Stantec

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

Reference: November 2022 Geotechnical Monitoring Summary Pikeview Quarry

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this November 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 and undergoing 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 November 2022. Continuous monitoring by the robotic survey system began in 2010 and has continued through the month November 2022. 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 November 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 or Stantec) 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.

On working days, site operators inspect their work areas for signs of instability daily 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 November 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 November 9, 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 and continued throughout November.
- An area approximately 4.6 acres in extent in the North Borrow Area has been graded to the final grade and covered with topsoil. This area was seeded in November 2022 and will be used as a “test plot” to demonstrate that the revegetation practices will work on the project. Erosion control blankets and flexible growth medium (FGM) have been installed on the slopes to control runoff and erosion and aid in revegetation. (Photos 2 and 3). Due to the limited access topography, the intent is to utilize FGM as the final erosion control medium in lieu of erosion control blanket for the remainder of the project, providing the test plot is successful next spring. While the North Borrow Area is a separate project, the revegetation for that project will occur in the same manner as the quarry revegetation.
- No cracking was observed on the native granite slopes above the extents of the disturbed area. (Photo 6)
- Operators continue to place compacted material in the buttress zone. The fill material was primarily excavated from the North Borrow Area and the Shop Borrow Area. Note that the North Borrow Area is a separate project associated with the City’s plans for the property; this grading was permitted by El Paso County. (Photo 7)
- Offsite fill was placed near the reclamation benches on the south side of the fill area. The material was spread by dozers and compacted in accordance with the project specifications.
- A safety buffer zone is being kept between the active work areas and the toe of the slide to stop any rocks that might come loose during grading operations. Compacted fill is placed in the buffer zone as the buttress fill is placed. (Photo 8)
- Known cracks were 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.
- 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. There currently 15 active prisms; 2 prisms were control points located outside the slope movement area and 13 prisms were located on the slopes surrounding the landslide area. As the slope is backfilled and graded, the existing prisms will be removed, and additional prisms will be installed. No prisms were removed in November. A log of prism removals and installations is included in Appendix B. The 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. 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. During November 2022, multiple alarms were received from multiple prisms; in each case, the subsequent readings returned to normal, and the alarms are assumed to be data errors related to weather conditions, sun glare, or power outages. The alarms are listed in Table 2.

Table 2 Alarm Summary

Date(s)	Alarm	Cause/Actions taken	Issue Resolved
4-Nov	Points not found	Snow and fog. No work being performed at time of alert.	4-Nov
5-Nov	NP2 and P33 regression limits received	Snow and fog. No work being performed at time of alert.	5-Nov
7-Nov	Points not found	Fog. Work shut down due to conditions.	7-Nov
11-Nov	Points not found	Fog.	11-Nov
14-Nov to 15-Nov	Points not found	Snow and fog. No work being performed at time of alert.	15-Nov
17-Nov to 18-Nov	Points not found	Snow and fog. No work being performed.	18-Nov
18-Nov to 21-Nov	Points not found and communication errors	Power outage related to weather. No work being performed.	21-Nov
27-Nov	Points not found	Believed to be weather related. No work being performed.	27-Nov
28-Nov	NP2 not found	Believed to be weather related. No work being performed.	28-Nov
29-Nov	Points not found	Snow and fog. No work being performed.	29-Nov
30-Nov	Points not found	Snow and frost blocking prisms. Readings resumed around the time work began.	30-Nov
30-Nov	No communication	Impacted a single reading. Power outage that was fixed immediately.	30-Nov

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 was reset when the Leica station was moved in July 2022. 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 12 of 15 prisms with recorded displacements limited to data scatter and not actual movements. Prisms BR1, BR2, and NP66 are located above the landslide, and these prisms also recorded slope creep movements at slow velocity. This settlement is likely related to the landslide material consolidating under its own weight. New prisms are placed in areas where slope creep movements are likely to be recorded; therefore, slope creep movements being recorded at more locations is expected to occur. 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
BR1	-0.061	-0.092	0.0105	0.1573	Slope creep movements.
BR2	-0.027	-0.107	0.0204	0.1572	Slope creep movements.
CP6	-0.028	0.000	0.0143	0.0410	
CP7	0.088	0.000	0.0276	0.0993	
NP2	0.014	0.031	-0.0003	0.0605	
NP3	0.024	0.016	0.0244	0.0289	
NP66	0.008	-0.053	-0.0141	0.0624	Slope creep movements.
P1	-0.007	-0.011	-0.0052	0.0282	
P2	0.001	-0.003	-0.0039	0.0312	
P5	-0.010	0.002	-0.0054	0.0252	
P25	-0.032	0.013	0.0158	0.0348	
P32	-0.029	0.023	0.0223	0.0431	
P33	0.003	-0.010	0.0228	0.1953	
P69A	0.015	-0.015	0.0062	0.2001	
P70	-0.030	0.012	0.0074	0.0356	

4.0 DRONE SURVEY

The site was flown for aerial imagery using an unmanned aircraft system (UAS or 'drone') on November 28, 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 November topography was also compared to the October topography to identify changes in the site topography. Comparison of the two surveys showed the placement of the fill material at the toe of the landslide. Fill material is excavated from the Shop Borrow Area or imported from offsite projects, including the North Borrow Area. 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 and continued throughout November 2022. Fill was excavated from the Shop and North Borrow Areas and placed in the buttress and buffer zones. Importing fill also continued. All fill is moisture conditioned as necessary and then compacted. Compaction testing began March 2022 and occurs at the rate of at least one test per 5,000 yd^3 placed. During November, approximately 147,000 yd^3 was placed and compacted. This includes approximately 5,900 yd^3 of imported fill. This volume placed in the buttress zone required at least 30 compaction tests. There were 60 compaction tests taken in November. As of November 30, 2022, a total 1,784,000 yd^3 had been placed and compacted. This required at least 357 compaction tests, and 517 tests have been taken. All tests in November except one test (#571) met or exceeded the minimum compaction requirement of 90% of the optimal density as measured by a Standard Proctor Test. The one test that did not meet the compaction requirements was recompacted and retested; the subsequent test met the project specifications. The compaction testing results are summarized in Appendix D, and the testing locations are shown on Figure 6.

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	Completed February 2022
Phase 4 – Reclamation Grading	February 2022 to present
Phase 4 – Contractor Demobilize from Site	Fall 2023
Phase 5 – Final Revegetation season 2 Begins	2023 until acceptance

Progress of activities this month:

- Surpassed the milestone of one-half of the buttress fill being placed.
- Contractor continued earth moving activities
- Quality assurance testing continued
- Importing fill material continued
- Geotechnical monitoring continued
- A potential and large source of imported fill material was rejected due to its high (90%) fines content.
- A test plot area was covered with topsoil, seeded, and covered in the adjacent North Borrow Area. One part of the test plot was covered with erosion control blanket, and another part was covered with flexible growth medium (FGM).
- Obtained approval from USFS for excavating 197,000 cubic yards from parts of the mine on USFS land.

Work planned for next month includes:

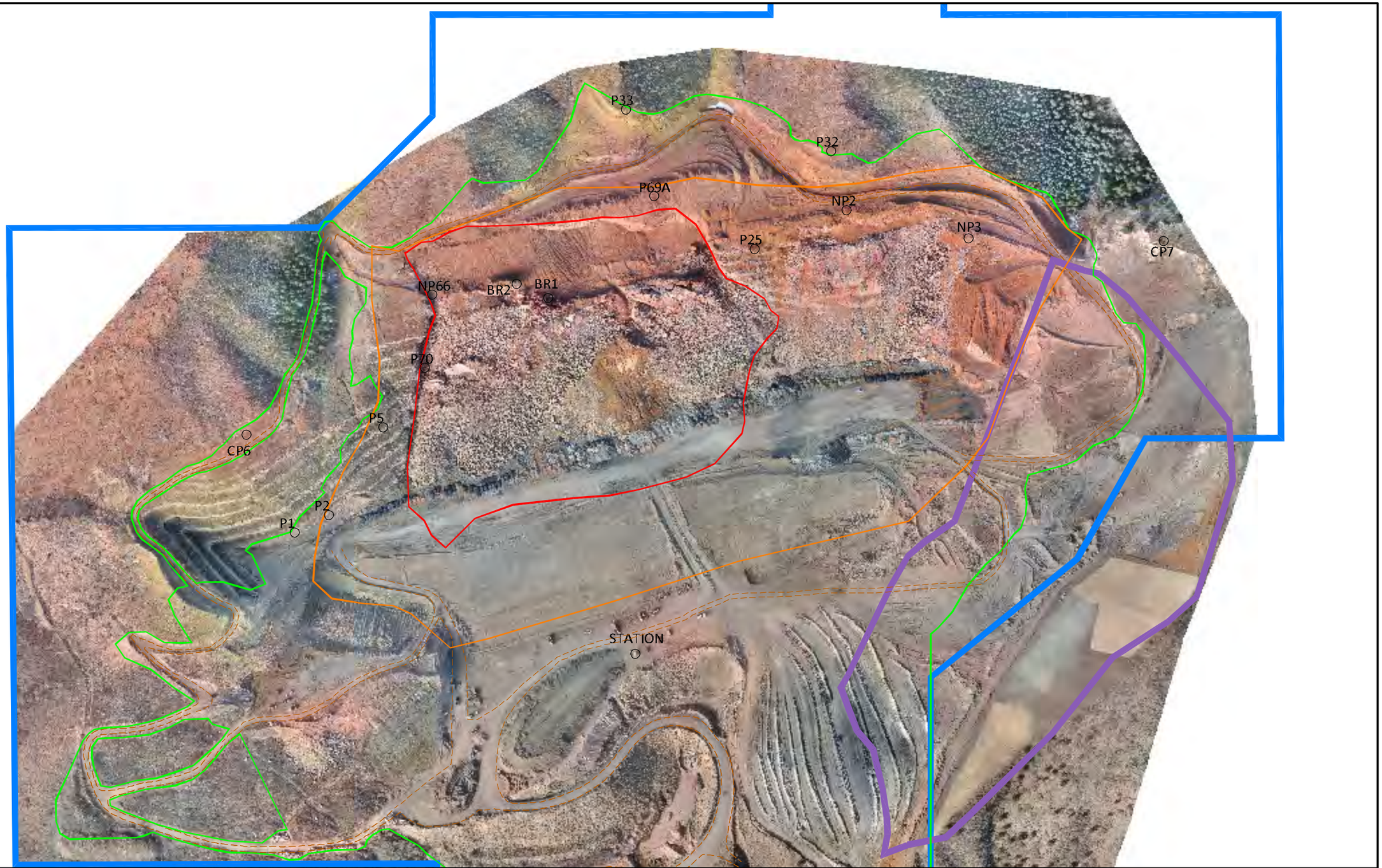
- Continue reclamation grading
- Continue importing fill material
- Continue geotechnical monitoring
- Continue removing and replacing prisms on an as-needed basis
- Continue working with USFS and the City of Colorado Springs to obtain approval to excavate the remaining material from USFS land.

7.0 CONCLUSIONS

The data collected in November 2022 demonstrate compliance with the reclamation grading plan. The buttress fill is being placed and compacted as intended and specified.

None of the data collected in November 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
- City Grading Permit Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Existing Prism
- Removed Prism

N

0 300' 600'

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
SITE MAP

Revision
#

Date
2022.12.31

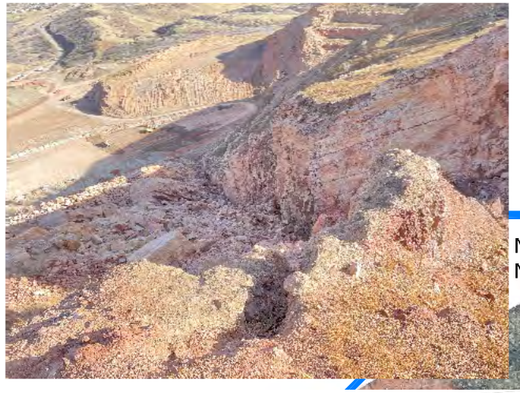
Drawn By
PK

Figure No.
1

Appendix A

Visual Inspections

6. View south of granite slopes above disturbed area.



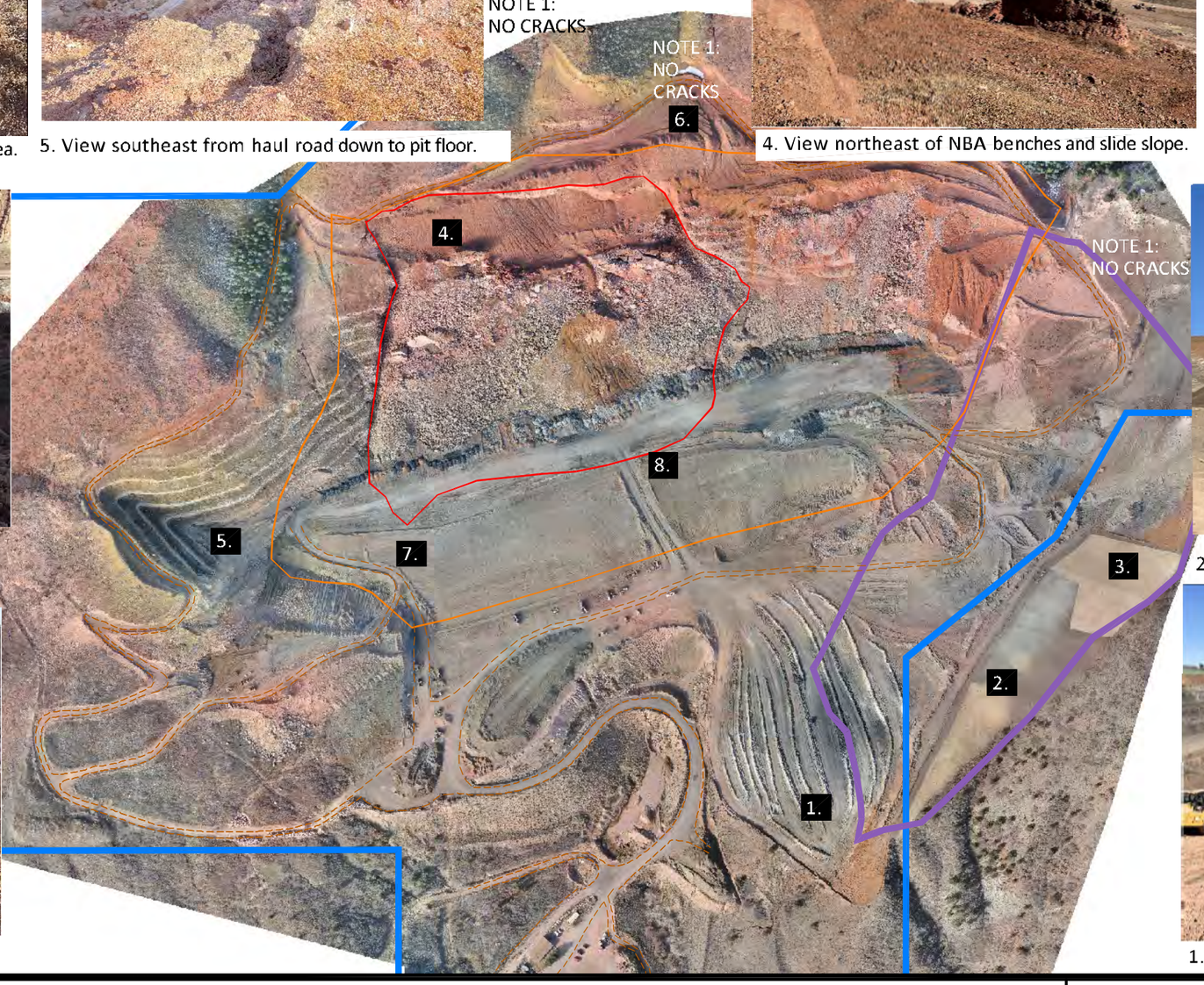
5. View southeast from haul road down to pit floor.

