

To: Jerald Schnabel
Castle Aggregate

From: Paul Kos
Denver, CO 80202

File: May 2024 Monitoring Summary

Date: June 30, 2024

Reference: May 2024 Geotechnical Monitoring Summary Pikeview Quarry

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this May 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 May 2024. Continuous monitoring by the robotic survey system began in 2010 and continued through the month of May 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 May 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 May 21, 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 May and observed to be similar in nature from previous inspections. Based on the aerial imagery, the upper crack had extended approximately 30 feet to the south, and this is still within the area of cracking when the upper and lower cracks are considered. Compaction tests in the area of the cracks resulted in densities that exceeded the fill specifications.
- Reclamation grading began in February 2022 and continued throughout May 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.
- A safety buffer zone is being kept between the active work areas and the toe of the slide to stop any rocks that might come loose during grading operations. Compacted fill is placed in the buffer zone as the buttress fill is placed.
- 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 24 prisms active in May; two prisms were control points located outside the slope movement area, six prisms are located on the slopes surrounding the slope movement area, three prisms were located on the slopes within the landslide area, and thirteen 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. No prisms were installed or removed in May. 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. The alerts are listed in Table 2.

Table 2 Alert Summary

| Date(s) | Alert | Cause/Actions taken | Resolved |
|------------------|----------------------|---|----------|
| 2-May | B7400-2 not found | Equipment operations in area. | 2-May |
| 3-May | B7300-4 not found | Equipment blocking prism. No work during alerts. | 3-May |
| 3-May to 4-May | B7300-4 not found | Prism impacted by topsoil placement. No work during alerts. | 4-May |
| 5-May | Points not found | Rain and fog. No work being performed at time of alerts. | 5-May |
| 6-May | Communication errors | High wind. System checked upon receipt of alert. | 6-May |
| 9-May to 10-May | Points not found | Rain and fog. No work being performed or spotters used at time of alerts. | 10-May |
| 9-May to 13-May | BR3 not found | Prism turned by rock raveling during grading operations higher on the slope. Spotter used or no work during alerts. | 13-May |
| 11-May to 12-May | Points not found | Rain and fog. No work being performed at time of alerts. | 12-May |
| 13-May | P5 not found | Equipment blocking prism. Limited work and spotter in place during alert. | 13-May |
| 15-May to 16-May | BR3 not found | Prism turned by grading operations higher on the slope. Spotter used or no work during alerts. | 16-May |
| 18-May | Points not found | Rain and fog. No work being performed at time of alerts. | 18-May |
| 18-May | P33 regression limit | Rain and fog at time of alerts. Readings in positive and negative directions. | 18-May |
| 21-May | Points not found | Rain and fog. No work being performed at time of alerts. | 21-May |
| 29-May | Points not found | Fog. No work being performed at time of alerts. | 29-May |

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 |
|----------|---|-------------------------------------|--------------------|-----------------------|---------------------------------------|
| BR1 | -0.013 | -0.461 | 0.0299 | 0.8762 | |
| BR3 | -0.065 | -0.146 | 0.0452 | 0.1796 | Prism impacted by grading operations. |
| CP6 | 0.004 | -0.014 | -0.0029 | 0.0324 | |
| CP7 | 0.095 | 0.010 | -0.0077 | 0.0974 | |
| NP4 | 0.036 | -0.078 | 0.0097 | 0.1567 | |
| P2 | -0.008 | -0.015 | -0.0077 | 0.0177 | |
| P5 | -0.002 | -0.016 | -0.0030 | 0.0164 | |
| P25 | 0.011 | 0.018 | 0.0018 | 0.0212 | |
| P32R | -0.022 | 0.033 | -0.0020 | 0.0401 | |
| P33 | 0.097 | -0.009 | 0.0042 | 0.1205 | |
| P70 | 0.041 | -0.032 | -0.0038 | 0.0825 | |
| B7200-1 | -0.049 | 0.009 | 0.0024 | 0.0557 | |
| B7200-2 | 0.005 | -0.024 | 0.0012 | 0.0611 | |
| B7200-3 | 0.193 | -0.084 | 0.0054 | 0.2608 | |
| B7300-0 | -0.898 | -0.180 | 0.0978 | 1.0916 | |
| B7300-1 | -0.194 | -0.178 | 0.0194 | 0.3939 | |
| B7300-2 | 0.021 | -0.244 | 0.0291 | 0.3033 | |
| B7300-3 | 0.211 | -0.161 | 0.0131 | 0.3258 | |
| B7300-4 | 0.538 | -0.323 | 0.0259 | 0.7331 | Prism impacted by topsoil operations. |
| B7400-1 | -0.355 | -0.800 | 0.0676 | 1.3050 | |
| B7400-2 | -0.047 | -0.526 | 0.0458 | 1.0651 | |
| B7400-3 | 0.124 | -0.372 | 0.0260 | 0.5005 | |
| B7400-4 | 0.538 | -0.323 | 0.0259 | 0.7331 | |
| B7400-5 | 0.702 | -0.134 | -0.0100 | 0.7562 | |

The data show stable conditions with no or very small settlement movements at each the 24 prisms. Prisms B7300-4 and BR3 recorded movements in May, and these movements were likely caused by the revegetation and construction crews causing the prism to be bumped or impacted. There were topsoil operations at the time of movement at B7300, and BR3 was impacted by a rock dislodged by the grading operations. 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. The previous prism installations were delayed by the topsoil and revegetation operations, and this initial settlement would not have been recorded. 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 using an unmanned aircraft system (UAS or 'drone') on May 28, 2024. The imagery was inspected for signs of instability and used to supplement the onsite visual inspections. Features noted in the aerial imagery review were inspected during Stantec's engineering inspection and are summarized in Section 2 above. The imagery was also used to create site topography.

The May topography was also compared to the April topography to identify changes in the site topography. Comparison of the two surveys showed the placement of the fill material at the toe of the landslide. Fill material was primarily excavated from the Upper Borrow and Area and placed in 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.

5.0 COMPACTION TESTING

Fill placement occurred from February 2022 through June 2023 and from September 2023 to present. In the month of May 2024, a total of 18,000 yd³ of material was placed and compacted on the buttress floor. All this material was from the Upper Borrow 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 yd³ placed. This volume placed in the buttress zone required at least 4 compaction tests. There were 21 compaction tests taken in May. As of May 28, 2024, when the site was surveyed, a total of approximately 3,422,000 yd³ had been placed and compacted. This required at least 685 compaction tests, and 1,134 tests have been taken.

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)

Design with community in mind

| 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.
- Conducted blasting operations on the lower channel outcropping. No additional blasting is planned.
- 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, and mulching operations.
- Began tree planting.
- Topsoil placement occurred where fill placement has been completed.
- Submitted Technical Revision for drainage revisions required by leaving granite bedrock.

Work planned for next month includes:

- Resume mechanical removal of rocky areas in the upper west.
- Continue placing compacted fill in the buttress area.
- Continue processing riprap.
- 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.

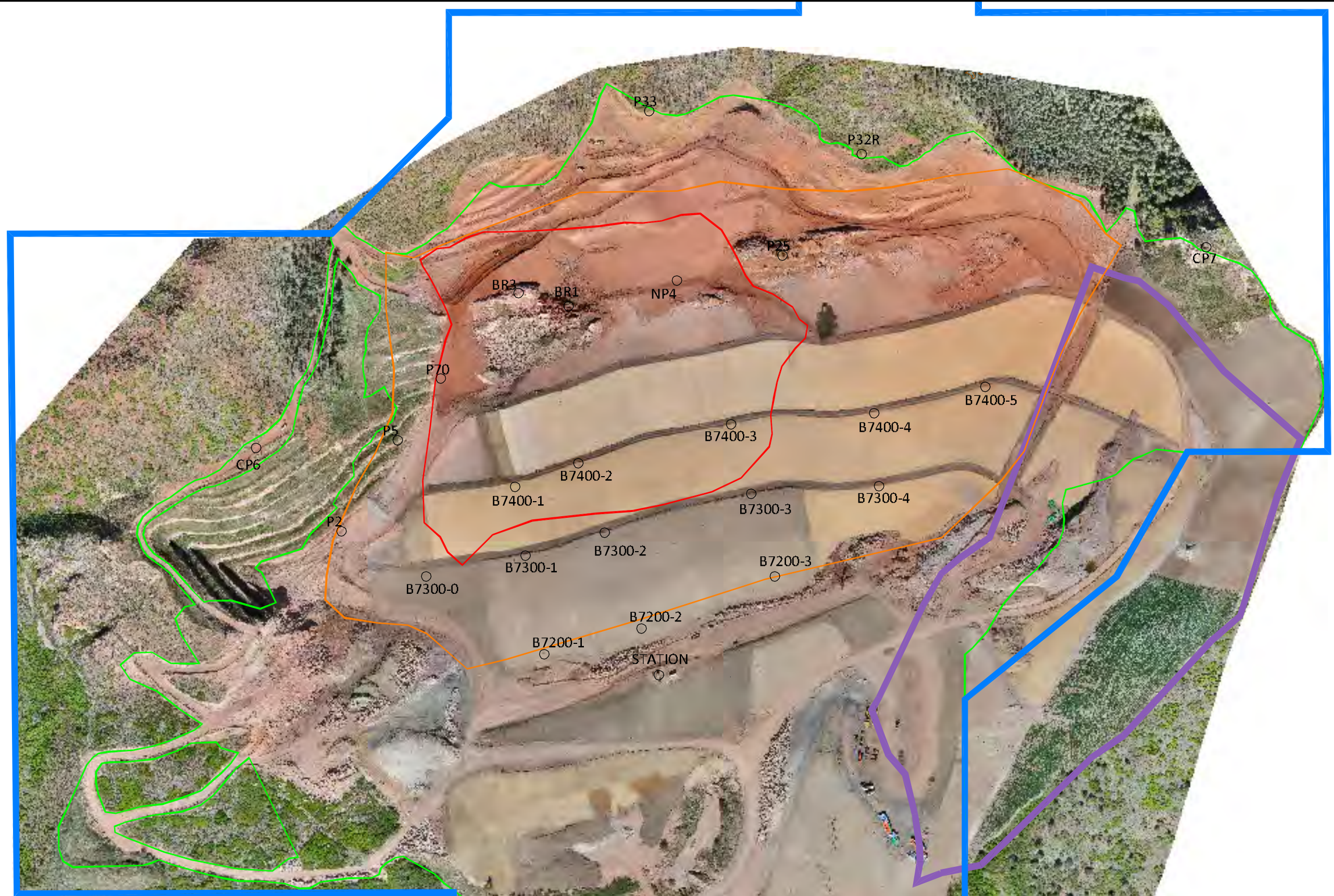
7.0 CONCLUSIONS

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

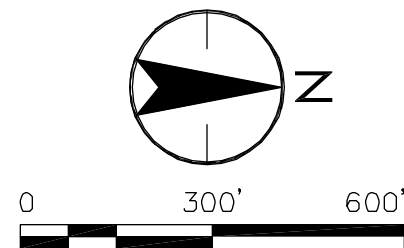
- Restricted access to the ungraded landslide slopes should continue.
- All monitoring should continue at current frequencies.
- All alerts shall continue to be taken seriously even if data errors are suspected.
- The upper fill slope should continue to be monitored for signs of increased or ongoing 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.
- Areas where cracking has been observed should be graded and compacted prior to placing topsoil to prevent infiltration of runoff through the cracks.

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Tel: (303) 295-1717
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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



Client/Project
CASTLE AGGREGATE
PIKEVIEW QUARRY SLOPE MONITORING
Project No.
2057288200

| Title SITE MAP | |
|-------------------|--------------------|
| Revision # | Date 2024.06.30 |
| Drawn By PK | Figure No. 1 |

Appendix A

Visual Inspections

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6. FILL PUSHED DOWN FROM ABOVE ROAD.



5. TREE AND SHRUB PLANTING.



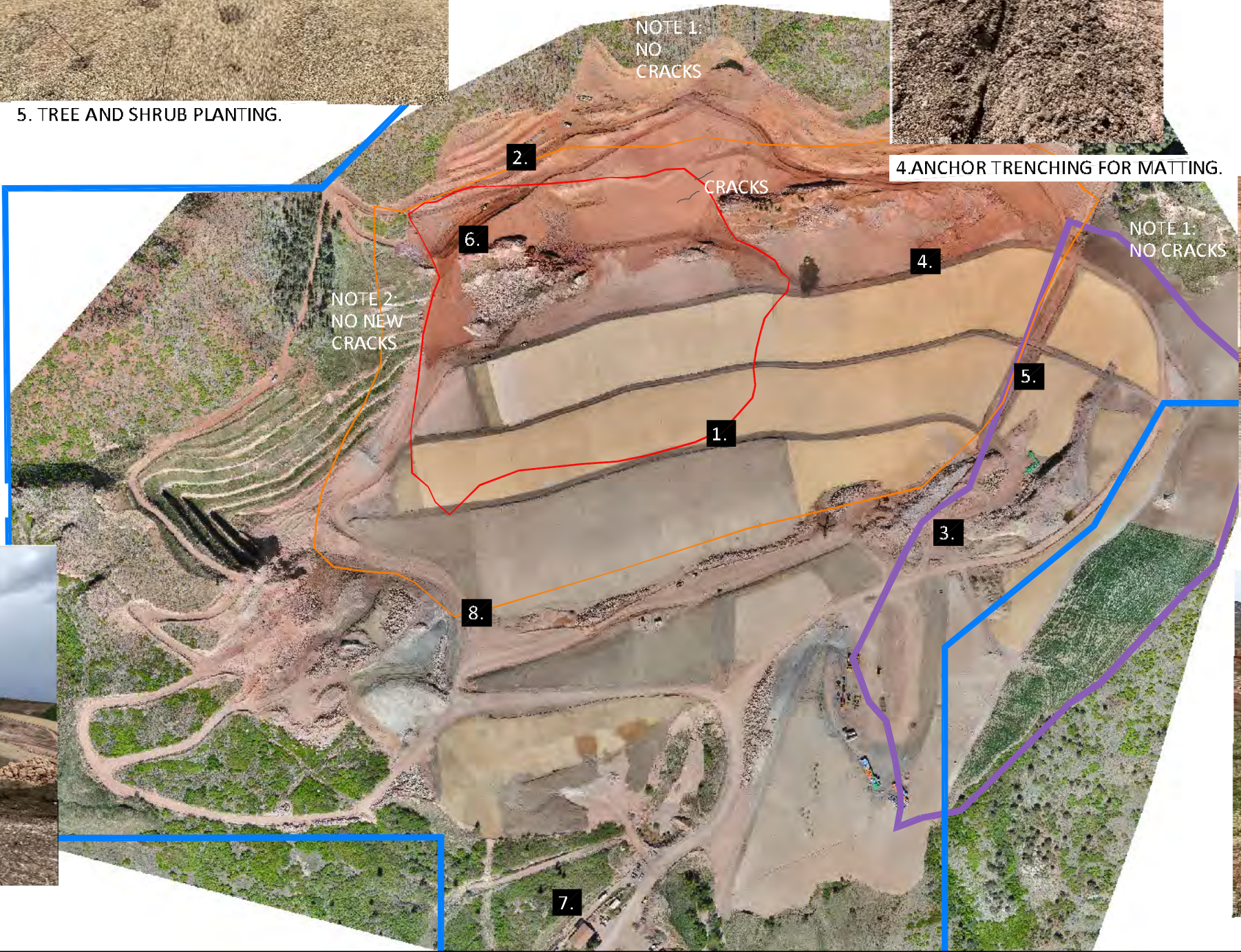
4. ANCHOR TRENCHING FOR MATTING.



3. LOWER CHANNEL BLASTING AREA



7. CONTAINER STOCK READY FOR PLANTING.



2. SOUTH PEAK BENCH WITH FILL PLACED.



1. VIEW NORTHEAST OF RECLAIMED SLOPES.



8. VIEW NORTHWEST OF RECLAIMED SLOPES.



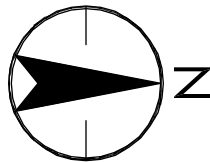
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LEGEND

- 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 ON MAY 21, 2024.



0 400' 800'

Client/Project

CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE
MONITORING

Project No.

2057288200

Title

OBSERVATIONS FROM
MAY INSPECTION

Revision

#

Drawn By

PK

Date

2024.06.30

Figure No.

2

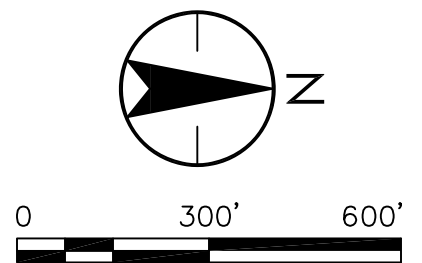
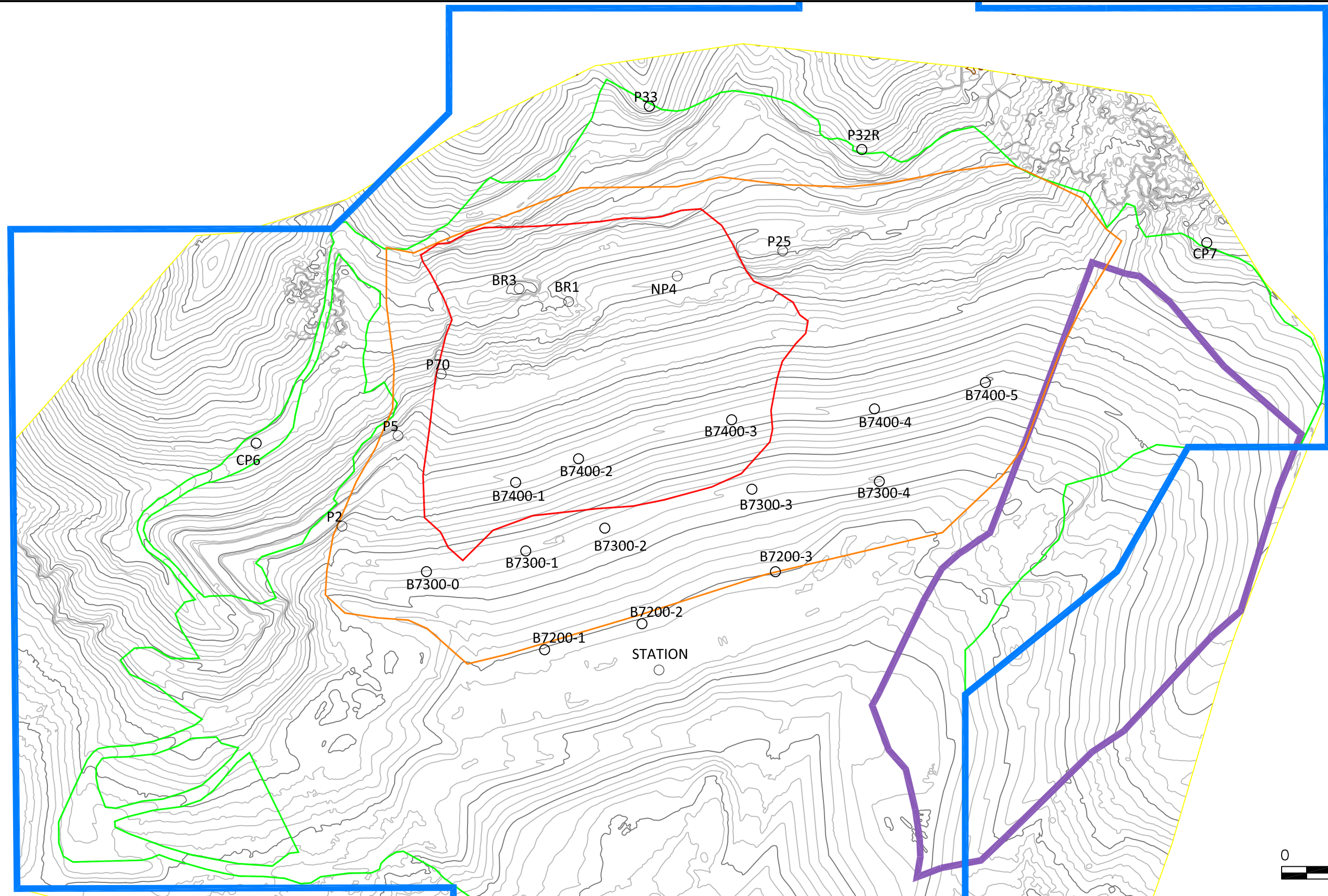
Table A-1 Summary of Daily Inspections

| Date | Notes | Inspection By |
|-------------|--|----------------------|
| 1-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 2-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 3-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 4-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 5-May-24 | No work. | Not applicable |
| 6-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 7-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 8-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 9-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 10-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 11-May-24 | No work. | Not applicable |
| 12-May-24 | No work. | Not applicable |
| 13-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 14-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 15-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 16-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 17-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 18-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 19-May-24 | No work. | Not applicable |
| 20-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 21-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 22-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 23-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 24-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 25-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 26-May-24 | No work. | Not applicable |
| 27-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 28-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 29-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 30-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |
| 31-May-24 | No movement observed. Good to proceed. | Jerald Schnabel |

