

To: Jerald Schnabel
Castle Aggregate

From: Paul Kos
Denver, CO 80202

File: Second Quarter 2025 Monitoring
Summary

Date: July 31, 2025

Reference: Second Quarter 2025 Geotechnical Monitoring Summary Pikeview Quarry

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this Second Quarter 2025 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 operated the quarry, which is currently closed and undergoing reclamation. A geotechnical monitoring program was established to monitor the geotechnical performance of the reclaimed slopes during and following reclamation grading. This report presents the geotechnical monitoring results at the site through the Second Quarter 2025. Continuous monitoring by the robotic survey system began in 2010 and continued through the Second Quarter 2025. 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 Second Quarter 2025 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 site activities and monitor reclamation progress.

1.2 MONITORING SUMMARY

Major components of the instrumentation monitoring program are listed in Table 1 and shown on Figures 1 (aerial imagery) and 2 (topography).

Table 1 Monitoring Frequency

Monitoring Type	Frequency
Visual inspection	Daily (if work activities that day, Castle Aggregate) and Quarterly (Stantec)
Robotic theodolite/prism	Continuous

2.0 VISUAL INSPECTIONS

Inspections are completed on working days by site staff prior to work activities and quarterly 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).

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 slopes for any changes.

Stantec conducted visual inspections of the Pikeview Quarry slopes on June 2 and 3, 2025. 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 3.

The visual observations noted localized features:

- Settlement cracks were noted on the southern slope adjacent to the main channel. This area on the edge of the buttress is in a fill area between cut areas, and the cracks are believed to be related to the fill settling (See Photo 1 on Figure 3).
- Settlement cracks were noted along the edges of the terrace benches. These settlement cracks are believed to be related to the topsoil and surficial material consolidating (See Photo 2 on Figure 3).
- Rock raveling occurred in two areas of bedrock outcropping (See Photo 3 on Figure 3). These areas are believed to be related to drastic temperature changes combined with heavy moisture.
- Water infiltration above a bedrock outcrop eroded a hole in two locations of fill placed against the bedrock. No erosion or debris was observed downhill from the hole (See Photo 8 on Figure 3).

Visual inspections of the Pikeview Quarry did not reveal any evidence of large-scale instability outside of the landslide areas previously identified. No other cracking, 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 32 prisms active in the Second Quarter 2025; two prisms were control points located outside the slope movement area, 4 prisms were located on the slopes surrounding the slope movement area, and 26 prisms were located in the buttress fill area. The prism locations are shown on Figures 1 and 2.

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. All alerts for potential movement have been attributed to weather, animal activity, equipment operations, vandalism, vegetation blocking the prism, or sun glare, and no alerts have been associated with slope movements. Castle Aggregate will notify CDRMS of any alerts caused by slope movement.

The prism monitoring results for transverse and height displacements, period change, and cumulative change are summarized in Table 2. 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 period delta is the most recent reading cumulative delta displacement (horizontal, lateral, and vertical) subtracted from the first reading of the quarter. 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 or when each prism was installed. According to Leica documentation, the survey accuracy is $\pm 4 \text{ mm} + 1.5 \text{ ppm}$ for prisms located greater than 500m from the robotic total station; this equates to an accuracy of $\pm 0.016 \text{ ft}$.

Table 2 First Quarter 2025 Prism Summary

Prism ID	Cumulative Transverse Displacement (ft)	Cumulative Height Displacement (ft)	Period Delta (ft)	Cumulative Delta (ft)	Notes
B7200-1	-0.076	0.018	0.015	0.086	
B7200-2	0.005	-0.039	0.008	0.086	
B7200-3	0.255	-0.099	0.019	0.328	
B7300-0	-1.049	-0.309	0.063	1.292	
B7300-1	-0.207	-0.234	0.011	0.498	
B7300-2	0.055	-0.409	0.054	0.475	No readings after June 25 due to vegetation
B7300-3	0.240	-0.236	0.046	0.462	
B7300-4	0.298	-0.198	0.044	0.400	
B7400-1	-0.338	-0.950	0.033	1.574	Data gaps in April and May due to wildlife
B7400-2	-0.058	-0.704	0.067	1.307	
B7400-3	0.176	-0.583	0.077	0.764	
B7400-4	0.545	-0.474	0.032	0.831	
B7400-5	0.875	-0.247	0.044	0.921	
B7500-1r	0.001	-0.046	0.053	0.101	
B7500-2	-0.003	-0.292	0.045	0.372	
B7500-3	0.120	-0.256	0.059	0.339	
B7500-4	0.200	-0.228	0.137	0.431	
B7500-5	0.158	-0.274	0.149	0.328	
B7600-5	0.477	-0.398	0.620	0.824	
B7700-1	-0.056	0.023	0.133	0.211	
B7700-2	-0.023	-0.003	-0.006	0.043	
B7700-3U	-0.032	0.010	0.000	0.034	
B7700-3L	-0.004	0.035	0.024	0.037	
BR4	-0.023	-0.025	0.023	0.056	
CP6	0.001	-0.013	-0.005	0.022	
CP7	0.083	0.013	0.011	0.085	
NP4	0.033	-0.072	0.007	0.188	Data gaps in April due to wildlife
P2	-0.007	-0.011	0.001	0.013	
P5	0.002	-0.008	0.005	0.012	
P25	0.021	0.020	0.006	0.029	
P32R	-0.025	0.030	0.010	0.041	
P33	0.087	0.006	0.008	0.145	No readings after June 25 due to vandalism

The data show stable conditions with no or very small settlement movements at each of the 32 prisms. Prisms on the buttress slope continued to record slow and decreasing gradual movement as the fill consolidates under its own weight. A small amount of settlement is common for newly placed compacted fill, particularly following rain events like those in May 2025, and this was being recorded by the prisms. Plots of the transverse and height displacements for each prism are included in Appendix A.

4.0 RECLAMATION PROGRESS

Castle Aggregate has completed reclamation grading at the Pikeview Quarry. A phased approach is being used to complete the reclamation process (See milestone schedule below).

Task/Milestone	Estimated Dates
Phase 1 – RFP Evaluation and 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 – Reclamation Grading	Completed February 2022 to July 2024
Phase 4 – Contractor Demobilize from Site	Completed Summer 2024
Phase 4 – Channel Armoring	Completed January 2025
Phase 4 – Reclamation Planting	Completed February 2025
Phase 5 – Final Revegetation	2024 until acceptance

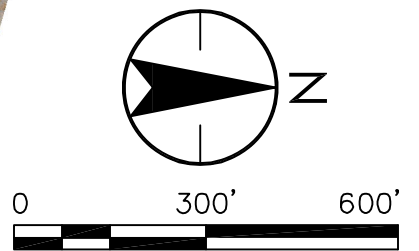
Work performed this quarter and planned for next quarter is limited to geotechnical monitoring and maintenance operations.

5.0 CONCLUSIONS

The data collected in the Second Quarter 2025 demonstrate compliance with the reclamation grading plan, and none of the data indicate evidence of any large-scale movements that increase risk to workers or to the public.

- All monitoring should continue at frequencies specified above.
- All alerts shall continue to be taken seriously even if data errors are suspected.
- CDRMS will be notified of any movement alerts not associated with weather or maintenance.

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1. AERIAL IMAGERY FROM SEPTEMBER 30, 2024 DRONE SURVEY.

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



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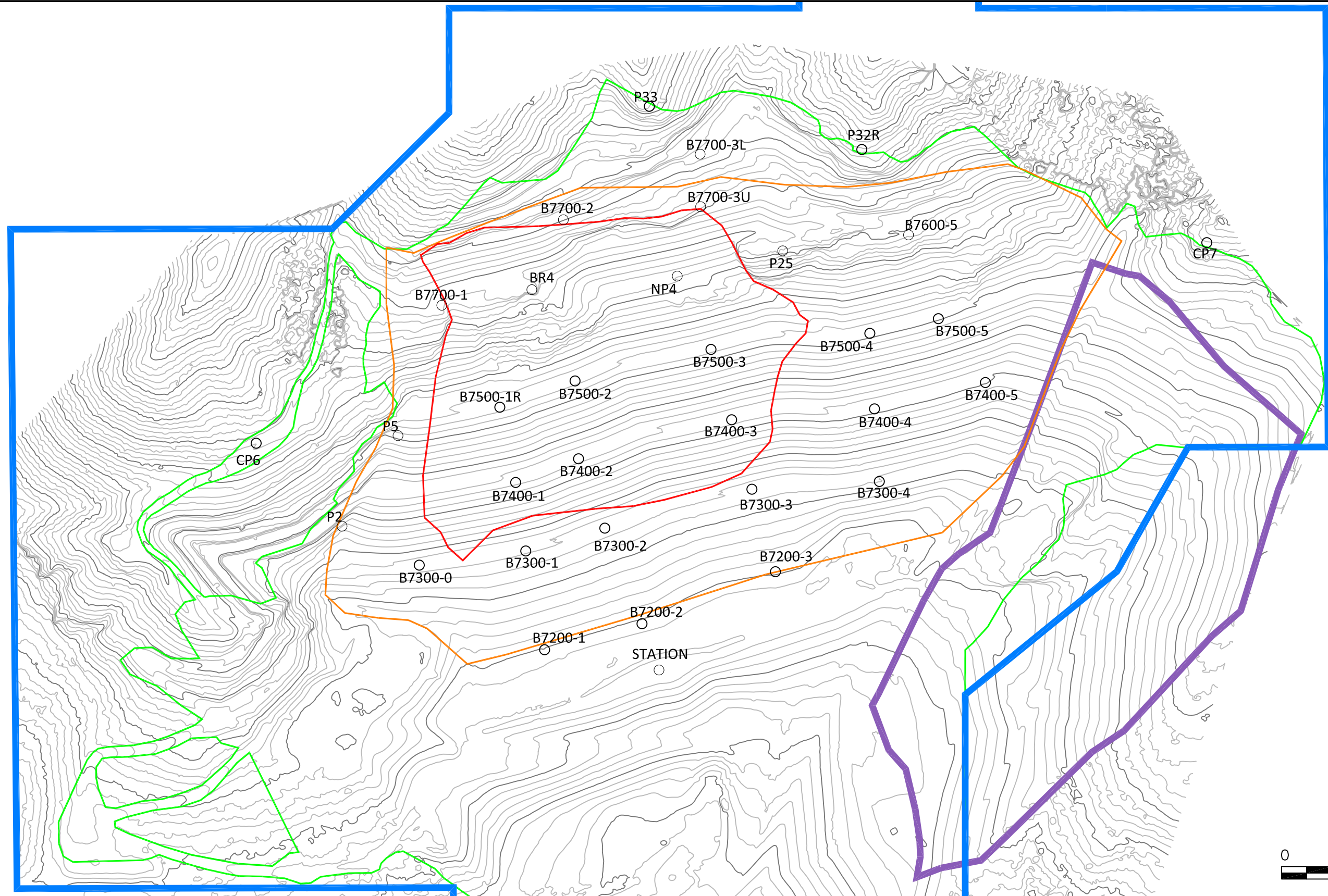
Client/Project
CASTLE AGGREGATE
PIKEVIEW QUARRY SLOPE
MONITORING

Project No.
2057288200

Title
SITE MAP

Revision #	Date
Drawn By PK	2025.07.31
	Figure No. 1

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

1. TOPOGRAPHY FROM SEPTEMBER 30, 2024 DRONE SURVEY.
2. CONTOUR INTERVAL IS 10 FEET

Client/Project
CASTLE AGGREGATE
PIKEVIEW QUARRY SLOPE
MONITORING

Project No.
2057288200

Title EXISTING PRISMS WITH CURRENT SURFACE	
Revision #	Date 2025.07.31
Drawn By PK	Figure No. 2



6. RECLAMATION VEGETATION.



5. MAIN CHANNEL RIPRAP.



4. RIP RAP CHANNEL.



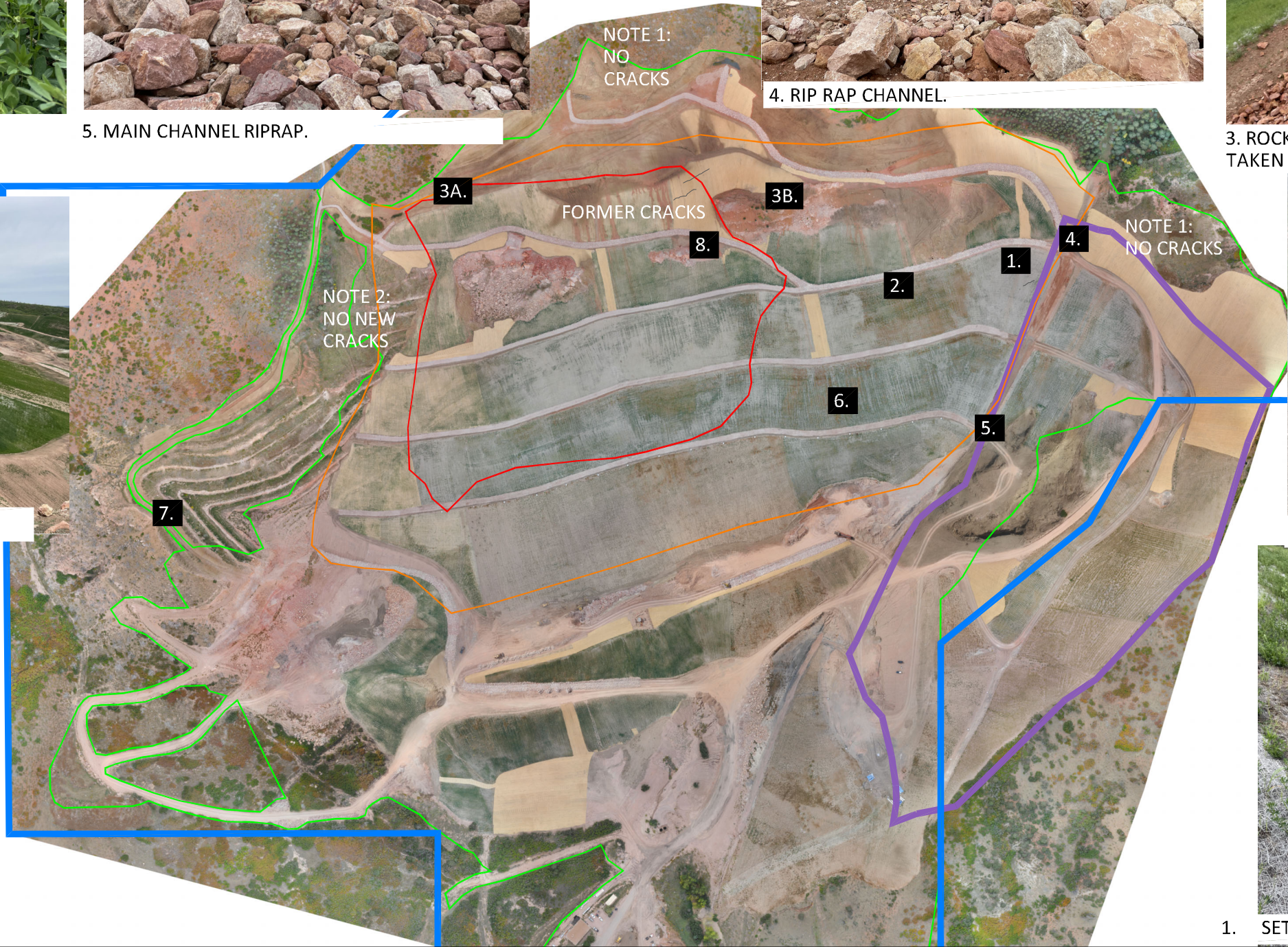
3. ROCK RAVELLING ON EXCAVATED BENCH. PHOTO TAKEN AT 3A. 3B SHOWED SIMILAR RAVELLING.



7. SITE OVERVIEW FROM SOUTH.



8. WATER INFILTRATION ABOVE OUTCROP.



2. SETTLEMENT CRACKS ON EDGE OF BENCH.



1. SETTLEMENT CRACK AT EDGE OF FILL.



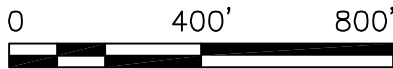
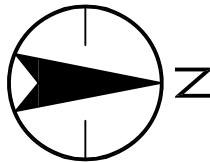
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LEGEND

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

NOTES

- NO CRACKS OBSERVED IN THIS AREA.
- NO NEW CRACKS OBSERVED IN THIS AREA.
- PHOTOS TAKEN JUNE 3, 2025.
- AERIAL IMAGE FROM SEPTEMBER 30, 2024.



Client/Project

CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE
MONITORING

Project No.

2057288200

Title

OBSERVATIONS FROM
SECOND QUARTER
INSPECTIONS

Revision

#

Drawn By

PK

Date

2025.07.31

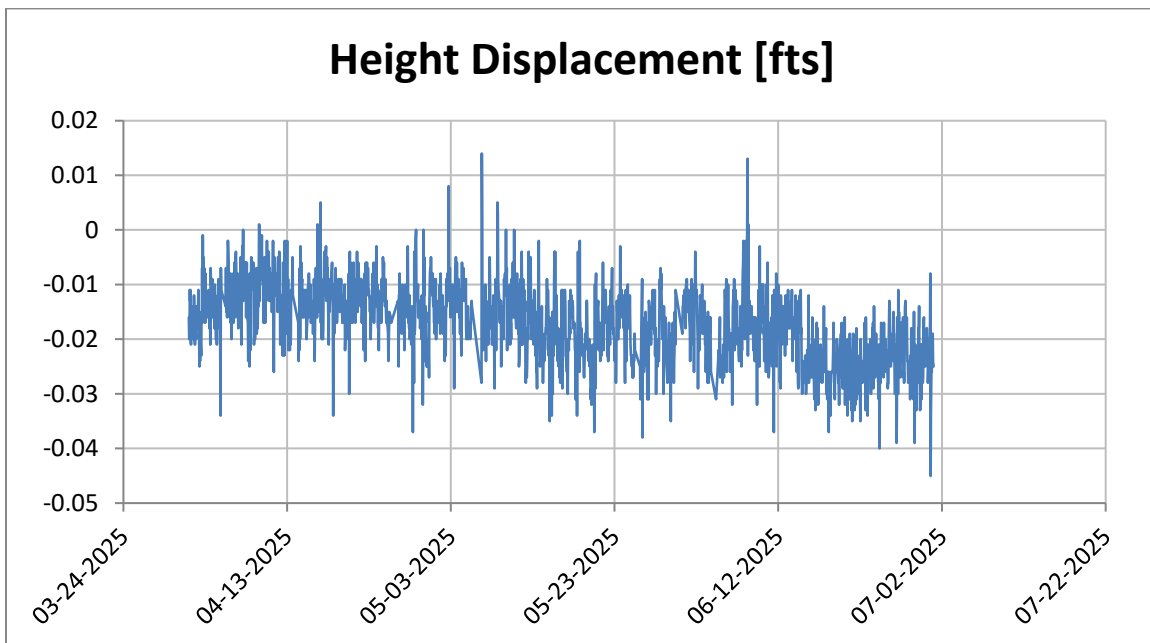
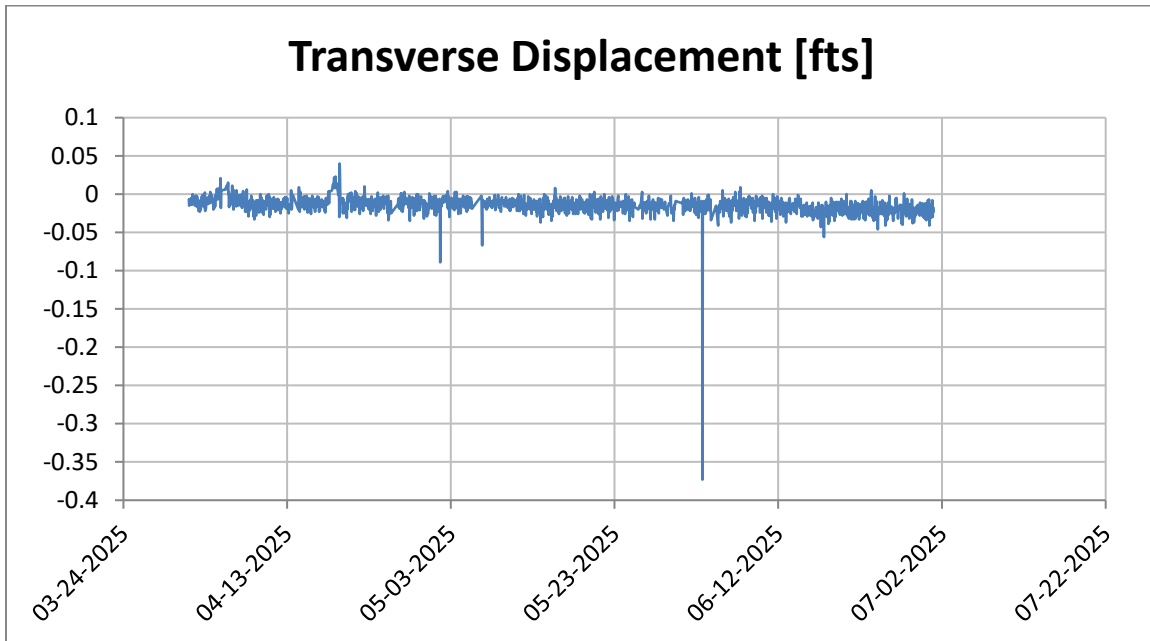
Figure No.

