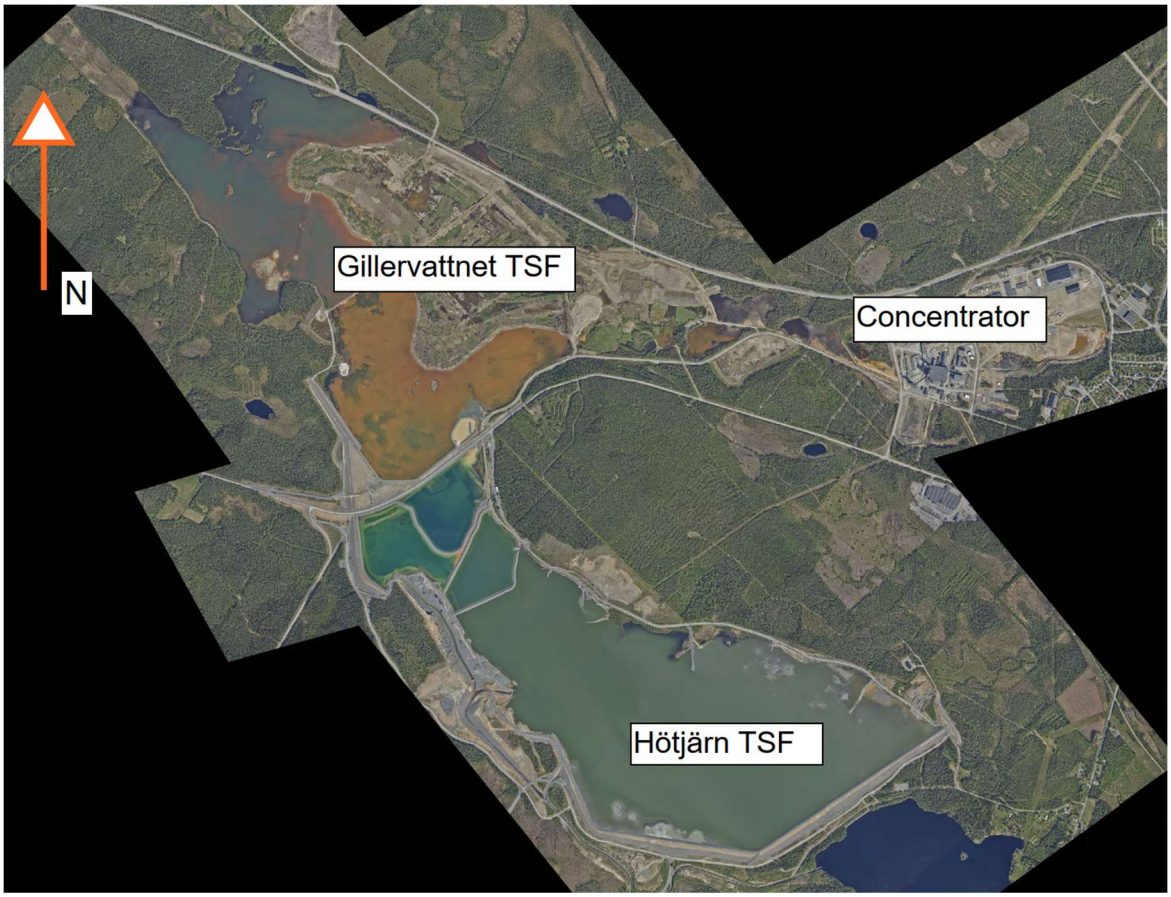
BOLIDEN

Public Disclosure Regarding Hötjärn Tailings Facility and Gillervattnets Tailings Facility



2025-08-01

Approved by:
Anna Åberg
Dam Safety Accountable Boliden Area –
Hötjärn TSF and Gillervattnet TSF

BOLIDEN

Contents

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 Hötjärn tailings facility and Gillervattnet tailings facility to fully provide the required information.

In addition, Chapter 11 of this document presents the status of implementation of GISTM for Hötjärn TSF and Gillervattnet TSF.