Appendix B

Prism Survey

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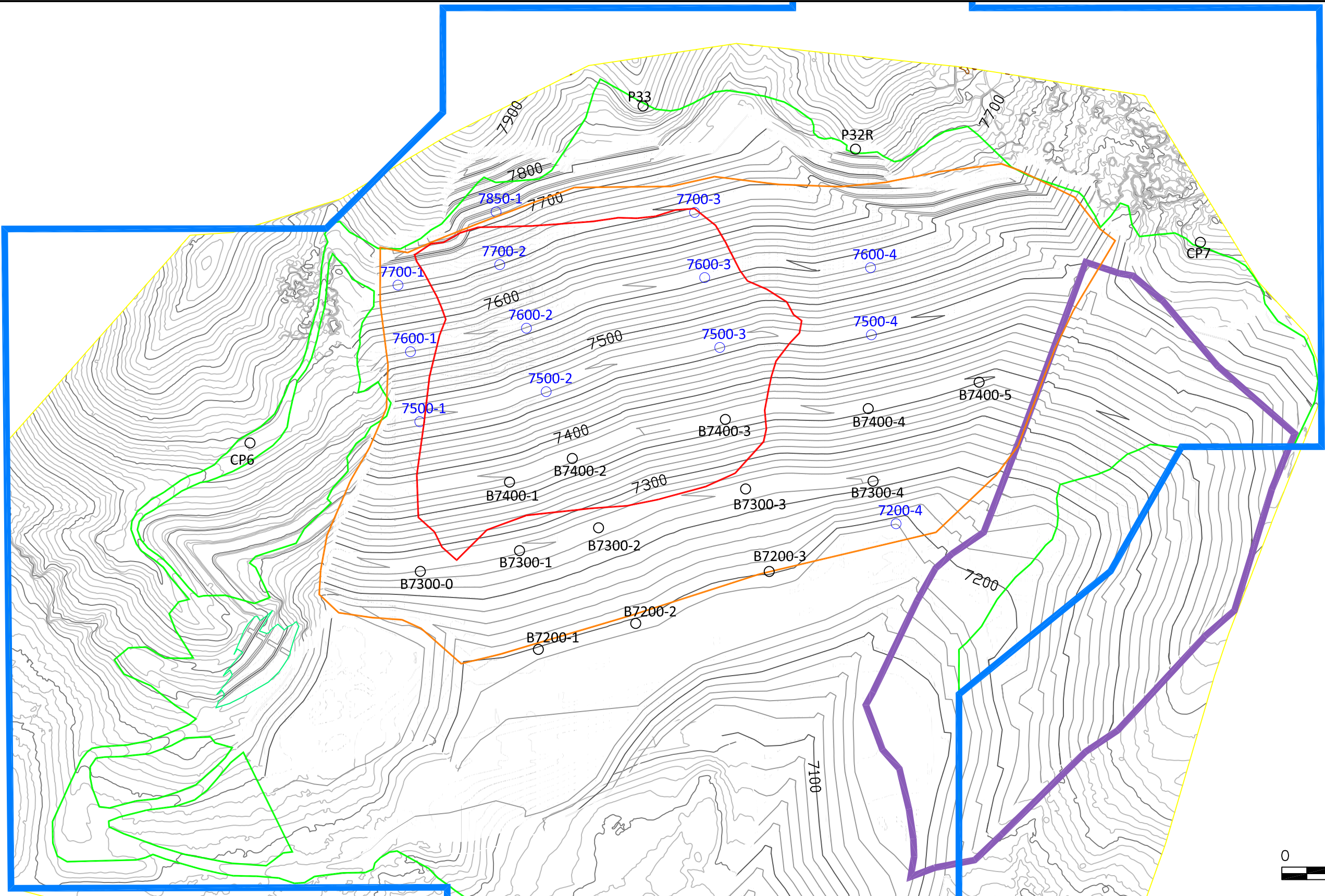
1. PRISMS WILL BE INSTALLED AS EACH BENCH IS FINISHED.
2. ALL PRISMS WILL BE RETAINED AS LONG AS POSSIBLE.
3. TOPOGRAPHY FROM MAY 28, 2024 DRONE SURVEY.
4. CONTOUR INTERVAL IS 10 FEET

Client/Project
CASTLE AGGREGATE
PIKEVIEW QUARRY SLOPE
MONITORING

Project No.
2057288200

| Title | |
|---|--------------------|
| EXISTING PRISMS WITH CURRENT SURFACE | |
| Revision # | Date 2024.06.30 |
| Drawn By PK | Figure No. 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
#

Drawn By
PK

Date
2024.06.30

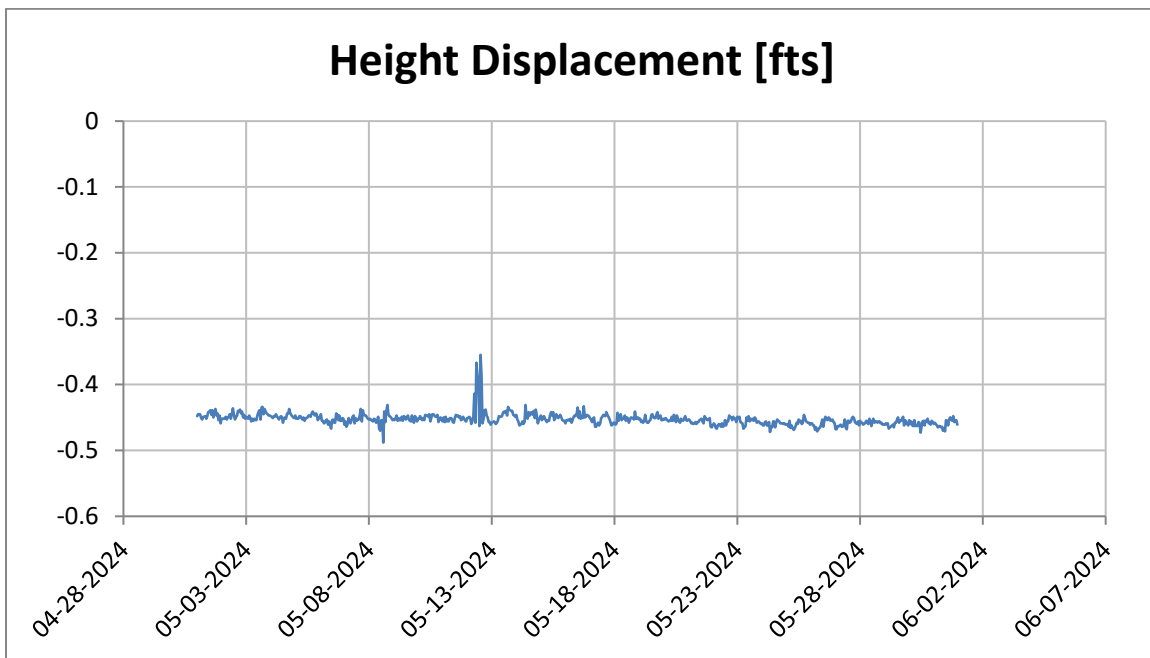
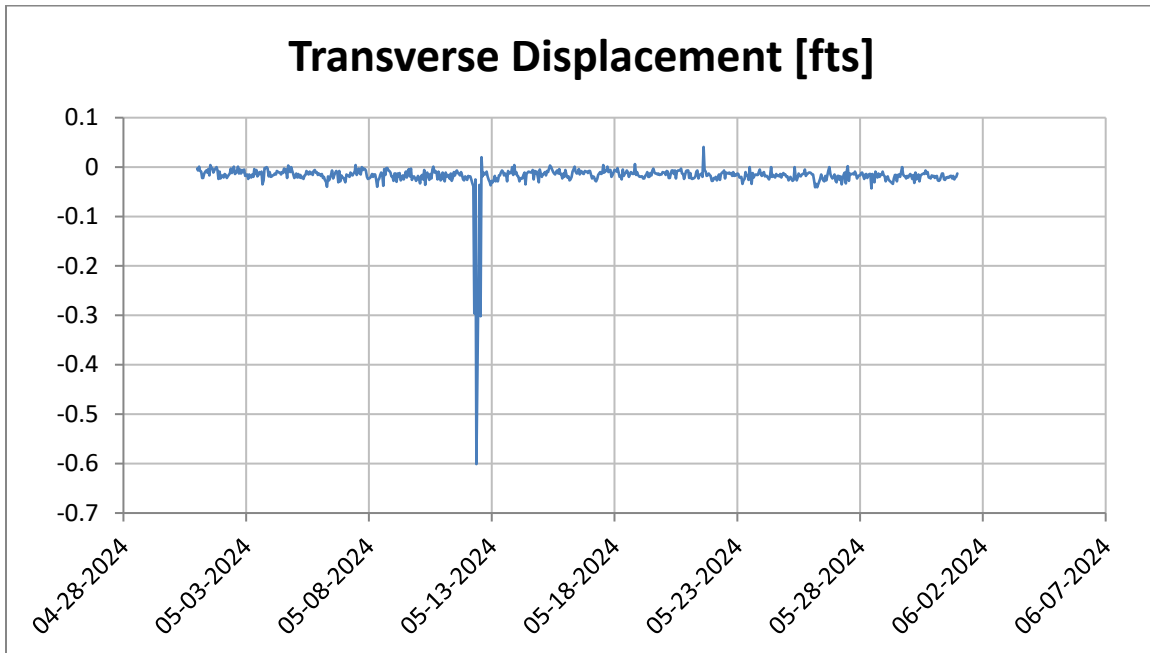
Figure No.
4

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 | Jan-24 | Prism Added | New prism added. |
| B7400-2 | Jan-24 | Prism Added | New prism added. |
| B7400-3 | Jan-24 | Prism Added | New prism added. |
| B7400-4 | Jan-24 | Prism Added | New prism added. |
| B7400-5 | Jan-24 | Prism Added | New prism added. |

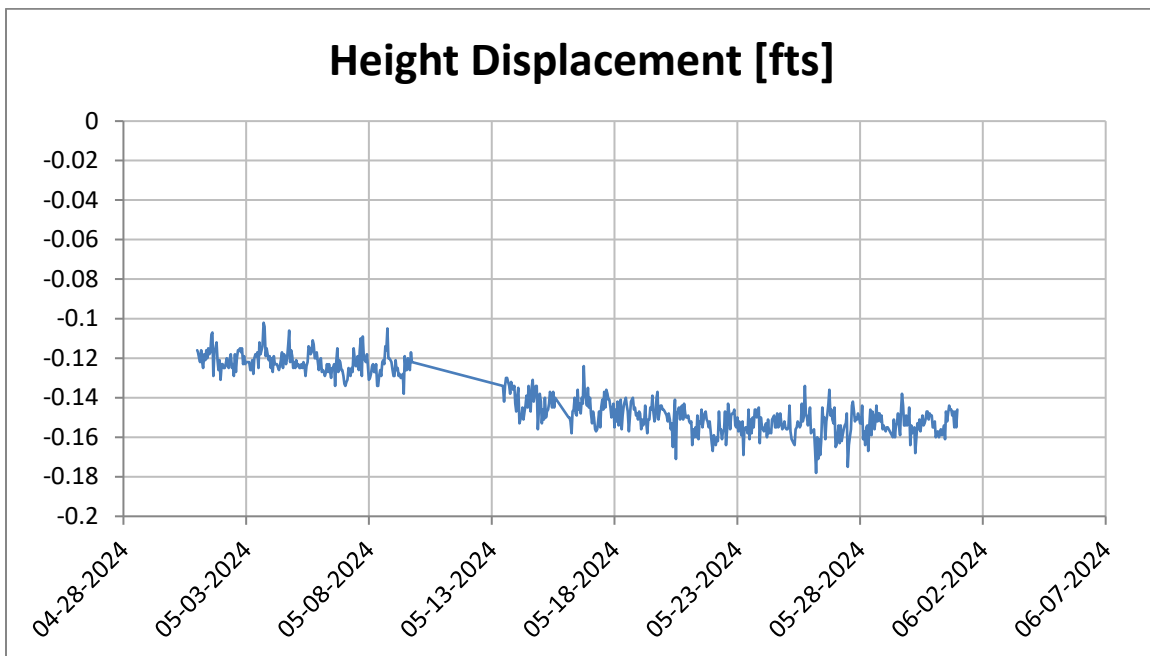
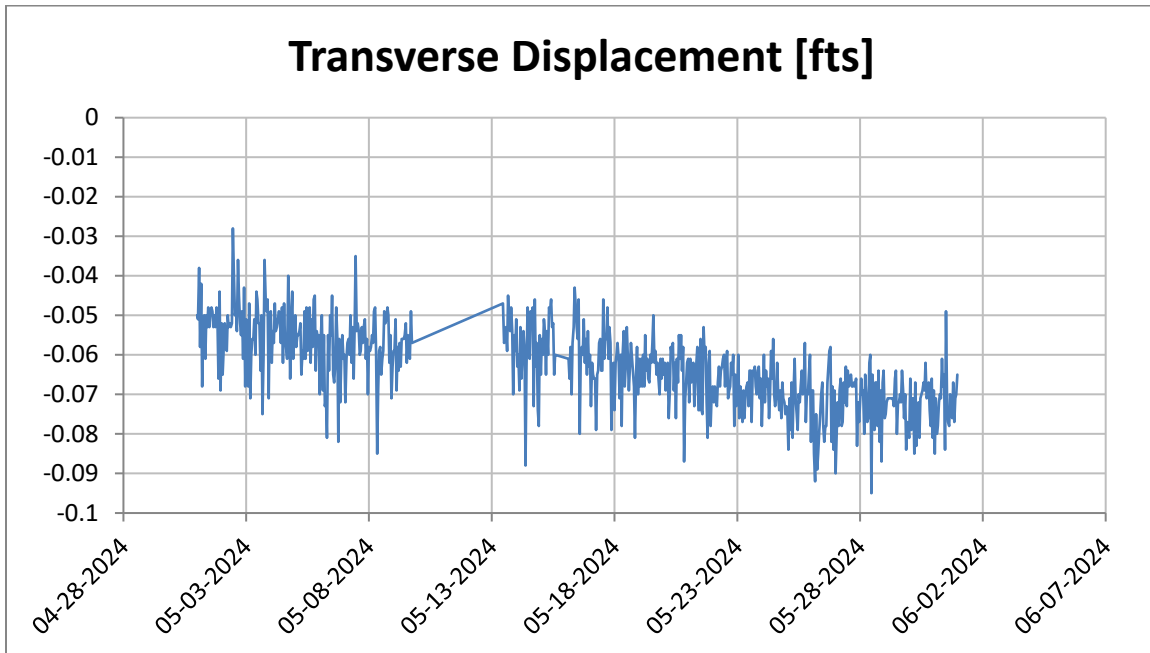
Prism BR1



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.

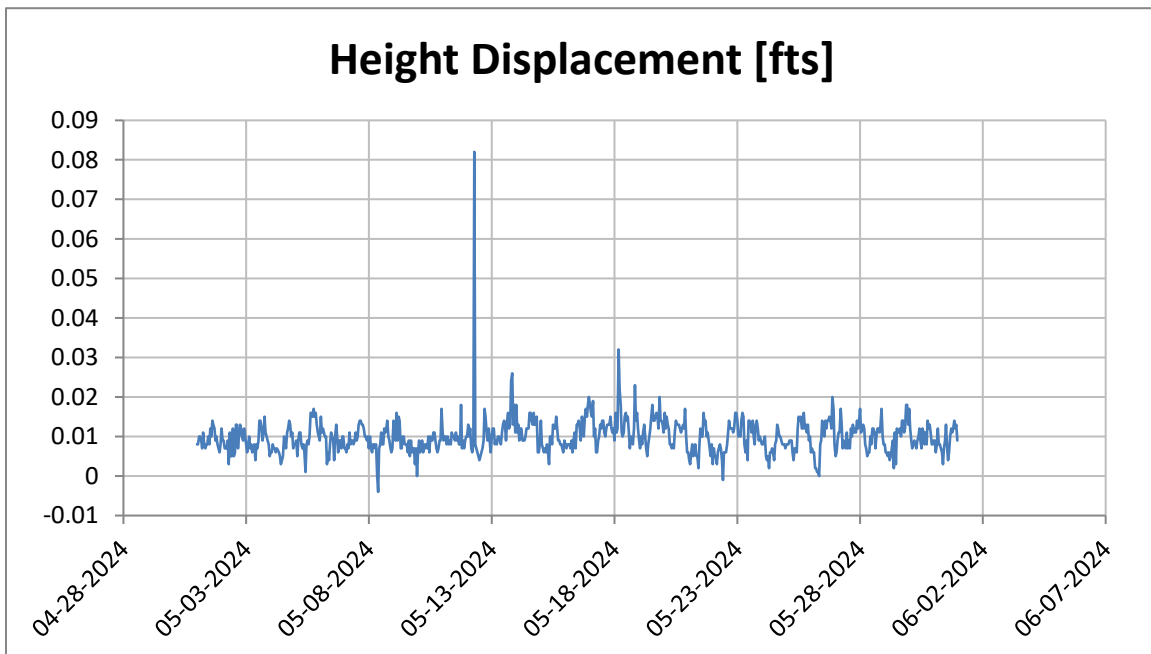
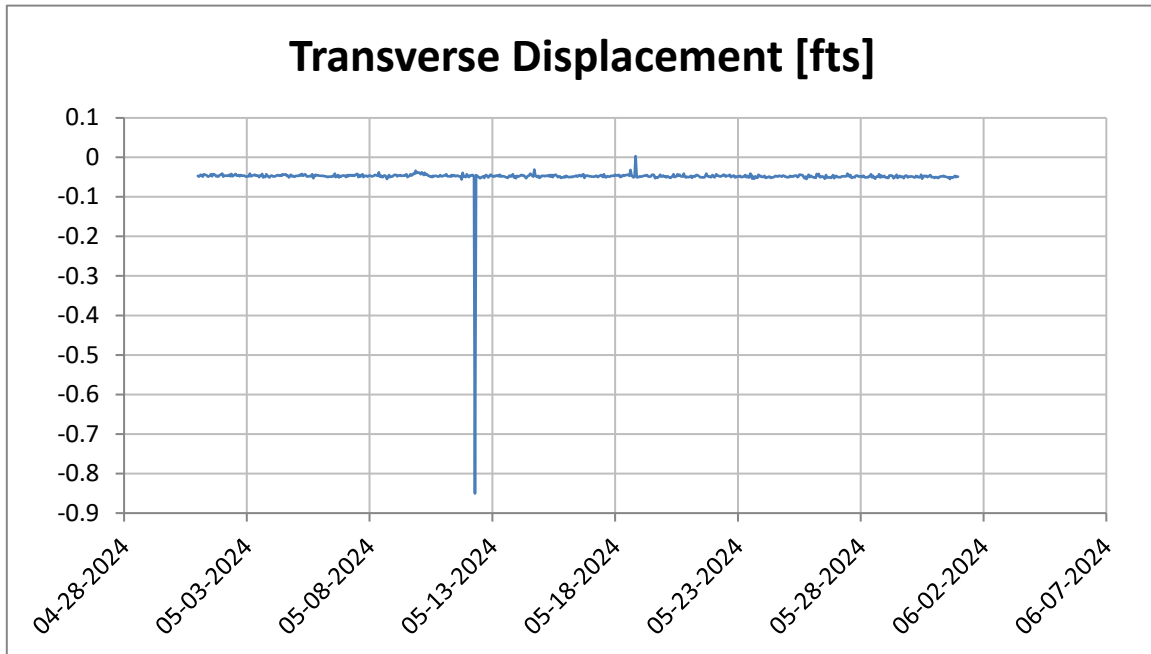
Prism BR3



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 turned by rock raveling during grading operations on May 9 to 13.

