

Global Industry Standard on Tailings Management (GISTM)

- Public Disclosure



GISTM Public Disclosure

In conformance with Principle 15 of the GISTM

What is the GISTM?

The Global Industry Standard on Tailings Management (GISTM) strives to achieve zero harm to people and the environment. Underpinned by an integrated approach to tailings management, GISTM aims to prevent catastrophic failure and improve the safety of tailings facilities across the world. It represents a step change in transparency, accountability and safeguarding the rights of project affected people.

The Standard is organized over six Topic areas, 15 Principles and 77 auditable requirements. The topic Area I focuses on project affected people. The Topic Area II requires Operators to develop knowledge about the social, environmental and local economic context of a proposed or existing tailings facility. Topic Area III raises standards for designing, constructing, operating, maintaining, monitoring and closing tailings facilities. Topic Area IV focuses on the ongoing management and governance of a tailings facility. Topic Area V covers emergency preparedness and response in the event of failure. Topic Area VI requires public disclosure of information about tailings facilities to support public accountability.

Principle 15

Principle 15 of GISTM sets requirements on public disclosure and access to information about tailings facilities to support public accountability.

Requirement 15.1 asks Operators to publish and regularly update information on their commitment to safe tailings facility management, implementation of its tailings governance framework, its organization wide policies, standards or approaches to the design, construction, monitoring and closure of tailings facilities. A list of information to be published is defined.

Hydro's tailings and residue facilities

Hydro's Bauxite and Alumina business area in Brazil is comprised of the Paragominas bauxite mine and the Alunorte alumina refinery. At Mineração Paragominas, the tailings generated by the beneficiation process are stored in two tailings facilities¹ (TFs) – the Valley TF and the Plateau TF (RP1). At Alunorte, the residue generated from the bauxite refining process is filtered and disposed of in dry filtered residue stacks known as DRS1 and DRS2 (Dry Residue Storage area).

At Hydro's legacy sites in Germany, there are three residue facilities: Schwandorf I, Schwandorf II and Schwandorf III, which store bauxite residue that was generated in the bauxite refining process in the past. There are also three tailings facilities: Grube Erna I & II and Marienschacht facilities, which store flotation sand that was generated during fluorite mining in the past.

Hydro's tailings and bauxite residue facilities, herein after referred as tailings facilities (TFs), meet relevant regulations. Hydro voluntarily follows best practices for all tailings facilities and international third parties conduct audits.

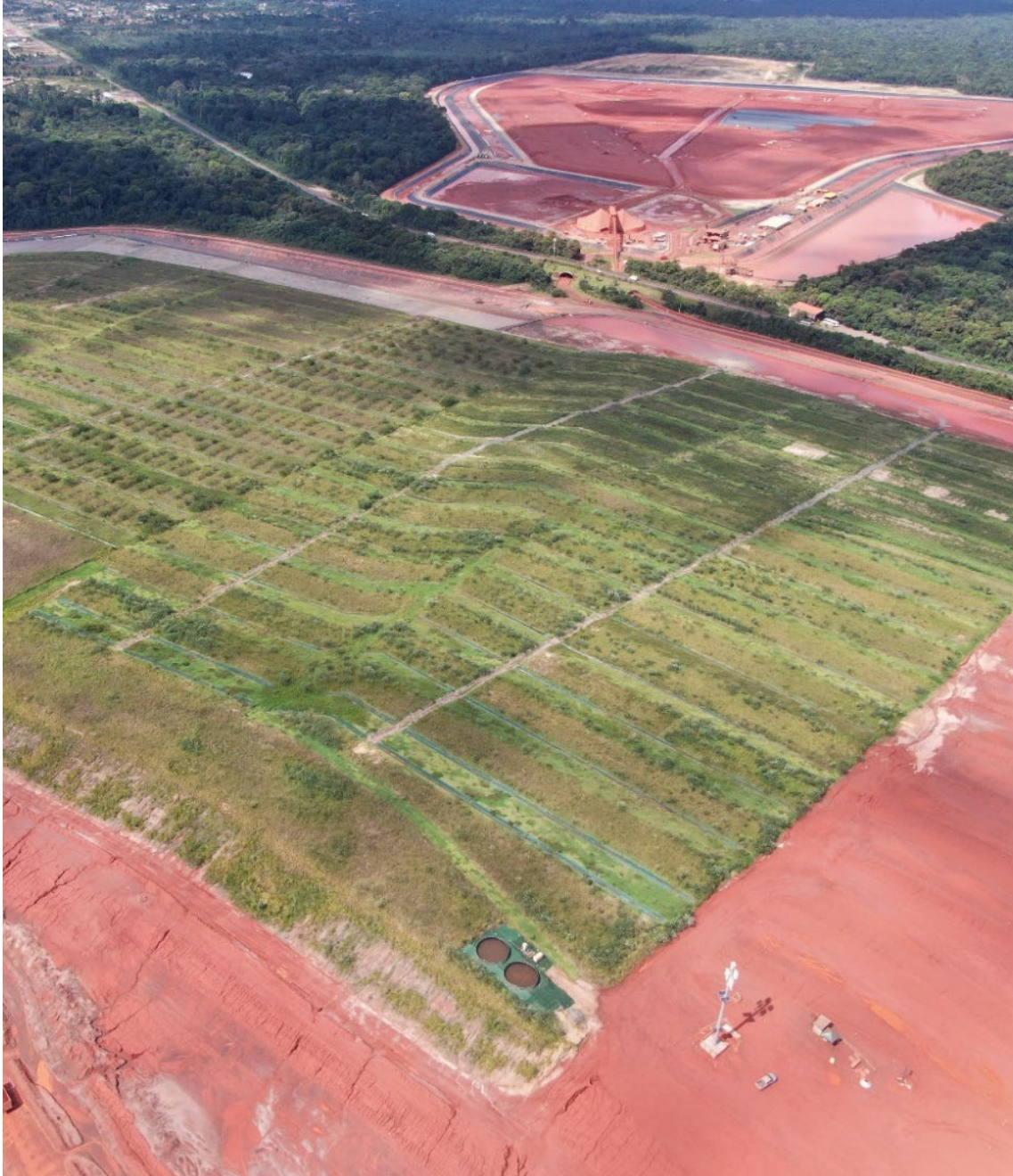
Hydro has committed to implementing GISTM to all “extreme” and “very high” consequence classification tailings facilities by August 5, 2023 and to its other TFs by August 5, 2025. None of Hydro's facilities are classified as “extreme.”

This public disclosure encompasses all of Hydro's TFs which have the deadline of August 5, 2023 (DRS1, DRS2, Valley) as well as the Paragominas RP1.

¹ Tailings facility is an asset that is designed and managed to contain the tailings produced by the mine process or the bauxite residue produced by the alumina refining process.

Hydro Alunorte

DRS1 and DRS2



General description of the structures

In response to items B1, B2 and B5 of Requirement 15.1

This item presents a description of the tailings facilities, their consequence classifications², and a description of the design for all phases of the tailings facility lifecycle including the current and final height.

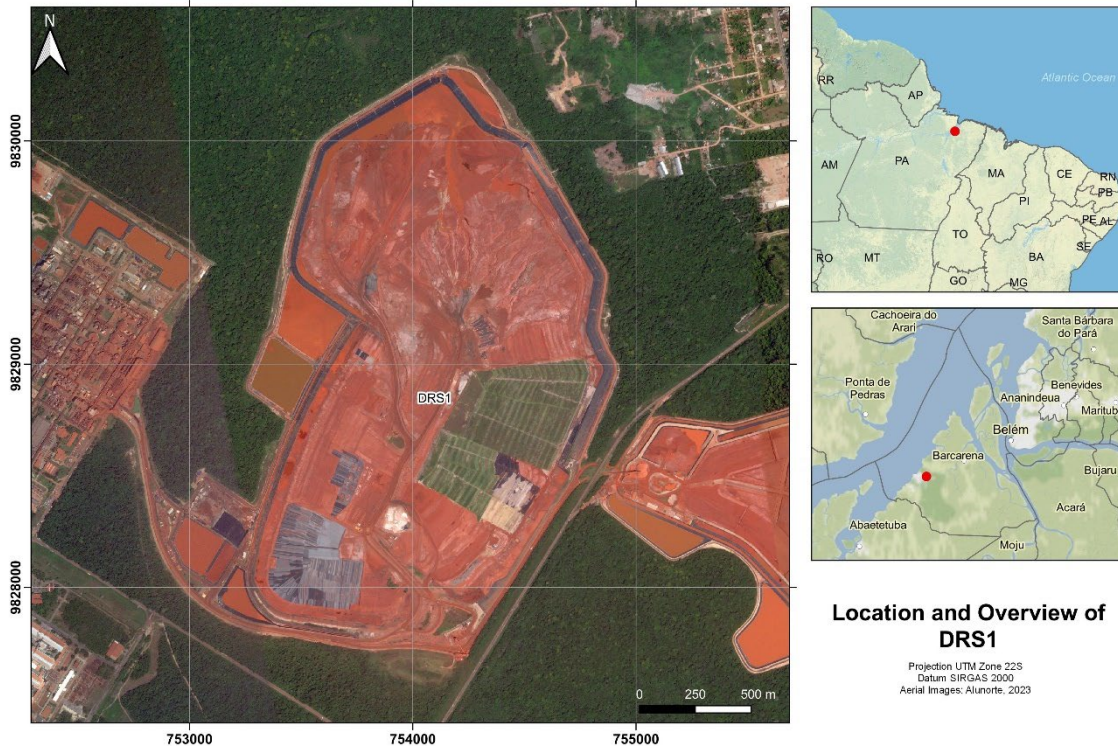
DRS1

The Alunorte refinery began operations in July 1995 and, since then, has relied on the DRS1 to store the residue generated from bauxite refining process for alumina production.

DRS1 is located to the east of the Alunorte refinery, in Barcarena, in the State of Pará, approximately 120 km from Belém.

The water management system consists of surface drainage facilities and five basins connected to channels, spillways and pumping stations designed to manage the water levels during extreme rainfall events of 10.000-year return period. The water is treated in the Industrial Effluent Treatment Plant to guarantee the required environmental conditions are met before discharge. The disposal area, basins and channels are lined with HDPE geomembrane to avoid contaminants migration through foundation seepage.

² Global Industry Standard on Tailings Management



DRS1 General Description	
Purpose ³	Storage of bauxite residue generated in alumina production
Current height	44.86 m
Final height	44.86 m
Volume of residue stored ⁴	60.54 Mm ³
Maximum residue storage capacity ⁵	64.83 Mm ³
Implementation stages ⁶	The facility was constructed in 1994 and 1995, and underwent 11 expansions (expansions 1, 2, 3, 4, 5, 6, 7, South cell, East cells CL1, CL2, and CL3).
Current status	In operation, with progressive closure and rehabilitation
Consequence classification ⁷	Very high

³ Operational Manual, Pimenta de Ávila, 2023.

⁴ Date of reference June, 2023

⁵ The maximum capacity may vary based on the closure design

⁶ As Is Design, Pimenta de Ávila, 2021.

⁷ The Classification of consequences was assessed with reference to Table 1 of Annex 2 of the report “Global Industry Standard for Tailings Management”. Note that the consequence classification does not consider likelihood of a failure. It considers the consequence if there were a failure.

