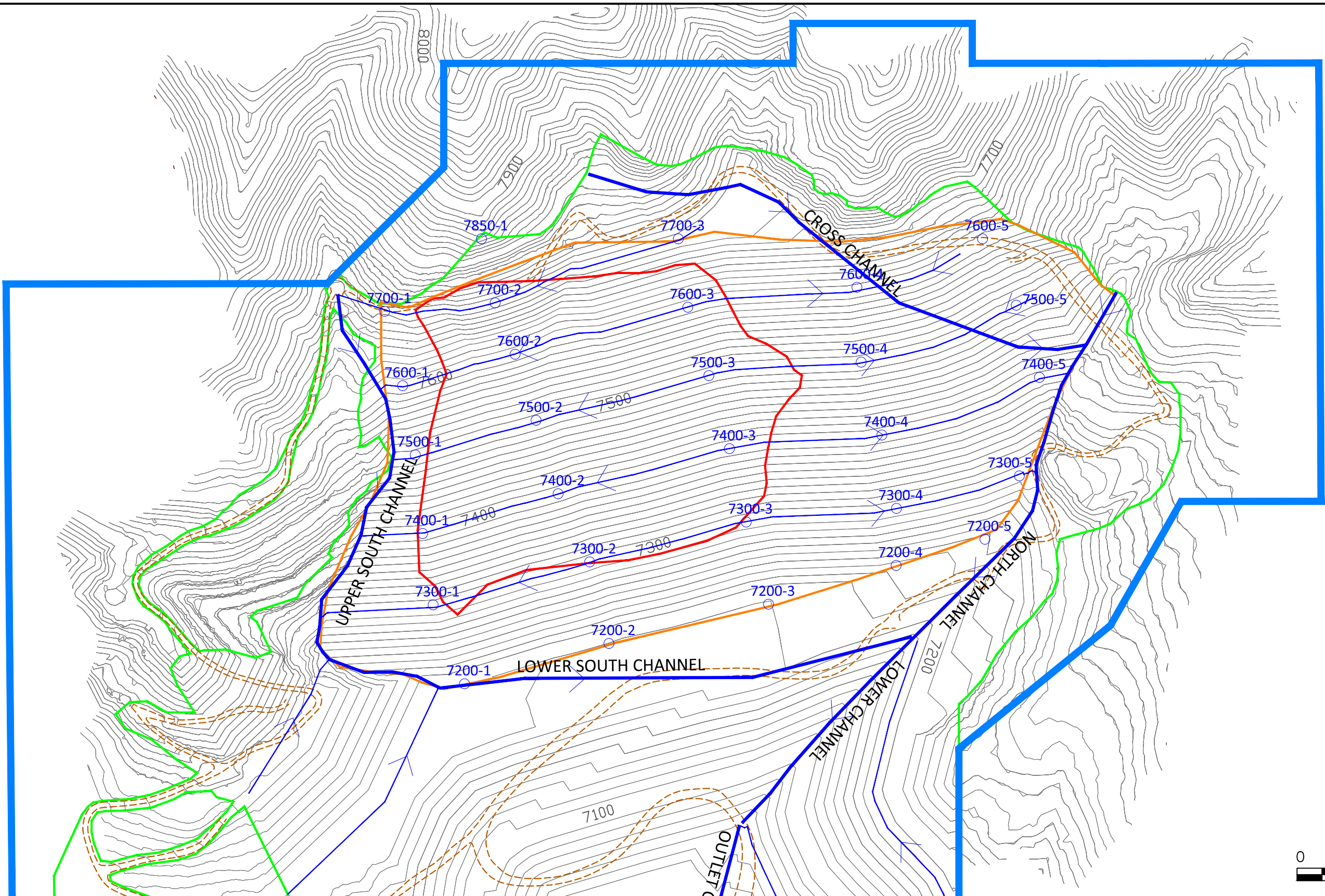
Client/Project
**CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING**

Project No.
227419041

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision #	Date
	2021.05.31
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

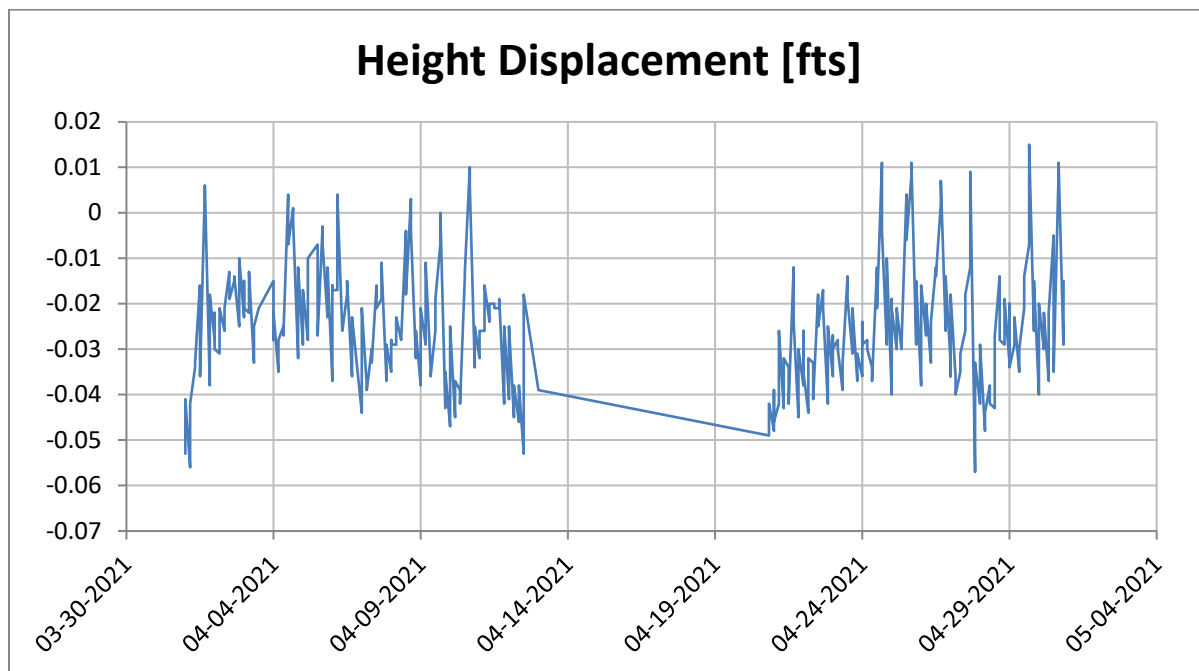
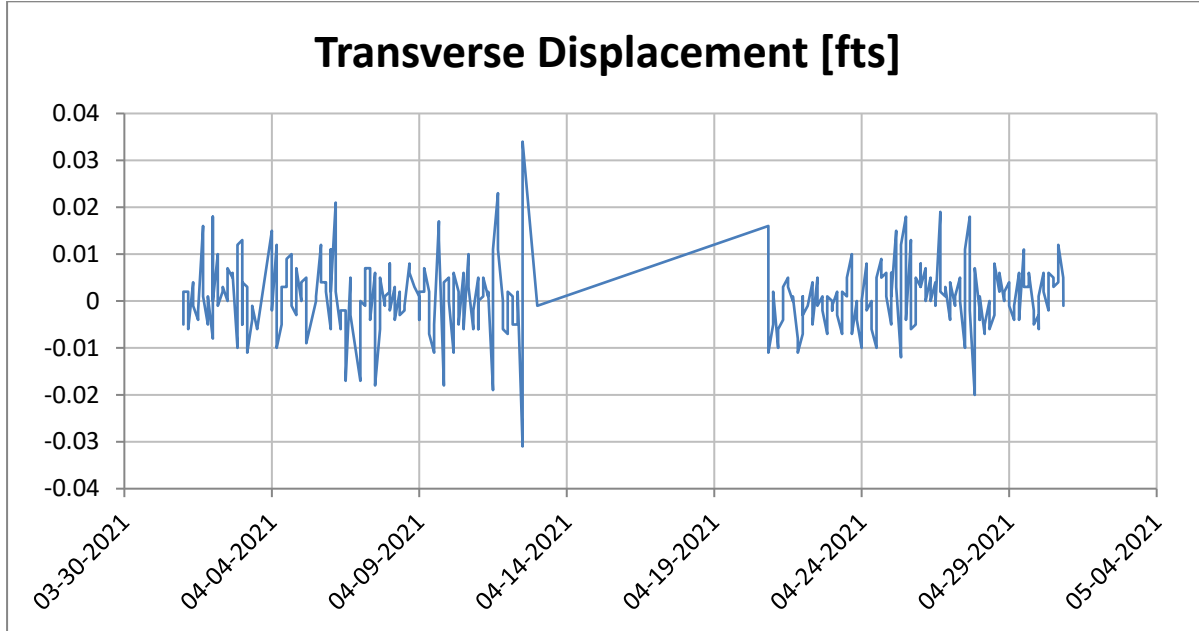
- NOTES
1. GRADING AND MOVEMENT OF STATION WILL BE EXTENDED AS LONG AS POSSIBLE.
 2. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
 3. ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.

Client/Project
**CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING**

Project No.
227419041

Title PROPOSED PRISMS WITH RECLAMATION SURFACE	
Revision #	Date 2021.05.31
Drawn By PK	Figure No. 4

Prism CP1

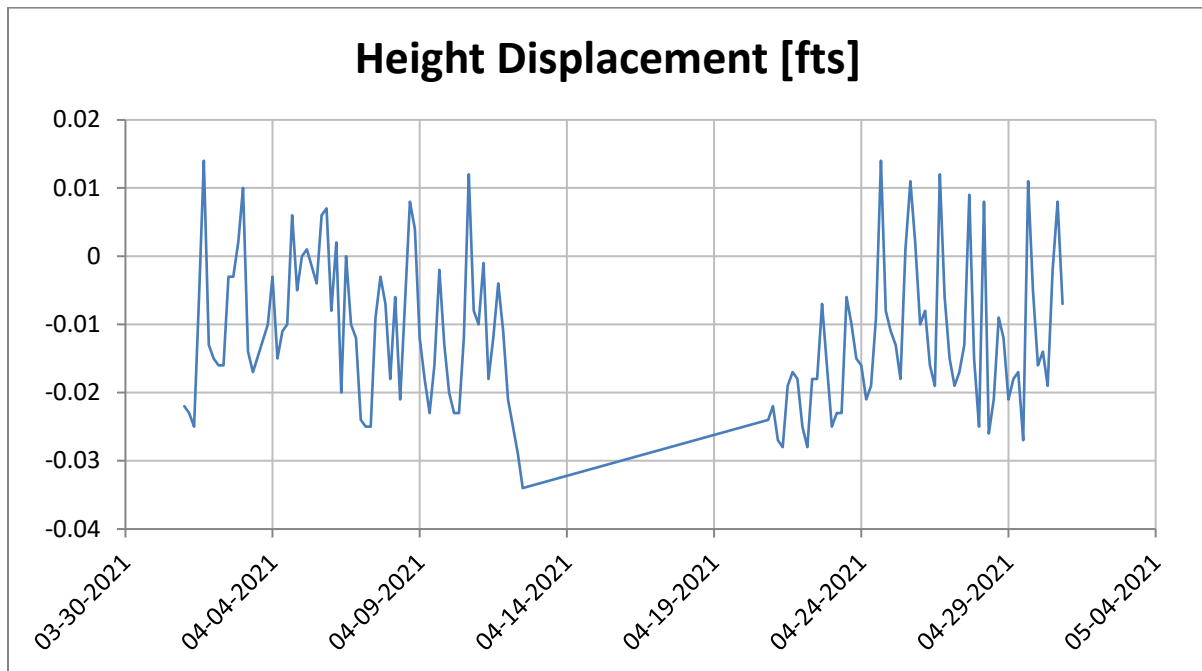
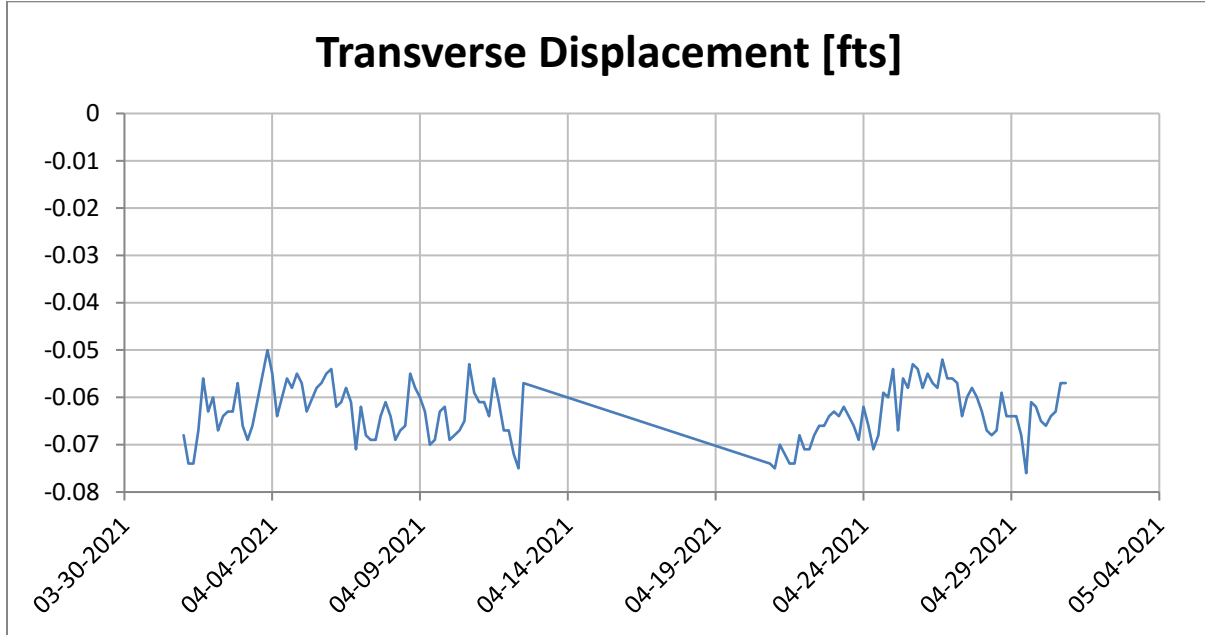


Notes:

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.