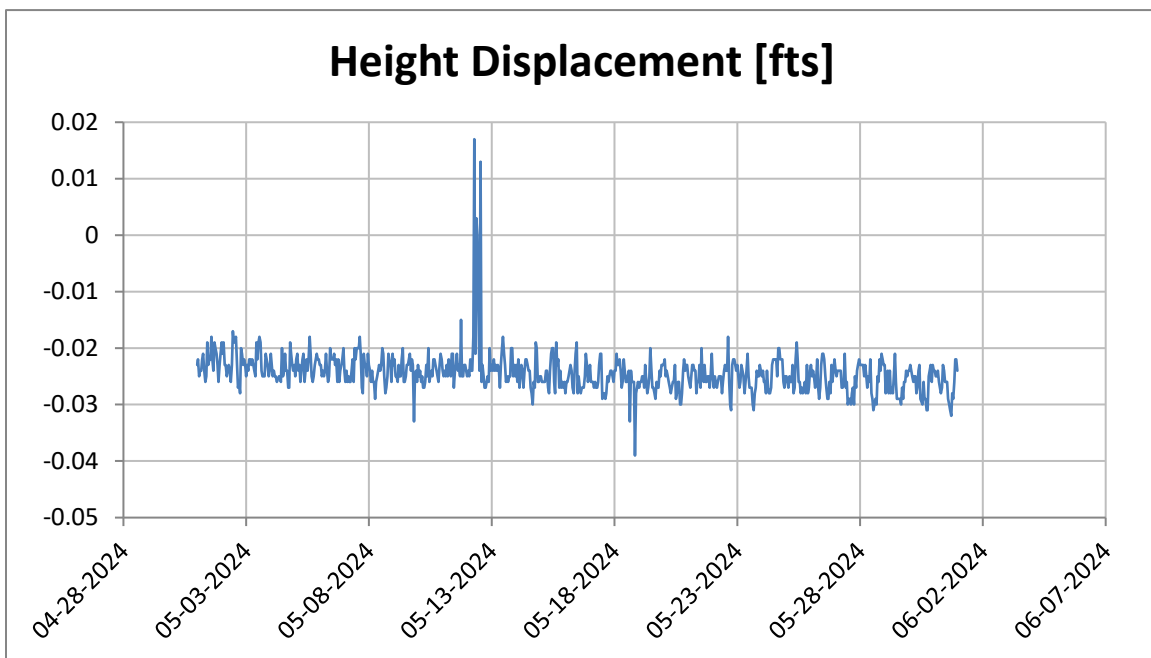
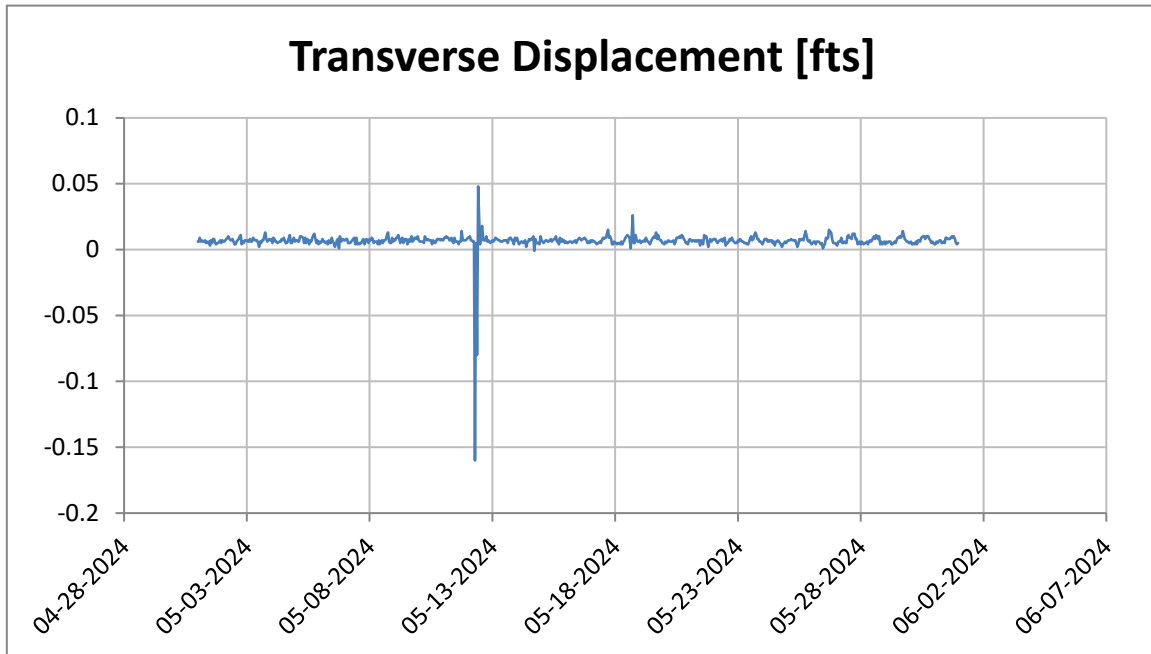
Prism B7200-1



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.

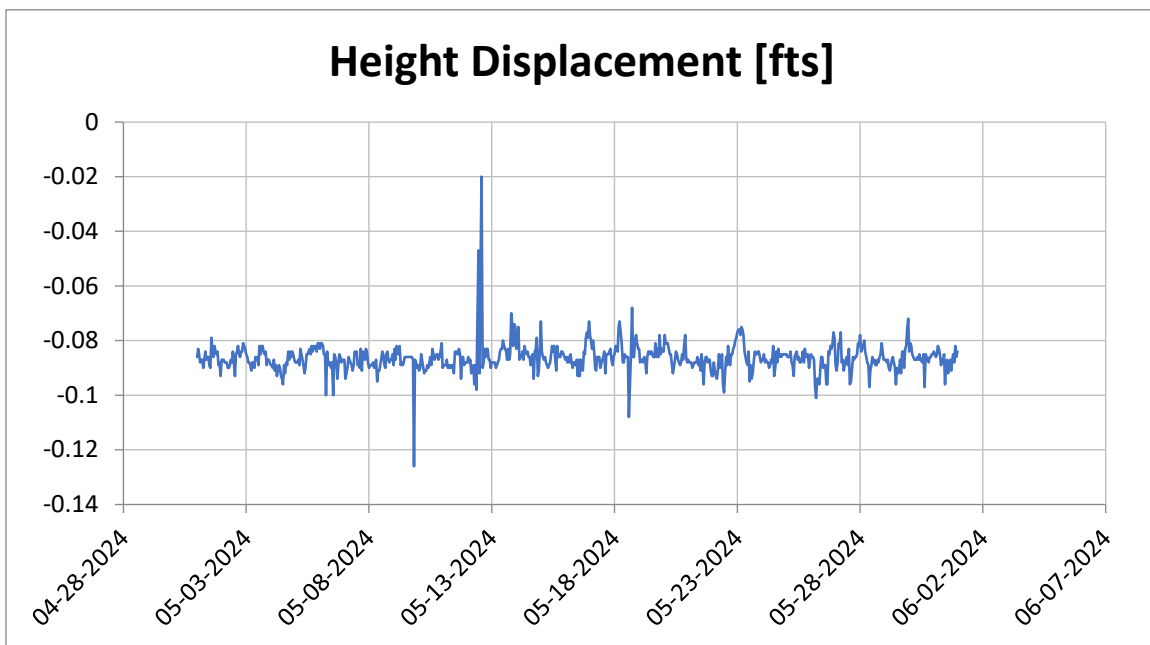
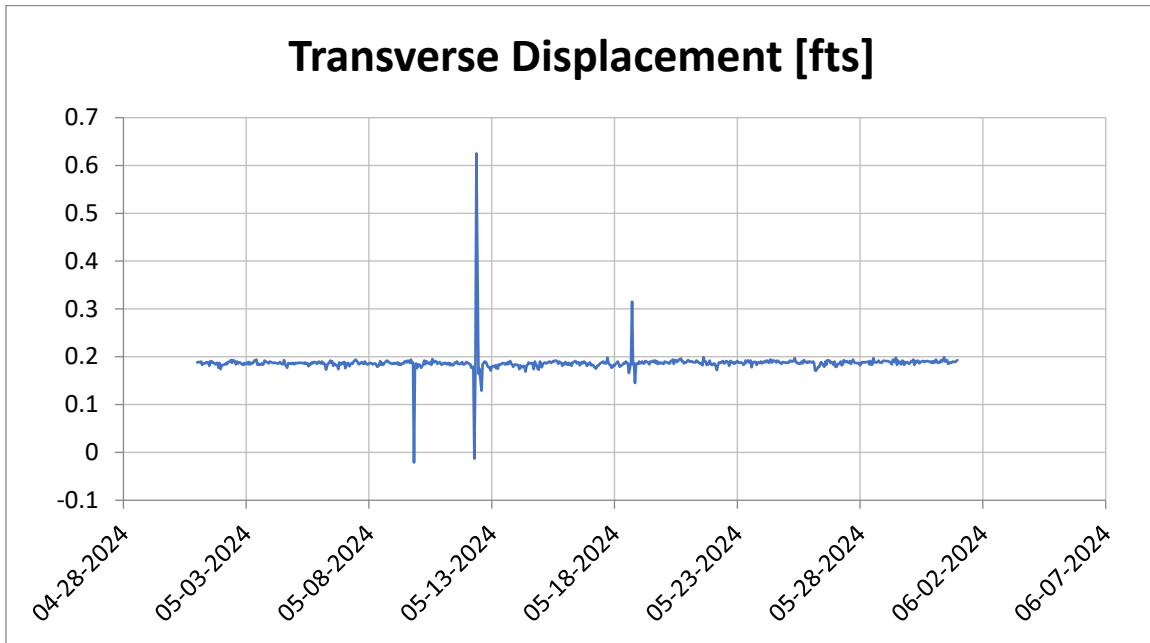
Prism B7200-2



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.

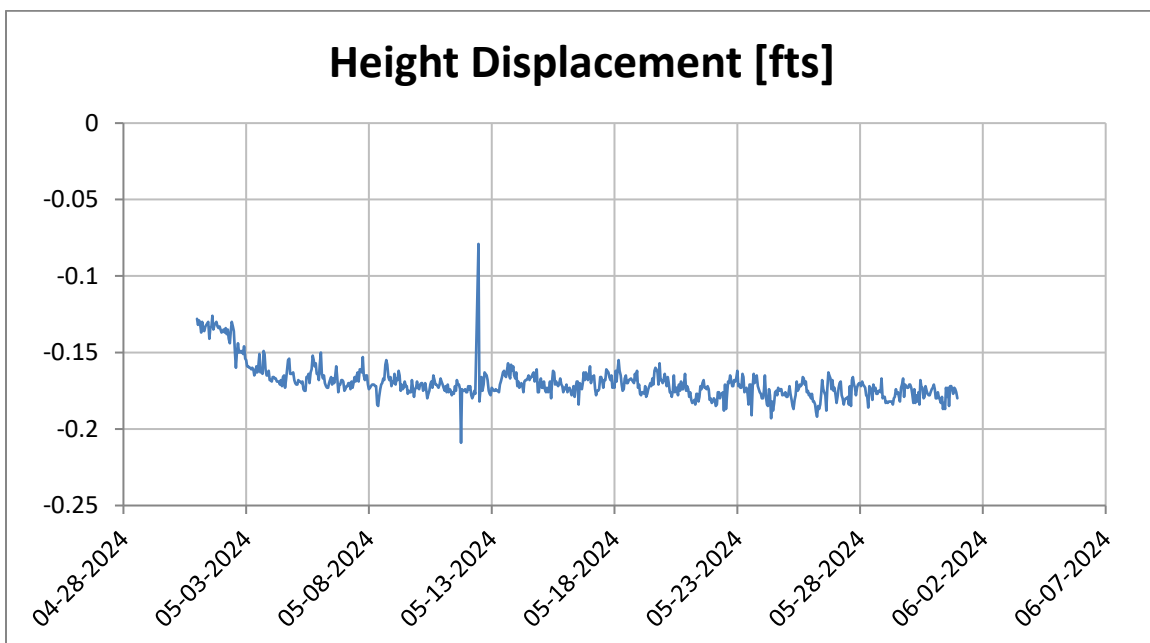
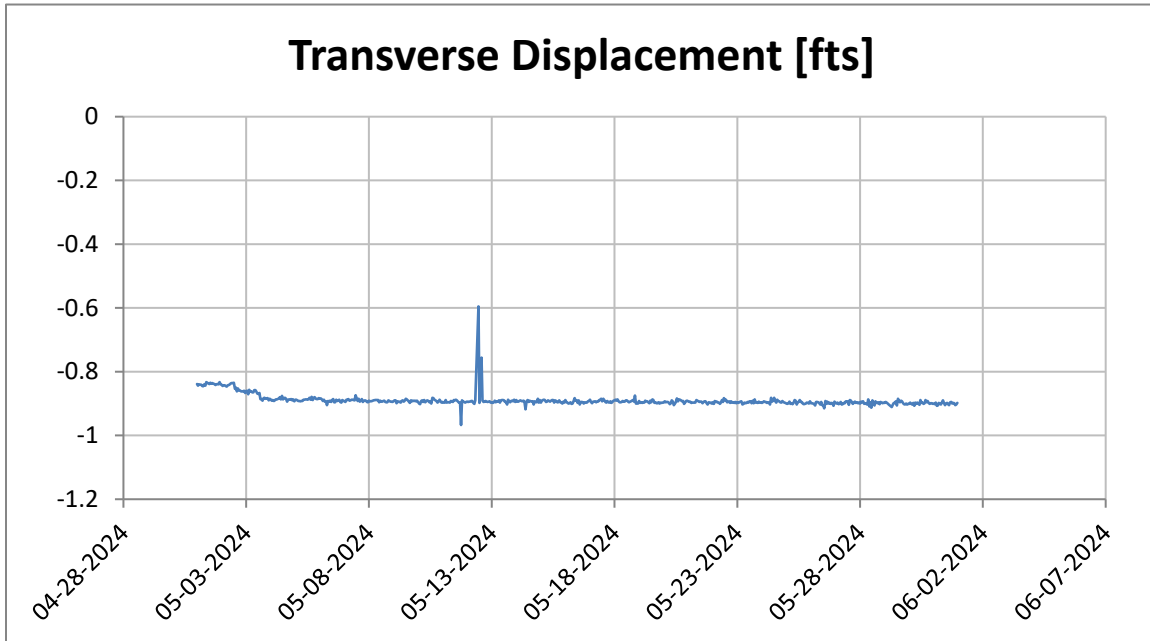
Prism B7200-3



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.

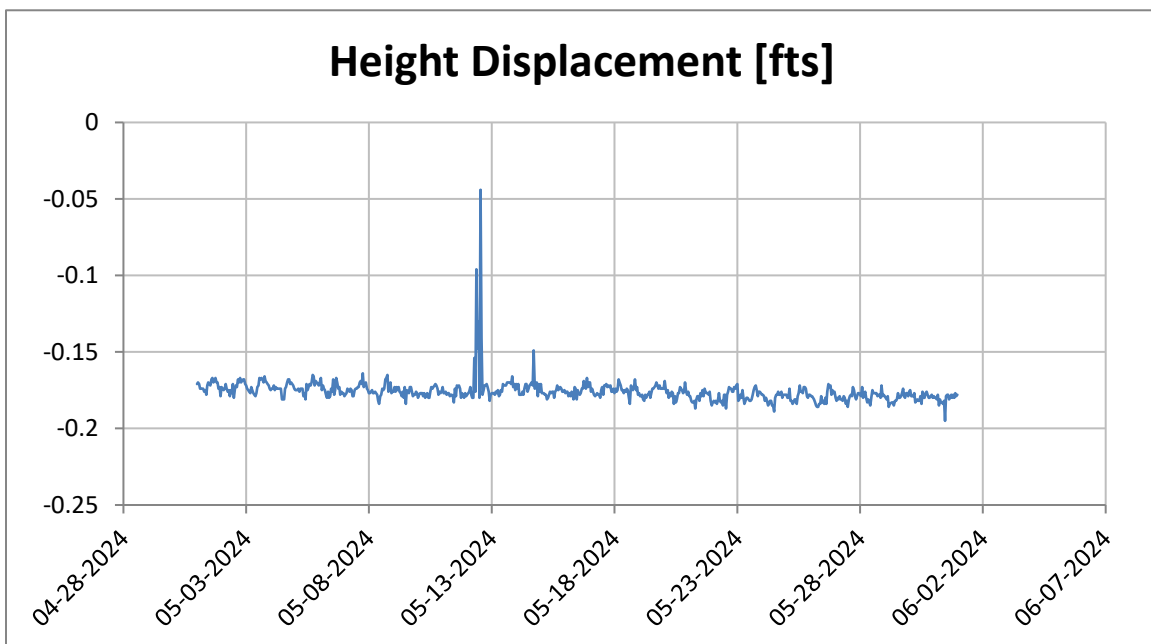
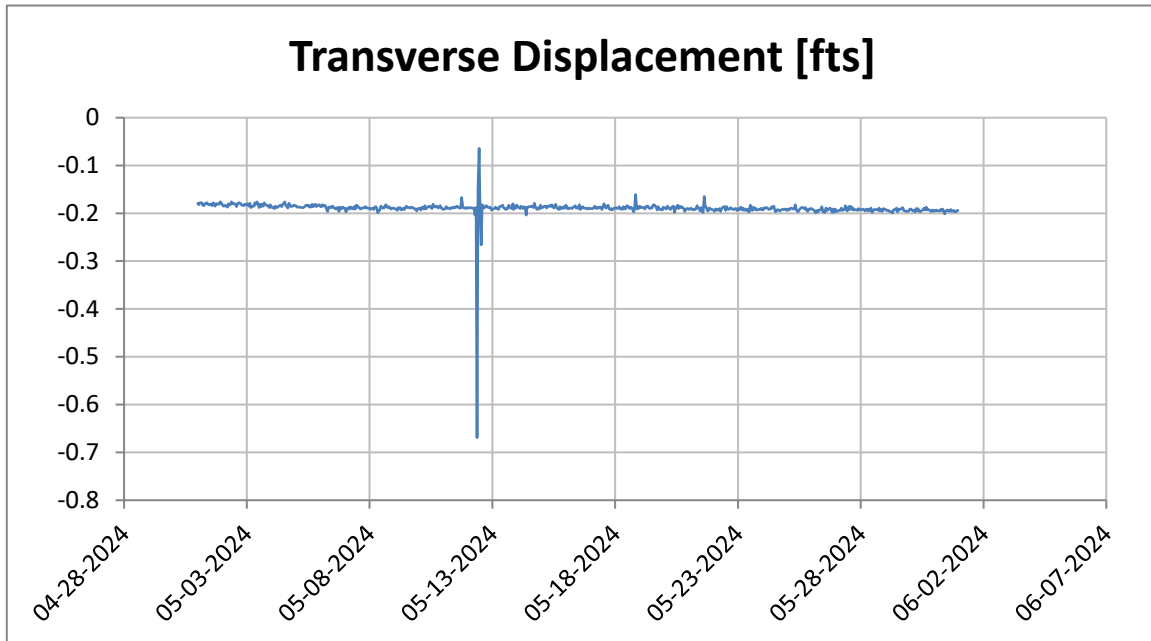
Prism B7300-0



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.