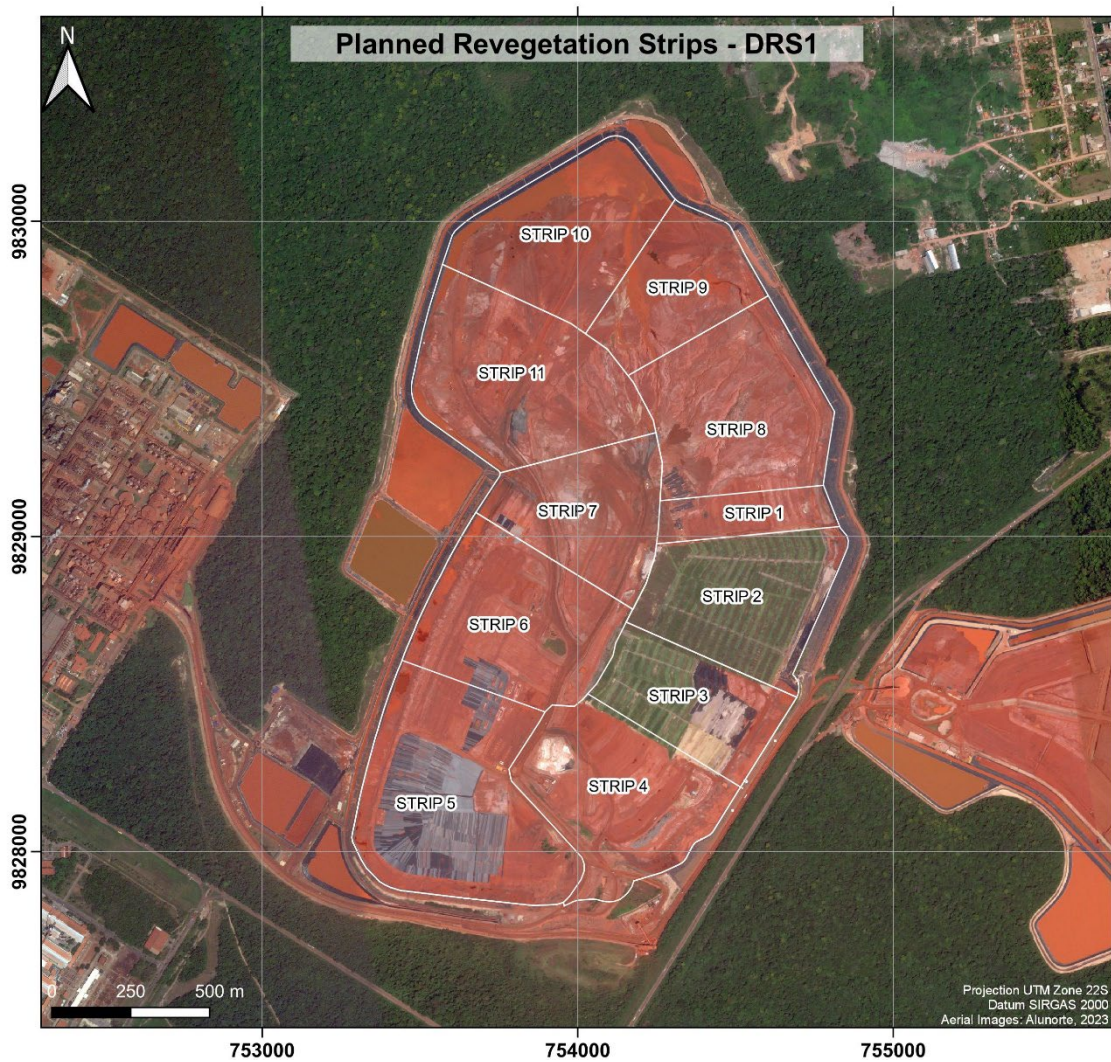
DRS1 General Description	
Construction type	Compacted earth fill embankment, downstream raised.
Estimated year of closure	2034*

*The year of completion for the structure's closure is subject to change.

Hydro Alunorte is committed to the progressive closure and rehabilitation of the DRS1 as part of our ongoing work to reduce our environmental footprint. The progressive closure and rehabilitation process will further reduce erosion, mitigate visual impact, restore the ecosystem, and strengthen rainwater management.

The progressive closure is divided in 11 stripes of rehabilitation. The strips 1, 2 and 3 have been rehabilitated, and represent approximately 40 ha. The design considers cap and store the residue with cover systems consisting of HPDE geomembrane, densified soil, and revegetation of the surface.

The image below shows the current configuration of DRS1 with the proposed revegetation strips.



DRS2

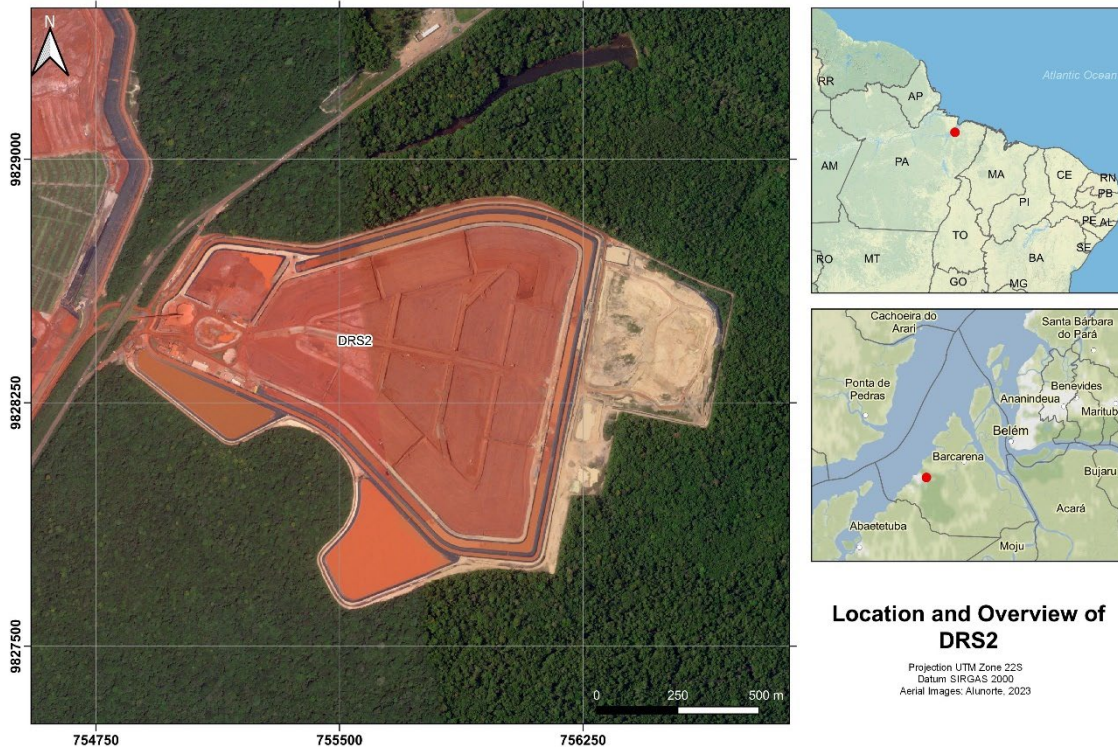
The dry filtered residue stack DRS2 was constructed in 2015. The facility was designed and built as the DRS1 was approaching the end of its lifecycle. The DRS2 is a dry stack designed to store compacted press filter residues generated from the bauxite refining process for alumina production.

DRS2 is located at the east of the Alunorte refinery, in Barcarena, in the state of Pará, approximately 120 km from Belém.

The water management system consists of surface drainage devices and two basins connected to channels, spillways and a pumping station designed to manage the water levels during extreme rainfall events of 10.000 years return period.

The water is treated in the Industrial Effluent Treatment Plant to ensure compliance with environmental regulations.

The disposal area, basins and channels are lined with HDPE geomembranes to mitigate risks of contaminants migration through foundation seepage.



DRS2 General Description	
Purpose ⁸	Storage for bauxite residue for alumina production
Current height	18.07 m
Final height ⁹	71.00 m
Volume of residue stored ¹⁰	5.03 Mm ³
Maximum residue storage capacity	24.85 Mm ³
Implementation stages ¹¹	Singles stage construction, 2015.
Current status	In operation

⁸ Operational Manual, Pimenta de Ávila, 2023.

⁹ Detailed Project Phase 1, Pimenta de Ávila, 2023.

¹⁰ Date of reference June, 2023

¹¹ As built, Pimenta de Ávila, 2019.

Consequence classification ¹	Very high
Estimated year of closure	2033*

*The year of completion for the structure's closure is subject to change.

Risk assessment

In response to item B3 of Requirement 15.1

This item presents a summary of risk assessment findings relevant to the tailings facilities.

As part of its commitment to the safe operation of the tailings facilities, the Hydro Bauxite & Alumina business area regularly conducts risk assessments for the TFs.

A multidisciplinary team carries out the process, including input from designers, EoR (Engineer of Record), and the ITRC (Independent Technical Review Board). This process aims to reduce identified risks to as low as reasonably practicable levels (ALARP).

To achieve this objective, actions are undertaken to improve the reliability of the considered failure mode (reducing uncertainties associated with risk mapping) or enhancing controls and monitoring.

The risk assessments concluded there are no risks associated with Alunorte's TFs that are classified as unacceptable.

DRS1

The qualitative risk assessment employed at DRS1 is based on Risk Analysis FMEA (Failure Mode and Effect Analysis)¹².

¹² Pimenta de Ávila Consultoria, June 2022

The credible failure modes¹³ appointed are: overtopping, piping and instability. Brittle failure and liquefaction were not considered to be credible failure modes.

The critical controls to prevent credible failure are: existing operational procedures for water level control, the Emergency Preparedness Response Plan and the trigger actions response plan (TARPs), periodic maintenance and inspection routines, desilting basins and channels, periodic spillway's maintenance, and quality assurance/quality control (QA/QC).

DRS2

The qualitative risk assessment employed at DRS2 is based on Risk Analysis FMEA (Failure Mode and Effect Analysis).

The credible failure modes appointed are: piping, overtopping, and instability.

Brittle failure and liquefaction were not considered to be credible failure modes.

The critical controls to prevent credible failure are: existing operational procedures for water level control, the Emergency Preparedness Response Plan and the trigger actions response plan (TARPs), periodic maintenance and inspection routines, desilting basins and channels, and the periodic updating of the residue disposal plan.

¹³ Refers to technically feasible failure mechanisms given the materials present in the structure and its foundation, the properties of these materials, the configuration of the structure, drainage conditions and surface water control at the tailings facility, throughout its lifecycle. Credible failure modes can and do typically vary during the lifecycle of the facility as the conditions vary. A tailings facility that is appropriately designed and operated considers all of these credible failure modes and includes sufficient resilience against each. Different failure modes will result in different failure scenarios. Some tailings facilities will have no credible failure modes. Further, even more tailings facilities will have no credible catastrophic failure modes. The term 'credible failure mode' is not associated with a probability of this event occurring and having credible failure modes is not a reflection of facility safety. The process of assessing credibility or non-credibility of failure modes for a given tailing facility should consider, among other factors such as construction and operations, whether the facility is designed to extreme external loads. [based on the definition provided in the Standard. (Tailings Management Good Practice Guide, ICMM, 2021).

Potential impacts

In response to item B4 of Requirement 15.1

This item provides a summary of the impact assessment and of human exposure and vulnerability to tailings facility credible flow failure scenarios.

DRS1 and DRS2

In order to identify the groups most at risk, the dam breach studies and the registration of employees and people within the hypothetical inundation area are regularly updated. This is part of the assessment and documentation of the potential human exposure and vulnerability to TF's credible failure scenarios.

The hypothetical inundation area refers to the downstream area that would be affected in the event of a hypothetical, credible failure. This hypothetical inundation area is determined from dam breach studies and presents the geographic extent and boundaries of the area that would be inundated by the sudden release of water or residues resulting from the hypothetical credible failure. It is important to note that the term credible failure mode is not associated with the probability of this event occurring and having credible failure modes is not a reflection of the tailings facility's safety.

The dam breach studies developed to Hydro Alunorte tailings facilities adopted a 2-dimensional, non-newtonian fluid modeling, based on rheological, geotechnical, chemical and mineral characterization of the materials. The studies are in compliance with the applicable legal requirements.

