Stantec

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

Reference: February 2024 Geotechnical Monitoring Summary Pikeview Quarry

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this February 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 reclamation activities which will affect the geotechnical performance of the existing and reclaimed slopes during and following reclamation grading. This report presents the geotechnical monitoring results for the slope reclamation activities at the site through the month of February 2024. Continuous monitoring by the robotic survey system began in 2010 and has continued through the month of February 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 February 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 inspecting those areas before work begins in that area. The daily inspection also includes visual observations of the quarry walls and floor for any changes. No changes to the quarry conditions were identified during daily inspections in February 2024. The notes from the daily inspections are included in Table A-1 in Appendix A.

Stantec conducted visual inspections of the Pikeview Quarry slopes on February 28, 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. The findings are listed below, and photographs of notable observations are included on Figure 2 in Appendix A.

- Reclamation grading began in February 2022 and continued throughout February 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 Lower Borrow, South Borrow and Shop Borrow Areas. The material was hauled up ramps to the buttress floor and placed in lifts and compacted.
- The fault between the granite and sedimentary rocks has been partially exposed. It is generally located farther east than originally thought; and the larger amount of granitic material reduces the driving force on the reclamation buttress and remaining sedimentary material.
- The access road below the “South Peak” continues to deteriorate and has been closed. The rock slope below the road was oversteepened was likely impacted by freeze/thaw conditions.
- No cracking was observed on the native granite slopes above the extents of the disturbed area.
- No new cracking was observed on the slope south of the southern scarp.
- 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.
- Rock was being screened, sorted, and stockpiled as riprap for use as erosion protection in the channels.
- Topsoil was placed on areas at final grade.
- Crews are preparing to blast the westernmost peak on site along the haul road. A drill rig was on site as a part of this operation.
- The contractor completed the removal of the culvert and berm.
- 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 February; 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 February. 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
1-Feb	B7300-1 not found	Single event. Equipment operations in area.	1-Feb
2-Feb to 3-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	3-Feb
4-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	4-Feb
5-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	5-Feb
7-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	7-Feb
9-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	9-Feb
10-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	10-Feb
11-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	11-Feb
15-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	15-Feb
16-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	16-Feb
17-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	17-Feb
25-Feb	B7300-0 not found	Single event during nighttime and fair weather. No work being performed at time of alert.	25-Feb
27-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	27-Feb
28-Feb	Points not found	Snow and fog. No work being performed at time of alerts.	28-Feb

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	-0.006	-0.431	0.0049	0.8119	
BR3	-0.036	-0.093	-0.0169	0.1015	
CP6	-0.002	-0.022	0.0043	0.0223	
CP7	0.092	0.014	0.0521	0.0961	
NP4	0.032	-0.067	0.0072	0.1230	
P2	-0.023	-0.022	0.0098	0.0318	
P5	-0.007	-0.018	-0.0058	0.0193	
P25	0.010	0.024	0.0035	0.0282	
P33	0.091	-0.011	-0.0116	0.1107	
P32R	-0.011	0.030	-0.0293	0.0320	
P70	0.031	-0.045	0.0086	0.0747	
B7200-1	-0.034	0.007	0.0057	0.0406	
B7200-2	0.008	-0.018	0.0018	0.0510	
B7200-3	0.176	-0.069	0.0337	0.2358	
B7300-0	-0.080	-0.107	0.0113	0.1416	
B7300-1	-0.146	-0.136	0.0378	0.3022	
B7300-2	-0.001	-0.129	0.0271	0.2150	
B7300-3	0.118	-0.121	0.0310	0.2369	
B7300-4	0.143	-0.064	0.0619	0.1764	
B7400-1	-0.014	-0.338	0.3420	0.3786	Settlement movement
B7400-2	-0.008	-0.224	0.2168	0.2404	Settlement movement
B7400-3	0.059	-0.162	0.1778	0.2089	Settlement movement
B7400-4	0.285	-0.140	0.3089	0.3374	Settlement movement
B7400-5	0.056	-0.038	0.0473	0.0781	

The data show stable conditions with no movements at 20 of 24 prisms with recorded displacements limited to data scatter and not actual movements. Prisms B7400-1, B7400-2, B7400-3 and B7400-4

recorded slow gradual movement as they settled in loose fill along the benches. This settlement was likely related to a lens of fill being placed after the prisms were installed. 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 February 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 February topography was also compared to the January 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 Lower Borrow, South Borrow and Shop Borrow Areas and placed in the Buttress Area. No slope movements or other changes in topography were identified. The current imagery and topography are included in Figures 1 and 3, and the comparison surface is included as Figure 5 in Appendix C.

As previously reported in the September 2020 monitoring report, there are limitations with the method of comparing drone surveys from different months. The drone data indicate changes in the slopes along each of the reclamation benches, buildings, and areas with trees or shrubs. These areas are stable, and the changes are the result of survey limitations on or near vertical slopes.

5.0 COMPACTION TESTING

Fill placement occurred from February 2022 through June 2023 and from September 2023 to present. In the month of February 2024, the contractor placed and compacted 168,000 yd^3 of material on the buttress floor. Castle Aggregate placed 30,000 yd^3 of this total. All this material was from the Lower Borrow, South Borrow and Shop Borrow Area and was hauled 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 34 compaction tests. There were 60 compaction tests taken in February. One test (#955) did not meet the compaction requirements; the area was recompacted and the subsequent test met the project specifications. Test #955 has not been included in the compaction test count. As of February 29, 2024, when the site was surveyed, a total of approximately 3,077,000 yd^3 had been placed and compacted. This required at least 616 compaction tests, and 1,216 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)

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 Spring 2024 (est.)
Phase 4 – Contractor Demobilize from Site	Spring 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.
- Construction activities continued in the Upper Borrow Area.
- Processing of riprap continued.
- Geotechnical monitoring continued.
- Topsoil placement occurred where fill placement has been completed.

Work planned for next month includes:

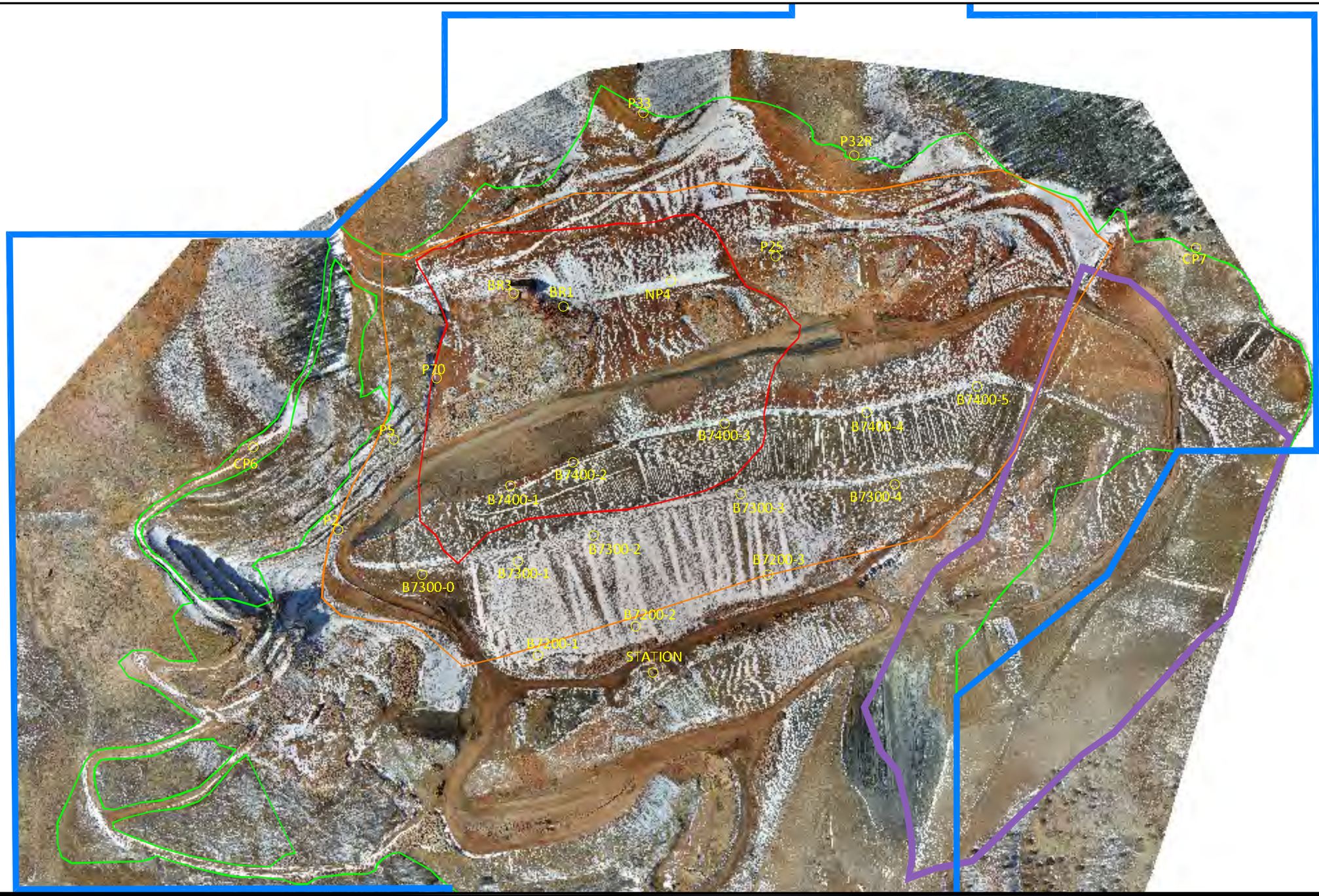
- Prepare a Technical Revision for drainage revisions required by leaving granite bedrock west of the fault.
- Begin drilling operations for blasting on the south peak of the Upper Borrow Area.
- Select a vegetation contractor and begin procuring container stock.
- Continue placing compacted fill in the buttress area.
- Continue processing riprap.
- Continue placing topsoil where grading has been completed.
- Continue geotechnical monitoring.
- Continue to remove and replace prisms on an as-needed basis.

7.0 CONCLUSIONS

The data collected in February 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 February 2024 indicate evidence of any large-scale movements that increase risk to workers or to the public. Shallow surface erosion continues to occur requiring ongoing maintenance and cleanup.

- Restricted access to the ungraded landslide slopes should continue.
- All monitoring should continue at current frequencies.
- All alerts shall continue to be taken seriously even if data errors are suspected.



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'

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Client/Project
CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
SITE MAP

Revision
#

Date
2024.03.31

Drawn By
PK

Figure No.
1

Appendix A

Visual Inspections

6. VIEW NORTH FROM NEW BENCHES.

5. RIP RAP STOCKPILE

4.DRILL RIG PREPARING FOR BLASTING.

3. CLOSED ACCESS ROAD WITH DETERIORATED BENCH. ALSO, AREA TO BE BLASTED.

7. NEW BENCH PRISM SETTLING.

2. CULVERT PIPE REMAINS.

8. SHOP AREA EXCAVATION.

1. POND AND CULVERT PIPE REMOVED.

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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 FEBRUARY 28, 2024.

N

0 400' 800'

Client/Project
CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
OBSERVATIONS FROM FEBRUARY INSPECTION

Revision	Date
#	2024.03.31
Drawn By	Figure No.
PK	2

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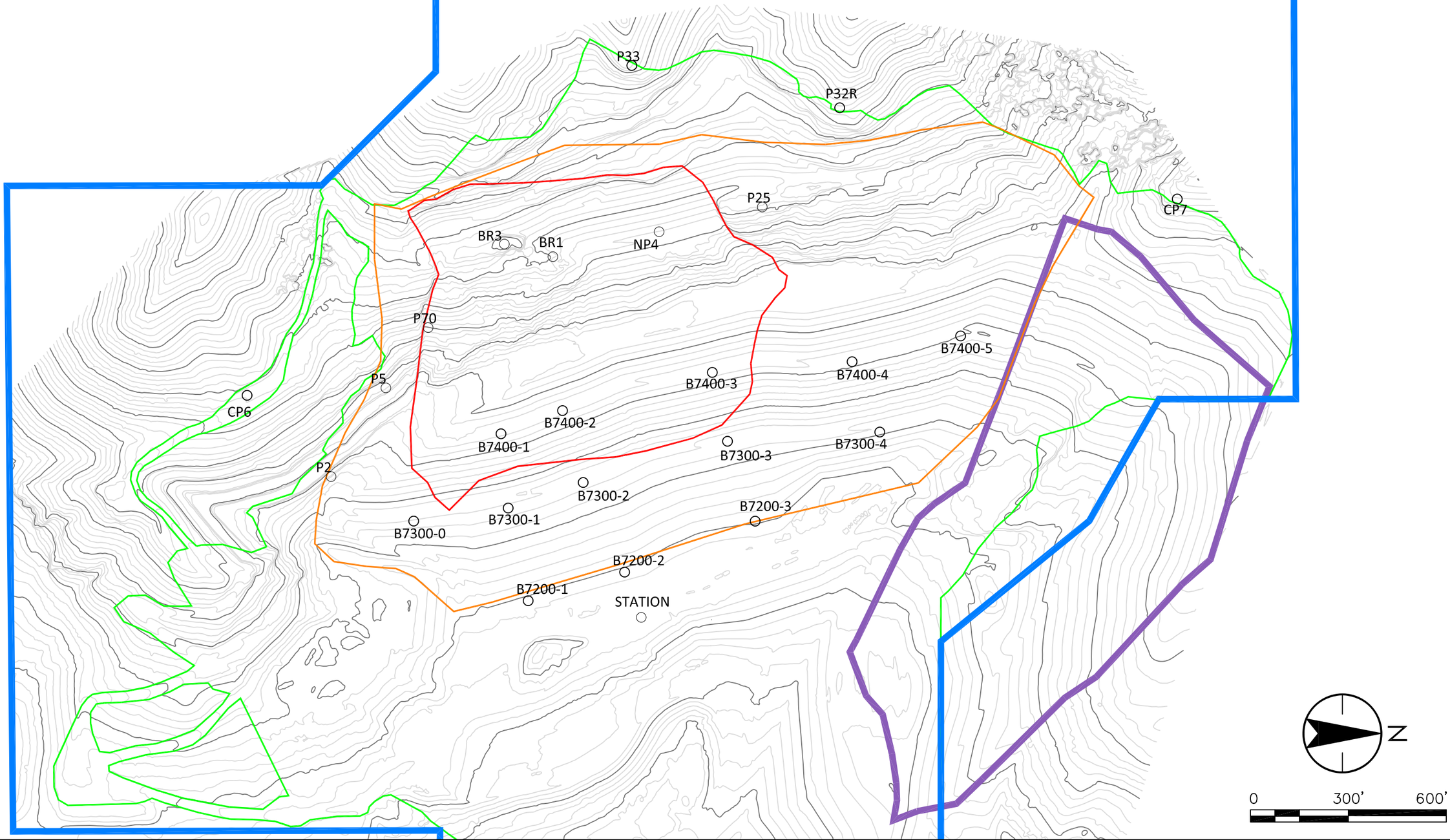
Table A-1 Summary of Daily Inspections

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

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 FEBRUARY 28, 2024 DRONE SURVEY.
4. CONTOUR INTERVAL IS 10 FEET

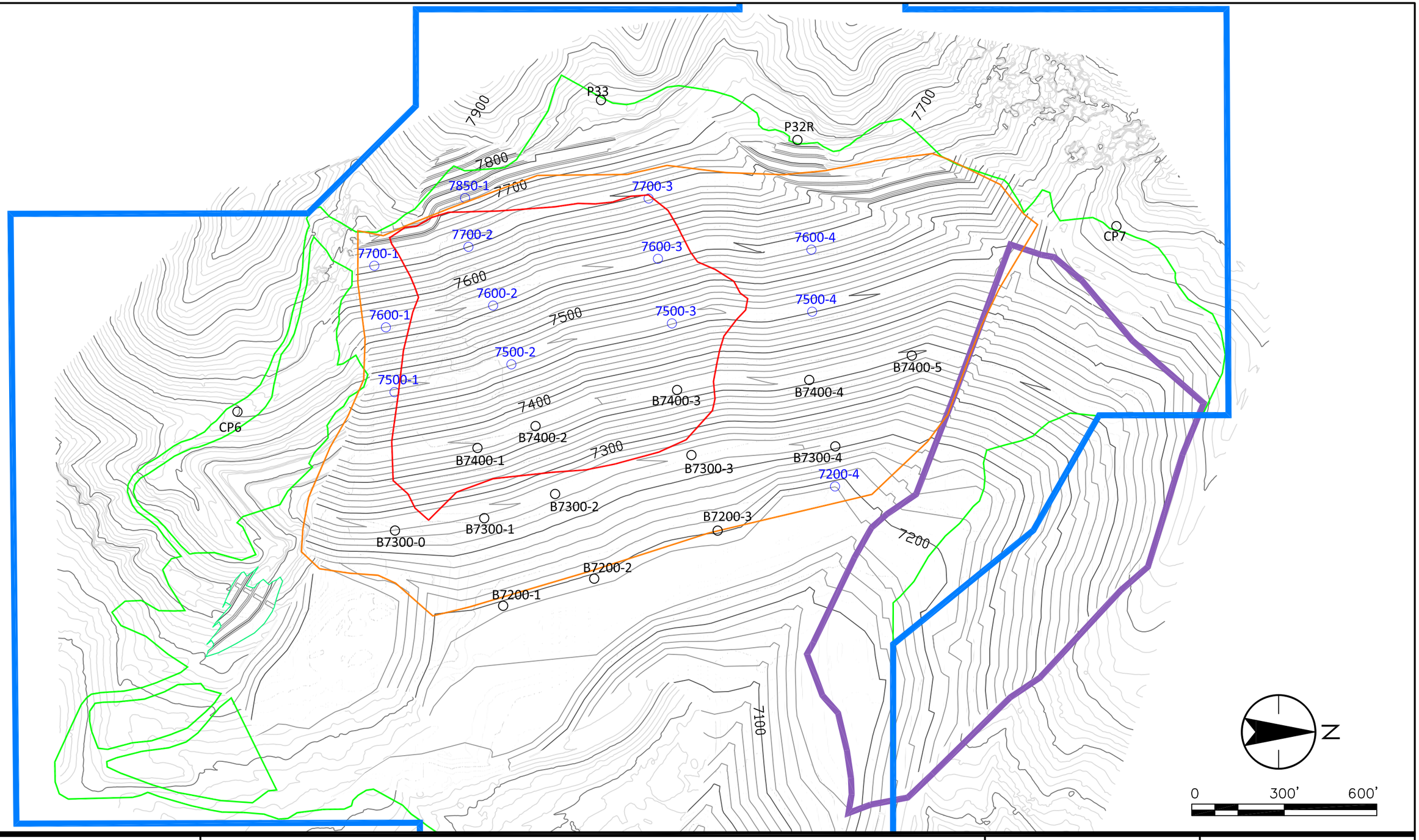
Client/Project
CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision	Date
#	2024.03.31
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
2024.03.31

