Stantec

To:	Jerald Schnabel	From:	Paul Kos
	Castle Aggregate		Denver, CO 80202
File:	June 2024 Monitoring Summary	Date:	July 31, 2024

Reference: June 2024 Geotechnical Monitoring Summary Pikeview Quarry

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this June 2024 Geotechnical Monitoring Summary for the Pikeview Quarry. The Pikeview Quarry is situated along the foothills of the Rocky Mountains, northwest of Colorado Springs, Colorado. Castle Aggregate operates the quarry, which is currently closed and undergoing reclamation. A geotechnical monitoring program was established to monitor 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 June 2024. Continuous monitoring by the robotic survey system began in 2010 and continued through the month of June 2024. Visual inspections of the slopes were performed by Castle Aggregate employees and Stantec engineers.

1.1 PURPOSE

The purpose of this report is to summarize the June 2024 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 (Castle Aggregate 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 engineers to document visual observations of slope conditions, including signs 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 when appropriate, 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. The notes from the daily inspections are summarized in Table A-1 in Appendix A.

Stantec conducted visual inspections of the Pikeview Quarry slopes on June 4, 17, and 25, 2024. 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. Slopes that have been seeded are observed from adjacent areas to avoid disturbing the seed and mulch covering. The findings are listed below, and photographs of notable observations are included on Figure 2 in Appendix A.

- Cracking was previously observed on the graded slopes near the upper extents of the fill slope. These tension cracks were inspected in June and observed to be similar in nature and extent from previous inspections.
- Reclamation grading began in February 2022 and continued throughout June 2024. Site maintenance, topsoil placement and riprap production also continued throughout the month.
- Operators placed compacted material in the buttress zone. Material was excavated from the Upper Borrow Area. The material was dozed down ramps to the buttress floor and placed in lifts and compacted.
- No cracking was observed on the native granite slopes above the extents of the disturbed area.
- No cracking was observed on the slope south of the southern scarp.
- Seepage was noted from the graded granite slopes. This seepage was observed in previous years and is expected to occur each spring.
- Topsoil was placed on areas at final grade.
- 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 total station is used to continuously survey the prisms onsite to document slope movements. The robotic total station records the location of each prism every hour. There were 30 prisms active in June; two prisms were control points located outside the slope movement area, seven prisms are located on the slopes surrounding the slope movement area, three prisms were located on the slopes within the landslide area, and eighteen prisms were located on the buttress fill. As the slope is backfilled

and graded, the existing prisms will be removed, and additional prisms will be installed. Five prisms were installed in June: B7500-1, B7500-2, B7500-3, B7500-4, and B7500-5.Two prisms were installed as replacements for two prisms that were removed in June. Prism BR-3 was replaced by prism BR-4 and prism P70 was replaced by prism P70R. Prism BR1 was removed before grading began in that area. 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 alerts if there is a movement recorded that is greater than 0.35 feet, if a prism cannot be located, or if there are communication errors. Following each alert, Castle Aggregate clears the area of concern until the data can be reviewed and the slope can be inspected. Castle Aggregate made sure that there were no workers in the area before inspecting the slope. The construction contractor also has a spotter monitoring the slope during construction, and they can radio the operators if there are any signs of movement or a falling rock. All alerts for potential movement have been attributed to weather, animal activity, equipment operations blocking the prism, or sun glare, and no alerts have been associated with slope movements. Rain and fog occurred at the end of June, and this caused erroneous readings and regression limit alerts at multiple prisms. The alerts are listed in Table 2.

Table 2 Alert Summary

Date(s)	Alert	Cause/Actions taken	Resolved
1-Jun	B7300-3 communication error	Single event. Rain and fog. No work being performed at time of alert.	1-Jun
2-Jun	B7500-3 not found	Single event. Rain and fog. No work being performed at time of alert.	2-Jun
3-Jun to 4-Jun	P70 not found	Equipment operations in area. Fill being moved down to buttress.	4-Jun
8-Jun	P2 and P5 not found	Single alert per prism. Prisms blocked by construction in area.	8-Jun
8-Jun to 9-Jun	B7500-3 not found	Believed to be animal activity or fog. No work being performed at time of alert.	9-Jun
9-Jun	Points not found	Rain and fog. No work being performed at time of alerts.	9-Jun
10-Jun	Points not found	Rain and fog. No work being performed at time of alerts.	10-Jun
11-Jun	BR3 not found	Prism removed during grading activities	11-Jun
11-Jun	P5 and P32 not found	Single alert per prism. Rain and fog. No work being performed at time of alerts.	11-Jun
17-Jun to 18-Jun	BR1 not found	Prism removed during grading activities	17-Jun
19-Jun	Points not found	Rain and fog. Spotters used during alerts.	19-Jun
19-Jun	P25 regression limit	Single alert during rain and fog. No work being performed at time of alert.	19-Jun
20-Jun	Points not found	Rain and fog. Spotters used during alerts.	20-Jun
22-Jun	Points not found	Rain and fog. No work being performed at time of alerts.	22-Jun
24-Jun	P70 not found	Equipment operations in area. Fill being moved down to buttress.	24-Jun
24-Jun	B7300-4 communication error	Single alert. Equipment operations in area.	24-Jun
25-Jun to 26-Jun	P70 communication errors and point not found	Equipment operations in area. Fill being moved down to buttress.	26-Jun
26-Jun	Points not found	Rain and fog. No work being performed at time of alerts.	26-Jun
27-Jun	Points not found	Rain and fog. No work being performed at time of alerts.	27-Jun
30-Jun to 1-Jul	Points not found	Rain and fog. No work being performed at time of alerts.	1-Jul
30-Jun to 1-Jul	P5 regression limits	Rain and fog. No work being performed at time of alerts. Readings in positive and negative directions.	1-Jul

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 total station to the prism; positive displacements indicate less distance between the robotic total station and prism (movement towards the robotic total station). The height displacement measures the change in the vertical distance from the robotic total station to the prism; positive displacements indicate upward movement. The monthly delta is the most recent reading cumulative delta displacement (horizontal, lateral, and vertical) subtracted from the first reading of the 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 robotic total 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 robotic total station; these equates to an accuracy of +/-0.016 ft.

Table 3 Prism Summary

Prism ID	Cumulative Transverse Displacement (ft)	Cumulative Height Displacement (ft)	Monthly Delta (ft)	Cumulative Delta (ft)	Notes / Recommendations
B7200-1	-0.762	0.034	0.7080	0.7635	
B7200-2	-0.030	-0.013	0.0077	0.0692	
B7200-3	-0.275	-0.066	0.0685	0.3264	
B7300-0	-1.641	-0.144	0.6642	1.7573	
B7300-1	-0.607	-0.166	0.3067	0.7015	
B7300-2	0.057	-0.259	0.0210	0.3245	
B7300-3	0.285	-0.160	0.0539	0.3796	
B7300-4	0.150	-0.158	0.0087	0.2527	
B7400-1	-0.365	-0.840	0.0474	1.3553	
B7400-2	0.026	-0.547	0.0314	1.0965	
B7400-3	0.227	-0.386	0.0523	0.5539	
B7400-4	1.057	-0.349	0.4479	1.1821	
B7400-5	0.752	-0.159	0.0472	0.8026	
B7500-1	-0.161	-0.060	0.165	0.183	New prism
B7500-2	-0.033	-0.050	0.069	0.077	New prism
B7500-3	0.025	-0.035	0.046	0.057	New prism
B7500-4	0.016	-0.002	0.039	0.047	New prism
B7500-5	-0.212	0.060	0.213	0.223	New prism
BR1	-0.016	-0.482	0.0567	0.9324	Prism removed
BR4	-0.332	0.018	0.3174	0.3325	New prism
CP6	-0.039	-0.005	0.0090	0.0441	
CP7	0.091	-0.005	0.0029	0.0917	
NP4	-0.195	-0.062	0.0938	0.2514	
P2	0.001	-0.021	-0.0017	0.0219	
P5	0.577	0.020	0.9363	0.9536	
P25	0.010	0.012	-0.0012	0.0238	
P32r	-0.002	0.044	0.0144	0.0484	
P33	0.099	0.005	0.0403	0.1635	
P70	0.041	-0.055	0.0124	0.0867	Prism removed
P70R	-0.048	-0.004	0.0406	0.0496	New prism

The data show stable conditions with no or very small settlement movements at each the 30 prisms. Prisms on the buttress slope continued to record slow and decreasing gradual movement as the fill consolidates along the benches. The fill is likely consolidating under its own weight and by the placement of topsoil. A small amount of settlement is common for newly placed compacted fill, and this is being

recorded by the prisms, which were installed as the buttress was constructed. Plots of the transverse and height displacements for each prism are included in Appendix B.

4.0 DRONE SURVEY

The site was flown for aerial imagery and LiDAR using an unmanned aircraft system (UAS or 'drone') on July 17, 2024. Previous surveys were performed using photogrammetry to develop the site topography; however, the surveying vendor's equipment was not available, and a different drone system had to be used for this survey. The availability of equipment and pilots resulted in the end of June flight being delayed until July 17. The imagery and topography were 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 July 17 topography was also compared to the May topography to identify changes in the site topography. Comparison of the two surveys showed the placement of the fill material in the Buttress Area, and fill material was primarily excavated from the Upper Borrow and Area and dozed down ramps to the Buttress Area. No slope movements or other changes in topography were identified. No slope movements were recorded in the area where cracking was observed. 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. The use of different surveying systems (photogrammetry and LiDAR) did not appear to change these limitations.

5.0 COMPACTION TESTING

Fill placement occurred from February 2022 through June 2023 and from September 2023 to present. In the month of June 2024 and through July 17, 2024, when the site was surveyed, a total of 30,000 yd^3 of material was placed and compacted on the buttress floor. All this material was from the Upper Borrow/South Peak Area and was dozed down to the buttress floor. All fill is moisture conditioned as necessary and then compacted. Compaction testing occurs at the rate of at least one test per 5,000 yd^3 placed. This volume placed in the buttress zone required at least 6 compaction tests. There were 44 compaction tests taken in June and through July 17, 2024. As of July 17, 2024, a total of approximately 3,452,000 yd^3 had been placed and compacted. This required at least 691 compaction tests, and 1,178 tests have been taken. A summary of the June compaction test results is included in Appendix D, and the test locations are shown on Figure 6.

6.0 RECLAMATION PROGRESS

Castle Aggregate 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 provide progress of activities, anticipated milestone schedule and a one month look ahead to better communicate project objectives. A phased approach is being used to complete the reclamation process (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 August 2023
Phase 3 – Project Kick-off with successful Contractor	Completed August 2023
Phase 4 – Contractor Mobilization to Site	Completed September 2023
Phase 4 – Reclamation Grading	February 2022 to Summer 2024 (est.)
Phase 4 – Contractor Demobilize from Site	Summer 2024 (est.)
Phase 5 – Final Revegetation	2024 until acceptance

Progress of activities this month:

- Earth moving activities and placement of compacted fill in the buttress area continued.
- Processing of riprap continued.
- Geotechnical monitoring continued.
- Continued dozing material from south peak of the Upper Borrow Area down to the buttress area.
- Continued seeding, matting, tree planting, and mulching operations.
- Continued topsoil placement occurred where fill placement has been completed.

Work planned for next month includes:

- Begin placing riprap.
- Complete placing compacted fill in the buttress area.
- Continue placing topsoil where grading has been completed.
- Continue seeding, tree planting, matting, and mulching operations.
- Continue geotechnical monitoring.
- Continue to remove and replace prisms on an as-needed basis.
- Demobilization of contractor.

7.0 CONCLUSIONS

The data collected in June 2024 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 June 2024 indicate evidence of any large-scale movements that increase risk to workers or to the public.

- Restricted access to the ungraded landslide slopes should continue.
- All monitoring should continue at current frequencies.
- All alerts shall continue to be taken seriously even if data errors are suspected.
- The upper fill slope should continue to be monitored for signs of increased or ongoing cracking. The area where cracking was observed will be covered with topsoil and erosion control matting in the near future, and the cracking will no longer be visible.

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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
- New Prism

N

0 300' 600'

Client/Project
CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
SITE MAP

Revision
#

Date
2024.07.31

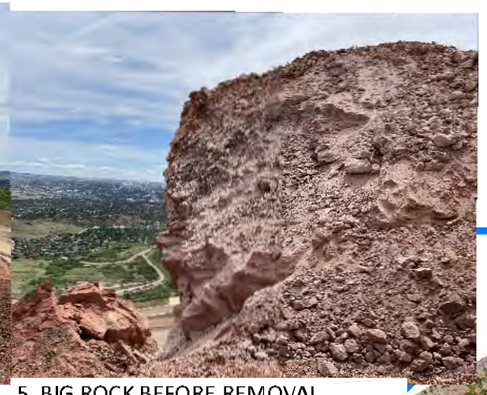
Drawn By
PK

Figure No.
1

Appendix A

Visual Inspections

6. REMOVING BIG ROCK AND GRADING AREA.

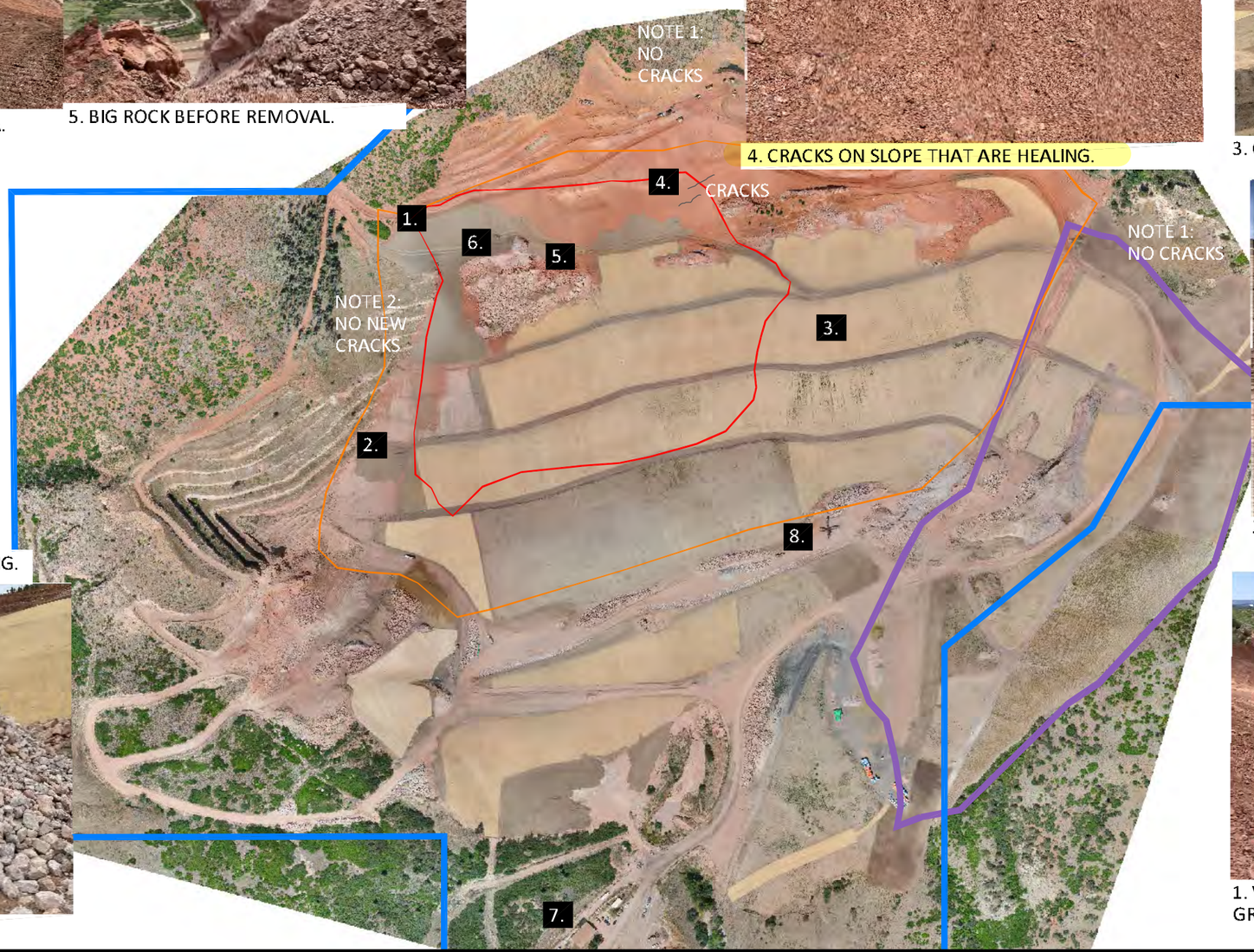


5. BIG ROCK BEFORE REMOVAL.

4. CRACKS ON SLOPE THAT ARE HEALING.

3. COMPLETED BENCHES.

7. CONTAINER STOCK WAITING FOR PLANTING.



2.SOUTH ROAD BEING REMOVED BY FILL.

8. ASTEC SORTING RIPRAP.

1. VIEW NORTHEAST OF RECLAIMED SLOPES AND GRADING OPERATION.

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LEGEND

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

NOTES

1. NO CRACKS OBSERVED IN THIS AREA.
2. NO NEW CRACKS OBSERVED IN THIS AREA.
3. PHOTOS TAKEN ON MULTIPLE DAYS IN JUNE 2024.

N

0 400' 800'

Client/Project
CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
OBSERVATIONS FROM JUNE INSPECTION

Revision
#

Date
2024.07.31

Drawn By
PK

Figure No.
2

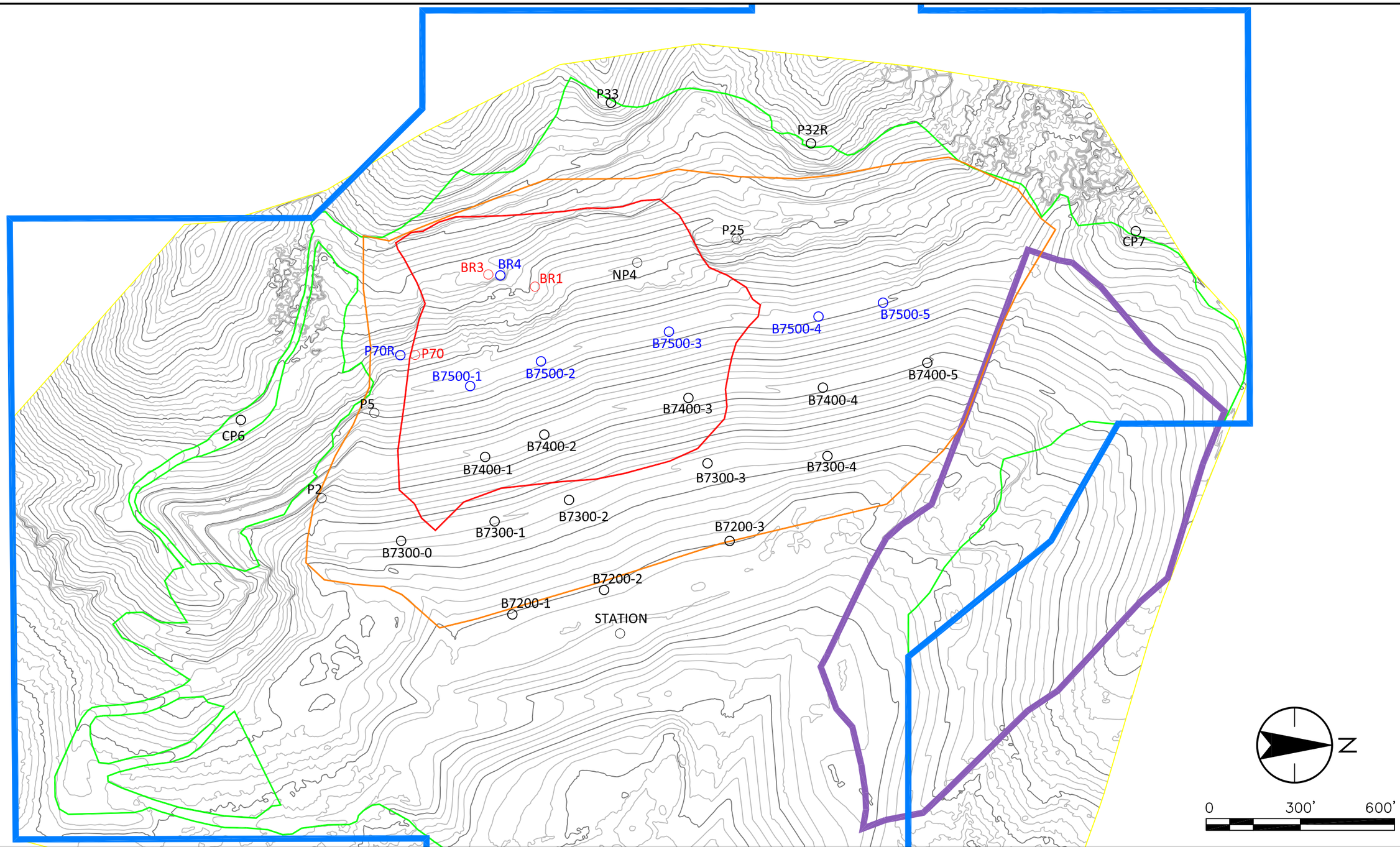
Stantec

Table A-1 Summary of Daily Inspections

Date	Notes	Inspection By
1-Jun-24	No work.	Not applicable
2-Jun-24	No work.	Not applicable
3-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
4-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
5-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
6-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
7-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
8-Jun-24	No work.	Not applicable
9-Jun-24	No work.	Not applicable
10-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
11-Jun-24	No work.	Not applicable
12-Jun-24	No work.	Not applicable
13-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
14-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
15-Jun-24	No work.	Not applicable
16-Jun-24	No work.	Not applicable
17-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
18-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
19-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
20-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
21-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
22-Jun-24	No work.	Not applicable
23-Jun-24	No work.	Not applicable
24-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
25-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
26-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
27-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
28-Jun-24	No movement observed. Good to proceed.	Jerald Schnabel
29-Jun-24	No work.	Not applicable
30-Jun-24	No work.	Not applicable

Appendix B

Prism Survey



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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
- New Prism

1. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
2. ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.
3. TOPOGRAPHY FROM JULY 17, 2024 DRONE SURVEY.
4. CONTOUR INTERVAL IS 10 FEET

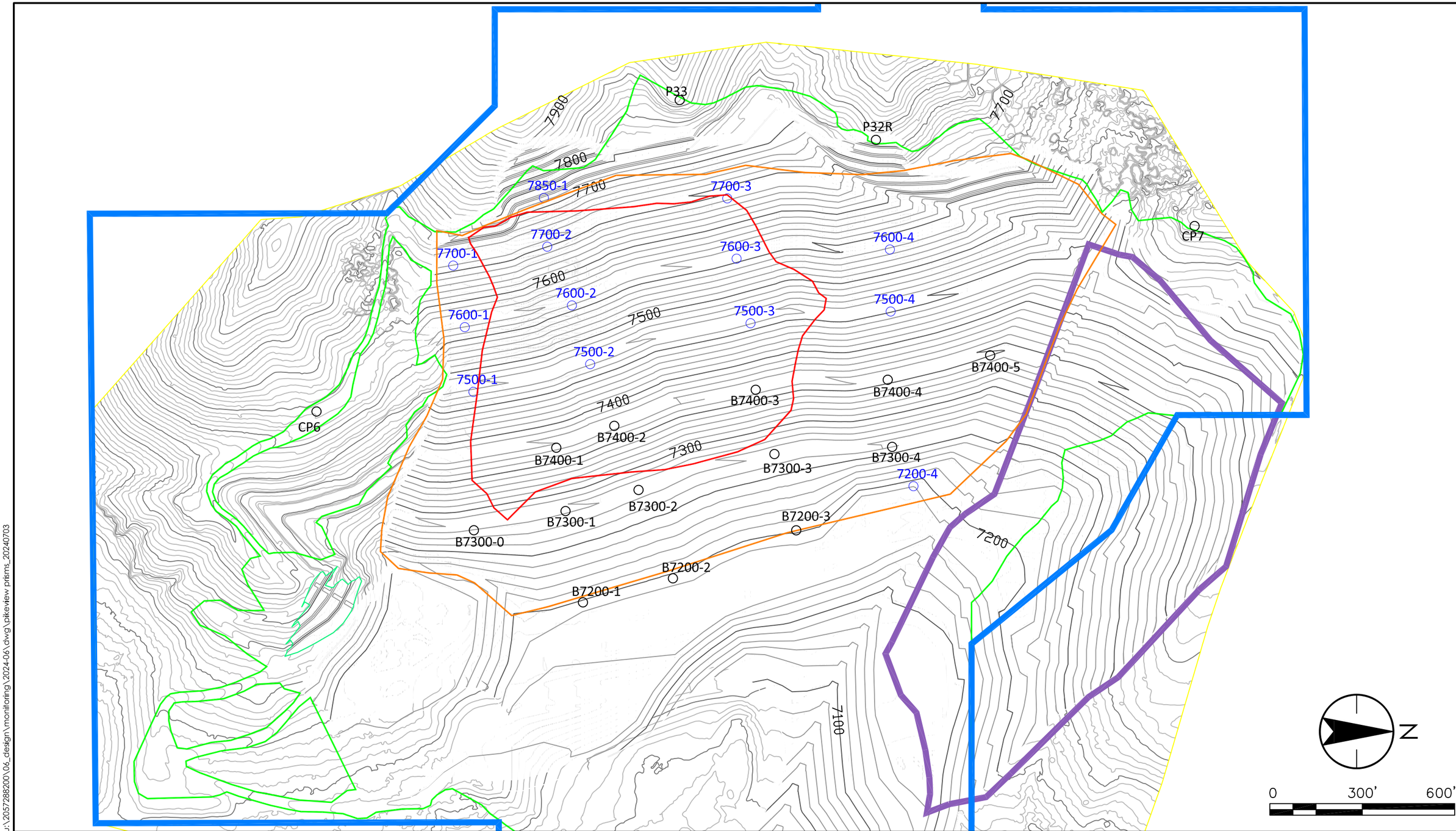
Client/Project
CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision	Date
#	2024.07.31
Drawn By	Figure No.
PK	3



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LEGEND

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

NOTES

1. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
2. EXISTING PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.
3. RECLAMATION SURFACE FROM SEPTEMBER 2023 TECHNICAL REVISION.