4. View northeast of NBA benches and slide slope.

3. Erosion control installed on north borrow slope.

7. Compacted area in the butress zone.

8. Buffer zone on pit floor along toe of slide.



2. Graded slopes in the north borrow area.

1. Benches in the north borrow area.

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LEGEND

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

NOTES

1. NO CRACKS OBSERVED IN THIS AREA.
2. ALL PHOTOS TAKEN NOVEMBER 9, 2022.

N

0 400' 800'

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
OBSERVATIONS FROM NOVEMBER INSPECTION

Revision	Date
#	2022.12.31
Drawn By	Figure No.
PK	2

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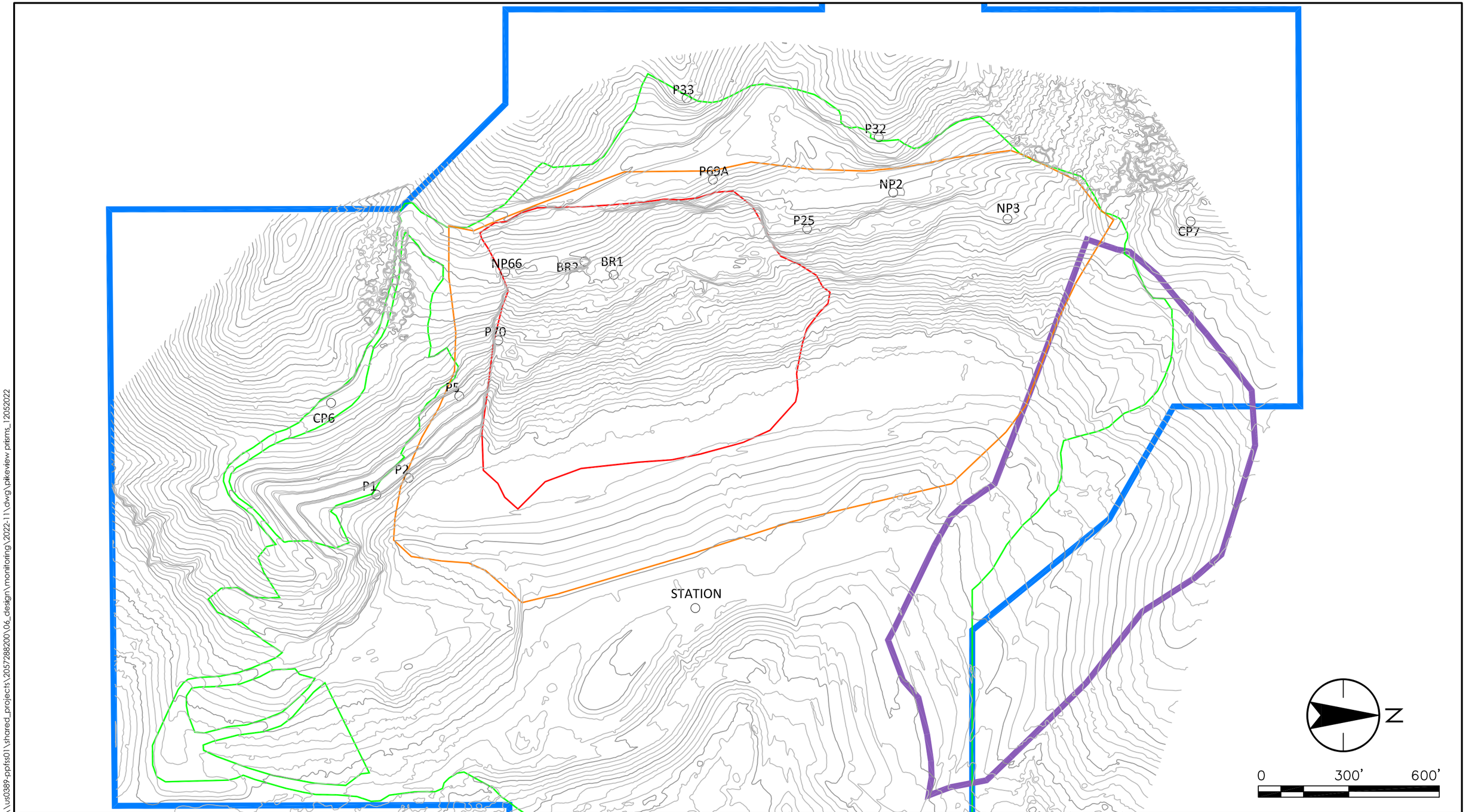
Table A-1 Summary of Daily Inspecitons

Date	Notes	Inspection By
1-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
2-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
3-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
4-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
5-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
6-Nov-22	No work.	Not applicable
7-Nov-22	Unable to make observations due to fog. Operations shut down.	Jerald Schnabel
8-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
9-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
10-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
11-Nov-22	Fog and snow limited observations.	Jerald Schnabel
12-Nov-22	Fog limited observations.	Jerald Schnabel
13-Nov-22	No work.	Not applicable
14-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
15-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
16-Nov-22	No movement observed. Good to proceed.	Tim Culverson
17-Nov-22	No movement observed. Good to proceed.	Tim Culverson
18-Nov-22	No work due to snow.	Tim Culverson
19-Nov-22	No work.	Not applicable
20-Nov-22	No work.	Not applicable
21-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
22-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
23-Nov-22	No work.	Not applicable
24-Nov-22	No work.	Not applicable
25-Nov-22	No work.	Not applicable
26-Nov-22	No work.	Not applicable
27-Nov-22	No work.	Not applicable
28-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel
29-Nov-22	No movement observed. No work due to snow.	Jerald Schnabel
30-Nov-22	No movement observed. Good to proceed.	Jerald Schnabel

Appendix B

Prism Survey



LEGEND

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

1. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
2. ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.
3. TOPOGRAPHY FROM NOVEMBER 28, 2022 DRONE SURVEY.
4. CONTOUR INTERVAL IS 10 FEET

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Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision	Date
#	2022.12.31
Drawn By	Figure No.
PK	3

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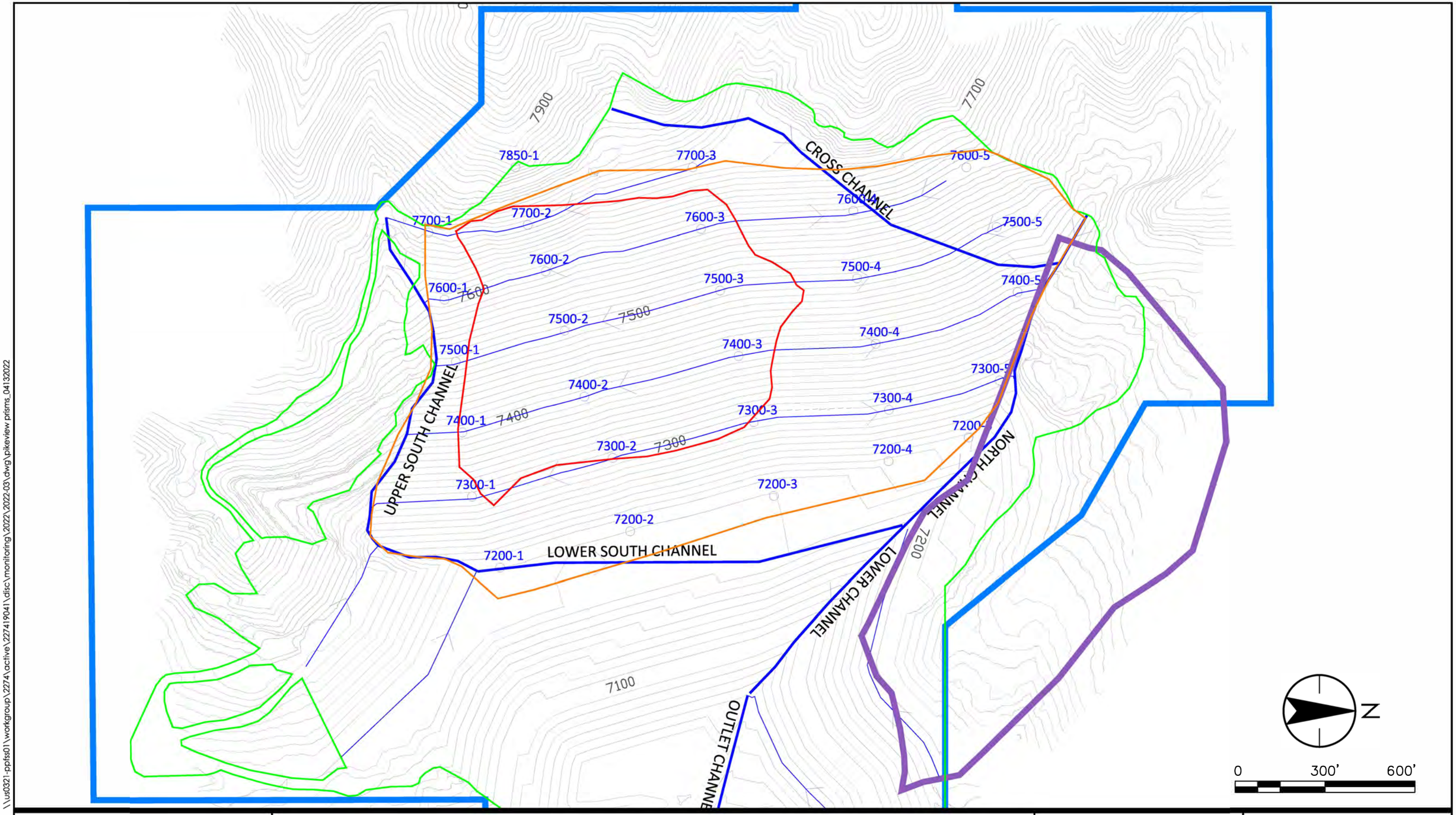

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LEGEND

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

NOTES

1. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
2. ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
PROPOSED PRISMS WITH RECLAMATION SURFACE

Revision	Date
#	2022.12.31
Drawn By	Figure No.
PK	4

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Prism Log

Prism	Date	Action	Comment
CP2	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
CP3	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
NP1	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
TOE2	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
CP4	11-Mar-22	Prism Added	Control Point Replacement
CP5	11-Mar-22	Prism Added	Control Point Replacement
TS1	12-Mar-22	Prism Added	New Prism Added
TOE3	30-Mar-22	Prism Removed	Reclamation grading to affect buffer filling activities
TOE4	8-Apr-22	Prism Added	New Prism Added
TOE5	8-Apr-22	Prism Added	New Prism Added
BR1	8-Apr-22	Prism Added	New Prism Added
BR2	8-Apr-22	Prism Added	New Prism Added
NP1	22-Apr-22	Prism Removed	Originally NP1. Prism re-set in same spot and is now NP3
NP3	22-Apr-22	Prism Added	
TOE3	22-Apr-22	Prism Removed	Originally TOE3. Prism moved to a higher elevation and is now TOE6
TOE6	22-Apr-22	Prism Added	
TOE1	22-Apr-22	Prism Removed	Reclamation grading to affect buffer filling activities
P4	17-Jun-22	Prism Removed	Prism removed due to rock deterioration
P69	20-Jul-22	Prism Removed	Prism was originally P69. It has been re-set to Higher Elevation and is now P69A. Related to base station relocation.
P69A	20-Jul-22	Prism Added	
P35	20-Jul-22	Prism Renamed	Prism was originally P35. It has been re-set to Higher Elevation and is now CP6. Related to base station relocation.
CP6	20-Jul-22	Prism Added	
CP5	20-Jul-22	Prism Renamed	Prism was originally CP5. It has been re-set to Higher Elevation and is now CP7. Related to base station relocation.
CP7	20-Jul-22	Prism Added	
CP1	20-Jul-22	Prism Removed	Not in line of sight of new base station.
CP4	20-Jul-22	Prism Removed	Not in line of sight of new base station.
TOE4	20-Jul-22	Prism Removed	Not in line of sight of new base station.
TOE6	20-Jul-22	Prism Removed	Not in line of sight of new base station.
TOE5	4-Aug-2022	Prism Removed	Out of line of sight of base station.
P63	15-Aug-2022	Prism Removed	Out of line of sight of base station.