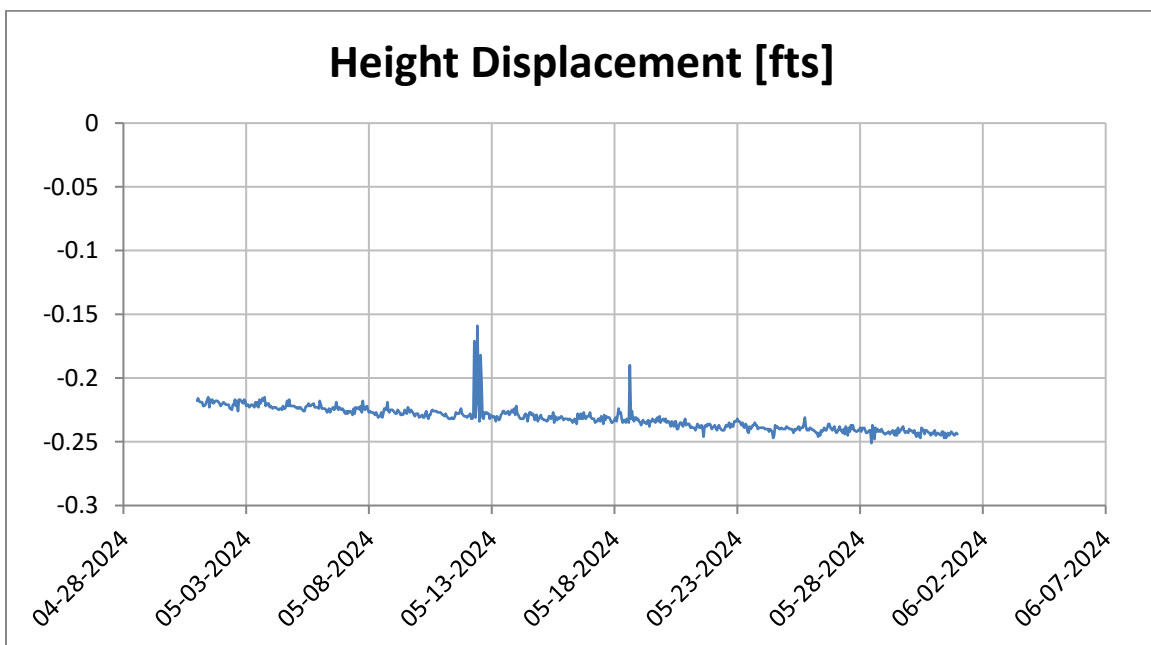
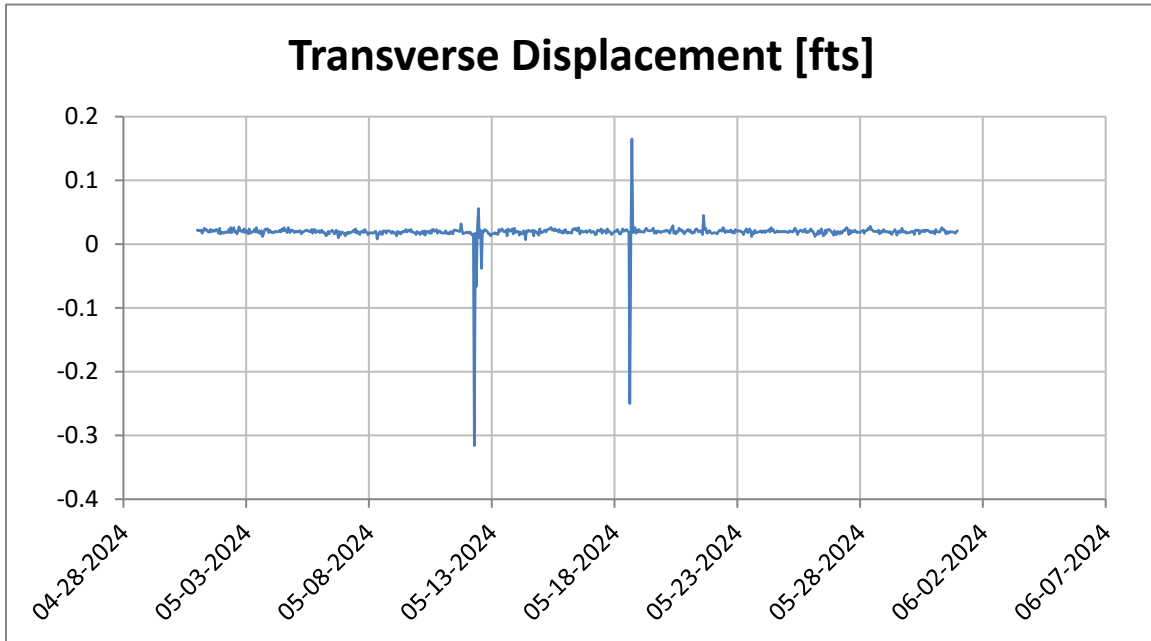
Prism B7300-1



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.

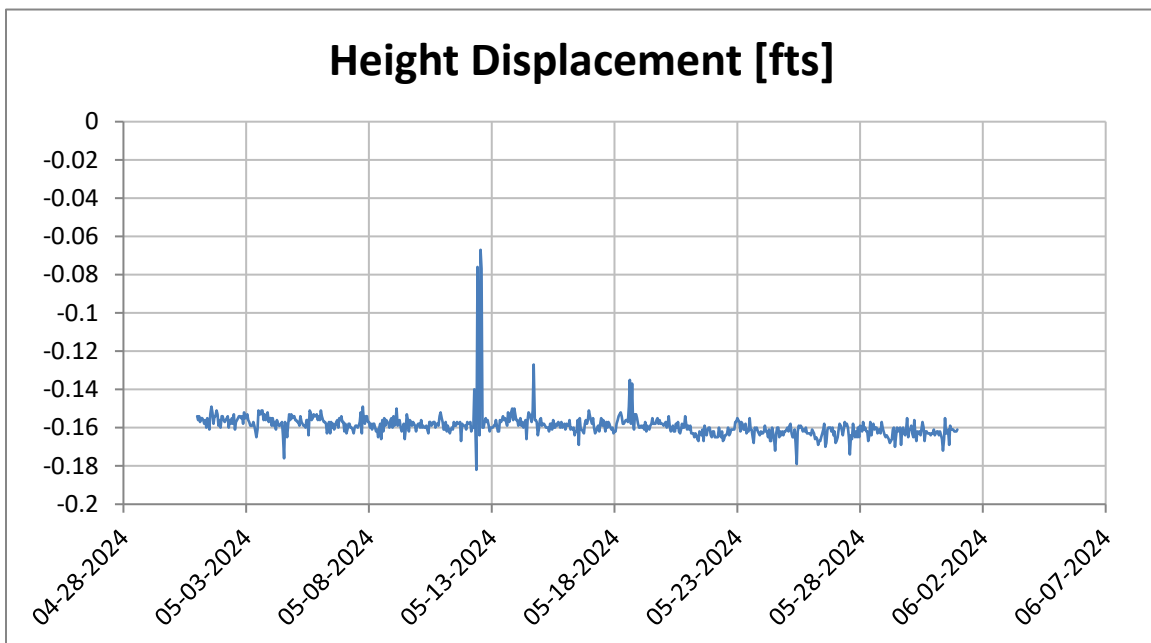
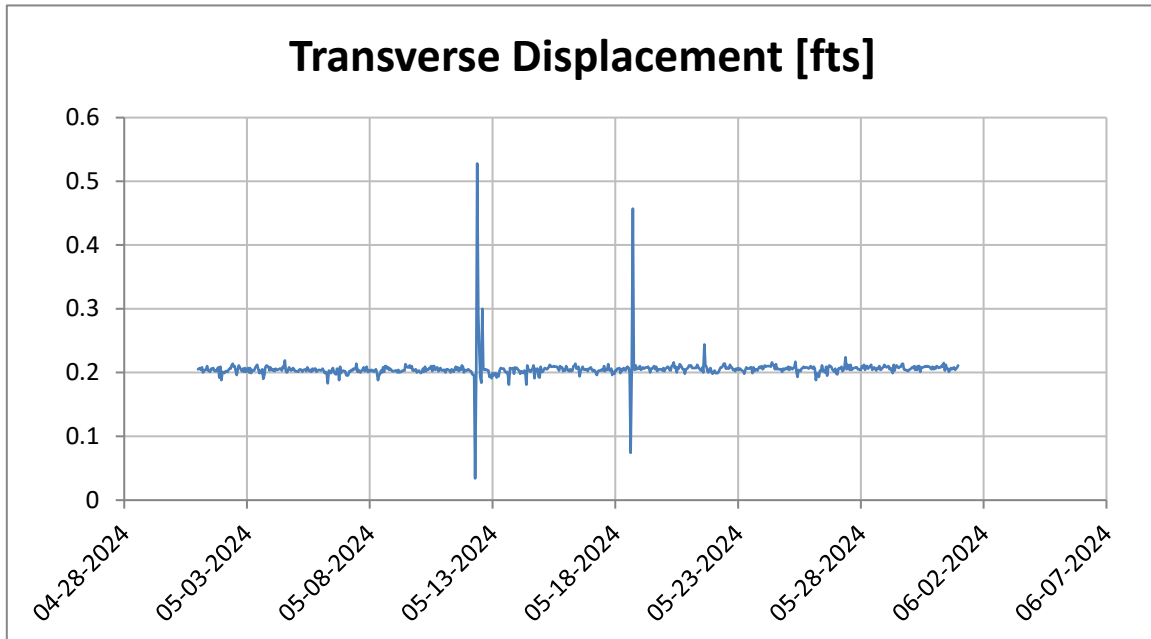
Prism B7300-2



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.

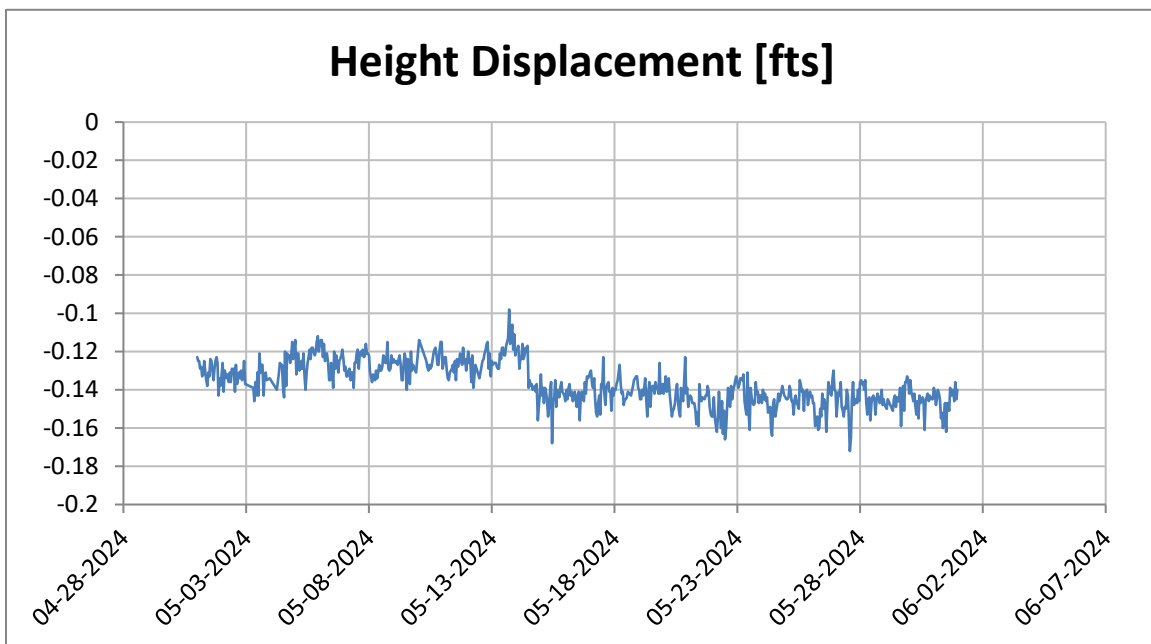
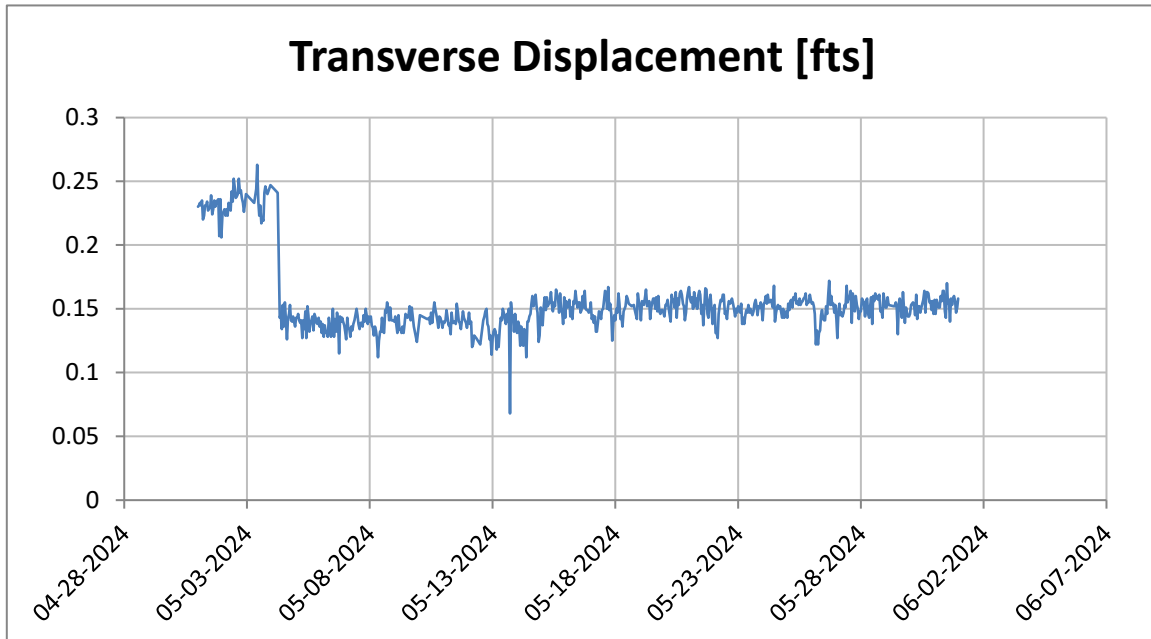
Prism B7300-3



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.

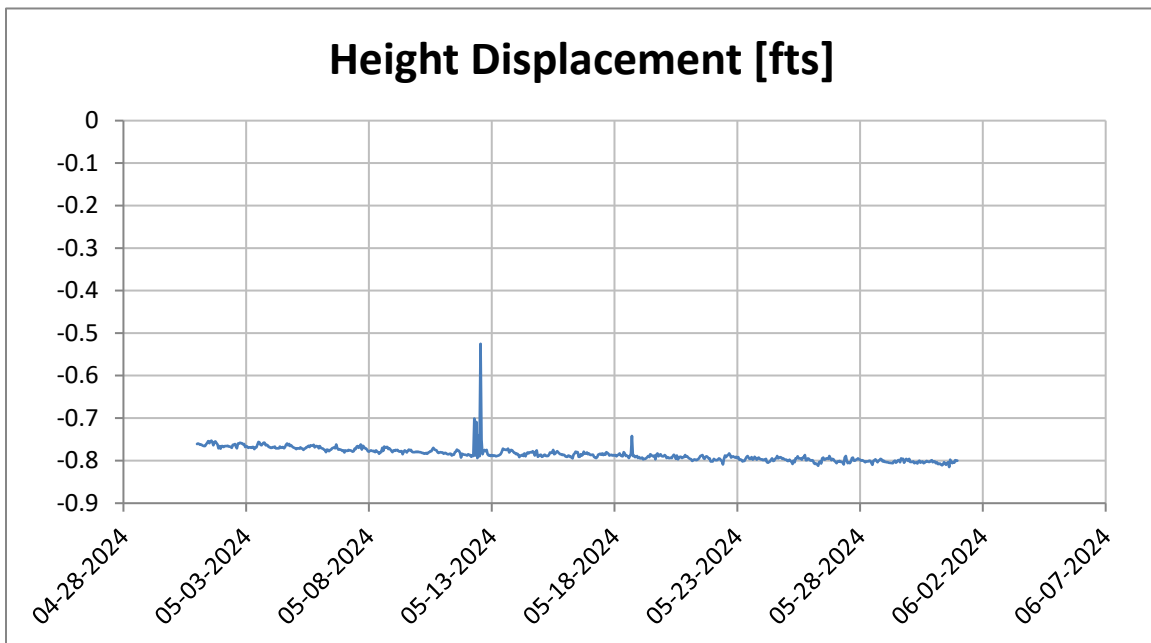
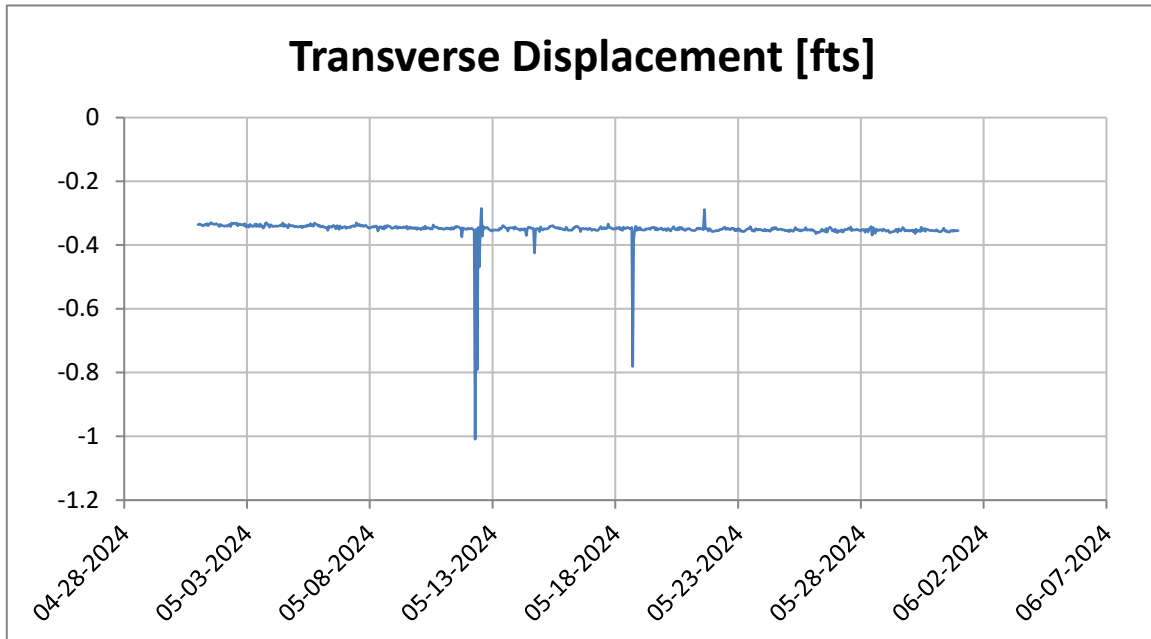
Prism B7300-4



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.
5. Prism impacted by topsoil placement on May 4.