1. Description of the tailings facility

The tailings storage facilities Hötjärn TSF and Gillervattnet TSF are situated 32 km west of the town Skellefteå in Skellefteå municipality in Västerbotten county, Sweden, see Figure 1. The coordinates (latitude, longitude) of the storage facility are Gillervattnet TSF 64°52'31.3"N 20°18'7.1"E and Hötjärn TSF 64°51'23.8"N 20°19'29.7"E. The concentrator have a production rate of around 1.6 Mton ore per year and the ore is transported with trucks from 3 different mines in the Skellefteå field, Kankberg mine, Renström mine and Kristineberg mine.

The mineral concentrate is transported by truck to the smelters in Rönnskär, outside Skellefteå town. Waste of tailings are transported in a slurry through pipelines and deposited in Hötjärn TSF. See Figure 1 for a map of the Boliden site.

Figure 1 Geographic location of Boliden Concentrator (Hötjärn TSF/Gillervattnet TSF)

The tailings facilities consists of Gillervattnet TSF and Hötjärn TSF which are connected, see Figure 2 and 3 for an aerial photo, and Table 1 for a description of the main structures. Runoff water is flowing from Gillervattnet TSF by gravity through a culvert under road 857 to Hötjärn TSF.

The tailings have a rather high sulfide content and vary depending on which ore being processed. Therefor Boliden uses subaqueous depositing in Hötjärn tailings pond 1 to seal the tailings from oxygen with a water cover and prevent the development of acid rock drainage. For more information regarding the dams, see Chapter 5.

