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Public Disclosure Regarding Laisvall Tailings Facility

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INTRODUCTION

Boliden has committed to apply the Global Industry Standard on Tailings Management (GISTM), adopted by the International Council for Mining and Metals (ICMM) in 2020, setting a precedent for the safe management of tailings facilities, towards the goal of zero harm (the "Standard" or "GISTM").

The Standard contains 77 specific requirements that need to be fulfilled to be in conformance with the Standard. The Standard also requires that adhering members annually issue a status report on their implementation of and conformance with the requirements to support public accountability. In accordance herewith, Boliden as the operator of its tailings facilities is to publish and regularly update information on its commitment to safe tailings facility management, implementation of its tailings governance framework, its organization-wide policies, standards and approaches to the design, construction, monitoring and closure of its tailings facilities

A separate document available via Boliden web, named Public Disclosure Regarding Boliden´s Tailings Management Framework, provides a general description concerning Boliden´s tailings and dam safety management for all sites, in which much of the information within requirement 15.1 is met.

This document provides additional information specifically related to Laisvall facility to fully provide the required information. In addition, Chapter 11 of this document presents the status of implementation of GISTM for Laisvall tailings facility.

1. Description of the tailings facility

The Laisvall tailings facility is situated in Arjeplogs municipality in Norrbotten county, Sweden, see Figure 1. The coordinates (latitude, longitude) of the site are 66°9'1.5"N 17°10'53.7"E.

Figure 1 Geographic location of Laisvall TSF in red

The ore in the tailings facility originated from the underground mine which was opened in 1943. Lead content was about 4 % and zinc about 0,1-1 %. Initially, tailings were deposited in pond Sjömagasinet. In 1952 Boliden started to deposit in Tålmaks valley and the ponds A and B were developed, and subsequently pond H was developed in 1975. The mine operations ceased in 2001. An overview of the area is shown in Figure 2.

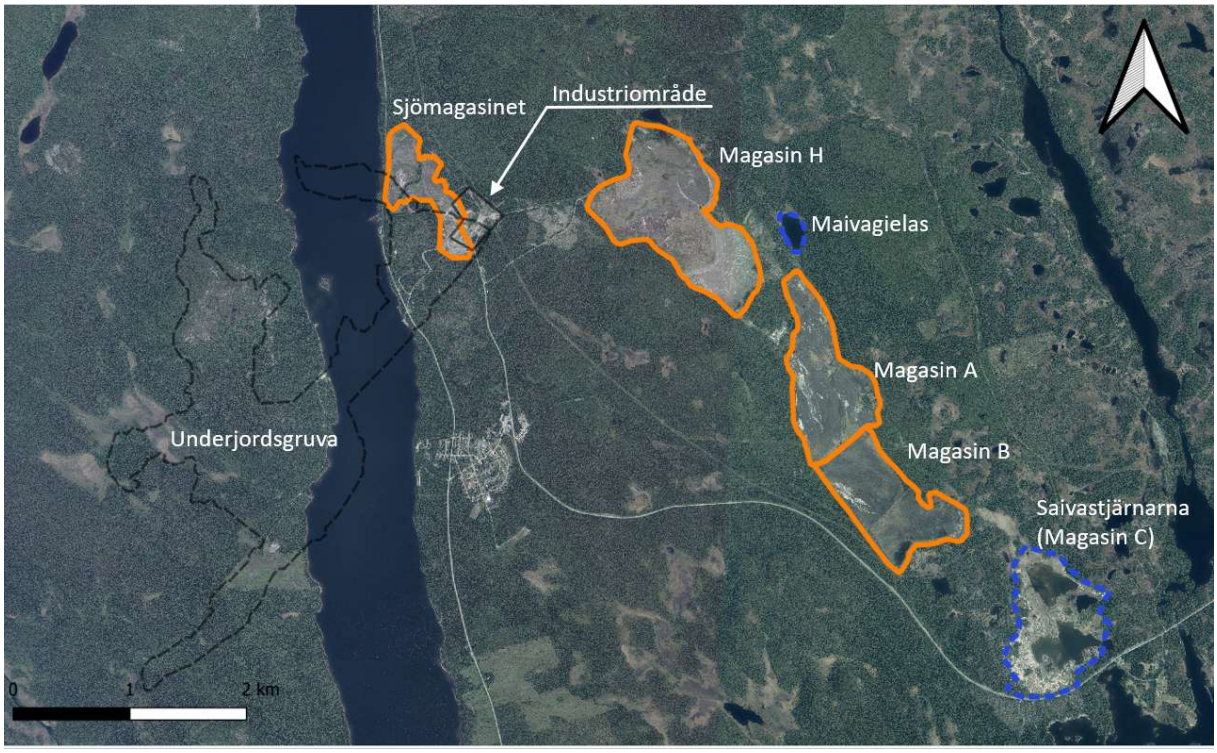

Figure 2 An overview of the Laisvall mine site and TSF including the clarification ponds (blue marking).

