Stantec

To:	Jerald Schnabel	From:	Paul Kos
	Riverbend Industries Inc.		Denver, CO 80222
File:	May 2023 Monitoring Summary	Date:	June 30, 2023

Reference: May 2023 Geotechnical Monitoring Summary Pikeview Quarry

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has prepared this May 2023 Geotechnical Monitoring Summary for the Pikeview Quarry. The Pikeview Quarry is situated along the foothills of the Rocky Mountains, northwest of Colorado Springs, Colorado. Riverbend Industries Inc. (Riverbend, formerly Continental Materials Corp.) 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 May 2023. Continuous monitoring by the robotic survey system began in 2010 and has continued through the month of May 2023. Visual inspections of the slopes were performed by Riverbend employees and Stantec engineers.

1.1 PURPOSE

The purpose of this report is to summarize the May 2023 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 (Riverbend or Stantec) and Monthly (Stantec)
Robotic theodolite/prism	Continuous
Drone inspection	Monthly
Compaction testing	Every 5,000 yd^3 (min.)

2.0 VISUAL INSPECTIONS

Inspections are completed daily by site personnel and monthly by Stantec personnel to document visual observations of slope conditions, including conditions of instability (i.e., cracking, slumping, over-steepened slopes, seeps, perched boulders, rock falls, erosion, and areas undercut by construction or maintenance activities). Certain areas of the landslide have been designated as safety exclusion zones, and these areas are inspected from adjacent locations.

On working days, site operators inspect their work areas for signs of instability daily before starting work per site safety rules and regulations. The daily inspection starts by reviewing any prism alerts/alarms and inspecting those areas before work begins in that area. The daily inspection also includes visual observations of the quarry walls and floor for any changes. No changes to the quarry conditions were identified during daily inspections in May 2023. 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 May 10 and again on May 15, 2023 following a series of heavy precipitation events from May 10 to 12. A total of 5.32 inches of rain fell during this period, with a 24-hour maximum of 4.33 inches as recorded by the nearby KCOCOLOR1825 weather station. This exceeds the 25-year, 24-hour storm total of 4.06 inches. During the inspection on May 10, the site was in the same condition observed in the previous report with no signs of instability. 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 May 2023.
- Operators continue to place compacted material in the buttress zone. Material was excavated from the North and Lower Borrow Areas. Material is initially excavated in benches for the majority of the excavation to efficiently remove the material; these benches are removed for final grading to create the reclamation surface.
- Compaction testing continues at the rate of at least one test per 5,000 cubic yards of fill placed in the buttress area.
- No cracking was observed on the native granite slopes above the extents of the disturbed area.
- Known cracks were monitored for changes. The hummocky field in the area immediately above the southern extent of the slide shows evidence of previous cracking. A fresh hairline crack was found immediately (approximately 20 feet south) next to the slide area, and the crack ran parallel to the slide area. Cracking of this kind and in this area was expected from the May 10-12 rain event and is addressed in the buttress design which specifically stabilizes these movements. The slide has not been reactivated, these cracks are alongside and like the older cracks in this area.
- The slope below the first bench has been placed to the final grade, and this slope was traversed on foot and examined for cracks or signs of instability by Stantec engineers. No cracks or signs of instability were identified.
- Surficial slumping and cracking were identified on the loose fill on the upper sections in the previously disturbed areas. These features were located near (within 3 feet of) the surface and are limited to loosely placed angle of repose slopes. Slumping of this nature is expected to occur on these types of slopes following the heavy rains that recently occurred at the site.

- 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.
- Offsite topsoil was stockpiled at the base of the buttress area with the additional topsoil and growth medium. The topsoil stockpiles contain a sufficient volume of material to place cover on all disturbed areas of the mine. Topsoil imports will continue, and any excess topsoil may be placed at increased thickness so that all topsoil is used in reclaiming the mine.
- Rock was being screened, sorted, and stockpiled as riprap for use as erosion protection in the channels.
- The culvert inlet was blocked by debris during the May 10-12 rain event. Water appears to have temporarily pooled before draining. Riverbend has partially cleared the debris, but access limitations and supports within the culvert inhibit clearing all the debris. Riverbend has procured a pump and will begin pumping operations if any water collects behind the culvert. Riverbend inspects the culvert for ponded water following rain events, and should any water be observed, it will be removed using pumps. Following the May 10-12 rain event, an insufficient amount of water remained after the rain event to warrant draining the basin using pumps.
- 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. During the May 10-12 rain event erosion occurred below the benches. Gullies formed by the run-off will be backfilled and compacted. There is no indication the erosion impacted the buttress in a meaningful way.

3.0 PRISM SURVEY

A Leica Robotic station is used to continuously survey the prisms onsite to document slope movements. The station records the location of each prism every hour. There are currently 14 active prisms; 2 prisms were control points located outside the slope movement area and 12 prisms were located on the slopes surrounding the landslide area. As the slope is backfilled and graded, the existing prisms will be removed, and additional prisms will be installed. Prism P1 was hit by a falling rock and was removed from the monitoring on May 12. Prism NP2 was removed on April 28, 2023, after the prism location was eroded by water; this was inadvertently omitted from the April report. 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, Riverbend clears the area of concern until the data can be reviewed and the slope can be inspected. Riverbend made sure that there were no workers in the area before inspecting the slope. All previous alerts for potential movement have been attributed to weather or animal activity, and no alerts have been associated with slope movements. Other alerts were determined to be caused by a power outage, equipment operations blocking the prism, weather conditions, or sun glare. The alerts are listed in Table 2.

Table 2 Alert Summary

Date(s)	Alert	Cause/Actions taken	Alert Resolved
3-May	Points not found	Rain, and fog. No work being performed at time of alerts.	4-May
May 3 to May 4	P25 regression limits received	Multiple alerts in positive and negative directions. No work during alert. Prism inspected and no signs of movement.	4-May

4-May	P1 regression limits received	Multiple alerts in positive and negative directions. No work during alert. Prism inspected and no signs of movement.	4-May
4-May	P69A regression limits received	Multiple alerts. No work during alert. Prism inspected and no signs of movement.	4-May
5-May	No communication	Planned power outage during excavation near Leica building. Spotters in place during outage.	5-May
May 10 to May 12	Points not found	Rain, and fog. No work being performed at time of alerts.	10-May
11-May	P25 regression limits received	Rain and fog at time of alerts. No work during alert.	11-May
11-May	P69A regression limits received	Rain and fog at time of alerts. No work during alert.	11-May
11-May	P33 regression limits received	Rain and fog at time of alerts. No work during alert.	11-May
11-May	NP66 regression limits received	Rain and fog at time of alerts. No work during alert. Prism rotated as part of a surficial slump	11-May
12-May	NP66 regression limits received	Rain and fog at time of alerts. No work during alert. Prism rotated as part of a surficial slump	12-May
12-May	P69A regression limits received	Rain and fog at time of alerts. No work during alert. “Movements” in positive and negative direction.	12-May
12-May	P1 not found	Prism hit by rock. Location is no longer monitored.	12-May
15-May	Points not found	Rain, and fog. No work being performed at time of alerts.	15-May
16-May	Points not found	Rain, and fog. No work being performed at time of alerts.	16-May
17-May	Points not found	Rain, and fog. No work being performed at time of alerts.	17-May
May 18 to May 19	Points not found	Rain, and fog. No work being performed at time of alerts.	19-May
May 19 to May 20	Points not found	Rain, and fog. No work being performed at time of alerts.	20-May
May 20 to May 22	No communication	Power outage. No work being performed at time of alerts.	22-May
May 23 to May 24	Points not found	Rain, and fog. No work being performed at time of alerts.	24-May
25-May	Points not found	Rain, and fog. No work being performed at time of alerts.	25-May
27-May	Points not found	Rain, and fog. No work being performed at time of alerts.	27-May
30-May	BR2 not found	Single event. Possible animal activity. No work being performed at time of alerts.	30-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 station to the prism; positive displacements indicate less distance between the station and prism (movement towards the total station). The height displacement measures the change in the vertical distance from the robotic station to the prism; positive displacements indicate upward movement. The values for the last reading in the month are included in Table 3. The monthly delta is the most recent reading cumulative delta displacement (horizontal, lateral, and vertical) subtracted from the last reading from the previous month. The cumulative delta values are a total displacement and are not

associated with a direction. The transverse, height, and cumulative delta displacements are the total displacement over the life of the monitoring, which was reset when the Leica station was moved in July 2022. According to Leica documentation, the survey accuracy is +/-4 mm+1.5 ppm for prisms located greater than 500m from the station; these equates to an accuracy of +/-0.016 ft.

The data show stable conditions with no movements at 8 of 14 prisms with recorded displacements limited to data scatter and not actual movements. Prisms BR1, BR2, NP66, NP3, P69A, and P70 are located above the landslide, and these prisms recorded slope creep movements at slow velocity following the heavy rains in mid-May. This settlement was likely related to the landslide material consolidating under its own weight with the addition of excess water. At least one prism was located within an area where surficial slumping was observed, the prism, and these movements partially account for the recorded movements. These prisms were placed in areas where slope creep movements are likely to be recorded; therefore, slope creep movements being recorded at more locations is expected to occur. Plots of the transverse and height displacements for each prism are included in Appendix B.

Table 3 Prism Summary

Prism ID	Cumulative Transverse Displacement (ft)	Cumulative Height Displacement (ft)	Monthly Delta (ft)	Cumulative Delta (ft)	Notes / Recommendations
BR1	0.024	-0.190	0.1587	0.3955	Slope creep movements.
BR2	0.088	-0.285	0.2460	0.5022	Slope creep movements.
CP6	-0.014	-0.005	-0.0001	0.0185	
CP7	0.084	-0.013	-0.0104	0.0861	
NP3	0.069	-0.185	0.1606	0.2067	
NP66	0.624	-0.681	0.8344	0.9569	Slope creep movements.
P1	-0.018	-0.040	0.0215	0.0460	Prism no longer monitored
P2	-0.006	-0.025	0.0020	0.0264	
P5	-0.001	-0.004	-0.0076	0.0051	
P25	-0.001	0.004	-0.0098	0.0057	
P32	-0.006	0.015	-0.0122	0.0162	
P33	0.103	-0.019	-0.0139	0.1238	
P69A	0.214	-0.208	0.1597	0.3576	
P70	0.035	0.007	0.0195	0.0536	

4.0 DRONE SURVEY

The site was flown for aerial imagery using an unmanned aircraft system (UAS or ‘drone’) on May 30, 2023. 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 is excavated from the Shop Borrow Area or imported from offsite projects, including the North Borrow Area. No slope movements or other changes in topography were identified. The current imagery and topography are included in Figures 1 and 3, and the comparison surface is included as Figure 5 in Appendix C.

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

5.0 COMPACTION TESTING

Fill placement started on February 25, 2022 and continued throughout May 2023. Fill was excavated from the Shop, Central, South Borrow and North Borrow Areas and placed in the buttress and buffer zones. All fill is moisture conditioned as necessary and then compacted. Compaction testing began April 2022 and occurs at the rate of at least one test per 5,000 yd^3 placed. During May 2023, approximately 61,700 yd^3 was placed and compacted. This volume placed in the buttress zone required at least 12 compaction tests. There were 30 compaction tests taken in May. As of May 31, 2022, a total of approximately 2,470,700 yd^3 had been placed and compacted. This required at least 495 compaction tests, and 889 tests have been taken. There were no failing tests in May; all tests met the minimum compaction requirement of 90%. The compaction testing results are summarized in Appendix D, and the testing locations are shown on Figure 6. Following the May 10-12 rain event the contractor was only able to work 3 full days from May 11-31 due to weather issues.

6.0 RECLAMATION PROGRESS

Riverbend 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 or ‘gated” approach will be used to complete the reclamation process going forward (See milestone schedule below)

Phase 1 - Value Engineering and issue RFP to qualified contractors

Phase 2 - Commercial negotiations with successful contractor

Phase 3 - Execution planning and Contractor readiness review

Phase 4 - Site Construction execution

Phase 5 - Final revegetation (season 2)

Task/Milestone	Estimated Dates
Phase 1 – Issue RFP to Bidders	Completed June 2021
Phase 1 – RFP Evaluation & Recommendation	Completed July 2021
Phase 2 – Constructor Contract Award	Completed January 2022
Phase 3 – Project Kick-off with successful Contractor	Completed February 4, 2022
Phase 4 – Contractor Mobilization to Site	Completed February 2022
Phase 4 – Reclamation Grading	February 2022 to present
Phase 4 – Contractor Demobilize from Site	Fall 2023

Task/Milestone	Estimated Dates
Phase 5 – Final Revegetation season 2 Begins	2023 until acceptance

Progress of activities this month:

- Contractor continued earth moving activities
- Quality assurance testing continued
- Importing topsoil material continued, but at a decreased rate
- Processing of riprap continued
- Geotechnical monitoring continued
- Obtained approval to excavate the remaining material from USFS land
- Began cleanup operations following the heavy rains

Work planned for next month includes:

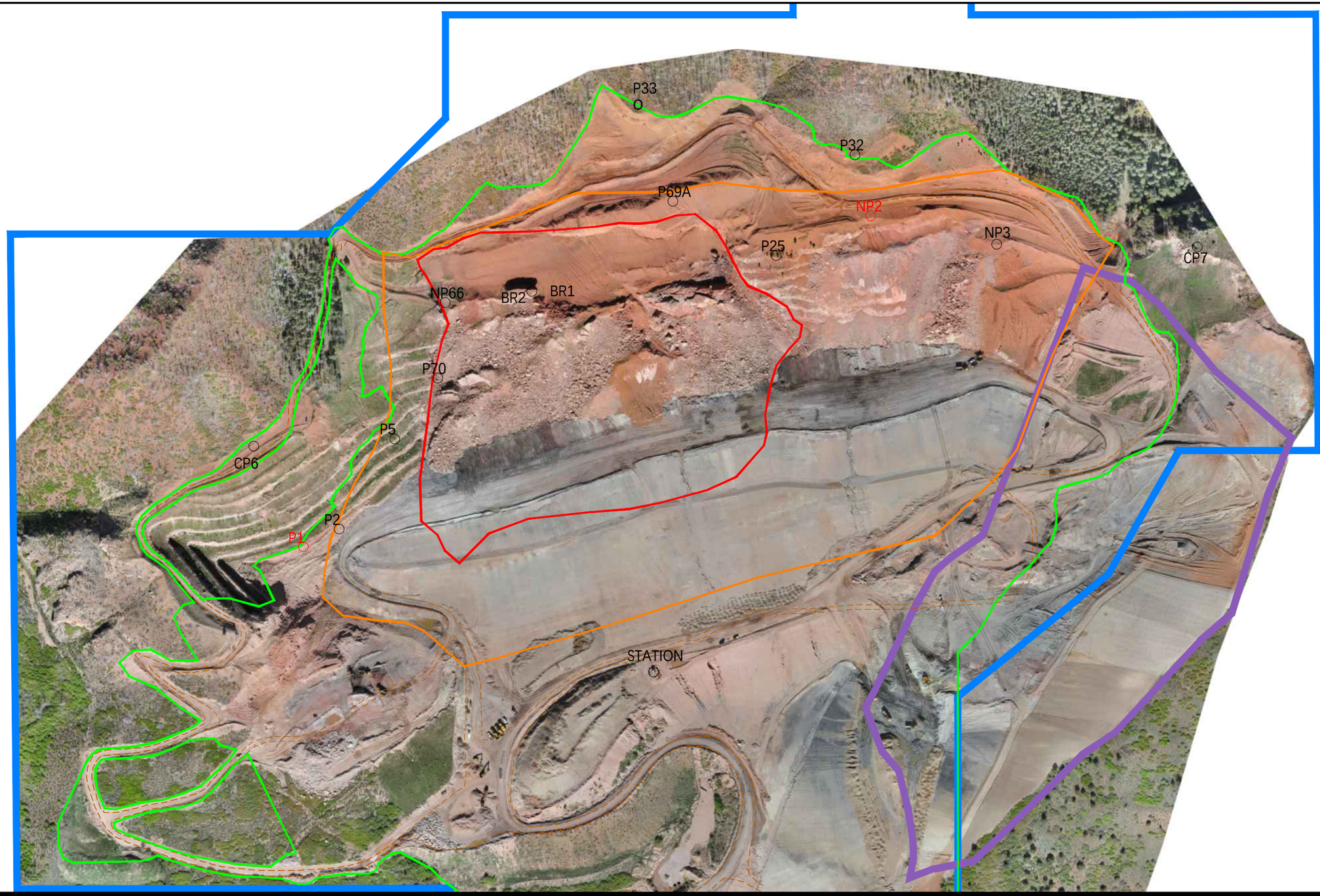
- Continue reclamation grading
- Continue importing topsoil material
- Continue processing riprap
- Continue geotechnical monitoring
- Planning for placing topsoil and revegetation of areas that have reached the final grade. This is mostly the area below the lowest terrace.
- Remove and replace prisms on an as-needed basis. Prisms along the buttress toe are being planned for installation in early June.
- Continue cleanup operations from the storm events

7.0 CONCLUSIONS

The data collected in May 2023 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 2023 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'

Stantec

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Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
SITE MAP

Revision
#

Date
2023.06.30

Drawn By
PK

Figure No.
1

Appendix A

Visual Inspections

6. Cracking along upper haul road following rain.

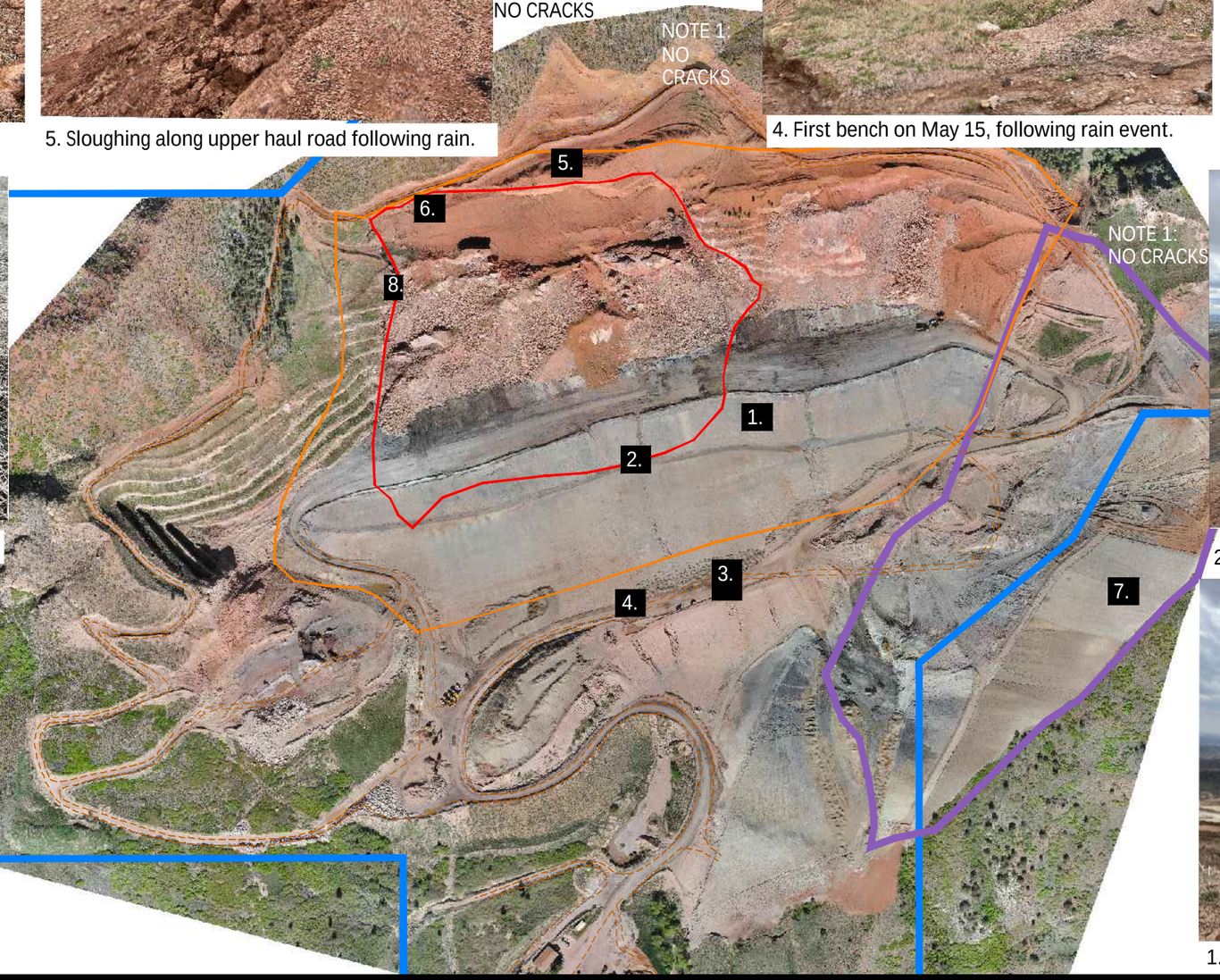
5. Sloughing along upper haul road following rain.

4. First bench on May 15, following rain event.

3. First bench on May 10, before rain event.

7. Vegetation growing within erosion blanket.

8. Hairline crack on the south end.



2. Pit floor on May 15, following rain event.

1. Pit floor on May 10, before rain event.

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LEGEND

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

NOTES

1. NO CRACKS OBSERVED IN THIS AREA.
2. ALL PHOTOS TAKEN MAY 10-15, 2023.

N

0 400' 800'

Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
OBSERVATIONS FROM MAY INSPECTION

Revision
#

Date
2023.06.30

Drawn By
PK

Figure No.
2

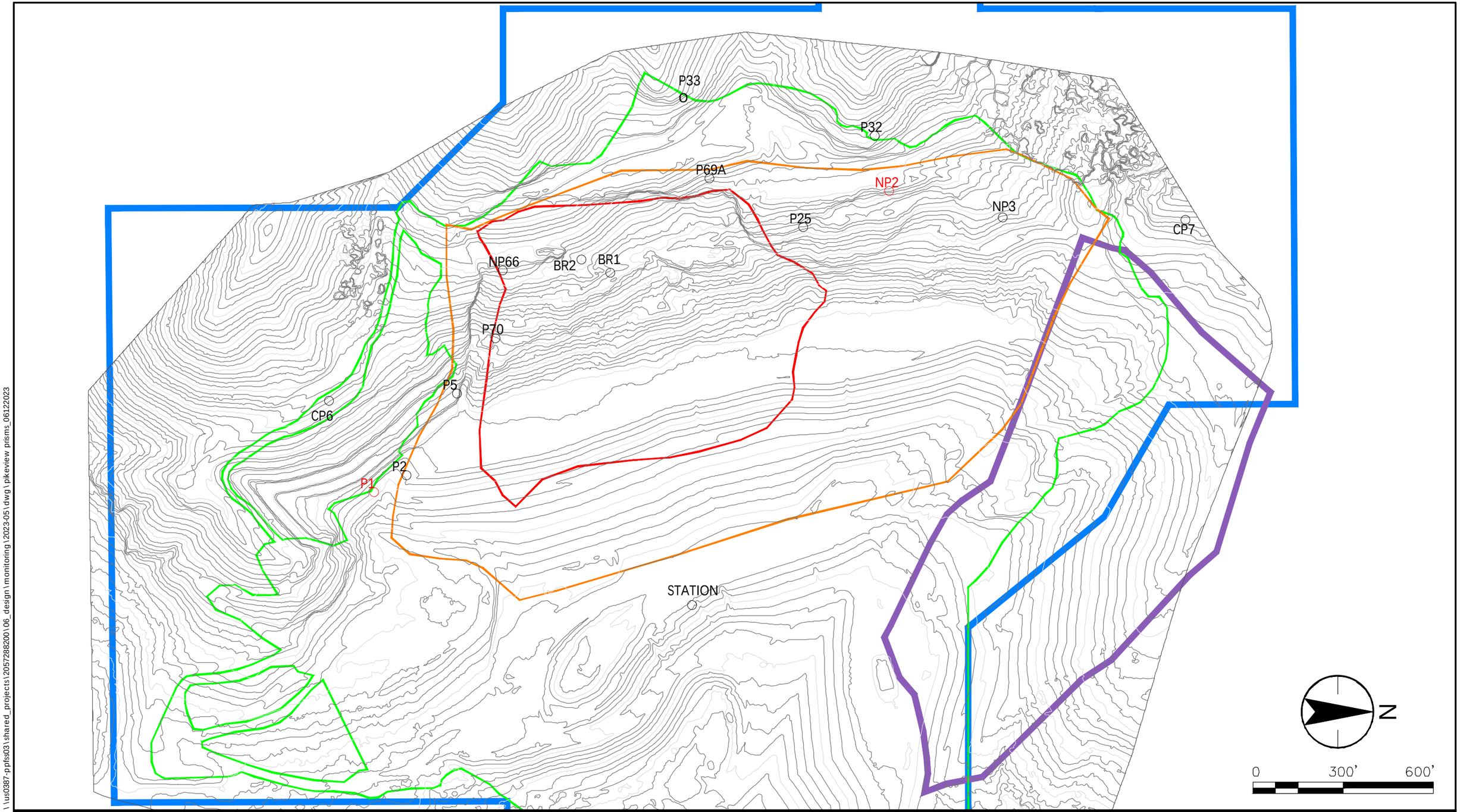
Stantec

Table A-1 Summary of Daily Inspections

Date	Notes	Inspection By
1-May-23	No movement observed. Good to proceed.	Jerald Schnabel
2-May-23	No movement observed. Good to proceed.	Jerald Schnabel
3-May-23	No movement observed. Good to proceed.	Jerald Schnabel
4-May-23	No movement observed. Good to proceed.	Jerald Schnabel
5-May-23	No movement observed. Good to proceed.	Jerald Schnabel
6-May-23	No movement observed. Good to proceed.	Jerald Schnabel
7-May-23	No work.	Not applicable
8-May-23	No movement observed. Good to proceed.	Jerald Schnabel
9-May-23	No movement observed. Good to proceed.	Jerald Schnabel
10-May-23	No movement observed. Good to proceed.	Jerald Schnabel
11-May-23	No work due to rain. Erosion noted. Rain and fog prevent full inspection.	Jerald Schnabel
12-May-23	No work due to recent rain. Erosion noted.	Jerald Schnabel
13-May-23	No work due to recent rain. Erosion noted.	Jerald Schnabel
14-May-23	No work due to recent rain. No signs of movement on buttress. Erosion noted.	Jerald Schnabel
15-May-23	Full geotechnical inspection. No movement observed. Good to proceed.	Paul Kos/Jerald Schnabel
16-May-23	No movement observed. Good to proceed.	Jerald Schnabel
17-May-23	No movement observed. Good to proceed.	Jerald Schnabel
18-May-23	No movement observed. Good to proceed.	Jerald Schnabel
19-May-23	No work due to recent rain. No movement observed.	Jerald Schnabel
20-May-23	No work due to rain. Rain and fog prevent full inspection.	Jerald Schnabel
21-May-23	No work.	Not applicable
22-May-23	Localized rock falls noted. No movement observed otherwise. Seepage from limestone on north end observed. No work in area below seep until it stops or can be further investigated.	Jerald Schnabel
23-May-23	Localized rock falls noted. No movement observed otherwise. Seepage from limestone on north end continues. No work in area below seep.	Jerald Schnabel
24-May-23	No movement observed. Seepage from limestone on north end continues. No work in area below seep.	Jerald Schnabel
25-May-23	No work due to recent rain. No movement observed.	Jerald Schnabel
26-May-23	No work due to recent rain. No movement observed.	Jerald Schnabel
27-May-23	No work.	Not applicable
28-May-23	No work.	Not applicable
29-May-23	No work.	Not applicable
30-May-23	No movement observed. Good to proceed.	Jerald Schnabel
31-May-23	No movement observed. Good to proceed.	Jerald Schnabel

Appendix B

Prism Survey



LEGEND

- Permit/Affected Lands Boundary
- City Grading Permit Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Existing Prism
- Removed Prism
- 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 MAY 30, 2023 DRONE SURVEY.
4. CONTOUR INTERVAL IS 10 FEET