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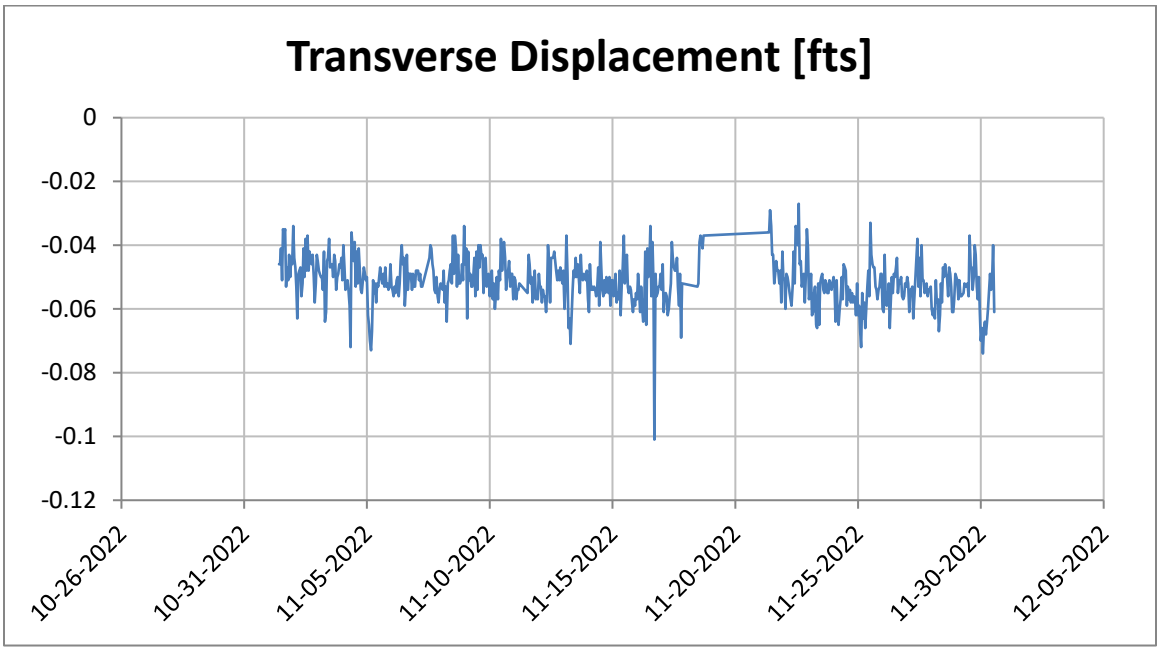
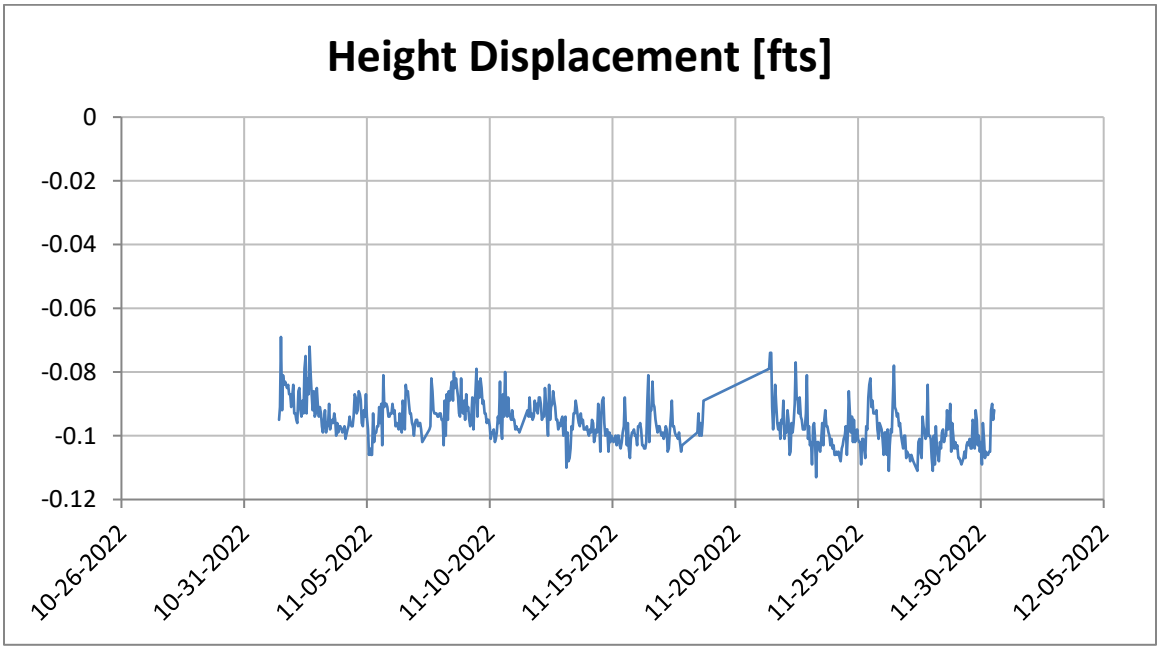
Prism BR1





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.

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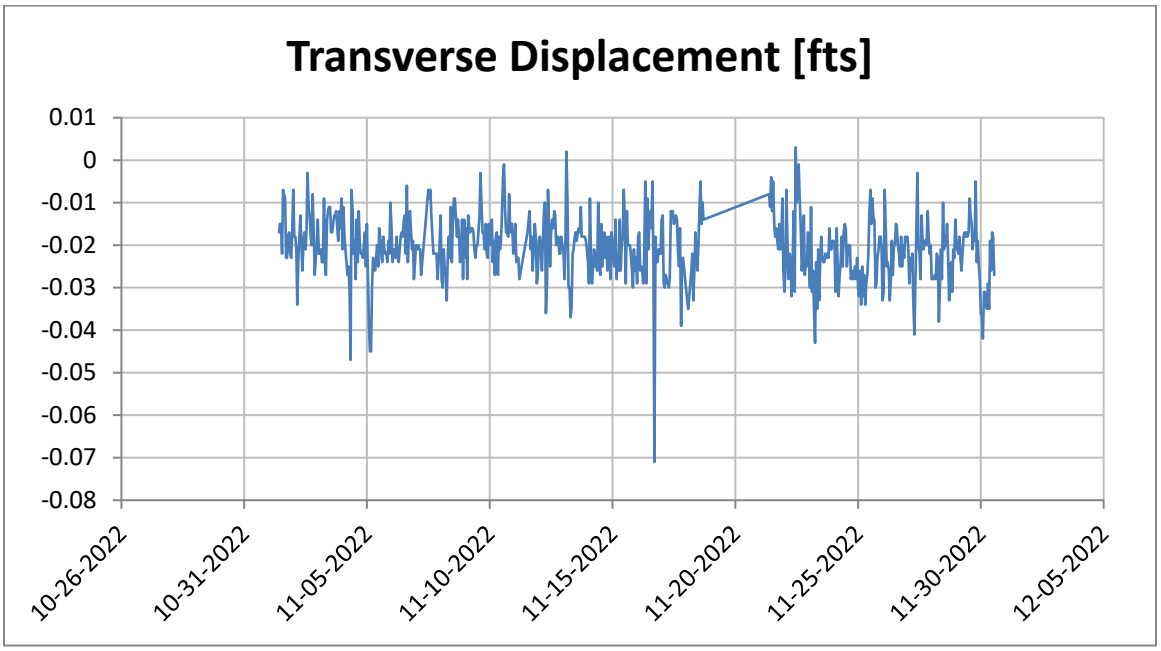
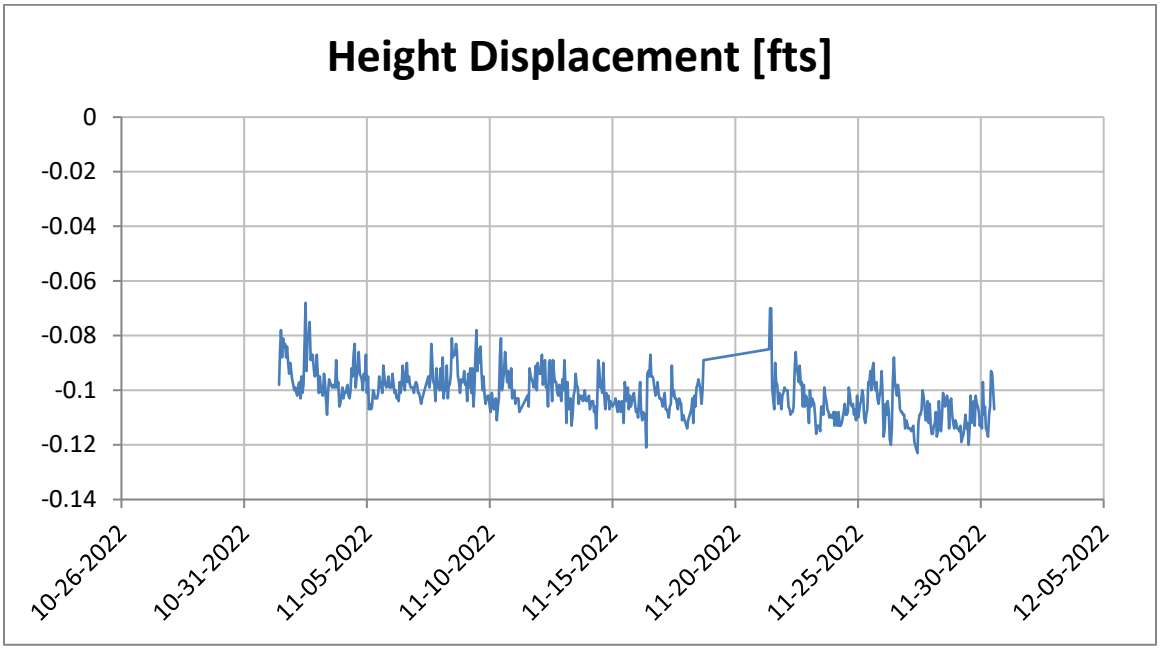
Prism BR2





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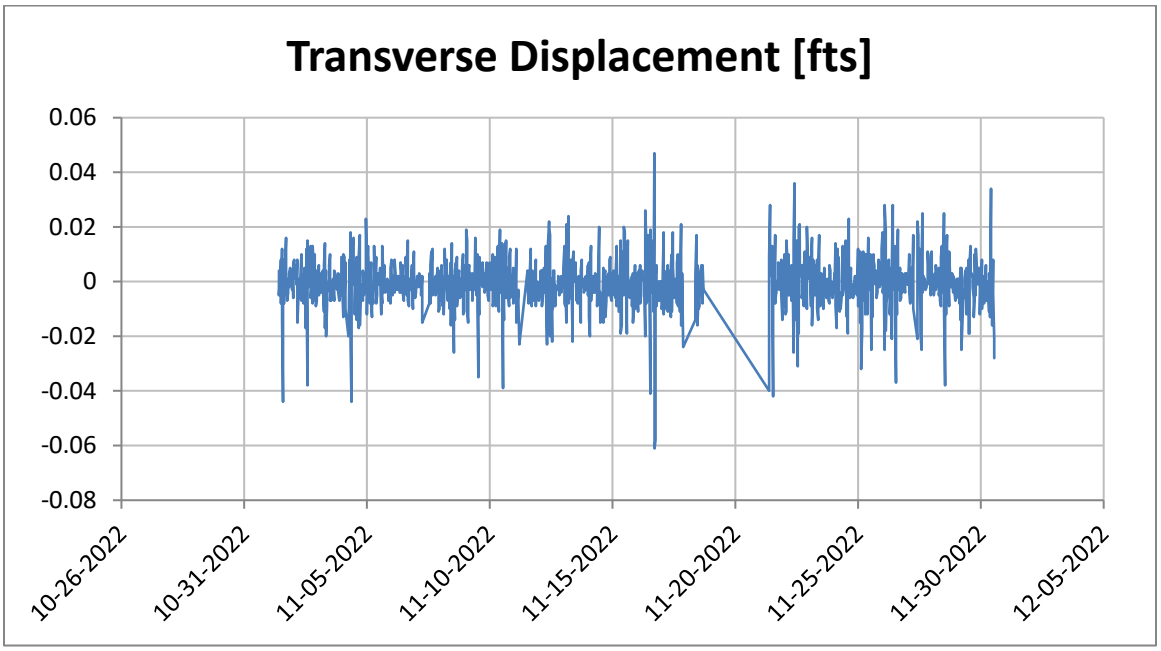
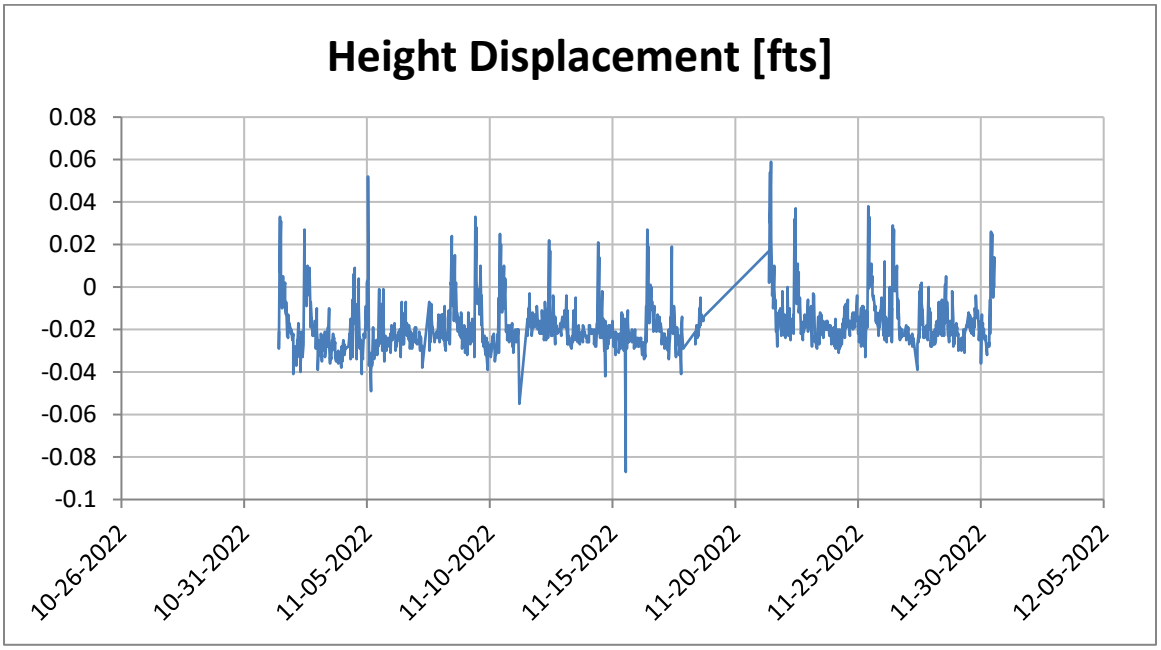
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism records slope creep movements with slow velocity.