The DRS1 dam breach study considered 12 flow failure scenarios, which encompass all the contour of the deposit dyke. The hypothetical inundation area reflected in the DRS1 Emergency Preparedness and Response Plan (EPRP) embraces the merge of the critical failure scenarios, including those resulting from basins rupture.

The hypothetical inundation area considered in the DRS2 EPRP was determined from nine failure scenarios over the deposit contour, including those resulting from basins rupture.

Based on the dam breach studies, the potential impacts resulting from a hypothetical catastrophic failure in the Alunorte TFs have been estimated and are presented below.

DRS1 – Potential impacts	
Municipality	Barcarena - PA
Human exposure and vulnerability	Human exposure: workers, residents, or floating population within the inundation area (SRZ ¹⁴ or SSZ ¹⁵).
Hypothetical impacts to communities, infrastructure, and environment ¹⁶	<ul style="list-style-type: none"> • Electrical supply interruption • Water supply interruption • Blocked internal access and external roads • Impact in water quality • Silting of the surrounding creeks and channels • Impact on local soil, fauna, and flora
DRS2 – Potential impacts ¹⁷	
Municipality	Barcarena - PA
Human exposure and vulnerability	Human exposure: workers, residents or floating population within the inundation area (SRZ or SSZ).
Hypothetical impacts to communities, infrastructure, and environment ¹⁸	<ul style="list-style-type: none"> • Electrical supply interruption • Water supply interruption • Blocked internal access and external roads • Impact in water quality • Silting of the surrounding creeks and channels • Impact on local soil, fauna, and flora

The hypothetical inundation area resulting from a hypothetical failure and the registration of the potentially affected population are inputs for the development of the EPRP¹⁹. The EPRP supports the identification and classification of emergency situations that may pose a risk to the integrity of the facilities and establishes immediate response actions to be taken in these situations in terms of the evacuation protocol, authorities, and responsible agents to be notified, aiming to prevent and minimize damage and loss of life.

14 According to Normative Instruction Nr. 12, dated December 27, 2019, the self-recue zone (SRZ) is the downstream area of the valley where it is considered that warning alerts to the population are of responsibility of the entrepreneur, as there is not enough time for intervention and evacuation by the competent authorities in emergency situations.

15 The secondary safety zone (SSZ), defined by Federal Law Nr. 14066, dated September 30th, 2020, consists of the portion of the flooding area where is not defined as SRZ.

16 Emergency Preparedness and Response Plan, Pimenta de Ávila, 2022.

17 The impact assessed considers the maximum occupation and final height of the DRS2 dry stack.

18 Emergency Preparedness and Response Plan, Pimenta de Ávila, 2022.

19 Emergency Preparedness and Response Plan, Pimenta de Ávila, 2022.

Periodic review and independent review

In response to items B6 and B9 of Requirement 15.1

This item presents a summary of material findings of annual performance reviews²⁰ and the dam safety review²¹ (DSR), including implementation of mitigation measures to reduce risk to ALARP²², and the dates of most recent and next independent reviews.

DRS1

The annual performance review is carried out on a half yearly basis in order to comply with applicable legislation²³.

A performance review was carried out in December 2022 and concluded that **the safety and stability conditions of the DRS1 are satisfactory.**

The monitoring and visual inspections reinforce these statements.

The DSR is a mandatory legal requirement to perform periodic evaluation of the dam structural, hydrologic and geotechnical safety. The frequency is based on the potential consequences of the associated risks.

The review is carried out by third-party, and the results are reported to the competent authorities.

The DSR was performed in March 2019 and **concluded that DRS1 structural safety, global stability and hydrological safety conditions are satisfactory.**

Our commitment to reduce the risks to ALARP highlighted the importance of the following actions: to keep the water storage areas conformed and cleaned, to maintain the basins in accordance with the hydrological premises, and to

20 RISR is the safety inspection audit report, performed by Geoconsultoria (Dec./2022)(RT-469137-54-G-0006)

21 RPSB is the Periodic Dam Safety Review.

22 ALARP = As low as reasonably practicable.

23 Normative Rule No. 02/2018, SEMAS

maintain drained the internal areas of the deposit. The above measures recommended to reduce the risk to ALARP have been implemented.

According to the current legal requirements and GISTM, the next DSR for DRS1 should take place in 2024 (5 year frequency).

DRS2

The Annual Performance Review is performed on an annual basis, as prescribed in the operational license.

The last performance review was carried out in June 2022. It concluded that **the safety and stability conditions of DRS2 are satisfactory.**

The monitoring and visual inspections reinforce these statements.

The DSR for DRS2 followed the same criteria as for DRS1.

The DSR was carried out in June 2022 and the conclusion is that **the structural conditions of safety, stability, and hydrological safety of DRS2 are satisfactory.**

No relevant actions were indicated as necessary to reduce the risks to ALARP for the DRS2.

The next DSR review for DRS2 should take place **in 2027 (5 year frequency).**

Monitoring

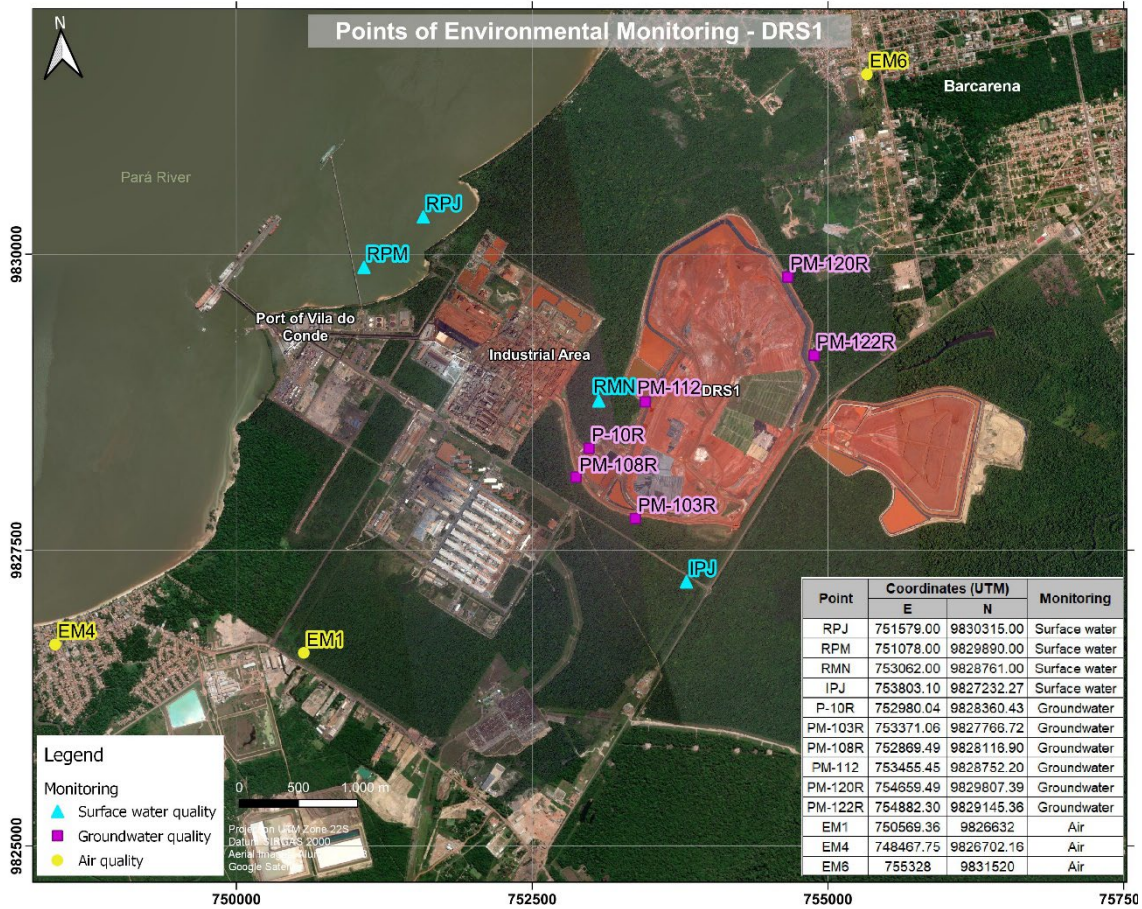
In response to item B7 of Requirement 15.1

This section presents a summary of material findings of the environmental and social monitoring program including implementation of mitigation measures.

DRS1

Environmental Monitoring

Monitoring of surface water, groundwater and air quality parameters potentially related to DRS1 operations is part of Hydro Alunorte's operational license. The disclosure of this environmental data is carried out through the Annual Environmental Information Report (Relatório de Informações Ambientais Anual - RIAA). The RIAA is a mandatory reporting requirement to demonstrate compliance with environmental licensing procedures. In addition to the obligation to disclose environmental data, it also requires the development of environmental programs to properly assess and mitigate the potential impacts resulting from the activities carried out. The data is disclosed annually and verified by a third party.



Surface water quality

There are four monitoring points to assess surface water parameters potentially related to DRS1 activities. The monitoring is performed by third parties and the results are reported to the regulator through the annual RIAA, in compliance with the operational license. A small number of the monitored parameters indicate deviations. The RIAA indicates that these deviations are due either to the natural hydrogeological conditions of the region or anthropic sources outside of Hydro Alunorte’s property limits.

Groundwater quality

There are six monitoring points to assess groundwater parameters potentially related to DRS1 activities. These are located around the perimeter of DRS1. The monitoring is performed by third parties and the results are reported to the regulator through the annual RIAA, in compliance with the operational license. A small number of the monitored parameters indicate deviations. The RIAA indicates that these deviations are due either to the natural hydrogeological conditions of the region or anthropic sources outside of Hydro Alunorte’s property limits.

Air quality

There are three air quality monitoring stations to assess air quality parameters potentially related to Hydro Alunorte operations. These monitoring stations are located outside of Hydro Alunorte's perimeter. The monitoring is performed by third parties and the results are reported to the regulator through the annual RIAA, in compliance with the operational license. No deviations related to Hydro Alunorte operations were observed in the monitored air quality parameters.

For further information on environmental monitoring at Hydro, Hydro's Annual Report for 2022 is available at the following hyperlink.



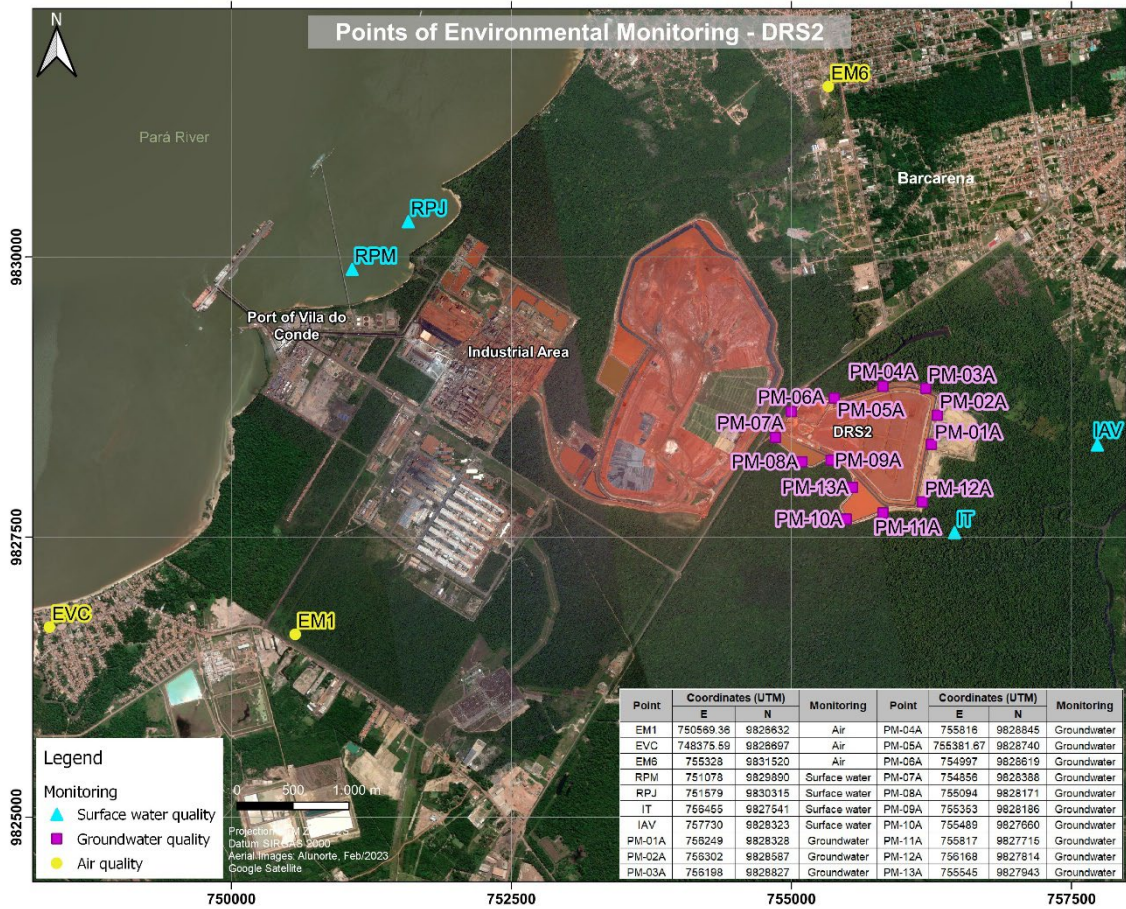
Social Monitoring of DRS1

Information on social monitoring related to DRS1 operations can be found under the following section on the DRS2.