Prism CP2

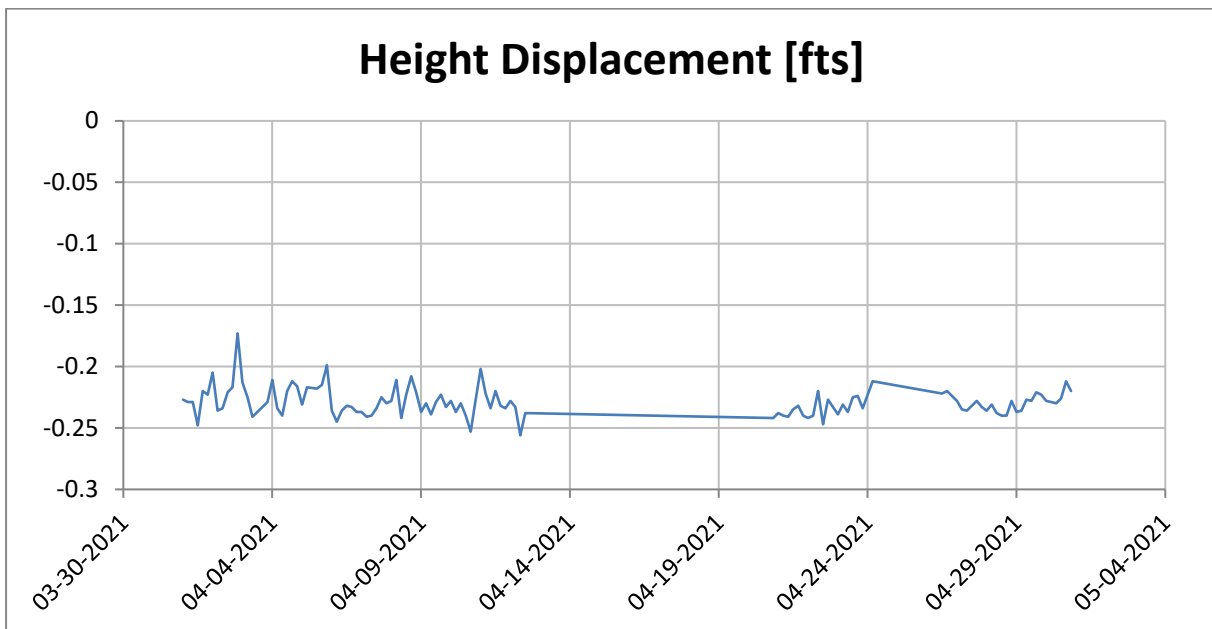
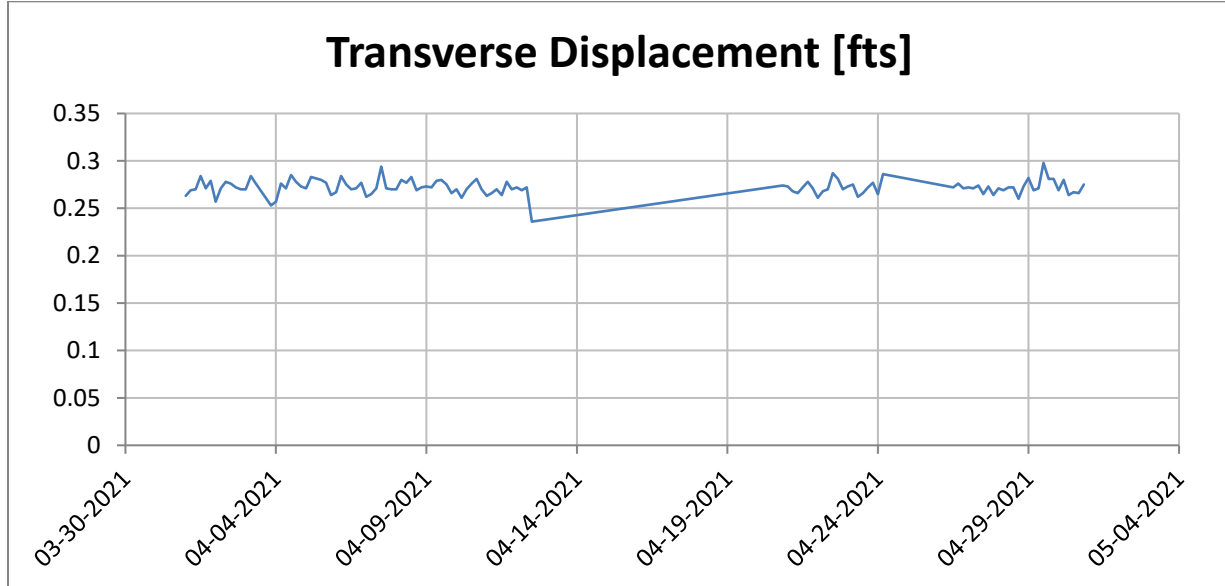


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Prism CP3

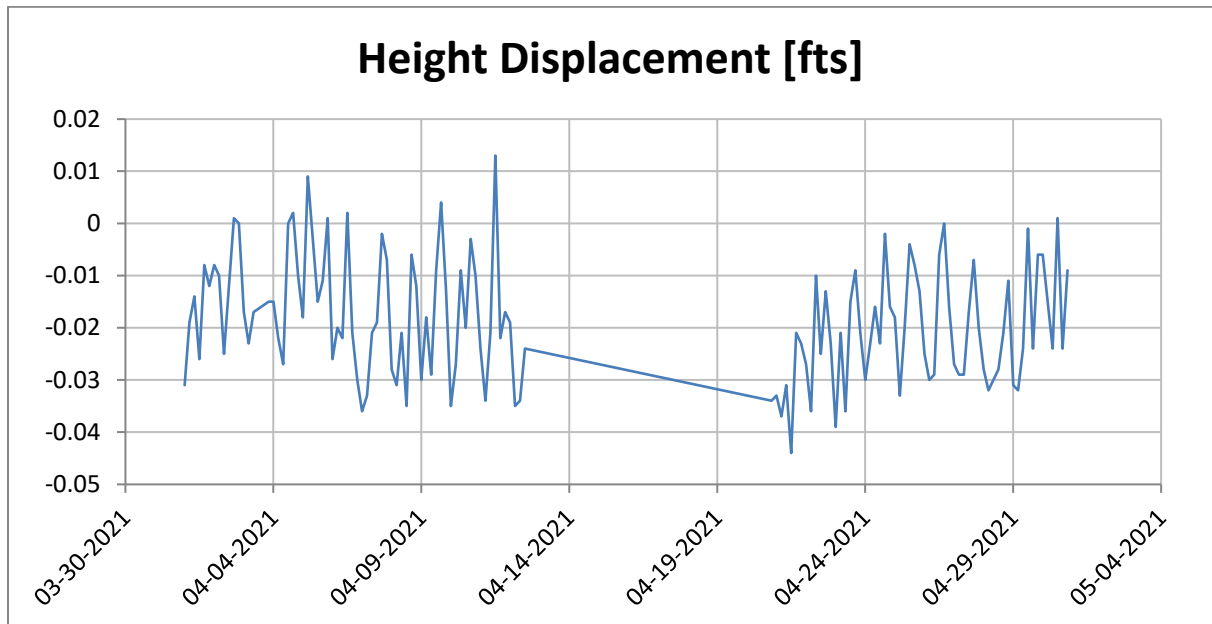
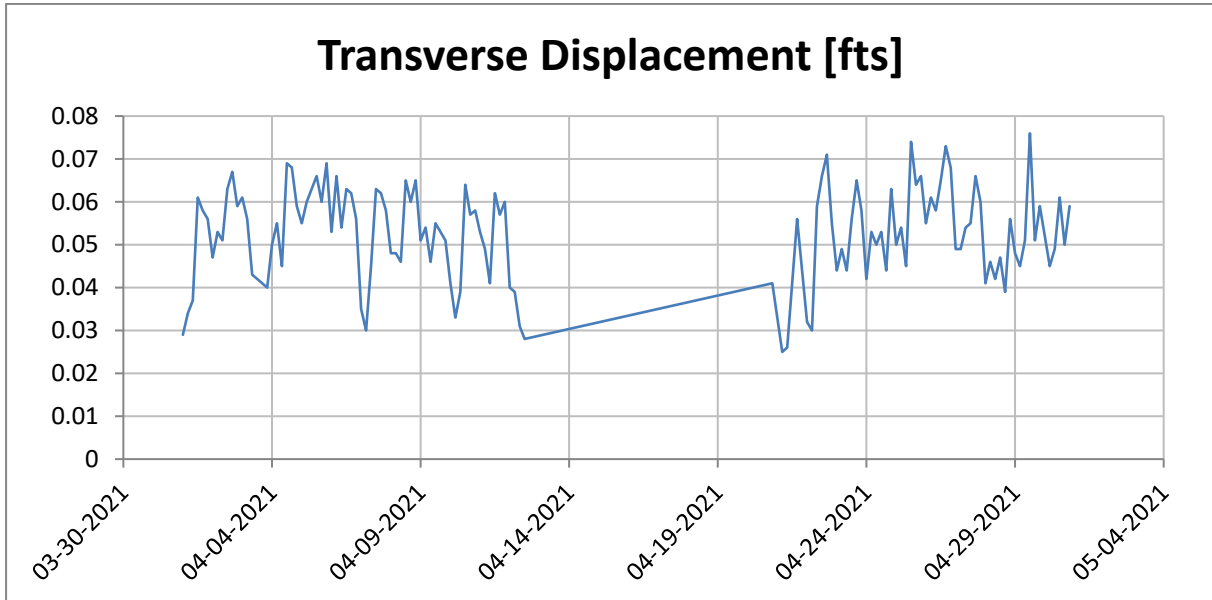


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Prism NP1

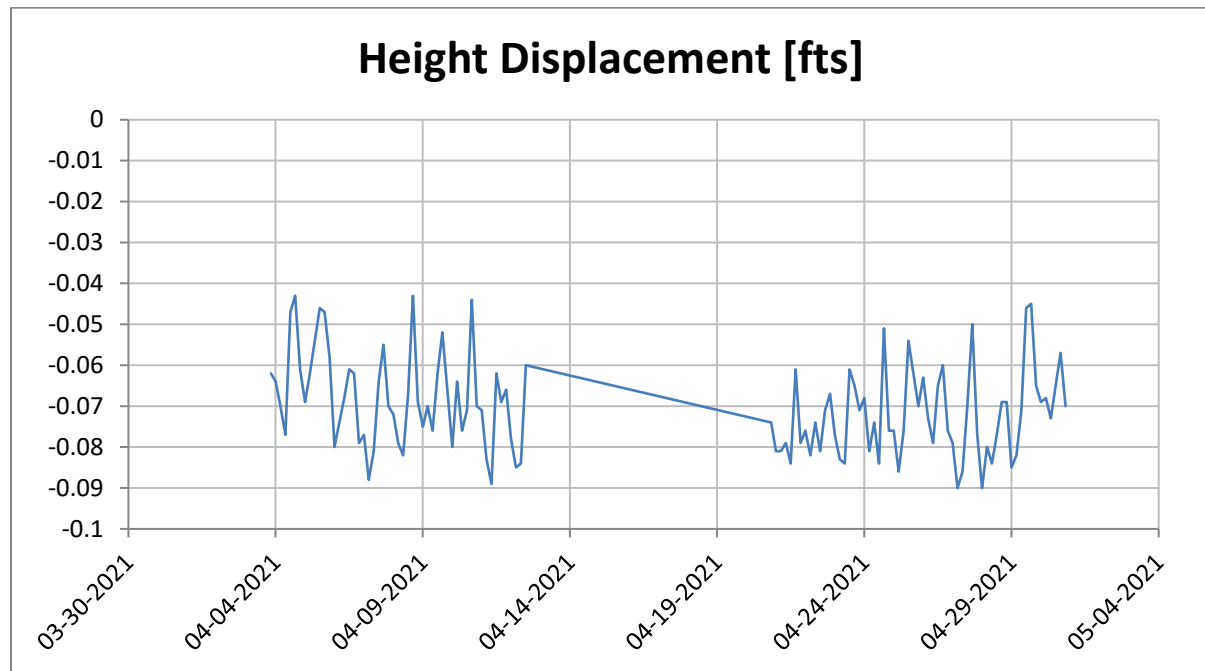
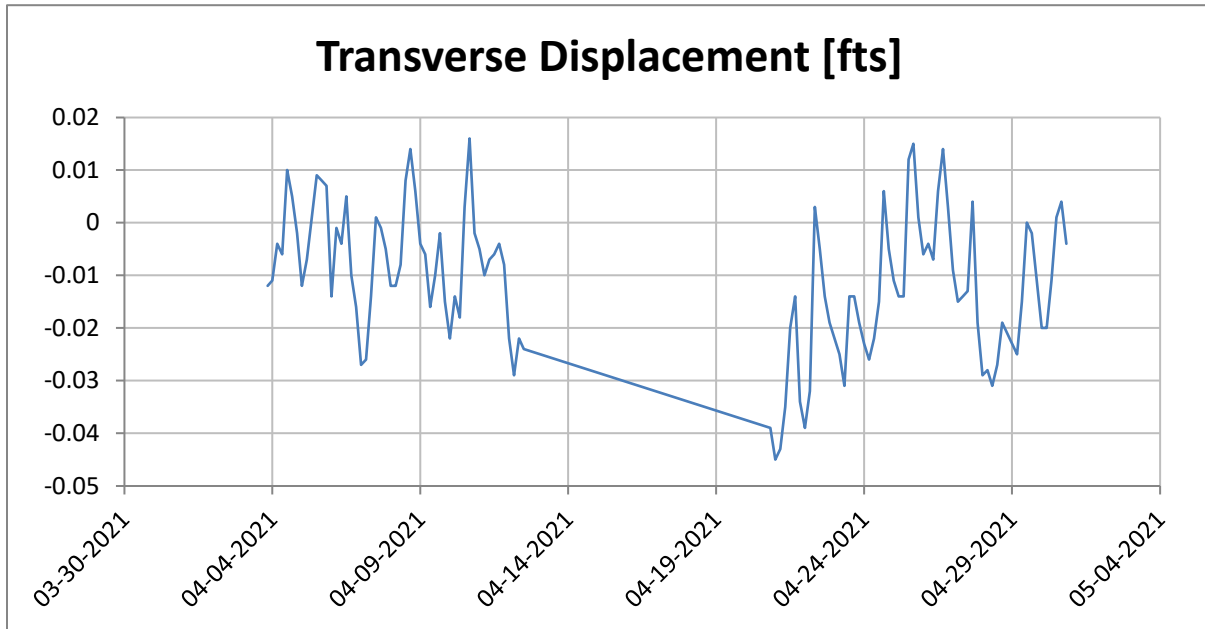