3

Appendix A

Second Quarter 2025 Prism Survey

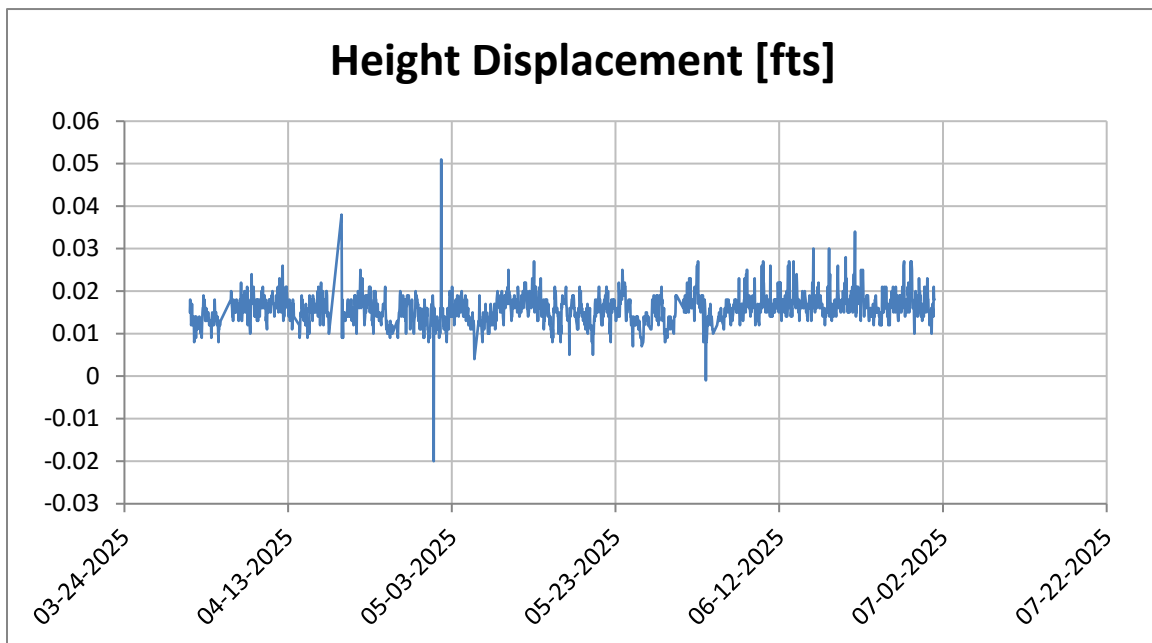
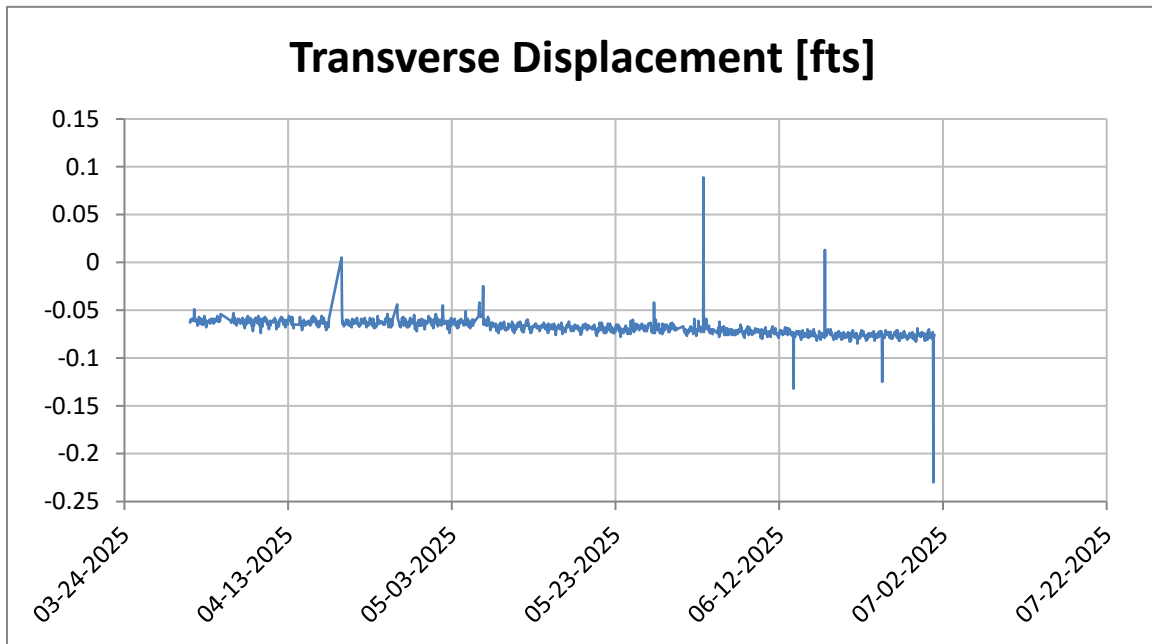
Prism BR4



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.

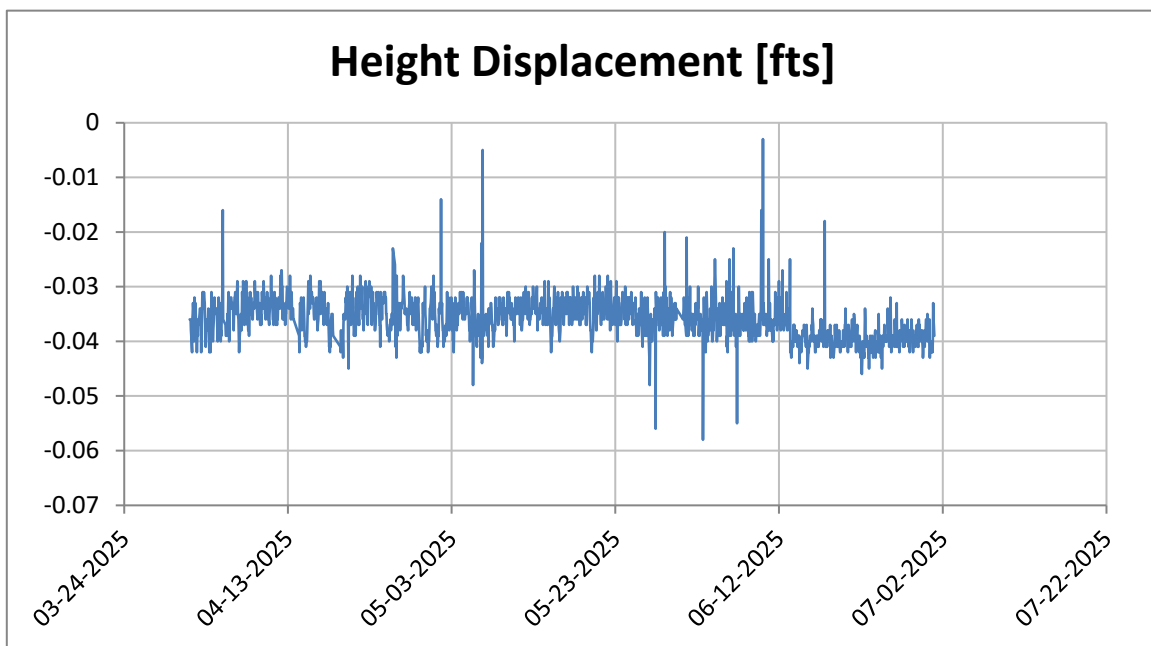
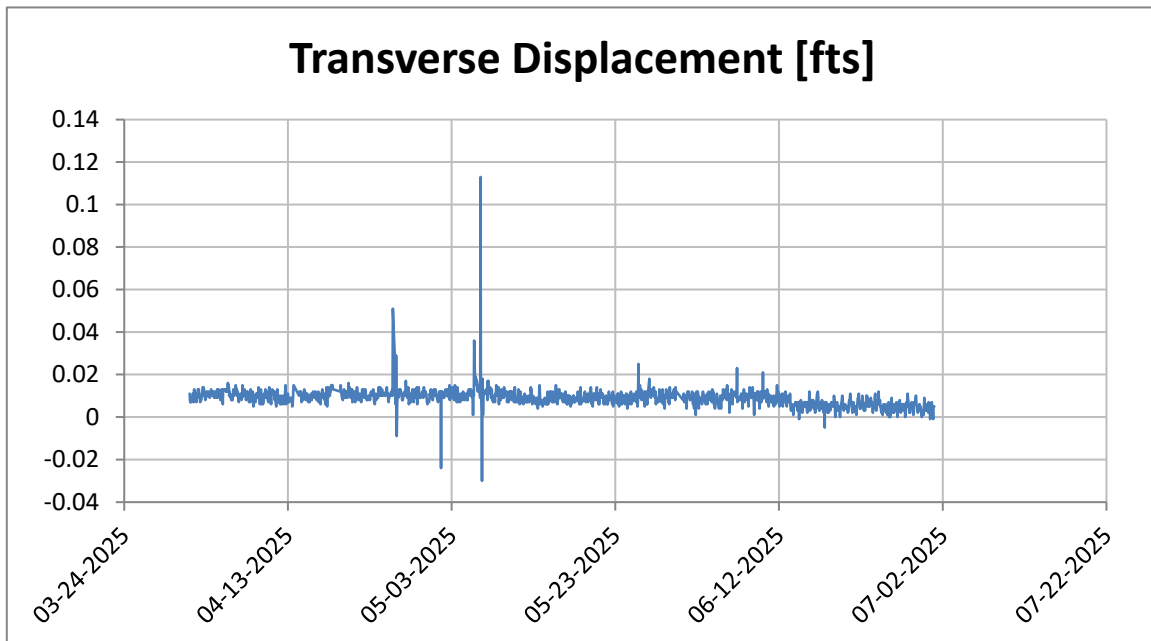
Prism B7200-1



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.

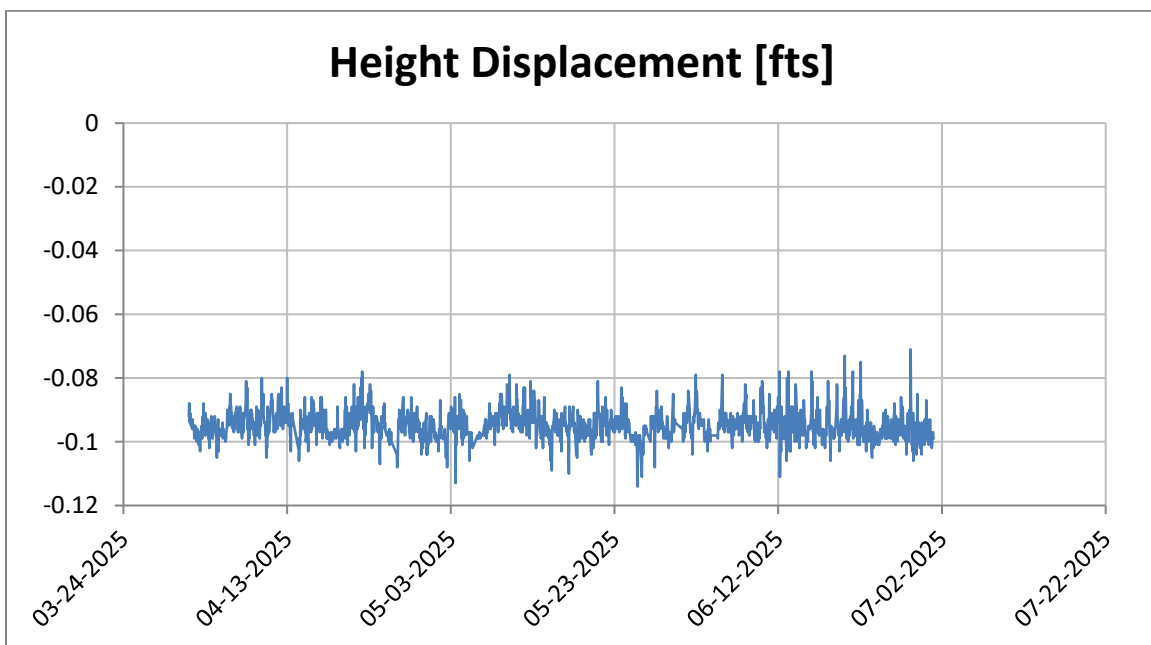
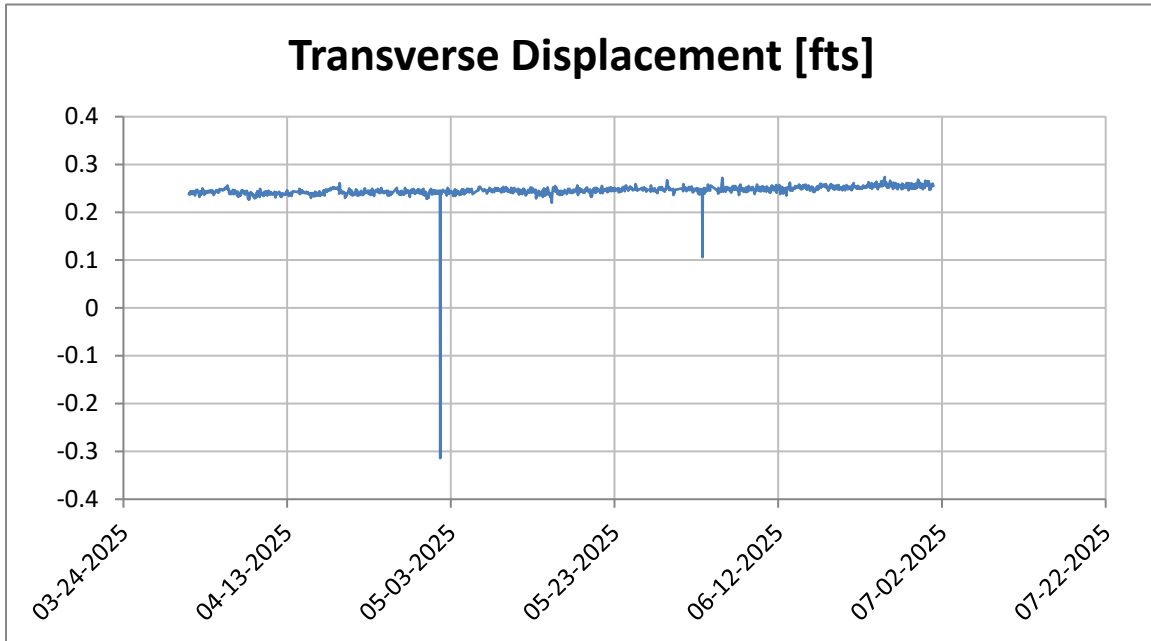
Prism B7200-2



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.

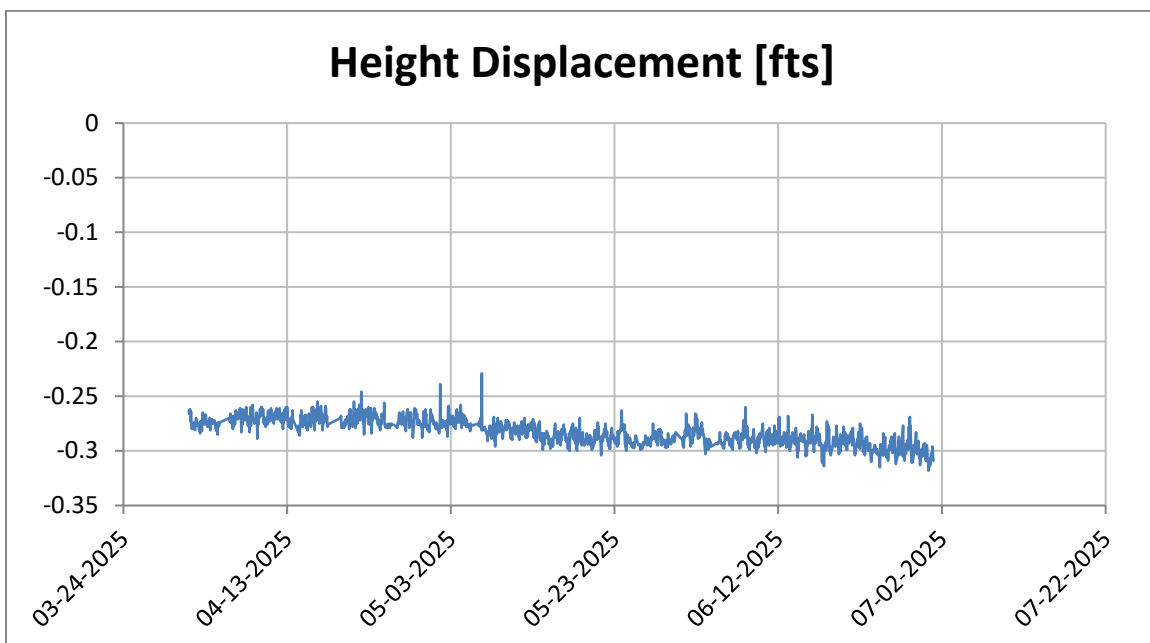
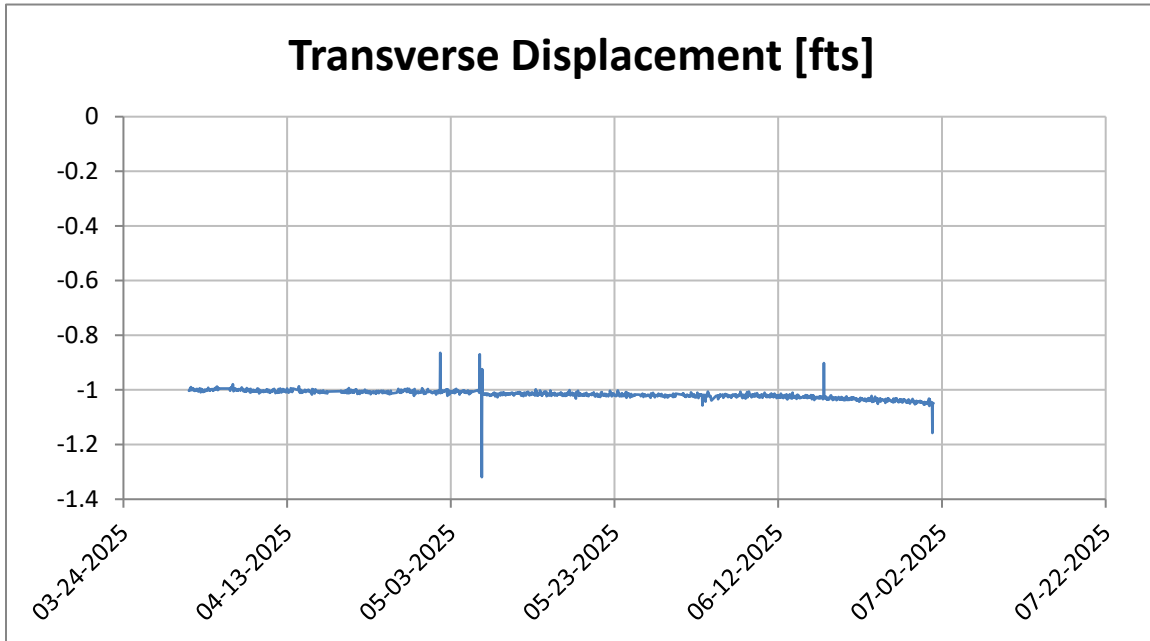
Prism B7200-3



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.