Client/Project
CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
PROPOSED PRISMS WITH RECLAMATION SURFACE

Revision	Date
#	2024.07.31
Drawn By	Figure No.
PK	4

Stantec

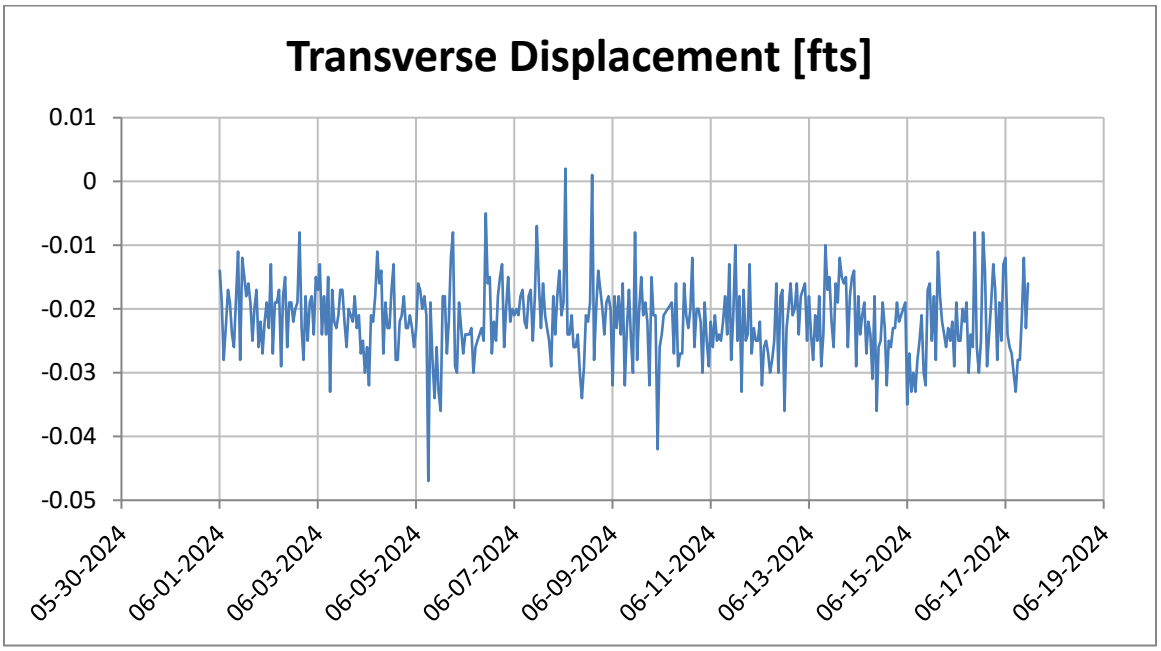
Prism Log

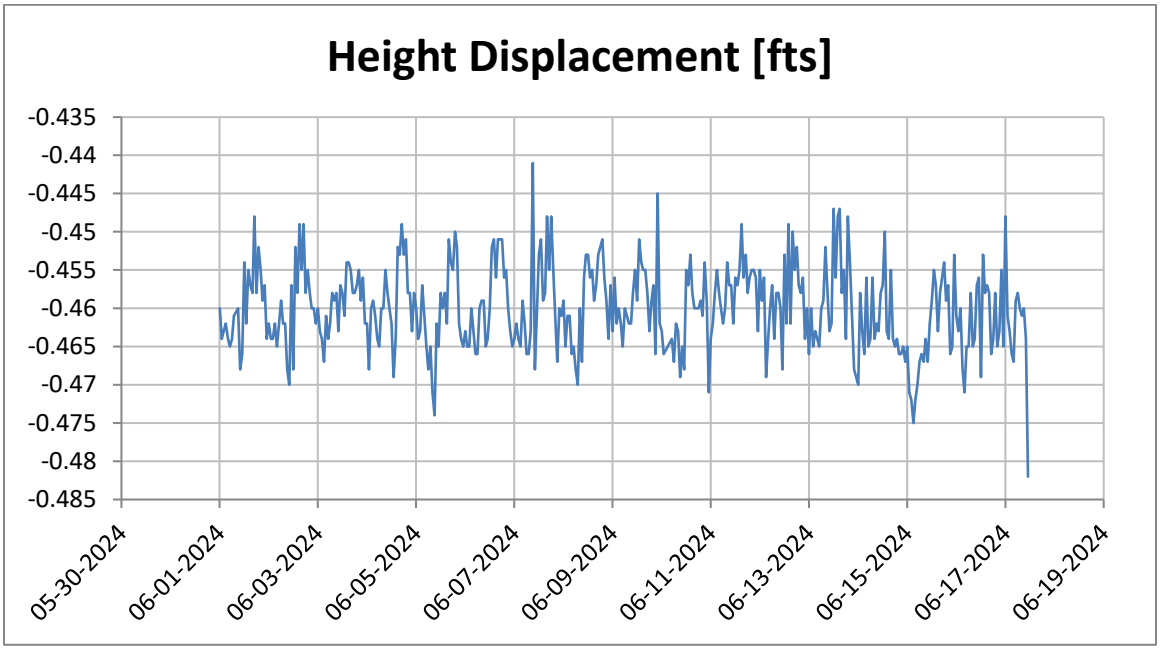
Prism	Date	Action	Comment
CP2	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future.
CP3	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future.
NP1	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future.
TOE2	11-Mar-22	Prism Removed	Reclamation 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 robotic total 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 robotic total 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 robotic total station relocation.
CP7	20-Jul-22	Prism Added	
CP1	20-Jul-22	Prism Removed	Not in line of sight of robotic total station.
CP4	20-Jul-22	Prism Removed	Not in line of sight of robotic total station.
TOE4	20-Jul-22	Prism Removed	Not in line of sight of robotic total station.
TOE6	20-Jul-22	Prism Removed	Not in line of sight of robotic total station.
TOE5	4-Aug-22	Prism Removed	Out of line of sight of robotic total station.
P63	15-Aug-22	Prism Removed	Out of line of sight of robotic total station.
NP2	28-Apr-23	Prism Removed	Prism location eroded.
P1	12-May-23	Prism Removed	Prism hit by falling rock.
B7200-1	1-Jun-23	Prism Added	New prism added.
B7200-2	1-Jun-23	Prism Added	New prism added.
B7200-3	28-Jun-23	Prism Added	New prism added.
B7300-1	28-Jun-23	Prism Added	New prism added.
B7300-2	28-Jun-23	Prism Added	New prism added.
B7300-3	28-Jun-23	Prism Added	New prism added.
B7300-0	27-Jul-23	Prism Added	New prism added.

Prism	Date	Action	Comment
P32	1-Aug-23	Prism Removed	P32 was damaged by a falling rock. P32R was installed in the same location.
P32R	1-Aug-23	Prism Added	
P69A	28-Sep-23	Prism Removed	Reclamation grading to affect prism in near future.
NP3	30-Sep-23	Prism Removed	Reclamation grading to affect prism in near future.
BR2	20-Oct-23	Prism Removed	Reclamation grading in Upper Borrow Area affected prism.
B7300-4	6-Nov-23	Prism Added	New prism added.
NP4	6-Nov-23	Prism Added	New prism added.
BR3	6-Nov-23	Prism Added	New prism added.
NP66	15-Nov-23	Prism Removed	Reclamation grading to affect prism in near future.
B7400-1	24-Jan-24	Prism Added	New prism added.
B7400-2	24-Jan-24	Prism Added	New prism added.
B7400-3	24-Jan-24	Prism Added	New prism added.
B7400-4	24-Jan-24	Prism Added	New prism added.
B7400-5	24-Jan-24	Prism Added	New prism added.
B7500-1	1-Jun-24	Prism Added	New prism added.
B7500-2	1-Jun-24	Prism Added	New prism added.
B7500-3	1-Jun-24	Prism Added	New prism added.
B7500-4	1-Jun-24	Prism Added	New prism added.
B7500-5	1-Jun-24	Prism Added	New prism added.
BR3	1-Jun-24	Prism Removed	Reclamation grading to affect prism in near future.
BR1	17-Jun-24	Prism Removed	Reclamation grading to affect prism in near future.
P70	25-Jun-24	Prism Removed	Reclamation grading to affect prism in near future.
P70R	26-Jun-24	Prism Added	New prism added. Replacement for P70.
BR4	26-Jun-24	Prism Added	New prism added. Replacement for BR3.

Stantec

Prism BR1





Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism previously recorded slope creep movements.
6. Prism replaced by BR4 and was removed on June 17.

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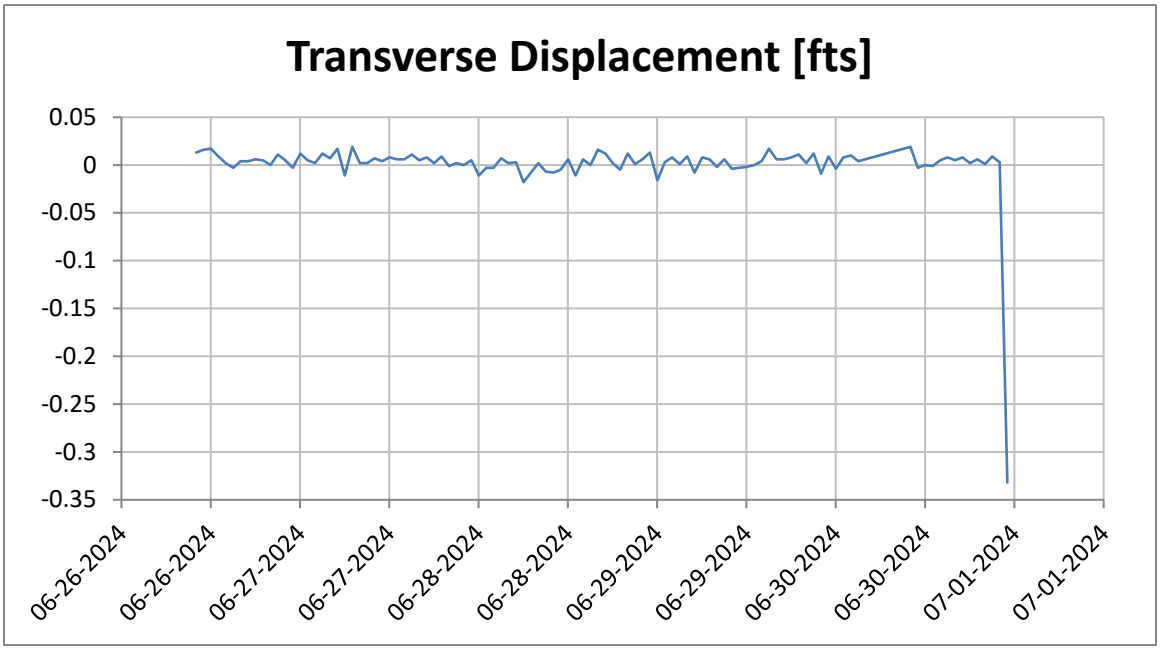
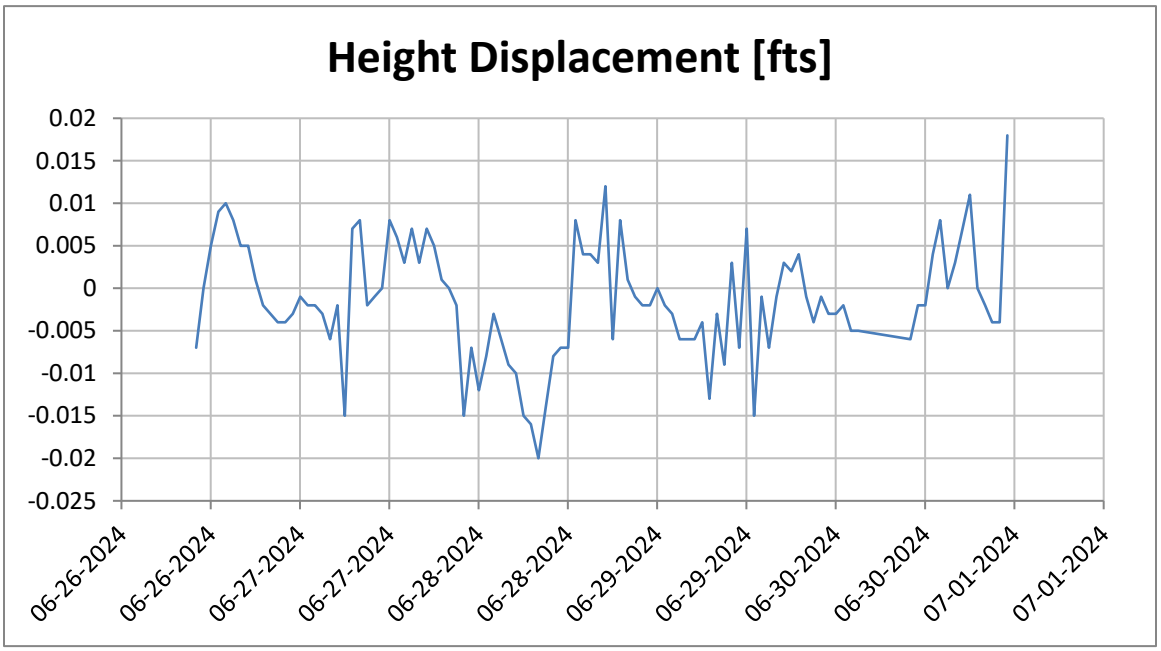
Stantec

Prism BR4



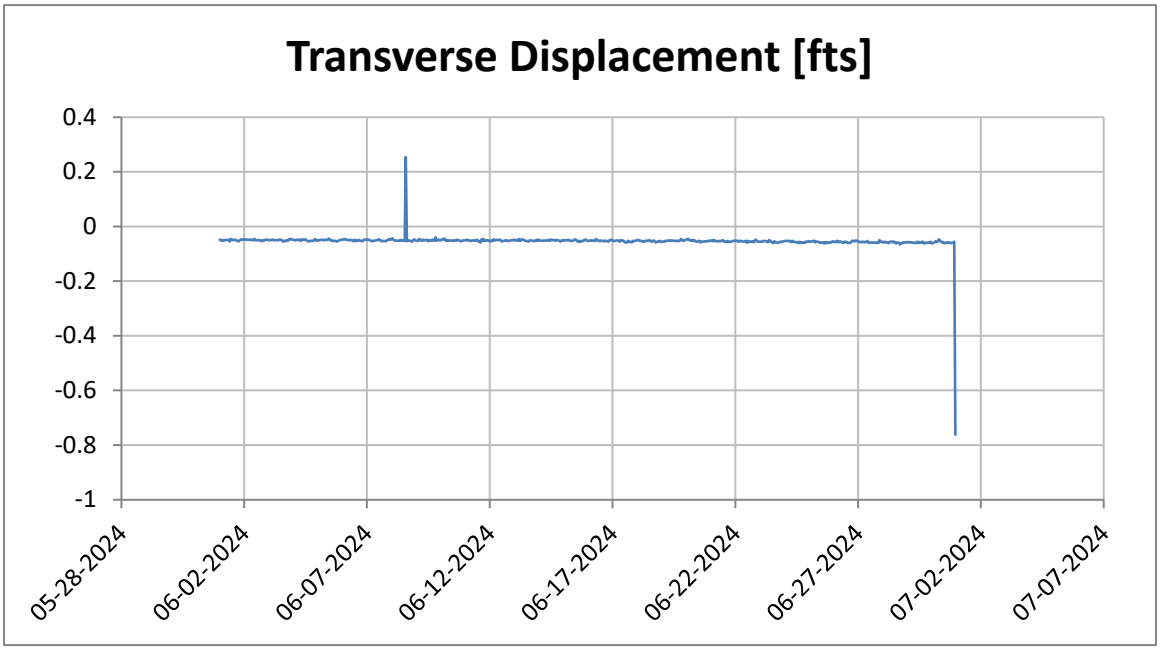


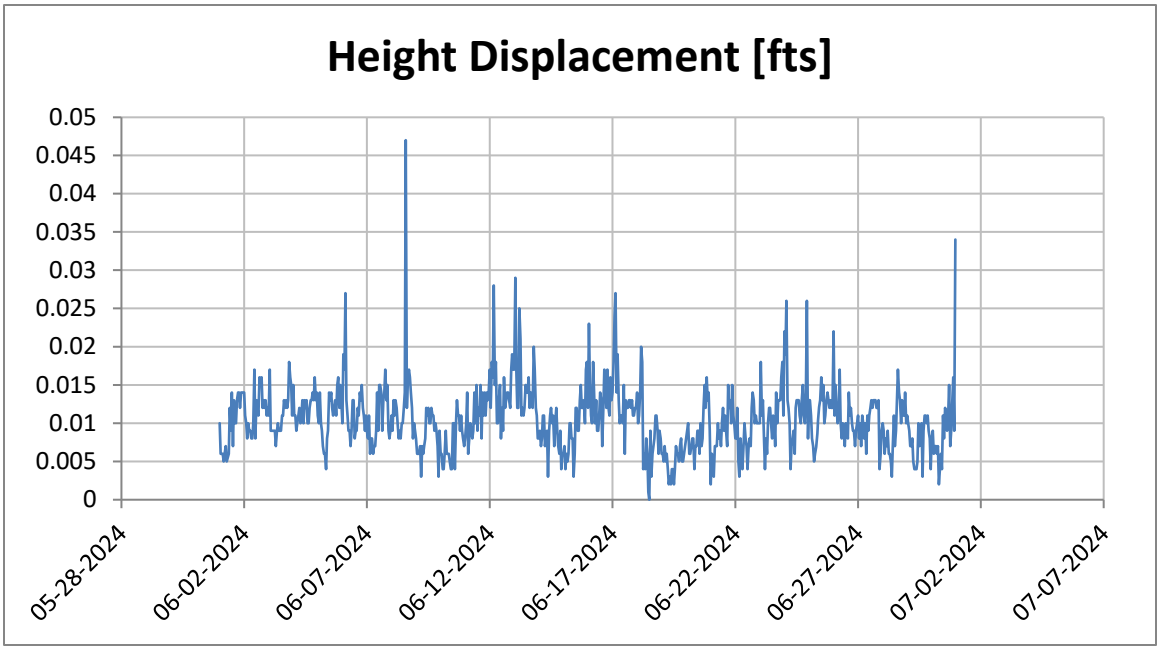
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism replaced BR1 and was installed on June 26.
6. Rain and fog at end of month caused erroneous readings.