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Prism NP2

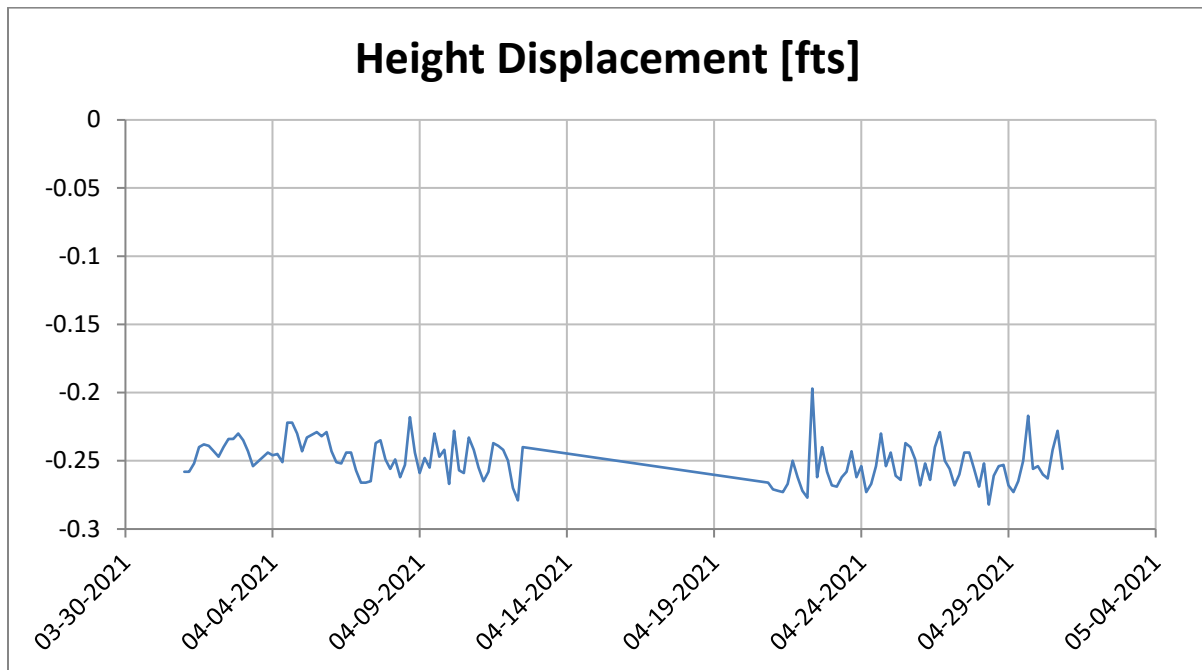
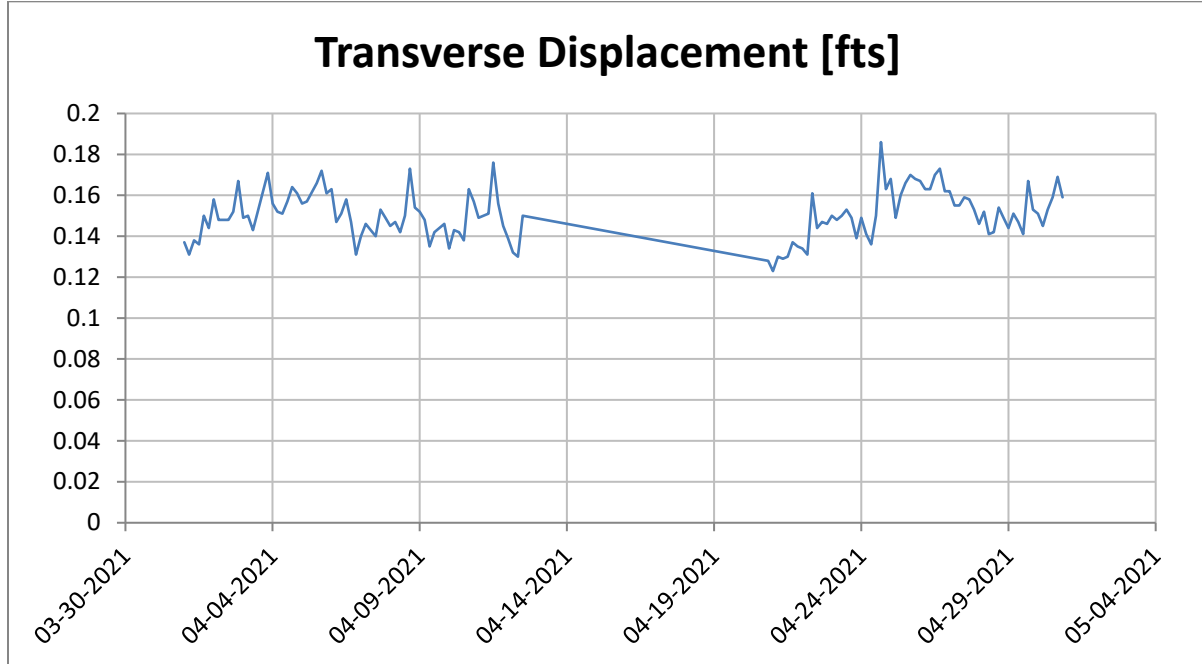


Notes:

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Prism NP66

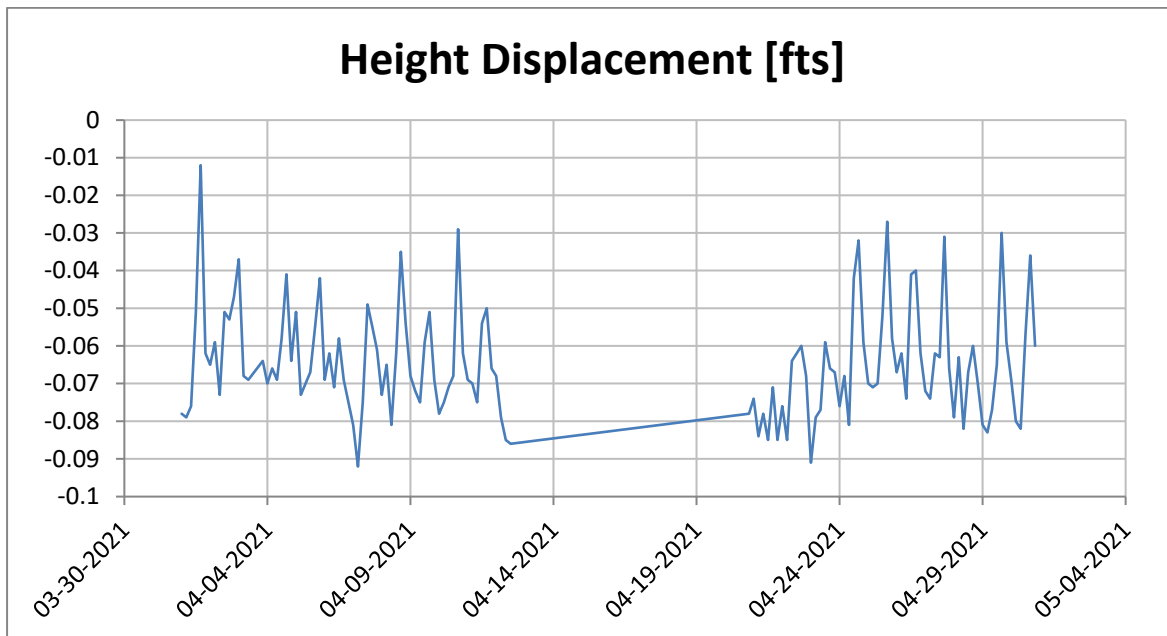
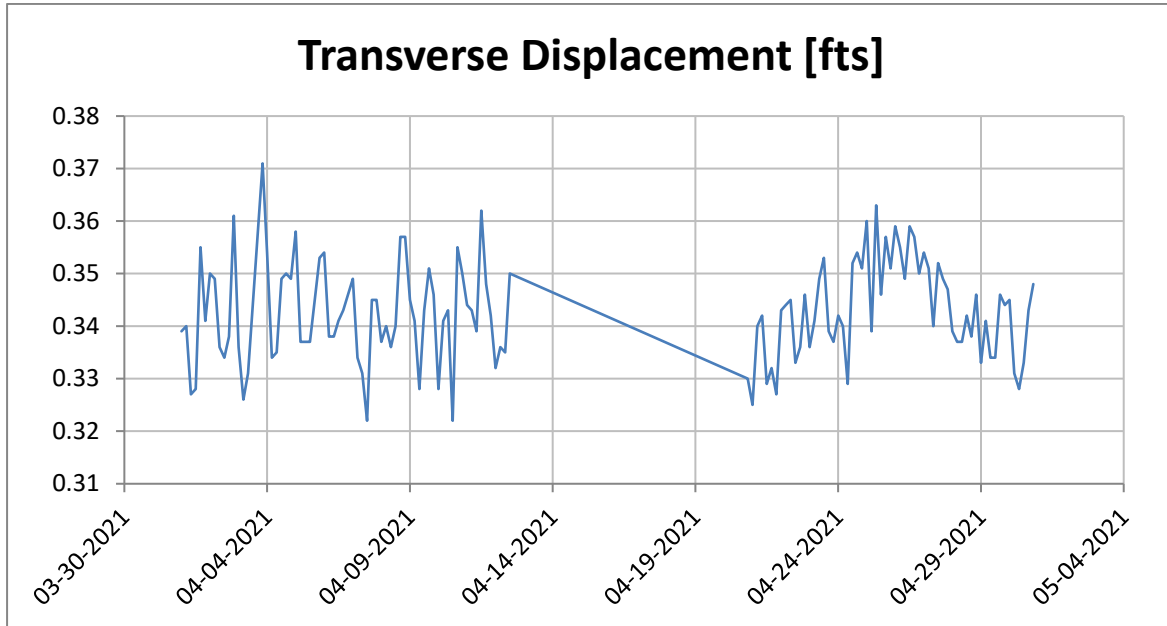