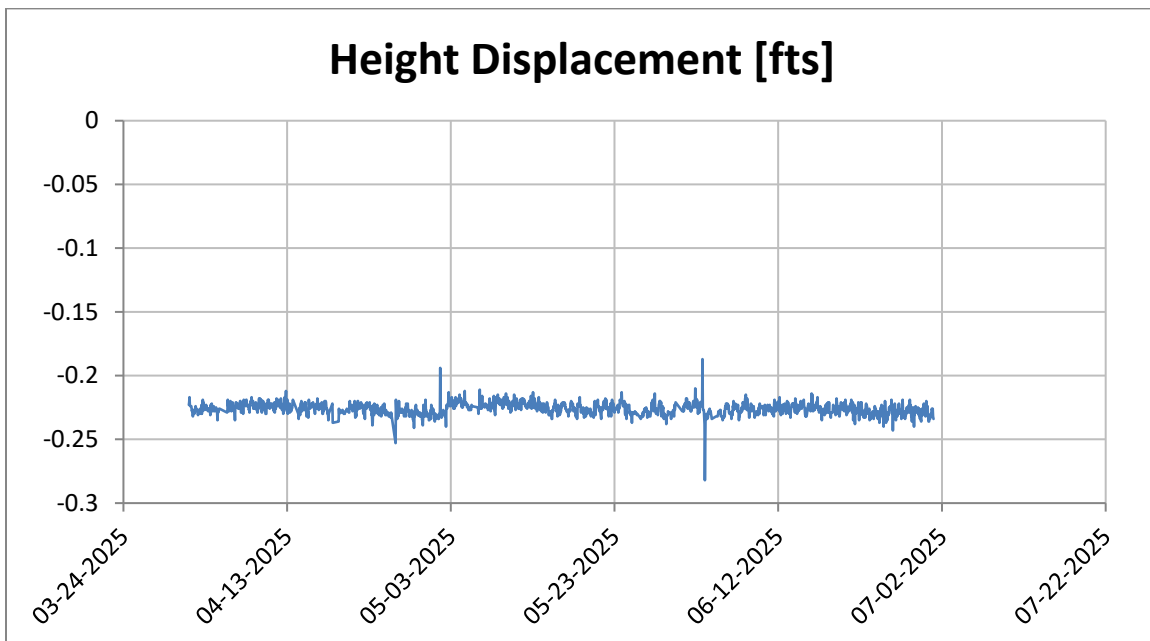
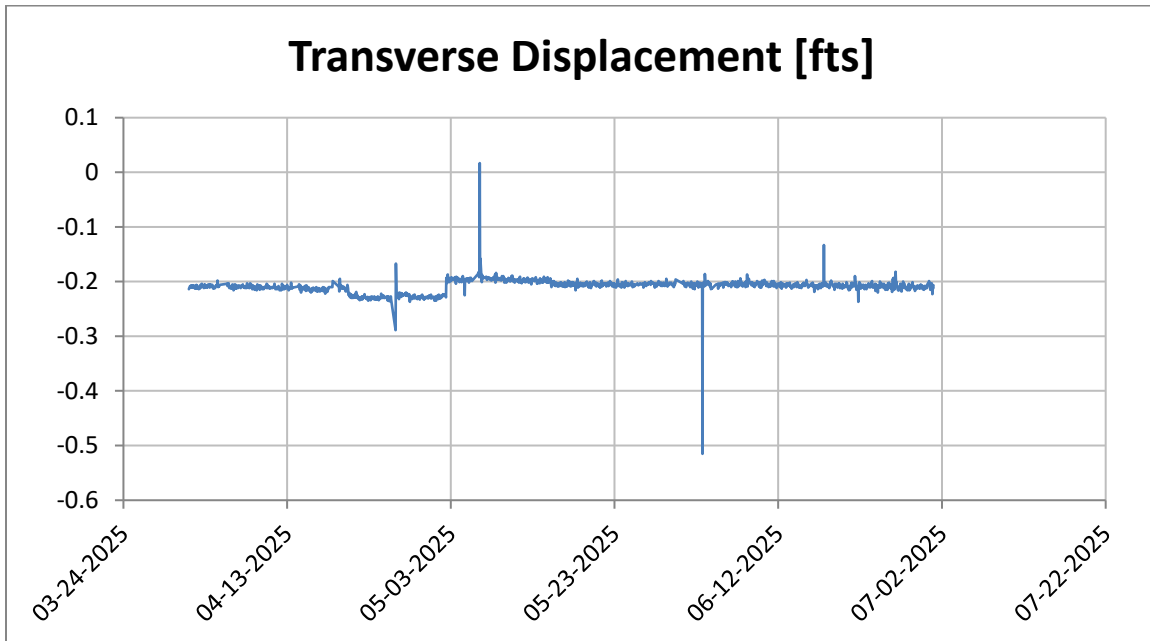
Prism B7300-0



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.

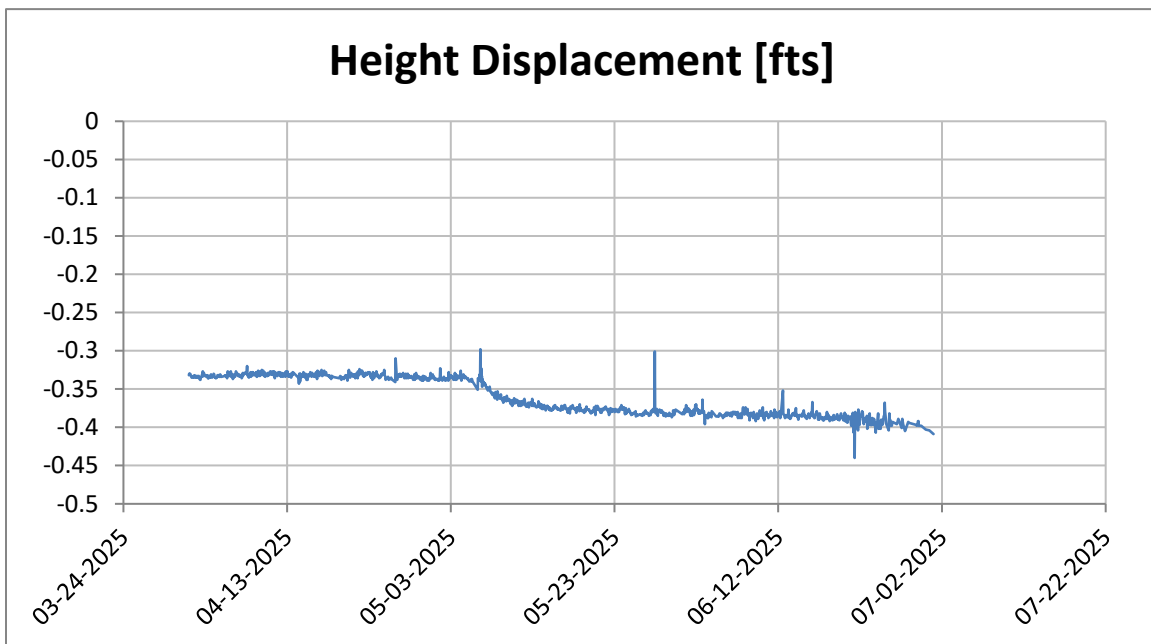
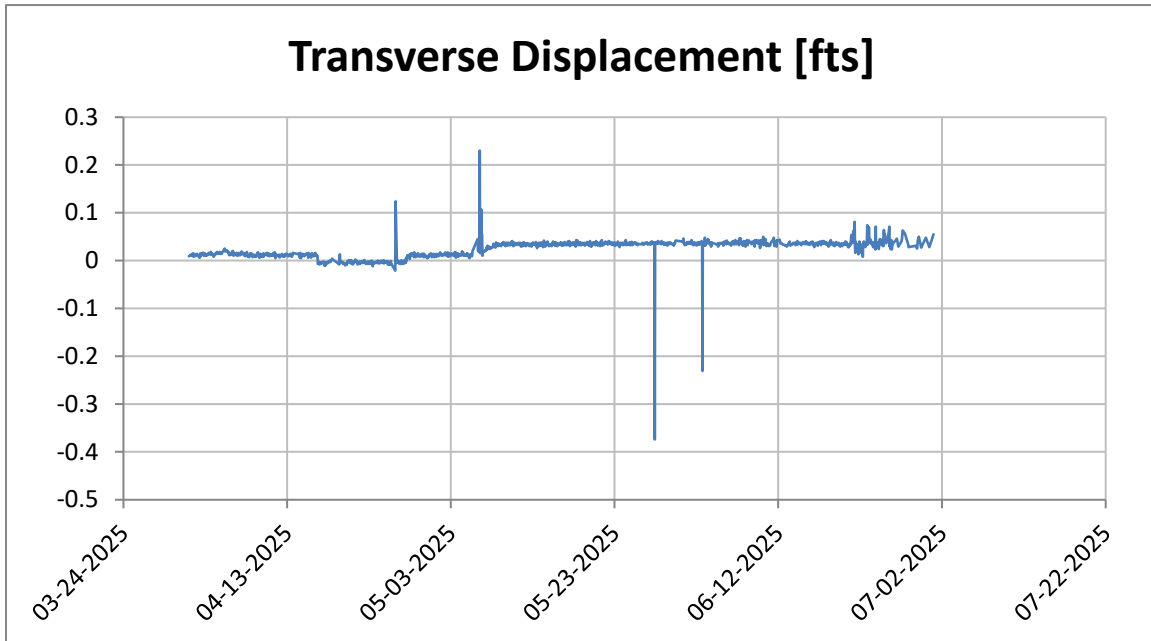
Prism B7300-1



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.

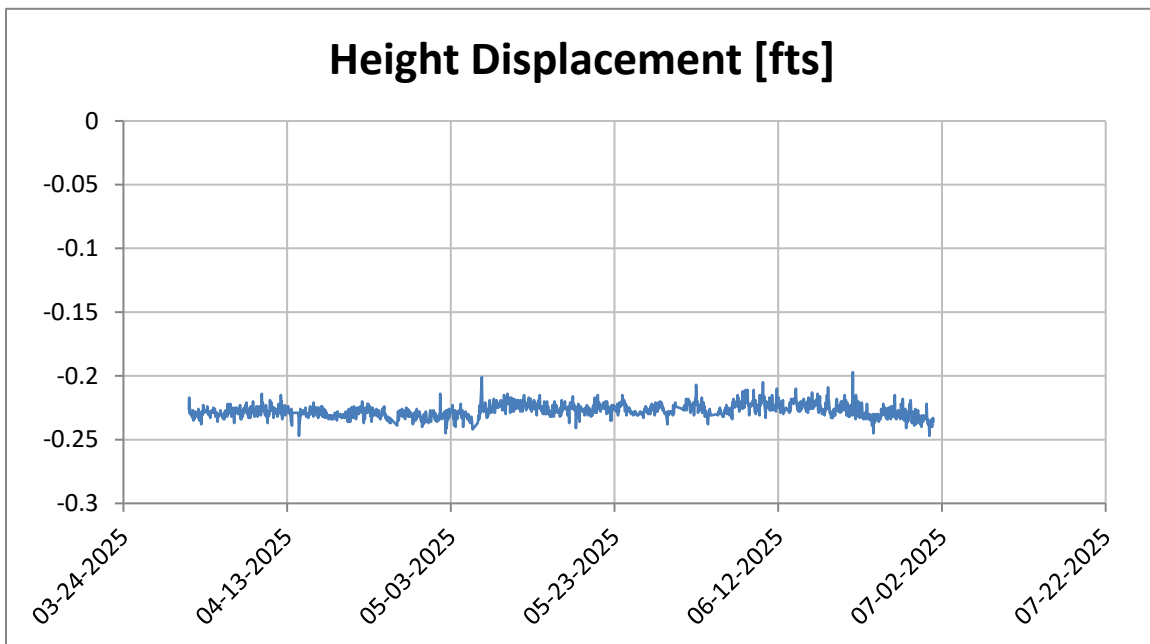
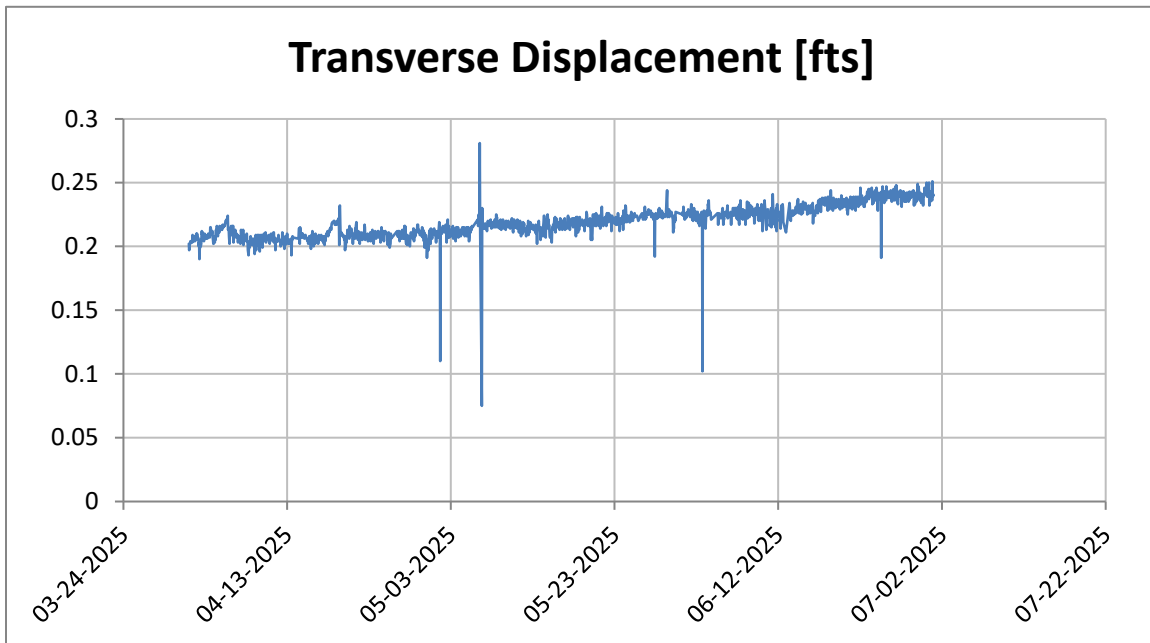
Prism B7300-2



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. No readings from June 25 to July 7.

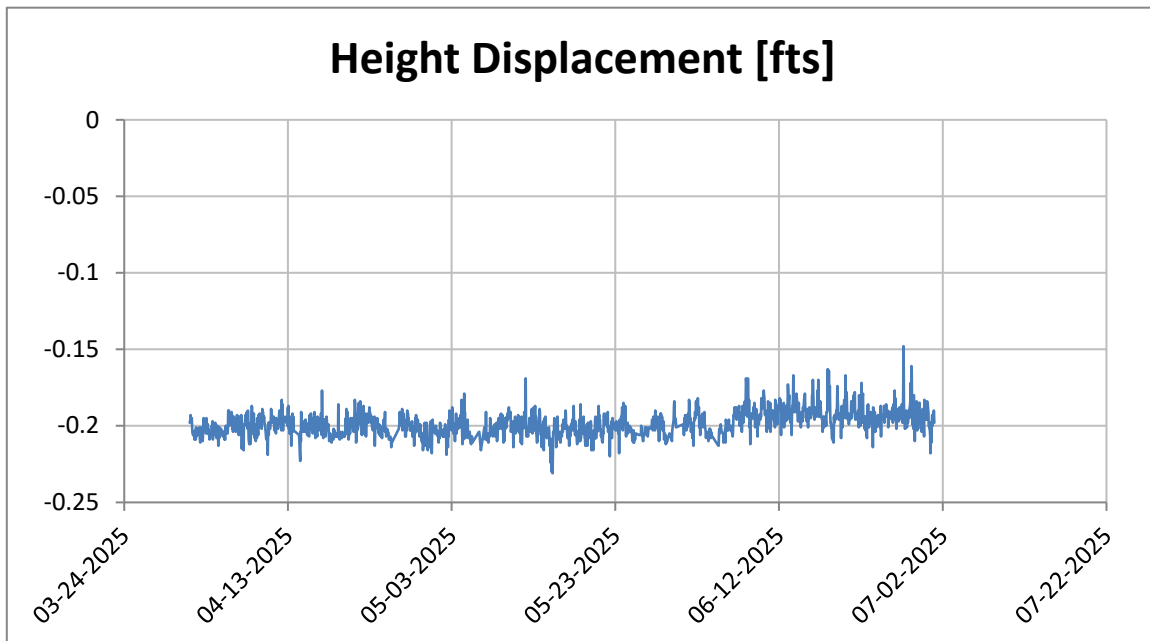
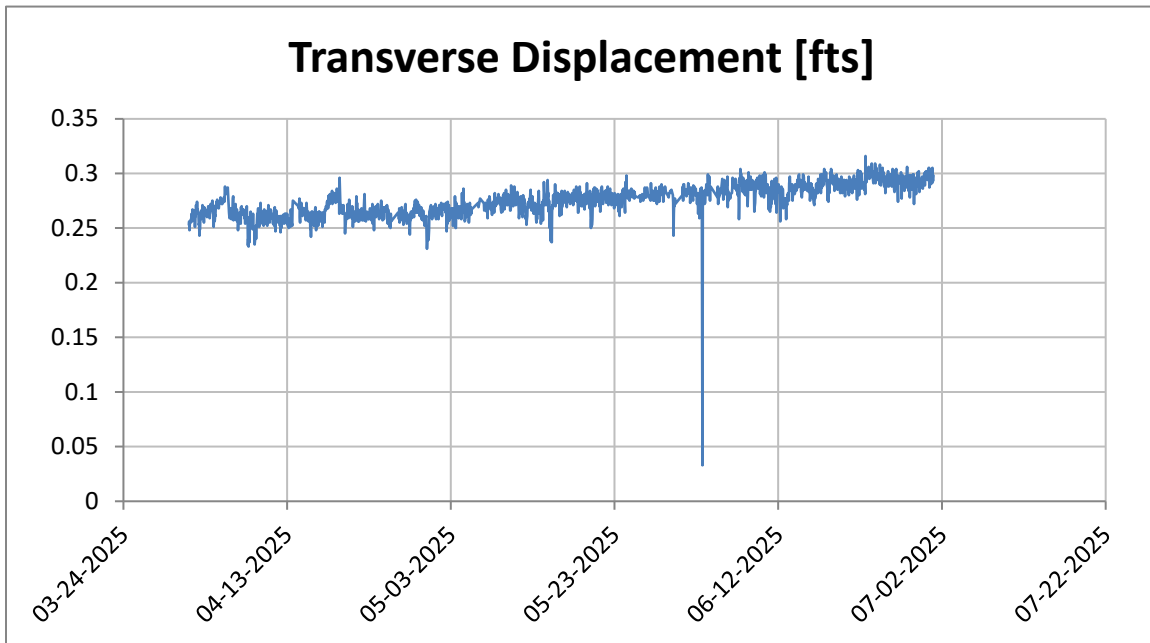
Prism B7300-3



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.

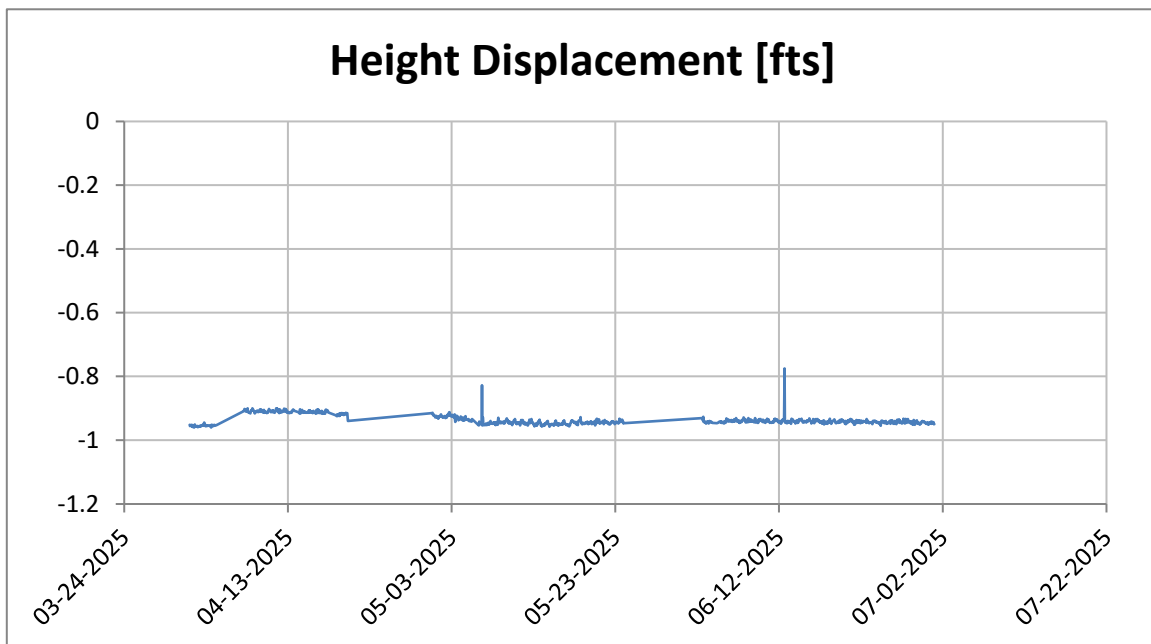
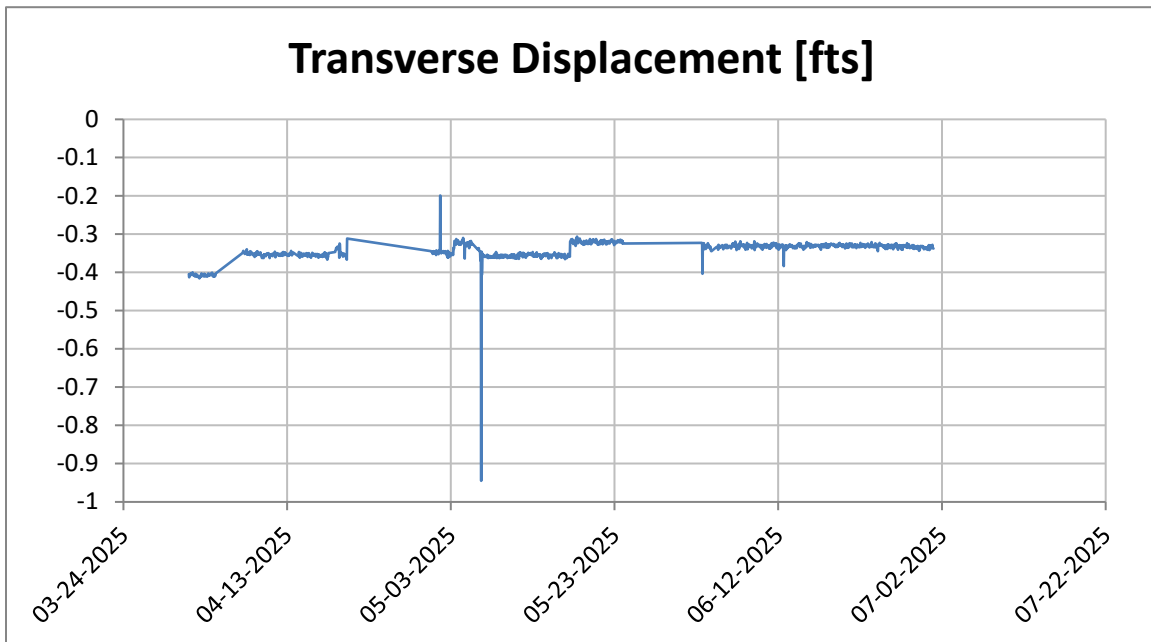
Prism B7300-4



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.

