Appendix 10

Meadowbank and Whale Tail 2024 Annual Geotechnical Recommendation Implementation Plan

Meadowbank 2024 Annual Geotechnical Recommendations Implementation Plan

Priority Level (1)	Location	Year (2)	Recommendation	Action Plan/Follow-up	Status
4	East Dike	2019	General trend in piezometric readings was steadily increasing since 2014 and seems to accelerate in 2019 and should be monitored.	**2025 Jan Update:** Following the seepage events in 2021 and 2023, AEM has gained better understanding of instrumentation trends, which have been closely monitored. Improvements to the drainage system completed in 2023 have proven effective, as evidenced by the less significant seasonal porewater pressure peaks. In addition to regular field inspections, the dike instrumentation is monitored regularly, and this will continue in 2025.	Ongoing
4	East Dike	2021	The two thermistors strings located at both abutments are no longer functioning. Since the dike remains in operation for several years and the abutment is subject to develop and aggregate ice lenses, it is recommended to replace thermistor strings to monitor thermal regime until the post-closure phase of the mine.	**2025 Jan Update:** AEM will consider replacing the thermistor strings located at the abutments.	Open
4	Stormwater Dike	2020	Monitor piezometers PZ-SWD-03-A and B since they are starting to show large and unexplained variations in pressure readings. (2024) trend seems to be seasonal, confirm cause.	**Jan 2025 Update**: As captured by WSP Annual Inspection Report, the trend is seasonal and stable for many years. The cause for such porewater pressure variation remains unexplained.	Ongoing
2	Stormwater Dike	2024	A faulty, open seam in the bituminous geomembrane liner is observed around Sta. 10+600, and it is recommended to repair the seam by welding it closed before tailings deposition resumes in North Cell. (2024) several seams in the exposed liner (between Sta. 10+100 and 10+400) appear to be deteriorating and are opening. They should be repaired if the closure concept requires to maintain the hydraulic barrier at Stormwater Dike.	Update (Summer 2023) : this defect (10+600) was fixed during the hole repair campaign of SWD in 2023 where more than 20 patches were done. **Jan 2025 Update**: AEM is aware of deteriorating seams. This area of SWD is expected to accomodade a spillway. The liner will be fixed in areas that require the hydraulic barrier at SWD (i.e., outside of the spillway footprint)	Ongoing
3	North Cell Internal Structure	2020	Linear erosion features were observed at several locations in the upstream surface, where fine filter started to wash out from the crest to the toe of the upstream toe. This was likely caused by significant volumes of water draining from the crest during freshet since no water discharge was occurring in the areas. Monitor for aggravation and possibly repair if needed.	**Jan 2025 Update**: 2024 Annual Inspection Report (WSP) considers this recommendation closed as the fine filter slopes were repaired.	Closed

