IVR V1 Open Pit

Observations - Northeast Wall

- Final wall in Design Sector V0B.
- The wall is performing well. Half-barrels are visible. The foliation is oriented perpendicular to the wall.
- Cross-cutting structures resulted in numerous small wedges in the upper benches and significant scaling was required when the benches were established. There was a concern that the benches would ravel over time. However, to date, very little material has accumulated on the catch benches.
- No evidence of movement has been observed on several potential wedges identified during the 2021 inspection.

IVR V1 Open Pit

Observations - Southeast Wall

- Final wall in Design Sector V0C.
- The wall is performing well. Half barrels are visible and very little material is present on the catch benches.
- Several persistent cross-cutting features were identified during the 2021 inspection (examples circled below). These structures were not prominent in the structural data underlying the design of the open pit and there was a concern that they could impact the achievable slope geometry. It now appears that these structures were localized as they have not influenced the bench performance at depth.

IVR V1 Open Pit

Observations - Southwest Wall

- Final wall in Design Sector V0D.
- The wall is generally performing well. While the benches are primarily within the Komatiite and Brittle Structures, the wall is oriented perpendicular to the foliation.
- Numerous seeps are present in the wall. As the pit is thought to be entirely within permafrost, the seeps are assumed to be in the active layer.
- In the southwest corner of the pit, the seepage is sufficient to have caused a prominent Brittle Structure to erode (circled at left with close-up at right). The area should be monitored for ravelling over time.

IVR V2 Open Pit

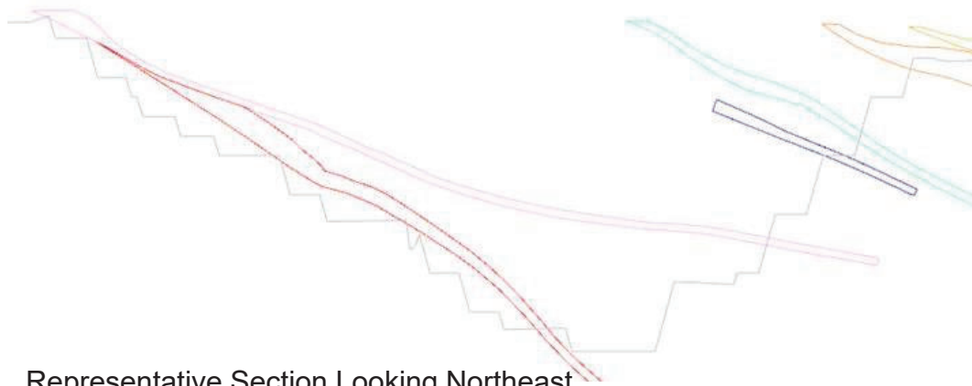
Observations - General

- The IVR V2 open pit is in the early stages of mining; approximately two benches have been established.
- These initial benches represent an important opportunity to validate the rock mass characterisation and slope geometry recommendations that underpin the open pit design. Recommend documenting the bench performance and key rock mass characteristics and comparing them to expectations.
- As noted earlier, managing spillover from the IVR V2 pit to the IVR V1 pit is an on-going challenge. The mine has adapted the blasting sequence to leave a small ridge adjacent the IVR V1 pit and then blasts the ridge into the V2 pit. This has been effective at reducing spillover.
- Comments on specific locations within the pit are provided on the following slides.

IVR V2 Open Pit

Observations - North Wall

- The north wall is located along the footwall of the deposit.
- Based on the results of the stability analyses, a decision was made to push back the wall so that it was located within the Mafic Volcanics rather than the Komatiite. This is expected to reduce the potential for bench- and multi-bench scale planar failures on the foliation. It also reduces the potential for inter-ramp scale planar failures on the brittle structures (see representative section below). If it is not possible to establish the wall in the Mafic Volcanics, it is likely that a much shallower slope will be required.
- It is important to verify that the slope is in fact being established in the Mafic Volcanics and below/behind the Brittle Structure expected along the contact between the Mafic Volcanics and the Komatiite.
- The performance of the initial two benches in this wall has been reasonable to date.



Representative Section Looking Northeast

IVR V2 Open Pit

Observations - North Wall “Turtlehead”

- The overburden in this area was thicker than expected, resulting in a large thermal cap. There are gaps in the thermal cap (outlined below in white) and exposed overburden is present along the crest of the upper bench. The overburden is likely to ravel over time. Section 1.135 of the Nunavut Mine Health and Safety Act requires unconsolidated material to be excavated back a minimum of 2 m from the crest. The thermal cap should be remediated in this area.
- Scaling of the end wall was in progress at the time of the inspection. Frequent hard toes were noted by the operator. The foliation is perpendicular to the wall in that area and significant scaling was required due to the presence of numerous small wedges/blocks. A potentially unstable block was observed on the wall (outlined below in black). It was not brought down with the scaling and should be monitored over time.
- A portion of the safety berm was missing at the end of the crest road where the photos below were taken. The berm should be re-established.

IVR V2 Open Pit

Observations - North Wall Noses

- A nose has been left in the final north wall adjacent the “Turtlehead” (shown in the photos below). The nose is intersected by a lens of Graphitic Chert aligned parallel to the north wall (circled in lower left photo).
- The creation of small, abrupt noses like this one should be avoided, particularly through contacts. The reduced confinement acting on the rock mass increases the potential for ravelling and instabilities over time.
- The nose may deteriorate further over time and should be specifically included in the visual inspection of the open pit.

IVR V2 Open Pit

Observations - Nose between IVR V1 and IVR V2

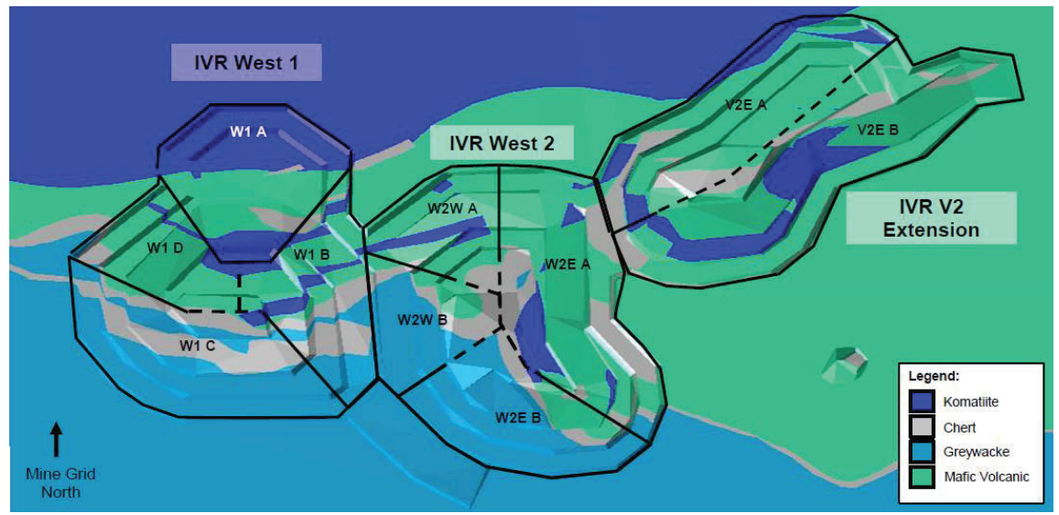
- A nose will be left on the uppermost bench at the point where the two open pits meet.
- The nose is in poor condition and had not been fully scaled at the time of the inspection. It should be scaled to reduce the rockfall hazard.
- The nose may deteriorate further over time and should be specifically included in the visual inspection of the open pit.

IVR WEST OPEN PITS

IVR West Open Pits

Overview

- The design recommendations for the IVR West 1, IVR West 2 and IVR V2 Extension open pits are shown at right for reference.
- The design sectors are shown at upper right along with the lithologies expected in the final open pit walls. The slope geometry recommendations are shown at lower right.
- The design of the open pits has changed since the recommendations were developed. The design shown here is the 20210202_ivr-w design.
- All three open pits have a depth of less than 50 m.