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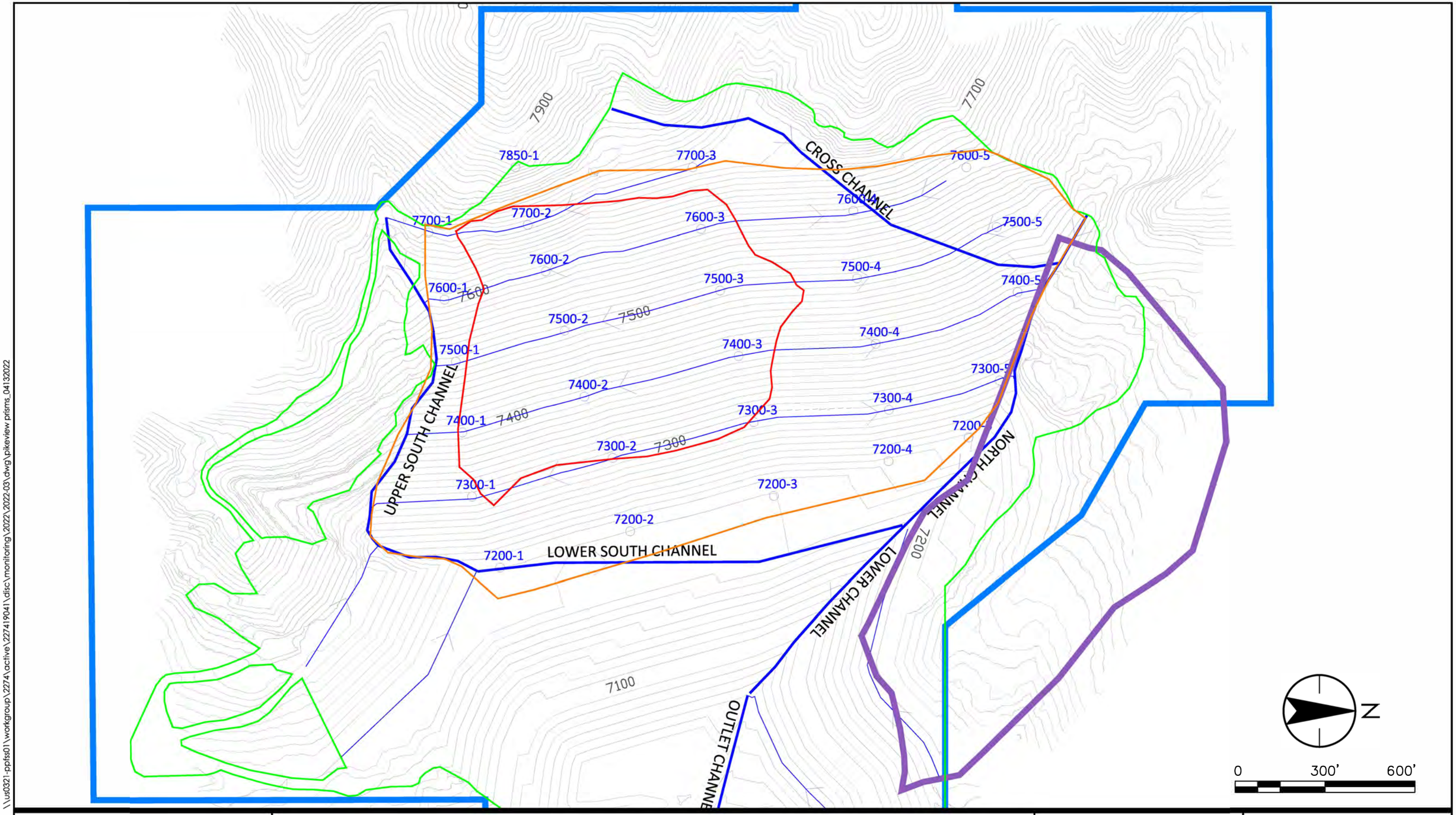
Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision	Date
#	2023.06.30
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
- Proposed Prism

NOTES

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

Client/Project
RIVERBEND INDUSTRIES INC.
PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
PROPOSED PRISMS WITH RECLAMATION SURFACE

Revision	Date
#	2023.06.30
Drawn By	Figure No.
PK	4

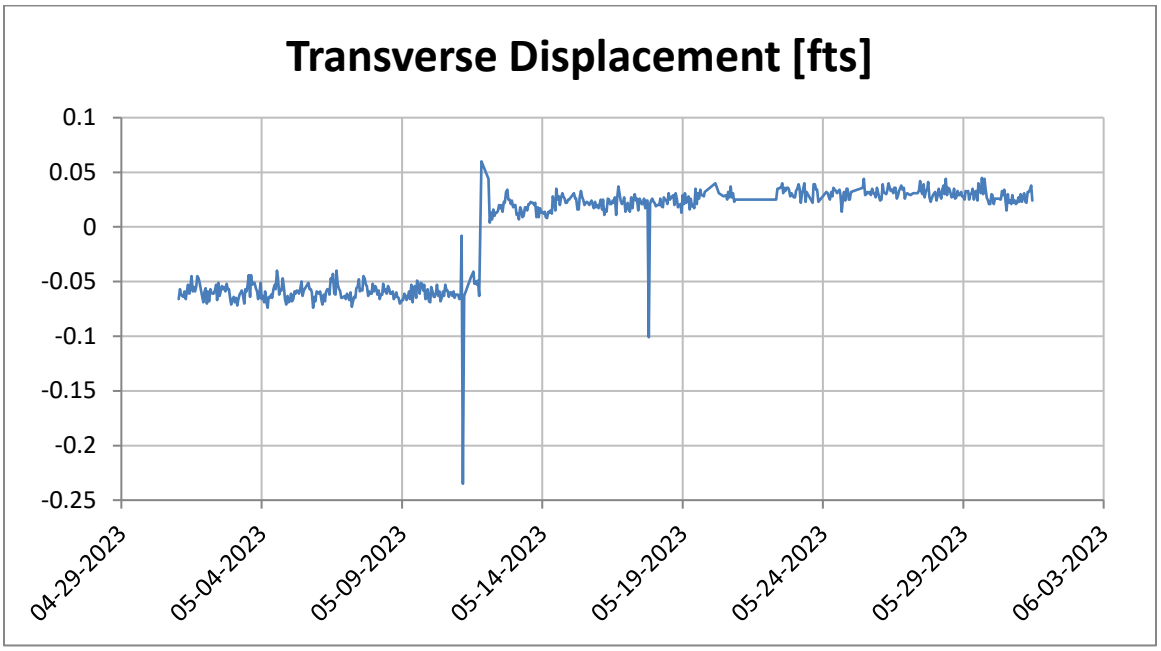
Stantec

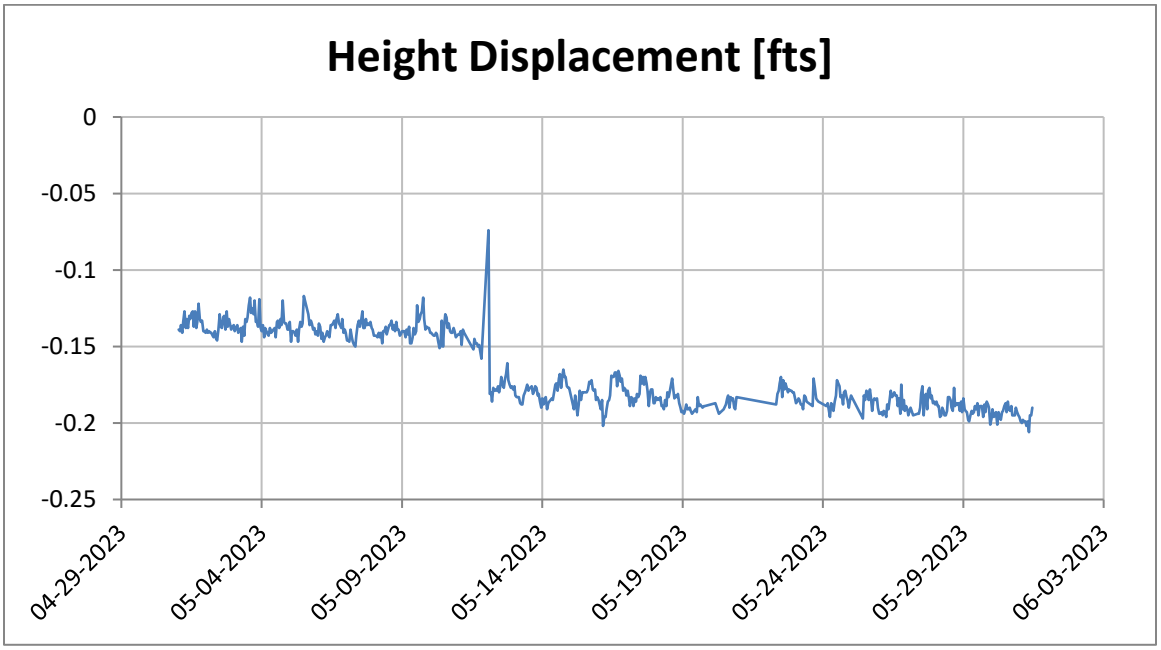
Prism Log

Prism	Date	Action	Comment
CP2	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
CP3	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
NP1	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
TOE2	11-Mar-22	Prism Removed	Reclamation grading to affect prism in near future
CP4	11-Mar-22	Prism Added	Control Point Replacement
CP5	11-Mar-22	Prism Added	Control Point Replacement
TS1	12-Mar-22	Prism Added	New Prism Added
TOE3	30-Mar-22	Prism Removed	Reclamation grading to affect buffer filling activities
TOE4	8-Apr-22	Prism Added	New Prism Added
TOE5	8-Apr-22	Prism Added	New Prism Added
BR1	8-Apr-22	Prism Added	New Prism Added
BR2	8-Apr-22	Prism Added	New Prism Added
NP1	22-Apr-22	Prism Removed	Originally NP1. Prism re-set in same spot and is now NP3
NP3	22-Apr-22	Prism Added	
TOE3	22-Apr-22	Prism Removed	Originally TOE3. Prism moved to a higher elevation and is now TOE6
TOE6	22-Apr-22	Prism Added	
TOE1	22-Apr-22	Prism Removed	Reclamation grading to affect buffer filling activities
P4	17-Jun-22	Prism Removed	Prism removed due to rock deterioration
P69	20-Jul-22	Prism Removed	Prism was originally P69. It has been re-set to Higher Elevation and is now P69A. Related to base station relocation.
P69A	20-Jul-22	Prism Added	
P35	20-Jul-22	Prism Renamed	Prism was originally P35. It has been re-set to Higher Elevation and is now CP6. Related to base station relocation.
CP6	20-Jul-22	Prism Added	
CP5	20-Jul-22	Prism Renamed	Prism was originally CP5. It has been re-set to Higher Elevation and is now CP7. Related to base station relocation.
CP7	20-Jul-22	Prism Added	
CP1	20-Jul-22	Prism Removed	Not in line of sight of new base station.
CP4	20-Jul-22	Prism Removed	Not in line of sight of new base station.
TOE4	20-Jul-22	Prism Removed	Not in line of sight of new base station.
TOE6	20-Jul-22	Prism Removed	Not in line of sight of new base station.
TOE5	4-Aug-2022	Prism Removed	Out of line of sight of base station.
P63	15-Aug-2022	Prism Removed	Out of line of sight of base station.
NP2	28-Apr-2023	Prism Removed	Prism location eroded.
P1	12-May-2023	Prism Removed	Prism hit by falling rock.

Stantec

Prism BR1



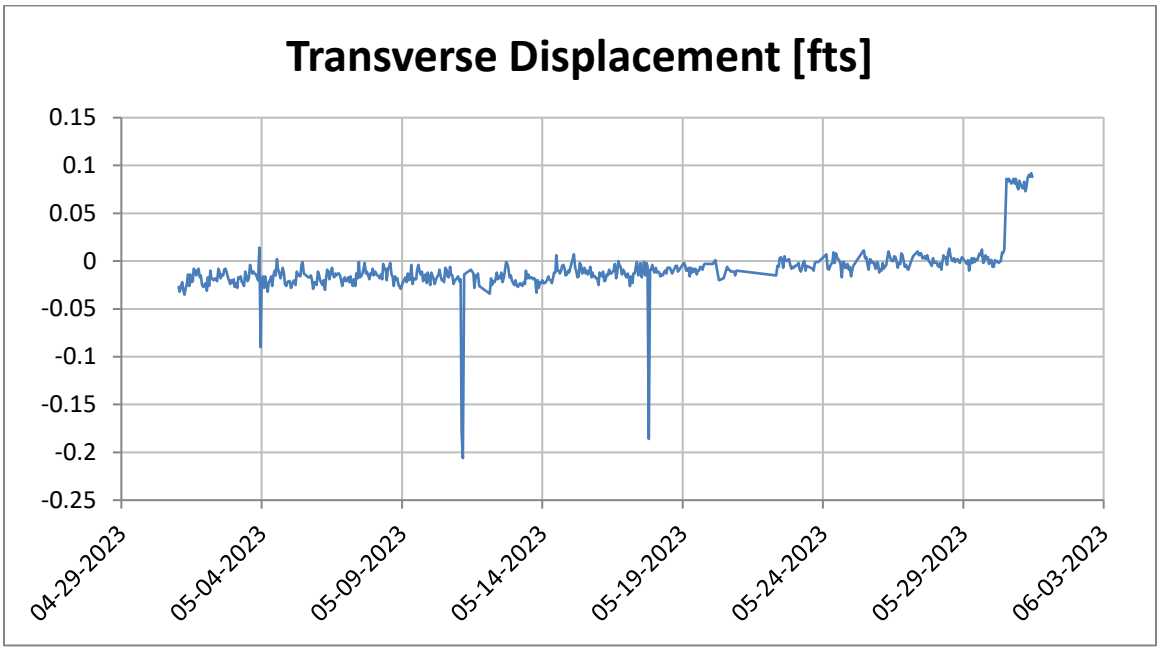


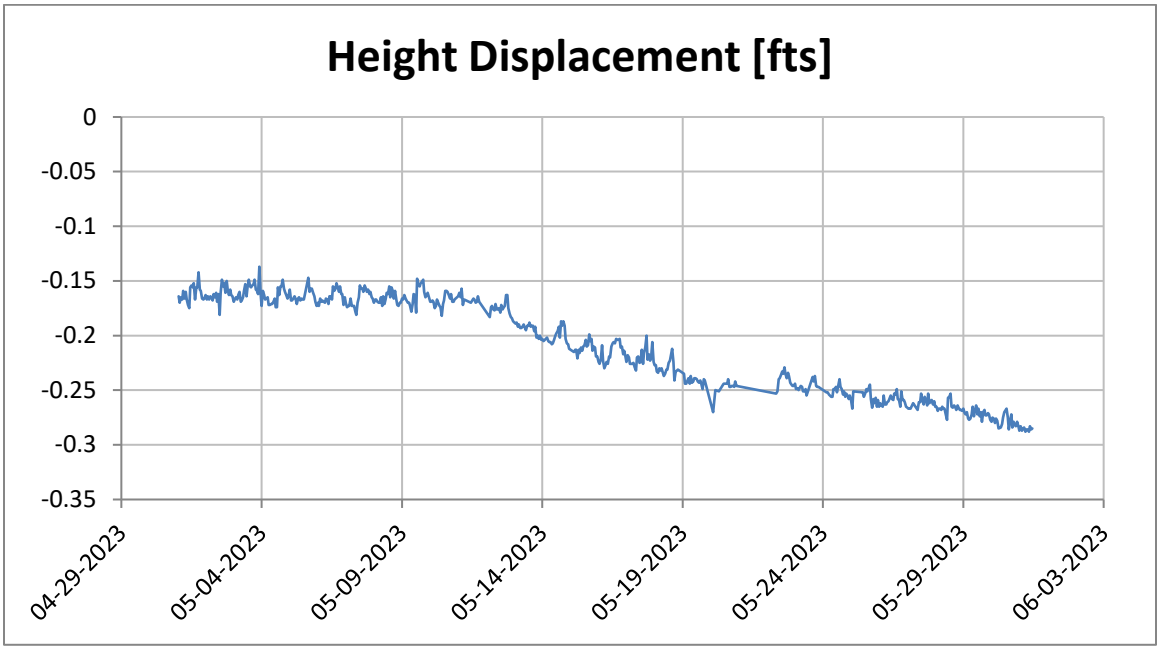
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Prism records slope creep movements with slow velocity.