Drawn By
PK

Figure No.
4

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Prism Log

Prism	Date	Action	Comment
CP2	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
CP3	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
NP1	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
TOE2	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
CP4	11-Mar-22	Prism Added	Control Point Replacement
CP5	11-Mar-22	Prism Added	Control Point Replacement
TS1	12-Mar-22	Prism Added	New Prism Added
TOE3	30-Mar-22	Prism Removed	Reclamation grading to affect buffer filling activities
TOE4	8-Apr-22	Prism Added	New Prism Added
TOE5	8-Apr-22	Prism Added	New Prism Added
BR1	8-Apr-22	Prism Added	New Prism Added
BR2	8-Apr-22	Prism Added	New Prism Added
NP1	22-Apr-22	Prism Removed	Originally NP1. Prism re-set in same spot and is now NP3
NP3	22-Apr-22	Prism Added	
TOE3	22-Apr-22	Prism Removed	Originally TOE3. Prism moved to a higher elevation and is now TOE6
TOE6	22-Apr-22	Prism Added	
TOE1	22-Apr-22	Prism Removed	Reclamation grading to affect buffer filling activities
P4	17-Jun-22	Prism Removed	Prism removed due to rock deterioration
P69	20-Jul-22	Prism Removed	Prism was originally P69. It has been re-set to Higher Elevation and is now P69A. Related to 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 prim
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

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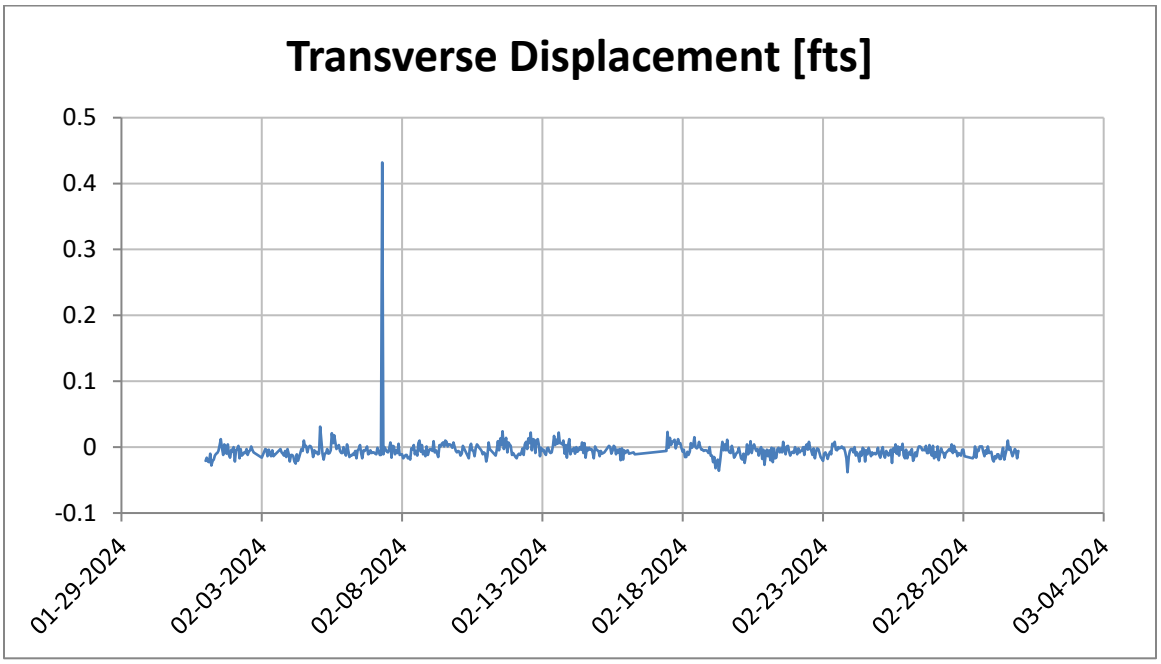
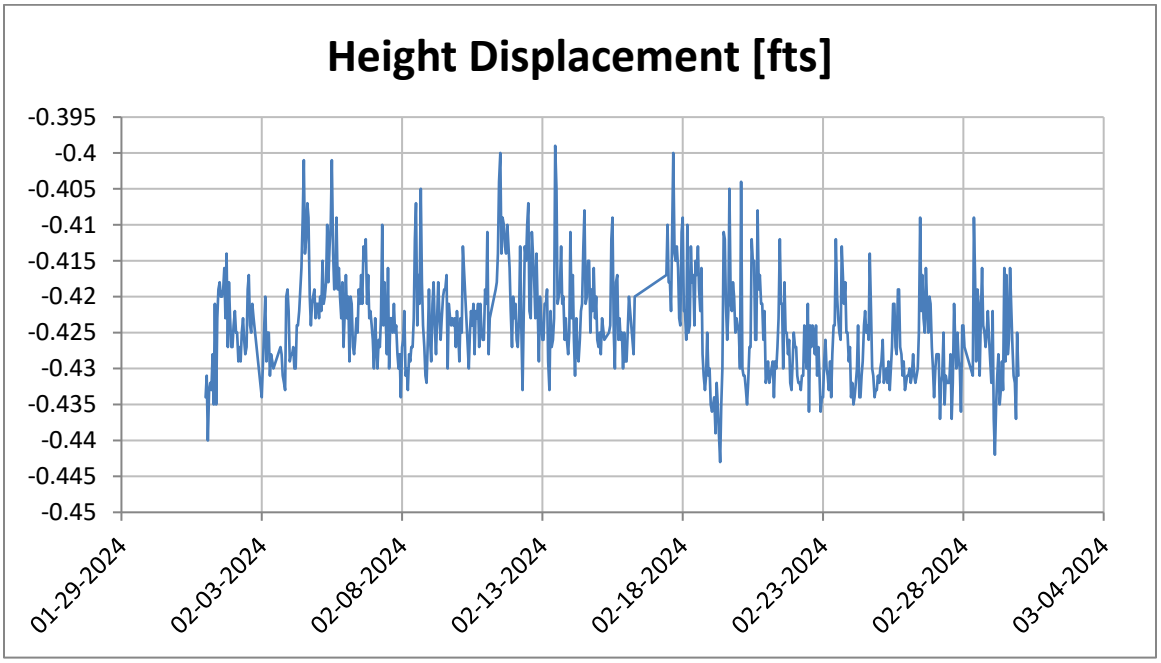
Prism BR1



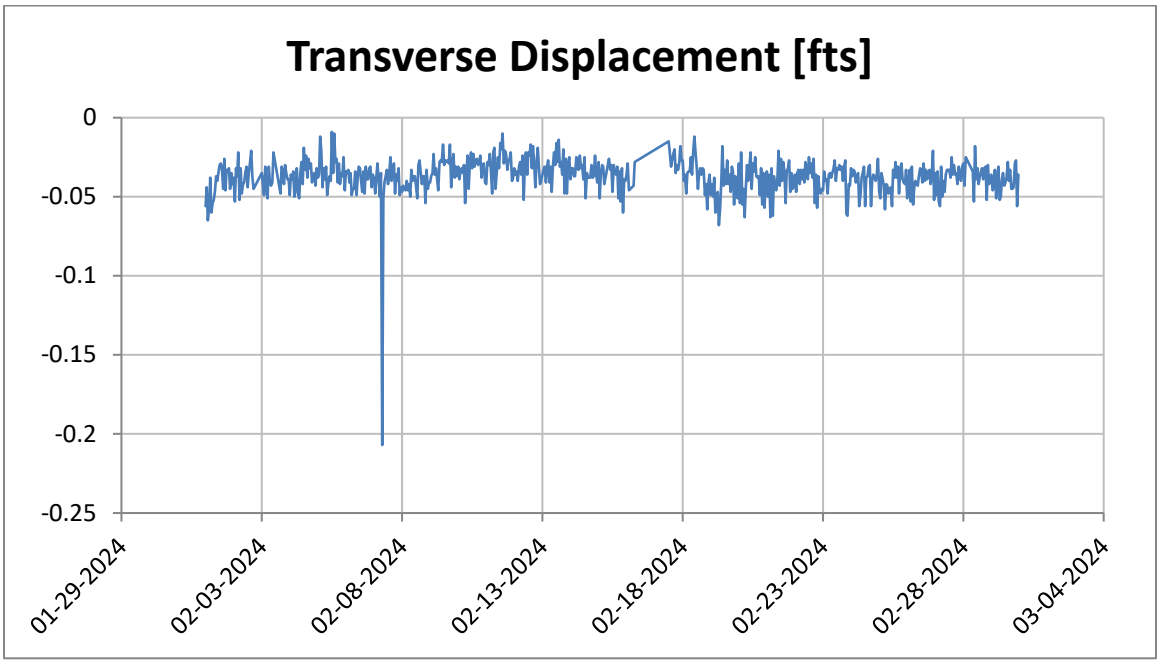


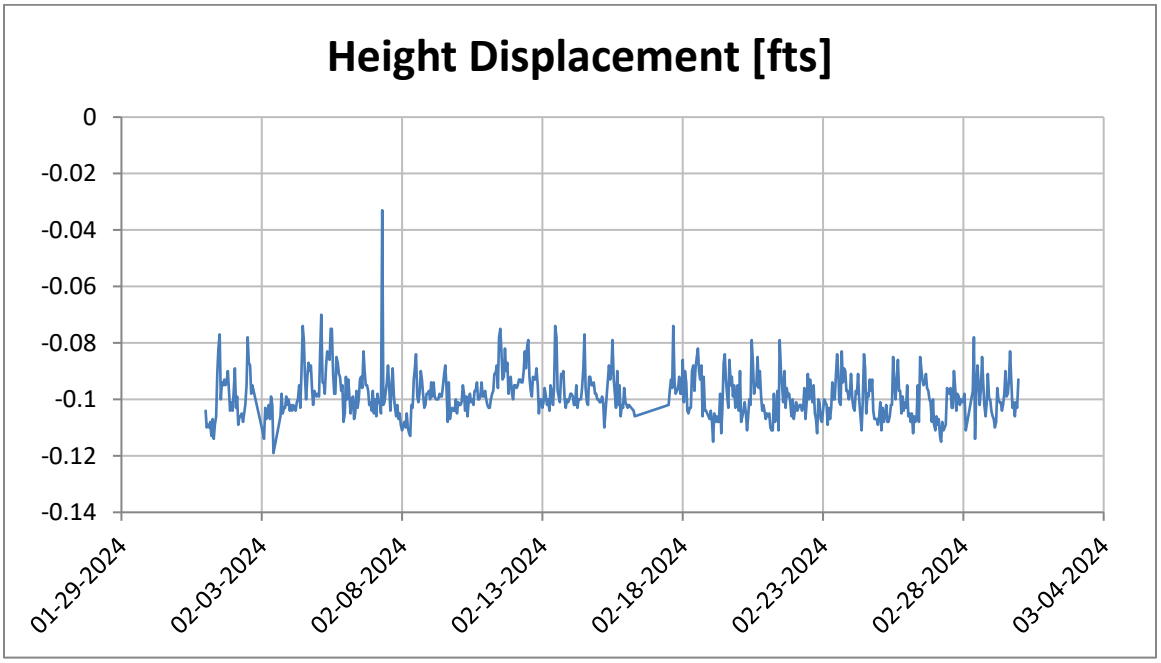
Notes:

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.

Stantec

Prism BR3



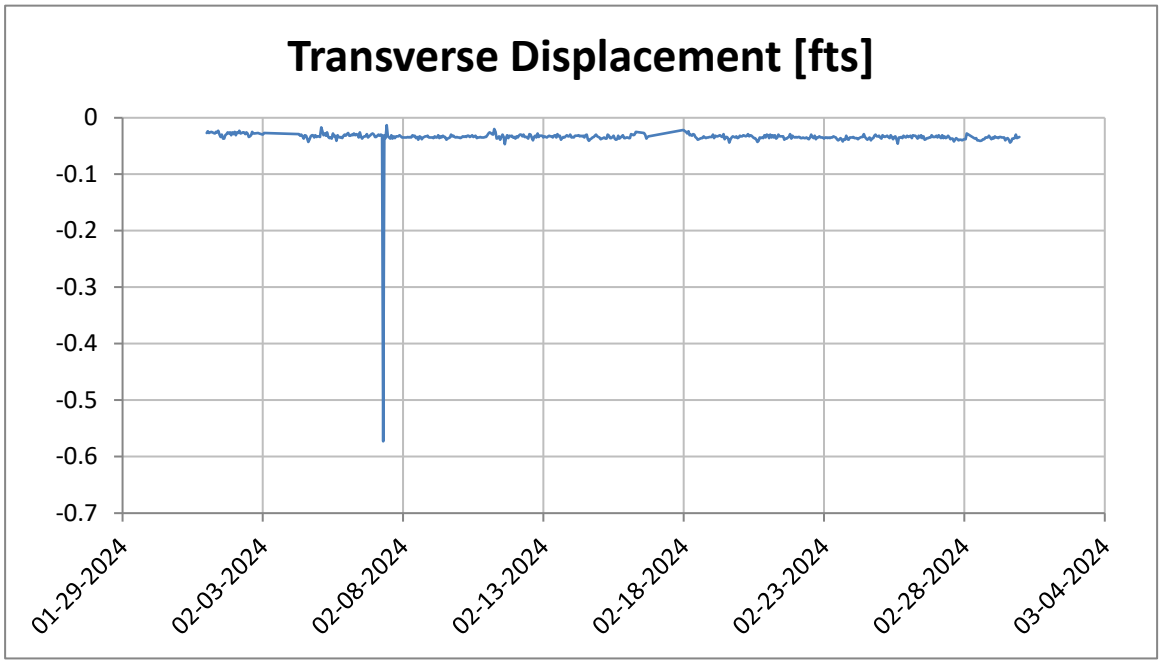


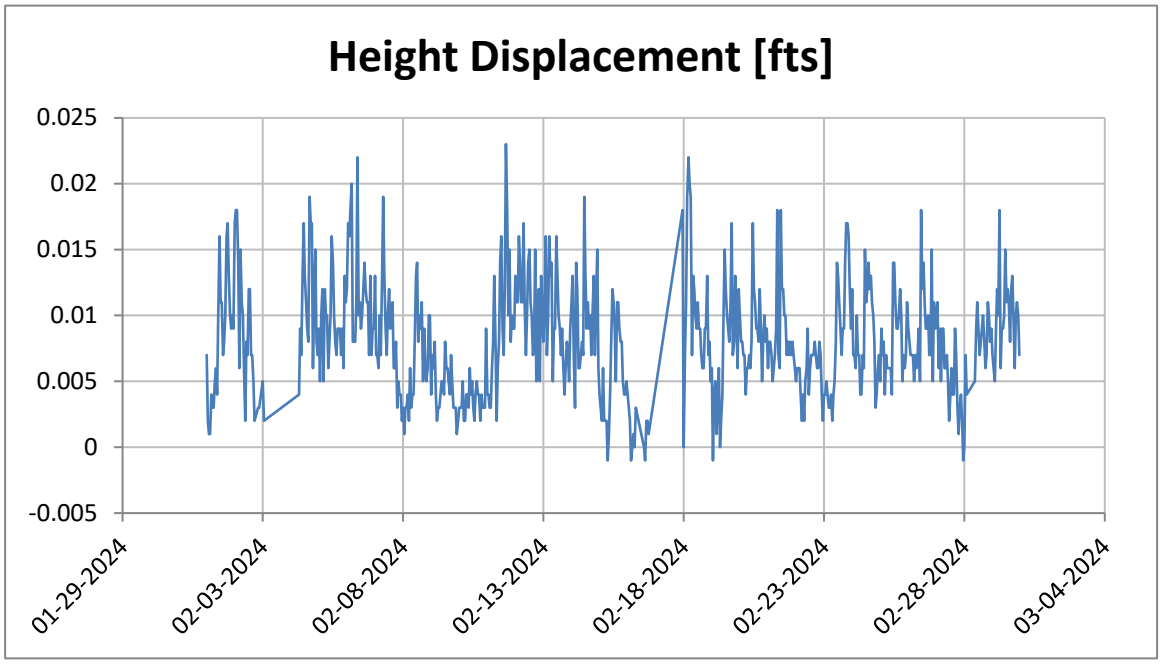
Notes:

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.

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.

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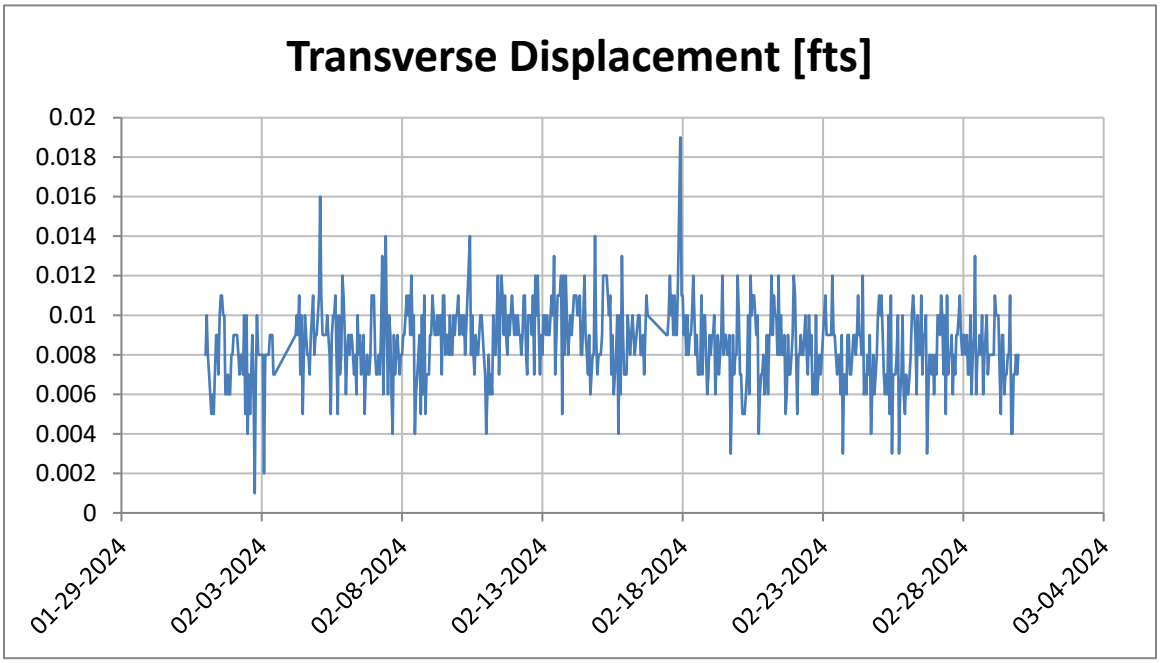
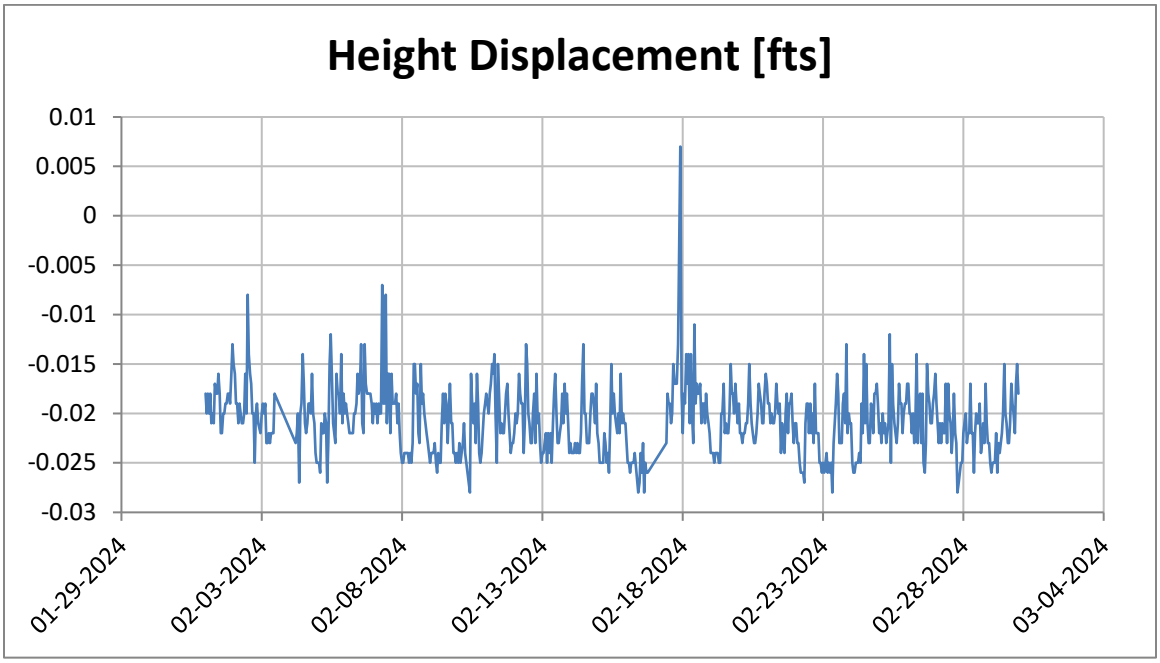
Stantec