Stantec

Prism CP6



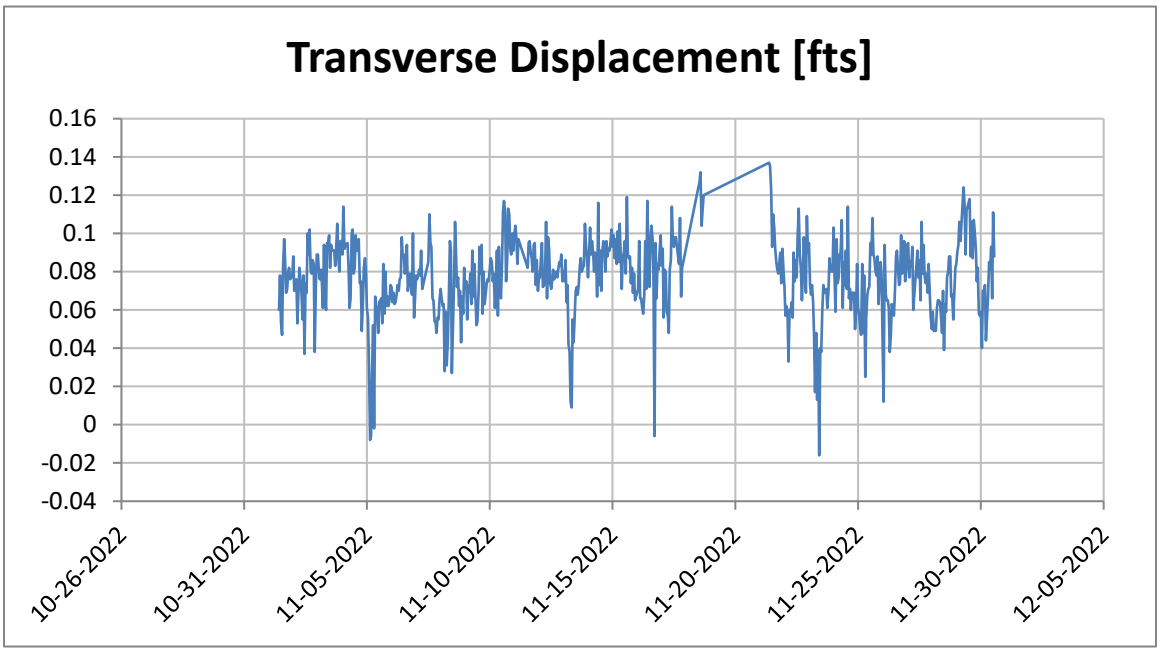


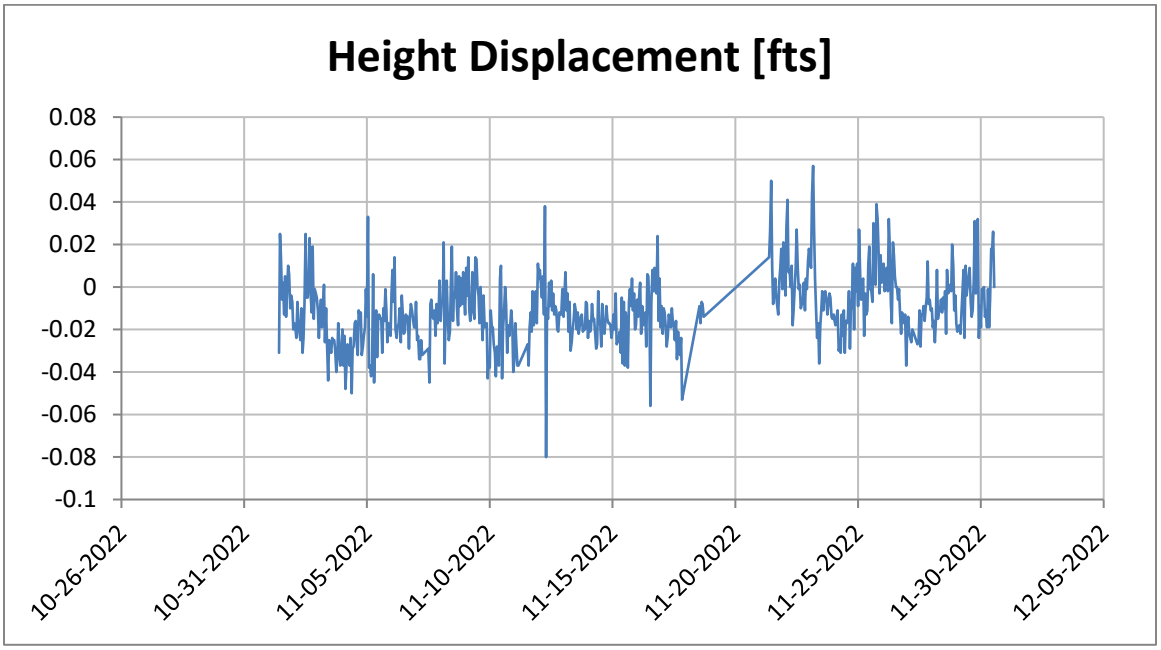
Notes:

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.

Stantec

Prism CP7



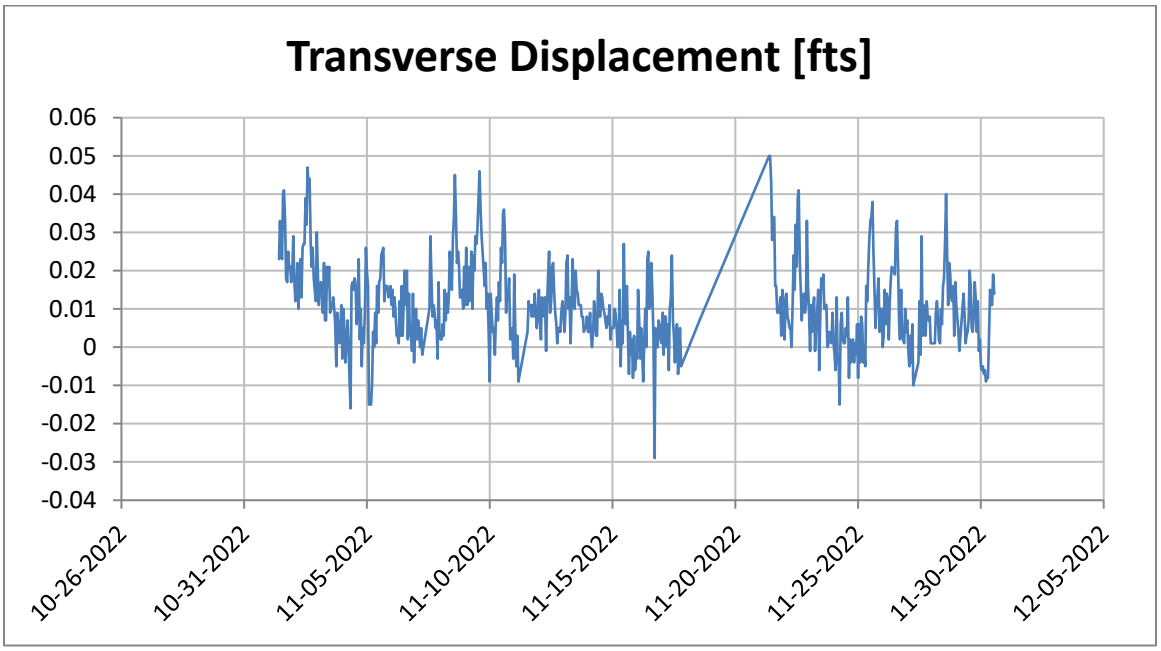


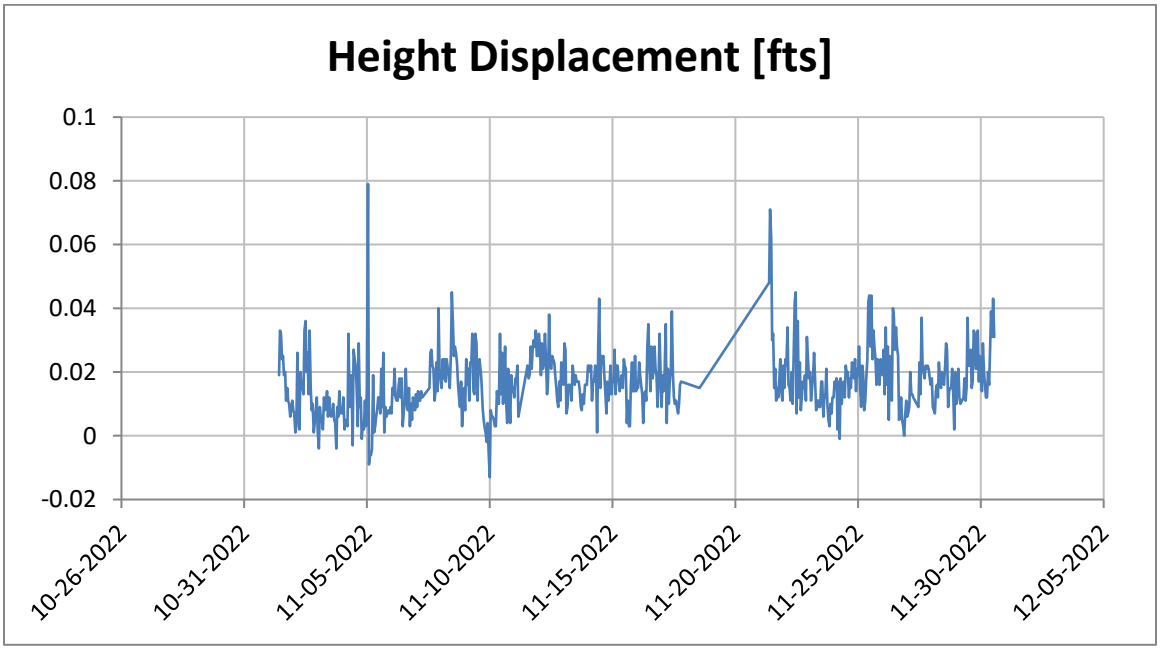
Notes:

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.

Stantec

Prism NP2



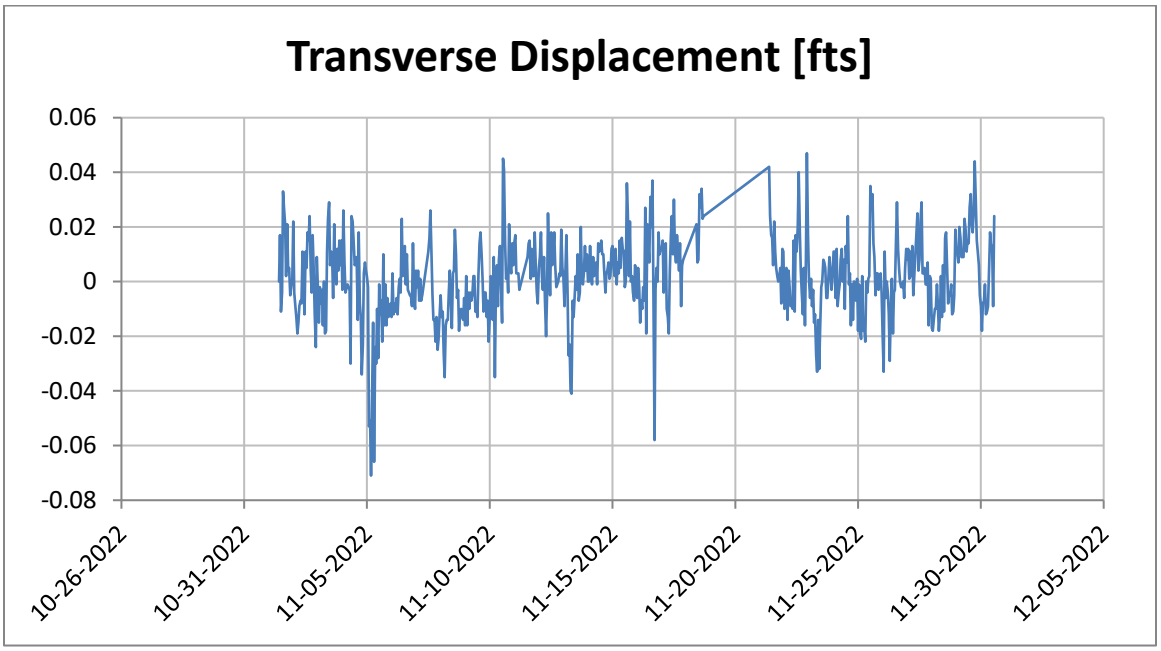


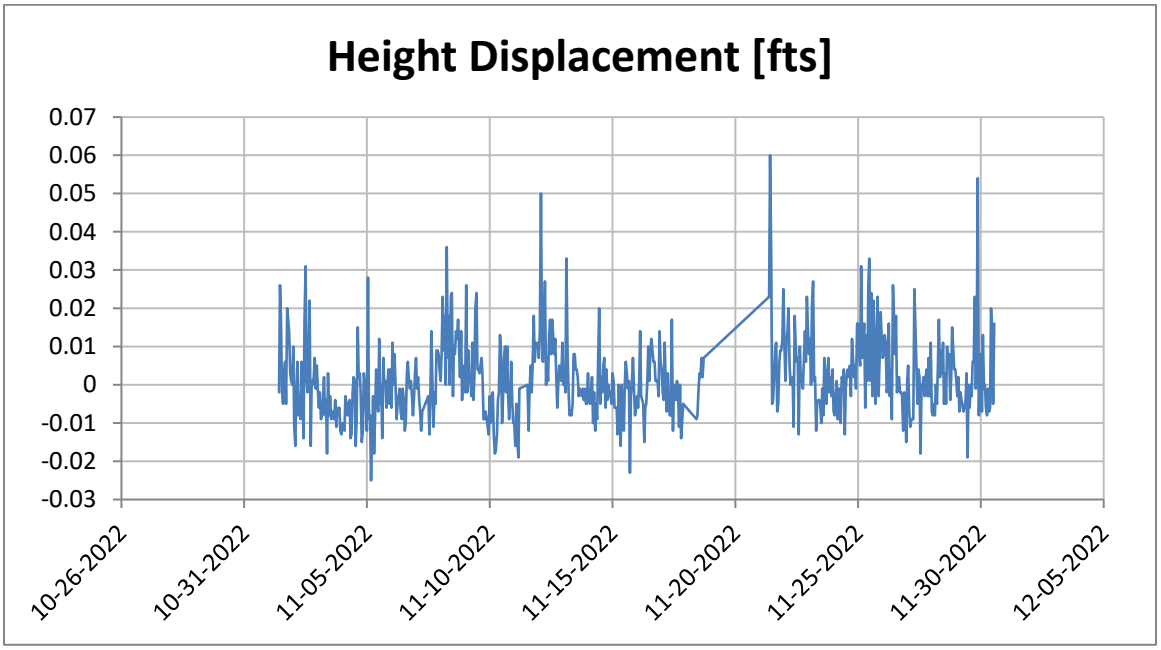
Notes:

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. Regression limit alert received on November 5.