Stantec

Prism BR2



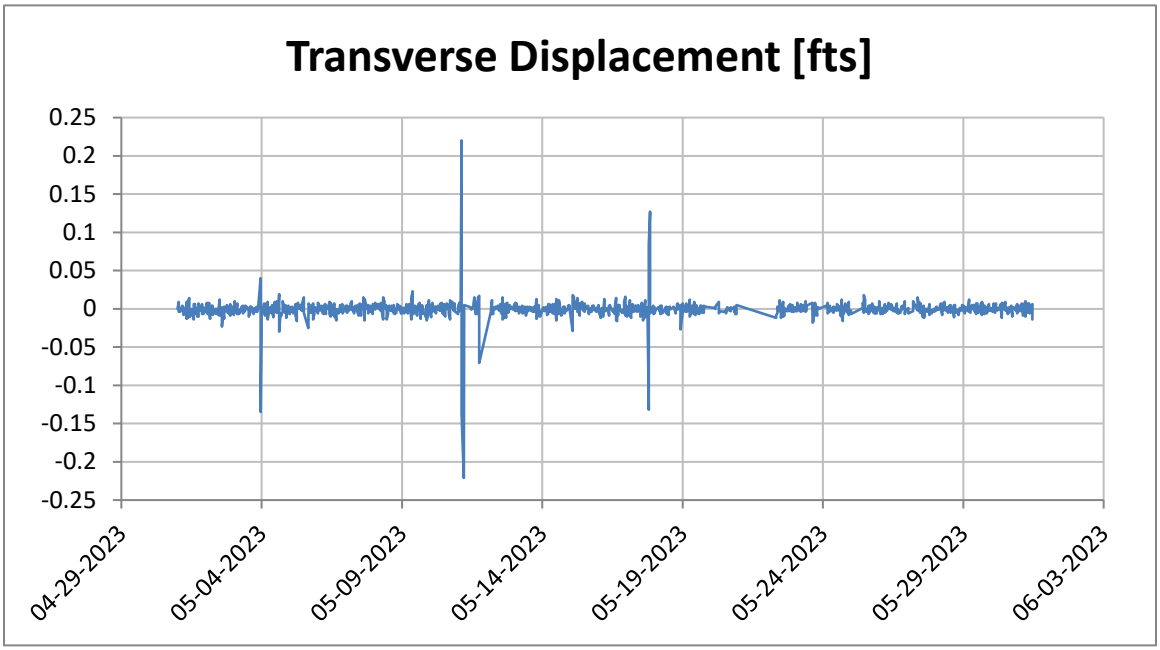


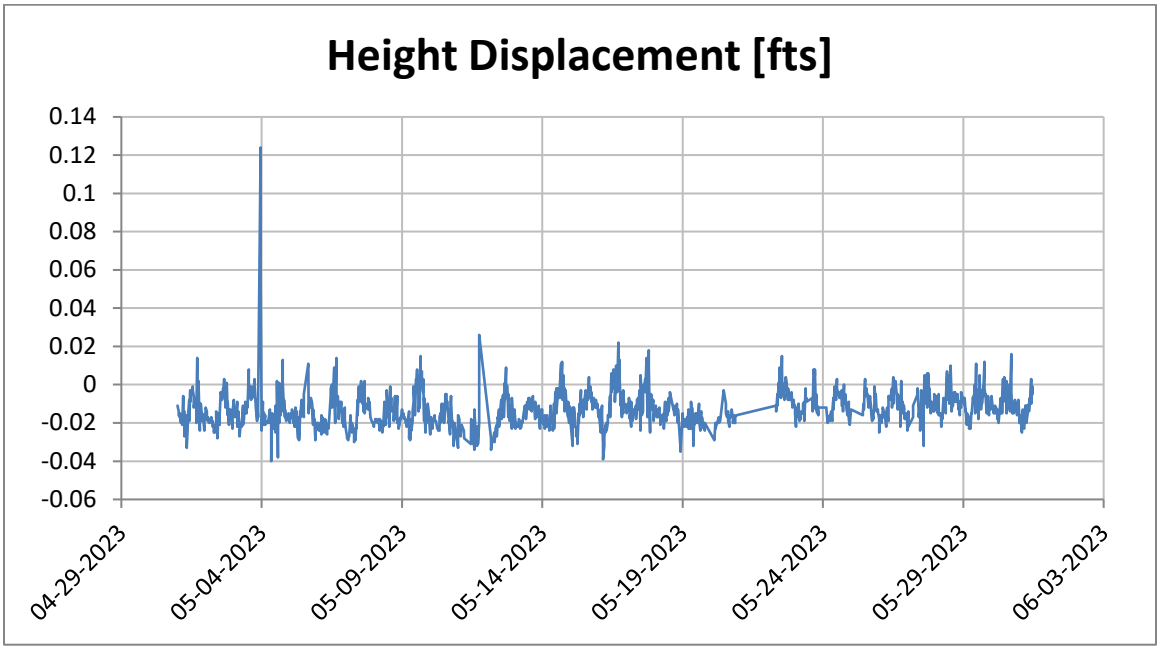
Notes:

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

Stantec

Prism CP6



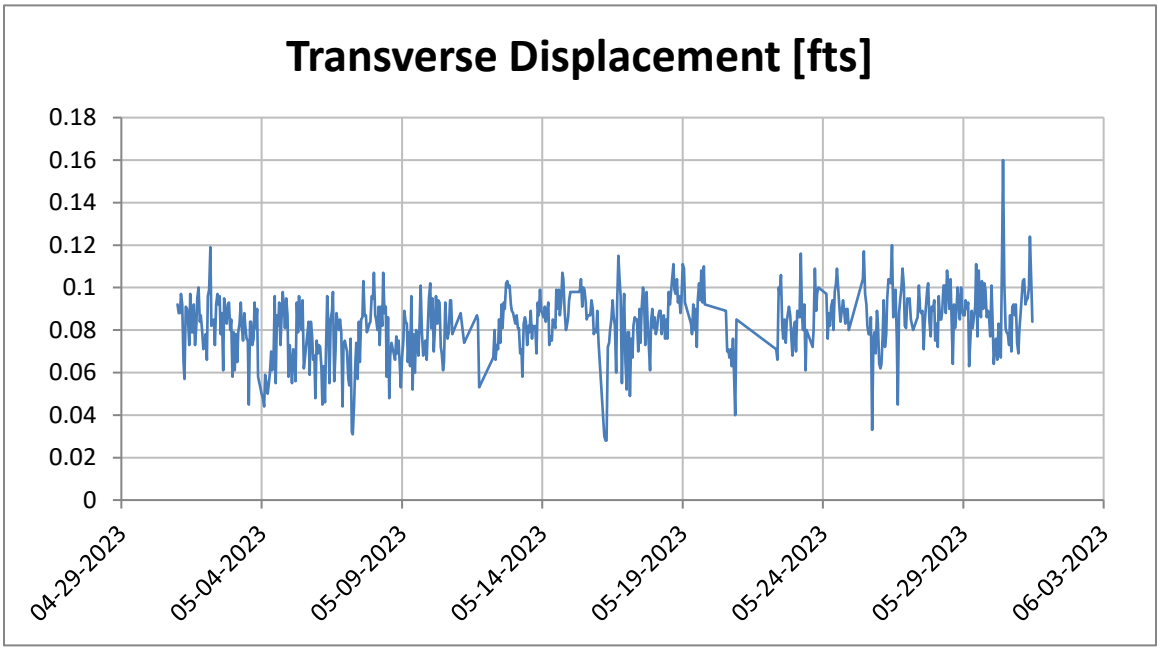


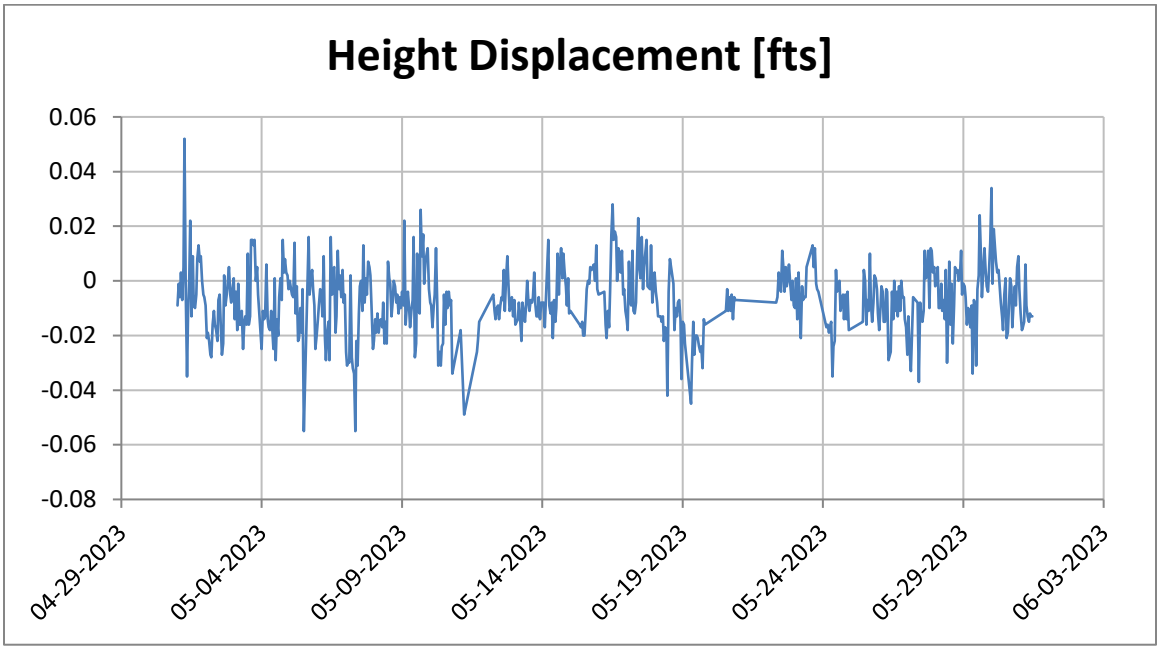
Notes:

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 station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.