Prism B7200-2



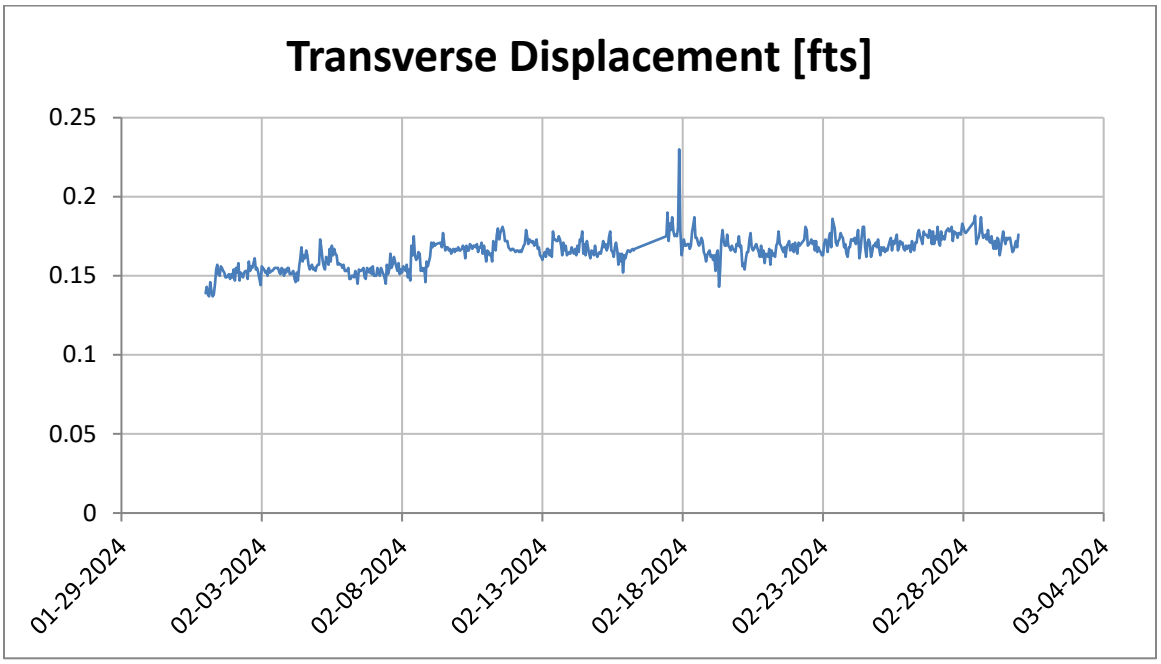


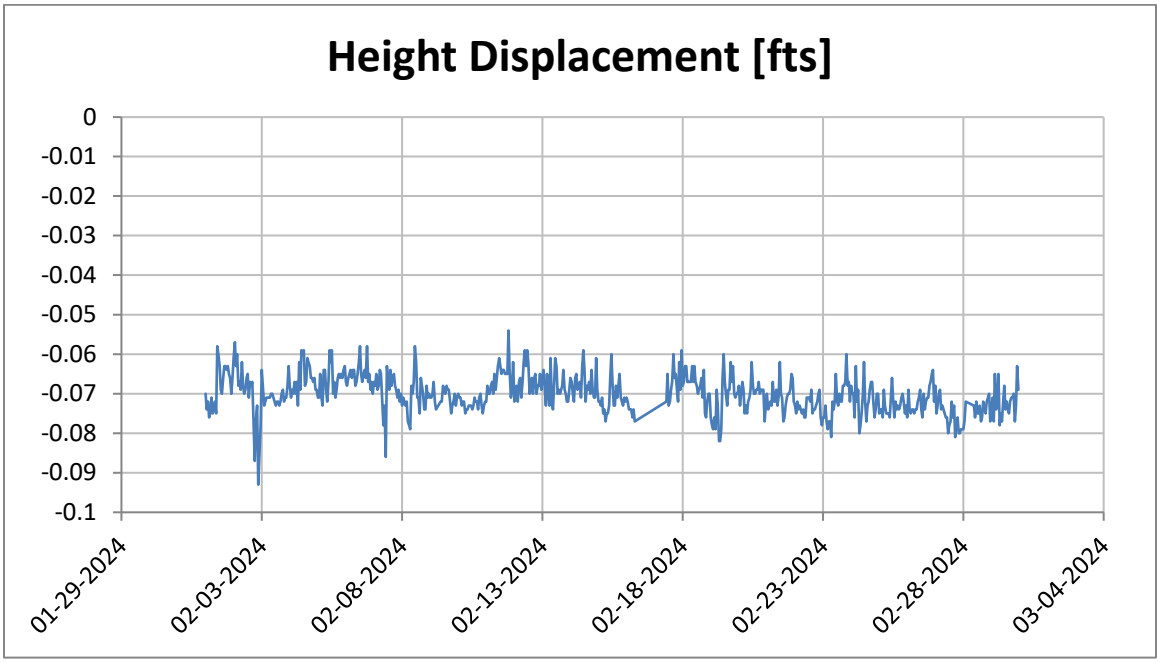
Notes:

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.

Stantec

Prism B7200-3



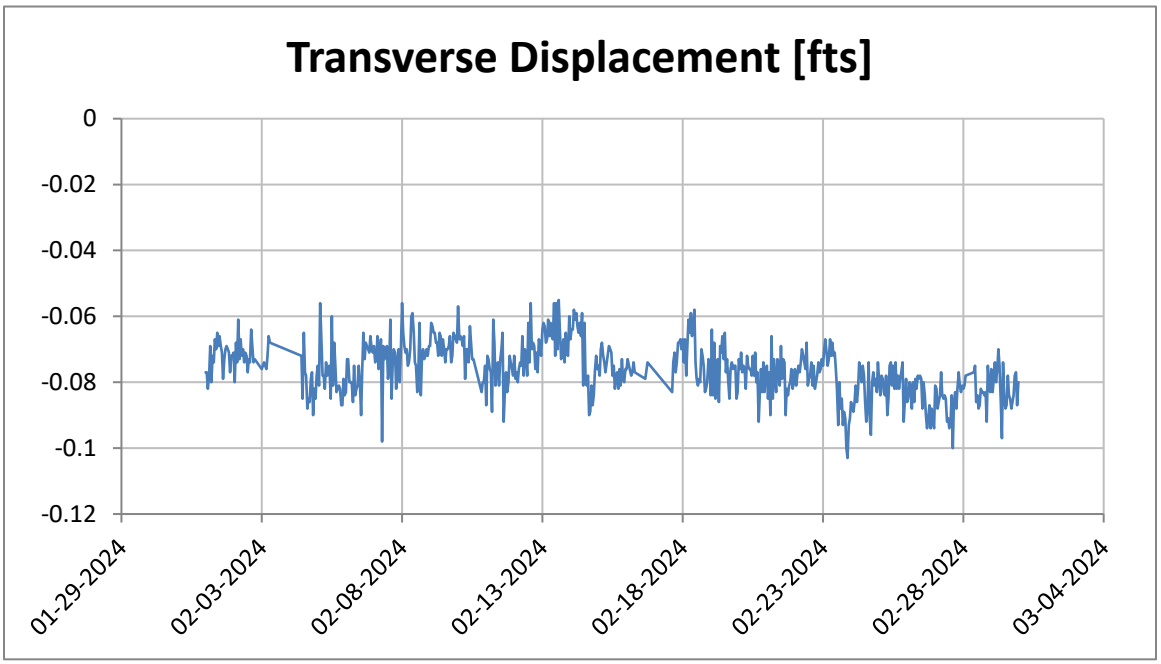


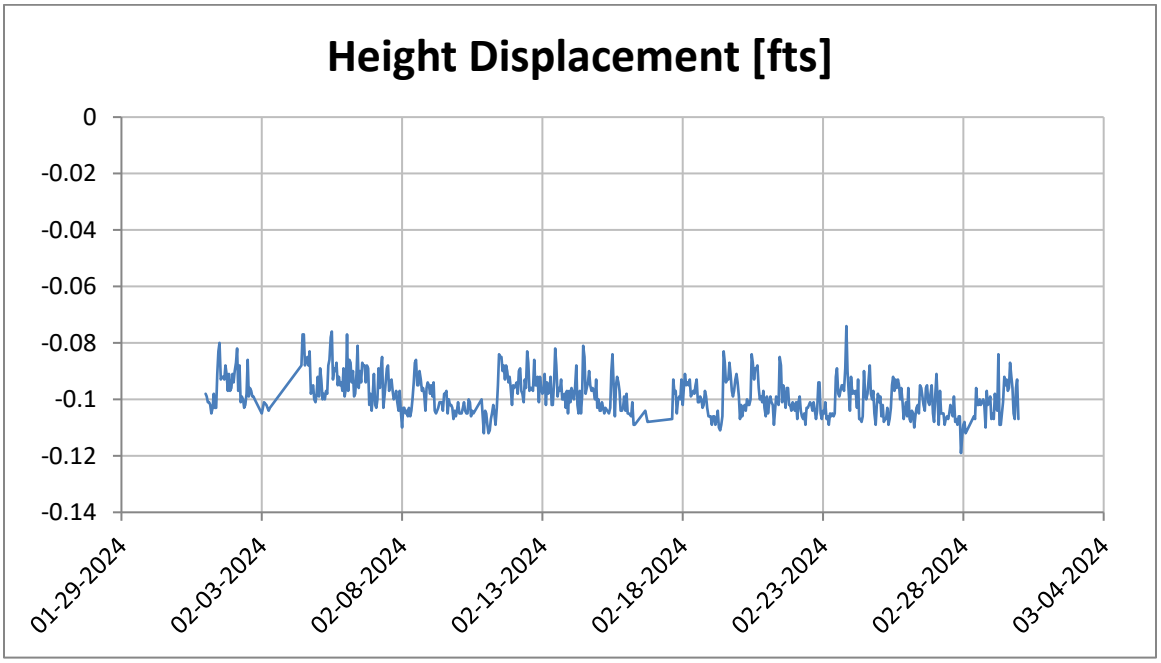
Notes:

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.

Stantec

Prism B7300-0



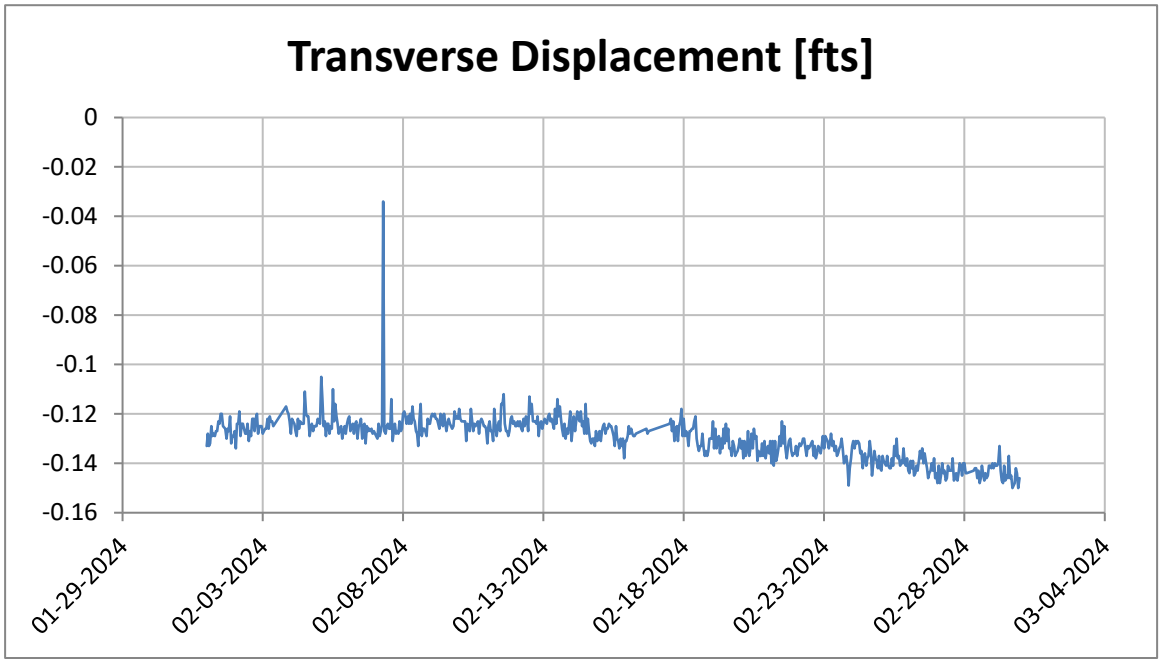


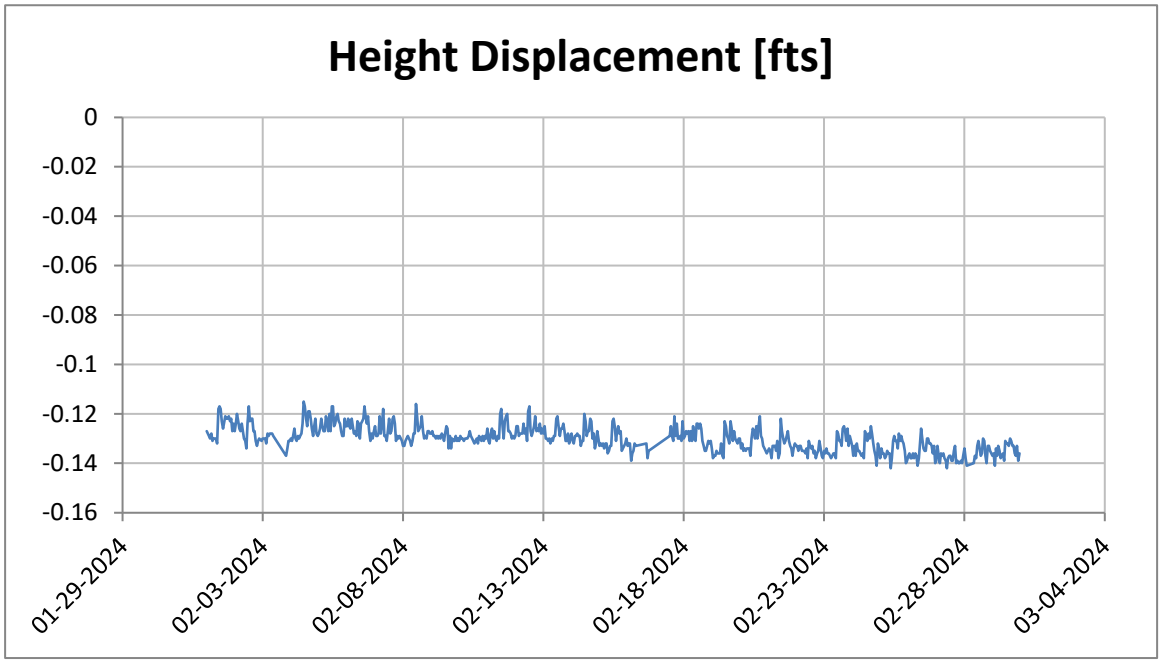
Notes:

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.

Stantec

Prism B7300-1



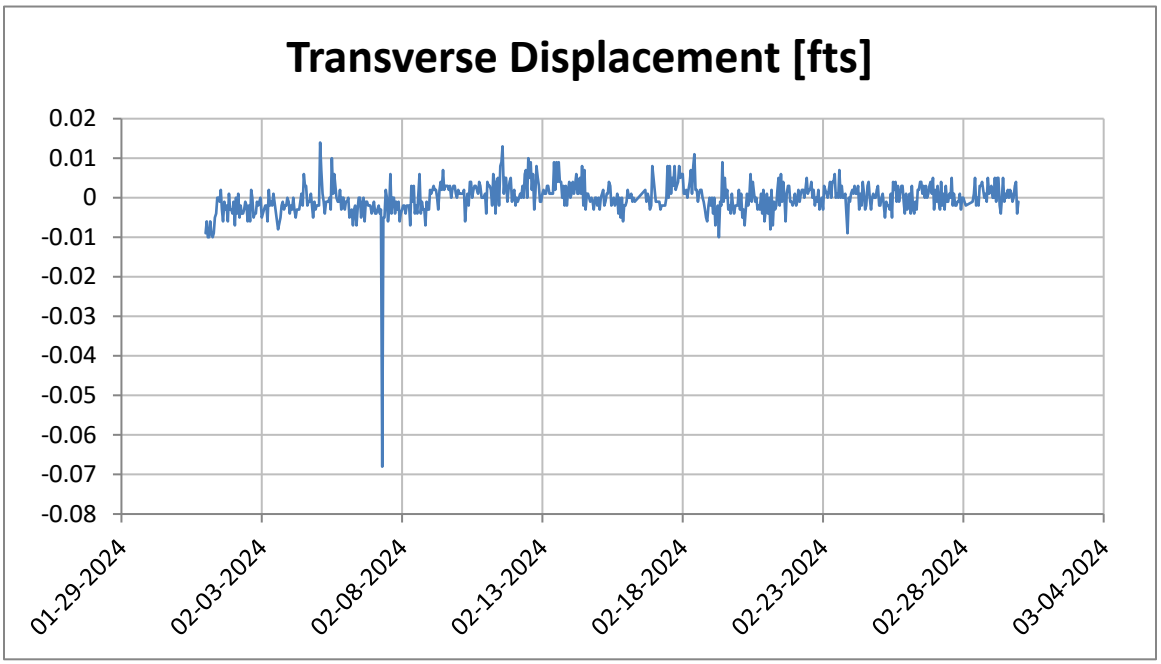


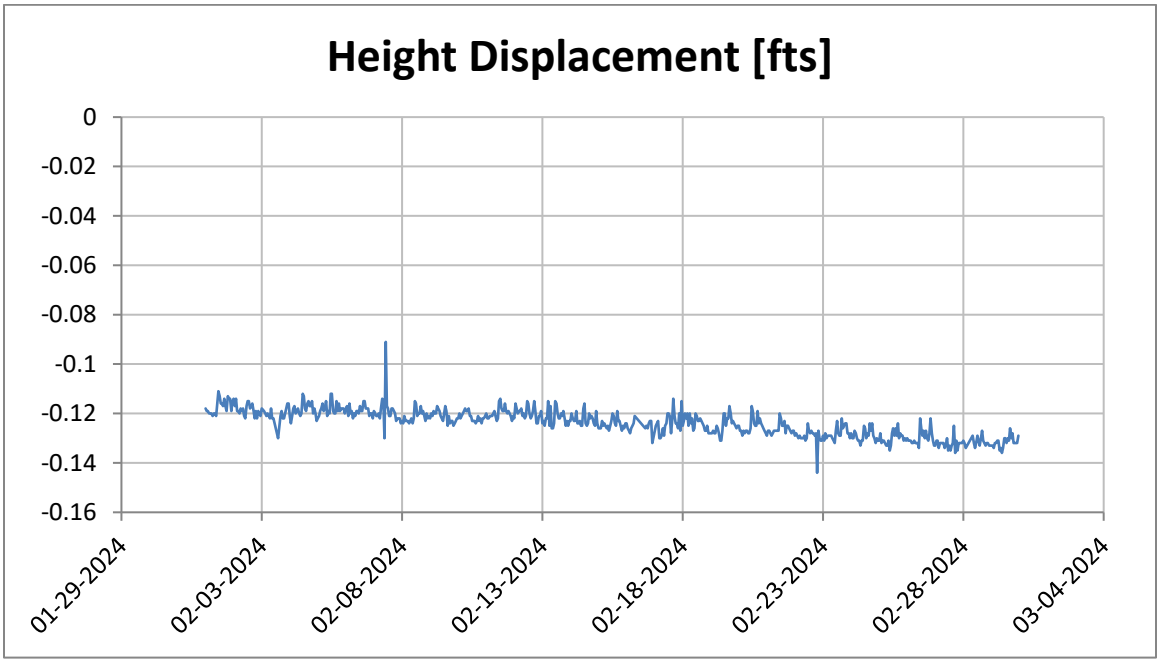
Notes:

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.