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Prism P1

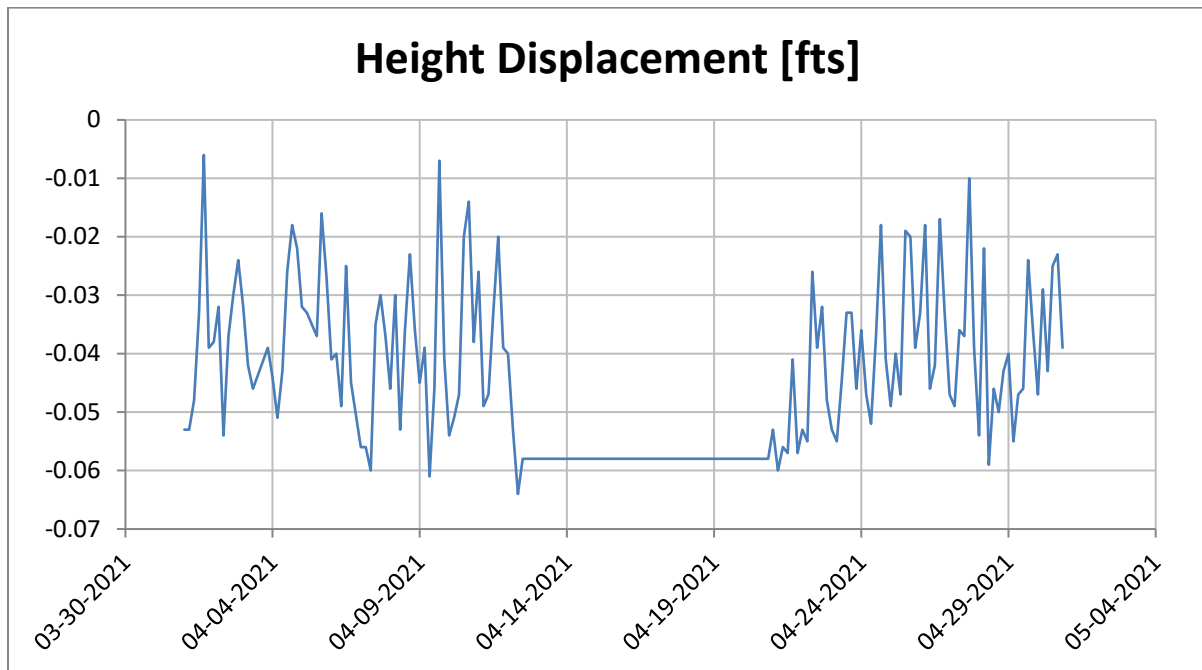
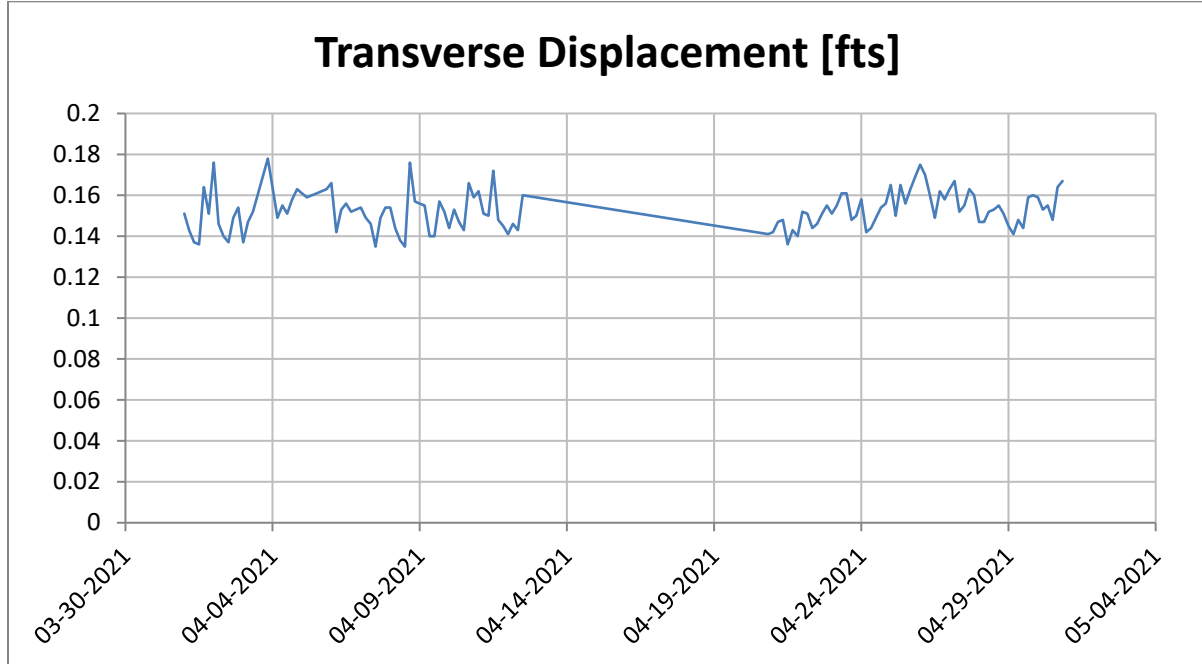


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Prism P2

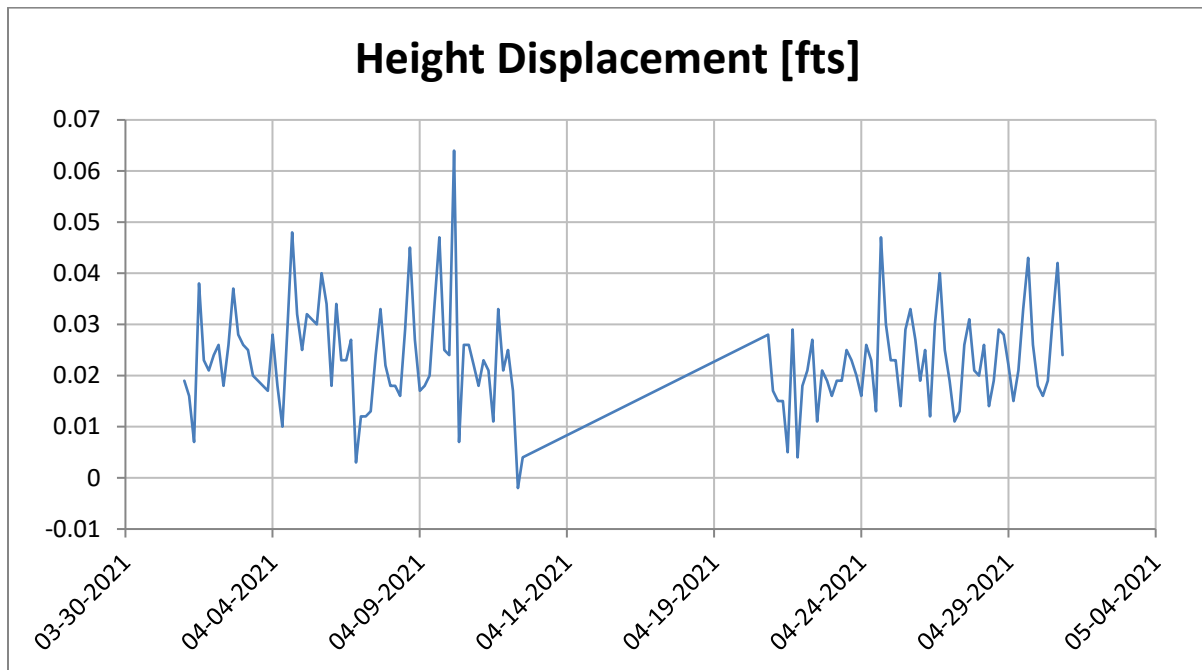
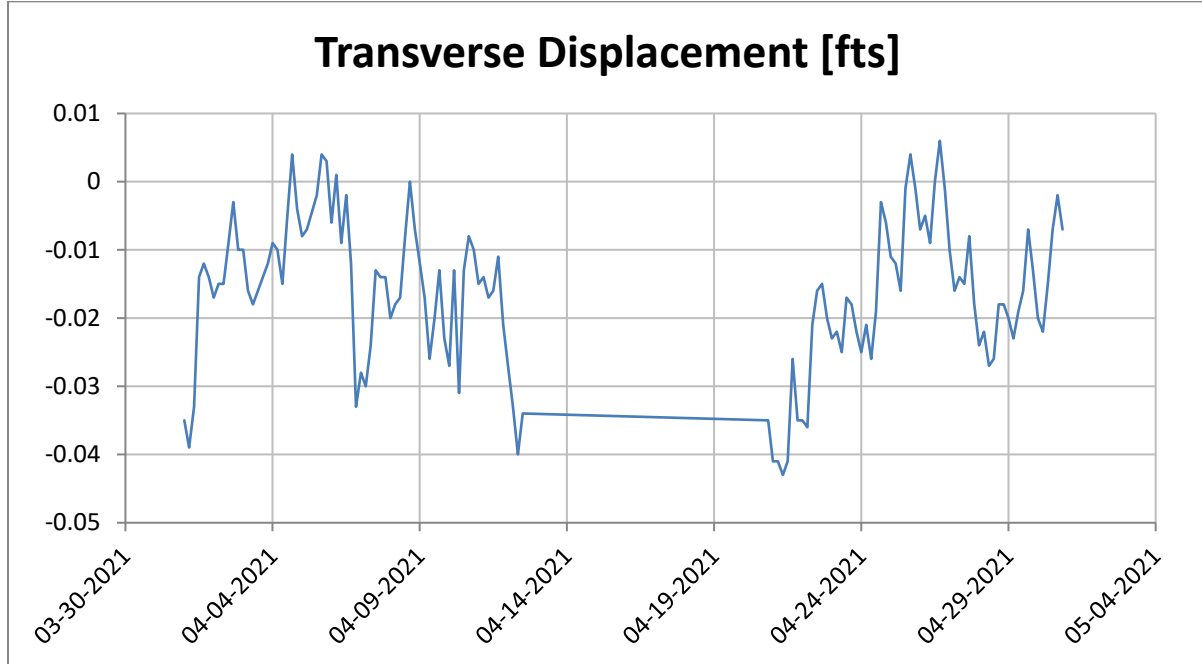


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Prism P25

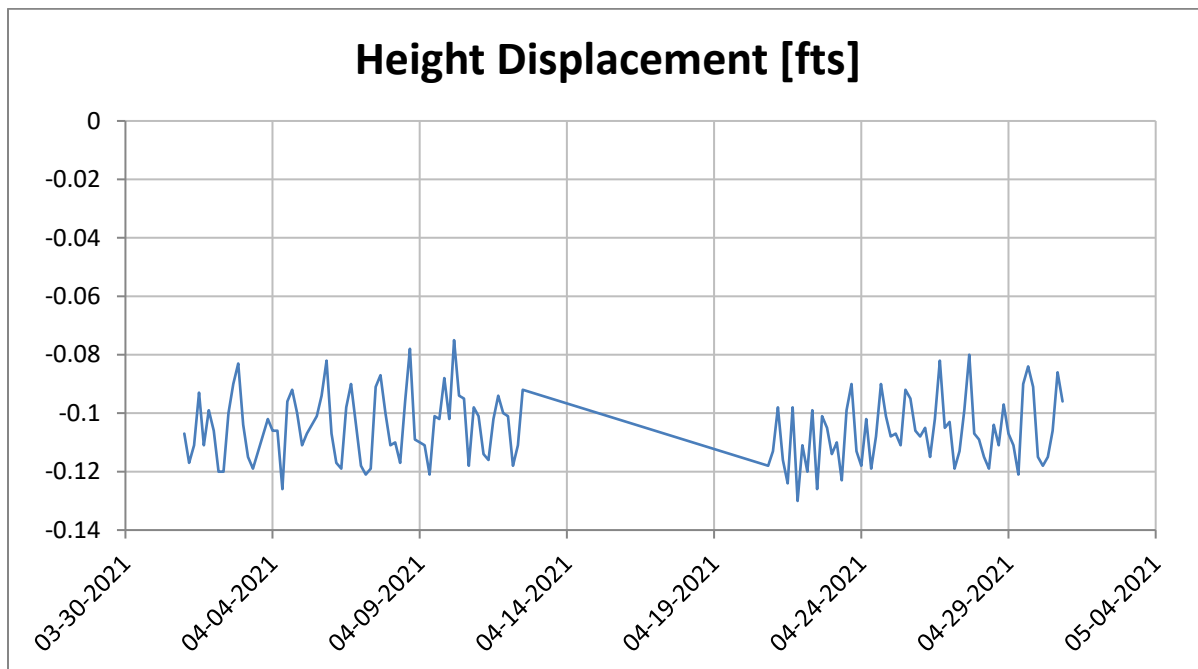
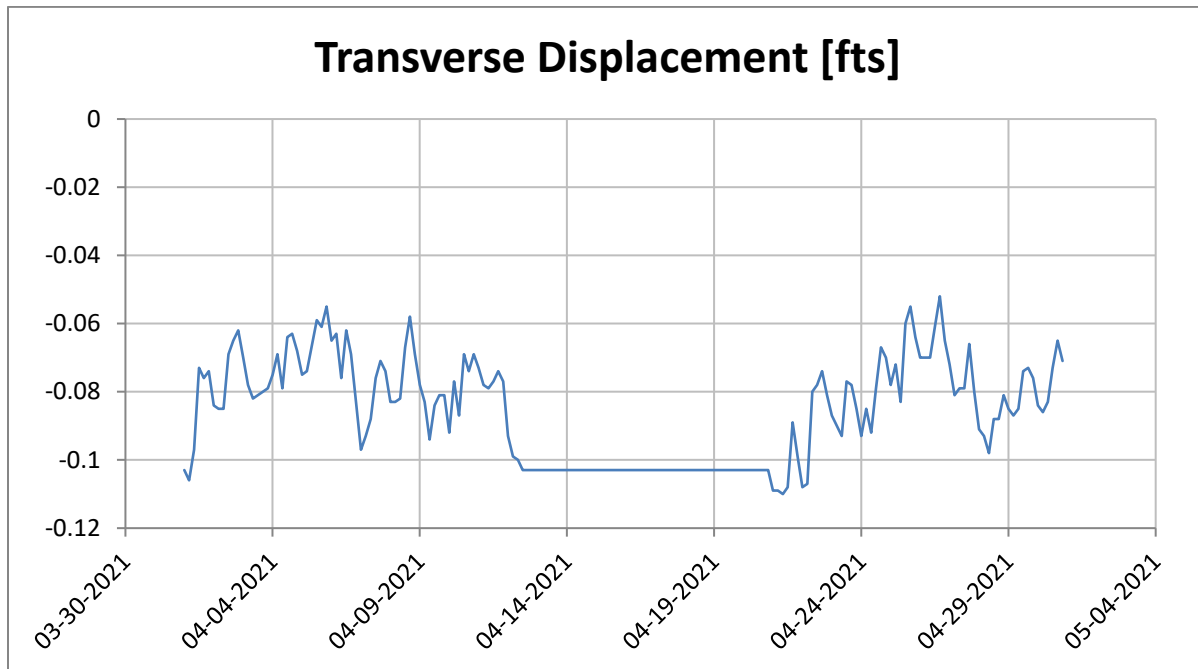