Stantec

Prism B7200-1



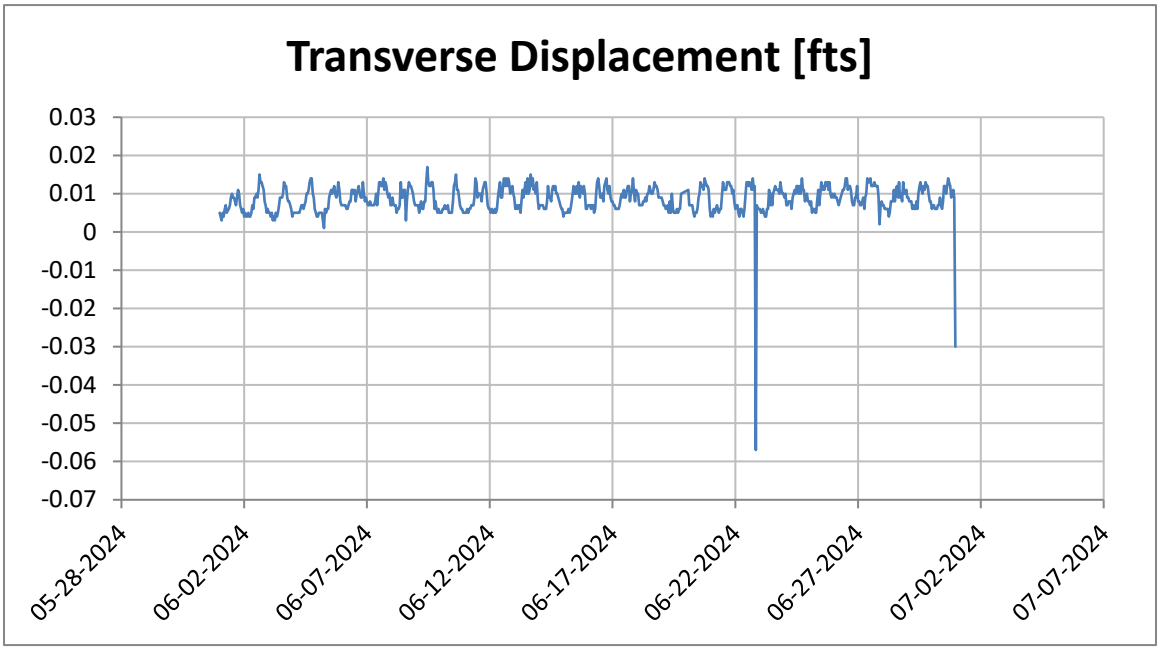


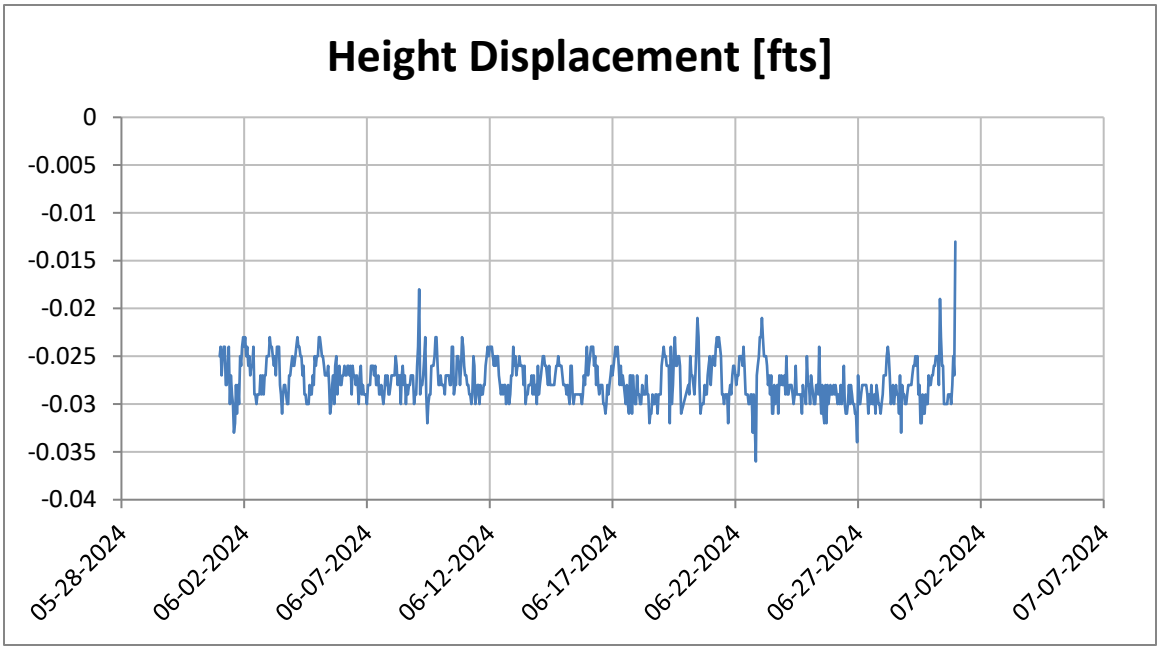
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism B7200-2





Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

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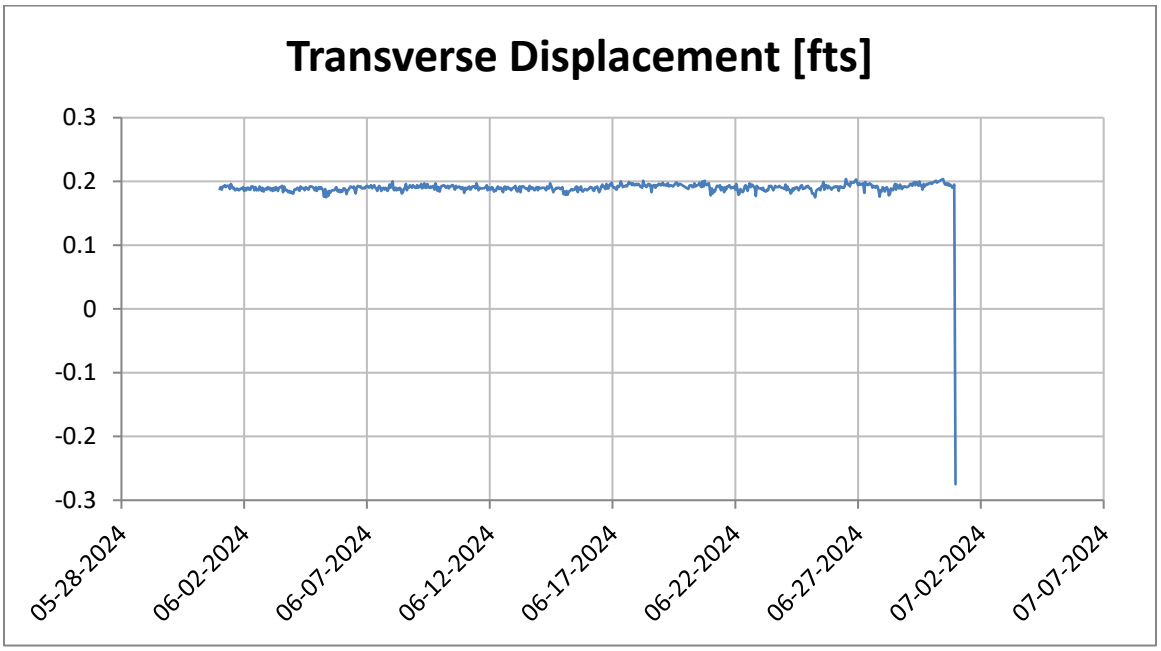
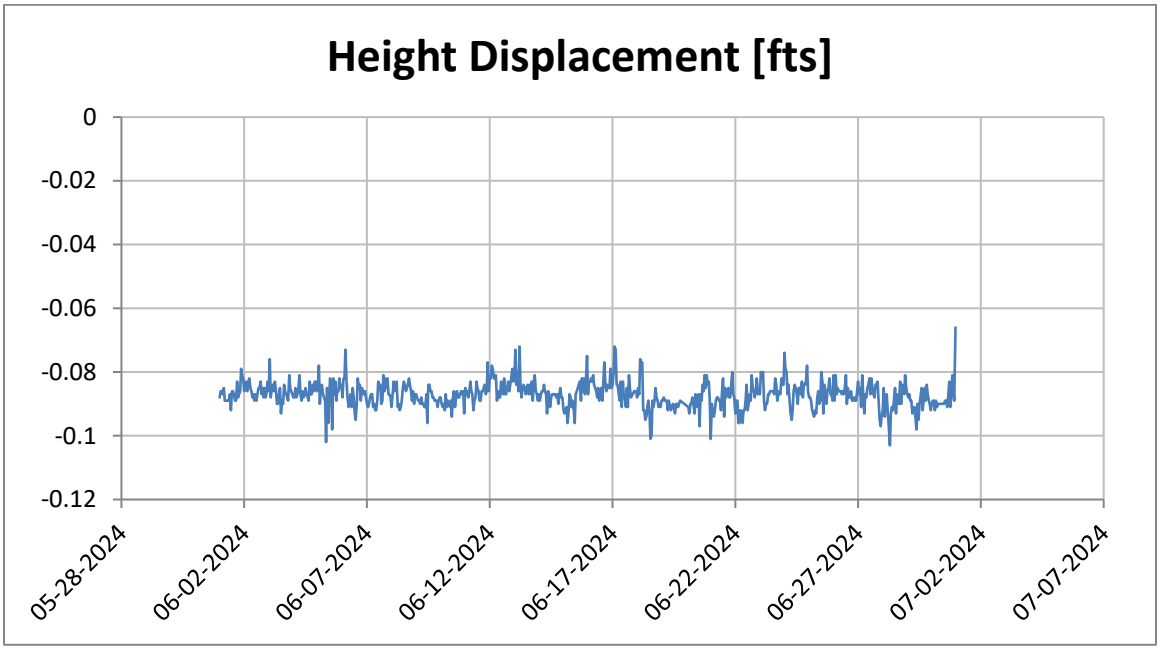
Stantec

Prism B7200-3



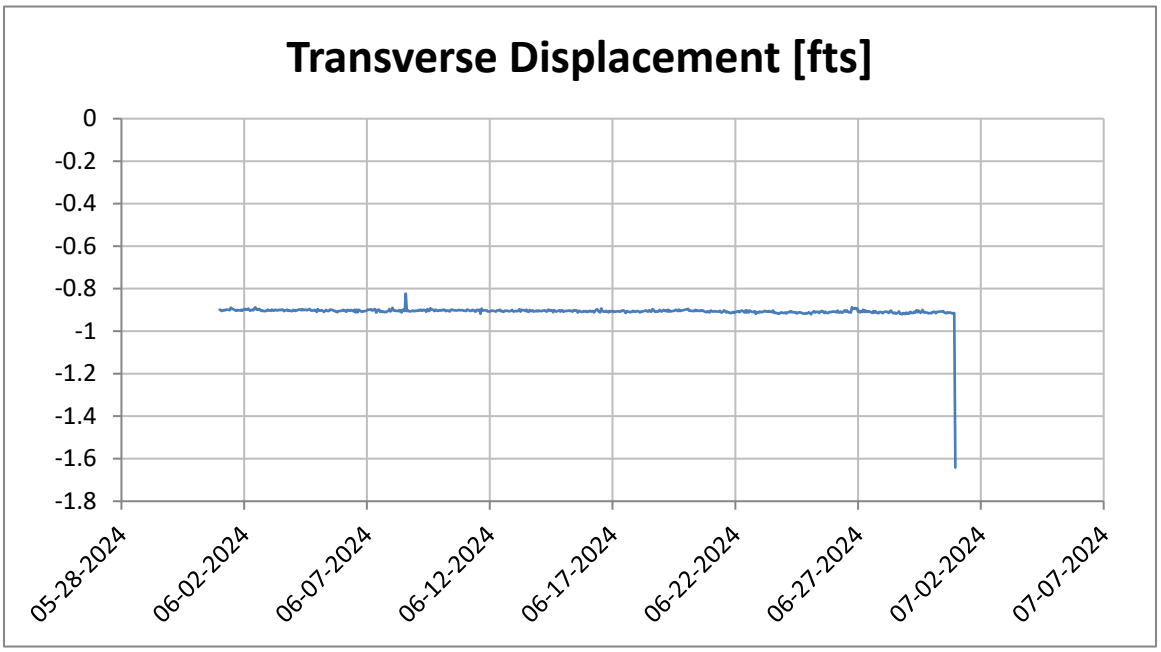


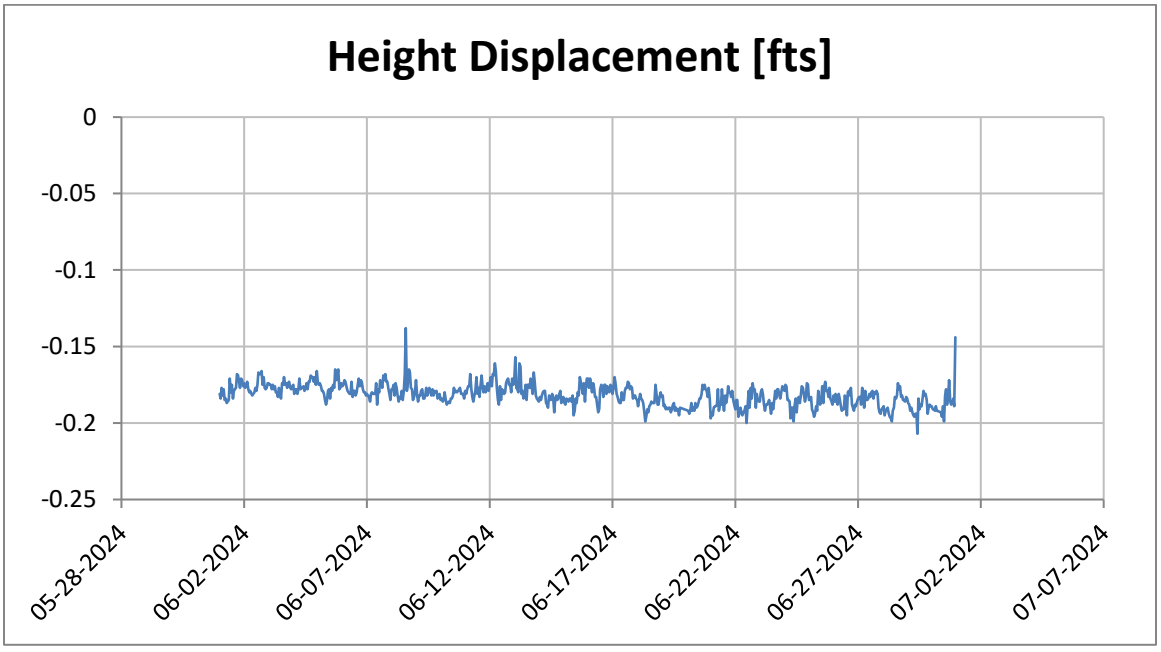
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism B7300-0



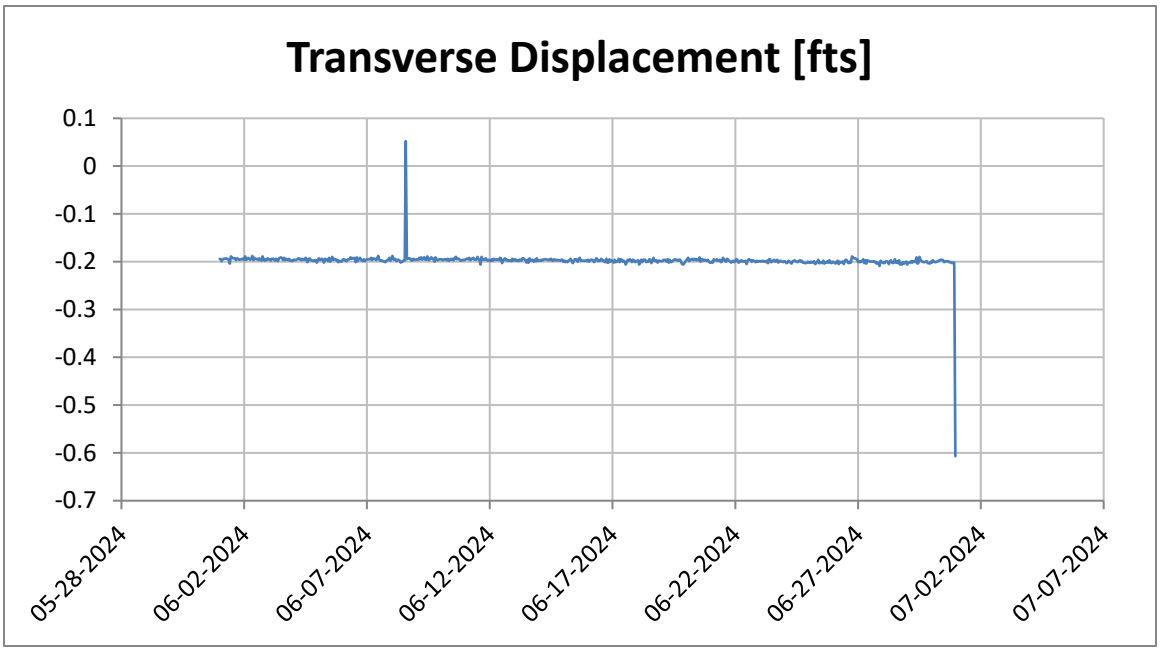


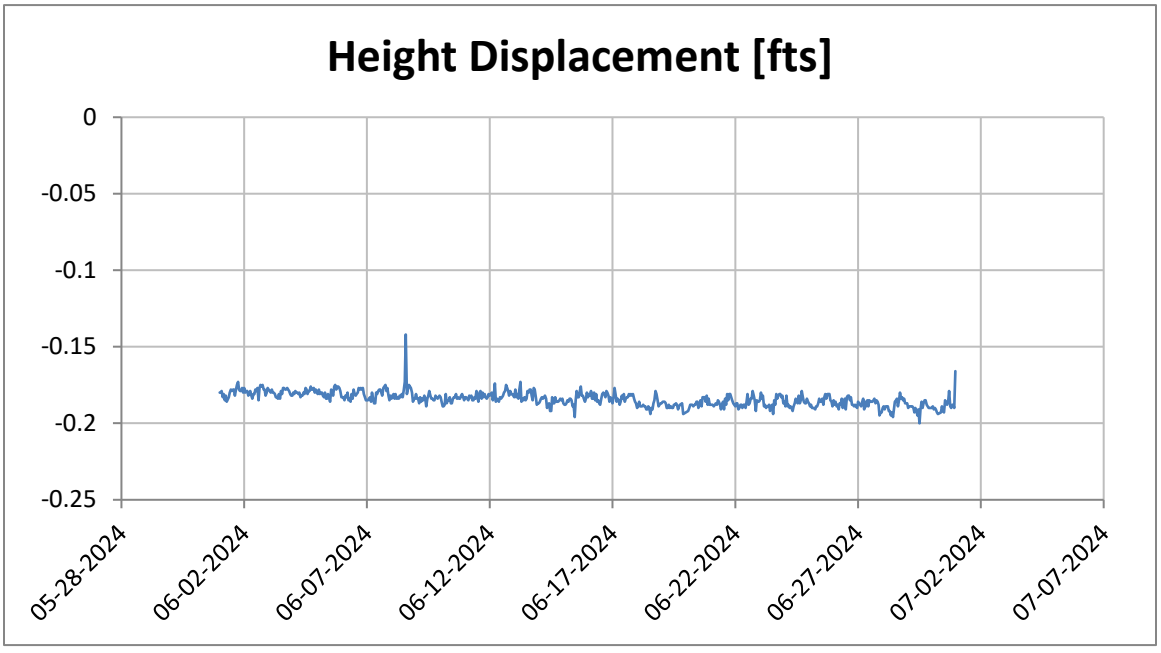
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism B7300-1



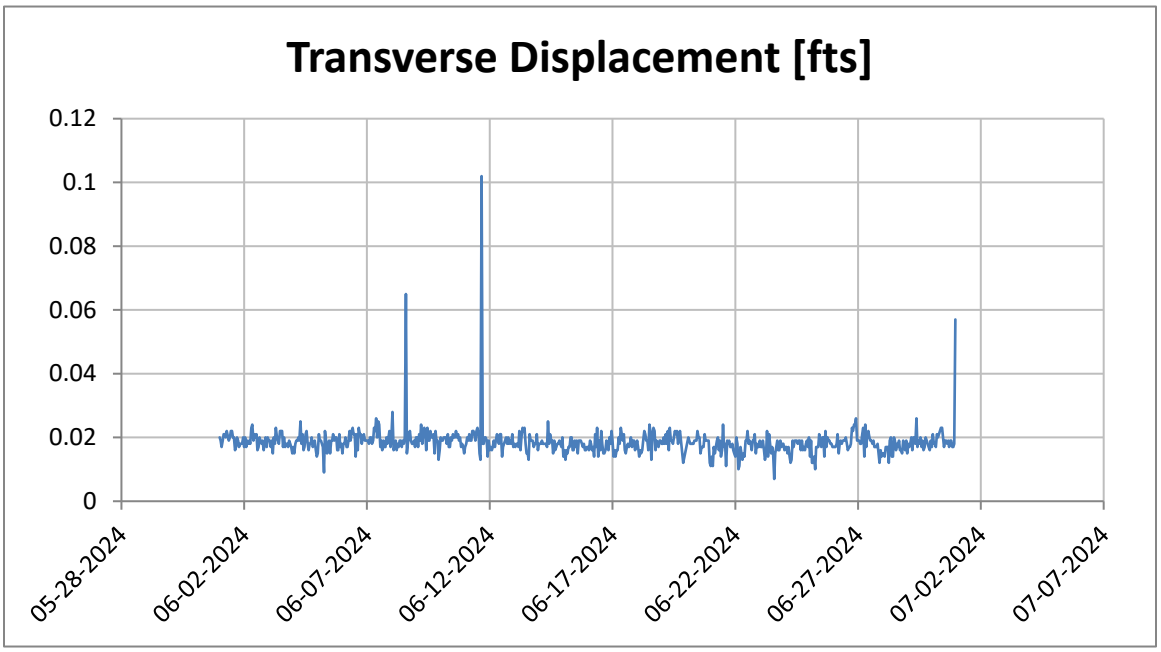


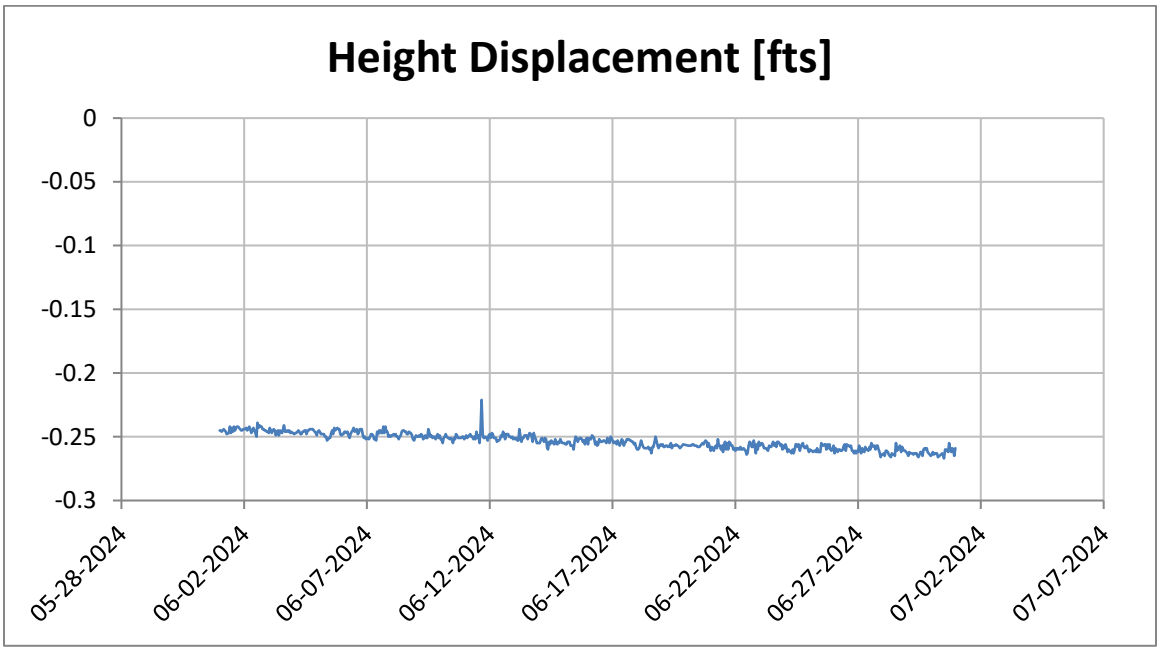
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism B7300-2