Base Bench Geometry

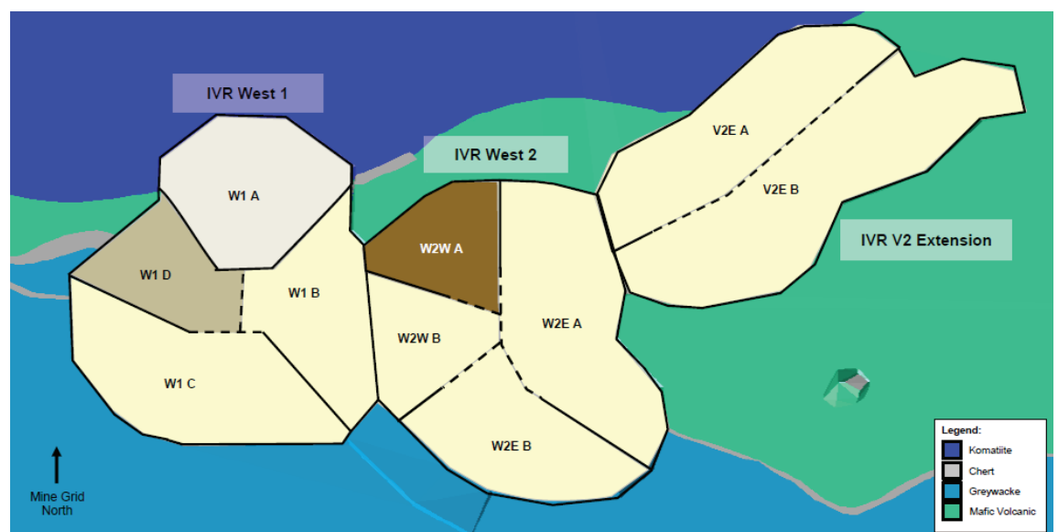
Base Case
BFA: 75°
Bench Width: 10 m
Bench Height: 21 m
IRA: 53°

Bench Geometry Controlled by Bench-Scale Failures

W1 A
BFA: 65°
Bench Width: 10.5 m
Bench Height: 21 m
IRA: 46°

W1 D
BFA: 65°
Bench Width: 10 m
Bench Height: 21 m
IRA: 47°

W2W A
BFA: 55°
Bench Width: 11 m
Bench Height: 21 m
IRA: 39°



IVR West Open Pits

General

- The IVR West 1 and IVR West 2 open pits were inspected on August 14 and 15, 2022. Observations made during the inspection are summarized on the following slides.
- The approximate current pit geometry is shown at right.
- Mining of IVR West 1 was recently completed and the open pit is being partially backfilled with waste rock. The drone imagery shown at right was taken prior to the start of backfilling.
- Mining of IVR West 2 will be completed in August 2022 at which point the open pit will be used for water management before being backfilled in 2033.
- Mining of IVR V2 Extension has not yet started.

IVR West Open Pits

Observations - IVR West 1

- Mining of the IVR West 1 pit is complete.
- A total of three single benches and one double bench were mined.
- The open pit is being backfilled with waste rock placed by end-dumping from the crest.
- A berm has been constructed on the ramp to prevent access to the open pit.

- The controls in place appear to be adequate to manage the expected hazards.

Looking Southeast

IVR West Open Pits

Observations - IVR West 2

- Mining of the IVR West 2 pit was nearing completion at the time of the inspection, with mining of the final bench in progress.
- The upper two benches are single benches. The lower bench is planned to be a triple bench, with a good-bye cut.
- As the pit will be used for on-going water management, safe access will need to be maintained once mining is complete.

- The rock mass structure within the open pit is complex, with the orientation of prominent structures changing over relatively short distances.
- The benches have generally performed well. Several rockfall hazards were observed and are shown on the following slide.

Looking East

IVR West Open Pits

Observations - IVR West 2

- Several rockfall hazards were observed along the northeast wall, above the ramp (circled at right).
- A thermal cap has not been constructed for the overburden between IVR West 1 and IVR West 2, and the overburden has started to slough. It is currently manageable, but if it progresses it could become a rockfall hazard.
- Recommend scaling the wall and constructing a rockfall berm along the inside of the ramp.

- The IVR V2 Extension is planned to merge with the east wall of this pit. The rockfall risk associated with spillover from blasting and the potential creation of noses at the breakthrough will need to be reviewed and managed.

Looking Northeast

AP5

AP5

Observations

- Attenuation Pond 5 is a former quarry located to the east of the WHL open pit that is now used for water management. The pond was inspected on August 15, 2022.
- The pond is partially flooded, with one to two benches exposed above the pond water level. As a result, a detailed inspection could not be completed.
- No stability concerns were identified in the exposed slopes.
- Pumps were present at the time of the inspection. Access to the ramp and pit was unrestricted, but pylons were installed during the inspection.

Monitoring and Inspections

Monitoring and Inspections

General

- The slope monitoring program at the mine currently consists of the following primary components:
  - Observations and Ground Control Log Book entries from mine personnel
  - Visual Inspections
    - Routine and special geotechnical inspections
    - Official wall inspections
    - Bench approvals
  - Slope Stability Radar (SSR) monitoring
- Note that in-situ instrumentation is not currently used, though vibrating wire piezometers and thermistors were installed in the past and additional instruments are planned in the future.
- Maptek LiDAR scans are used to document the achieved slope geometry but are not used for monitoring.

Monitoring and Inspections

Visual Inspections

- The frequency of each visual inspection, the person responsible and the communication of the results of the inspection are defined in the GCMP (at right).
- In addition to the inspections noted at right, the mine also employs a bench approval procedure.
- The routine and special visual inspections are documented with photos and summarized in emails. They focus on specific identified or reported hazards.
- The official wall inspections are completed by a multi-disciplinary group and consider all of the open pit walls rather than specific hazards. The inspections are documented with photos and in a formal report.
- Identified hazards are discussed, a risk rating assigned, and mitigation measures agreed upon.
- The GCMP also includes a commitment to use a drone to examine the catch benches and known geotechnical hazards but this has not been done in the last two years except on an ad-hoc basis. Several areas in the pits would benefit from drone inspections.

Table 5-5: Summary of Inspection Program

Structure	Responsible	Type	Frequency	Reporting	Distribution List
Whale Tail pit and IVR pit	Geotechnical Engineer or Technician	Routine visual inspection	1 x 2 days	Email highlighting the main observation and conclusions	Meadowbank Mine Operation Supervisors
		Official wall inspection	Biweekly	Wall inspection map and report	Surveyors, Grade control, Mine Ops, E&I, Environment, Mine inspector, Geology team
		Special visualization inspection	After each of these events: •New potential geotechnical hazard was identified by personnel working in the open pit and/or reported in the ground control book. • Rockfall (in area of event) •Earthquake	Ground control book and email highlighting the main observation and conclusions	Meadowbank Mine Operation Supervisors, Geotechnical coordinator
	Geotechnical Engineer and third-party reviewer	Annual pit slope performance	Once per year	Annual pit slope performance review	Geotechnical Team, Mine inspector, Regulators
	Geotechnical Engineer and Mine inspector expert	Mine inspector geotechnical inspection	Once per year	Whale Tail Project Mine Inspector review	Mine manager

Monitoring and Inspections

Visual Inspections - Comments

- The following comments from the previous annual review remain applicable:
  - The wall inspection reports rightfully focus on the identified hazards. Recommend also compiling a series of overview photos (e.g., of each major wall) with comments to generate a record of wall performance over time. This can be invaluable for back-analysis.
  - While there are frequent visual inspections, there should be a formal mechanism (e.g., TARP) in place to increase the frequency of inspections in the event that an instability is observed or, for example, particular deformation limits are exceeded.
  - Recommend incorporating a periodic inspection of the open pit crest for evidence of instability (e.g., above D4K). As a starting point, this could be completed monthly.
  - The drone inspection commitment in the GCMP should be reviewed and aligned with current needs and capabilities. For example a biannual (e.g., at start and end of summer) review of catch bench condition / performance.