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Prism P32

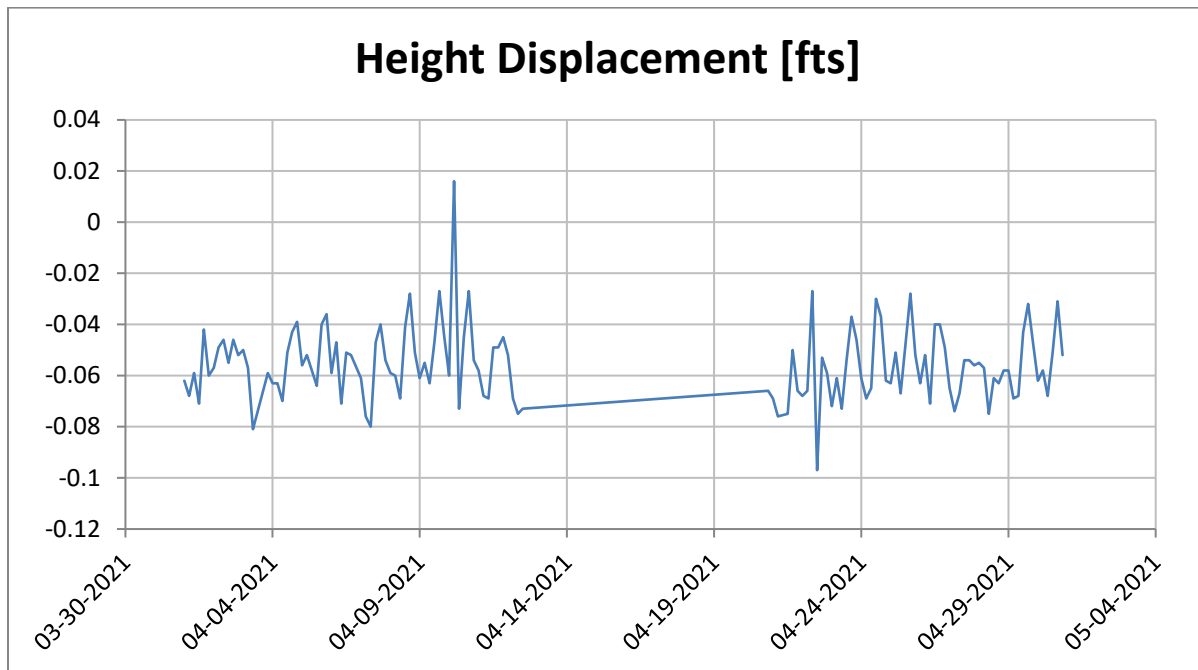
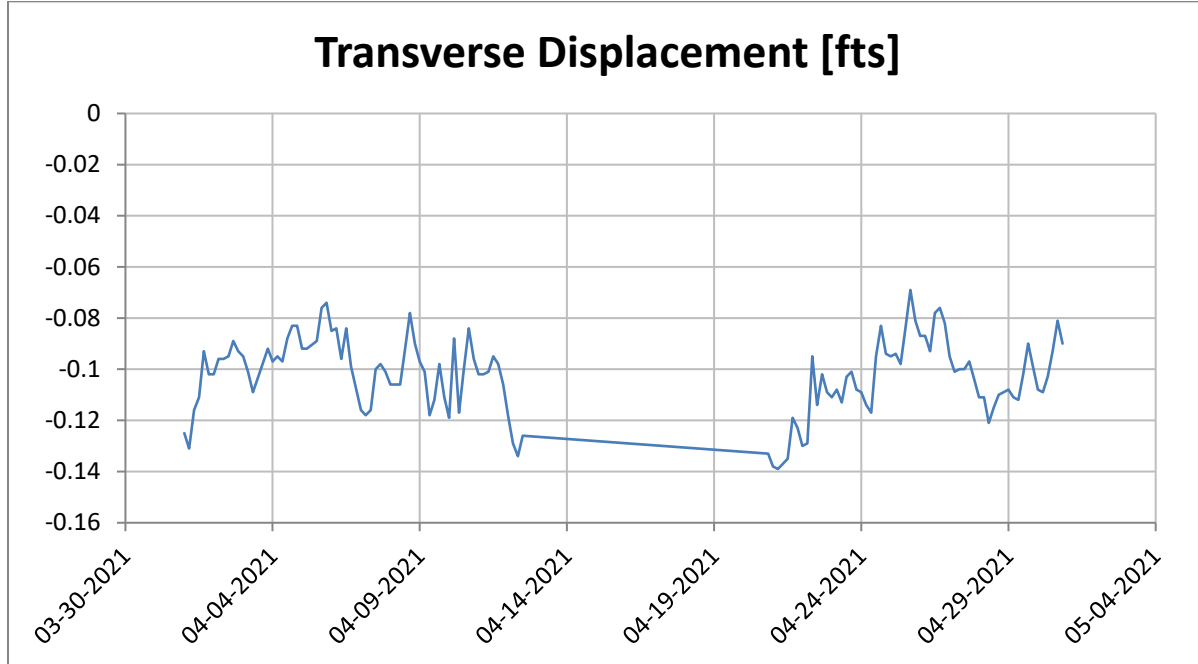


Notes:

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.



Prism P33

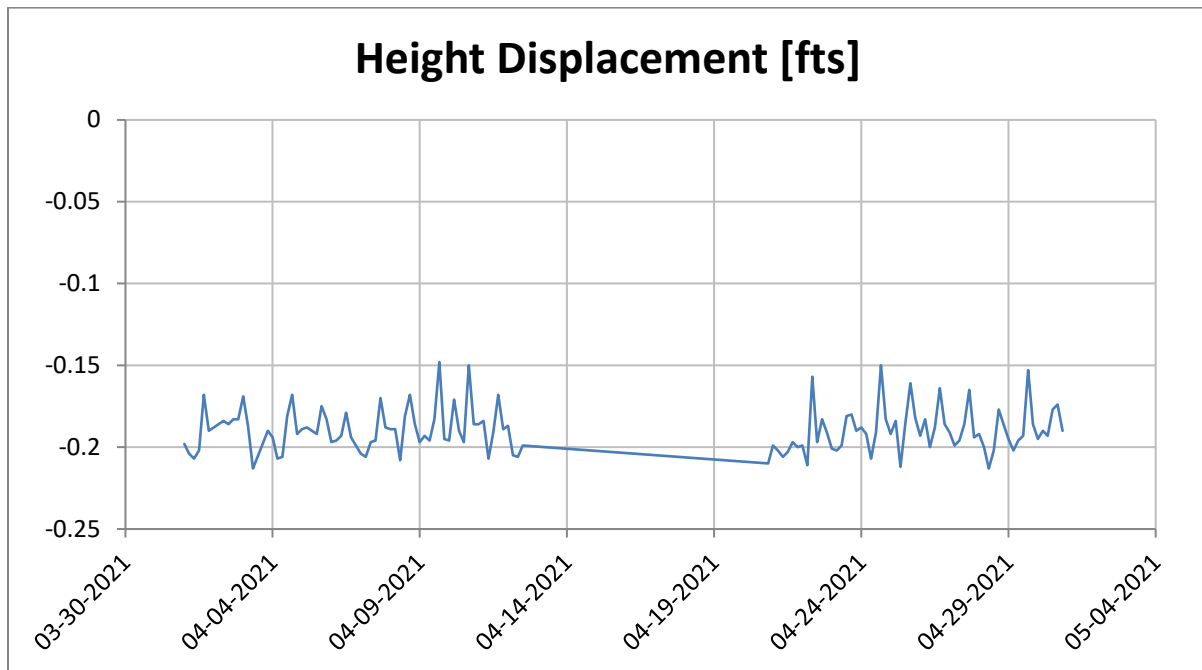
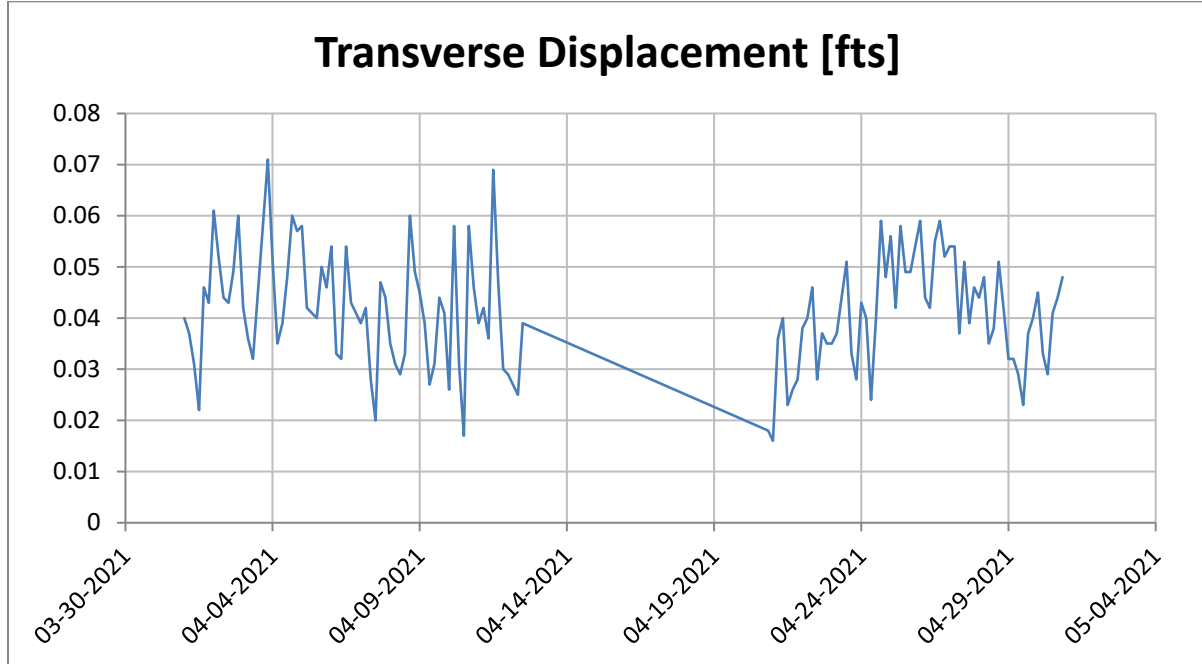


Notes:

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.



Prism P35

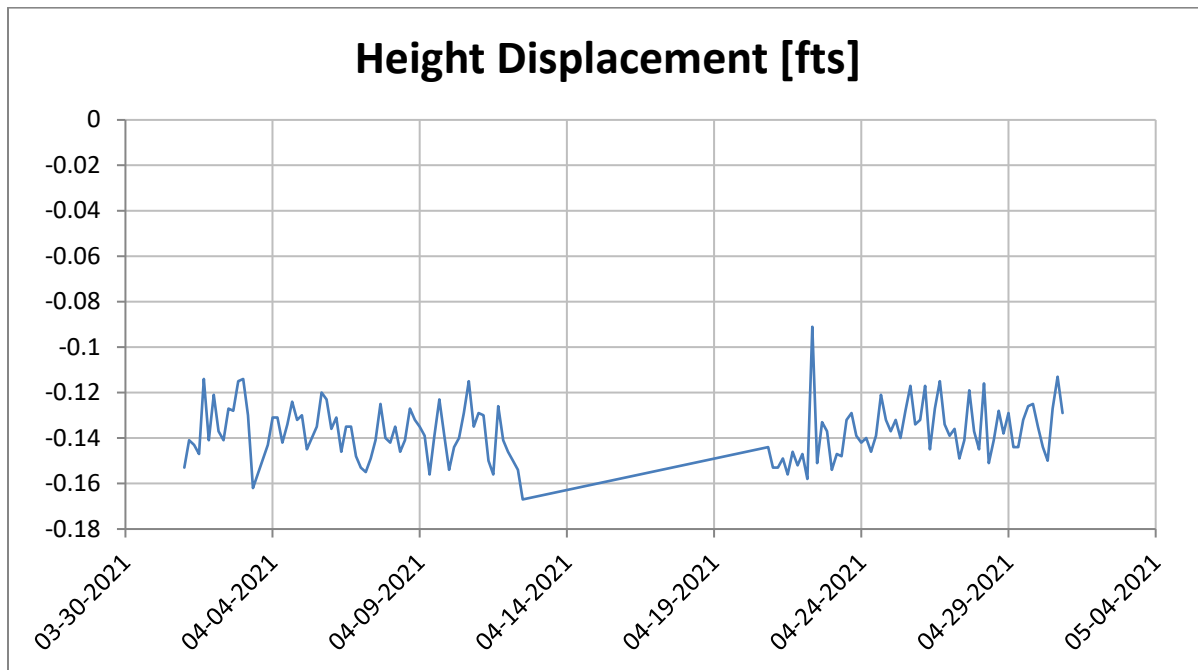
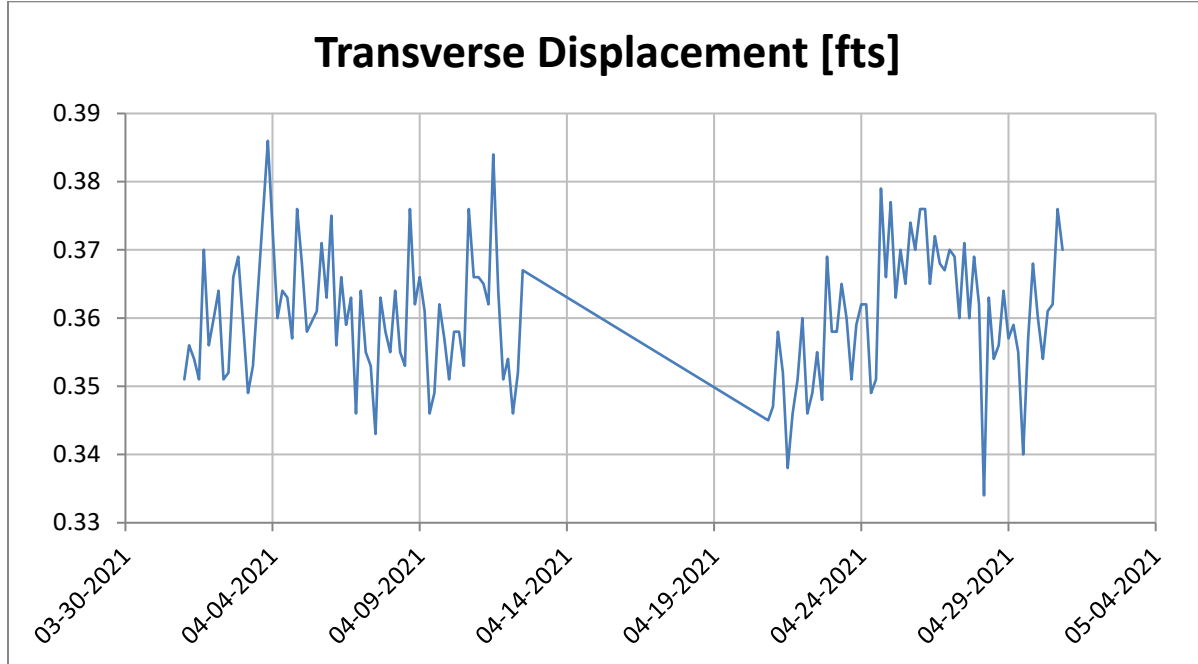


Notes:

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.