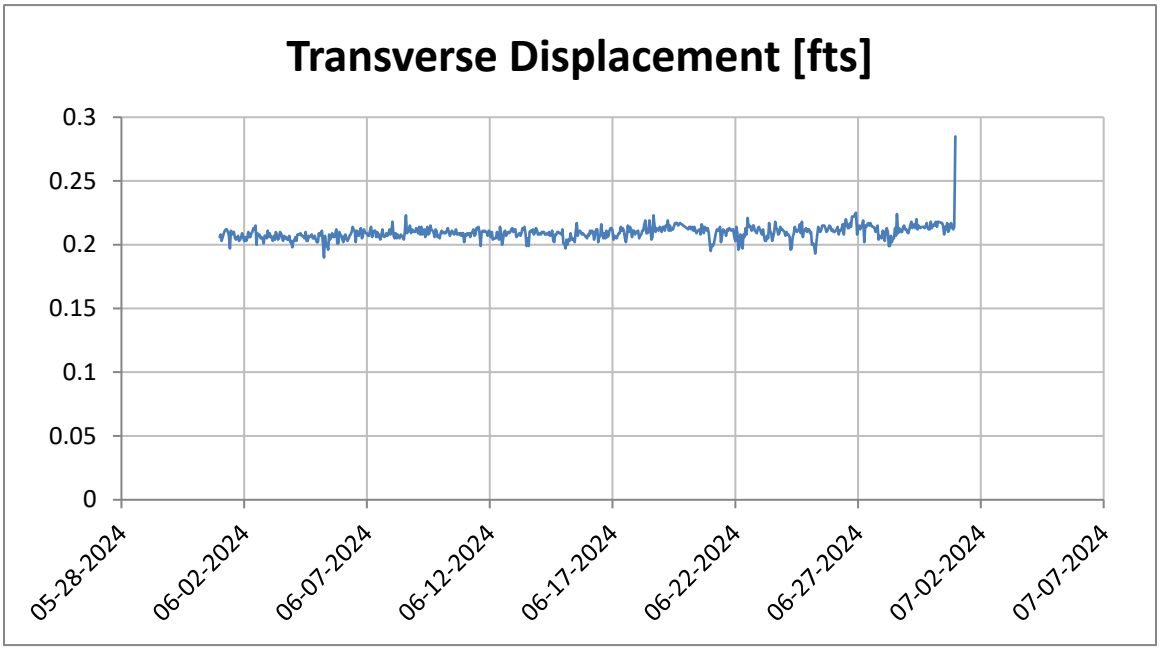


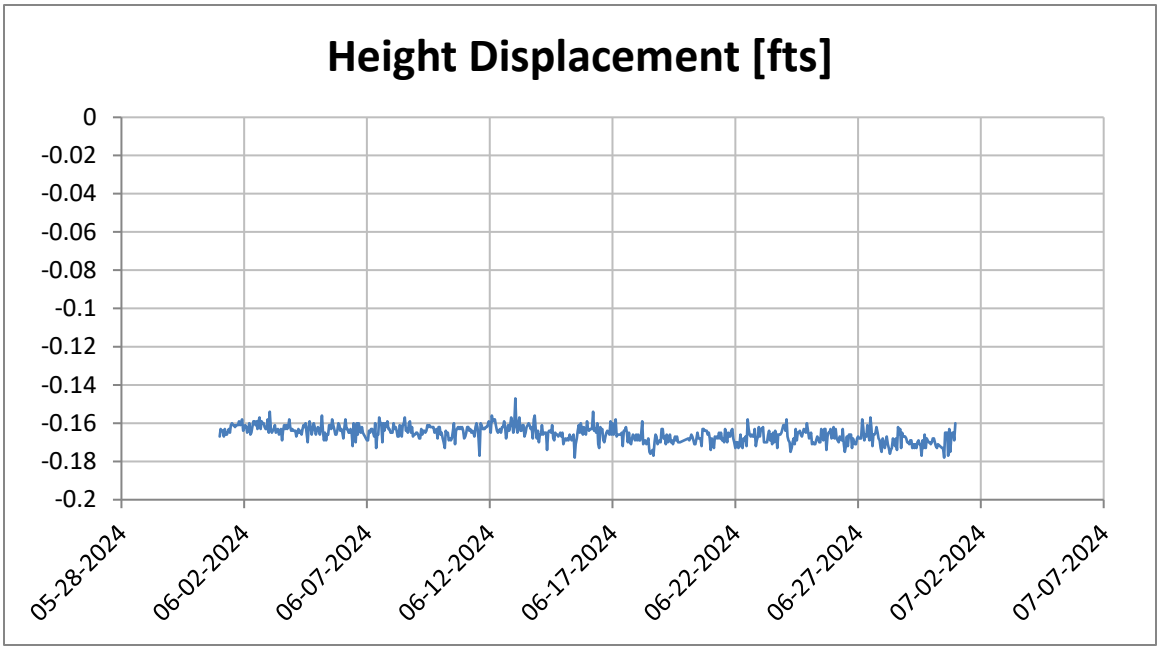
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism B7300-3





Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

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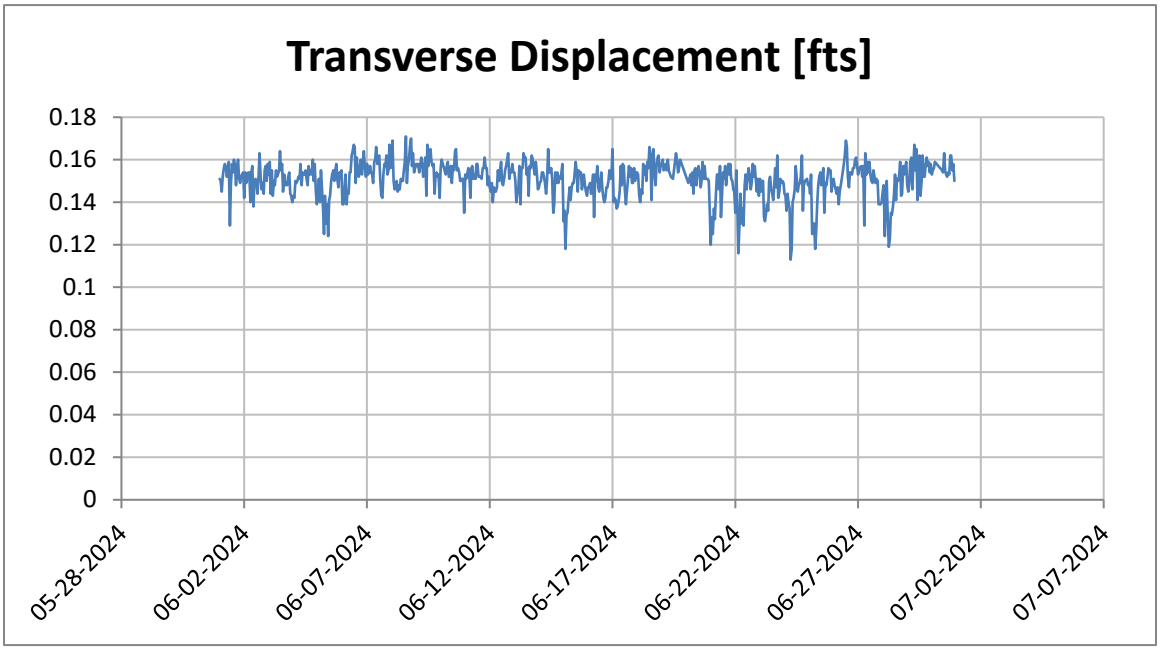
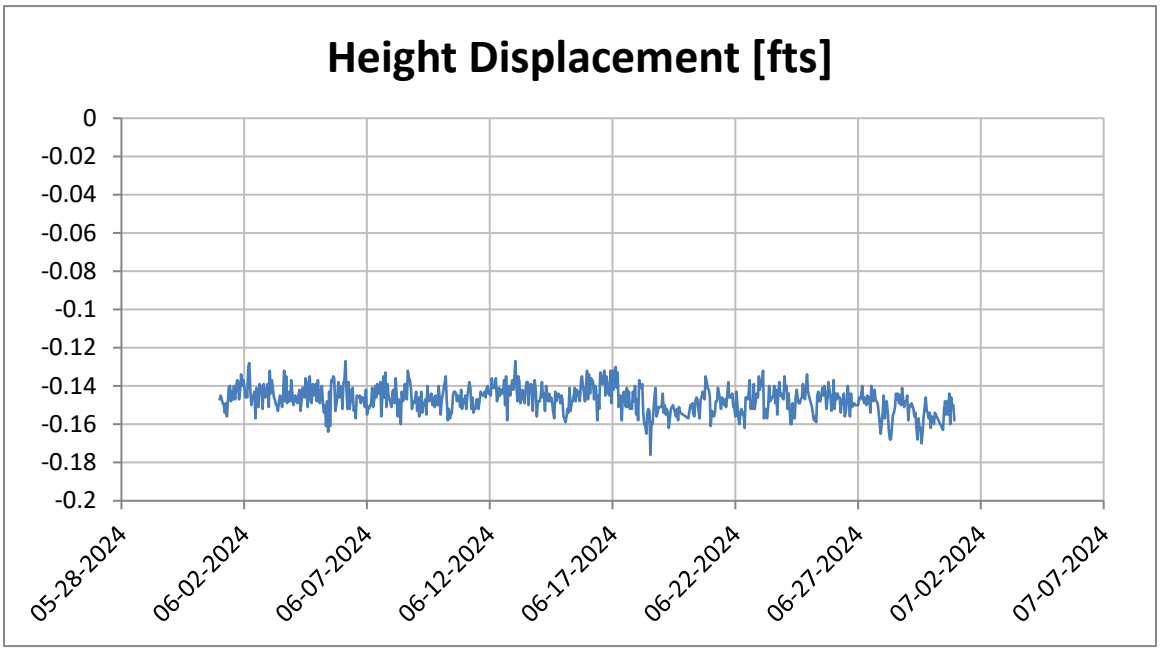
Stantec

Prism B7300-4



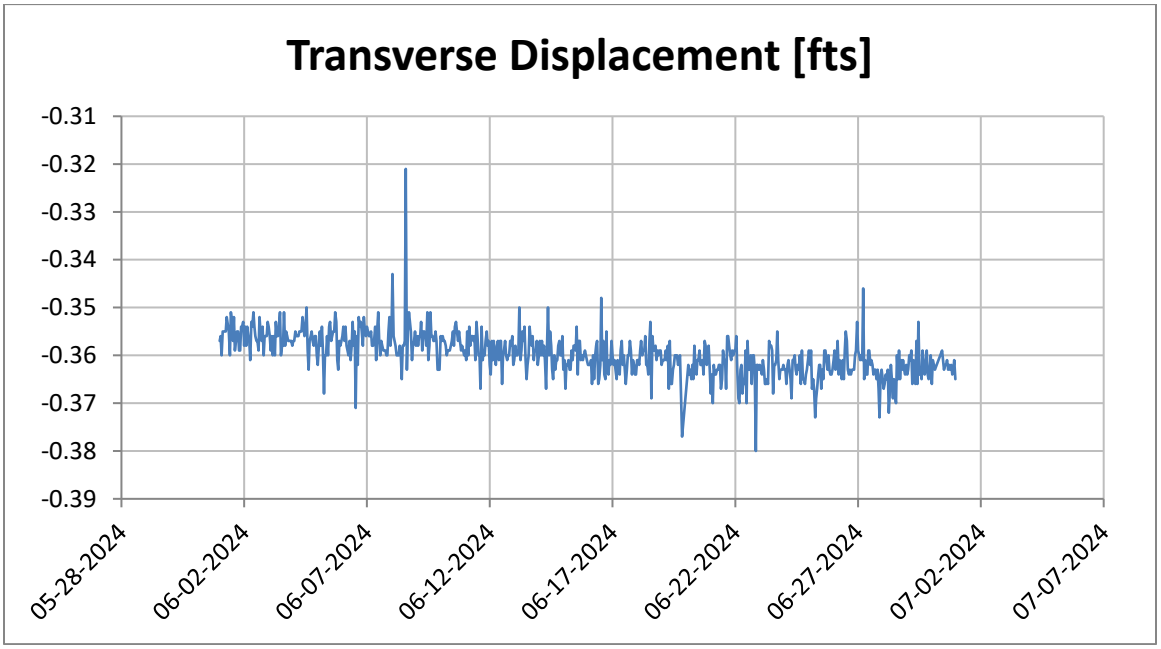


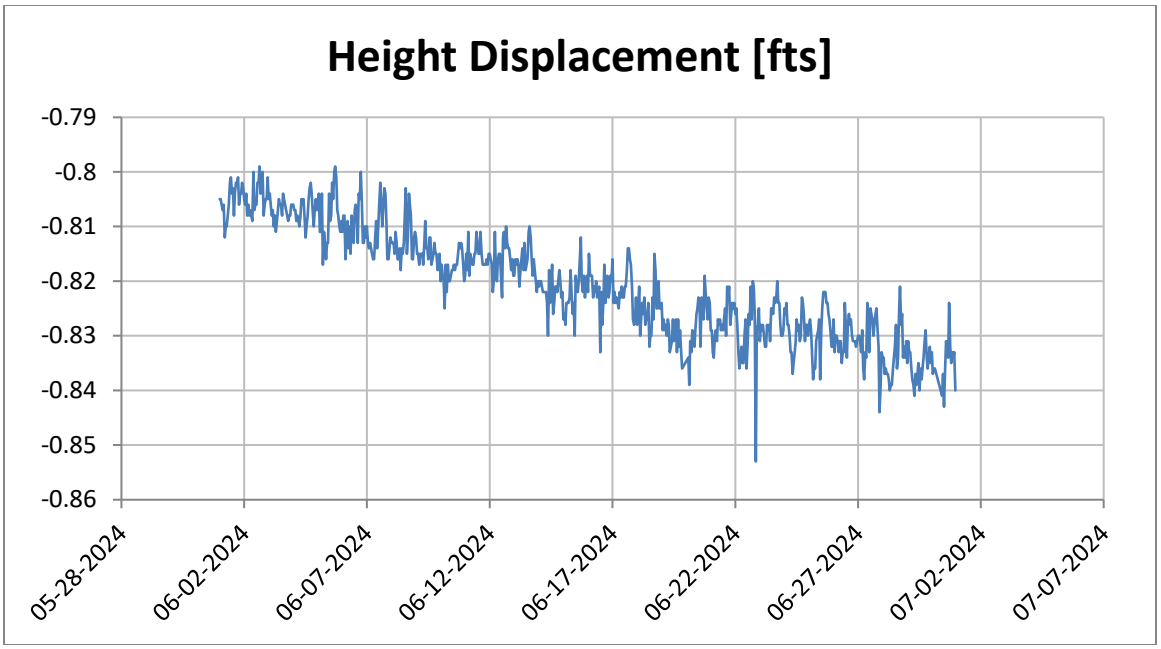
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism B7400-1



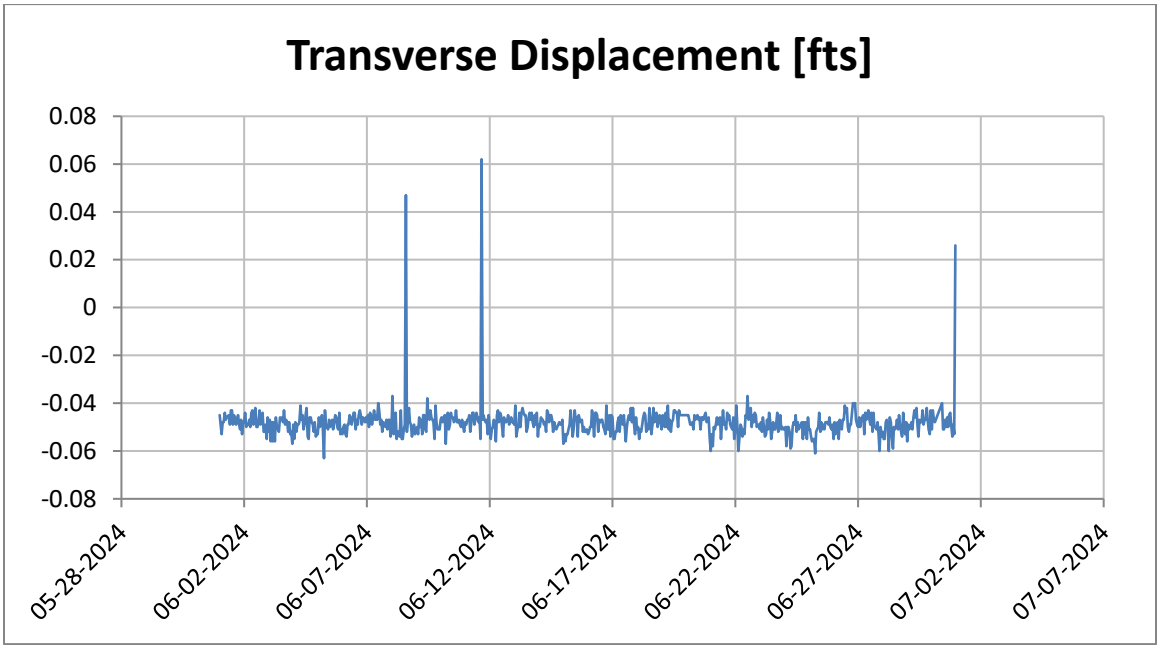


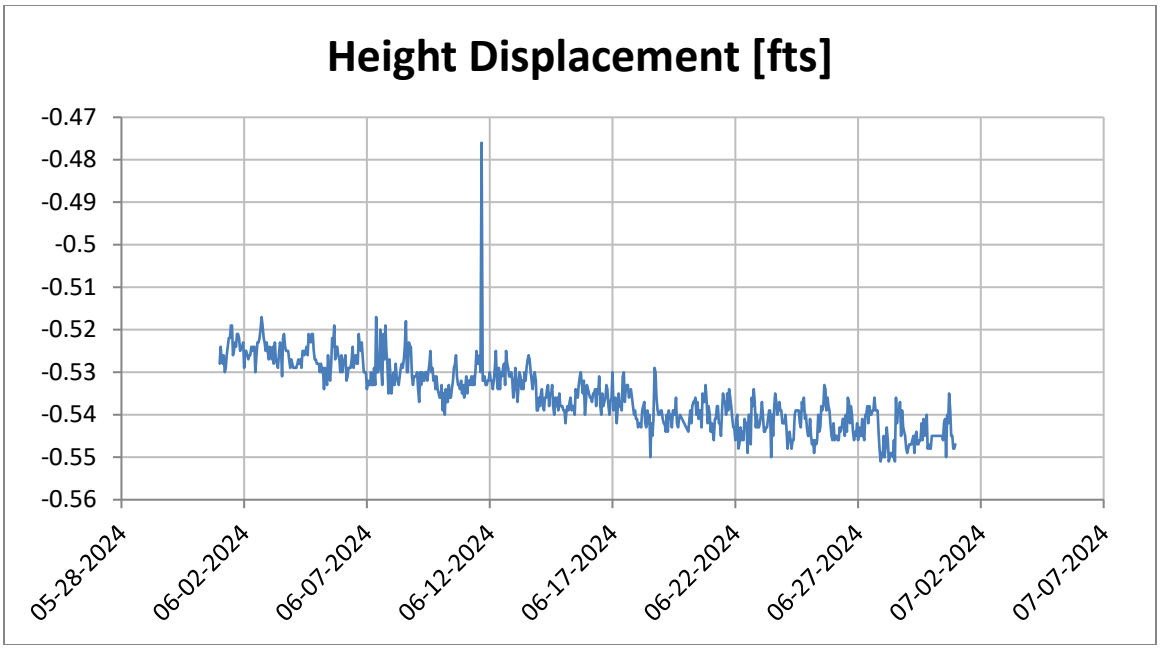
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism B7400-2



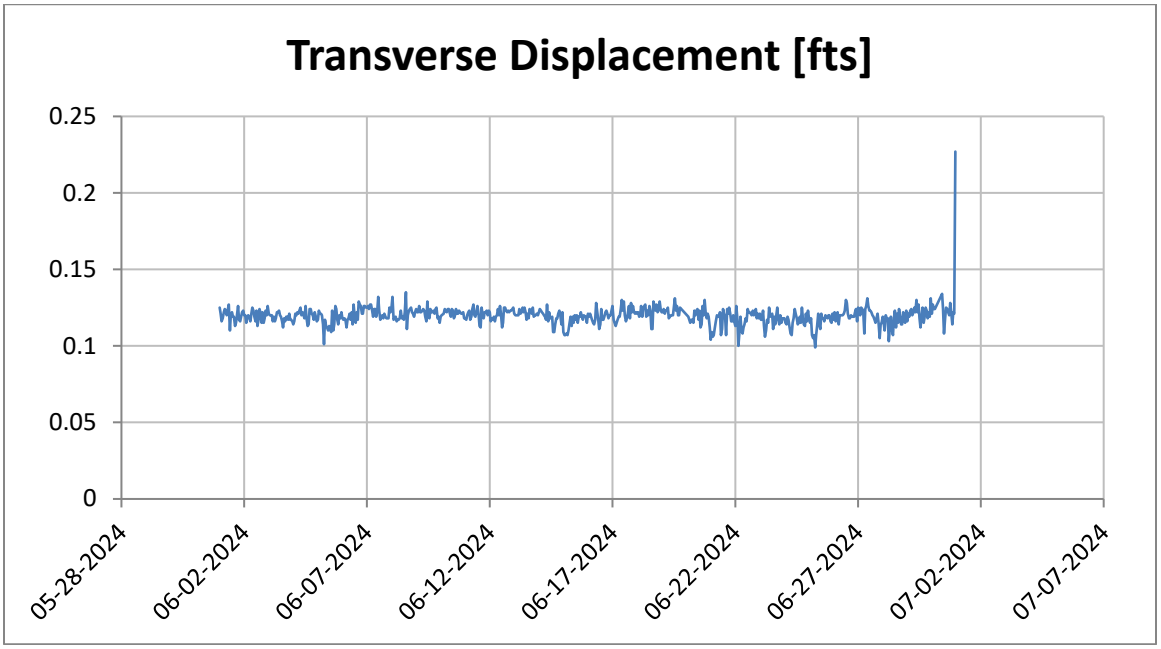


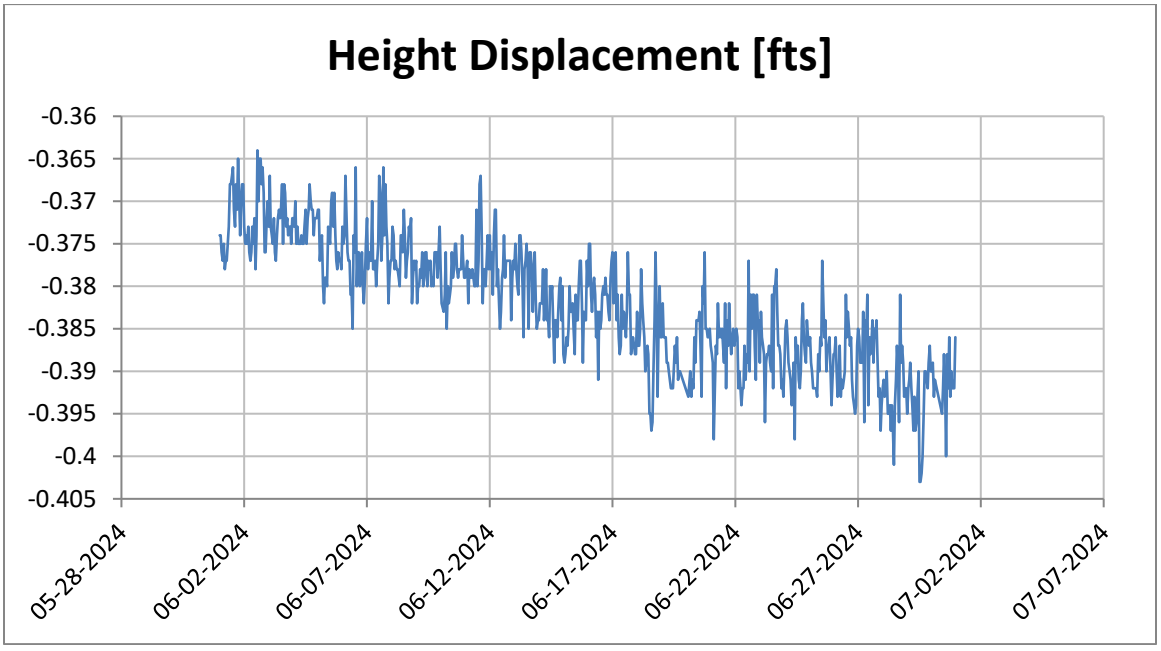
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism B7400-3