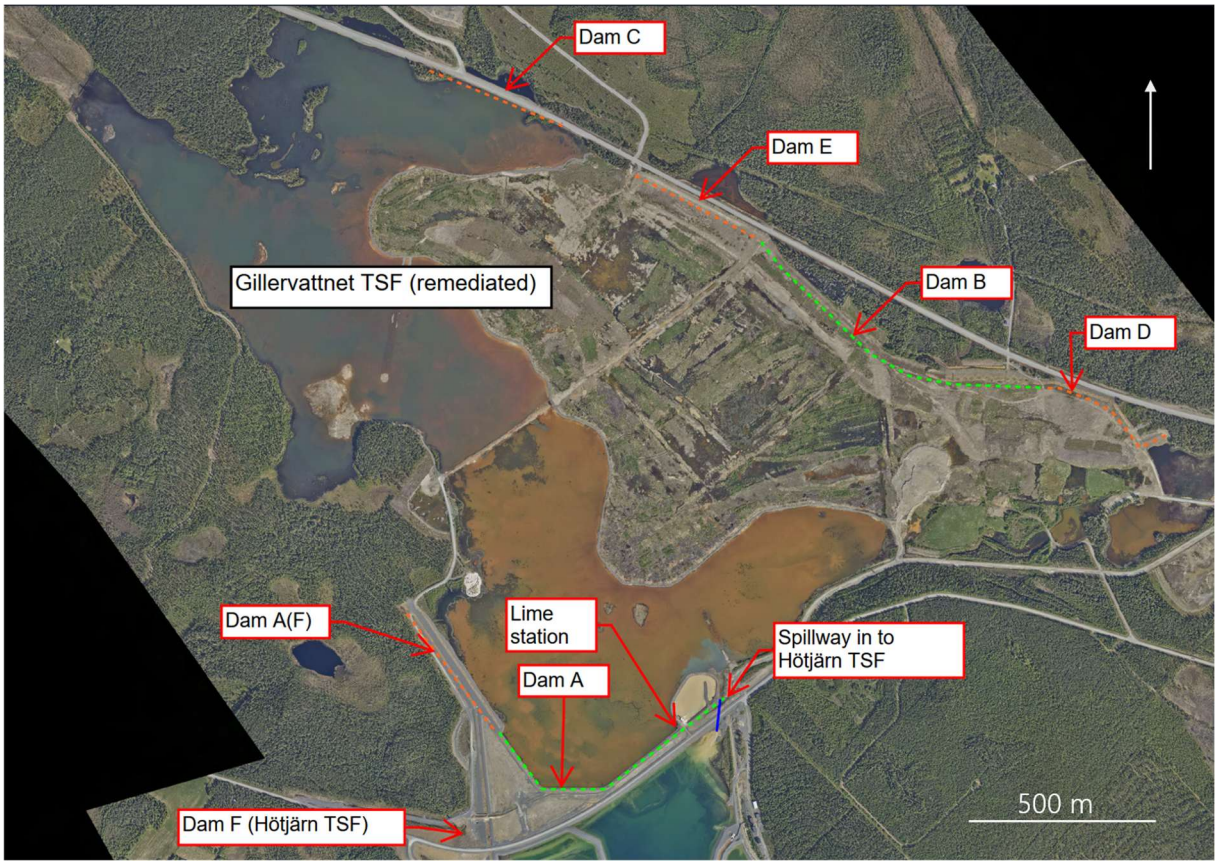


Figure 2 Aerial photo (June 2022) of the Gillervattnet TSF

Figure 3 Aerial photo (June 2022) of the Hötjärn tailings facility

Table 1 Description of main structures of the Hötjärn and Gillervattnets tailings facility

Object	Description
Gillervattnet TSF	Commenced in 1950s in Gillervattnet lake and decommissioned in 2011. Contained by the A, A(F), B, D and E dams and natural ground. Covers an area of approximately 3.4 km^2. Approximately 38 Mton of tailings are stored. The storage facility has been remediated between 2016 and 2018 and is in an active monitoring phase. Runoff water exits the facility by gravity, through an active outlet and culvert spillway under road 857, to the clarification pond 3 in Hötjärn TSF.
Hötjärn TSF	Commenced with deposition in 2011, the facility with the dam F, dam H and Fenton plant were constructed in 2 stages, stage 1 between 2008 – 2010 and stage 2 between 2018 - 2020. The facility includes one tailings pond (pond 1) and 3 clarifications ponds (pond 2-4) and receives the tailings from the process plant by slurry transport in pipe. The tailings are deposit with floating pipes, subaqueous deposition, in pond 1, see figure 1. Hötjärn TSF is contained by the dam F and dam H and natural ground. The whole facility covers an area of approximately 3.1 km^2. Approximately 15 Mm^3 of tailings are stored (end of 2024) and maximum storage capacity is 20 m^3. Process water and water from Gillervattnet TSF exits the facility after treatment by gravity from internal pond 4, through a spillway channel in bedrock with an active outlet, to the recipient Brubäcken.

BOLIDEN

2. Consequence classification

The consequence classification for the Hötjärn tailings facility have been defined both according to Swedish legislation (Miljöbalken) and according to GISTM, see Table 2.

Table 2 Overview of consequence classes for all dams of the Hötjärn tailings facility

Dam	Consequence class according to:	
	Swedish legislation (Miljöbalken)	Global Industry Standard on Tailings Management (GISTM)
F	B	High
H	B	High

The consequence classification for the Gillervattnet tailings facility have been defined both according to Swedish legislation (Miljöbalken) and according to GISTM, see Table 3.

Table 3 Overview of consequence classes for all dams of the Gillervattnet tailings facility

Dam	Consequence class according to:	
	Swedish legislation (Miljöbalken)	Global Industry Standard on Tailings Management (GISTM)
A	B	Low (preliminary)
A(F)	B	High (preliminary)
B	C	High (preliminary)
D	C	High (preliminary)
E	C	High
C	U	High (preliminary)

The consequence classification of both tailings facilities according to Swedish legislation is "Dammsäkerhetsklass B". The classification was approved by the national regulatory authority for dam safety (County Administrative Board) in 2017.

The consequence classification of both tailings facility according to the Global Industry Standard on Tailings Management (GISTM) is High.

3. Risk assessment

Both Hötjärn and Gillervattnet facilities 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 has 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.

Within Boliden's risk framework, risks are categorized into four levels, based on the likelihood of occurrence and consequence of a critical hazard. Based on risk level, risks are managed according to Table 4.

