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YANKEE DOODLE TAILINGS IMPOUNDMENT
2022 ANNUAL INSPECTION REPORT

Rev	Description	Date
0	Issued in Final	January 20, 2023

EXECUTIVE SUMMARY

This 2022 Annual Inspection Report (AIR) was prepared by Knight Piésold Ltd. (KP) and the Engineer of Record (EOR) and complies with MCA 82-4-381: Annual Inspections. The EOR for the Yankee Doodle Tailings Impoundment (YDTI) is currently Mr. Daniel Fontaine, P.E. of KP. The previous EOR, Mr. Ken Brouwer, P.E. of KP, remains available to the KP and Montana Resources, LLC (MR) team as a Principal technical reviewer. The annual inspection of the YDTI was completed by Mr. Fontaine on September 28, 2022. He was accompanied during the inspection by Mr. Mike Harvie (Manager of Engineering and Geology) and Mr. Travis Birkenbuel of MR in the morning and afternoon, respectively.

This report provides an overview of the observations of the YDTI facilities and covers the YDTI, including the associated embankments, tailings distribution works, reclaim water systems, monitoring devices, stormwater diversions, and other ancillary structures associated with the operation, maintenance, and surveillance of the YDTI. This AIR includes:

- observations made by the Engineer of Record (EOR) during visual inspections and review of the available monitoring data
- observations made based on videos collected using an Unmanned Aerial Vehicle (UAV)
- observations made by others from KP and MR during various visual inspections and field reviews of the impoundment
- summary of initial construction activities for the Stage 1 drainage system in the HsB area
- discussion of information collected during the ongoing Central Pedestal Area construction monitoring program
- discussion of the subsurface and surface monitoring programs
- discussion of the Quantitative Performance Parameters (QPPs)
- discussion of recent important trends and additional future considerations
- identification of recommended actions required for ongoing operation and maintenance of the facility

The YDTI continues to be developed and operated in a manner consistent with the designs, the QPPs, and the operating protocols established for the facility. No piezometric trigger elevation exceedances were observed at QPP monitoring sites during 2022 and the facility was observed to be in good condition during the annual inspection. YDTI construction activities since the previous annual inspection include the continued construction of the elevation (EL.) 6,450 ft lift of the embankment, with construction now mostly complete along the East-West and West Embankments and in the Central Pedestal Area near the corner of the North-South and East-West Embankments. Lift construction is continuing along the EL. 6,450 ft of the North-South Embankment and is anticipated to be completed during 2023. MR also continued construction work for the realignment of the Reclaim Water Pipeline along Rampart Mountain and initiated drainage system construction activities in the HsB area associated with the Stage 1 rock disposal site planned for this area.

Construction activities were routinely completed and monitored as outlined in the CMP (KP, 2018c), and construction progress was regularly reviewed by the EOR by means of weekly inspection reports and Monthly Quality Control progress reports completed by MR, quarterly field reviews by KP representatives, and the Central Pedestal Area construction monitoring program progress reports.

A risk assessment (KP, 2018d) was undertaken during preparation of the design document associated with continued construction of the embankments to a crest elevation of 6,450 ft. It was recognized that design and operating enhancements could provide further opportunities for risk mitigation, and these enhancements continue to be progressively implemented at the YDTI. There was uncertainty identified in the risk assessment due to the reliance on modelling predictions and observational monitoring related to several factors was planned, including tailings beach development, pore pressure changes within the embankment, and water inventory changes. A status update related to each is provided in this report.

A Corrective Action Plan (CAP) was prepared by MR in response to the 2021 AIR recommendations on January 11, 2022. The CAP identified the actions proposed or undertaken to address the 2021 recommendations. MR completed the proposed corrective actions for recommendations 1, 5, 6, and 8, and implementation of the remaining recommendations was partially completed and/or deferred to 2023 due to the schedule associated with continued construction of the EL. 6,450 ft embankment lift.

The EOR has identified the following recommendations for consideration in 2023 based on a review of the information collected and conditions observed in 2022:

1. **Maintain reductions in freshwater use from the Silver Lake Water System to the extent reasonably practicable and continue the Pilot Project to incrementally reduce the water inventory in the YDTI supernatant pond towards the target of approximately 15,000 acre-ft (continuation of 2021 recommendation).**
2. **Modify the tailings distribution system by extending Line 2 to allow discharge at location Discharge 3-2 (NS-1) and add a discharge location between the current locations of Discharge 3-1 (EW-1) and Discharge 3-2 (NS-1) when the EL. 6,450 ft raise of the embankment is completed. Use of 12-inch discharge lines along the extension of Line 2 to location Discharge 3-2 (NS-1) would satisfy the recommendation (modification of 2021 recommendation).**
3. **Regrade the upstream slope of the embankment during relocation of the tailings delivery pipelines (Lines 2 and 3) to the tailings pipeline corridor for EL. 6,450 ft lift. Regrade the embankment upstream slope to cover and incorporate the tailings pipeline bench along the EL. 6,400 ft lift. Implement the alluvium facing layer between the crest of the pipeline corridor along the EL. 6,450 ft lift and the upstream alluvial facing of the EL. 6,400 ft lift along the regraded upstream slope prior to cutting off access with placement of the tailings pipelines. The intent is to create a continuous layer of alluvium between the EL. 6,450 pipeline corridor and the alluvium facing previously placed as part of the EL. 6,400 ft lift construction. This recommendation applies to the portion of the East-West Embankment in the Central Pedestal Area to the east of approximately Section 23+00NW (Discharge location EW-1) and the entire North South Embankment.**
4. **Develop and implement a new system to collect flows along the Seep 10 bench and convey these flows to the HsB Pond (continuation of 2021 recommendation).**

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ABBREVIATIONS

ACC ..... Anaconda Copper Company
AIR ..... Annual Inspection Report
AR ..... Atlantic Richfield Company
BMFOU ..... Butte Mine Flooding Operable Unit
BPPS ..... Berkeley Pit Pumping System
CAP ..... Corrective Action Plan
CMP ..... Construction Management Plan
CPP ..... Construction Performance Parameters
DAR ..... Data Analysis Report
DH ..... Drillhole
E ..... East
EAP ..... Emergency Action Plan
EL ..... Elevation
EOR ..... Engineer of Record
GNSS ..... Global Navigational Satellite System
HDPE ..... High-Density Polyethylene
HsB ..... Horseshoe Bend
HsBCS ..... Horseshoe Bend Capture System
InSAR ..... Interferometric Synthetic-Aperture Radar
IPI ..... In-place-inclinometer
IRP ..... Independent Review Panel
KP ..... Knight Piésold Ltd.
MBMG ..... Montana Bureau of Mines and Geology
MDEQ ..... Montana Department of Environmental Quality
MCA ..... Montana Code Annotated
MGPD ..... Million gallons per day
MR ..... Montana Resources, LLC
N ..... North
the Pilot Project ..... Berkeley Pit and Discharge Pilot Project
Q ..... Quarter
QPPs ..... Quantitative Performance Parameters
RDS ..... Rock Disposal Site
RMS ..... Remote Monitoring System
S ..... South
SLWS ..... Silver Lake Water System
TAC ..... The Anaconda Company
TARP ..... Trigger-Action Response Plan
TOMS ..... Tailings Operations, Maintenance, and Surveillance
tpd ..... Short Tons per day
TSX ..... TerraSAR-X
UAV ..... Unmanned Aerial Vehicle
VWP ..... Vibrating Wire Piezometer

W ..... West
WED ..... West Embankment Drain
WET ..... Water and Environmental Technologies
WTP ..... Water Treatment Plant
YDTI ..... Yankee Doodle Tailings Impoundment

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 GENERAL

Montana Resources, LLC (MR) operates an open pit copper and molybdenum mine in Butte, Montana. MR has owned and operated the mine site since the 1980's and is currently mining the Continental Pit with a nominal concentrator throughput rate of approximately 45,000 short tons per day (tpd). The property was acquired from Atlantic Richfield Company (AR) and the former Anaconda Copper Company (ACC) who had previously mined the Berkeley Pit since 1955. The key components of the MR facilities include the:

- Continental Pit
- Mill and processing facilities (the Concentrator)
- Yankee Doodle Tailings Impoundment (YDTI)
- Historical leach facilities
- Horseshoe Bend (HsB) area and Precipitation Plant

The existing Precipitation Plant in the HsB area is being gradually decommissioned and a new facility is being constructed in an area adjacent to the HsB Water Treatment Plant.

1.1.2 YANKEE DOODLE TAILINGS IMPOUNDMENT

Tailings produced from ore processing are stored in the YDTI. The YDTI was originally constructed in 1963 and the embankments have been constructed to elevation (EL.) 6,400 ft using rockfill from the Berkeley Pit (until 1982) and from the Continental Pit (beginning in 1986). The YDTI comprises a valley-fill style impoundment created by a continuous rockfill embankment that for descriptive purposes is divided into three embankment sections: the North-South Embankment, the East-West Embankment, and the West Embankment. The current maximum embankment height is approximately 800 ft along the southern end of the impoundment upstream of the HsB area.

The jurisdiction for the YDTI resides with the Montana Department of Environmental Quality (MDEQ). The YDTI is not subject to dam hazard potential classification within the State (Montana Code Annotated (MCA) 85-15-209) as the embankments for tailings impoundments and water reservoirs subject to permits issued by MDEQ are specifically exempt from provisions of the Montana Dam Safety Act (MCA 85-15-107). MR currently holds one MDEQ operating permit allowing for continued use of the YDTI facilitated by continued construction of the embankment to a crest elevation of 6,450 ft and operation of the West Embankment Drain (WED). Construction of the EL. 6,450 ft lift of the embankment is underway and expected to be substantially completed in 2023.

The MR facilities, mine operations, and YDTI operational procedures are described in additional detail in the MR report entitled *'Yankee Doodle Tailings Impoundment – Tailings Operations, Maintenance and Surveillance (TOMS) Manual'* (MR/KP, 2022). The best practices employed at the site continue to progressively evolve, taking advantage of the best practicable new technologies and techniques to enhance dam safety. The design, construction, operation, maintenance, and surveillance of the YDTI involves a multidisciplinary team of professionals. The team works closely together to achieve the fundamental objective of ongoing continuous improvement of the safety of the impoundment.

1.1.3 HORSESHOE BEND AREA

The HsB area is shaped like an inverted 'U', bounded to both the east and west by historically leached mine rock and to the north by the East-West Embankment. The HsB area contains infrastructure related to YDTI seepage collection and Precipitation Plant operations along with miscellaneous mine buildings, including the truck maintenance workshop. The project arrangement is shown on Figure 1.1.

Sources contributing seepage from the YDTI facility to groundwater discharge in the HsB area include tailings slurry water that percolates into the tailings beach, meteoric recharge to the tailings surface, and seepage from the supernatant pond. Groundwater discharges downstream (south) of the facility in the following four areas:

- Number 10 Seep (Seep 10)
- Leach seeps (reporting to Houligan Pond)
- Historical Drain
- HsB seeps (north of the Precipitation Plant and reporting to the upper HsB area)

The flows collected at Seep 10 are conveyed to the upper HsB area where they combine with the HsB seeps, flows from the historical drain, and local runoff. These flows were previously conveyed to the Precipitation Plant via the Cell 10 Pump with discharge after processing measured using a calibrated Parshall flume (the Precipitation Flume). These flows are now conveyed directly to the HsB Pond by a surface ditch, and flow measurement at the Precipitation Flume is inactive.

Leaching of uncrushed low grade rockfill historically occurred in the area immediately south of the YDTI. Barren leach solution recirculation activities were terminated in July 2021 following months of gradual reduction. The drainage from precipitation on the historical leach areas continues to be collected with surface drainage ditches along the east and northeast side of the HsB area. The surface ditches convey the water to one of three historical pre-processing storage ponds: the Houligan, Surge, or Holding Ponds, which were used to equalize inflows prior to processing at the Precipitation Plant. The Surge and Holding Ponds were breached in 2022 to facilitate draining down of the ponds in preparation for HsB Rock Disposal Site (RDS) drainage system construction activities beginning in the HsB area. Drainage passing through these two breached ponds flows via gravity to the Houligan Pond. Discharge from the Houligan Pond flows to the south via a series of culverts and surface ditches to the HsB Pond. Flow measurement at the historical Precipitation Weir is also now inactive.

The HsB Pond is a long, narrow basin approximately 100 ft wide and 2,000 ft long. Flow rates in the HsB area have been measured regularly since 1996 using a weir established by the Montana Bureau of Mines and Geology (MBMG). Flow through the HsB Pond is continuously measured using a weir plate and level meter near the south end of the pond.

1.1.4 BERKELEY PIT AND DISCHARGE PILOT PROJECT

The Berkeley Pit and Discharge Pilot Project (the Pilot Project), commissioned in 2019 and associated with the Butte Mine Flooding Operable Unit (BMFOU) of Superfund, facilitates the treatment and release of up to 10 million gallons per day (MGPD) of water from the YDTI. One goal of the pilot project is to progressively reduce the YDTI supernatant pond volume to approximately 15,000 acre-ft over a period of several years. The Pilot Project is not entirely within MR's control and a variety of factors and interruptions are possible that could impact the timeline.

As part of the Pilot Project, Berkeley Pit water is pumped using the Berkeley Pit Pumping System (BPPS), consisting of a floating barge system and land-based pump house, to the Number 5 Cell in the Precipitation Plant. Approximately 3 million gallons per day (MGPD) of Berkeley Pit water is treated and introduced into the site water management system when the BPPS is operating. Flow rates are typically measured by an in-line flowmeter on the BPPS. The flow is gravity discharged from the Precipitation Plant Cell 5 using High-Density Polyethylene (HDPE) pipelines. Under normal conditions flows are conveyed along the west side of the HsB Pond to a small transfer pond and pump located to the west of the HsB Weir. A second HDPE pipeline is available for upset conditions and the flows are conveyed directly to the HsB Pond.

Flow discharged to the transfer pond is either pumped to the Horseshoe Bend Water Treatment Plant (HsB WTP) or the Horseshoe Bend Capture System (HsBCS). The HsBCS flows are conveyed via two HsBCS pump houses and metered into the tailings (which have additional lime to facilitate treatment of this water) at a manifold after the No. 3 (Tailings) Booster Pump House. The combined flow is discharged into the YDTI, and the supernatant pond provides residence time for water treatment objectives to be achieved. Flows directed to the HsB WTP are treated before being conveyed to the Concentrator for incorporation into the tailings circuit and additional treatment at the YDTI.

NOTES:

1. COORDINATE SYSTEM AND ELEVATIONS ARE BASED ON ANACONDA MINE GRID.
2. AERIAL IMAGERY PROVIDED BY MONTANA RESOURCES, LLC ON JULY 20, 2022.

SCALE A: 1500 0 1500 3000 4500 6000 7500 ft

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	20JAN'23	ISSUED WITH REPORT	DDF	RMM	JRG

MONTANA RESOURCES, LLC

YANKEE DOODLE TAILINGS IMPOUNDMENT

PROJECT ARRANGEMENT

Knight Piésold CONSULTING

P/A NO. VA101-126/27 | REF NO. 2

FIGURE 1.1 | REV 0

SAVED: M:\1\101\00126\27\A\Acad\FIGS\A09_1/13/2023 12:16:22 PM_RMCLELLAN PRINTED: 1/20/2023 2:51:13 PM, FIG 1.1, RMCLELLAN
XREF FILE(S): Tailings and Reclaim Pipelines_5ft_01_2022-07-18 IMAGE FILE(S): 5ft_01 2022-07-18

1.2 SCOPE OF REPORT

This 2022 Annual Inspection Report (AIR) was prepared by Knight Piésold Ltd. (KP) and complies with MCA 82-4-381: Annual Inspections. The report provides an overview of the observations of the YDTI facilities and covers the YDTI, including the associated embankments, tailings distribution works, reclaim water systems, monitoring devices, stormwater diversions, and other ancillary structures associated with the operation, maintenance, and surveillance of the YDTI. This AIR presents information contained in historical and more recent reports and includes:

- observations made by the Engineer of Record (EOR) during visual inspections and review of the available monitoring data
- observations made based on videos collected using an Unmanned Aerial Vehicle (UAV)
- observations made by others from KP and MR during various visual inspections and field reviews of the impoundment
- summary of initial construction activities for the Stage 1 drainage system in the HsB area
- discussion of information collected during the ongoing supplemental construction monitoring program associated with EL. 6,450 ft lift construction
- discussion of the subsurface and surface monitoring programs
- discussion of the Quantitative Performance Parameters (QPPs)
- discussion of recent important trends and additional future considerations
- identification of recommended actions required for ongoing operation and maintenance of the facility

KP has provided engineering services for the YDTI in support of on-going mining operations since 2015 and, in collaboration with the EOR, prepares the AIR. The structure of this report is generally consistent with the scope of the last several inspection reports (KP, 2018a; KP, 2019a; KP, 2020a; KP, 2021a; KP, 2022a).

An annual Data Analysis Report (DAR) summarizing the instrumentation and monitoring records and trends for the YDTI has been prepared separately from the AIR since 2017 (KP, 2018b; KP 2019b; KP, 2020b; KP, 2021b; KP, 2022b). The 2022 DAR will again be prepared in 2023 to present the YDTI instrumentation and monitoring records for the 2022 calendar year, when the necessary records are available.

1.3 ENGINEER OF RECORD

The EOR for the YDTI is currently Mr. Daniel Fontaine, P.E. of KP, who accepted the role of EOR on September 10, 2021. Mr. Ken Brouwer, P.E. of KP had previously held the role of EOR since September 2015. The former EOR, Mr. Brouwer, remains available to the KP and MR team as a Principal technical reviewer.

1.4 REFERENCE COORDINATE SYSTEM AND DATUM

Coordinates and elevations in this report are referenced to the site coordinate system known as the ‘Anaconda Mine Grid’ established by The Anaconda Company (TAC) in 1957. The Anaconda Mine Grid is based on the ACC Datum established in 1915. The MR Site Coordinate System is based on the Anaconda Mine Grid and utilizes International Feet. All elevations are stated in Anaconda Mine Grid coordinates with respect to the ACC Vertical Datum unless specifically indicated otherwise.

2.0 INSPECTIONS AND OBSERVATION METHODS

2.1 GENERAL

Various inspections and data reviews of the YDTI were completed throughout 2022 and were used to inform the observations and recommendations detailed in this AIR. The information compiled confirms the YDTI continues to be constructed and operated in a manner consistent with the designs, QPPs, and operating protocols established for the facility. Key inspections and monitoring methods of the YDTI discussed herein include the following:

- EOR Annual Site Inspection
- Four quarterly construction field reviews of the YDTI
- Piezometric and deformation monitoring instrumentation and techniques
- Central Pedestal Area construction monitoring program
- Quantitative Performance Parameters

Other inspections of the YDTI completed during 2022 that generally inform the summary and conclusions presented herein also include the following:

- Weekly inspections of active YDTI construction areas performed by the MR Engineering Department. The inspections are summarized in weekly inspection reports provided to KP to document construction progress and used to track quantities of materials placed by the MR Operations Department.
- The MR Engineering Department performs a detailed inspection of the facility at least monthly and documents the inspection using an inspection log template from the TOMS Manual (MR/KP, 2022). Copies of the associated records are provided to the EOR periodically.
- Monitoring of 2022 site investigation activities performed by Gwen James, P.Eng., Sean Yao, E.I.T., and Emily Miszk, E.I.T. of KP from mid-September through December 2022.

MR and KP routinely monitor piezometric conditions, embankment deformation behavior, the supernatant pond elevation, tailings distribution system usage, beach elevation at tailings discharge locations, and flowrates at several water management locations. Real-time piezometric records and flow rates at the Seep 10 Weir are available to MR and KP via the web-based Remote Monitoring System (RMS) via the Sensemetrics web and mobile applications. Surveillance data is comprehensively reviewed by KP on a quarterly and annual basis, and summary reports are provided to MR, MDEQ, and the Independent Review Panel (IRP). The following surveillance reporting completed in 2022 was considered in conjunction with observations from the various inspections listed above to inform the discussion and conclusions contained in this report:

- The 2021 DAR (KP, 2022b), which summarized the monitoring and instrumentation data for the impoundment for the 2021 calendar year.
- Quarterly piezometric monitoring updates summarizing the piezometric data for QPP monitoring sites for Q1, Q2, and Q3 2022 (KP, 2022c; KP, 2022d; KP, 2022e).
- Quarterly summaries of water monitoring data, including the supernatant pond elevation, tailings beach development records, and flow records for Q1, Q2, and Q3 2022. (KP, 2022f; KP, 2022g; KP, 2022h).

2.2 MEANS OF OBSERVATION

2.2.1 UNMANNED AERIAL VEHICLES

Aerial videos of the YDTI were collected by Water and Environmental Technologies (WET) using an UAV in June 2022. The desired flight paths were outlined by KP, and the video footage captured by the UAV was used to prepare a comprehensive series of site tour videos, similar to those prepared for the previous two years. The site tour videos were reviewed by the EOR, KP, and MR, and provide valuable documentation of the construction progress and conditions as observed in June 2022. Select images extracted from the site tour videos are included in Appendix A (Photos 1 to 28).

Aerial videos to document the progress of ongoing construction in the HsB area were also collected by WET using an UAV approximately monthly beginning in August 2022. Drone footage is available to KP from flights completed by WET on August 22, September 15, October 17, November 21, and December 19, 2022.

2.2.2 ANNUAL INSPECTION SITE VISIT

The annual inspection of the YDTI was completed by Mr. Daniel Fontaine, P.E., the EOR, on September 28, 2022. Mr. Fontaine was accompanied during the annual inspection by Mr. Mike Harvie (Manager of Engineering and Geology) and Mr. Travis Birkenbuel of MR in the morning and afternoon, respectively. The facility was observed to be in good condition, and active construction was ongoing in the Central Pedestal Area and North-South Embankment along the EL. 6,450 ft lift. Observations from the annual inspection are presented in Section 3. Select photographs from the annual inspection are included in Appendix A (Photos 29 to 80). An overview image of the facility observed from the Sentinel-2 satellite on September 5, 2022 is included on Figure 2.1.

2.2.3 2022 QUARTERLY CONSTRUCTION FIELD REVIEWS

Quarterly construction field reviews were performed during 2022 as per the requirements of the Construction Management Plan (CMP) (KP, 2018c). KP engineers completed the quarterly reviews as designates of the EOR and were accompanied during the inspections by a representative of MR. The quarterly field reviews were completed as follows:

- The Q1 field review was completed on March 8, 2022 by Mr. Jason Gillespie, P.Eng. with observations and opinions summarized in a quarterly construction field review letter (KP, 2022c).
- The Q2 field review was completed from June 7-8, 2022 by Ms. Kate Boyle, P.Eng. and Mr. Jason Gillespie, P.Eng. and observations and opinions were summarized in a letter (KP, 2022d).
- The Q3 field review was completed from August 29-30, 2022 by Mr. Ethan Alban, E.I.T. and observations and opinions were summarized in a letter (KP, 2022e). The 2022 Q3 Construction Summary and Field Review letter is included as Appendix B.
- The Q4 field review was completed from November 16-17, 2022 by Mr. Jason Gillespie, P.Eng. The Q4 summary letter is in progress and will be completed by KP in early 2022.

2.2.4 PIEZOMETRIC INSTRUMENTATION AND MONITORING

Pore pressures are monitored at 117 active instrumentation locations at the YDTI and in the West Ridge and HsB areas. These sites include 39 standpipe piezometers/monitoring wells, 78 drillholes with active

vibrating wire piezometers (VWPs) and two Elexon Geo4Sight installations (multi-node wireless deformation and pore water pressure monitoring instruments). Most standpipe piezometers and monitoring wells have been outfitted for continuous monitoring by suspending a VWP sensor within the PVC riser and connecting the sensor via radiotelemetry to the RMS. Piezometric data are accessible to KP via the RMS and data from QPP sites are reviewed weekly by KP and MR. Geo4Sight data are downloaded and reviewed approximately monthly although some equipment damage/replacement resulted in outages during the year.

2.2.5 DEFORMATION INSTRUMENTATION AND MONITORING

Surface and subsurface embankment deformations continued to be monitored using in-situ instrumentation and remote sensing techniques. Surface deformations are monitored using satellite-based interferometric synthetic aperture radar (inSAR), laser scanning, manual DGPS survey-monitoring and using Global Navigational Satellite System (GNSS) instrumentation. These techniques are further described below.

InSAR remote sensing provides comprehensive spatial assessment of satellite-based estimates of surface displacements throughout the YDTI embankments, with measurements collected every 11 days. Data were processed by TRE-Altamira in the following formats during 2022:

- Long-term inSAR evaluations (SqueeSAR) use 2-dimensional data from TerraSAR-X (TSX) satellite constellation to monitor high-precision (0.1-0.2 inches) vertical, east-west and line-of-sight surface displacements. Data are typically processed and reported twice per year in July and November.
- Short-term inSAR evaluations (Bulletins) use 1-dimensional TSX data from an ascending orbit to monitor line-of-sight surface deformations over a 22-day observation period. These shorter-term analyses were intended to provide more regular inSAR reporting as compared with the SqueeSAR analyses to support active construction monitoring during 2021 and 2022. Bulletin analyses were completed every 11-days from approximately April through October 2021 and April through October 2022, with results made available within a week of acquiring the second inSAR dataset. Bulletin analyses are capable of detecting deformations occurring at between approximately 3 and 50 in/year.

Lateral surface deformations within the Central Pedestal Area of the East-West Embankment were monitored using weekly Maptek I-Site laser scans from mid-June 2021 to November 2021 and approximately monthly from December 2021 through 2022. Scanning results were used to screen for elevated construction-related deformations within the downstream slope of the embankment.

Manual DGPS survey-monitoring of surface deformations in proximity to the active Central Pedestal Area embankment and surcharge construction was completed from June 2021 through 2022 at 15 monument locations. Six additional DGPS survey monitoring sites were added along the North-South Embankment in late 2022, and monitoring data from Q4 2022 are available at three of these locations. The DGPS technique monitors both lateral and vertical deformations and has been useful for monitoring influence from nearby embankment construction. Daily measurements were collected by KP from June through October 2021 followed by measurements three times per week completed by MR from November 2021 through 2022. Continuation of the current survey program is scheduled for 2023 during active embankment construction. The DGPS data exhibit relatively high noise levels typical of this type of instrumentation and are considered suitable for assessment of long-term deformation trends and to monitor for changes in deformation rates and/or behavior on a weekly or longer timestep.

GNSS instruments are installed on the embankment surface to monitor surface deformation at four locations (DH19-S3, DH19-S4, DH19-S5, and DH19-S7) within the East-West Embankment Central Pedestal Area. Surface deformation data (vertical and lateral deformation components) from GNSS instrumentation were available in near real-time via the RMS throughout the year. The GNSS data exhibit relatively high noise levels typical of this type of instrumentation and are considered suitable for assessment of long-term deformation trends and to monitor for changes in deformation rates and/or behavior on a weekly or longer timestep. GNSS data provide valuable deformation data for comparison with inSAR and DGPS monitoring results and maintain coverage during the snow-season, while inSAR data collection is unavailable.

Subsurface deformations are measured within the embankments at four instrumented inclinometer sites (DH19-S3, DH19-S4, DH19-S5, and DH19-S7), which are co-located with the GNSS surface displacement instrumentation discussed above. The inclinometers are instrumented with in-place-inclinometer (IPI) sensors and monitor deformations oriented in two directions. KP typically analyzes IPI deformation data using monthly averaging applied to both the baseline and monitoring readings to remove noise and better monitor for long-term deformation trends. Two additional inclinometers were installed during 2021 to expand monitoring coverage. Regular manual monitoring of these new sites occurred in 2022.

Elexon Geo4Sight instrumentation (multi-node wireless deformation monitoring instruments) is installed at two locations upstream of the embankment crest on Sections 8+00W (DH20-S2) and 0+00 (DH21-S4). This instrumentation monitors angular deformation within tailings, rockfill and foundation materials, similar to an inclinometer, and has been useful for monitoring sub-surface deformations associated with ongoing construction.

2.2.6 CENTRAL PEDESTAL AREA CONSTRUCTION MONITORING PROGRAM

A focused construction monitoring program for the ongoing construction of the EL. 6,450 ft lift, including construction within the Central Pedestal Area, was initiated in June 2021 and continued throughout 2022. Approvals for each sequential construction lift in the Central Pedestal Area were provided by the EOR following review of the construction monitoring data (KP, 2021d; KP, 2021e; KP, 2021f; KP, 2021g; KP, 2022l). Monthly construction progress and monitoring letters were produced by KP to document and present trends identified during the construction period. The monitoring program includes the following:

- On-site construction supervision by a KP field engineer and/or MR site representative with duties including regular visual inspection, construction progress monitoring and QA/QC activities.
- Piezometric monitoring of select monitoring instruments beneath and downstream of the construction areas with piezometric elevations designated as Construction Performance Parameters (CPPs) using tiered-thresholds and an associated Trigger-Action Response Plans (TARPs).
- Analysis of surface and subsurface deformation monitoring instruments to characterize and track embankment deformations. Deformation monitoring was completed using manual-survey, in-situ instrumentation, and remote sensing techniques including review of:
  - inSAR bulletin analyses.
  - Laser scans of the Central Pedestal Area.
  - Crack mapping and progression monitoring.
  - GNSS surface deformation instrumentation data.
  - Inclinometer data.

2.2.7 QUANTITATIVE PERFORMANCE PARAMETERS

The ongoing development and operation of the YDTI considers continuously achieving four key performance objectives as fundamental requirements for maintaining consistency with the design of the facility. These objectives incorporate the following:

- The YDTI supernatant pond remains separated from the embankments by large tailings beaches.
- The embankments and adjacent tailings beaches remain well drained, and piezometric elevations within the embankments remain below prescribed levels.
- Sufficient freeboard is maintained at all times to manage risks associated with extreme floods and seismic events.
- The embankment geometry, including downstream slope angle and crest width, remains consistent with the design criteria.

QPPs were selected during development of the TOMS Manual (MR/KP, 2022) to enable a high-level comparative assessment with the performance objectives listed above. The QPPs from the TOMS Manual, included in Table 2.1 of this report for reference, are intended to be a good reference to quickly assess the performance of the YDTI.

Table 2.1 Quantitative Performance Parameters

Location	QPP	Value
YDTI Supernatant Pond	Total Freeboard	> 22 ft
YDTI Tailings Beach	Minimum beach length	> 200 ft
YDTI Embankments	Downstream Overall Slope	No steeper than 2H:1V
	Minimum Crest Width	> 200 ft
East-West Embankment Piezometers	Water level: MW94-08	< 5,680 ft
	Water level: MW94-11	< 5,693 ft
	Water level: DH15-S3 VW1	< 5,690 ft
	Water level: DH15-S4 VW1	< 5,740 ft
	Water level: DH15-S4 VW2	< 5,800 ft
	Water level: DH15-S5 VW1	< 5,785 ft
	Water level: DH17-S1 VW2	< 5,741 ft
	Water level: DH18-S3 VW3	< 6,044 ft
	Water level: DH19-S7-VW1	< 5,770 ft
North-South Embankment Piezometers	Water level: MW12-01	< 5,940 ft
	Water level: MW12-05	< 6,200 ft
	Water level: DH18-S1 VW2	< 6,010 ft
	Water level: DH18-S2 VW2	< 6,029 ft
West Embankment Piezometers	Water level: VWP-DP1	< 6,374 ft
	Water level: VWP-DP2	< 6,366 ft
	Water level: DH15-12 VW1	< 6,372 ft
	Water level: DH15-12 VW2	< 6,372 ft
	Water level: DH15-12 VW3	< 6,372 ft

Note(s):

1. Table 2.1 above reproduced from Table 5.1 of the Tailings Operations, Maintenance and Surveillance (TOMS) Manual (MR/KP, 2022).
2. Sensor DH15-S5 VW2 was activated as a QPP sensor on October 3, 2022 with a trigger elevation set at 5,890 ft to replace DH15-S5 VW1, which was damaged during a collar raise.

NOTES:

1. TAILINGS DISCHARGE AND SUPERNATANT POND ELEVATIONS WERE SURVEYED ON SEPTEMBER 1, 2022. ALL ELEVATIONS ARE RELATIVE TO THE ANACONDA DATUM.
2. THE MINIMUM BEACH LENGTH AT THE NORTHERN EXTREMITY OF THE N-S EMBANKMENT IS MEASURED FROM THE TAILINGS BEACH AND UPSTREAM EMBANKMENT INTERFACE, AT THE INTERSECTION OF THE N-S EMBANKMENT AND NATURAL TOPOGRAPHY OF RAMPART MOUNTAIN, TO THE TAILINGS BEACH AND POND SURFACE INTERFACE.
3. SENTINEL-2 VISIBLE SATELLITE IMAGE TAKEN ON SEPTEMBER 5, 2022.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	20JAN'23	ISSUED WITH REPORT	LC	DDF

MONTANA RESOURCES, LLC

YANKEE DOODLE TAILINGS IMPOUNDMENT

SENTINEL-2 SATELLITE IMAGERY FACILITY OVERVIEW SEPTEMBER 5, 2022

Knight Piésold CONSULTING

P/A NO. VA101-126/27

REF. NO. 2

FIGURE 2.1

REV 0

3.0 OBSERVED CONDITIONS AND CHANGES

3.1 CONSTRUCTION PROGRESS AND CHANGES

YDTI construction continued since the previous annual inspection and throughout 2022, with the facility continuing to be observed in good condition throughout the year. Construction activities were routinely completed and monitored as outlined in the CMP (KP, 2018c) with supplemental monitoring and reporting associated with on-going construction in the Central Pedestal Area of the East-West Embankment. Initial construction activities related to the Stage 1 drainage system in the HsB area were completed and monitored as specified in an initial limited authorization to proceed (KP, 2022m). Construction progress was regularly reviewed by KP and the EOR by means of weekly inspection reports, Monthly Quality Control progress reports completed by MR, quarterly field reviews by KP representatives, and the Central Pedestal Area construction monitoring program weekly and monthly progress reports. Active construction areas during 2022 and facility changes noted below are illustrated on Figures 3.1 to 3.4. The main construction activities and notable changes at the YDTI since the 2021 Annual Inspection are described below.

West Embankment

- Zone D1 was completed to EL. 6,450 ft in the areas north and south of the Ridge Road; however, final grading of the downstream slopes to 3H:1V should be completed to allow progressive reclamation to be carried out when and where practical.
- The access road to the 1-4 discharge location was re-established and discharge 1-4 was reconnected.
- Eight 12-inch discharge locations, connected to Tailings Delivery Line 1, were installed, and operated.

East-West Embankment

- EL. 6,350 ft and EL. 6,400 ft Zone U lifts were completed in the Central Pedestal Area.
- EL. 6,450 ft Zone U lift and surcharge zone construction was substantially completed.
- Tailings delivery pipelines along the EL. 6,400 ft lift were relocated up to the EL. 6,450 ft crest from the No. 3 Booster Tailings Pump House.
- Two 12-inch discharge locations, connected to Tailings Delivery Line 1, were installed and operated.

North-South Embankment

- EL. 6,400 ft Zone U lift construction was completed at the corner of the Central Pedestal Area.
- Construction along the EL. 6,450 ft Zone U lift commenced between approximately Section 8+00N and 43+00N.
- Infilling and regrading work was completed in select areas with observed undulations and depressions along the EL. 6,400 ft crest, north of Section 43+00N.
- Eight 12-inch discharge locations, connected to Tailings Delivery Line 3, were installed and operated.

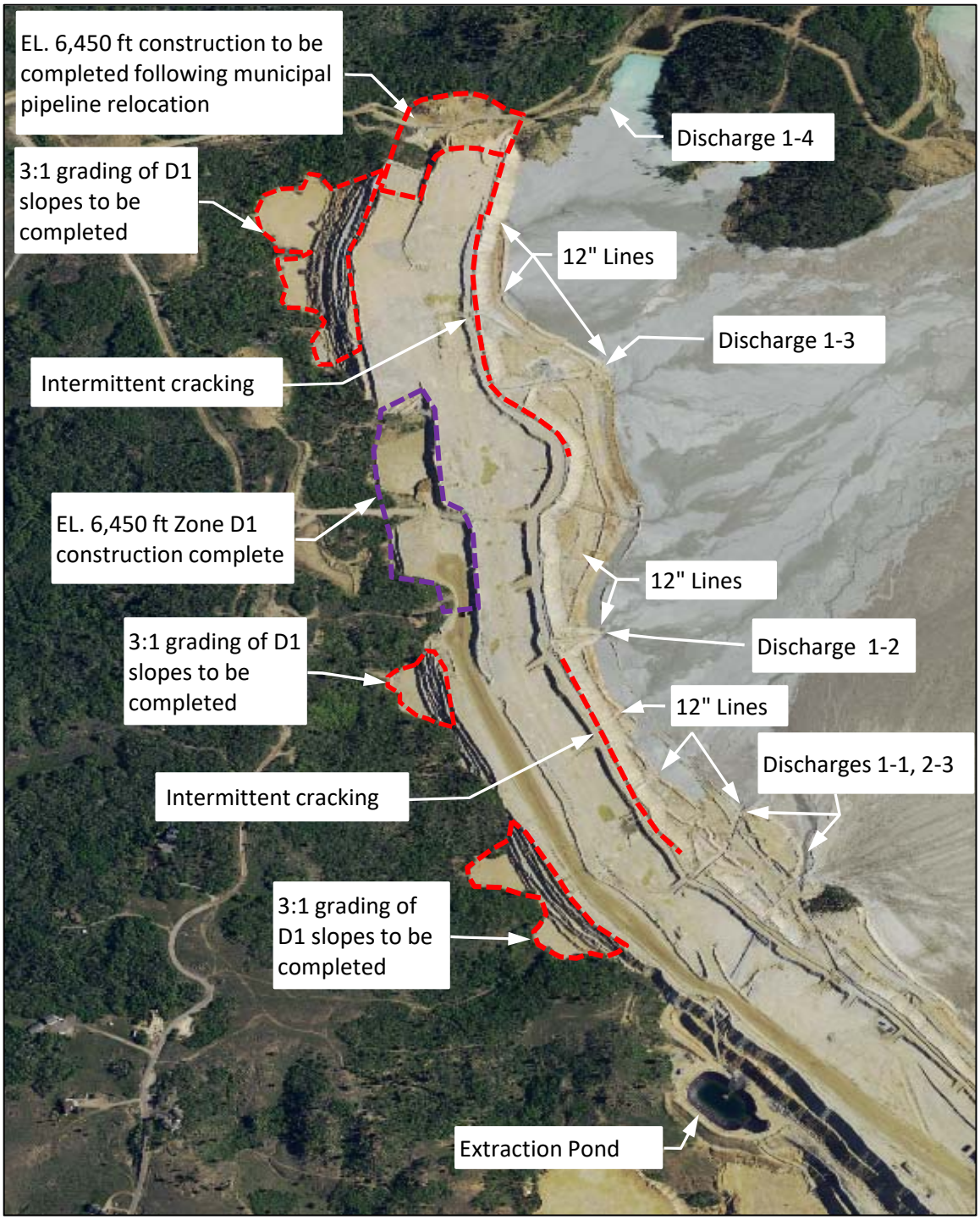
Horseshoe Bend Area

- Stockpiling of drainage system construction materials (Zone UF, Zone 2A, Zone 2B, and Zone 3A).
- Placement of UF material for the foundation layer grading occurred in the historical Holding Pond and Surge Pond areas.
- The historical Precipitation Plant launders were demolished and removed.

- The Cell 10 Pump was removed, and flows were conveyed via an existing drainage ditch to the HsB Pond.
- The Muddler Pump was decommissioned and flows collecting in the area now are conveyed under the adjacent roads via a decant structure and buried pipeline to the HsB Pond.
- A look down level sensor was installed and connected to the automatic Sensemetrics data collection system to provide online monitoring of HsB Weir flows. Calibration of the sensor is pending.
- Grading was completed along the Seep 10 bench in preparation for relocation of the Seep 10 pond and weir to the west.

Other Construction Activities

- Construction of the new reclaim pipeline road adjacent to Rampart Mountain was substantially completed. Installation of the new reclaim pipeline commenced along the completed road.
- Construction of the on-site containment project, which includes cut and fill works in the area of the Scalper Road near the Continental Pit, commenced and was nearing completion by the end of 2022.
- Construction of the new Precipitation Plant commenced in the area adjacent to the HsB WTP.



NOTES:

1. AERIAL IMAGERY PROVIDED BY MONTANA RESOURCES, LLC ON JULY 20, 2022.

2. CONSTRUCTION AREAS ARE ESTIMATED TO REPRESENT AREAS OF INTEREST FOR 2022.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	20JAN'22	ISSUED WITH REPORT	EJA	DDF

MONTANA RESOURCES, LLC

YANKEE DOODLE TAILINGS IMPOUNDMENT

2022 ANNUAL INSPECTION REPORT
WEST EMBANKMENT
AREAS OF INTEREST

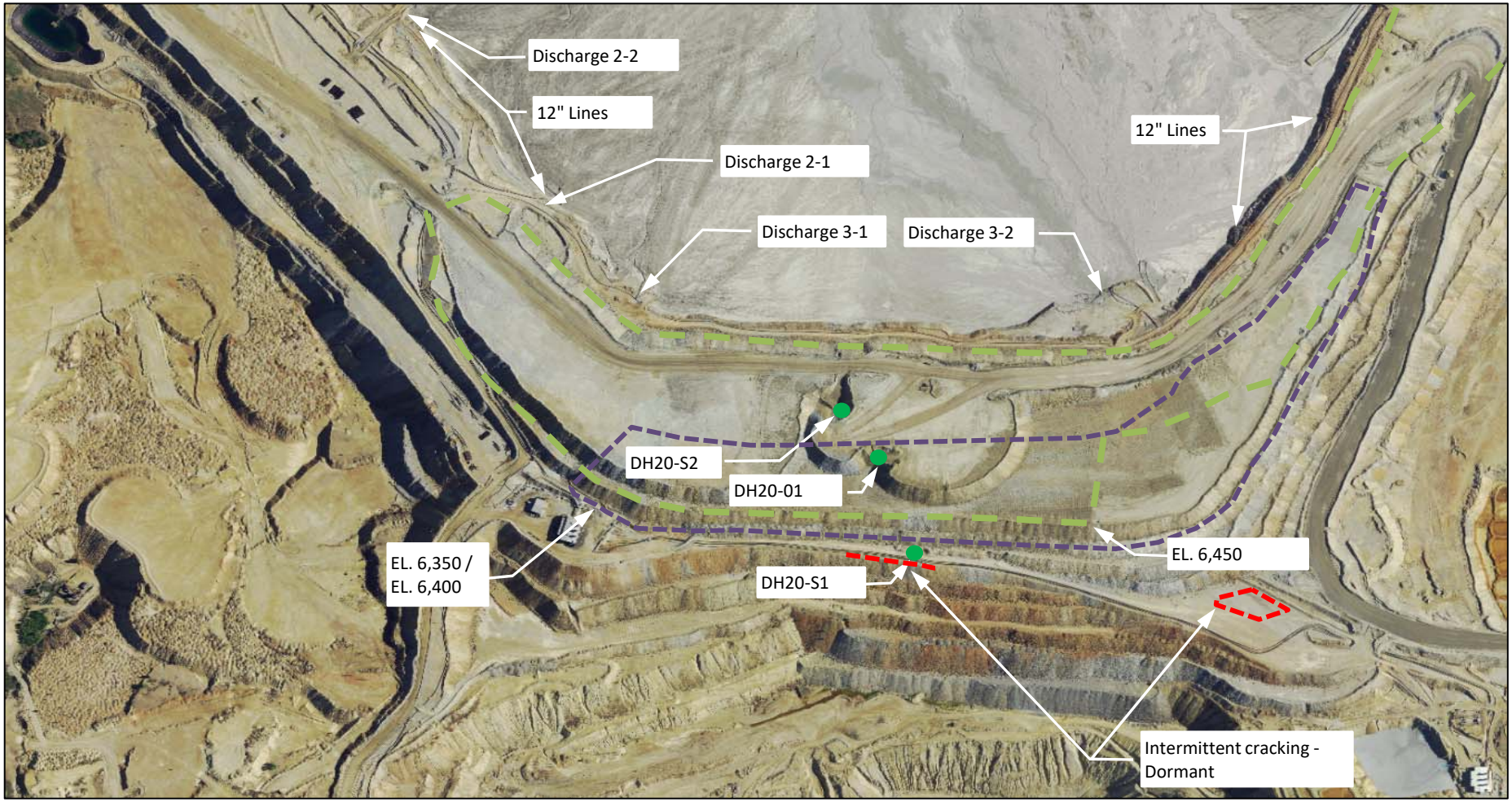
Knight Piésold CONSULTING

P/A NO. VA101-126/27

REF. NO. 2

FIGURE 3.1

REV 0



NOTES:

1. AERIAL IMAGERY PROVIDED BY MONTANA RESOURCES, LLC ON JULY 20, 2022.
2. CONSTRUCTION AREAS ARE ESTIMATED TO REPRESENT AREAS OF INTEREST FOR 2022.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	20JAN'22	ISSUED WITH REPORT	EJA	DDF

MONTANA RESOURCES, LLC

YANKEE DOODLE TAILINGS IMPOUNDMENT

2022 ANNUAL INSPECTION REPORT
EAST-WEST EMBANKMENT
AREAS OF INTEREST

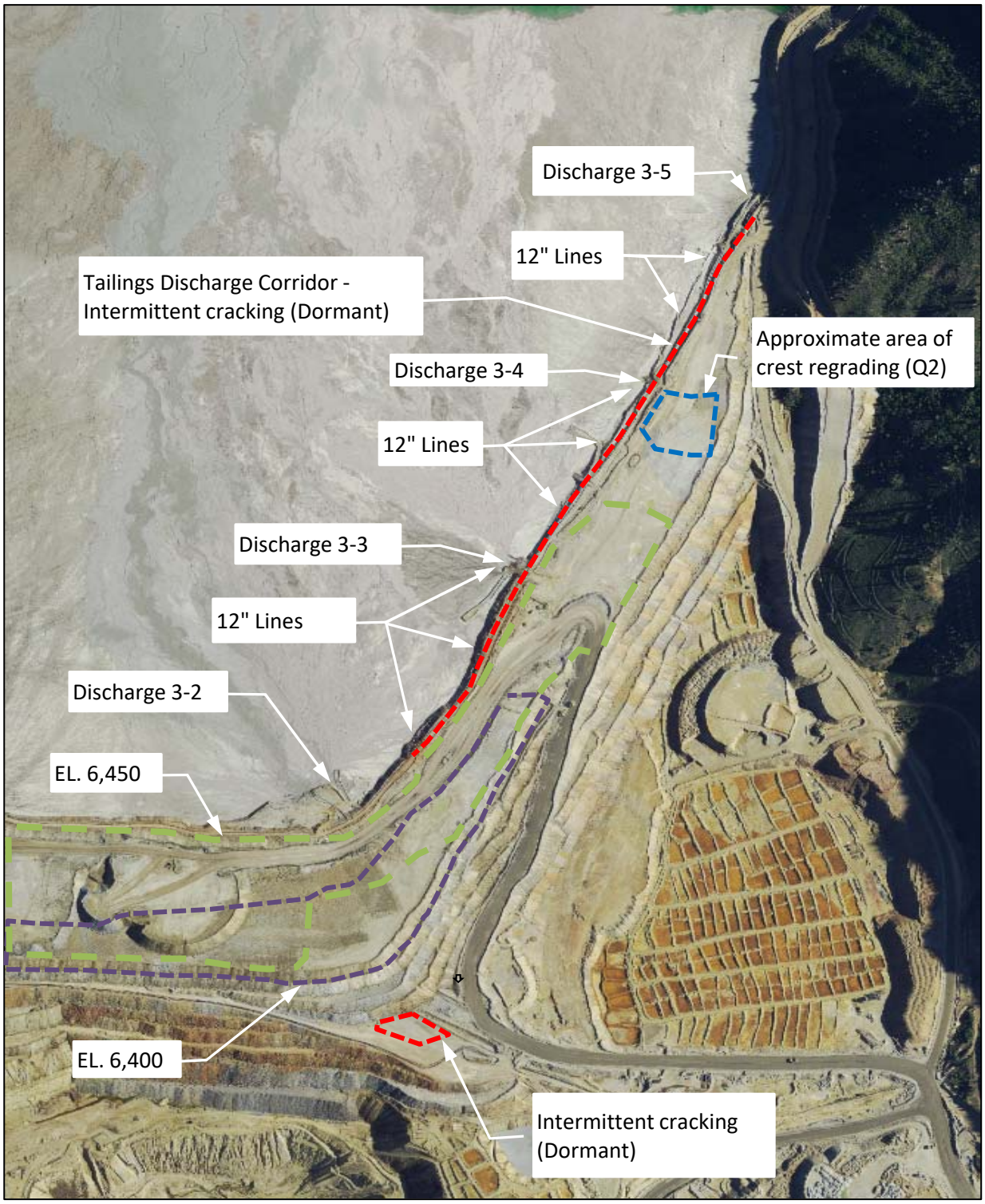
Knight Piésold CONSULTING

P/A NO. VA101-126/27

REF. NO. 2

FIGURE 3.2

REV 0



NOTES:

1. AERIAL IMAGERY PROVIDED BY MONTANA RESOURCES, LLC ON JULY 20, 2022.

2. CONSTRUCTION AREAS ARE ESTIMATED TO REPRESENT AREAS OF INTEREST FOR 2022.

MONTANA RESOURCES, LLC

YANKEE DOODLE TAILINGS IMPOUNDMENT

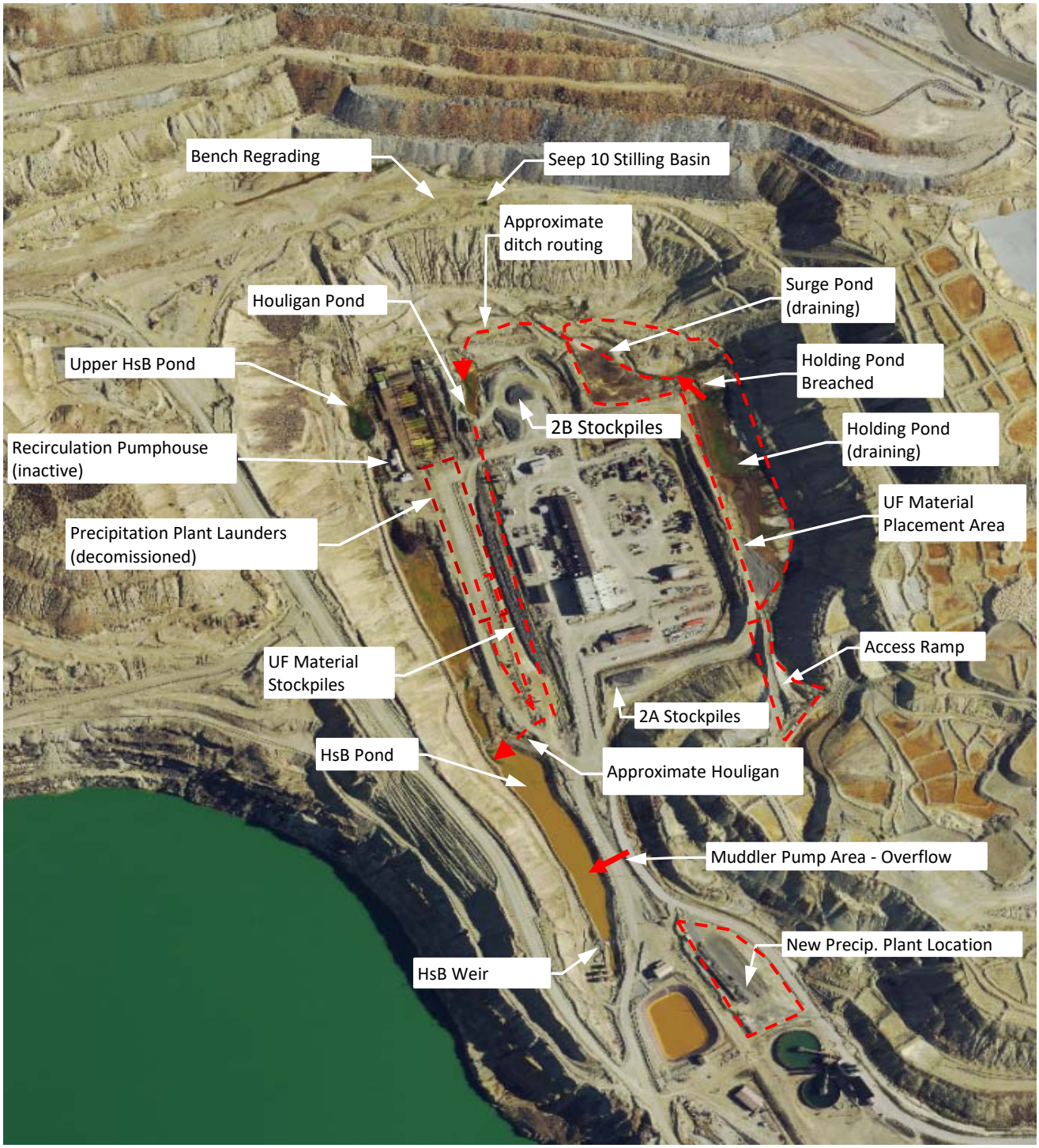
2022 ANNUAL INSPECTION REPORT
NORTH-SOUTH EMBANKMENT
AREAS OF INTEREST

Knight Piésold CONSULTING

P/A NO. VA101-126/27 | REF. NO. 2

FIGURE 3.3 | REV 0

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	20JAN'22	ISSUED WITH REPORT	EJA	DDF



NOTES:

1. AERIAL IMAGERY PROVIDED BY MONTANA RESOURCES, LLC ON JULY 20, 2022.

2. CONSTRUCTION AREAS ARE ESTIMATED TO REPRESENT AREAS OF INTEREST FOR 2022.

MONTANA RESOURCES, LLC

YANKEE DOODLE TAILINGS IMPOUNDMENT

2022 ANNUAL INSPECTION REPORT
HORSESHOE BEND
AREAS OF INTEREST

Knight Piésold CONSULTING

P/A NO. VA101-126/27 | REF. NO. 2

FIGURE 3.4 | REV 0

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	20JAN'22	ISSUED WITH REPORT	EJA	DDF

3.2 HORSESHOE BEND AREA FLOWS

The HsB area water management systems generally functioned as expected throughout the year. There were various changes made to flow routing and storage upstream of the HsB Weir to facilitate construction activities as described in Section 3.1. Quarterly summaries of water monitoring data helped inform the observations below for 2022. The Q4 water data summary will be completed in 2023 once data is available. Observations on flow conditions in the HsB area in 2022 are summarized as follows:

- Flowrates at the Number 10 Seep (Seep 10) have been measured using an ultrasonic lookdown sensor to automatically measure the stilling pond level near the weir since April 2019. The trend of the Seep 10 flows observed during 2022 is similar to the seasonal trend observed since installation of the lookdown sensor. Lower flowrates are observed in the beginning of the year, with flows increasing during Q2 and reaching a peak throughout late Q2 and Q3 then gradually diminishing during Q4 as winter conditions set in.
- The pipeline conveying flows from the Seep 10 stilling basin to the upper HsB area appears to have shifted and settled in the vicinity of a bracket along the slope between the Seep 10 bench and HsB area (see Photo 75 in Appendix A). This has resulted in a leak at the location of the bracket connection that was initially observed in approximately Q2 2022, and some flow from the leak is now being conveyed along surface on the lower section of the embankment slope to the upper HsB collection area.
- Flow measurement at the Precipitation Flume and Precipitation Weir were inactive in 2022 due to termination of leach water recirculation in 2021 and changes to flow routing in the HsB area.
- The average monthly flowrates measured at the HsB Weir through Q3 2022 were comparable to the average flowrates since recirculation of leach solution flows to the rock disposal sites (RDSs) ceased in Q3 2021. The flowrates appear to be slightly elevated compared to conditions in 2019 and 2020 when recirculation of flows to the RDSs was still active.