DRS2

Environmental Monitoring

Monitoring of surface water, groundwater and air quality parameters potentially related to DRS2 operations are part of Hydro Alunorte's operational license. The disclosure of this environmental data is carried out through the Annual Environmental Information Report (Relatório de Informações Ambientais Anual - RIAA). The RIAA is a mandatory reporting requirement to demonstrate compliance with environmental licensing procedures. In addition to the obligation to disclose environmental data, it also requires the development of environmental programs to properly assess and mitigate the potential impacts resulting from the activities carried out. The data is disclosed annually and verified by a third party.



Surface water quality

There are four monitoring points to assess surface water parameters potentially related to DRS2 activities. The monitoring is performed by third parties and the results are reported to the regulator through the annual RIAA, in compliance with the operational license. A small number of the monitored parameters indicate deviations. The RIAA indicates that that these deviations are due either to the natural hydrogeological conditions of the region or anthropic sources outside of Hydro Alunorte’s property limits.

Groundwater quality

There are thirteen monitoring points to assess groundwater parameters potentially related to DRS2 activities. These are located around the perimeter of DRS2. The monitoring is performed by third parties and the results are reported to the regulator through the annual RIAA, in compliance with the

operational license. There is no indication of deviations in monitored parameters related to Hydro Alunorte activities.

Air quality

There are three air quality monitoring stations to assess air quality parameters potentially related to Hydro Alunorte operations. These monitoring stations are located outside of Hydro Alunorte's perimeter. The monitoring is performed by third parties and the results are reported to the regulator through the annual RIAA, in compliance with the operational license. No deviations related to Hydro Alunorte operations were observed in the monitored air quality parameters.

For further information on environmental monitoring at Hydro, Hydro's Annual Report for 2022 is available at the following hyperlink.



Social Monitoring of DRS1 and DRS2

Alunorte provides a grievance mechanism called “Canal Direto” (Direct channel) to monitor and facilitate effective participation of local communities.

Canal Direto opens a channel for complaints, suggestions or clarifications regarding Hydro's operations. The channel is managed by an independent supplier following United Nations Guiding Principles on Business and Human Rights.

Canal Direto is available 24 hours a day and can be accessed by a toll-free phone number, e-mail or on Hydro's website. The channel complies with LGPD (Brazilian General Data Protection Law), protecting anonymity, and providing accessibility to people with visual or hearing disabilities.

Year to date²⁴, no notification has been registered in Canal Direto for DRS1 and DRS2.



²⁴ Period January 1 – June 23, 2023.

Emergency plan and information for external agencies

In response to items B8 and C of Requirement 15.1

This section presents a summary version of the tailings facilities emergency preparedness and response plan (EPRP) for facilities that have a credible failure mode(s) that could lead to a flow failure event that:

- (i) is informed by credible flow failure scenarios from the tailings facility breach analysis;
- (ii) includes emergency response measures that apply to project affected people as identified through the tailings facility breach analysis and involve cooperation with public sector agencies.

This section also provides local authorities and emergency services with information derived from the breach analysis to enable effective disaster management planning.

The EPRP²⁵ aims to identify and classify emergency situations that may pose a risk to the integrity of the structures, as well as establish immediate actions to be taken in such emergency situations, including engagement with authorities. The EPRP is subject to periodic updates, and Hydro Alunorte emergency response teams are maintained, trained and in readiness state.

The plans developed to DRS1 and DRS2 present the corrective measures and the available resources related to each potential failure mode according to the emergency response level. The EPRP presents the defined emergency notification flows between the company and authorities, represented by external agents. These agents include municipal, state, and national civil defense, the Coordination of the National Center for Risk and Disaster Management (CENAD), environmental agencies, agencies with responsibilities for emergency response, municipalities potentially affected, regulatory bodies, and other competent public authorities.

²⁵ EPRP was issued in October 2022 by Pimenta de Ávila

In compliance to the applicable legislation, the Fire Department, Police officers, Municipal, State and Federal Civil Protection and Defense, Environmental and Economic Development Municipal Secretary (SEMADE), Environmental and Sustainability State Secretary (SEMAS), Transport State Secretary (SETRAN), Brazilian Institute of Environment and Renewable Natural Resources (IBAMA), the Municipality of Barcarena have received the EPRP of DRS1 and DRS2. To mitigate or prevent consequences of a hypothetical failure, **Hydro Alunorte has implemented a communication plan to engage internal and external agents with emergency responsibilities to attend the following emergency response measures:** a mass communication system through radios and cell phones, establishing a "Community Environmental Brigade," which consists of a specialized team to support the communities with vehicles with alert systems for evacuation in case of emergencies.

A three-phase evacuation procedure has been established. In the **First stage, communication**, the alert systems are activated for the individuals to proceed with the preventive evacuation with the assistance of a specialized team provided by Hydro, and the event is informed internally and externally following the communication plan. The **Second stage is the crowding out**, whereas the evacuation is conducted through clean, pre-defined and fast routes. Hydro Alunorte has implemented signs identifying the exit routes within the affected communities towards the meeting points foreseen in the EPRP. The **Third stage is finishing the procedure**, which establishes that after reaching safe and pre-defined meeting points individuals shall wait for an emergency rescue team for following care.

Aiming to mitigate potential impacts due to a failure, in case of emergency, Hydro Alunorte is committed to adopt the following actions listed in the EPRP: to establish a crisis headquarter, to settle partnerships on emergency response, control or limit local accesses, provide aid and assistance to individuals and animals, provide human-resources and logistics, reestablish essential services and provide actions for mitigation of environmental and social impacts.

DRS1

The EPRP²⁶ presents three hypothetical **failure modes that could potentially lead to a breach:** overtopping, internal erosion within the embankment or foundation, and slope instability. The plan considered the hypothetical credible failure events that would potentially lead to higher impacts in the downstream area, as indicated by the dam breach study.

²⁶ EPRP was issued in October 2022 by Pimenta de Ávila

The public authorities and **the community** are engaged through seminars, workshops, tabletops, and internal and external emergency exercises. The processes are audited by third-party specialists aiming to assess the effectiveness of the response measures.

The last audit (2022/2023) evaluated effectiveness of the internal expositive workshop, notification flow assessment, tabletop, and the internal practical exercise (September, 2022). In addition, the seminar and the external exercise involving the external agents, employees and communities were audited in March, 2023.

DRS2

The EPRP²⁷ presents three hypothetical **potential failure modes that could potentially lead to a breach**: overtopping, internal erosion within the embankment or foundation, and slope instability. The plan considered the hypothetical credible failure events that would potentially lead to higher impacts in the downstream area, as indicated by the dam breach study.

The public authorities and **the community** are engaged through seminars, workshops, tabletops, and internal and external emergency exercises. The processes are audited by third-party specialists aiming to assess the effectiveness of the response measures.

The last audit (2022/2023) evaluated effectiveness of the internal expositive workshop, notification flow assessment, tabletop, and the internal practical exercise (September, 2022). In addition, the seminar and the external exercise involving the external agents, employees and communities were audited in March, 2023.

²⁷ EPRP was issued in October 2022 by Pimenta de Ávila

Financial capacity

In response to item B10 of Requirement 15.1

This item presents the annual confirmation that the Operator has adequate financial capacity to cover estimated costs of planned closure, early closure, reclamation, and post-closure of the tailings facility and its appurtenant structures.

Hydro prepares and revises the cost estimate following the ARO (Asset Retirement Obligation) methodology²⁸, with public disclosure in financial reports.

DRS1

The key data for DRS1 is presented in the table below.

DRS1*	
Type of closure	Progressive
Expense in 2022 (MBRL)	107
Planned for 2023 (MBRL)	178
ARO** (MBRL)	621
Estimated year of completion of closure	2034

(*) It should be noted that the estimated closure year and the mentioned values are subject to revision due to local economic variations and progress of project phases.

(**) Per June 2023.

DRS2

The key data for DRS2 is presented in the table below.

²⁸ Prepared in accordance with International Financial Reporting Standard (IFRS).

DRS2*	
Type of closure	Progressive
Expense in 2022 (MBRL)	1.5
Planned for 2023 (MBRL)	7.8
ARO** (MBRL)	274
Estimated year of completion of closure	2033

(*) It should be noted that the estimated closure year and the mentioned values are subject to revision due to local economic variations and progress of project phases.

(**) Per June 2023.

Hydro Paragominas

RP1 and Valley



General description of the structure

In response to items B1, B2 and B5 of Requirement 15.1

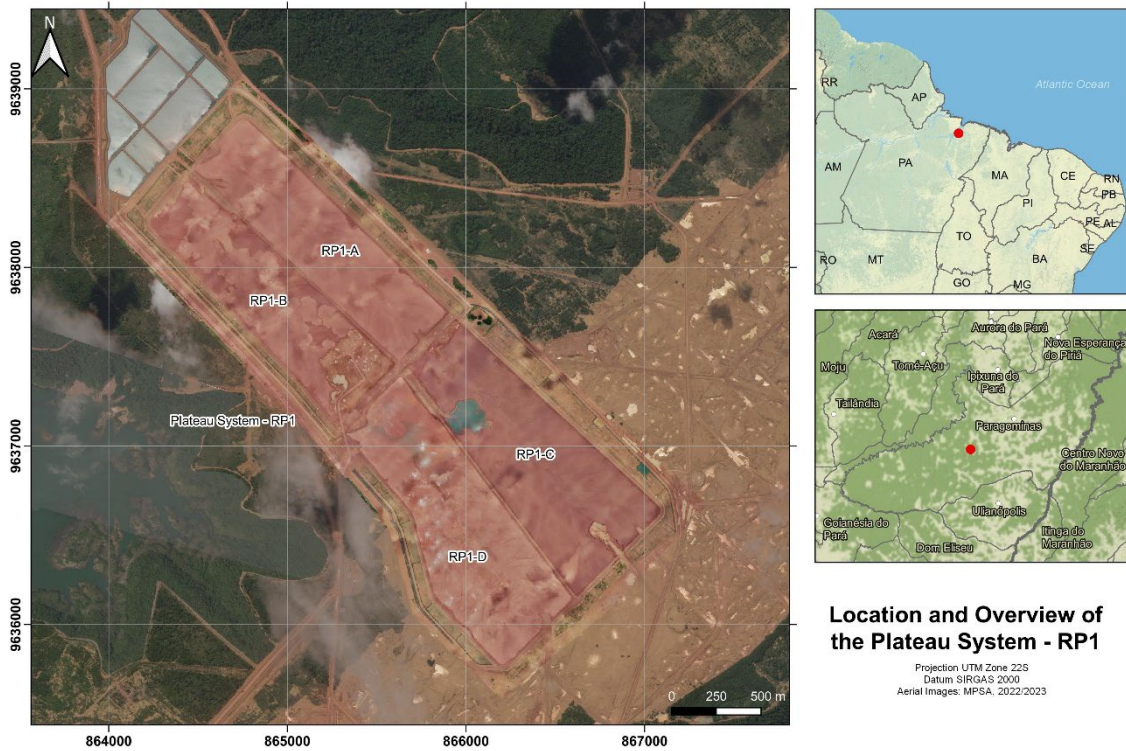
This item presents a description of the tailings facilities, their consequence classifications, and a description of the design for all phases of the tailings facility lifecycle including the current and final height.