Stantec

Prism NP3



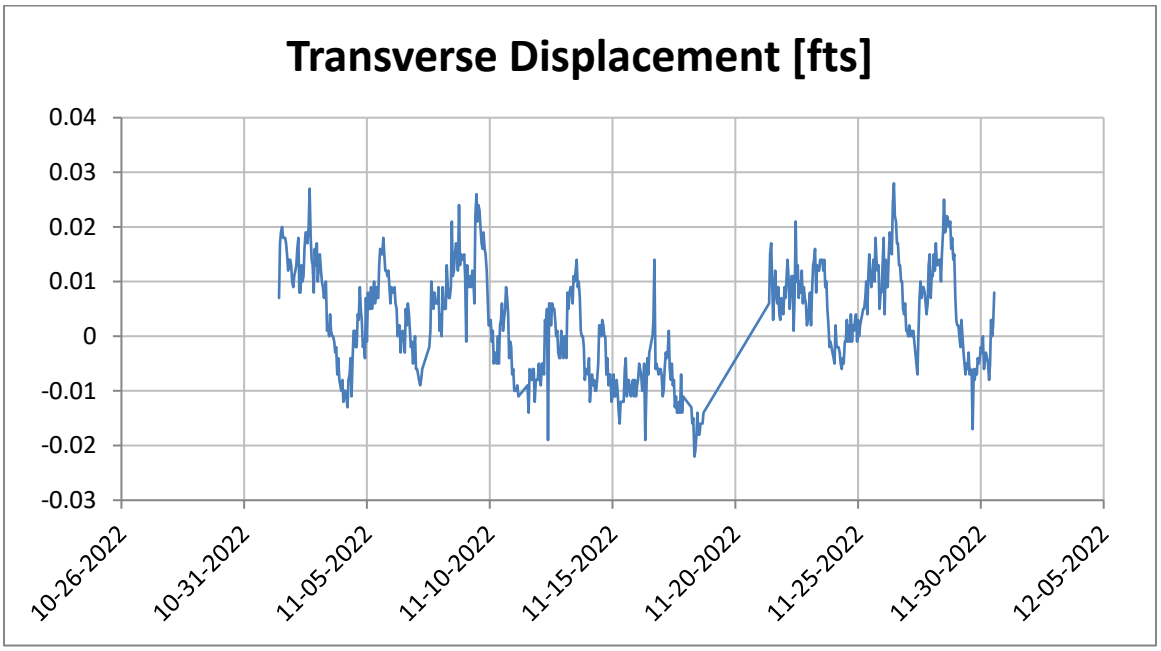


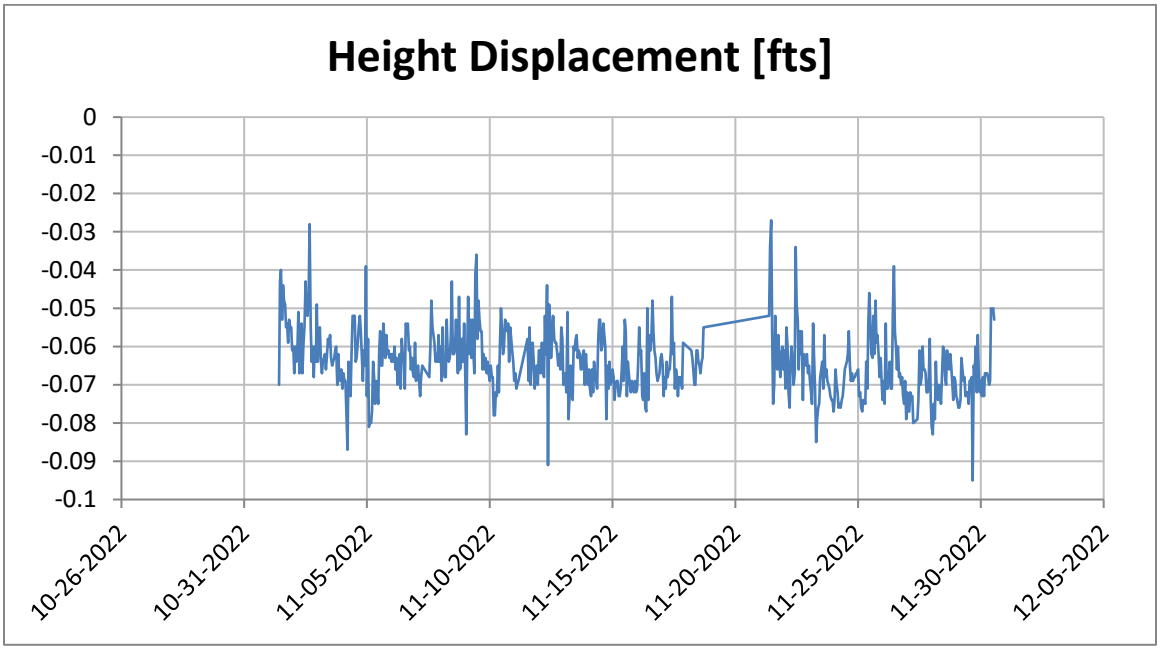
Notes:

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.

Stantec

Prism NP66



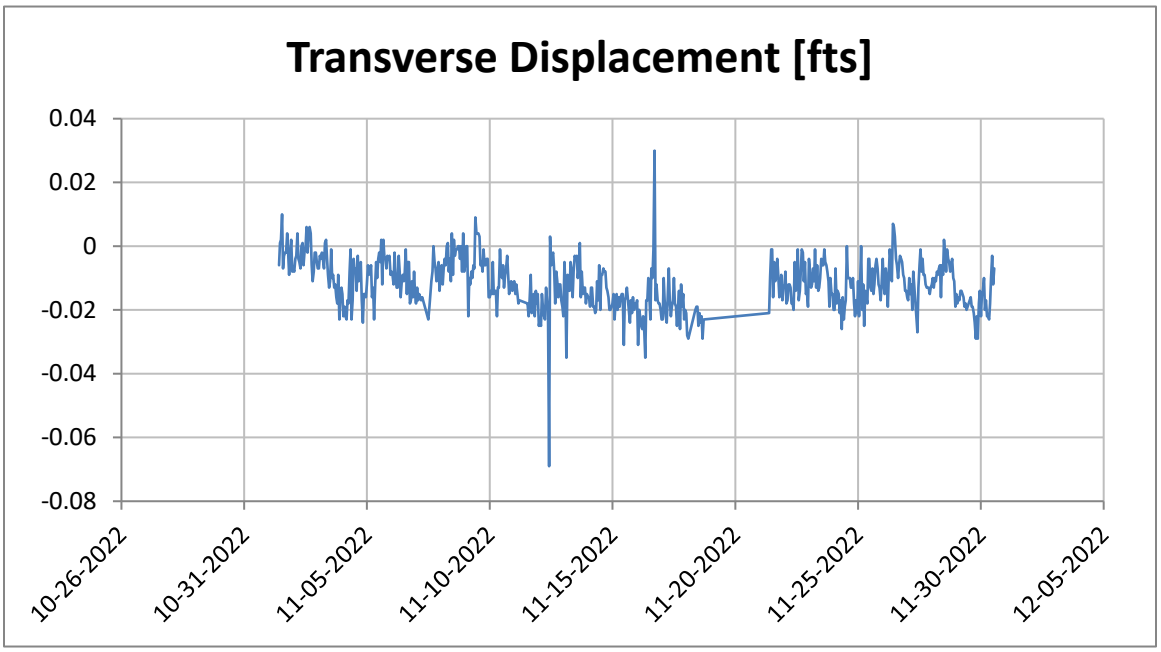


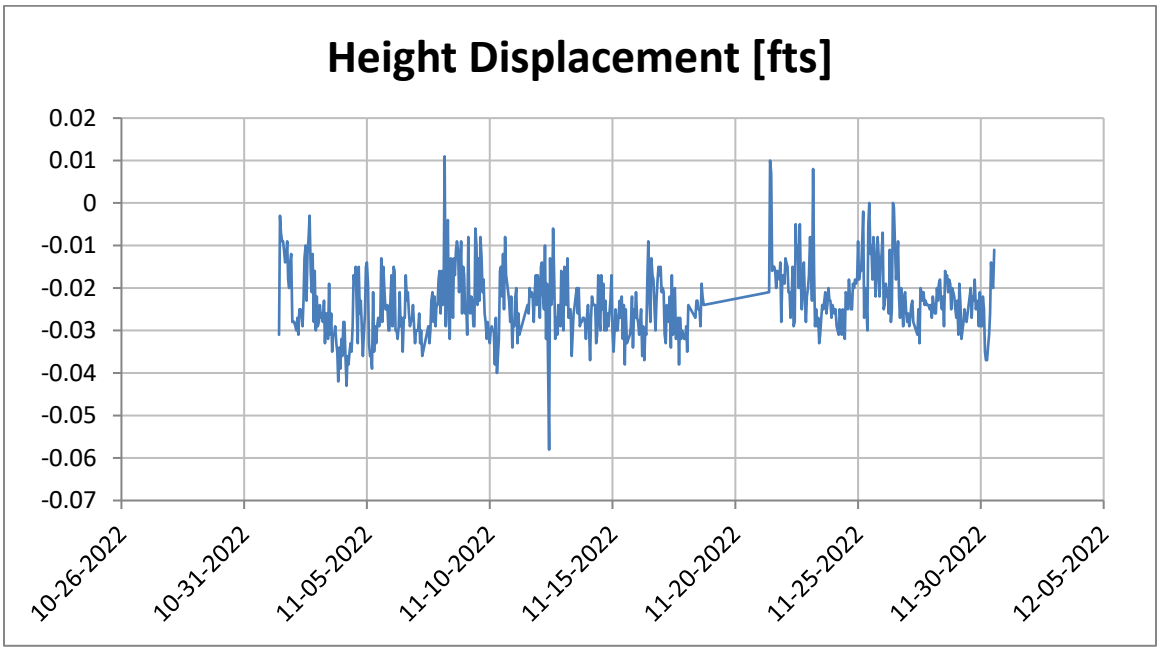
Notes:

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.

Stantec

Prism P1



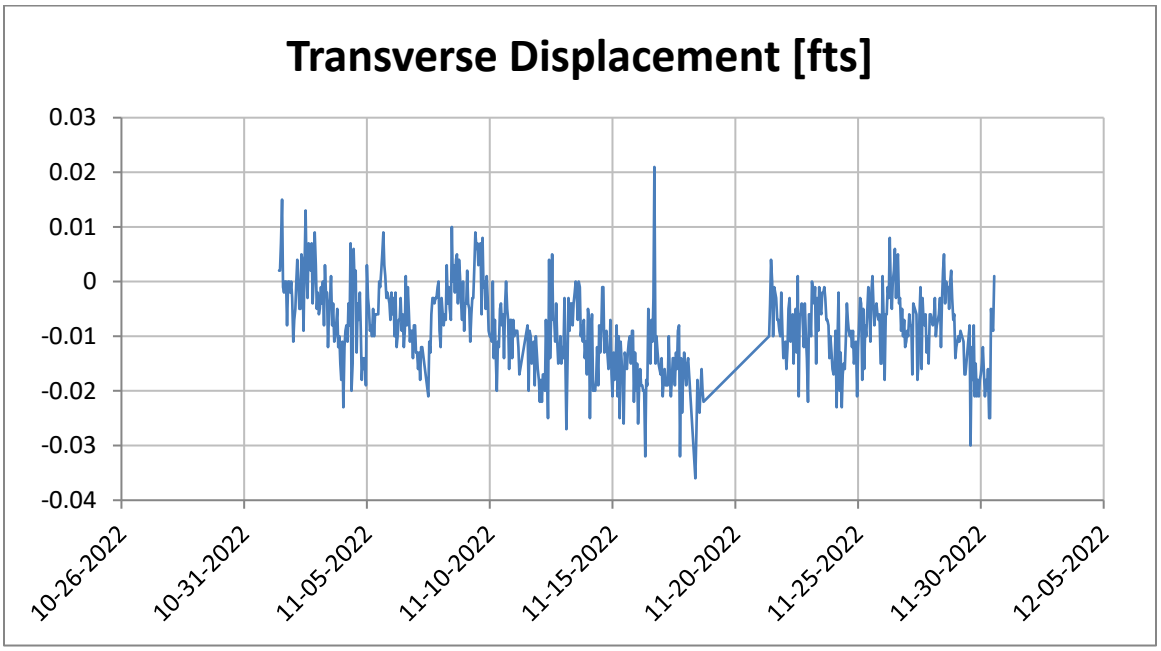


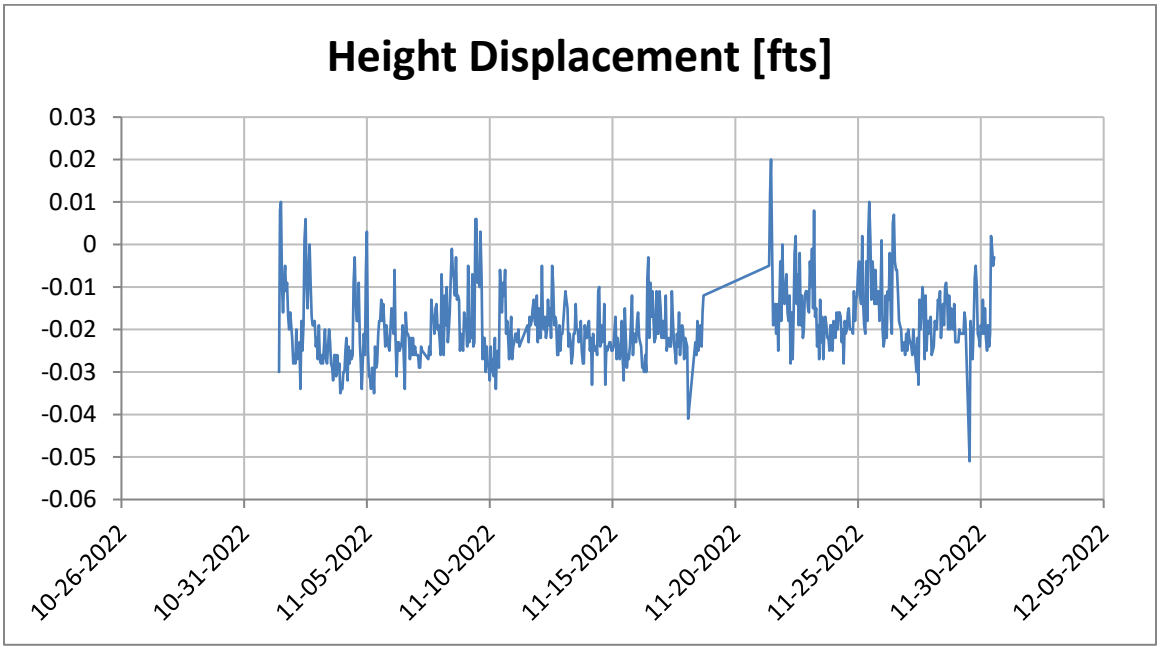
Notes:

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.