3.3 TAILINGS BEACH DEVELOPMENT

The tailings beach continued to be well managed in 2022 with the shortest beach length (of approximately 1,500 ft) typically observed at the northern end of the North-South Embankment, consistent with previous years. The tailings beach remains well drained and firm where tailings are not being actively discharged, consistent with the key performance objectives for the impoundment.

MR completed the installation of 18 new discharge locations, comprising single or twinned 12-inch pipelines, during Q2 and Q3 2022. The 12-inch discharge lines are distributed along the YDTI embankments as shown on Figure 3.5. The new smaller diameter discharge lines are typically operated to enhance beach wetting (to help limit the potential for blowing tailings) with discharge occurring at several locations along the line concurrently. This discharge strategy provides additional flexibility to maintain beach wetting in broad areas without cycling discharge locations, while leaving other beach areas exposed longer to improve trafficability for application of dust suppressants (e.g. magnesium chloride) using MR's track mounted Terramac units. Field observations from the site inspections and remote sensing data indicates that this approach appears to be very effective. The satellite image included on Figure 2.1 provides a good example of the effectiveness.

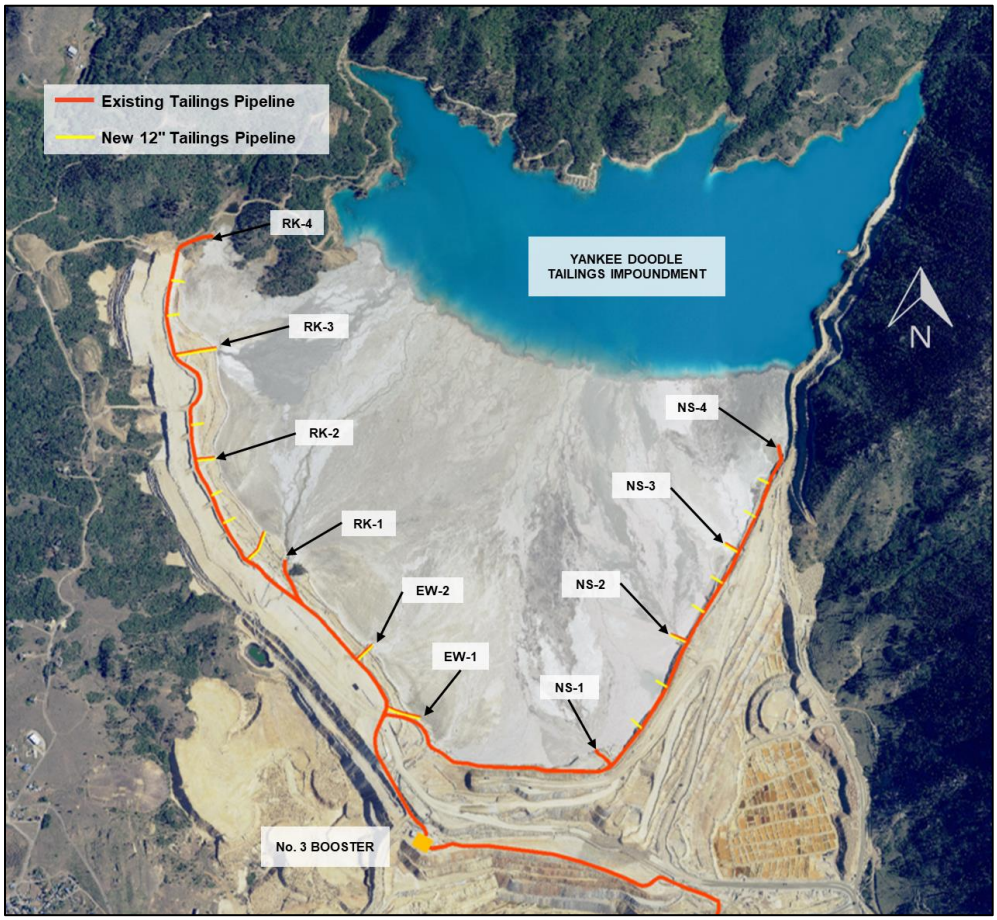


Figure 3.5 YDTI Tailings Discharge Locations

3.4 SUPERNATANT POND

The results of the annual bathymetric survey and assessment of the YDTI supernatant pond undertaken in 2022 (MR, 2022) are presented in Table 3.1 along with data for the last five years. Results of the evaluation indicate an estimated pond volume of approximately 21,500 acre-ft, which corresponds to a 5,700 acre-ft decrease in the estimated pond volume compared to the previous bathymetric survey conducted in 2021. The annual survey also indicated a very minimal (~ 1 ft) reduction in the supernatant pond elevation over the same period and a decrease in pond area by approximately 65 acres.

MR continues to monitor the supernatant pond elevation and measures the elevation on a weekly basis. The pond elevation coincident with the annual inspection site visit at the end of Q3 2022 was recorded at EL. 6,358.4 ft (KP, 2022h), which was a decrease of 1.1 ft since the annual bathymetric survey. The rate of change of the supernatant pond elevation is affected by the ongoing discharge of water off-site due to the Pilot Project. The Pilot Project has continued to operate since being commissioned in September 2019 and has resulted in gradual reduction in pond volume over the past several years.

Table 3.1 Bathymetry Survey Results

Attribute	Year 2022	Year 2021	Year 2020	Year 2019	Year 2018
Methodology	2022 June Composite	2021 June Composite	2020 June Composite	2019 June Composite	2018 June Composite
Pond Area	482 acres	547 acres	613 acres	774 acres	837 acres
Tailings Area	1,043 acres	971 acres	918 acres	727 acres	642 acres
Total Impoundment Area	1,524 acres	1,518 acres	1,531 acres	1,501 acres	1,479 acres
Pond Volume	21,444 acre-ft	27,163 acre-ft	32,084 acre-ft	34,392 acre-ft	33,447 acre-ft
Avg. Water Depth	48.0 ft	68.6 ft	56.2 ft	41.1 ft	42.9 ft
Max Water Depth	92.3 ft	110.5 ft	112.7 ft	112.0 ft	109.2 ft
Min Water Depth	1.3 ft	9.0 ft	2.4 ft	2.8 ft	0.4 ft
Measured Water Elevation	6,359.5 ft	6,360.6 ft	6,360.3 ft	6,357.9 ft	6,351.7 ft
Data Points Used	29,295	22,801	24,509	23,562	100,707

Note(s):

1. Bathymetry results and pond volume estimate provided by MR (MR, 2022).
2. Survey completed from June 28 to 30, 2022.

3.5 QUANTITATIVE PERFORMANCE PARAMETERS

3.5.1 PIEZOMETRIC

No piezometric trigger elevation exceedances were observed at QPP monitoring sites during 2022. Monitoring findings for QPP and select non-QPP piezometric monitoring sites were reviewed weekly by KP and were formally documented in quarterly instrumentation letters during 2022. The Q4 quarterly piezometric and deformation monitoring summary will be completed in 2023 with additional analysis and discussion presented later in 2023 in the DAR. Discussion of key piezometric trends and conditions monitored during 2022 is provided in Section 4.3.

3.5.2 GEOMETRIC

The geometry of the YDTI embankments was reviewed during site visits and confirmed based on the survey information provided periodically by MR. The geometric properties as the related to the QPPs as defined in Table 2.1 can be summarized as:

- **Total Freeboard**: The West Embankment and East-West Embankment have been raised to approximately EL. 6,450 ft. The lowest point on the embankment crest is currently located along the northern end of North-South Embankment where construction of the EL. 6,450 ft lift of the embankment is ongoing. The minimum elevation of the embankment in this area is approximately EL. 6,393 ft. The maximum allowable pond elevation based on the lowest point of the embankment crest and freeboard QPP (22 ft) is approximately 6,371 ft, which is approximately 11 ft higher than the maximum operating pond elevation of EL. 6,360 ft recorded in Q1 and Q2 of 2022. This confirms that freeboard allowances were maintained (with significant contingency) throughout 2022.

- **Minimum Beach Length:** The shortest tailings beach length continues to be typically observed at the northern end of the North-South Embankment at the location of the NS-4 discharge. The tailings beach length is reviewed on a semi-monthly basis and was consistently estimated to be approximately 1,500 ft at this location throughout 2022. This is more than the minimum beach length of 200 ft set out in the QPPs.
- **Downstream Overall Slope:** The downstream slope geometry has continued to be developed by incorporating 50 to 70 ft wide benches between successive 50 to 100 ft high angle of repose rockfill slopes along the embankment. This configuration has resulted in overall downstream slopes of approximately 2H:1V or flatter, consistent with the QPP for downstream overall slopes to be no steeper than 2H:1V.
- **Minimum Crest Width:**
  - The minimum crest width is required at the embankment freeboard compliance elevation (EL. 6,382 ft for 2022), which is based on the maximum annual YDTI pond elevation (EL. 6,360 ft) plus the 22 ft of freeboard requirement. The crest width along the entirety of the YDTI embankment is more than the minimum crest width QPP of 200 ft.
  - Ongoing construction in the Central Pedestal Area and infilling of the historical mine haul ramp has increased the minimum embankment width in the narrowest portion of the crest of the East-West Embankment. The current width the embankment on the EL. 6,450 ft lift, including the embankment crest and surcharge, ranges from approximately 500 to 750 ft. The width of the East-West Embankment is exaggerated by the rockfill surcharge that was extended over the tailings beach area beginning in 2015.
  - The minimum crest width at the North-South Embankment along the EL. 6,400 ft lift ranges from approximately 400 ft along the southern half to over 600 ft along the northern half. The narrowest section is located at approximately 23+00N with a crest width of 370 ft. The crest width continues to be exaggerated along the northern half of the embankment due to construction of the downstream step-out of the embankment completed in 2020. Construction of the embankment lift to EL. 6,450 ft will reduce the crest width at this higher elevation as the downstream step-out forms the base for construction of the upper lift; however, the crest width along the North-South Embankment will remain more than the QPP requirement of 200 ft.
  - The minimum crest width along the West Embankment is currently approximately 600 ft along the EL. 6,450 ft lift. The crest width of the West Embankment is currently exaggerated to accommodate the potential for future lifting of the embankment crest elevation without further downstream step-out.

4.0 DISCUSSION OF IMPORTANT TRENDS

4.1 GENERAL

The YDTI continues to be developed and operated in a manner consistent with the designs, the QPPs, and the operating protocols established for the facility. A risk assessment (KP, 2018d) was undertaken during preparation of the design document associated with continued construction of the embankments to a crest elevation of 6,450 ft. The risk assessment identified potential failure modes and the factors affecting likelihood and consequences associated with each failure mode. It was recognized that design and operating enhancements could provide further opportunities for risk mitigation, and these enhancements continue to be progressively implemented at the YDTI, taking advantage of the best practicable new technologies and techniques to enhance dam safety. Risk mitigation opportunities incorporated into the design and operating procedures of the YDTI since 2015 include:

- Modifications to the tailings distribution system for improved beach development along all three embankments.
- Stress densification of tailings below the rockfill surcharge to strengthen tailings adjacent to the East-West Embankment, improve seismic performance of the facility, and reduce potential flowability of the underlying tailings mass.
- Water management changes, including substantial reductions to freshwater use from the Silver Lake Water System (SLWS) and development of the Pilot Project to facilitate additional water inventory reductions within the YDTI supernatant pond.
- Expansion of the piezometric monitoring network and development of surface and subsurface deformation monitoring programs.
- Continued investigation of the geotechnical and hydrogeological conditions within the embankment rockfill, tailings, and foundation materials underlying the embankment following a phased investigation plan developed by KP for the period from 2017 through 2021.
- Developed and commenced execution of a new phased investigation and monitoring plan (KP, 2021i) for the period from 2022 to 2026.
- Automation of monitoring systems that are at the leading end of practice.
- Improved data analysis frequency and reporting rigor.
- Updates to the MR Emergency Action Plan (EAP).

The risk assessment also identified opportunities to utilize the observational method during ongoing development of the facility, which was noted to be particularly relevant for the transitional period between implementing the modifications to the tailings distribution system and achieving a new steady-state condition associated with the revised discharge strategy. There was uncertainty identified due to the reliance on modelling predictions related to tailings beach development and water balance modelling, and foreseeable deviations were considered along with the planned observational monitoring related to several factors, including tailings beach development, pore pressure changes within the embankment, and water inventory changes. The trends related to these factors are regularly discussed in the quarterly and annual surveillance reporting, and a status update related to each is provided briefly below.

4.2 TAILINGS BEACH DEVELOPMENT

Beach development continues to be reviewed frequently to inform design and operating enhancements that could provide further opportunities for risk mitigation. Beach development along the North-South Embankment was recognized as a key risk factor in the risk assessment and related to the potential for piping initiated by natural flooding. The risk assessment identified that improving uniformity of the tailings beach adjacent to the embankments is a potential mitigation measure and thus beach development is monitored closely as part of the surveillance plans for the facility. Adjustments to the tailings distribution system were recommended during the last several annual inspections (KP, 2020a; KP 2021a; KP, 2022a).

MR completed the installation of 18 new discharge locations, comprising single or twinned 12-inch pipelines, during Q2 and Q3 2022. The use of multiple, more closely spaced tailings discharge locations should also increase beach uniformity adjacent to the embankment and limit tailings beach elevation differences along the embankment upstream face. The addition of the 12-inch discharge lines along the North-South Embankment is consistent with the intent of Recommendation 3(b) in the 2021 Annual Inspection Report (KP, 2022a). This corrective action applied by MR provides more coverage than the action proposed in the 2021 Corrective Action Plan (2021 CAP) and satisfies the requirement.

The 2021 AIR also included a recommendation (#2) to extend Line 2 to allow discharge at location NS-1 and NS-2 when the EL. 6,450 ft raise of the embankment is completed adjacent to these discharge locations. The addition of a new discharge point between EW-1 and NS-1 was also recommended in the 2021 AIR when relocating the tailings delivery pipelines following construction of the EL. 6,450 ft embankment lift (Recommendation 3a). It is recognized that the ability to discharge from either of two lines or at two locations concurrently along the North-South Embankment would improve flexibility for operations and enhance beach development along this section of the embankment. Construction of the EL. 6,450 ft lift is still in progress and MR anticipates lift construction will be completed in 2023. The recommended extension of Line 2 can continue to be deferred until lift construction is complete. Use of 12-inch discharge lines along the extension of Line 2 would also satisfy the intent of the AIR recommendations. These recommendations will be combined and carried forward with some rewording to clarify the current recommendation.

4.3 EMBANKMENT PIEZOMETRIC CONDITIONS

4.3.1 GENERAL

The conceptual hydrogeological model for the YDTI embankments presented in the Site Characterization Report (KP, 2017) suggests that a basal saturated zone exists within the bottom 50 to 200 ft of embankment rockfill and that isolated perched saturated zones are present within the overlying rockfill. Site investigation programs completed since 2016 (KP, 2018e; KP, 2019c; KP, 2019d; KP, 2020c; KP, 2020d; KP, 2021h) and piezometric data collected (KP, 2018b; KP, 2019b; KP, 2020b) continue to refine and corroborate this conceptual hydrogeological model. Pore water pressure trends associated with both tailings discharge and embankment construction continue to be observed.

Detailed analysis of pore water pressure trends from 2022 will be presented in a Data Analysis Report (DAR) to be issued in early 2023 and key trends have been discussed in the quarterly instrumentation letters as part of the dam safety monitoring programs. Key piezometric trends monitored during 2022 for each YDTI embankment and for the tailings mass are summarized below. The Q3 2022 Quarterly

Piezometric and Deformation Monitoring Update (KP, 2022e) is included as Appendix E for additional details.

4.3.2 EAST-WEST EMBANKMENT

Piezometric conditions within the East-West Embankment have generally continued to decrease slightly through 2022, continuing the long-term trends observed since late-2016 following the implementation of multiple-point tailings discharge system. Influence from construction (pressure increase followed by dissipation) was observed at a few sites, corresponding with ongoing embankment and surcharge construction within the Central Pedestal Area. Key East-West Embankment piezometric monitoring trends include:

- QPP sensors installed within basal rockfill near the East-West Embankment toe on Sections 0+00 and 8+00W generally monitored minor decreasing piezometric conditions throughout 2022.
- QPP and non-QPP sensors installed beneath the East-West Embankment crest and tailings pipeline ramp also monitored minor pore water pressure decreases within the embankment rockfill during 2022.
- Non-QPP site DH19-S7 VW1 (Section 0+00) observed increasing pore water pressures (up to about 12 ft of increase) followed by subsequent dissipation during Q3 and Q4 2022. The sensor is installed within the historical 1982 lift-top interval (relatively finer grained, perched saturated zone) and the observed trend corresponds with construction of the EL. 6,450 ft lift upstream of the instrumentation site. Pore water pressures began to increase in June 2022 and fluctuated through September 2022 before dissipating in Q4 2022 once construction activity moved away from the area. Conditions remained within the Low-Risk TARP Scenario throughout construction.

No piezometric QPP exceedances were observed during 2022 at instrumentation installed within the East-West Embankment.

4.3.3 NORTH-SOUTH EMBANKMENT

Piezometric monitoring instruments at QPP sites within the embankment rockfill at the North-South Embankment generally indicate relatively stable pore water pressures with minor construction related influence. Piezometric elevations measured in the basal saturated zone at QPP sites DH18-S1 (VW2) and DH18-S2 (VW2) remained relatively constant during July and August 2022 with minor pore water pressure increases observed beginning in September 2022 corresponding with active EL. 6,450 ft lift construction in the area. Several non-QPP sensors also show minor construction related pore pressure increases in the basal saturated zone with cumulative increases of between 2 and 6 ft since the start of lift construction. The piezometric response is consistent with expectations based on monitoring observations during downstream step-out construction in 2019 and 2020.

4.3.4 WEST EMBANKMENT

Piezometric elevations within the foundation of the West Embankment remained relatively constant from 2019 through early Q2 2022, which was interpreted to be controlled by drainage to the West Embankment Drain (WED). Sensors installed in the area observed minor pore pressure increases (< 2 ft) during late Q2 and early Q3 2022. The recent minor pore pressure increases within the WED area are attributed to continuous tailings deposition along the West Embankment from Q1 through Q3, particularly from location RK-1 and the use of the new 12-inch discharges as discussed previously. Tailings discharge in this area likely contributed to higher observed seepage flows to the WED and Extraction Pond, via slurry water

infiltration into the tailings beach and embankment rockfill when the tailings slurry flows along the beach adjacent to the upstream side of the embankment.

Piezometric monitoring between the West Embankment and West Ridge continues to indicate that hydrodynamic containment (eastward flow gradient from the West Ridge towards the YDTI) remains present as of December 2022 within both critical monitoring areas (the Deep Isolated Fracture System and West Ridge Potentiometric Low). Comparison of West Ridge piezometric data and YDTI pond elevation indicates that the WED is not presently required to maintain hydrodynamic containment; however, it does enhance the security of the hydrodynamic seepage containment system along the West Ridge.

4.3.5 TAILINGS MASS

Pore water pressure instrumentation installed within the tailings mass upstream of the East-West Embankment Central Pedestal Area generally monitored relatively stable or slightly decreasing conditions during 2022. Piezometric elevations generally remain well below the historical levels observed in late-2016 prior to the implementation of multiple-point tailings discharge and extensive tailings beach development that has occurred subsequently. Instrumentation installed within the tailings beach adjacent to the North-South Embankment and East-West Embankment outside the Central Pedestal Area generally exhibited increasing pore pressures with fluctuations influenced by activity/inactivity of tailings discharge locations local to each monitoring site with pore pressures stabilizing following relocation of tailings discharge. There are presently no QPP thresholds set for tailings pore water pressures.

4.4 EMBANKMENT DEFORMATION TRENDS

KP and MR have rigorously monitored embankment surface and subsurface deformations throughout 2022 to characterize deformation conditions and monitor elevated deformations associated with ongoing embankment construction. Deformation monitoring relies on both in-situ instrumentation and remote sensing techniques as described in Section 2.2.5. Key deformation monitoring findings from 2022 include:

- Observed surface deformations within regions of historical rockfill generally continued to occur at constant rates throughout 2022 without observation of progressive (accelerating) deformations. Deformation magnitudes are consistent with expectations for end-dumped rockfill and settlement rates are interpreted to vary based on rockfill thickness and time following placement.
- Elevated surface and subsurface deformation rates have been observed localized within and around regions of active construction. The onset of elevated deformation rates continues to correspond with the advancement of construction, and rates begin to slow upon completion of construction in a given area, except where overlapping of sequential lift influence occurs. Findings do not indicate the development of unexpected deformations within the downstream embankment slope nor evidence of progressive (accelerating) deformations following construction.

Detailed analyses of deformation trends have been included in the 2022 quarterly instrumentation and monitoring letters and in monthly construction monitoring data reviews. In addition, detailed analysis of 2022 trends and conditions will be included in the 2022 DAR following the end of 2022.

4.5 WATER INVENTORY MANAGEMENT

The YDTI supernatant pond provides a source of water to support continuous mill operations and the elevation of the pond surface rises as the volume of tailings in the facility increases. The risk assessment

(KP, 2018c) identified that reducing the normal operating pond volume towards a target volume of approximately 15,000 acre-ft would reduce risks associated with facility performance following natural flooding. MR implemented changes to the Silver Lake Water Supply (SLWS) use practices in 2016 and 2017 as part of the goal of gradually reducing the operating pond volume and substantially reduced freshwater and make-up water demands for ore processing. MR and KP recognized that changing SLWS practices was an achievable way to influence the water inventory in the YDTI and that other opportunities existed to further reduce water stored within the facility.

Ongoing reduced use of the SLWS (as practicable) along with the commissioning of the Pilot Project in 2019 has resulted in a notable impact on the supernatant pond volume in recent years. The Pilot Project has continued to operate since being commissioned in September 2019 and has resulted in gradual reduction in pond volume over the past several years. Results of the bathymetric evaluations in 2019 and 2022 indicate an estimated pond volume reduction of approximately 13,000 acre-ft between mid-2019 and mid-2022, resulting in an estimated pond volume of approximately 21,500 acre-ft in mid-2022. The target pond volume of approximately 15,000 acre-ft should be achievable in the next year or two if similar performance is maintained. The Pilot Project is not entirely within MR's control and a variety of factors and interruptions are possible that could impact achieving the target pond volume; however, the EOR continues to be pleased with the progress achieved since late 2019.

5.0 RECOMMENDATIONS AND ACTIONS

5.1 2021 RECOMMENDATIONS AND ACTIONS

KP identified the recommendations below in the 2021 AIR for consideration in 2022. MR issued a Corrective Action Plan (CAP) in response to the 2021 AIR recommendations on January 11, 2022, which is included as Appendix D1. The CAP identified the actions proposed or already undertaken to address the eight recommendations. MR completed the proposed corrective actions for recommendations 1, 5, 6, and 8; however, the remaining recommendations were not able to be implemented in 2022 due to delays associated with continued construction of the EL. 6,450 ft embankment lift. MR provided a deferral notification and updated schedule for the 2021 CAP in a letter on December 16, 2022, which is included as Appendix D2.

The MR actions completed in 2022 to address each of the 2021 recommendations were as follows:

1. *Maintain reductions in freshwater use from the Silver Lake Water System to the extent reasonably practicable and continue the Pilot Project to incrementally reduce the water inventory in the YDTI supernatant pond towards the target of approximately 15,000 acre-ft (continuation of 2020 recommendation).*

COMPLETED/ONGOING. MR continued to operate with reduced freshwater and make-up water from the SLWS. The Polishing Plant has continued to operate since being commissioned on September 30, 2019 and has resulted in a supernatant pond volume of approximately 21,500 acre-ft) as of the end of June 2022. This recommendation has been continued in the 2022 AIR.

2. *Modify the tailings distribution system by extending Line 2 to allow discharge at location NS-1 and NS-2 when the EL. 6,450 ft raise of the embankment is completed adjacent to these discharge locations (deferral from 2020 recommendations).*

DEFERRED. MR evaluated options for adjustment of Line 2 in 2020 and concluded that it would not be practicable to complete the extension of Line 2 until the EL. 6,450 ft raise of the embankment is completed adjacent to discharge locations NS-1 and NS-2. Construction of the EL. 6,450 ft lift is still in progress and MR anticipates lift construction will be completed in 2023. The recommended extension of Line 2 can be deferred until lift construction is complete. Use of 12-inch discharge lines along the extension of Line 2 to location NS-1 would satisfy the 2021 AIR recommendation. The recommendation will be carried forward and reworded slightly to provide this clarification.

3. *Modify the tailings distribution system to include two additional discharge locations as follows:*
    - one located between the current locations of EW-1 and NS-1.
    - one located between the current locations of NS-1 and NS-2.

PARTIALLY COMPLETED/DEFERRED. MR installed eight new discharge locations along the North-South Embankment on Tailings Delivery Line 3 consisting of single or twinned 12-inch pipelines during Q2 and Q3 2022, including two locations between NS-1 and NS-2. The addition of the 12-inch discharge lines along the North-South Embankment is consistent with the intent of Recommendation 3b, and the corrective action applied by MR provides more coverage than the action proposed in the 2021 Corrective Action Plan assuming that these discharge points will be raised to the EL. 6,450 ft lift. The addition of a new discharge point between EW-1 and NS-1 (Recommendation 3a) will be completed when relocating the tailings delivery

pipelines following construction of the EL. 6,450 ft embankment lift. Use of 12-inch discharge lines along the extension of Line 2 to NS-1 would satisfy this recommendation. Recommendation 3a will be combined with recommendation 2 above and carried forward with rewording to provide additional clarification.

4. *Implement additional alluvium facing at the interface between the rockfill surcharge and tailings beach between Section 23+00 NW and Section 13+00 N along the upstream face of the EL. 6,400 ft surcharge lift.*

PARTIALLY COMPLETED/DEFERRED. MR placed alluvium on the upstream slope face of the embankment when initially constructing the EL. 6,400 ft raise of the rockfill surcharge and following the EOR annual inspection in September 2021, as outlined in the 2021 CAP (MR, 2022). Alluvium was not placed on the upstream face of the tailings discharge corridor because access is currently limited by the presence of Tailings Delivery Line 2 along this corridor. MR plans to place alluvium in the area adjacent to the tailings discharge corridor when Tailings Delivery Line 2 is relocated to EL. 6,450 ft as outlined in the 2021 CAP. This can be completed following completion of the EL. 6,450 ft lift during relocation of the tailings delivery pipeline. The recommendation has been carried forward and wording has been updated based on observations during EL. 6,450 ft lift construction.

5. *Infill low areas along the downstream side of the North-South Embankment and regrade the embankment crest from approximately Section 43+00 N towards the north.*

COMPLETED. Fill placement and regrading of the specified area was completed in May 2022.

6. *Complete maintenance work in the upper HsB area to improve drainage and limit ponding in this area.*

COMPLETED. The berm between the upper HsB area and the Cell 10 pump area was breached in Q4 2021 to improve drainage in the area. A new culvert was installed in 2022 to facilitate access to the pipelines that run along the west side of the HsB Pond. The new culvert will be removed and the upper pond breached as part of the HsB area drainage system construction activities after the Precipitation Plant is decommissioned and the associated pipelines are removed.

7. *Develop and implement a new system to collect flows along the Seep 10 bench and convey these flows to the HsB Pond. Re-grade the Seep 10 bench surface to enhance drainage collection and limit ponding of water to the extent practicable.*

PARTIALLY COMPLETED/DEFERRED. MR completed various grading activities along the Seep 10 bench in advance of construction of the new Seep 10 drainage system proposed as part of the HsB Rock Disposal Site Stage 1 Drainage System (KP, 2021c). The design concept for the drainage system includes the relocation of the Seep 10 pond and weir to the west and installation of a drainage pipeline to the HsB Pond along the 7 percent Ramp. Construction of the works will be completed after the Issued-for-Construction (IFC) design drawings and associated technical specifications are developed by KP. The IFC design development is underway, and construction has been scheduled for 2023. The recommendation will be carried forward.

8. *Investigate options for automating collection of the HsB Weir flow monitoring data using the Sensemetrics remote monitoring system platform.*

COMPLETED. Instrumentation to automate collection and distribution of weir data was procured in 2022. The instrumentation was installed at the HsB Weir in December 2022, and calibration of the automated measurements is currently underway.

5.2 2022 RECOMMENDATIONS

The YDTI continues to be operated and developed consistent with the designs, the QPPs, and operating protocols established for the facility. The EOR has identified the following recommendations for consideration in 2023 based on a review of the information collected and conditions observed in 2022:

1. **Maintain reductions in freshwater use from the Silver Lake Water System to the extent Maintain reductions in freshwater use from the Silver Lake Water System to the extent reasonably practicable and continue the Pilot Project to incrementally reduce the water inventory in the YDTI supernatant pond towards the target of approximately 15,000 acre-ft (continuation of 2021 recommendation).**
2. **Modify the tailings distribution system by extending Line 2 to allow discharge at location Discharge 3-2 (NS-1) and add a discharge location between the current locations of Discharge 3-1 (EW-1) and Discharge 3-2 (NS-1) when the EL. 6,450 ft raise of the embankment is completed. Use of 12-inch discharge lines along the extension of Line 2 to location Discharge 3-2 (NS-1) would satisfy the recommendation (modification of 2021 recommendation).**
3. **Regrade the upstream slope of the embankment during relocation of the tailings delivery pipelines (Lines 2 and 3) to the tailings pipeline corridor for EL. 6,450 ft lift. Regrade the embankment upstream slope to cover and incorporate the tailings pipeline bench along the EL. 6,400 ft lift. Implement the alluvium facing layer between the crest of the pipeline corridor along the EL. 6,450 ft lift and the upstream alluvial facing of the EL. 6,400 ft lift along the regraded upstream slope prior to cutting off access with placement of the tailings pipelines. The intent is to create a continuous layer of alluvium between the EL. 6,450 pipeline corridor and the alluvium facing previously placed as part of the EL. 6,400 ft lift construction. This recommendation applies to the portion of the East-West Embankment in the Central Pedestal Area to the east of approximately Section 23+00NW (Discharge location EW-1) and the entire North South Embankment.**
4. **Develop and implement a new system to collect flows along the Seep 10 bench and convey these flows to the HsB Pond (continuation of 2021 recommendation).**

6.0 REFERENCES

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Knight Piésold Ltd. (KP, 2018b). 2017 Data Analysis Report (KP Reference No. VA101-126/16-5 Rev 0), dated July 20, 2018.

Knight Piésold Ltd. (KP, 2018c) Yankee Doodle Tailings Impoundment: Construction Management Plan (KP Reference No. VA101-126/12-5 Rev. 3), May 1, 2018.

Knight Piésold Ltd. (KP, 2018d). Dam Breach Risk Assessment (KP Reference No. VA101-126/12-3 Rev 3), March 12, 2018.

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Knight Piésold Ltd. (KP, 2021d). Approval to Commence EL. 6,250 ft Construction of the North-South Embankment (KP Reference No. VA21-01148), dated June 17, 2021

Knight Piésold Ltd. (KP, 2021e). Approval to Commence EL. 6,300 ft Construction of the Central Pedestal Area (KP Reference No. VA21-01356), dated July 16, 2021

Knight Piésold Ltd. (KP, 2021f). Approval to Commence EL. 6,350 ft Construction of the Central Pedestal Area (KP Reference No. VA21-01727), dated September 24, 2021

Knight Piésold Ltd. (KP, 2021g). Approval to Commence EL. 6,400 ft Construction of the Central Pedestal Area (KP Reference No. VA21-01996), dated November 10, 2021

Knight Piésold Ltd. (KP, 2021h). 2020 Embankment Geotechnical Site Investigation Report (KP Reference No. VA101-126/23-4 Rev 0), October 22, 2021.

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KNIGHT PIÉSOLD LTD.
PERMIT NUMBER
1001011
EGBC PERMIT TO PRACTICE

7.0 CERTIFICATION

This report was prepared and reviewed by the undersigned.

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APPENDIX A

Site Photos

(Pages A-1 to A-40)

2022 ANNUAL INSPECTION REPORT

AERIAL DRONE SURVEY (JUNE 2022)

PHOTO 1 – North-South Embankment downstream shell, facing north from southeast end of YDTI.

PHOTO 2 – North-South Embankment downstream shell, facing west towards the top of the mine haul ramp at EL. 6,400 ft.

PHOTO 3 – Old Reclaim Barge and New Reclaim Water Pipeline Ramp road.

PHOTO 4 – New Reclaim Water Pipeline road, supernatant pond, and tailings beach, facing southeast.

PHOTO 5 – Tailings beach and supernatant pond interface, looking south from the supernatant pond.

PHOTO 6 – New Reclaim Water Pipeline road, North-South Embankment Crest, and tailings beach, facing south.

PHOTO 7 – North-South Embankment crest (left), tailings discharge corridor, and tailings beach (right) near tailings discharge NS-4.

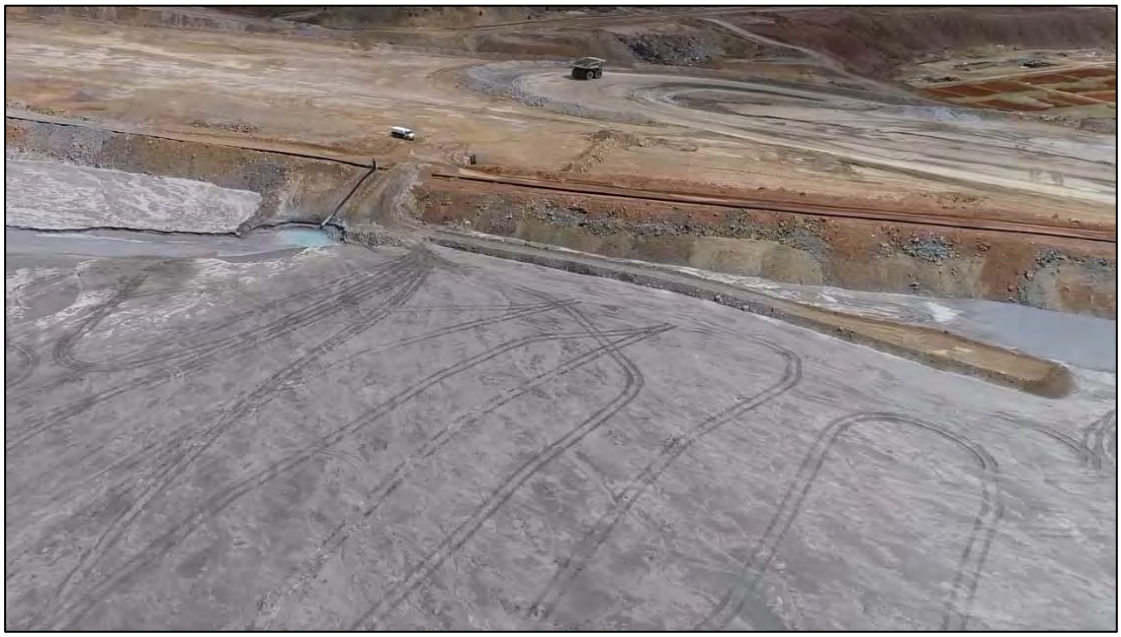

PHOTO 8 – Upstream side of the North-South Embankment by tailings discharge location NS-2, facing east.

PHOTO 9 – Discharge location NS-1 along the North-South Embankment, facing east.

PHOTO 10 – Tailings beach (left), EL. 6,450 ft rockfill surcharge placement progress (left), North-South Embankment crest (right), and subgrade preparation at the North-South Embankment and East-West Embankment tie-in area, facing north.

PHOTO 11 – East-West Embankment downstream slope and Number 10 Seep bench area, facing north.

PHOTO 12 – Overview of Central Pedestal Area of the East-West Embankment, Seep 10 Bench, and HsB Area, facing north.

PHOTO 13 – Central pedestal area of the East-West Embankment, looking northeast.

PHOTO 14 – EL. 6,450 ft lift placement progress, No. 3 Booster Pump House, and East-West pipeline ramp in Central Pedestal Area of the East West Embankment, facing east.

PHOTO 15 – Upstream interface of East-West Embankment, in between NS-1 and EW-1, and EL. 6,450 ft lift and rockfill surcharge placement progress, looking south.

PHOTO 16 – East-West Embankment pipeline ramp and EL. 6,450 ft lift and surcharge zone placement progress, facing northwest from east of No. 3 Booster Pump House.

PHOTO 17 – East-West Embankment upstream face at discharge location EW-1, facing south.

PHOTO 18 – East-West Embankment downstream slope along the northwest dumps area, facing northeast.

PHOTO 19 – East-West Embankment EL. 6,450 ft lift and surcharge zone, with view of adjacent tailings beach and Line 3, recently routed over the EL. 6,450 ft lift.

PHOTO 20 – East-West Embankment upstream side at discharge location EW-2, facing southwest.

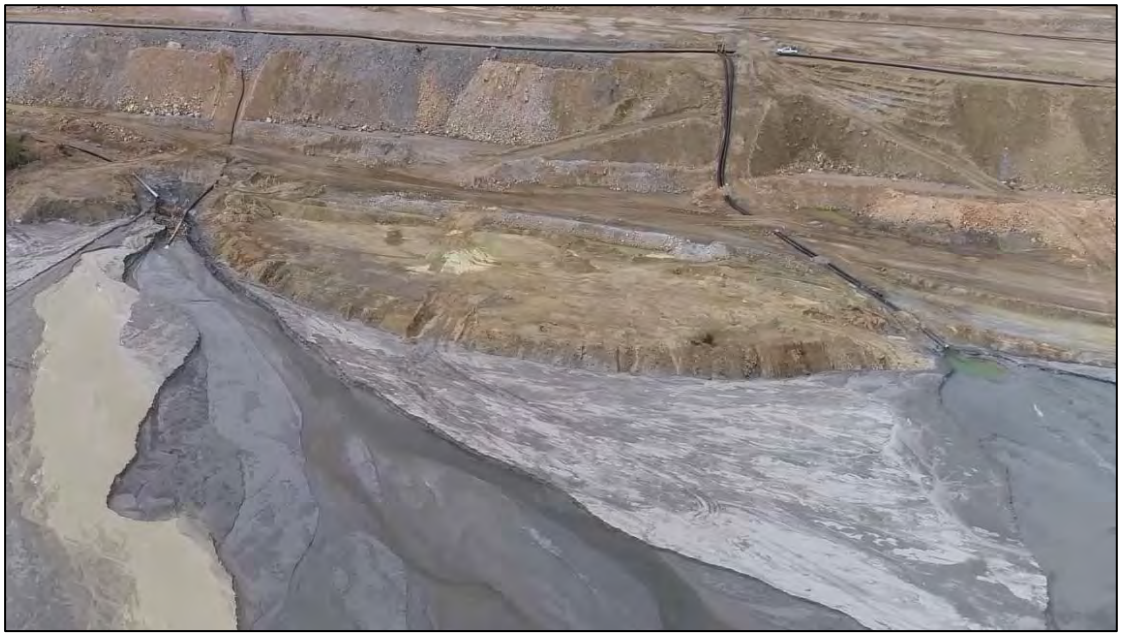

PHOTO 21 –West Embankment upstream interface near Rocky Knob, with view of discharge location RK-1 and an adjacent, recently installed 12” discharge, facing south.

PHOTO 22 – West Embankment upstream interface with view of recently installed 12” discharges between discharge locations RK-2 and RK-3, facing west.

PHOTO 23 – West Embankment upstream interface and discharge location RK-3, facing west.

PHOTO 24 – Northern end of West Embankment with view of upstream interface and EL. 6,450 ft crest, facing south near discharge location RK-4.

PHOTO 25 – West Embankment crest and downstream shell at northern end of West Embankment, facing east.

PHOTO 26 – West Embankment downstream shell, northwest of Rocky Knob and Extraction Pond, looking northeast.

PHOTO 27 – West Embankment D1 – Rockfill material placement progress by Ridge Road, facing east.

PHOTO 28 – Overview of WED Extraction Pond.

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 29 – Reclaim Barge and YDTI supernatant pond, facing west from the New Reclaim Water Pipeline road.

PHOTO 30 – Reclaim Water Pipeline construction, facing south from the New Reclaim Water Pipeline road.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 31 – Completed New Reclaim Pipeline road (left) and YDTI supernatant pond (right), facing south.

PHOTO 32 – YDTI tailings beach and supernatant pond interface, facing north.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 33 – North-South Embankment and beach, looking west from the New Reclaim Water Pipeline ramp.

PHOTO 34 – North-South Embankment downstream side, looking southwest from New Reclaim Water Pipeline ramp.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 35 – North-South Embankment crest and EL. 6,450 ft lift subgrade preparation, looking north from the North-South Embankment and East-West Embankment tie-in area.

PHOTO 36 – Tailings beach north of tailings discharge location NS-4 and by New Reclaim Water Pipeline Ramp hillside cut, facing south.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 37 – North-South Embankment tailings discharge corridor (left) and EL. 6,450 ft lift placement progress (right), facing north.

PHOTO 38 – North-South Embankment crest (left) and tailings discharge corridor (right), facing south.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 39 – East-West Embankment and North-South Embankment tie-in area downstream shell, facing northwest from Sunflower Hill.

PHOTO 40 – East-West Embankment Central Pedestal Area downstream shell, facing northwest from Sunflower Hill.

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ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 41 – East-West Embankment EL. 6,450 ft surcharge zone upstream shell and adjacent tailings beach in between tailings discharge locations EW-1 and EW-2, facing south from the North-South Embankment.

PHOTO 42 – East-West Embankment EL. 6,450 surcharge zone (left), tailings pipeline (middle), and tailings beach (right), facing west from tailings discharge location NS-1 towards EW-2.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 43 – Drill rig for 2022 site investigation program along the East-West Embankment tailings pipeline ramp in the Central Pedestal Area, facing east.

PHOTO 44 – East-West Embankment downstream slopes and WED Extraction Pond emergency overflow pipelines, west of Booster Station #3, facing southeast near Extraction Pond. Boulders for energy dissipation and final alignment of pipeline discharge remains to be completed.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 45 – WED Extraction Pond facing southwest.

PHOTO 46 – WED Extraction Pond facing north along West Embankment.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 47 – Downstream side of the West Embankment including completed Zone D1 of the downstream shell, facing east from West Ridge topsoil stockpile.

PHOTO 48 – Downstream side of West Embankment south of the Ridge Road. Completed D1 material placement in benches pending final grading and trimming to 3H:1V slope angle, facing north.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 49 – Downstream side of West Embankment south of the Ridge Road. Completed D1 material placement in benches pending final grading and trimming to 3H:1V slope angle, facing north.

PHOTO 50 – Minor depressions and ponded water on downstream side of West Embankment crest, facing north at EL. 6,450 ft.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 51 – West Embankment upstream shell (right) and tailings beach (left) north of Rocky Knob, facing southeast from EL. 6,450 ft.

PHOTO 52 – West Embankment upstream shell (right) and tailings beach (left) by tailings discharge location RK-3, facing southeast from EL. 6,450 ft.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 53 – Northern end of West Embankment (left) and adjacent tailings beach (right) by tailings discharge location RK-4, facing northeast.

PHOTO 54 – Horseshoe Bend overview from East-West Embankment EL. 6,450 ft, facing south.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 55 – Zone UF construction progress, Holding Pond, and Surge Pond in the HsB Area, facing south from Number 10 Seep Bench.

PHOTO 56 – UF – Foundation Layer material placement over the Holding Pond in the HsB Area, facing southeast.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 57 – UF – Foundation Layer material placement over the Holding Pond in the HsB Area, facing south.

PHOTO 58 – Zone 2B and UF stockpiles, Houligan Pond, Upper HsB Pond, and HsB Pond, facing southwest from Number 10 Seep Bench.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 59 – Historical Surge Pond, facing south from Number 10 Seep Bench.

PHOTO 60 – Zone 2B stockpile (left) and Houligan Pond (center), facing south.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 61 – Houligan Pond inflow in ditch collecting embankment toe seepage and conveying surface water flow from the Holding Pond to the Houligan Pond, facing north from the Houligan Pond.

PHOTO 62 – Ditch conveying surface water flows from the Holding Pond, around the perimeter of the historical Surge Pond, to the Houligan pond, facing west.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 63 – Decommissioned Precipitation Plant, facing south

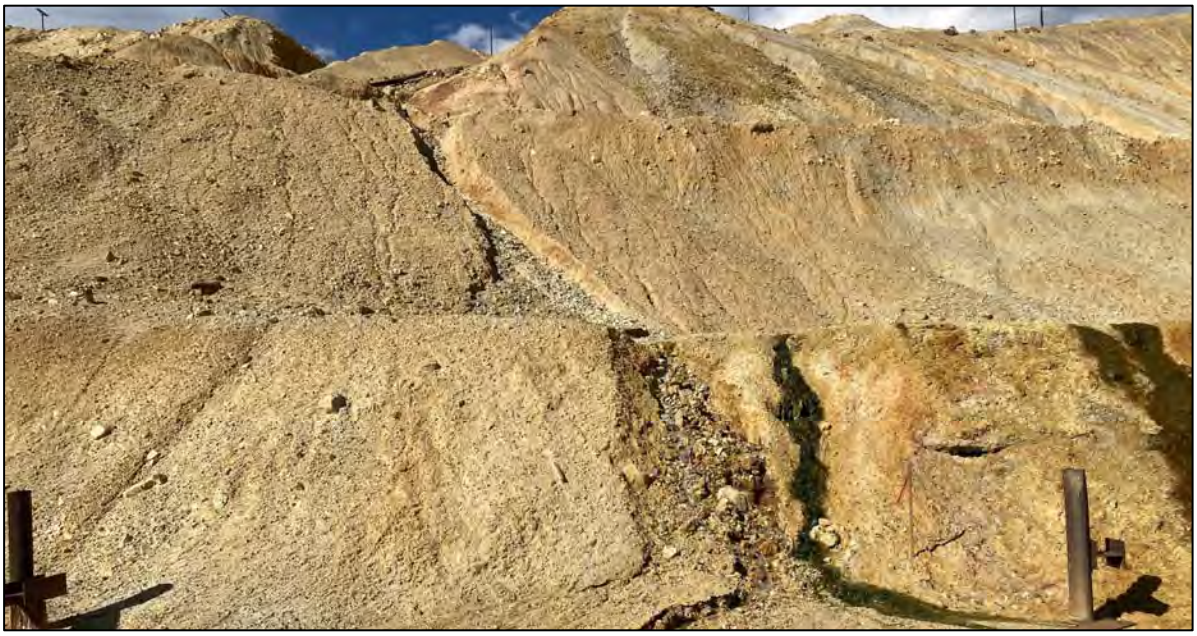

PHOTO 64 – Rilling observed along the downstream embankment shell in the HsB area, facing north.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 65 – Embankment toe seepage (right) flowing into Upper HsB Pond, facing west.

PHOTO 66 – Upper HsB Pond, facing south.

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 67 – Muddler Pump area, facing south.

PHOTO 68 – Transfer Pond, Pilot Project return flow pipe and P1-16 Pump facing east.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 69 – Horseshoe Bend Weir, facing north.

PHOTO 70 – Overview of Seep 10 Bench (left) and Horseshoe Bend Area (right), facing east from the 7 percent haul ramp.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 71 – Seepage at the Number 10 Seep bench area, looking west.

PHOTO 72 – Regrading progress of the Number 10 Seep bench area, looking west.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 73 – Number 10 Seep V-notch weir staff gauge reading 0.38.

PHOTO 74 – Overview of Number 10 Seep stilling pond.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 75 – Seep 10 pipeline with observed leak, facing west.

PHOTO 76 – New Precipitation Plant construction, facing west.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 77 – Scalper Road On-site Containment Project construction progress, facing southeast.

PHOTO 78 – Berkeley Pit, looking southwest from Sunflower Hill.

2022 ANNUAL INSPECTION REPORT

ANNUAL INSPECTION PHOTOS (SEPTEMBER 28, 2022)

PHOTO 79 – Continental Pit, looking south from Sunflower Hill.

PHOTO 80 – Continental Pit, looking north.

APPENDIX B

Q3 2022 Construction Summary and Field Review

(Pages B-1 to B-34)

Knight Piésold CONSULTING

Management System Certified by: bsi ISO 9001 ISO 14001 ISO 45001 CERTIFIED

October 31, 2022

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Mr. Mike Harvie
Manager of Engineering and Geology
Montana Resources, LLP
600 Shields Avenue
Butte, Montana
USA, 59701

Dear Mike,

RE: 2022 Q3 Field Review and Construction Summary

1.0 INTRODUCTION

This letter summarizes the construction progress and field review completed at the Yankee Doodle Tailings Impoundment (YDTI) during the third quarter (Q3) of 2022. This field review and summary document is intended to satisfy the Engineer's quarterly inspection frequency as outlined in the Earthworks Inspection and Test Plan in Table 3.4 of the Construction Management Plan (CMP) (KP, 2018) for placement of fill materials for Zone U, UA, D1, F, and D2, and to provide a summary of construction progress around the YDTI during the quarter.

The YDTI Q3 construction progress summary presented in this letter was developed using information provided by Montana Resources, LLP (MR) throughout the quarter. Sources of construction progress information included weekly construction progress reports and Monthly Quality Reports which are completed by MR to satisfy inspection requirements outlined in the CMP. Monthly survey and construction volume records were also provided by MR and assist in the summary of construction progress and activities.

KP developed an Authorization to Proceed for the Horseshoe Bend (HsB) drainage works outlining construction methodology and quality requirements in Q2 (KP, 2022a). MR has contracted Water and Environmental Technologies (WET) to provide oversight and construction management and Intermountain Construction Services (ICS) to complete the foundation layer and drainage construction in the HsB area. WET is responsible for submitting quality documentation on behalf of the Constructor including weekly reports that are used to inform this construction progress summary.

The 2022 Q3 Construction Field Review of the YDTI was completed on August 29 and 30, 2022 by Mr. Ethan Alban, E.I.T., of Knight Piésold Ltd. (KP) as a nominee of the Engineer of Record (EOR) Mr. Daniel Fontaine, P.E. Mr. Ethan Alban was accompanied by Mr. Mike Harvie and Mr. Travis Birkenbuel of the MR Mining Engineering Department during the field review.

2.0 QUARTERLY CONSTRUCTION SUMMARY

2.1 YDTI EMBANKMENT CONSTRUCTION SUMMARY AND TONNAGES

YDTI embankment construction activities continued within the Central Pedestal Area (East-West and North-South Embankments) and in select areas along the West Embankment during Q3 of 2022.

Zone U construction for the EL. 6,450 ft lift of the rockfill surcharge and embankment continued to advance between approximately Section 12+00W and 8+00N in the Central Pedestal Area of the embankment and commenced in the area between approximately Section 28+00N and 43+00N along the North-South Embankment. West Embankment Zone D1 construction up to EL. 6,450 ft was completed in the area south of the Ridge Road at approximately Section 82+80W and north of the Ridge Road south of Section 95+00W.

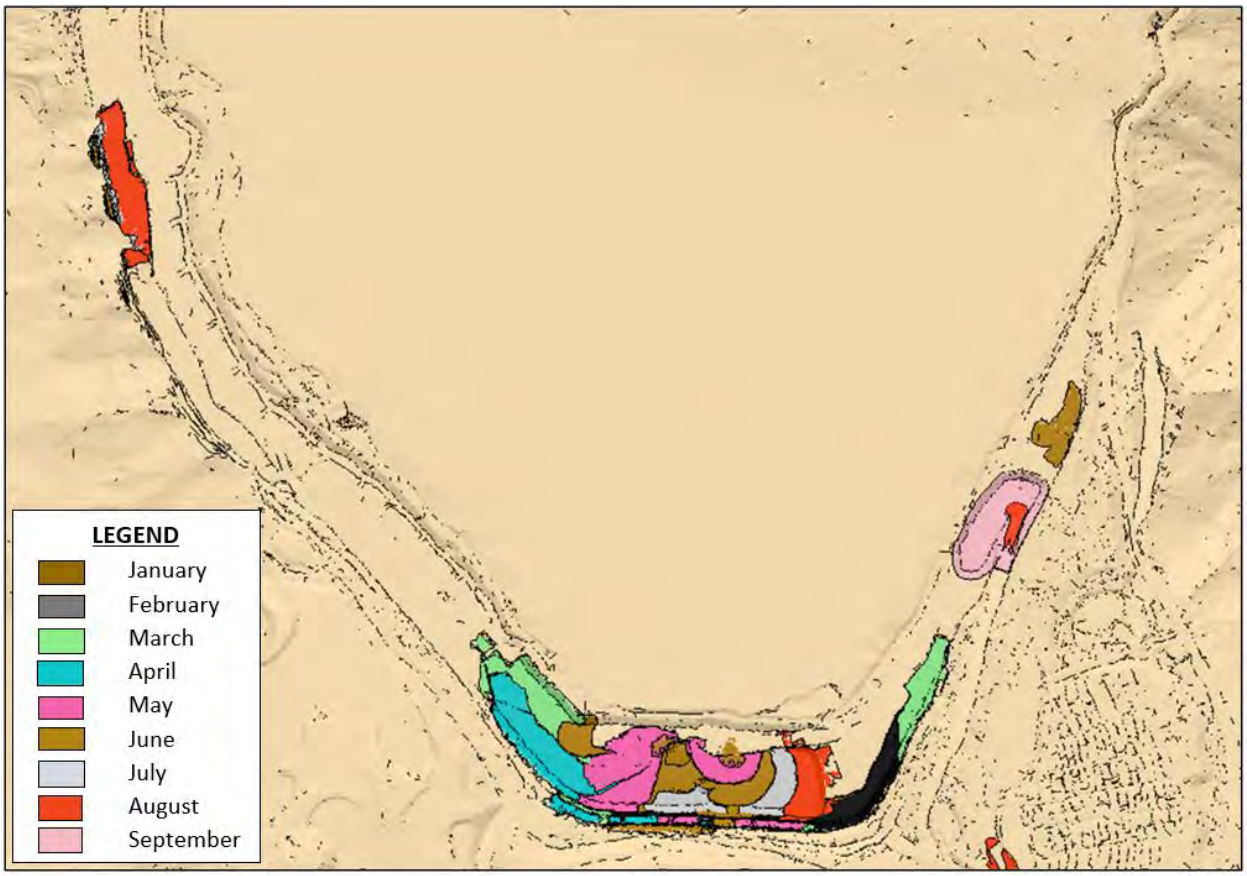


Figure 2.1 2022 YDTI Construction Survey

Construction tonnage estimates for Q3 were provided by MR for each of the active construction areas. The tonnages were estimated using CAT – MineStar Edge (MineStar) survey and are provided in Table 2.1. MR continues to collect and summarize tonnages based on haul truck pit cards; however, MineStar tonnages represent a more accurate record of the construction activities.