RP1

The RP1 of Mineração Paragominas S.A. consists of four disposal quadrants (RP1-A, RP1-B, RP1-C, and RP1-D) delimited by internal and peripheral dikes and is responsible for the temporary drying of the tailings generated from the beneficiation of bauxite ore.

From RP1, the dried bauxite tailings are mechanically excavated and transported to the mined-out areas, where the tailings are permanently stored and covered by overburden as part of the land forming and rehabilitation processes. This novel methodology developed and employed by Hydro is named tailings dry backfill.

RP1 began operation in 2017. RP1 is located approximately 70 km southwest of the municipality of Paragominas, in the northeastern region of the state of Pará.



RP1 Information	
Purpose ²⁹	Temporary drying of tailings from bauxite ore beneficiation
Current height	13.50 m
Final height	13.50 m
Maximum tailings storage ³⁰ capacity	10.55 Mm ³
Implementation stages ³¹	Single stage construction, 2017
Current status	In operation
Consequence classification ³²	High
Construction type	Compacted earth fill embankment, starter dike
Estimate of closure start (year)	2054*

*The year of completion for the structure’s closure is subject to change.

29 Operations Manual, Pimenta de Ávila, June 2023

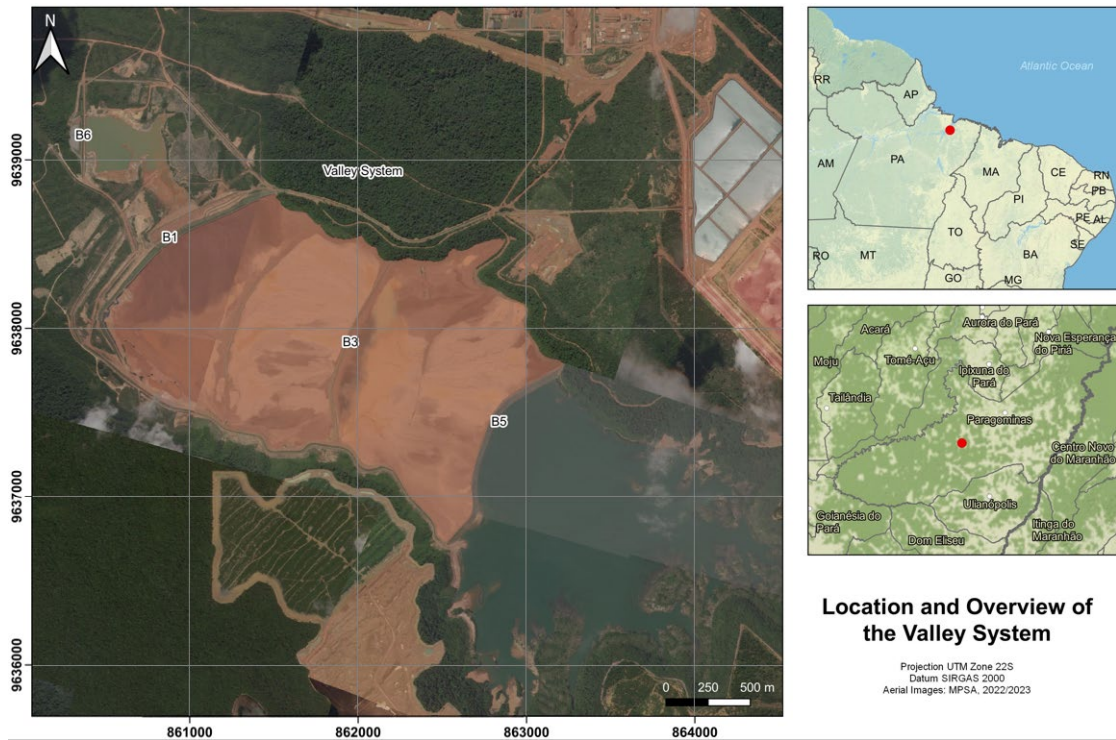
30 As part of the Tailings Dry Backfill technology, the tailings are temporarily stored for drying purposes before the permanent disposal at the mined-out areas

31 As Is Design, Pimenta de Ávila, 2018

32 The Classification of consequences was elaborated with reference to Table 1 of Annex 2 of the report “Global Industry Standard for Tailings Management”.

Valley

The Valley tailings facility comprises the B1, B5, and B6 dams, along with an auxiliary dike (B3) and a contour channel, and its purpose is the disposal of tailings from the beneficiation of bauxite ore. The Valley tailing facility at Mineração Paragominas S.A. is located approximately 70 km southwest of the municipality of Paragominas, in the northeastern region of the state of Pará.



Valley Information	
Purpose ³³	Storage of the tailings generated from the beneficiation of bauxite ore.
Current height	B1 Dam: 31.80 m B5 Dam: 37.00 m B6 Dam: 13.00 m
Final height	B1 Dam: 31.80 m B5 Dam: 37.00 m B6 Dam: 13.00 m
Volume of tailings stored ³⁴	44.00 Mm ³
Maximum tailings storage capacity	51.50 Mm ³
Implementation stages ³⁵	The B1 dam was constructed in 2005/06 and 5 stages were raised. The starter dike of B6 dam was constructed in 2006 in a single stage construction. The B5 dam was constructed in 2005/06 and were raised on 6 stages.
Current status	In operation
Consequence classification ³⁶	Very high
Construction type	B1 dam: compacted earth fill embankment, 3 downstream raisings and 2 center line raisings B6 dam: heterogeneous section, starter dike in compacted earth fill and buttress in rockfill B5 dam: compacted earth fill, downstream raised
Estimated year of closure ³⁷	2045*

*The year of completion for the structure's closure is subject to change.

³³ Operations Manual, Pimenta de Ávila, 2023

³⁴ Date of reference June, 2023

³⁵ As Built 6th Raise Report, Pimenta de Ávila, 2015/2017

³⁶ The Classification of consequences was elaborated with reference to Table 1 of Annex 2 of the report "Global Industry Standard for Tailings Management".

³⁷ SR1 Tailings Dams Deactivation Plan, Geoestável Consultant, 2019

Risk assessment

In response to item B3 of Requirement 15.1

This item provides a summary of **risk assessment findings relevant to the tailings facilities.**

As part of its **commitment to the safe operation of the tailings facilities, the Hydro Bauxite & Alumina business unit regularly conducts risk assessments for the TFs.**

A multidisciplinary team carries out the process, including input from designers, EoR (Engineer of Record), and ITRB (Independent Technical Review Board). This process aims to reduce identified risks to as low as reasonably practicable (ALARP).

To achieve this objective, actions are undertaken to improve the reliability of the considered failure mode (reducing uncertainties associated with risk mapping) or enhancing controls and monitoring.

The risk assessment concluded there are no risks in the Mineração Paragominas TFs classified as unacceptable.

RP1

The qualitative risk assessment employed at RP1 is based on Risk Analysis FMEA (Failure Mode and Effect Analysis).

The risk assessment program concluded there are no risks classified as unacceptable.

The credible failure modes appointed are: overtopping, piping, and instability.

The brittle failure and liquefaction were not considered as credible failure modes.

The critical controls to prevent credible failure are: maintenance procedures as per the Operations Manual, routine visual and safety

inspections, geotechnical monitoring center, Emergency Preparedness Response Plan and the trigger actions response plan (TARPs), active monitoring of the Self-Rescue Zone (ZAS) and the Secondary Safety Zone (ZSS).

Valley

The qualitative risk assessment employed at Valley is based on Risk Analysis FMEA (Failure Mode and Effect Analysis).

The risk assessment program concluded there are no risks classified as unacceptable.

The credible failure modes appointed are: piping, overtopping, and instability.

The brittle failure and liquefaction were not considered as credible failure modes.

The critical controls to prevent the risks are: maintenance procedures as per the Operations Manual, routine visual and safety inspections, geotechnical monitoring center, Emergency Preparedness Response Plan, and the trigger actions response plan (TARPs), Active monitoring of the Self-Rescue Zone (ZAS) and the Secondary Safety Zone (ZSS).

Potential impacts

In response to the item B4 of the Requirement 15.1

This item provides a summary of the impact assessment and of human exposure and vulnerability to tailings facility credible flow failure scenarios.

RP1 and Valley

In order to identify the groups most at risk, the dam breach studies and the registration of employees and people within the inundation areas are regularly updated. This is part of the assessment and documentation of the potential human exposure and vulnerability to TF's credible failure scenarios.

The hypothetical inundation area refers to the downstream area that would be affected in the event of a hypothetical, credible failure. This hypothetical inundation area is determined from dam breach studies and presents the geographic extent and boundaries of the area that would be inundated by the sudden release of water or residues resulting from the hypothetical credible failure. It is important to note that the term credible failure mode is not associated with the probability of this event occurring and having credible failure modes is not a reflection of the tailings facility's safety.

The dam breach studies developed to Mineração Paragominas tailings facilities adopted a 2-dimensional, non-newtonian fluid modeling, based on rheological, geotechnical, chemical and mineral characterization of the materials. The studies are in compliance with the applicable legal requirements.

The RP1 dam breach study considered six flow failure scenarios, which encompasses all the dyke perimeter. The hypothetical inundation area reflected in the EPRP embraces the merge of the critical failure scenarios, including those resulting from basins rupture.

Additionally, the hypothetical inundation area considered in the Valley EPRP was determined from three flow failure scenarios, which encompasses the rupture of B1 dam associated with B3 auxiliary dyke and the B6 dam in cascade.

Based on the dam breach studies, the potential impacts resulting from a hypothetical catastrophic failure in the RP1 and Valley TFs have been estimated and are presented below.

RP1 – Potential impacts	
Municipality	Paragominas – PA
Human exposure and vulnerability	Human exposure: workers, residents or floating population within the inundation area (SRZ or SSZ).
Hypothetical impacts to communities, infrastructure and environment	<ul style="list-style-type: none"> • Industrial water supply interruption • Blocked internal access and external roads • Impact in surface water quality and increasing turbidity • Silting of the surrounding creeks • Inundation of rural areas • Impact on local soil, fauna and flora

Valley – Potential impacts	
Municipality	Paragominas - PA
Human exposure and vulnerability	Human exposure: workers, residents or floating population within the inundation area (SRZ or SSZ).
Hypothetical impacts to communities, infrastructure and environment	<ul style="list-style-type: none"> • Electrical supply interruption • Water supply interruption • Blocked internal access and external roads • Impact in water quality and increasing turbidity • Silting of the surrounding rivers • Inundation of rural areas • Impact on local soil, fauna and flora

Periodic review and independent review

In response to items B6 and B9 of Requirement 15.1

This item presents a summary of material findings of annual performance reviews³⁸ and dam safety review³⁹ (DSR), including implementation of mitigation measures to reduce risk to ALARP, and the dates of most recent and next independent reviews.