Table 4 Required actions for different risks

Risk	Action
Extreme	Intolerable – Requires immediate actions to reduce the risk
High	Generally unacceptable – Detailed action plan required and mitigation plan during transition
Medium	Acceptable if ALARP – Monitor and manage as appropriate
Low	Acceptable – Monitor and manage as appropriate

An update of the risk assessment for Hötjärn TSF was undertaken in 2025, after results from the geotechnical investigations work 2024 were analyzed. The conclusion was that previously identified risks in the category's extreme have been managed through developing the knowledgebase. There still are actions to be taken to reduce the High to Medium risks.

A new risk assessment, planned for Q3 2025, will reflect the actions taken to lower the risk, with most risks expected to meet the ALARP principle ("As Low As Reasonably Practical"). Table 5 and 6 provides a list of the highest identified risks as well as the status of associated mitigation measures for each facility.

The identified events which can potentially lead to flow failure events, are used as input for the dam breach analysis (see Chapter 4), as well as for the Trigger Action Response Plan and the Emergency Preparedness Response Plan (see Chapter 8).

Table 5: High and medium class risks and associated mitigation plans, Hötjärn TSF

Dams	Failure mode	Identified high and medium risks	Current mitigation used to manage and monitor identified risks
F, H	Overtopping	Overtopping due to: • Sabotage	• Progressive closure measures with construction of beach.
F, H	Instability	Instability due to: • Undetected weak materials • Incorrect strength assumptions • Unexpected pore pressure generation • Artesian pore water pressures • Liquefaction of cohesionless soils and cyclic softening of cohesive soils.	• Additional site investigations, characterization study and stability analysis (sensitivity) • Trech ditch with filter material downstream the dam. • Continue to develop monitoring pore pressure with optic fiber. • Surveillance program, with comprehensive monitoring of groundwater levels, seepage and deformations, daily inspections, and TARP execution.
F, H	Seepage and erosion	Seepage and/ or erosion due to: • Material incompatibility between dam and foundation • Underground features that could cause internal erosion • Seismic events, differential settlement	• Internal erosion assessment • Surveillance program, with comprehensive monitoring of groundwater levels, seepage and deformations, daily inspections, and TARP execution. • Additional site investigations, characterization study and stability analysis (sensitivity)

Table 6: High and medium class risks and associated mitigation plans, Gillervattnet TSF

Dams	Failure mode	Identified high and medium risks	Current mitigation used to manage and monitor identified risks
A, A(F), B, D, E	Overtopping	Overtopping due to: • No high and medium risks	
B, D, E	Instability	Instability due to: • Undetected weak materials • Incorrect strength assumptions • Unexpected pore pressure generation • Artesian pore water pressures • Liquefaction of cohesionless soils and cyclic softening of cohesive soils. • Weak materials in the structural portion of the dam	• Site geotechnical investigations, characterization study and stability analysis (incl sensitivity) • Installation of piezometers • Surveillance program, with comprehensive monitoring of groundwater levels, daily inspections, and TARP execution.
B, E	Seepage and erosion	Seepage and/ or erosion due to: • Material incompatibility between dam and foundation • Underground features that could cause internal erosion • Elevated pore water pressures and increased hydraulic gradients.	• Site geotechnical investigations, characterization study • Internal erosion assessment • Installation of piezometers • Surveillance program, with comprehensive monitoring of groundwater levels, daily inspections, and TARP execution.

BOLIDEN

4. Impact assessment

The impact assessments for the Hötjärn tailings facility, dam F and H, are based on breach analysis of credible flow scenario. For Gillervattnet TSFs dams have the impact been assessed (GISTM) in 2025 without a dam breach analysis. The results are used to evaluate the consequence classification (see Chapter 2) of the dams and to develop the Emergency Preparedness Response Plan, see Chapter 8.

The impact assessment has been evaluated within two different frameworks, according to Swedish legislation (Miljöbalken), and according to the Global Industry Standard on Tailings Management (GISTM).

The impact assessment of Hötjärn TSF according to Swedish legislation (Miljöbalken) is based on breach analyses from 2019, see Table 7. The impact assessment of Gillervattnet TSF according to Swedish legislation (Miljöbalken) is based on assessments when dam A was an external dam before Hötjärn TSF was constructed. The impact assessment for Gillervattnet TSF is currently being reviewed, and an updated assessment will be submitted for approval to the authorities.