Monitoring and Inspections

Hazard and Action Item Tracking

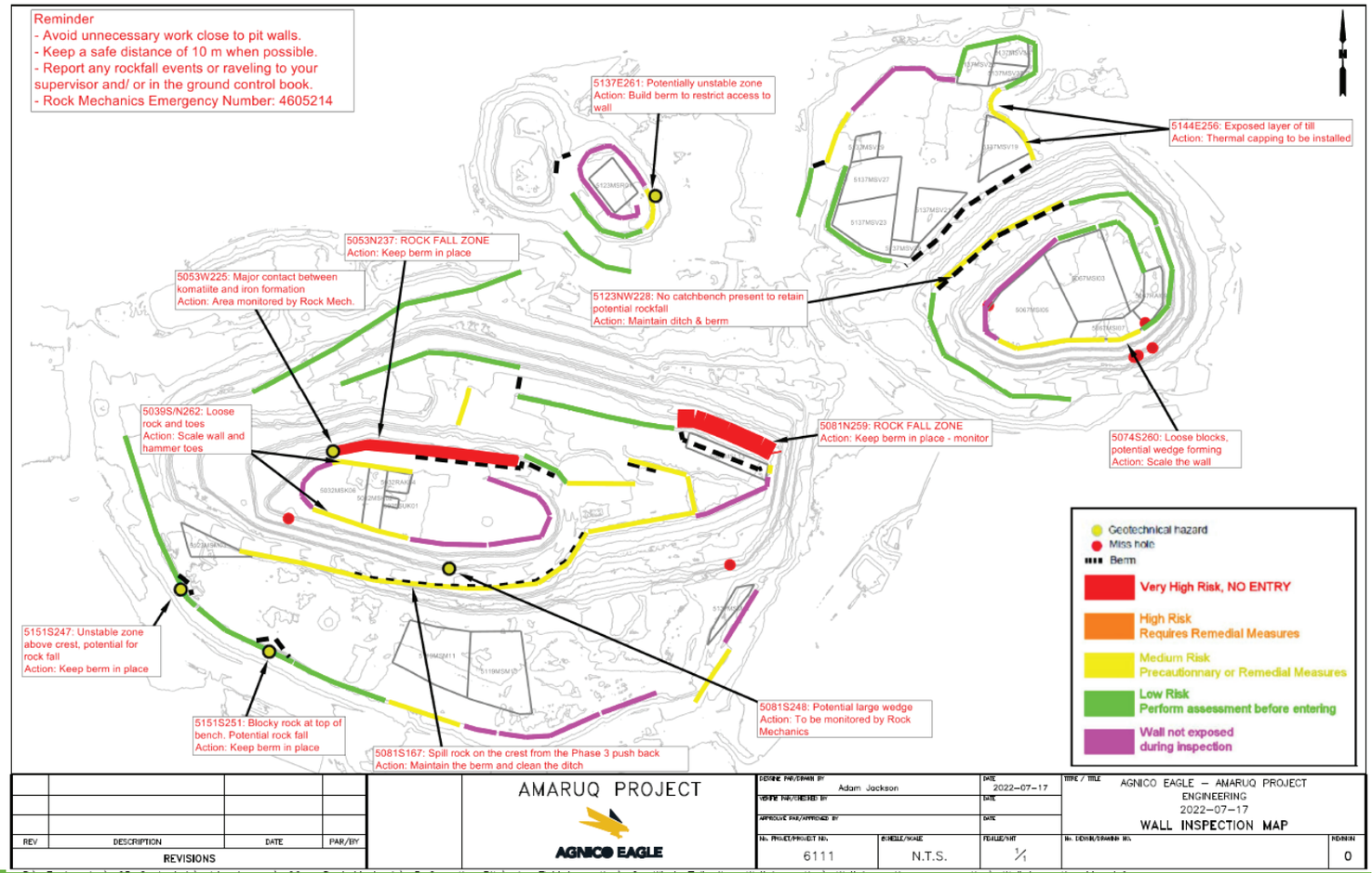
- Hazards, the associated risk rating, and any required corrective actions are tracked in a database. An example from the database is shown below.
- A total of 61 hazards had been identified in 2022 by the end of July. The most common hazards (34) are associated with rockfall hazards or loose. The remainder are roughly evenly split between possible wedges/bench-scale failures, hard toes, and exposed till at the crest of the slope.
- A due date to complete the corrective actions is specified. However, overdue items are not flagged. Recommend setting up a mechanism within the database to flag overdue corrective actions so that they aren't overlooked. For example, there are 55 hazards from 2020 and 2021 that are listed as either not completed or without a status. In many cases the recommendation appears to have been superseded or the hazard mitigated through other means; these items should be closed out.
- The date the corrective action is completed and the person who verified completion is tracked, with some exceptions. This is a good practice.
- Two of the hazards noted as requiring ongoing monitoring (e.g., slabs on the crest of the 5137 bench in Whale Tail Phase 3) have been removed from the hazard map (see next slide). It is not clear why some hazards requiring on-going monitoring are shown while these have been removed. Recommend showing all of the hazards on the map.

Date	ID	Pit/Quarry	Bench	Geotechnical Hazard	Corrective Measure	Due date	Completed (Yes/No)	Date completed	Approved by	Status
12-02-2022	5095W202	IVR	5095	Toes along the wall	hammer toes	Before staking out the 5081PS	Yes	?		
02-02-2022	5095NE203	IVR	5095	Loose material along the wall	Light scaling	Before marking of adjacent pattern	Yes	?		
02-02-2022	5151SW204	IVR	5151	Loose rocks and blocks	Scale the wall	Before marking of adjacent pattern	Yes	?		
28-02-2022	5137SE205	WT Phase 3	5137	Loose rock and block	Scale the wall & crest	Before making the adjacent pattern	Yes	?	DS	4
28-02-2022	5074SE206	WT Phase 2	5074	Block on the corner	Sacle and Hammer if needed	Before making the adjacent pattern	Yes	44620	MMM/AT	4

Monitoring and Inspections

Hazard / Risk Assessment

- Identified hazards and the required mitigation work are tracked on a Hazard Map available to the workforce. The map is an effective tool.
- There continues to be limited guidance on how to select the risk ratings. Recommend providing detailed guidance, including examples, on how to determine these ratings. The goal is to ensure that each member of the Rock Mechanics team can perform the assessment in a consistent and reliable manner.
- The map is updated every two weeks. However, with multiple pits in progress it is often rapidly out of date. Recommend issuing an update weekly (or more frequently) if there are notable changes. One possibility would be to issue a brief supplement that focuses solely on what has changed.



Monitoring and Inspections

Hazard / Risk Assessment

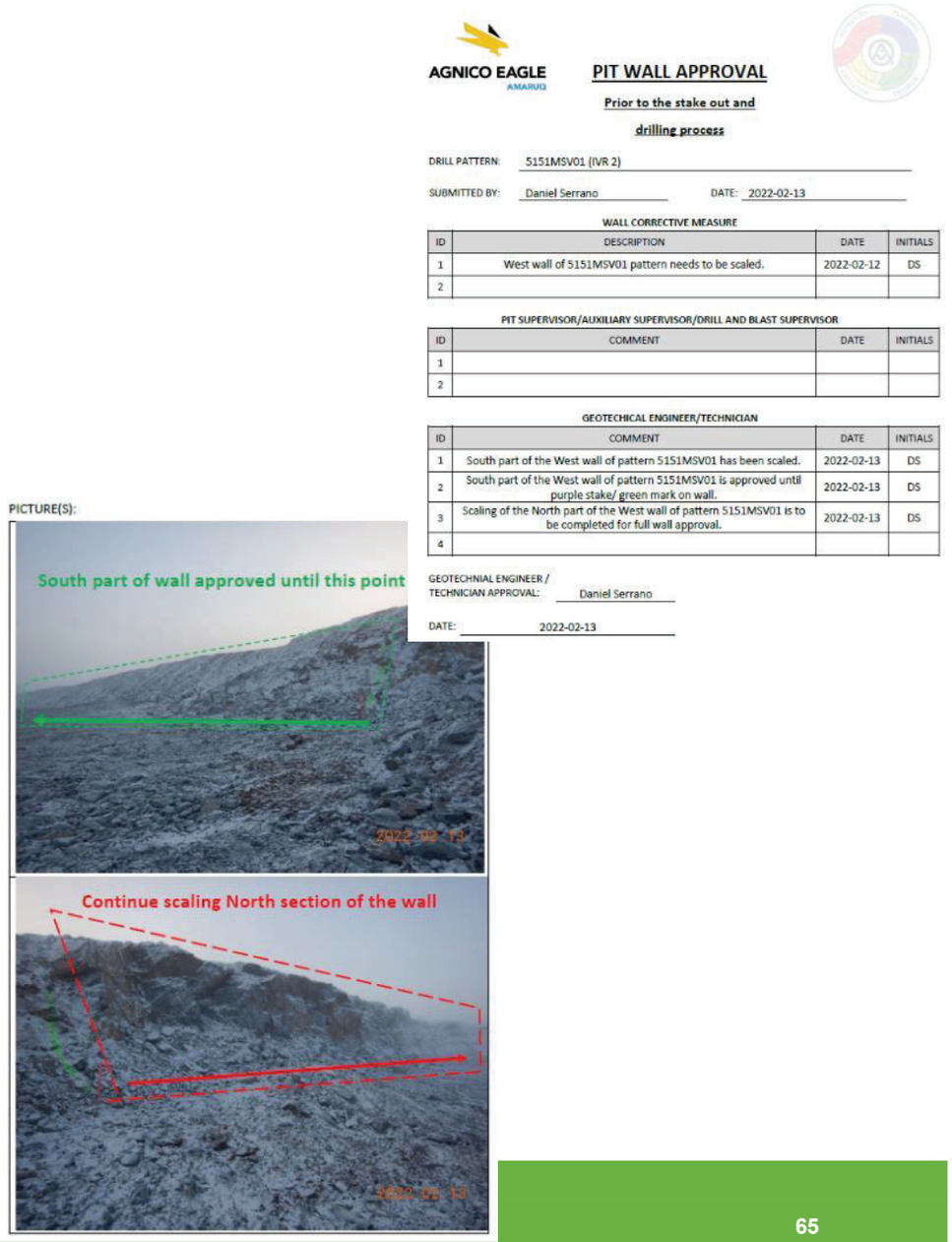
- The hazard maps form the basis for the risk-based Work Close to Pit Wall procedure, which is a key process for managing geotechnical risk (excerpt shown at right). It applies to personnel in vehicles as well as those on foot.
- Annual training is provided on the procedure.
- The procedure was discussed with one of the production geologists working in the pit and one of the rock mechanics engineers. Both were unaware that the hazard map rankings were linked to how work was to be completed near the highwall. The geologist indicated that they would use a spotter if they had to approach within 10 m of the wall but as they work alone it is not clear how reliably this is done.
- Large areas of the open pits are defined as Yellow Zones, where access can be granted by the pit supervisor with the use of a spotter. However, free access is maintained to many of these areas (e.g. Phase 2 ramp).
- The hazard maps are used both to present rock mechanics hazards and to communicate corrective actions. While this is efficient, it has created confusion at times (e.g., the Green Zones were mistakenly believed to mean that the bench had been approved).
- The following are recommended:
  - Review the Work Close to Pit Wall procedure to ensure that is effective, practical and used. Are spotters being consistently used in Yellow Zones?
  - Provide refresher training on the Work Close to Pit Wall procedure.
  - Refine the legend on the hazard map to clearly note the restrictions associated with the risk ratings (e.g., Yellow - Spotter Required).
  - Consider the use of physical markers (e.g. pylons) in the pit to remind personnel of hazards that are not bermed off (e.g., Yellow Zones).
  - Consider communicating the corrective actions separately to operations so that it is clear that the map is focussed on existing hazards.