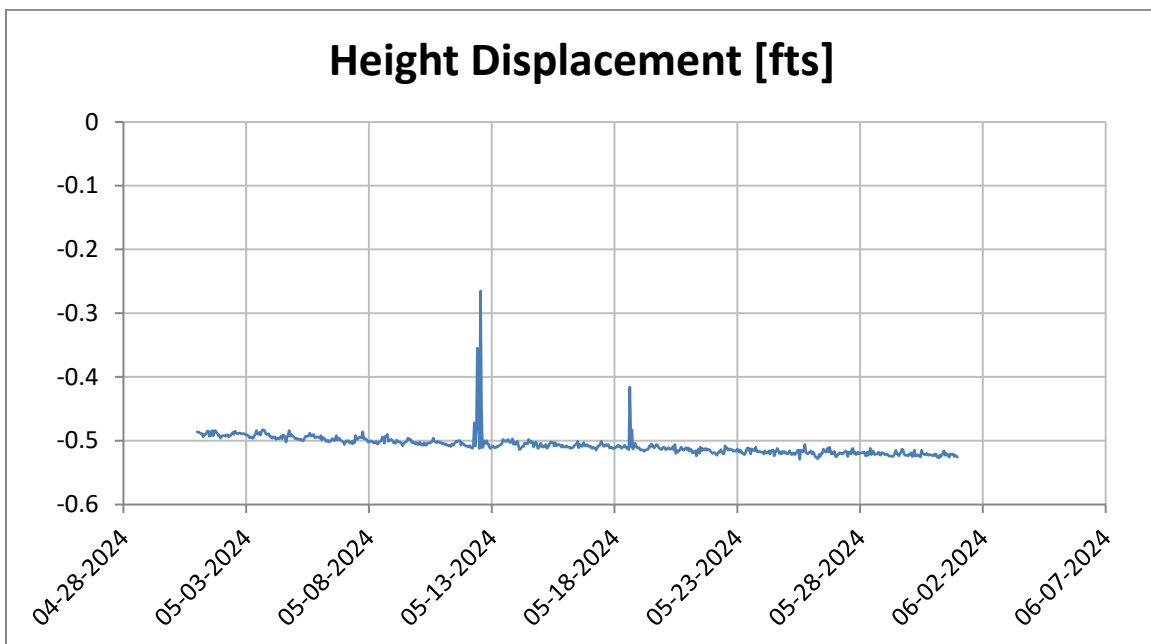
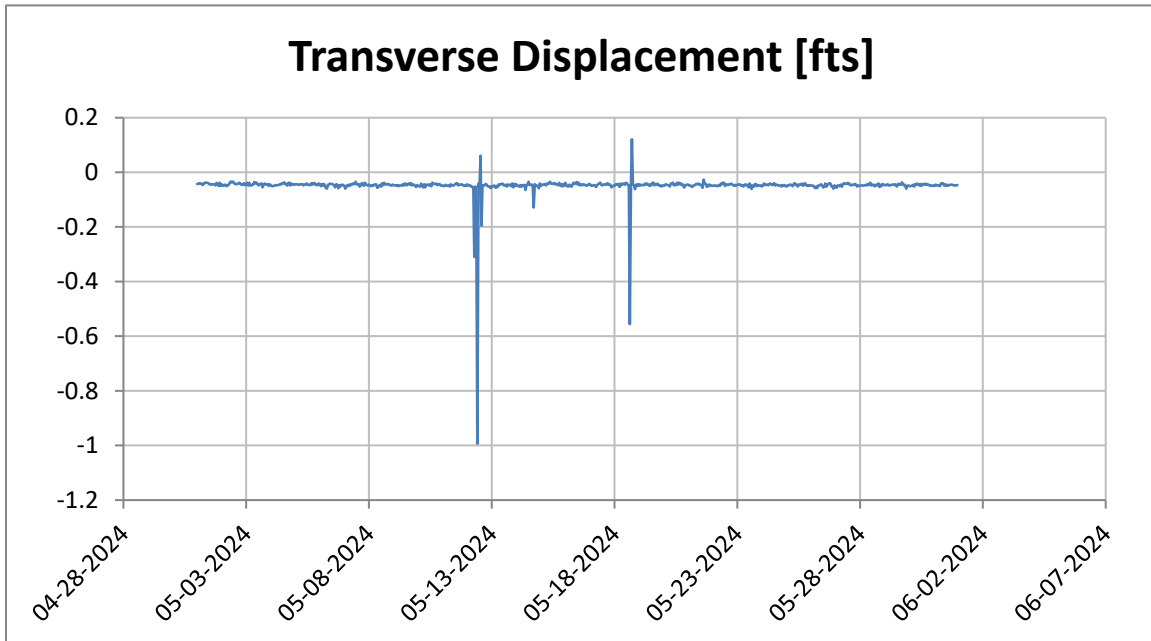
Prism B7400-1



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.

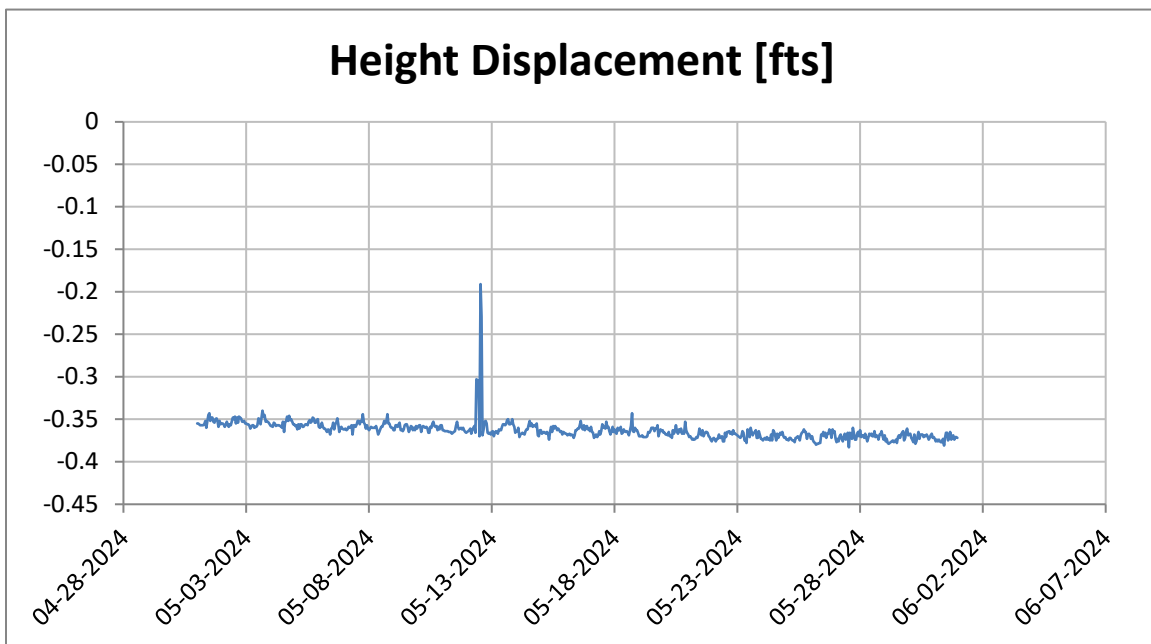
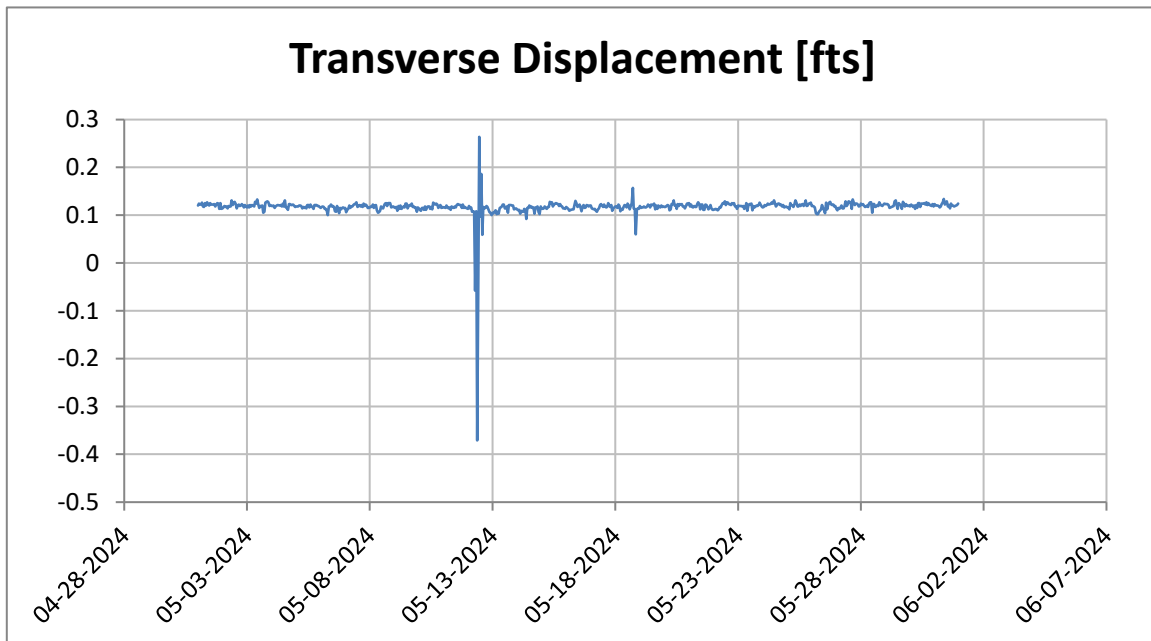
Prism B7400-2



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.

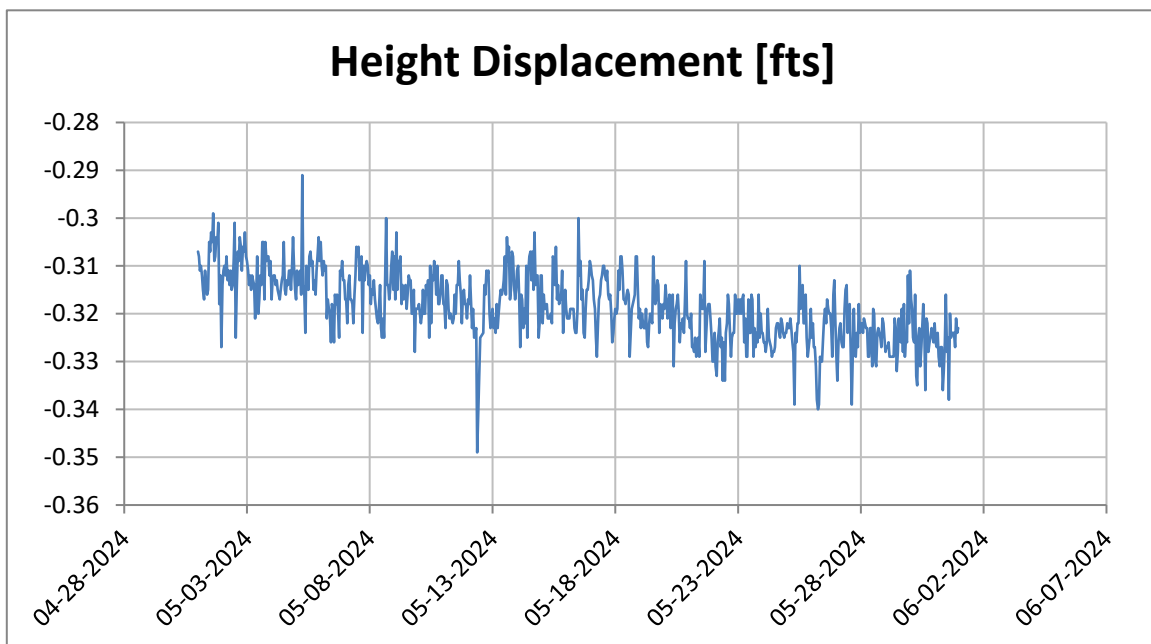
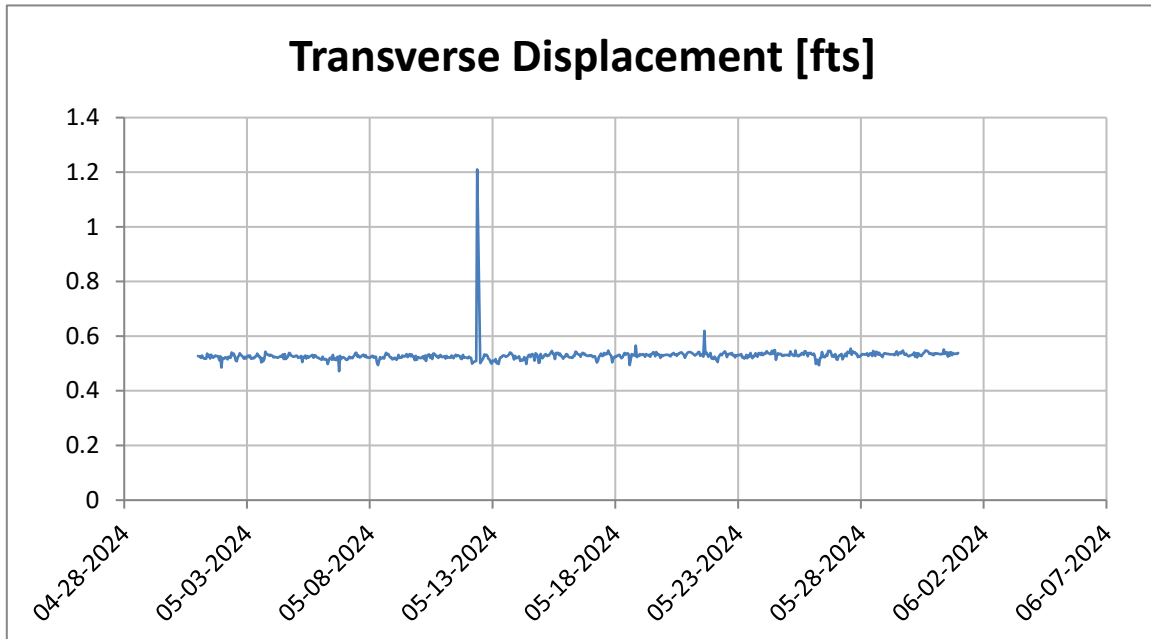
Prism B7400-3



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.

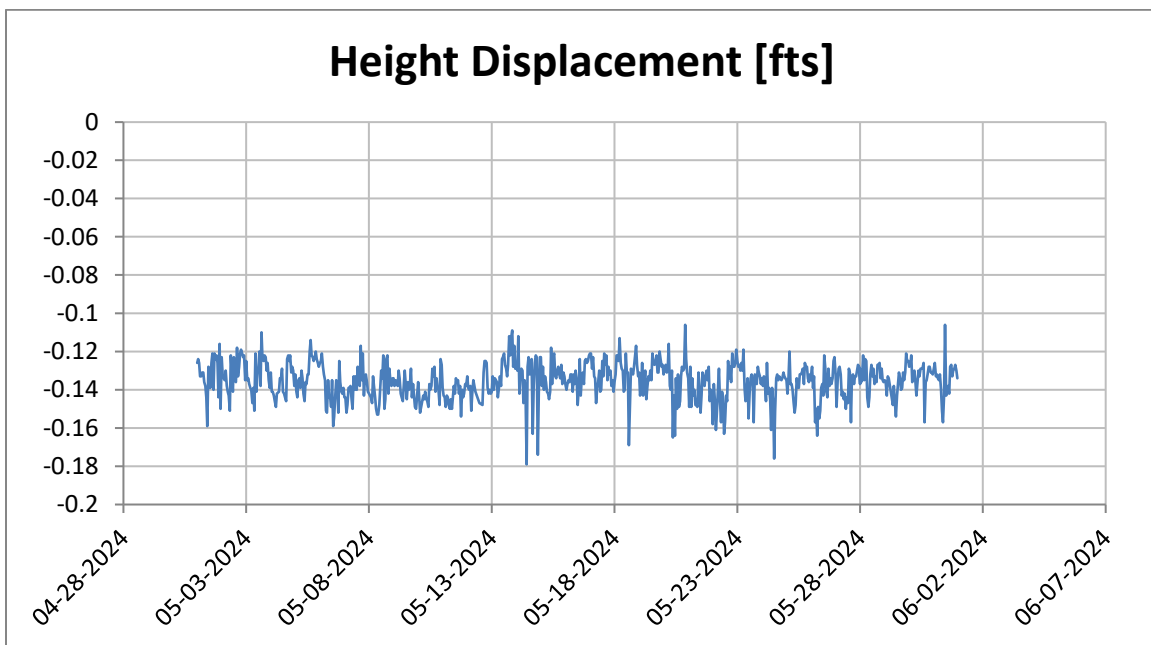
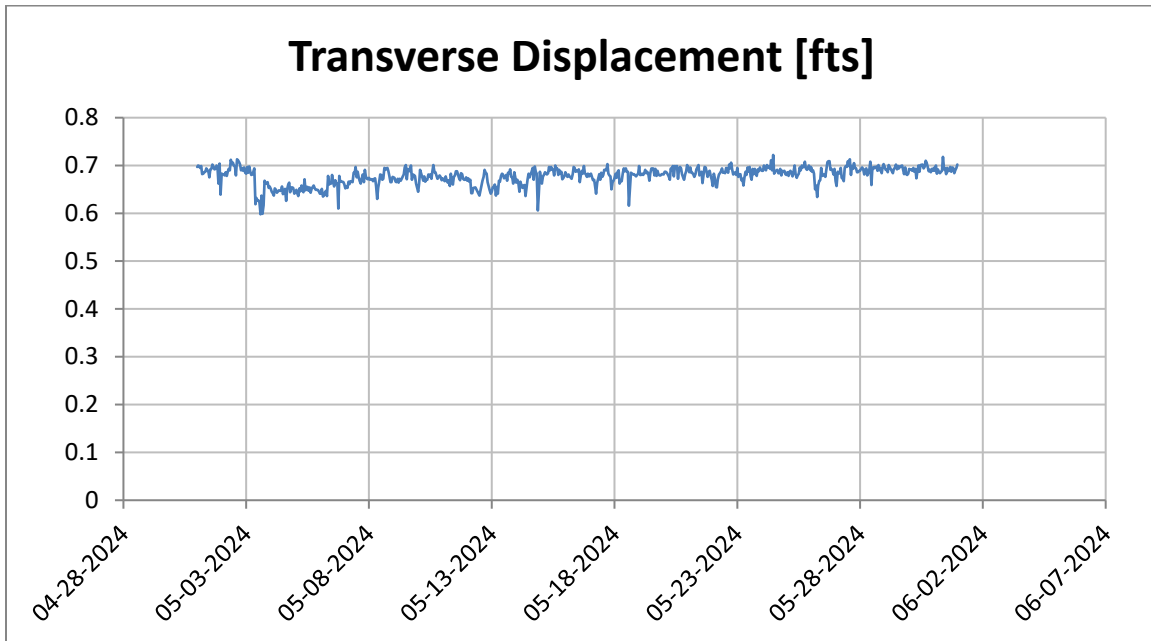
Prism B7400-4



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.