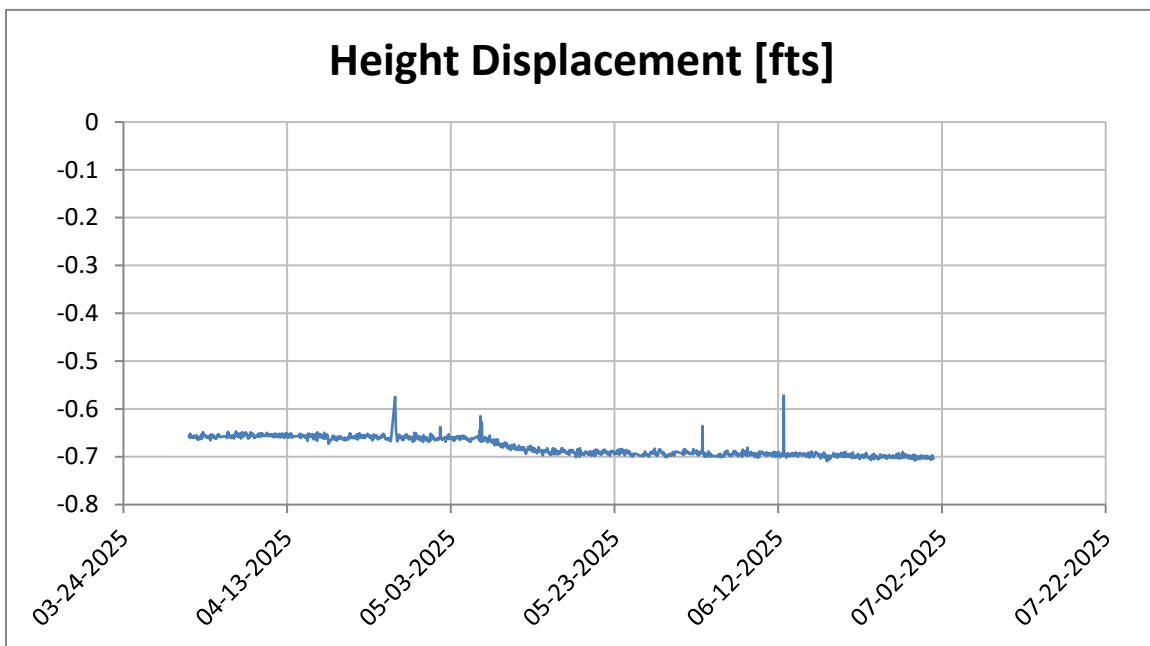
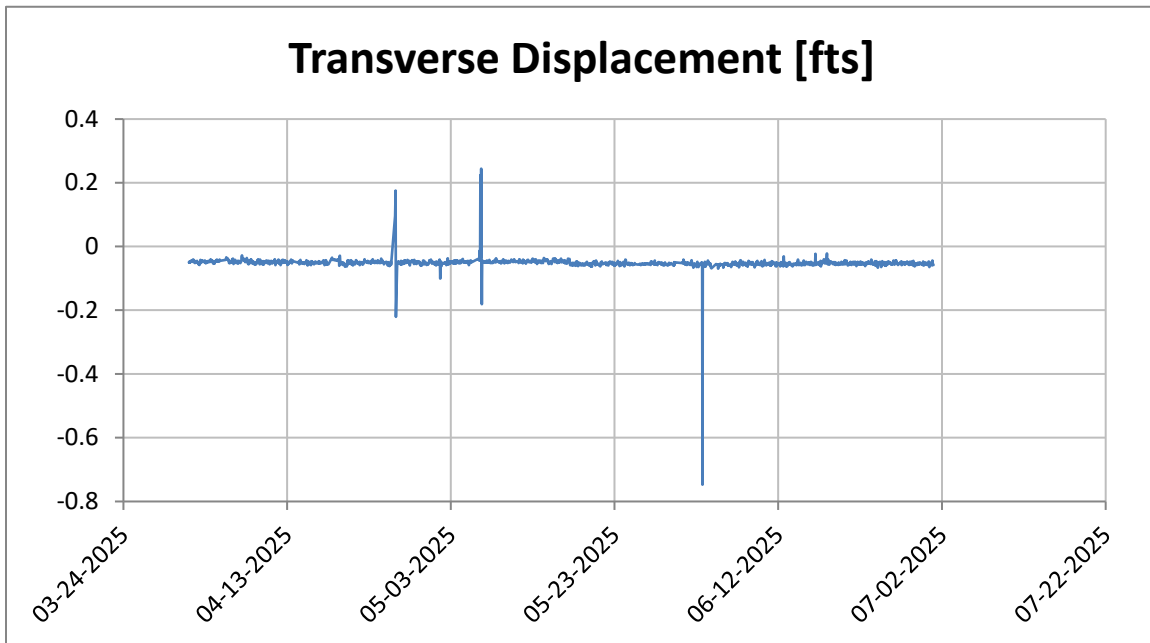
Prism B7400-1



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. Data gaps April 4 to 7, April 20 to 30, and May 24 to June 4.

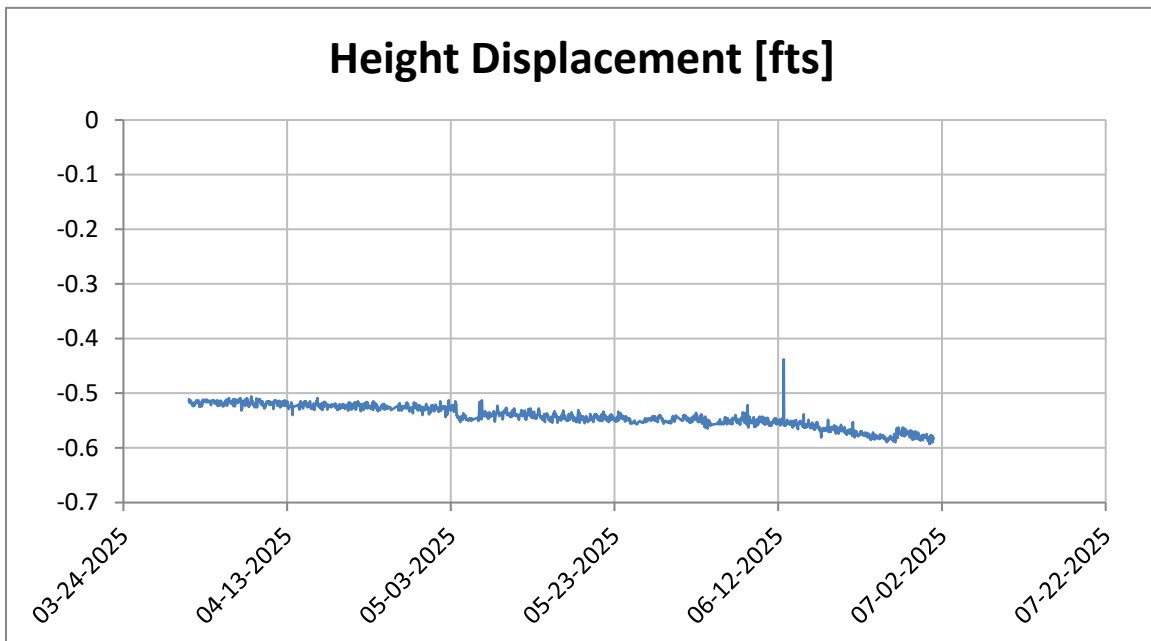
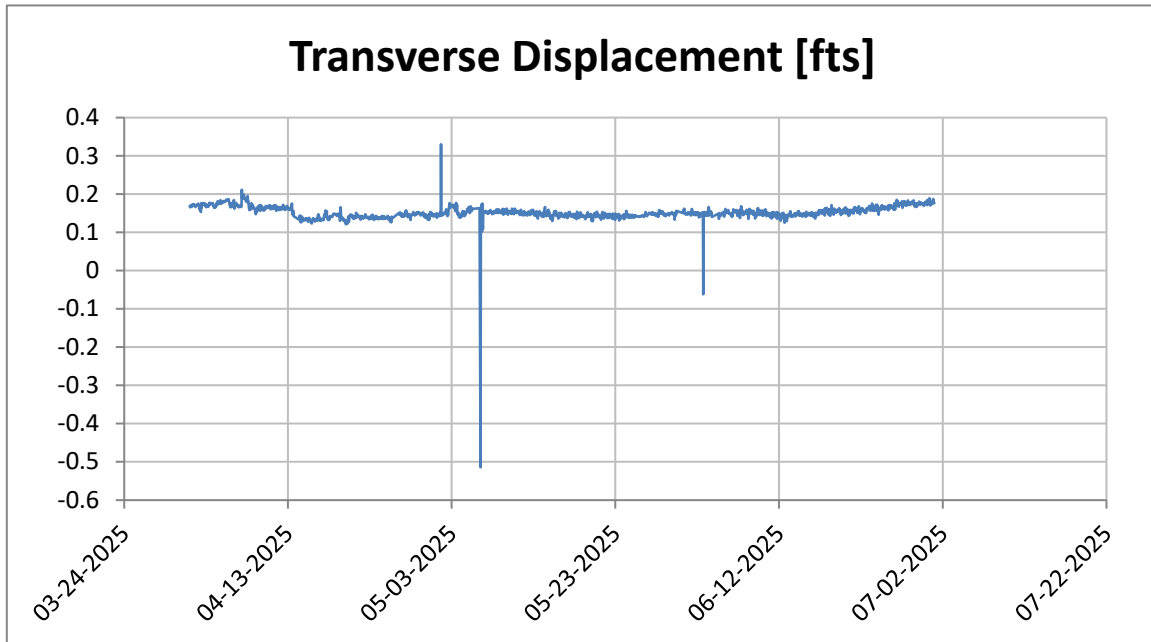
Prism B7400-2



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.

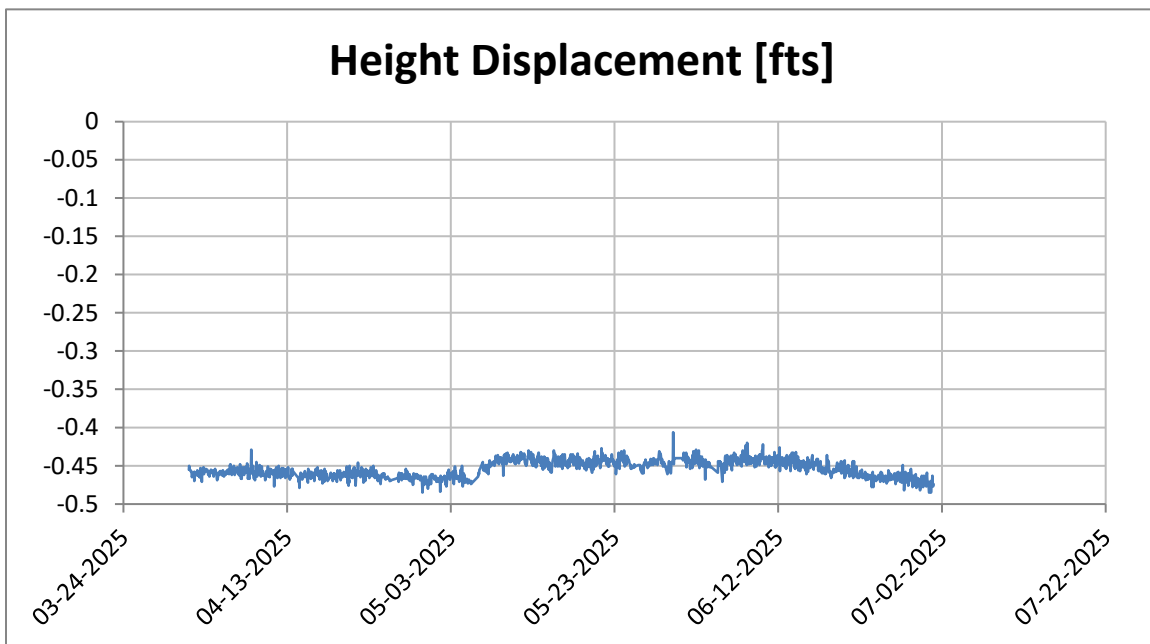
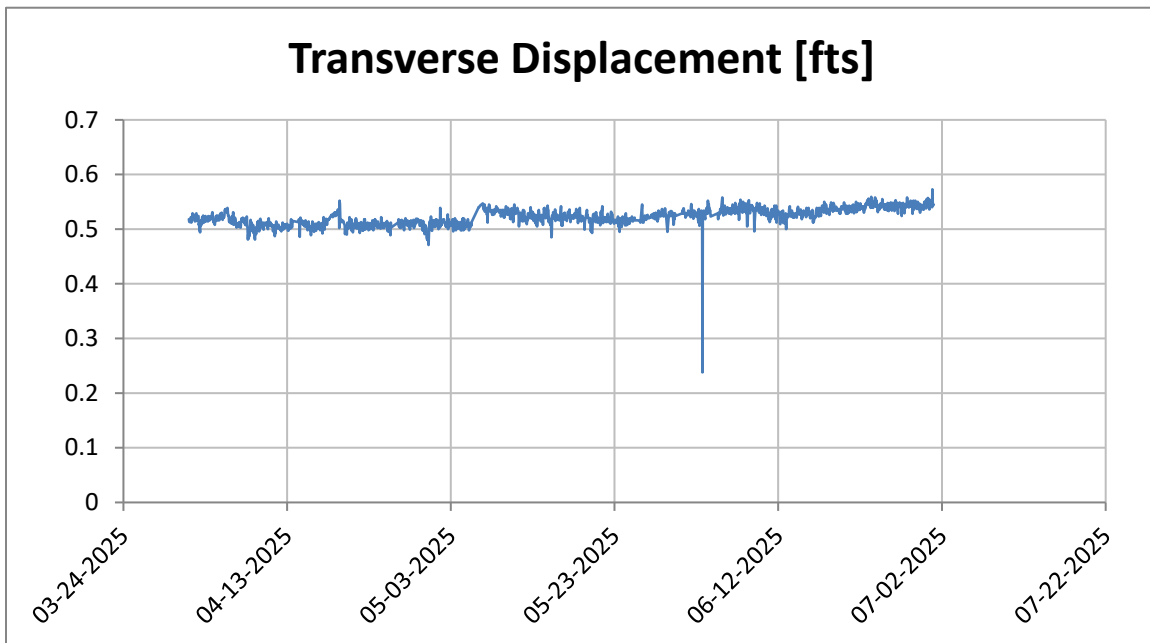
Prism B7400-3



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.

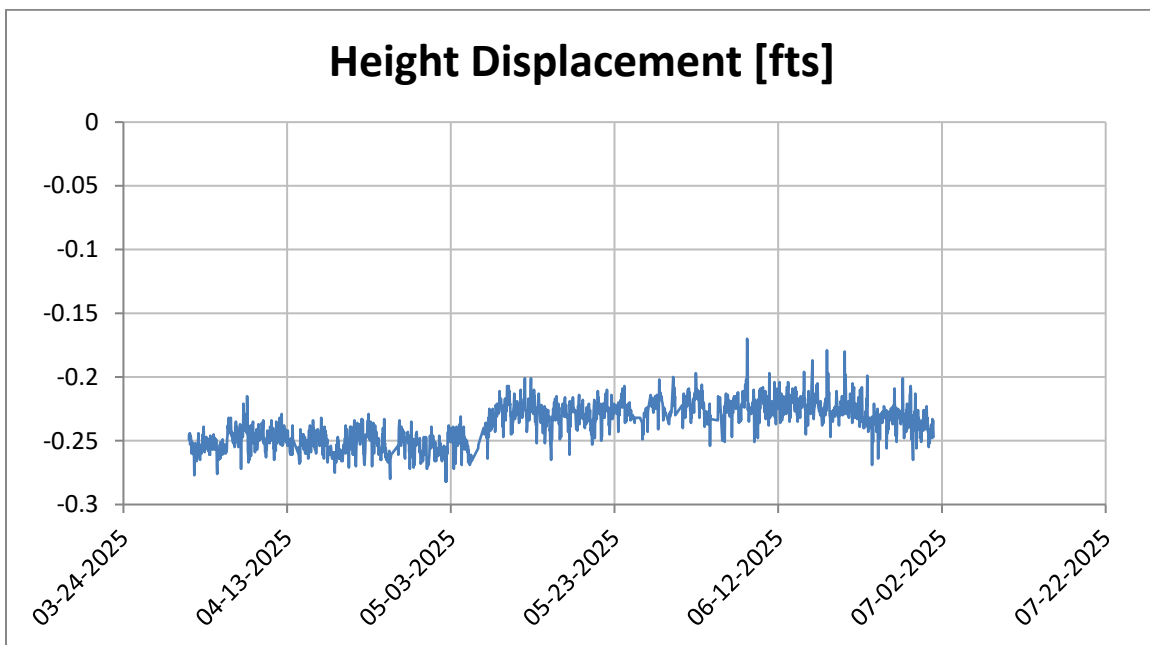
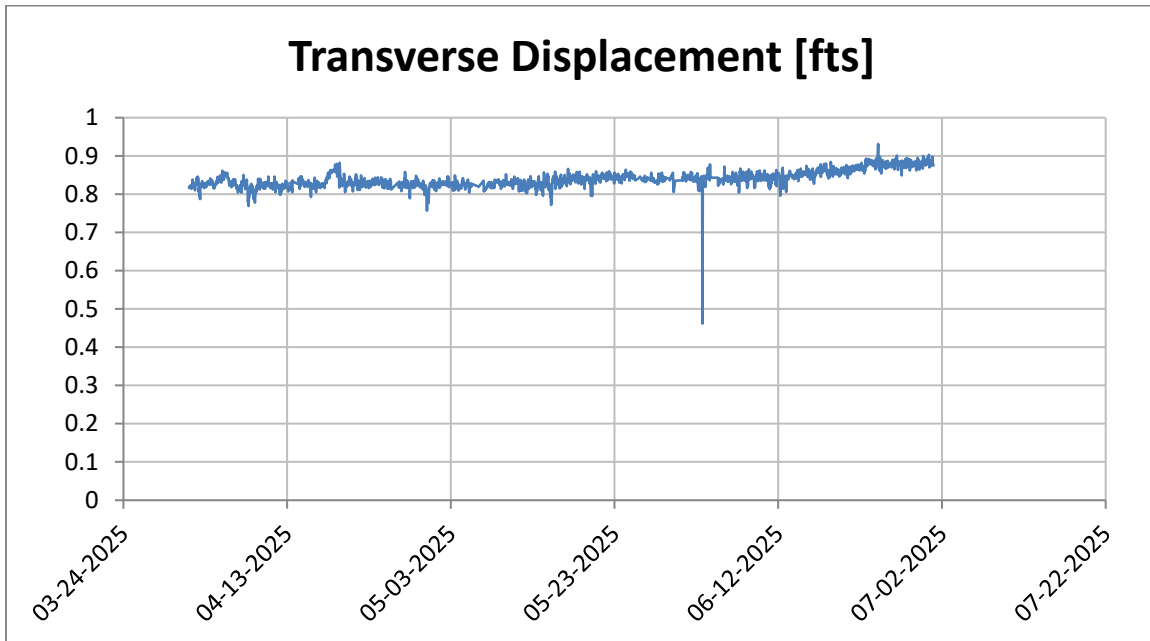
Prism B7400-4



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.