- Red Zone: An area defined as very high risk.
- Orange Zone: An area defined as high risk. It is a section of the Pit Walls requiring remedial work and must remain closed to all duties, except to the machinery that carries the remedial work, until the work is completed.
- Yellow Zone: An area defined on the pit wall inspection map as medium risk. It is a section of the Pit Wall also requiring remedial work, but access can be granted by the pit supervisor with the use of the spotter.
- Green Zone: An area defined on the pit wall inspection map as low risk. It is a section of the Pit Walls where no remedial work is required to make the area safe for worker access. However, a regular workplace inspection must still occur prior to commencing work.
- Purple Zone: An area defined on the pit wall inspection map as an area where the wall was not exposed at the time of previous inspection.

Monitoring and Inspections

Bench Approval Process

- The rock mechanics group has implemented an approval process for the benches on the final walls (both ultimate pit and interim stages).
- The condition of the bench and whether or not the face has been adequately scaled is assessed. The process is intended to be completed after each 7 m flitch is established and before work resumes in the area. A standard two-page report is issued each time.
- This process is a key control for managing potential rockfalls and bench-scale instabilities and is formalized within the Pit Wall Approval procedure.
- Based on observations and discussions during the visit, the bench approval report would benefit from a checklist to improve consistency between staff and avoid hazards being missed. Approvals in key sectors (e.g. WHL F6) should be limited to experienced staff.



AGNICO EAGLE
AMARUQ

PIT WALL APPROVAL

Prior to the stake out and drilling process

DRILL PATTERN: 5151MSV01 (IVR 2)

SUBMITTED BY: Daniel Serrano DATE: 2022-02-13

WALL CORRECTIVE MEASURE

ID	DESCRIPTION	DATE	INITIALS
1	West wall of 5151MSV01 pattern needs to be scaled.	2022-02-12	DS
2			

PIT SUPERVISOR/AUXILIARY SUPERVISOR/DRILL AND BLAST SUPERVISOR

ID	COMMENT	DATE	INITIALS
1			
2			

GEOTECHICAL ENGINEER/TECHNICIAN

ID	COMMENT	DATE	INITIALS
1	South part of the West wall of pattern 5151MSV01 has been scaled.	2022-02-13	DS
2	South part of the West wall of pattern 5151MSV01 is approved until purple stake/ green mark on wall.	2022-02-13	DS
3	Scaling of the North part of the West wall of pattern 5151MSV01 is to be completed for full wall approval.	2022-02-13	DS
4			

GEOTECHNIAL ENGINEER / TECHNICIAN APPROVAL: Daniel Serrano

DATE: 2022-02-13

PICTURE(S):

Monitoring and Inspections

Wall Approval Process

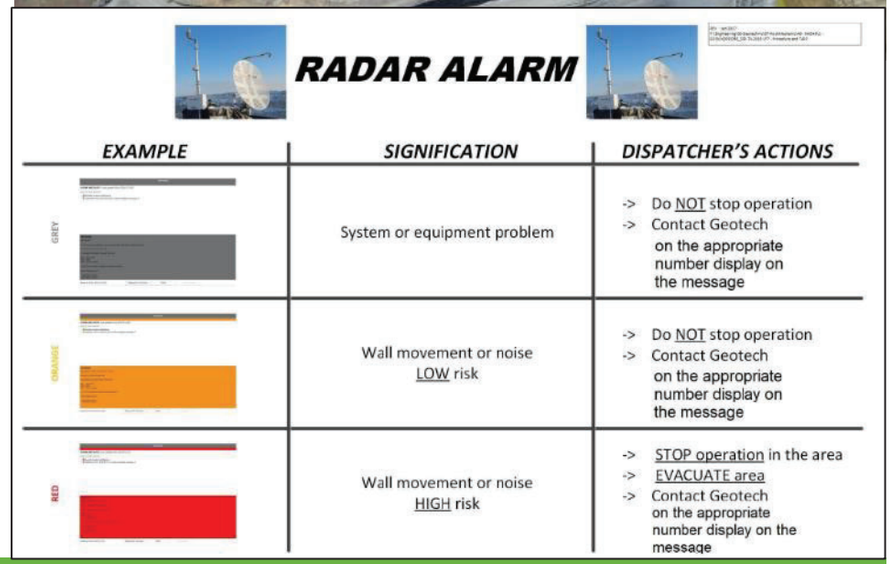
- Rock Mechanics must complete a Bench Approval before drilling can begin on a pattern adjacent to a given bench. Rock Mechanics tracks whether or not a bench is approved in a spreadsheet that is shared with Engineering and Operations. The responsibility is on Operations to check the spreadsheet and verify that a bench is approved before starting to drill the pattern.
- It is understood that this does not always happen and that patterns are sometimes drilled or pre-shear blasts completed before a bench is approved. It was not possible to review the frequency of these events but they are understood to be irregular.
- The communication and verification of whether or not a wall has been approved needs to be reviewed as the current process does not appear to be effective. The process should be reviewed with Engineering and Operations to ensure that bench approvals are completed before work is undertaken in the immediate vicinity. One possibility would be to transition the responsibility to the Drill and Blast Engineers, such that a pattern is not issued to Operations until the relevant benches/flitches have been approved.

Monitoring and Inspections

SSR - General

- The mine has two GroundProbe SSR-XT real aperture radars. One radar covers the north wall while the other radar covers the south wall (see image at right).
- There is a procedure setting out responsibilities and how the SSR data are communicated. The radar data are reviewed at least twice a day and whenever alarms are triggered. The process followed when an alarm is triggered is defined in a TARP, shown at lower right.
- The TARP describes Orange (contact rock mechanics) and Red (evacuate) alarms, but in practice only Orange alarms are used in order to provide the rock mechanics group greater flexibility in determining a response.
- Someone from Rock Mechanics is designated as being on-call and has a pager in the event that they cannot be immediately reached or it is night shift.

- The actions to be taken by Dispatch in the event of a Grey or Orange alarm specifically state that operations are not to be stopped. This is often at odds with the guidance provided by Rock Mechanics and creates room for confusion. Recommend modifying the response, so that the first action is to contact Rock Mechanics (or the Pit Supervisor).



Monitoring and Inspections

SSR Monitoring - Alarms

- The current Orange alarm thresholds are as follows:
  - Velocity exceeding 1.3 mm/hr with a calculation period of 180 minutes
  - 3 contiguous pixels over 2 consecutive scans
- Red alarms are not used. The Orange alarms are adjusted on an informal basis in response to observed conditions. For example, a lower deformation threshold may be used for an area of concern at a low angle of incidence. Additional parameters (e.g., coherence, inverse velocity) are used to interpret the observed movement on a case-by-case basis but are not incorporated into the alarms.
- The strategy of using Orange alarms and adjusting the alarm parameters on a case-by-case basis relies on an experienced operator who is familiar with the historical slope performance and is comfortable interpreting the data. The mine has recently developed a procedure for using the radar, including the process of setting alarms. This is a useful reference and particularly important given the number of new staff joining the Rock Mechanics team. However, neither the procedure nor the GCMP explain why the alarms have been set at their current values or provide guidance on how they can be adjusted based on different circumstances. While it is recognized that it is not practical to cover all eventualities, recommend providing additional guidance on how to define alarm criteria.
- As the open pit gets deeper and the potential for multi-bench failures increases, Red alarms will need to be developed for some areas in order to manage the associated risk. Recommend developing a Red trigger condition as a backstop for unexpected or unprecedented conditions.
- The SSR was involved in the forecasting of 10 of the 17 reported slope failures that had occurred in 2022 as of the time of the site visit. The failures that were not forecast occurred in areas that were masked or during periods when the radar was offline (see comments on next slide).
- The alarm parameters were last reviewed in 2021. Recommend completing a similar review in 2022 and establishing a commitment to do so annually.