RP1

In order to comply with the National Mining Agency legislation⁴⁰ the Annual Performance Review⁴¹ is carried out on half-yearly basis.

A performance review was carried out in March 2023. It **concluded that the stability and hydraulic safety conditions of RP1 are satisfactory.**

The monitoring results and the routine and safety inspection data reinforce these statements.

The DSR is a mandatory legal requirement to periodically evaluate the structural, hydrological, and geotechnical safety of the tailing facility. The frequency is based on the potential consequences of the associated risks.

The review is carried out by a third party and the results are reported to the relevant authorities.

The DSR was performed in August 2022 and **concluded that RP1 structural safety, stability and hydrological safety conditions are satisfactory.**

Our commitment to reduce the risks to ALARP highlighted the importance of the following actions: to conclude the implementation of surface drainage on the embankments, accesses and other structures; completion of works for adequate surface protection and conformation of downstream terrains and accesses; and to perform topographic surveys of the RP1 spillways.

According to current legal requirements, the next DSR for RP1 should take place in 2025.

38 RISR is the safety inspection audit report, performed by Geoconsultoria (Dec./2022)(RT-469137- 54-G-0006).

39 RPSB is the Periodic Dam Safety Review.

40 Resolution n 95, February, 2022, ANM

41 RISR is the safety inspection audit report, GeoHydroTech, June 2023

Valley

To comply with National Mining Agency legislation the Annual Performance Review⁴² is performed on half-yearly basis.

A performance review was carried out in March 2023. It **concluded that the stability and hydraulic safety conditions of Valley system (B1, B5 and B6) are satisfactory.**

The monitoring and visual inspections reinforce these statements.

The review is carried out by third-party, and the results are reported to the competent authorities.

The **DSR for B1, B5, and B6** dams of the Valley system were issued in June 2022, May 2021, and July 2021, respectively, by the companies Geoestável, GeoHydroTech, and Walm, **and concluded that the stability and hydrological safety of the structures are satisfactory.**

No relevant actions were indicated as necessary to reduce the risks to ALARP for the Valley System.

According to current legal requirements and GISTM, the next DSR reviews should take place in **2025, 2026, and 2024** for B1, B5, and B6 dams, respectively.

Monitoring

In response to the item B7 of the Requirement 15.1

This section presents a summary of material findings of the environmental and social monitoring program including implementation of mitigation measures.

RP1

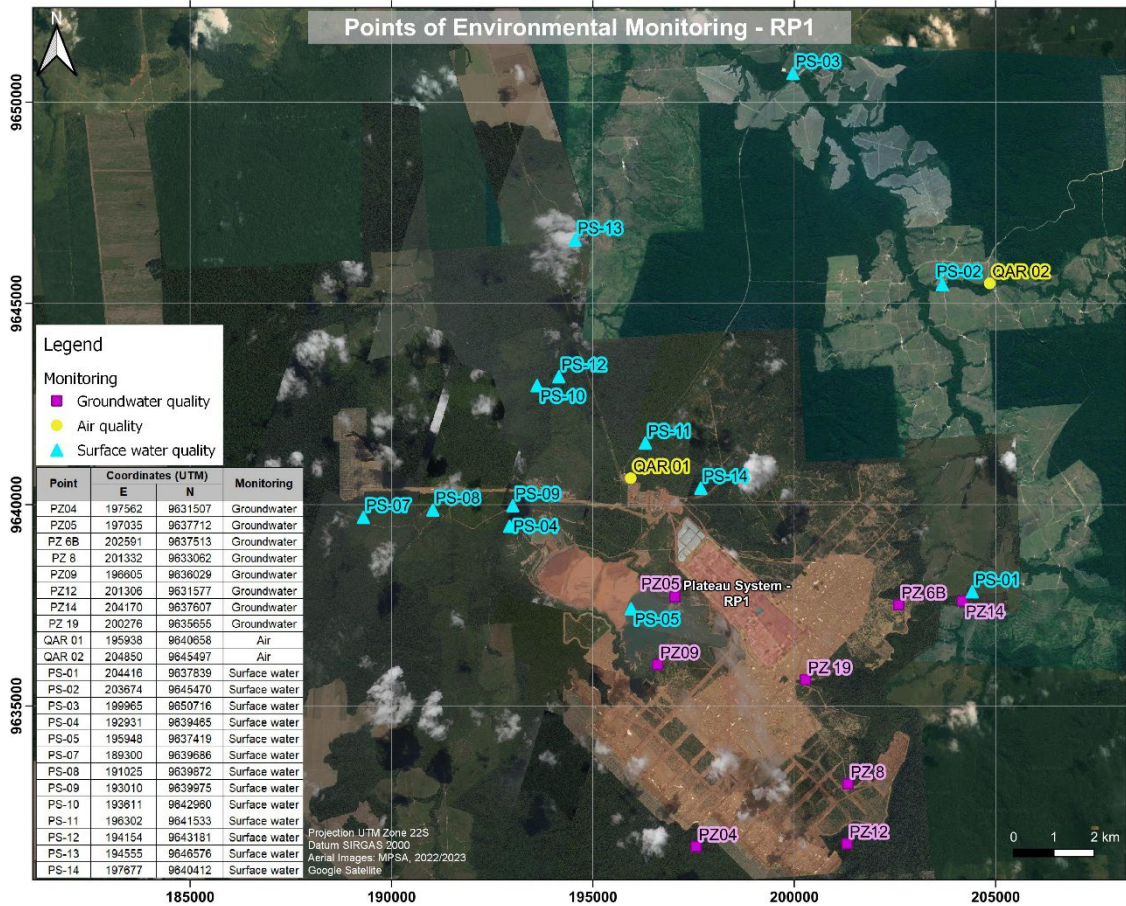
⁴² RISR is the safety inspection audit report, GeoHidroTech, June 2023

Environmental monitoring

Monitoring of surface water, groundwater and air quality parameters potentially related to RP1 operations is part of Hydro Paragominas' operational license. The disclosure of this environmental data is carried out through the Annual Environmental Information Report (Relatório de Informações Ambientais Anual - RIAA). The RIAA is a mandatory reporting requirement to demonstrate compliance with environmental licensing procedures. In addition to the obligation to disclose environmental data, it also requires the development of environmental programs to properly assess and mitigate the potential impacts resulting from the activities carried out. The data is disclosed annually and verified by a third party.

Surface water quality

RP1 is located on the Miltônea 3 Plateau and is delimited by the Parariquara and Cachoeirinha catchment basins. There are fourteen monitoring points to assess surface water quality parameters potentially related to RP1 operations. The monitoring is performed by third parties and the results are reported to the regulator through the annual RIAA in compliance with the operational license. A small number of the monitored parameters indicate deviations. The RIAA indicates that these deviations are due to the natural hydrogeological conditions of the region.



Groundwater quality

There are eight monitoring points to assess groundwater quality parameters potentially related to RP1 operations. The monitoring is performed by third parties and the results are reported to the regulator through the annual RIAA in compliance with the operational license. A small number of the monitored parameters indicate deviations. The RIAA indicates that these deviations are due either to the natural hydrogeological conditions of the region or anthropic sources not linked to Hydro Paragominas.

Air quality

There are two monitoring points to assess air quality parameters potentially related to Hydro Paragominas’ operations. The monitoring is performed by third parties and the results are reported to the regulator through the annual RIAA, in compliance with the operational license. None of the monitored parameters indicate deviations.

For further information on environmental monitoring at Hydro, Hydro's Annual Report for 2022 is available at the following hyperlink.



Social Monitoring

Information on social monitoring related to RP1 operations can be found under the following section on the Valley TF.

Valley

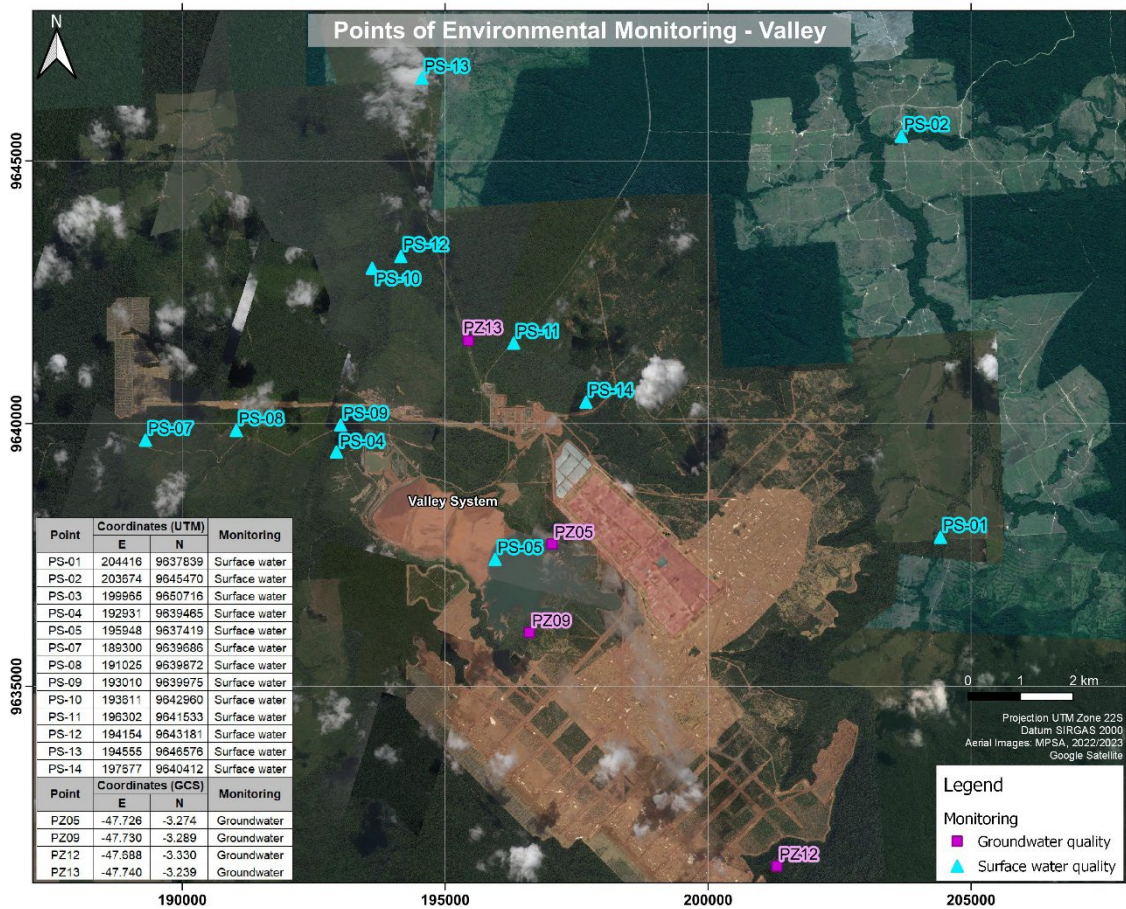
Environmental monitoring

Monitoring of groundwater quality parameters potentially related to Valley operations is part of Hydro Paragominas' operational license. The disclosure of this environmental data is carried out through the Annual Environmental Information Report (Relatório de Informações Ambientais Anual - RIAA). The RIAA is a mandatory reporting requirement to demonstrate compliance with environmental licensing procedures. In addition to the obligation to disclose environmental data, it also requires the development of environmental programs to properly assess and mitigate the potential impacts resulting from the activities carried out. The data is disclosed annually and verified by a third party.

In addition, Hydro Paragominas voluntarily monitors both surface water and air quality parameters potentially related to Valley operations, even though these are not part of Hydro Paragominas' operational license. The monitoring data is voluntarily reported in the appendix of the annual RIAA.