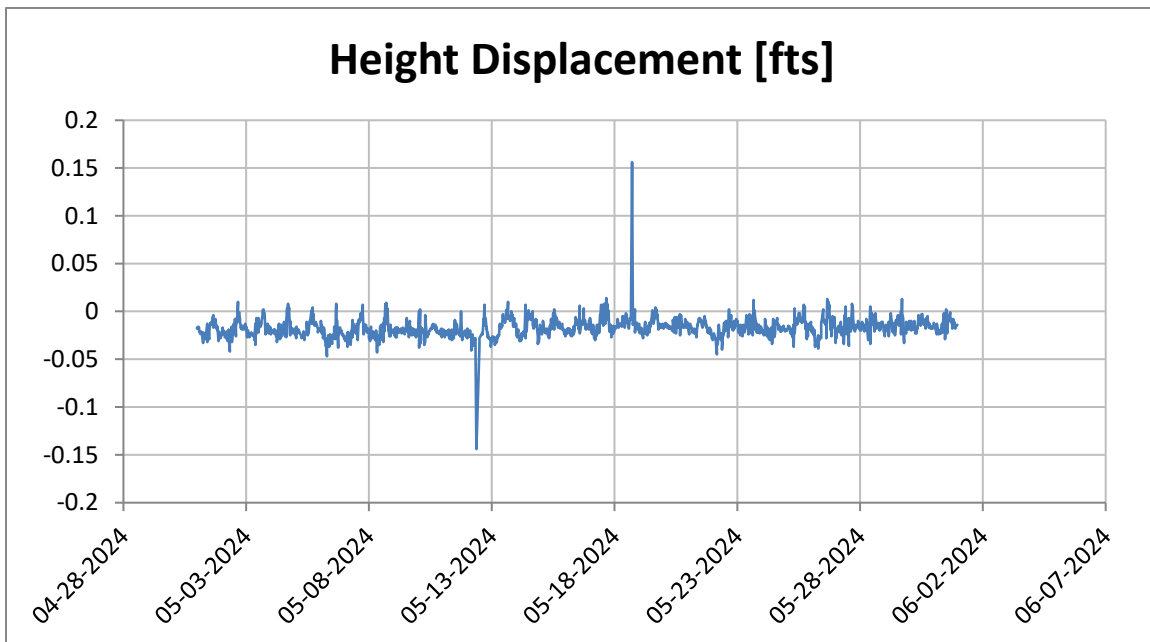
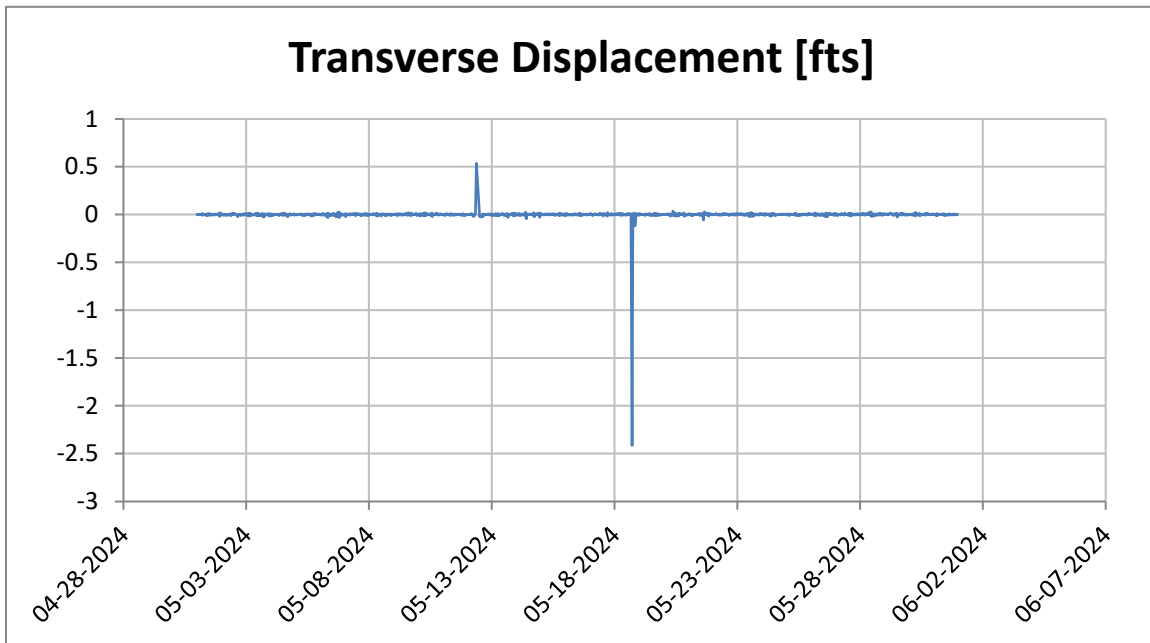
Prism B7400-5



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.

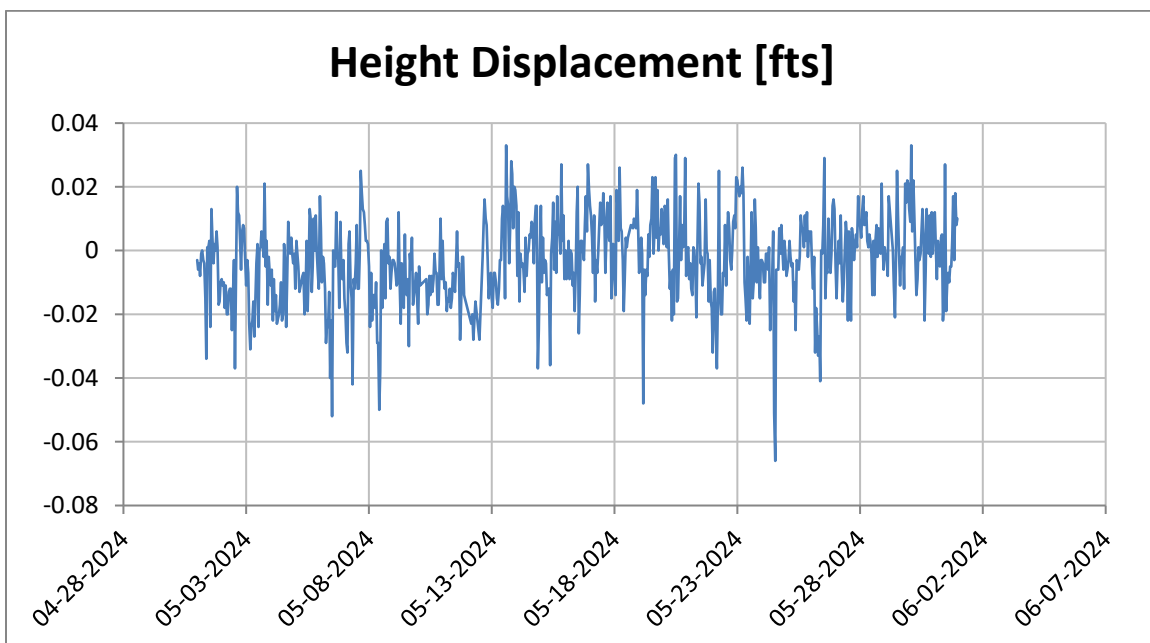
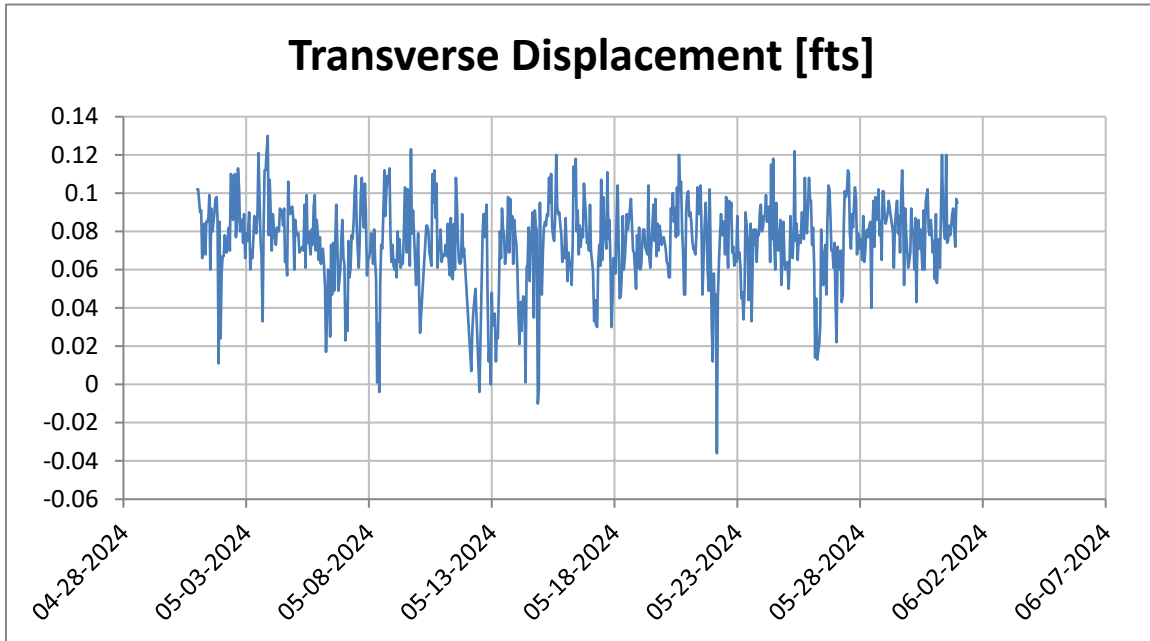
Prism CP6



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.

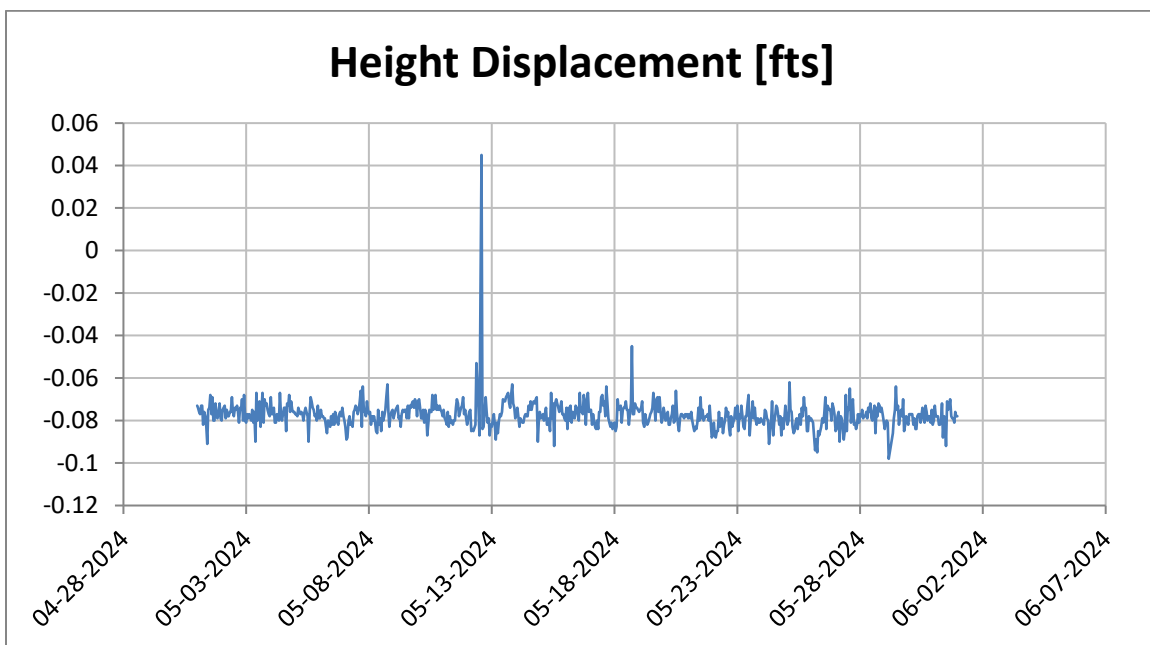
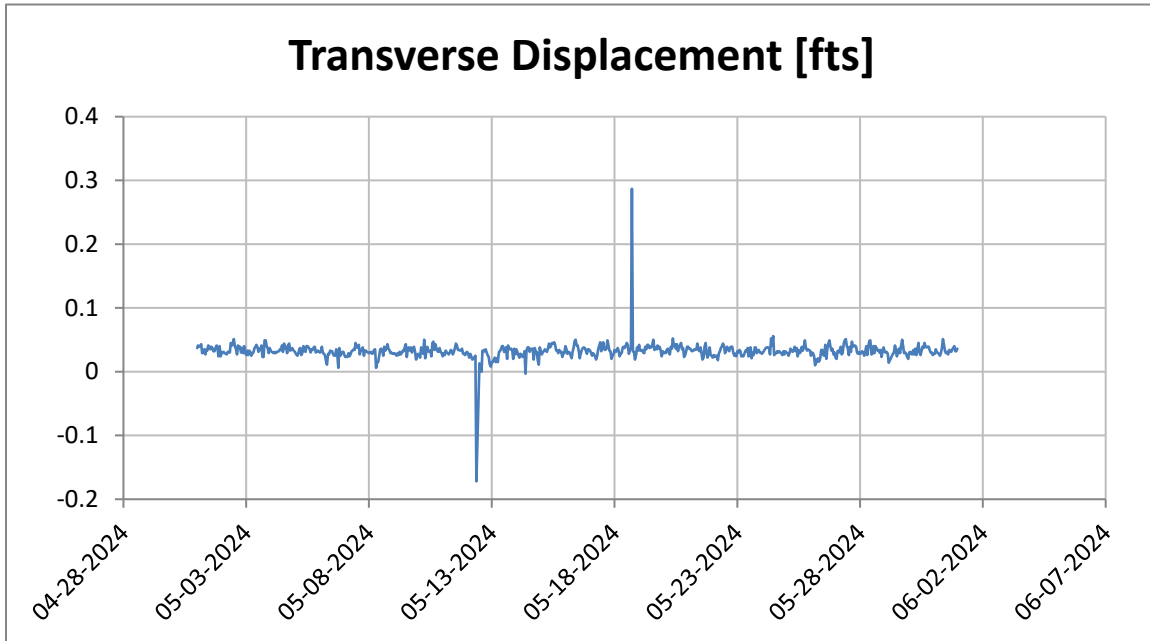
Prism CP7



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.

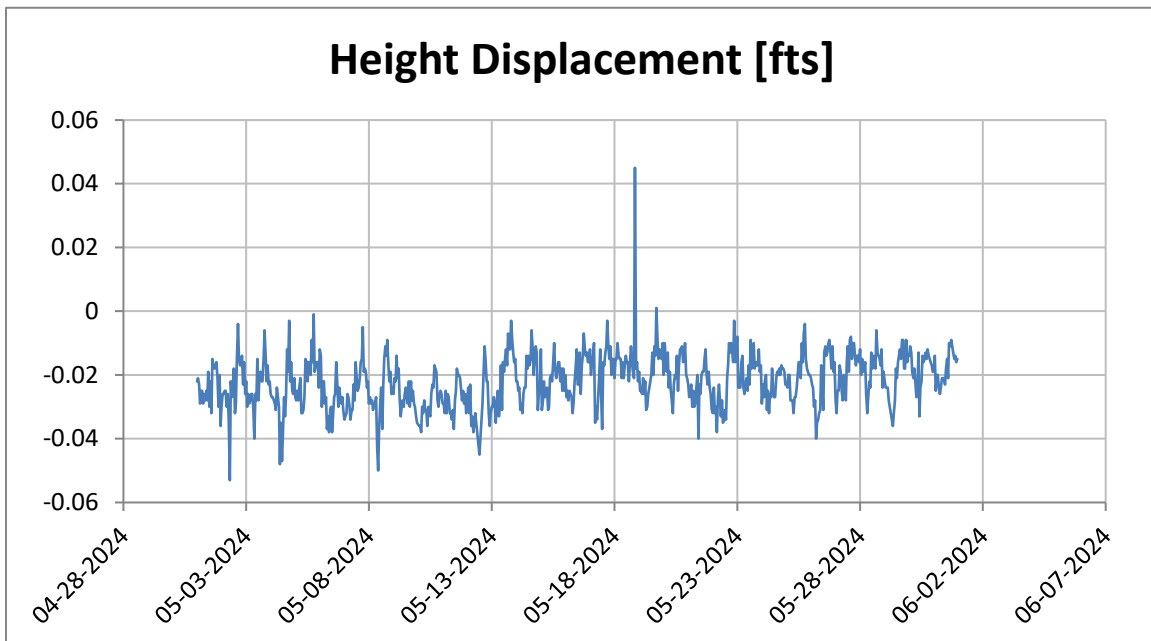
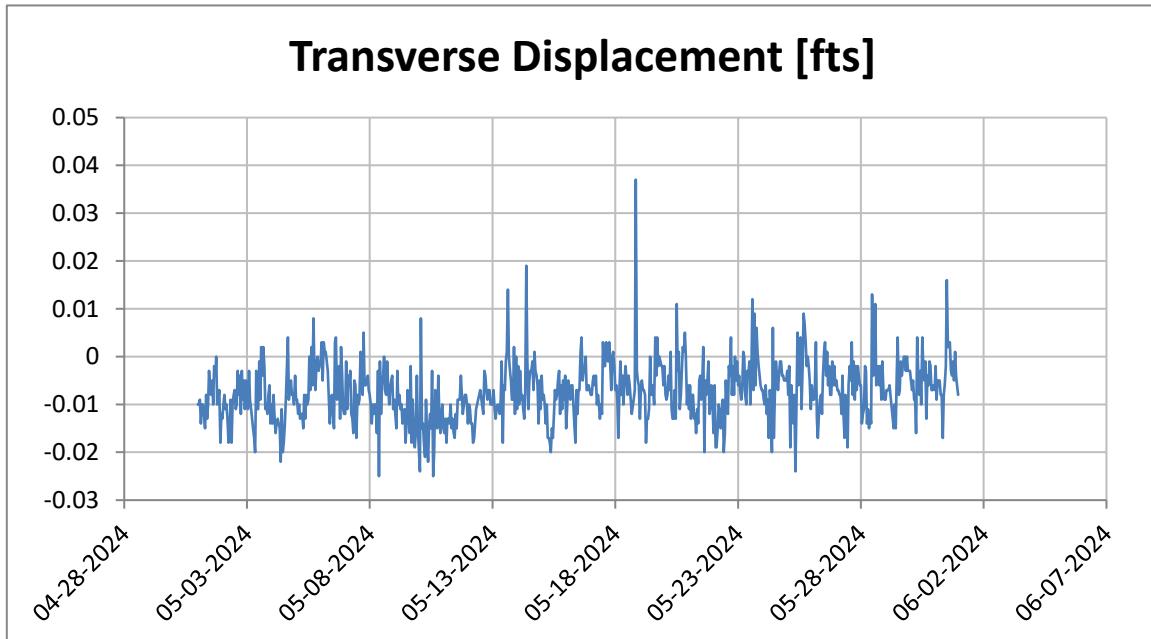
Prism NP4



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.