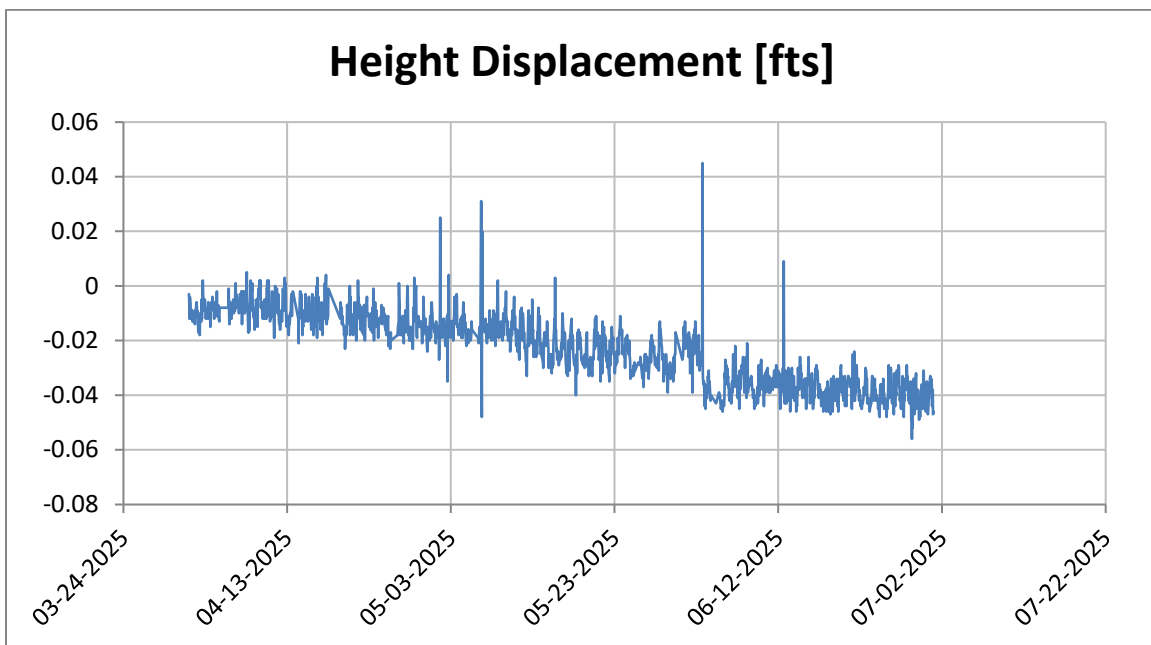
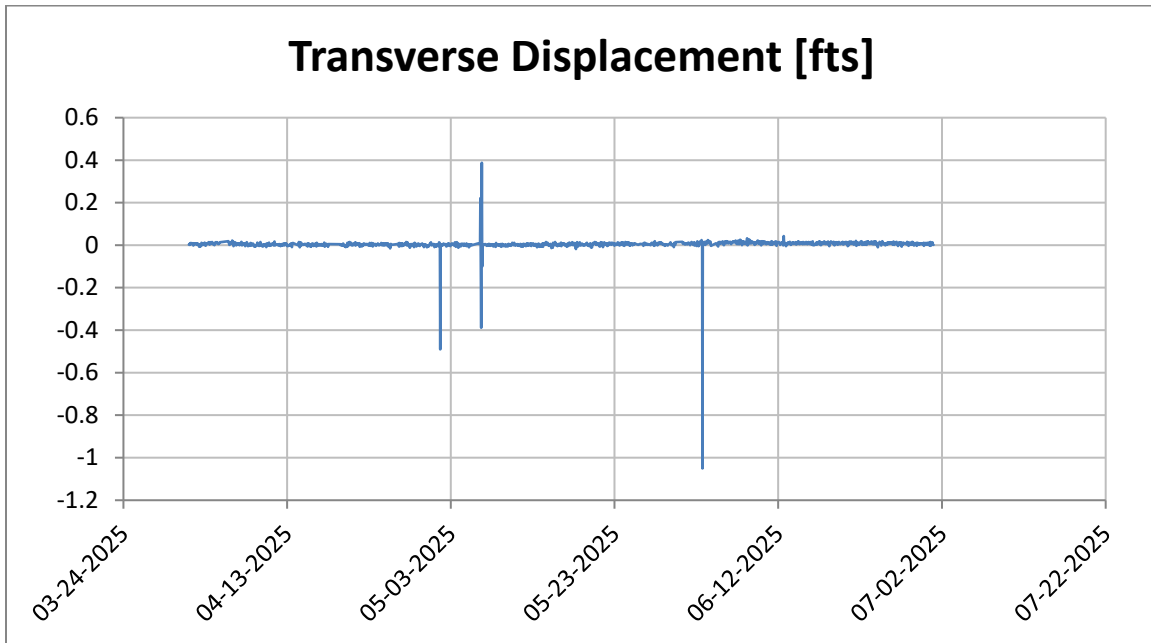
Prism B7400-5



Notes:

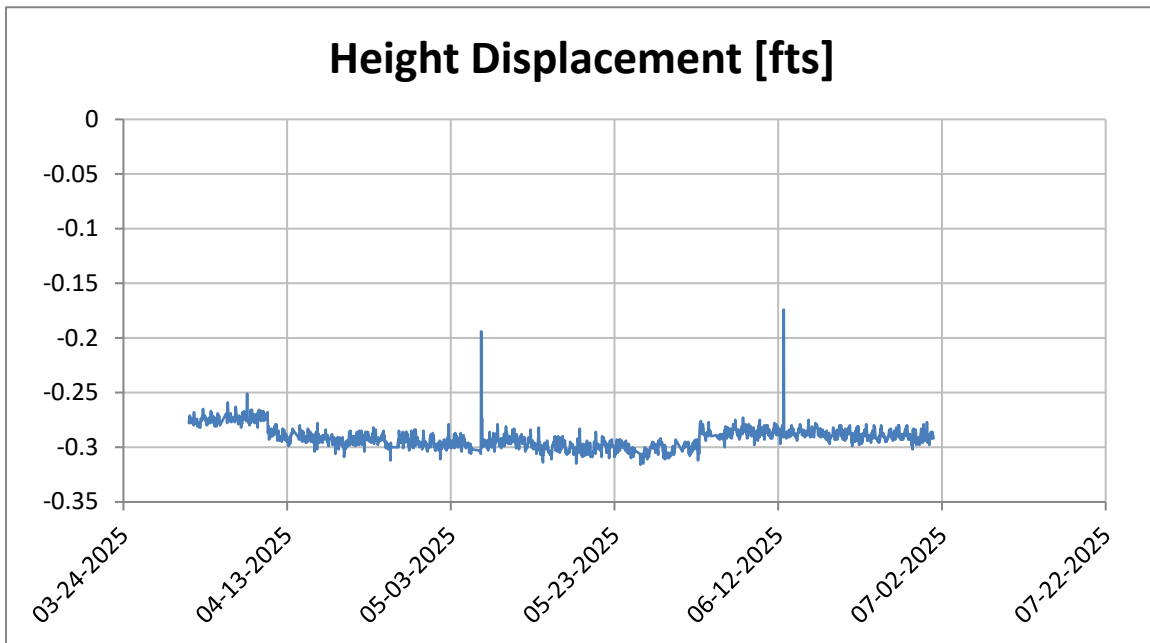
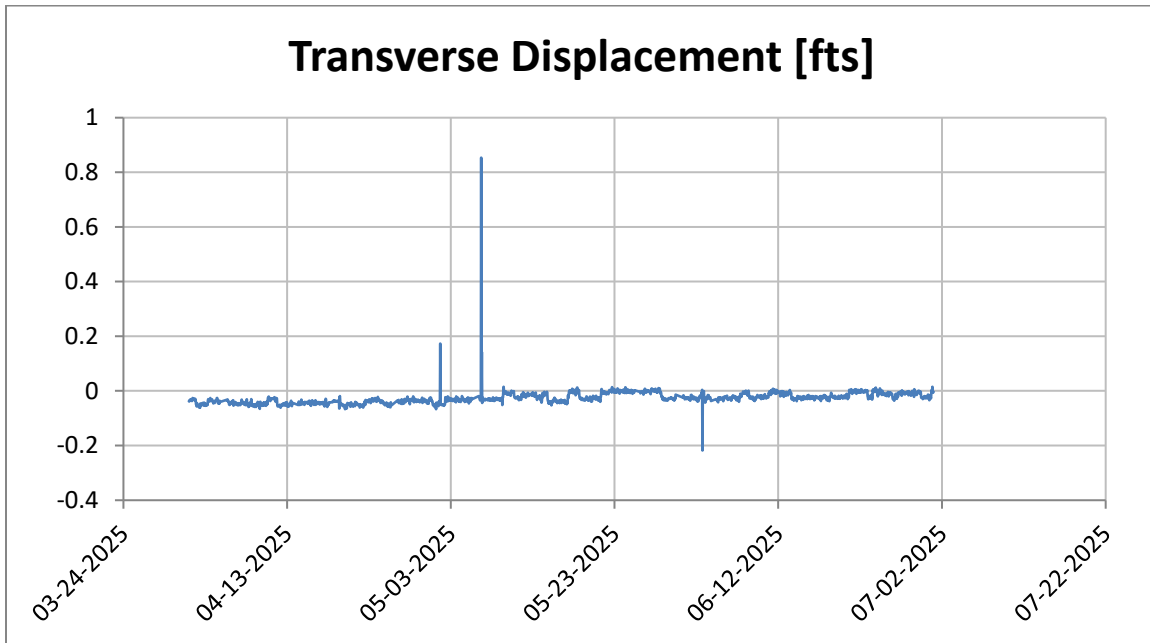
1. Survey accuracy is ± 0.016 feet.
2. Alert threshold is ± 0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.

B7500-1R

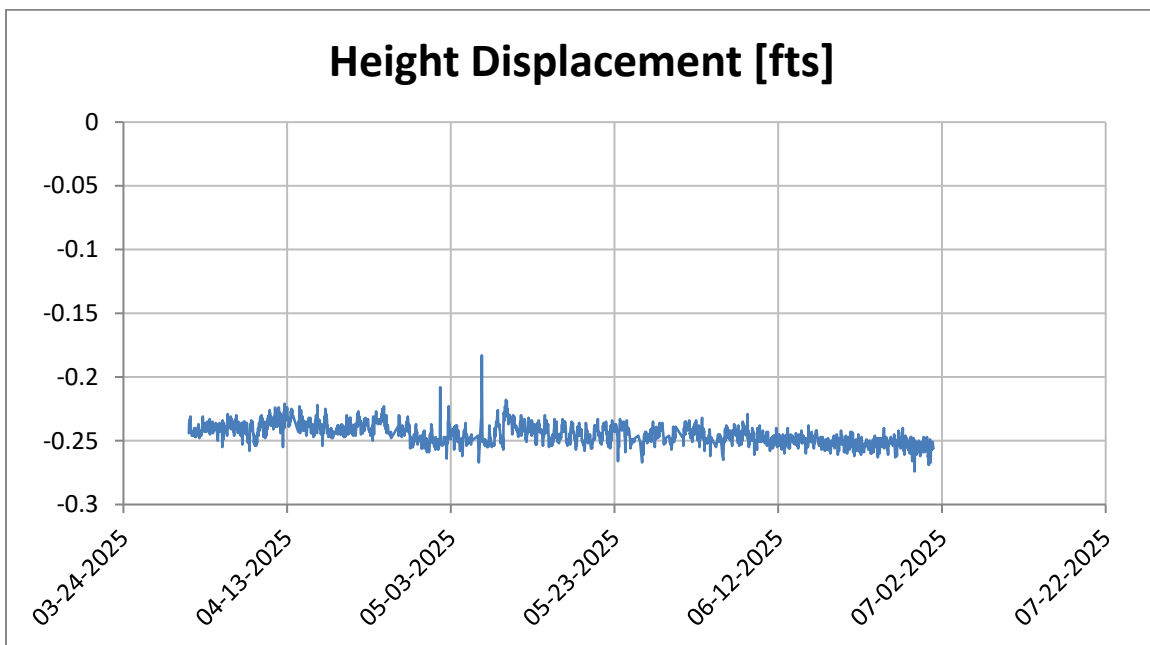
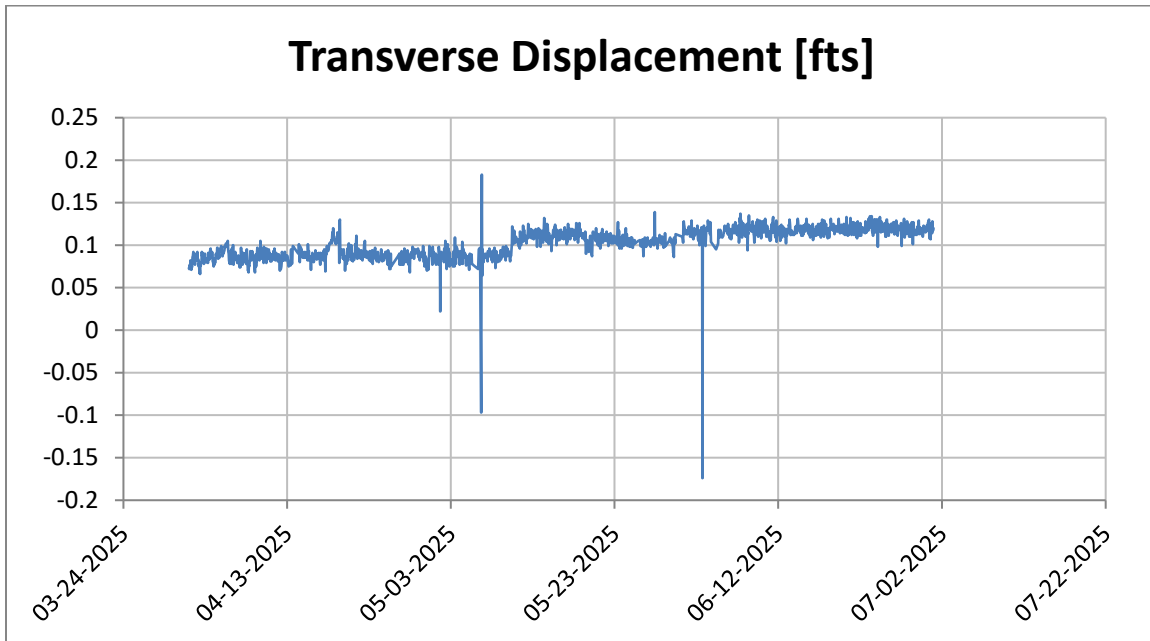


Notes:

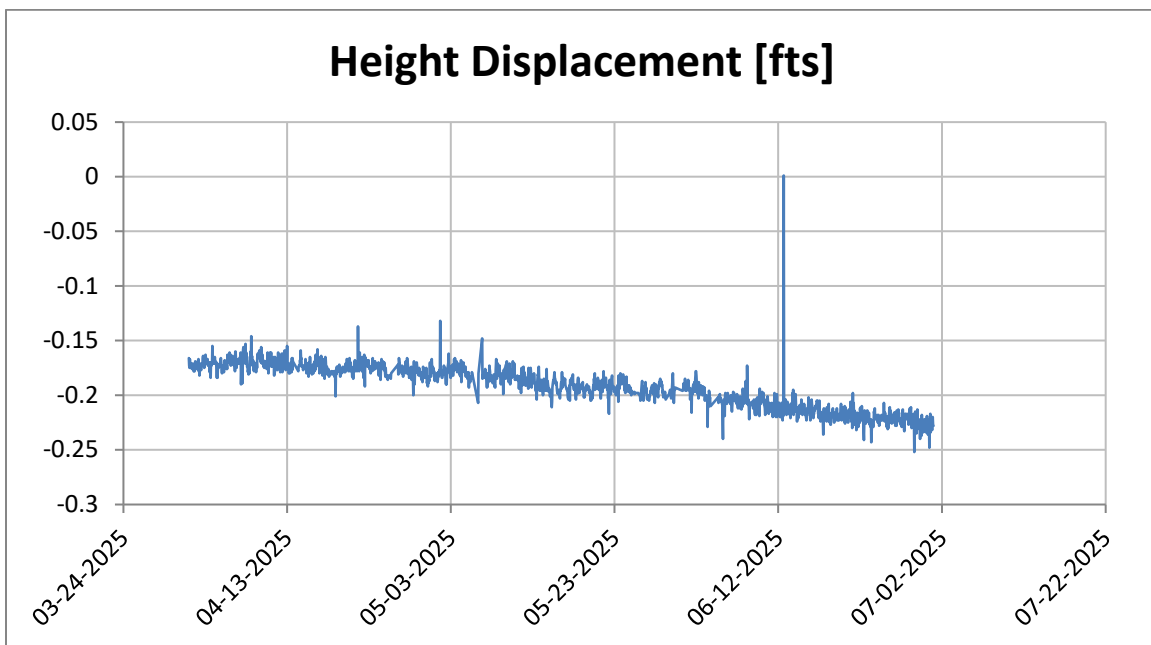
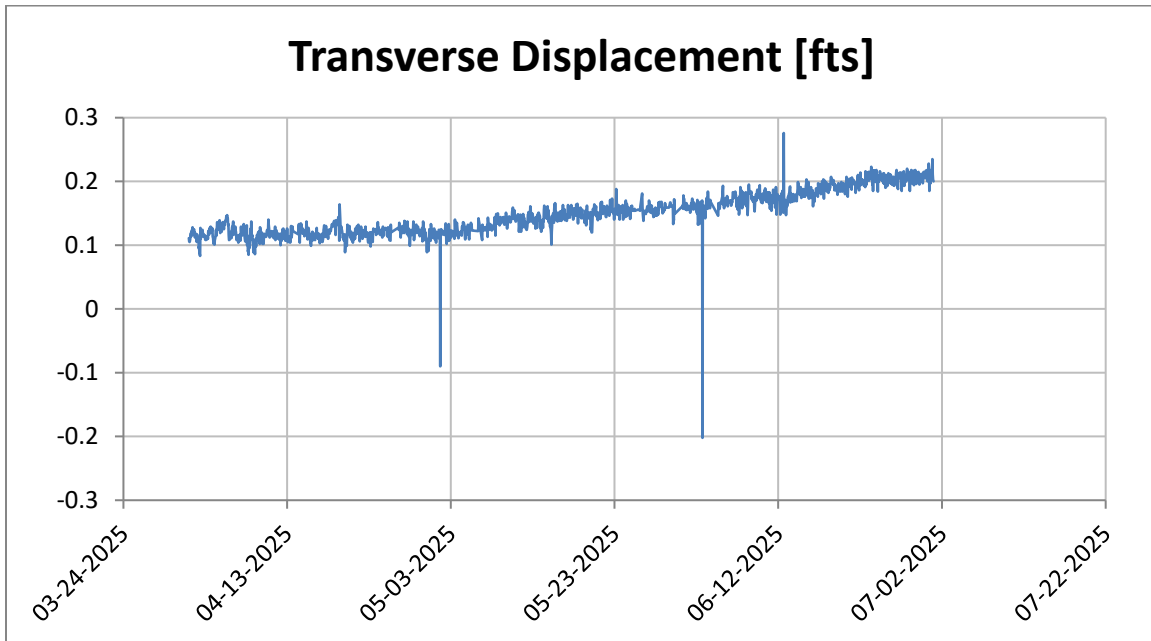
1. Survey accuracy is ± 0.016 feet.
2. Alert threshold is ± 0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism was replaced on January 16, 2025, and renamed as P7500-1R. Displacement recorded that day is from the repairs and not attributed to slope movement.

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.