Stantec

Prism CP7



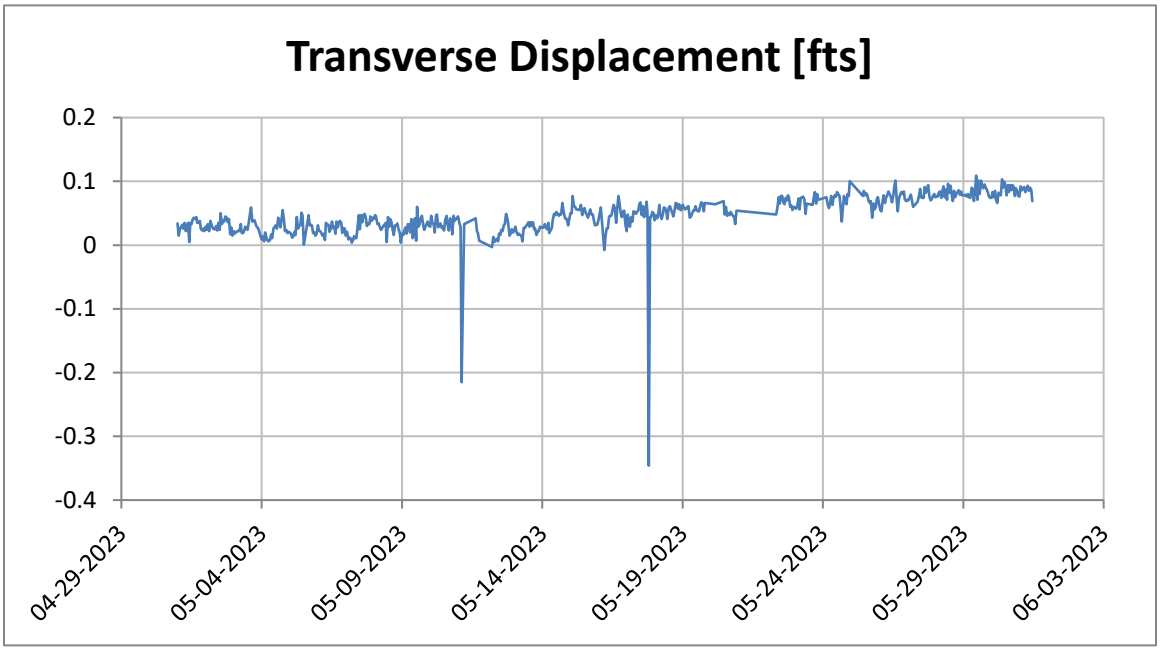


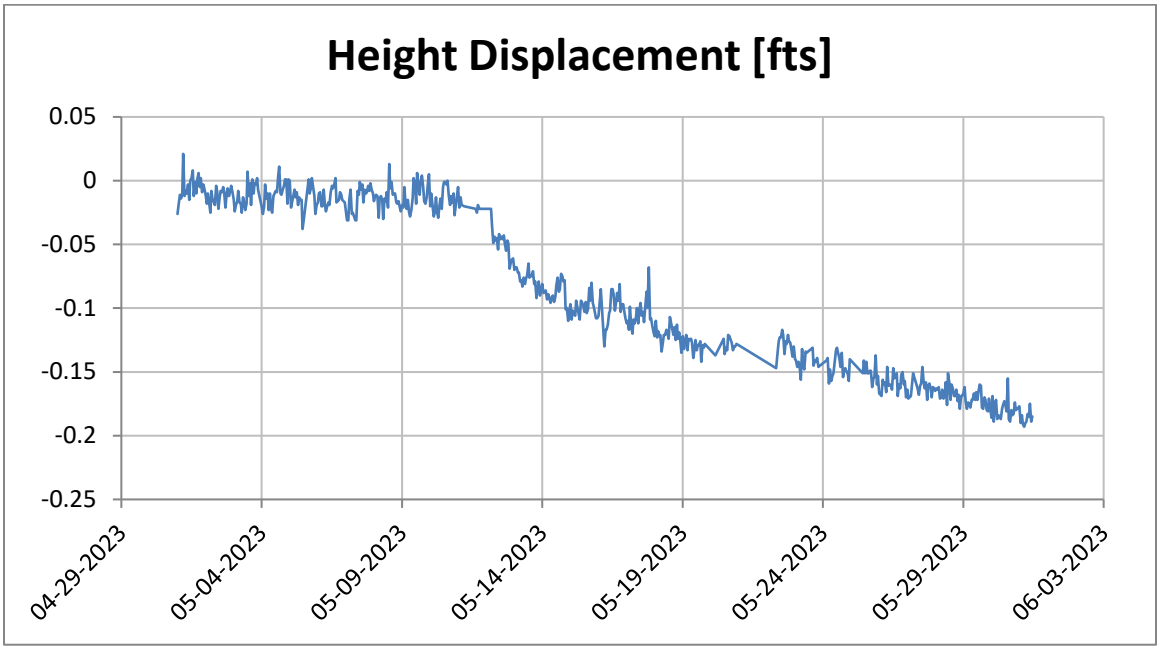
Notes:

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 station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.

Stantec

Prism NP3



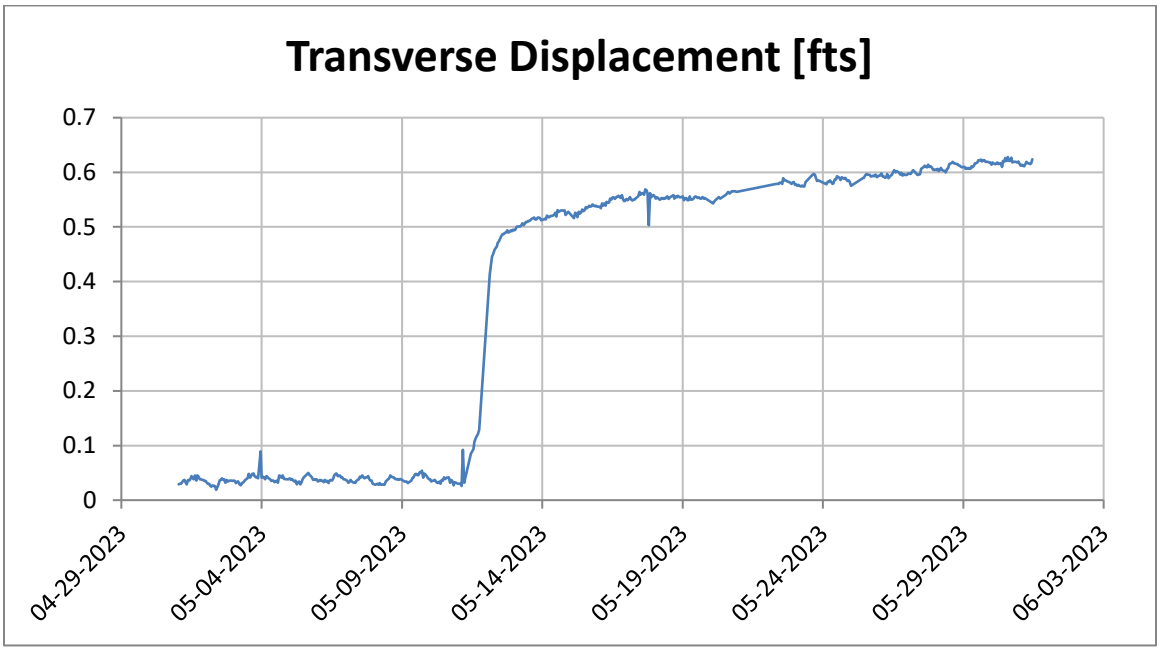


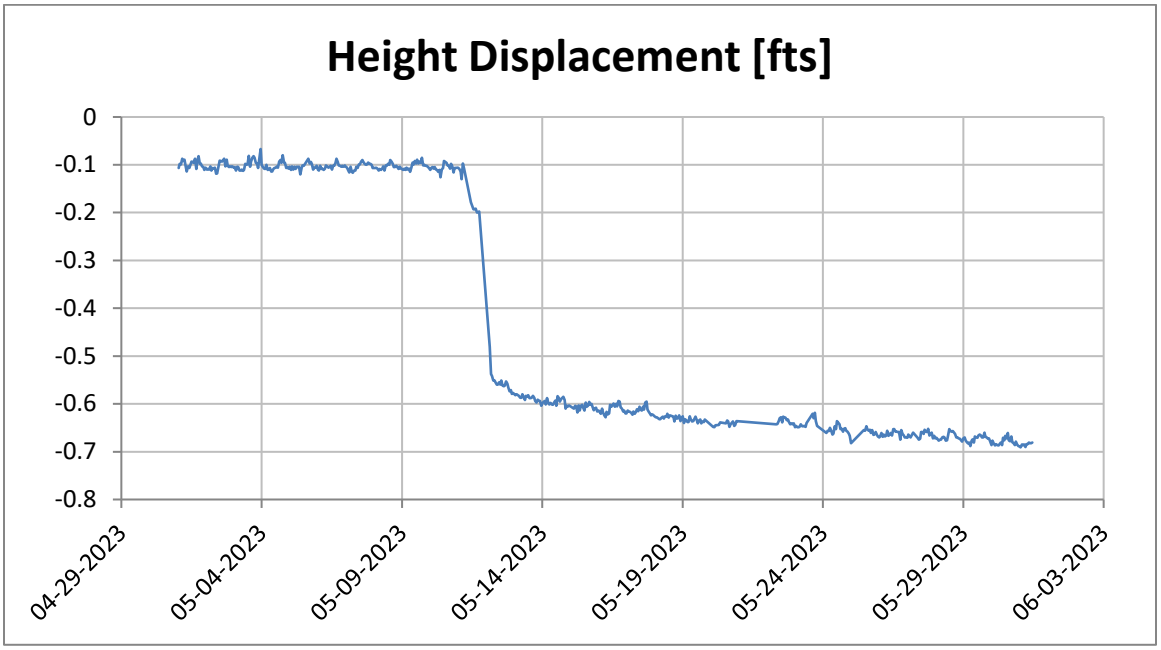
Notes:

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

Stantec

Prism NP66



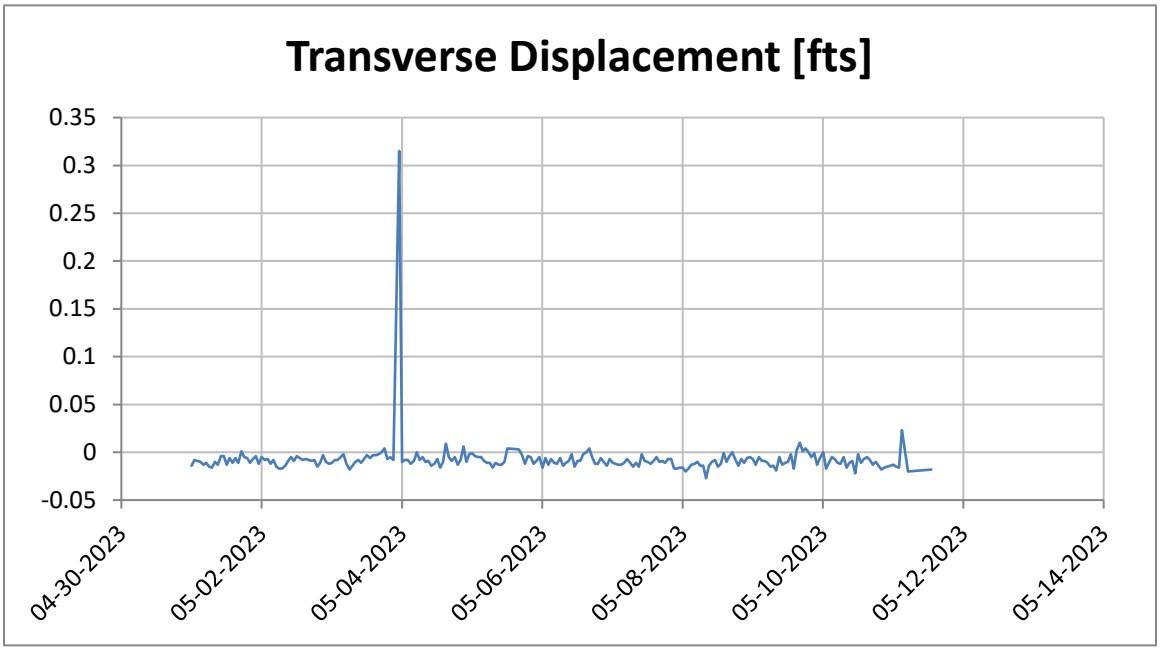


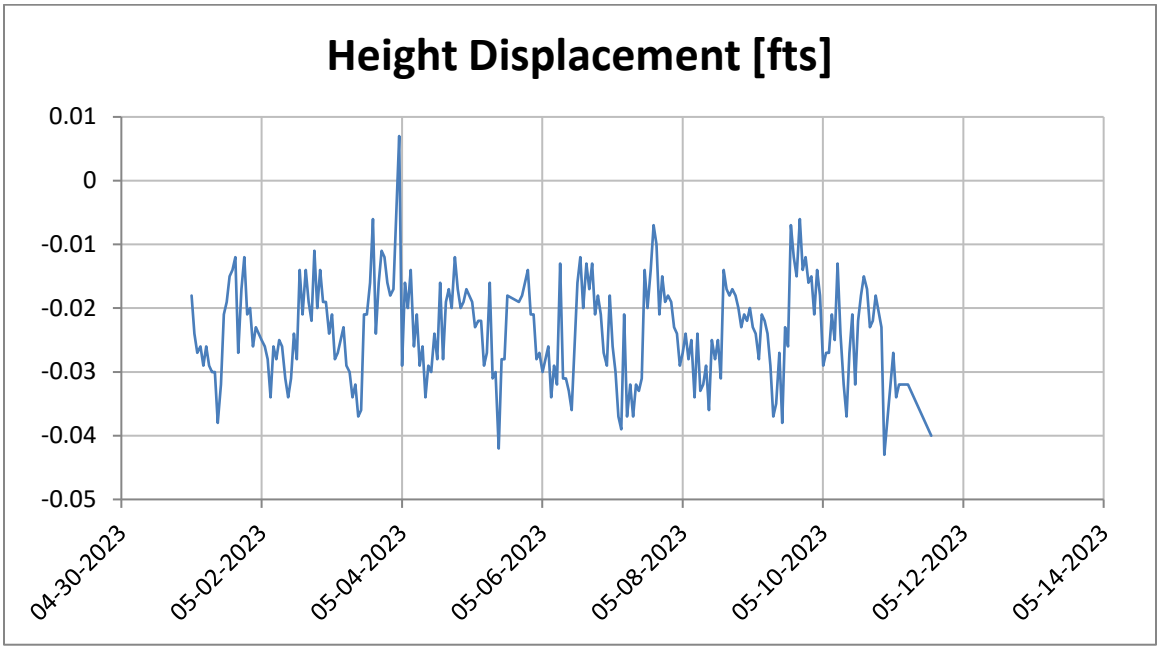
Notes:

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

Stantec

Prism P1



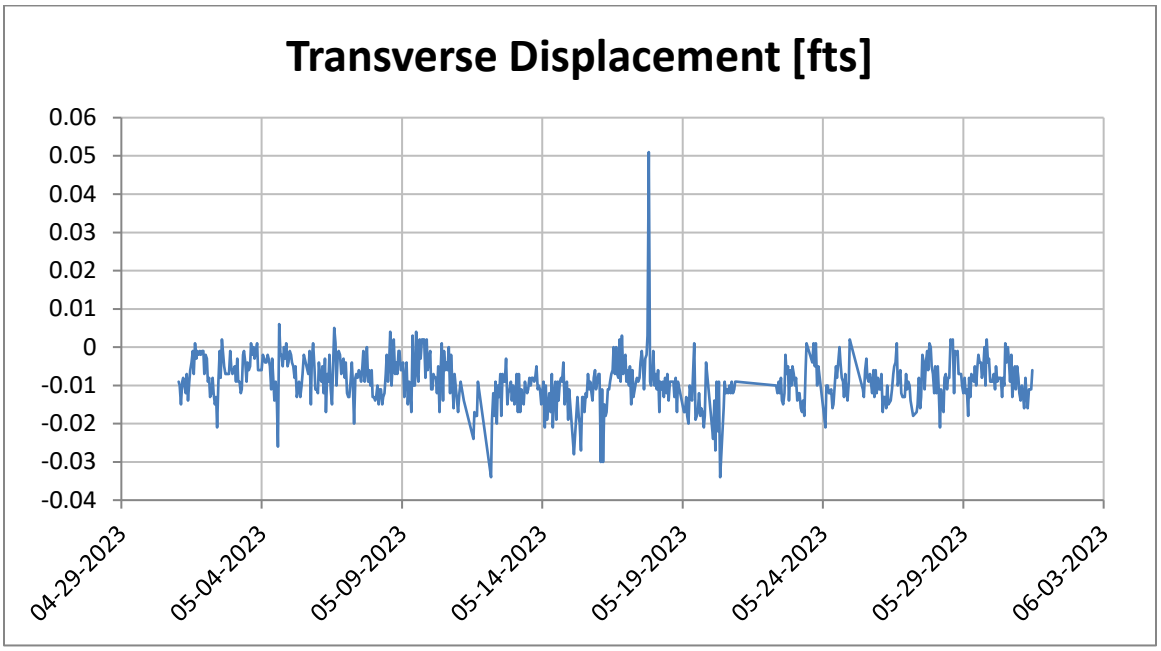


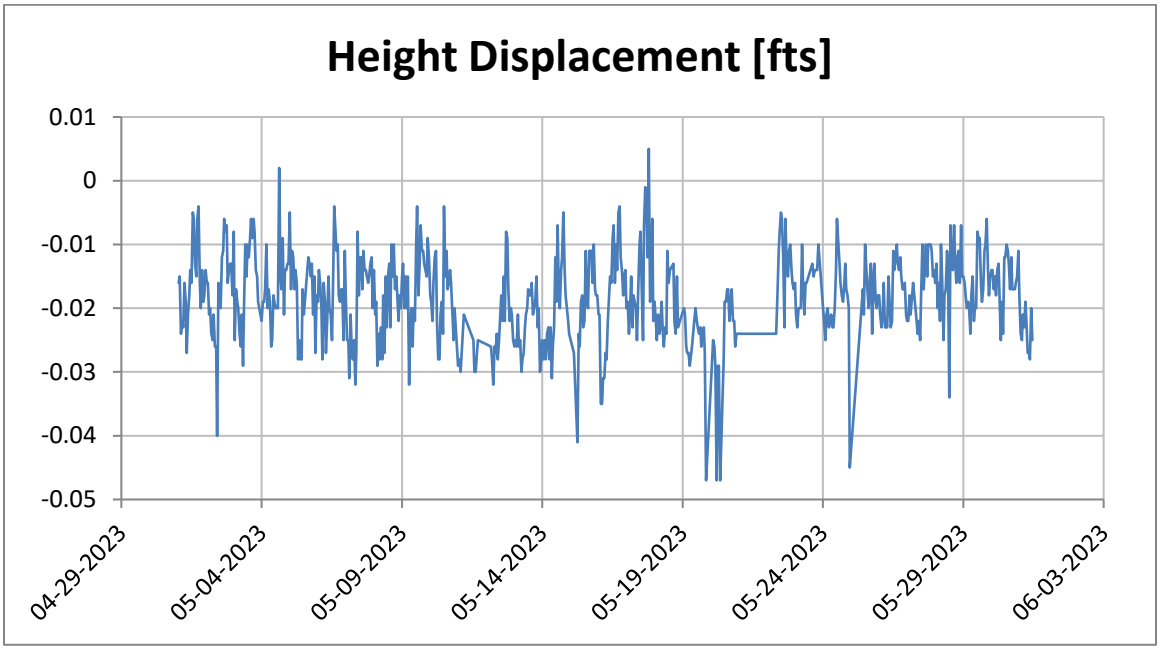
Notes:

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

Stantec

Prism P2



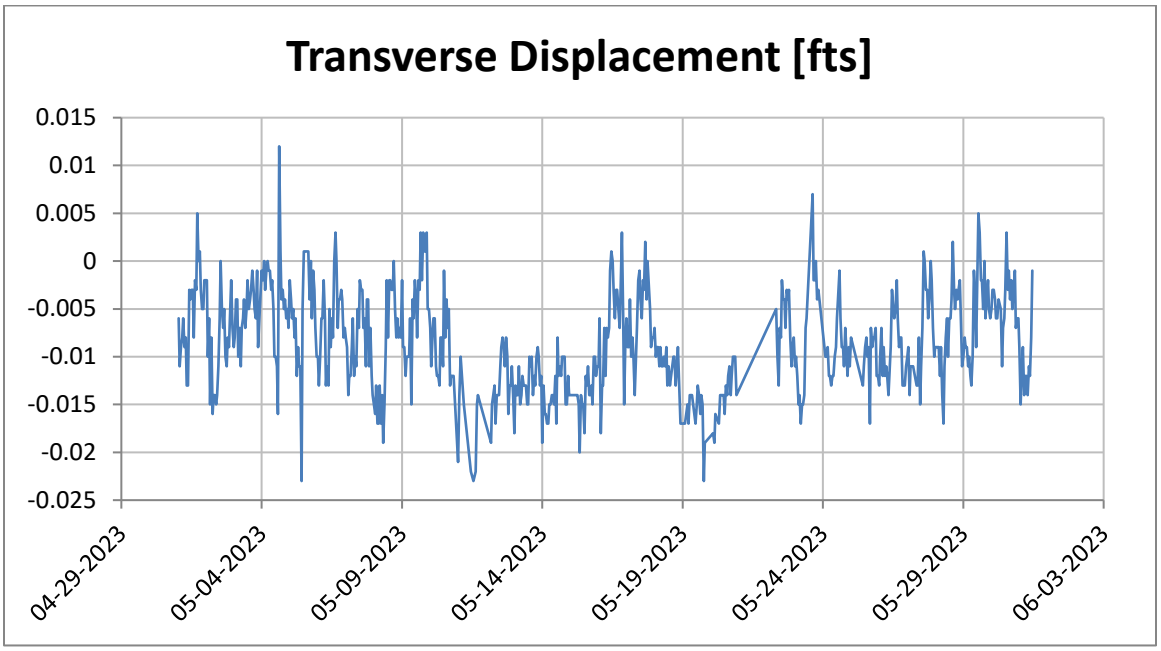


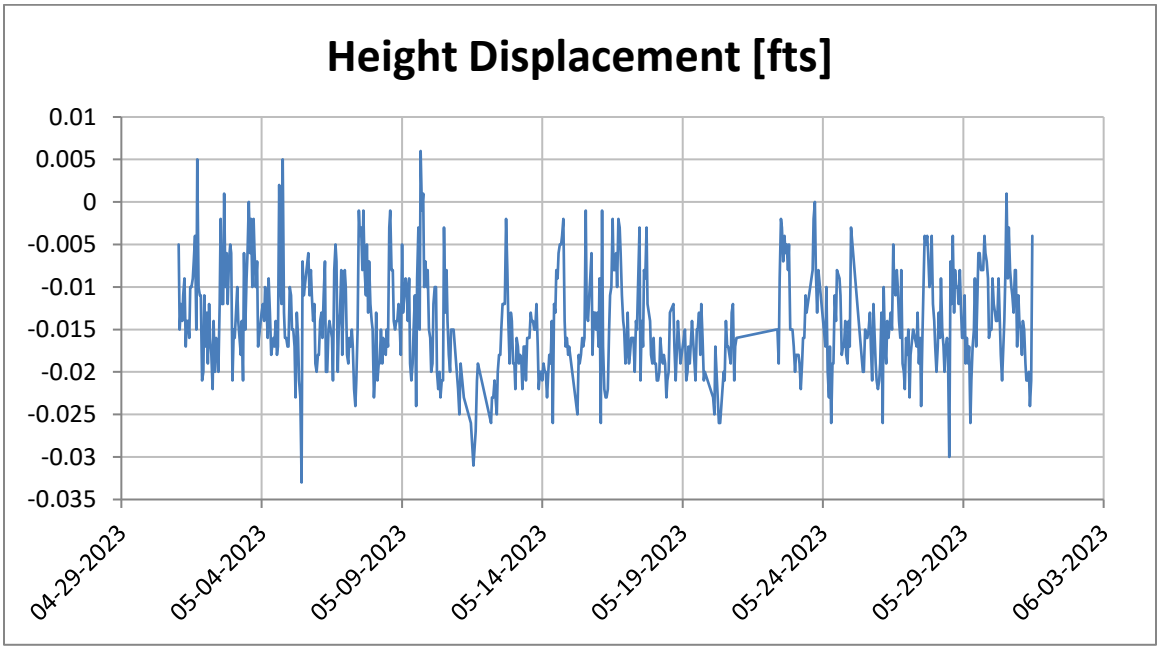
Notes:

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

Stantec

Prism P5



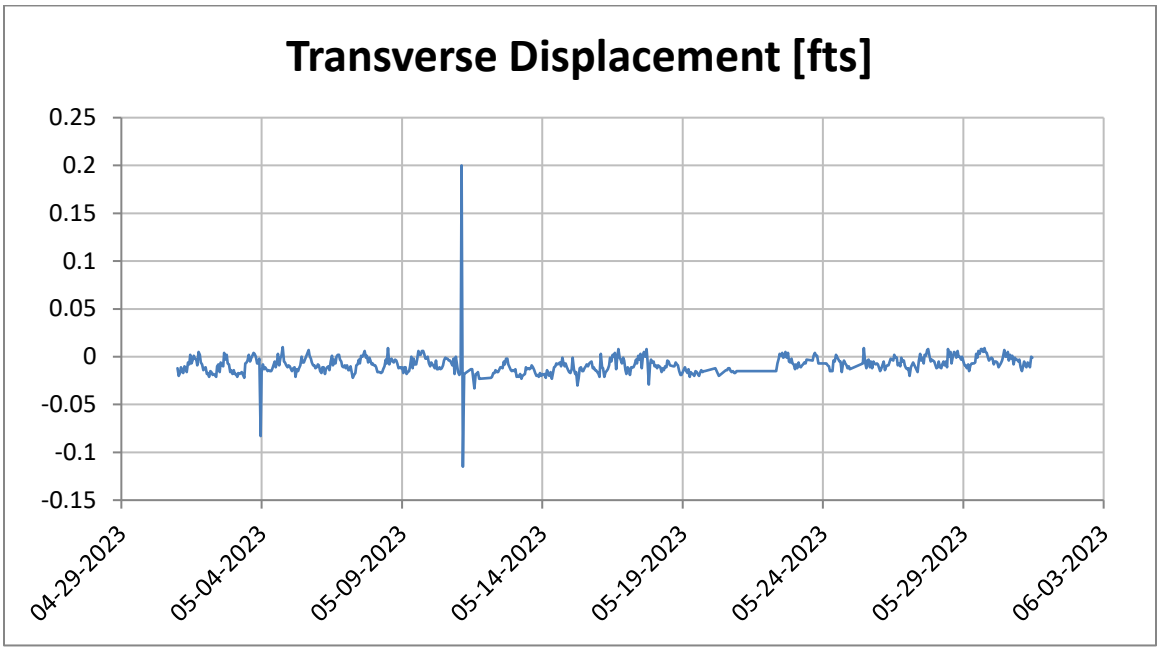


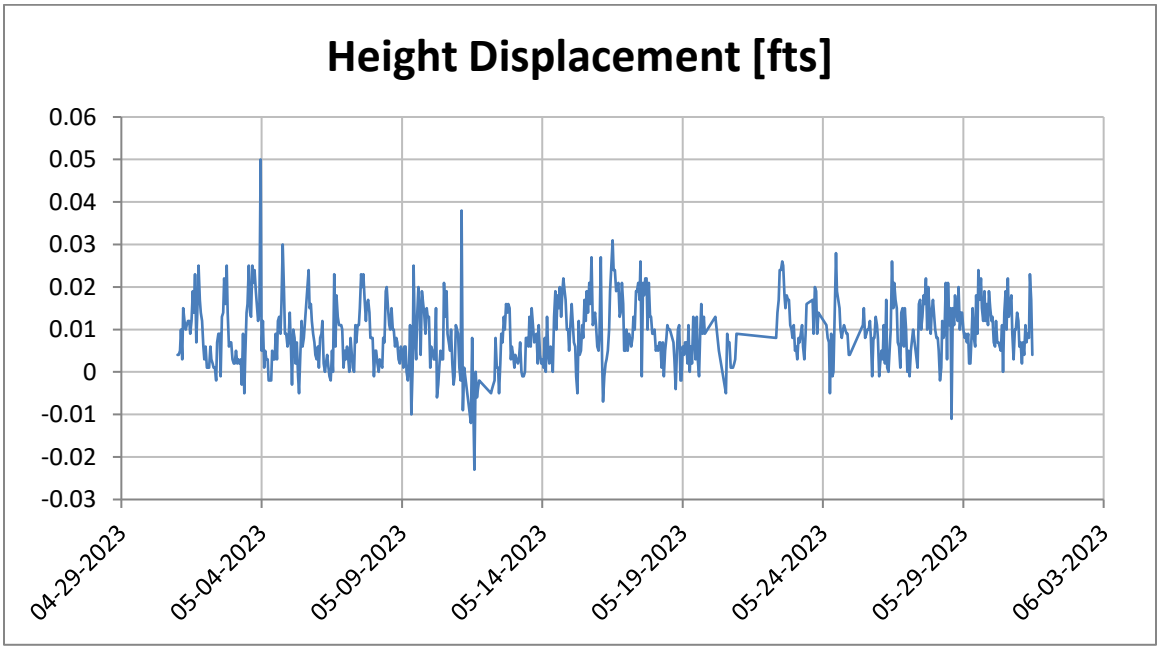
Notes:

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

Stantec

Prism P25



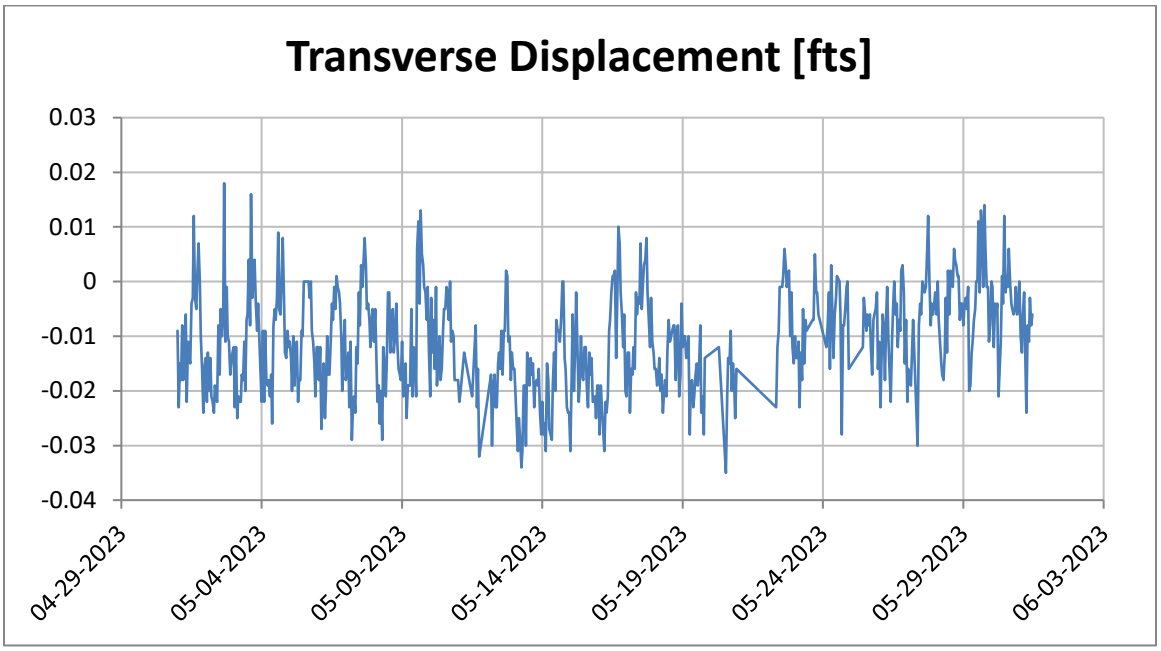


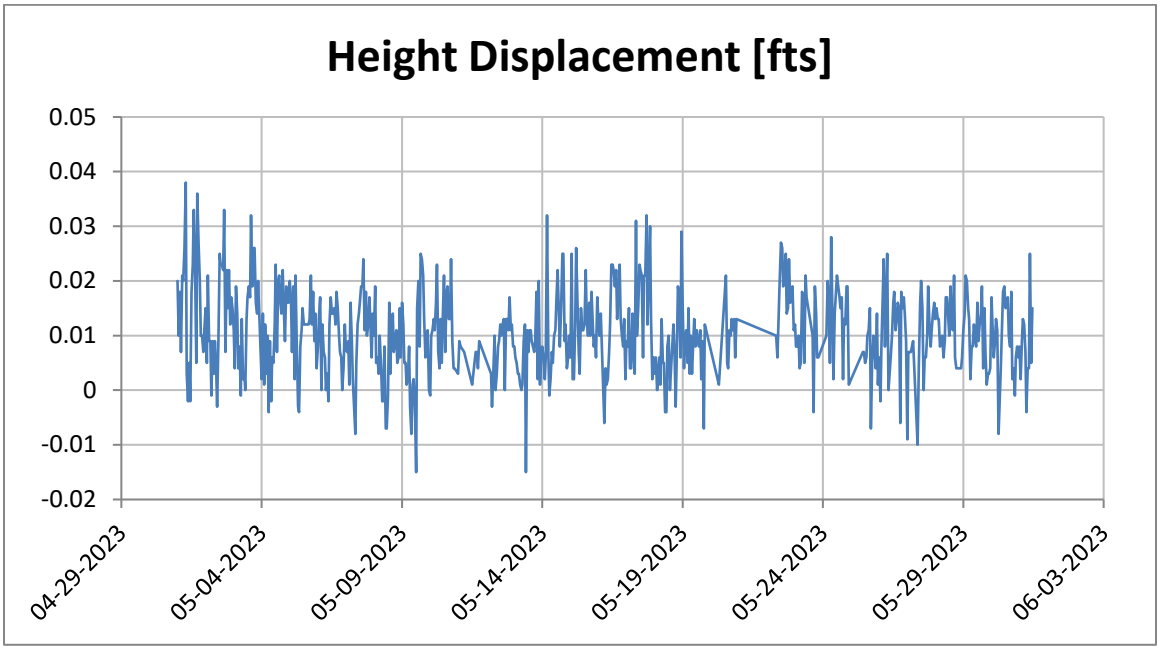
Notes:

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

Stantec

Prism P32



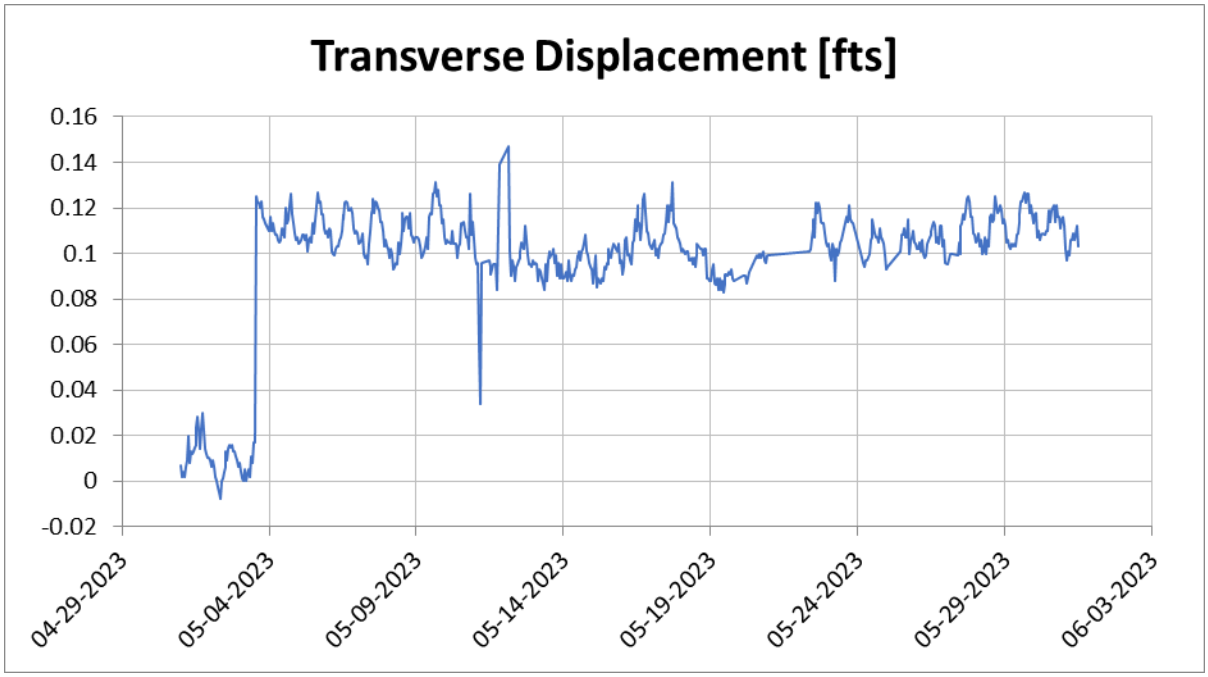


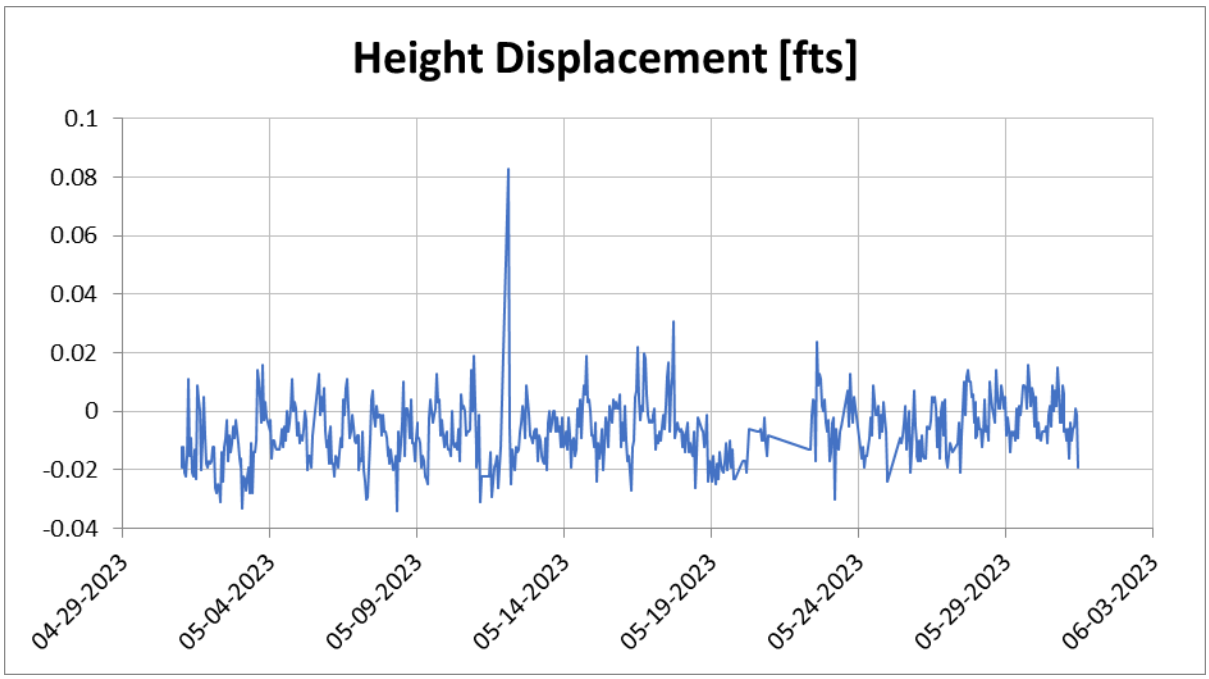
Notes:

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

Stantec

Prism P33



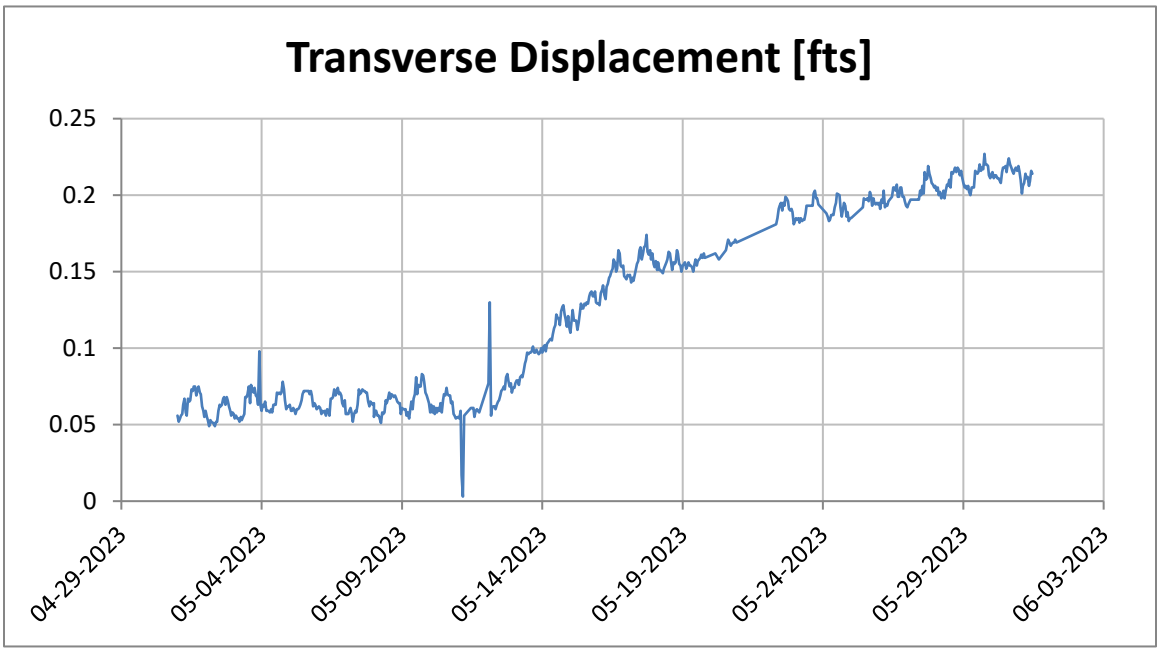


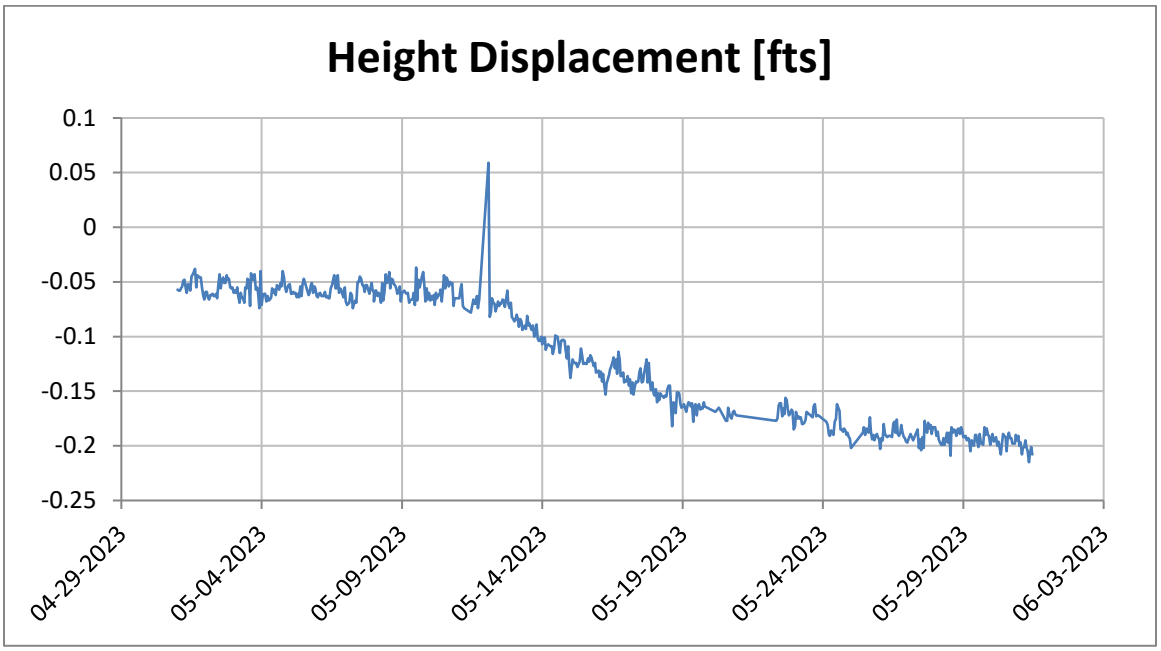
Notes:

1. Survey accuracy is +/-0.016 feet.
2. Alert threshold is +/-0.35 feet.
3. Transverse displacement is in the horizontal direction. Positive direction means closer to the robotic station.
4. Height displacement is in the vertical direction. Positive direction means higher in elevation.
5. Movement on P33 believed to have been caused by a shift of the prism support pole.