Remediation of tailings pond Sjömagasinet began in 1976 by sealing the spillway and seeding the impoundment with grass. During the 1980s, the tailings facility was drained, tailings surfaces were levelled, and the area was again seeded with grass. A dam/dyke was constructed across the impoundment, and a spillway was opened in the northern section of the Sjömagasinet lower dam. In 1996, the upper part of the dam crest was set back approximately 3 meters, lowered by about 1 meter, and rounded off, the slope angle of the upper part of the dam was adjusted to approximately 1:2,5. On the southern side of the dam, a support terrace was constructed, which was used to establish vegetation.

Remediation of pond A and B was carried out between 1978 and 1983 through dewatering, ditching, and grass seeding. To promote vegetation growth, the sand surface was fertilized. During 2005 and 2006, a thin layer of moraine and sewage sludge was applied to the most exposed areas of the impoundment. These areas were seeded in 2008. In 2001, an older erosion damage at pond B was repaired using coarser material.

After the end of the mining operations, the tailings surface in pond H was covered with approximately 0,2–0,3 m of moraine mixed with composted bark and sewage sludge, which was harrowed into the top layer. In 2001, test areas were established for vegetation establishment using various combinations of sludge and bark, along with a specially composed seed mix. Seeding took place in spring 2002, and follow-up in 2004 showed successful vegetation establishment.

In 2004, the moraine cover on the downstream slope was washed away during rapid snowmelt in 2004 and damages due to erosions could be seen in the downstream slope. To reduce erosion, three interception ditches were constructed using coarse blasted rock as drainage material. The old spillway was demolished in 2006 and replaced with a new permanent concrete outlet, approximately 50 meters north of the previous one. A 150-meter-long connecting ditch was constructed and protected against erosion with stone-filled gabions. The old ditch was straightened and restored to its original alignment toward the clarification pond (pond C). At the same time, the remaining dam embankment was rounded off and leftover material was levelled on the upstream side.

Today, the function and thickness of the cover vary, as so the extent and quality of the vegetation. **Error! Reference source not found.** gives a general description of the tailing facility.

Table 1 Description of main structures of the Laisvall tailings facility

Object	Description
Pond Sjömagasinet	The facility was used for deposition 1943-1977. Tailings were contained two upstream dams (lower and upper Sjömagasinet) near lake Laisan. Water was released through a decant tower. The area is approx. 20 ha and contains approx. 2Mt of tailings.
Pond A	The facility was used for deposition 1952-1977. Tailings were contained by an upstream dam in Tålmaks valley. Water was released through a wooden outlet. The area is approx. 60 ha and contains approx. 10 Mt of tailings.
Pond B	The facility was used for deposition 1952-1977. Tailings were contained by an inward raised dam built by cyclone tailings in Tålmaks valley. Water was released through two spillways. The area is approx. 70 ha and contains approx. 10,4 Mt of tailings.
Pond H	The facility was used for deposition 1977-2001. Tailings were contained by three different dam structures (dam 1, Björnbergs dam and dam H) in Tålmaks valley.

	Water was released through a decant tower. The area is approx. 120 ha and contains approx. 25 Mton of tailings.

2. Consequence classification

The consequences in the event of a tailings facility failure in Laisvall are estimated from impact assessment including a breach analyses, see Chapter **Error! Reference source not found.**. The consequence classifications refer to current conditions after remediation. The consequence classification of the tailings facility according to the Global Industry Standard on Tailings Management (GISTM) is "**High**".

3. Risk assessment

Laisvall has assessed risks in a manner consistent with the risk management instruction established by Boliden. Assessment of risks related to the operation and closure of tailings facilities have been undertaken by a team of multidisciplinary specialists. The risks have been evaluated regarding potential consequences related to a range of aspects, including but not limited to health and safety, environment, infrastructure, social aspects and local communities.

The risk assessment was based on the current understanding of the facility and its surroundings at the time and identified some uncertainties related to the characteristics of the dams and tailings witch lead to additional targeted site investigations to ensure better understanding for the site. Since the work on compiling the knowledge base for the facility is ongoing, the risk assessment will be continuously updated going forward to reflect the increased understanding of the TSF.