Stantec

Prism B7300-2



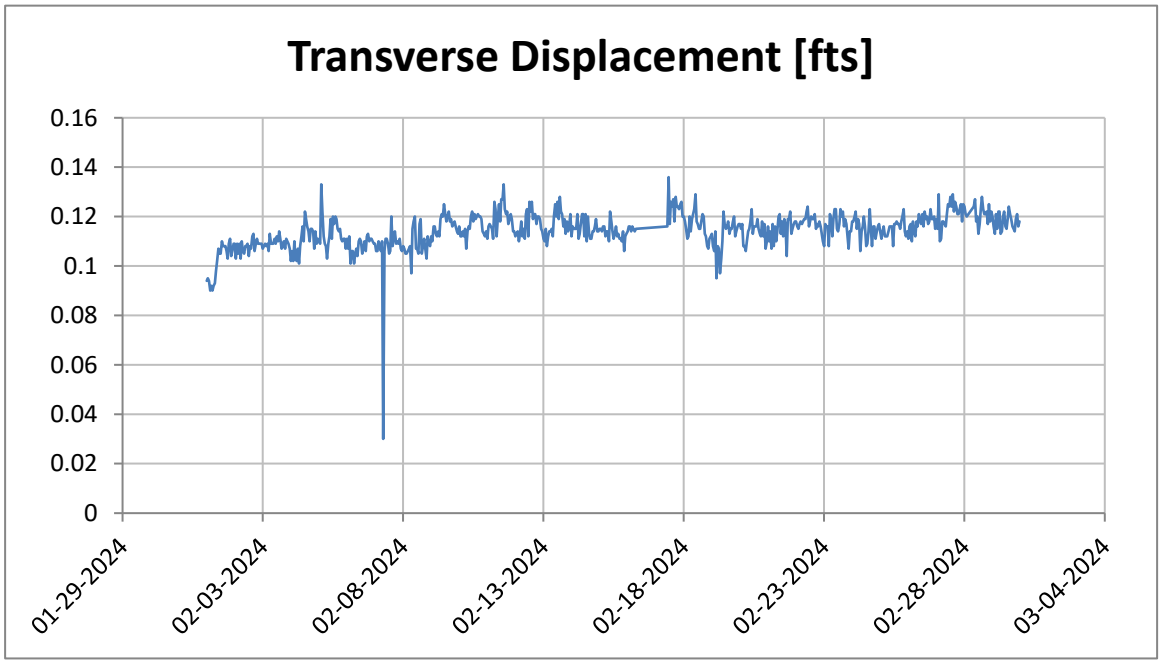


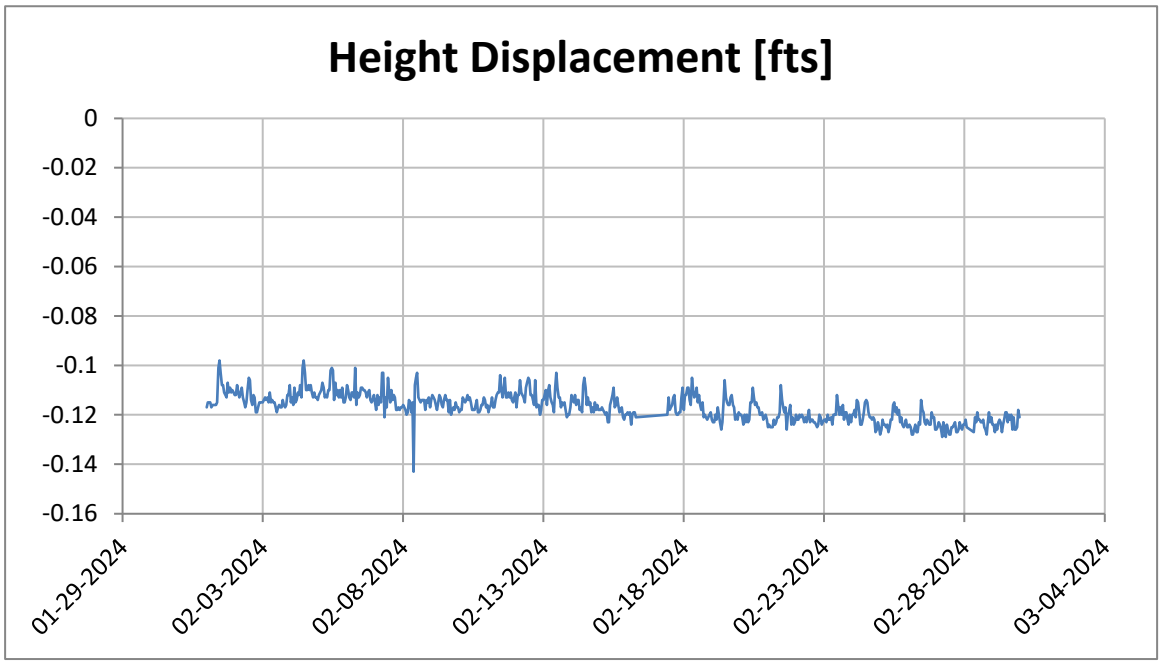
Notes:

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.

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.

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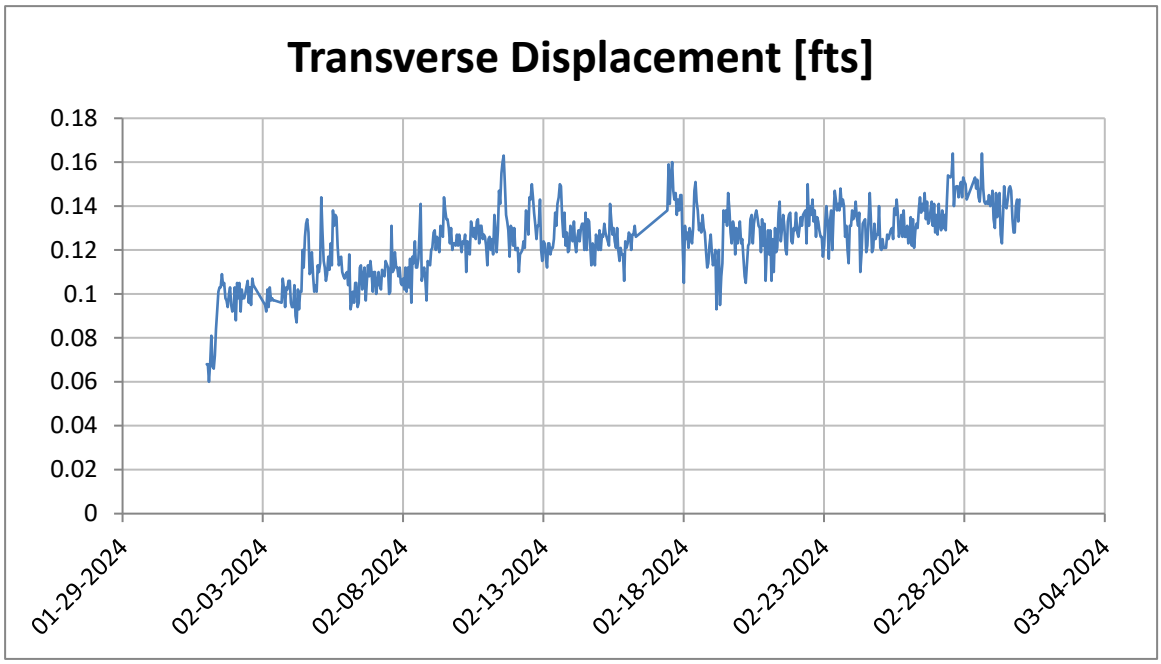
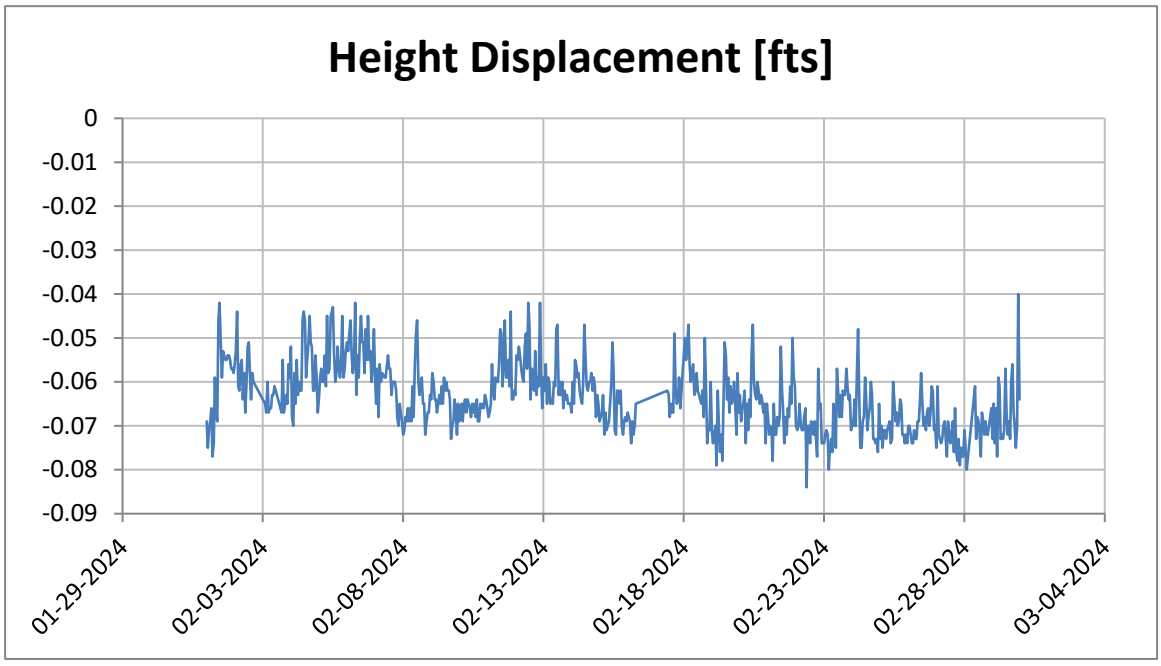
Stantec

Prism B7300-4



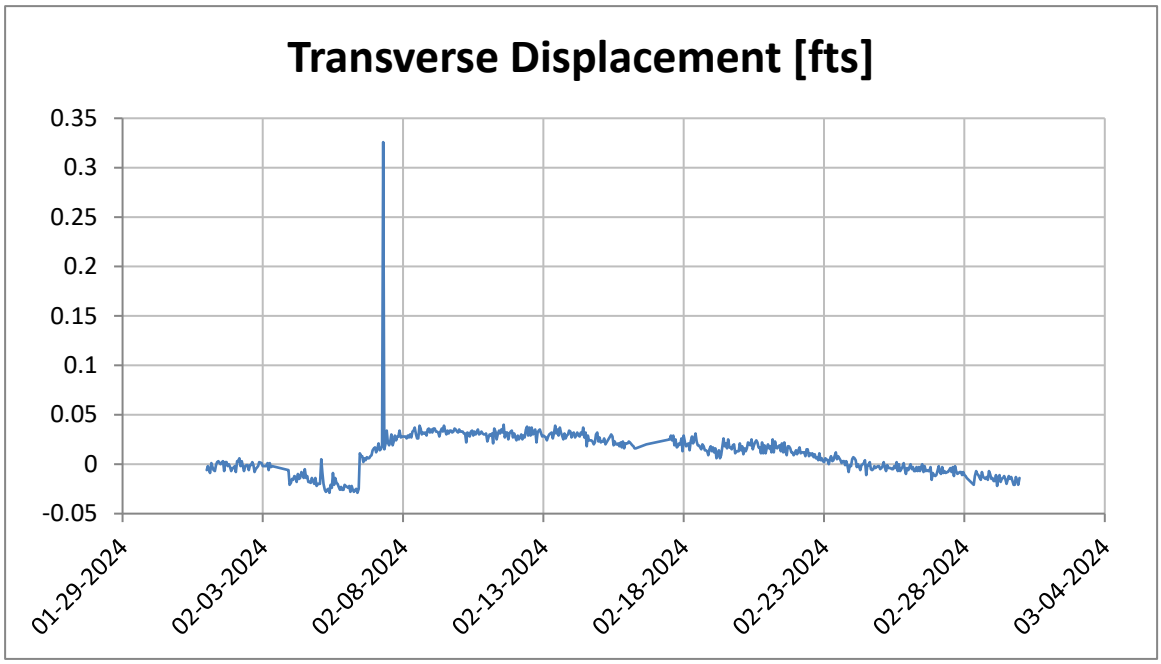


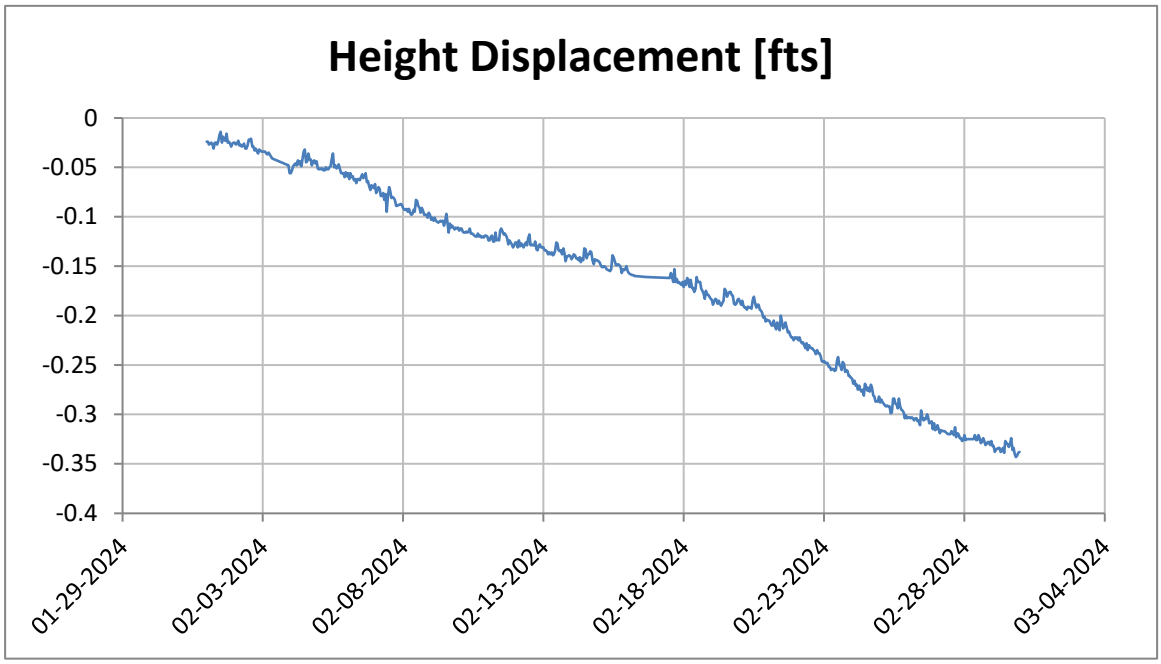
Notes:

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.