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3	North Cell Internal Structure	2022	Tension cracks (10-20 mm wide) in the fine filter slope in all the east sector of the dike. It is recommended to monitor the evolution of the cracks and repair the fine filter if the coarse filter starts to be exposed to ensure good performance of the filter system. (2024) tension cracks of similar dimensions are still observed in some parts of the east sector, as well as the recently built western extension. However, much of the east part is now stabilized with a rockfill buttress and no longer shows signs of movement.	The tension cracks in the fine filter slope at the NCIS will be closely monitored and repaired if judged necessary. Update (Summer2023) : Repairs to the upstream slopes were completed. **Jan 2025 Update**: As noted in 2024 Annual Inspection Report (WSP), "much of the east part is now stabilized with a rockfill buttress and no longer shows signs of movement". Both the eastern part and the western extension will continue to be monitored for any signs of degradation. AEM will repair the slopes in the event of any negative impacts to the performance of the structure.	Ongoing
3	North Cell Internal Structure	2023	Channeling of water at the toe of the filter slope is observed in a large part of the eastern sector. It is recommended to direct supernatant and runoff water away from the dike when resuming tailings deposition to discharge from this area.	**Jan 2025 Update**: As noted in 2024 Annual Inspection Report (WSP), the "addition of rockfill buttress protected the toe of the filter slope from water". This recommendation is considered resolved.	Closed
3	Central Dike	2022	Gravel is present on the geomembrane around Sta. 0+950. If tailings deposition resumes in the South Cell, it is recommended to clean the liner beforehand to avoid puncture. (2024): Still the case in 2024 at Sta. 0+950. To clean before placement of the closure cover or additional deposition.	**Jan 2025 Update**: AEM will remove the gravel from the liner prior to tailings deposition in the SC, planned for Q3 2025.	Open
2	Saddle Dam 4	2021	A section of pipe with a metal connector and a metal rod are present on the liner and should be removed to avoid damaging the liner. (2024) metal rod was removed but pipe is still present. It is reiterated that the pipe should be lifted off the liner and not pulled to avoid ripping the liner.	**Jan 2025 Update**: AEM will remove the pipe from the liner prior to tailings deposition in the SC, planned for Q3 2025.	Open
3	Saddle Dam 4	2023	Water has been discharged on the granular cover of the SD4 East tie-in, causing channeling against the liner and fine filter and protective till material to erode. It is recommended to move the discharge point further towards the South Cell, over the rockfill section of the granular cover, to avoid channeling and erosion.	**Jan 2025 Update:** AEM will inspect the area to define a more appropriate location for the dewatering pipeline. Also, additional tailings deposition will be done in the SC in 2025, which may potentially restablish the eroded tailings beach against SD4 liner.	Open
3	Saddle Dam 1	2023	The liner is ripped under one of the piles of granular material on SD1 at the top of the slope. It is recommended to repair the liner and inspect for possible further damage under the material.	**Jan 2025 Update:** The liner was repaired with till, as recommended by the EoR, during the 2024 Progressive Closure construction. This repair is documented in the 2024 PC as-built report, which includes pictures of the work.	Closed

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2	Saddle Dam 2	2024	Holes in the liner are observed near the top of the slope of SD2, close to the East abutment, as well at Sta. 20+350 and 20+425. The holes should be repaired before placement of the closure cover in that area.	**Jan 2025 Update:** Holes were identified during the WSP inspection on July 23, 2024. In the afternoon of the same day, fine filter was placed on the liner as part of the 2024 Progressive Closure construction, covering the holes. The liner was most likely damaged when the pipeline was removed from the crest of SD2 to make space for the progressive closure work. Photographic records indicate the location of the holes (near the first liner panel seam to the south) is above the tailings freeboard and above the future non-contact water management spillway invert. AEM recognizes that as these holes are near the crest and covered in fine material and then capped with coarse filter and rockfill. There is low risk to the holes impacting the overall performance the structure.	Closed
3	Saddle Dam 4	2024	A small hole in the liner is observed at the top of the slope of SD4. While it is not in the slope, it is recommended to repair it before placement of the closure cover.	**Jan 2025 Update:** Even if this hole is present at the crest of the infrastructure and does not present a threat to the integrity of the structure, AEM will fix this hole, in addition to 6 small holes in the crest of SD5 and Central Dike liner in a timely manner when the areas will become available for the capping activities.	Open
3	Western Diversion Ditch	2024	Sloughing is occurring in the riprap layer on the southern side of the ditch. It is recommended to repair the slope by recompacting the material to avoid further deformation and eventual obstruction of the ditch.	**Jan 2025 Update:** The southern slope of the ditch was repaired during the 2024 Progressive Closure construction season. The ditch was reprofiled, and water flow was improved significantly. This repair is documented in the 2024 PC as-built report, which includes pictures of the work.	Closed
3	Baker Lake Fuel Farm	2018	The granular fill material protecting the geomembrane was eroded due to wave/ice action in some areas, exposing the geomembrane. This condition was observed along the south side of Tanks 3 and 4 and on the west side of Tank 1. A folded section of exposed geomembrane was observed at the northwestern corner of Tank 2 and the northeastern corner of Tank 4. It is recommended to cover the exposed area with geotextile and fill material to re-establish liner protection. Liner is exposed on the northern side of Tank 5. Since this condition appears above the elevation of the southern berm, the liner protection with granular material is not considered as important as in other areas; however, it remains good practice and provides protection against animal damage. Partially resolved in 2024: some areas of exposed liner were covered with granular material. Still exposed geomembrane on the north and south side of Tanks 1 to 4, in the northeastern corner of Tank 4, and on the south side of Tanks 5 and 6.	**Jan 2025 Update:** As noted in 2024 Annual Inspection Report (WSP), "partially resolved: some areas of exposed liner were covered with granular material. Still exposed geomembrane on the north and south side of Tanks 1 to 4, in the northeastern corner of Tank 4, and on the south side of Tanks 5 and 6." AEM will plan to protect the liner sections identified in the 2024 annual inspection.	Ongoing