Table 2.1 Q3 Construction Placement Summary

Location	Mass (Tons) – MineStar Edge[1]			
	July	August	September	Total
West Embankment EL. 6,450 ft - Zone D1	445,665	129,182	-	574,848
N-S / E-W Embankment EL. 6,450 ft - Zone U	844,293	986,646	1,222,963	3,053,902
Total Tons Placed	**1,259,958**	**1,115,829**	**1,222,963**	**3,628,750**

Note(s):

1. End of quarter material tonnages provided by Montana Resources, LLP.

2.2 HORSESHOE BEND DRAINAGE AND ROCK DISPOSAL SITE

Construction activities in the Horseshoe Bend area for the foundation layer (Zone UF), drains and ditches continued during Q3 of 2022. KP is currently advancing the Issued-for Construction (IFC) design of the drainage network within the HsB area. ICS continued to haul UF, 2A, and 2B materials to stockpile locations within the HsB area and place UF materials in the Holding Pond. WET continues to provide oversight and construction management of the HsB drainage works including issuing HsB quality control documentation.

2.3 OTHER CONSTRUCTION ACTIVITIES

ICS and MR continued construction of the on-site containment project which includes cut and fill works in the area of the Scalper Road near the Continental Pit. Installation of the new reclaim pipeline along the completed reclaim pipeline road is ongoing. MR has indicated these works are scheduled to be completed during Q4 of 2022; however, these works are out of the scope of the field review.

3.0 FIELD REVIEW SUMMARY

3.1 GENERAL

The quarterly construction field review is intended to review embankment construction progress, observe construction practices, and to provide recommendations for priority actions. The field review is a visual assessment and does not constitute supervision of construction. The 2022 Q3 Construction Field Review was completed on August 29 and 30, 2022. Weather during the field review was cool to warm (~50 to 85° F, 10 to 29 °C) and sunny with some clouds. Precipitation was sparse for weeks leading up to the review resulting in relatively dry conditions during the review.

The photos and visual observations from the field review were compared by KP to similar information collected during previous field reviews and construction progress reporting completed by MR to inform the opinions and recommendations presented in this letter. A checklist providing a summary of the areas viewed, along with relevant observations, is attached as Table 3.1.

The general arrangement of the YDTI, along with locations corresponding to the field review photos included in the attached Photo Log, is presented on Figure 3.1.

NOTES:

1. COORDINATE SYSTEM AND ELEVATIONS ARE BASED ON ANACONDA MINE GRID.
2. PHOTO LOCATIONS CORRESPOND TO PHOTO LOG ISSUED WITH 2022 Q3 QUARTERLY CONSTRUCTION FIELD REVIEW SUMMARY.
3. AERIAL IMAGERY PROVIDED BY MONTANA RESOURCES, LLP ON JULY 20, 2022.

SCALE A: 1500 0 1500 3000 4500 6000 7500 ft

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	31OCT'22	ISSUED WITH LETTER	EJA	RMM	JRG

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

2022 Q3 CONSTRUCTION FIELD REVIEW GENERAL ARRANGEMENT AND PHOTO LOCATION MAP

Knight Piésold CONSULTING

P/A NO.	REF NO.
VA101-126/27	VA22-01895

FIGURE 3.1 REV 0

SAVED: M:\1\101\00126\27\A\Acad\FIGS\A06, 10/20/2022 11:06:18 AM, RMCLELLAN PRINTED: 10/31/2022 1:55:45 PM, FIG 3.1, RMCLELLAN
XREF FILE(S): Tailings and Reclaim Pipelines, 5ft_01_2022-07-18 IMAGE FILE(S): 5ft_01 2022-07-18

3.2 YDTI EMBANKMENT CONSTRUCTION

3.2.1 WEST EMBANKMENT

Construction activities along the West Embankment were inactive at the time of the field review. Relevant areas of interest viewed along the West Embankment during the field review are outlined on Figure 3.2.

The EL. 6,450 ft Zone U lift construction has not advanced since Q3 of 2021. The northern end of the embankment, where the relocation of a municipal water pipeline is required, is still to be completed as described in the 2021 Q3 letter (KP, 2021). MR has indicated that this pipeline relocation is expected to be completed in Q4 of 2022.

The EL. 6,450 ft crest has a variety of undulations and depressions which are likely a function of bulk material settlement, differential settlement caused by haul truck routing during material placement, and construction practices where the end dumped materials are spread by a dozer operator in 50 ft lifts with limited survey controls. Similar conditions along the EL. 6,450 ft crest were previously observed in the Q2 Field Review (KP, 2022b). Despite relatively dry conditions for weeks leading up to the field review, several of these areas were filled with standing water at the time of the field review, with one example at approximately Section 108+40 W shown on Photo 3.1.

Photo 3.1 EL. 6,450 ft West Embankment Crest and Ponding

Zone D1 construction progress along the downstream edge of the embankment in the draws north and south of the Ridge Road was viewed during the field review. Zone D1 has been completed to EL. 6,450 ft in these areas and surface preparation was completed as per the CMP prior to each lift of D1 materials being placed.

Photo 3.2 Completed Zone D1 – North of the Ridge Road at EL. 6,450 ft

The majority of the EL. 6,450 ft tailings discharge corridor along the West Embankment has been constructed, outside of the section awaiting the municipal water pipeline relocation and the completion of the EL. 6,450 ft lift. Intermittent cracking was observed along the loosely placed berm on the upstream edge of the tailings corridor, approximately between Sections 108+40W and 95+00W as well as Sections 82+80W and 60+00W. This cracking is similar to other locations with observed cracking throughout the construction of the EL. 6,450 ft lift and detailed in previous field reviews between 2020 and 2022.

The dormant cracking observed in the 2022 Q2 Field Review (KP, 2022b) at approximately Section 53+00NW, near the downstream berm, was no longer visible, as MR indicated this area has since been regraded.

Slash piles remain outside of the embankment footprint along the tree line and were observed sporadically along the downstream toe of West Embankment. The 2021 Q3 field review (KP, 2021) included a recommendation for the slash piles to be relocated from the tree line and piled where they can be burned when weather conditions allow. This recommendation has not yet been completed, and it is understood that MR is required to purchase a new burn permit for 2023. MR intends on purchasing a new burn permit prior to the upcoming burn season, which normally takes place from March 1 to August 31st.

3.2.2 EAST-WEST EMBANKMENT

Areas of interest examined during the field review along East-West Embankment are outlined on Figure 3.3. MR continued construction of the EL. 6,450 ft Zone U lift of the East-West Embankment during the quarter and construction was ongoing at the time of the field review between approximately Section 3+00W and 8+00N of the Central Pedestal Area. Construction was progressing in an easterly direction as shown on Photo 3.3. The lift subgrade surface, comprising the previously placed U material of the EL. 6,400 ft lift, had been cross ripped in preparation for the advancing lift above.

Photo 3.3 EL. 6,450 ft East-West Embankment Construction Near Section 0+00

The EL. 6,450 ft crest has a variety of undulations and depressions, similar to those described along the West Embankment and in the Q2 Field Review (KP, 2022b). Ponding was observed at various locations along the crest at the time of the review, with the largest apparent depression and resulting ponding shown on Photo 3.4.

Photo 3.4 EL. 6,450 ft East-West Embankment Crest Depression and Ponding

The downstream edge of the tailings pipeline ramp along the East-West Embankment and the downstream edge of the EL. 6,400 ft and EL. 6,450 ft embankment lifts were viewed during the field review. Minor

surficial cracking continues to be intermittently present in these areas as identified during the Central Pedestal Area construction monitoring program.

The tailings discharge corridor has not been constructed along the East-West Embankment east of approximately Section 28+00NW. MR has indicated this will be constructed after completion of the EL. 6,450 ft lift along the East-West and North-South Embankment tie-in area. The tailings 3 line remains at EL. 6,400 ft heading east along the central section of the embankment, while the 2 line is located on the EL. 6,450 ft tailings pipeline corridor.

The interface of the tailings beach and rockfill surcharge between discharge locations 3-1 and 3-2 upstream of the Central Pedestal Area of the embankment remains relatively low when compared to the beach elevation at the adjacent discharge locations, consistent with the observations from the field reviews completed since Q3 of 2021. The recommendation to introduce an additional discharge in this location was included in the 2021 EOR Annual Inspection Report (KP, 2022c) and was scheduled in the 2021 Corrective Action Plan (CAP) (MR, 2022) to be completed in Q3 or Q4 of 2022. This was not completed in Q3 of 2022. MR indicated the installation of the additional discharge is expected to be in Q1 of 2023, once the tailings discharge corridor is constructed.

3.2.3 NORTH-SOUTH EMBANKMENT

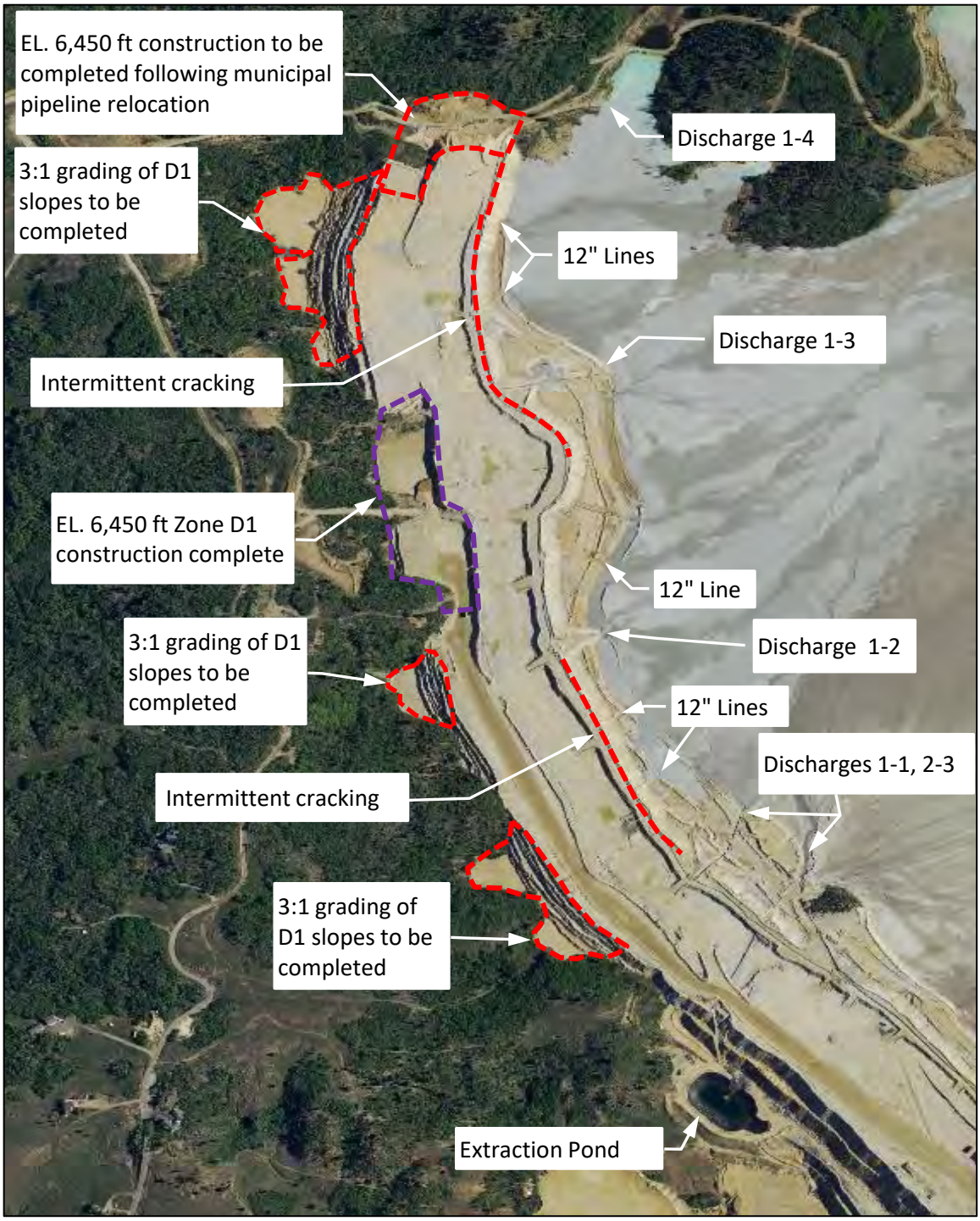
Areas of interest observed during the field review along the North-South Embankment are outlined on Figure 3.4. MR commenced and progressed construction of the EL. 6,450 ft Zone U lift along the North-South Embankment, between Sections 28+00N and 43+00N during Q3. Construction was progressing northwards near Section 38+00N, as shown on Photo 3.5, during the field review. The lift subgrade surface, comprising the previously placed U material of the EL. 6,400 ft lift, had been cross ripped in preparation for the advancing lift above.

Photo 3.5 EL. 6,450 ft North-South Embankment Construction

No obvious signs of ponding were observed in areas that were infilled and regraded along the EL. 6,400 ft crest north of Section 43+00N in Q2 of 2022 as per the 2021 EOR AIR and CAP. Several undulations and depressions were observed in the area between Sections 28+00N and 38+00N, similar to the conditions described above along the West and East-West Embankment crest and in the Q2 Field Review (KP, 2022b), with an example shown on Photo 3.6.

Photo 3.6 EL. 6,450 ft North-South Embankment Crest Depression and Ponding

Cracking identified during the Central Pedestal Area construction monitoring program at the toe of the North-South Embankment on the old tailings pipeline ramp was reviewed and no obvious signs of crack progression were identified. Dormant cracking continued to be present along the upstream edge of the tailings discharge corridor, similar to the cracking observed during previous field reviews throughout 2021 and 2022.



NOTES:

1. AERIAL IMAGERY PROVIDED BY MONTANA RESOURCES, LLP ON JULY 20, 2022.

2. CONSTRUCTION AREAS ARE ESTIMATED TO REPRESENT AREAS OF INTEREST FOR Q3.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	31OCT'22	ISSUED WITH LETTER	EJA	DDF

MONTANA RESOURCES, LLP

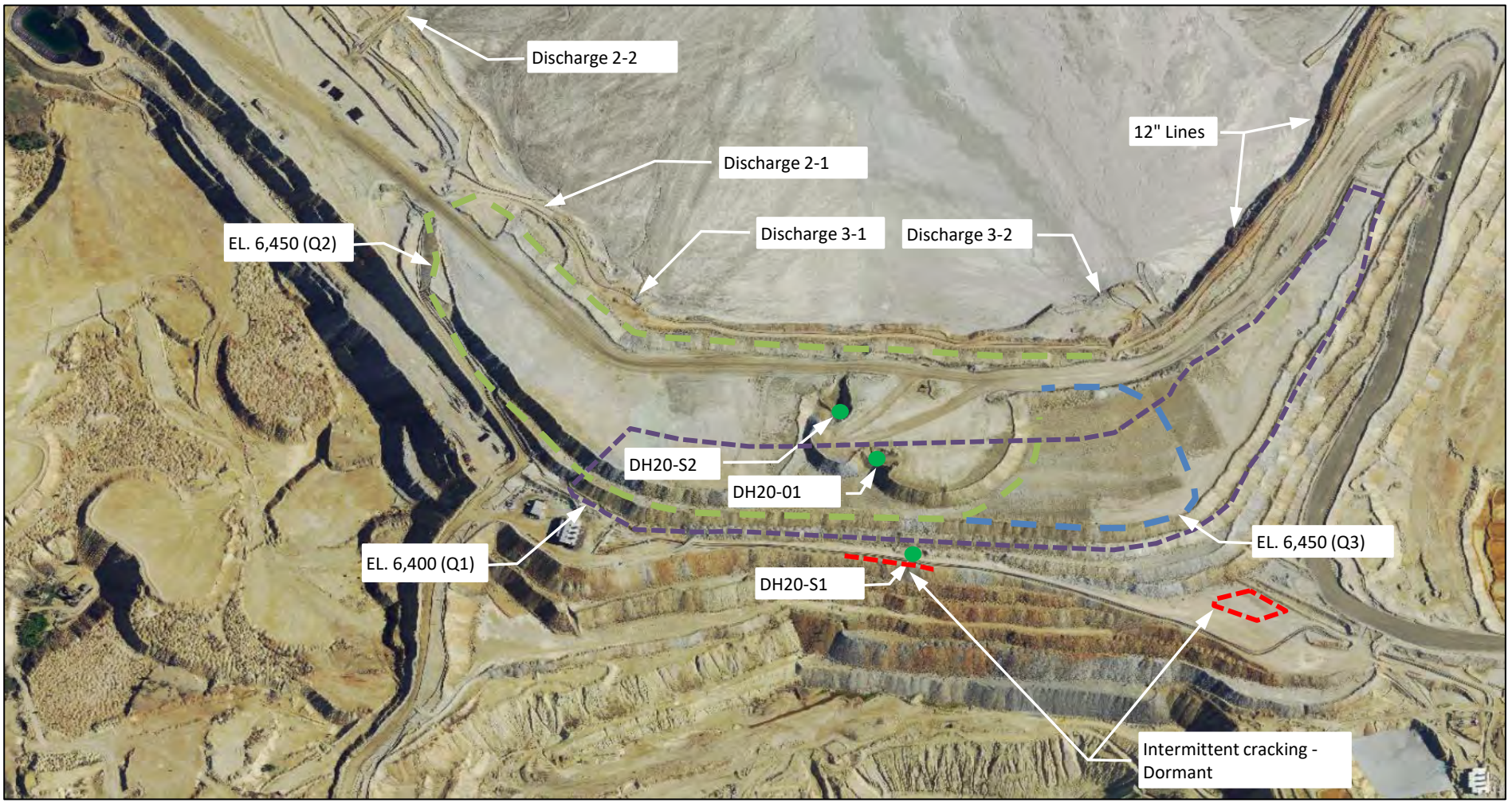
YANKEE DOODLE TAILINGS IMPOUNDMENT

2022 Q3 CONSTRUCTION SUMMARY
WEST EMBANKMENT
AREAS OF INTEREST

Knight Piésold CONSULTING

P/A NO. VA101-126/27 | REF. NO. VA22-01895

FIGURE 3.2 | REV 0



NOTES:

1. AERIAL IMAGERY PROVIDED BY MONTANA RESOURCES, LLP ON JULY 20, 2022.
2. CONSTRUCTION AREAS ARE ESTIMATED TO REPRESENT AREAS OF INTEREST FOR Q3.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	31OCT'22	ISSUED WITH LETTER	EJA	DDF

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

2022 Q3 CONSTRUCTION SUMMARY
EAST-WEST EMBANKMENT
AREAS OF INTEREST

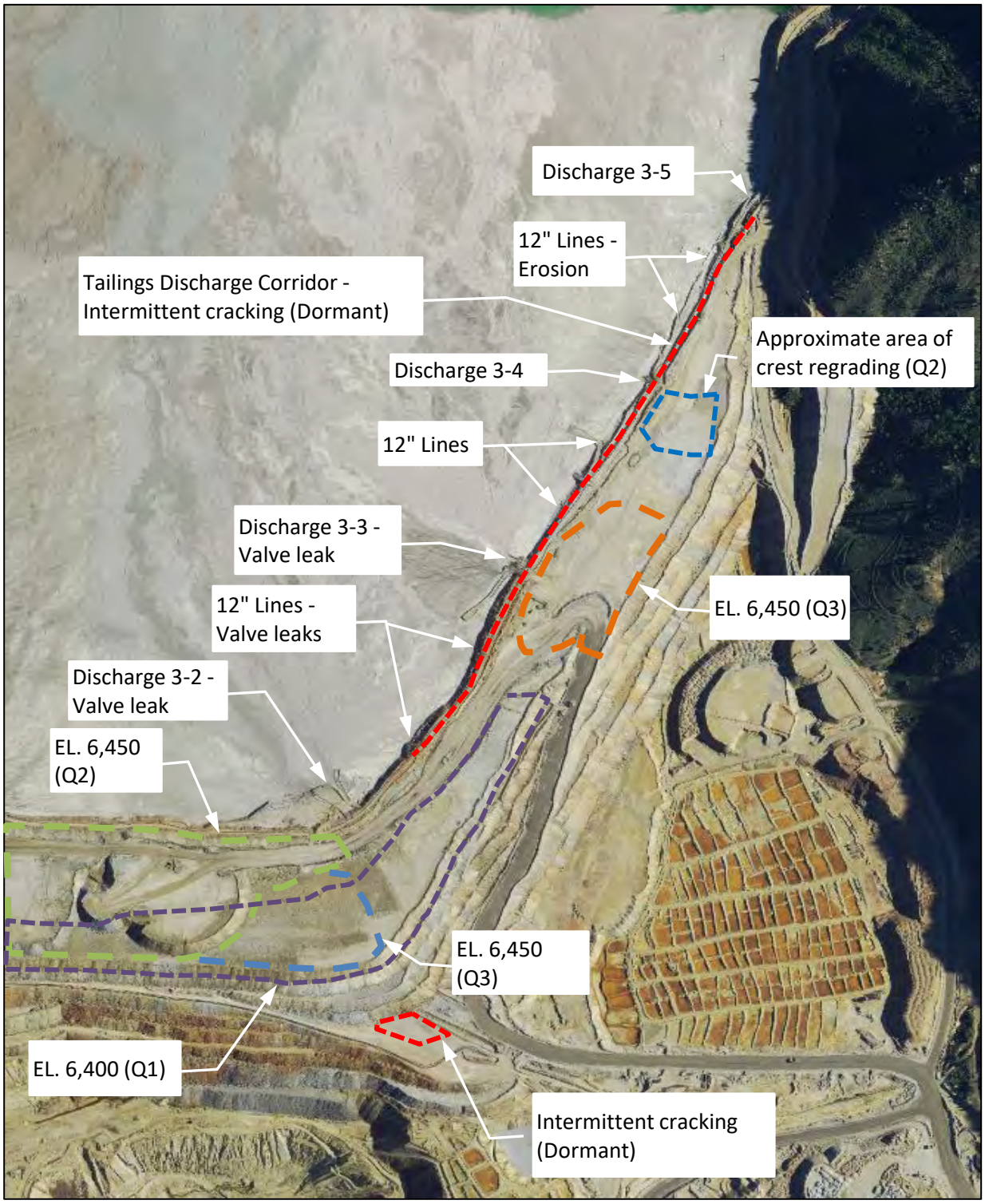
Knight Piésold CONSULTING

P/A NO. VA101-126/27

REF. NO. VA22-01895

FIGURE 3.3

REV 0



NOTES:

1. AERIAL IMAGERY PROVIDED BY MONTANA RESOURCES, LLP ON JULY 20, 2022.

2. CONSTRUCTION AREAS ARE ESTIMATED TO REPRESENT AREAS OF INTEREST FOR Q3.

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

2022 Q3 CONSTRUCTION SUMMARY
NORTH-SOUTH EMBANKMENT
AREAS OF INTEREST

Knight Piésold CONSULTING

P/A NO. VA101-126/27 | REF. NO. VA22-01895

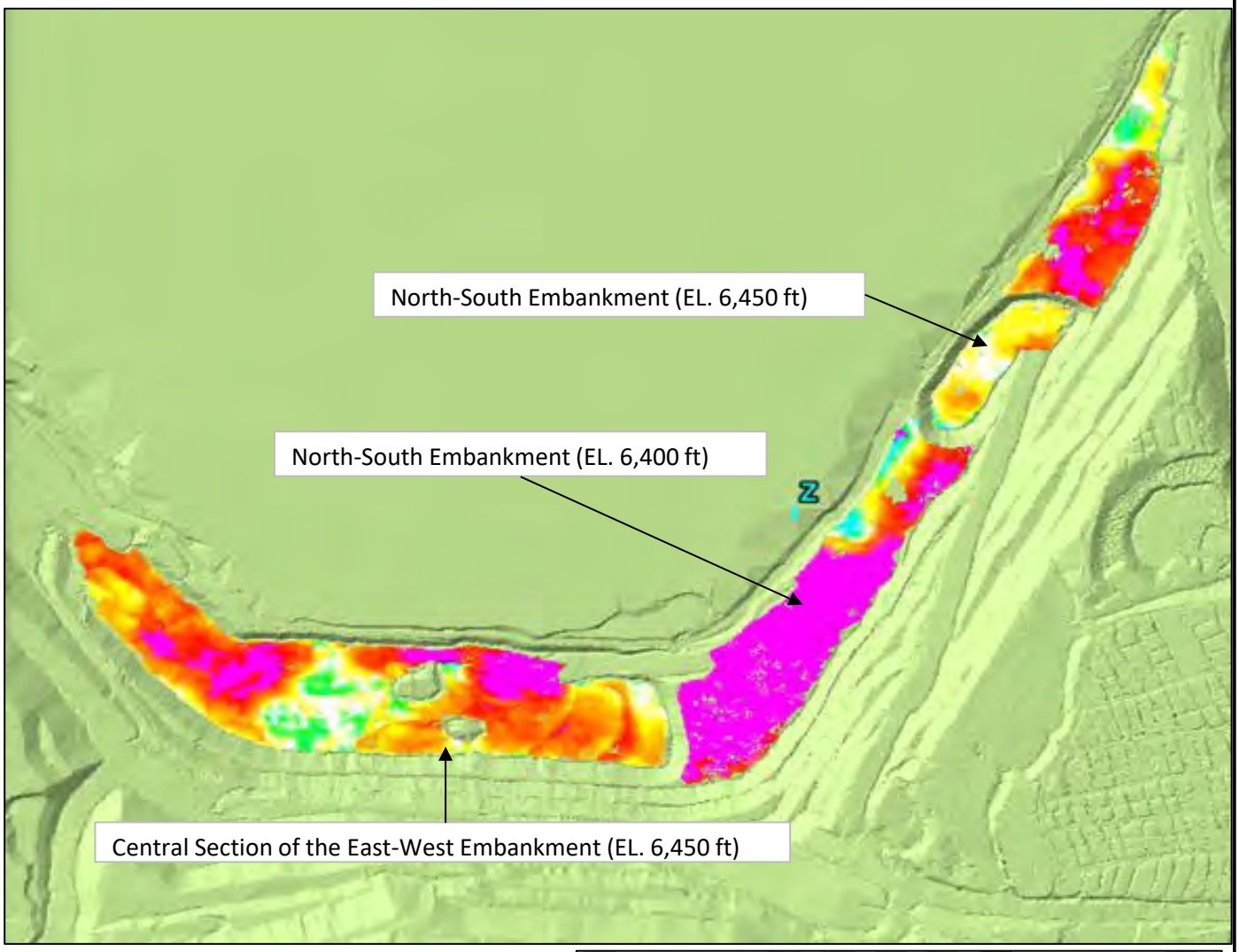
FIGURE 3.4 | REV 0

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	31OCT'22	ISSUED WITH LETTER	EJA	DDF

3.3 REVIEW OF EMBANKMENT SURFACES

Several crest depressions and areas of settlement were observed along the EL. 6,450 ft West and East-West Embankments, as well as the EL. 6,400 ft North-South Embankment as described above and in the Q2 Field Review (KP, 2022b). A recommendation of the Q2 Field Review was to consider additional grading and/or infilling in areas that did not meet the allowable embankment crest grade tolerance of 24 inches (2 ft) as outlined in Table 3.3 of the CMP.

MR provided end of Q3 survey information for the East-West Embankment Central Pedestal Area and North-South Embankment to present the varying embankment crest elevations using a hot/cool map, similar to the survey information provided for Q2. The end of Q3 maps are presented on Figure 3.5. The updated maps show that some infilling and regrading work was completed along the North-South Embankment, north of Section 43+00N, during Q3; however, the surfaces provided and presented on Figure 3.5 continue to show areas of variance in excess of 5 ft in this area and throughout the East-West and North-South Embankments. Continued grading and/or infilling should be considered within these areas to manage ponding water and promote surface runoff following construction of the EL. 6,450 ft lift to maintain the crest surface within the grade tolerances outlined in the CMP.



NOTES:

1. IMAGERY PROVIDED BY MONTANA RESOURCES, LLP ON OCTOBER 12, 2022.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	31OCT'22	ISSUED WITH LETTER	EJA	DDF

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

2022 Q3 CONSTRUCTION SUMMARY
EMBANKMENT CREST DEPRESSIONS

Knight Piésold CONSULTING

P/A NO. VA101-126/27

REF. NO. VA22-01895

FIGURE 3.5

REV 0

3.4 HORSESHOE BEND AND SEEP 10 AREAS

The general observations of the HsB and Seep 10 areas outlined below are based on visual observations in comparison with the conditions at the time of the 2022 Q2 field review (KP, 2022b). Areas of interest identified during the field review within the HsB area are indicated on Figure 3.6, and an overview of the HsB area as viewed from the Seep 10 bench is shown on Photo 3.7.

Photo 3.7 HsB Area Overview

HsB Drainage and Rock Disposal Site

- 2A, 2B and UF material stockpiles were observed to be in good condition with limited contamination.
- UF material placed at the south end of the Holding Pond was viewed. This material has been dumped and dozed into the pond by ICS and has advanced northwards since Q2.
- The displaced material at the toe of the placed UF material at the south end of the Holding Pond are relatively dry, friable, and stable enough to walk on except for the area along a localized depression consisting of a minor stream flow concentrated at the base of the placed material, shown on Photo 3.8.
- Drain down of the Holding Pond has continued. Surface water flows from the Holding Pond and seepage flows collected from the toe of the embankment continue to be conveyed in a ditch that runs from the Holding Pond, around the perimeter of the historical Surge Pond, to the Houligan Pond.
- The Houligan Pond continues to operate at near full capacity and overflows to the lower HsB pond via a pipeline and ditch.

Photo 3.8 Placed UF Material in the Southern End of the Holding Pond

General HsB and Seep 10 Area Observations:

- Groundwater discharges and flows collecting within the upper HsB area appear generally consistent with conditions observed during previous field reviews.
- There were no signs of overflow/leakage from the recirculation pumphouse head tank (reporting to the former Cell 10 Pump area) as shown on Photo 3.9.
- Minor flow was observed to be passing the decommissioned Precipitation Flume (previously monitoring the outflow from Cell 10 of the Precipitation Plant).
- Seepage flows collecting in the decommissioned Muddler Pump area were overflowing to the lower HsB Pond. The decommissioned Muddler Pump housing structure was moved to the perimeter of the standing pond area as shown on Photo 3.10.
- The Pilot Project return flow pipeline from the Precipitation Plant to the Transfer Pond was operating, and conditions appeared similar to flow rates observed during the Q2 field review.
- The HsB Weir, Transfer Pond and associated pumping system were viewed and appeared to be functioning normally.
- KP has requested the HsB Weir flows be monitored and added to the automatic Sensemetrics data collection system (KP, 2022c). Look down level sensor instrumentation had been ordered by MR and was in the process of being shipped to site at the time of the field review.
- The Seep 10 flow paths, surface collection ditches, and stilling pond appear generally consistent with previous reviews. The reading on the staff gauge installed at the stilling pond was observed to be approximately 0.38. No additional grading was completed in the Seep 10 area since Q2.
- Sensemetrics automatic data collection for the Seep 10 look down level sensor was not operating at the time of the field review. MR had resolved this issue by the time of this summary.

Photo 3.9 Recirculation Pumphouse Head Tank

Photo 3.10 Decommissioned Muddler Pump Area

NOTES:

1. AERIAL IMAGERY PROVIDED BY MONTANA RESOURCES, LLP ON JULY 20, 2022.

2. CONSTRUCTION AREAS ARE ESTIMATED TO REPRESENT AREAS OF INTEREST FOR Q3.

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

2022 Q3 CONSTRUCTION SUMMARY
HORSESHOE BEND
AREAS OF INTEREST

Knight Piésold CONSULTING

P/A NO. VA101-126/27 | REF. NO. VA22-01895

FIGURE 3.6 | REV 0

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	31OCT'22	ISSUED WITH LETTER	EJA	DDF

4.0 TAILINGS DISCHARGE ACTIVITY AND BEACH DEVELOPMENT

4.1 TAILINGS BEACH FIELD REVIEW OBSERVATIONS

Tailings deposition and beach development were reviewed during the field review and the tailings beach continues to be well managed by MR. MR has installed discharge locations consisting of single or twinned 12-inch lines at various locations along Tailings Line 3 along the North-South Embankment, similar to the 12-inch lines along Tailings Line 1 (West Embankment) installed in Q2. Flow through the newly installed 12-inch discharge locations is being tracked by MR. A naming convention for the new 12-inch discharge locations had not yet been established at the time of this summary.

Tailings discharge lines connected to Line 1 were operating during the time of the field review. Erosion was observed at a 12-inch discharge south of discharge 3-5 near Section 58+00 N as shown on Photo 4.1. MR Engineering indicated they will work with Operations to extend the 12-inch line onto the tailings beach, although the line had not yet been extended at the time of this summary and the exact timing remains to be determined.

Photo 4.1 Erosion Along Tailings Discharge Corridor Near Section 58+00 N

Valve leaks were observed at discharge 3-2, 3-3, and at both 12-inch discharges in between. This caused ponding on the bench near discharge 3-3, shown on Photo 4.2, as well as minor tailings seepage into the embankment at all locations with observed valve leaks. MR Engineering indicated that Operations is working to repair these valve leaks; however, the valves had not been repaired at the time of this summary and exact timing remains to be determined.

Photo 4.2 Discharge 3-2 Valve Leak and Minor Ponding

Infilling of the tailings beach adjacent to the north end of the West Embankment continued with the use of the 12-inch discharges near discharge 1-4. Minor ponding was previously observed during the 2021 Q4 and 2022 Q1 field reviews; however, no ponding was observed in this area at the time of the field review, as shown on Photo 4.3.

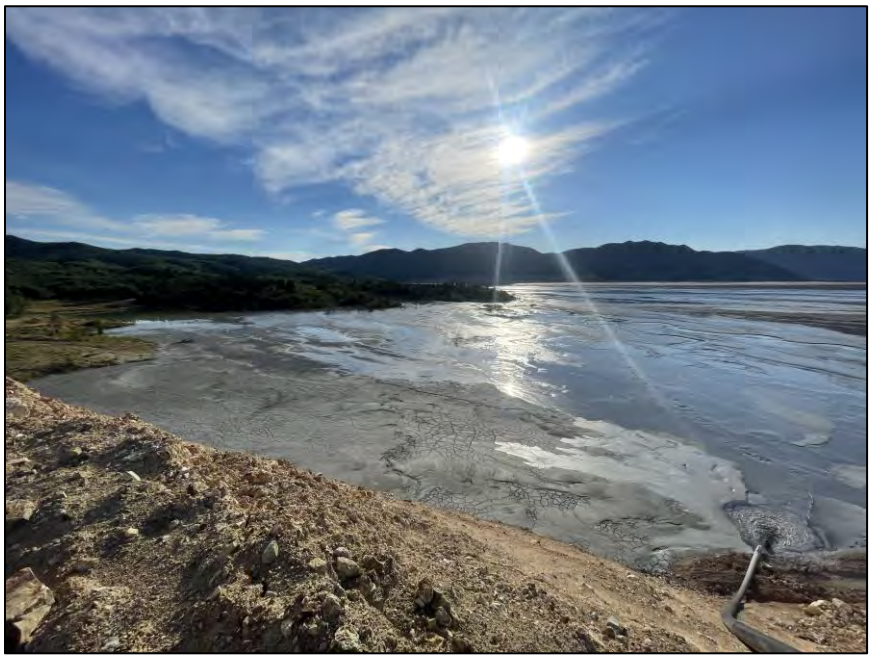


Photo 4.3 Tailings Beach Near Discharge 1-4

4.2 QUARTERLY TAILINGS DISCHARGE ACTIVITY AND TRENDS

Tailings discharge activity was inferred using the weekly tailings discharge elevations and daily discharge activity information provided by MR. Tailings discharge records indicate that the 12-inch discharge lines installed on tailings lines 1 and 3 were operational, and three of the ten discharge locations were active during Q3. The approximate beach elevation for each discharge location (at the end of 2022 Q2 and 2022 Q3) and the change in elevation over that period are summarized in Table 4.1.

All 12-inch discharges for each line (e.g., Line 1 or Line 3) were run at the same time (i.e., in parallel) during the quarter and are being tracked together. MR is not currently tracking beach elevations adjacent to 12-inch discharges.

Table 4.1 Tailings Discharge Point Elevations and Quarterly Change

Discharge Location	Valve (s)[3]	Valve Active During Q3	Q2 2022 Beach Elevation	Q3 2022 Beach Elevation	Elevation Difference (Q2 to Q3)
			ft	ft	
		Y / N	Date: 06/30/2022	Date: 09/29/2022	ft
Line 1	12" lines	Y	-	-	-
Line 3	12" lines	Y	-	-	-
EW - 1	2-1, 3-1	N, N	6,391.07	6,391.07	0.0
EW - 2	2-2	N	6,389.17	6,389.17	0.0
RK - 1	1-1, 2-3	N, Y	6393.37	6394.40	1.0
RK - 2	1-2	N	6380.69	6390.62	9.9
RK - 3	1-3	N	6378.13	6382.43	4.3
RK - 4	1-4	N	6373.01	6375.75	2.7
NS - 1	3-2	Y	6391.34	6391.34	0.0
NS - 2	3-3	Y	6385.09	6388.39	3.3
NS - 3	3-4	N	6381.75	6381.75	0.0
NS - 4	3-5	N	6376.16	6376.41	0.3

Note(s):

1. Weekly discharge elevation survey provided by MR. End of quarter elevations are closest provided dates to month end.
2. Highlighted cells indicate discharge locations with beach elevation change during the quarter.

Additional observations of the tailings discharge system and beach development, inferred from the tailings discharge records and field review visit are provided below.

- Only three discharge valves (not including 12-inch lines) were active during Q3, compared to all ten in Q2.
- Tailings Line 3 was the most active discharge line during Q3 and Tailings Line 2 was the least active (2,116 hours vs 249 hours).
- The 12-inch line connected to Line 1 was recorded to be the most active discharge during Q3 (2,008 hours).
- Line 1 valves 1-1 through 1-4 were inactive during Q3. Beach elevation rise at these locations is inferred to result from discharge from the 12-inch line connected to Line 1.
- Valve 3-5 was inactive during Q3. Beach elevation rise at this location is inferred to result from discharge from the 12-inch line connected in Line 3.

- Valve 3-2 (NS-1) was recorded to be active intermittently during Q3; however, no change in beach elevation was recorded. Similar trends have been observed in previous field reviews at other discharge locations.
- The elevation difference between the beach at discharge NS-1 and NS-4 was approximately 14.9 ft at the end of Q3, which is a small decrease (approximately 0.3 ft) compared to 2022 Q2.
- The elevation difference between RK-1 and RK-4 was approximately 18.6 ft, which is a 1.7 ft decrease compared to 2022 Q2 and a 3.5 ft decrease since 2022 Q1.

5.0 QUALITY SYSTEM AND CONSTRUCTION MONITORING

The focused construction monitoring program for the East-West and North-South Embankments continued throughout Q3 as EL. 6,450 ft lift construction progressed. MR continued the collection of construction monitoring data (Piezometric, manual surveying, GNSS, inclinometer, Geo4Sight, laser scan, crack progression, and inSAR bulletin monitoring) and observes construction progress with support from KP.

Construction quality documentation continues to be completed for the YDTI by MR as per the CMP. Subgrade Inspection Records continued to be completed by Travis Birkenbuel (MR) prior to progressing subsequent lifts of D1 and U materials. Weekly construction reports were completed by MR and submitted to KP in a timely manner throughout the quarter. The Monthly Quality Report for September was outstanding at the time of this letter.

WET started completing HsB quality documentation in Q3 as per the Limited Authorization to Proceed (KP, 2022a). An initial Subgrade Inspection Record was issued by KP describing subgrade conditions prior to initial UF material placement. A subsequent Subgrade Inspection Record was completed by WET and submitted to MR and KP for review in September, prior to progressing placement of UF material. Weekly construction reports were completed by WET and generally submitted to MR and KP in a timely manner throughout the quarter.

KP and MR continue to review and discuss short and long-term construction planning during bi-weekly meetings, and MR provides monthly survey and placement volumes in a timely manner.

6.0 RECOMMENDATIONS

6.1 PREVIOUS RECOMMENDATIONS REVIEW

The list below outlines the recommendations included in the 2022 Q2 Construction Field Review (KP, 2022b) and provides an update on the status of these recommendations:

- MR is recommended to prioritize D1 material placement along the West Embankment between approximately Section 87+00W and 110+00W to complete the Zone D1 placement of the EL. 6,450 ft lift in this area (as per 2021 Q3 and subsequent field reviews). ***Complete. Fill placement of D1 on both the south and north side of the Ridge Road was completed in August, as described in Section 3.2.1.***
- Relocate slash piles currently pushed up along the tree line at the downstream toe of the West Embankment to locations suitable for burning when weather conditions allow (as per 2021 Q3 and subsequent field reviews). ***Still to be completed.***

- MR is recommended to complete additional grading and infilling of the EL. 6,450 ft embankment crest to reduce the potential for ponding water and promote surface runoff. Table 3.3 of the CMP outlines the allowable embankment crest grade tolerance to be +24 inches / -0 inches. Remedial actions should be considered to remain within this allowable tolerance. ***Ongoing. MR completed grading and infilling along select areas of the North-South Embankment crest but additional grading is still required, as described in Section 3.3.***
- MR is recommended to develop a naming convention and tracking method for the newly installed 12-inch discharge locations. ***Still to be completed.***
- MR is to continue to monitor existing cracking and complete regular inspections for any additional cracking or progression during the advancement of Zone U construction in the Central Pedestal Area. ***Complete/ongoing. MR is completing weekly crack mapping as required as part of the EL. 6,450 ft lift construction monitoring program.***

6.2 2022 Q3 RECOMMENDATIONS

The observations made during the field review indicate that the YDTI construction generally conforms with the procedures and specifications outlined in the Construction Management Plan (KP, 2018) and Issued for Construction design drawings. Initial HsB foundation and drainage works construction generally conform with the procedures and specifications outlined in the Limited Authorization to Proceed (KP, 2022a). The following recommendations have been made resulting from the 2022 Q3 field review, and in review of the 2022 Q2 recommendations:

- MR is recommended to repair any tailings pipeline valve leaks and extend tailings discharge spigots directly onto the tailings beach to reduce the potential for ponding water adjacent to the embankment, erosion of the underlying rockfill, and tailings seepage migration into the upstream face of the embankment.
- MR is recommended to develop a naming convention and tracking method for the newly installed 12-inch discharge locations.
- MR is recommended to continue grading and infilling of the EL. 6,450 ft embankment crest to reduce the potential for ponding water and promote surface runoff. Table 3.3 of the CMP outlines the allowable embankment crest grade tolerance to be +24 inches / -0 inches. Remedial actions should be considered to remain within this allowable tolerance.
- MR is to continue to monitor existing cracking and complete regular inspections for any additional cracking or progression during the advancement of Zone U construction of the East-West and North-South Embankment.
- Relocate slash piles currently pushed up along the tree line at the downstream toe of the West Embankment to locations suitable for burning when weather conditions allow (as per 2021 Q3 and subsequent field reviews).

7.0 CONCLUSION

MR and ICS continued construction activities around the YDTI during 2022 Q3. Construction of Zone D1 on the West Embankment was completed near the Ridge Road, approximately between Sections 87+00W and 110+00W, and bulk fill placement within Zone D1 along the entire West Embankment is substantially complete. Construction of the Zone U EL. 6,450 ft lift in the Central Pedestal Area continued approximately between Sections 12+00W and 8+00N. Construction of the Zone U EL. 6,450 ft lift of the North-South Embankment commenced in Q3 and continued between approximately Sections 28+00N and 43+00N.

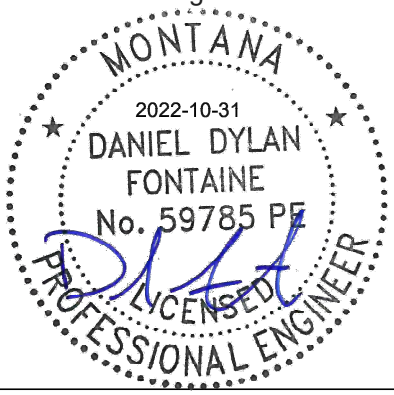
Zone U construction was ongoing along the East-West Embankment and North-South Embankment at the time of the field review, and appropriate subgrade preparation had occurred.

A variety of maintenance and demolition/salvage work has continued in the HsB area since 2021 Q4. Initial stockpiling of drainage materials (2A, 2B) and foundation layer (UF) material began during 2022 Q2 and continued intermittently throughout Q3. WET started issuing quality documentation for the HsB area during 2022 Q3 and has generally been submitting weekly reports to MR and KP in a timely manner.

The field observations indicate that the YDTI construction generally conforms with the procedures and specifications outlined in the Construction Management Plan (KP, 2018) and Issued for Construction Design Drawings. Field observations also indicated that the HsB construction generally conforms with the procedures and specifications outlined in the Limited Authorization to Proceed provided by KP (KP, 2022a). The recommendations from the 2022 Q3 field review are outlined in Section 6.2.

We trust this letter appropriately summarizes the construction activities at the YDTI during 2022 Q3 and observations from the field review completed by KP in August 2022. The information, descriptions and conclusions presented are based on a visual assessment of the information provided and observations during the field review. The construction summary and field review does not constitute supervision of construction and does not represent a guarantee that all deficient or non-conforming works have been identified.

Yours truly,
Knight Piésold Ltd.



Prepared:

Ethan Alban, EIT
Junior Engineer

Reviewed:

Daniel Fontaine, P.E.
Specialist Engineer | Associate
Engineer of Record

Reviewed:

Jason Gillespie, P.Eng.
Senior Engineer

KNIGHT PIÉSOLD LTD.
PERMIT NUMBER
1001011
EGBC PERMIT TO PRACTICE

Approval that this document adheres to the Knight Piésold Quality System: DDF

Attachments:

Table 3.1 Rev 0 2022 Q3 Construction Field Review Checklist

2022 Q3 Construction Field Review Photo Log

References:

Knight Piésold Ltd. (KP, 2018). Yankee Doodle Tailings Impoundment: Construction Management Plan (KP Reference No. VA101-126/12-5 Rev. 3), May 1, 2018.

Knight Piésold Ltd. (KP, 2021). 2021 Q3 Construction Field Review (KP Reference No. VA21-01715), November 2, 2021.

Knight Piésold Ltd. (KP, 2022a). Horseshoe Bend Rock Disposal Site – Stage 1 Drainage System Limited Authorization to Proceed (KP Reference No. VA22-00972), July 8, 2022.

Knight Piésold Ltd. (KP, 2022b). 2022 Q2 Field Review and Construction Summary (KP Reference No. VA22-01079), July 28, 2022.

Knight Piésold Ltd. (KP, 2022c). Yankee Doodle Tailings Impoundment: 2021 Annual Inspection Report (KP Reference No. VA101-126/25-2 Rev. 0), January 11, 2022.

Montana Resources, LLP (MR, 2022). 2021 Annual Inspection Report for Yankee Doodle Tailings Impoundment and Corrective Action Plan for Recommendations, January 11, 2022.

Copy To: Mark Thompson, Corey Warner, Amanda Griffith, Johnathan Hoover

TABLE 3.1

MONTANA RESOURCES, LLP
YANKEE DOODLE TAILINGS IMPOUNDMENT

2022 Q3 CONSTRUCTION FIELD REVIEW CHECKLIST

Date: August 29 and 30, 2022 **Time:** 8:30AM to 3:30PM, 8:00AM to 3:00PM

Field Review By:
Name: Ethan Alban, E.I.T. Title: Staff Engineer, Knight Piésold Ltd. (KP) Signature: See Report Closure Page

Inspection Type: DAILY WEEKLY MONTHLY OTHER EVENT (Specify): Q3 Inspection

Weather Conditions: Precipitation (24 hr.): Wind Speed:
Temperature (°F): 50 - 85 Sky (circle): Clear Partly Cloudy Cloudy

Instrumentation Data Collected: Yes No **Details:**

Samples Collected: Yes No **Details:**

WEST EMBANKMENT

LOCATION	REVIEW COMPLETED	ITEM	ITEM PRESENT YES	ITEM PRESENT NO	PHOTO	COMMENTS
Crest of Dam	✓	Cracking, Subsidence, Depressions	X		X	Undulations along surface grade of the embankment crest due to settlement. Ponding in various locations.
		Erosion		X		
		Lateral Deformation		X		
Upstream Face	✓	Cracking, Subsidence, Depressions	X		X	No obvious signs of additional seepage resulting in increased Extraction Pond flowrates. Minor cracking intermittently present along the loosely placed upstream berm.
		Erosion		X		
		Pipeline Corridor	X		X	Recently installed 12" discharge spigots were operating at the time of the field review.
Downstream Face	✓	Cracking, Subsidence, Depressions		X		
		Erosion		X		
		Seeps, Damp or Soft areas		X		
Extraction Pond	✓	General Review	X		X	Pump was operating at the time of the field review. MR indicated increased pumping rates were found to generally correspond with tailings discharge in adjacent upstream beach area.
Active Embankment Construction		Location and Elevation Reviewed		NA		No active construction at time of field review.
		Surface Preparation		NA		No active construction at time of field review. Zone D1 construction complete in Ridge Road Area.

EAST-WEST EMBANKMENT

LOCATION	REVIEW COMPLETED	ITEM	ITEM PRESENT YES	ITEM PRESENT NO	PHOTO	COMMENTS
Crest of Dam	✓	Cracking, Subsidence, Depressions	X		X	Undulations along surface grade of crest of embankment and surcharge zones due to placement and settlement. Ponding in various locations.
		Erosion		X		
		Lateral Deformation		X		
Upstream Face	✓	Cracking, Subsidence, Depressions		X		
		Erosion		X		
		Pipeline Corridor	X		X	Tailings beach between 3-1 and 3-2 remains relatively low.
Downstream Face	✓	Cracking, Subsidence, Depressions	X		X	Minor cracking intermittently present along the loosely placed berm.
		Erosion		X		
		Seeps, Damp or Soft areas		X		
Seep 10 Bench	✓	Overview of HsB Photo	X		X	
	✓	Seep 10 Stilling Basin	X		X	Staff gauge reading approximately 0.38.
	✓	Seep 10 V-Notch Weir	X		X	
	✓	Seep 10 Inflows	X		X	
Active Embankment Construction	✓	Location and Elevation Reviewed	X		X	EL. 6,450 ft lift construction ongoing.
		Surface Preparation	X		X	Subgrade preparation completed for advancing EL. 6,450 ft lift.
		Survey Stake Locations for Expansion		NA		
Pipe Ramp	✓	Cracking, Subsidence, Depressions	X		X	Old cracking identified during construction monitoring visible, no clear and obvious signs of progression. Crack monitoring ongoing as part of construction monitoring program.
		Erosion		X		

NORTH-SOUTH EMBANKMENT

LOCATION	REVIEW COMPLETED	ITEM	ITEM PRESENT YES	ITEM PRESENT NO	PHOTO	COMMENTS
Crest of Dam	✓	Cracking, Subsidence, Depressions	X		X	Undulations along surface grade of the embankment crest due to settlement. Ponding in various locations.
		Erosion		X		
		Lateral Deformation		X		
Upstream Face	✓	Cracking, Subsidence, Depressions		X		
		Erosion		X		
		Pipeline Corridor	X		X	Recently installed 12" discharge spigots were not operating at time of field review. Erosion was observed at one 12" discharge spigot location due to the discharge not being fully extended onto the beach.
Downstream Face	✓	Cracking, Subsidence, Depressions		X		
		Erosion		X		
		Seeps, Damp or Soft areas		X		
Active Embankment Construction	✓	Location and Elevation Reviewed	X		X	EL. 6,450 ft lift construction ongoing.
		Surface Preparation	X		X	Subgrade preparation completed for advancing EL. 6,450 ft lift.