Stantec

Prism B7400-1



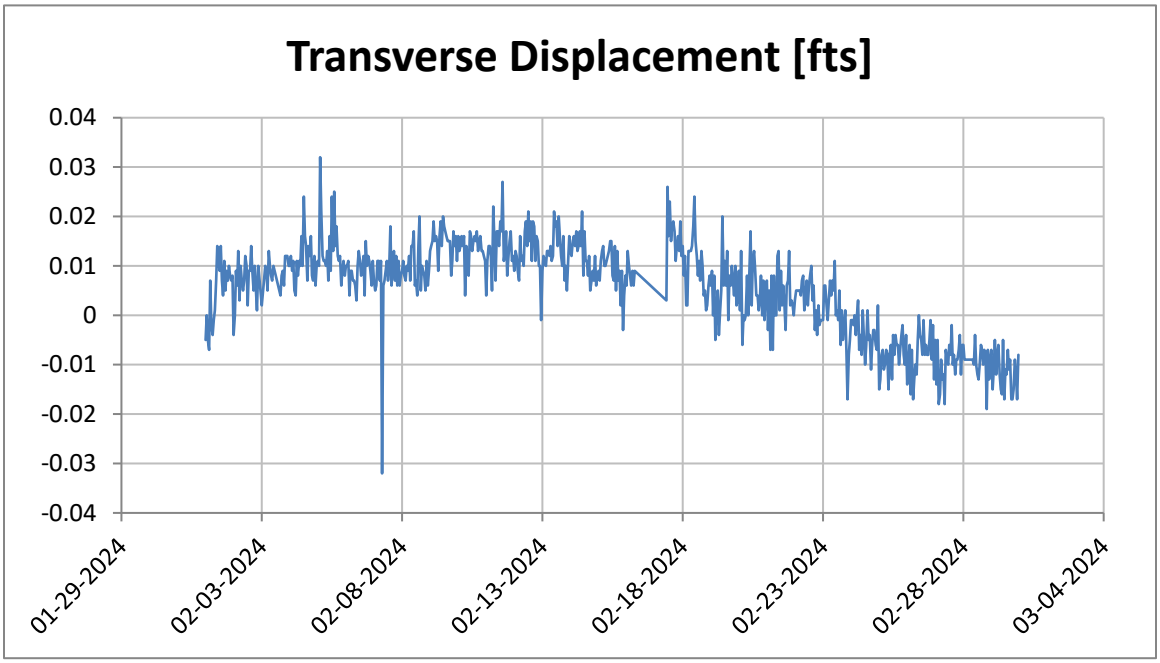


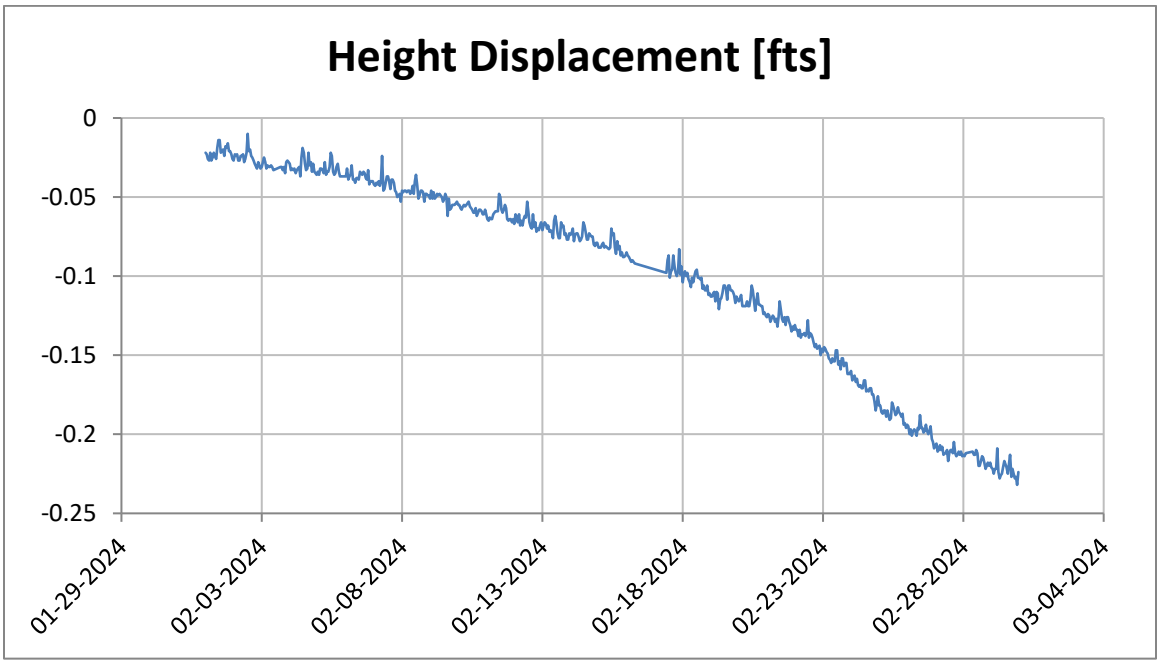
Notes:

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. Movement believed to be settlement of the compacted fill.

Stantec

Prism B7400-2



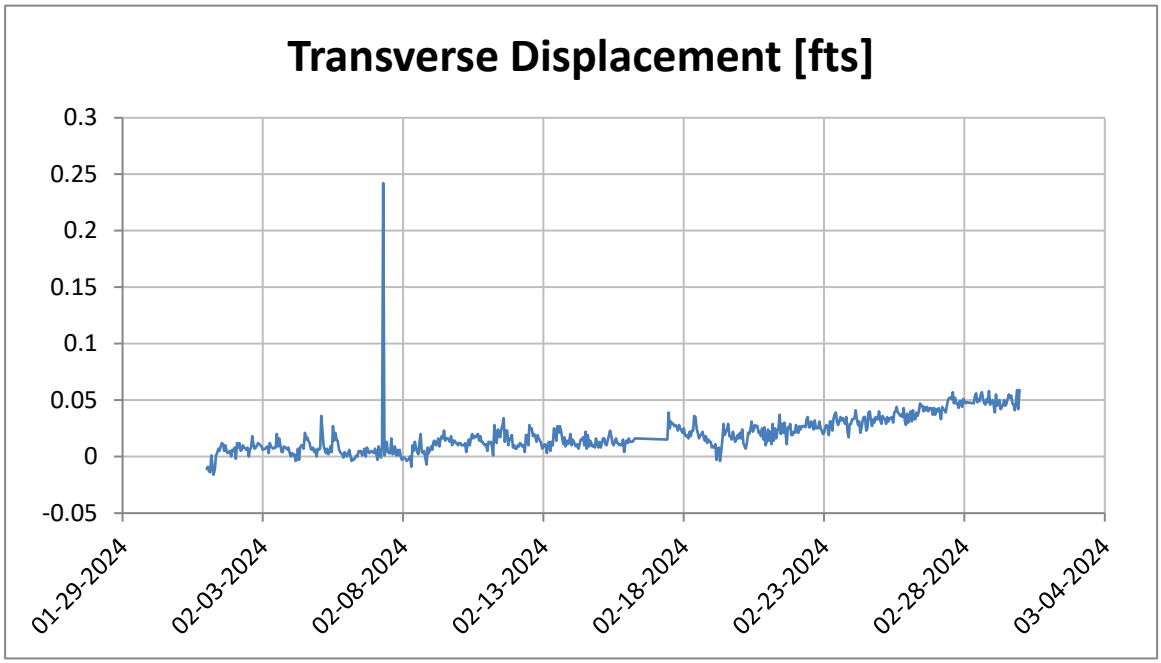


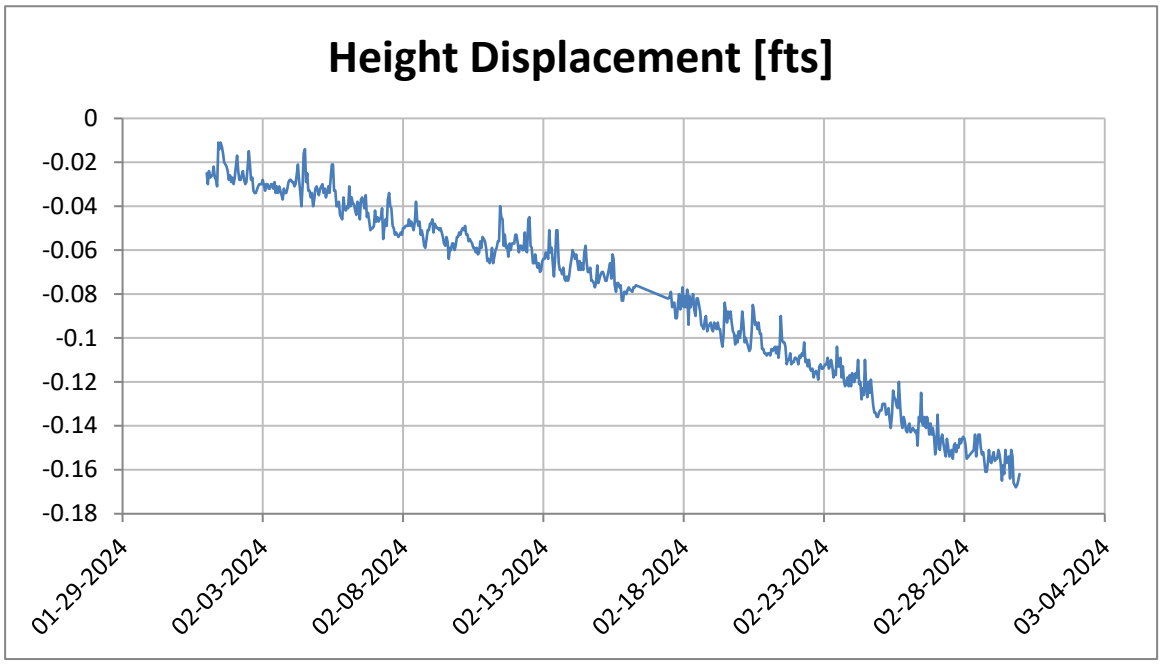
Notes:

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. Movement believed to be settlement of the compacted fill.

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. Movement believed to be settlement of the compacted fill.

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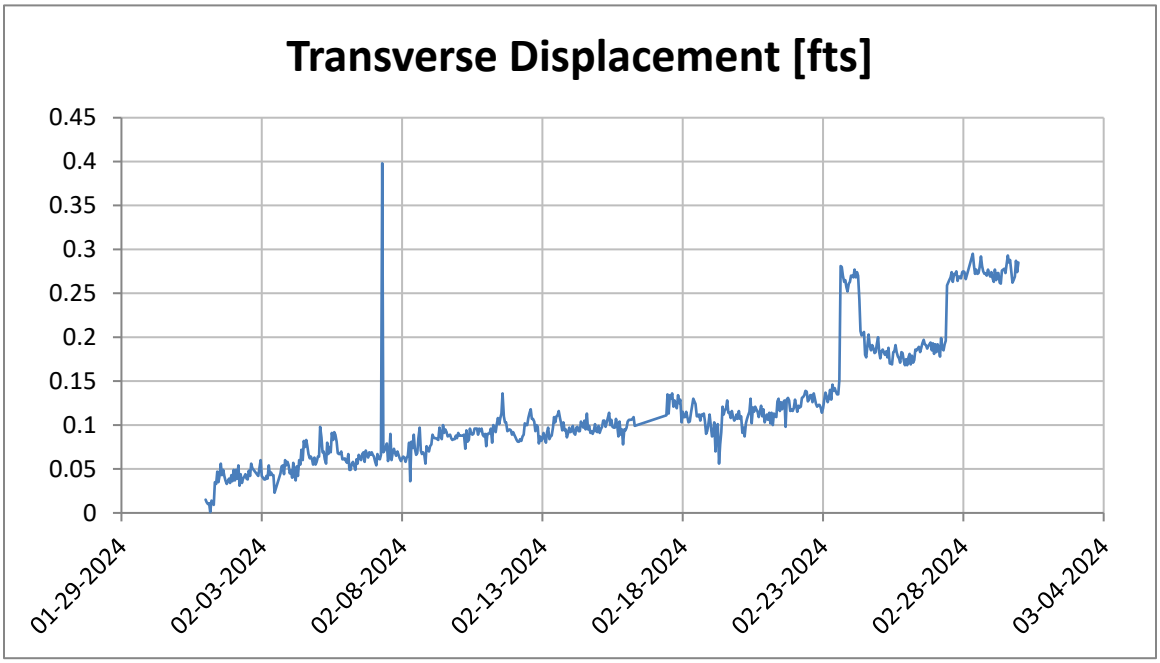
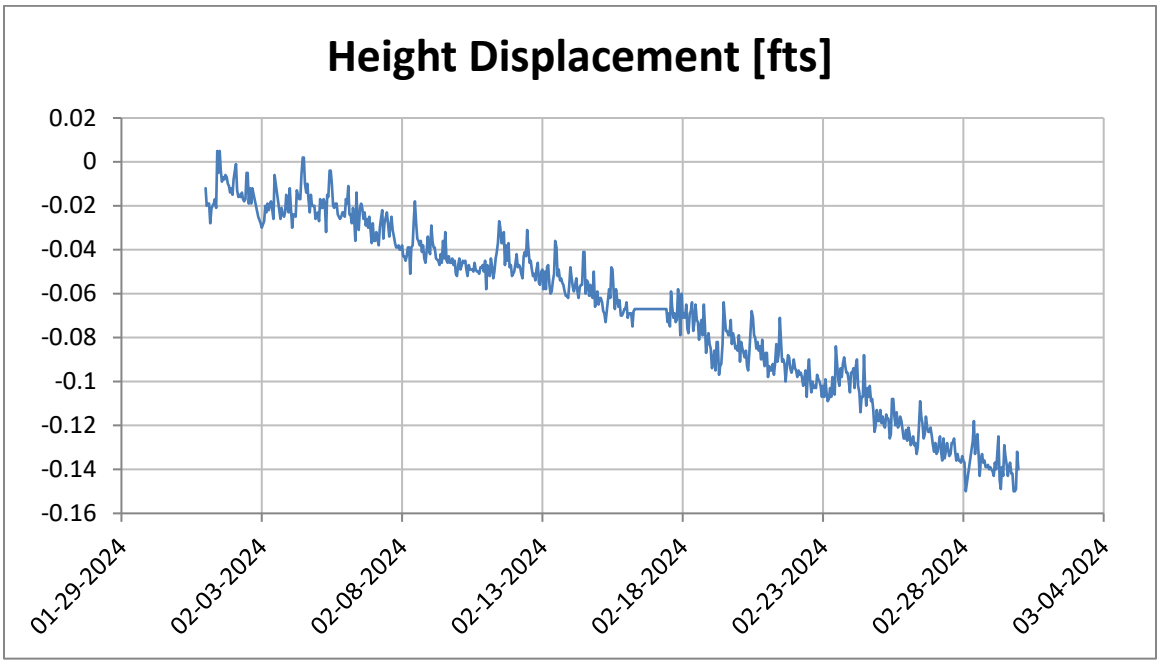
Stantec

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. Movement believed to be settlement of the compacted fill.

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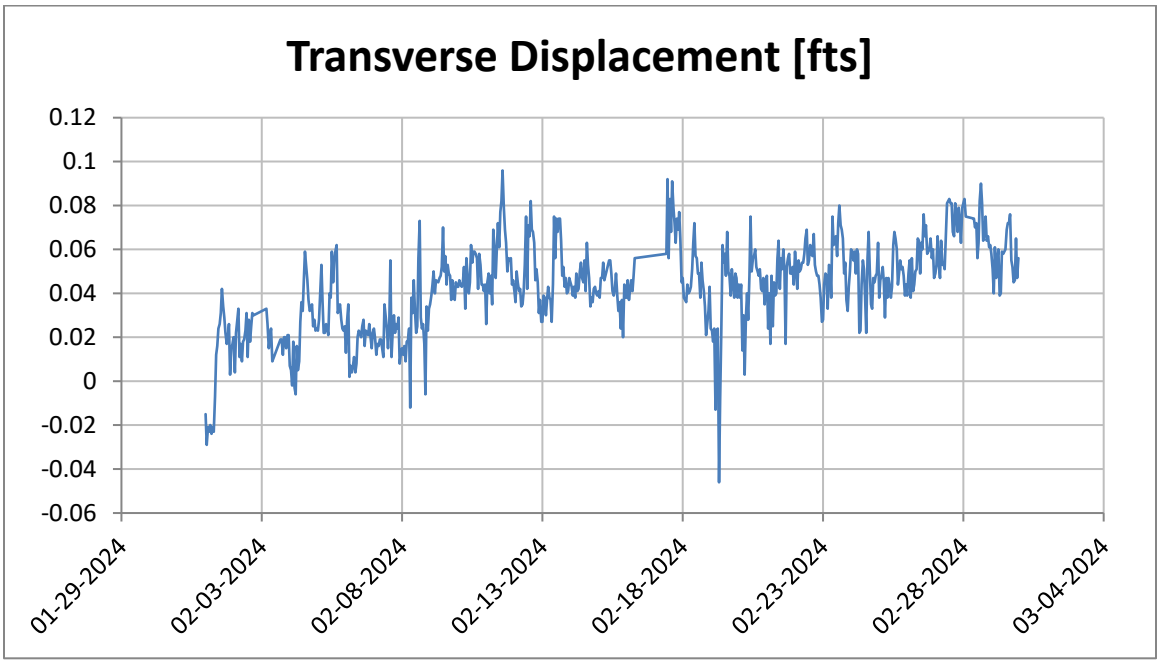
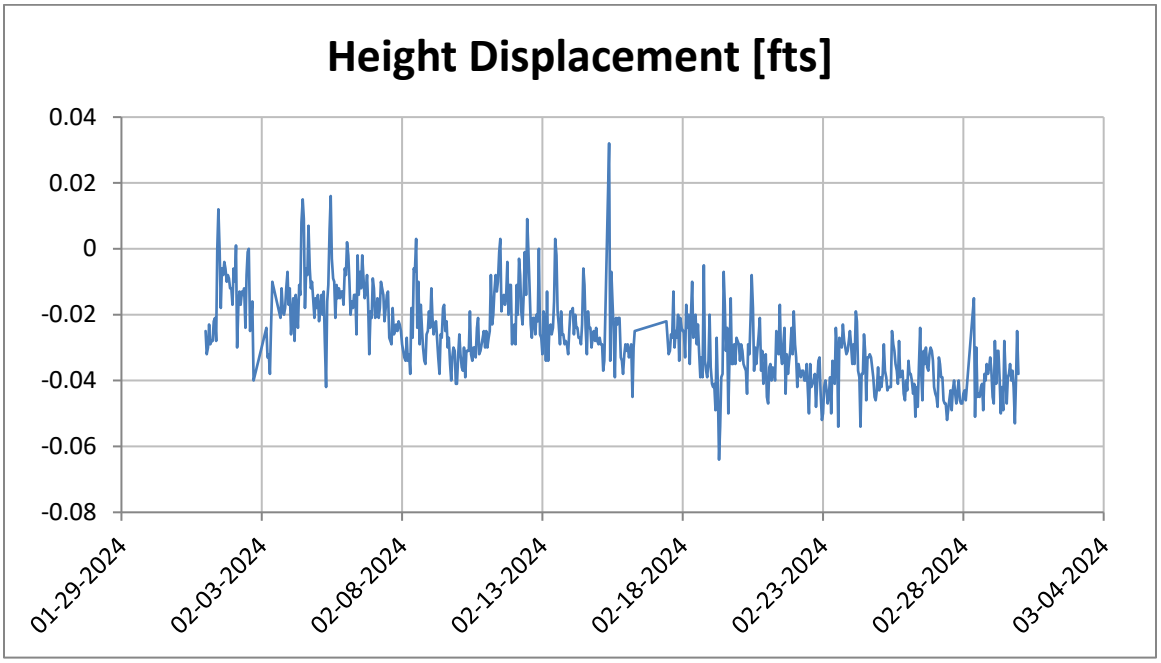
Stantec