Prism P4

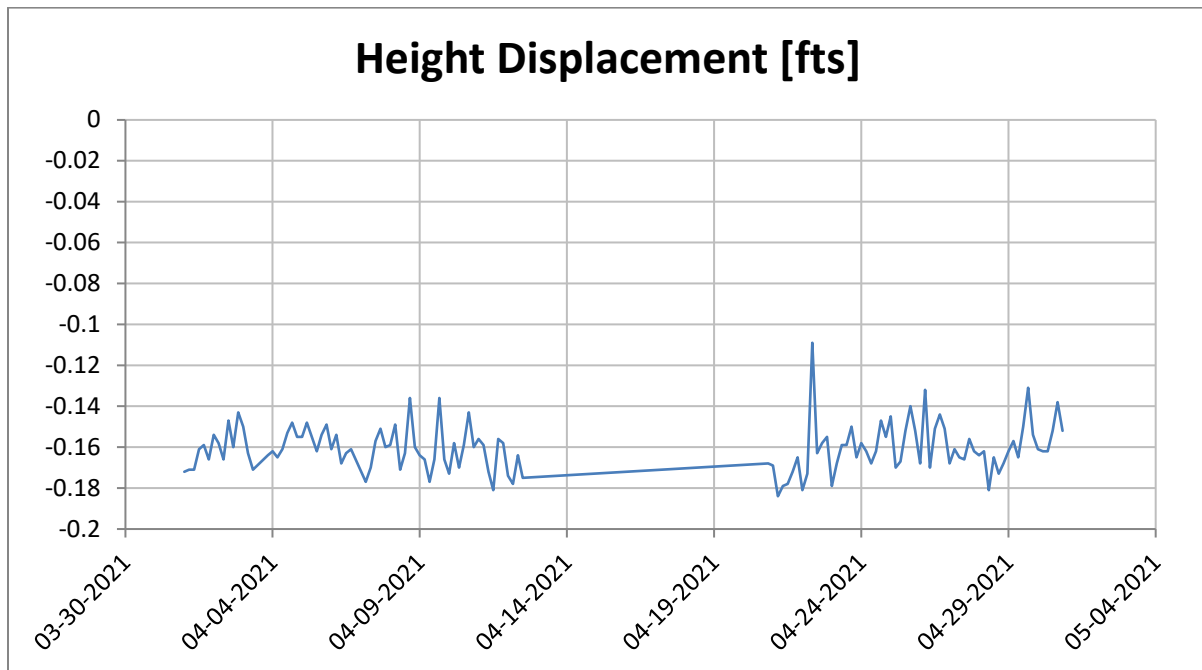
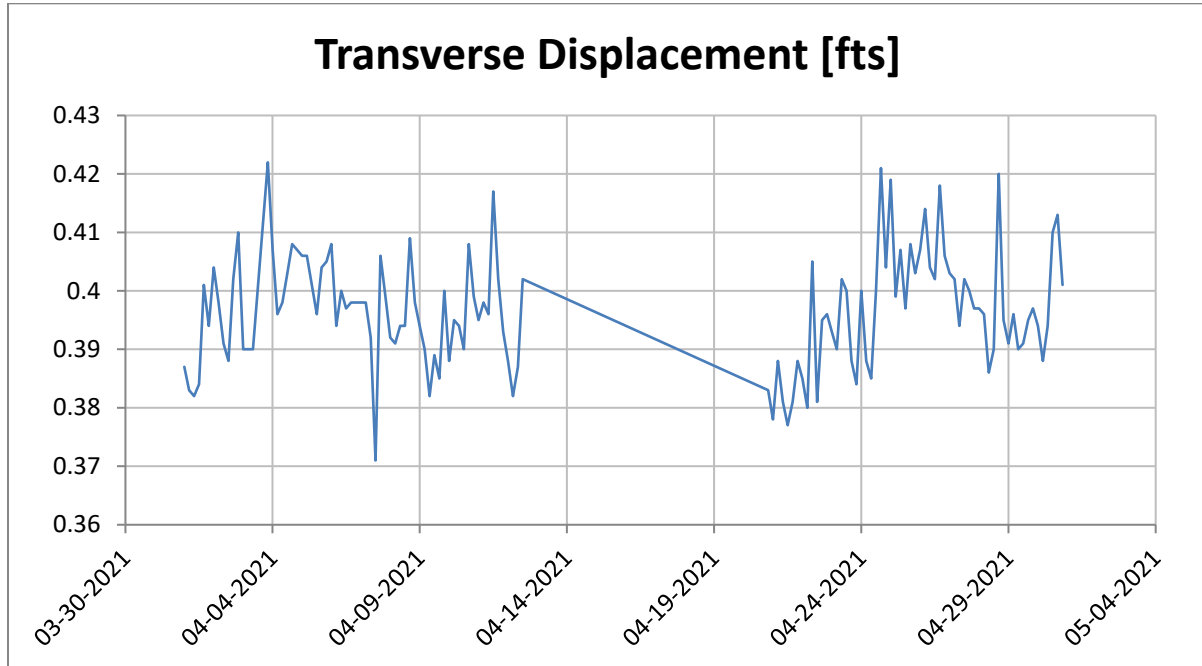


Notes:

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.



Prism P5

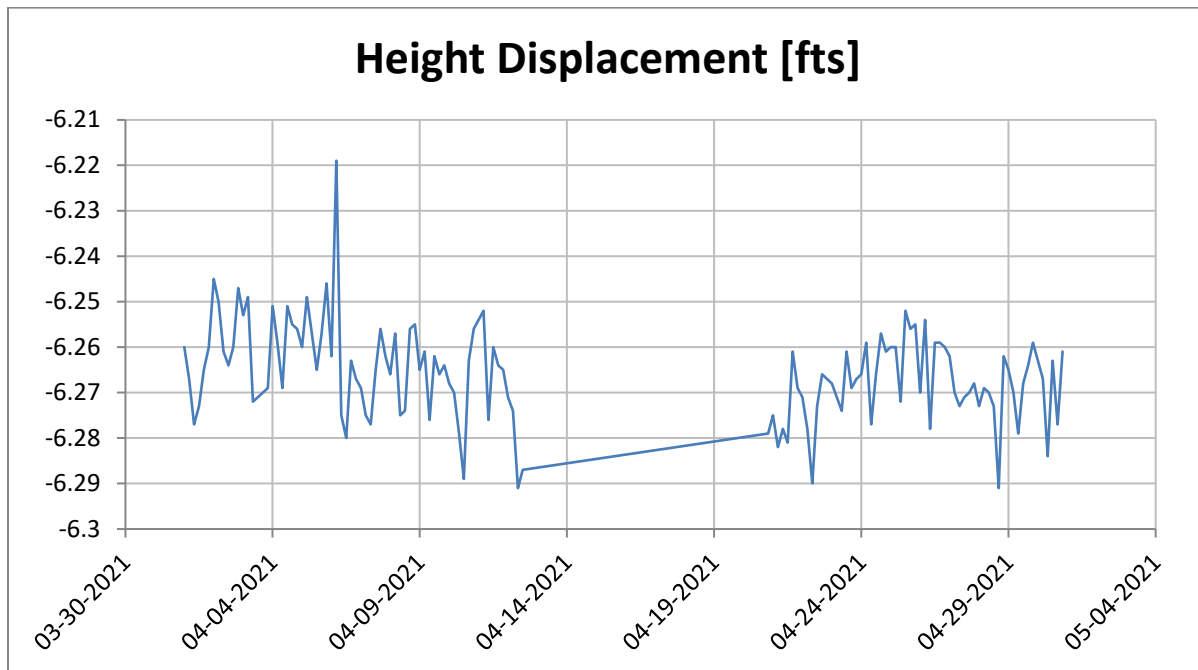
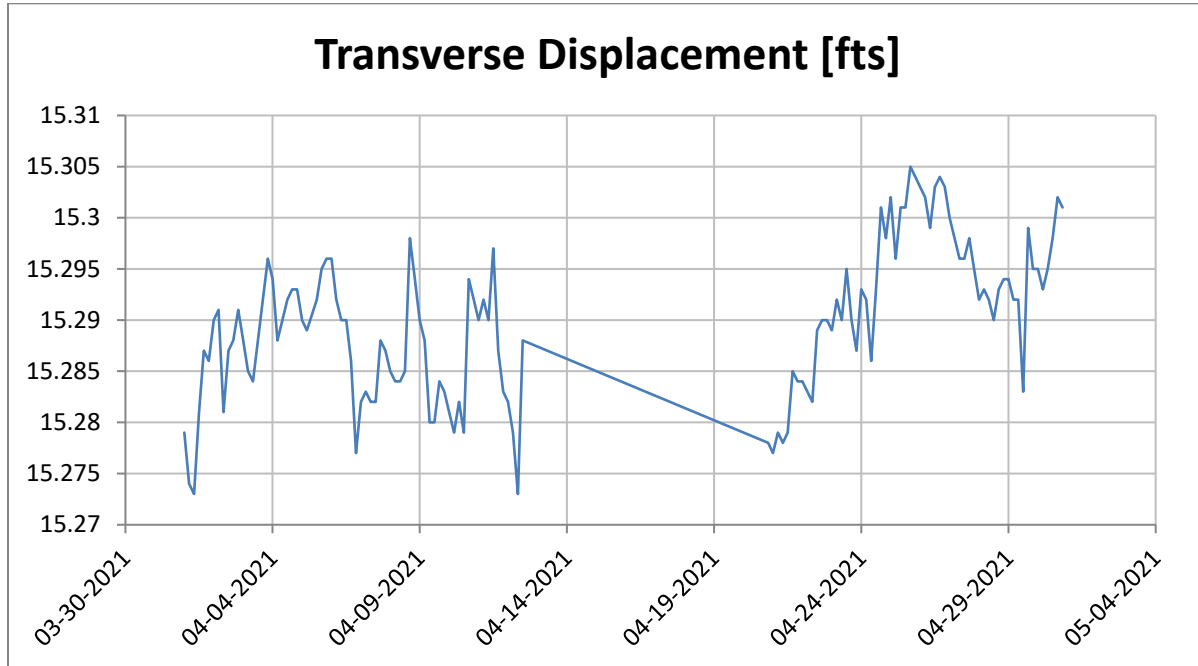


Notes:

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.



Prism P63

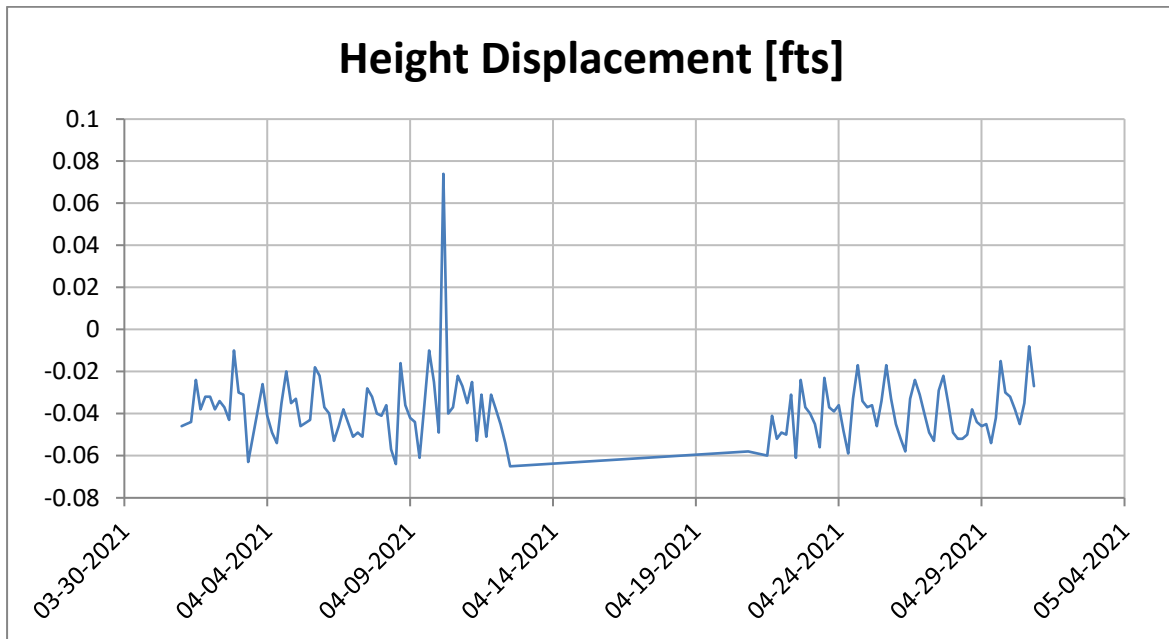
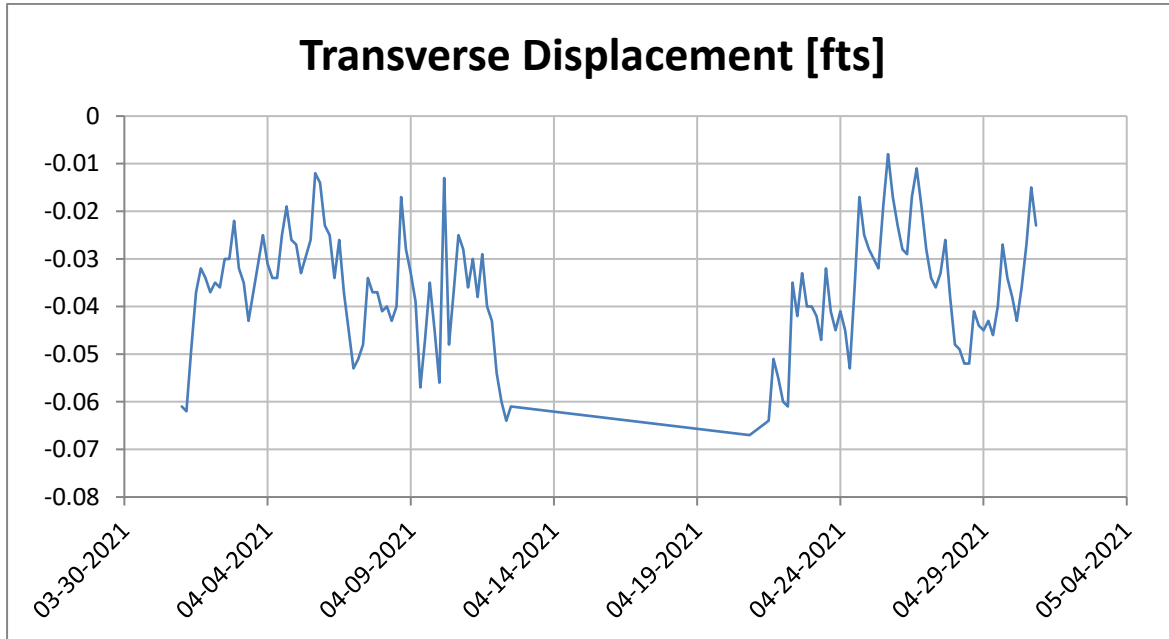


Notes:

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.