YANKEE DOODLE TAILINGS IMPOUNDMENT

LOCATION	REVIEW COMPLETED	ITEM	ITEM PRESENT YES	ITEM PRESENT NO	PHOTO	COMMENTS
General	✓	Pond Elevation and Location Reviewed	X		X	~ EL. 6,359 ft.
		Water pooling/ponding against Embankment		X	X	12" lines connected to Line 1 have been running, and the conditions at the north end of the West Embankment have improved since the Q2 Field Review.
		Lowest Crest Elevation Determined		X		
Tailings Discharges	✓	Active Discharge Locations	X		X	12" lines along the West Embankment were operating at the time of the field review.
		Pipeline leakage	X		X	Valves at discharge 3-2, 3-3, and at the 12" discharges in between showed signs of recent or fresh leakage.
		Pipeline wear/damage		X		None observed.
Reclaim Water System	✓	Pipeline wear/damage		NA		
		Pipeline leakage		NA		
		Access Road Construction		NA		

HORSESHOE BEND DRAINAGE AND ROCK DISPOSAL SITE

LOCATION	REVIEW COMPLETED	ITEM	ITEM PRESENT YES	ITEM PRESENT NO	PHOTO	COMMENTS
Drain Down Conditions	✓	Holding Pond	X		X	Pond breached to a lower elevation, continuing to drain down.
		Surge Pond	X		X	Pond appears to be fully drained, flows bypassing to the north.
		Houligan Pond	X		X	Houligan Pond still full capacity, bypassing to Lower HsB Pond.
Active Material Placement	✓	Foundation Layer	X		X	ICS intermittently hauling and placing materials in the south end of the Holding Pond.
		Drain Materials		X		
		Material Stockpiles	X		X	ICS has continued to haul and stockpile 2A, 2B and UF materials.
		Ditch Construction		X		
Seep 10 Bench Works	✓	Collection Ditch	X		X	Ditch alignment has been staked by MR. Various cleanup activities underway.
		Collection Pond		X		

HORSESHOE BEND - GENERAL

LOCATION	REVIEW COMPLETED	ITEM	PHOTO	COMMENTS
Horseshoe Bend and Precipitation Plant	✓	Upper HSB Pond	X	
	✓	Lower HsB Pond	X	
	✓	HsB Seepage to Upper Pond	X	HsB seeps appear consistent with previous reviews.
	✓	HsB Seepage to Houligan Pond	X	Seeps appear consistent with previous reviews.
	✓	Precipitation Plant Overflow Box Leak	X	
	✓	Precipitation Plant Overflow	X	Precipitation Plant was not overflowing to the Lower HsB Pond at the time of the field review.
	✓	HsB Weir	X	
	✓	Muddler Pump and Overflow	X	Overflow from Muddler Pump to HsB Pond observed. Muddler Pump was moved to perimeter of the pond in the area.
	✓	HsB WTP Influent Pump (P1-16) and Transfer Pond	X	
		Leach Pump Head Tank (Weir)	NA	
		BMFOU Pilot Project Facilities	NA	

Additional Notes:
- Old Precipitation Plant demolition is ongoing. Construction of the new Precipitation Plant (near the Water Treatment Plant) is ongoing.
- Scalper Road on-site containment project is ongoing.
- Reclaim pipeline construction on the new reclaim road is ongoing.

M:\1\01\00126\27\A\Correspondence\VA22-01895 - Q3 2022 Construction Summary and Field Review\Table\[T3.1 2022 Q3 Field Review Checklist.xlsx]T3.1 2022 Q3

NOTES:
1. CHECKLIST COMPLETED BY KP REPRESENTATIVE ETHAN ALBAN.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	31OCT'22	ISSUED WITH LETTER VA22-01895	EJA	DDF

2022 Q3 CONSTRUCTION FIELD REVIEW PHOTO LOG

PHOTO 1 – West Embankment – Viewed from the topsoil stockpiles along the West Ridge

PHOTO 2 – West Embankment – Completed Zone D1 (EL. 6,450 ft) construction north of the Ridge Road

2022 Q3 CONSTRUCTION FIELD REVIEW PHOTO LOG

PHOTO 3 – West Embankment – Completed Zone D1 (EL. 6,450 ft) construction south of the Ridge Road

PHOTO 4 – West Embankment – Tailings discharge corridor loosely placed berm cracking

2022 Q3 CONSTRUCTION FIELD REVIEW PHOTO LOG

PHOTO 5 – East-West Embankment – Central Pedestal Area, looking east

PHOTO 6 – East-West Embankment – Tailings Discharge 3-2 valve leak and pooling

2022 Q3 CONSTRUCTION FIELD REVIEW PHOTO LOG

PHOTO 7 – East-West Embankment – EL. 6,450 ft subgrade preparation and U material placement, looking south

PHOTO 8 – North-South Embankment – EL. 6,400 ft crest in area that underwent CAP recommended re-grading, looking northeast

2022 Q3 CONSTRUCTION FIELD REVIEW PHOTO LOG

PHOTO 9 – North-South Embankment – EL. 6,450 ft lift subgrade preparation and U material placement, looking northeast

PHOTO 10 – North-South Embankment – Overview of embankment downstream slope

2022 Q3 CONSTRUCTION FIELD REVIEW PHOTO LOG

PHOTO 11 – Overview of the Seep 10 bench and Horseshoe Bend Area, looking east

PHOTO 12 – Seep 10 Stilling Pond

2022 Q3 CONSTRUCTION FIELD REVIEW PHOTO LOG

PHOTO 13 – Horseshoe Bend – Minor flows passing through the Precipitation Flume from the former Cell 10 Pump area

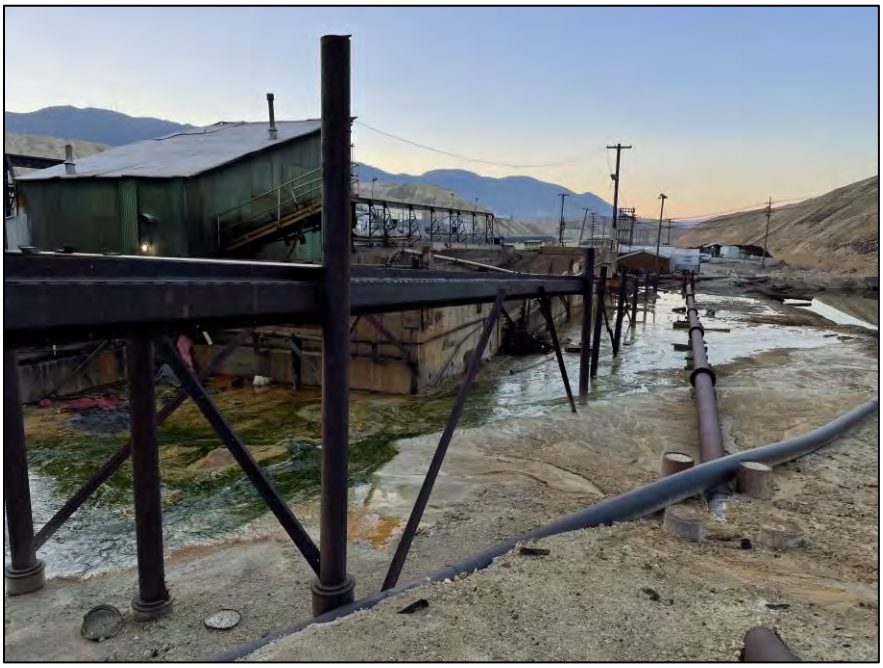


PHOTO 14 – Horseshoe Bend – Precipitation Plant area and seepage runoff from East-West Embankment, looking south

2022 Q3 CONSTRUCTION FIELD REVIEW
PHOTO LOG

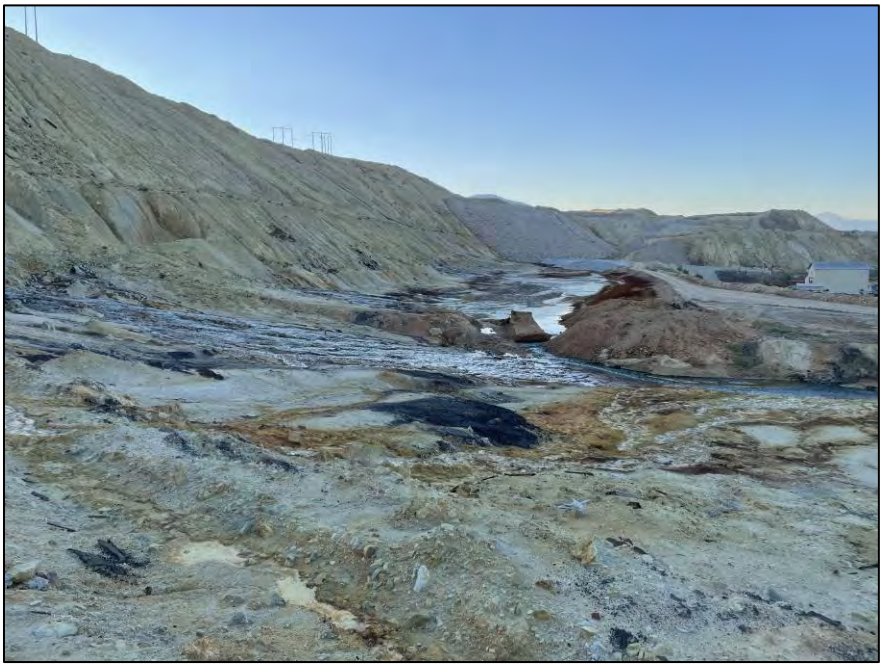


PHOTO 15 – Horseshoe Bend – Overview of the Holding Pond, looking south

PHOTO 16 – Horseshoe Bend – Houligan Pond and overflow, looking north

APPENDIX C

2022 Bathymetric Survey Summary

(Pages C-1 to C-3)

Montana Resources
600 Shields Avenue Butte, Montana 59701 (406) 723-4081
(406)496-3200 FAX (406) 723-9542

MEMORANDUM

TO: TRAVIS CHIOTTI

FROM: JOHNATHAN HOOVER

SUBJECT: BATHYMETRIC SURVEY – 2022

DATE: 7/19/2022

The Bathymetric survey of the tailings pond was conducted from June 28 through June 30, 2022.

The total number of points captured in this survey was 29,295. Additionally, Measurements were taken using the TSC7 and a rental Hydrolite system. Due to the processing power of the TSC7 survey had to slow down the data capturing to a point every 1 to 3 seconds based on how the fast we traveled (3 to 5 mph). This ensures that the data being captured has no latency and the position associated with the depth is accurate.

The bathymetric data collected during the survey was downloaded and converted to the local Montana Resources Coordinate System. MineSight was used to develop the sub-surface of the tailings pond which was then used to calculate the volume of water in the pond. The results are shown in Table 1.

Table 1: Tailings Pond Volume Calculation Results

Method	Volume
MineSight	21,444 Acre-ft

The 2022 volume is 21,444 acre-ft which is a decrease of 5,719 acre-ft from last years' volume of 27,163 acre-ft. Table 2 shows the calculated pond volumes for all of the bathymetric surveys conducted to date.

Table 2: Tailings Pond Volume History

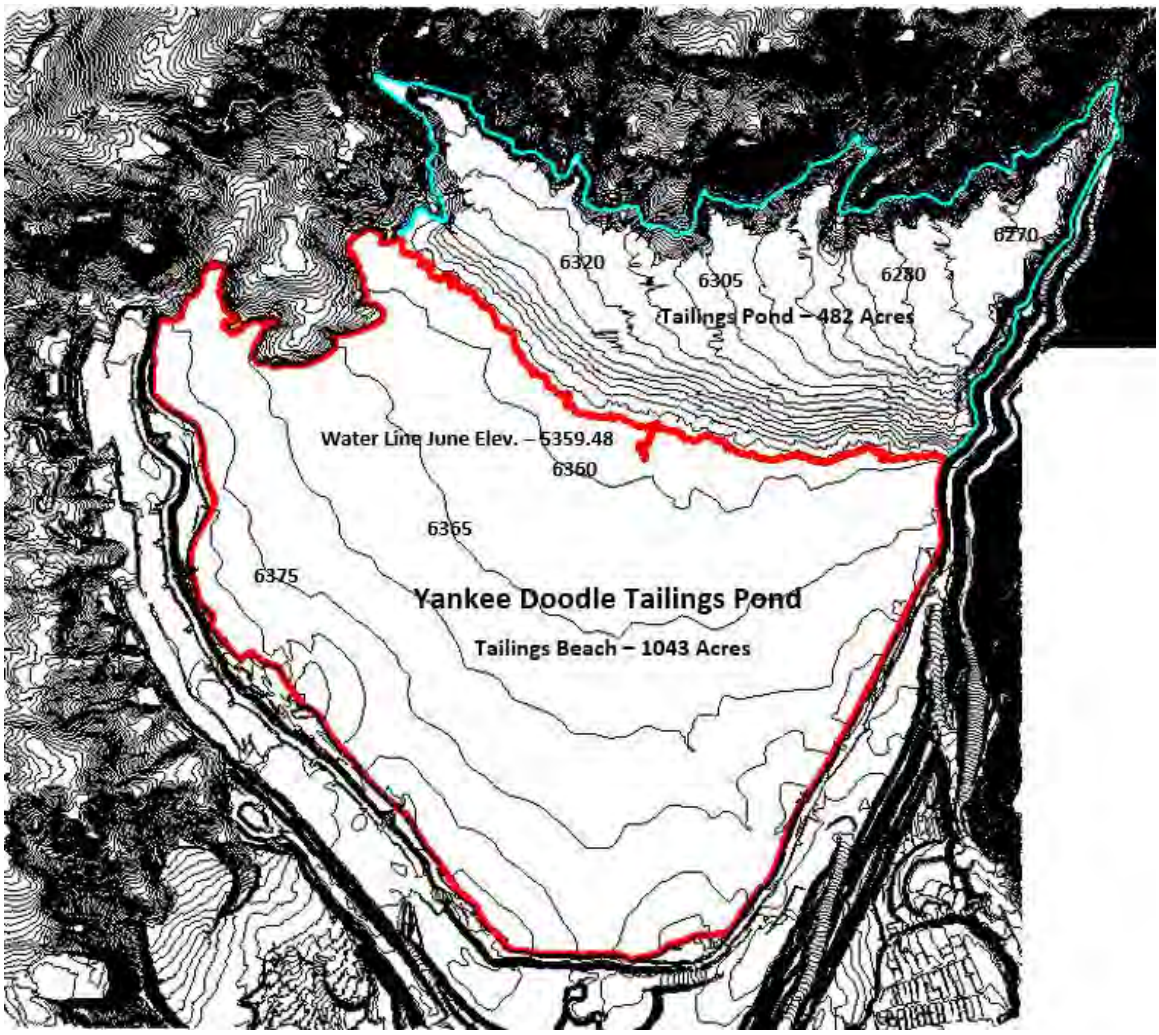
Year	Volume, Acre-Ft
2007	20,068
2009	16,008
2010	18,491
2011	22,145
2012	21,812
2013	21,474
2014	25,116
2015	29,113
2016	31,041
2017	31,264
2018	33,447
2019	34,392
2020	32,084
2021	27,163
2022	21,444

Table 3: General Study Information

Attribute	Year 2022	Year 2021	Year 2020	Year 2019	Year 2018	Year 2017
Methodology	2022 June Composite	2021 June Composite	2020 June Composite	2019 June Composite	2018 June Composite	2017 June Composite
Pond Area	482 Acres	547 Acres	613 Acres	774 Acres	837 Acres	798 Acres
Tailings Area	1,043 Acres	971 Acres	918 acres	727 Acres	642 Acres	658 Acres
Total Impoundment Area	1,524 Acres	1,518 Acres	1,531 Acres	1,501 Acres	1,479 Acres	1,456 Acres
Pond Volume	21,444 Acre-Ft	27,163 Acre-Ft	32,084 Acre-ft	34,392 Acre-ft	33,447 Acre-ft	31,264 Acre-ft
Avg. Water Depth	48.02 ft	68.62 ft	56.15 ft	41.09 ft	42.85 ft	45.9ft
Max Water Depth	92.34 ft	110.49 ft	112.72 ft	112.03 ft	109.2 ft	109.1ft
Min Water Depth	1.28 ft	9.02 ft	2.35 ft	2.795 ft	0.4 ft	2.7ft
Measured Water Elevation	6359.48 ft.	6360.59 ft.	6360.30 ft.	6357.902 ft.	6351.67 ft.	6345.02 ft.
Data Points Used	29,295	22,801	24,509	23,562	100,707	55,787

Figure 1 is a contour map of the bottom of the tailings pond and beach generated from MineSight. The deepest areas of the pond are located nearest to the barge.

Figure 1: Contour Lines of Current Tailings Beach and Pond Bottom



APPENDIX D

2021 Corrective Action Plan and Deferral

APPENDIX D1

2021 Corrective Action Plan (CAP)

(Pages D1-1 to D1-6)

600 Shields Ave.
Butte, Montana 59701

January 11, 2022

Montana Department of Environmental Quality
Hard Rock Mining Bureau
Attn: Garrett Smith
P.O. Box 200901
Helena, MT 59620

Re: 2021 Annual Inspection Report for Yankee Doodle Tailings Impoundment and Corrective Action Plan for Recommendations

Dear Mr. Smith:

The Engineer of Record (EOR) annual inspection of the Montana Resources, LLP (MR) Yankee Doodle Tailings Impoundment (YDTI) was conducted on September 13, 2021, by Mr. Daniel Fontaine, P.E., the Engineer of Record (EOR). Mr. Fontaine was accompanied during the site inspection by Mr. Mike Harvie (Manager of Engineering and Geology) of MR.

The EOR annual inspection is required under Section 82-4-381 of the Montana Code Annotated (MCA), which also requires the mine operator to prepare a Corrective Action Plan (CAP) summarizing the recommendations of the EOR and an implementation schedule for the corrective actions. KP prepared the 'Yankee Doodle Tailings Impoundment – 2021 Annual Inspection Report' (AIR), following the inspection.

This letter documents MR's CAP in response to the eight recommendations presented by the EOR:

1. Maintain reductions in freshwater use from the Silver Lake Water System to the extent reasonably practicable and continue the Pilot Project to incrementally reduce the water inventory in the YDTI supernatant pond towards the target of approximately 15,000 acre-ft (continuation of 2020 recommendation).

2. Modify the tailings distribution system by extending Line 2 to allow discharge at location NS-1 and NS-2 when the EL. 6,450 ft raise of the embankment is completed adjacent to these discharge locations (deferral from 2020 recommendations).

3. Modify the tailings distribution system to include two additional discharge locations as follows:
    - one located between the current locations of EW-1 and NS-1, and
    - one located between the current locations of NS-1 and NS-2.

4. Implement alluvium facing at the interface between the rockfill surcharge and tailings beach between discharge between Section 23+00 NW and Section 13+00 N along the upstream face of the EL. 6,400 ft surcharge lift.

5. Infill low areas along the downstream side of the North-South Embankment and regrade the embankment crest from approximately Section 43+00 N towards the north.

6. Complete maintenance work in the upper Horseshoe Bend (HsB) area to improve drainage and limit ponding in this area.

7. Develop and implement a new system to collect flows along the Seep 10 bench and convey these flows to the HsB Pond. Re-grade the Seep 10 bench surface to enhance drainage collection and limit ponding of water to the extent practicable.

8. Investigate options for automating collection of the HsB Weir flow monitoring data using the Sensemetrics remote monitoring system platform.

MR has developed the following CAP that is expected to effectively address the recommendations contained in the AIR.

1. **Maintain reductions in freshwater use from the Silver Lake Water System to the extent reasonably practicable and continue the Pilot Project to incrementally reduce the water inventory in the YDTI supernatant pond towards the target of approximately 15,000 acre-ft (continuation of 2020 recommendation).**

MR continued to operate with reduced freshwater use in 2021 (in comparison to pre-2017 years), with an average SLWS flowrate of approximately 1.2 MGPD (January through December inclusive). This is comparable with the average flowrate since mid-2017. MR anticipates comparable average use of freshwater in 2022.

Since commissioning the Pilot Project in September 2019, the net YDTI water deficit is approximately 2,190 M gallons (6,720 ac-ft), through 2021. MR is optimistic that the YDTI supernatant pond target inventory of approximately 15,000 acre-ft can be achieved over the next 2 to 4 years through a combination of the discharging water from the YDTI using the pilot project and continuing to operate the concentrator with reduced SLWS freshwater use. The Pilot Project is not entirely within MR's control however due to a variety of factors and Polishing Plant interruptions are possible that could impact the timeline.

2. **Modify the tailings distribution system by extending Line 2 to allow discharge at location NS-1 and NS-2 when the EL. 6,450 ft raise of the embankment is completed adjacent to these discharge locations (deferral from 2020 recommendations).**

As noted in the 2019 and 2020 CAP, MR recognizes the ability to discharge from either of two lines or at two locations concurrently along the North-South Embankment would improve flexibility for operations and enhance beach development adjacent to the embankment. MR committed in the 2019 CAP to making adjustments to the system in 2020 provided it was reasonably practicable within the mine schedule. MR issued a Deferral Notification in December 2020 (MR, 2020), identifying that realignment would not be practicable due to construction occurring in this area through to mid-2022. MR now anticipates the construction of the EL. 6,450 ft embankment will be complete in this area in Q3 of 2022, and Line 2 can then be realigned in Q4 of 2022.

3. **Modify the tailings distribution system to include two additional discharge locations as follows:**
    - **one located between the current locations of EW-1 and NS-1, and**
    - **one located between the current locations of NS-1 and NS-2.**

MR agrees the addition of two new discharge locations, for a total of 12 locations, will continue to improve operational flexibility and beach development within the tailings facility. As detailed in the Recommendation 2 Corrective Action, MR are currently constructing the EL. 6,450 ft raise of the YDTI embankments and will relocate the tailings delivery pipelines following completion of this raise.

MR propose to install the two new recommended tailings discharge points (one point between the existing EW-1 and NS-1, and one point between NS-1 and NS-2) when relocating the tailings pipelines. MR also intend to review the spacing of the spigots along Line 2 and Line 3 to have the discharges more equally spaced. The current schedule for relocation of the tailings delivery pipeline to EL.6,450 ft is Q3 and Q4 of 2022.

4. **Implement alluvium facing at the interface between the rockfill surcharge and tailings beach between Section 23+00 NW and Section 13+00 N along the upstream face of the EL. 6,400 ft surcharge lift.**

MR has placed additional alluvium (Zone F) on the upstream face of the rockfill surcharge between Section 23+00 NW and Section 13+00 N since the EOR inspection in September 2021. MR will place additional alluvium in this area adjacent to the tailings discharge corridor after relocation of the Tailings Delivery Line 2. This recommendation will be completed in Q3 of 2022. MR will continue to monitor for tailings water ponding adjacent to the embankment upstream slope as per the TOMS Manual (MR/KP. 2020) and take additional operational and/or maintenance measures as appropriate to limit water ingress into the embankment.

Note, MR placed alluvium on the upstream slope face of the embankment when initially constructing the EL. 6,400 ft raise of the rockfill surcharge; however, alluvium was not placed on the upstream slope face of the tailings discharge corridor at the time of construction. MR will place alluvium as required to maintain a separation zone between the tailings and the Zone U during construction of the EL. 6,450 ft embankment and associated tailings discharge corridor.

5. **Infill low areas along the downstream side of the North-South Embankment and regrade the embankment crest from approximately Section 43+00 N towards the north.**

MR agrees that promoting drainage from the embankment crest surface and eliminating areas of ponded water is important. MR will regrade and place additional of U material along the EL. 6,400 ft crest of the North-South Embankment as required to promote drainage and runoff of surface water from the embankment crest and slopes. Construction activities are currently ongoing in the Central Pedestal Area and MR utilizes portions of the North-South Embankment as haul road access to this area. MR will address this embankment surface grading recommendation in Q1 of 2022.

6. **Complete maintenance work in the upper HsB area to improve drainage and limit ponding in this area.**

MR agrees that improving drainage and limiting ponding in the HsB area adjacent to the toe of the YDTI embankments is beneficial. MR completed a variety of maintenance activities in the HsB area during Q4 of 2021

to improve drainage and reduce ponding as recommended by the EOR during the annual inspection site visit. The works completed to date include breaching the upper HsB area berm to limit ponding in the upper HsB Area. MR have also breached the berm of the Holding Pond to discharge into Surge Pond. MR will continue to monitor ponding and flow rates in the HsB area and complete drainage maintenance as required.

7. **Develop and implement a new system to collect flows along the Seep 10 bench and convey these flows to the HsB Pond. Re-grade the Seep 10 bench surface to enhance drainage collection and limit ponding of water to the extent practicable.**

MR will regrade the existing surface drainage ditches located on the Seep 10 (EL. 5,900 ft) bench to reduce ponding of water on the bench surface. Minor works to lower culvert elevations to promote drainage to the existing Seep 10 pond and weir will be conducted if required. The Seep 10 flows will continue to be gravity conveyed to the HsB area via the existing weir and pipeline system. MR propose to conduct this work in Q2 of 2022. MR considers these works an interim stage prior to construction of a new Seep 10 surface drainage system in 2023.

The preliminary design of a new Seep 10 bench drainage system was presented in the HsB Rock Disposal Site Stage 1 Drainage System Report prepared by KP in December 2021 (KP, 2021). The design concept included the relocation of the Seep 10 pond and weir to the west, and a drainage pipeline to HsB Pond along the 7 percent Ramp. The Issued for Construction designs will be prepared during 2022, and construction of the new system will commence once the design process is complete.

8. **Investigate options for automating collection of the HsB Weir flow monitoring data using the Sensemetrics remote monitoring system platform.**

The HsB Weir was established by the Montana Bureau of Mines and Geology (MBMG) to monitor the flows through the HsB pond in 1996. MR will review options for automating collection and distribution of the weir flow monitoring data using the existing remote monitoring system operating on-site. MR will coordinate with MBMG to obtain their approval for automation of the weir data collection. Provided MBMG are in agreement with the proposed upgrade connection, MR intend to commission automation of HsB weir data collection by Q3 of 2022.

If there are any questions or concerns regarding the CAP and schedule please contact me at (406) 496-3211.

Sincerely,

Mark Thompson

Vice President of Environmental Affairs
Montana Resources, LLP

600 Shields Ave.
Butte, Montana 59701

Attachments:

A. Engineer of Record – Verification

References:

Knight Piésold Ltd. (KP) 2021, Horseshoe Bend Rock Disposal Site – Stage 1 Drainage System Report, KP Ref . No. VA101-126/25-3 Rev. 0, December 6, 2021.

Montana Resources and Knight Piésold Ltd. (MR/KP, 2020). Yankee Doodle Tailings Impoundment – Tailings Operations, Maintenance and Surveillance (TOMS) Manual, Rev 4, May 13, 2020.

Montana Resources, LLP. (MR) 2020, 2019 Yankee Doodle tailings Impoundment Corrective Action Pan – Corrective Action 2 Deferral Notification Letter, December 18, 2020

600 Shields Ave.
Butte, Montana 59701

ATTACHMENT A:

Engineer of Record (EOR) Verification

I have reviewed and verify that the corrective actions proposed by MR should reasonably be expected to effectively address the recommendations contained in the 2021 Annual Inspection Report.

Reviewed: _____

Daniel Fontaine, P.E.
Engineer of Record,
Knight Piésold Ltd.

APPENDIX D2

2021 CAP Deferral Notification

(Pages D2-1 to D2-5)

Montana Resources

Montana Resources, LLP
600 Shields Ave.
Butte, Montana USA 59701
(406) 496-3200
(406) 723-9542 fax
www.montanaresources.com

December 16, 2022

Knight Piésold Limited
Attn: Daniel Fontaine
Suite 1400, 750 West Pender Street
Vancouver, BC V6C 2T8

Re: 2021 Yankee Doodle Tailings Impoundment Correction Action Plan – Corrective Action Deferral Notification

This letter has been prepared to request that Mr. Daniel Fontaine, the Engineer of Record (EOR) for the Yankee Doodle Tailings Impoundment (YDTI), allow for deferral of select Corrective Actions presented in the Corrective Action Plan (CAP) letter dated January 11, 2022 (MR, 2022). Montana Resources, LLP (MR) prepared the 2021 CAP and implementation schedule to address the eight recommendations identified by the EOR in the 2021 Annual Inspection Report (AIR) for the YDTI (KP, 2022).

MR completed the Corrective Actions for recommendations 1, 5, 6 and 8; however, the remaining recommendations will not be completed this year. A summary of the recommendation and a revised action plan schedule is provided below.

2021 EOR AIR Recommendations 2, 3 and 4:

Recommendations 2, 3, and 4 have been delayed due to the continued construction of the EL. 6,450 embankment lift. MR's proposed revised Corrective Action Plan for these recommendations is below:

> **Recommendation 2: Modify the tailings distribution system by extending Line 2 to allow discharge at location NS-1 and NS-2 when the EL. 6,450 ft raise of the embankment is completed adjacent to these discharge locations (deferral from 2020 EOR AIR recommendations).**
>
> *MR issued a Deferral Notification in December 2020 (MR, 2020), identifying that the extension of Tailing Delivery Line 2 would not be practicable due to ongoing EL. 6,450 ft embankment construction in this area. Construction of the EL. 6,450 ft lift is still in progress and MR anticipates lift construction will be completed in 2023. MR requests that the recommended extension of Line 2 continues to be deferred until lift construction is completed. MR also requests clarification if 12-inch discharge points would satisfy the EOR recommendation for the additional Line 2 discharge points at NS-1 and NS-2.*

Recommendation 3: Modify the tailings distribution system to include two additional discharge locations as follows:

- **one located between the current locations of EW-1 and NS-1, and**
- **one located between the current locations of NS-1 and NS-2.**

The 2021 CAP (MR, 2022) proposed that a new tailings discharge point would be added between the existing EW-1 and NS-1 (Recommendation 3a) when relocating the tailings delivery pipelines following construction of the EL. 6,450 embankment lift. Construction of this embankment lift is ongoing, and the tailings delivery pipeline relocation and discharge addition will be completed following completion of the lift.

MR installed eight new discharge locations along the N-S Embankment (Tailings Delivery Line 3) consisting of single or twinned 12-inch pipelines from Q2 through Q3 2022, including two locations located between locations NS-1 and NS-2. The addition of the 12-inch discharge pipelines along the N-S Embankment provides more coverage than the action proposed in the CAP. MR requests that the EOR recommendation to install additional 26" discharge points along the N-S Embankment between NS-1 and NS-2 be reconsidered, given the installation of 12-inch points.

Recommendation 4: Implement alluvium facing at the interface between the rockfill surcharge and tailings beach between Section 23+00 NW and Section 13+00 N along the upstream face of the EL. 6,400 ft surcharge lift.

MR placed alluvium on the upstream slope face of the embankment when initially constructing the EL. 6,400 ft raise of the rockfill surcharge and following the EOR annual inspection in September 2021, as outlined in the 2021 CAP (MR, 2022). Alluvium was not placed on the upstream face of the tailings discharge corridor because access is currently limited by the presence of Tailings Delivery Line 2 along this corridor.

MR plans to place alluvium in the area adjacent to the tailings discharge corridor when Tailings Delivery Line 2 is relocated to EL. 6,450 ft as outlined in the 2021 CAP. This was initially anticipated to occur by Q3 2022. MR requests that the CAP be deferred into2023 and following completion of the EL. 6,450 ft lift and relocation of the tailings deliver line.

2021 EOR AIR Recommendation 7

Recommendation 7 will not be complete in 2022; however, preliminary works have been undertaken to implement the 2021 Corrective Action of the EOR recommendation. MR's revised Corrective Action for these recommendations is below:

Recommendation 7: Develop and implement a new system to collect flows along the Seep 10 bench and convey these flows to the HsB Pond. Re-grade the Seep 10 bench

surface to enhance drainage collection and limit ponding of water to the extent practicable.

MR has completed various grading activities along the Seep 10 bench in advance of construction of the new Seep 10 drainage system proposed as part of the HsB Rock Disposal Site Stage 1 Drainage System (KP, 2021). The design concept for the drainage system includes the relocation of the Seep 10 pond and weir to the west and installation of a drainage pipeline to the HsB Pond along the 7 percent Ramp. Construction of the works will be completed after the Issued-for-Construction (IFC) design drawings and associated technical specifications are developed by KP. The IFC design development is underway, and construction has been scheduled for 2023.

MR will complete these outstanding 2021 CAP items as outlined above, when practical to do so following construction of the EL. 6,450 ft lift of the embankment and development of the IFC design for the new Seep 10 drainage system. An EOR verification document is included as Attachment A. Please verify if the 2021 CAP schedule adjustment is acceptable.

If there are any questions or concerns regarding this deferral, please contact me at (406) 496-3215.

Sincerely,

Mark Thompson
FOR

Mike Harvie
Manager of Engineering and Geology
Montana Resources, LLP

Copy to: Garrett Smith, MDEQ

Attachments:

A. Engineer of Record – Verification

References

Knight Piésold Ltd. (KP, 2021). Horseshoe Bend Rock Disposal Site Stage 1 Drainage System Report (KP Reference No. VA101-126/25-3 Rev 0), dated December 6, 2021.

Knight Piésold Ltd. (KP, 2022). 2021 Annual Inspection Report (KP Reference No. VA101-126/25-2 Rev 0), dated January 11, 2022.

Montana Resource, LLP (MR, 2020). 2019 Yankee Doodle Tailings Impoundment Correction Active Plan – Corrective Action 2 Deferral Notification, dated December 18, 2020.

Montana Resource, LLP (MR, 2022). 2021 Annual Inspection Report for Yankee Doodle Tailings Impoundment and Corrective Action Plan for Recommendations, dated January 11, 2022.

ATTACHMENT A:

Engineer of Record (EOR) Verification

I have reviewed the deferral notification related to the 2021 CAP items proposed by MR and verify that the adjusted schedule should reasonably be expected to effectively address the outstanding recommendations from the 2021 Annual Inspection Report.

Reviewed: _____

Daniel Fontaine, P.E.
YDTI Engineer of Record,
Knight Piésold Ltd.

APPENDIX E

Q3 2022 Piezometric and Deformation Monitoring Update

(Pages E-1 to E-58)

Knight Piésold CONSULTING

Management System Certified by: bsi ISO 9001 ISO 14001 ISO 45001 CERTIFIED

November 1, 2022

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Mr. Mike Harvie
Manager of Engineering and Geology
Montana Resources, LLP
600 Shields Avenue
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USA, 59701

Dear Mike,

RE: Q3 2022 – YDTI Quarterly Piezometric and Deformation Monitoring Update

1.0 INTRODUCTION

1.1 GENERAL

Montana Resources, LLP (MR) operates an open pit copper and molybdenum mine in Butte, Montana. Tailings produced from ore processing are stored within the Yankee Doodle Tailings Impoundment (YDTI), which is a valley-fill style impoundment contained within rockfill embankment. Knight Piésold Ltd. (KP) supports MR to routinely monitor hydrogeological and geotechnical conditions as part of their operation surveillance plan for the tailings facility, as described in the TOMS Manual (MR/KP, 2022). Monitoring data are comprehensively reviewed on a quarterly basis to evaluate the performance of the YDTI in conjunction with observations made during periodic inspections.

Piezometric conditions within the YDTI embankments, tailings mass and surrounding areas are an important indicator of facility performance. Real-time piezometric data from instrumentation within these monitoring sites have designated Quantitative Performance Parameters (QPPs) within the TOMS manual and are regularly evaluated relative to piezometric 'trigger elevations' to pre-emptively identify and respond to changing conditions.

MR and KP commenced an embankment deformation monitoring program, with data collection beginning in 2020, to characterize and monitor surface and subsurface deformations using in-situ instrumentation and satellite-based remote sensing. Observed deformation rates, magnitudes and spatial distribution are an important indicator of embankment performance and are regularly reviewed by KP. The TOMS Manual does not yet include deformation based QPPs; however, these will be considered for future revisions. KP evaluated and presented available deformation data on a quarterly basis throughout 2021 to regularly monitor for changes in deformation behavior and evaluate incorporation of deformation instrumentation for QPP monitor in the future; a practice that will continue through 2022.

This letter provides a quarterly summary of piezometric and deformation monitoring data collected during the third quarter (Q3) of 2022 for key monitoring sites.

1.2 SUMMARY OF ACTIVE CONSTRUCTION

MR is continuing construction of the YDTI embankments up to a crest elevation (EL.) of 6,450 ft. Active rockfill placement during Q3 2022 included construction of the EL. 6,450 ft embankment and surcharge lifts within the Central Pedestal Area between approximately Sections 0+00 and 8+00N. Additional EL. 6,450 ft

lift placement along the North-South Embankment between sections 28+00N and 38+00N commenced during Q3. KP and MR have developed and implemented a supplemental construction monitoring program that includes monitoring of the construction-related piezometric and deformation response (KP, 2021b). Construction has significantly influenced monitored surface deformations in areas within and localized around active construction, as expected. Only minor construction-related pore water pressure influence has been observed to date. Construction-related monitoring data are comprehensively reviewed on a monthly basis and presented in monthly construction monitoring letters, in addition to the dam safety monitoring program, and select results are presented herein.

2.0 PIEZOMETRIC MONITORING

2.1 OVERVIEW OF PIEZOMETRIC MONITORING NETWORK

Piezometric data are available to KP via the RMS and data from QPP sites are reviewed weekly by KP and MR. This letter presents trends and conditions based on data collection from the QPP sites during Q3 2022, with select additional data from non-QPP sites, when useful to support the key findings. Comprehensive analysis of data from the remaining non-QPP monitoring sites is completed annually and will be presented in the 2022 Data Analysis Report in early 2023. The active piezometric monitoring network and a summary of Q3 2022 piezometric conditions are presented in the following sections.

Pore pressures are monitored at 117 active instrumentation locations at the YDTI, the West Ridge, and Horseshoe end (HsB) areas. Locations of the piezometric monitoring sites are shown on Figure 1. These sites include 39 standpipe piezometers/monitoring wells, 78 drillholes with active vibrating wire piezometers (VWPs) and two Elexon Geo4Sight (Geo4Sight) installations. Most existing standpipe piezometers and monitoring wells have been outfitted for continuous monitoring by suspending a VWP sensor within the PVC riser and connecting the sensor via radiotelemetry to the RMS.

Eighteen (18) standpipe piezometers and drillhole VWP sensors have designated QPPs within the TOMS Manual and are used to routinely assess the performance of the YDTI. The QPPs include a piezometric ‘trigger elevation’ at or above which the QPP is exceeded, and a Level 1 Unusual Occurrence would be triggered, as specified in Table 5.1 of the TOMS Manual (MR/KP, 2022). Trigger elevations assigned to each QPP site are re-evaluated by KP on an annual basis. A summary of the piezometric QPPs that are currently in use at the YDTI is included in Table 1.

Piezometric data availability via the RMS has typically been highly reliable, except for minor outages including battery depletion, minor hardware problems, and temporary loss of communication with the local network. Minor outages have continued to be regularly identified during weekly monitoring reviews and corrective measures carried out, with minor issues typically remedied within one week of identification. Sensors within drillholes DH15-S5 and DH17-S2 were disconnected during Q1/Q2 2022 to facilitate a collar raise to EL. 6,450 ft. These sensors were reconnected during Q3 2022; however, all except for DH15-S5 VW2 were damaged and have been abandoned. QPP sensor DH15-S5 VW1 was amongst the damaged sensors. KP have implemented DH15-S5 VW2 as a replacement QPP sensor. A piezometric threshold elevation of 5,890 ft has been assigned to DH15-S5 VW2 and is based on the existing ‘moderate risk’ construction performance threshold developed in KP (2021b). Evaluation of QPP DH15-S5 VW2 has been incorporated into the weekly monitoring review process and results will be formally presented in the Q4 2022 piezometric and deformation monitoring letter.

2.2 SUMMARY OF Q3 2022 PIEZOMETRIC CONDITIONS

2.2.1 GENERAL

No piezometric trigger elevation exceedances were observed at QPP monitoring sites during Q3 2022. A high-level summary of QPP piezometric data and instrumentation status is provided in Table 1. Piezometric data recorded at QPP sites within the East-West, North-South, and West Embankments are shown relative to the trigger elevations on Figures 2 through 6. Piezometric conditions and quarterly change in piezometric elevation along Section 8+00W of the East-West Embankment are presented graphically on Figure 7.

2.2.2 EAST-WEST EMBANKMENT

All QPP sites within the basal saturated zone of the East-West Embankment exhibited slightly decreasing piezometric conditions during Q3 2022, continuing the previously observed long-term decreasing pore water pressure trend monitored beginning in 2017. Notable piezometric trends observed within the East-West Embankment during Q3 2022 are summarized below.

QPP sensors installed within basal rockfill near the East-West Embankment toe on Section 0+00 and 8+00W generally monitored slightly decreasing piezometric conditions throughout Q2 2022. Supporting monitoring findings include:

- QPP monitoring sites MW94-8, MW94-11, and DH15-S3 VW1 observed slight pore pressure decreases (0.1 – 0.3 ft) during Q3 2022.
- QPP site DH17-S1 VW2 monitored a very minor pore pressure decrease (approximately 0.2 ft) during Q3 2022.

Pore water pressures monitored by QPP and non-QPP sensors installed beneath the East-West Embankment crest and tailings pipeline ramp also decreased during Q3 2022. Construction influence on pore water pressures (increases followed by subsequent dissipation) was observed, corresponding with ongoing EL. 6,450 ft embankment and surcharge construction within the Central Pedestal Area. Key findings include:

- QPP sensor DH19-S7 VW1 (Section 0+00) continued to observe decreasing pore water pressures (approximately 3 ft) during Q3 2022. Recent EL. 6,450 ft central embankment lift construction did not discernably influence the basal pore pressures.
- Non-QPP sites DH19-S7 VW7 observed increasing pore water pressures followed by subsequent partial dissipation during Q3 2022. The sensor is installed within the historical 1982 lift-top interval (relatively finer grained, saturated zone) and the observed trend corresponds with construction of the EL. 6,450 ft embankment lift upstream of the instrumentation site. Pore water pressures increased by approximately 12 ft between June and mid-September 2022 before subsequently decreasing during September 2022 to within 2 ft of pre-EL. 6,450 lift construction conditions. KP expects DH19-S7 VW7 pore pressure to continue dissipating following completion of EL. 6,450 ft lift construction in the area.

The continued, slightly decreasing pore water pressures observed within the East-West Embankment during Q3 2022 suggests that the piezometric regime has generally continued the long-term decreasing pore water pressure trend observed since the implementation of multiple point tailings discharge in late 2016. Influence of construction (pressure increase followed by dissipation) was visible at DH19-S7 VW7, and KP will continue to closely monitor this pore pressure response during the conclusion of EL. 6,450 ft lift construction.

2.2.3 NORTH-SOUTH EMBANKMENT

QPP sites within the rockfill of the North-South Embankment monitored relatively constant piezometric elevations during Q3 2022, with minor construction influence apparent at two sites. Select monitoring observations supporting this conclusion are:

- Piezometric elevations measured in the basal saturated zone at drillholes DH18-S1 (VW2) and DH18-S2 (VW2) remained relatively constant during July and August 2022. Minor pore water pressure increases (0.2 – 0.6 ft) were observed during September 2022 and correspond with active EL. 6,450 ft lift construction between approximately Sections 28+00N and 43+00N.
- Monitoring well MW12-05 has historically been unsaturated and remained unsaturated through Q3 2022. This indicates that the piezometric elevation remains below the bottom of the well screen (less than 6,198 ft elevation) and is suggestive of a stable piezometric trend.
- No data are available for MW12-01 due to an apparent sensor performance issue. KP has recommended diagnostics and replacement of the VWP sensor, if possible.

2.2.4 TAILINGS MASS

Pore water pressure instrumentation installed within the tailings mass upstream of the Central Pedestal Area of the East-West Embankment generally monitored stable or slightly decreasing conditions during Q3 2022. The following are notable findings regarding tailings beach piezometric conditions upstream of the Central Pedestal Area:

- Pore pressures within the central tailings mass upstream of the rockfill surcharge at non-QPP sites SCPT15-04 VW2 and SCPT15-05 VW3 (the upper most saturated sensors at each site) generally monitored stable or slightly decreasing conditions throughout Q3 2022.
- Instrumentation beneath the central rockfill surcharge (Section 0+00 to 12+00W, inclusive) at non-QPP sites DH17-S3 VW2 and SCPT15-03 VW2 observed stable conditions (quarterly change of <0.1 ft).
- Non-QPP sensors SCPT21-S5 VW2 and VW3 became saturated and monitored increasing pore water pressured during Q1 2022 in response to recent surcharge construction. Pore pressures have subsequently decrease and all sensors remained unsaturated during Q3 2022.

Instrumentation installed within the tailings beach adjacent to the North-South and East-West Embankments outside the Central Pedestal Area generally exhibited increasing pore pressures during Q2 2022. Key findings include:

- Sensor DH19-S6 VW6 installed upstream of the North-South Embankment near Section 56+00N observed a pore pressure increase of approximately 8 ft during Q3 2022 due to the continued tailings deposition from the nearby 12-inch discharge pipelines. Pore pressures stabilized near the end of Q3.
- Sites SCPT21-S3 (VW3), SCPT15-06, SCPT15-07, SCPT15-08, SCPT13-05, and SCPT13-06 observed minor pore pressure increases during Q3 2022 ranging from less than 0.1 ft to approximately 3 ft. These fluctuations are inferred to be influenced by activity/inactivity of tailings discharge locations local to each monitoring site.

There are presently no QPPs designated for pore water pressures within the tailings mass.

2.2.5 WEST EMBANKMENT AND DRAIN

Piezometric elevations within the foundation of the West Embankment and West Embankment Drain (WED) remained relatively constant from 2019 through early-Q2 2022 (interpreted to be controlled by drainage to

the WED). Sensors installed in the area observed minor pore pressure increases during late-Q2 and early-Q3 2022 (ranging in magnitude from approximately 0.4 to 2 feet). Key findings include:

- QPP sensors in drillhole DH15-12 (VW1, VW2, and VW3) are installed within the West Embankment foundation and monitored slight increases in pore pressures during early-Q3 2022 (<1 ft), followed by stabilization of piezometric conditions. Data from the nested VW1 through VW3 sensors continue to indicate an upward gradient towards the drain.
- Pore water pressures monitored by QPP sensors installed in WED Drain Pods 1 and 2 (VWP-DP1 and VWP-DP2, respectively) monitored relatively stable pore water pressures during Q3 2022; however, these sites observed increases of between 0.5 and 2 ft during late-Q2 2022.
- The piezometric elevation monitored by the non-QPP sensor in the WED Extraction Basin (VWP-EB1) also increased by approximately 2 ft in July 2022.

QPP sensors installed in drillhole DH15-12 are presently more than 20 feet below the TOMS QPP trigger elevations. Sensors installed in Drain Pods 1 and 2 remain more than 30 feet below the trigger elevations. The recent pore pressure increases within the WED are likely attributed to continuous tailings deposition along the West Embankment during Q1 through Q3 2022, particularly from location RK-1 and the 12-inch discharges. Tailings discharge in this area likely contributed higher seepage flows to the WED and Extraction Pond, via slurry water infiltration into the tailings beach and embankment rockfill when the tailings slurry flows along the beach adjacent to the upstream side of the embankment. KP will continue to closely monitor WED and West Embankment pore water pressures during Q4 2022.

3.0 DEFORMATION MONITORING

3.1 OVERVIEW OF DEFORMATION MONITORING NETWORK

Surface and subsurface deformation data are regularly reviewed by KP, and a summary of the deformation monitoring programs and key monitoring trends from Q3 2022 are provided in the following sections. Quarterly monitoring generally observed continued constant rate surface deformations within regions of historical rockfill with no observation of progressive (accelerating) deformation rates. Elevated deformation rates were observed within and localized around regions of active construction (East-West Embankment EL. 6,450 ft crest and surcharge construction and North-South Embankment crest construction), as rockfill placement continued to progress. Monitored deformation rates and response to construction are consistent with expectations for end-dumped rockfill and deformation rates vary based on rockfill thickness and time following construction. Similar deformation response to construction loading were observed during previous construction at both the East-West and North-South Embankments (KP, 2021a). Data from instrumentation sites were readily available via the RMS and remote-sensing data were routinely reported by the service provider during Q3 2022.

No deformation related QPPs are presently active; however, KP is evaluating the data and considering incorporation of deformation related QPPs for future revisions of the TOMS Manual. This letter discusses available deformation data from Q3 2022. More comprehensive analysis of available deformation data will be presented in the 2022 Data Analysis Report in early 2023.

Surface and subsurface deformations of the YDTI embankments are actively monitored using in-situ instrumentation and remote sensing techniques. The techniques incorporated into the monitoring program including the following:

- **Global Navigational Satellite System (GNSS) instruments** monitor surface deformation at four locations (DH19-S3, DH19-S4, DH19-S5, and DH19-S7) within the Central Pedestal Area of the East-West Embankment, as shown in Figure 1. Surface deformation data (vertical and lateral deformation components) from GNSS instrumentation are available via the RMS in near real-time throughout the year. The GNSS data exhibit relatively high noise levels typical of this type of instrumentation and operating environment. GNSS data are considered suitable for assessment of long-term deformation trends and to monitor for changes in deformation rates and/or behavior on a monthly or longer timestep.
- **Satellite-based interferometric Synthetic Aperture Radar (inSAR)** provides a comprehensive spatial and temporal assessment of vertical surface displacements occurring throughout all YDTI embankments. InSAR (two-dimensional Terra-SAR-X Strip Map) data collection is active from April through October, while snow-free conditions persist. Short-term inSAR Bulletins are available and monitor deformations over a 22-day data collection period. Eight Bulletin analyses are available during Q3 2022 covering the period of June 27 through October 4, 2022 (Appendix A). Long-term SqueeSAR scans are also available, and the first of the long-term scans was received in Q3 2022 including monitoring data for the period from April 11 to July 28, 2022 (Appendix B).
- **Differential Global Positioning System (DGPS) survey monuments** are used to monitor surface deformation at 15 locations along the East-West Embankment. This manual measurement technique provides short and long-term deformation monitoring with routine measurements with minimal obstructions due to weather. Additional survey monuments have been installed in the North-South Embankment to facilitate monitoring during construction.
- **In-Place-Inclinometer (IPI) instruments** are co-located with the GNSS instrumentation within drillholes DH19-S3, DH19-S4, DH19-S5, and DH19-S7 to monitor subsurface deformation within the East-West Embankment Central Pedestal Area. Data are available in near real-time via the RMS but exhibit relatively high noise unless temporal-averaging is applied. KP typically compiles IPI deformation data using monthly averaging to remove noise and monitoring long-term deformation trends.
- **Geo4ight deformation instruments** provide subsurface angular deformation data within the upstream East-West Embankment slope and overlying tailings mass in drillholes DH20-S2 (Section 8+00W) and DH21-S4 (Section 0+00). Each drillhole has 127 Geo4Sight markers, and angular deformation data (change in tilt over time) are available at each marker depth. Data are routinely downloaded by MR and compiled by KP using monthly averaging to remove noise and monitor long-term deformation trends. The Geo4Sight markers can be used to assess angular deformation (similar to a change-in-tilt plot from an inclinometer probe) by monitoring change of the two orientation parameters listed below (illustrated graphically on Figure 9).
  - Dip: The Geo4Sight dip parameter quantifies marker inclination relative to the gravitational horizontal. Dip ranges from 0 to 90 degrees, with positive dip corresponding to an upward orientation and negative dip corresponding to a downward orientation.
  - Heading: The Geo4Sight heading parameter is a clockwise azimuth measured from magnetic north to the central axis of the marker, where it exits the downhole end. The utility of the heading parameter is limited for DH20-S2 and DH 21-S4 due to their vertical drillhole orientation.

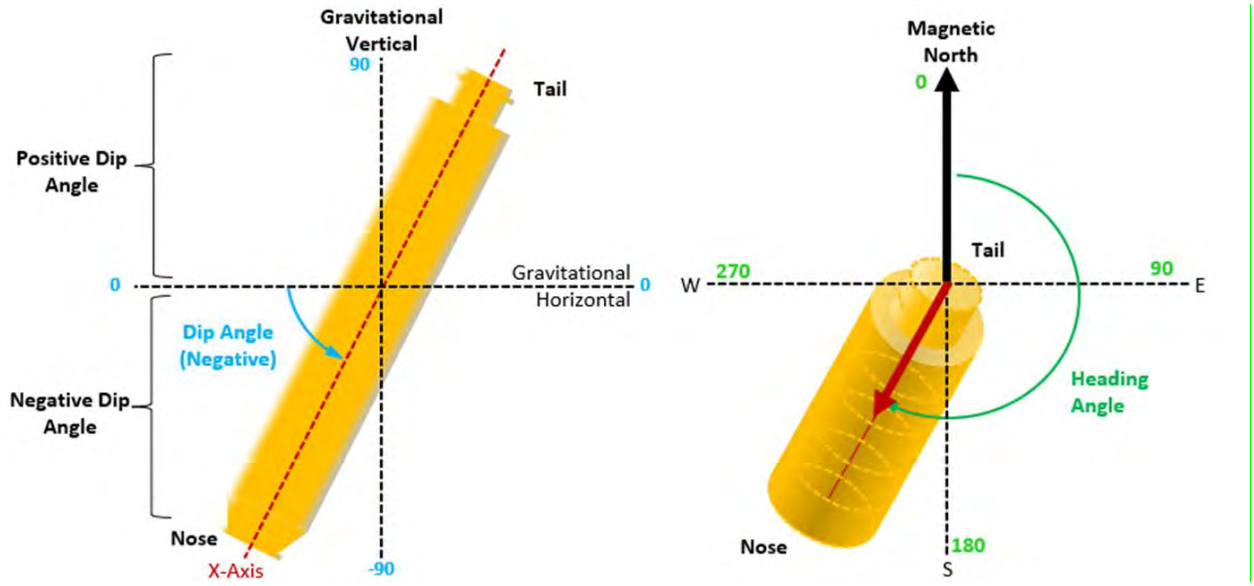


Figure 9 Illustration of Geo4Sight Dip and Heading Deformation Parameters

Trends and conditions observed in the monitoring data during Q3 2022 using available instrumentation and remote sensing data are summarized in the following sections.

3.2 OVERVIEW OF OBSERVED DEFORMATION TRENDS

3.2.1 GENERAL

Elevation 6,450 ft surcharge and embankment lift construction continued within the Central Pedestal Area throughout Q3 2022, and construction of the North-South Embankment EL. 6,450 ft lift commenced during Q3 2022.Construction induced deformations continued to be observable within the available surface and subsurface deformation datasets. Elevated deformation rates continue to be observed localized within and around the footprints of newly placed rockfill. The onset of elevated deformation rates continues to correspond with the advancement of construction, and rates have generally begun to slow upon completion of construction in a given area, except where overlapping of sequential lift influence occurs. Findings do not indicate development of unexpected deformations within the downstream embankment shell nor evidence of progressive (accelerating) deformation following construction. Comprehensive analysis of long-term deformation data from 2022 will be presented in the Data Analysis Report in early 2023. Key findings from the techniques described in Section 3.1 are discussed in the following sections.

3.2.2 INSAR SURFACE DEFORMATION MONITORING

InSAR data collection continued during Q3 2022. Eight (8) short-term inSAR bulletins and 1 long-term InSAR SqueeSAR analysis are available with coverage during Q3 2022 (Appendices A and B). InSAR has continued to observe elevated deformation rates within and localized around construction areas, with rates generally slowing with time following rockfill placement. The following deformation trends were observed during Q3 2022:

- Elevated deformations continue to be observed within and localized around recent embankment (sequential EL. 6,250 ft through EL. 6,450 ft lifts) and surcharge lift construction along the East-West and North-South Embankments. Monitoring during Q3 2022 generally observed slowing deformation

rates following completion of the EL. 6,450 ft lift within the Central Pedestal Area and increasing deformations around the North-South Embankment EL. 6,450 ft lift. No progressive (accelerating) deformations were monitored following construction in each area (KP, 2022c).