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3	Baker Lake Ditch No.1	2024	The diversion ditch is newly built and shows signs of overflowing before the outlet due to high water levels and a permeable berm. It is recommended to amend the ditch by impermeabilizing the downstream side (e.g. with a liner) or improving the slope to ensure a controlled flow towards the outlet.	**Jan 2025 Update:** Baker Lake water management infrastructure was improved in 2024. This repair is documented in the 2024 Baker Lake Water Management Infrastructure Improvement as-built report, which includes pictures of the work. Infrastructure performance will be monitored during the 2025 freshet and summer.	Completed
	Bay Goose Dike	2024	WSP recommends performing visual inspections in areas at Bay-Goose Dike (Central Shallows) where large variations in piezometric heads are measured following thawing or piezometers that were temporarily frozen.	**Jan 2025 Update**: As part or our OMS in response to these variation, visual inspections of the dike are conducted weekly, with special attention given to areas where instruments indicate unusual trends. The channels are of particular interest during the dike inspections.	Ongoing
	Central Dike	2024	WSP recommends inspecting the location of TH 745-P3 (Central Dike) and continuing to monitor this area closely. TH 745-P3 appears to be recording unrealistic warm temperatures compared to other thermistors nearby and temperatures measured by other piezometers in the vicinity. Also, WSP recommends replacing instruments 545-P2, or at least the thermistor, to keep monitoring thermal regime in the foundation in this sector where cooling was observed before losing data.	**Jan 2025 Update:** A detailed field instrumentation review was completed in 2024, with manual readings taken for every thermistor bead. This assessment confirms the issue with TH 745-P3. AEM is aware of the beads that have a capacitive effect and takes this into consideration when analyzing the data. AEM will consider replacing the instrument as suggested. However, a cooling trend is considered unlikely in the area of 545-P2 moving forward, as the water level of the downstream seepage pond is expected to rise as the mine transitions into closure and post-closure phases.	Closed