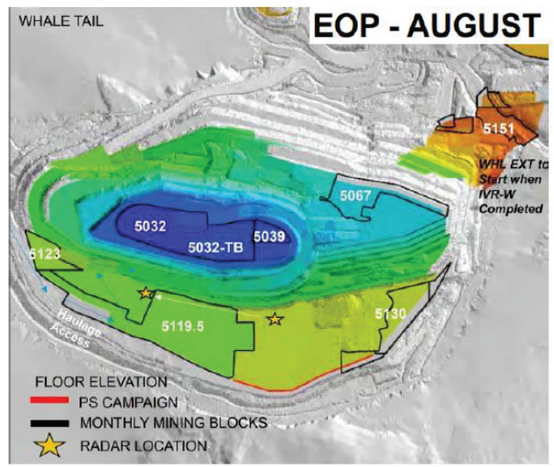
Monitoring and Inspections

SSR Monitoring - Coverage

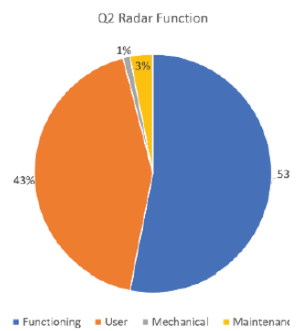
- The mining of multiple phases of the mine, particularly the Phase 3 pushback, strongly influences where the radar can be located and the activities that can be covered by the radar.
- The mine reviews the expected radar coverage relative to the planned mining as part of the quarterly reports (example at right). This is endorsed.
- Radar availability has been a significant limitation in 2022.
  - Radar SSR253 was damaged by flyrock and was only operating 18% of the time in Q1. The radar was repaired in April and availability improved in Q2 to 53% (a large proportion of the remaining downtime was due to intensive mining in Phase 3, represented by the orange “User” category in the chart).
  - Radar SSR560 was operating 100% of the time in Q1, reducing to 60% of Q2 due to an internal computer failure.
- It is understood that GroundProbe’s technical support has improved and this has helped with radar availability.
- As the radar is the sole quantitative monitoring system for the open pit slopes, this amount of downtime has a significant impact on the mine’s ability to manage geotechnical risk. This reinforces the need for additional monitoring systems.
- The SSR is a critical control for achieving an acceptable level of residual risk in sectors of the pit with an increased likelihood of slope failures (e.g., D4K, Phase 1 North Wall). Develop a formal process to stop or modify mining activities in these areas when radar coverage is not available. This can be linked to the Grey alarms.

MONITORING OF NORTH WALL

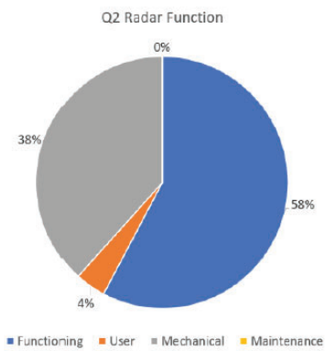
Exact location for the radar to be determined. It will be critical to monitor the NE wall once activities resume in Phase 2, however it may interfere with mining of 5130 bench in Phase 3. Blasts are typically directed to the west. Moving the radar out for each blast may be required.



SSR253



SSR560



Monitoring and Inspections

Instrumentation

- There are currently no geotechnical instruments being actively monitored in or around the open pit. The radar is the sole quantitative method for measuring surface displacement at the mine and the measured displacements are only along a vector between the radar and the pit wall.
- An additional surface monitoring system is recommended, such as prisms or GPS beacons, to complement the SSR, provide a long-term deformation baseline, and to allow the true displacement vector to be measured. It is acknowledged that the mine has had challenges with prisms in the past but it may be possible to benefit from the knowledge gained at other operations.
- The mine is currently planning and budgeting an instrumentation program for the Northeast Wall in 2023. The mine is planning to install a combination of Shape Accelerometer Arrays (SAA) and TDR cables to provide sub-surface data that can be used to better define deeper-seated instabilities. VWPs and thermistors are also planned within the four upper benches of the wall to better understand the potential impact of surface water infiltration on the bench performance. Two GPS beacons are also planned to complement the radar monitoring of the surface displacement. The proposed instrumentation is considered reasonable.
- The instrumentation should be expanded as mining progresses (e.g., Design Sector A1K).
- Vibrating Wire Piezometers and a thermistor were installed in the South Wall in 2022 to allow the effectiveness of the planned water management system to be quantified.

Monitoring and Inspections

Blasting

- The Third-Party review identified limitations in drilling and blasting practices as having a significant effect on wall performance and whether or not the design bench geometry was achieved. Two key limitations were the lack of quality control for the drilling and the use of a limited number of blast patterns for a wide range of conditions.
- The mine commissioned DynoNobel to review the blasting practices. Dyno recommended the use of stemming, air decking and larger diameter holes, and provided several trial patterns. A blasting trial is ongoing, which is endorsed.
  - The first trial blast for pre-shear with stemming was completed in the Diorite (Phase 3 Pushback) and a second trial was planned at the time of the visit.
  - The mine has concerns about the practicality of air decking in an arctic environment and with relatively high turnover of the blasting personnel. Patrick Andrieux of A2GC is reviewing the recommendations and adapting them for the mine.
  - Additional trial patterns were recommended for the Greywacke and Komatiite. The use of a different pattern for the Komatiite is likely to have a material impact on wall performance and a trial should be completed.

- Over the summer, an intern completed quality control on the depth of the blastholes. A Boretrak was also trialled to measure pre-shear drillhole deviation, and the mine is considering buying one. However, the quality control program won't be continued over the winter. Given the issues identified during the Third-Party review, it is recommended that the quality control program be continued over the winter.

Ground Control Program

Ground Control Program

General

Comments on the following aspects of the ground control program for the open pit are provided on the following slides:

- Mine Design Input and Review
- Quarterly Summary Reports
- Data Collection and Design Verification
- Resources and Training
- Ground Control Management Plan (GCMP)

Ground Control Program

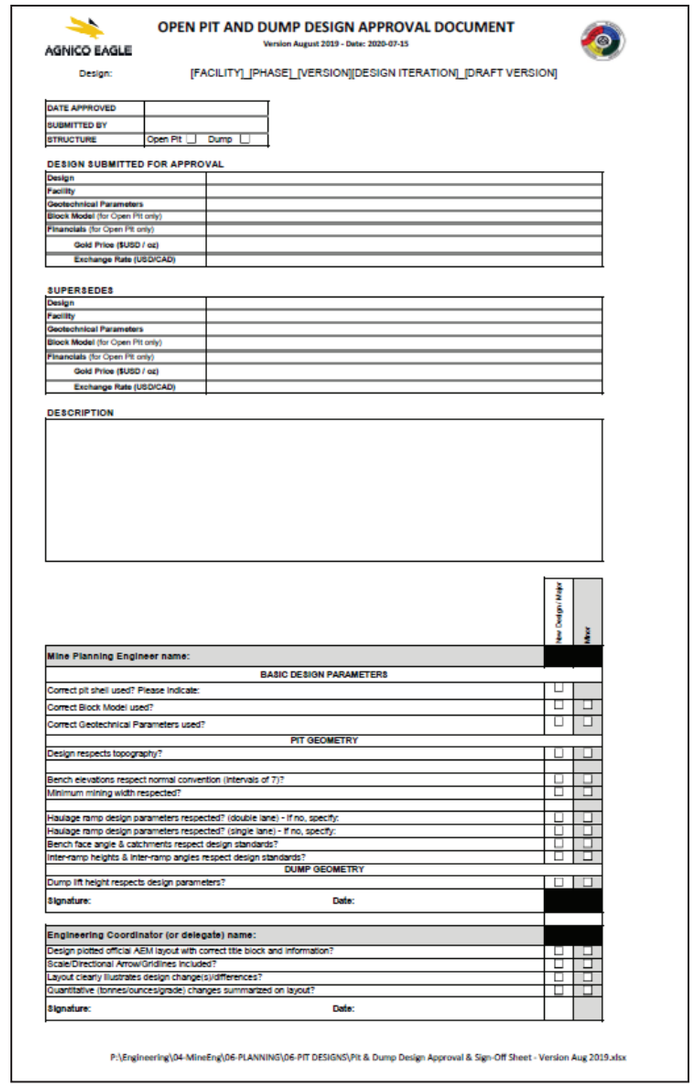
Mine Design Input and Review

- Regular review of, and feedback on, interim designs by the rock mechanics team is important as it allows early recognition and possible mitigation of potential slope instabilities or geomechanical hazards. Ground control factors requiring consideration include:
  - The structural domain(s) involved, including the presence of adverse structure and whether the conditions deviate from expectations.
  - The rock mass quality domains involved, including the presence of weak units (Komatiite and overburden) and whether the conditions deviate from expectations.
  - Whether the proposed design is consistent with the slope geometry recommendations (bench scale and inter-ramp scale).
  - Whether the slope geometry recommendations are applicable (e.g., is the orientation of the dominant structure relative to the orientation of the wall consistent with the analyses underlying the slope geometry recommendations). Is a specific analysis required (by the mine or a consultant)?
  - Possible interactions with faults and brittle structures (e.g. will a fault intersect or lie directly behind the slope).
  - Possible interactions with existing or predicted slope instabilities.
  - Possible interactions with talik or surface water (e.g. the formation of an ice wall or potential for significant inflows)
  - The creation of adverse slope geometry (e.g. a nose).
  - Potential impacts on nearby infrastructure (e.g. ramp, roads at pit crest, attenuation pond, etc.).
  - Is instrumentation or a specific monitoring plan required?