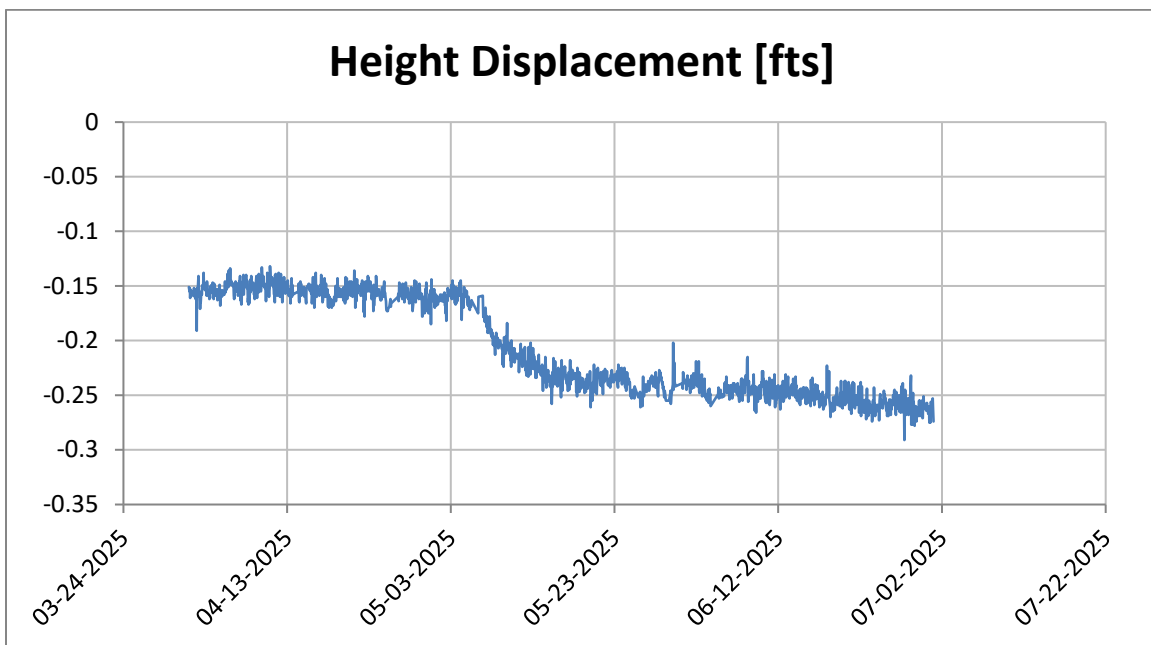
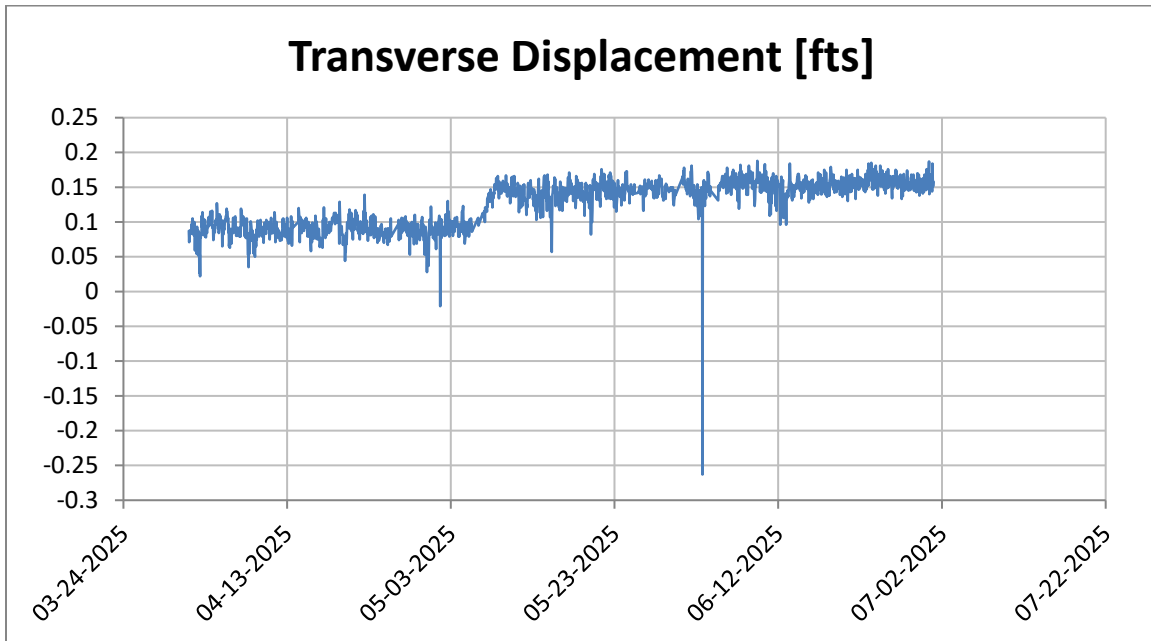
B7500-3**Notes:**

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.

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.

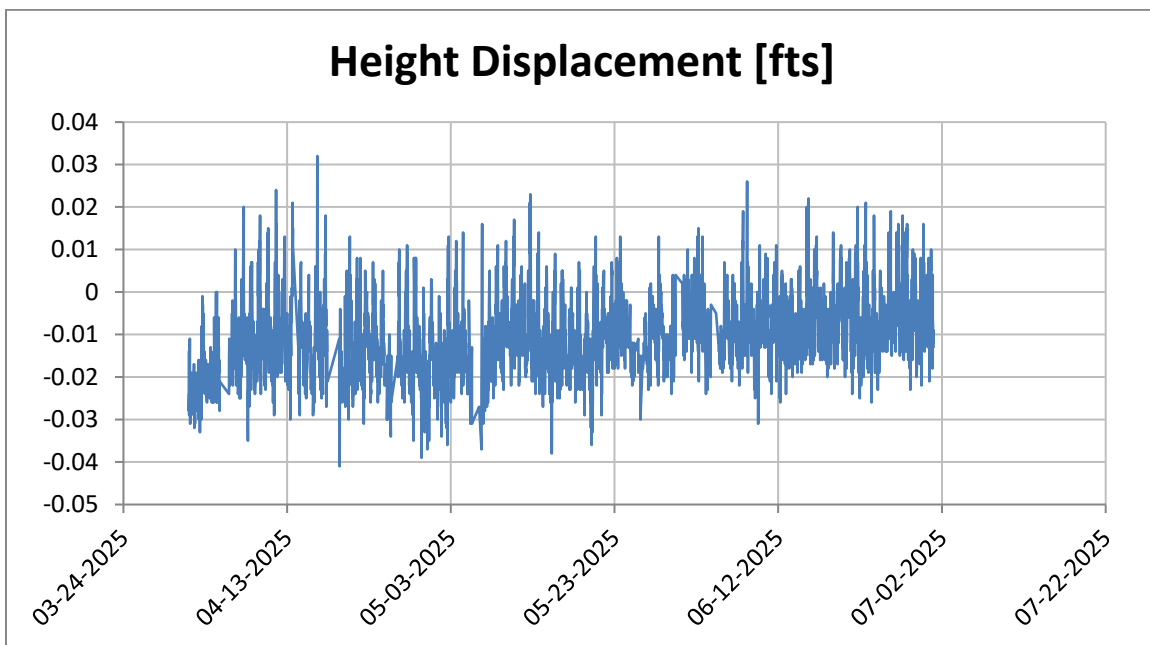
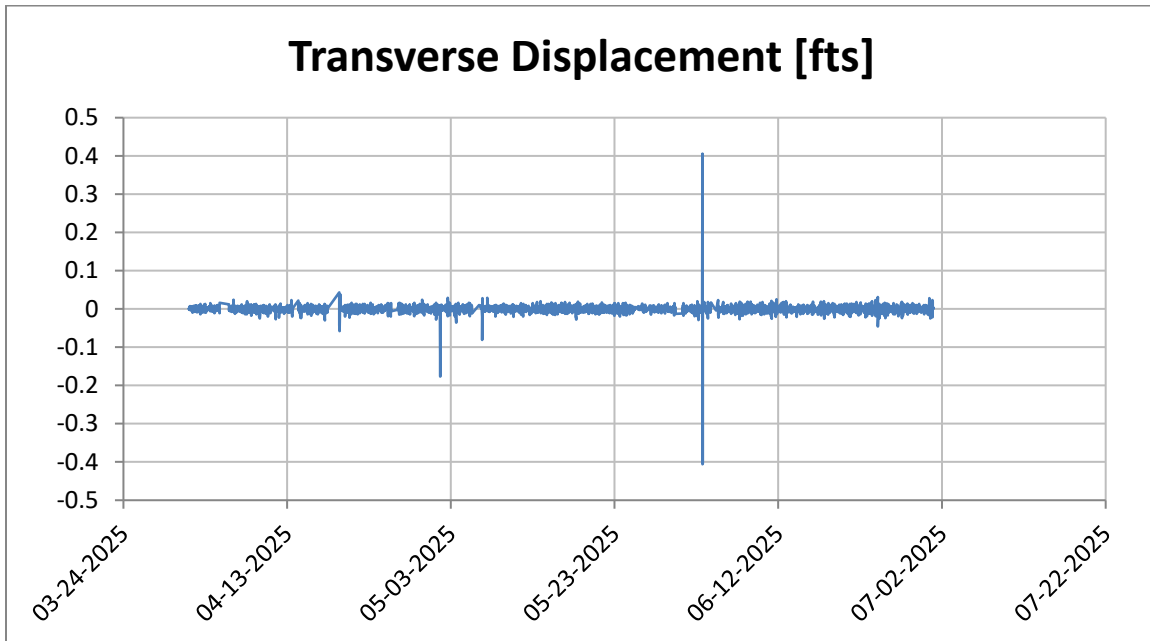
B7500-5



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

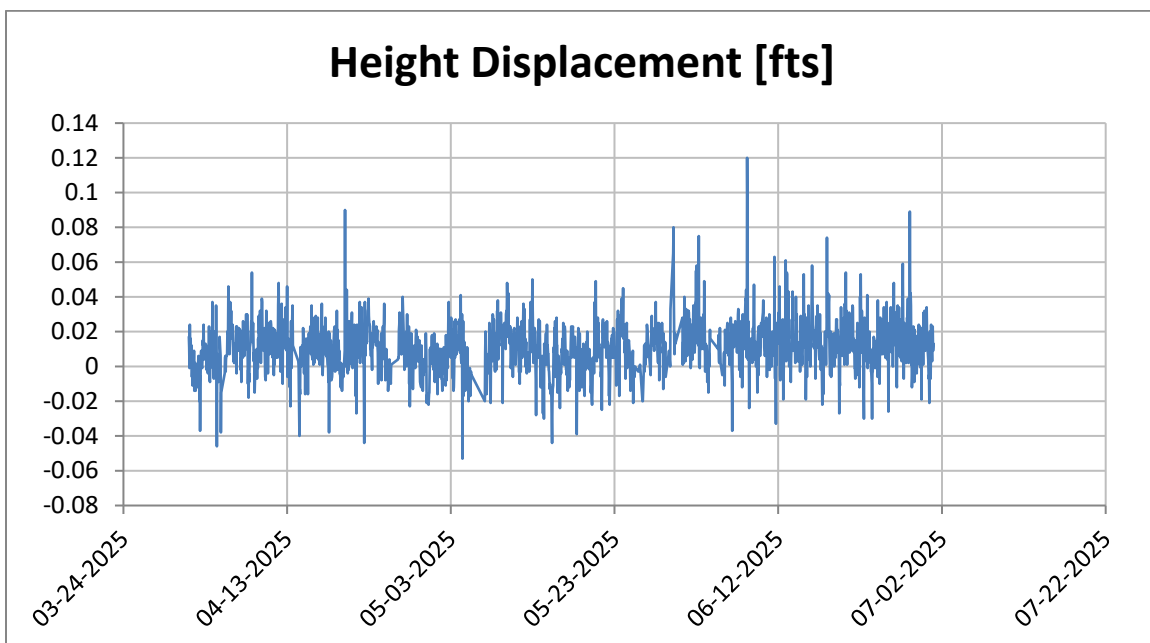
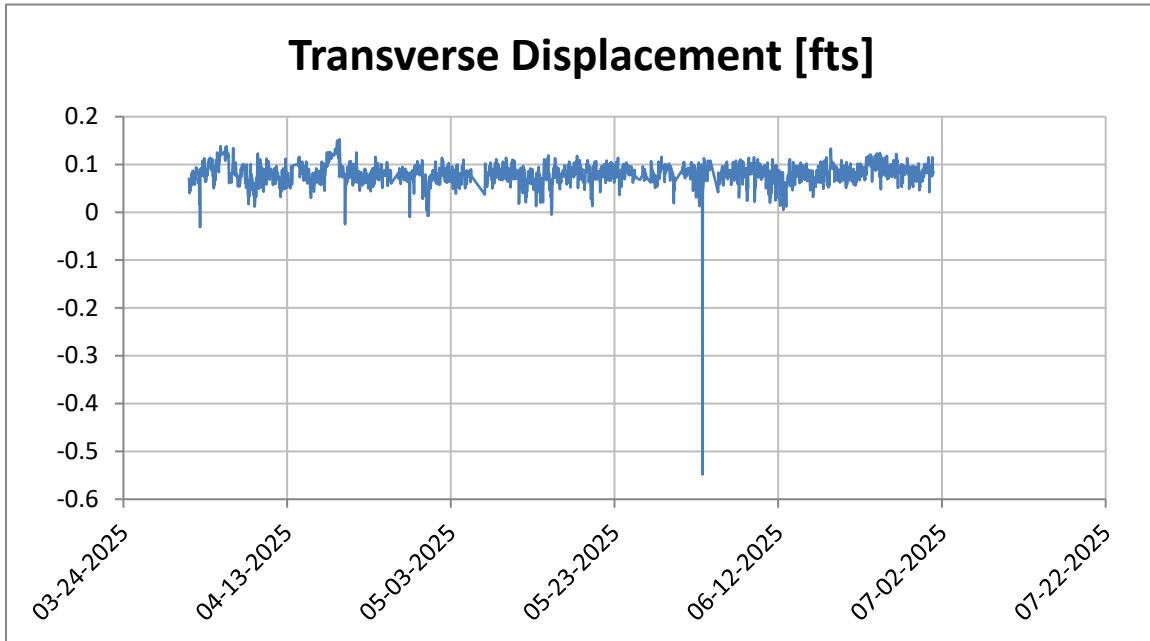
Prism CP6



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.

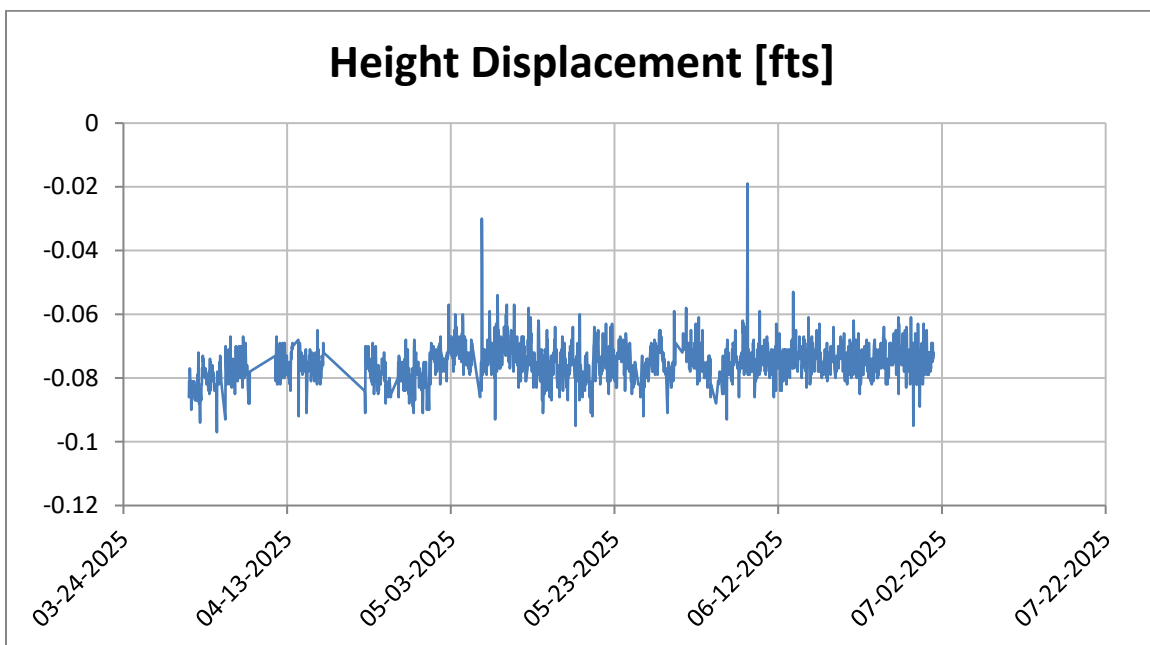
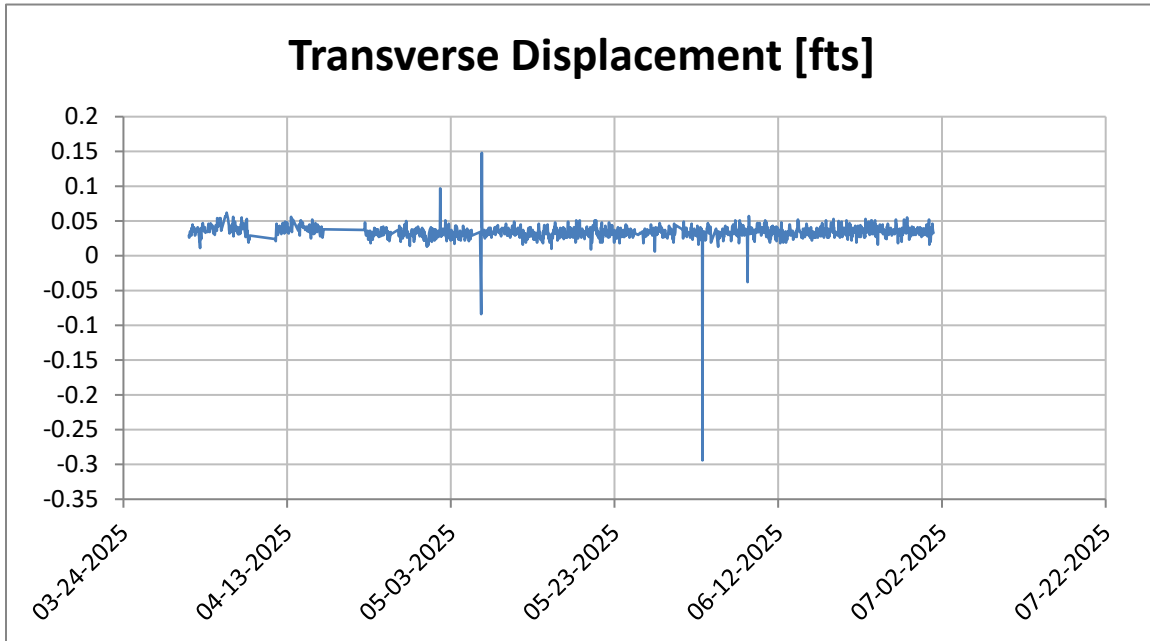
Prism CP7



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.