Stantec

Prism P2



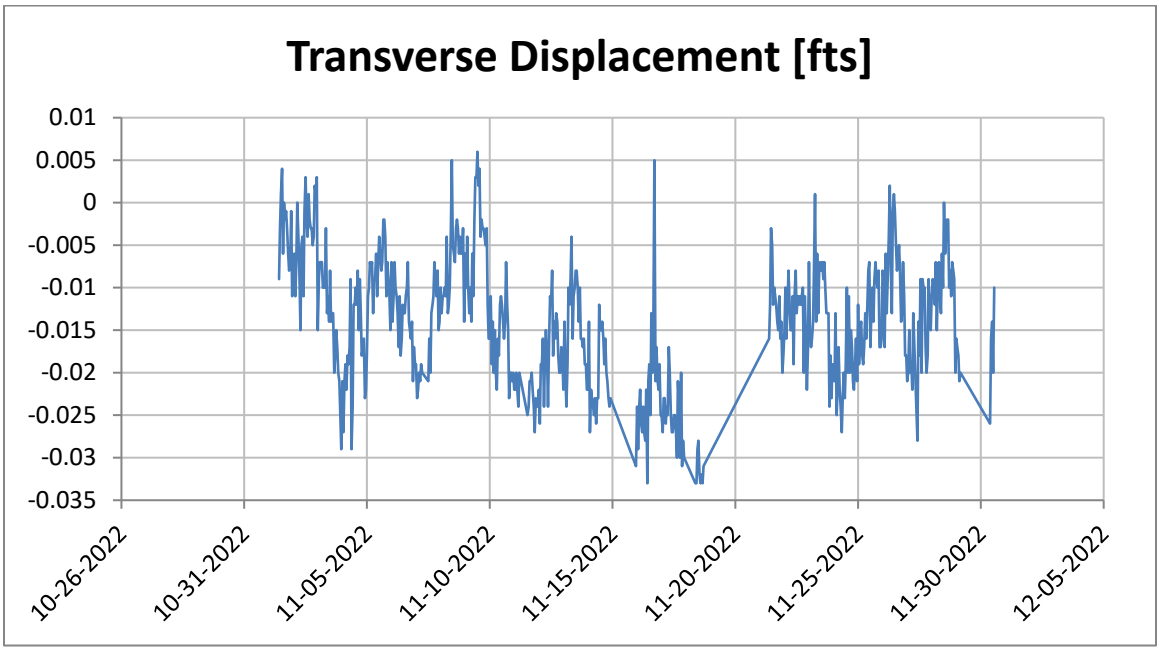


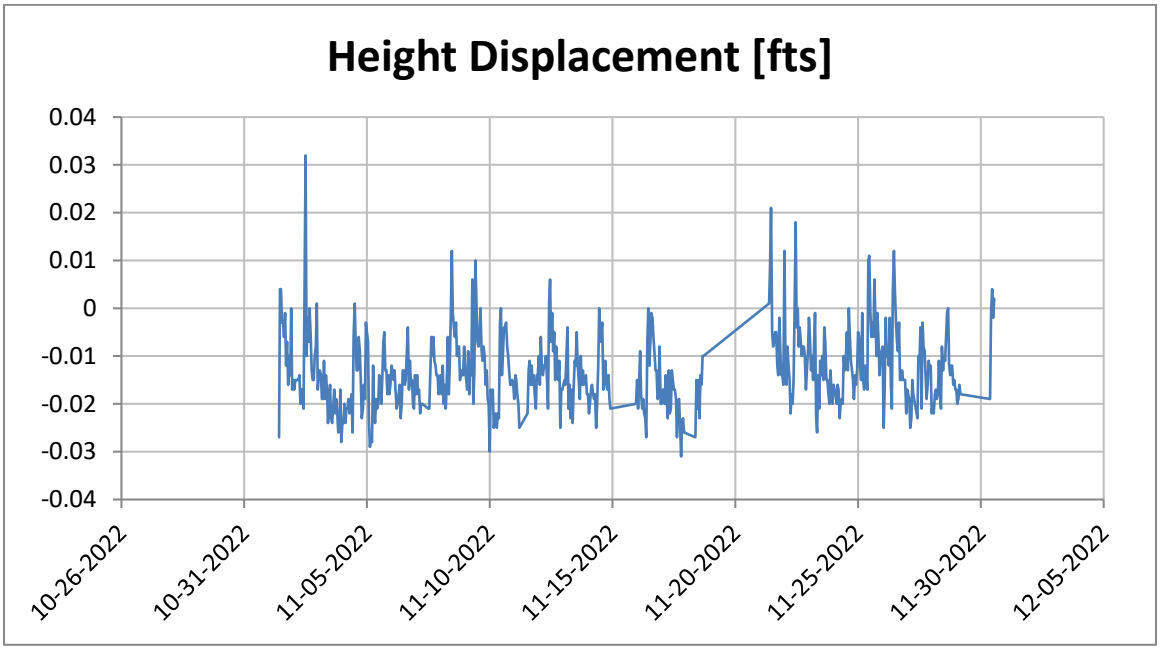
Notes:

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.

Stantec

Prism P5



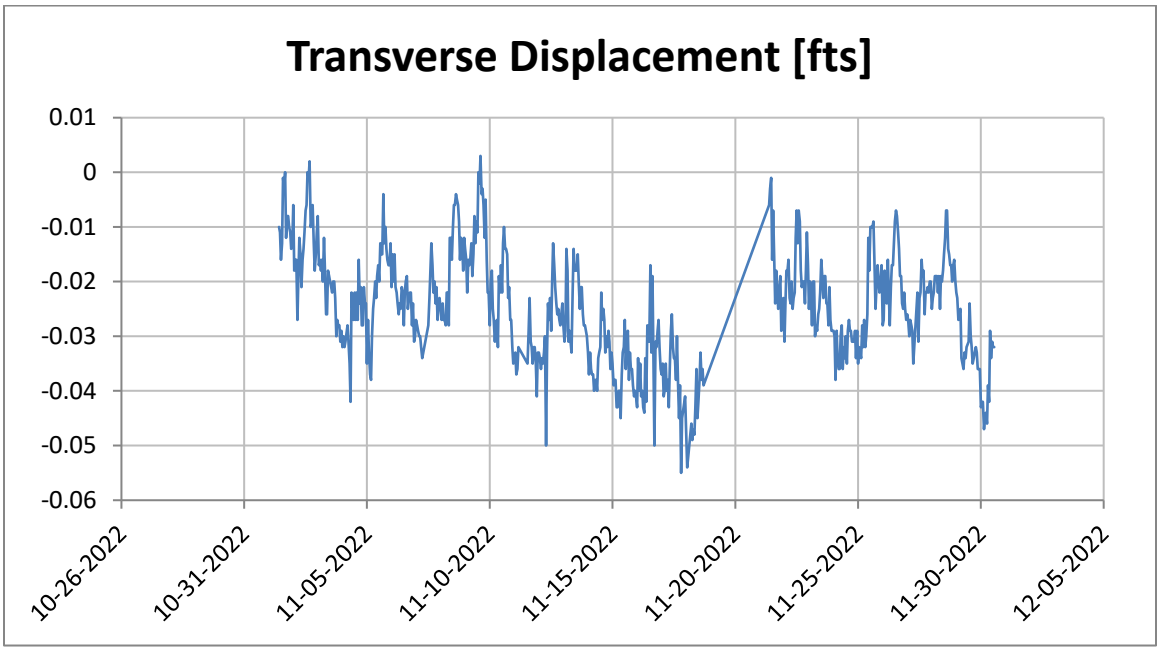


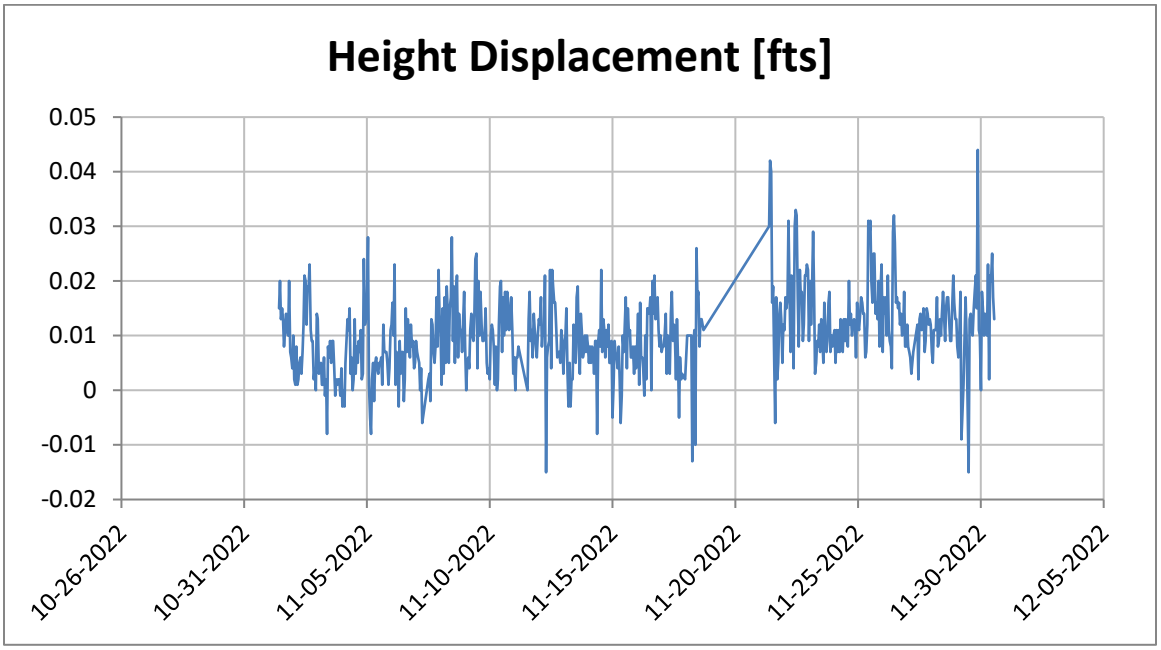
Notes:

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.