The impact assessment of Hötjärn TSF according to the Global Industry Standard on Tailings Management (GISTM) is based on breach analyses from 2023, see Table 8 and for Gillervattnet TSF Table 9.

Table 7 Summary of the Hötjärn/Gillervattnet facilities impact assessment according to Swedish legislation (Miljöbalken)

Dam	Impact assessment (major, large, moderate, small)	Risk for loss of, destruction of or disturbance of:						
		1. Human life	2. Cultural values	3. Electricity infrastructure	4. Infrastructure	5. Essential services	6. Environmental	7. Economy
Gillervattnet TSF								
A (before Hötjärn TSF)	Large	X			X		X	X
B	Moderate				X		X	X
D	Moderate				X		X	X
E	Moderate				X		X	X
Hötjärn TSF								
F	Large	X			X		X	X
H	Large	X			X		X	X

Table 8 Summary of the Hötjärn TSF impact assessment to the GISTM

Consequence Criteria	Classification	Impact assessment
Potential Population at risk (PAR)	High	The PAR varies between 2 and 26 for calculated scenarios on dam H. Given the uncertainty surrounding the outflow volume estimations, the consequence category for the PAR can be estimated to be either Significant or High.
Potential Loss of Life (LOL)	High	In conclusion, for scenarios on dam H, when applying proposed fatality rates for the case without warning, the PLL can be considered to belong to the category 0-10 (High).
Environment	High	In overall, incremental environmental losses are considered to correspond to the category High.
Health, Social and Cultural	High	Based on the consequences, incremental losses are considered to belong to the category High mainly due to consequences to national heritage, recreation and social assets.
Infrastructure and Economics	High	The sum of the economic losses for failure at dam H (buildings, roads, culvert and bridges, hydropower productions) would not exceed 1 000 MSEK (US$100M), if not clean-up cost is included.

Table 9 Summary of the Gillervattnet TSF impact assessment to the GISTM

Consequence Criteria	Classification	Impact assessment
Potential Population at risk (PAR)	High (preliminary)	The critical factor in relation to dams B, D and E is highway 370, which has an average daily flow of approximately 1300 vehicles.
Potential Loss of Life (LOL)	High	The critical factor in relation to dams B, D and E is highway 370, which has an average daily flow of approximately 1300 vehicles.
Environment	High (preliminary)	The critical factor for dam A(F) is the toxicity of the water in the dam. Based on the water quality measurements, the results exceed the guideline values (thresholds) for the following contaminants: Arsenic (As), Cadmium (Cd), Copper (Cu), Nickel (Ni), Lead (Pb) and Zinc (Zn).
Health, Social and Cultural	High (preliminary)	This fact determines the potential population at risk according to highway 370, the potential loss of life and also the health, social and culture, since more than 1000 people would be affected by disruption of social dislocation. There are other roads even if 370 is out of order.
Infrastructure and Economics	High (preliminary)	Concerning the economic losses, one of the main sources of uncertainty is the clean-up costs, corresponding to the restoration of the areas damaged by the tailings sedimentation. In the Hötjärn consequence assessment, the clean-up of 1 m^3 of released tailings was assumed to cost 1 000 SEK, then the total cost would be in a class between high and very high.

BOLIDEN

5. Description of the design of the tailings facility

See Table 10 for a description of the design of the main dams. For a description of the overall tailings facilities and the location of the dams is presented in Chapter 1.