Stantec

Prism P69A



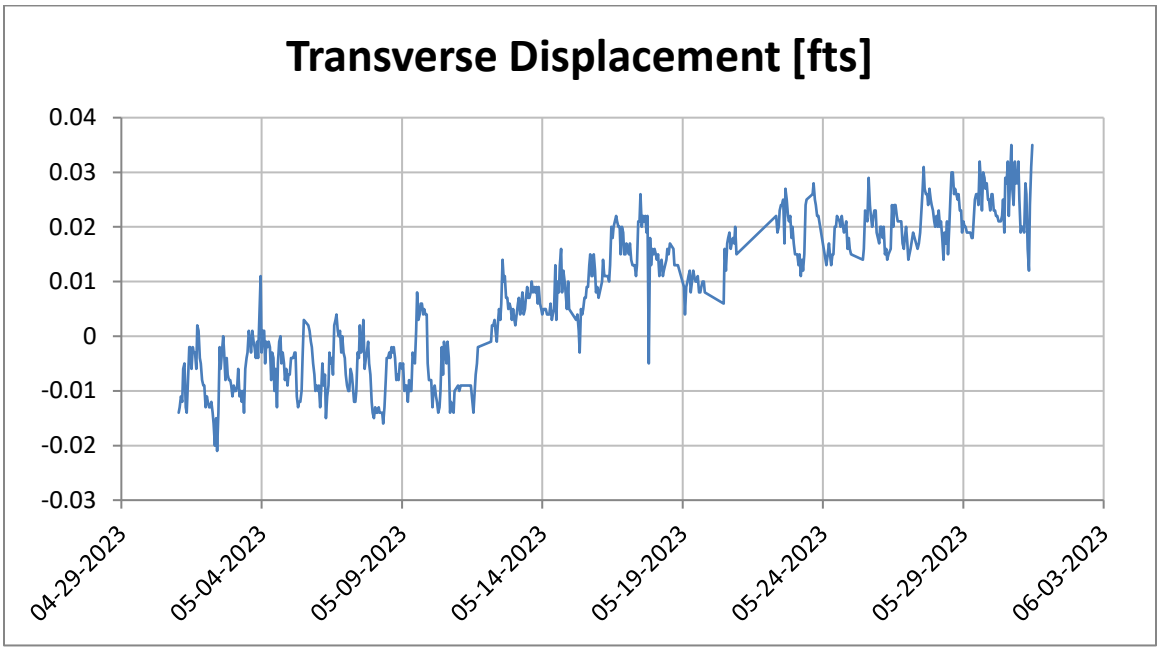


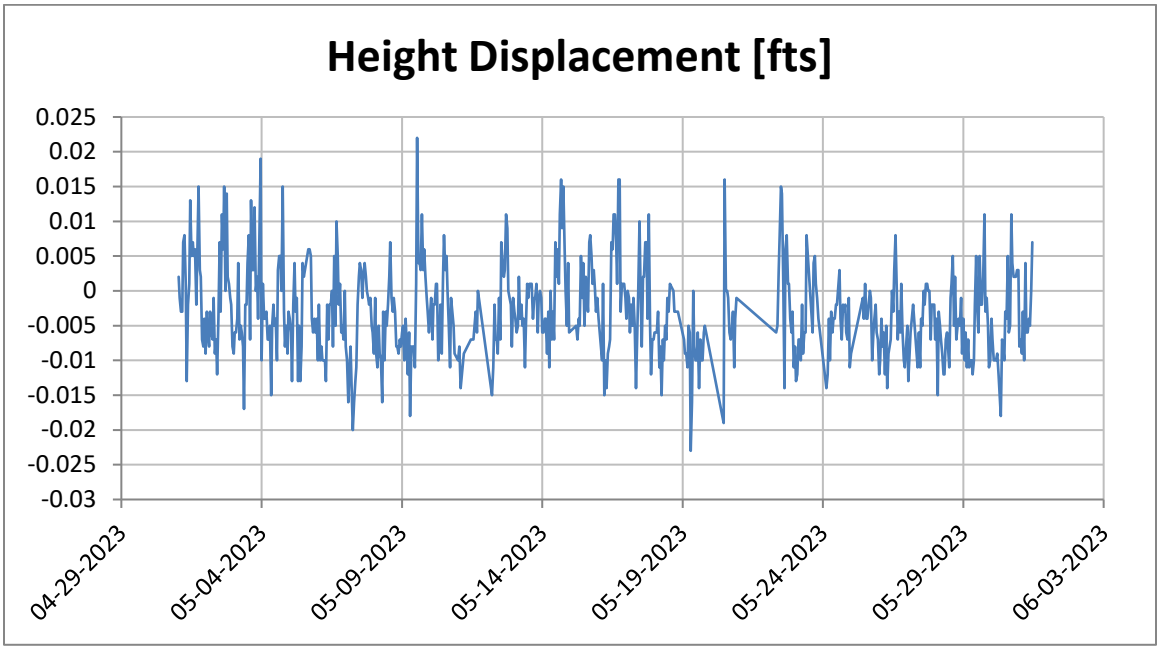
Notes:

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

Stantec

Prism P70



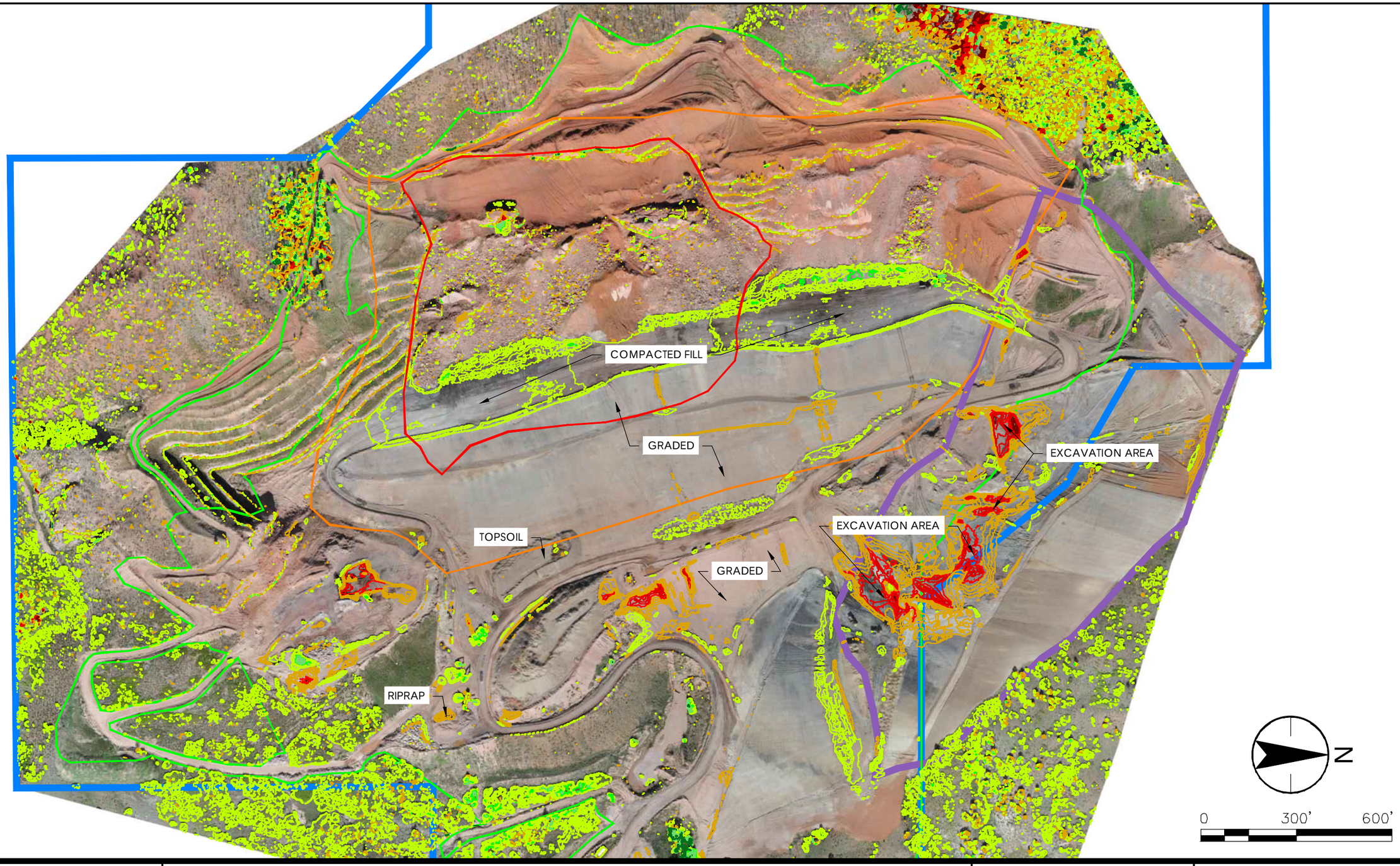


Notes:

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

Appendix C

Drone Survey



Stantec

Stantec Consulting Services Inc.
2000 South Colorado Boulevard Suite 2-330
Denver CO 80222-7933
Tel: (303) 758-4058
www.stantec.com

LEGEND

- Permit/Affected Lands Boundary
- City Grading Permit Boundary
- Proposed Disturbance Limit
- Landslide Extent
- Buttress Fill Extent
- Comparison Contour. Increase in elevation. (CI=2')
- Comparison Contour. Decrease in elevation. (CI=2')

1. COMPARISON OF DRONE FLIGHTS FROM 04/25/2023 to 05/30/2023.

Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
EXISTING PRISMS WITH CURRENT SURFACE

Revision	Date
#	2023.06.30
Drawn By	Figure No.
PK	5

\\us0387-ppfss03\shared_projects\2057288200\06_design\monitoring\2023-05\dwg\pikeview prisms_06122023

2023.06.12 3:34:56 PM

Appendix D

Compaction Testing Results

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Stantec Consulting Services Inc.
2000 South Colorado Boulevard Suite 2-330
Denver CO 80222-7933
Tel: (303) 758-4058
www.stantec.com

LEGEND

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

N

0 150' 300'

Client/Project
RIVERBEND INDUSTRIES INC.

PIKEVIEW QUARRY SLOPE MONITORING

Project No.
2057288200

Title
COMPACTION TEST LOCATIONS

Revision	Date
#	2023.06.30
Drawn By	Figure No.
PK	6

Stantec

Compaction Testing Log

BCC Test	Test No.	Date	Elevation (ft)	Northing (ft)	Easting (ft)	Wet Density (pcf)	Moisture Content (%)	Dry Density (pcf)	Compaction (%)
Test BBBB10	#644	1-May	7334	1401018	3173259	128.7	12	116.7	95
Test BBBB7	#641	1-May	7336	1401417	3173221	145	11.7	133.3	100
Test BBBB8	#642	1-May	7336	1401313	3173213	143.7	12	131.7	100
Test BBBB9	#643	1-May	7334	1401187	3173292	127.1	9.3	117.8	96
Test CCCC1	#645	2-May	7340	1402697	3172863	137.6	9.1	128.5	100
Test CCCC2	#646	2-May	7337	1402526	3172948	137.6	8.7	128.9	100
Test CCCC3	#647	2-May	7335	1402348	3173029	124	11.1	112.9	92
Test CCCC4	#648	2-May	7337	1402203	3172948	133.4	8.5	124.9	100
Test CCCC5	#649	3-May	7336	1402049	3173027	134.2	13.2	120.9	99
Test CCCC6	#650	3-May	7335	1401874	3173085	127	15.6	111.3	90
Test CCCC7	#651	3-May	7337	1401698	3173086	125.4	13.4	112	91
Test CCCC8	#652	4-May	7337	1401586	3173115	122.5	11.1	111.4	90
Test CCCC9	#653	4-May	7338	1401426	3173197	122.7	9.4	113.2	92
Test CCCC10	#654	5-May	7334	1401106	3173324	131.6	11	120.7	99
Test DDDD1	#655	8-May	7341	1402735	3172872	127.3	13.5	113.8	92
Test DDDD2	#656	8-May	7339	1402565	3172959	131.1	10.3	120.8	99
Test DDDD3	#657	8-May	7338	1402405	3172968	143.5	8.9	134.6	100
Test DDDD4	#658	8-May	7338	1402205	3172958	133.9	11.8	122.1	100
Test DDDD5	#659	9-May	7337	1401810	3173058	135.1	15.2	119.9	98
Test DDDD6	#660	9-May	7339	1401681	3173087	139.6	15.8	123.8	100
Test DDDD7	#661	9-May	7338	1401503	3173199	127.1	12.9	114.2	93
Test DDDD8	#662	9-May	7341	1401382	3173141	133.7	13.2	120.5	98
Test DDDD10	#664	10-May	7339	1401052	3173308	138.9	7.3	131.5	100
Test DDDD9	#663	10-May	7335	1401200	3173213	130.2	11.8	118.4	97
Test EEEE1	#665	18-May	7341	1402652	3172930	137.3	14.9	122.4	99
Test EEEE2	#666	18-May	7342	1402494	3172912	127.9	11	116.9	95
Test EEEE3	#667	22-May	7340	1402415	3172978	127.2	13.1	114.2	93
Test EEEE4	#668	22-May	7341	1402201	3172938	125.5	12.6	113	91
Test EEEE5	#669	31-May	7338	1401848	3173088	128.7	11.7	115.4	94
Test EEEE6	#670	31-May	7338	1401729	3173116	127.4	12.6	113.2	92

Notes:

1. As of May 31, 2022, a total 2,470,700 yd3 had been placed and compacted. This requires at least 495 compaction tests, and 889 tests have been taken.