A couple of high and intolerable risks were identified in the risk assessment and are being acted upon, mainly through investigations to increase the understanding of the risks. One intolerable instability risk is acted with mitigation measures.

The identified events which can potentially lead to dam breach, are used as input for the Trigger Action Response Plan (TARP) and the Emergency Preparedness Response Plan (EPRP).

A new risk assessment, planned for Q4 2025, will reflect the actions taken to lower the risk, with most risks expected to meet the ALARP principle ("As Low As Reasonably Practical").

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4. Impact assessment

The impact assessments for the Laisvall tailings facility are based on breach analyses of credible flow scenarios conducted in 2021. The impact assessment was done in a first step on dam H and Sjömagasinets lower dam which were assessed to have the highest impact.

In Q4 2025 an impact assessment for all dams will be performed. The results are used to evaluate the consequence classification (see Chapter **Error! Reference source not found.**) of the dams and to develop the Emergency Preparedness Response Plan, see Chapter **Error! Reference source not found.**.

The impact assessment has been evaluated according to the Global Industry Standard on Tailings Management (GISTM), as presented in Table 2 and Table 3. The impact assessment is reviewed in the event of any major changes to the facility or local surrounding, or as part of the next Dam Safety Review at the latest.

Table 2 Summary of the Dam H impact assessment to the GISTM

Consequence Criteria	Classification	Impact assessment
Potential Population at risk (PAR)	Significant	1-10 people in the risk of harm.
Potential Loss of Life (LOL)	High	Potential risk to human life for 1–10 individuals due to rapid dam breach flow and large volumes of sand in connection with a property and road section above Loholm. One property has been assessed as potentially affected by the dam breach flow
Environment	High	There is a risk of significant loss or degradation of species and habitats in the water body, as well as a risk of temporary contamination of drinking water sources. The tailings sand is assessed to have a low potential for generating acidic leachate through oxidation, due to low levels of sulfur-bearing minerals and high levels of buffering minerals. The direct impact area of the dam breach flow amounts to 4.9 km^2, and beyond this, turbidity is expected in a larger area. Restoration of the area is considered possible but complex and may take longer than five years
Health, Social and Cultural	Significant	Affects the use of the downstream lake system for recreation and fishing.
Infrastructure and Economics	High	A road section below the facility is expected to require repairs, and activities related to fishing and tourism along the affected watercourse are expected to be impacted in the event of a failure. The economic damage cannot be ruled out as exceeding the threshold of approximately 10 million USD but is assessed to be below 100 million USD

Table 3 Summary of the Sjömagasinets lower dam impact assessment to the GISTM

Consequence Criteria	Classification	Impact assessment
Potential Population at risk (PAR)	Low	No assessed risk of personal injury, as there is good visibility along Road 625 leading into the area expected to be affected in the event of a failure. Road 625 also has the lowest traffic load according to the Swedish Transport Administration's classification (< 250 vehicles/day), with an annual average daily traffic of 55 vehicles/day. No significant rise in the water level of Lake Laisen is expected from the released tailings.
Potential Loss of Life (LOL)	Low	No assessed risk to human life, as there is good visibility along Road 625 leading into the area expected to be affected in the event of a failure. Road 625 also has the lowest traffic load according to the Swedish Transport Administration's classification (< 250 vehicles/day), with an annual average daily traffic of 55 vehicles/day. No significant rise in the water level of Lake Laisen is expected from the released tailings
Environment	High	Risk of significant loss of habitat and weakening of species in Laisan and the Laisälven River, which are designated Natura 2000 areas
Health, Social and Cultural	Significant	Affects the use of the downstream lake system for recreation and fishing. The likelihood of health effects is considered low.
Infrastructure and Economics	Significant	A road section below the facility is expected to require repairs, and activities related to fishing and tourism along the affected watercourse are expected to be impacted in the event of a failure. The economic damage may exceed the threshold of approximately 10 million USD, as the affected area along the water system could be extensive and the impact prolonged

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5. Description of the design of the tailings facility

See Table 4 for a description of the design of the main dams. For a description of the overall tailing facility and the location of the dams, it is presented in Chapter **Error! Reference source not found.**.