Table 10 Description of the design for the dams in the Hötjärn/Gillervattnet tailings facilities

Dam	Description
Gillervattnet TSF	
A	After Hötjärn TSF was constructed dam A is an internal dam between Gillervattnet TSF and Hötjärn TSF. The water level between the facilities is around 1 m in operation conditions. The permit maximum level is the same for both facilities. Dam A was designed to be impermeable, and the method of raise has been downstream from the start. Dam length is about 850 m and the maximum dam height is about 13 m. The downstream area of dam A is currently filled with soil and rock material to a around level of upstream water level.
A(F)	External dam in the Gillervattnet tailings facility. Dam A(F) was earlier a part of dam A and designed to be impermeable. The dam has only been raised downstream 0.5 m in stage 2 construction of Hötjärn TSF when dam F and dam A(F) was connected. In the construction work dam A(F) was reinforced with berms on both the upstream and the downstream side. Dam length is about 400 m and the maximum dam height is about 5 m.
B	External dam in the main tailings facility. The dam was designed to be impermeable and have been raised 3 times. The method of raise was centerline from the start. Dam length is about 950 m and the maximum dam height is about 12 m. The dam has been remediated 2016 – 2018 with dry cover of till and flatten of the downstream slope.
C	Before the year 2000 dam C had a function of preventing tailings and water from eroding on road 370 embankment. Around 2000 the road was raised with culverts which implies that the dam C no longer had a function as a water barrier.
D	External dam in the main tailings facility. The dam was designed to be impermeable and have been raised 1 time. The method of raise was upstream on tailings. Dam length is about 450 m and the maximum dam height is about 5 m. The dam has been remediated 2016 – 2018 with dry cover of till on the dam crest. There was no flattening of the downstream slope in the construction work on dam D depending on the fact that road 370 lies directly against the toe of the dam.
E	External dam in the main tailings facility. The dam was designed to be impermeable and have been raised 1 time. The starter dam was more of a widening of the road embankment and method of raise was upstream on tailings. Dam length is about 400 m and the maximum dam height is about 5 m. The dam has been remediated 2016 – 2018 with dry cover of till on the dam crest. There was no flattening of the downstream slope in the construction work on dam E depending on the fact that road 370 lies directly against the toe of the dam.
Hötjärn TSF	
F	External impermeable dam in the main Hötjärn tailings facility. The dam F was designed to full height but have been constructed in 2 stages. Almost all foundation works were done in stage 1. Only extending parts of foundation were done in stage 2. Dam length is about 900 m and the maximum dam height is about 18 m. The dam is not intended to be raised.

H	External impermeable dam in the main Hötjärn tailings facility. The dam H was designed to full height but have been constructed in 2 stages. Almost all foundation works were done in stage 1. Only extending parts of foundation were done in stage 2. Dam length is about 2 700 m and the maximum dam height is about 20 m. The dam is not intended to be raised.

The main goal for mine closure is to leave an area free of hazards which allows for alternative use of the area, for example recreation, hunting and forestry. To achieve the main goal the facility will be treated so that:

• The environmental impact from pollution is restricted in accordance with environmental requirements set in the approved closing plan for the mine.

• The facility will melt into the landscape using morphology.

• The facility needs a minimum of maintenance and supervision.

Methods to reduce the environmental impact from pollution are for example:

• Similarly to the Gillervattnet TSF, the Hötjärn TSF will mainly be covered with water in a combination with constructed beaches of tailings covered by moraine/ bentonite or moraine, depending on degree of saturation in deposited tailings.

As far as possible, objects of cultural and historical importance will be kept.

6. Annual Performance Review

The following activities relating to dam safety and tailings management were undertaken during 2024:

• Geotechnical and geophysical investigations of foundation dam F and H – risk mitigation measure.

• Establishment of a hydrological model, calculation of design flows – increase knowledge base.

• Surveillance and maintenance according to plan.

• IR site visit and review, see Chapter 9.

• Updates of tailings management documents and routines, such as OMS manual, Risk register Gillervattnet TSF, Trigger Action Response Plan (TARP) and Emergency Preparedness Response Plan (EPRP).

Based on the review, the facility was assessed to have satisfactory safety.

7. Environmental and social monitoring programme

The environmental performance of the tailings facilities is monitored according to an established environmental monitoring program. Groundwater monitoring is carried out at 23 monitoring wells installed around the perimeter of the tailings facilities. The water is sampled and analyzed with different intervals depending on the location and purpose of the groundwater monitoring. Another 23 monitoring wells are placed within Gillervattnet to monitor the remediation.