- Minor elevated deformations have been observed along the downstream slope of the East-West Embankment, beginning in 2021, resulting from embankment lift construction. InSAR monitoring during Q3 2022 continued to observe elevated rates in this area. It is anticipated the elevated deformation rates and extents will begin to decrease now that construction in the Central Pedestal Area is largely complete.
- Surface deformations observed throughout the West Embankment remain low (generally below the bulletin detection limit) and exhibited stable deformation rates. No construction is presently active in this area.

The first of two SqueeSAR reports were delivered during Q3 2022 and results showed similar findings to the inSAR bulletins. Elevated deformation rates surrounding construction within the East-West and North-South Embankments are apparent and rates slow with time following placement in a given area. No progressive (accelerating) deformations were monitored following construction. Embankment areas outside of construction influence monitored generally constant deformation rates during Q3 2022.

3.2.3 GNSS SURFACE DEFORMATION MONITORING

In-situ surface deformation data were collected at four GNSS sites during Q3 2022. All four GNSS instruments remained online for most of the quarter with a minor outage between August 17 to September 2, 2022 due to a GNSS satellite update. These sites provide long-term surface deformation data from July 2020 through September 2022. Findings from Q3 2022 are generally consistent with inSAR monitoring. Key findings include:

- Elevated vertical and lateral deformations immediately downstream of the central embankment construction area continue to be monitored at drillhole DH19-S7, located at Section 0+00 of the central tailings pipeline ramp. Observed deformation rates generally remained constant during Q3 2022, following completion of the EL. 6,450 ft lift in the western portion of the pipeline ramp. KP anticipates that the deformation rates monitored by GNSS DH19-S7 will decrease as influence from construction diminishes with time.
- Very minor elevated vertical and lateral (downslope) deformation rates continue to be observed on the Seep 10 Bench downstream of active EL. 6,400 and 6,450 ft lift construction by GNSS DH19-S3 (Section 0+00) and DH19-S4 (Section 8+00W) during Q3 2022.

A high-level summary of the surface displacement trends during Q3 2022 for each GNSS instrumentation site is provided below. A comparison of the cumulative vertical deformations from each GNSS site is presented on Figure 8.

DH19-S3 (Seep 10 bench downstream of active construction area; Section 0+00) continued to monitor slightly elevated, relatively constant deformation rates during Q3 2022 that are interpreted indicate minor influence from construction of the EL. 6,300, 6,350, 6,400, and 6,450 ft embankment lifts:

- Monitored GNSS deformation rates and magnitudes are generally consistent with inSAR SqueeSAR findings (Figure C.1).
- Vertical settlement rates remained relatively constant (approximately at 0.8 in/year) during Q3 2022 (Figures C.1 and C.2)
- Lateral (southward and westward) deformation rates remained relatively constant during Q3 2022.

- No progressive (accelerating) vertical or lateral displacements were observed during Q3 2022 following active construction.

DH19-S4 (Seep 10 bench; Section 8+00W) continued to monitor slightly elevated, relatively constant vertical and lateral deformation rates during Q3 2022 that are interpreted to be minor influence from EL. 6,450 ft lift construction upstream. Deformation rates remain substantially lower than those observed at DH19-S3 (Section 0+00) and along the tailings pipeline ramp (DGPS, DH19-S7). The following trends were observed during Q3 2022:

- Monitored GNSS deformation rates and magnitudes are generally consistent with those monitored by inSAR SqueeSAR (Figure C.3).
- Relatively constant vertical settlement rates of approximately 0.2 in/year were observed during Q3 2022 (Figure C.3 and C.4).
- Southward deformations remained slightly elevated and occurred at constant rates during Q3 2022 at rates consistent with Q1/Q2 2022 (Figure C.4).
- Minimal westward deformations have been observed (<0.2 in/year) with a cumulative magnitude that falls within the noise present within the GNSS data (Figure C.4).
- No progressive (accelerating) vertical or lateral displacements have been observed following completion of construction upstream.

DH19-S5 (Historical Western Leach Area) exhibited the following deformation trends during Q3 2022 and is interpreted to be outside influence from active construction:

- Monitored GNSS deformations are slightly lower than inSAR SqueeSAR results; however, GNSS monitored deformation rates remain within 1 standard deviation of the SqueeSAR rates. GNSS from DH19-S5 are presented relative to the inSAR cumulative deformation series, including the average and average plus one standard deviation, on Figure C.5.
- Very minor and relatively constant vertical settlement rates of approximately 0.2 in/year were monitored.
- Southward deformations increased slightly during Q2 2022. These remain elevated and occurred at relatively constant rates during Q3 2022 (approximately 1.2 in/year; Figure C.6).
- Minimal eastward deformation (<0.1 in/year) has been observed with a cumulative magnitude that falls within the noise present within the GNSS data (Figure C.6).
- No progressive (accelerating) vertical or lateral displacements were discernable.

DH19-S7 (installed tailings pipeline bench downstream of active embankment construction; Section 0+00) recorded the following deformation trends during Q3 2022 and has been strongly influenced by construction:

- Monitored GNSS deformation rates and magnitudes slightly higher than those monitored using inSAR SqueeSAR but are interpreted to be generally consistent.
- Observed vertical and lateral deformation rates remain elevated due to overlapping influence of EL. 6,300, 6,350, 6400, and 6,450 ft lift construction immediately upstream. Observed rates generally remained constant during Q3 2022 and are anticipated to slow with time following EL. 6,450 ft lift construction.
- Southward and eastward deformation rates remained relatively constant during Q3 2022 (Figure C.8) and are anticipated to slow with time following EL. 6,450 ft lift construction.

- No progressive (accelerating) deformation rates were observed following placement of the EL. 6,450 ft lift in the Central Pedestal Area.

KP anticipates that monitored GNSS surface deformation rates will begin to decrease with time following completion of construction within the Central Pedestal Area.

3.2.4 SUBSURFACE DEFORMATION MONITORING

Subsurface deformations within the embankments continued to be measured at four inclinometer sites (DH19-S3, DH19-S4, DH19-S5, and DH19-S7) during Q3 2022, relative to a July 1, 2020 baseline date. The inclinometers are instrumented with IPI sensors at 10 to 20-foot vertical intervals and monitor deformations oriented in the A and B axes. The A+ direction is typically oriented towards the embankment toe (generally to the south within the Central Pedestal Area), while the B+ direction is oriented at 90 degrees clockwise (approximately to the west) from the A+ direction. All four inclinometer instruments remained online throughout the quarter and no outages were encountered. GNSS-based assessments of collar wander (northing and easting displacement at the inclinometer collar) were also completed for comparison with cumulative inclinometer displacements. Data from the inclinometers are presented in Appendix D.

Inclinometer data continue to show varying degrees of influence from settlement occurring within the embankment rockfill, which is consistent with surface deformation monitoring data. IPI instrumentation within drillholes DH19-S3 and DH19-S4 are completed within historical rockfill below the Seep 10 Bench and exhibit minor settlement influence due to the relatively older rockfill age. Lateral deformation data from these sites are usable and are generally interpreted to be representative of in-situ conditions (excepting where noted below). Much stronger settlement influence is observed at drillholes DH19-S5 and DH19-S7 completed through the Historical Western Leach Area and immediately downstream of the active embankment construction, respectively. Incremental deformations monitored at these sites exhibit substantial settlement influence (s-shaped deformations) that preclude assessment of lateral deformation over a portion (DH19-S5) or all of the vertical profile (DH19-S7).

A high-level summary of the subsurface displacement trends monitored during Q3 2022 and settlement influence at each inclinometer site is provided below.

DH19-S3 (Seep 10 bench downstream of active construction area; Section 0+00) showed the following deformation trends during Q3 2022:

- Predominantly southward (A+) lateral deformation continues to be observed with the most significant incremental deformation occurring within the alluvium (at approximately 200 ftbgs; Figure D.2). Deformation rates within this interval generally remained stable during Q3 2022. Cumulative displacement magnitudes are largest near to surface and decrease with depth, as shown on Figure D.1.
- Minor yet increasing settlement influence is apparent within the embankment rockfill (s-shaped on incremental deformation plot; Figure D.2). Diminishing agreement between collar wander and cumulative near-surface displacement suggests that settlement is increasingly influencing IPI performance at DH19-S3. Cumulative near-subsurface southward deformation is approximately 4 inches and underestimates the GNSS-based collar wander data for the same period (approximately 5 inches, Figure D.3). This is interpreted to result from continued settlement-derived casing distortion at DH19-S3.

DH19-S4 (Seep 10 bench; Section 8+00W) monitored the following deformation trends during Q3 2022:

- Southward (A+) cumulative lateral deformation has been observed to date with the most significant incremental deformation occurring within the basal embankment fill (at approximately 270 ftbgs). Monitored Q3 2022 deformation rates remained relatively constant throughout the inclinometer. A discernable northward shift of the cumulative deformation series is apparent above 190 ftbgs (Figure D.4); however, this is interpreted to result from increasing settlement influence between approximately 150 and 200 ftbgs, rather than being indicative of a change in deformation direction. This interpretation is consistent with GNSS and DGPS monitoring, which continue to indicate southward deformation directions.
- Relatively minor yet increasing settlement influence is apparent within the embankment rockfill (s-shapes on incremental deformation plot; Figure D.5). This is consistent with GNSS monitored vertical settlement at the instrumentation location. Inclinometer data indicate a cumulative near-surface southward deformation of approximately 2 inches (Figure D.4) and GNSS instrumentation monitored similar cumulative southward deformation magnitudes of approximately 2 inches (Figure D.6). Alignment between the two techniques is presently good; however, there continues to be a minor discrepancy potentially caused by erroneous incremental deformation magnitudes at 270 ftbgs, which is interpreted to be influenced by rod-flexion (bending of connection rods between adjacent IPI sensors).

DH19-S5 (Historical Western Leach Area) identified the following deformation trends during Q3 2022:

- Deformation data from IPI instrumentation installed within DH19-S5 exhibits substantial settlement influence within 275 ftbgs, as shown on Figure D.7. These axial deformations preclude representative assessment of the lateral deformation trends within the upper 300 ft of drillhole DH19-S5. As a result, no cumulative deformation plot is presented herein.
- Strong settlement (axial deformation) signatures are observed within the historically leached rockfill above the elevation of the Seep 10 Bench, with relatively minor observable settlement influence below. The lateral incremental deformation data between approximately 350 and 450 ftbgs (below the major settlement influence) indicate a cumulative displacement of up to 0.5-inches within the basal rockfill in the downslope direction (the B-direction in this inclinometer). Deformation began at this depth in Q4 2021 and has continued to deform at relatively constant rates during Q3 2022. These data do not exhibit significant settlement influence and are likely to be representative.
- A significant mismatch exists between calculated near-surface displacement and GNSS collar wander (Figure D.8) indicating that the settlement observed above approximately 350 ftbgs at DH19-S5 precludes calculation of representative cumulative or incremental deformation within the relevant depth range.

DH19-S7 (relatively recently constructed tailings pipeline ramp; Section 0+00) monitored the following deformation trends during Q3 2022:

- Deformation data from IPI instrumentation installed within DH19-S7 exhibit substantial settlement influence throughout the entire vertical profile, as shown on Figure D.9. These axial deformations preclude representative assessment of the cumulative deformation at DH19-S7. No cumulative deformation plot is presented herein, as a result.

- Apparent settlement rates observed within the upper 50 to 100 ft remained relatively constant during Q3 2022, following a minor increase observed during Q1 2022. These findings are consistent with observations from co-located survey-monuments, GNSS, and inSAR, which indicate elevated vertical deformation rates during Q1 followed by decreasing or constant rates thereafter, as EL. 6,400 and 6,450 ft lift construction influence diminished.

Additional subsurface deformation data are available within the upstream shell of the East-West Embankment on Sections 0+00 and 8+00W from multi-node Geo4Sight instrumentation (markers) installed at 6 ft vertical spacing throughout drillholes DH21-S4 and DH20-S4, respectively. Angular deformation data are available from these instruments relative to November 2020 (DH20-S2) and November 2021 (DH21-S4) baseline.

Geo4Sight instrumentation installed within both drillholes (DH20-S2 and DH21-S4) has monitored minor angular deformations at depths corresponding to multiple historical embankment features, including relatively fine-grained lift-top intervals (Appendix E). Deformation rates within these intervals increased during periods of active EL. 6,450 ft surcharge lift construction, which progressed westward past the instrument sites between approximately April and October 2021, slowing thereafter. Influence from sequential lift construction diminished during Q3 2022 at DH21-S4 as embankment construction focus shifted towards the North-South Embankment. Key findings include:

- Geo4Sight instrumentation within drillhole DH21-S4 (Section 0+00) monitored decreasing deformation rates within the rockfill surcharge and tailings during Q3 2022. Rates in these intervals have continued to decrease since late-June 2022, as construction in the Central Pedestal Area paused. Similarly, the localized deformation observed previously within the triangle infill lift top (475 ftbgs) continued to monitor slowing deformation rates. Previously identified zones of observed deformations included the 1978 lift top (290 ftbgs) and the upstream starter dam shell (649 ftbgs) elevations. Angular deformation rates monitored within both intervals continued to slow during Q3 2022. Deformations corresponding with the depth of the upstream starter dam exhibit a characteristic s-shaped (sequential negative and positive deformation directions) deformation pattern interpreted to be indicative of axial compression (settlement).
- No new Geo4Sight data are available drillhole DH20-S2 (Section 8+00W) during Q3 2022. The data logger was damaged on March 3, 2022 (due to intrusion of water into the enclosure) and no data are available thereafter. A replacement data logger has arrived onsite and will be installed in Q4 2022. It is expected that deformation rates at DH20-S2 have decreased similarly to DH21-S4, given the gradual eastward advancement of construction along the rockfill surcharge and associated decreasing construction influence allowing previously elevated rates to dissipate.

4.0 CONCLUSION

KP supports MR with routine monitoring of the hydrogeological and geotechnical conditions, as part of their operational surveillance plan for the tailings facility, as described in the TOMS Manual (MR/KP, 2022). Piezometric, surface deformation, and subsurface deformation data are available in real-time using the RMS. Formal analysis and reporting of monitoring data are completed on a quarterly basis to evaluate the performance of the YDTI. The quarterly evaluations along with an assessment of conditions and trends at all piezometric monitoring sites will be included in a comprehensive annual data analysis report issued in early 2023. Additional monthly piezometric and deformation data analyses for conditions associated with active embankment construction have been completed since June 2021 and will continue through the current EL. 6,450 ft lift construction phase within the East-West Embankment. KP anticipates that influence

from construction (localized elevated pore water pressures and surface/subsurface deformation rates) will slow with time following completion of construction.

Piezometric conditions are monitored within the YDTI embankments, tailings mass and surrounding areas and are an important indicator of facility performance. A subset of piezometric monitoring sites have designated QPPs within the TOMS and are regularly evaluated relative to piezometric 'trigger elevations' to pre-emptively identify and respond to changing conditions. There were no piezometric QPP exceedances during Q3 2022. Elevated pore pressures associated with construction are anticipated to dissipate following completion of EL. 6,450 ft lift placement within the Central Pedestal Area. QPP site DH15-S5 (VW1) was damaged during a planned collar raise and DH15-S5 (VW2) has been adopted as a replacement QPP sensor and will be reported in subsequent weekly and quarterly reporting.

Construction of the EL. 6,450 ft embankment crest continued throughout Q3 2022 within the East-West and North-South Embankments. Elevated surface and subsurface deformations continue to be monitored within and localized around areas of recent construction. Monitored deformation rates within the Central Pedestal Area generally decreased slightly during Q3 2022, corresponding with a period of EL. 6,450 ft lift construction inactivity. InSAR, GNSS, and DGPS monitoring has also begun to indicate decreasing deformation rates. Onset of elevated deformation rates has been monitored within the North-South Embankment corresponding with advancement of EL. 6,450 ft lift construction during Q3 2022. Findings do not indicate development of unexpected deformations within the downstream embankment slopes nor evidence of progressive (accelerating) deformation following construction. Surface deformation monitoring during Q3 2022 (GNSS) also continues to observe settlement and downslope (southward) creep of historical rockfill outside of active construction areas at relatively constant or slowing rates that are consistent with previous monitoring periods.

Subsurface deformations are monitored using IPIs and Geo4Sight markers installed within embankment rockfill and foundation materials beneath the Seep 10 Bench, Tailings Pipeline Ramp, Historical Western Leach Area and within the upstream embankment slope. Inclinometer data continue to show varying degrees of influence from settlement occurring within the embankment rockfill (consistent with surface deformation monitoring data). Inclinometers (DH19-S5 and DH19-S7) beneath the Seep 10 Bench monitored relatively constant deformation rates during Q3 2022. Inclinometers (DH19-S5 and DH19-S7) are significantly impacted by settlement (axial distortion) and continue to be of limited utility for monitoring lateral displacements. Geo4Sight instrumentation within drillhole DH21-S4 (Section 0+00) monitored decreasing deformation rates within the rockfill surcharge and tailings during Q3 2022 as construction influence at this site is gradually diminishing. This trend corresponds with a period of inactivity in the construction of the EL. 6,450 ft lift within the Central Pedestal Area.

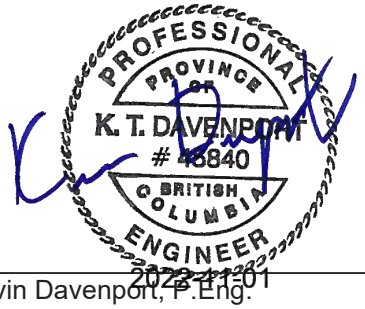
Please do not hesitate to contact the undersigned should you have any questions or if you would like any additional information.

Yours truly,
Knight Piésold Ltd.

Prepared:

Sean Yao, EIT
Junior Engineer

Prepared:



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KNIGHT PIÉSOLD LTD.
PERMIT NUMBER
1001011
EGBC PERMIT TO PRACTICE

Approval that this document adheres to the Knight Piésold Quality System: DDF

Attachments:

Table 1 Rev 0	Summary of Piezometric Quantitative Performance Parameter (QPP) Monitoring
Figure 1 Rev 0	Active Piezometric and Deformation Monitoring Instrumentation
Figure 2 Rev 0	Summary of Measured Piezometric Elevations vs. QPP Triggers East-West Embankment
Figure 3 Rev 0	Summary of Measured Piezometric Elevations vs. QPP Triggers East-West Embankment
Figure 4 Rev 0	Summary of Measured Piezometric Elevations vs. QPP Triggers North-South Embankment
Figure 5 Rev 0	Summary of Measured Piezometric Elevations vs. QPP Triggers West Embankment
Figure 6 Rev 0	Summary of Measured Piezometric Elevations vs. QPP Triggers West Embankment
Figure 7 Rev 0	Piezometric Conditions Along East-West Embankment Section 8+00W (Looking West)
Figure 8 Rev 0	Comparison of Monitored Surface Deformations at GNSS Instrumentation Sites
Appendix A	InSAR Surface Deformation Plots

Appendix B SqueeSAR Surface Deformation Plots
Appendix C GNSS Deformation Plots
Appendix D Inclinometer Deformation Plots
Appendix E Geo4Sight Deformation Plots

References:

Knight Piésold Ltd. (KP, 2020). 2019 Data Analysis Report (KP Reference No. VA101-126/21-4 Rev 0), dated August 28, 2020.

Knight Piésold Ltd. (KP, 2021a). 2020 Data Analysis Report (KP Reference No. VA101-126/23-5 Rev 0), dated June 30, 2021.

Knight Piésold Ltd. (KP, 2021b). Monthly EL. 6,450 Construction Progress and Monitoring Summary - MP#1 (Jun 22 to Jul 31, 2021) (KP Reference No. VA21-01362), dated September 30, 2021.

Knight Piésold Ltd. (KP, 2022a). Approval to Commence East-West and North-South Embankment EL. 6,450 ft Construction (KP Reference No. VA22-00361), dated March 11, 2022.

Knight Piésold Ltd. (KP, 2022b). Q2 2022 – YDTI Quarterly Piezometric and Deformation Monitoring Update (KP Reference No. VA22-01238), dated September 12, 2022.

Knight Piésold Ltd. (KP, 2022c). Monthly EL. 6,450 Construction Progress and Monitoring Summary - MP#15 (Sept 1 to Sept 30, 2022) (KP Reference No. VA22-01889).

Montana Resources and Knight Piésold (MR/KP, 2022). Yankee Doodle Tailings Impoundment – Tailings Operations, Maintenance and Surveillance (TOMS) Manual, Rev 4, dated January 2022.

Copy To: Mark Thompson, Amanda Griffith (Montana Resources)

Knight Piésold CONSULTING

TABLE 1

MONTANA RESOURCES, LLP
YANKEE DOODLE TAILINGS IMPOUNDMENT

Q3 2022 INSTRUMENTATION SUMMARY
SUMMARY OF PIEZOMETRIC QUANTITATIVE PERFORMANCE PARAMETER (QPP) MONITORING

Print Oct/26/22 14:21:01

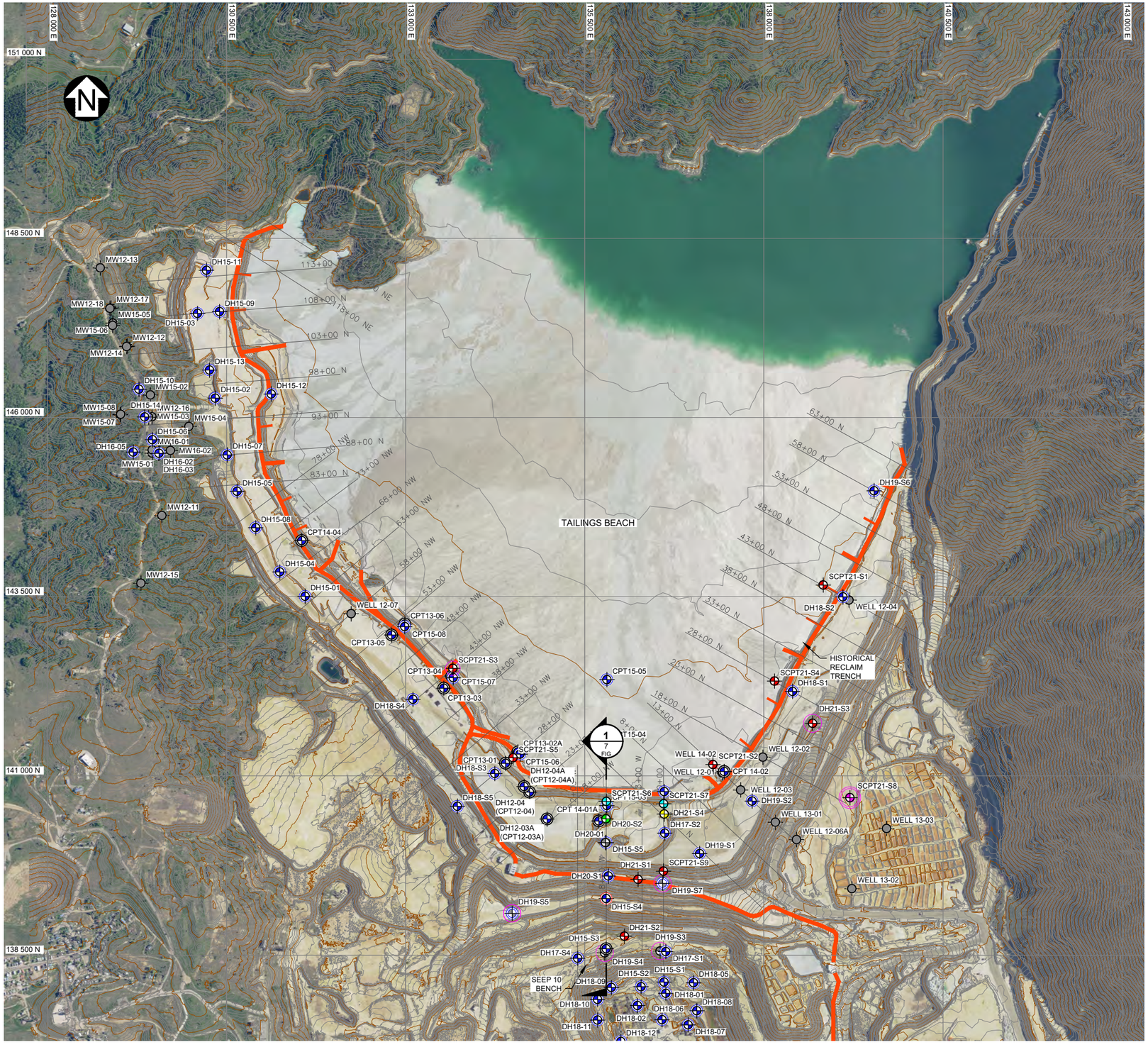
Monitoring Region	QPP Instrumentation Site	Monitoring Site Type [1]	Piezometric Trigger Elevation (ft)	Maxiumum Piezometric Elevation Recorded Q3 2022 (ft)	Exceeded Trigger Elevation During Q3 2022 (Yes/No)	Pore Pressure Change Q3 2022 (ft)	Comments
East-West Embankment	MW94-08	VWP Sensor	5,680	5,669	No	-0.13	
	MW94-11	VWP Sensor	5,693	5,673	No	-0.14	
	DH15-S3 VW1	VWP Sensor	5,690	5,665	No	-0.22	
	DH15-S4 VW1	VWP Sensor	5,740	-	No	-1.28	Sensor reporting erroenous values due to suspected data logger issue[6]
	DH15-S4 VW2	VWP Sensor	5,800	-	No	1.26	Sensor reporting erroenous values due to suspected data logger issue[6]
	DH15-S5 VW2	VWP Sensor	5,890	5,854	No	1.87	Activated as a QPP on October 3, 2022 to replace DH15-S5 VW1[5]
	DH17-S1 VW2	VWP Sensor	5,741	5,714	No	-0.17	
	DH18-S3 VW3	VWP Sensor	6,044	6,022	No	-0.23	
	DH19-S7 VW1	VWP Sensor	5,770	5,740	No	-2.91	Activated as a QPP on March 19, 2021 to replace DH17-S2 VW2[4]
North-South Embankment	MW12-01	VWP Sensor	5,940	5,910	No	-	Sensor reporting erroenous values due to suspected data logger issue[7]
	MW12-05	VWP Sensor	6,200	5,984	No	-0.02	
	DH18-S1 VW2	VWP Sensor	6,010	5,984	No	0.13	
	DH18-S2 VW2	VWP Sensor	6,029	6,008	No	0.60	
West Embankment	VWP-DP1	VWP Sensor	6,374	6,341	No	-0.05	
	VWP-DP2	VWP Sensor	6,366	6,338	No	0.69	
	DH15-12 VW1	VWP Sensor	6,372	6,350	No	0.49	
	DH15-12 VW2	VWP Sensor	6,372	6,352	No	0.62	
	DH15-12 VW3	VWP Sensor	6,372	6,351	No	0.49	

M:\1\01\00126\27\A\Correspondence\VA22-01888 - Q3 2022 Piezometric and Deformation Monitoring Summary\Tables\[QPP Compliance Figures and Table Q3.xlsm]Table 1 - QPP Evaluation

NOTES:

1. PIEZOMETRIC DATA FROM VWP SITES ARE COLLECTED CONTINUOUSLY USING DATA LOGGERS AND A REMOTE MONITORING SYSTEM.
2. THE SPECIFIED QPP TRIGGER ELEVATION FOR MW12-05 WAS UPDATED FROM 6,195 ft. TO 6,200 ft. IN THE 2018 REVISION OF THE TOMS MANUAL (MR/KP, 2018).
3. THE PIEZOMETRIC QPP NETWORK WAS EXPANDED TO INCLUDE ADDITIONAL SENSORS DURING THE MOST RECENT TOMS UPDATE (MR/KP, 2020).
4. DH17-S2 VW2 BECAME DAMAGED ON MARCH 19, 2021 AND DATA THEREAFTER ARE INTERPRETED TO BE ERRONEOUS. THIS SENSOR WAS RETIRED FROM THE QPPS AND REPLACED WITH THE NEARBY DH19-S7 VW1.
5. SENSOR DH15-S5 VW1 IS POTENTIALLY DAMAGED DUE TO THE RECENT COLLAR RAISE AND HAVE BEEN ABANDONED. THIS SENSOR WAS RETIRED FROM THE QPPS AND REPLACED WITH DH15-S5 VW2 ON OCTOBER 3, 2022.
6. DATA LOGGERS INSTALLED FOR SENSORS DH15-S4 VW1 AND VW2 BECAME DAMAGED ON AUGUST 10, 2022 AND HAVE REPORTED ERRONEOUS VALUES SUBSEQUENTLY. VALUES HAVE BEEN OMITTED FOR CLARITY. TROUBLESHOOTING AND MANUAL DATA COLLECTION IS ONGOING.
7. SENSOR MW12-01 HAS BEEN REPORTING ERRONEOUS VALUES DUE TO A SUSPECTED DATA LOGGER ISSUE SINCE JULY 23, 2022. TROUBLESHOOTING IS ONGOING.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER VA22-01888	SY3	KTD



NOTES:

1. COORDINATE SYSTEM AND ELEVATIONS BASED ON ANACONDA MINE GRID.
2. QPP = QUANTITATIVE PERFORMANCE PARAMETER.
3. RK-3 TAILINGS DISCHARGE POINT WAS RELOCATED NORTH IN OCTOBER 2017.
4. THE AERIAL PHOTO SHOWN IS FROM JULY, 2022.
5. TOPOGRAPHY PROVIDED BY MONTANA RESOURCES, LLP IN JULY, 2022.
6. NO PORE WATER PRESSURE DATA ARE AVAILABLE FROM DH20-S1 AND DH20-S2 AS THE INSTRUMENTATIONS ARE NOT FUNCTIONAL.

LEGEND:

- 2021 DRILLHOLE WITH NESTED PIEZOMETERS
- 2021 DRILLHOLE WITH NESTED PIEZOMETERS AND INCLINOMETER
- 2021 DRILLHOLE WITH NESTED VIBRATING WIRE PIEZOMETERS AND GEO4SIGHT INSTRUMENTATION
- 2021 DRILLHOLE WITH INCLINOMETER
- 2021 GEOTECHNICAL DRILLHOLE
- EXISTING DRILLHOLE WITH NESTED VIBRATING WIRE PIEZOMETERS AND GEO4SIGHT INSTRUMENTATION
- EXISTING GEOPHYSICAL CASING
- EXISTING INCLINOMETER
- EXISTING INCLINOMETER WITH NESTED VIBRATING WIRE PIEZOMETERS
- EXISTING NESTED VIBRATING WIRE PIEZOMETERS
- EXISTING SINGLE VIBRATING WIRE PIEZOMETER
- EXISTING THERMISTOR WITH VIBRATING WIRE PIEZOMETER
- EXISTING INSTRUMENTED MONITORING WELL OR STANDPIPE
- TAILINGS PIPELINE

SCALE A 500 0 500 1000 1500 2000 2500 ft

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	11OCT'22	ISSUED WITH LETTER	SY3	RMM	KTD

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

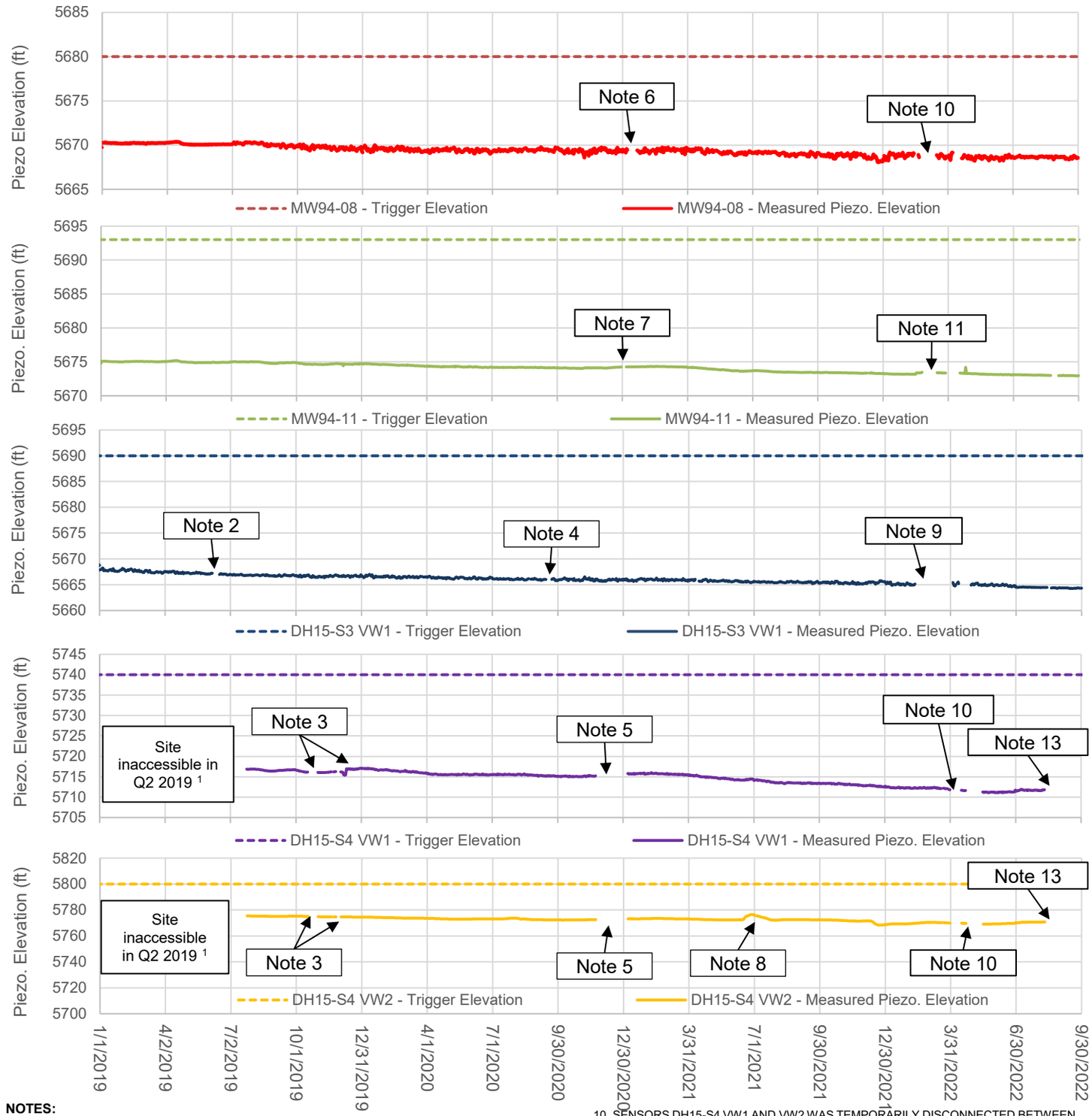
ACTIVE PIEZOMETRIC INSTRUMENTATION AND MONITORING SITE

Knight Piésold CONSULTING

P/A NO. VA101-126/27 | REF NO. VA22-01888

FIGURE 1 | REV 0

SAVED: M:\1101\01\26\27\AVAcad\FIGS\B52, 9/12/2022 9:47:00 AM - RMCLELLAN PRINTED: 10/11/2022 9:28:29 AM, FIG 1, RMCLELLAN
XREF FILE(S): TOPO - 5 - July 2022_08_01 - 2022-07-18, Tailings and Reclaim Pipelines IMAGE FILE(S): BR_01 2022-07-18



NOTES:

1. NO DATA ARE SHOWN FROM DEC 20, 2017 TO JULY 25, 2019 FOR DH15-S4 VW1 AND VW2 AS MR STAFF WERE UNABLE TO CONNECT THE INSTRUMENTATION WITH THE REMOTE MONITORING SYSTEM DUE TO SITE INACCESSIBILITY.
2. NO DATA WERE COLLECTED BY DH15-S3 VW1 FROM JUNE 7, 2019 TO JUNE 16, 2019 DUE TO INSUFFICIENT BATTERY VOLTAGE
3. NO DATA WERE COLLECTED BY DH15-S4 VW1 AND VW2 DUE TO POWER SUPPLY ISSUES OCTOBER 19 TO 31 AND NOVEMBER 27, 2019 TO DECEMBER 3, 2019. SENSORS MOVED NEW LOGGER.
4. NO DATA WERE COLLECT BY DH15-S3 VW1 FROM SEPTEMBER 15 TO SEPTEMBER 21, 2020 DUE TO DEPLETED GEONET BATTERY WHICH WAS SUBSEQUENTLY REPLACED.
5. NO DATA WERE COLLECTED BY DH15-S4 VW1 AND VW2 DUE TO SUSPECTED LOGGER ISSUE FROM NOVEMBER 22, 2020. FUNCTIONALITY WAS RESTORED USING A REPLACEMENT LOGGER IN Q1 2021.
6. NO DATA WERE COLLECTED BY MW94-08 FROM JANUARY 7 TO 19, 2021 DUE TO A DEPLETED BATTERY WHICH WAS SUBSEQUENTLY REPLACED.
7. NO DATA WERE COLLECTED BY MW94-11 FROM DECEMBER 30, 2020 TO JANUARY 4, 2021 DUE TO A DEPLETED BATTERY WHICH WAS SUBSEQUENTLY REPLACED.
8. PIEZOMETRIC ELEVATION INCREASED IN RESPONSE TO OBSERVED INFILTRATION OF TAILINGS SLURRY WATER INTO THE CENTRAL ROCKFILL SURCHARGE FROM JUNE 14 TO JUNE 28, 2021 AS DESCRIBED IN VA21-01320.
9. SENSOR DH15-S3 VW1 WENT OFFLINE ON FEBRUARY 9, 2022 DUE TO A SUSPECTED RMS CONNECTIVITY ISSUE. CONNECTIVITY WAS RE-ESTABLISHED ON APRIL 20, 2022.
10. SENSORS DH15-S4 VW1 AND VW2 WAS TEMPORARILY DISCONNECTED BETWEEN APRIL 1 AND MAY 17, 2022 DUE TO A SUSPECTED RMS CONNECTIVITY ISSUE.
11. SENSOR MW94-8 WAS TEMPORARILY DISCONNECTED BETWEEN FEBRUARY 19 AND APRIL 21, 2022 DUE TO A SUSPECTED LOGGER VOLTAGE ISSUE.
12. SENSOR MW94-11 WAS TEMPORARILY DISCONNECTED BETWEEN MARCH 6 AND APRIL 18, 2022 DUE TO A SUSPECTED RMS CONNECTIVITY ISSUE.
13. SENSORS DH15-S4 VW1 AND VW2 COLLECTED ERRONEOUS READINGS STARTING ON AUGUST 9, 2022 DUE TO SUSPECTED LOGGER ISSUE. VALUES HAVE BEEN OMITTED FOR CLARITY. TROUBLESHOOTING IS CURRENTLY IN PROGRESS.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

SUMMARY OF MEASURED VS. QPP TRIGGER PIEZOMETRIC ELEVATIONS EAST-WEST EMBANKMENT

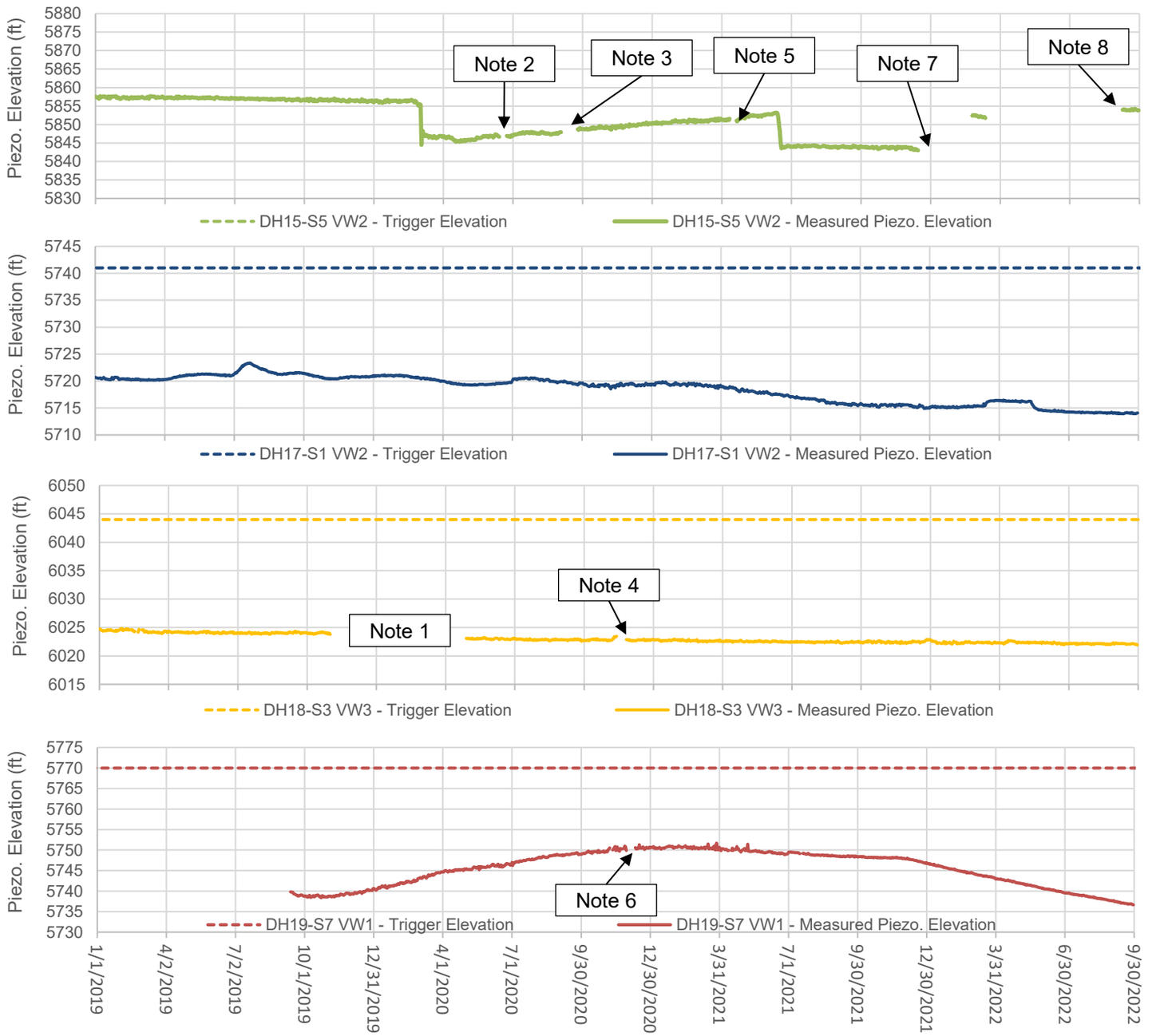
Knight Piésold CONSULTING

P/A NO. VA101-126/27

REF. NO. VA22-01888

FIGURE 2

REV 0



NOTES:

1. NO DATA WERE COLLECTED BY DH18-S3 VW1 FROM NOVEMBER 1, 2019 TO FEBRUARY 3, 2020 AND FEBRUARY 4 TO APRIL 30, 2020 DUE TO SUSPECTED HARDWARE DAMAGE.
2. NO DATA WERE COLLECTED BY DH15-S5 VW2 DUE TO LOGGER POWER SUPPLY ISSUES FROM JUNE 13 TO 23, 2020.
3. NO DATA WERE COLLECTED BY DH15-S5 VW2 DUE TO WATER DAMAGED LOGGER FROM SEPTEMBER 2 TO 24, 2020. THE LOGGER WAS SUBSEQUENTLY REPLACED.
4. NO DATA WERE COLLECTED BY DH18-S3 DUE TO A DEPLETED DATA LOGGER BATTERY FROM NOVEMBER 12 TO 25, 2020.
5. NO DATA WERE COLLECTED BY DH15-S5 VW2 FROM APRIL 11 TO APRIL 20, 2021 DUE TO A DEPLETED DATA LOGGER BATTERY.
6. NO DATA WERE COLLECTED BY DH19-S7 VW1 FROM NOVEMBER 30 TO DECEMBER 10, 2020 DUE TO AN UNKNOWN HARDWARE ISSUE.
7. SENSORS IN DH15-S5 WERE TEMPORARILY DISCONNECTED BETWEEN DECEMBER 14, 2021 AND FEBRUARY 24, 2022 TO FACILITATE A COLLAR RAISE IN ADVANCE OF THE EL. 6,450 ft CREST CONSTRUCTION. SENSOR WAS TEMPORARILY RECONNECTED AND BECAME DISCONNECTED ON MARCH 12, 2022 DUE TO A SUSPECTED RMS CONNECTIVITY ISSUE. SENSOR BECAME RECONNECTED AND REMAINED OFFLINE UNTIL SEPTEMBER 8, 2022 TO FACILITATE THE PLANNED COLLAR RAISE.
8. QPP SENSOR DH15-S5 VW1 WAS DAMAGED DURING EL. 6450 ft LIFT CONSTRUCTION AND HAS BEEN ABANDONED. KP HAVE ELECTED SENSOR DH15-S5 VW2 AS A REPLACEMENT QPP.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

SUMMARY OF MEASURED VS. QPP TRIGGER PIEZOMETRIC ELEVATIONS EAST-WEST EMBANKMENT

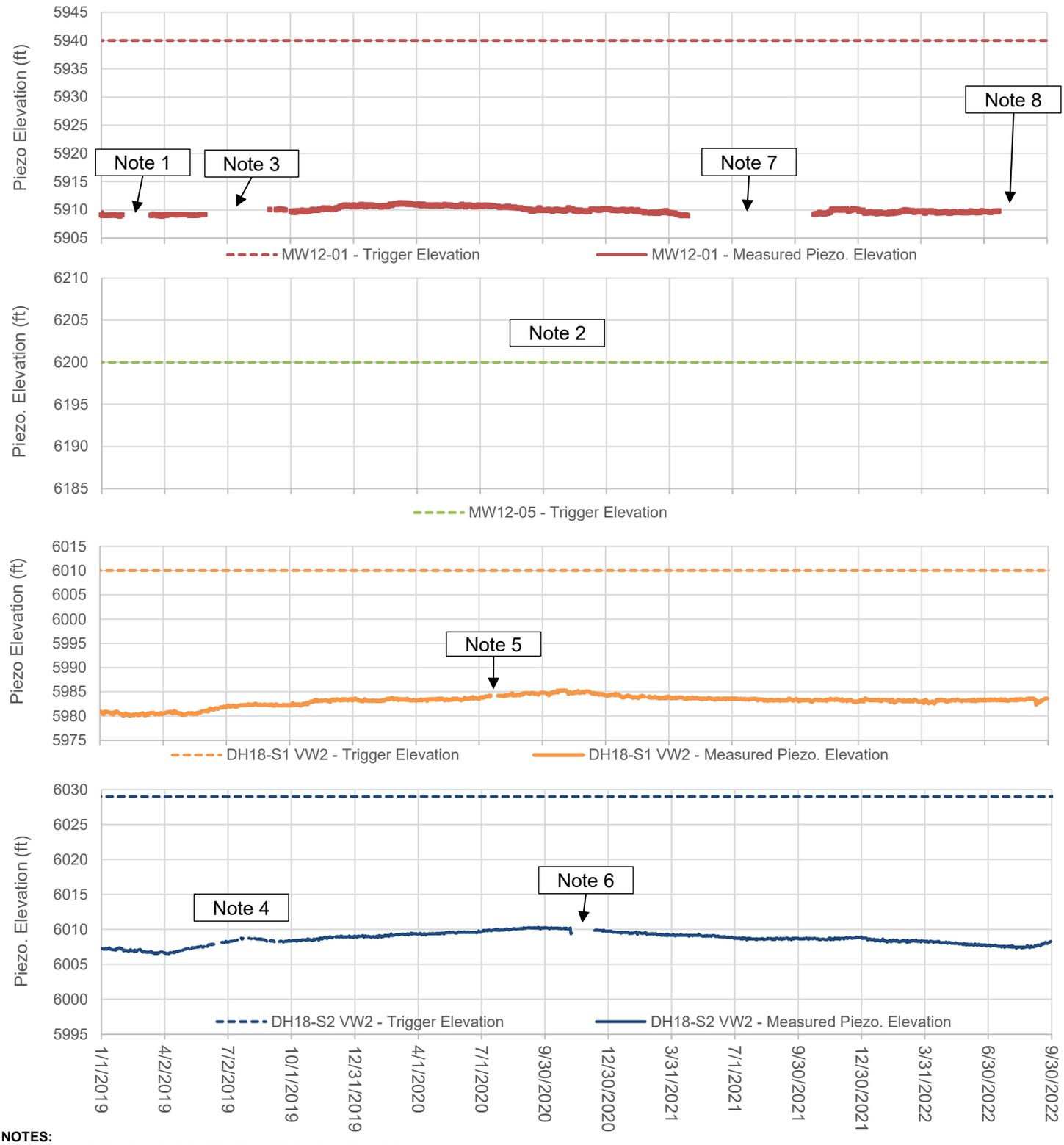
Knight Piésold CONSULTING

P/A NO. VA101-126/27

REF. NO. VA22-01888

FIGURE 3

REV 0



NOTES:

1. MW12-01 BECAME UNSATURATED FROM FEBRUARY 1 TO MARCH 13, 2019.
2. NO DATA WERE COLLECTED BY MW12-05. THE STANDPIPE WAS AND REMAINS UNSATURATED (DRY).
3. NO DATA WERE COLLECTED BY MW12-01 FROM MAY 31 TO SEPTEMBER 11, 2019 DUE TO DATA LOGGER FAILURE.
4. ERRONEOUS NOISE WAS RECORDED IN THE DATA BY DH18-S2 VW2. THESE DATA HAVE BEEN OMITTED FOR CLARITY.
5. NO DATA WERE COLLECTED BY DH18-S1 VW2 FROM JULY 27 TO 29, 2020 DUE TO UNKNOWN SENSOR ISSUE.
6. NO DATA WERE COLLECTED BY DH18-S2 VW2 FROM NOVEMBER 8 TO DECEMBER 12, 2020 WHILE THE SENSORS WERE REROUTED TO A NEW MONITORING HUB LOCATION.
7. SENSOR MW12-01 VW1 WAS UNSATURATED BETWEEN APRIL 28 AND OCTOBER 28, 2021. DATA HAVE BEEN OMITTED FROM PLOT FOR CLARITY. THE SENSOR RESATURATED ON OCTOBER 18, 2021 AND REMAINED SATURATED THEREAFTER.
8. SENSOR MW12-01 VW1 RECORDED ERRONEOUS VALUES DUE TO A SUSPECTED LOGGER ISSUE. VALUES HAVE BEEN OMITTED FOR CLARITY.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

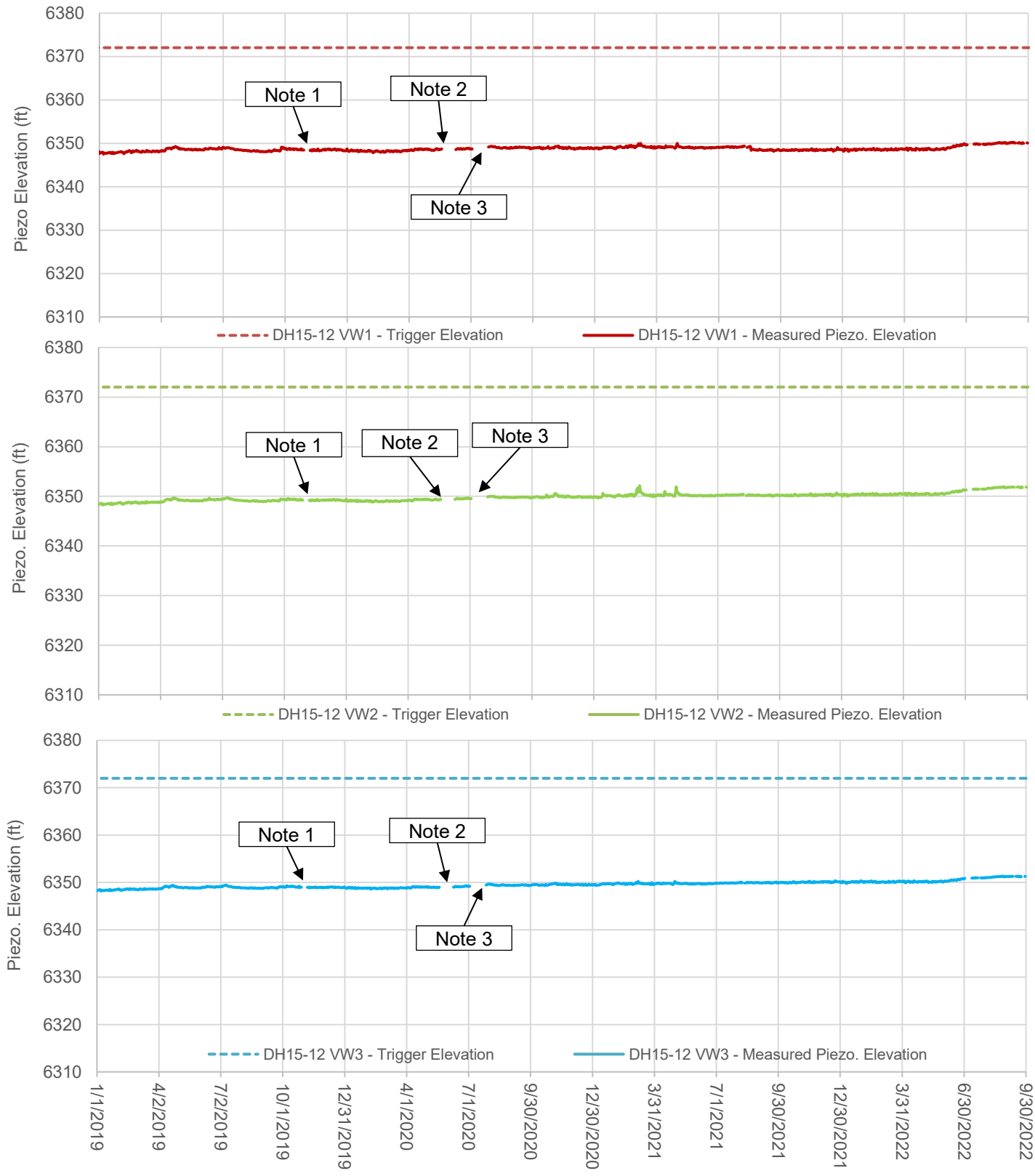
YANKEE DOODLE TAILINGS IMPOUNDMENT

SUMMARY OF MEASURED VS. QPP TRIGGER PIEZOMETRIC ELEVATIONS NORTH-SOUTH EMBANKMENT

Knight Piésold CONSULTING

P/A NO.	REF. NO.
VA101-126/27	VA22-01888

FIGURE 4 REV 0



NOTES:

1. NO DATA WERE COLLECTED BY DH15-12 VW1, VW2, AND VW3 FROM OCTOBER 30, 2019 TO NOVEMBER 6, 2019 DUE TO A CONNECTIVITY ISSUE.
2. NO DATA WERE COLLECTED BY DH15-12 VW1, VW2, AND VW3 FROM MAY 19 TO JUNE 9, 2020 DUE TO A SUSPECTED LOGGER CONNECTIVITY ISSUE.
3. NO DATA WERE COLLECTED BY DH15-12 VW1, VW2, AND VW3 FROM JULY 3 TO JULY 26, 2020 DUE TO A CONNECTIVITY ISSUE.