Table 4 Description of the design for the dams in the Laisvall tailings facility

Dam	Description
Pond Sjömagasinet/ Sjömagasinets lower dam	Pond Sjömagasinet is the sites oldest tailings storage and is located to the west, close to lake Laisan. The pond consists of five sub-sections (First Tailing basin, Second Tailing basin, Emergency basin, Sjömagasinets upper dam and lower dam). There is a lack of information regarding the different parts of the pond, their functions, associated dams, foundations, design and construction. Depositing in the pond Sjömagasinet began in 1943 and was used until 1977, with limited use from 1952. In the early 1950s, construction of the Sjömagasinets lower dam began. A dam failure occurred during its construction. Another dam failure in the lower dam occurred in the spring of 1961, after which the dam was raised by 0.5 meters and repaired. Historical documentation states that the dam was built using soil and tailings and is considered a homogeneous moraine dam, raised inward. The dam is founded on moraine. Dam length is about 800 m and the maximum dam height is about 20 m. The pond was remediated between 1976 and 1980 by sealing the outlet and seeding the area with grass. The pond was re-fertilized and planted with grass several times. Today, sparse vegetation (bushes) grows on the pond, and exposed tailings is present.
Pond A/ dam A	Pond A is an internal dam and located in the Tålmaks valley and is connected to pond B. Deposition in pond A took place between 1952 and 1975. Tailings were pumped to top of Tålmak valley where they are released and flow down the valley by gravity towards dam A. The system worked good during most of the year but during high floods (snow melt usually) an annual release of suspended particles to Loholmsviken in the lake Aisjaure was noted. Dam A has been raised 5 times upstream on tailings, and the raisings were constructed using moraine and cyclone tailings. Dam length is about 600 m and the maximum dam height from foundation is about 20 m. Downstream of dam A in pond B there are deposit tailings resulting in maximum dam height now being only around 6 m. Closure measures were dewatering, new ditches and planting of grass. The pond was fertilized several times with a few years interval. The downstream slope was flattened to 1:2.5-1:3 and planted with grass in 1996. The pond was re-fertilized and planted with grass several times. Today, sparse vegetation (bushes and grass) grows on the pond, and exposed tailings is present.
Pond B/ dam B	This pond B was supposed to primarily be a clarification pond to the tailings pond A but the clarification progress didn't work so well. Deposition of tailings was later carried out through cyclone. Tailings were deposited in pond B until 1975-1978. According to old documentation dam B was founded on moraine after peat or other

	unsuitable materials were excavated. According to construction drawings, the dam construction type is an upstream hybrid with moraine raises on top of cyclone tailings. Dam length is about 1 200 m and the maximum dam height is about 11 m. Dam B had a dam failure in location of the latest closed spillway which released tailings in ditches and wetlands, with probable release of tailings to lake Aisjaure. Closure measures were dewatering, new ditches and planting of grass. The pond was fertilized several times with a few years interval. The dam crest has been lowered sometime between 1975 and 2015. Today, sparse vegetation (bushes, "wetlands" and grass) grows on the pond, and exposed tailings is present.
Pond H, dam H, dam 1 and Björnbergs dam	Pond H is the sites newest tailings storage and is located at Tålmaks valleys highest point. The pond consists of three external dams (Dam H, Dam 1, Björnbergs dam) and some minor barriers and road dams. Björnbergs dam was constructed in 1992 in the upper part of the valley Tålmaks valley. The dam was designed with a core of till and raised 3 times upstream on tailing. The dam length is about 200 m and the maximum dam height is about 14 m. Dam H was constructed in 1975 in the downer part of pond H in the valley Tålmaks valley. The dam was constructed with cyclone tailing. Coarse fraction wad used for construction of downstream slope and fine fraction was being pumped into the pond from dam H. The foundation is mainly moraine and bedrock based on site investigations 1975. The dam length is about 850 m and the maximum dam height is about 45 m. Dam 1 was constructed with a core of till and raised downstream. A dam failure in dam 1 occurred in 1996. An estimated 100 000 m^3 of water and tailings was released from the pond, about 25 % went straight to clarification pond C through spillway channels and the east diversion ditch. The remaining 75 % caused damage to dam toe of dam H, roads, ditches, natural ground and dam A and B. Dam 1 length is about 600 m and the maximum dam height is about 20 m. A new spillway and emergency spillway at dam 1 was constructed. The old decant tower was plugged. During the remediation pond H was covered with 3 dm of till with a mix of bark and sludge, the downstream slope was covered by 3 cm of till, which was washed away in spring 2004. Erosion damage on the downstream surface of dam H was observed in summer 2004 due to overtopping caused by melting water from the winter period. Surface water diversion ditches were constructed on downstream slope. In 2005 an inspection was conducted and the erosion damage from 2004 was repaired. Today, sparse vegetation (bushes and mostly grass) grows on the pond, and exposed tailings is present.