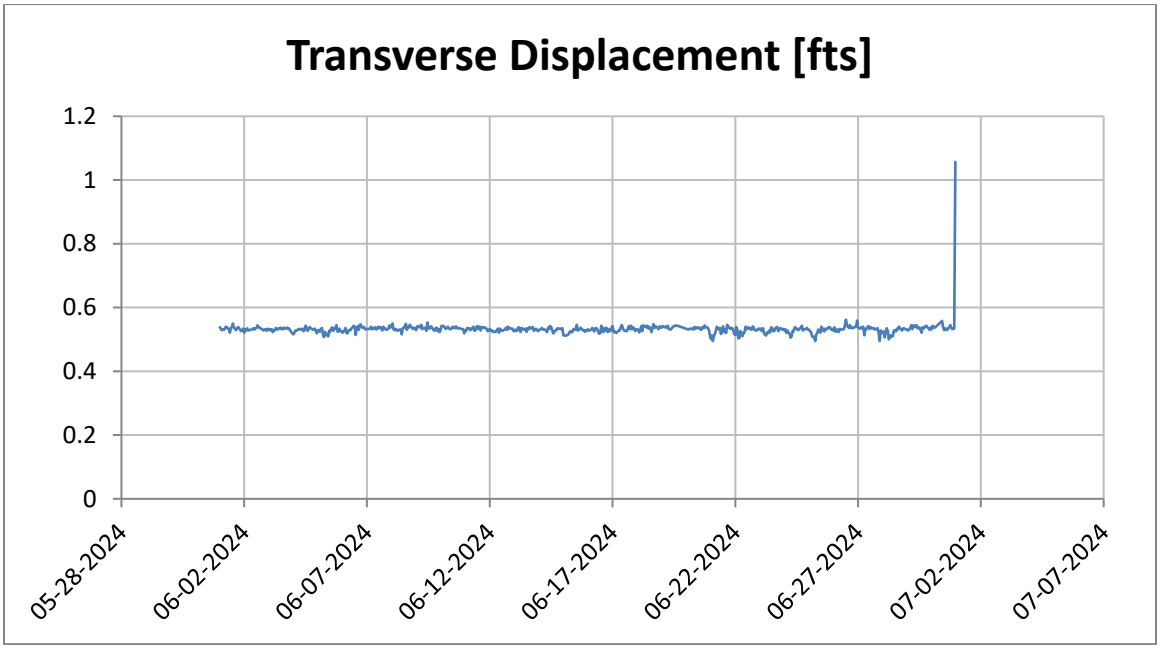


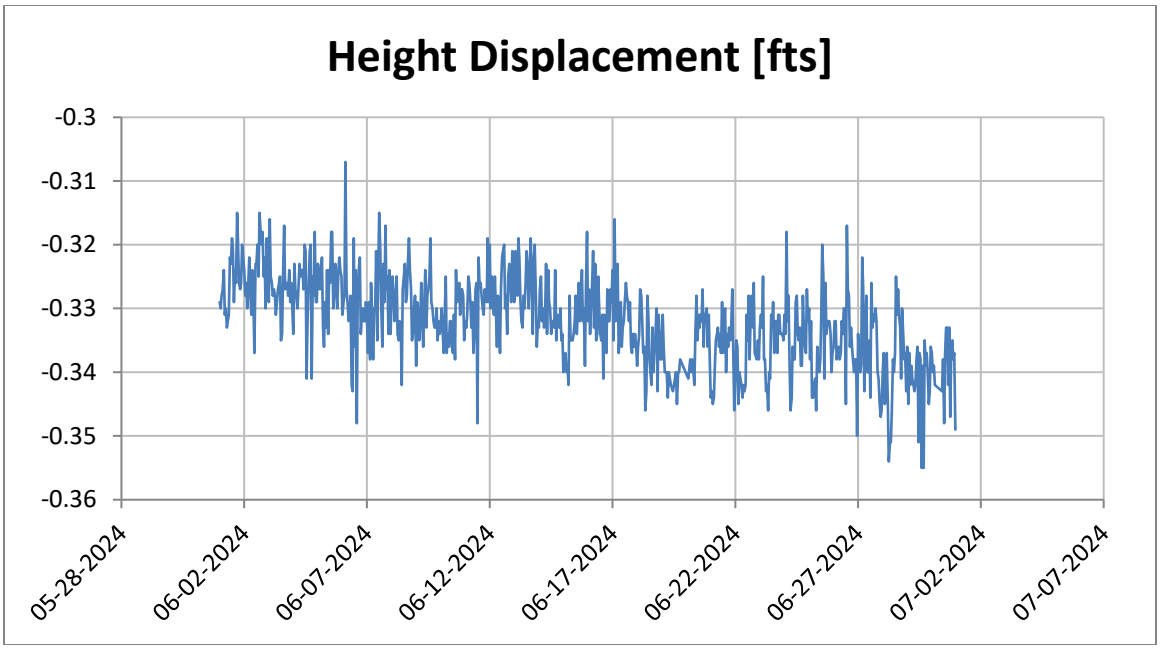
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism B7400-4



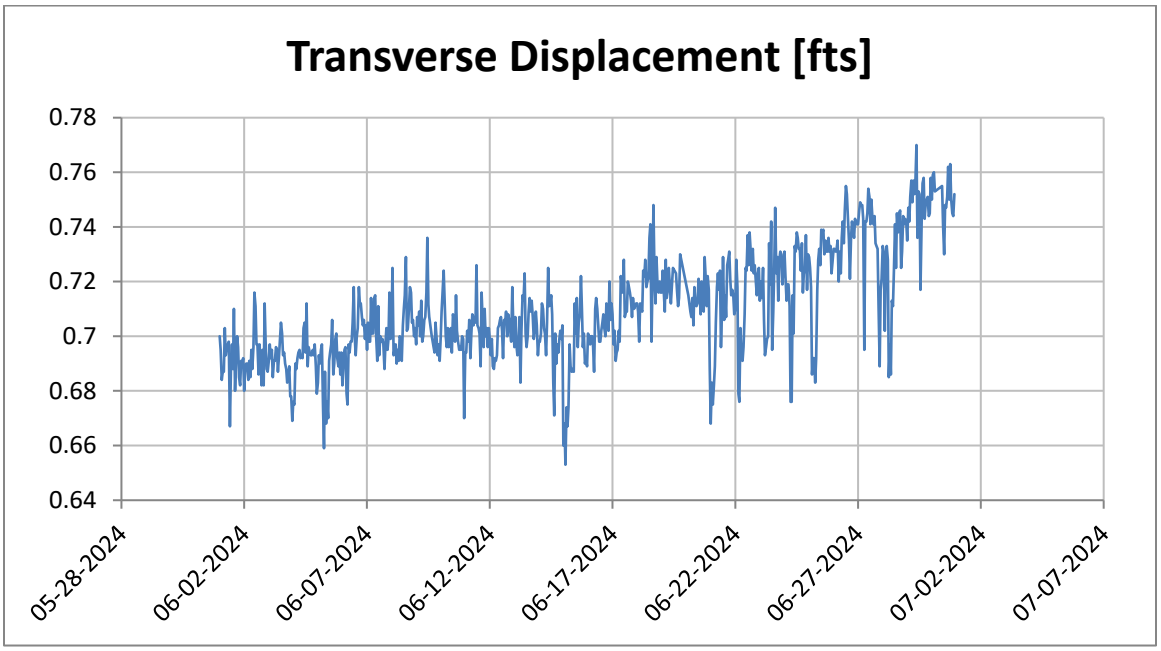


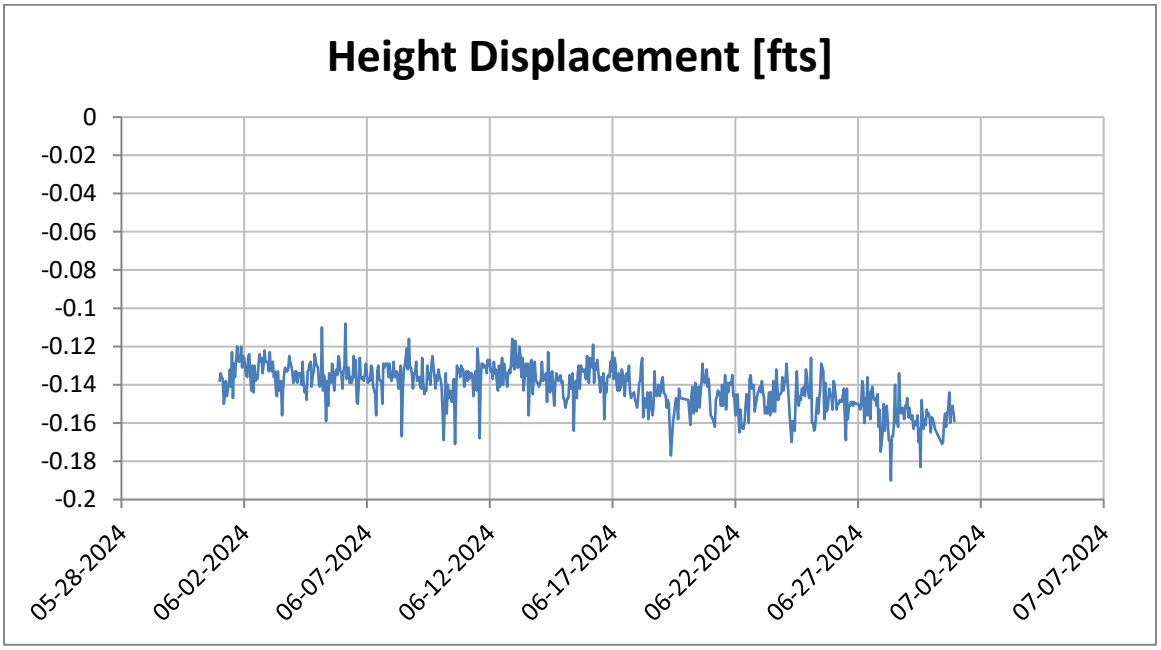
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism B7400-5



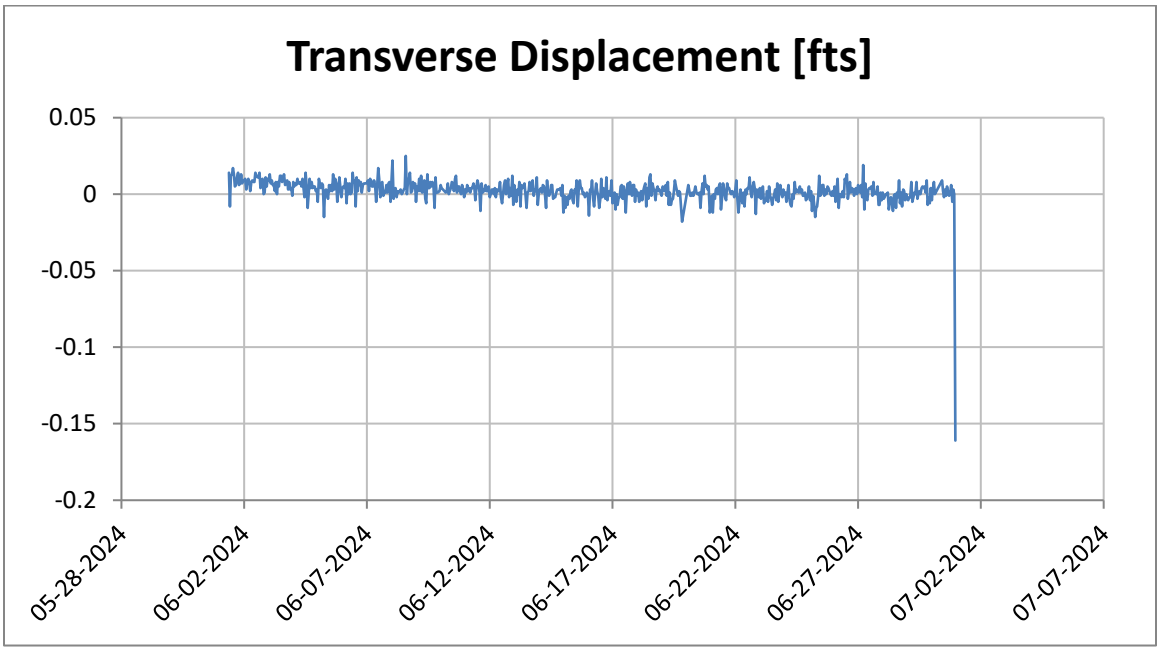


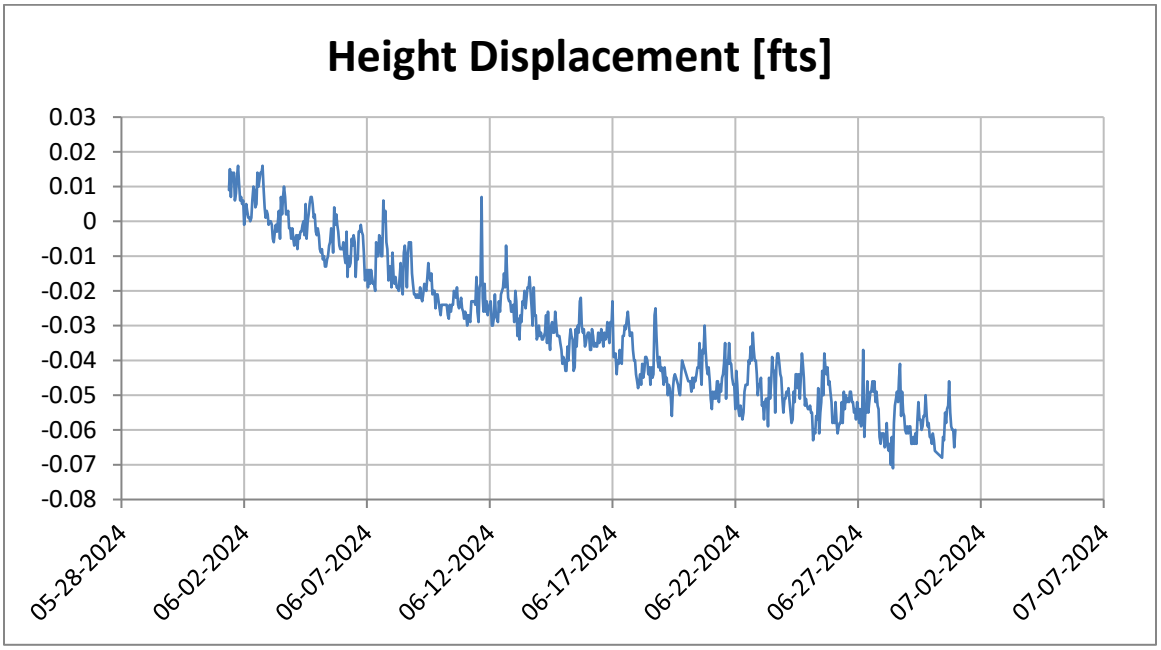
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

B7500-1



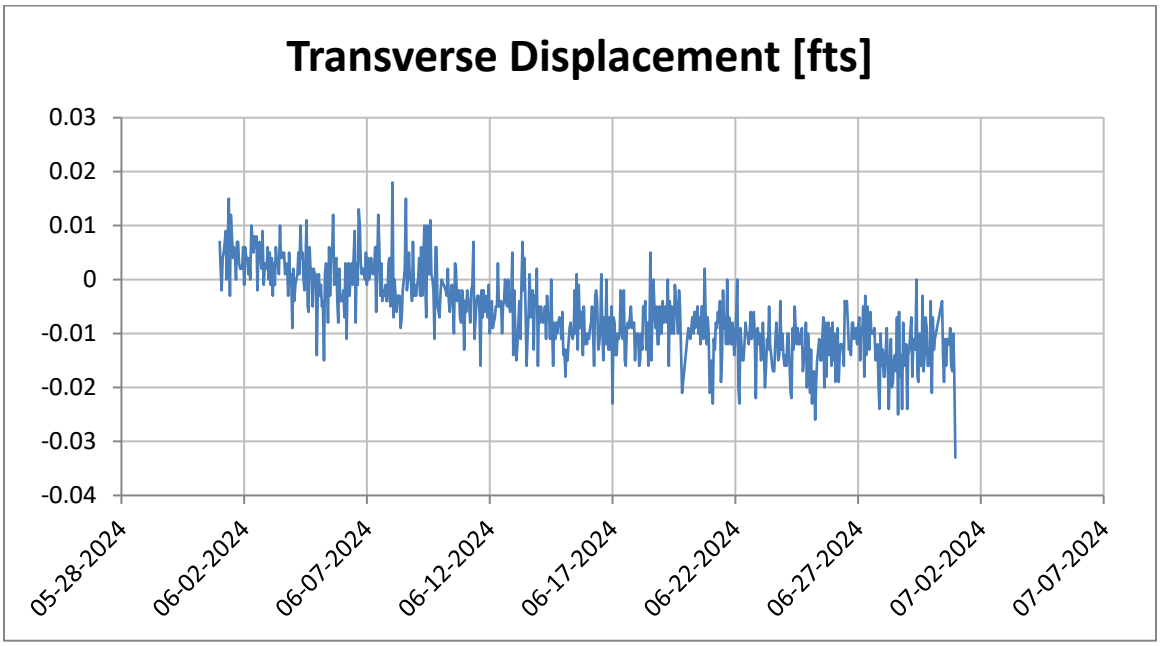


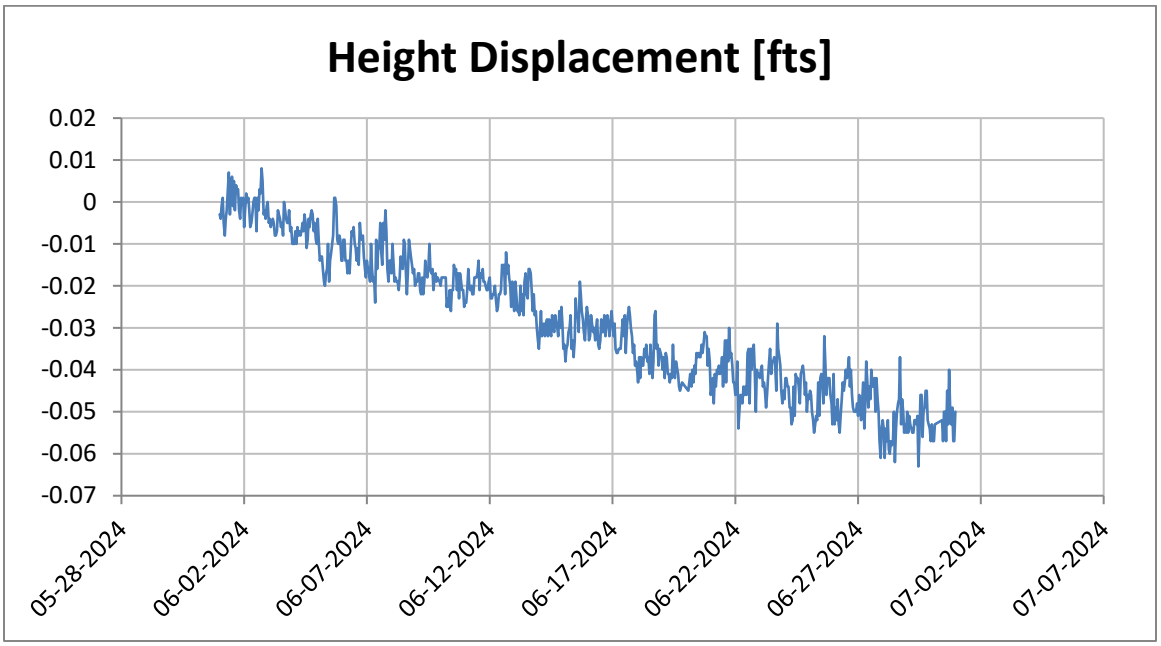
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. New instrument installed June 25.
6. Rain and fog at end of month caused erroneous readings.

Stantec

B7500-2



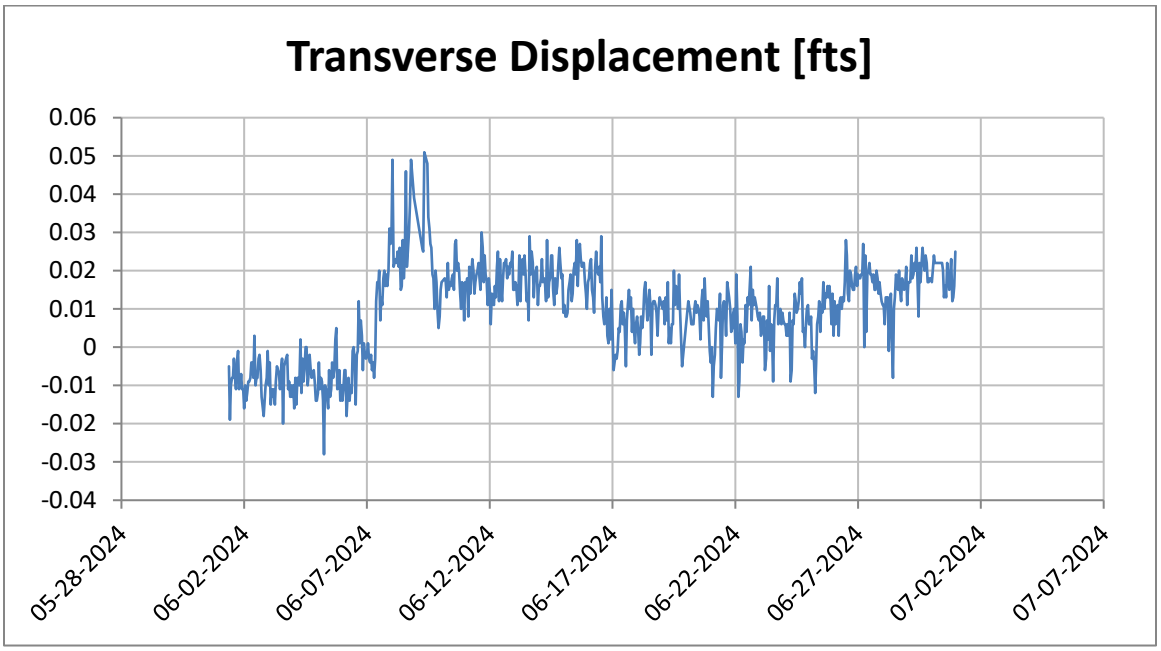


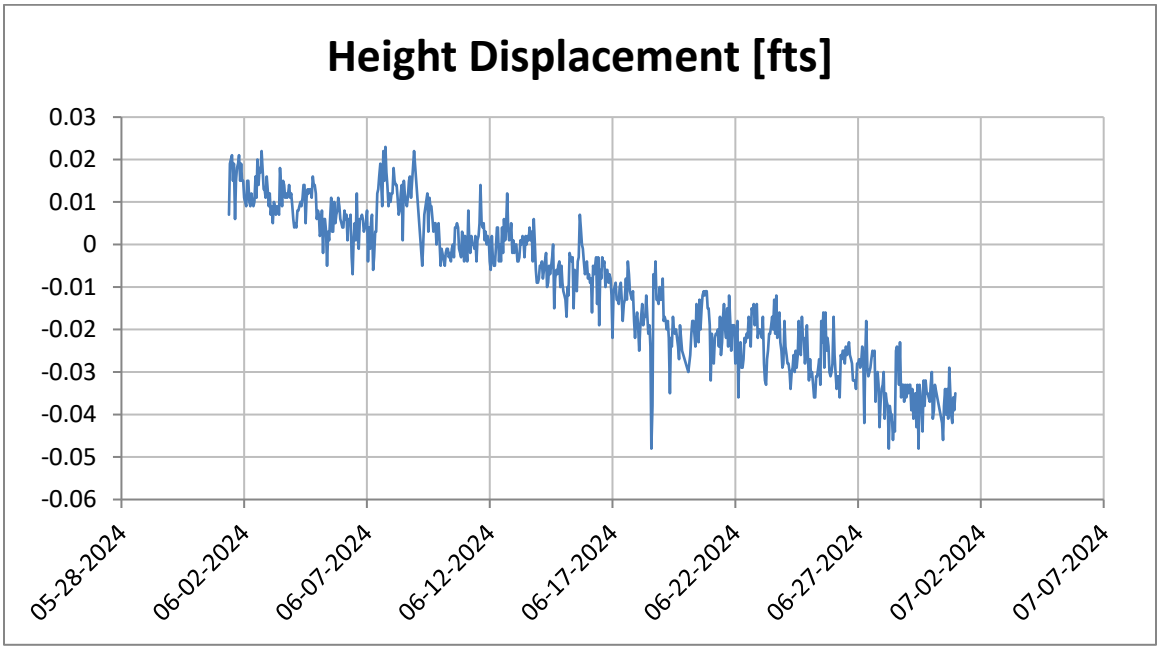
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. New instrument installed June 25.
6. Rain and fog at end of month caused erroneous readings.