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

SUMMARY OF MEASURED VS. QPP TRIGGER PIEZOMETRIC ELEVATIONS WEST EMBANKMENT

Knight Piésold CONSULTING

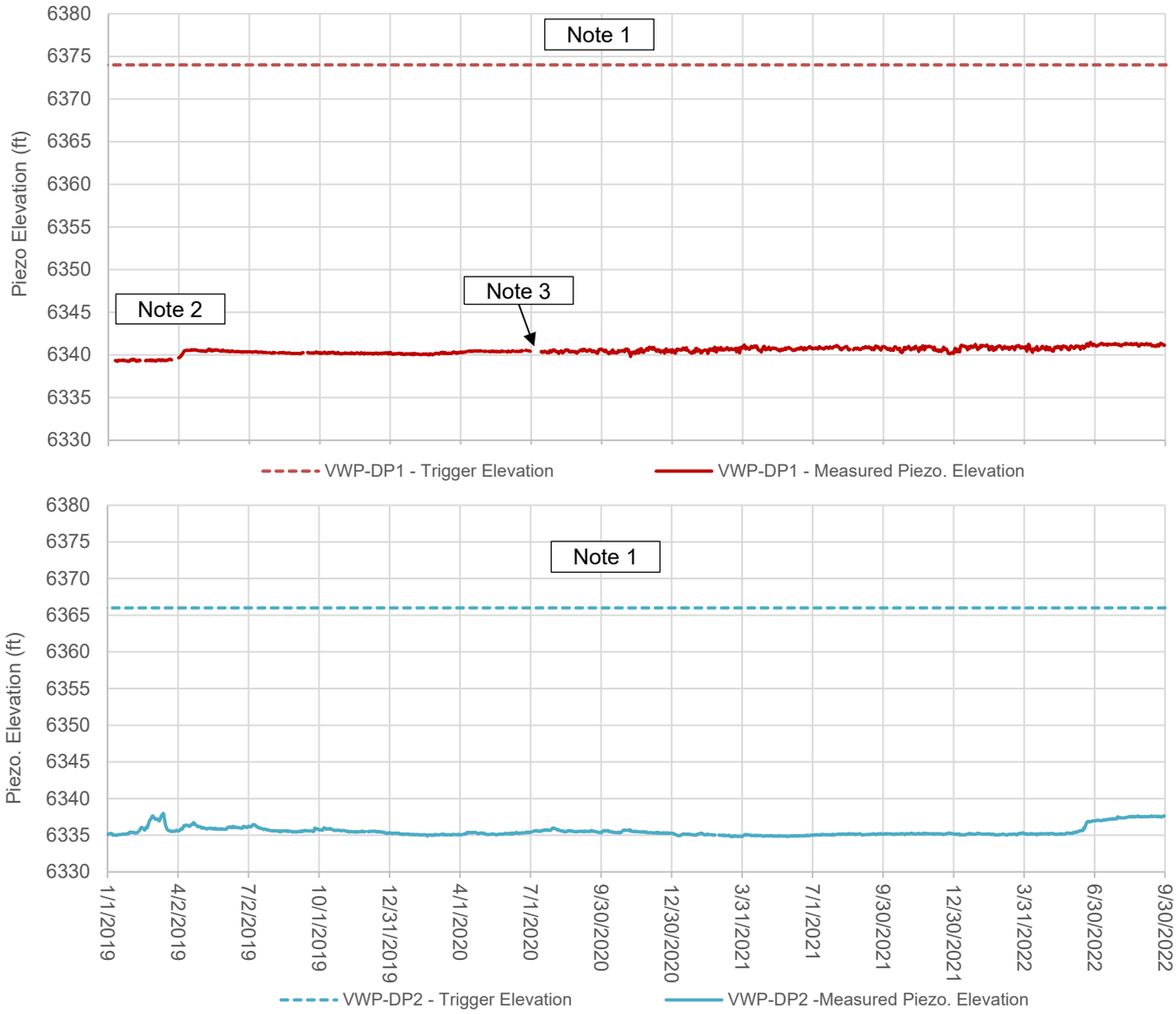
P/A NO. VA101-126/27

REF. NO. VA22-01888

FIGURE 5

REV 0

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD



NOTES:

1. TRIGGER ELEVATIONS FOR SENSORS INSTALLED IN THE DRAIN PODS HAVE BEEN SPECIFIED AT THE ALLOWABLE HYDRAULIC GRADE LINE.
2. PERIODIC OUTAGES OCCURED AT VWP-DP1 DUE TO INTERMITTENT BATTERY VOLTAGE ISSUES.
3. NO DATA WERE RECORDED BY VWP-DP1 FROM JULY 1 TO 14, 2020 DUE TO A COMMUNICATION OUTAGE. A REPLACEMENT DATA LOGGER WAS SUBSEQUENTLY INSTALLED TO RESOLVE THE ISSUE.

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

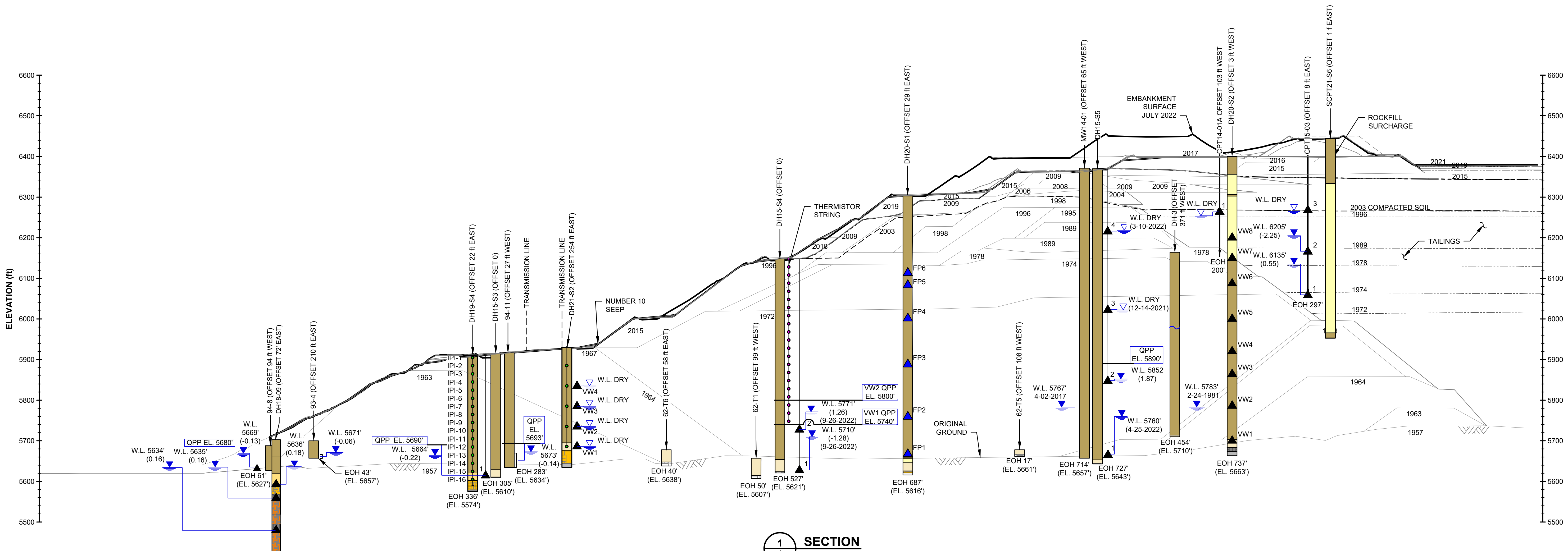
SUMMARY OF MEASURED VS. QPP TRIGGER PIEZOMETRIC ELEVATIONS WEST EMBANKMENT

Knight Piésold CONSULTING

P/A NO. VA101-126/27 | REF. NO. VA22-01888

FIGURE 6 | REV 0

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD



SECTION 1
STATION 8+00 W
SCALE A

NOTES:

1. COORDINATE SYSTEM IS ANACONDA MINE GRID.
2. DIMENSIONS AND ELEVATIONS ARE IN FEET, UNLESS NOTED OTHERWISE.
3. PIEZOMETRIC LEVELS (W.L.) SHOWN USING END OF Q3 2022 READINGS (SEPTEMBER 30, 2022), UNLESS OTHERWISE INDICATED.
4. CHANGE IN WATER LEVEL FOR QPP SITES IS RELATIVE TO END OF Q2 2022.
5. MONITORING WELL MW14-01 ABANDONED DUE TO RISER BLOCKAGE DURING Q4 2019, RESULTING IN ERRONEOUS DATA. DATA OMITTED FOR CLARITY.
6. QPP STANDS FOR QUANTITIVE PERFORMANCE PARAMETER.
7. NO PORE WATER PRESSURE DATA ARE AVAILABLE FROM DH20-S1 AND DH20-S2 AS THE INSTRUMENTATION IS NOT FUNCTIONAL.

LEGEND:

- TAILINGS
- EMBANKMENT FILL
- ALLUVIUM
- RECENT ALLUVIUM
- HIGHLY ALTERED BEDROCK
- HIGHLY WEATHERED BEDROCK
- MODERATELY WEATHERED BEDROCK
- BEDROCK
- W.L. XXX — QUARTERLY PIEZOMETRIC ELEVATION CHANGE (±X.X feet) SINCE LAST QUARTER
- VIBRATING WIRE PIEZOMETER
- THERMISTOR
- IN-PLACE INCLINOMETER SENSOR
- SOL — SETTING OUT LINE
- 1972 — HISTORICAL TAILINGS SURFACE
- 1972 — DATE OF EMBANKMENT RAISE

SCALE A: 125 0 125 250 375 500 625 ft

MONTANA RESOURCES, LLP

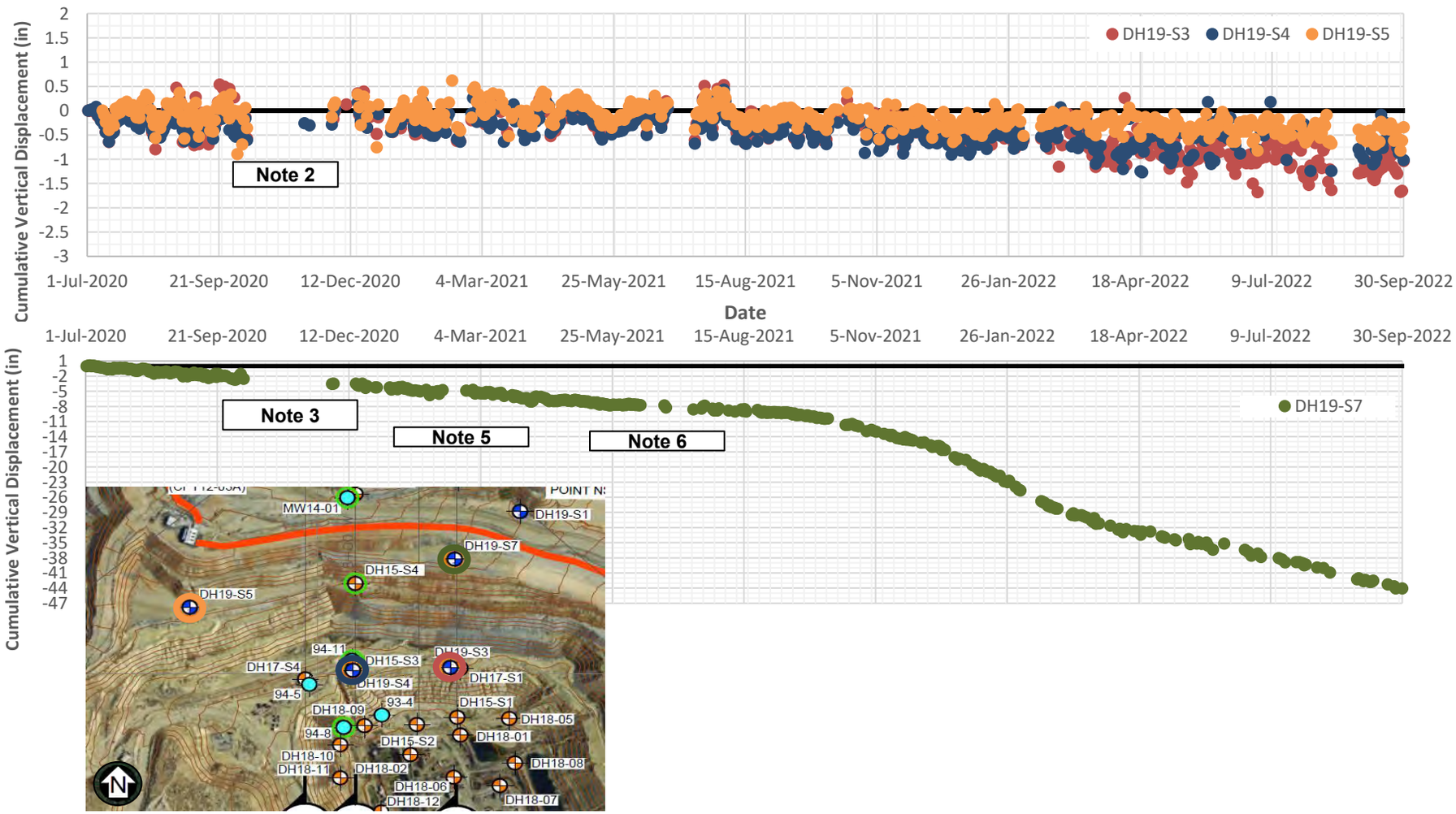
YANKEE DOODLE TAILINGS IMPOUNDMENT

PIEZOMETRIC CONDITIONS ALONG EAST-WEST EMBANKMENT SECTION 8+00W (LOOKING WEST)

Knight Piésold CONSULTING

P/A NO.	REF NO.	
VA101-126/27	VA22-01888	
FIGURE 7		REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	11OCT'22	ISSUED WITH LETTER	SY3	RMM	KTD



NOTES:

1. CUMULATIVE VERTICAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM DH19-S2 AND DH19-S5 BETWEEN OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NO DATA WERE COLLECTED FROM DH19-S3 AND DH19-S7 BETWEEN OCTOBER 7 TO NOVEMBER 13, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
4. NEGATIVE VERTICAL DISPLAEMENTS INDICATE DOWNWARD DISPLACEMENT.
5. NO DATA WERE COLLECTED FROM FEBRUARY 9 TO 21, 2021 DUE TO A DEPLETED DATA LOGGER BATTERY.
6. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	30SEPT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES LLP.

YANKEE DOODLE TAILINGS IMPOUNDMENT

COMPARISON OF GNSS CUMULATIVE VERTICAL DISPLACEMENTS AND RATES (JULY 1, 2020 THROUGH SEPTEMBER 30, 2022)

Knight Piésold CONSULTING

P/A NO. VA101-00126/27

REF. NO. VA22-01888

FIGURE 8

REV 0

APPENDIX A

InSAR Surface Deformation Plots

(Pages A-1 to A-8)

137,533

143,058

N

(i)

(ii)

(iii)

(iv)

Miles

0

0.6

Background: Orthophoto (29-07-2021)
Local Coordinate System

137,533

InSAR Bulletin

Yankee Doodle Tailings Impoundment

27 Jun 2022 - 19 Jul 2022

COMMENTS

Main areas of movement detected during the current 22-day period:

(i) West Embankment Up to -0.8 inches

East-West Embankment Up to **(ii)** -1.5 inches in the northern region and **(iii)** -2.4 inches in the southern region

(iv) East Embankment Up to -1.5 inches

PROCESSING DATA

Date range (UTC)	27 Jun 2022 - 19 Jul 2022
Interval	22 days
Satellite (resolution)	TSX (10x10 ft)
Orbit (angle)	Ascending (θ=29°)
Normal Baseline	289 [ft]

LEGEND

LOS Displacement [in]

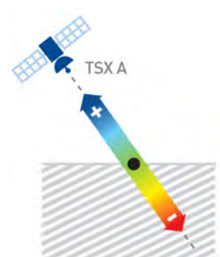
≤ -1 | -0.5 | 0 | +0.5 | ≥ +1

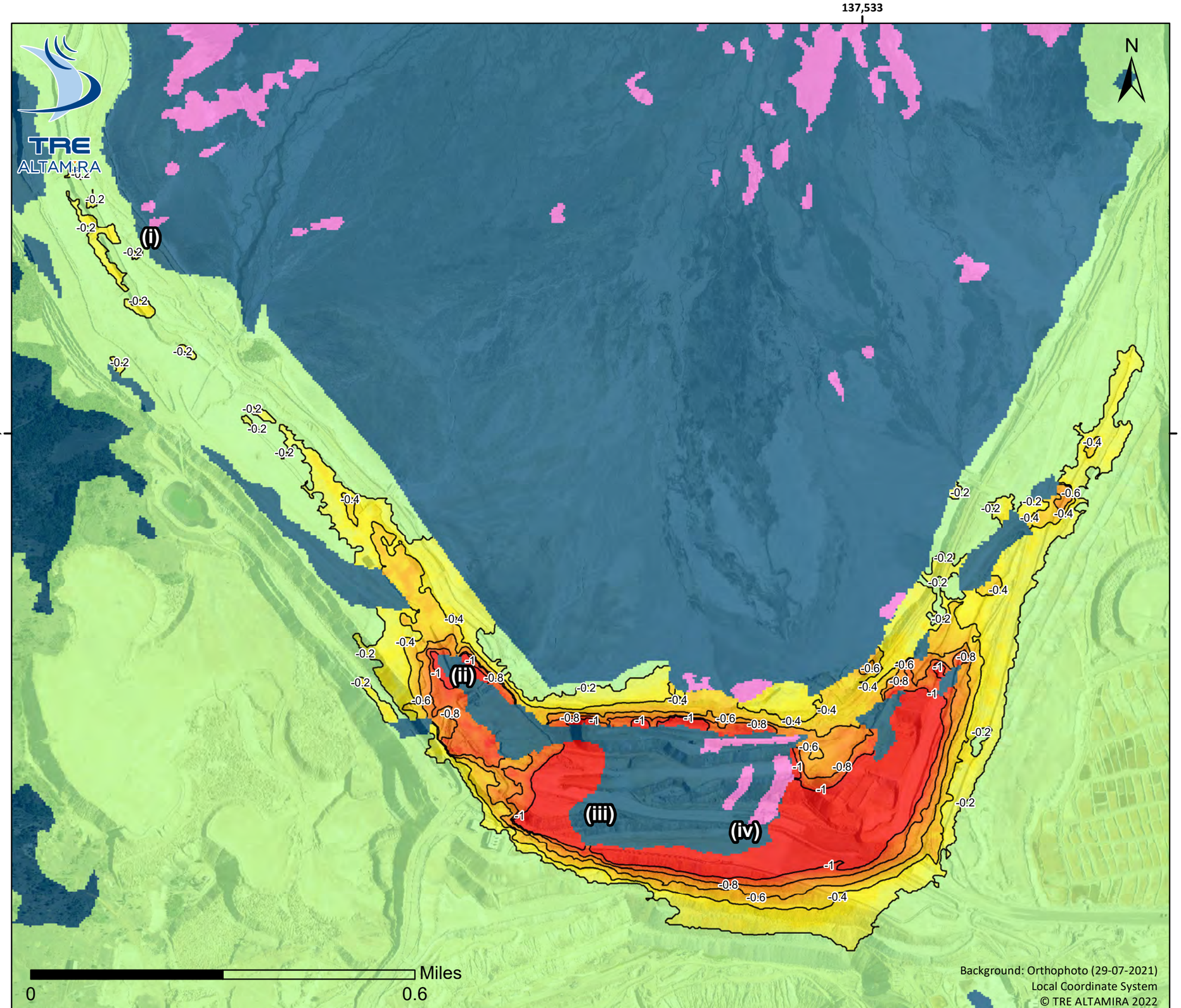
Displacement contour lines

Visibility

- Surface variation
- No Information
- Possible motion

Movement Detection Threshold: ±0.2 in





InSAR Bulletin

Yankee Doodle Tailings Impoundment

08 Jul 2022 - 30 Jul 2022

COMMENTS

Main areas of movement detected during the current 22-day period:

(i) West Embankment Up to -0.4 inches

East-West Embankment Up to **(ii)** -1.4 inches in the northern region and **(iii)** -3.8 inches in the southern region

(iv) East Embankment Up to -2.5 inches

PROCESSING DATA

Date range (UTC)	08 Jul 2022 - 30 Jul 2022
Interval	22 days
Satellite (resolution)	TSX (10x10 ft)
Orbit (angle)	Ascending (θ=29°)
Normal Baseline	36 [ft]

LEGEND

LOS Displacement [in]

≤ -1 | -0.5 | 0 | +0.5 | ≥ +1

Displacement contour lines

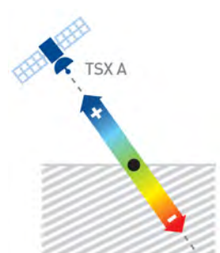
Visibility

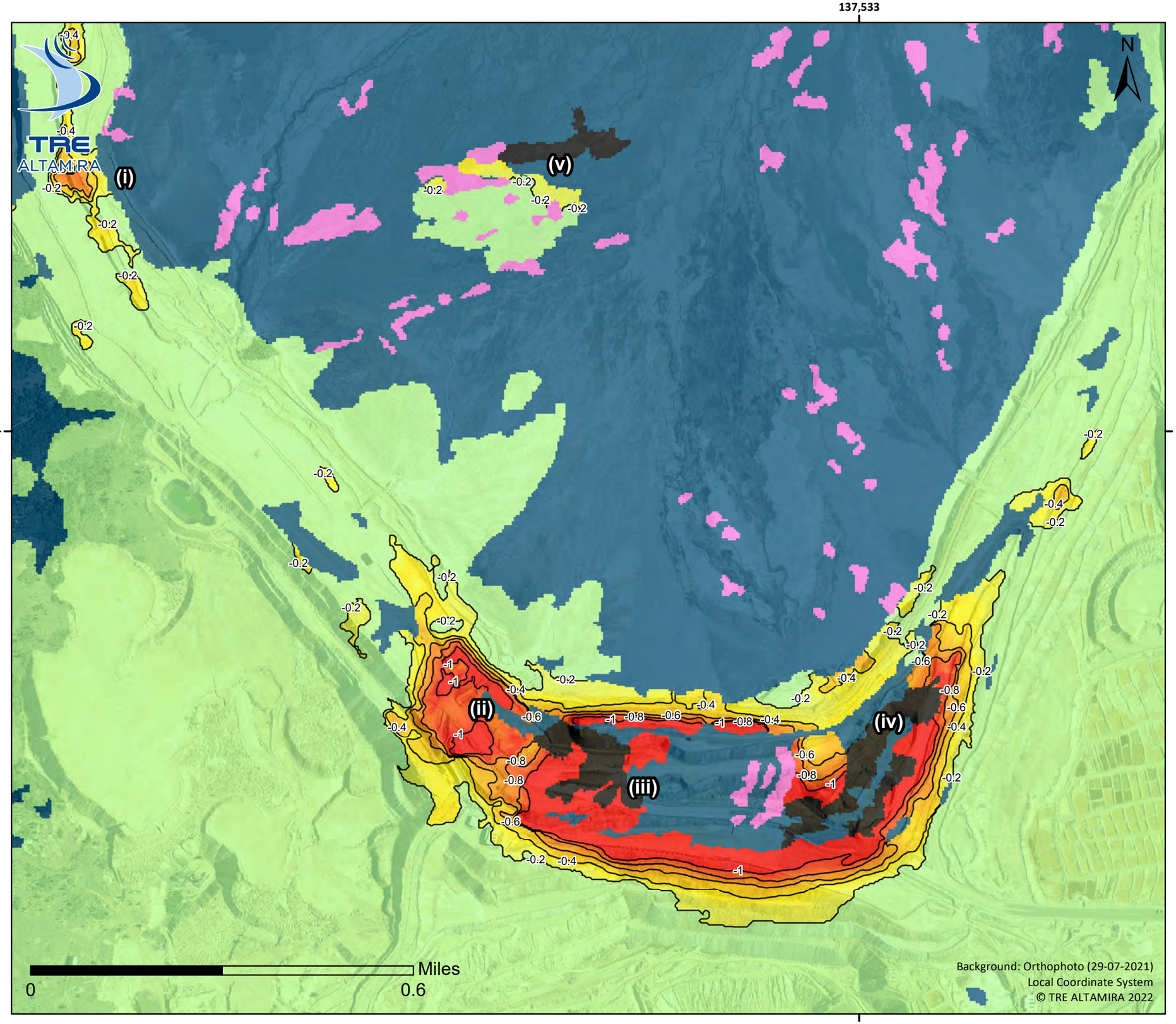
Surface variation

No Information

Possible motion

Movement Detection Threshold: ±0.2 in





InSAR Bulletin

Yankee Doodle Tailings Impoundment

19 Jul 2022 - 10 Aug 2022

COMMENTS

Main areas of movement detected during the current 22-day period:

(i) West Embankment Up to -0.8 inches

East-West Embankment Up to **(ii)** -1.6 inches in the northern region and **(iii)** -5.6 inches in the southern region

(iv) East Embankment Up to -2.0 inches

(v) Within the Impoundment Up to -0.4 inches

PROCESSING DATA

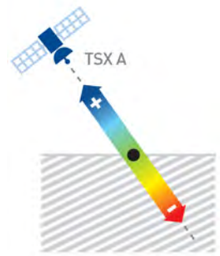
Date range (UTC)	19 Jul 2022 - 10 Aug 2022
Interval	22 days
Satellite (resolution)	TSX (10x10 ft)
Orbit (angle)	Ascending (θ=29°)
Normal Baseline	427 [ft]

LEGEND

LOS Displacement [in]

≤ -1 | -0.5 | 0 | +0.5 | ≥ +1

Displacement contour lines



Visibility

- Surface variation
- No Information
- Possible motion

Movement Detection Threshold: ±0.2 in

137,533

143,058

(i)

(ii)

(iii)

(iv)

N

Miles

0

0.6

Background: Orthophoto (29-07-2021)
Local Coordinate System

137,533

InSAR Bulletin

Yankee Doodle Tailings Impoundment

30 Jul 2022 - 21 Aug 2022

COMMENTS

Main areas of movement detected during the current 22-day period:

(i) West Embankment Up to -0.8 inches

East-West Embankment Up to **(ii)** -1.8 inches in the northern region and **(iii)** -2.4 inches in the southern region

(iv) East Embankment Up to -1.2 inches

PROCESSING DATA

Date range (UTC)	30 Jul 2022 - 21 Aug 2022
Interval	22 days
Satellite (resolution)	TSX (10x10 ft)
Orbit (angle)	Ascending (θ=29°)
Normal Baseline	200 [ft]

LEGEND

LOS Displacement [in]

≤ -1 | -0.5 | 0 | +0.5 | ≥ +1

Displacement contour lines

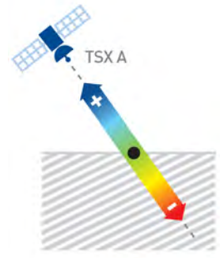
Visibility

Surface variation

No Information

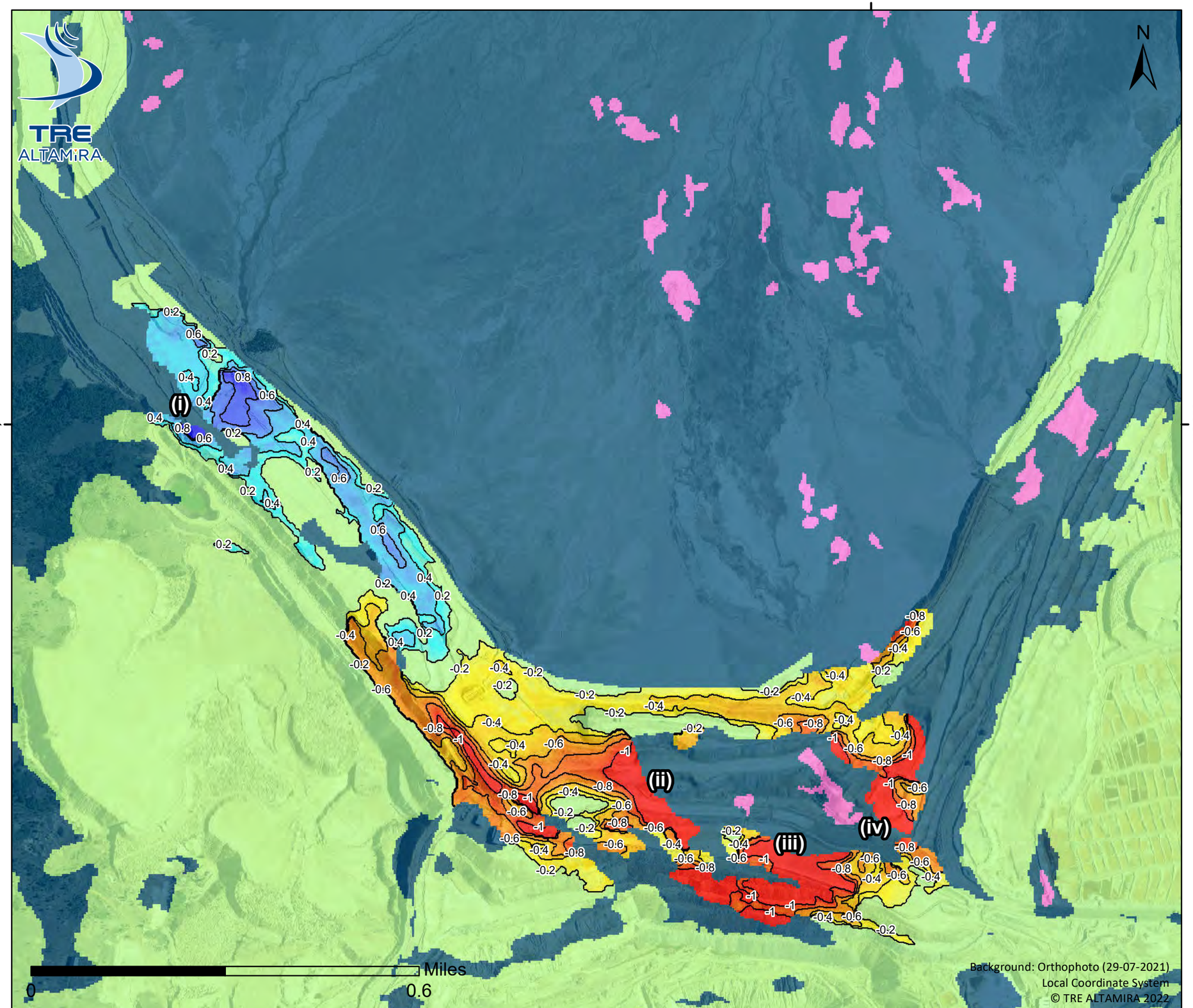
Possible motion

Movement Detection Threshold: ±0.2 in



137,533

143,058



143,058

137,533

E - 30 of 58
A - 5 of 8

InSAR Bulletin

Yankee Doodle Tailings Impoundment

12 Aug 2022 - 03 Sep 2022

COMMENTS

Main areas of movement detected during the current 22-day period:

(i) West Embankment Up to +1.3 inches

East-West Embankment Up to **(ii)** -1.8 inches and **(iii)** -1.9 inches

(iv) East Embankment Up to -2.5 inches

PROCESSING DATA

Date range (UTC)	12 Aug 2022 - 03 Sep 2022
Interval	22 days
Satellite (resolution)	TSX (10x10 ft)
Orbit (angle)	Descending (θ=29°)
Normal Baseline	1640 [ft]

LEGEND

LOS Displacement [in]

≤ -1 | -0.5 | 0 | +0.5 | ≥ +1

Displacement contour lines

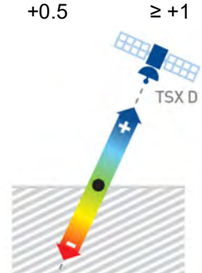
Visibility

Surface variation

No Information

Possible motion

Movement Detection Threshold: ±0.2 in



137,533

143,058

N

(i)

(ii)

(iii)

(iv)

(v)

Miles

0

0.6

Background: Orthophoto (29-07-2021)
Local Coordinate System

137,533

InSAR Bulletin

Yankee Doodle Tailings Impoundment

21 Aug 2022 - 12 Sep 2022

COMMENTS

Main areas of movement detected during the current 22-day period:

(i) West Embankment Up to -0.6 inches

East-West Embankment Up to **(ii)** -2.5 inches in the northern region and **(iii)** -2.5 inches in the southern region

East Embankment Up to **(iv)** -1.8 inches in the southern region and **(v)** up to -1.9 inches in the northern region

Further possible motion observed

PROCESSING DATA

Date range (UTC)	21 Aug 2022 - 12 Sep 2022
Interval	22 days
Satellite (resolution)	TSX (10x10 ft)
Orbit (angle)	Ascending (θ=29°)
Normal Baseline	269 [ft]

LEGEND

LOS Displacement [in]

≤ -1 | -0.5 | 0 | +0.5 | ≥ +1

Displacement contour lines

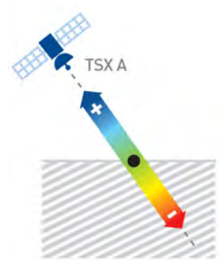
Visibility

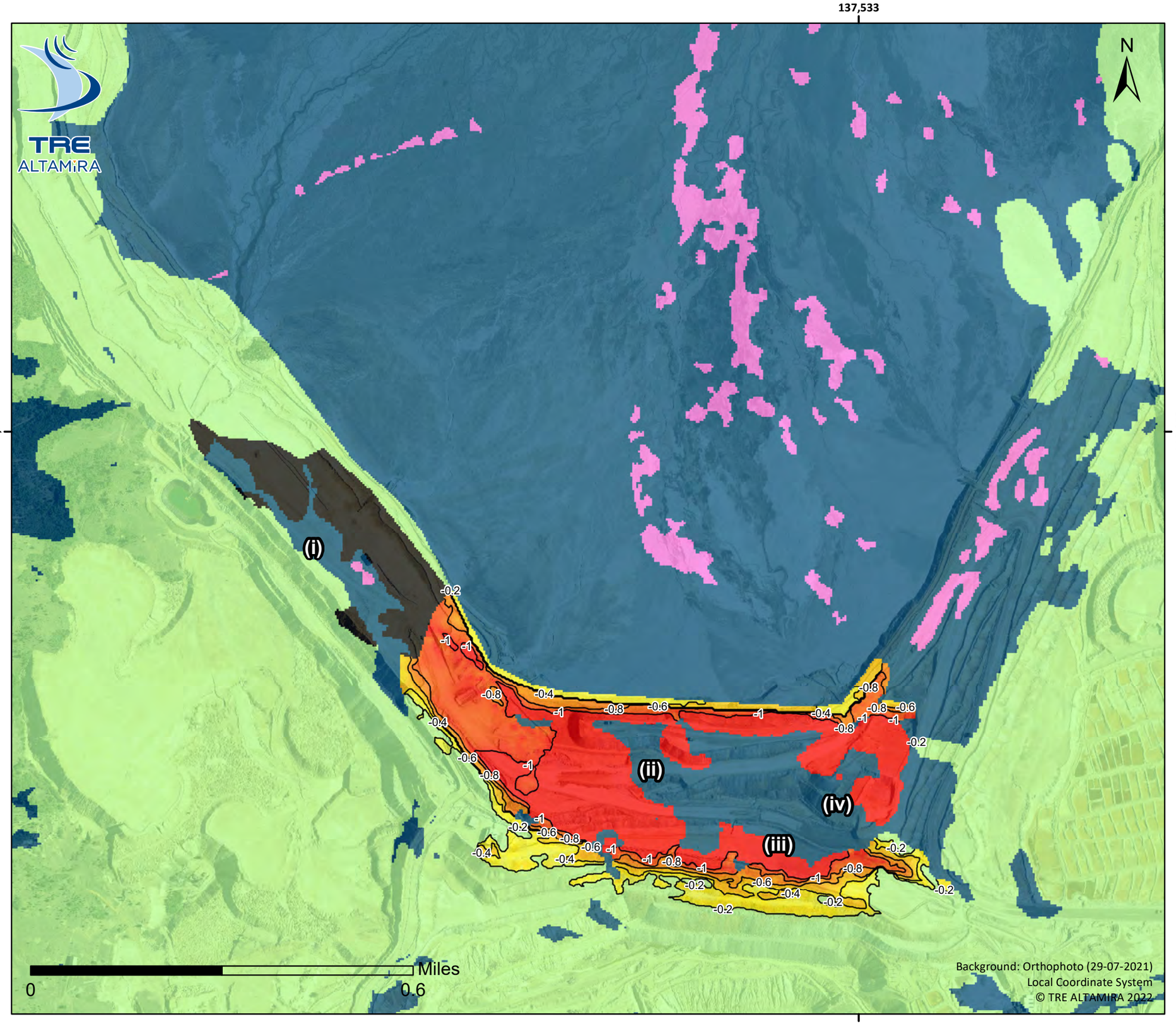
Surface variation

No Information

Possible motion

Movement Detection Threshold: ±0.2 in





E - 32 of 58
A - 7 of 8

InSAR Bulletin

Yankee Doodle Tailings Impoundment

03 Sep 2022 - 25 Sep 2022

COMMENTS

Main areas of movement detected during the current 22-day period:

(i) West Embankment Possible motion

East-West Embankment Up to **(ii)** -2.9 inches and **(iii)** -3.3 inches

(iv) East Embankment Up to -3.5 inches

PROCESSING DATA

Date range (UTC)	03 Sep 2022 - 25 Sep 2022
Interval	22 days
Satellite (resolution)	TSX (10x10 ft)
Orbit (angle)	Descending (θ=29°)
Normal Baseline	1030 [ft]

LEGEND

LOS Displacement [in]

≤ -1 | -0.5 | 0 | +0.5 | ≥ +1

Displacement contour lines

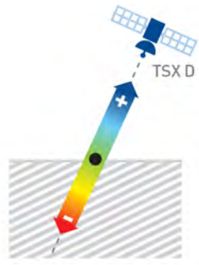
Visibility

Surface variation

No Information

Possible motion

Movement Detection Threshold: ±0.2 in



137,533

143,058

N

(i)

(ii)

(iii)

(iv)

(v)

Miles

0

0.6

Background: Orthophoto (29-07-2021)
Local Coordinate System

137,533

InSAR Bulletin

Yankee Doodle Tailings Impoundment

12 Sep 2022 - 04 Oct 2022

COMMENTS

Main areas of movement detected during the current 22-day period:

(i) West Embankment Up to -0.5 inches

East-West Embankment Up to **(ii)** -2.2 inches in the northern region and **(iii)** -3.1 inches in the southern region

East Embankment Up to **(iv)** -1.4 inches in the southern region and **(v)** up to -2.5 inches in the northern region

Further possible motion observed

PROCESSING DATA

Date range (UTC)	12 Sep 2022 - 04 Oct 2022
Interval	22 days
Satellite (resolution)	TSX (10x10 ft)
Orbit (angle)	Ascending (θ=29°)
Normal Baseline	79 [ft]

LEGEND

LOS Displacement [in]

≤ -1 | -0.5 | 0 | +0.5 | ≥ +1

Displacement contour lines

TSX A

Visibility

Surface variation

No Information

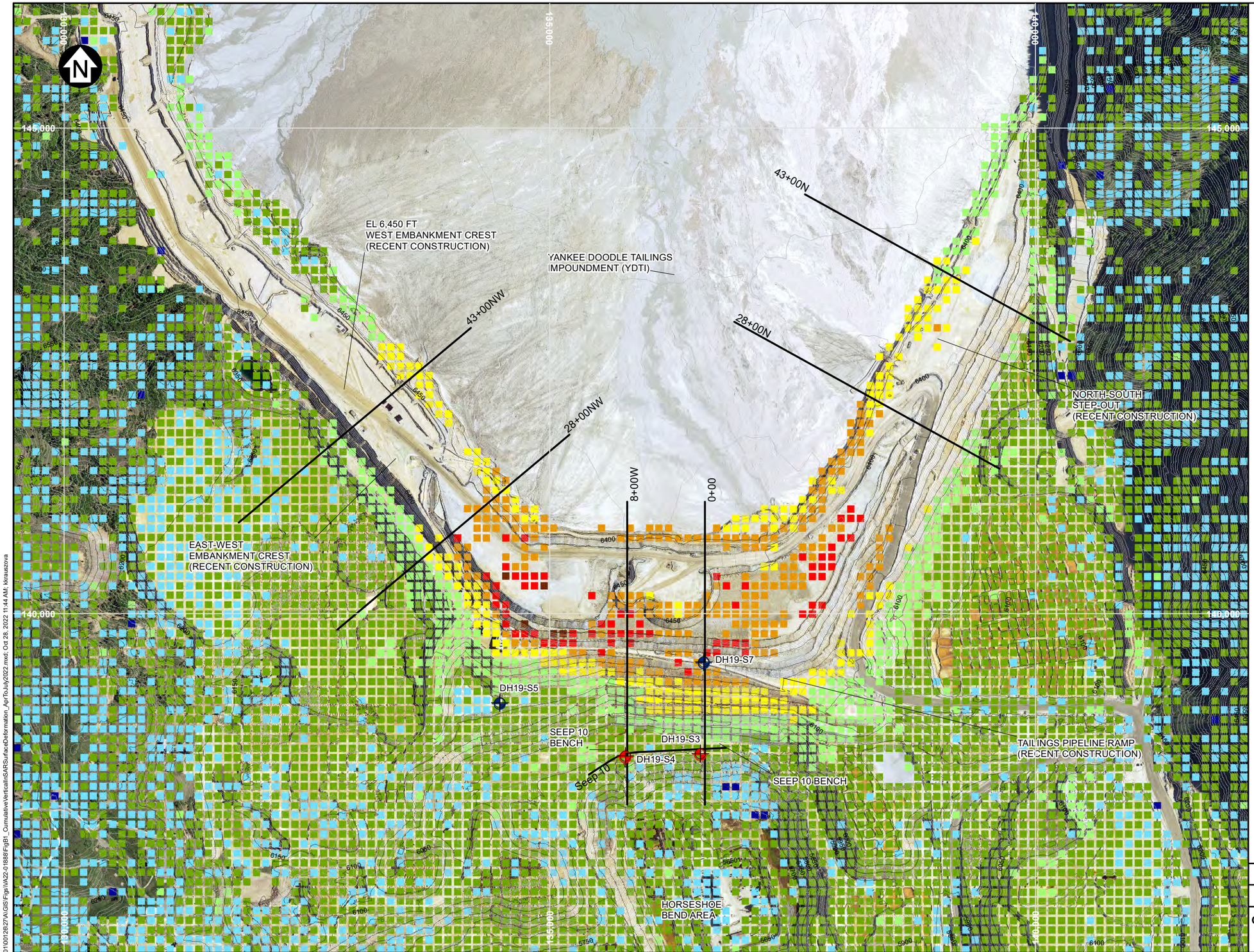
Possible motion

Movement Detection Threshold: ±0.2 in

APPENDIX B

SqueeSAR Surface Deformation Plots

(Figure B.1)



LEGEND:

GENERAL

- IN-PLACE INCLINOMETER AND GNSS INSTRUMENTATION
- IN-PLACE INCLINOMETER, GNSS AND PORE PRESSURE INSTRUMENTATION
- SECTION
- ELEVATION INDEX CONTOUR 50 ft
- ELEVATION CONTOUR 10 ft

CUMULATIVE SURFACE DISPLACEMENT (in)

- < -4
- -4 - -3
- -3 - -2
- -2 - -1
- -1 - -0.25
- -0.25 - 0
- 0 - 0.25
- 0.25 - 1

NOTES:

1. BASE MAP: AERIAL IMAGERY AND TOPOGRAPHY ARE FROM JULY 2022.
2. COORDINATE GRID IS IN FEET. COORDINATE SYSTEM: MR2007.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:12,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.
4. NEGATIVE InSAR DISPLACEMENTS ARE INDICATIVE OF SETTLEMENT/DOWNWARD DEFORMATION.
5. NO InSAR COVERAGE IS AVAILABLE FOR THE EAST-WEST EMBANKMENT CREST, AND PORTIONS OF THE 6,450 ROCKFILL SURCHARGE AND NORTH-SOUTH EMBANKMENT WHERE RECENT CONSTRUCTION HAS RESULTED IN OBSTRUCTION OF LONG-TERM InSAR CONTINUITY.
6. PIEZOMETRIC MONITORING INSTRUMENTATION HAS BEEN OMMITED FOR CLARITY.

400 200 0 400 800 1,200 1,600 2,000 Feet

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

CUMULATIVE VERTICAL InSAR SURFACE DEFORAMTION (APRIL 11 TO JULY 19, 2022)

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	28OCT'22	ISSUED WITH LETTER	KTD	KK	DDF

Knight Piésold CONSULTING

P/A NO. VA101-126/27 | REF NO. VA22-01888

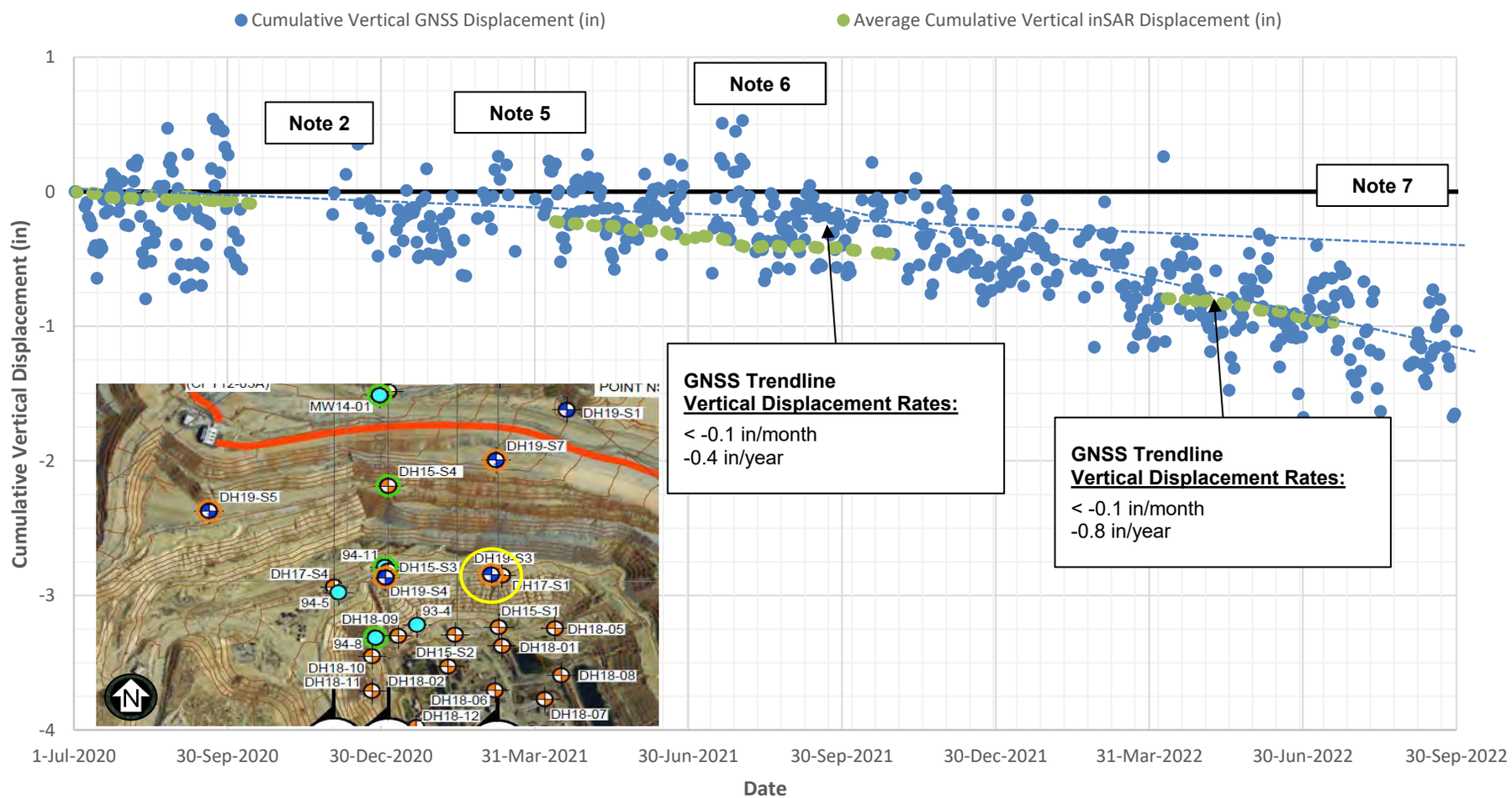
FIGURE B.1 | REV 0

SAVED: M:\101\00126\27\A\GIS\Figs\VA22-01888\Fig\B1_CumulativeVerticalInSARSurfaceDeformation_AprToJuly2022.mxd: Oct 28, 2022 11:44 AM: kirauszova

APPENDIX C

GNSS Deformation Plots

(Figures C.1 to C.8)



NOTES:

1. CUMULATIVE VERTICAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. THE AVERAGE CUMULATIVE VERTICAL INSAR DISPLACEMENT IS CALCULATED BY AVERAGING TIME-SERIES DISPLACEMENTS FROM NINE INSAR DATA POINTS LOCATED ADJACENT TO DH19-S3.
5. NO LONG-TERM (SQUEESAR) INSAR DATA ARE AVAILABLE FROM OCTOBER 2, 2020 TO APRIL 13, 2021 DUE TO THE ONSET OF WINTER CONDITIONS.
6. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
7. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	30SEPT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES LLP.

YANKEE DOODLE TAILINGS IMPOUNDMENT

CUMULATIVE VERTICAL DISPLACEMENTS MONITORED AT DH19-S3 (JULY 1, 2020 THROUGH SEPTEMBER 30, 2022)

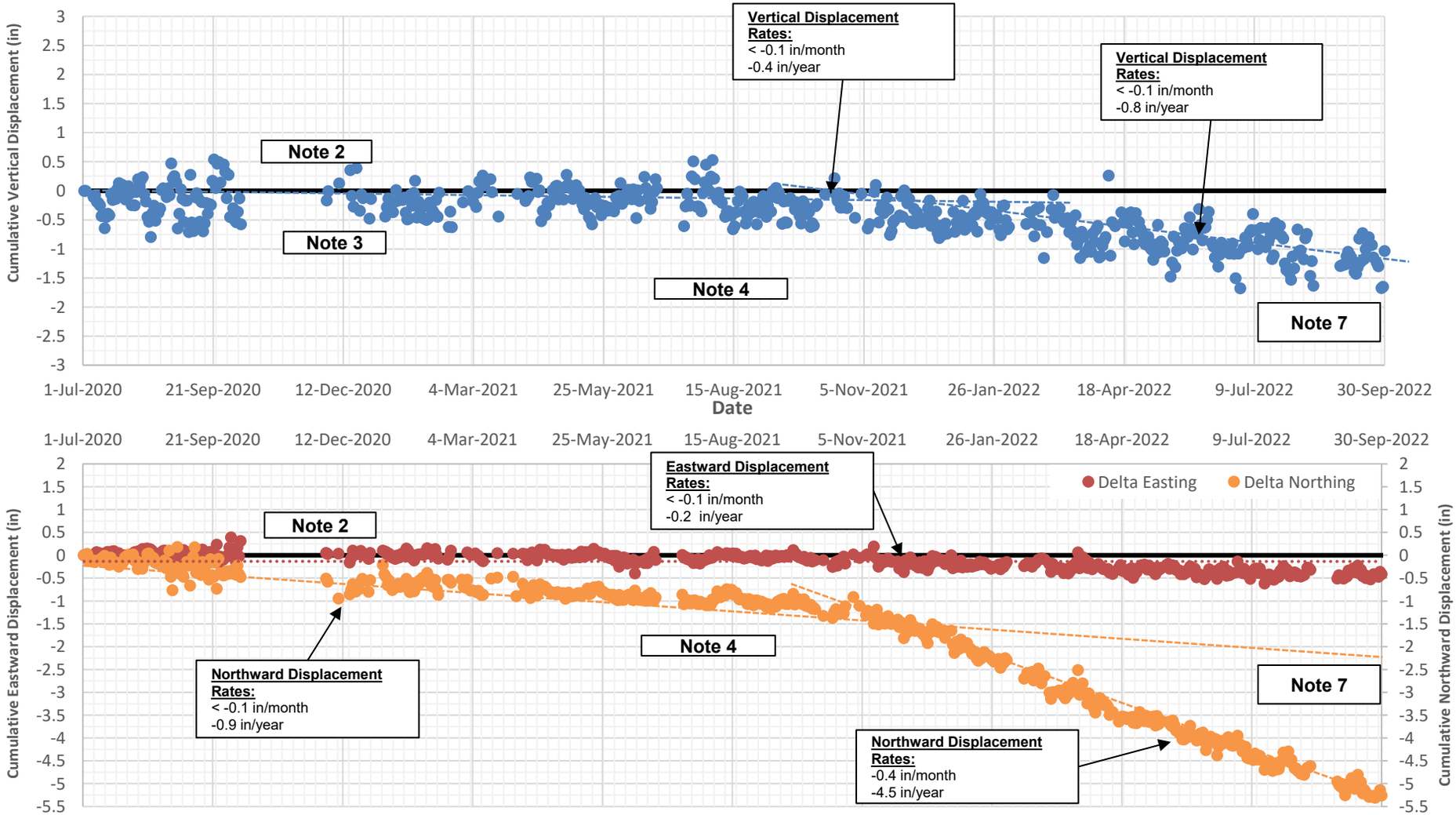
Knight Piésold CONSULTING

P/A NO. VA101-00126/27

REF. NO. VA22-01888

FIGURE C.1

REV 0



NOTES:

1. CUMULATIVE VERTICAL AND LATERAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
7. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	30SEPT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES LLP.