The Laisvall TSF has already been closed and remediated according to best available technology at the time of closure, as described. Currently, work is ongoing to evaluate the sustainability of the performed remediation measures over time, and to develop a safe closure plan for the area in accordance with ICMM expectations. If needed, additional measures will be taken to ensure the long-term stability and safety of the area. As far as possible, objects of cultural and historical importance will be kept.

6. Annual Performance Review

In conformance with GISTM and Boliden´s framework for tailings management an annual performance review has been conducted for the Laisvall tailings facility. The facility was not considered to have satisfactory safety of the facility with need for additional actions and investigations.

The following activities were performed for Laisvall in 2024:

- Inspections conducted as planned (spring and autumn)
- Spring flood routine performed during snow melt.
- Geotechnical field investigations performed
- Installation of groundwater pipes
- Geochemical analysis of tailings
- Initiation of Safe closure workshops
- Measures on ditches, culverts and vegetation clearing close to outlets
- Environmental monitoring activities as planned.
- Site Characterization; seismic hazard, hydrology, geology, etc.
- Stability analyses.
- Design criteria agreed and documented in Design Basis Report.
- IR review.
- Tiltmeters installed
- Bird scaring at three different ponds

The main recommendation from the review was to work with mitigation of the higher risks and follow the plan to implement the GISTM, as that will ensure full implementation of the tailings management system at the site.

7. Environmental and social monitoring program

The environmental performance of the tailings facility at Laisvall is monitored according to an established environmental monitoring program.

Groundwater monitoring started in 2024 and is carried out in 25 monitoring pipes. The water is sampled and analyzed three times a year. Surface water is monitored in 18 locations around the mine and the tailings facility, measured monthly, every other month or quarterly depending on location.

The result from the environmental monitoring is prepared in an annual environmental report and is reported to the supervising authority yearly.

An environmental, social, and local economic impact assessment is carried out in 2024-2025. The Boliden portal for stakeholder feedback, available online, is used for the site and Boliden uses the Borealis system to record and address any potential grievance.

Stakeholder meetings with neighbors, the local sami community, the municipality and the county administrative board is being held when necessary.

8. Emergency Preparedness and Response Plan (EPRP)

The Emergency Preparedness and Response Plan (EPRP) is triggered by a failure or a near failure. The triggers of the EPRP are defined in the Trigger Action Response Plan (TARP).

The EPRP is common for all of Boliden's Closed Mines, supported by local appendices specific to each site and its credible flow failure scenarios. The structure of the dam safety emergency group is similar to the dam safety organization in normal operation. Emergency response simulations are held every year for at least one of the Boliden Closed Mine sites. The plan is to have an exercise in Laisvall during 2025. The EPRP is reviewed yearly after every simulation and updated when necessary.

9. Independent review

A Senior Independent Reviewer (IR) reviewed the Laisvall site during 2024, see Table 3, but will not continue to do so in 2025. A new IR is being engaged for the site for 2026.

Table 3 Planned, ongoing, and conducted independent reviews (2024-2025).

Type	Conducted/planned	Year	By
Independent review	Online meeting (June 4)	2024	Michael Nelson (WSP)
Independent review	Site meeting (September 9-10)	2024	Michael Nelson (WSP)

A first dam safety review (DSR/FDU) will be summarized in 2026 by DOR (Tailings Consultants Scandinavia) as a part of the GISTM implementation work.

10. Reclamation securities and other financial safeguards

The financing of operation and reclamation work costs at Boliden legacy sites is budgeted according to an annually updated work plan. Based on the updated long-term plan for closed mines, annual provisions are made to cover future costs. This long-term plan is reviewed with the responsible controller ahead of each budget process.

11. Implementation of the Global Industry Standard on Tailings Management

A self-assessment of the conformance to GISTM, based on the guidance in the ICMM Conformance Protocols, has been conducted by the personnel involved in all the closed mine sites. The results show that Laisvall is **in partial conformance** with the Standard. While significant progress has been made towards conformance, there are still several actions that need to be taken for the tailings facility to be in full conformance with all requirements. These actions have been summarized in a corrective action plan that has been submitted and approved by the Dam Safety Accountable and the Accountable Executive. Based on the plan it is expected that Laisvall will meet all GISTM requirements by 2026.