Prism P69

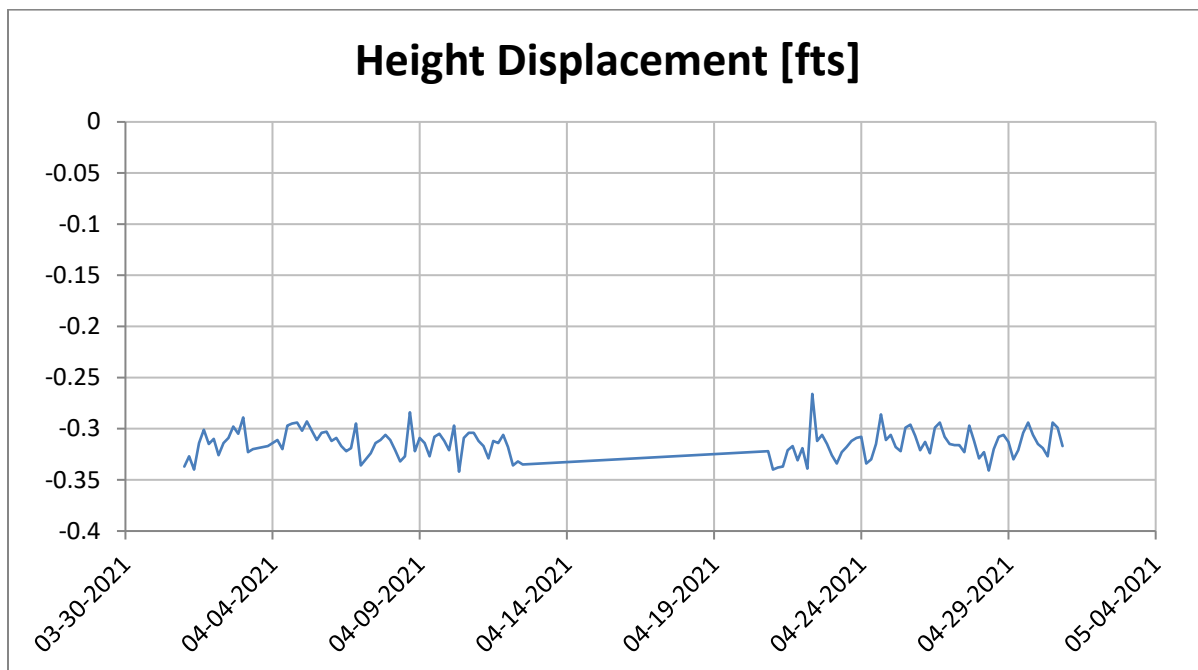
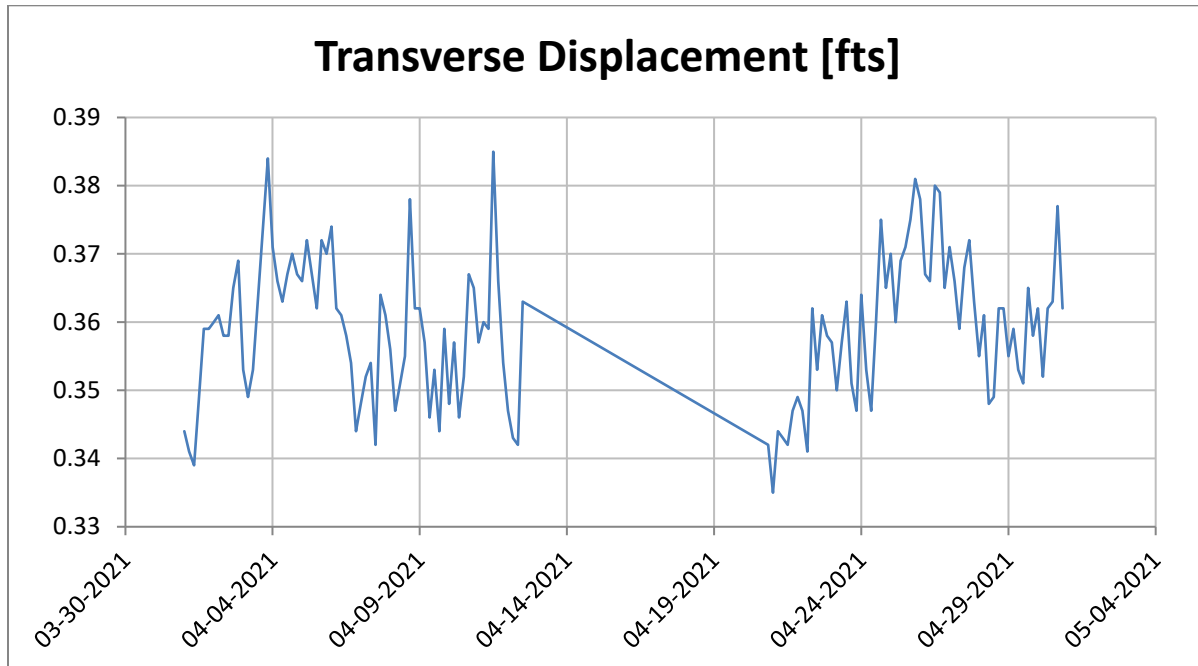


Notes:

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.



Prism P70

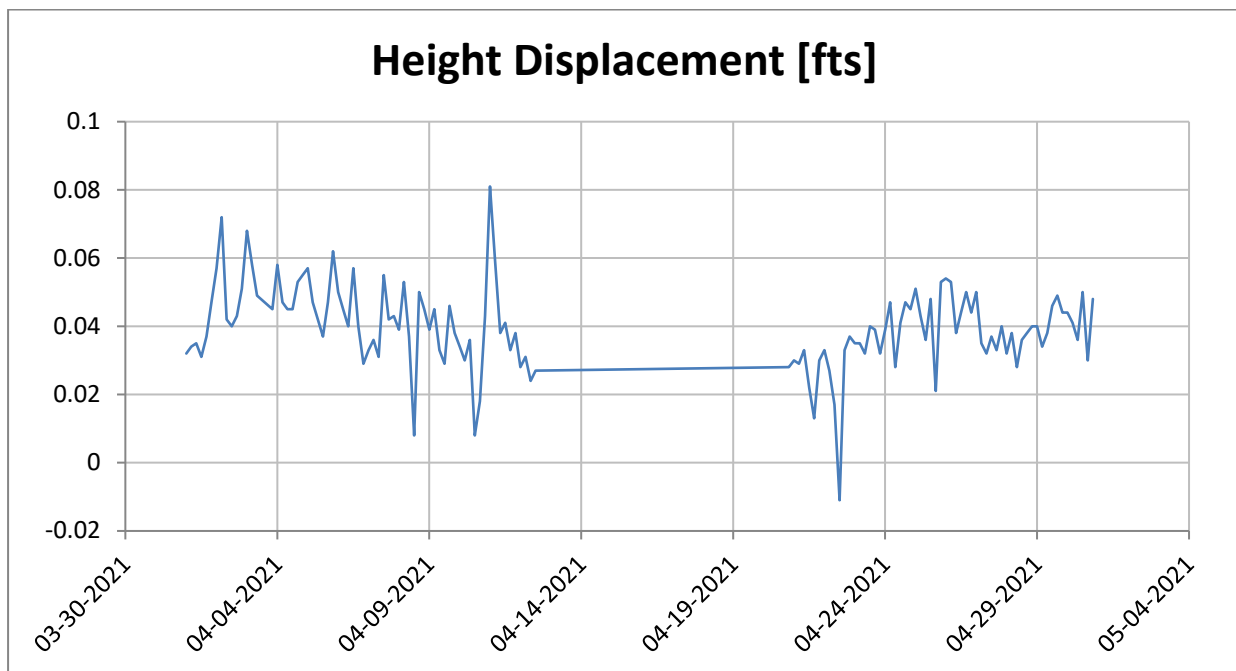
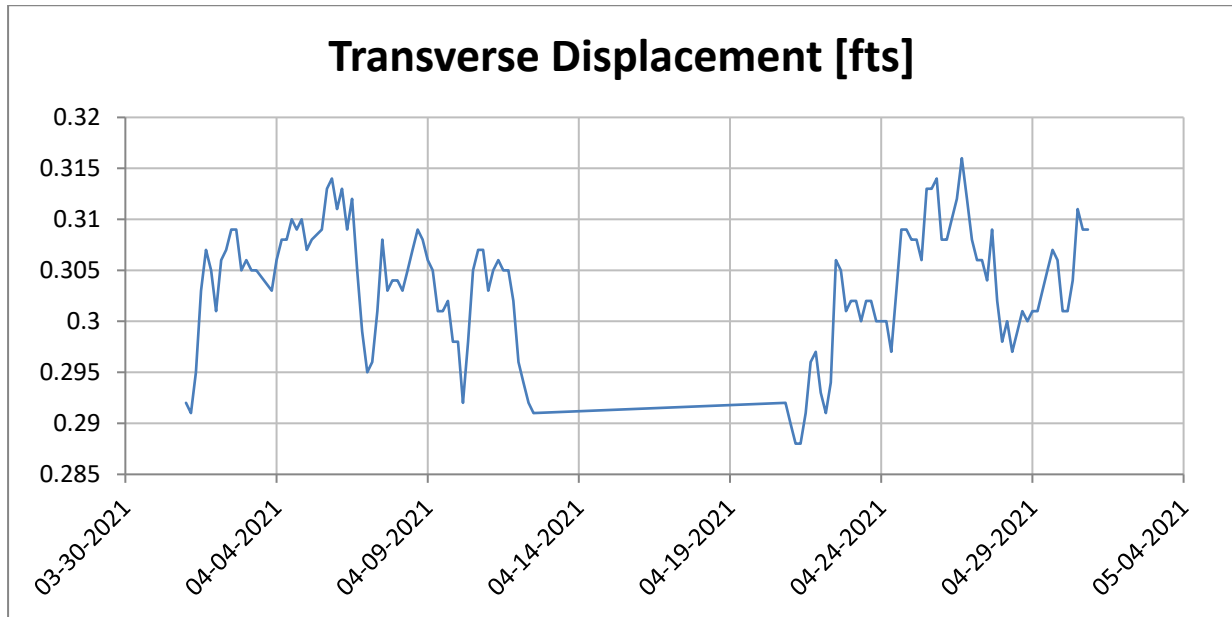


Notes:

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.