Ground Control Program

Mine Design Input and Review

- The rock mechanics team provides input to mine design and planning process as follows:
  - **Bench Master -** The Bench Master is reviewed by the rock mechanics team as part of the sign-off process.
  - **Weekly Mine Planning Meeting -** Attended by a member of the rock mechanics team. The mine plan for the next two weeks is discussed and any geomechanical considerations identified. Key decisions are documented in meeting minutes.
  - **Three Month Rolling Mine Plan (3MR) -** The rock mechanics team provides input to the 3MR as part of the mine planning meetings. High-level comments are documented in an overall summary presentation.
  - **Budget Mine Plan -** The rock mechanics team reviews the mine plan and key geomechanical considerations are summarized on a slide. Recommend documenting the review in greater detail, even if the document remains internal to the team.
- While the mine does not have an explicit Management of Change procedure, the "Open Pit and Dump Design Approval Document" is used to track sign-off, including from the rock mechanics team, on major changes to the open pit design. This is a good practice.
- The rock mechanics team has a good working relationship with the planners and geologists.



AGNICO EAGLE

OPEN PIT AND DUMP DESIGN APPROVAL DOCUMENT

Version August 2019 - Date: 2020-07-15

Design: [FACILITY]_[PHASE]_[VERSION][DESIGN ITERATION]_[DRAFT VERSION]

DATE APPROVED	
SUBMITTED BY	
STRUCTURE	Open Pit ☐ Dump ☐

DESIGN SUBMITTED FOR APPROVAL

Design	
Facility	
Geotechnical Parameters	
Block Model (for Open Pit only)	
Financials (for Open Pit only)	
Gold Price ($USD / oz)	
Exchange Rate (USD/CAD)	

SUPERSEDES

Design	
Facility	
Geotechnical Parameters	
Block Model (for Open Pit only)	
Financials (for Open Pit only)	
Gold Price ($USD / oz)	
Exchange Rate (USD/CAD)	

DESCRIPTION

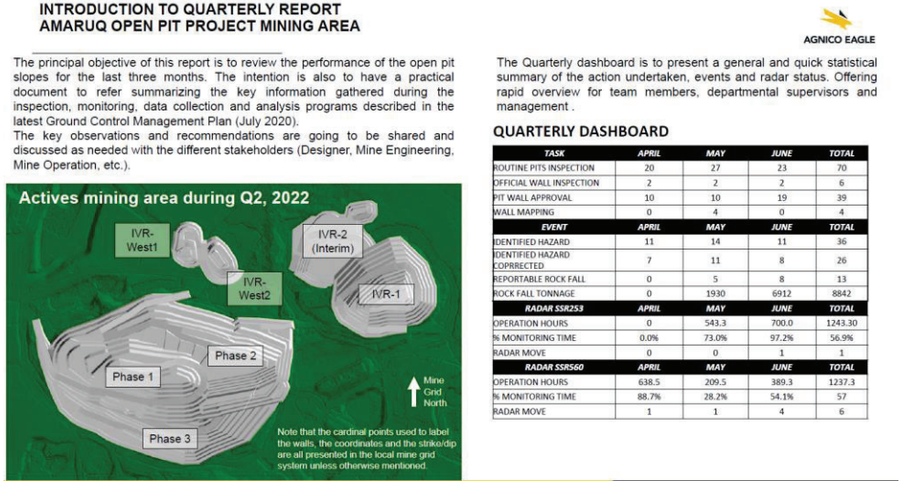
	New Design Major	Minor
Mine Planning Engineer name:		
BASIC DESIGN PARAMETERS		
Correct pit shell used? Please indicate:	☐	
Correct Block Model used?	☐	☐
Correct Geotechnical Parameters used?	☐	☐
PIT GEOMETRY		
Design respects topography?	☐	☐
Bench elevations respect normal convention (intervals of 7)?	☐	☐
Minimum mining width respected?	☐	☐
Haulage ramp design parameters respected? (double lane) - If no, specify:	☐	☐
Haulage ramp design parameters respected? (single lane) - If no, specify:	☐	☐
Bench face angle & catchments respect design standards?	☐	☐
Inter-ramp heights & inter-ramp angles respect design standards?	☐	☐
DUMP GEOMETRY		
Dump lift height respects design parameters?	☐	☐
Signature: **Date:**		
Engineering Coordinator (or delegate) name:		
Design plotted official AEM layout with correct title block and information?	☐	☐
Scale/Directional Arrow/Gridlines included?	☐	☐
Layout clearly illustrates design change(s)/differences?	☐	☐
Quantitative (tonnes/ounces/grade) changes summarized on layout?	☐	☐
Signature: **Date:**		

P:\Engineering\04-MineEng\06-PLANNING\06-PIT DESIGNS\Pit & Dump Design Approval & Sign-Off Sheet - Version Aug 2019.xlsx

Ground Control Program

Summary Reports

- The mine has committed to producing a report every four months that summarizes the slope performance and the inspection, monitoring, instrumentation, and rock mass characterization data collected over the reporting period. In practice, these are being issued quarterly.
- At the time of the inspection, two reports had been completed in 2022. The reports include:
  - A dashboard of Ground Control activities and identified hazards
  - A summary of open pit slope performance, including any slope failures
  - A summary of radar performance and coverage
  - An update on any projects
  - Planning for next quarter
- The following comments are provided on the reports:
  - The reports are a clear and effective summary and are endorsed.
  - The reports include a dashboard summary of the activities complete, but there is no reference to the commitments in the GCMP. Recommend including a column in the dashboard indicating the target frequency for the tracked items.
  - Consider including a slide commenting on the effectiveness of the mine's controls (e.g., radar alarms, prior identification of rockfalls, etc.)



INTRODUCTION TO QUARTERLY REPORT
AMARUQ OPEN PIT PROJECT MINING AREA

AGNICO EAGLE

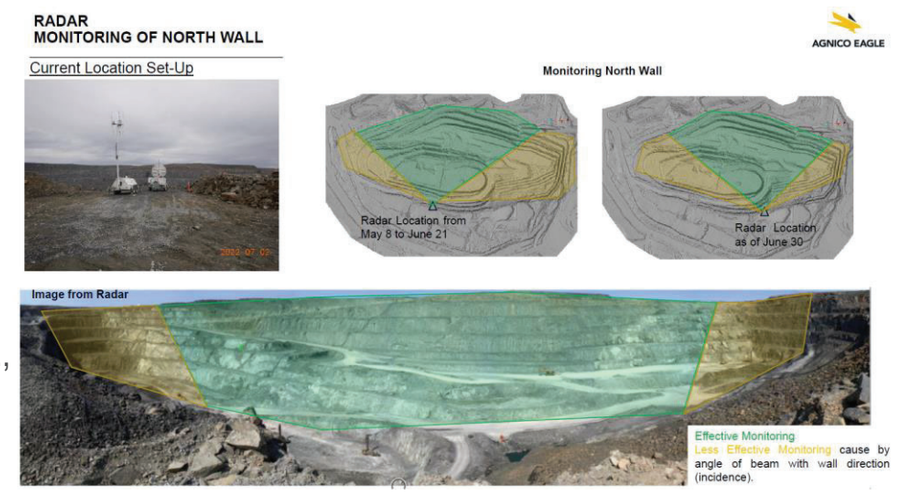
The principal objective of this report is to review the performance of the open pit slopes for the last three months. The intention is also to have a practical document to refer summarizing the key information gathered during the inspection, monitoring, data collection and analysis programs described in the latest Ground Control Management Plan (July 2020).
The key observations and recommendations are going to be shared and discussed as needed with the different stakeholders (Designer, Mine Engineering, Mine Operation, etc.).

Actives mining area during Q2, 2022

The Quarterly dashboard is to present a general and quick statistical summary of the action undertaken, events and radar status. Offering rapid overview for team members, departmental supervisors and management .