YANKEE DOODLE TAILINGS IMPOUNDMENT

CUMULATIVE VERTICAL & LATERAL DISPLACEMENTS MONITORED AT DH19-S3 (JULY 1, 2020 THROUGH SEPTEMBER 30, 2022)

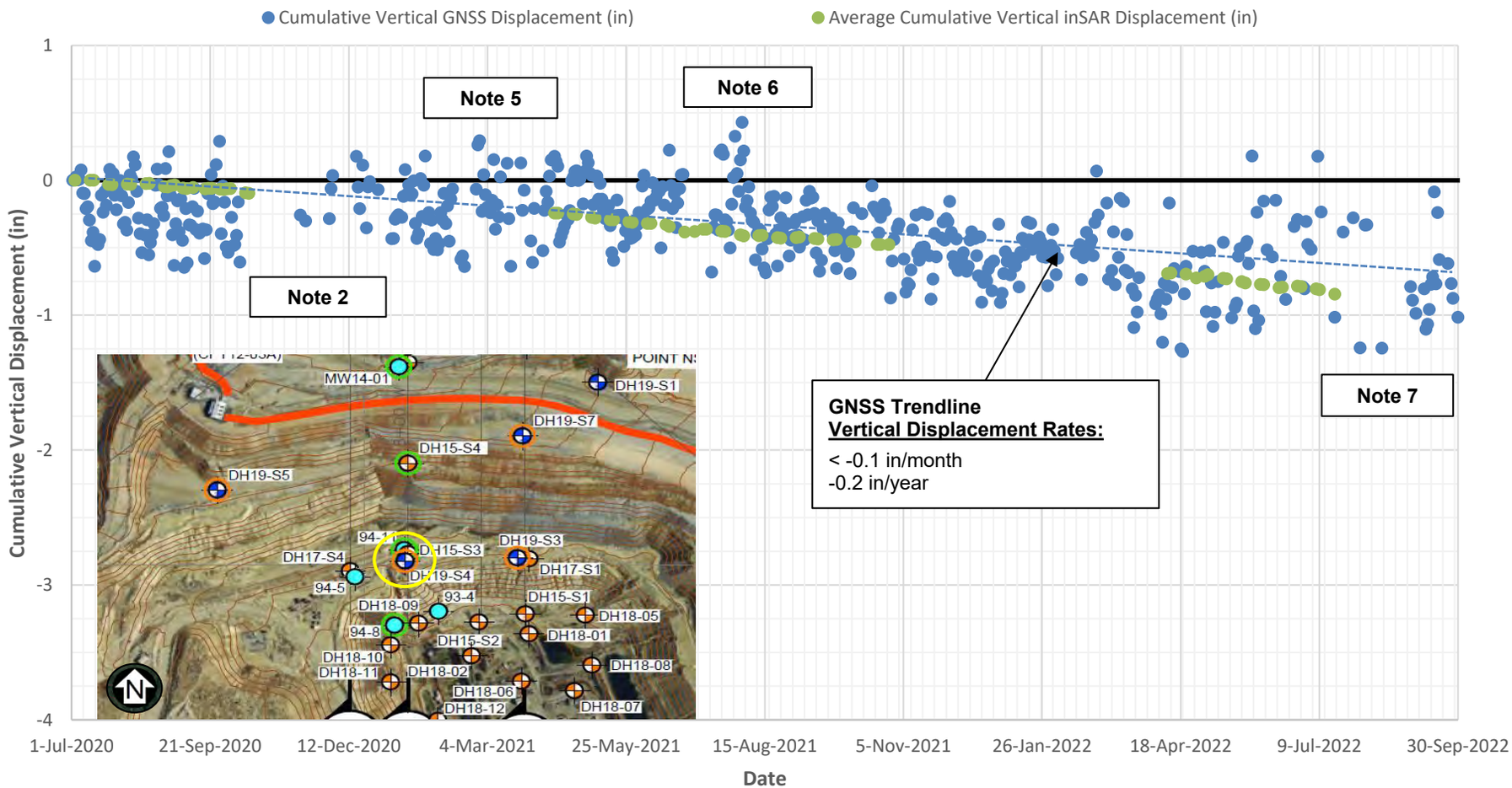
Knight Piésold CONSULTING

P/A NO. VA101-00126/27

REF. NO. VA22-01888

FIGURE C.2

REV 0



NOTES:

1. CUMULATIVE VERTICAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. THE AVERAGE CUMULATIVE VERTICAL INSAR DISPLACEMENT IS CALCULATED BY AVERAGING TIME-SERIES DISPLACEMENTS FROM NINE INSAR DATA POINTS LOCATED ADJACENT TO DH19-S4.
5. NO LONG TERM (SQUEESAR) INSAR DATA ARE AVAILABLE FROM OCTOBER 2, 2020 TO APRIL 13, 2021 DUE TO THE ONSET OF WINTER CONDITIONS.
6. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
7. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	30SEPT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES LLP.

YANKEE DOODLE TAILINGS IMPOUNDMENT

CUMULATIVE VERTICAL DISPLACEMENTS MONITORED AT DH19-S4 (JULY 1, 2020 THROUGH SEPTEMBER 30, 2022)

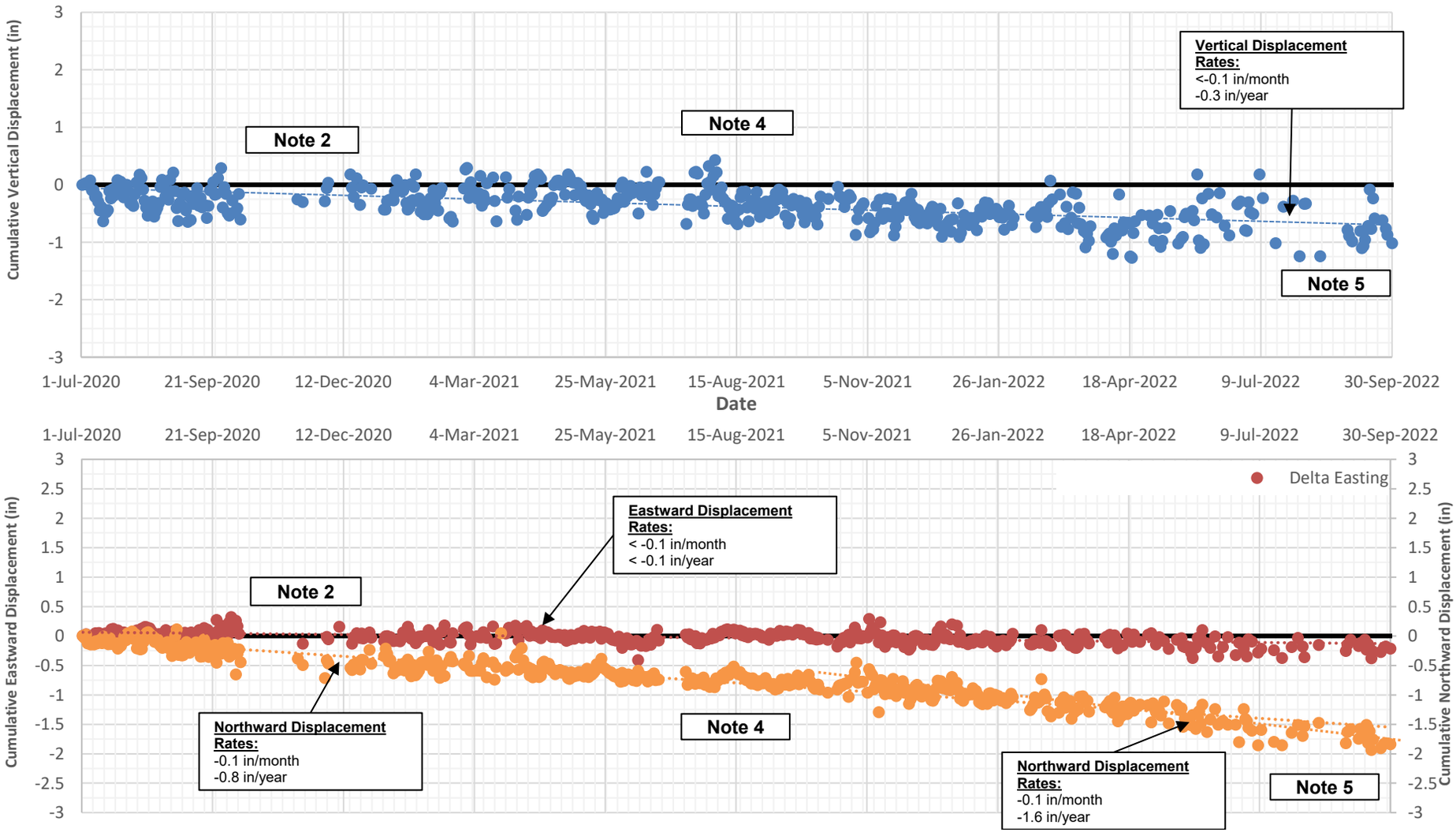
Knight Piésold CONSULTING

P/A NO. VA101-00126/27

REF. NO. VA22-01888

FIGURE C.3

REV 0



NOTES:

1. CUMULATIVE VERTICAL AND LATERAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
5. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	30SEPT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES LLP.

YANKEE DOODLE TAILINGS IMPOUNDMENT

CUMULATIVE VERTICAL & LATERAL DISPLACEMENTS MONITORED AT DH19-S4 (JULY 1, 2020 THROUGH SEPTEMBER 30, 2022)

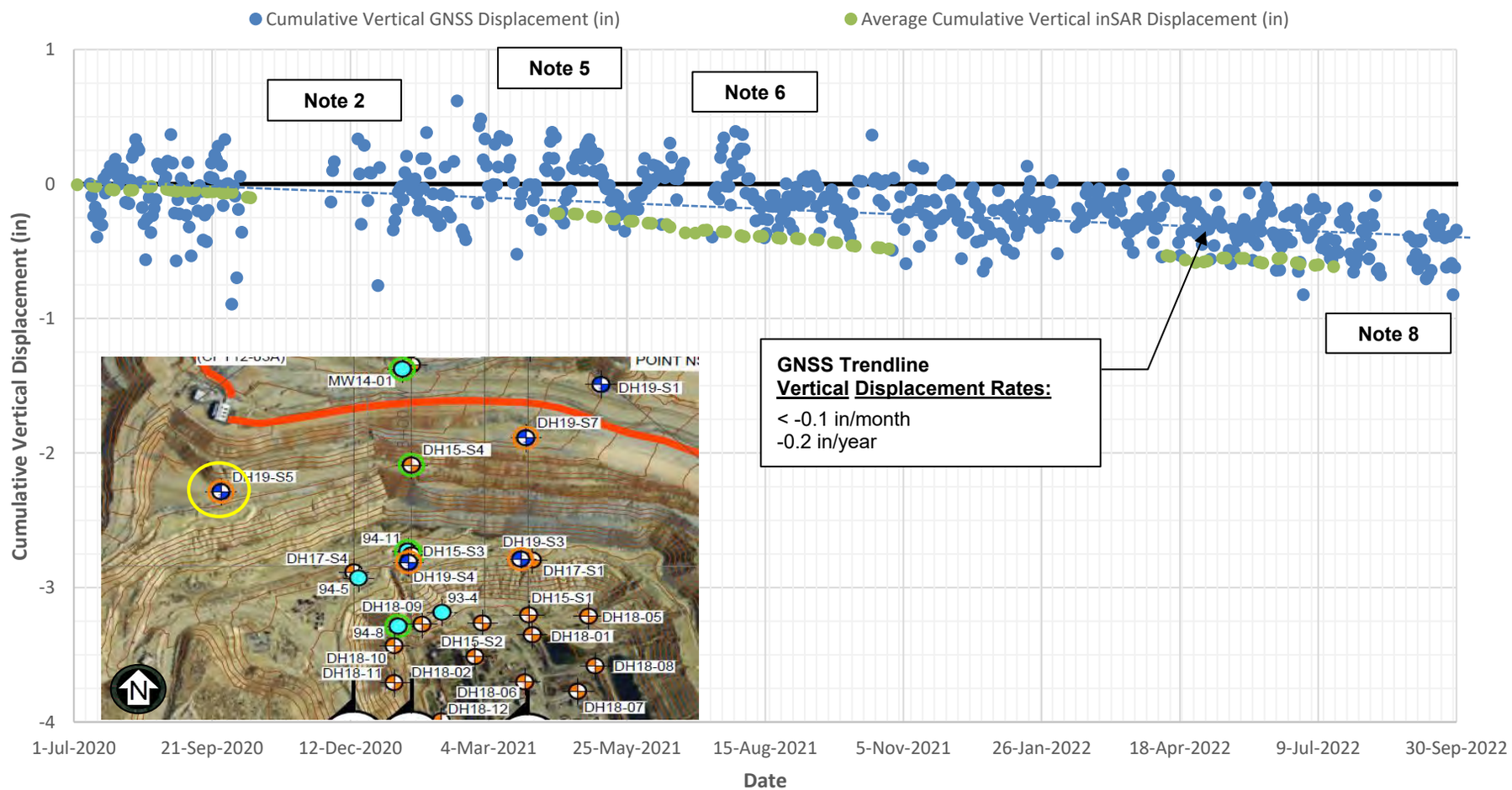
Knight Piésold CONSULTING

P/A NO. VA101-00126/27

REF. NO. VA22-01888

FIGURE C.4

REV 0



NOTES:

1. CUMULATIVE VERTICAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. THE AVERAGE CUMULATIVE VERTICAL INSAR DISPLACEMENT IS CALCULATED BY AVERAGING TIME-SERIES DISPLACEMENTS FROM NINE INSAR DATA POINTS LOCATED ADJACENT TO DH19-S5.
5. NO LONG TERM (SQUEESAR) INSAR DATA ARE AVAILABLE FROM OCTOBER 2, 2020 TO APRIL 13, 2021 DUE TO THE ONSET OF WINTER CONDITIONS.
6. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
7. THE +1 STD. DEV. SERIES IS THE AVERAGE INSAR DEFORMATION RATE PLUS THE STANDARD DEVIATION OF DATA POINTS LOCAL TO THE INSTRUMENTATION SITE.
8. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	30SEPT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES LLP.

YANKEE DOODLE TAILINGS IMPOUNDMENT

CUMULATIVE VERTICAL DISPLACEMENTS MONITORED AT DH19-S5 (JULY 1, 2020 THROUGH SEPTEMBER 30, 2022)

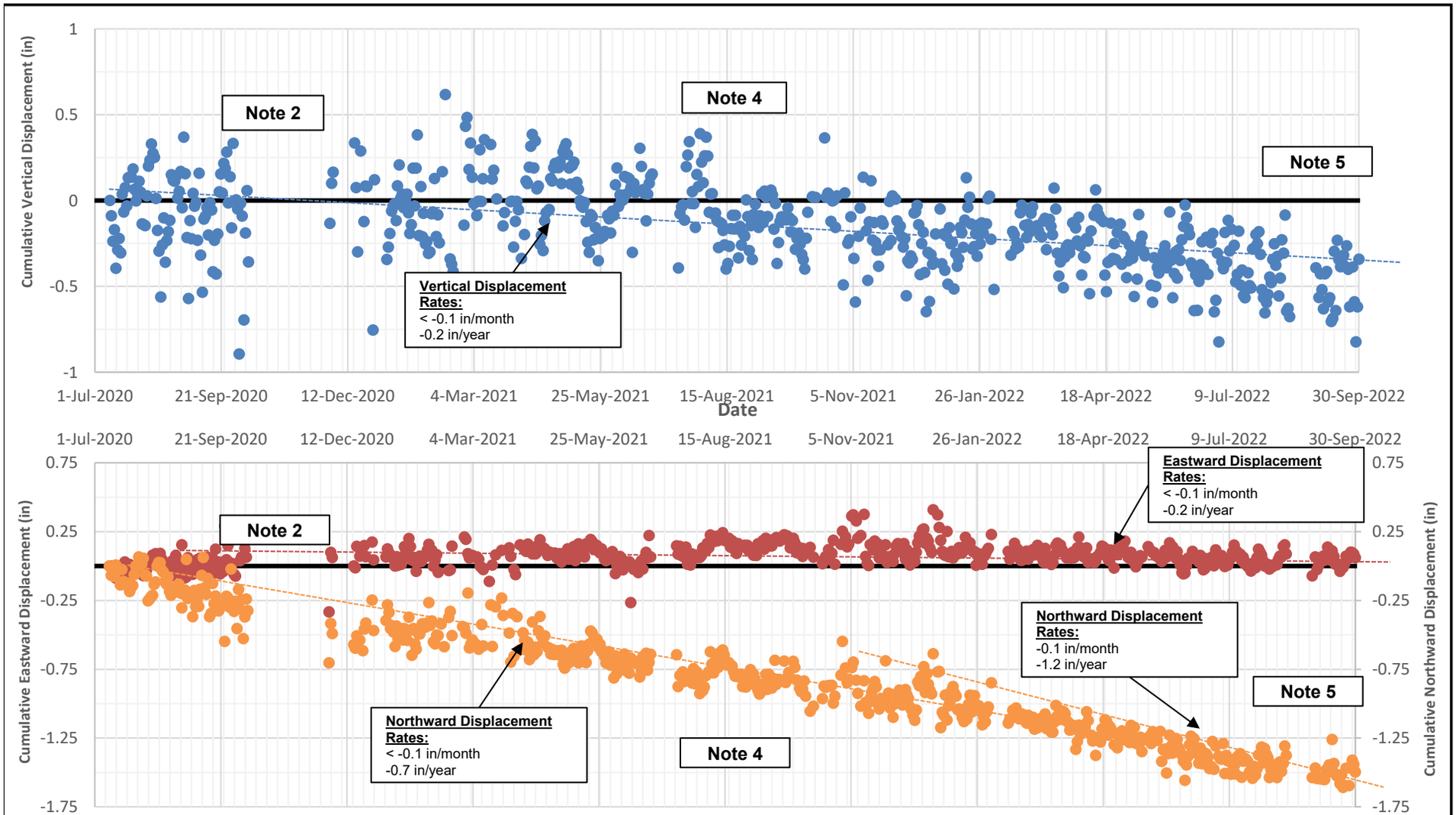
Knight Piésold CONSULTING

P/A NO. VA101-00126/27

REF. NO. VA22-01888

FIGURE C.5

REV 0



NOTES:

1. CUMULATIVE VERTICAL AND LATERAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
5. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	30SEPT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES LLP.

YANKEE DOODLE TAILINGS IMPOUNDMENT

CUMULATIVE VERTICAL & LATERAL DISPLACEMENTS MONITORED AT DH19-S5 (JULY 1, 2020 THROUGH SEPTEMBER 30, 2022)

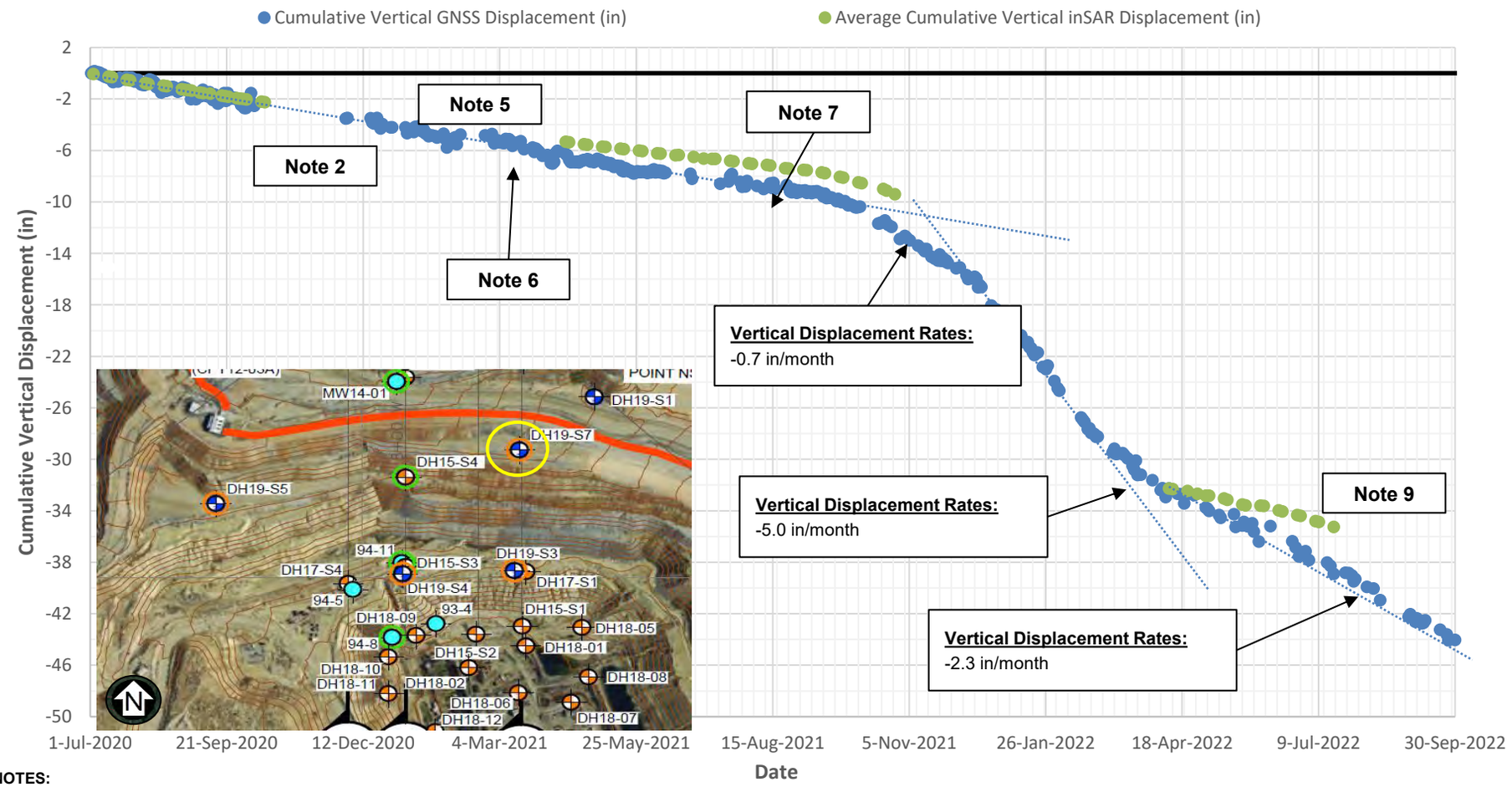
Knight Piésold CONSULTING

P/A NO. VA101-00126/27

REF. NO. VA22-01888

FIGURE C.6

REV 0



NOTES:

1. CUMULATIVE VERTICAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. THE AVERAGE CUMULATIVE VERTICAL INSAR DISPLACEMENT IS CALCULATED BY AVERAGING TIME-SERIES DISPLACEMENTS FROM NINE INSAR DATA POINTS LOCATED ADJACENT TO DH19-S7.
5. NO LONG TERM (SQUEESAR) INSAR DATA ARE AVAILABLE FROM OCTOBER 2, 2020 TO APRIL 13, 2021 DUE TO THE ONSET OF WINTER CONDITIONS.
6. NO DATA WERE COLLECTED FROM FEBRUARY 9 TO 21, 2021 DUE TO A DEPLETED DATA LOGGER BATTERY.
7. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
8. THE -1 STD. DEV. SERIES IS THE AVERAGE INSAR DEFORMATION RATE MINUS THE STANDARD DEVIATION OF DATA POINTS LOCAL TO THE INSTRUMENTATION SITE.
9. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	30SEPT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES LLP.

YANKEE DOODLE TAILINGS IMPOUNDMENT

CUMULATIVE VERTICAL DISPLACEMENTS MONITORED AT DH19-S7 (JULY 1, 2020 THROUGH SEPTEMBER 30, 2022)

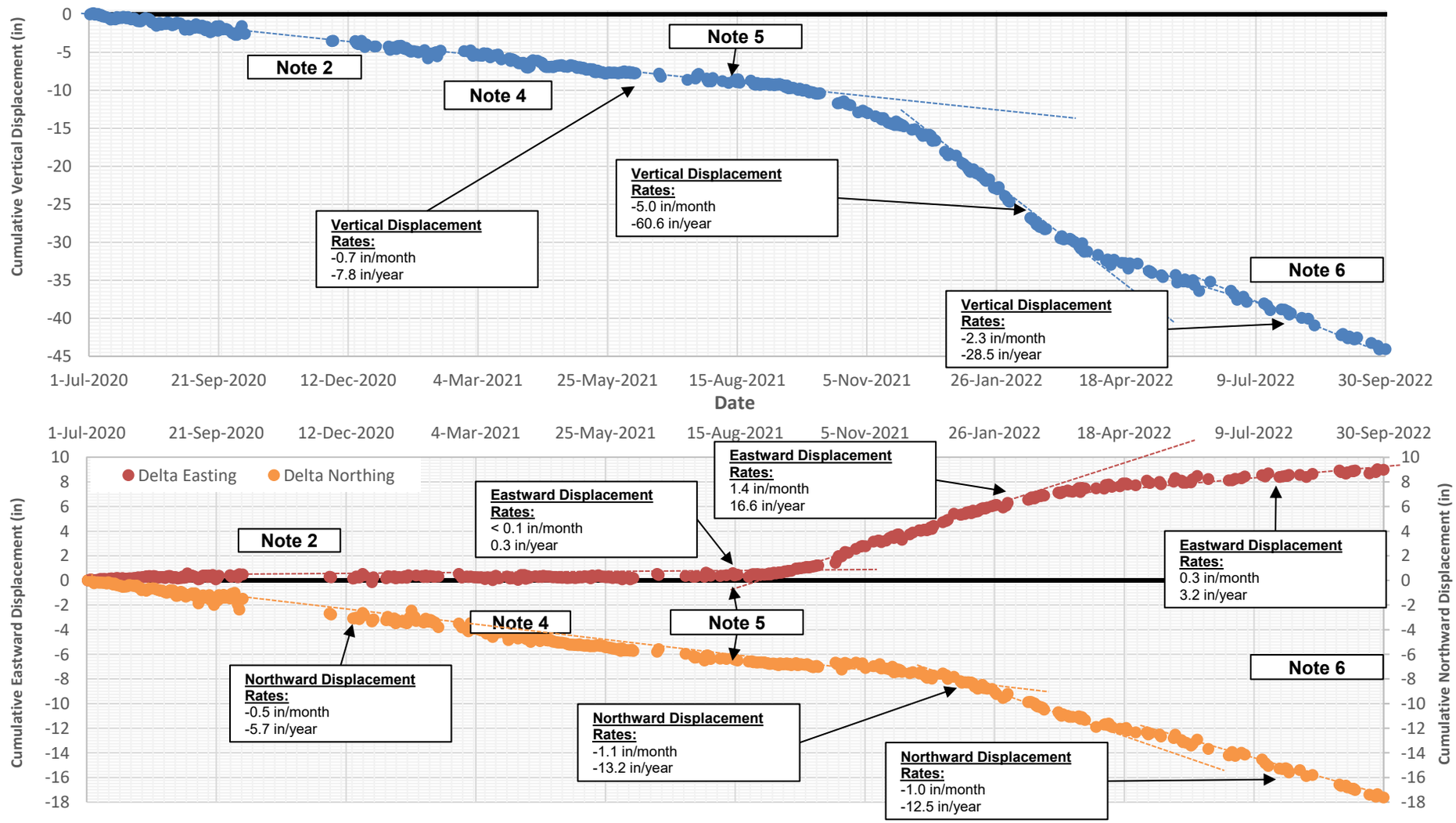
Knight Piésold CONSULTING

P/A NO. VA101-00126/27

REF. NO. VA22-01888

FIGURE C.7

REV 0



NOTES:

1. CUMULATIVE VERTICAL AND LATERAL DISPLACEMENTS ARE CALCULATED RELATIVE TO JULY 1, 2020.
2. NO DATA WERE COLLECTED FROM OCTOBER 7 TO DECEMBER 2, 2020 DUE TO A POWER MANAGEMENT SCHEDULE ISSUE AT THE GNSS REFERENCE STATION (DH16-04).
3. NEGATIVE VERTICAL DISPLACEMENTS INDICATE DOWNWARD DISPLACEMENT.
4. NO DATA WERE COLLECTED FROM FEBRUARY 9 TO 21, 2021 DUE TO A DEPLETED DATA LOGGER BATTERY.
5. NO DATA WERE COLLECTED FROM JUNE 12 TO JULY 15, 2021 DUE TO A TELEMETRY HARDWARE OUTAGE.
6. NO DATA WERE COLLECTED FROM AUGUST 17 TO SEPTEMBER 2 DUE TO A SATELLITE UPDATE REQUIRING THE SENSORS TO HARD RESET.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	30SEPT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES LLP.

YANKEE DOODLE TAILINGS IMPOUNDMENT

CUMULATIVE VERTICAL & LATERAL DISPLACEMENTS MONITORED AT DH19-S7 (JULY 1, 2020 THROUGH SEPTEMBER 30, 2022)

Knight Piésold CONSULTING

P/A NO. VA101-00126/27

REF. NO. VA22-01888

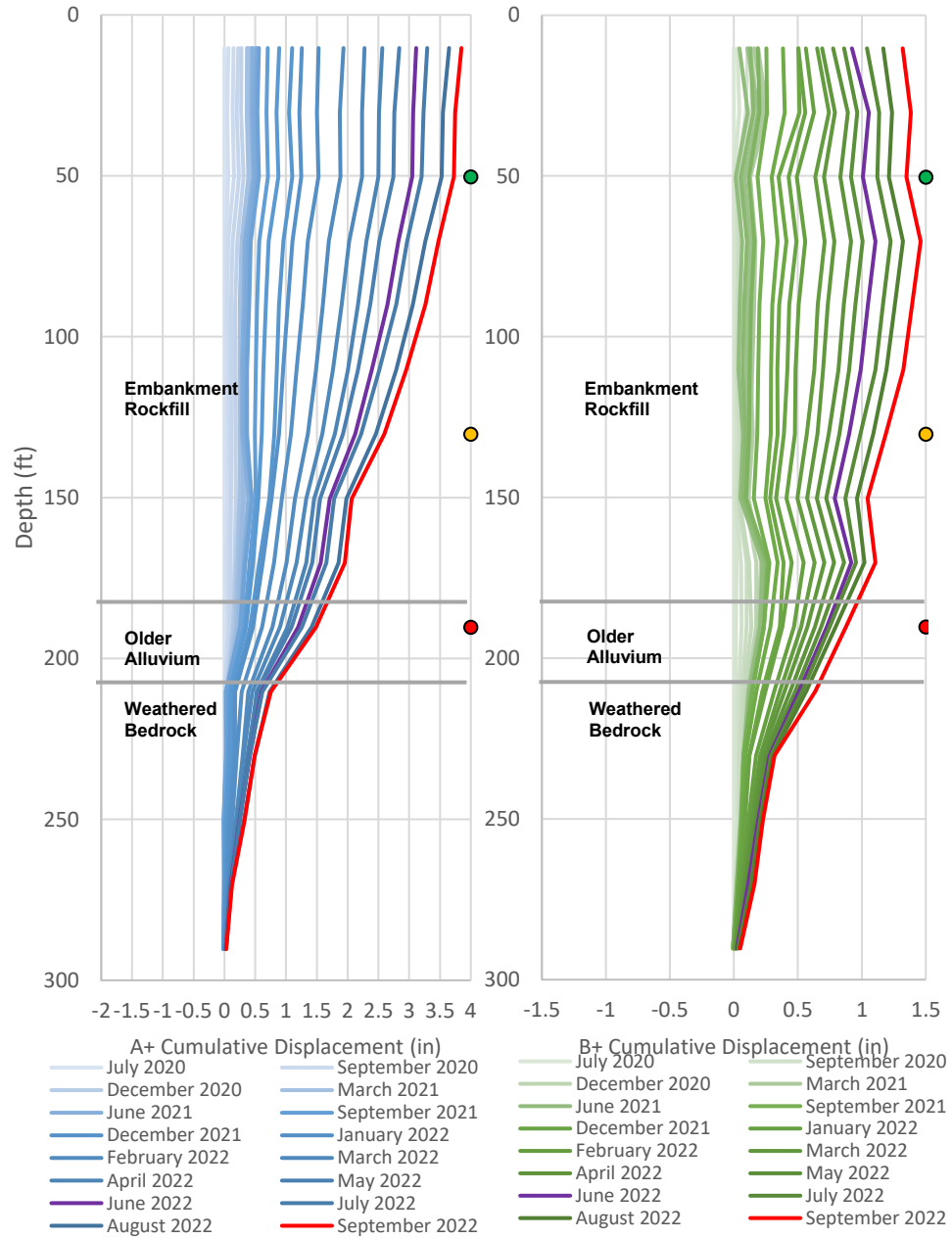
FIGURE C.8

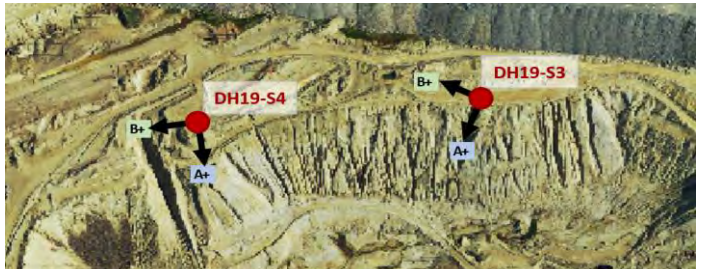
REV 0

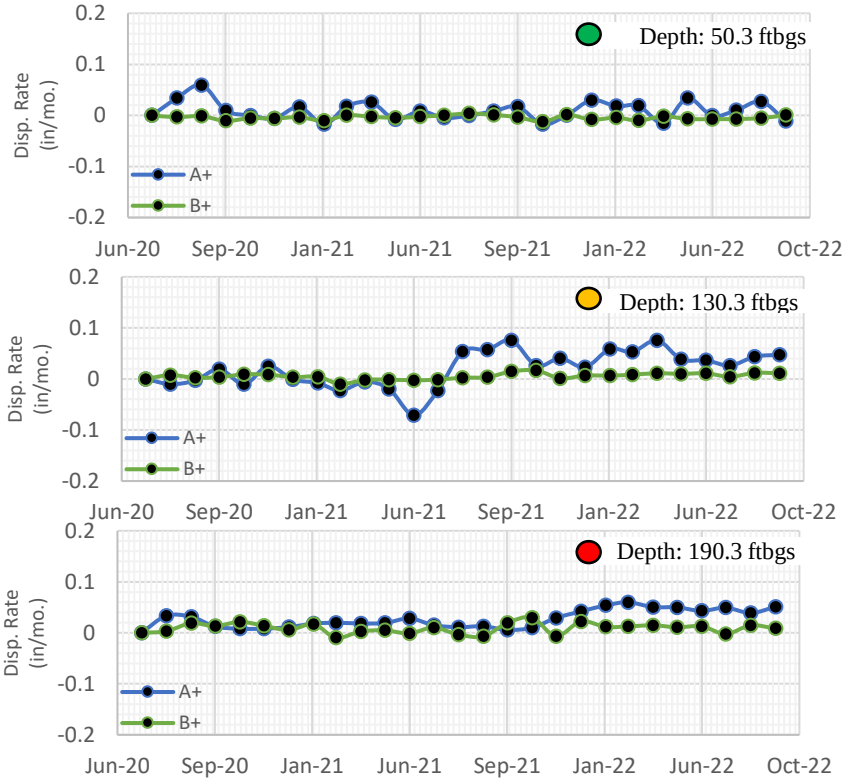
APPENDIX D

Inclinometer Deformation Plots

(Figures D.1 to D.10)







NOTES:
1. CUMULATIVE DEFORMATION MAGNITUDES AND RATES ARE PRESENTED AS MONTHLY AVERAGES.
2. POSITIVE A+ AND B+ DEFORMATIONS INDICATE SOUTHWARD AND WESTWARD DISPLACEMENTS, RESPECTIVELY.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

MONTHLY AVERAGE CUMULATIVE SUBSURFACE DEFORMATION DRILLHOLE DH19-S3 (JULY 2020 THROUGH SEPTEMBER 2022)

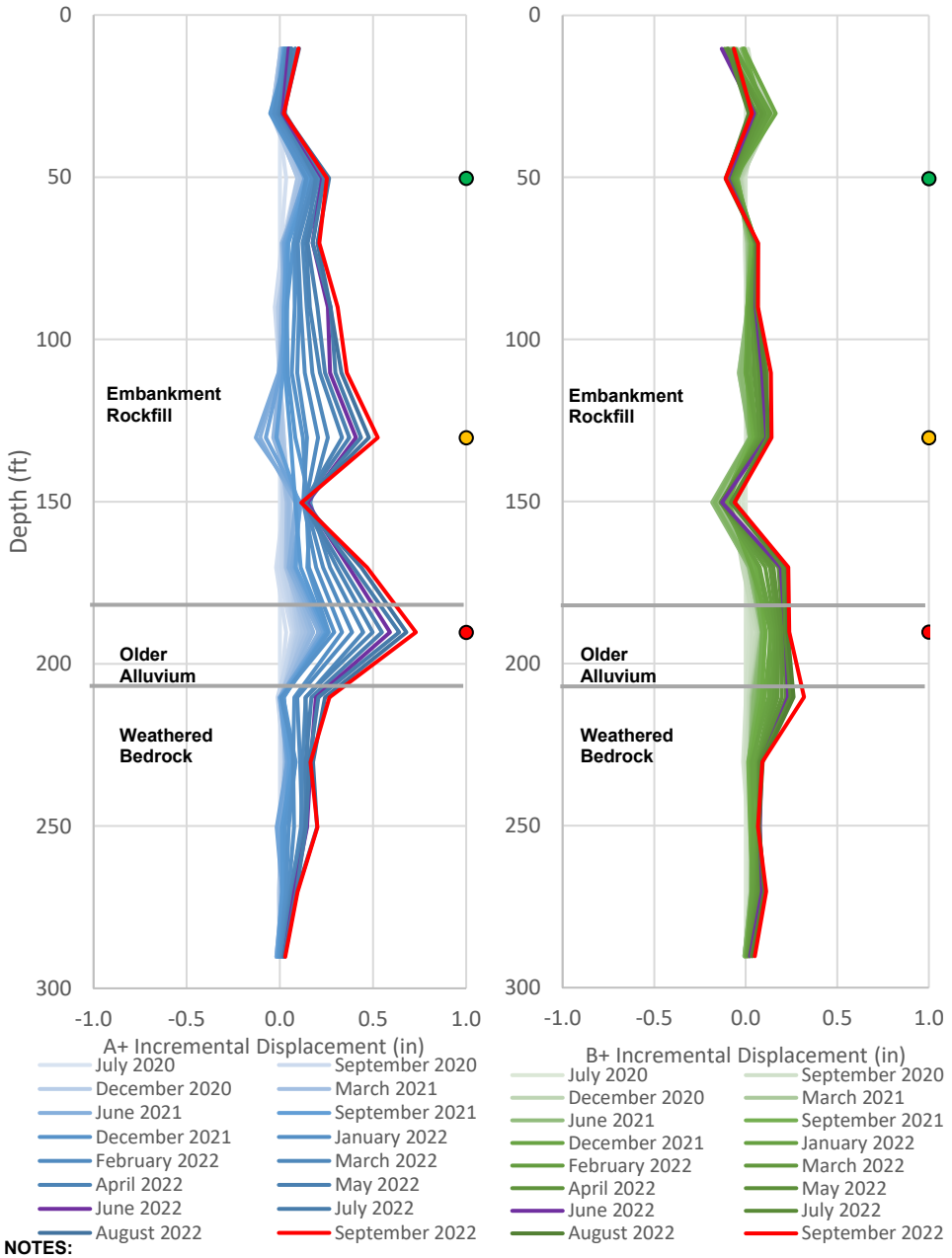
Knight Piésold CONSULTING

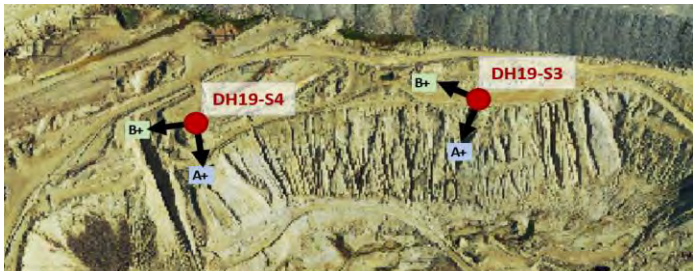
P/A NO. VA101-126/27

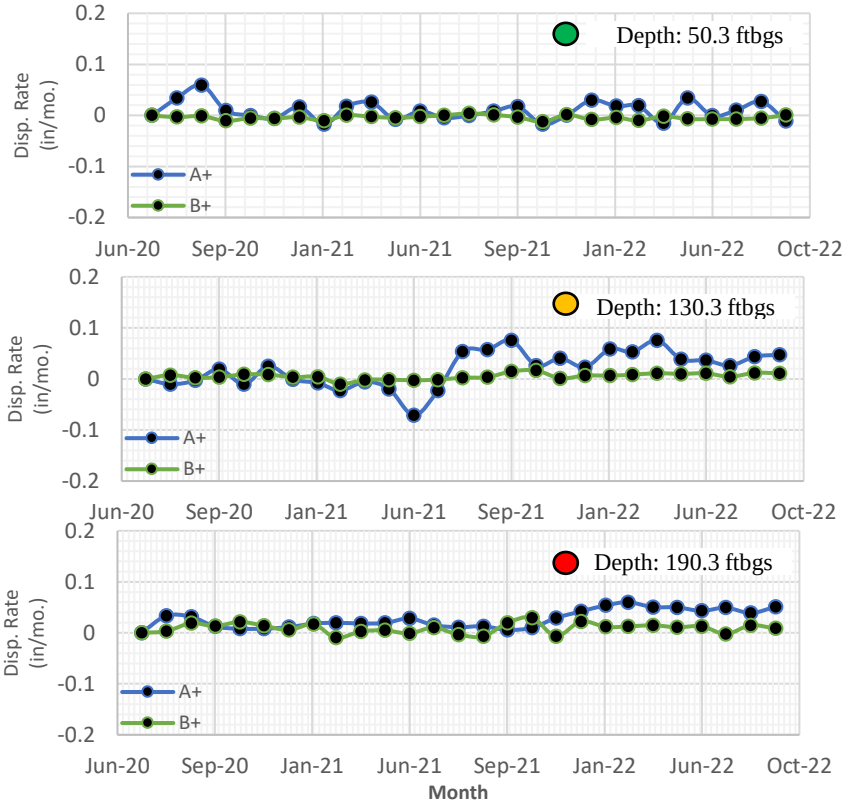
REF. NO. VA22-01888

FIGURE D.1

REV 0







NOTES:
1. INCREMENTAL DEFORMATION MAGNITUDES AND RATES ARE PRESENTED AS MONTHLY AVERAGES.
2. POSITIVE A+ AND B+ DEFORMATIONS INDICATE SOUTHWARD AND WESTWARD DISPLACEMENTS, RESPECTIVELY.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

MONTHLY AVERAGE INCREMENTAL SUBSURFACE DEFORMATION DRILLHOLE DH19-S3 (JULY 2020 THROUGH SEPTEMBER 2022)

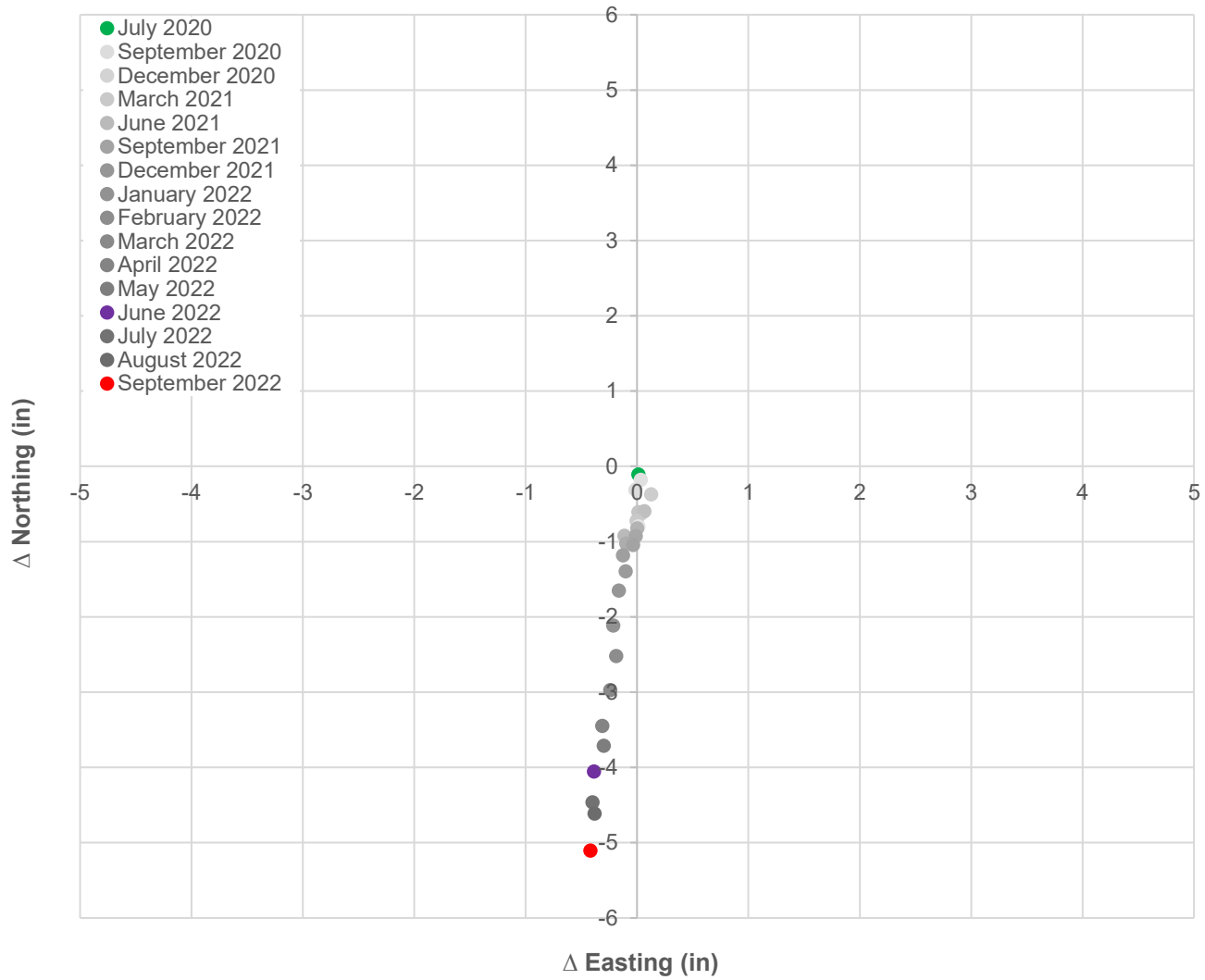
Knight Piésold CONSULTING

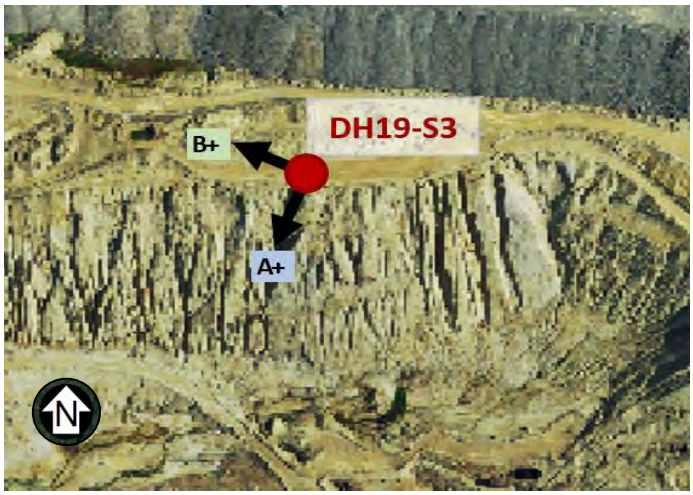
P/A NO. VA101-126/27

REF. NO. VA22-01888

FIGURE D.2

REV 0





NOTES:
1. COLLAR WANDER IS MONITORED USING GNSS INSTRUMENTATION INSTALLED AT THE INCLINOMETER COLLAR LOCATION.
2. THE PLOT ABOVE PRESENTS COLLAR POSITION BASED ON NORTH AND EAST CHANGE RELATIVE TO A JULY 1, 2020 BASELINE GNSS SURVEY.
3. NO DATA ARE AVAILABLE FOR NOVEMBER, 2020 WHILE THE INSTRUMENTATION WAS OFFLINE DUE TO A POWER MANAGEMENT ISSUE.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

DH19-S3 GNSS-BASED INCLINOMETER COLLAR WANDER (JULY 1, 2021 THROUGH SEPTEMBER 30, 2022)

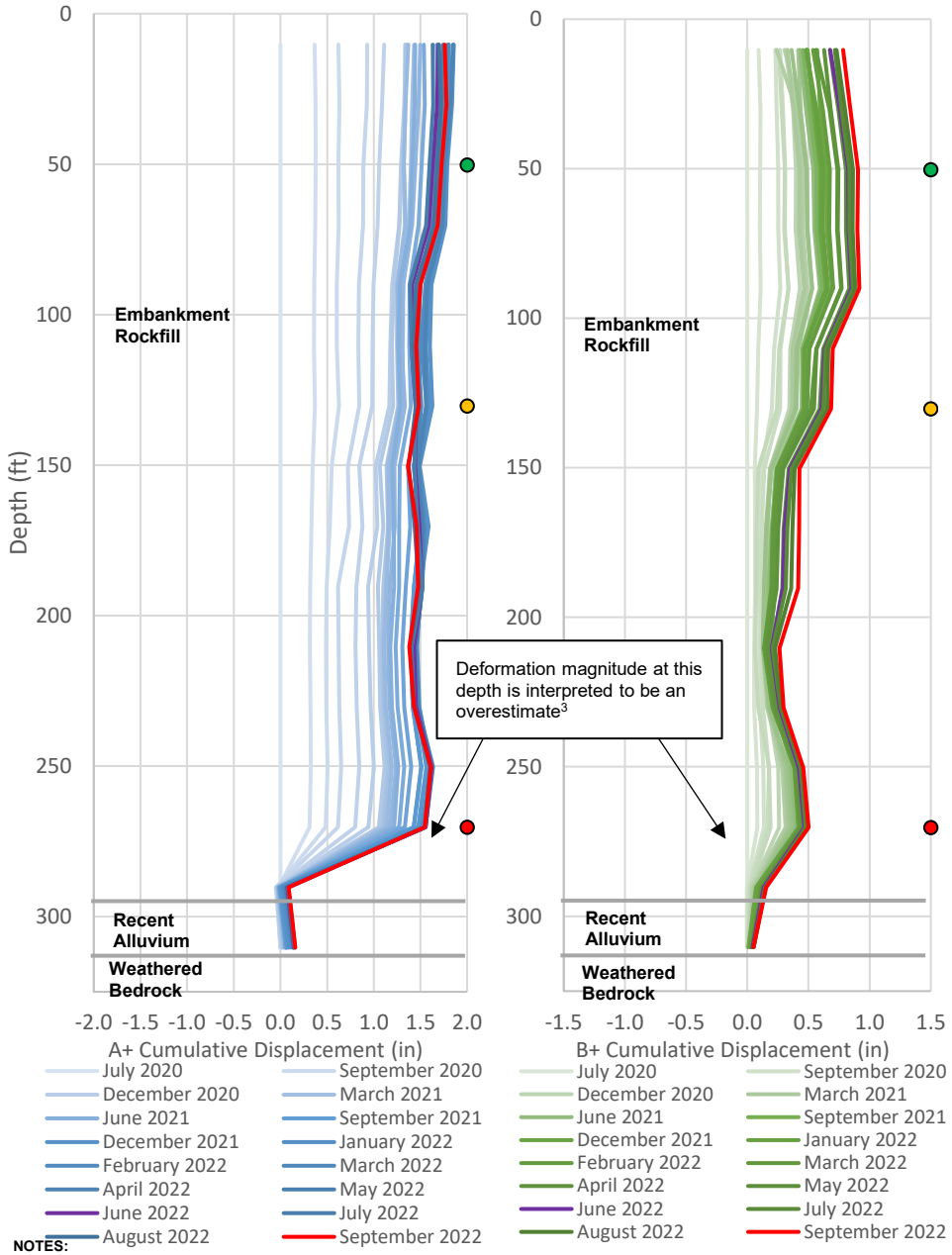
Knight Piésold CONSULTING

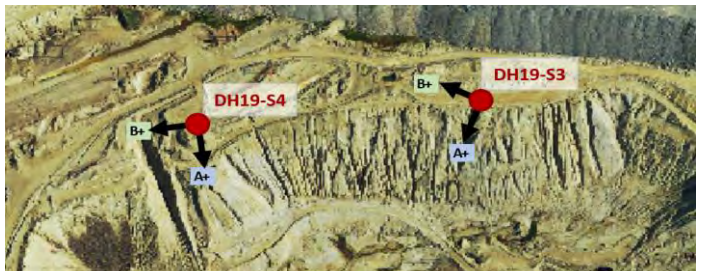
P/A NO. VA101-126/27

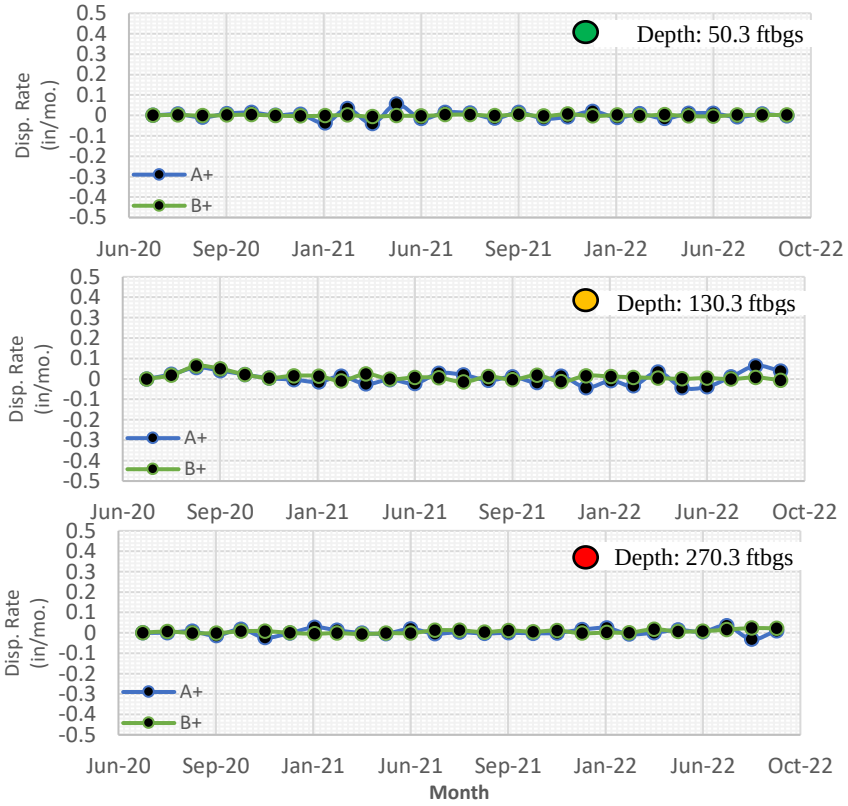
REF. NO. VA22-01888

FIGURE D.3

REV 0







NOTES:
1. CUMULATIVE DEFORMATION MAGNITUDES AND RATES ARE PRESENTED AS MONTHLY AVERAGES.
2. POSITIVE A+ AND B+ DEFORMATIONS INDICATE SOUTHWARD AND WESTWARD DISPLACEMENTS, RESPECTIVELY.
3. DEFORMATION MAGNITUDE BETWEEN 290 FTBG AND 310 FTBG IS INTEPRETED TO BE AN OVERESTIMATE DUE TO IPI CONNECTING ROD FLEXION.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