Stantec

Prism P25



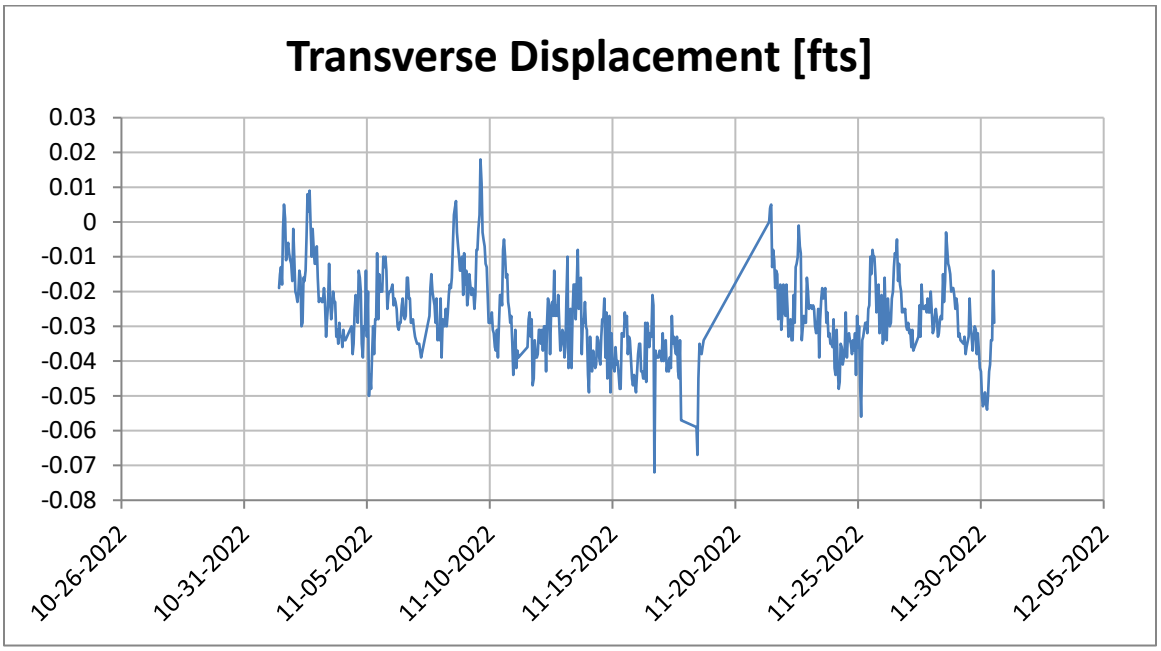


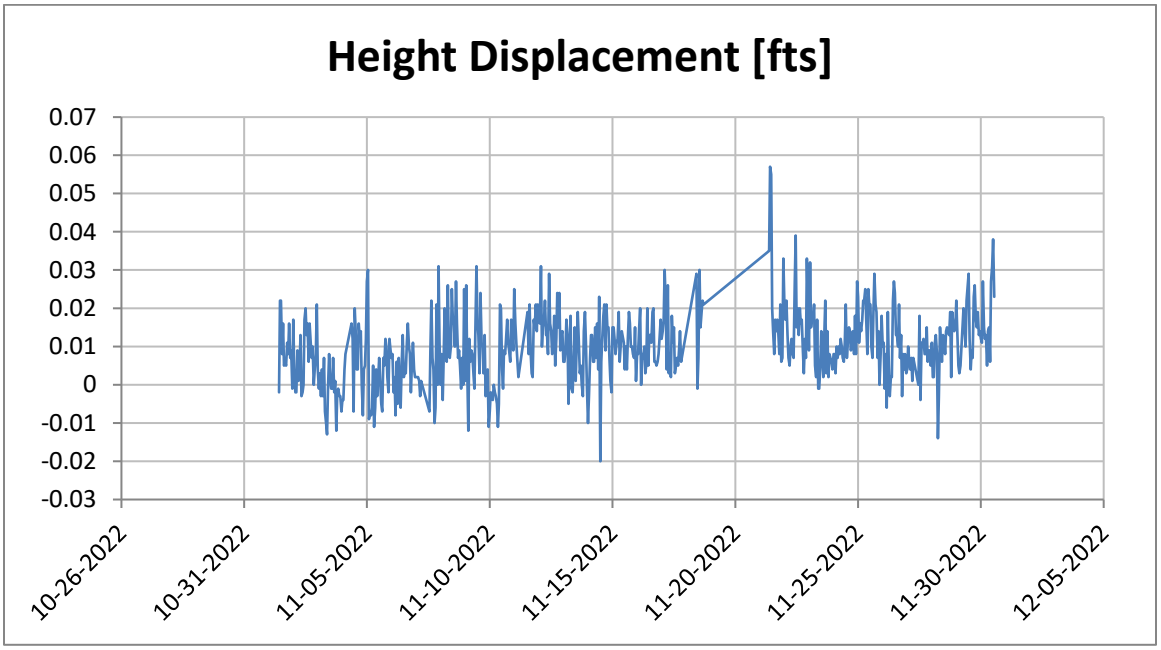
Notes:

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.

Stantec

Prism P32



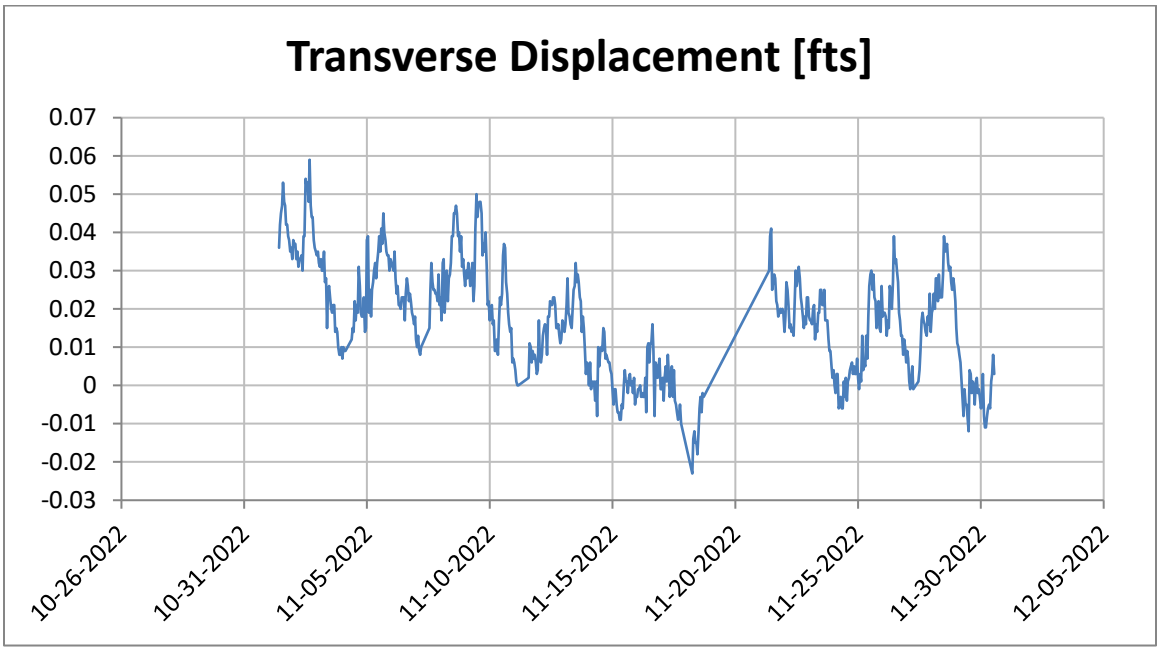


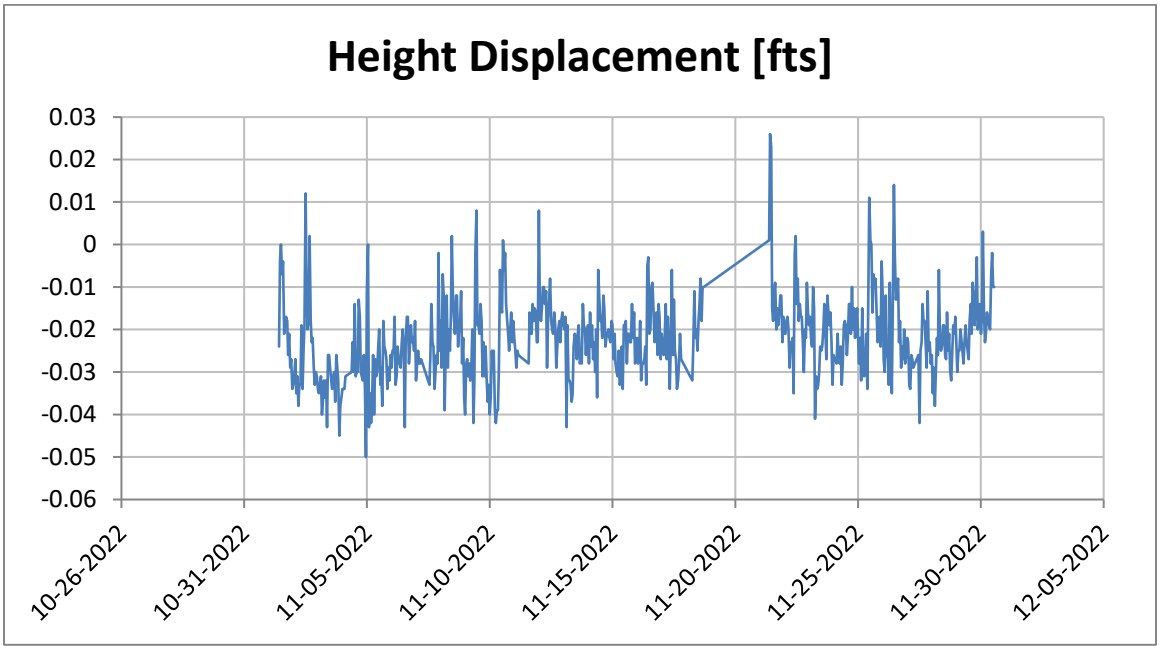
Notes:

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.

Stantec

Prism P33



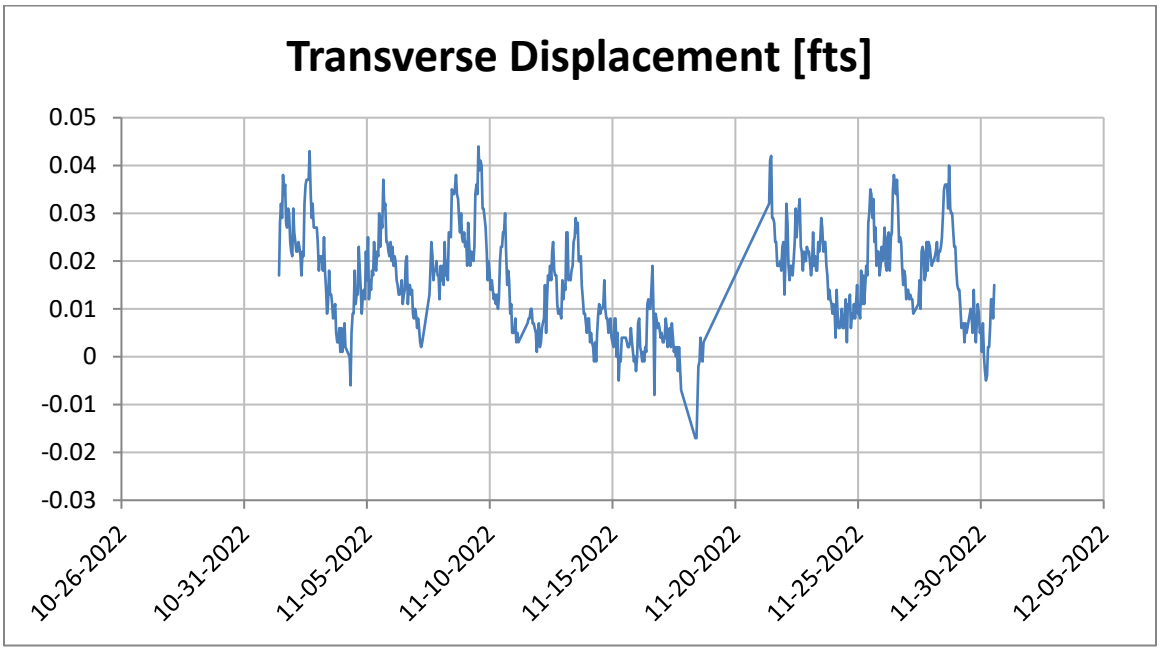


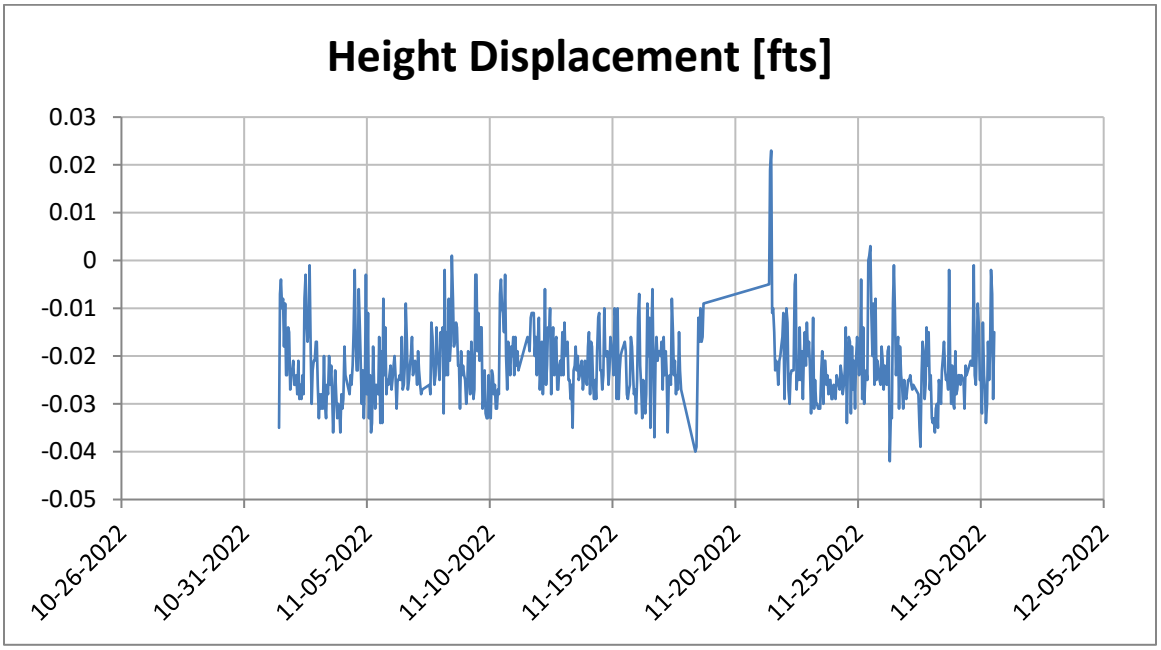
Notes:

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. Regression limit alert received on November 5.