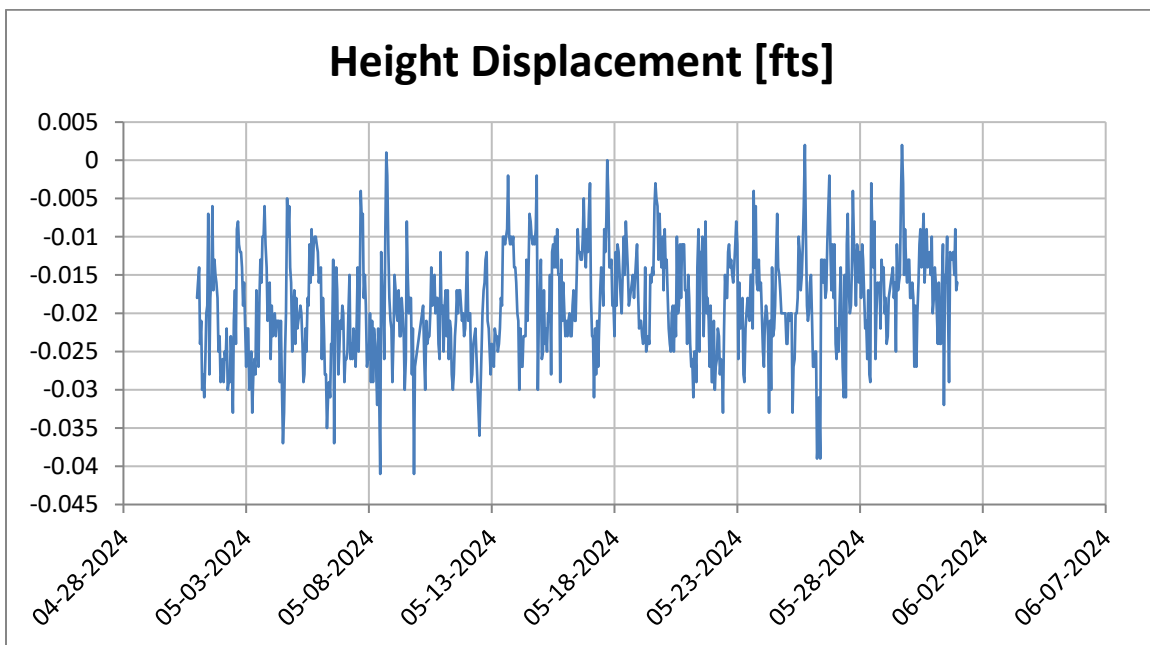
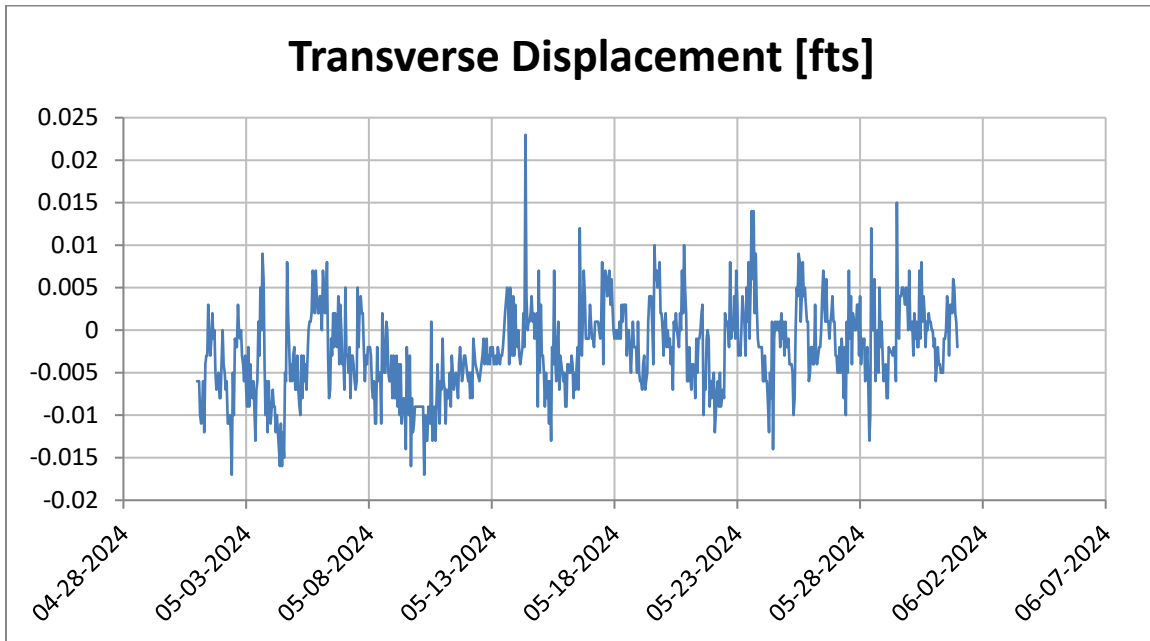
Prism P2



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.

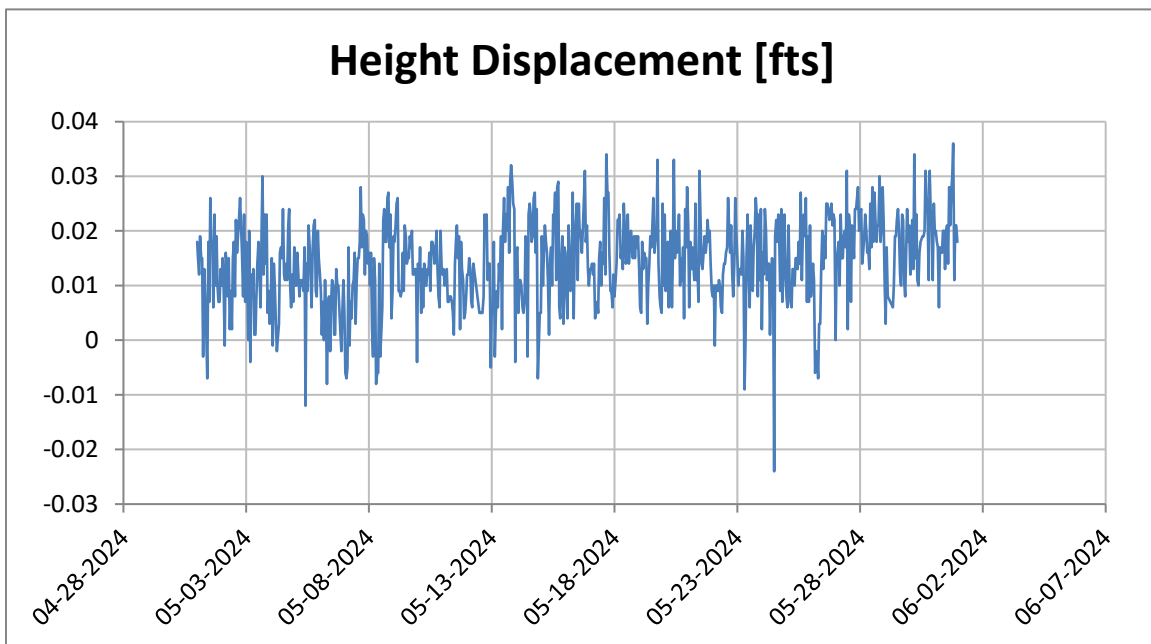
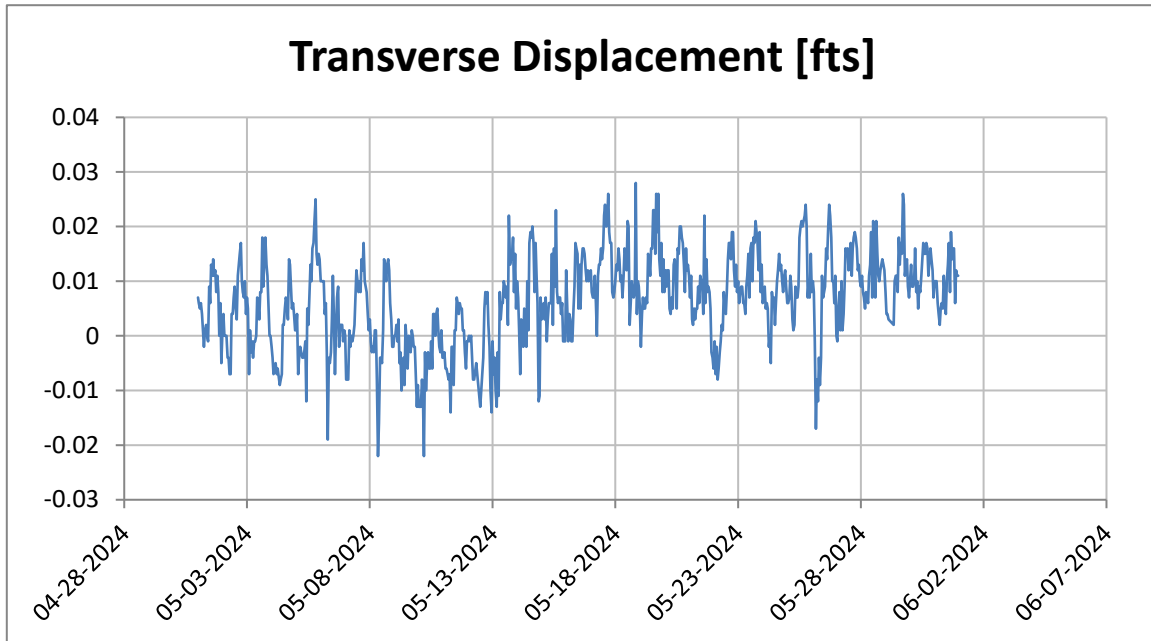
Prism P5



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.

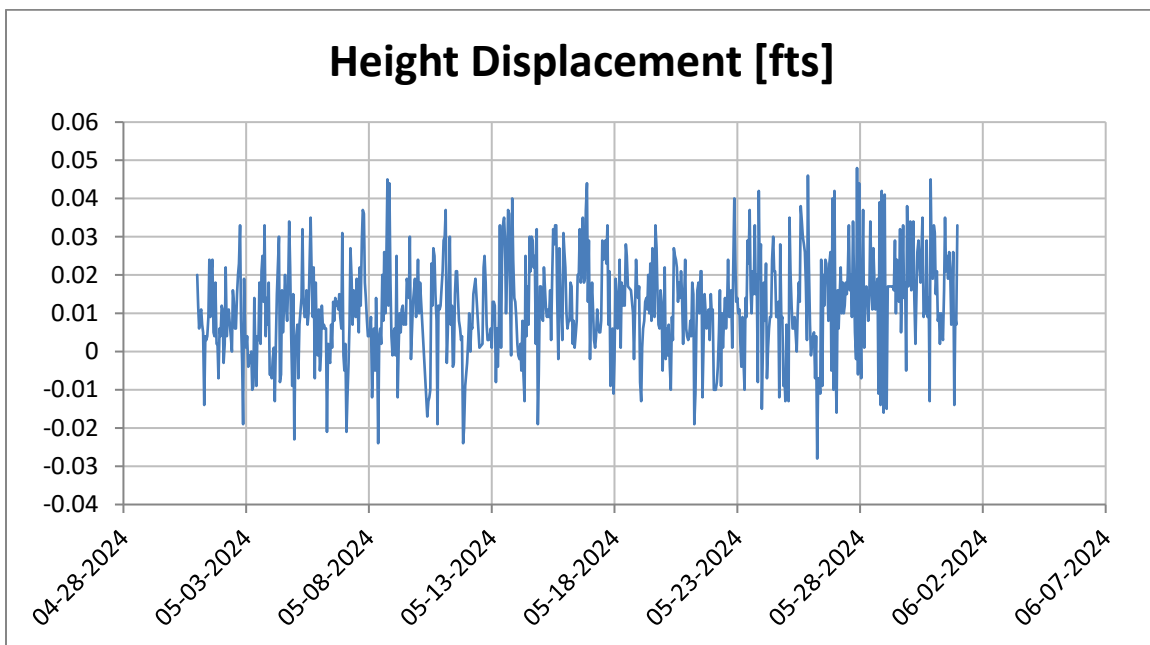
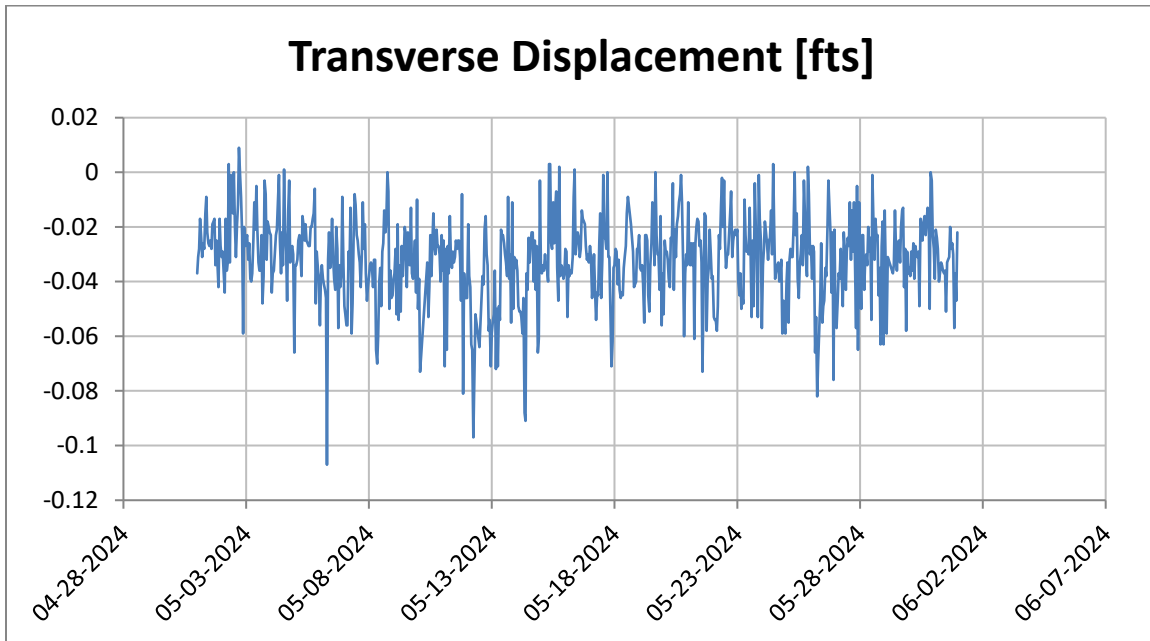
Prism P25



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.

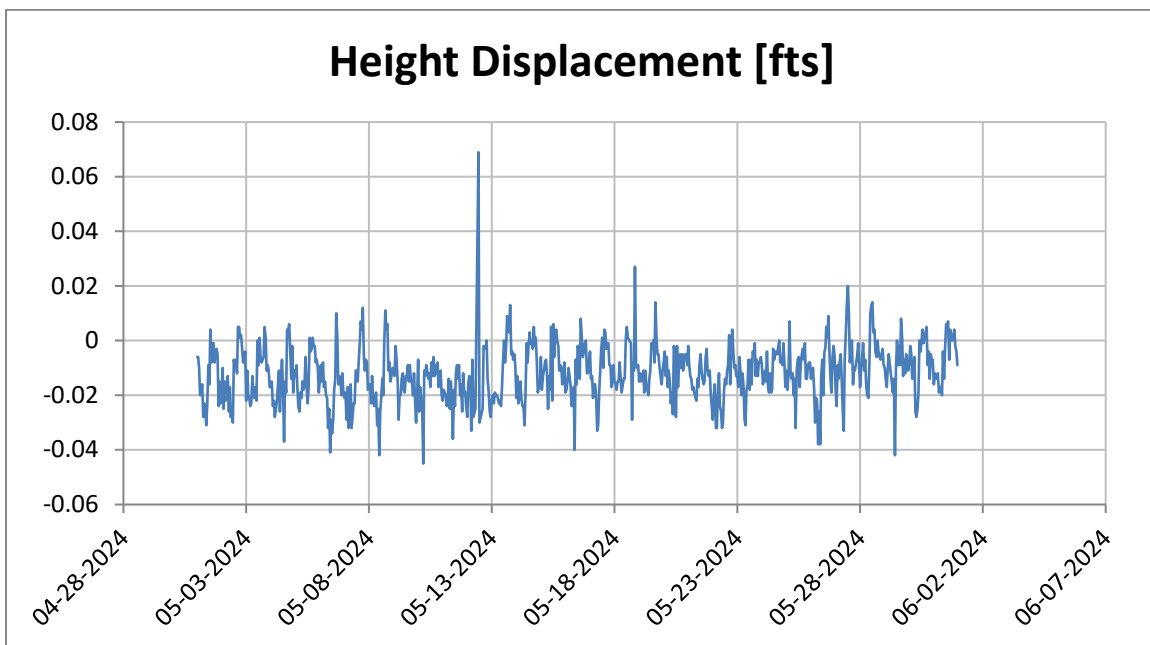
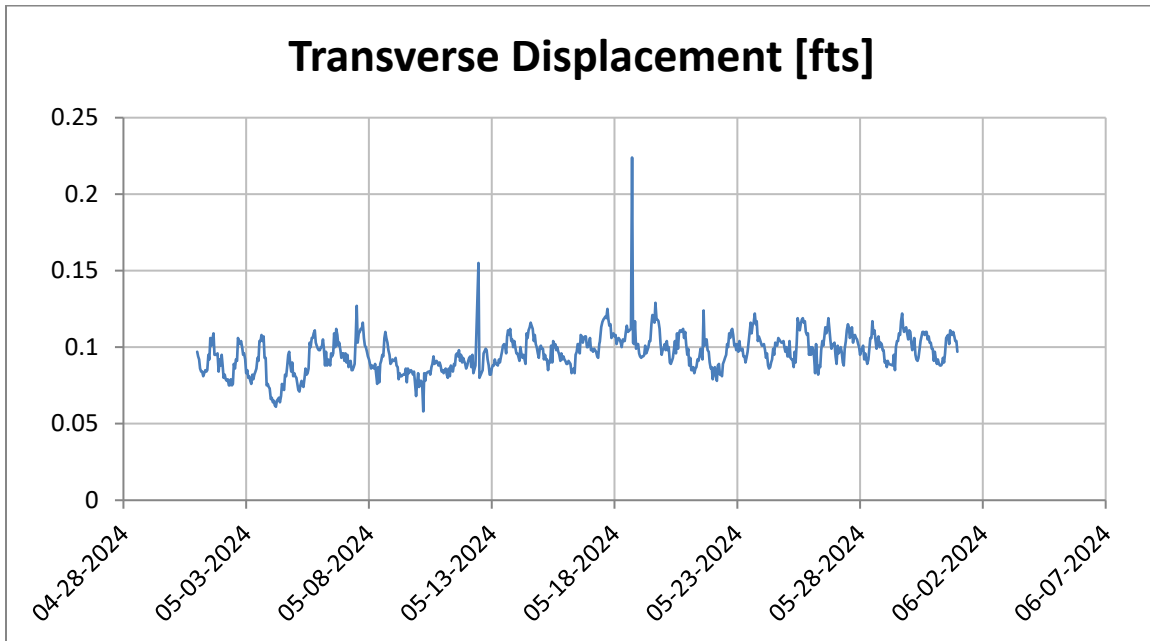
Prism P32R



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.