Surface water quality

Valley is located in the Parariquara river catchment basin. Hydro Paragominas voluntarily monitors surface water quality parameters potentially related to Valley operations through thirteen monitoring points. The monitoring is performed by third parties and the results are voluntarily reported to the regulator through the annual RIAA, written by the same third parties. This monitoring data is not linked to Hydro Paragominas' operational license. A small number of the monitored parameters indicate deviations. The RIAA indicates that these deviations are due either to the natural hydrogeological conditions of the region or anthropic sources not linked to Hydro Paragominas.



Groundwater quality

There are four monitoring points to assess groundwater quality parameters potentially related to Valley operations. The monitoring is performed by third parties and the results are reported to the regulator through the annual RIAA in compliance with the operational license. A small number of the monitored parameters indicate deviations. The RIAA indicates that these deviations are due either to the natural hydrogeological conditions of the region or anthropic sources not linked to Hydro Paragominas.

Air quality

There are two monitoring points to assess air quality parameters potentially related to Hydro Paragominas’ operations. The monitoring is performed by third parties and the results are reported to the regulator through the annual RIAA, in compliance with the operational license. None of the monitored parameters indicate deviations.

For further information on environmental monitoring at Hydro, Hydro's Annual Report for 2022 is available at the following hyperlink.



Social Monitoring of RP1 and Valley

Hydro Paragominas provides a grievance mechanism called “Canal Direto” (Direct channel) to monitor and facilitate effective participation of communities.

For further information, consult the Hydro's Annual Report for 2022.

Canal Direto opens a channel for complaints, suggestions or clarifications regarding Hydro’s operations. The channel is managed by an independent supplier following United Nations Guiding Principles on Business and Human Rights.

Canal Direto is available 24 hours a day and can be accessed by a toll-free phone number, e-mail or on Hydro’s website. The channel complies with LGPD (Brazilian General Data Protection Law), protecting anonymity, and providing accessibility to people with visual or hearing disabilities.

Year to date⁴³, no notification has been registered in Canal Direto for RP1 and Valley.



Emergency plan and information for external agencies

⁴³ Period January 1 – June 23, 2023.

In response to the items B8 and C of the Requirement 15.1

This section presents a summary version of the tailings facilities emergency preparedness and response plan (EPRP) for facilities that have a credible failure mode(s) that could lead to a flow failure event that:

- (i) is informed by credible flow failure scenarios from the tailings facility breach analysis;
- (ii) includes emergency response measures that apply to project affected people as identified through the tailings facility breach analysis and involve cooperation with public sector agencies.

This section also provides local authorities and emergency services with information derived from breach analysis to enable effective disaster management planning.

The EPRP aims to identify and classify emergency situations that may pose a risk to the integrity of the structures, as well as establish immediate actions to be taken in such emergency situations, including engagement with authorities. The EPRP is subject to periodic updates, and Mineração Paragominas' emergency response teams are maintained, trained and in readiness state.

The plans developed to RP1 and Valley presents the corrective measures and the available resources related to each potential failure mode according to the emergency response level. The EPRP presents the defined emergency notification flows between the company and authorities, represented by external agents. These agents include municipal, state and national civil defense, fire department, the Coordination of the National Center for Risk and Disaster Management (CENAD), environmental agencies, agencies with responsibilities for emergency response, municipalities potentially affected, regulatory bodies, and other competent public authorities.

In compliance to the applicable legislation, **the public authorities** Municipal City Hall, Municipal Civil Defense (Paragominas), Fire department and State Civil Defense (Pará) have received the EPRP of RP1 and Valley. To mitigate or prevent consequences of a hypothetical failure, **Mineração Paragominas has implemented a communication plan to engage internal and external agents with emergency responsibilities to attend the following emergency response measures:** a mass communication system including sirens and radio communicators.

Mineração Paragominas has established a three-phase evacuation procedure. In the **First stage, communication**, the alert systems are automatically or manually activated for the individuals to proceed with the evacuation. The

second stage is the crowding out, whereas the evacuation is conducted through clean, pre-defined and fast routes. Mineração Paragominas has implemented signs identifying the exit routes within the inundation area, including the industrial and rural roads, towards the meeting points foreseen in the EPRP. The **third stage is finishing the procedure**, which establishes that after reaching safe and pre-defined spots individuals shall wait for an emergency rescue team for following care.

Aiming to mitigate potential impacts due to a failure, in case of emergency, Mineração Paragominas is committed to adopt the following actions listed in the EPRP: to establish a crisis headquarter, to settle partnerships on emergency response, control or limit local accesses, provide aid and assistance to individuals and animals, provide human-resources and logistics, reestablish essential services and provide actions for mitigation of environmental and social impacts.

RP1

The EPRP⁴⁴ presents **three hypothetical failure modes that could potentially lead to a breach**: overtopping, internal erosion within the embankment or foundation, and slope instability. The plan considered the hypothetical credible failure events that would potentially lead to higher impacts in the downstream area, as indicated by the dam breach study.

The public authorities and **the community** are engaged through seminars, workshops, tabletops and internal and external practical emergency exercises. The processes are audited by third-party specialists aiming to assess the effectiveness of the response measures.

The last audit (2022/2023) evaluated effectiveness of the internal and external expositive workshop, notification flow, and the tabletop exercise (May 2023). In addition, the seminar and the external practical exercise involving the external agents, employees and communities were audited in October 2022.

Valley

The EPRP⁴⁵ presents **three hypothetical failure modes that could potentially lead to a breach**: overtopping, internal erosion within the embankment or foundation, and slope instability. The plan considered the hypothetical credible failure events that would potentially lead to higher impacts in the downstream area, as indicated by the dam breach study.

44 Pimenta de Ávila, July 2021

45 Pimenta de Ávila, 2021

The public authorities and **the community** are engaged through seminars, workshops, tabletops and internal and external practical emergency exercises. The processes are audited by third-party specialists aiming to assess the effectiveness of the response measures.

The last audit (2022/2023) evaluated effectiveness of the internal expositive workshop, notification flow assessment, tabletop, and internal practical exercise (May 2023). In addition, the seminar and the external practical exercise involving the external agents, employees and communities were audited in October, 2022.

Financial capacity

In response to item B10 of Requirement 15.1

This item presents the annual confirmation that the Operator has adequate financial capacity to cover estimated costs of planned closure, early closure, reclamation, and post-closure of the tailings facility and its appurtenant structures.

Hydro prepares and revises the cost estimate following the ARO (Asset Retirement Obligation) methodology⁴⁶, with public disclosure in financial reports.

RP1

The key data for the RP1 TF is presented in the table below.

RP1*	
ARO** (MBRL)	15
Estimated year of completion of closure	2056

(*) It should be noted that the estimated closure year and the mentioned values are subject to revision due to local economic variations and progress of project phases.

(**) Per June 2023.

Valley

The key data for the Valley TF is presented in the table below.

Valley*	
Expense in 2022 (MBRL)	0.6
Planned for 2023 (MBRL)	3.4
ARO** (MBRL)	1.4
Estimated year of completion of closure	2045

(*) It should be noted that the estimated closure year and the mentioned values are subject to revision due to local economic variations and progress of project phases.

(**) Per June 2023.

Hydro Aluminium Deutschland GmbH

Schwandorf I, II & III, Grube Erna I & II, and Marienschacht



General description of the structure

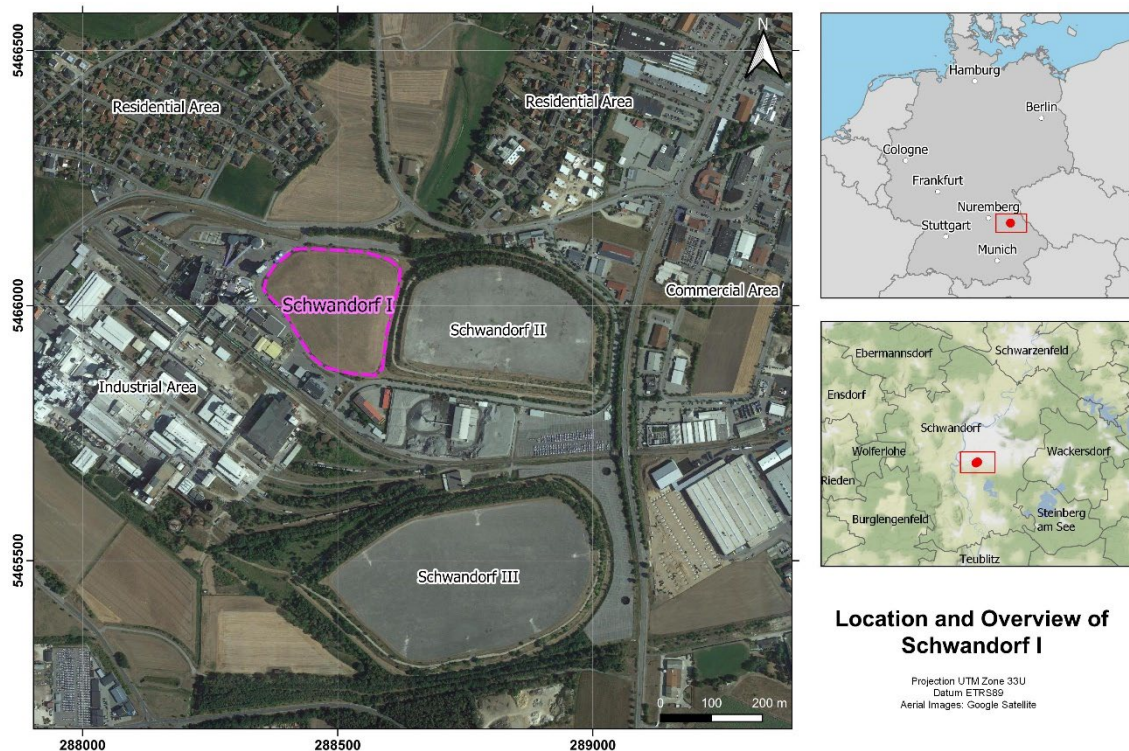
In response to items B1 and B2 of Requirement 15.1

This item presents a description of the tailings facilities and their consequence classification.

The full GISTM disclosure will be provided by the deadline August 2025.

Schwandorf I

The Schwandorf I tailings facility (TF) is located in Schwandorf, Bavaria, Germany. It began operating in 1936 for the purpose of storing bauxite residue, and it was closed in 2009.