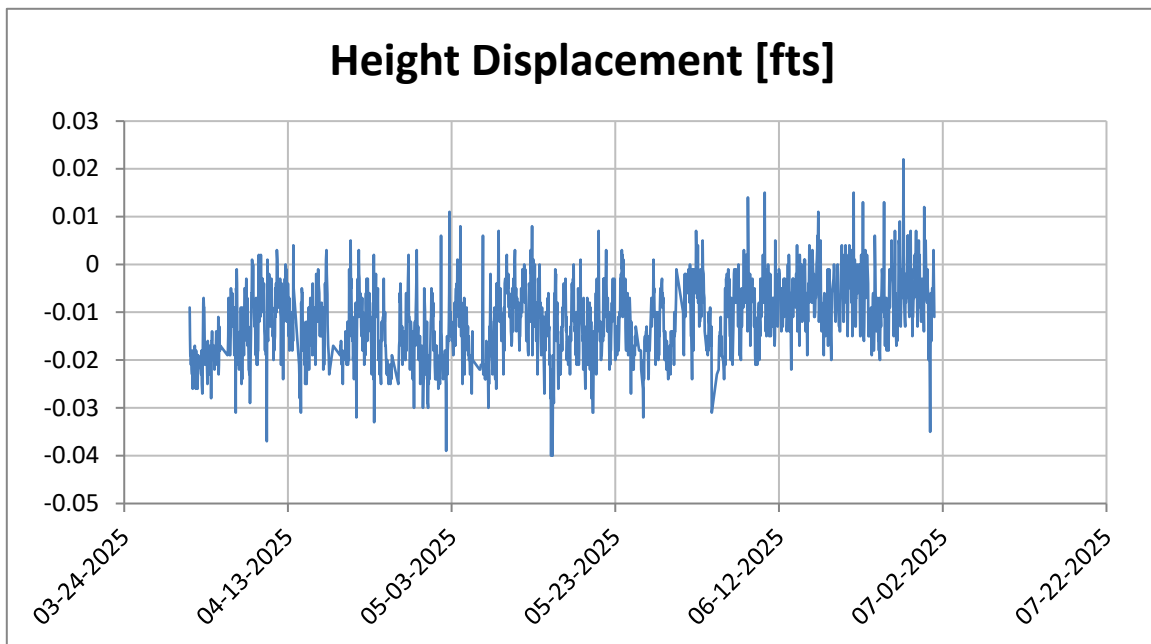
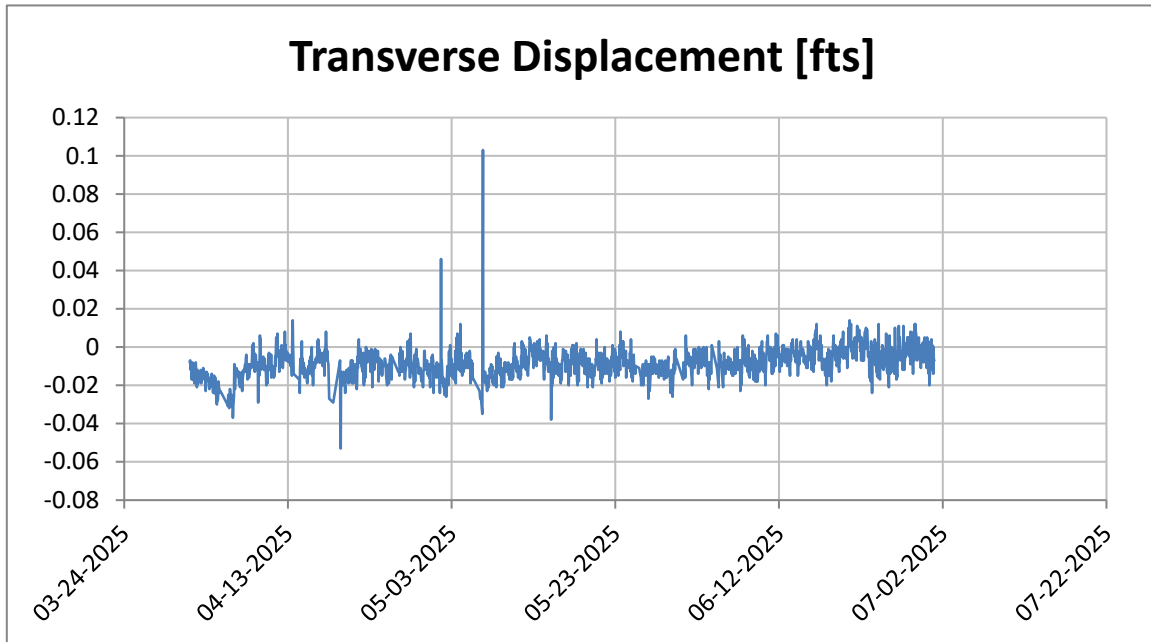
Prism NP4



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. Data gaps from April 8 to 11 and April 17 to 22.

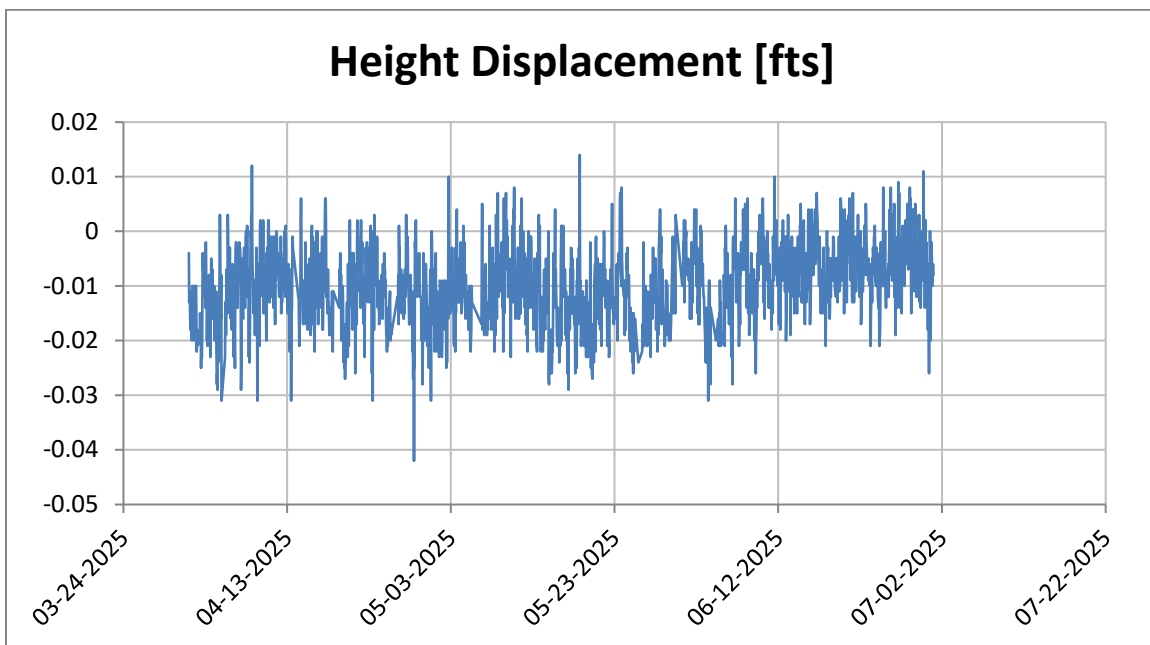
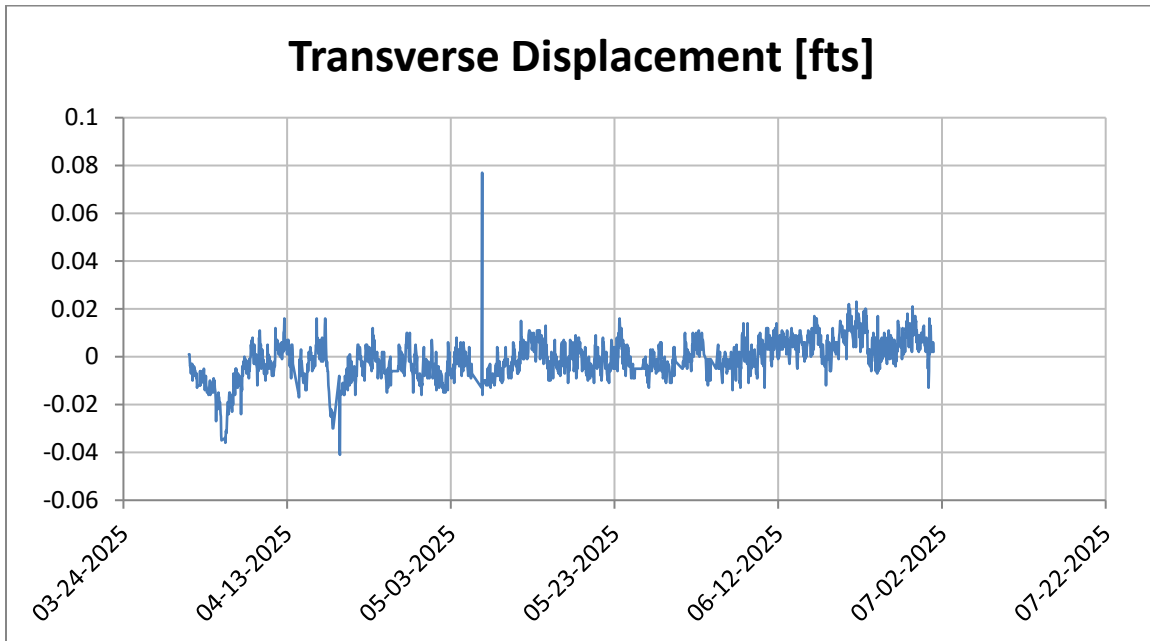
Prism P2



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.

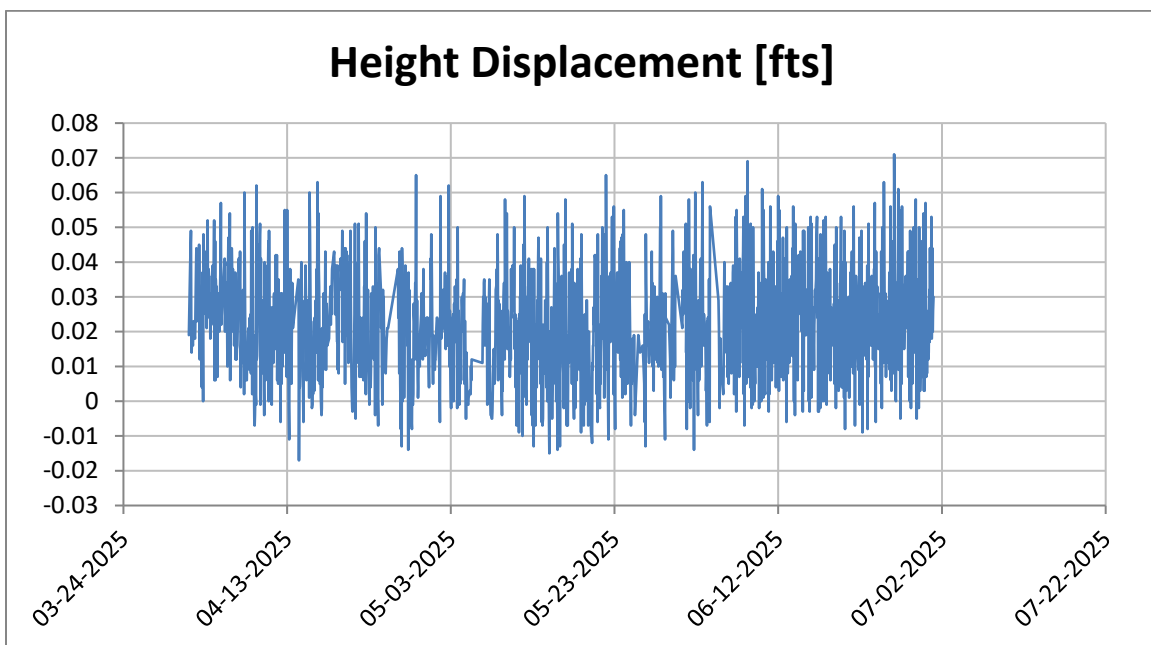
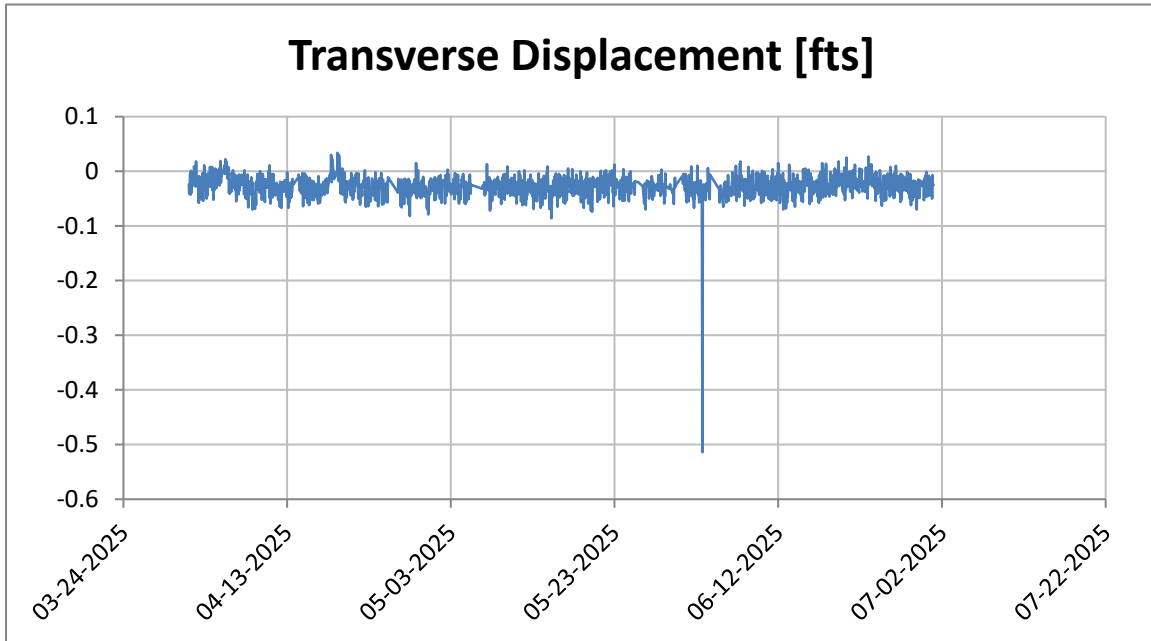
Prism P5



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.

Prism P32R

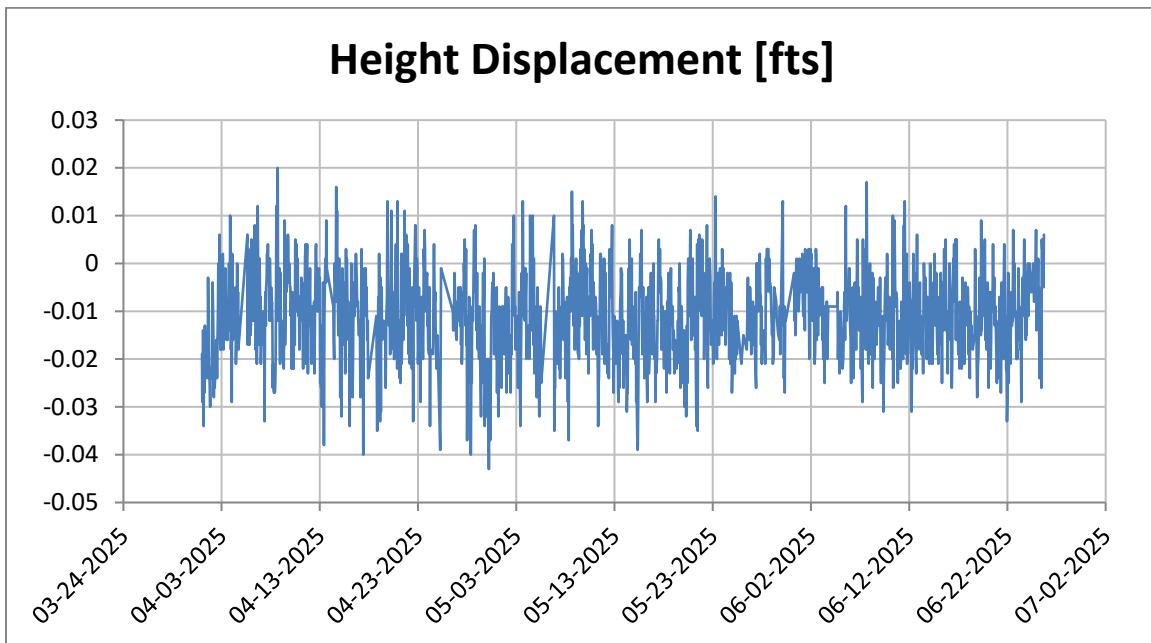
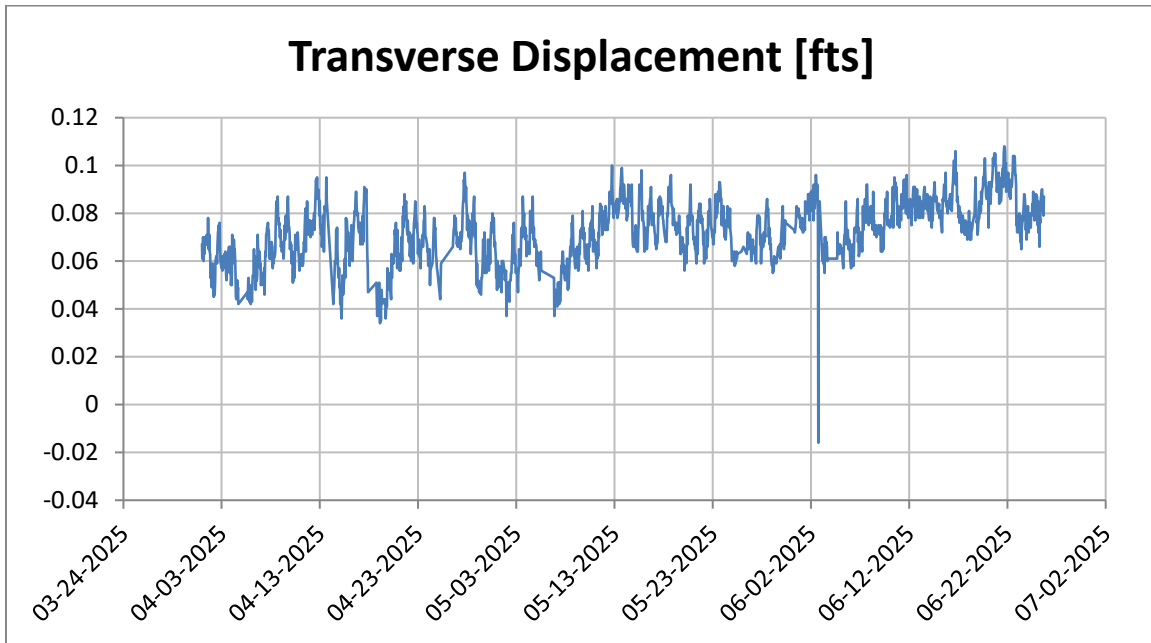


Notes:

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.

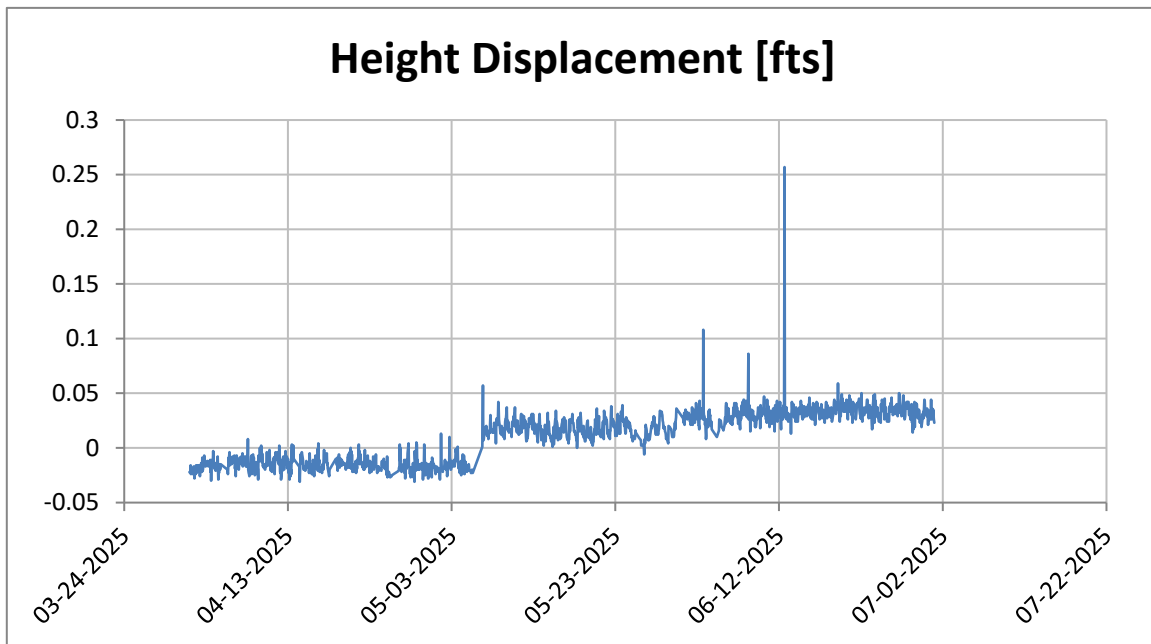
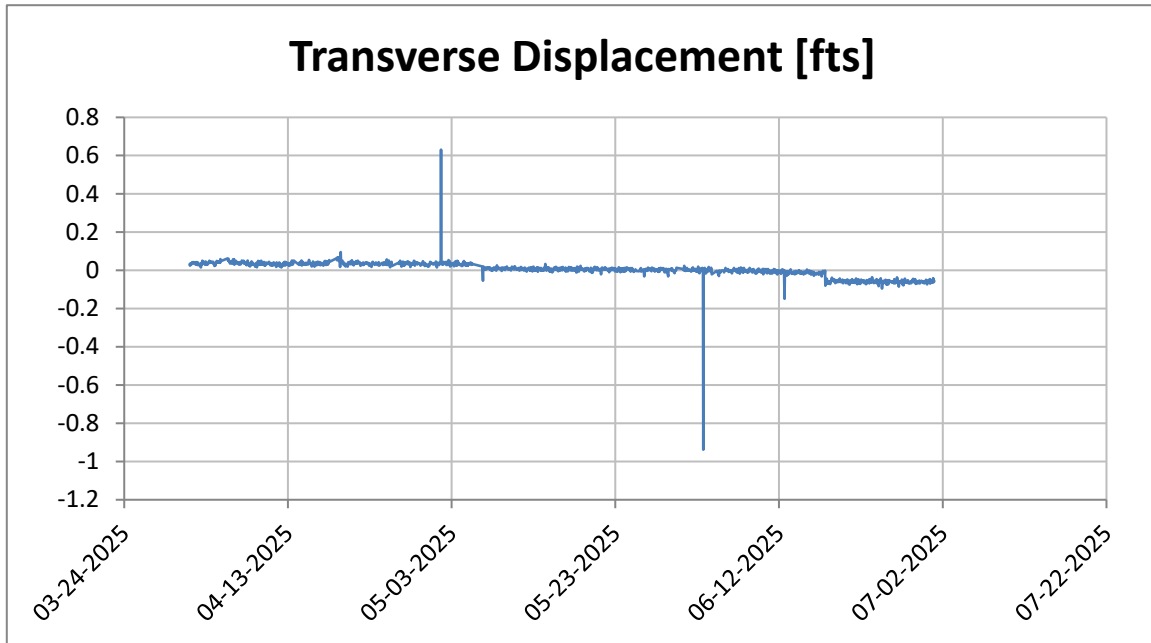
Prism P33



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. No readings after June 25 due to prism vandalism.