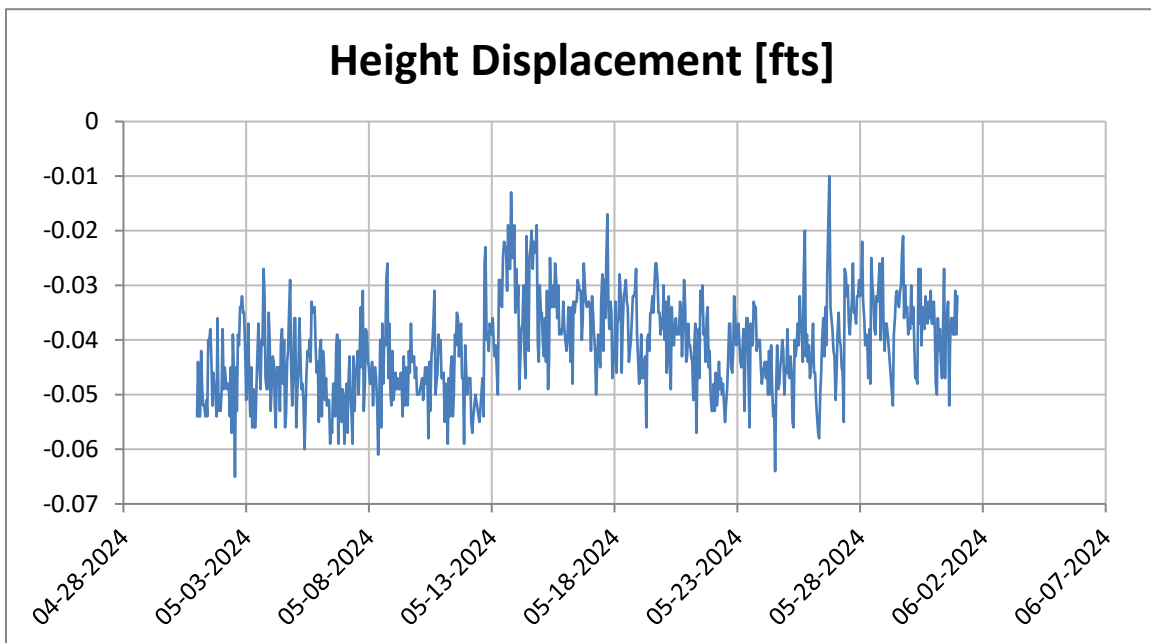
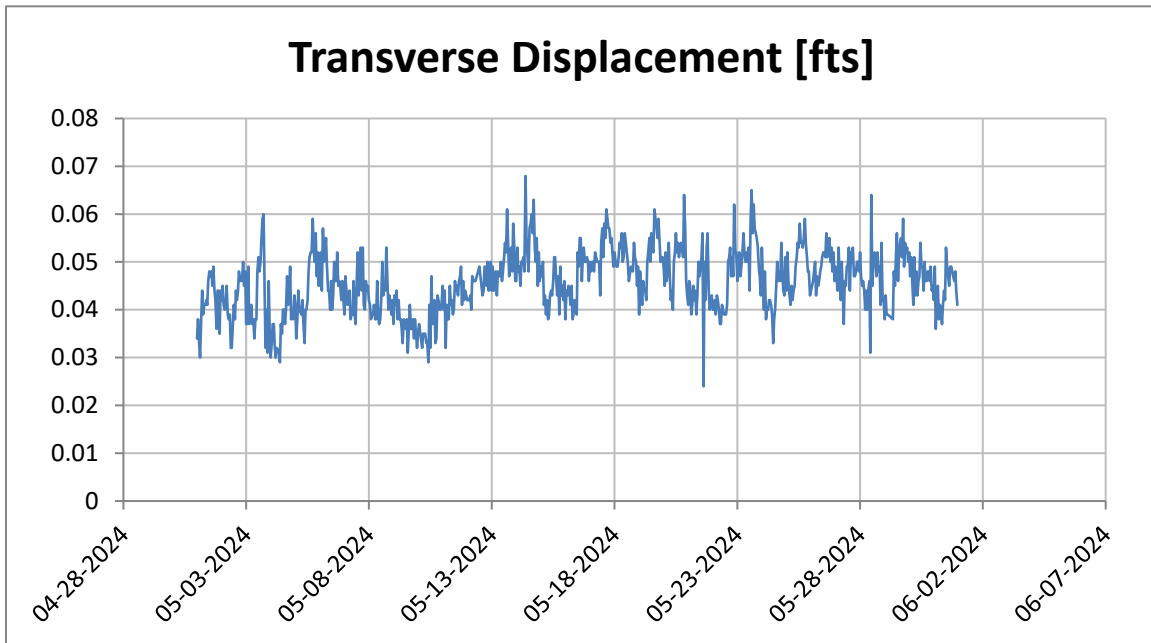
Prism P33



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. Regression limit received on May 18.

Prism P70



Notes:

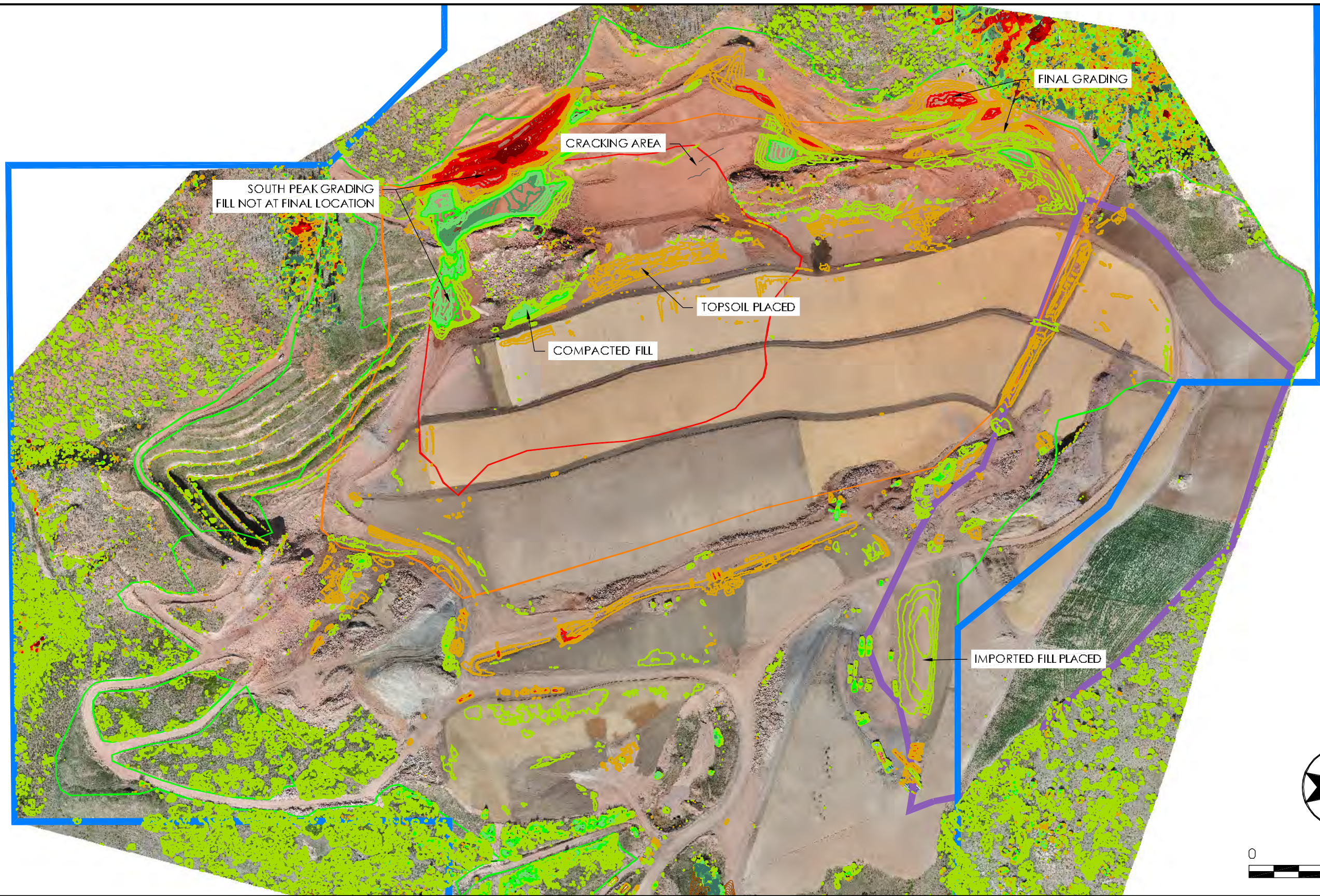
1. Survey accuracy is ± 0.016 feet.
2. Alert threshold is ± 0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic total station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.

Appendix C

Drone Survey

U:\2057288200\06_design\monitoring\2024-05\dwg\pkreview ptims_20240603

2024.06.26 3:51:33 PM



Stantec Consulting Services Inc.
410 17th Street Suite 1400
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
05/02/2024 TO 05/28/2024

Client/Project

CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE
MONITORING

Project No.

2057288200

Title

COMPARISON OF RECENT
AND PREVIOUS SURVEYS

Revision
#

Drawn By
PK

Date

2024.06.30

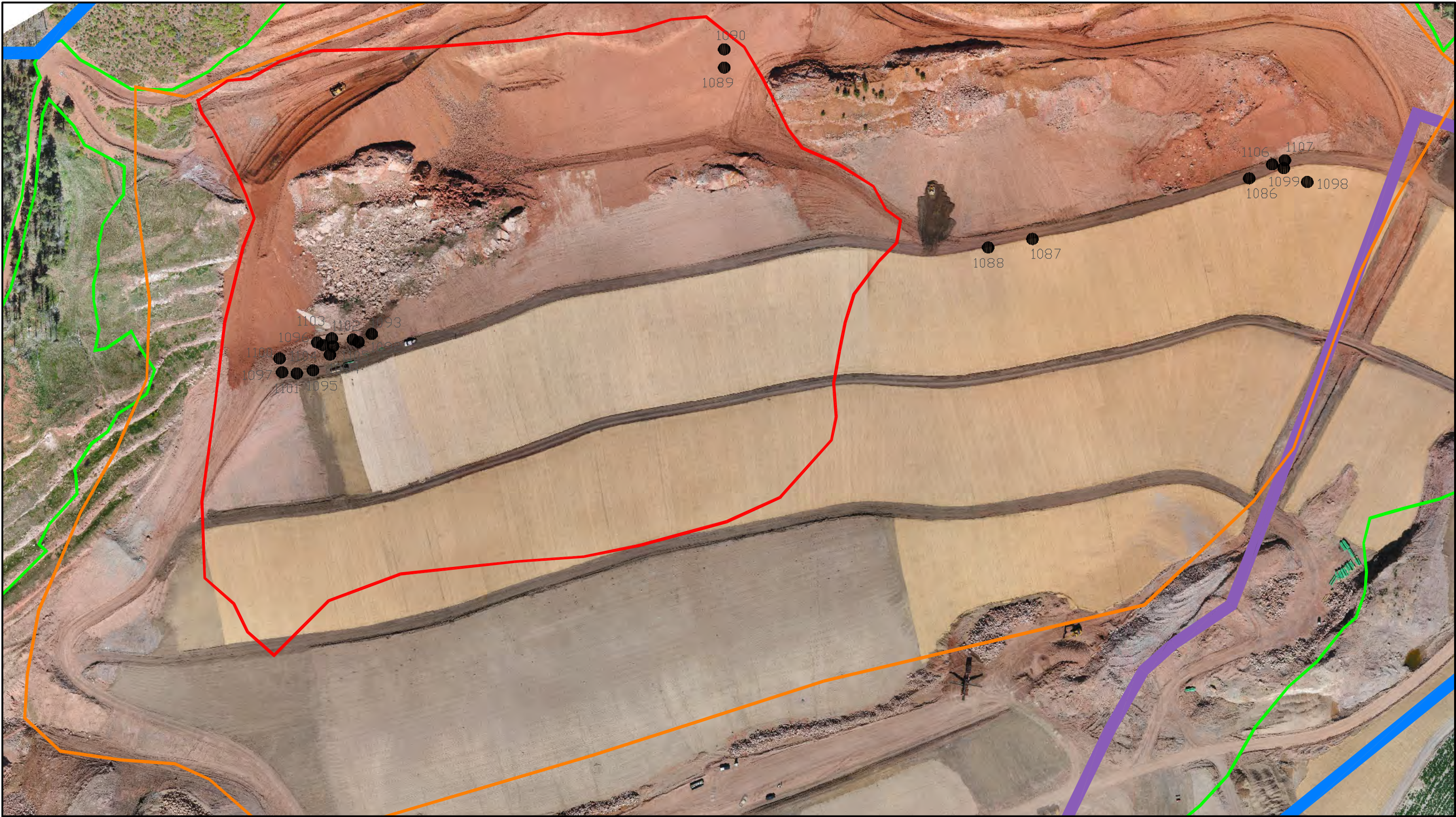
Figure No.

5

Appendix D

Compaction Testing Results

u:\2057288200\06_design\monitoring\2024-06\dwg\pkreview\pkreview.pltms_20240603
2024.06.26 3:52:10 PM

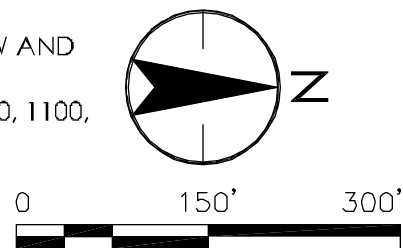


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410 171st Street Suite 1400
Denver CO 80202-4427
Tel: (303) 295-1717
www.stantec.com

LEGEND

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

1. THERE WAS NO TEST 1091.
2. TESTS 1089 AND 1090 ARE BELOW AND ABOVE THE CRACKING AREA.
3. LOCATIONS FOR TESTS 1089, 1090, 1100, AND 1101 ARE APPROXIMATE.



Client/Project

CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE
MONITORING

Project No.

2057288200

Title

COMPACTION TEST
LOCATIONS

Revision
#

Drawn By
PK

Date
2024.06.30

Figure No.
6

Compaction Testing Log

| Test No. | Date | Elevation (ft) | Northing (ft) | Easting (ft) | Wet Density (pcf) | Moisture Content (%) | Dry Density (pcf) | Compaction (%) |
|----------|-----------|----------------|---------------|--------------|-------------------|----------------------|-------------------|----------------|
| 1086 | 1-May-24 | 7446 | 1402756.7 | 3172683.3 | 144.3 | 6.3 | 135.8 | 111 |
| 1087 | 1-May-24 | 7453 | 1402398.9 | 3172783.1 | 147.5 | 8.8 | 135.6 | 110 |
| 1088 | 1-May-24 | 7454 | 1402325.8 | 3172796.5 | 130.7 | 14.7 | 113.9 | 93 |
| 1089 | 1-May-24 | 7680 | 1401890 | 3172500 | 131 | 7 | 122.4 | 100 |
| 1090 | 1-May-24 | 7670 | 1401890 | 3172470 | 122.6 | 3.1 | 118.9 | 97 |
| 1092 | 8-May-24 | 7476 | 1401285.9 | 3172952.9 | 131.9 | 5.4 | 125.2 | 102 |
| 1093 | 8-May-24 | 7476 | 1401307.9 | 3172940.4 | 125.1 | 5.1 | 119 | 97 |
| 1094 | 8-May-24 | 7477 | 1401238.7 | 3172973.6 | 129.1 | 6.6 | 121.1 | 99 |
| 1095 | 8-May-24 | 7477 | 1401211.1 | 3172999.9 | 121.4 | 4.3 | 116.4 | 95 |
| 1096 | 8-May-24 | 7479 | 1401218.1 | 3172954.3 | 127.2 | 7.2 | 118.7 | 97 |
| 1097 | 8-May-24 | 7476 | 1401159.5 | 3173003.1 | 129 | 5 | 122.8 | 100 |
| 1098 | 20-May-24 | 7446 | 1402852.8 | 3172689.3 | 129.5 | 11.6 | 116 | 94 |
| 1099 | 20-May-24 | 7445 | 1402813.6 | 3172666.4 | 140.5 | 12.2 | 125.2 | 102 |
| 1100 | 22-May-24 | 7476 | 1401155 | 3172980 | 150 | 4.1 | 144.1 | 117 |
| 1101 | 22-May-24 | 7476 | 1401160 | 3173000 | 140.5 | 4.5 | 134.4 | 109 |
| 1102 | 29-May-24 | 7478 | 1401243.5 | 3172960.4 | 150 | 4.1 | 144.1 | 117 |
| 1103 | 29-May-24 | 7478 | 1401241.8 | 3172947.4 | 140.2 | 4.5 | 134.1 | 109 |
| 1104 | 29-May-24 | 7478 | 1401226.7 | 3172957.7 | 142.6 | 4.3 | 136.7 | 111 |
| 1105 | 29-May-24 | 7476 | 1401276.6 | 3172948.6 | 144.5 | 3.6 | 139.5 | 114 |
| 1106 | 31-May-24 | 7445 | 1402795.2 | 3172659.9 | 123.2 | 4.9 | 117.4 | 96 |
| 1107 | 31-May-24 | 7444 | 1402816.1 | 3172653.2 | 135.6 | 3.4 | 131.1 | 107 |

Notes:

- A total 3,422,000 yd³ had been placed and compacted. This requires at least 685 compaction tests and 1,134 tests have been taken.
- Locations for Tests 1089, 1090, 1100, and 1101 are approximate.
- There is no test 1091.