Prism B7400-5



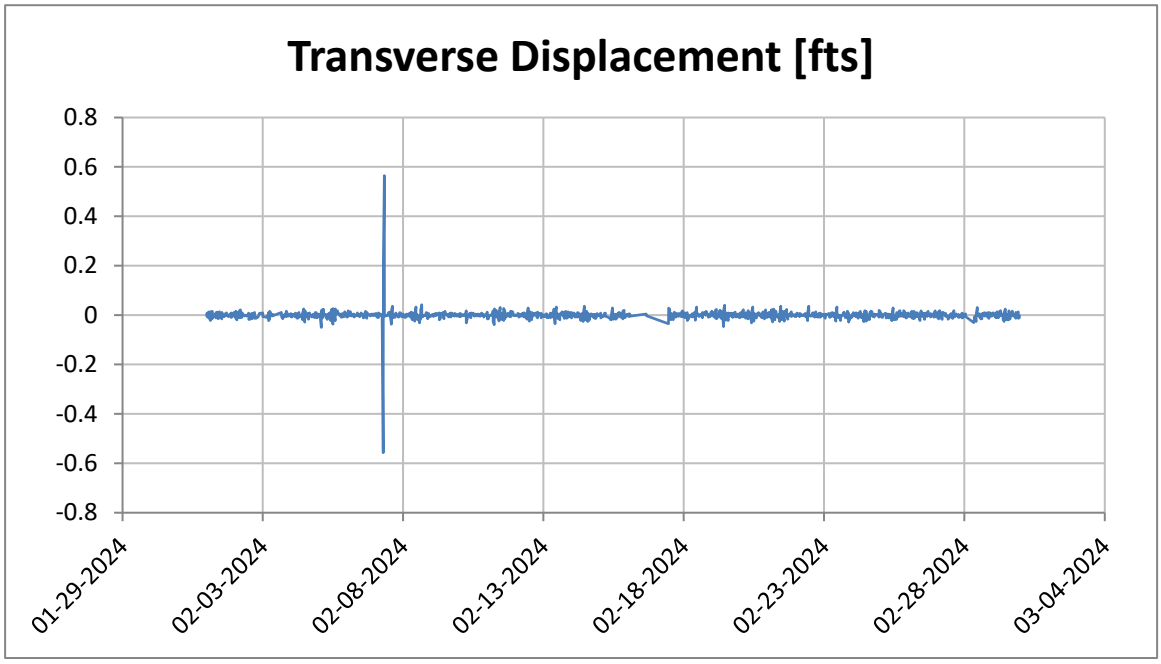


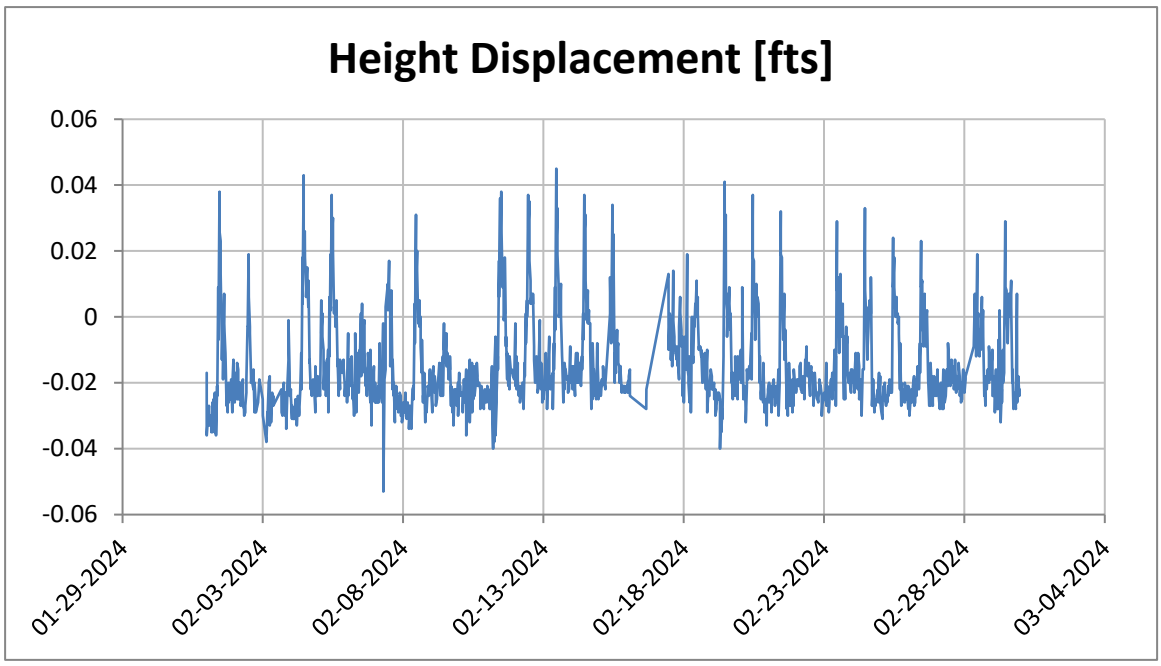
Notes:

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. New prism installed January 2024

Stantec

Prism CP6



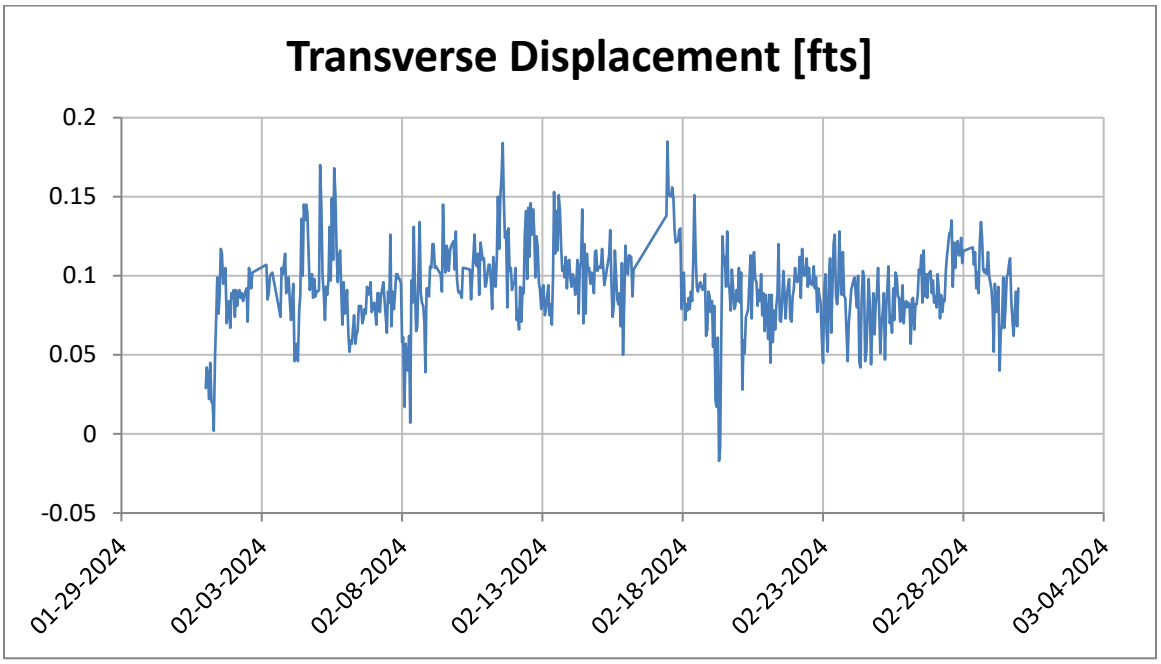


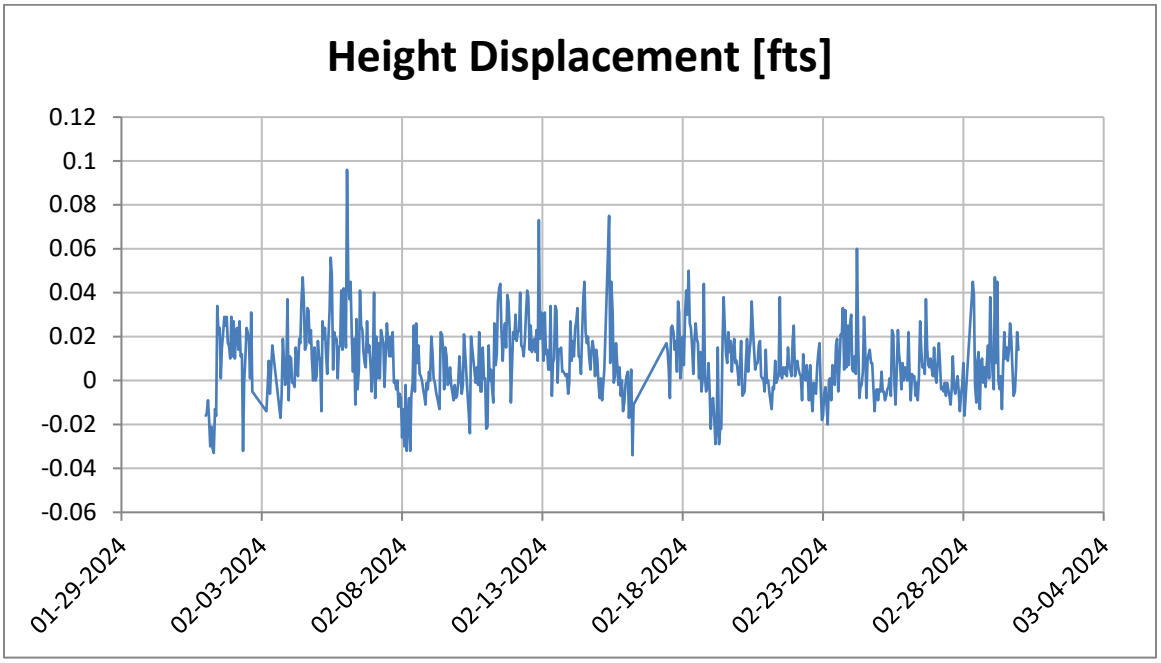
Notes:

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.

Stantec

Prism CP7



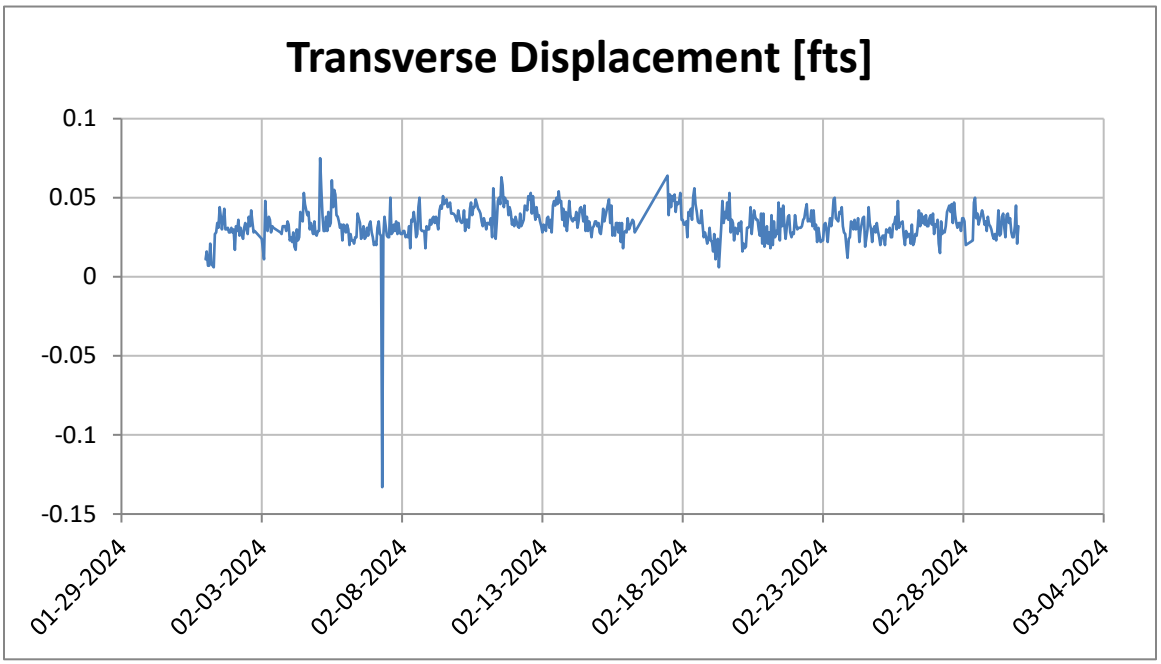


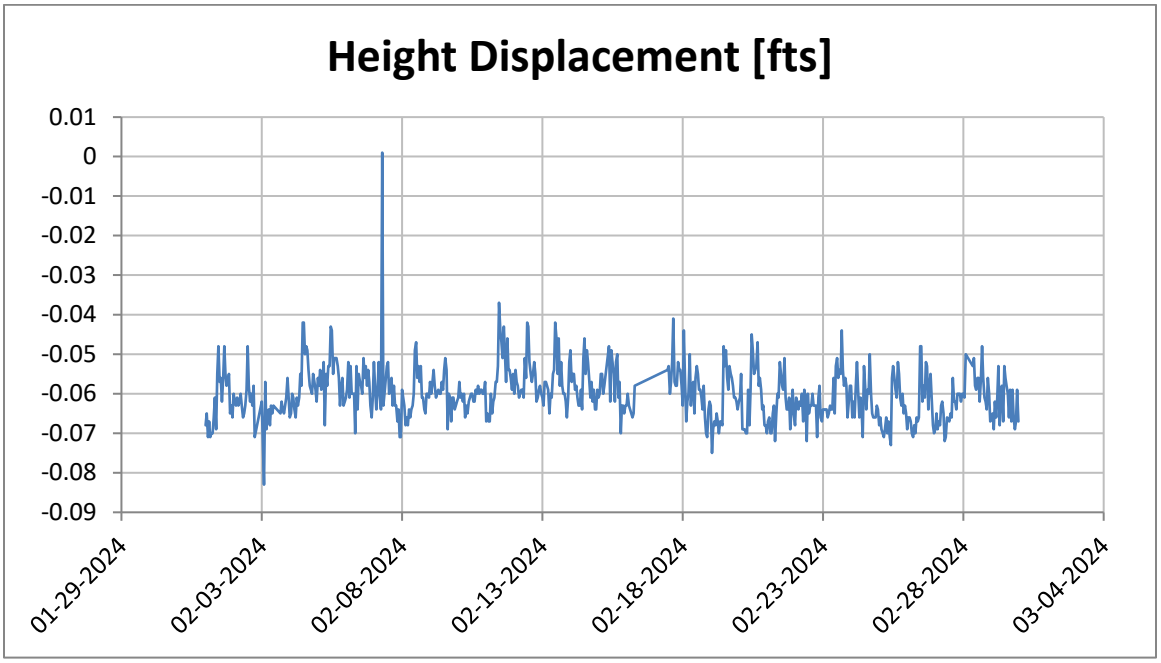
Notes:

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.

Stantec

Prism NP4



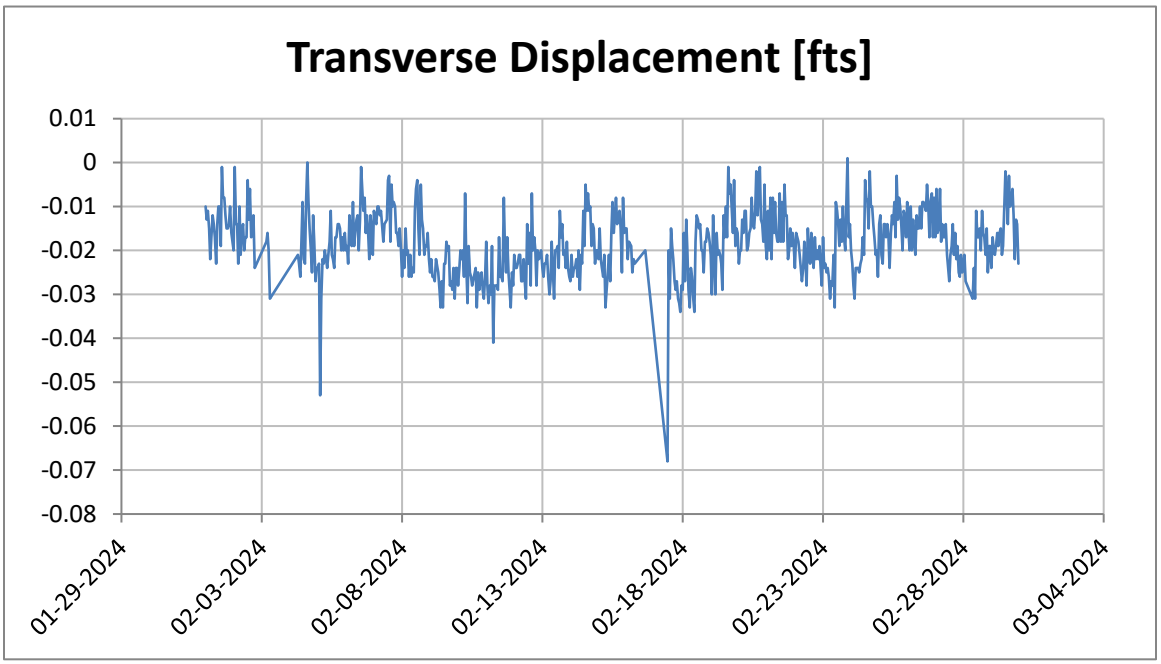


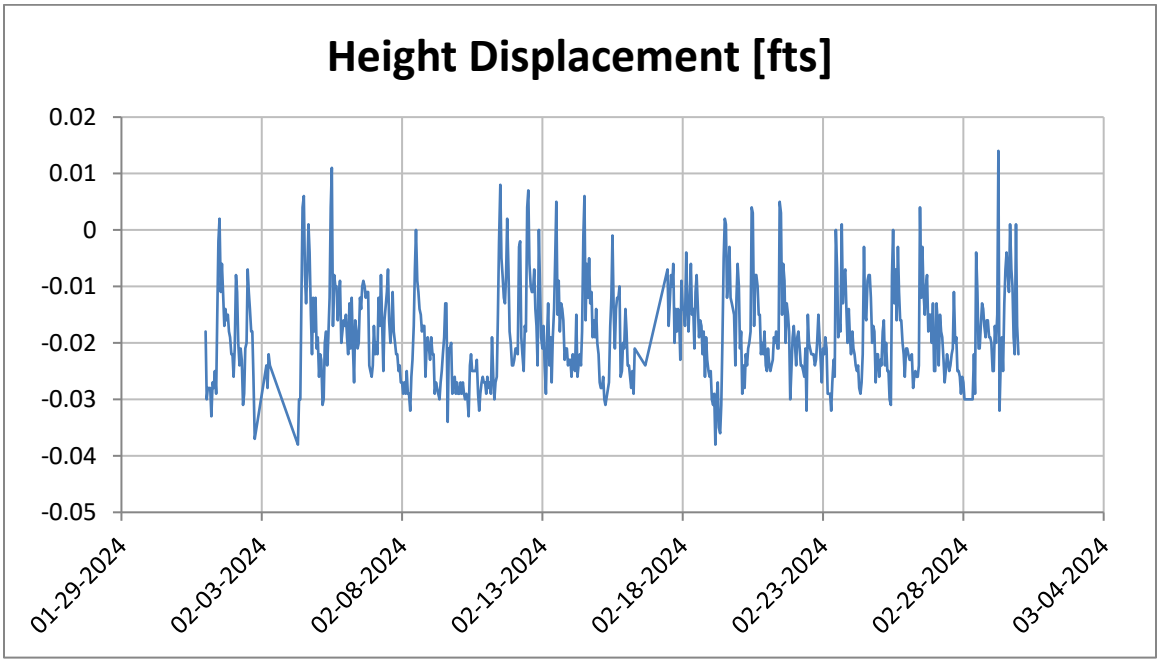
Notes:

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.