Surface water monitoring is carried out in the creeks Brubäcken and Klintforsån. Water is being continuously emitted from the clarification pond, as a requirement in the permit. The sampling frequency varies between the total of 43 sample points related to surface water around the facility. Sample point 6205 is where the permit requirements for water quality is monitored.

Settling dust is measured monthly at 8 stations surrounding the operations. The concentration of particles in air is measured in the Boliden community, at the industrial area, at dam H and a reference point.

Dam seepage through dam B and D at Gillervattnet is collected in ditches which leads to smaller pumpstations from where the water is pumped back into the water management system for treatment. Seepage from the other dams within the TSF is not collected.

Water and/or road salt are applied to roads when necessary.

The results from the environmental monitoring are reported quarterly to the supervising authority (the county administrative board). An annual environmental report is uploaded to the Swedish portal for environmental reporting (SMP).

External stakeholder meetings are held with e.g. neighbors, the local Sami community, and the county administrative board. Measures exist to record and address any potential grievance. A human impact risk assessment has been carried out in 2025.

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).

When the EPRP is triggered by a dam safety related incident, the dam safety emergency group is activated to support the Concentrator emergency group with technical dam safety expertise. The dam safety emergency group is responsible for assessing the situation as well as proposing and leading dam safety related measures but is subordinated to the Concentrator emergency group.

The structure of the dam safety emergency group is similar to the dam safety organization in normal operation. Each role in the group has one responsible individual and at least one substitute. For each role, a checklist is available.

In case of an emergency, the EPRP provides routines for cooperation with local emergency authorities "Räddningstjänsten in Skellefteå municipality".

Emergency response simulations are held at three years intervals.

The EPRP is reviewed yearly and updated when necessary. The EPRP has been reviewed and updated during 2025 based on an updated dam breach analysis. For 2025 training of staff and an emergency response simulation, based on the updated EPRP is scheduled.

9. Independent review

An Independent Reviewer (IR) has been established for Hötjärn/Gillervattnet facilities, with 2 online meetings yearly and a site inspection scheduled every two years. The previous site visit was completed in May 2024.

A Dam Safety Review (DSR) was undertaken on Hötjärn TSF before stage 2 was constructed by the consultant company Ramboll with the results presented in 2018, after stage 2 was constructed an externa comprehensive dam safety inspection (FDI) was performed by the consultant company Sweco.

A Dam Safety Review (DSR) was undertaken in Gillervattnet TSF by the DOR design team company Sweco with the results presented in 2023.

The recommendations from the reviews have been incorporated in the risk assessment as well in the ongoing work with Operation, Maintenance and Surveillance (OMS) undertaken by Boliden Area Dam Safety Organization.

The Dam Safety Reviews are scheduled every five years as required based on the consequence classification, next DSR is planned in 2027 for both Hötjärn and Gillervattnet facilities.

10. Reclamation securities and other financial safeguards

Boliden makes provisions in its accounts for future reclamation costs. Boliden´s current provisions for reclamation works can be found in its Annual and Sustainability Report. In addition, insurance is used to cover sudden and unexpected tailings related incidents.

Mining operations, including tailings management, are subject to court/authority approved environmental permits, including the posting of mandatory reclamation securities, usually in the form of bank guarantees. These securities are intended to make sure that there are sufficient financial resources available to cover estimated costs of planned closure, early closure, reclamation, and post-closure of the tailings facility and its appurtenant structures, even in a situation where the operator is unable to cover these costs.

11. Implementation of the Global Industry Standard on Tailings Management

At Boliden Area – Hötjärn/Gillervattnet a second self-assessment of the conformance to GISTM, based on the guidance in the ICMM Conformance Protocols, has been conducted by the site personnel with involvement from the management team and staff support function. The result of the self-assessment (May 2025) indicated a few minor items that required actions during Q2 2025. These were addressed and Boliden Area – Hötjärn/Gillervattnet is assessed in full conformance with GISTM, as the 5 of August 2025.

To validate the results of the self-assessment, Boliden Area – Hötjärn/Gillervattnet will undergo an external review of GISTM conformance status through an external independent auditor, with review of tailings management system and site visit planned during Q1 2026 and a conformance status report issued in Q2 2026.