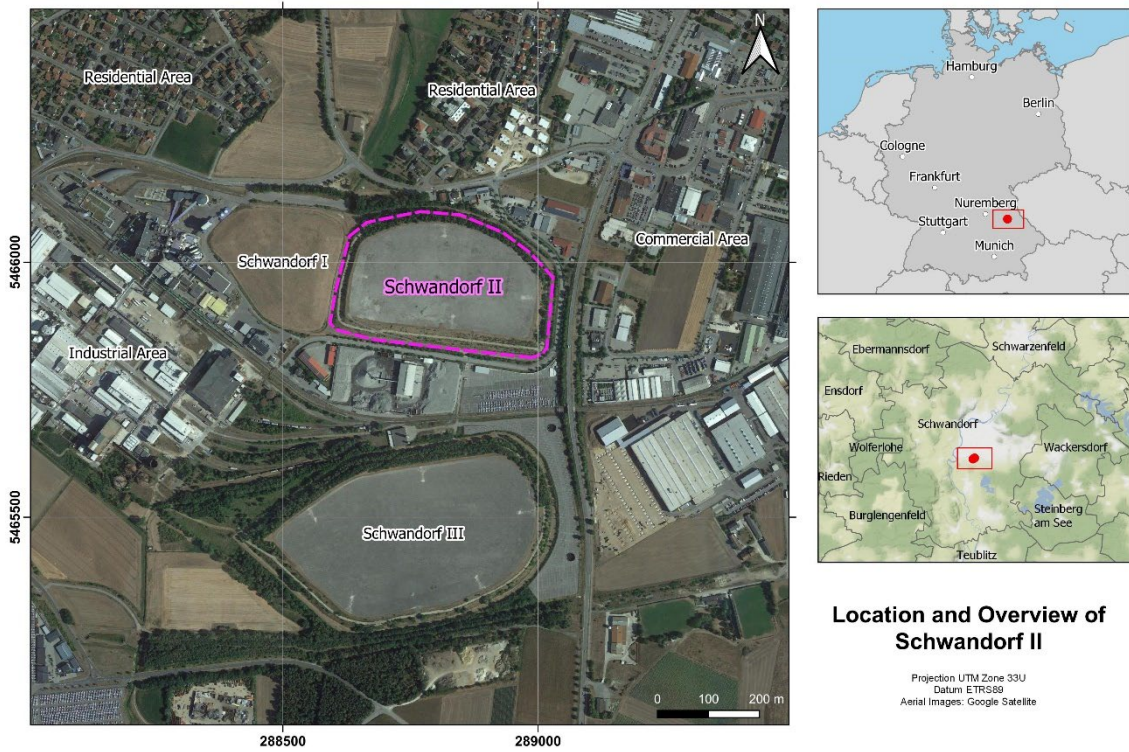


According to the **Tailings Consequence Classification** report prepared by SRK Consulting in 2023, the following points can be highlighted:

Schwandorf I Information	
Tailing type	Bauxite residue
Maximum height (m)	18
Size (Ha)	4.5
Volume (m ³)	600,000
Rising method	Stock piled (dry deposited)
Current status	Closed
Lifetime	1936 - 1957
Consequence classification	High

Schwandorf II

The Schwandorf II TF is located in Schwandorf, Bavaria, Germany. It began operating in 1956 for the purpose of storing bauxite residue and it was closed in 2009.

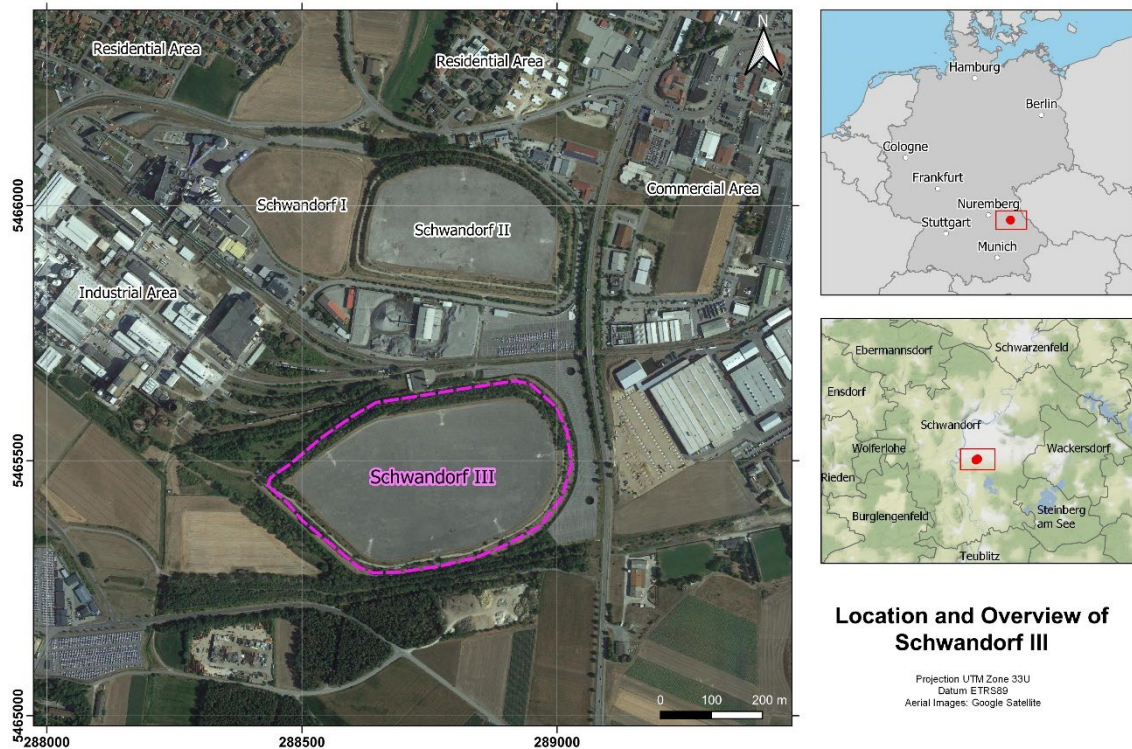


According to the **Tailings Consequence Classification** report prepared by SRK Consulting in 2023, the following points can be highlighted:

Schwandorf II Information	
Tailing type	Bauxite residue
Maximum height (m)	16
Size (Ha)	9.9
Volume (m ³)	1,500,000
Rising method	Upstream design
Current status	Closed
Lifetime	1956 - 1973
Consequence classification	High

Schwandorf III

The Schwandorf III TF is located in Schwandorf, Bavaria, Germany. It began operating in 1936 for the purpose of storing bauxite residue and it was closed in 2009.

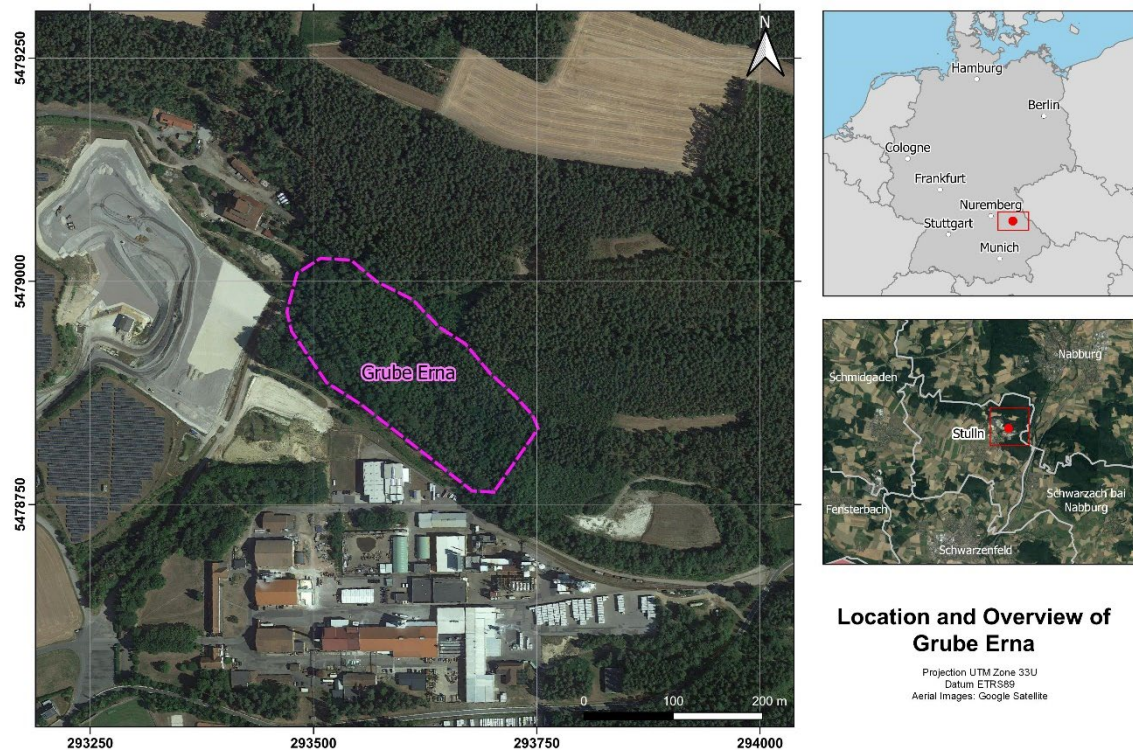


According to the **Tailings Consequence Classification** report prepared by SRK Consulting in 2023, the following points can be highlighted:

Schwandorf III Information	
Tailing type	Bauxite residue
Maximum height (m)	18
Size (Ha)	15.9
Volume (m ³)	3,000,000
Rising method	Upstream design
Current status	Closed
Lifetime	1936 - 1994
Consequence classification	High

Grube Erna I & II

Grube Erna Tailings I&II began operating in 1933 for the purpose of storing flotation sand from the processing of fluorite. The facility was closed in 1981.

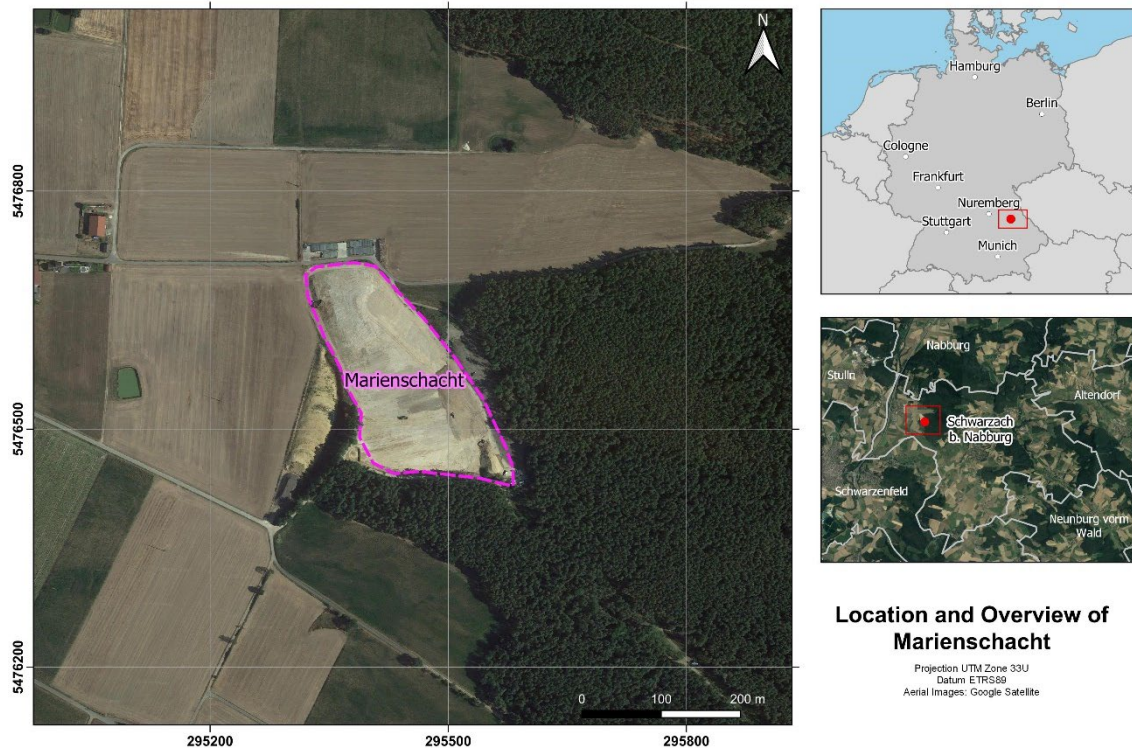


According to the **Tailings Consequence Classification** report prepared by SRK Consulting in 2023, the following points can be highlighted:

Grube Erna Information	
Tailing type	Flotation sand
Maximum height (m)	9
Size (Ha)	4.7
Volume	130.000
Rising method	Upstream design
Current status	closed
Lifetime	1933-1981
Consequence classification	Significant

Marienschacht Halde

The Marienschacht tailings facility is located in Wölsendorf, Bavaria, Germany. The Marienschacht tailings facility began operating in the 1930s for the purpose of depositing sand from fluorite processing. The facility was closed in 1968.



According to the **Tailings Consequence Classification** report prepared by SRK Consulting in 2023, the following points can be highlighted:

Marienschacht Information	
Tailing type	Flotation sand
Maximum height (m)	18
Size (Ha)	4.6
Volume (m ³)	133,000
Rising method	Upstream design
Current status	Closed
Lifetime	1930-1980
Consequence classification	Low