Stantec

Prism P2



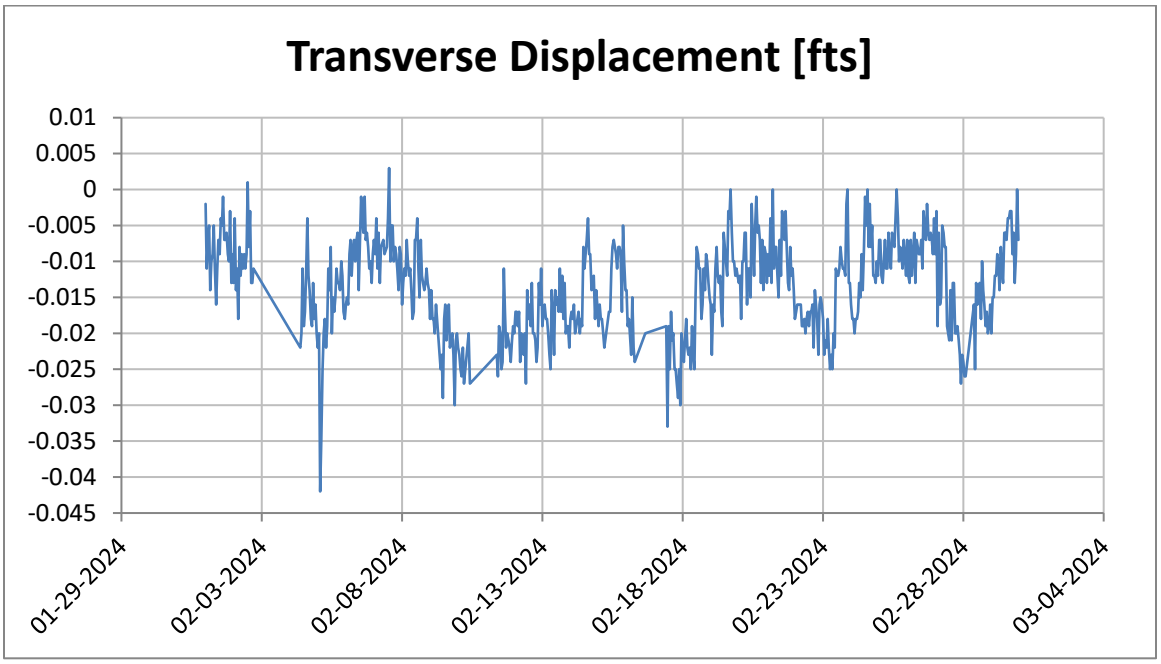


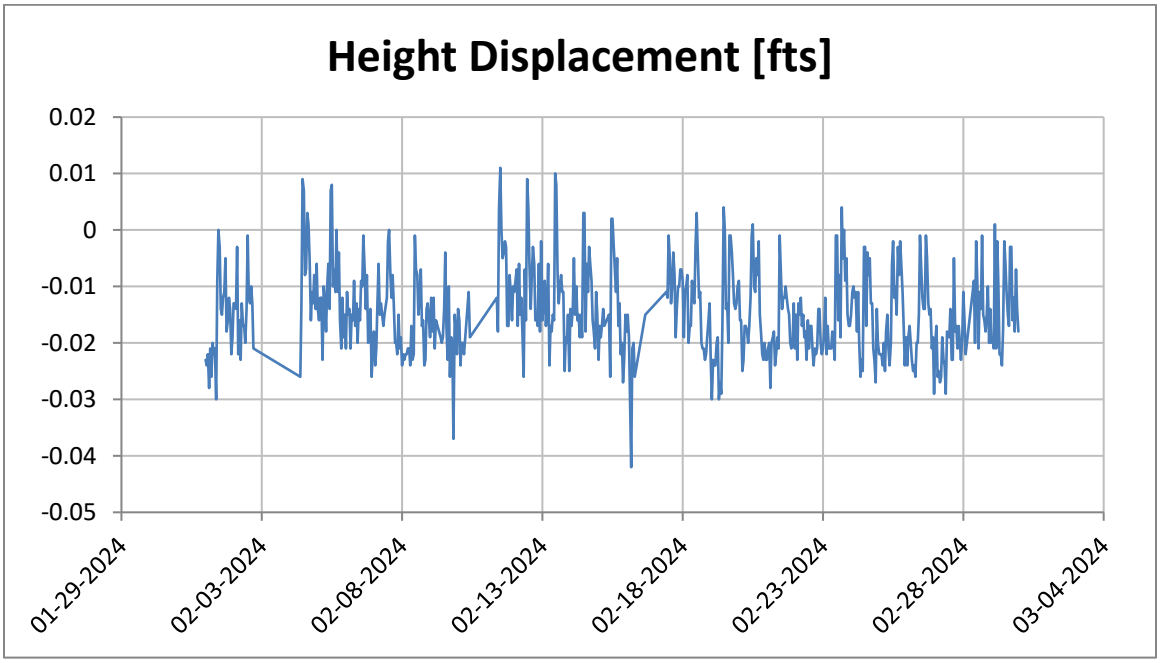
Notes:

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.

Stantec

Prism P5



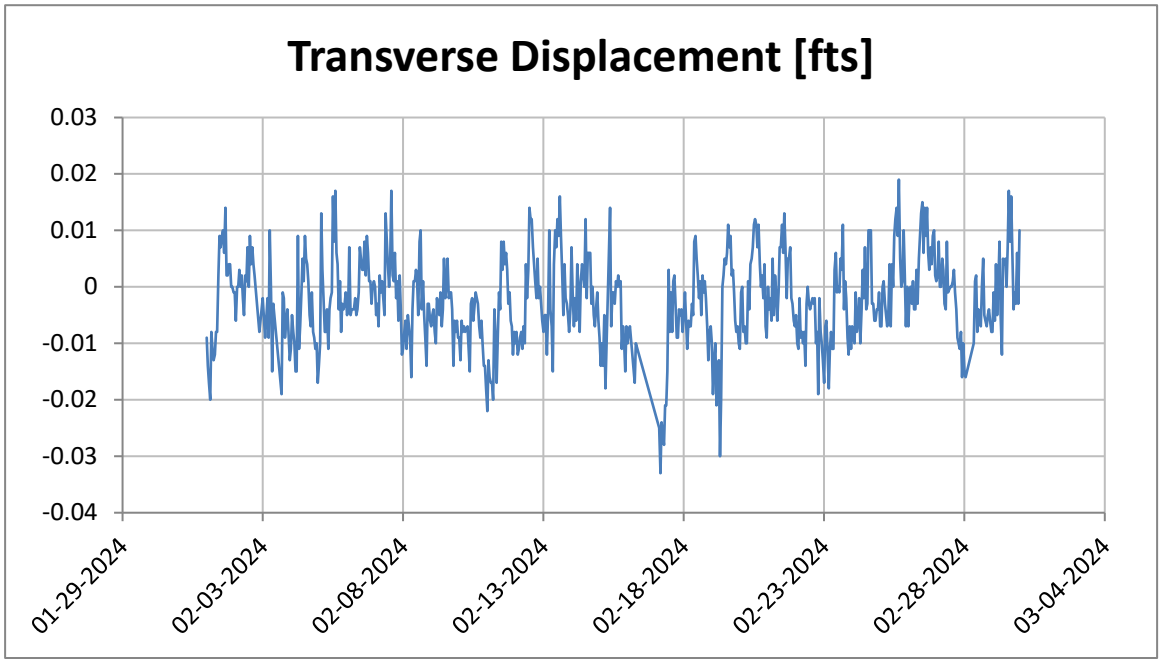


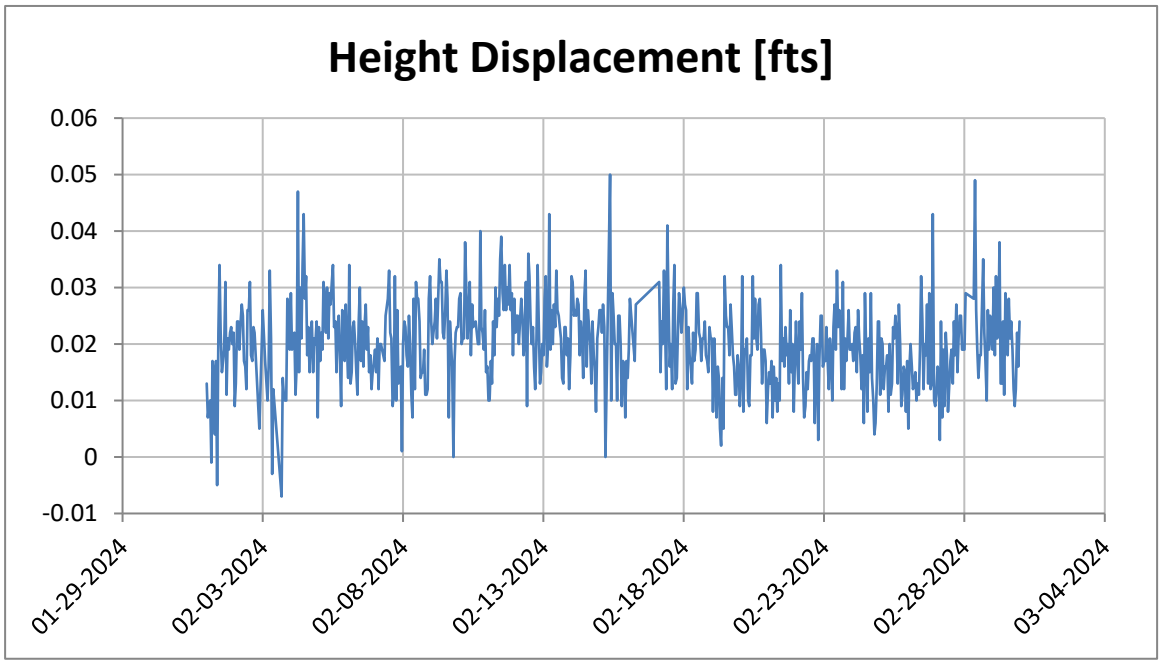
Notes:

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.

Stantec

Prism P25



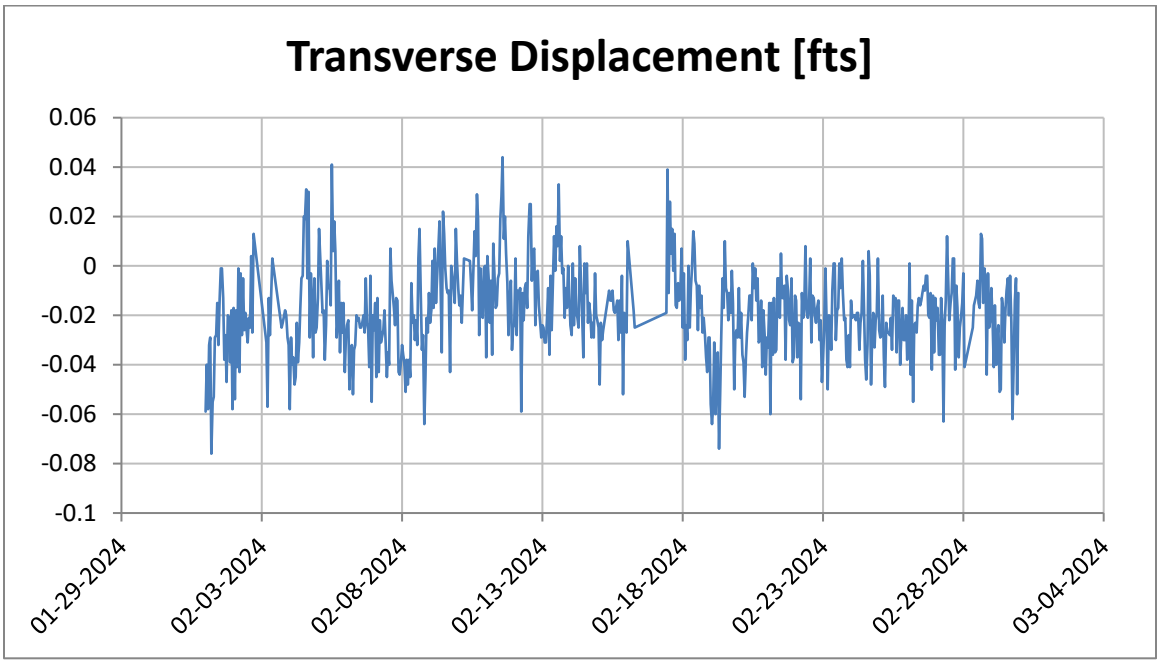


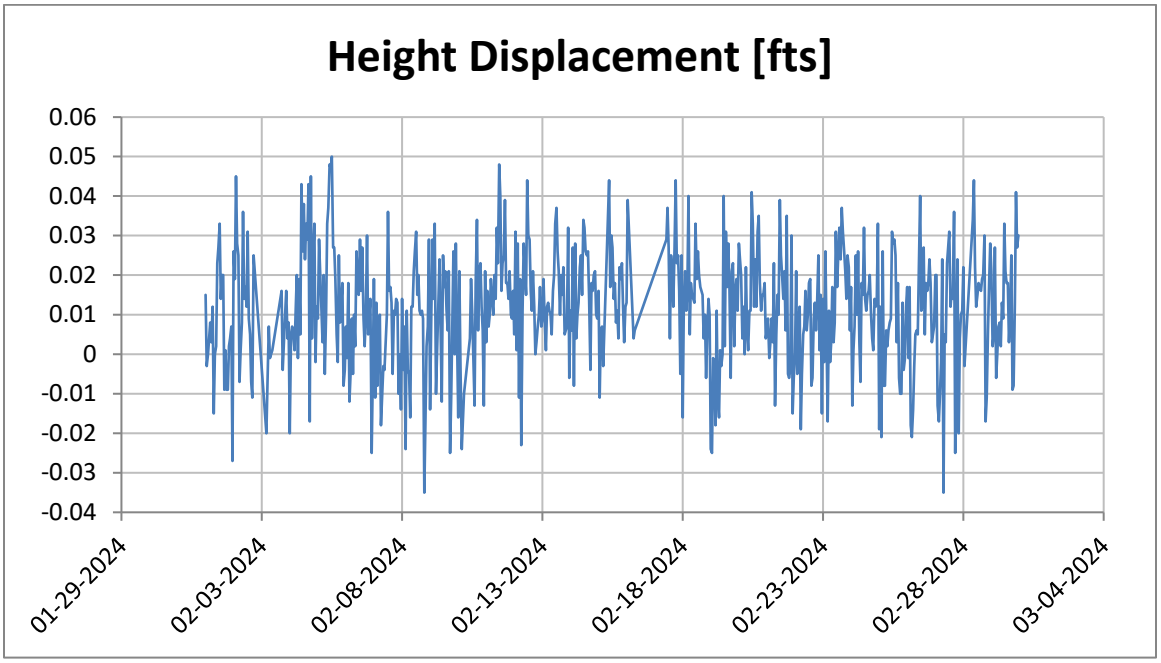
Notes:

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.

Stantec

Prism P32R



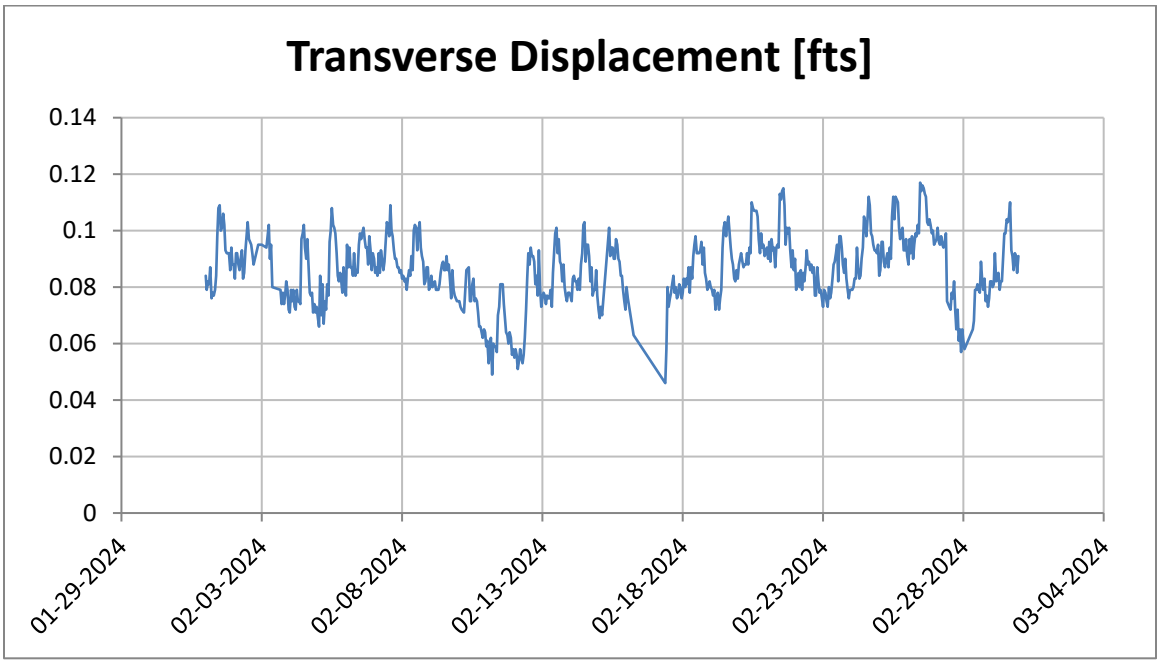


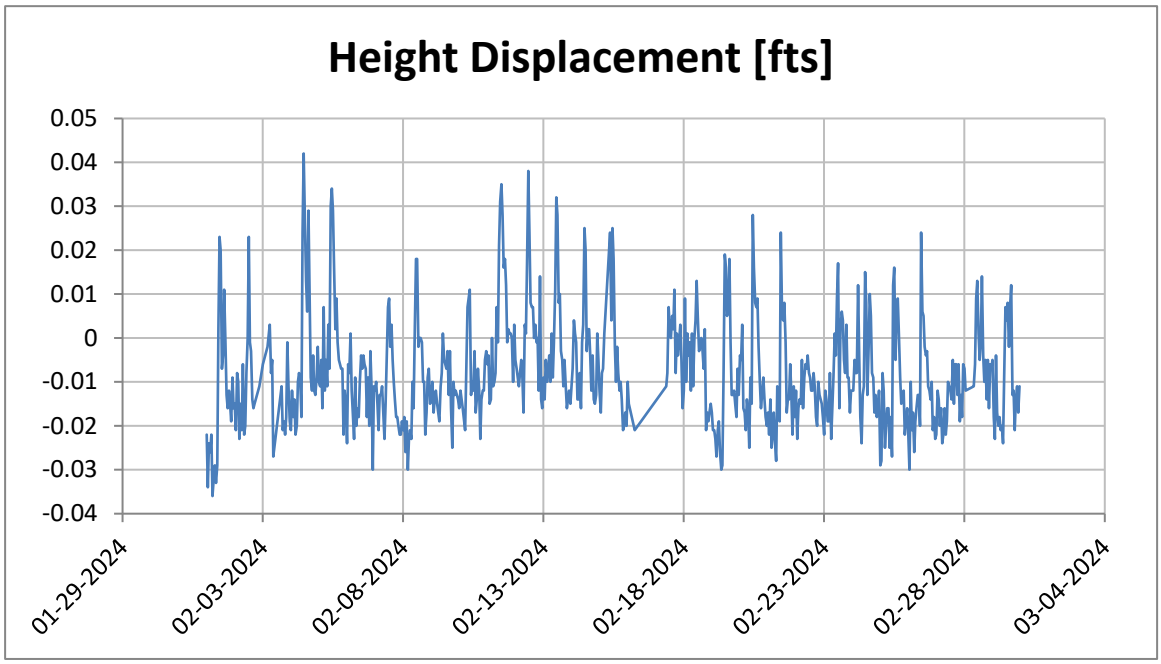
Notes:

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.

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.