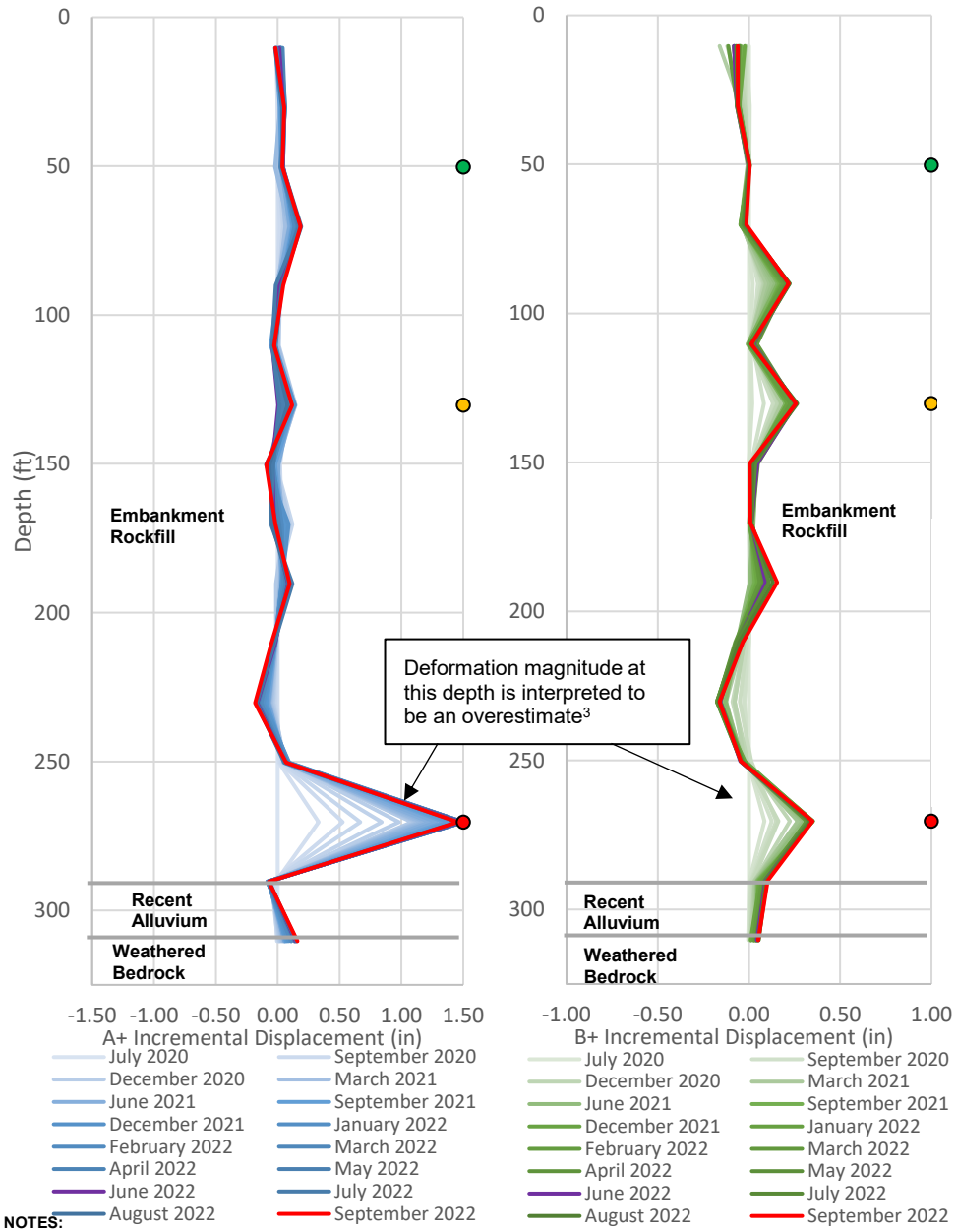
YANKEE DOODLE TAILINGS IMPOUNDMENT

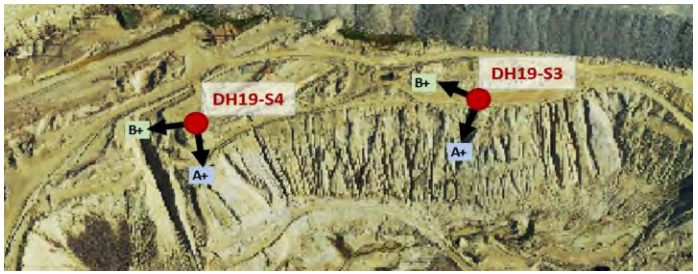
MONTHLY AVERAGE CUMULATIVE SUBSURFACE DEFORMATION DRILLHOLE DH19-S4 (JULY 2020 THROUGH SEPTEMBER 2022)

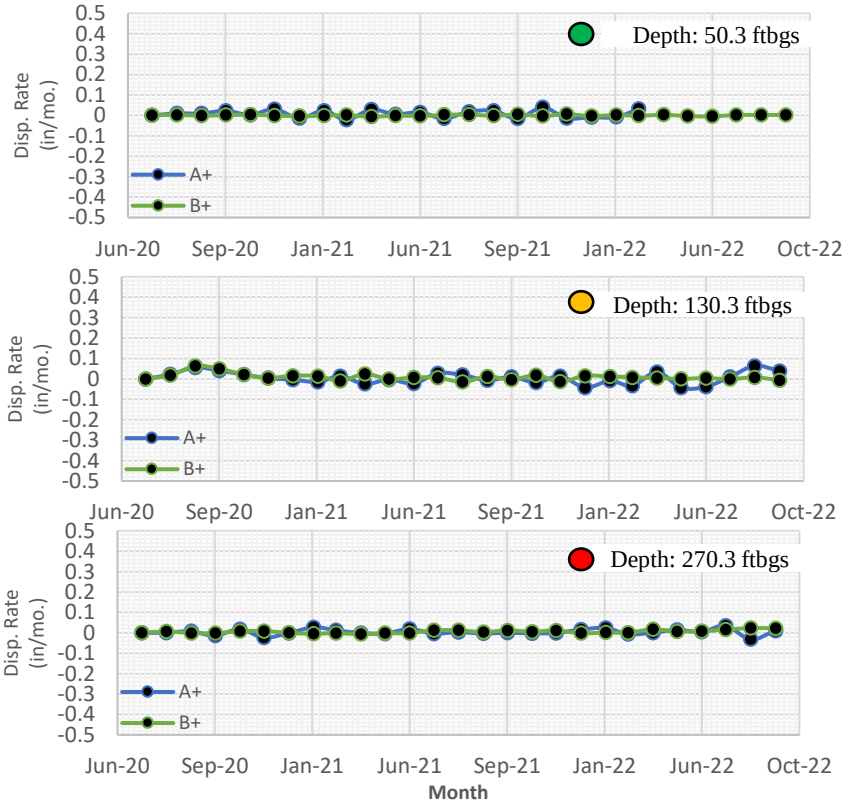
Knight Piésold CONSULTING

P/A NO.	REF. NO.
VA101-126/27	VA22-01888

FIGURE D.4 REV 0







NOTES:
1. INCREMENTAL DEFORMATION MAGNITUDES AND RATES ARE PRESENTED AS MONTHLY AVERAGES.
2. POSITIVE A+ AND B+ DEFORMATIONS INDICATE SOUTHWARD AND WESTWARD DISPLACEMENTS, RESPECTIVELY.
3. DEFORMATION MAGNITUDE BETWEEN 250 FTBG TO 290 FTBG IS INTERPRETED TO BE AN OVERESTIMATE DUE TO IPI CONNECTING ROD FLEXION.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

MONTHLY AVERAGE INCREMENTAL SUBSURFACE DEFORMATION DRILLHOLE DH19-S4 (JULY 2020 THROUGH SEPTEMBER 2022)

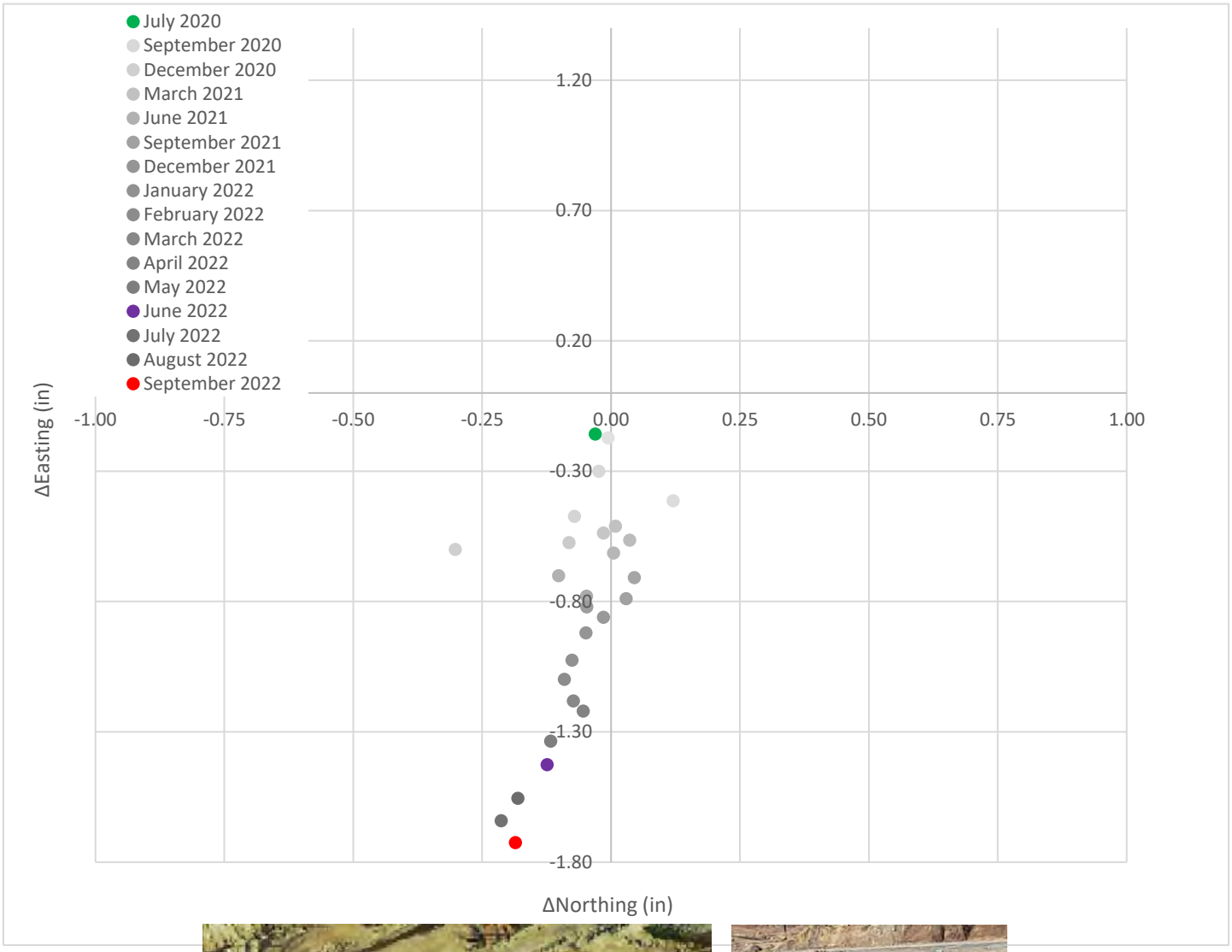
Knight Piésold CONSULTING

P/A NO. VA101-126/27

REF. NO. VA22-01888

FIGURE D.5

REV 0



NOTES:
1. COLLAR WANDER IS MONITORED USING GNSS INSTRUMENTATION INSTALLED AT THE INCLINOMETER COLLAR LOCATION.
2. THE PLOT ABOVE PRESENTS COLLAR POSITION BASED ON NORTH AND EAST CHANGE RELATIVE TO A JULY 1, 2020 BASELINE GNSS SURVEY.
3. NO DATA ARE AVAILABLE FOR NOVEMBER, 2020 WHILE THE INSTRUMENTATION WAS OFFLINE DUE TO A POWER MANAGEMENT ISSUE.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

DH19-S4 GNSS-BASED INCLINOMETER COLLAR WANDER (JULY 1, 2020 THROUGH SEPETEMBER 30, 2022)

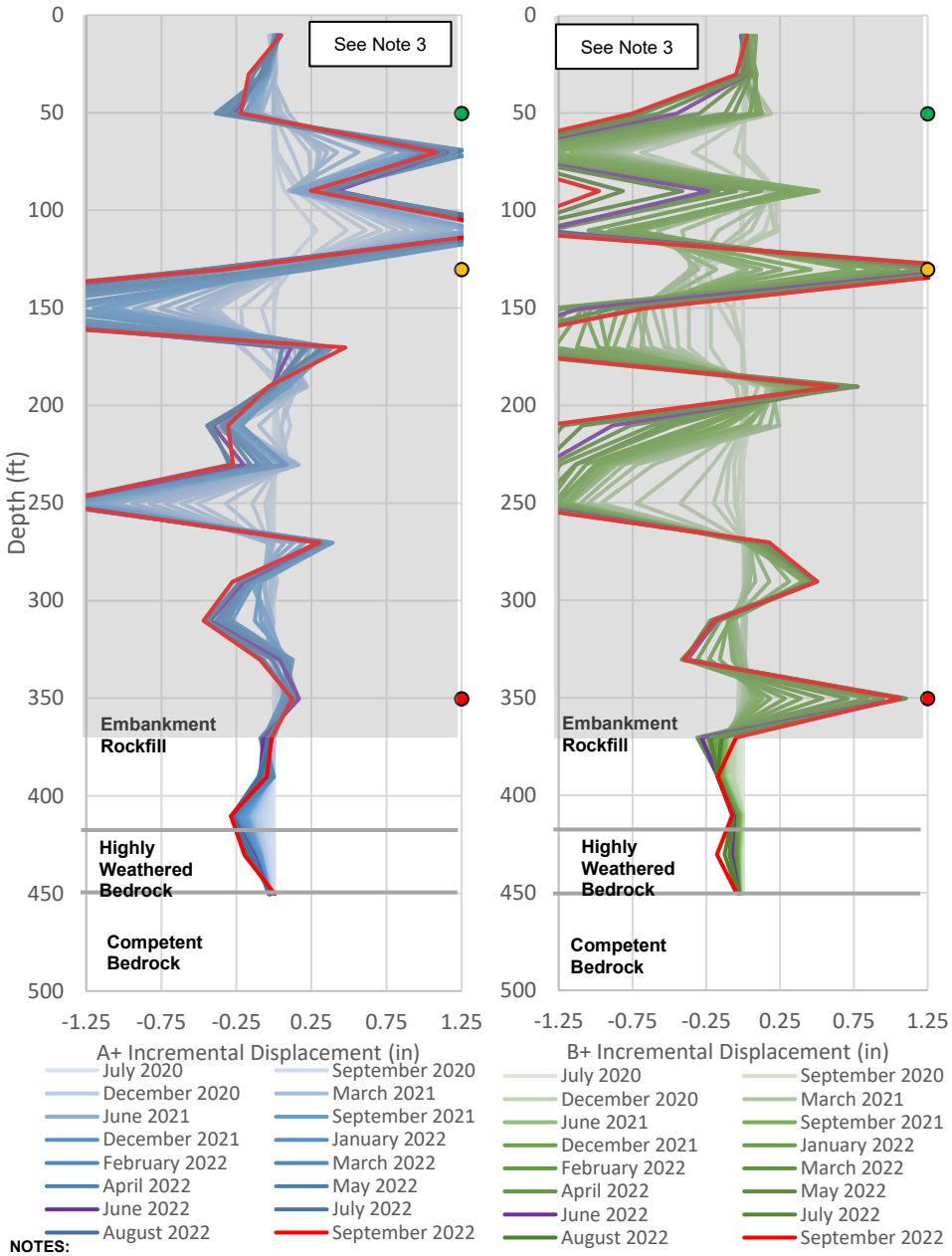
Knight Piésold CONSULTING

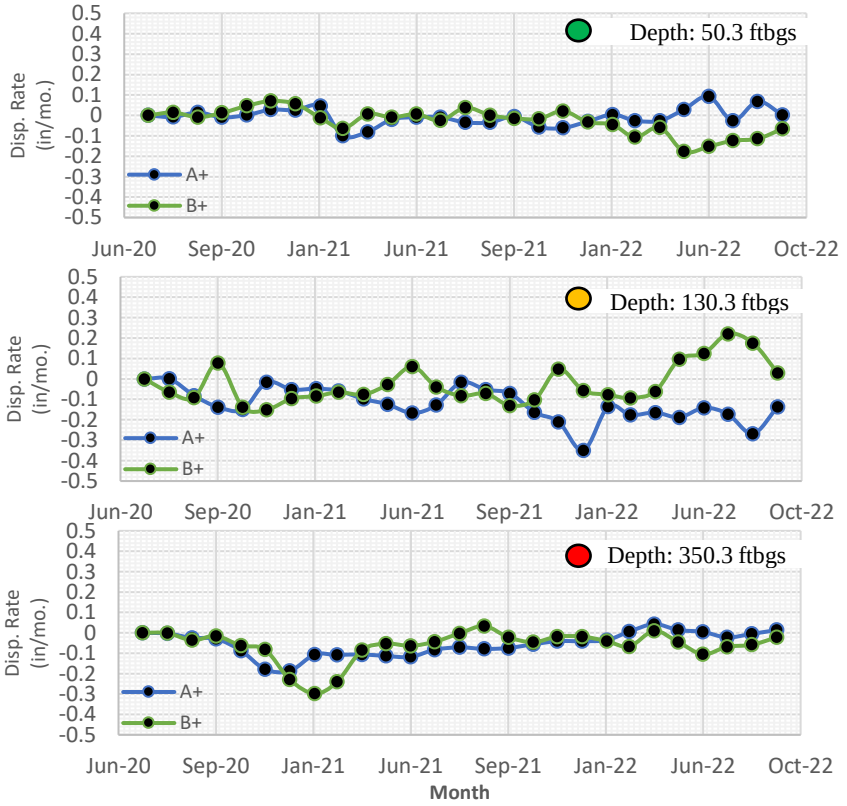
P/A NO. VA101-126/27

REF. NO. VA22-01888

FIGURE D.6

REV 0





NOTES:
1. INCREMENTAL DEFORMATION MAGNITUDES AND RATES ARE PRESENTED AS MONTHLY AVERAGES.
2. POSITIVE A+ AND B+ DEFORMATIONS INDICATE SOUTHWARD AND WESTWARD DISPLACEMENTS, RESPECTIVELY.
3. DEFORMATION DATA WITHIN THE UPPER 275 FTBG ARE INTERPRETED TO RESULT PREDOMINANTLY FROM SETTLEMENT-DERIVED CASING DISTORTION WITHIN HISTORICALLY LEACHED ROCKFILL.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	30SEP'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

MONTHLY AVERAGE INCREMENTAL SUBSURFACE DEFORMATION DRILLHOLE DH19-S5 (JULY 2020 THROUGH SEPTEMBER 2022)

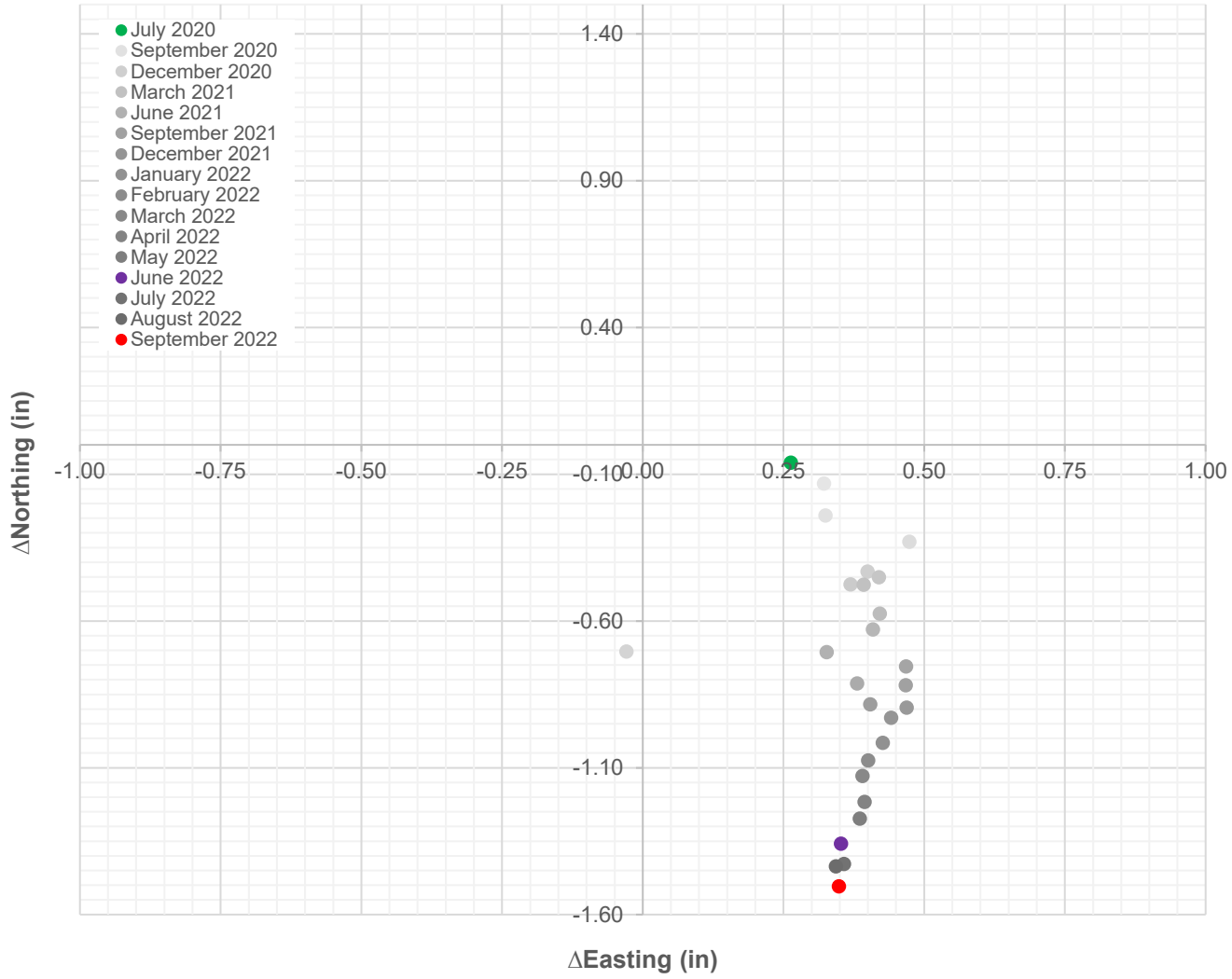
Knight Piésold CONSULTING

P/A NO. VA101-126/27

REF. NO. VA22-01888

FIGURE D.7

REV 0



NOTES:

1. COLLAR WANDER IS MONITORED USING GNSS INSTRUMENTATION INSTALLED AT THE INCLINOMETER COLLAR LOCATION.
2. THE PLOT ABOVE PRESENTS COLLAR POSITION BASED ON NORTH AND EAST CHANGE RELATIVE TO A JULY 1, 2020 BASELINE GNSS SURVEY.
3. NO DATA ARE AVAILABLE FOR NOVEMBER, 2020 WHILE THE INSTRUMENTATION WAS OFFLINE DUE TO A POWER MANAGEMENT ISSUE.

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

DH19-S5 GNSS-BASED INCLINOMETER COLLAR WANDER (JULY 1, 2020 THROUGH SEPTEMBER 30, 2022)

Knight Piésold CONSULTING

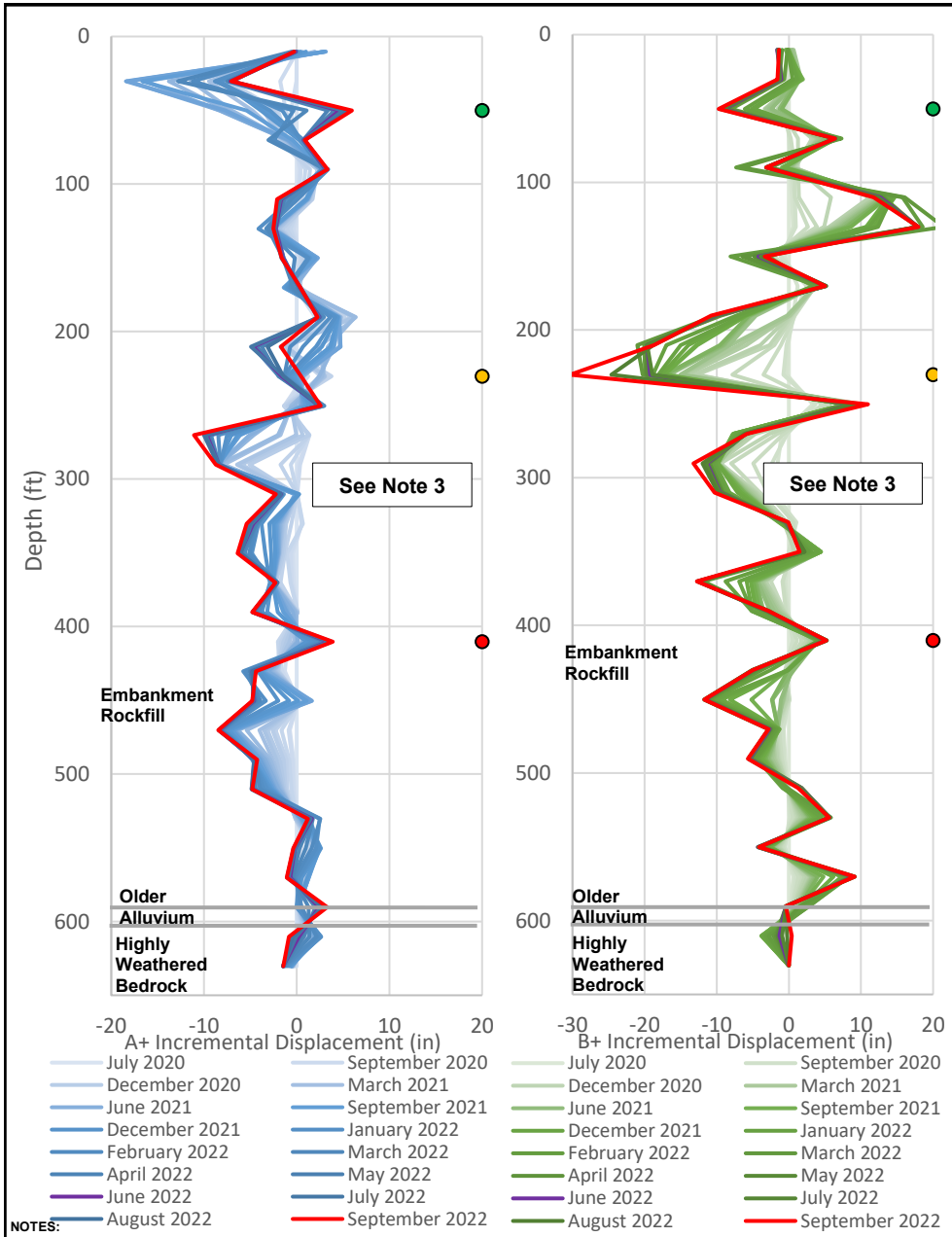
P/A NO. VA101-126/27

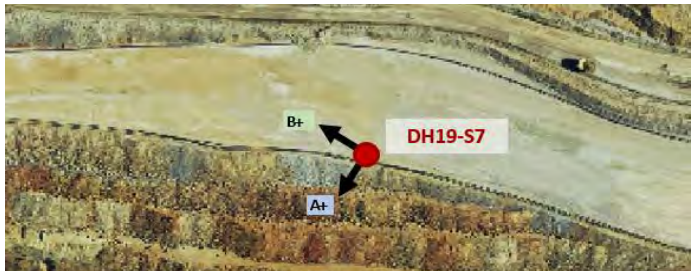
REF. NO. VA22-01888

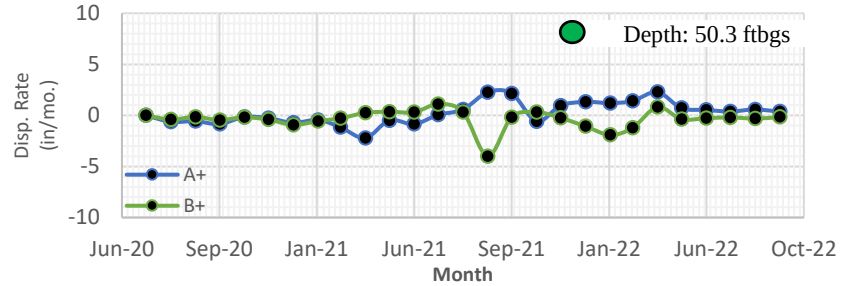
FIGURE D.8

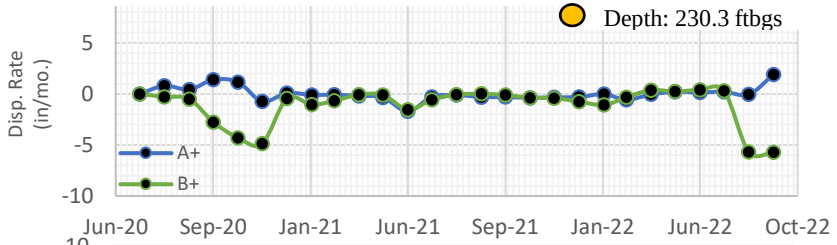
REV 0

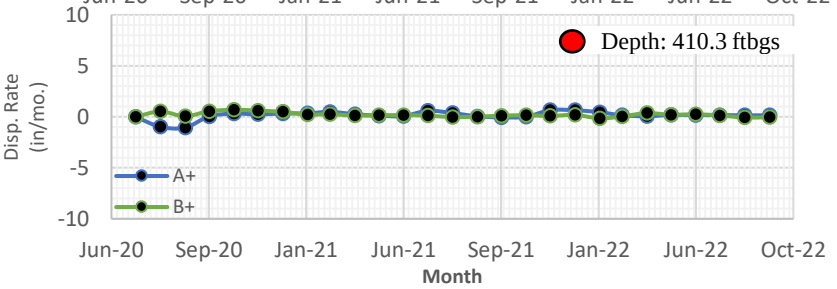
REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	30SEP'22	ISSUED WITH LETTER	SY3	KTD











NOTES:
1. INCREMENTAL DEFORMATION MAGNITUDES AND RATES ARE PRESENTED AS MONTHLY AVERAGES.
2. POSITIVE A+ AND B+ DEFORMATIONS INDICATE SOUTHWARD AND WESTWARD DISPLACEMENTS, RESPECTIVELY.
3. DEFORMATION DATA THROUGHOUT THE EMBANKMENT ROCKFILL ARE INTTERPRETED TO RESULT PREDOMINANTLY FROM SETTLEMENT-DERIVED CASING DISTORTION WITHIN HISTORICALLY LEACHED ROCKFILL AND ARE NOT REPRESENTATIVE OF IN-SITU LATERAL DISPLACEMENT.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

MONTHLY AVERAGE INCREMENTAL SUBSURFACE DEFORMATION DRILLHOLE DH19-S7 (JULY 2020 THROUGH SEPTEMBER 2022)

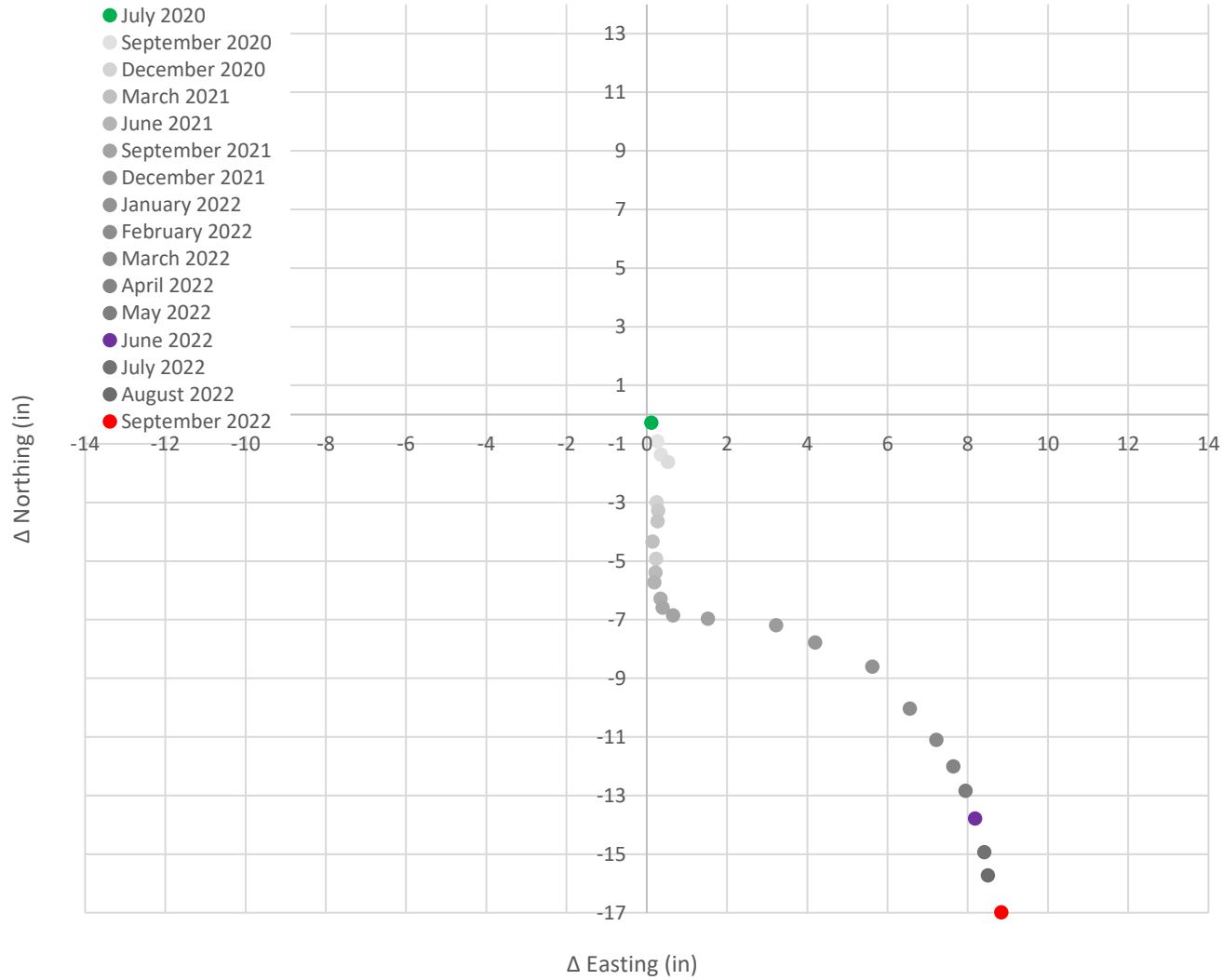
Knight Piésold CONSULTING

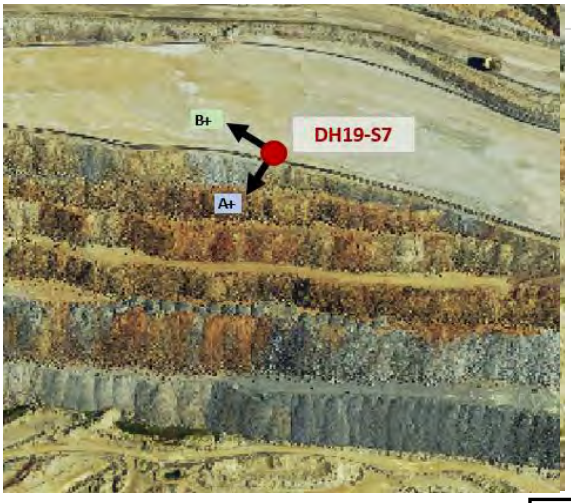
P/A NO. VA101-126/27

REF. NO. VA22-01888

FIGURE D.9

REV 0





NOTES:
1. COLLAR WANDER IS MONITORED USING GNSS INSTRUMENTATION INSTALLED AT THE INCLINOMETER COLLAR LOCATION.
2. THE PLOT ABOVE PRESENTS COLLAR POSITION BASED ON NORTH AND EAST CHANGE RELATIVE TO A JULY 1, 2020 BASELINE GNSS SURVEY.
3. NO DATA ARE AVAILABLE FOR NOVEMBER, 2020 WHILE THE INSTRUMENTATION WAS OFFLINE DUE TO A POWER MANAGEMENT ISSUE.

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

DH19-S7 GNSS-BASED INCLINOMETER COLLAR WANDER (JULY 1, 2020 THROUGH SEPTEMBER 30, 2022)

Knight Piésold CONSULTING

P/A NO. VA101-126/27

REF. NO. VA22-01888

FIGURE D.10

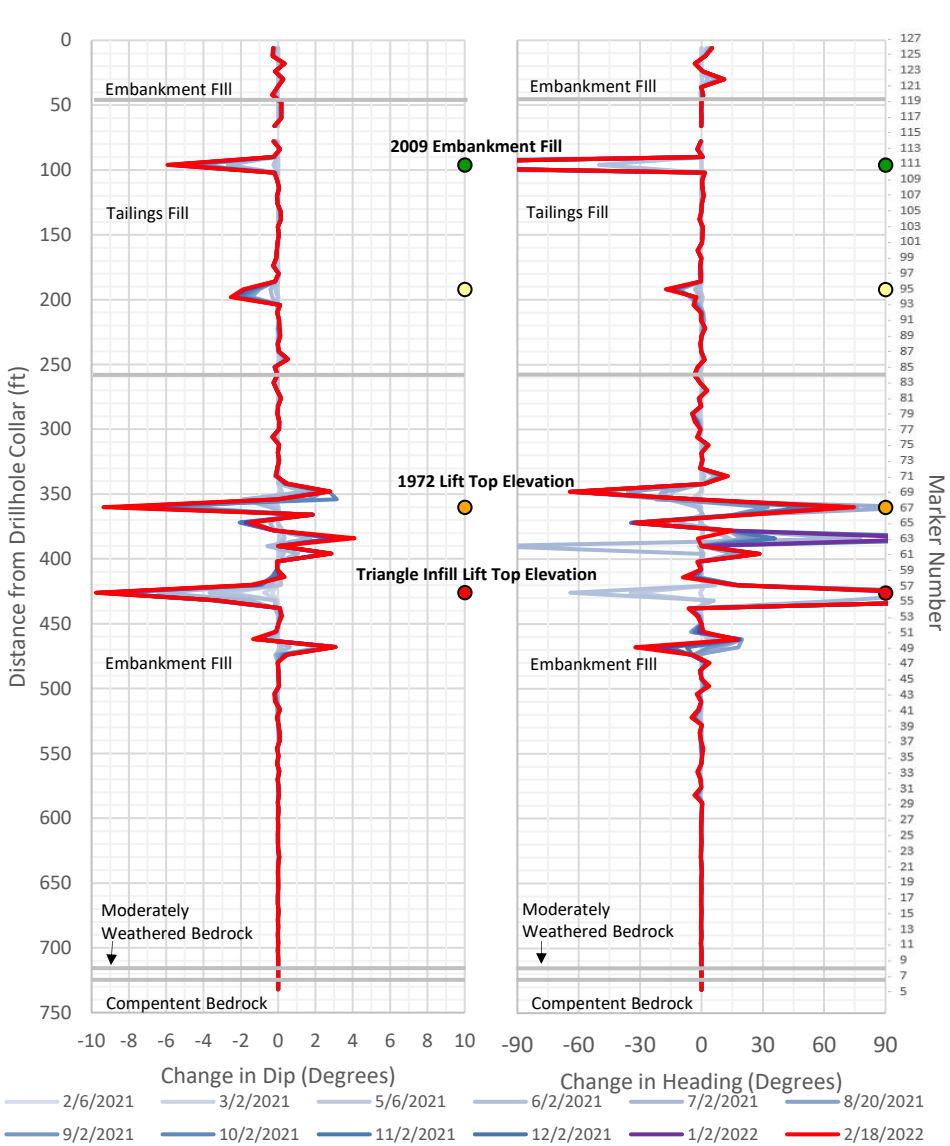
REV 0

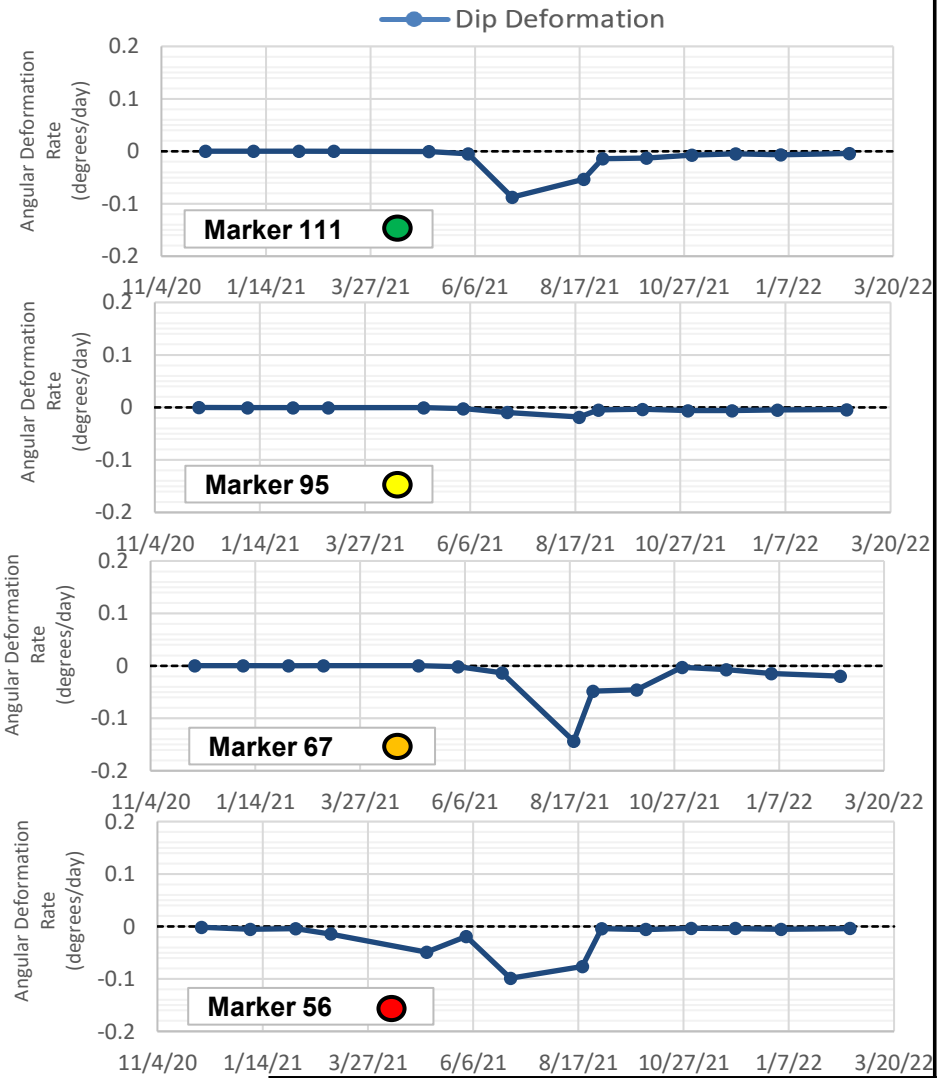
REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	03OCT'22	ISSUED WITH LETTER	SY3	KTD

APPENDIX E

Geo4Sight Deformation Plots

(Figures E.1 to E.2)





NOTES:

1. MONTHLY AVERAGE DEFORMATIONS ARE PRESENTED AND ARE RELATIVE TO A MONTHLY AVERAGE BASELINE FROM NOVEMBER 24, 2020 TO FEBRUARY 26, 2022.
2. DIP IS MEASURED FROM THE HORIZONTAL GROUND SURFACE TO THE SENSOR'S Y-AXIS. NEGATIVE CHANGE-IN-DIP INDICATES A STEEPENING SENSOR ORIENTATION.
3. HEADING IS MEASURED CLOCKWISE (CW) FROM THE MAGNETIC NORTHING. POSITIVE CHANGE-IN-HEADING INDICATES CW ANG. DEFORMATION.
4. DH20-S2 GEO4SIGHT DATA LOGGER BECAME WATER DAMAGED ON MARCH 3, 2022, NO DATA ARE AVAILABLE THEREAFTER. A REPLACEMENT DATA LOGGER HAS BEEN ORDERED.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	05OCT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

DH20-S2 GEO4SIGHT DIP AND HEADING ANGULAR DEFORMATION MAGNITUDES AND RATES (NOVEMBER 2020 TO SEPTEMBER 2022)

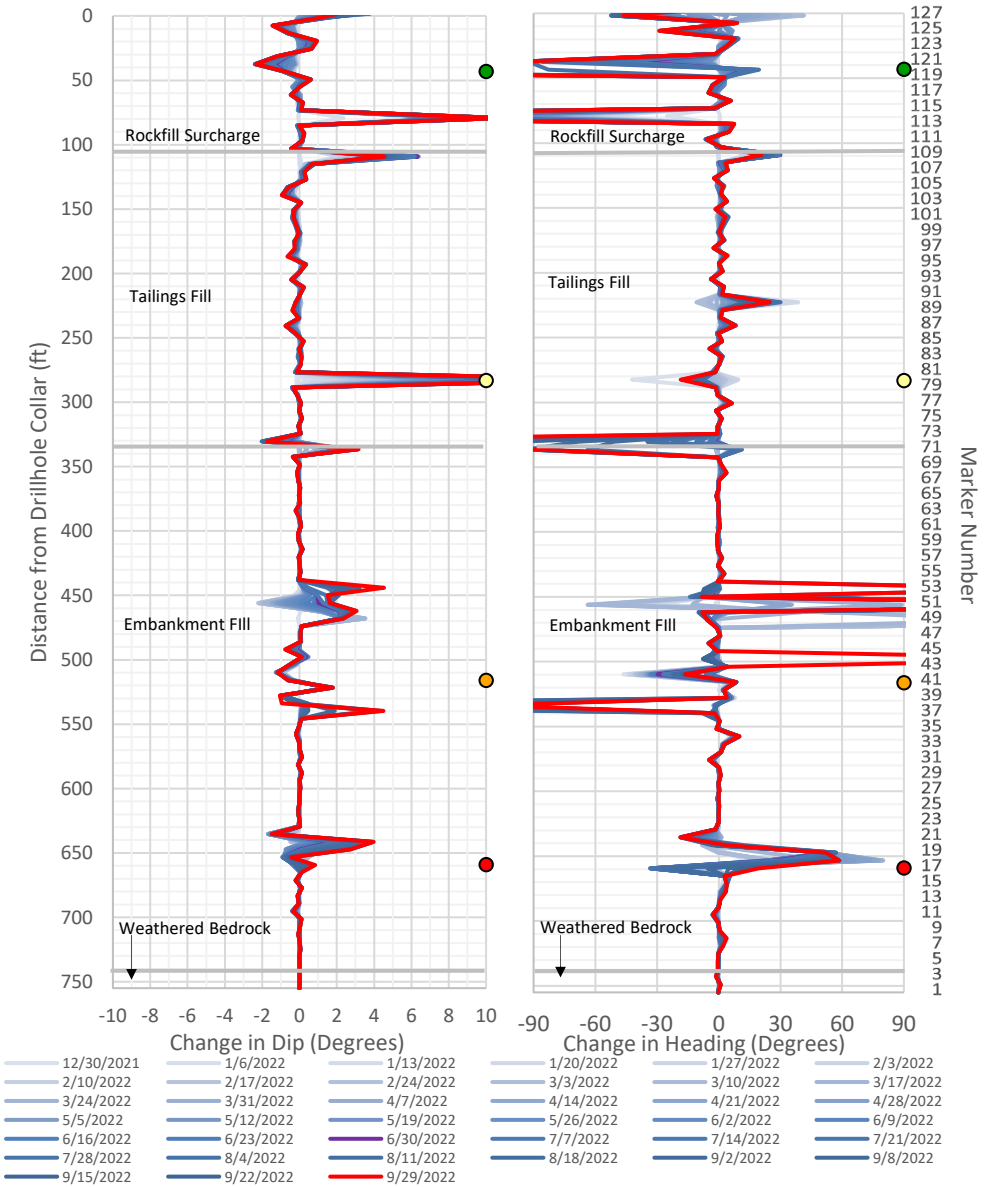
Knight Piésold CONSULTING

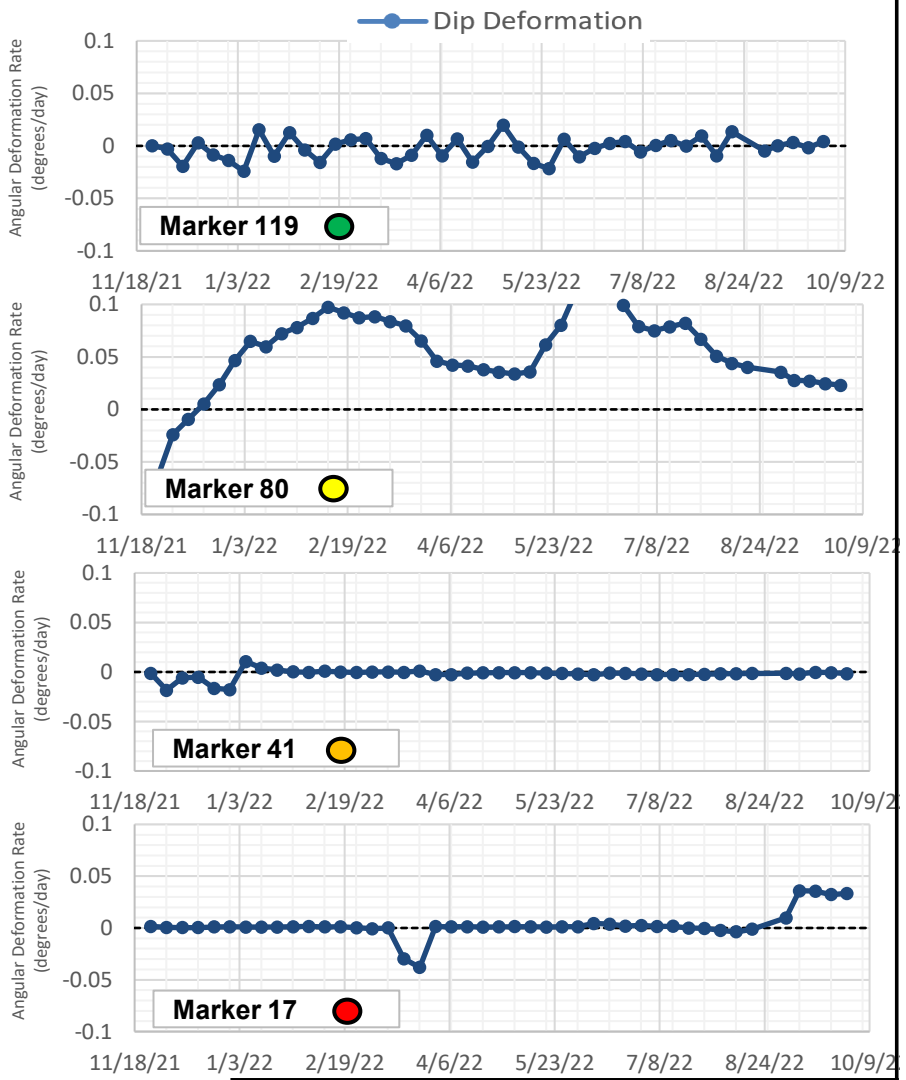
P/A NO. VA101-00126/27

REF. NO. VA22-01888

FIGURE E.1

REV 0





NOTES:

1. MONTHLY AVERAGE DEFORMATIONS ARE PRESENTED AND ARE RELATIVE TO A WEEKLY AVERAGE BASELINE FROM NOVEMBER 18, 2021 TO OCTOBER 5, 2022.
2. DIP IS MEASURED FROM THE HORIZONTAL GROUND SURFACE TO THE SENSOR'S X-AXIS. NEGATIVE CHANGE-IN-DIP INDICATES A STEEPENING SENSOR ORIENTATION.
3. HEADING IS MEASURED CLOCKWISE (CW) FROM THE MAGNETIC NORTHING. POSITIVE CHANGE-IN-HEADING INDICATES CW ANG. DEFORMATION.

REV	DATE	DESCRIPTION	PREP'D	RVW'D
0	04OCT'22	ISSUED WITH LETTER	SY3	KTD

MONTANA RESOURCES, LLP

YANKEE DOODLE TAILINGS IMPOUNDMENT

DH21-S4 GEO4SIGHT ANALYSIS
ANGULAR DEFORMATION PROFILES AND RATES
(NOVEMBER 2021 TO SEPTEMBER 2022)

Knight Piésold CONSULTING

P/A NO. VA101-00126/27

REF. NO. VA22-01888

FIGURE E.2

REV 0