Stantec

Prism P69A



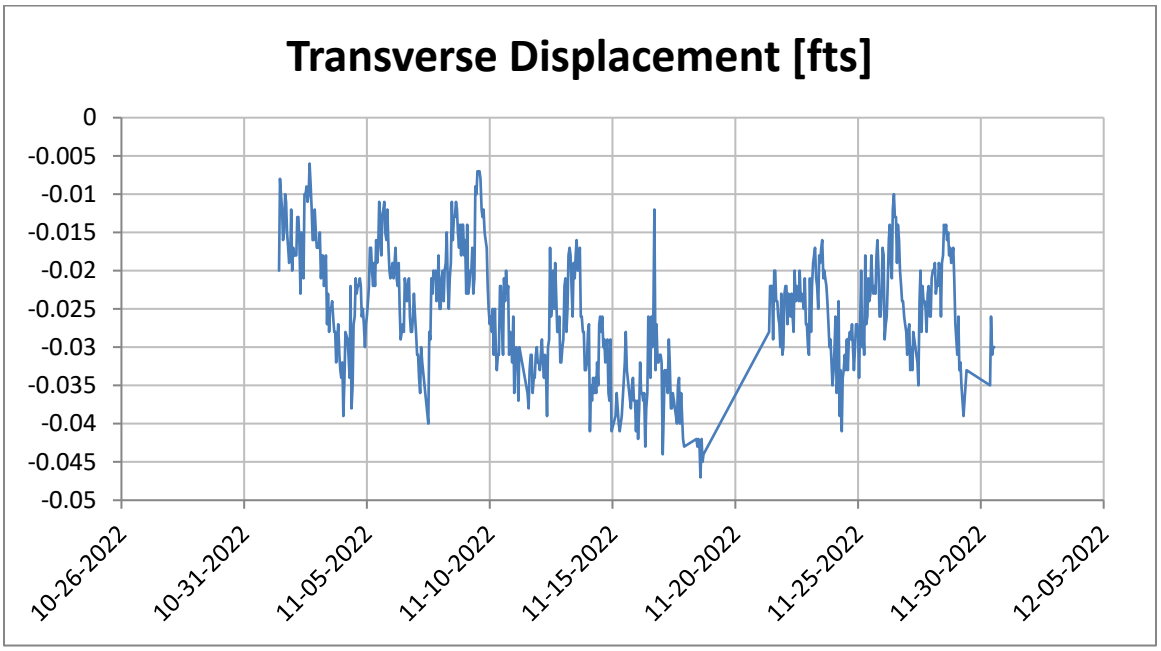


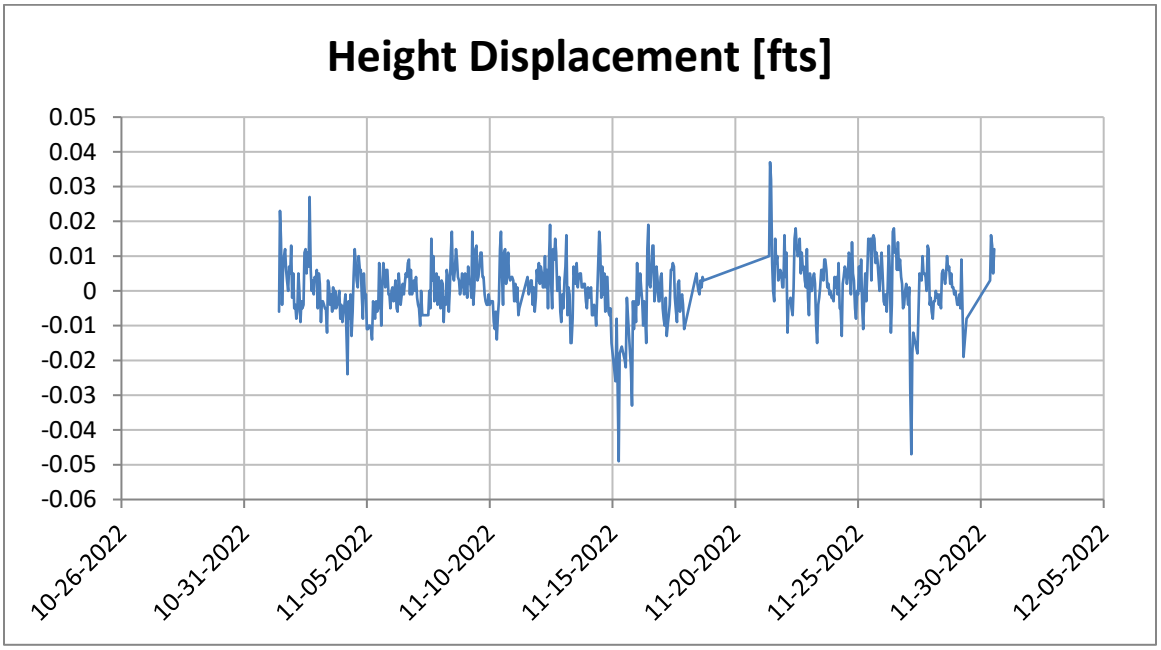
Notes:

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.

Stantec

Prism P70



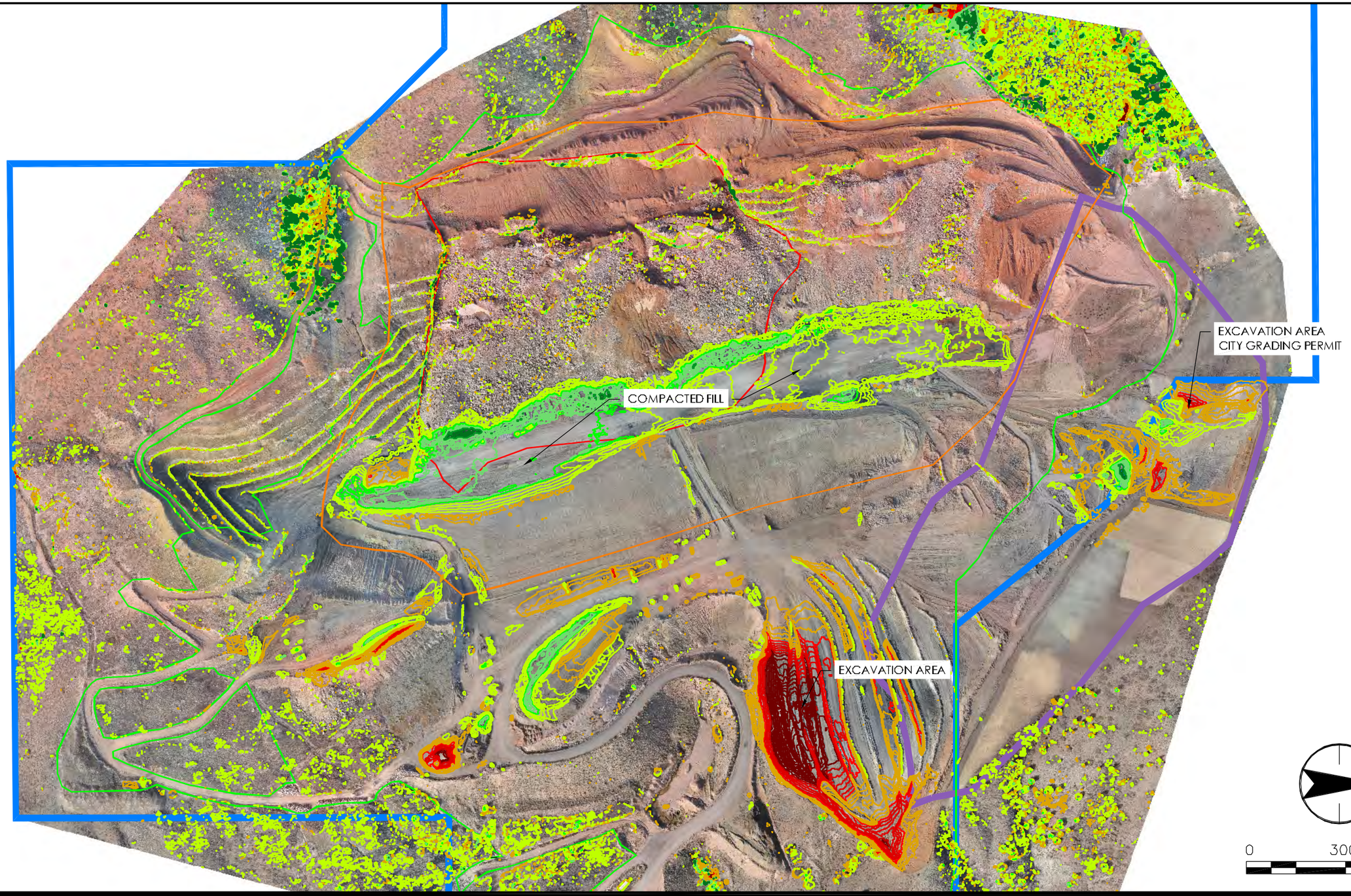


Notes:

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.

Appendix C

Drone Survey



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Stantec

Stantec Consulting Services Inc.
2000 South Colorado Boulevard Suite 2-300
Denver CO 80222-7933
Tel (303) 758-4058
www.stantec.com

LEGEND

- Permit/Affected Lands Boundary
- City Grading Permit 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 10/31/2022 to 11/28/2022.

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision	Date
#	2022.12.31
Drawn By	Figure No.
PK	5

Appendix D

Compaction Testing Results

\\us0389-ppfss01\shared_projects\2057288200\06_design\monitoring\2022-11\dwg\plt\eview pltsmg_12282022

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Stantec Consulting Services Inc.
2000 South Colorado Boulevard Suite 2-300
Denver CO 80222-7933
Tel: (303) 758-4058
www.stantec.com

LEGEND

- Permit/Affected Lands Boundary
- City Grading Permit Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Compaction Test Location

N

0 150' 300'

Client/Project
CONTINENTAL MATERIALS CORP.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
COMPACTION TEST LOCATIONS

Revision
#

Date
2022.12.31

Drawn By
PK

Figure No.
6

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Compaction Testing Log

BCC Test	Test No.	Date	Elevation (ft)	Northing (ft)	Easting (ft)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)	Compaction (%)
Test TT1	#565	1-Nov	7281	1402469	3173009	128.1	7.7	118.9	94
Test TT2	#566	1-Nov	7276	1402344	3173114	118.9	6.9	112	91
Test TT3	#567	1-Nov	7281	1402273	3172972	122.4	4	117.7	94
Test TT4	#568	2-Nov	7265	1401006	3173511	134.2	6.3	127.9	100
Test TT5	#569	2-Nov	7273	1401078	3173345	125.2	6	117.2	95
Test TT6	#570	2-Nov	7271	1401212	3173334	125.9	7.8	116.8	95
Test TT7	#571	3-Nov	7277	1401872	3173187	122	14.4	107.6	87
Re-Test TT7	#571R	4-Nov	7277	1401872	3173187	132.5	6.7	125.8	100
Test TT8	#572	3-Nov	7274	1401913	3173252	127.9	13.2	114.7	93
Test TT9	#573	3-Nov	7273	1401640	3173281	135	12.9	122.1	99
Test TT10	#575	4-Nov	7279	1402260	3173013	125.5	4.1	121.4	98
Test TT 12 In.	#576	4-Nov	7278	1402260	3173013	119.7	5.1	114.6	93
Test TT11	#577	4-Nov	7271	1401068	3173417	130.5	5.2	125.3	100
Test UU1	#578	8-Nov	7273	1400865	3173451	141.6	5.8	135.8	100
Test UU2	#579	8-Nov	7270	1400995	3173500	144.7	10.9	133.8	100
Test UU3	#580	8-Nov	7276	1401028	3173361	125.8	5.4	120.5	98
Test UU4	#581	8-Nov	7274	1401153	3173388	142.5	10.1	132.5	100
Test UU5	#582	9-Nov	7278	1401279	3173329	128.2	4.1	123.1	100
Test UU6	#583	9-Nov	7273	1401288	3173436	125.6	4.1	120.6	98
Test UU7	#584	9-Nov	7275	1401406	3173392	125.7	3.3	121.6	99
Test UU8	#585	9-Nov	7281	1401441	3173244	125.8	4.1	120.8	98
Test UU9	#586	9-Nov	7277	1401545	3173304	129.3	4	124.3	100
Test UU10	#587	9-Nov	7276	1401750	3173221	126.3	9	115.9	94
Test VV1	#588	10-Nov	7279	1400936	3173418	119.1	7.3	111	90
Test VV2	#589	10-Nov	7276	1400965	3173488	129	2.8	125.5	100
Test VV3	#590	10-Nov	7277	1401039	3173445	126.9	9.3	116.2	94
Test VV4	#591	10-Nov	7276	1401191	3173464	132.5	8.9	121.6	99
Test VV5	#592	10-Nov	7278	1401309	3173379	123.7	3.4	119.7	97
Test VV6	#593	10-Nov	7281	1401543	3173232	125.2	3.1	121.4	98
Test VV7	#594	10-Nov	7280	1401603	3173269	132.4	5.7	125.3	100
Test WW1	#595	14-Nov	7279	1400911	3173473	126.9	7	118.6	96
Test WW2	#596	14-Nov	7282	1400871	3173423	135.2	5.4	128.3	100
Test WW3	#597	14-Nov	7281	1400961	3173412	132.1	4	127	100
Test WW4	#598	14-Nov	7281	1401091	3173413	133.2	7.1	124.4	100
Test WW5	#599	14-Nov	7282	1401359	3173283	131.3	3.6	126.7	100
Test WW6	#600	14-Nov	7276	1401342	3173440	131.1	5.2	124.6	100
Test XX1	#601	16-Nov	7279	1400958	3173492	127	7.3	119.6	97

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BCC Test	Test No.	Date	Elevation (ft)	Northing (ft)	Easting (ft)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)	Compaction (%)
Test XX2	#602	16-Nov	7282	1401050	3173425	125.4	5.7	119.7	97
Test XX3	#603	16-Nov	7283	1401242	3173312	121.5	4.4	117.1	95
Test XX4	#604	16-Nov	7281	1401312	3173356	116.2	2.5	112.7	92
Test XX5	#605	16-Nov	7278	1401400	3173407	116	3.5	112.5	91
Test XX6	#606	16-Nov	7283	1401501	3173304	121.7	4.4	117.3	95
Test XX7	#607	16-Nov	7283	1401728	3173201	119.2	3.1	116.1	94
Test XX8	#608	16-Nov	7282	1401869	3173224	124	6.3	117.3	95
Test XX9	#609	16-Nov	7281	1402022	3173152	129.7	6.3	123.4	100
Test XX10	#610	16-Nov	7279	1402184	3173148	121.4	8	113.4	92
Test YY1	#611	21-Nov	7285	1402661	3173058	116.2	3.4	112.4	91
Test YY2	#612	21-Nov	7289	1402713	3172957	123.3	2.5	120.3	97
Test YY3	#613	21-Nov	7286	1402419	3172971	128.3	4	123.3	100
Test YY4	#614	21-Nov	7283	1402262	3173072	123.9	3.3	120	97
Test YY5	#615	21-Nov	7285	1402038	3173083	128.5	2.5	125.4	100
Test YY6	#616	21-Nov	7282	1401883	3173226	123.8	4.5	118.5	96
Test YY7	#617	22-Nov	7283	1400884	3173446	123.9	11.8	112.1	91
Test YY8	#618	22-Nov	7284	1401054	3173386	123.3	10.2	113.1	92
Test YY9	#619	22-Nov	7284	1401260	3173325	133.3	7.1	126.2	100
Test YY10	#620	22-Nov	7283	1401300	3173348	138.6	8.6	130	100
Test ZZ1	#621	30-Nov	7282	1402240	3173128	123.6	12.6	111	91
Test ZZ2	#622	30-Nov	7280	1402302	3173134	123.4	6.8	116.6	96
Test ZZ3	#623	30-Nov	7286	1402204	3173043	126.8	7.7	119.1	99
Test ZZ4	#624	30-Nov	7284	1402041	3173123	120.1	3.8	116.2	95
Test ZZ5	#625	30-Nov	7286	1401881	3173141	125.7	5.6	120.1	100

Notes:

1. As of November 30, 2022, a total 1,784,000 yd3 had been placed and compacted. This requires 357 compaction tests, and 517 tests have been taken.

2. The test indicated by “(12in)” was measured by excavating down 12 inches to measure the density of the material placed in the lower portion of the lift.