QUARTERLY DASHBOARD

TASK	APRIL	MAY	JUNE	TOTAL
ROUTINE PITS INSPECTION	20	27	23	70
OFFICIAL WALL INSPECTION	2	2	2	6
PIT WALL APPROVAL	10	10	19	39
WALL MAPPING	0	4	0	4
EVENT	**APRIL**	**MAY**	**JUNE**	**TOTAL**
IDENTIFIED HAZARD	11	14	11	36
IDENTIFIED HAZARD COPRRECTED	7	11	8	26
REPORTABLE ROCK FALL	0	5	8	13
ROCK FALL TONNAGE	0	1930	6912	8842
RADAR SSR253	**APRIL**	**MAY**	**JUNE**	**TOTAL**
OPERATION HOURS	0	543.3	700.0	1243.30
% MONITORING TIME	0.0%	73.0%	97.2%	56.9%
RADAR MOVE	0	0	1	1
RADAR SSR560	**APRIL**	**MAY**	**JUNE**	**TOTAL**
OPERATION HOURS	638.5	209.5	389.3	1237.3
% MONITORING TIME	88.7%	28.2%	54.1%	57
RADAR MOVE	1	1	4	6



RADAR
MONITORING OF NORTH WALL

AGNICO EAGLE

Current Location Set-Up

Monitoring North Wall

Image from Radar

Ground Control Program

Data Collection and Design Verification

The mine collects information to support design verification and reconciliation. These efforts can be broadly grouped into two categories.

- Rock Mass Characterization
  - Structural and rock mass quality mapping are to be completed for at least one location each 150 m along the length of the benches in the final walls.
  - Maptek LiDAR scans are completed for all benches on the final walls.
- Slope Performance
  - Bench backbreak is measured for the final walls using Maptek scans on a periodic basis and reviewed as part of the quarterly reports.
  - Rockfalls are tracked in a database as they occur.

Comments on the these activities are provided below.

- The geomechanical mapping is not reliably completed (e.g., 18 locations were mapped in Q1 but none were mapped in Q2). Additional mapping should be completed, particularly during the summer months when the bench faces are clear of snow.
- The mapping to date has been focussed on critical areas in Design Sector D4 of the Whale Tail pit and Design Sector V0A of the IVR V1 pit, which is endorsed. It should also include Design Sector F6 at the Whale Tail pit and Design Sectors V2A and V2E of the IVR V2 pit.
- The mine is now consistently recording all parameters for rockfall events.

Ground Control Program

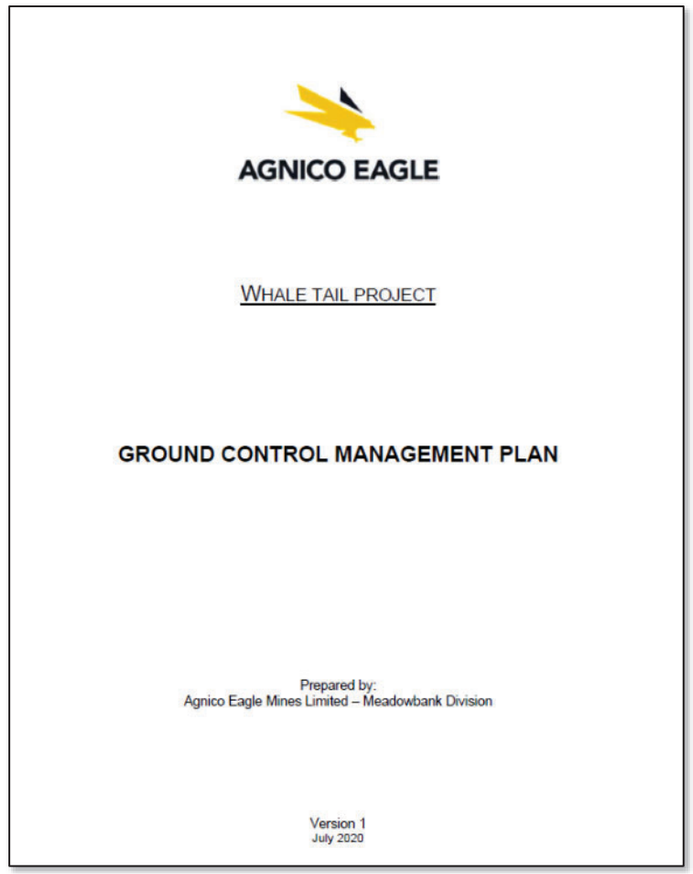
Resources and Training

- The rock mechanics team consists of:
  - Christian Tremblay, Rock Mechanics Coordinator
  - Amadou Traore, Rock Mechanics Engineer
  - Daniel Serrano, Rock Mechanics Engineer
  - Vincent Duranleau, Rock Mechanics Technician
  - Intern
  - During the summer of 2022, the team was supplemented by Adam Jackson from Tetra Tech.
- A new technician, formerly a surveyor in the open pit, is in the process of joining the team. A posting is open for a second rock mechanics coordinator.
- As a result, there are typically two rock mechanics staff on site at any given time. These staff are responsible for both of the open pits as well as the underground mine. The team are currently meeting most of their commitments for the open pits.
- The team has experienced significant turnover, with only two staff remaining from the team at the time of the 2021 review.
- The recent and planned hires put an emphasis on training while staff become familiar with the site and/or new responsibilities (e.g., someone with underground experience needs to learn about open pit rock mechanics). Recommend developing a skills matrix to help identify training needs.
- The team has a full suite of Rocscience software (DIPS, RocPlane, Swedge, RocFall, Slide, RS2) and also has access to Leapfrog, Maptek, and Pix4D. In particular, the team makes effective use of Leapfrog and Maptek to track and visualize observations and geomechanical data. This is endorsed.

Ground Control Program

GCMP

- The GCMP is a clear concise document. The GCMP has not been updated since July 2020 and needs to be updated as a priority. The GCMP should then be reviewed and updated annually. This is a regulatory requirement under the Nunavut Mine Health and Safety Regulations.
- For reference, the following observations and recommendations from the 2021 review are included:
  - Consider adding a one-page overview of the deposit geology and mine plan, including key information such as the ultimate pit dimensions, approximate mine life, major lithologies, etc.
  - (5.2.1.3) - Review and revise the commitments for drone monitoring so that they are focussed and achievable.
  - (5.3.2) Clarify that the collected data should be compared to the design basis for the open pit in addition to looking for trends.
  - (5.4.1) Note that crack meters and extensometers have not been installed and clarify that vibrating wire piezometers and thermistors are not currently being monitored. A plan with the location of the instrumentation should be included or referenced.
  - (5.5) Reference a register that tracks who has received what geomechanical training.
  - (8) Provide greater clarity and detail on the input the team provides to the mine planning and approval process. For example, the input to the Bench Master and 3MR.
  - Describe and include a commitment to the bench approval process.


AGNICO EAGLE

WHALE TAIL PROJECT

GROUND CONTROL MANAGEMENT PLAN

Prepared by:
Agnico Eagle Mines Limited – Meadowbank Division

Version 1
July 2020

Recommendations

Recommendations

Priorities

The recommendations stemming from the inspection have been grouped into four categories at AEM's request:

- **Priority 1 (P1):** A high priority or structural safety issue considered immediately dangerous to life, health or the environment. Also includes issues with a significant risk of regulatory enforcement.
- **Priority 2 (P2):** An issue that, if not corrected, could plausibly result in a structural safety issue leading to injury, environmental impact or significant regulatory enforcement. Also includes repeated deficiencies that demonstrate a systematic breakdown of procedures.
- **Priority 3 (P3):** Single occurrences of deficiencies or non-conformances that in isolation are unlikely to result in structural safety issues. Also includes recommendations for pro-active measures and design validation.
- **Priority 4 (P4):** Opportunity for improvement, for example to meet industry best practices.

The recommendations contained in this presentation are briefly summarized by category on the following slides.