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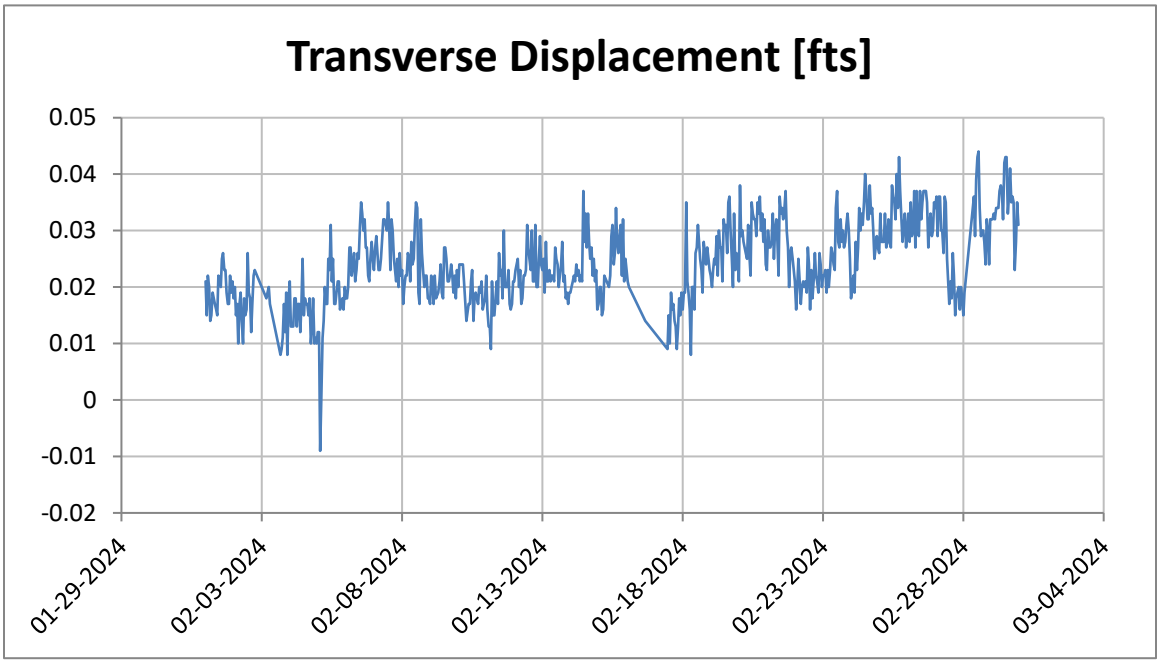
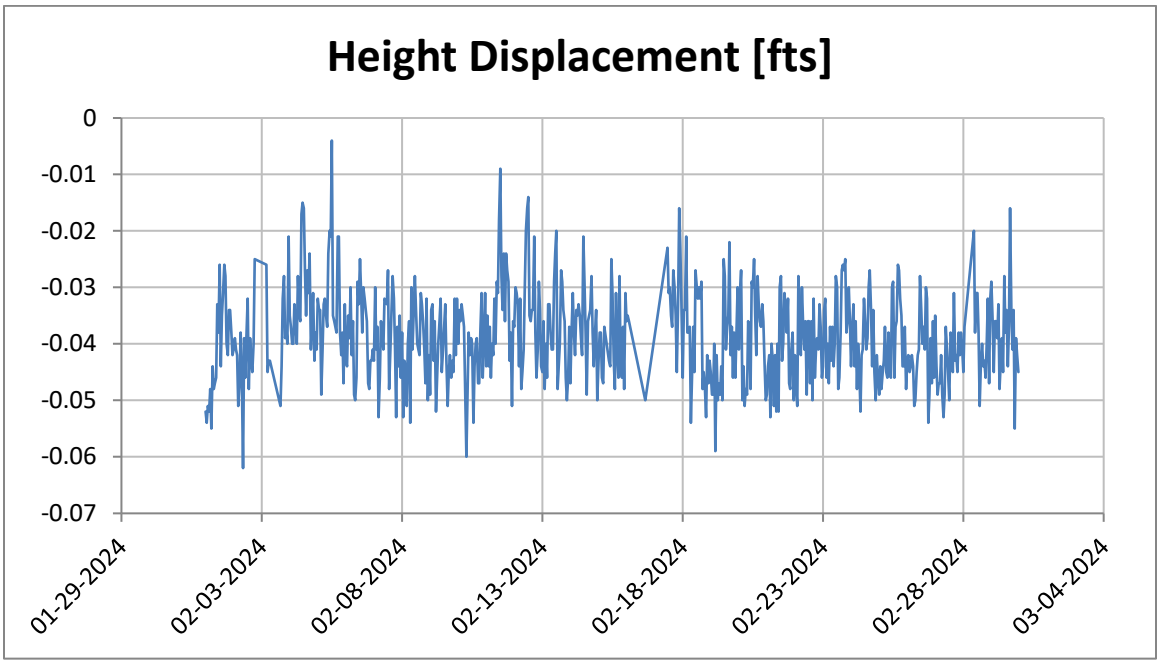
Stantec

Prism P70



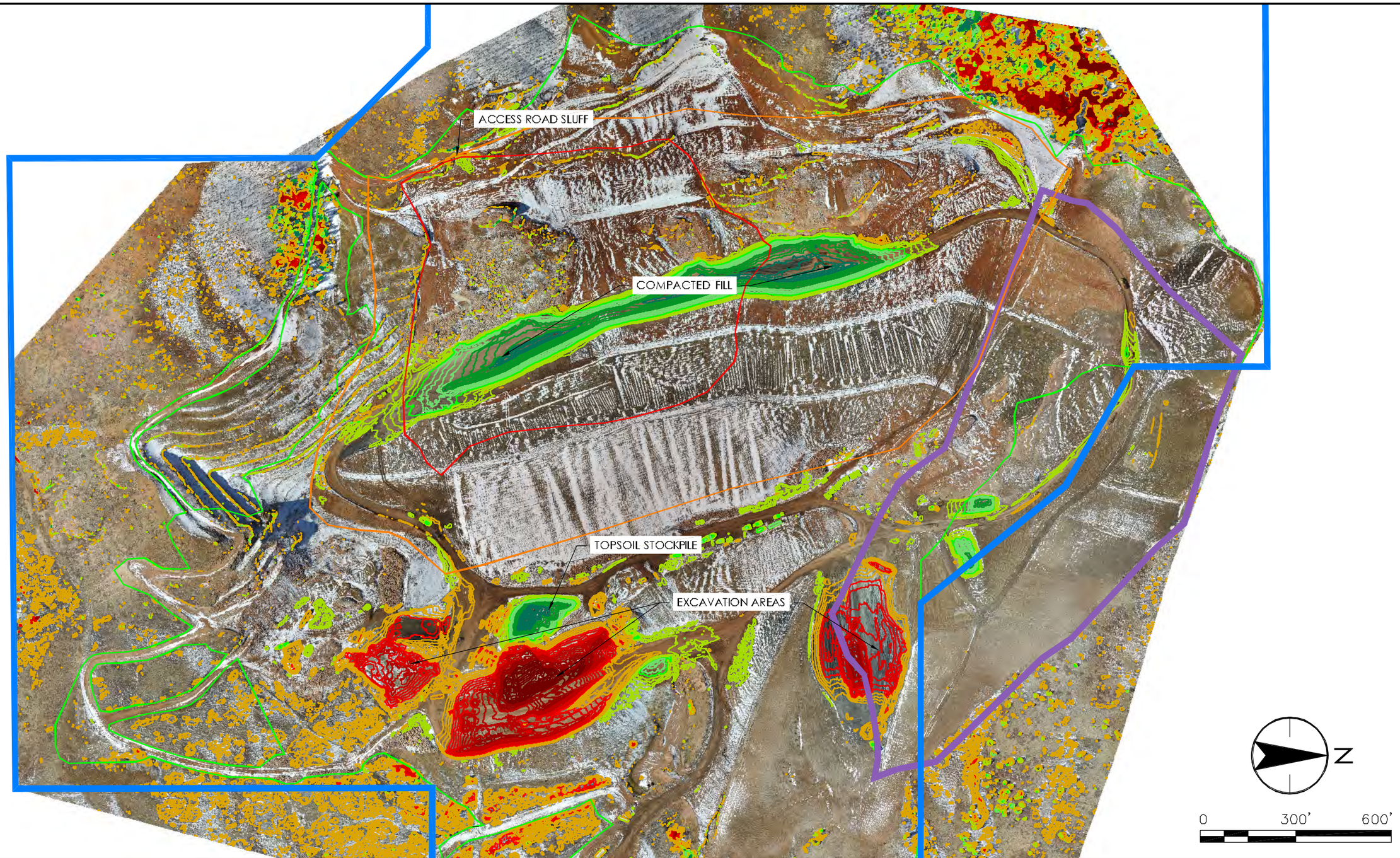


Notes:

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.

Appendix C

Drone Survey



Stantec

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 01/24/2024 TO 02/28/2024

Client/Project
CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE MONITORING

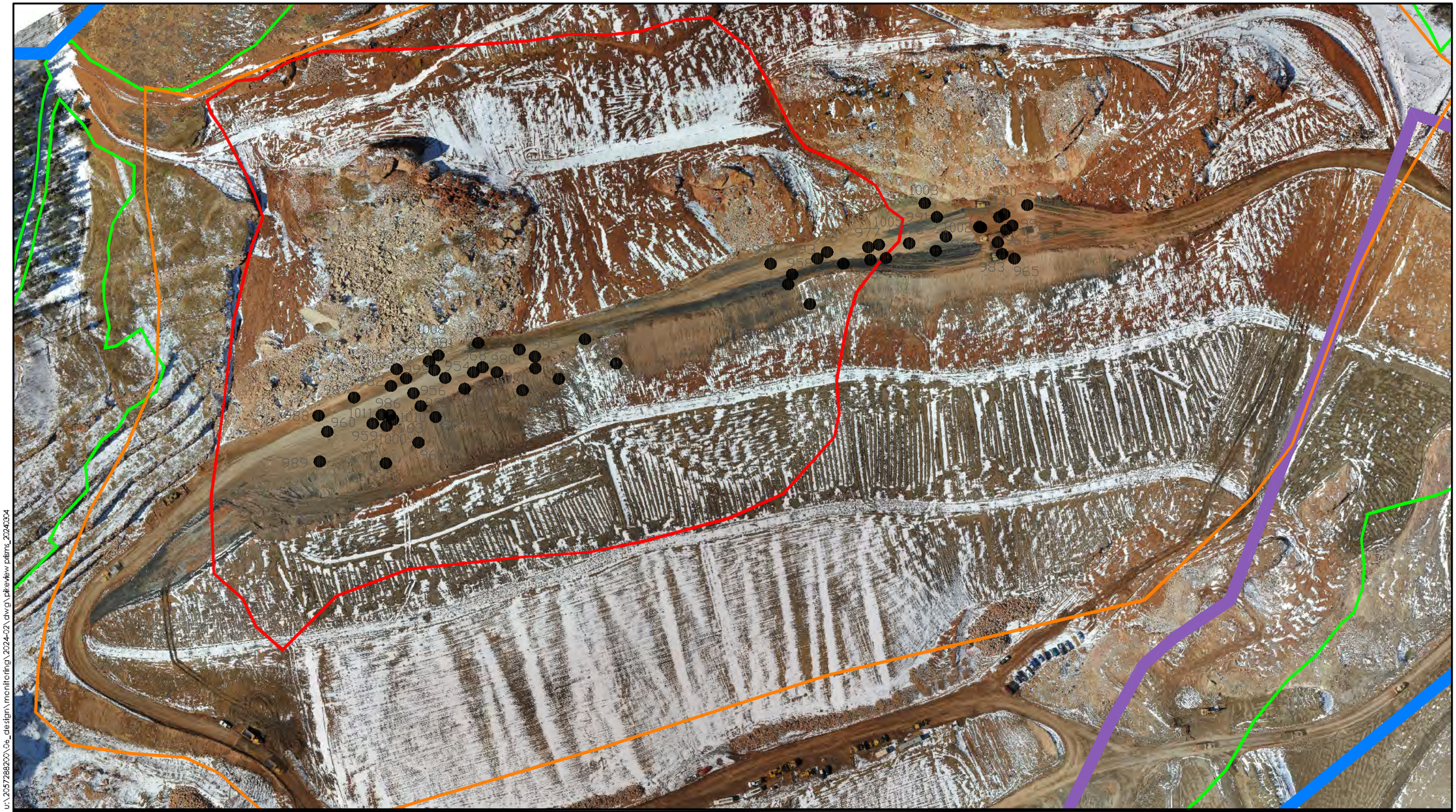
Project No.
2057288200

Title
COMPARISON OF RECENT AND PREVIOUS SURVEYS

Revision	Date
#	2024.03.31
Drawn By	Figure No.
PK	5

Appendix D

Compaction Testing Results



Stantec

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LEGEND

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

1. TEST 958 IS A RETEST OF 955. TEST 955 IS NOT SHOWN.

N

0 150' 300'

Client/Project
CASTLE AGGREGATE

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
COMPACTION TEST LOCATIONS

Revision	Date
#	2024.03.31
Drawn By	Figure No.
PK	6

Stantec

Compaction Testing Log

Test No.	Date	Elevation (ft)	Northing (ft)	Easting (ft)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)	Compaction (%)
951	1-Feb-24	7407	1402236.3	3172805.1	127.3	5.5	120.7	98
952	1-Feb-24	7408	1402339.6	3172791.0	130.1	6.0	122.7	100
953	1-Feb-24	7406	1402127.2	3172820.1	127.5	4.7	121.8	99
954	1-Feb-24	7391	1401418.1	3173017.1	126.4	6.5	118.7	97
955	1-Feb-24	7389	1401365.0	3173042.3	117.2	8.8	107.7	88
958	2-Feb-24	7389	1401372.3	3173040.8	129.5	9.7	118.0	96
956	2-Feb-24	7408	1402082.2	3172826.4	127.7	5.5	121.1	99
957	2-Feb-24	7408	1401996.6	3172844.3	124.0	9.7	113.0	92
959	2-Feb-24	7383	1401297.2	3173093.1	125.6	10.8	113.4	92
960	2-Feb-24	7380	1401221.4	3173106.6	126.9	7.2	118.4	96
961	8-Feb-24	7385	1401318.9	3173159.1	130.3	9.0	119.5	97
962	8-Feb-24	7388	1401373.5	3173124.5	132.7	7.5	123.4	100
963	8-Feb-24	7388	1401312.2	3173078.4	133.6	9.2	122.4	100
964	13-Feb-24	7416	1402353.8	3172770.0	128.8	11.9	115.1	94
965	13-Feb-24	7415	1402367.3	3172817.9	143.4	7.7	133.1	108
966	13-Feb-24	7414	1402253.1	3172781.3	133.3	9.6	121.6	99
967	13-Feb-24	7396	1401546.9	3173037.5	141.6	7.8	131.4	107
968	13-Feb-24	7397	1401464.8	3173007.6	132.9	10.0	120.8	98
969	13-Feb-24	7391	1401402.0	3173082.1	133.0	8.8	122.2	100
970	14-Feb-24	7401	1401568.4	3173000.9	134.6	7.9	124.8	102
971	14-Feb-24	7404	1401703.2	3172992.8	135.8	6.2	127.9	104
972	14-Feb-24	7402	1401607.6	3173018.5	130.0	9.1	119.2	97
973	15-Feb-24	7415	1401990.1	3172860.9	133.3	5.1	126.8	103
974	15-Feb-24	7415	1402026.2	3172893.8	127.6	9.8	116.2	95
975	19-Feb-24	7420	1402311.6	3172766.3	137.8	7.0	128.8	105
976	19-Feb-24	7418	1402191.8	3172792.4	141.3	7.1	131.9	107
977	19-Feb-24	7419	1402123.7	3172799.1	136.5	8.2	126.1	103
978	19-Feb-24	7418	1402055.0	3172807.0	142.8	8.9	131.1	107
979	20-Feb-24	7407	1401541.8	3172969.6	140.4	7.0	131.2	107
980	20-Feb-24	7405	1401480.2	3172999.1	139.4	7.0	130.3	106
981	20-Feb-24	7402	1401399.9	3173003.9	139.4	4.6	133.3	109
982	20-Feb-24	7398	1401327.6	3173030.5	140.9	5.1	134.1	109
983	21-Feb-24	7423	1402262.4	3172847.0	130.6	3.9	125.7	102
984	21-Feb-24	7424	1402336.1	3173842.9	132.0	10.7	119.2	97
985	21-Feb-24	7426	1402341.9	3172748.7	132.7	5.2	126.1	103
986	22-Feb-24	7404	1401377.3	3173063.9	135.2	7.9	125.3	102
987	22-Feb-24	7401	1401326	3173078.8	135.5	6.7	127	103

Test No.	Date	Elevation (ft)	Northing (ft)	Easting (ft)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)	Compaction (%)
988	22-Feb-24	7401	1401265.9	3173049.6	142	4.7	135.6	110
989	22-Feb-24	7393	1401206.8	3173079.7	132.6	6.7	124.3	101
990	22-Feb-24	7390	1401208.9	3173156.2	124.4	10.7	112.4	92
991	23-Feb-24	7430	1402350.3	3172744	140.9	6.5	132.3	108
992	23-Feb-24	7429	1402238	3172748.7	140.2	6	132.3	108
993	23-Feb-24	7427	1402363.9	3172363	132.6	8	122.8	100
994	23-Feb-24	7427	1402042.6	3172396.9	139.4	6.4	131	107
995	23-Feb-24	7426	1401960.7	3172826.7	125.3	4.5	119.9	98
996	26-Feb-24	7420	1401567.6	3172981.4	134.6	11.6	120.6	98
997	26-Feb-24	7422	1401651.2	3172952.5	126.7	12.4	112.7	92
998	26-Feb-24	7416	1401450.4	3173034.9	123.2	12	110	90
999	26-Feb-24	7412	1401391.2	3172989.4	140.8	11.8	125.9	103
1000	26-Feb-24	7410	1401352.9	3173017.6	135.4	14.7	118	96
1001	26-Feb-24	7406	1401320.1	3173096.7	121.7	9.2	111.4	91
1002	28-Feb-24	7438	1402388.8	3172728.8	131.6	4.8	125.6	102
1003	28-Feb-24	7438	1402308.7	3172764.9	132.5	6.6	124.3	101
1004	28-Feb-24	7439	1402217.8	3172725.6	134.7	9.1	123.5	101
1005	28-Feb-24	7436	1402153.1	3172817.1	140.9	8.6	129.8	106
1006	28-Feb-24	7436	1402114.1	3170807.5	138	8.4	127.3	104
1007	29-Feb-24	7422	1401504.1	3173007.6	130.4	13.3	115.1	94
1008	29-Feb-24	7422	1401473.1	3172958.5	137.7	9.7	125.5	102
1009	29-Feb-24	7418	1401406.5	3172979.1	139.8	8	129.4	105
1010	29-Feb-24	7414	1401337.1	3173002.5	134.4	4.8	128.2	104
1011	29-Feb-24	7413	1401331	3173086.6	134.4	12	120	98

Notes:

- A total 3,077,000 yd3 had been placed and compacted. This requires at least 616 compaction tests, and 1,216 tests have been taken.

- Test #958 is a retest of failed test #955. The area was recompacted and the second test met the project specifications.