Stantec

B7500-3



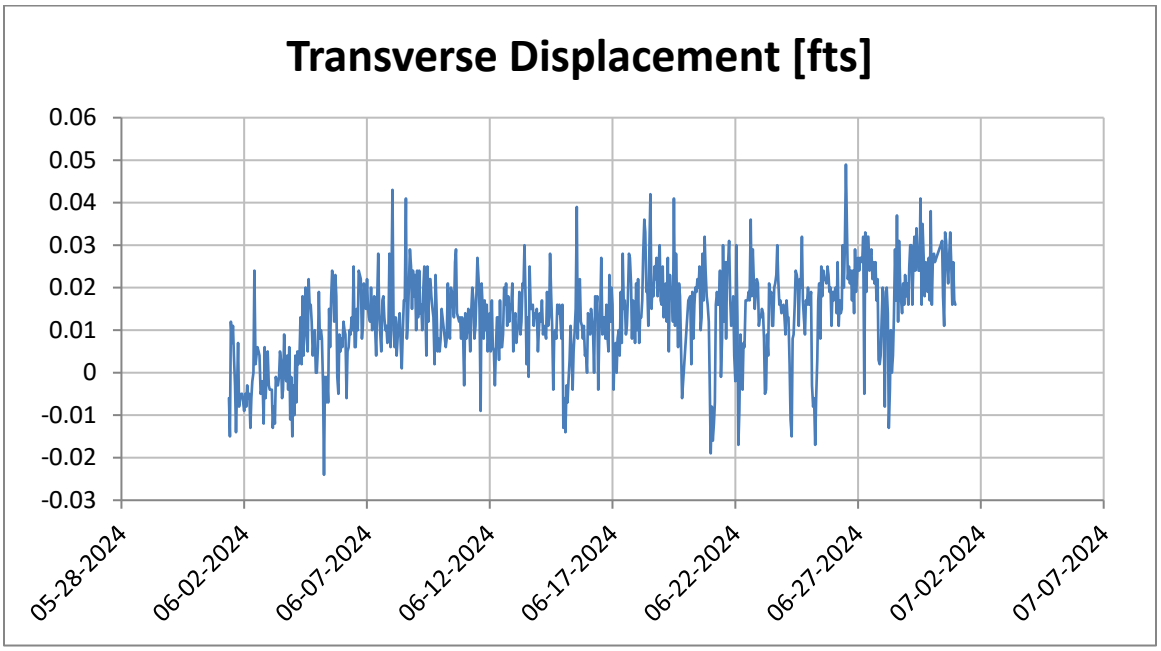


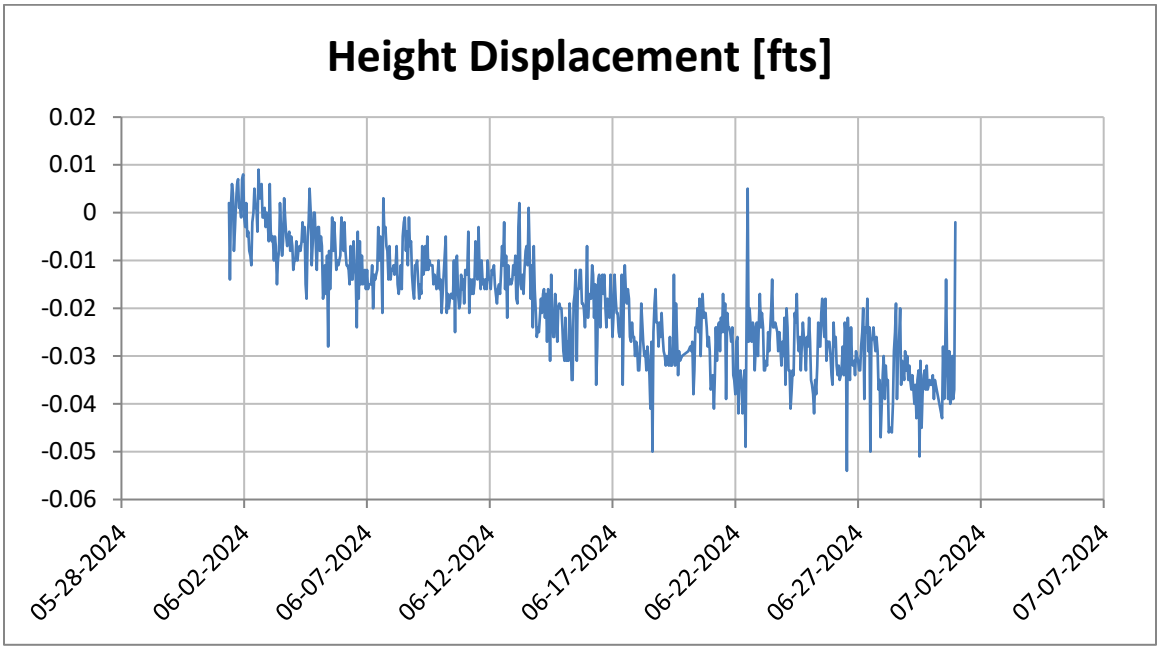
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. New instrument installed June 25.
6. Rain and fog at end of month caused erroneous readings.

Stantec

B7500-4



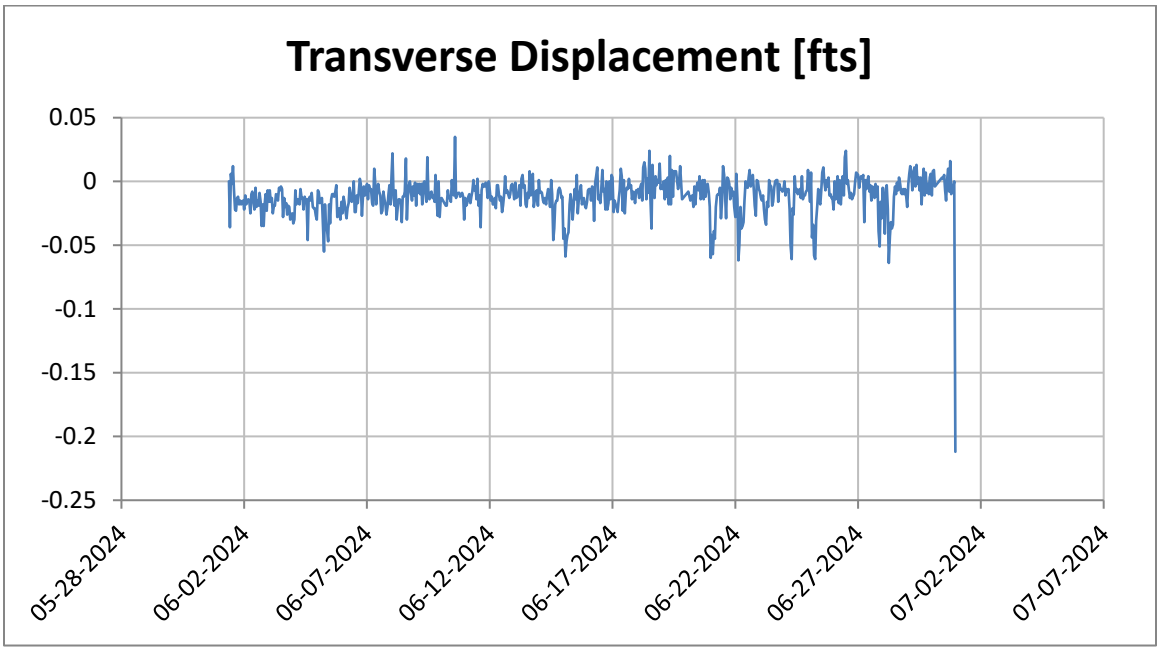


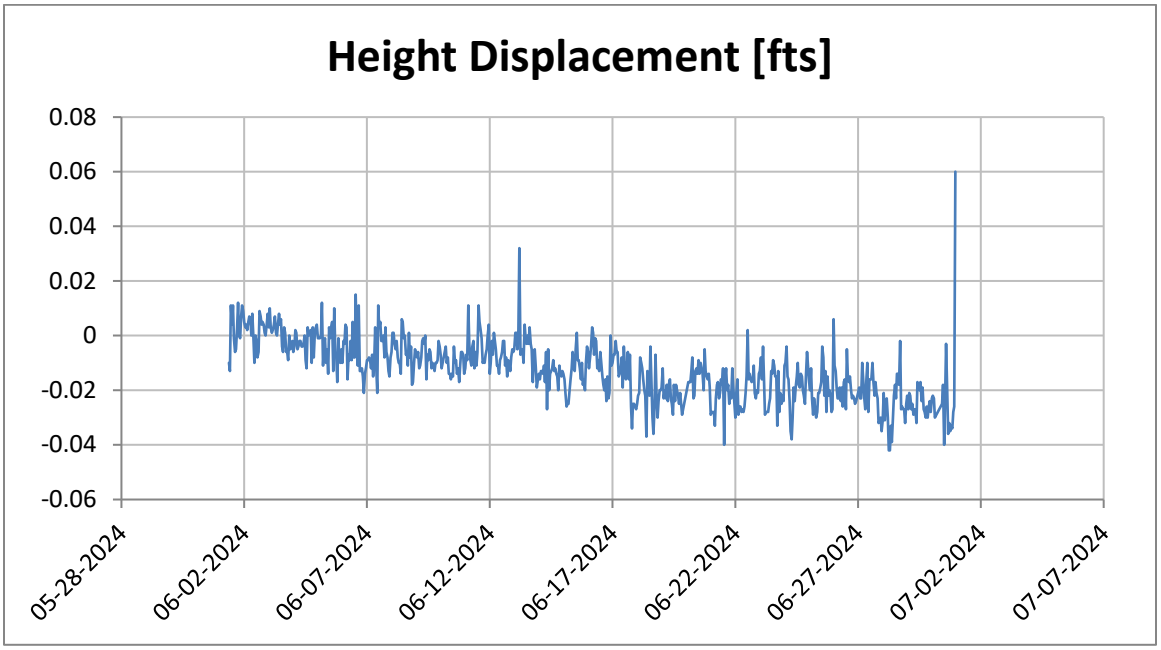
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. New instrument installed June 25.
6. Rain and fog at end of month caused erroneous readings.

Stantec

B7500-5



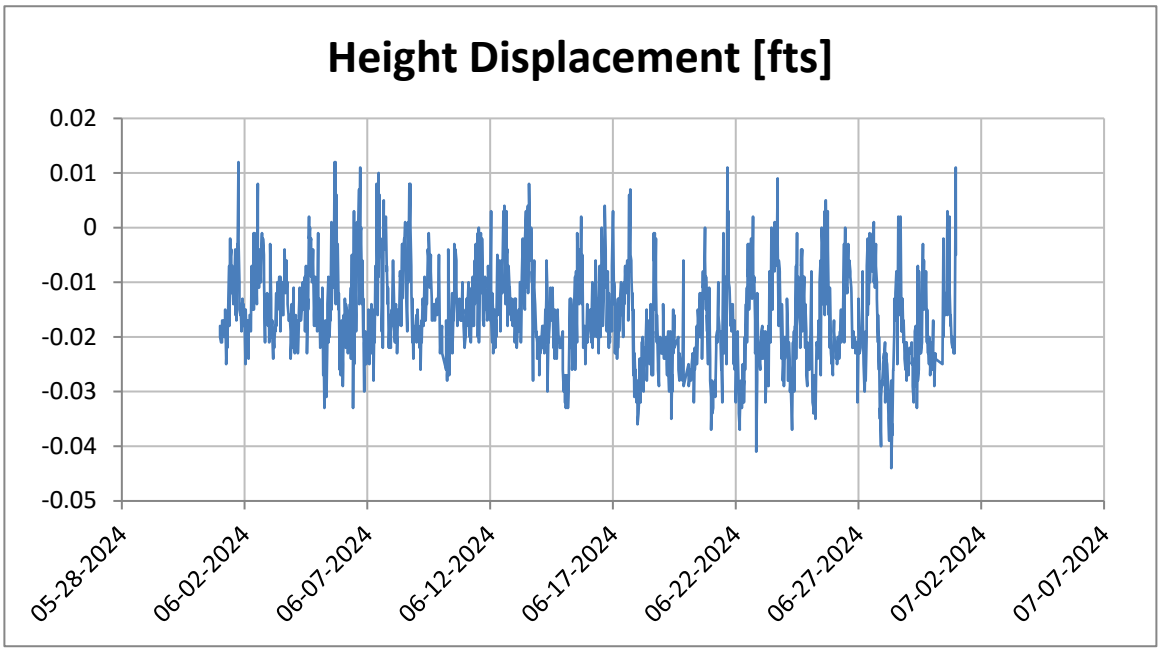


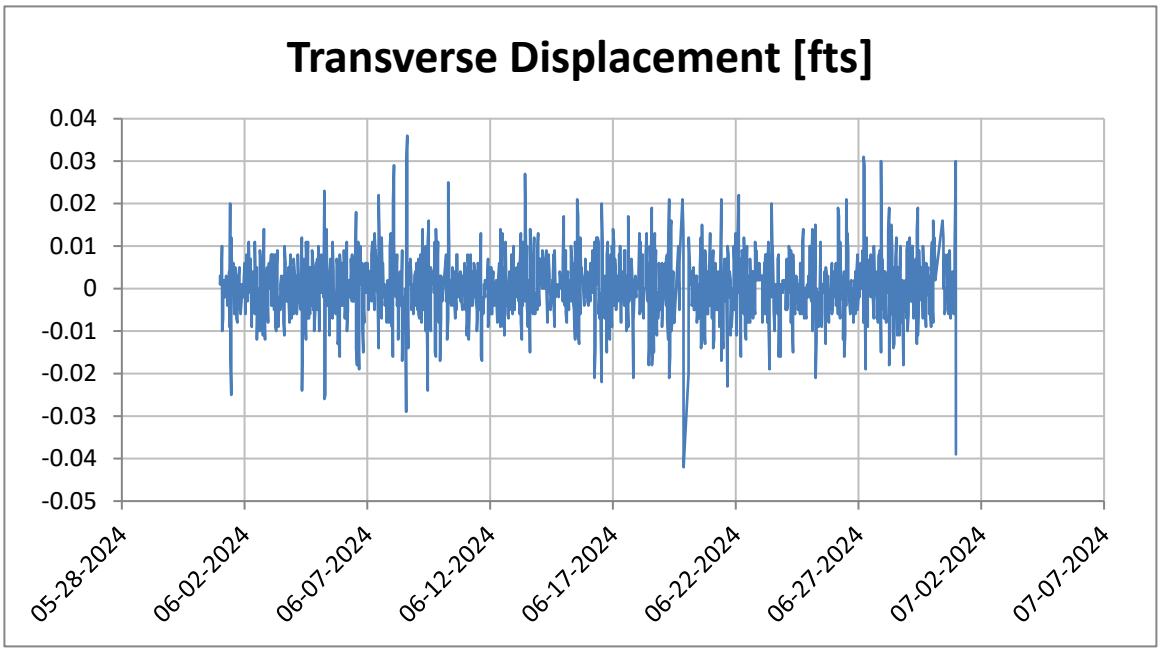
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. New instrument installed June 25.
6. Rain and fog at end of month caused erroneous readings.

Stantec

Prism CP6



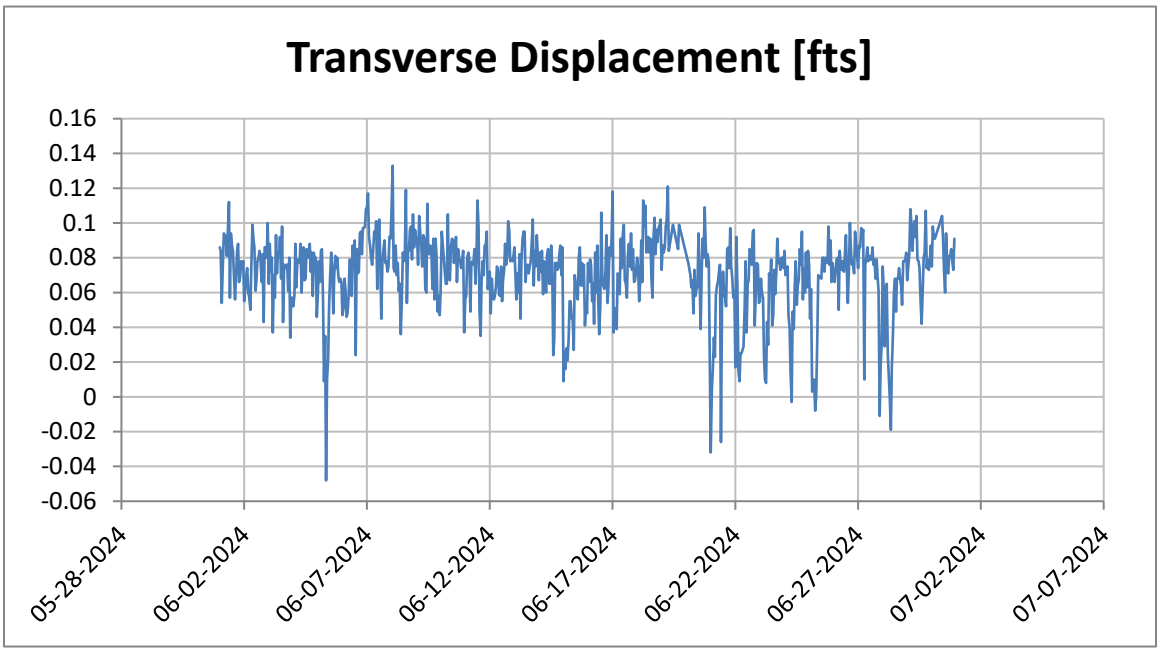


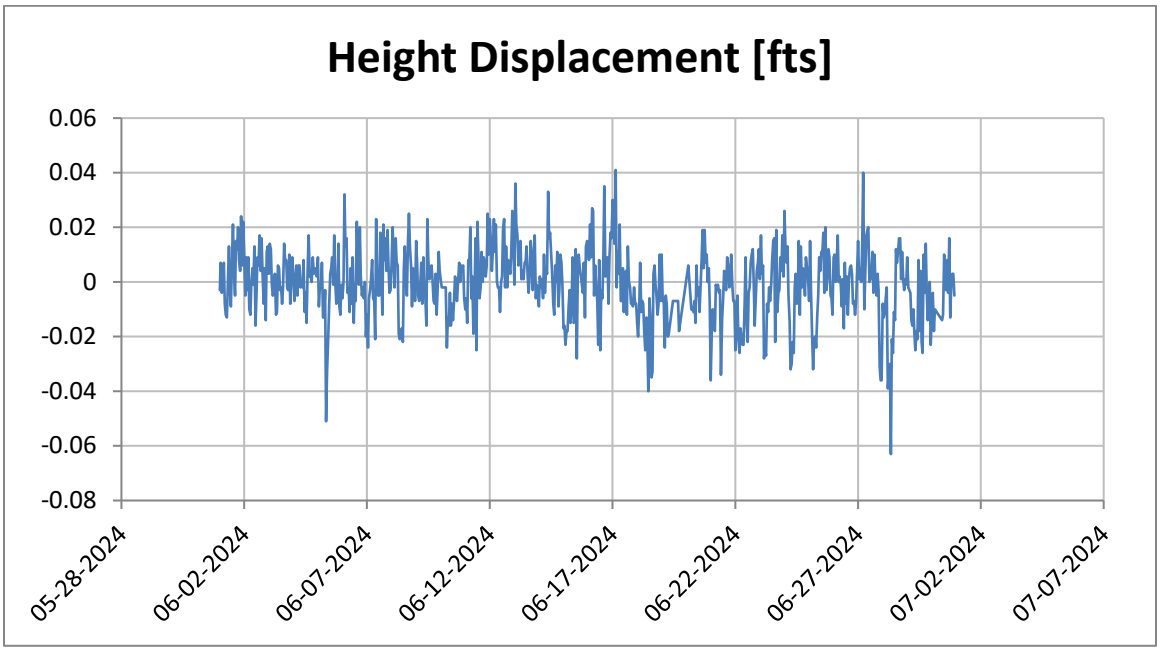
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism CP7