Prism TOE1

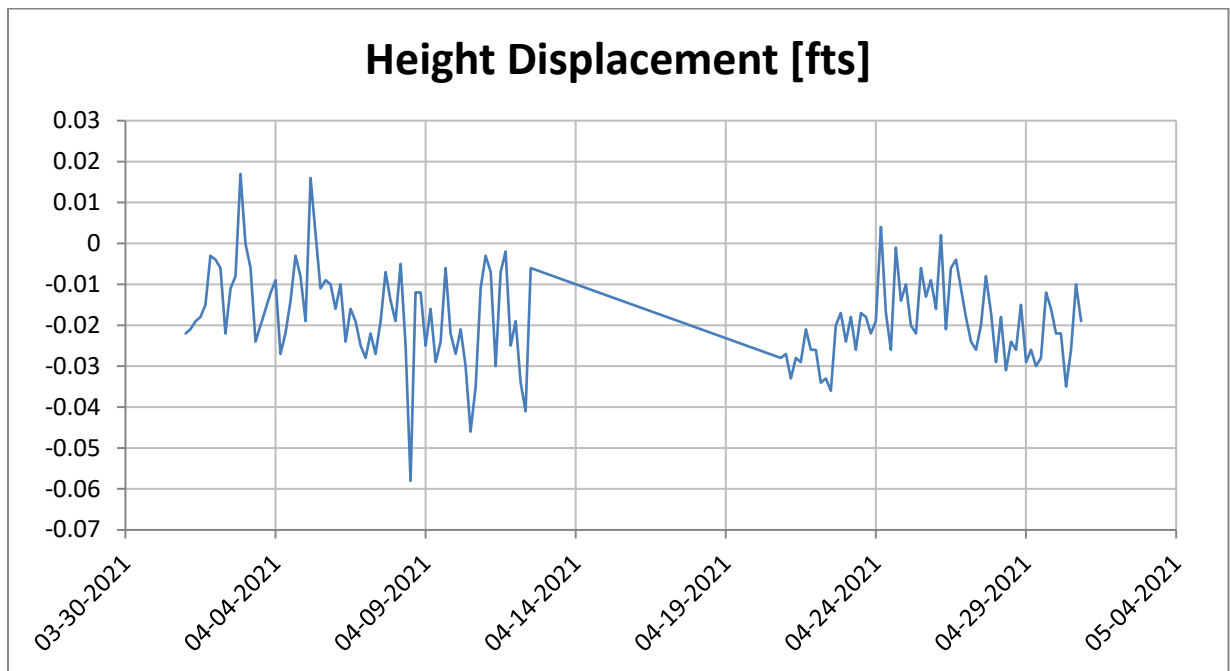
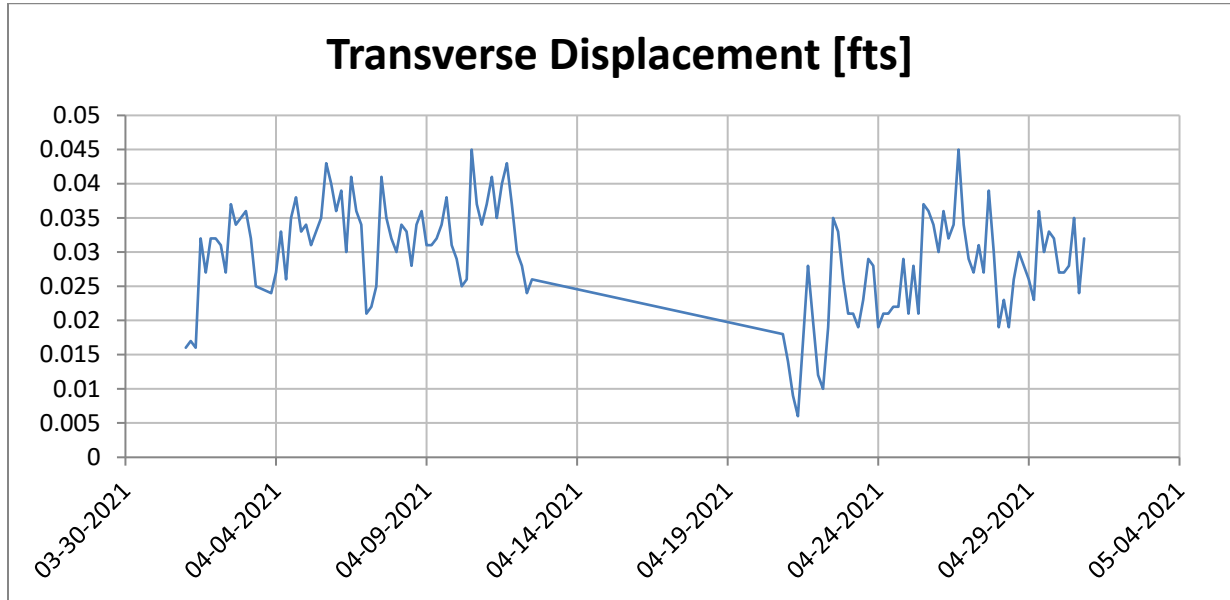


Notes:

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.



Prism TOE2

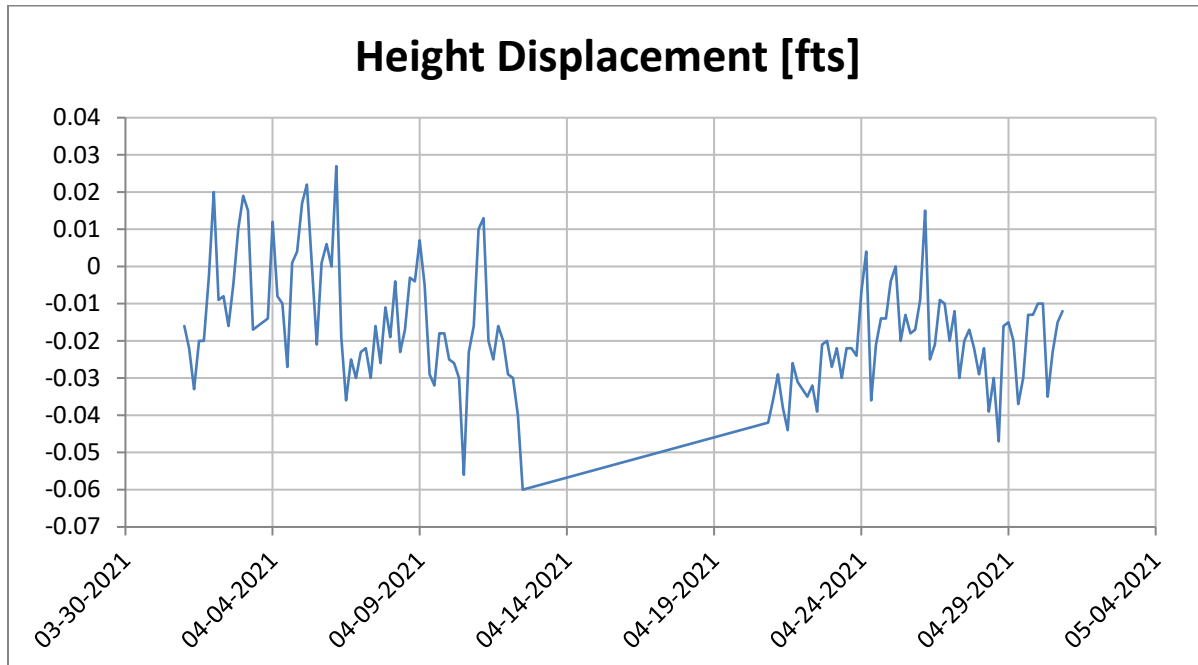
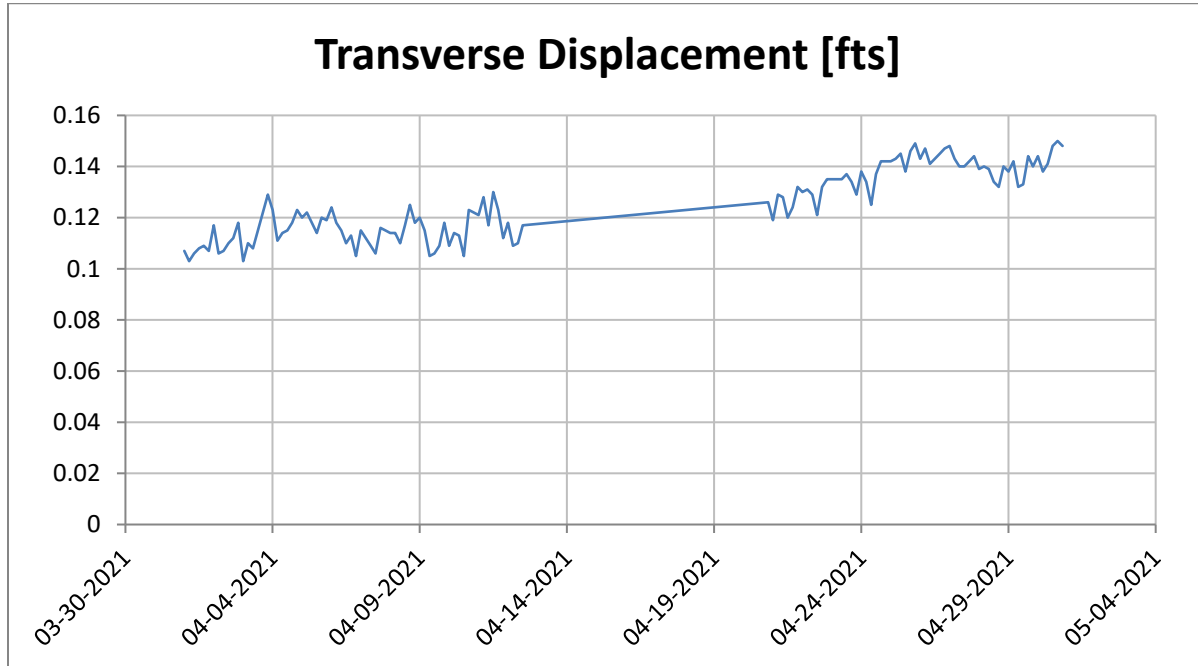


Notes:

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.



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.



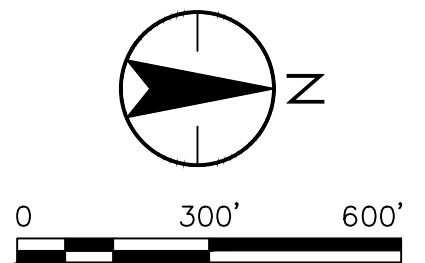
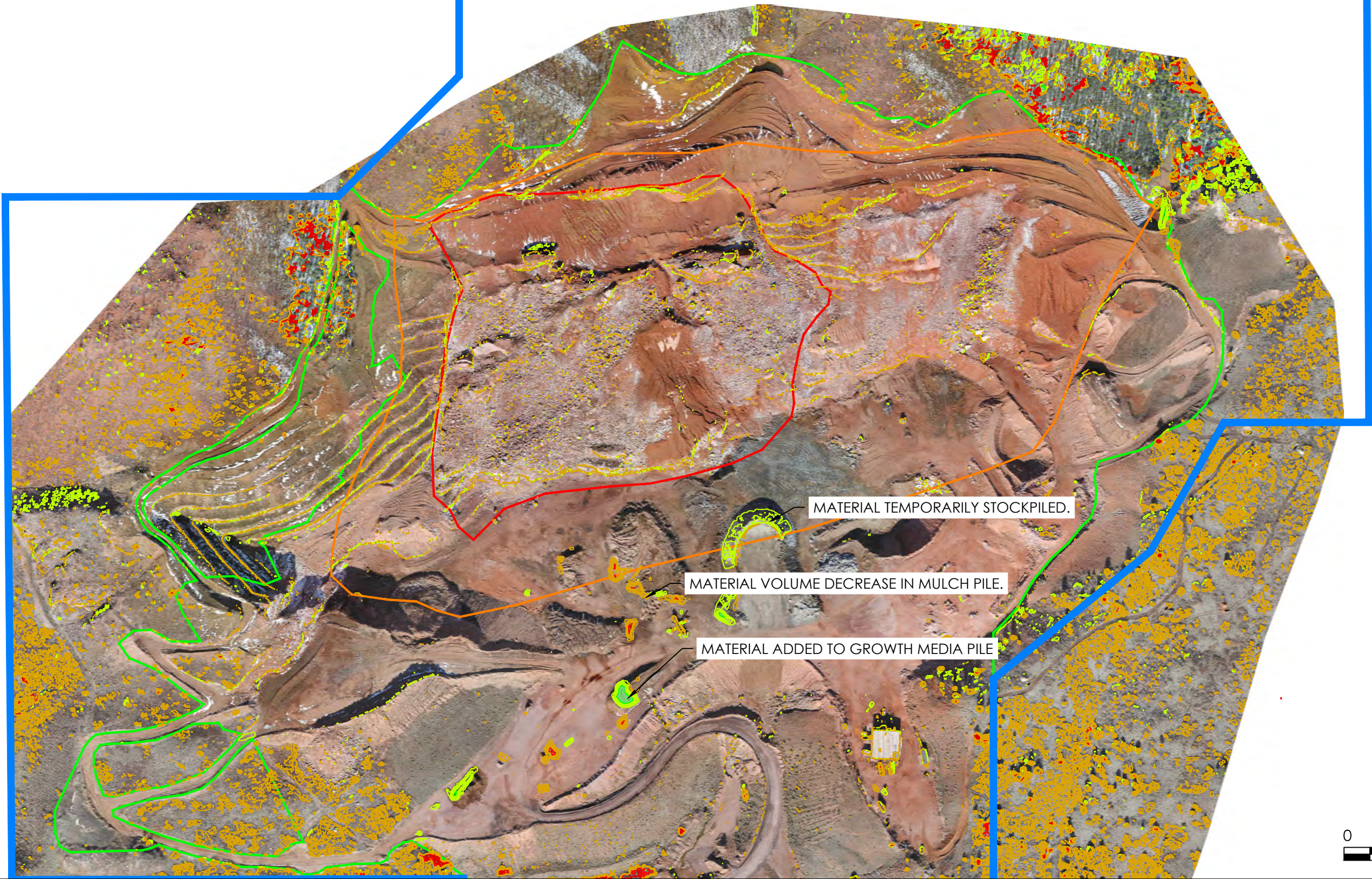
Appendix C

Drone Survey



\\us0321-ppfss01\workgroup\2274\active\227419041\disc\monitoring\2021-04\dwg\pikeview prisms_30qpr2021

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www.stantec.com

LEGEND

- Blue line: Permit/Affected Lands Boundary
- Green line: Proposed Disturbance Limit
- Red line: Landslide Extent
- Orange line: Buttress Fill Extent
- Yellow line: Comparison Contour. Increase in elevation. (CI=2')
- Green line: Comparison Contour. Decrease in elevation. (CI=2')

1. COMPARISON OF DRONE FLIGHTS FROM 03/19/21 and 04/22/2021.

Client/Project
CONTINENTAL MATERIALS
CORP.
PIKEVIEW QUARRY SLOPE
MONITORING

Project No.
227419041

Title
EXISTING PRISMS WITH
CURRENT SURFACE

Revision #	Date 2021.05.31
Drawn By PK	Figure No. 5