Recommendations

P1 and P2

Priority 1 (P1):

- None identified

Priority 2 (P2):

1. Several areas were identified during the visit that should be scaled or rockfall hazards mitigated.
    a) Whale Tail Phase 2 South Wall
    b) Whale Tail Phase 3 South Wall at the Ramp Fault
    c) Loose slabs and debris from scaling on the Whale Tail Phase 3 Southeast Wall
    d) Loose slabs and overhangs on the lower northwest wall of the IVR V1 open pit
    e) Nose between IVR V1 and IVR V2
    f) Loose on the North and East walls of the IVR West 2 open pit
2. Remediate the thermal cap in the IVR V2 “Turtlehead”.
3. Construct, remediate or maintain rockfall or safety berms in the following locations:
    a) Along the inside of the Whale Tail Phase 2 ramp. The ramp needs to be extended along the upper ramp and built up to a consistent 2 m height.
    b) Along the inside of the ramp on the Northwest Wall of the IVR V1 open pit
    c) At the end of the crest road on the east side of the IVR V2 “Turtlehead”
    d) Along the inside of the ramp of the IVR West 2 open pit prior to the pit being used for water management

Recommendations

P2

Priority 2 (P2):

4. Prevent access above the potentially unstable block in the Whale Tail Phase 2 Southeast Wall. Consider leaving some muck against the block to buttress it during drilling and blasting. The area should be monitored when crews are working in the area.
5. Review the Work Close to Pit Wall procedure, how it is communicated and whether it is being consistently used, including:
    a) Provide refresher training on the procedure to ensure it is understood and implemented consistently.
    b) Review the use of spotters in Yellow Zones, as it is unclear if they are being reliably used.
    c) Review the annual training material and assess its appropriateness.
6. Review the use of the Hazard Maps:
    a) Refine the legend on the Hazard Map to clearly note the restrictions associated with the risk ratings (e.g., Yellow – Spotter Required).
    b) Provide more detailed guidance, including examples, on how to determine the risk ratings.
    c) Consider the use of physical markers (e.g., pylons) in the open pit to remind personnel of hazards that are not bermed off (e.g., Yellow Zones).
    d) Consider a separate method for communicating the corrective actions to Operations so that it is clear that the Hazard Map is focussed on existing hazards rather than whether or not work has been completed. This could be captured within the Bench Approval process.
    e) Two of the hazards noted as requiring ongoing monitoring in the Hazard Tracking Database have been removed from the hazard map. All current hazards requiring mitigation should be shown on the Hazard Map.
7. Implement a mechanism within the Hazard Tracking Database to flag overdue corrective actions. If an action has been superseded or the hazard mitigated through other means the action should be closed out.

Recommendations

P2

Priority 2 (P2):

8. Review the Pit Wall Approval process:
   a) Review the communication of bench approvals with Engineering and Operations to ensure that the process is reliably followed.
   b) Incorporate a checklist to improve consistency between staff and avoid hazards being missed.
   c) Limit approvals in key sectors (e.g. WHL F6) to experienced staff.
9. Formally identify sectors of the open pit where SSR is a critical control for achieving an acceptable level of residual risk. Develop a process to stop or modify mining activities in these areas when SSR coverage is not available. This could be captured within the SSR TARP.
10. Inspect the crest of the open pit for evidence of instability (e.g., above D4K) periodically. As a starting point, this could be completed in the spring and fall.
11. Conduct periodic drone inspections of the open pit slopes. Review the inspection frequency in the GCMP and align it with current needs/capabilities.
12. Implement an additional surface monitoring system, such as prisms or GPS beacons, to complement the SSR, provide a long-term deformation baseline, and to allow the true displacement vector to be measured.
13. Update the GCMP and subsequently review and update it annually. The GCMP has not been updated since July 2020 and annual updates are a regulatory requirement under the Nunavut Mine Health and Safety Regulations.
14. Complete the on-going review and re-design of the Northeast Wall of the Whale Tail open pit. Possible measures under consideration include managing surface water, seasonal mining and double-benching in the lower wall.

Recommendations

P3

Priority 3 (P3):

1. Several areas were identified during the visit that should be a focus of on-going monitoring and inspections:
    a) The failure in the Phase 1 North Wall of the Whale Tail open pit
    b) The failed slab in the northwest corner of the Phase 1 North Wall of the Whale Tail open pit
    c) The potentially unstable blocks in the Whale Tail East Wall
    d) The accumulation of rockfall on the catch benches of the Whale Tail Phase 2 Southeast wall
    e) The potentially unstable wedge below the Whale Tail Phase 2 ramp, particularly during blasting below the wedge
    f) The Brittle Structure with seepage in the southwest corner of the IVR V1 open pit
    g) The nose on the north wall of the IVR V2 open pit
    h) The potentially unstable block in the IVR V2 open pit North wall “Turtlehead”
    i) The nose between the IVR V1 and IVR V2 open pits
2. Review the risks associated with future access below the failure in the Phase 1 North Wall of the Whale Tail open pit for water management purposes. Implement mitigation measures as appropriate.
3. Review the rockfall risk associated with spillover from blasting and the potential creation of noses at the breakthrough between the IVR West 2 and IVR V2 Extension pits.

Recommendations

P3

Priority 3 (P3):

4. Install instrumentation (e.g., wireline extensometer) in the potentially unstable wedge below the Whale Tail Phase 1 ramp to supplement radar monitoring.
5. Review failure in the Phase 1 North Wall of the Whale Tail open pit in greater detail to better understand the failure mechanism, likely contributing factors, and the potential for the failure to continue below the ramp. A Maptek scan is recommended to better define the failure geometry.
6. Monitor the implementation and performance of the double-benching trial in the Diorite at the Whale Tail pit. In particular, there will need to be an emphasis on scaling and the Bench Approval process to ensure that hazards are managed.
7. Monitor the implementation and performance of the benches in the Whale Tail Phase 3 Southeast Wall (Design Sector F6). Once the next bench is complete, a review should be completed to assess if the current bench design is achievable or if it needs to be adjusted (i.e., to a BFA of 50°).
8. Revert to a 55° pre-shear angle for the IVR V1 Northwest Wall (Design Sector V0A).
9. Review the effectiveness of the SSR alarm parameters in 2022 and establish a commitment to review the parameters annually.
10. Define a red trigger for the SSR TARP to provide a backstop for unprecedented or unexpected conditions.
11. Adjust the SSR TARP so that the response to Grey and Orange SSR alarms does not explicitly state that mining operations are not to be stopped.
12. Complete the recommended blasting trials. In particular, the development of a blasting pattern for the Komatiite is likely to be beneficial to bench performance.

Recommendations

P3

Priority 3 (P3):

13. Implement a year-round blasting quality control program, at a minimum measuring blasthole depth.
14. Undertake structural mapping to:
    a) Define the northwest dipping joint set in the lower Phase 2 Southeast Wall of the Whale Tail open pit
    b) Better define the extents of Structural Domain 5 in the Whale Tail open pit
    c) Validate the Brittle Structure model.
15. Document the lithology, rock mass structure, and bench performance at regular intervals along the Northeast Wall of the IVR V2 pit in order to better understand the controls on the wall performance. While few benches remain in the pit, the results are relevant to the footwall of the IVR V1 pit.
16. Document the bench performance and key rock mass characteristics in the IVR V2 open pit and compare them to the design. In particular, it is important to verify that the north wall is being established in the Mafic Volcanics and below the Brittle Structure expected along the contact between the Mafic Volcanics and the Komatiite as the slope geometry recommendations for the V2A and V2E design sectors are based on this premise.
17. Complete geomechanical mapping on a regular basis, consistent with the commitments in the GCMP. Mapping is particularly important in Q2 and Q3 when the bench faces are clear of snow. The mapping should focus on critical areas of the open pit, including Design Sectors D4K and F6 of the Whale Tail pit and V0A, V2A and V2E of the IVR pits.

Recommendations

P4

Priority 4 (P4):

1. Take a series of overview photos (e.g., of each major wall) as part of the visual inspections to generate a record of wall performance over time.
2. Implement a formal mechanism (e.g., TARP) to increase the frequency of inspections in the event that an instability is observed or, for example, particular deformation limits are exceeded.
3. Explain in the GCMP or radar monitoring procedure why the SSR alarms have been set at their current values and provide guidance on how they can be adjusted based on different circumstances.
4. Evaluate methods for communicating updates to the hazard map outside of the regular two-week period if there are notable changes to the identified hazards. As an alternative to issuing an updated map, a brief addendum describing the change could be issued.
5. Document the review of the Budget Mine Plan in greater detail, even if the document remains internal to the team, in order to better capture risks and opportunities.
6. Add the following to the Quarterly Summary Reports to improve the communication of the completed rock mechanics activities and their effectiveness:
    a) The reports include a dashboard summary of the activities complete, but there is no reference to the commitments in the GCMP. Recommend including a column in the dashboard indicating the target frequency for the tracked items.
    b) Consider including a slide commenting on the effectiveness of the mine's controls (e.g. radar alarms, prior identification of rockfalls, etc.).
7. Develop a skills matrix to help identify training needs.

Recommendations

P4

Priority 4 (P4) (cont'd):

8. The following opportunities to improve the Hazard Maps
9. The following comments are provided for the GCMP:
    a) Consider adding a one-page overview of the deposit geology and mine plan, including key information such as the ultimate pit dimensions, approximate mine life, major lithologies, etc.
    b) (5.2.1.3) - Review and revise the commitments for drone monitoring so that they are focussed and achievable.
    c) (5.3.2) Clarify that the collected data should be compared to the design basis for the open pit in addition to looking for trends.
    d) (5.4.1) Note that crack meters and extensometers have not been installed and clarify that vibrating wire piezometers and thermistors are not currently being monitored. A plan with the location of the instrumentation should be included or referenced.
    e) (5.5) Reference a register that tracks who has received what geomechanical training.
    f) (8) Provide greater clarity and detail on the input the team provides to the mine planning and approval process. For example, the input to the Bench Master and 3MR.
    g) Describe and include a commitment to the bench approval process.


THANK
YOU