Whale Tail 2024 Annual Geotechnical Recommendations Implementation Plan

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3	Whale Tail Dike	2021	Updated (2024): The following piezometers show unexplained trends, and cause should be investigated to rule out the development of adverse conditions: -PZ 0+260 P1C, P3A, and B exhibit a yearly pressure rise in the fall. PZ 0+260 P1B has a similar behaviour starting in the winter. - PZ0+360 P1C exhibits a unique high-pressure trend that seems to be seasonal. - PZ 0+701 P2D had high-pressure fluctuations between the summer and following fall in 2023.	(2023) The unexplained trends PZ 0+260 P3A and B, PZ 0+360 P1C, PZ 0+550 P1C,PZ 0+701 P1C, and PZ 0+701 P2D exhibit are being investigated to determine the mechanism responsible. **Jan 2025 Update**: These seasonal trends, although unexplained, have been consistent for some time, with no evidence of development of adverse effects on seepage rates or the performance of the dike. Seepage rates have remained stable in recent years. AEM will continue to monitor and investigate the cause.	Ongoing
3	UG WRSF Saline Ditch	2021	Blocks and debris are present in the ditch close to the south culvert (ditch outlet) and should be cleared to avoid water flowing out of the ditch. Partially resolved in 2021 & 2023: most debris was cleaned but a boulder still blocks the outlet of the culvert under the WRSF ramp. 2024: same status.	**Jan 2025 Update**: Regular ditch maintenance has been required due to nearby work. The ditch will continue to be inspected, and obstructions will be removed. Delineating the ditch and raising workforce awareness are examples of proactive measures to prevent any unwanted material from entering the ditch.	Completed
3	IVR Dike	2022	A large area of the dike between Sta. 0+100 and 0+300 show settlement (up to about 300 mm), likely due to shallow foundation settlement in the footprint of the former water channel. It is recommended to survey the area and to follow-up on the settlement over time to better understand the mechanism. 2024: Movement seems to have stabilized visually; confirm with survey. AEM plans to restore the crest surface to design elevation.	The settlement at IVR Dike was surveyed and very closely monitored during the summer and fall (2023 & 2024). It was concluded the settlement mechanism seems to be related to the thawing of the esker material placed above the liner. Deformation of this esker zone will not impact the liner or the keytrench. This mechanism is supported by the thermistor data indicating that the keytrench and bedrock remained frozen in 2022 while only the esker material within the active layer thawed. As of November 2022, the esker material is completely frozen. Close monitoring of this area will continue. **Jan 2025 Update**: Visual inspections have not detected any signs of settlement in 2024. Drone survey also confirms that the movement is inactive. Area will be regraded in 2025 summer. Visual inspections of the dike will continue.	Ongoing
2	UG WRSF Saline Ditch	2022	The outlet of the ditch towards Groundwater Storage Pond 1, from a culvert under the road, was obstructed at its outlet by a wooden plank placed by AEM in the winter to avoid snow accumulation inside the culvert. It is recommended to clear the culvert. 2024: culvert completely blocked by a plank and backfill material.	**Jan 25 Update:** Wooden plank is put place during the winter and usually removed during freshet. Ditch maintenance will continue in 2025, and the conditions of the ditch closely monitored.	Ongoing

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2	Ore Stockpile Saline Ditch	2022	Numerous debris from the stockpile and the crusher pad are present in the ditch. They must be removed to ensure the ditch capacity. (2024) presence of some debris and boulders in ditch.	The debris in the ditch were cleaned up in Summer 2023. **Jan 25 Update**: Additional ditch maintenance/cleanup was completed in July 2024, with good results for water flow. Maintenance will continue in 2025 as needed, and ditch conditions will be closely monitored. Delineating the ditch with flags and tires, as well as raising workforce awareness are examples of proactive measures to prevent any unwanted material from entering the ditch.	Ongoing
2	IVR Dike	2024	Two zones of apparent seepage with very little flow are present at the downstream toe of the dike around Sta. 0+320 m. This area is above the IVR Attenuation Pond level during the 2024 inspection and may have runoff water draining from the rockfill. It is recommended to confirm the origin of the water by monitoring the evolution of these seepage zones to correlate with pond level variations and weather conditions.	The downstream toe around St. 0+320 is above (higher elevation) the maximum IVR Attenuation Pond level. Area will continue to be closely monitored through detailed inspections to identify any changing conditions and to assess the persistence of the seepage.	Ongoing
3	Ore Stockpile Saline Ditch	2024	Sediments and grout are present in the ditch, especially in the west section. It is recommended to clean the ditch regularly to avoid accumulation of sediments that can cause water to pond behind culverts.	Ditch maintenance and clean-up was completed in July 2024. Cement was removed and the structure is back to performing as intended. Inspections and maintenance of the ditch will continue in 2025.	Completed