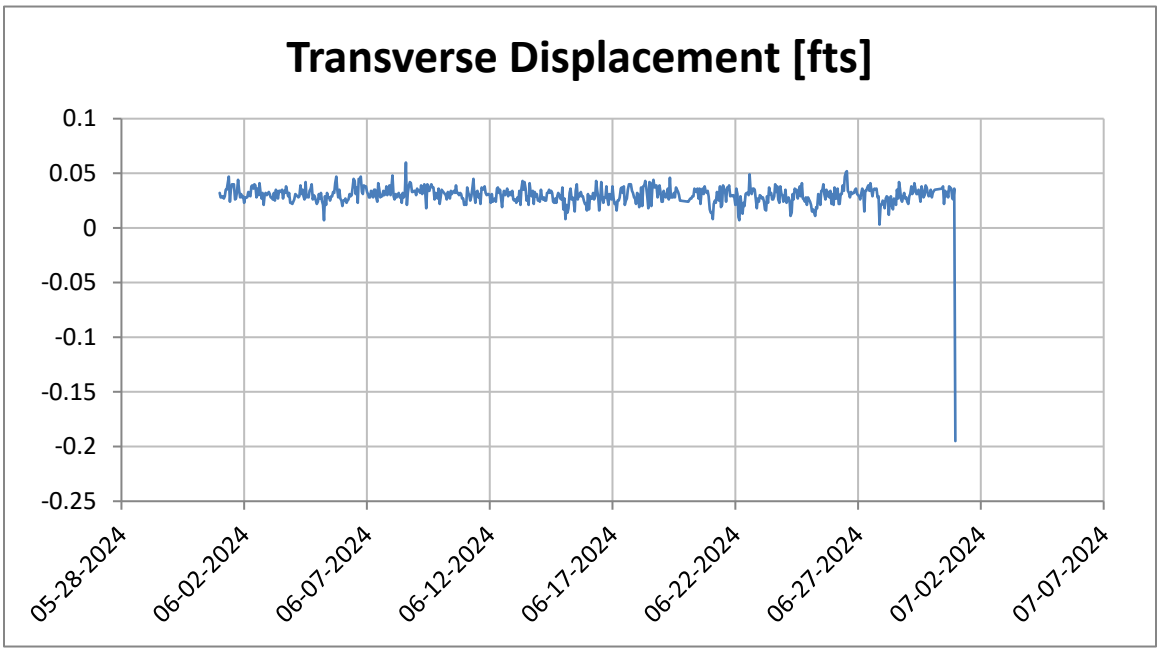


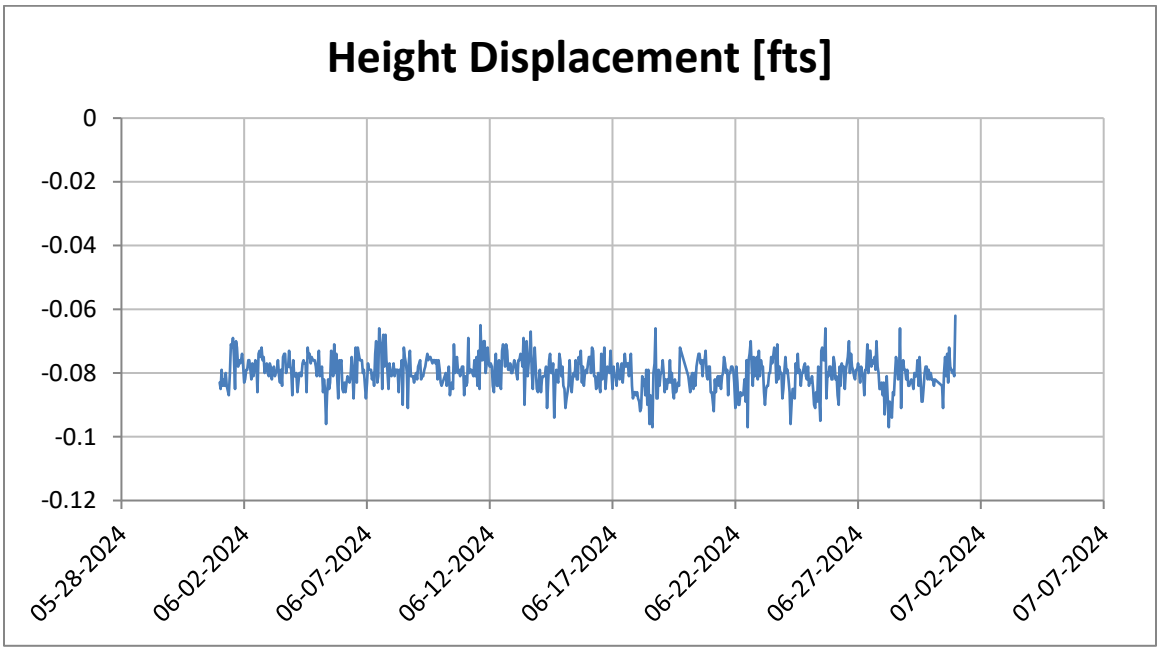
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism NP4



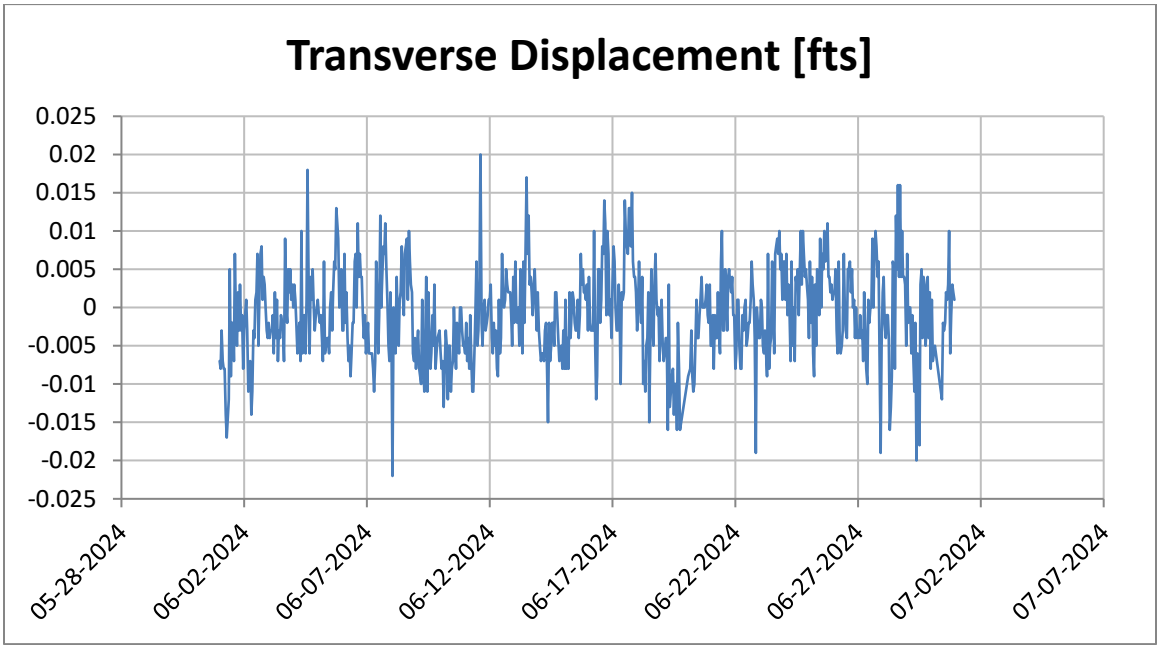


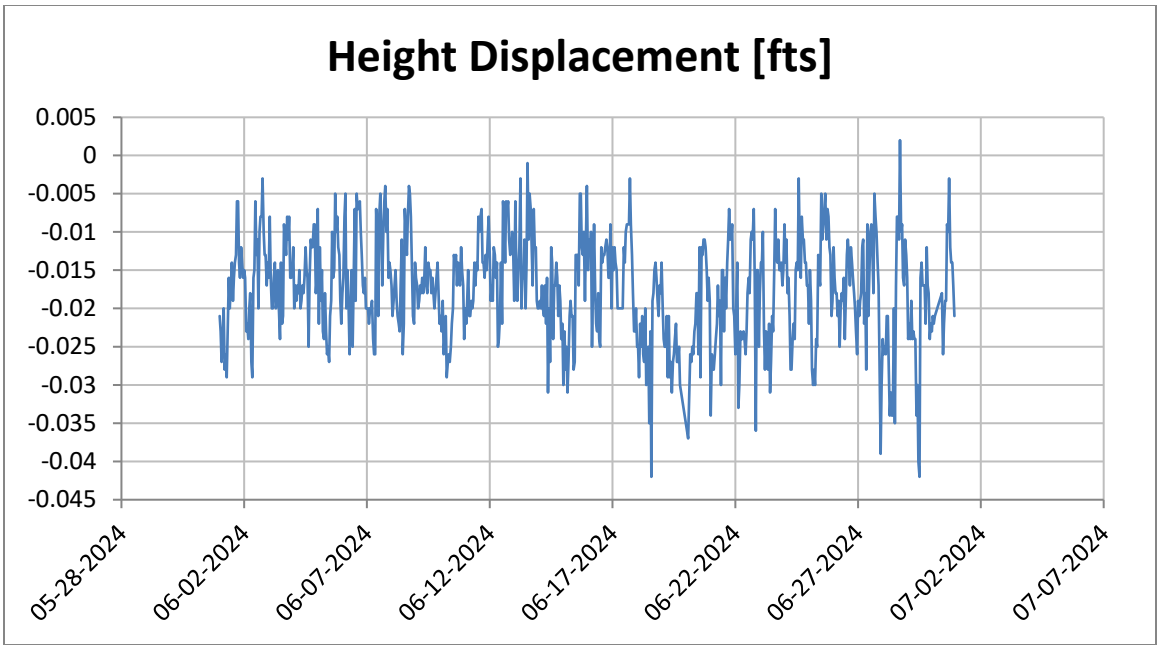
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism P2



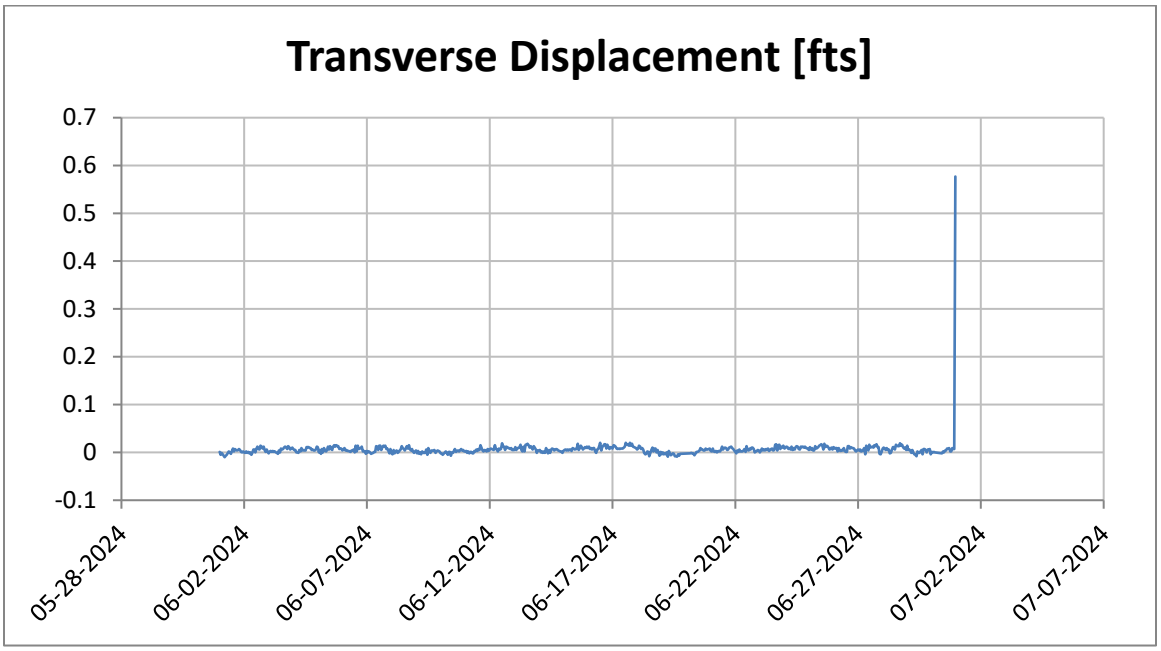


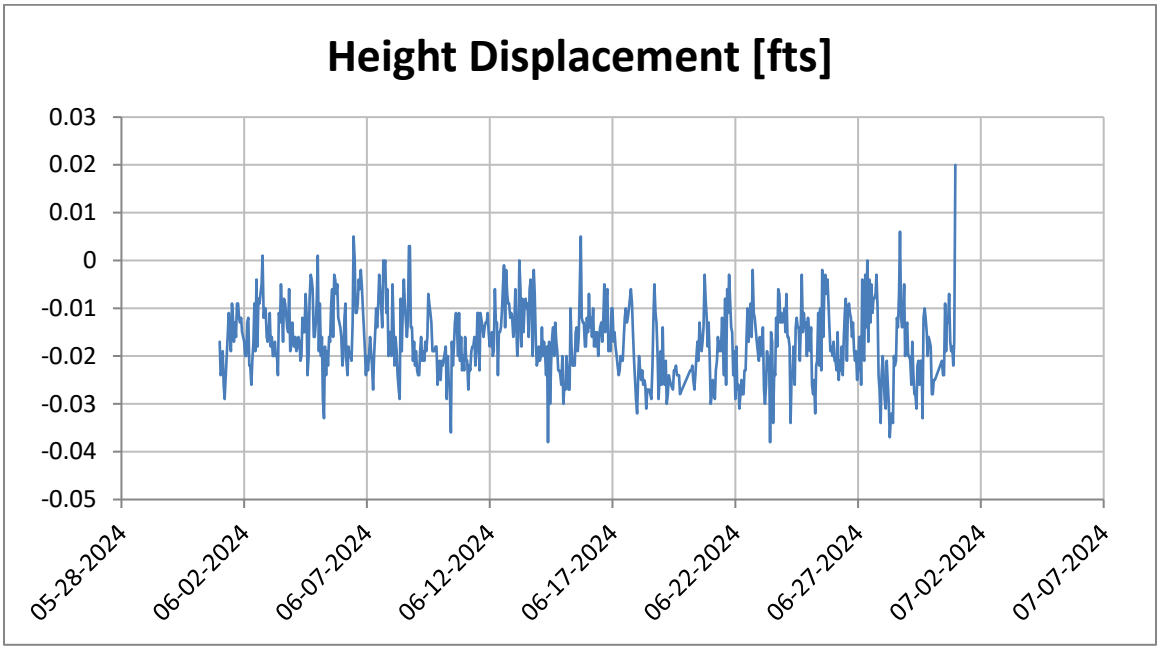
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism P5



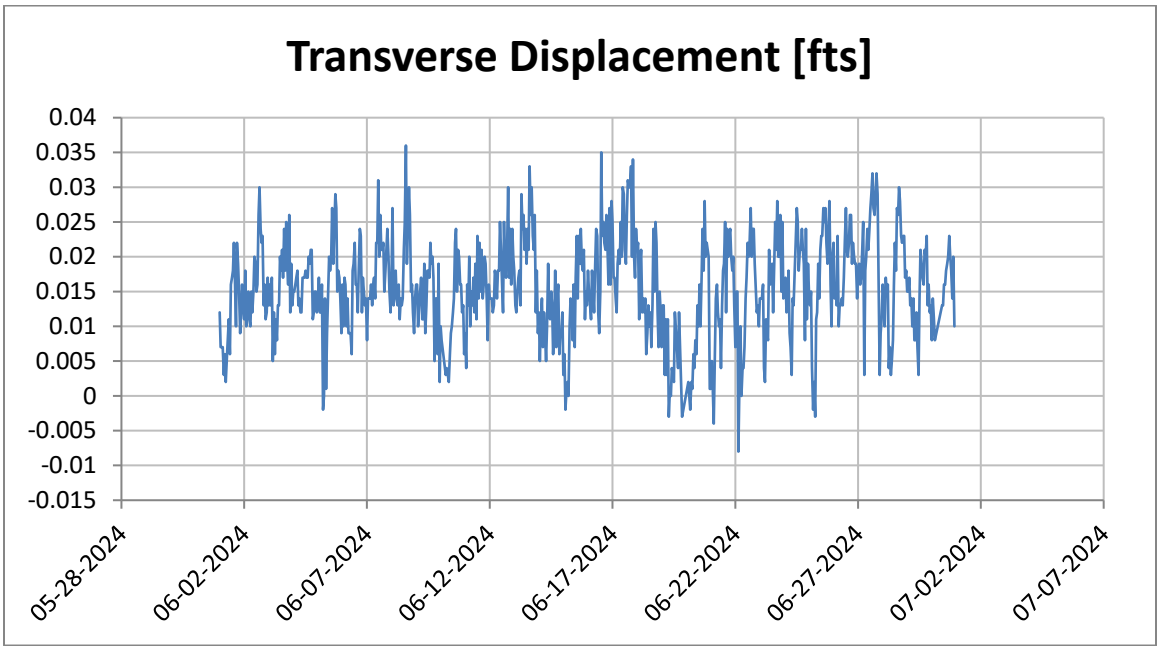


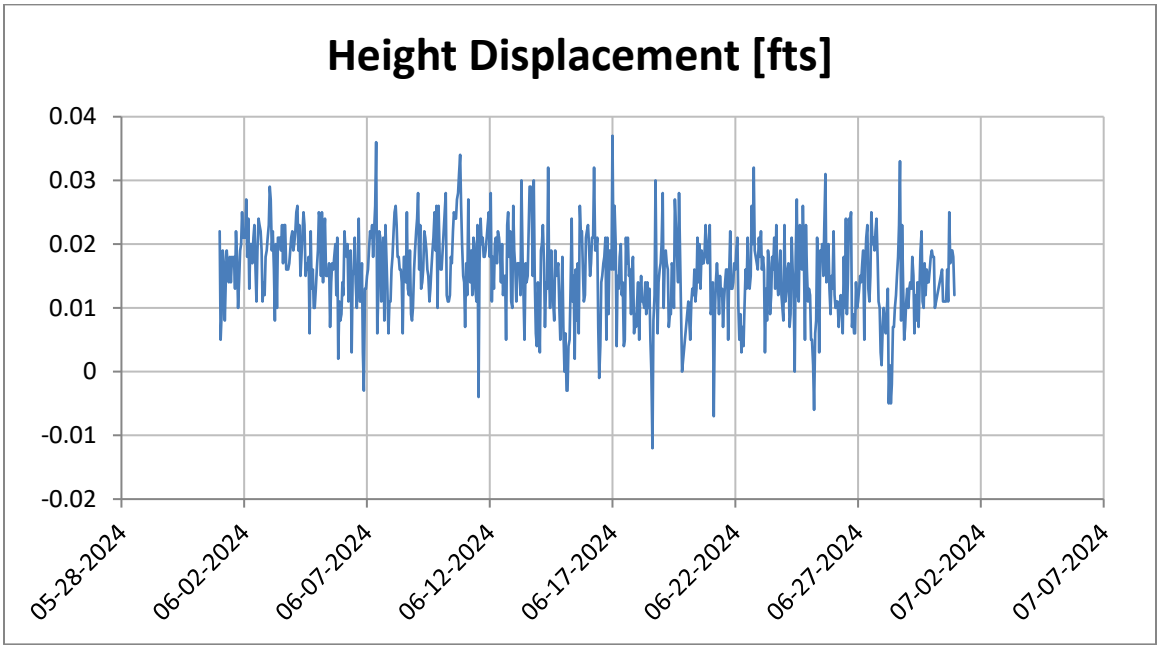
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings and regression limit alerts.

Stantec

Prism P25



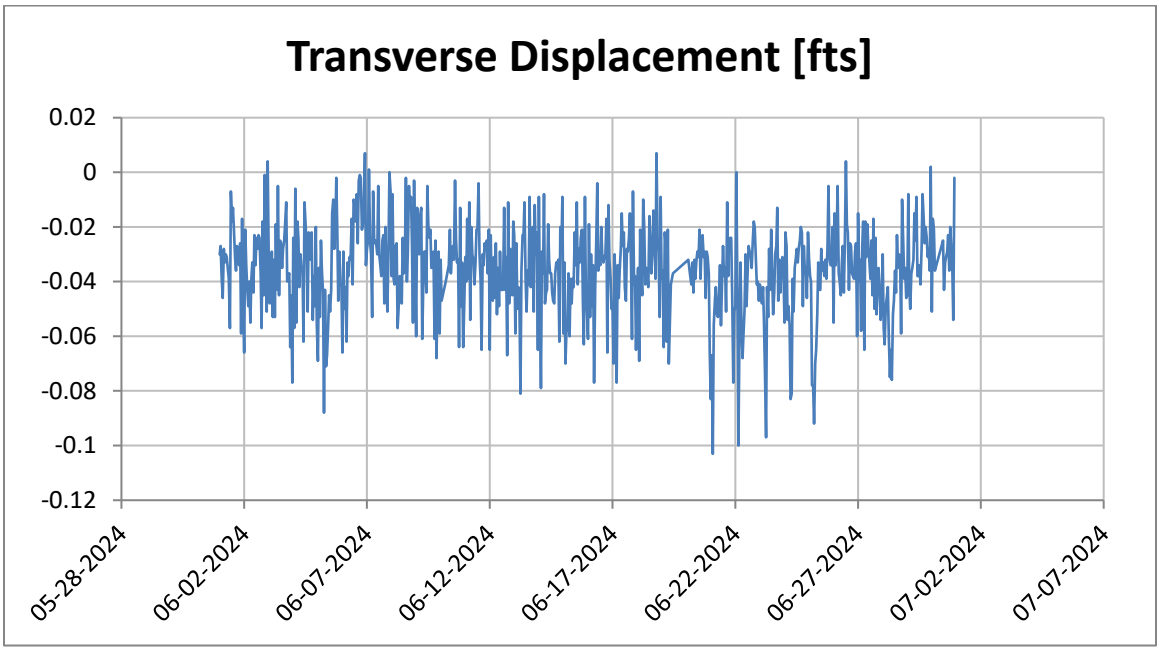


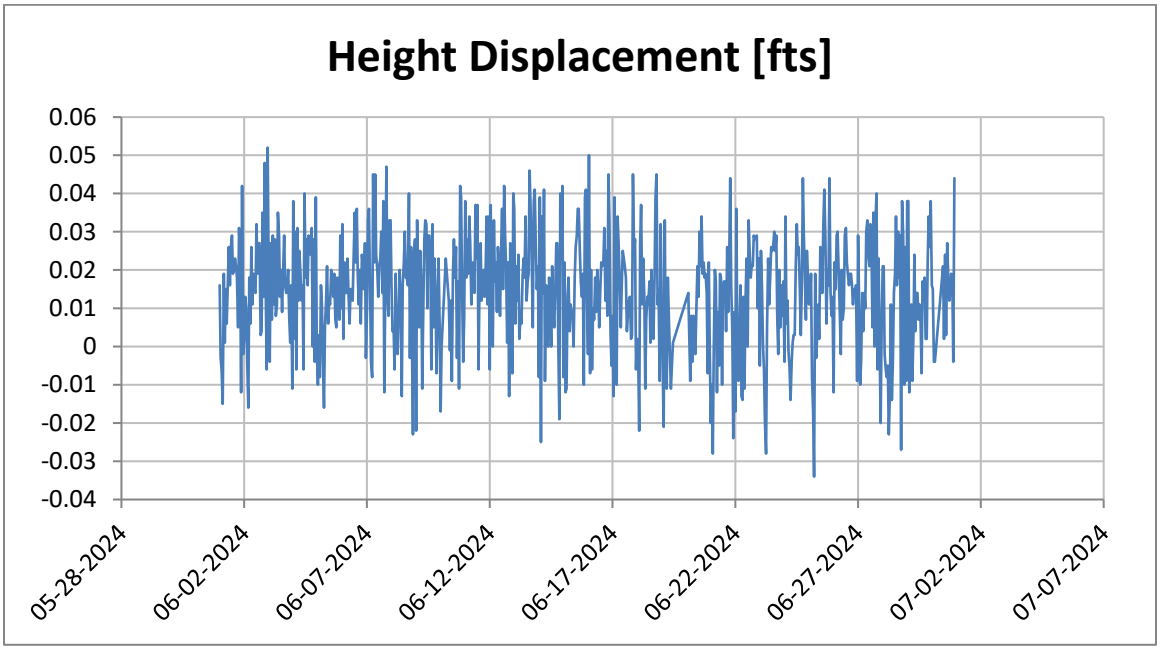
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Regression limit alert received on June 19.
6. Rain and fog at end of month caused erroneous readings.