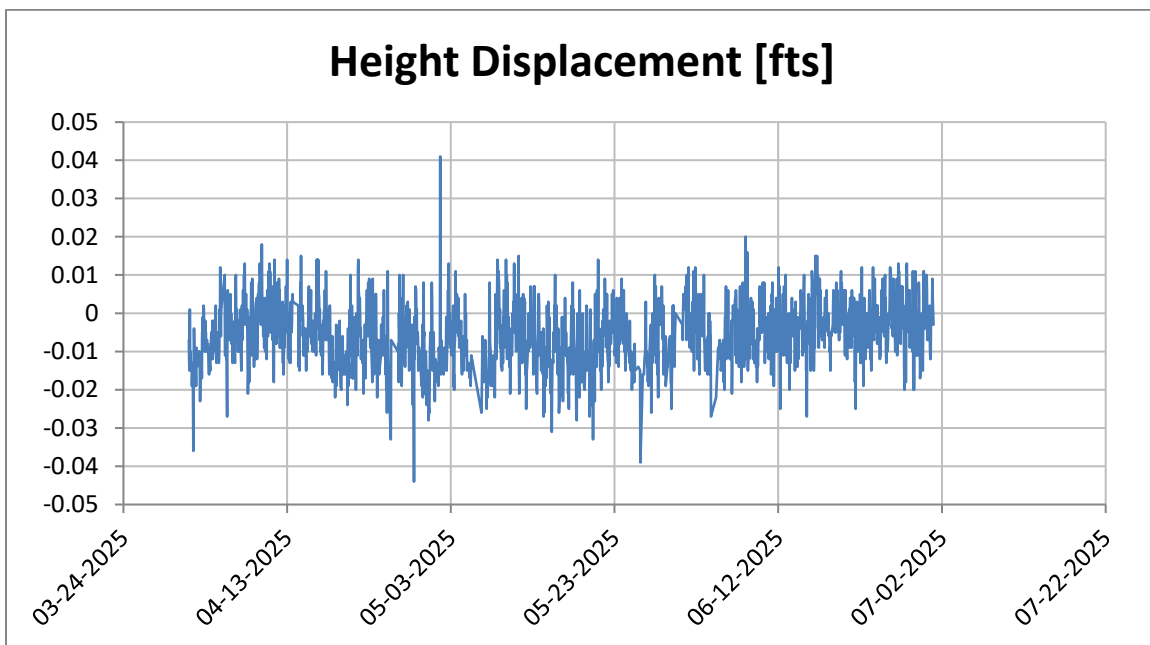
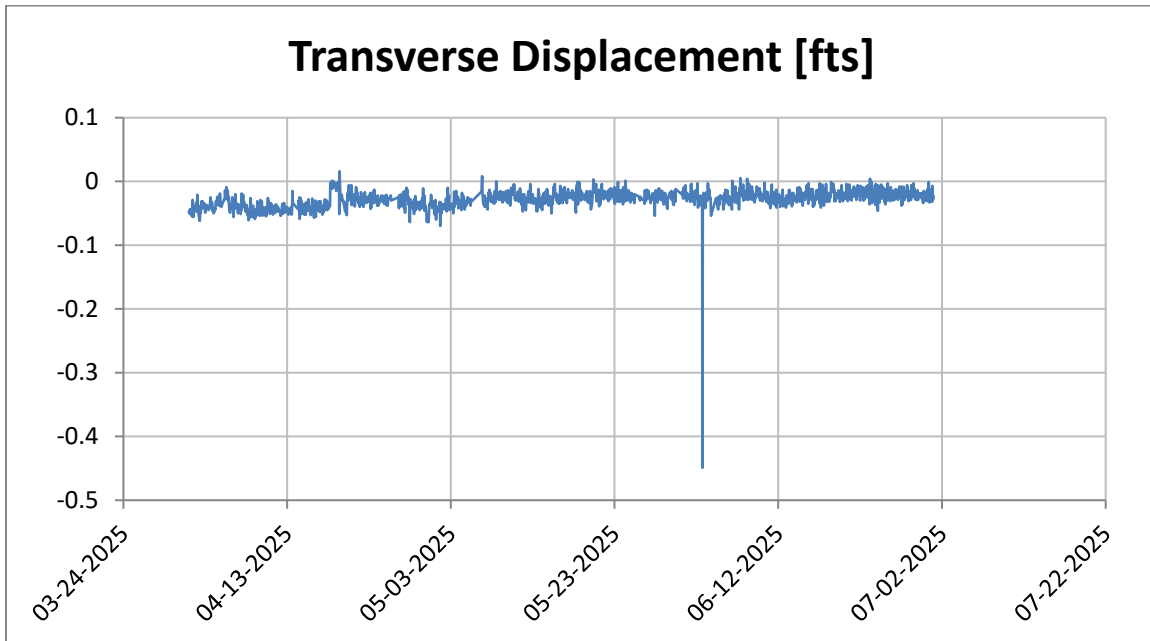
Prism B7700-1



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.

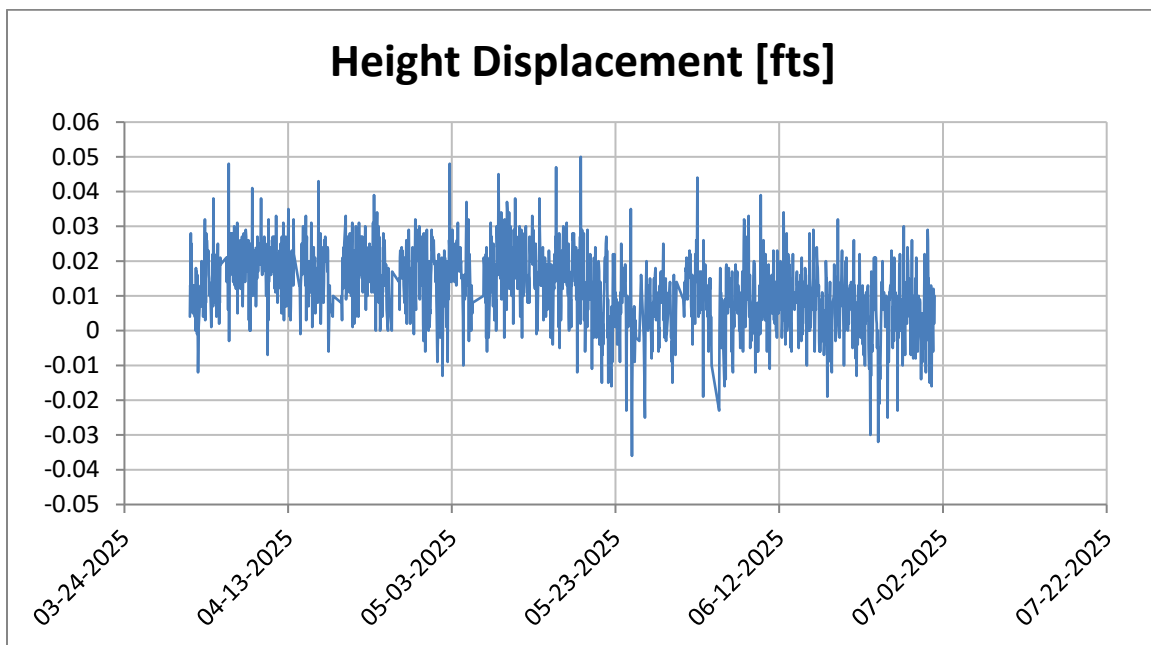
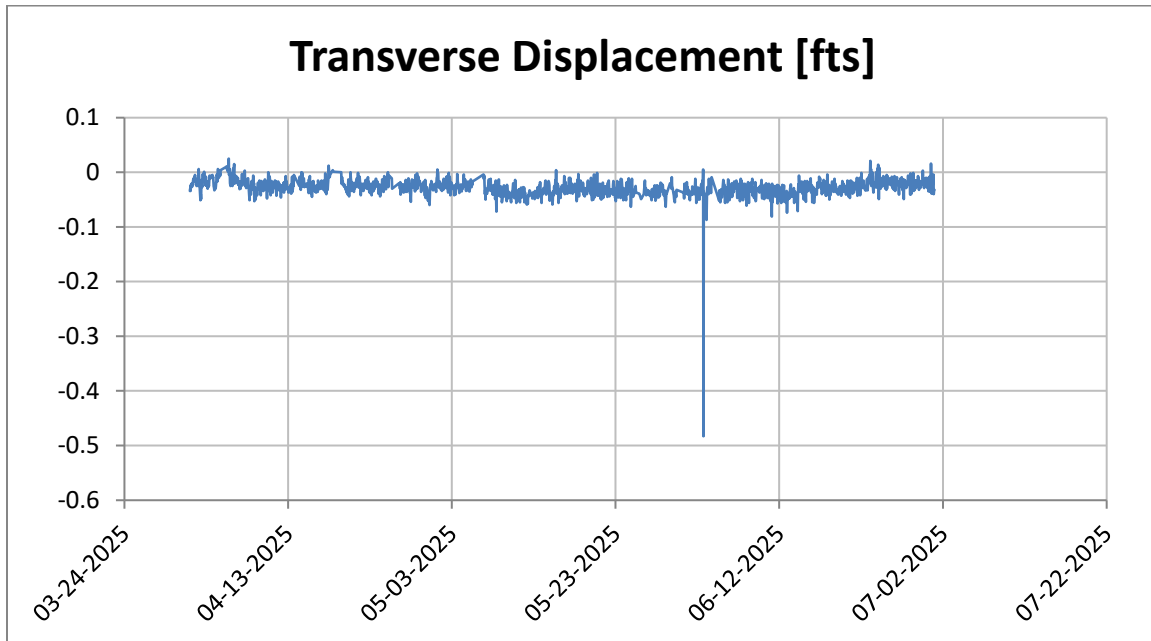
Prism B7700-2



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.

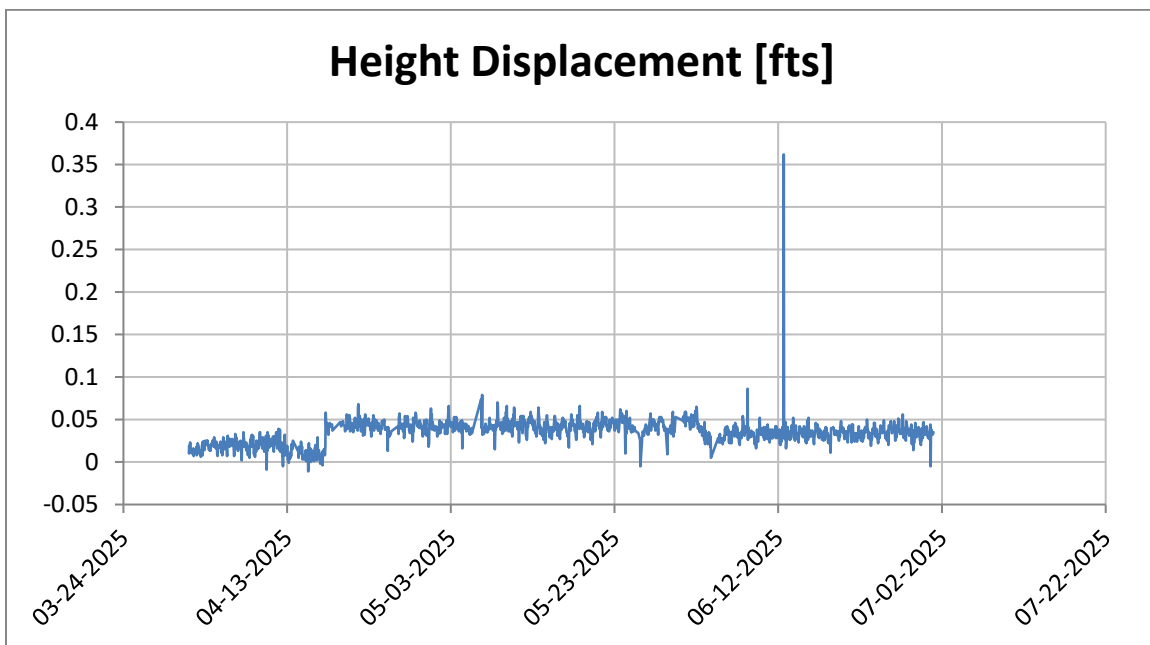
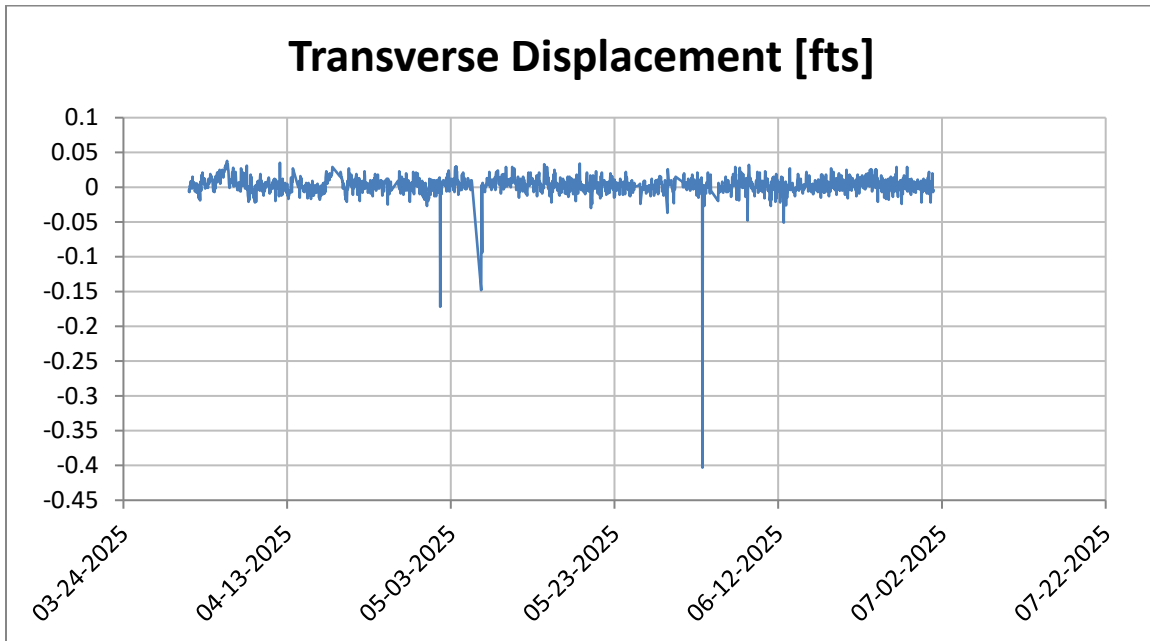
Prism B7700-3U



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.

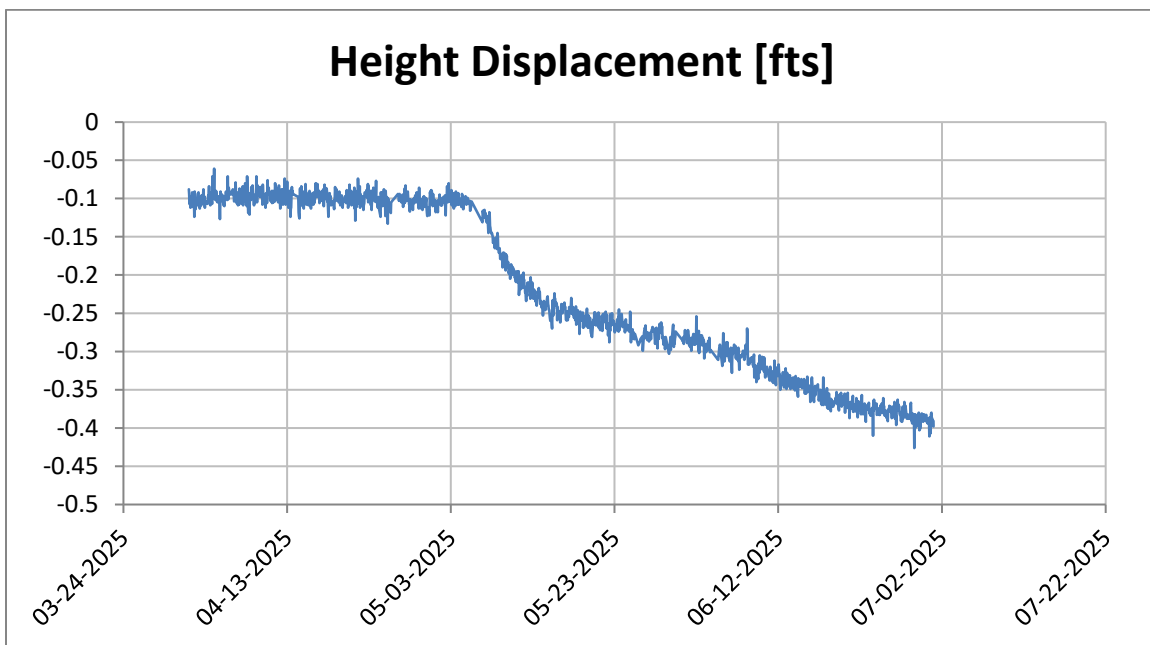
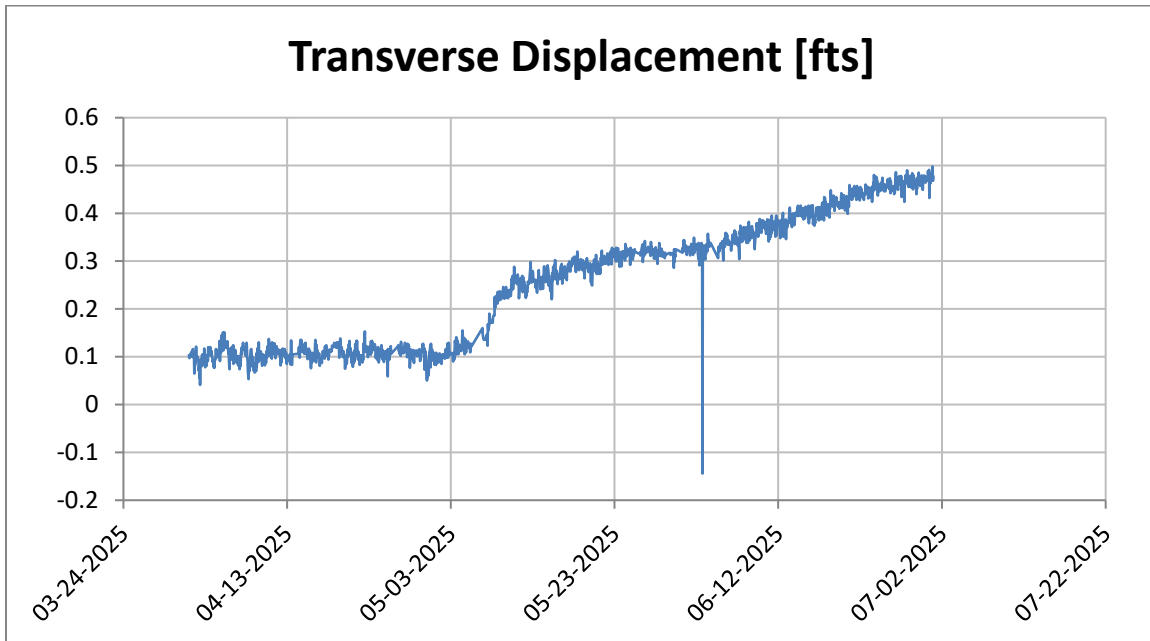
Prism B7700-3L



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.

Prism B7600-5



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.