Stantec

Prism P32R



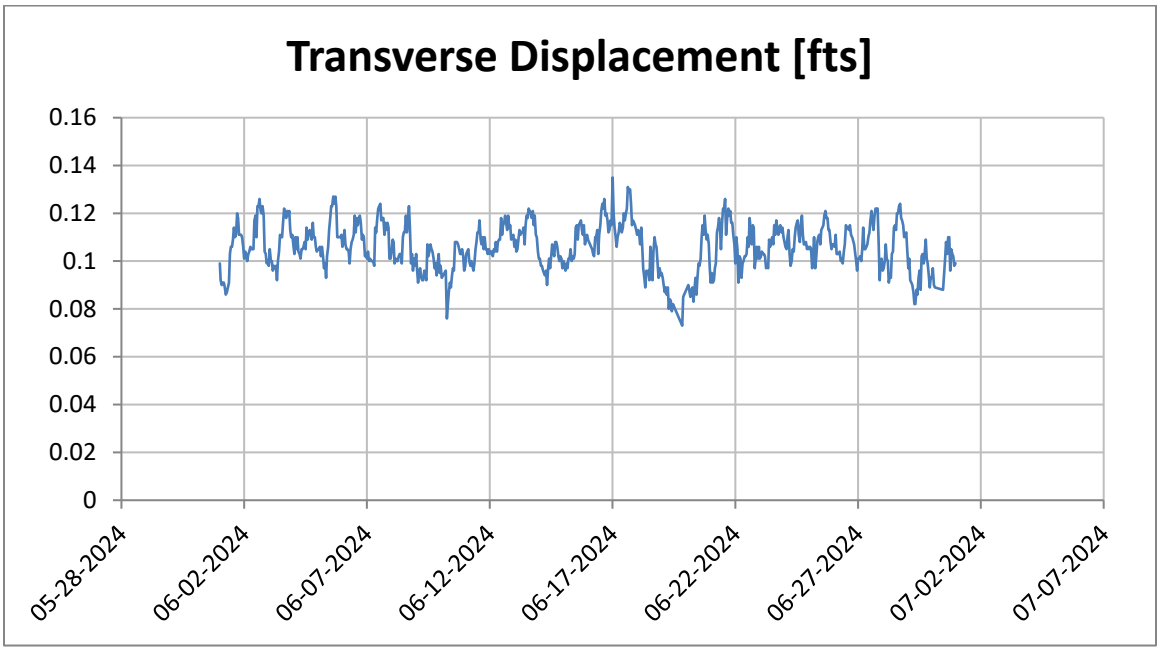


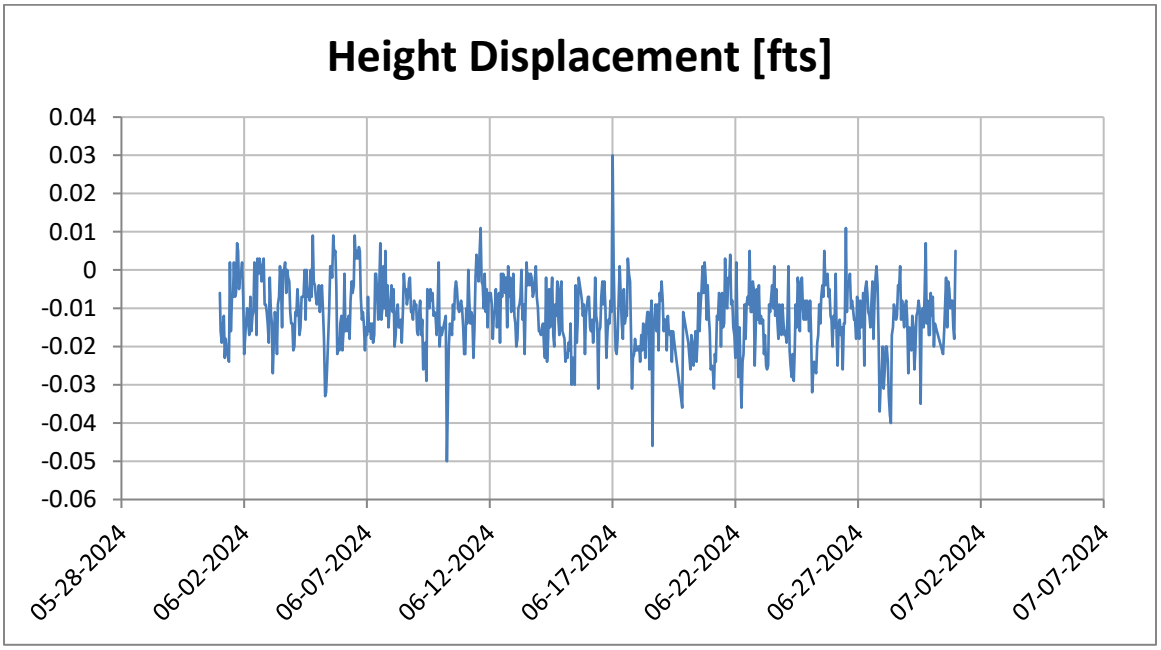
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism P33



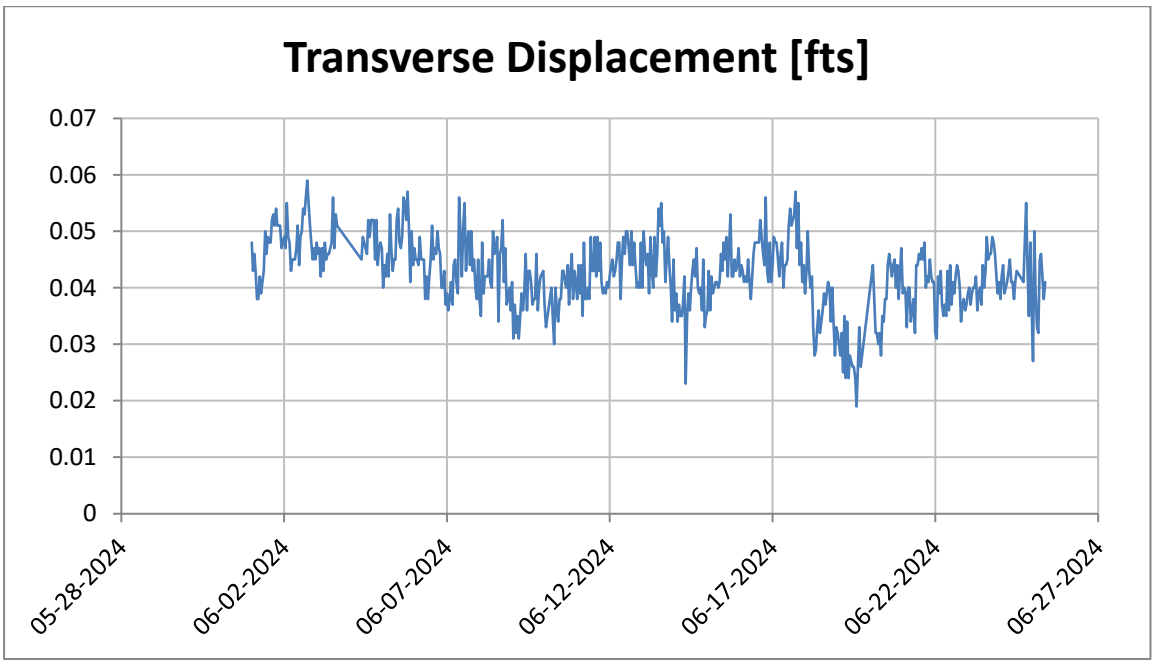


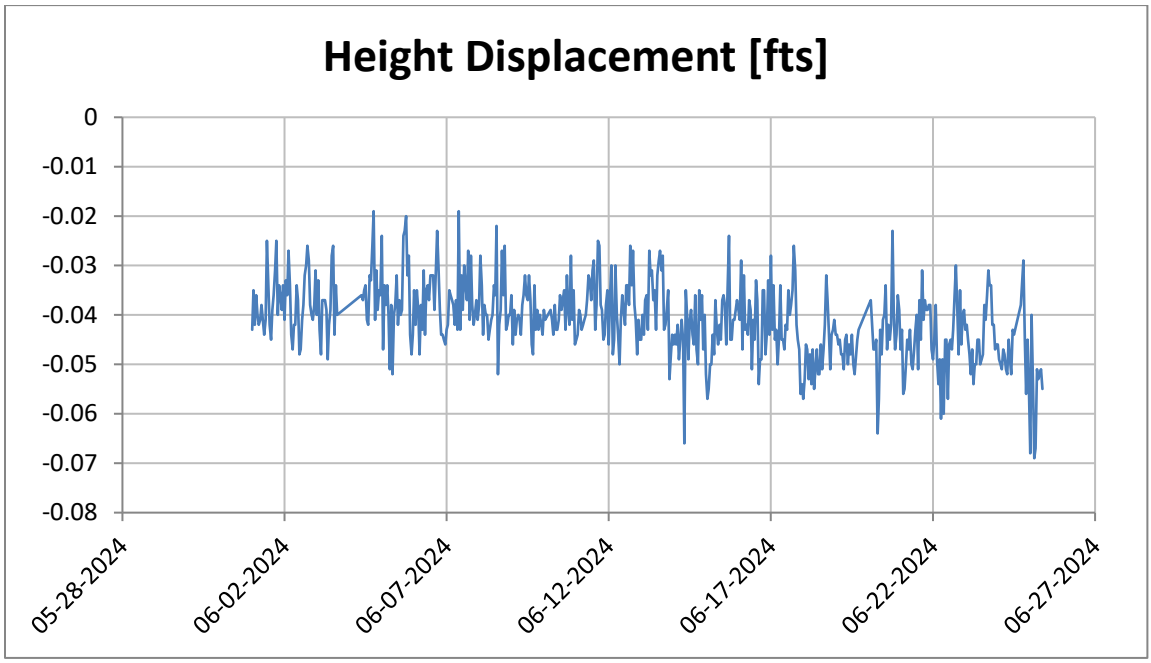
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Rain and fog at end of month caused erroneous readings.

Stantec

Prism P70





Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism removed on June 25.

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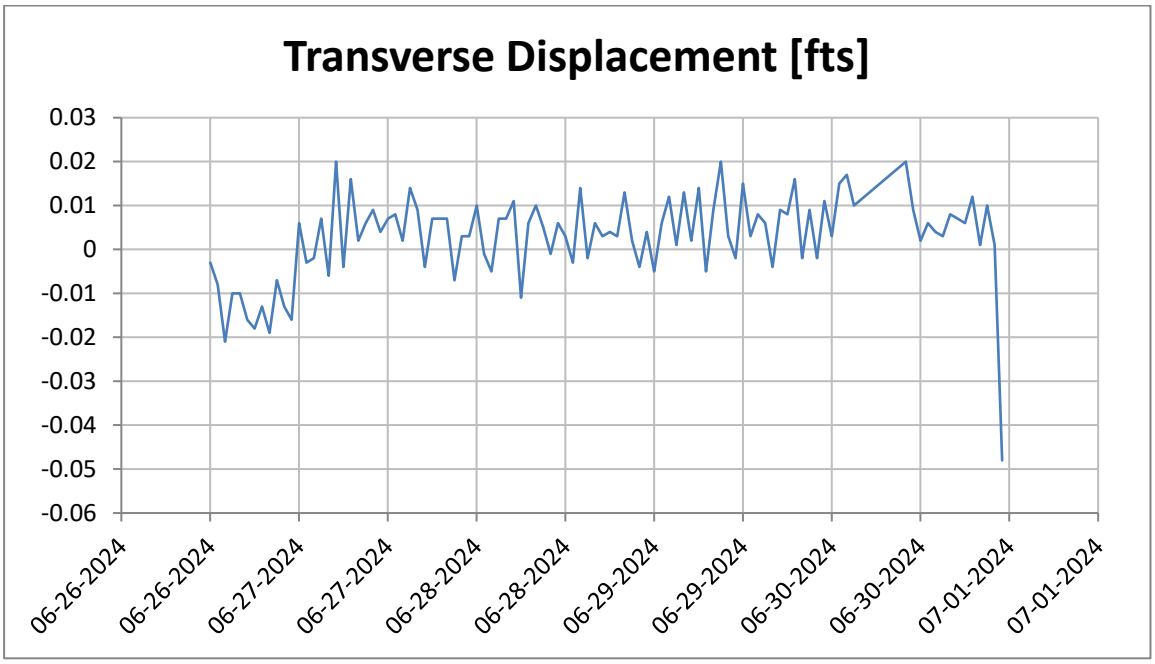
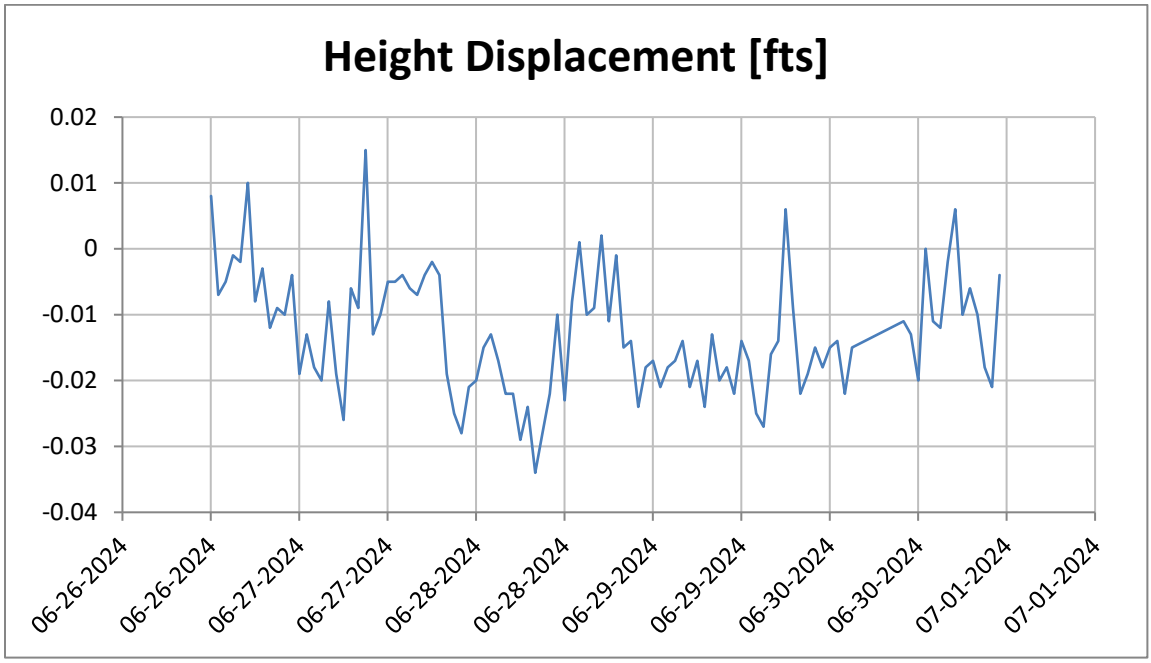
Prism P70R



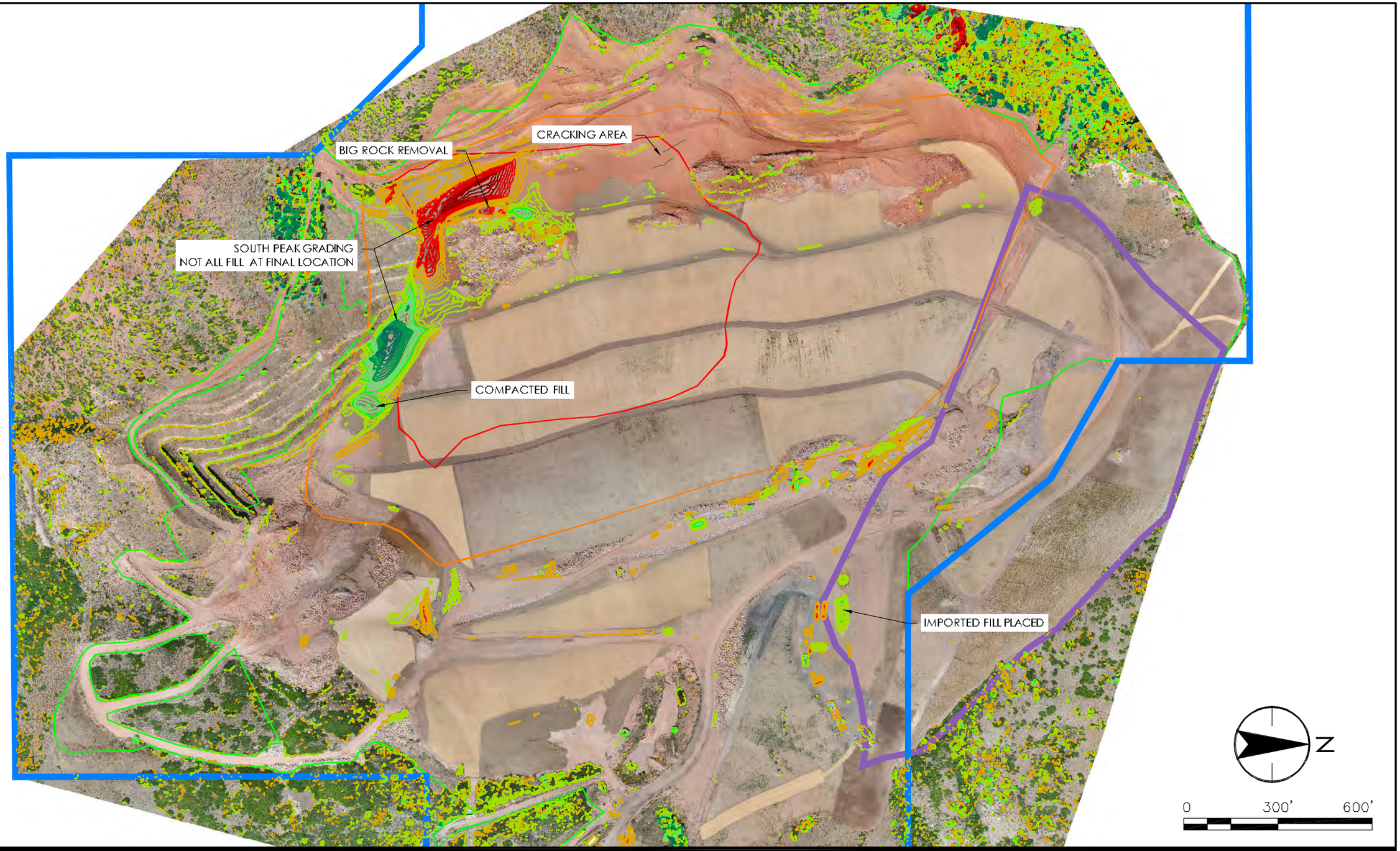


Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism replaced P70 and was installed on June 26.
6. Rain and fog at end of month caused erroneous readings.

Appendix C

Drone Survey



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Denver CO 80202-4427
Tel (303) 295-1717
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 05/28/2024 TO 07/17/2024

Client/Project
CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
COMPARISON OF RECENT AND PREVIOUS SURVEYS

Revision	Date
#	2024.07.31
Drawn By	Figure No.
PK	5

2024.07.24 3:09:57 PM

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Appendix D

Compaction Testing Results

u:\2057288200\06_design\monitoring\2024-06\dwg\pikeview plans_20240703

2024.07.24 3:09:50 PM

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Tel (303) 295-1717
www.stantec.com

LEGEND

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

1. THERE WAS NO TEST 1134.

N

0 150' 300'

Client/Project
CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
COMPACTION TEST LOCATIONS

Revision
#

Date
2024.07.31

Drawn By
PK

Figure No.
6

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Compaction Testing Log

Test No.	Date	Elevation (ft)	Northing (ft)	Easting (ft)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)	Compaction (%)
1108	3-Jun-24	7479	1401186	3172978	136.8	1.9	134.2	109
1109	3-Jun-24	7480	1401231	3172947	124.3	1.9	122	99
1110	5-Jun-24	7372	1400950	3173278	121.8	3	118.2	96
1111	5-Jun-24	7380	1400924	3173236	118.3	3.4	114.2	93
1112	6-Jun-24	7382	1401054	3173065	120.6	3.3	116.8	95
1113	6-Jun-24	7374	1400909	3173257	119.5	2.2	116.9	95
1114	10-Jun-24	7410	1400977	3173300	122.5	3.1	118.8	97
1115	10-Jun-24	7410	1400933	3173257	117.9	4.5	112.8	92
1116	10-Jun-24	7420	1400978	3173257	121.1	2.2	118.5	96
1117	11-Jun-24	7500	1401226	3172967	128.5	2.7	125.1	102
1118	11-Jun-24	7490	1401111	3173001	124.4	2.7	121.1	99
1119	11-Jun-24	7470	1401038	3173029	125.3	2.8	121.9	99
1120	12-Jun-24	7503	1401241	3172960	125.2	2	122.8	100
1121	12-Jun-24	7503	1401156	3172979	127.8	2.5	124.7	102
1122	12-Jun-24	7498	1401063	3173024	116.6	3.1	113.1	92
1123	13-Jun-24	7480	1401204	3173000	143.4	6.1	135.1	110
1124	13-Jun-24	7483	1401123	3172999	123.2	3.1	119.5	97
1125	13-Jun-24	7480	1401073	3172992	118.3	3.7	114.1	93
1126	17-Jun-24	7480	1401046	3173005	120.3	3.3	116.5	95
1127	17-Jun-24	7480	1401034	3173002	118	2.4	115.2	94
1128	17-Jun-24	7469	1401031	3173041	117.4	2.4	114.7	93
1129	18-Jun-24	7467	1401223	3172928	125.1	2.5	122.1	99
1130	18-Jun-24	7470	1401270	3172942	129.6	1.9	127.2	104
1131	20-Jun-24	7470	1401175	3173011	120	2.3	117.3	96
1132	20-Jun-24	7472	1401111	3173008	131.4	3.1	127.5	104
1133	21-Jun-24	7486	1401246	3172947	124.8	2.4	121.9	99
1135	25-Jun-24	7482	1401240	3172942	126.8	2.4	123.8	101
1136	25-Jun-24	7478	1401172	3172990	126.5	2.1	123.9	101
1137	26-Jun-24	7481	1401247	3172954	132.6	1.1	131.1	107
1138	26-Jun-24	7477	1401139	3173018	134.4	2.2	131.5	107
1139	27-Jun-24	7480	1401024	3173034	125.8	6.4	118.2	96
1140	27-Jun-24	7479	1401062	3173022	129.8	3.5	125.4	102
1141	1-Jul-24	7482	1401074	3172993	127	1.5	125.1	102
1142	1-Jul-24	7480	1401108	3172996	128.1	3.1	124.3	101
1143	2-Jul-24	7480	1401043	3173032	129.2	2.9	125.5	102
1144	2-Jul-24	7481	1401010	3173038	118.5	5.7	112.1	91
1145	8-Jul-24	7481	1401007	3173035	134.6	1.8	132.2	108

Test No.	Date	Elevation (ft)	Northing (ft)	Easting (ft)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)	Compaction (%)
1146	8-Jul-24	7482	1400982	3173031	121	7.2	112.9	92
1147	9-Jul-24	7478	1401157	3173021	115.9	3.2	112.3	91
1148	9-Jul-24	7477	1401216	3173021	136.4	8.9	125.3	102
1149	10-Jul-24	7481	1401014	3173035	126.9	2.1	124.3	92
1150	10-Jul-24	7482	1400975	3173036	128.5	5.6	121.7	91
1151	17-Jul-24	7503	1401072	3173015	124.7	1.8	122.5	100
1152	17-Jul-24	7506	1401036	3173045	125.2	2.2	122.5	100

Notes:

- A total 3,452,000 yd3 had been placed and compacted. This requires at least 691 compaction tests and 1,179 tests have been taken.
- There is no test 1134.
- Twelve tests included from July, since aerial survey was completed on July 17, 2024, and that date was used for volume calculations.