

# **Tailings Storage Facility Disclosure Report**

**Turnbull South Tailings Storage Facility**

**July 2023**



**Teck**

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## 1. Tailings Facility Description

The Turnbull South Tailings Storage Facility (TBS) is an active Tailings Storage Facility (TSF) at the Fording River Operation (FRO) which is owned and operated by Teck Coal Ltd. (Teck). The Fording River Operation is located approximately 30 km north of Elkford in the interior of British Columbia.

The site is located within the southern interior of BC near the eastern Rocky Mountains. The topography is predominately characterized by a mix of fluvial valley bottoms and gentle side slopes leading to upper mountainous slopes. FRO is located within either the Engelmann Spruce – Subalpine Fir (ESSF) or Montane Spruce (MS) bio-geoclimatic zones. Common vegetation includes subalpine fir and Engelmann Spruce. Shrubs include false azalea, black huckleberry, grouseberry, low bilberry western meadow rue, heart-leaved arnica, and one-leaved foamflower. The climate is characterized by warm dry summers and cool winters. Climate conditions in the area are described based on data from the Fording River Cominco meteorological station, located within the Fording River Valley 4 km south of FRO. Climate conditions surrounding FRO are strongly influenced by elevation, slope aspect and proximity to the Fording River Valley.

Tailings are retained in an inactive pit that was converted to a tailings storage facility in 2016. The impounded tailings are contained entirely by bedrock. Tailings are deposited hydraulically via single-point discharge at the southeast side of the facility. Tailings are seasonally dredged from the South Tailings Pond to the TBS facility. The facility occupies a total area of approximately 45 hectares.

The TBS facility is located approximately 3.5 km north of the processing plant, on the east side of the Fording River. TBS first began operations in 2016. TBS can collect and store up to approximately 19.6 million cubic metres of tailings.

A description of the TBS TSF is summarized in the table below.

Table 1: Description of TBS TSF

TSF Design Summary	Description
Status	Active
Number of tailings embankment structures	N/A
Type of Construction	In pit
Most recent Annual Facility Performance Review	2022 <a href="http://www.teck.com/tailings">www.teck.com/tailings</a>
Independent Review Board	Yes

*Note: Further details regarding the TSF configuration can be found in our facility inventory at [www.Teck.com/tailings](http://www.Teck.com/tailings)*

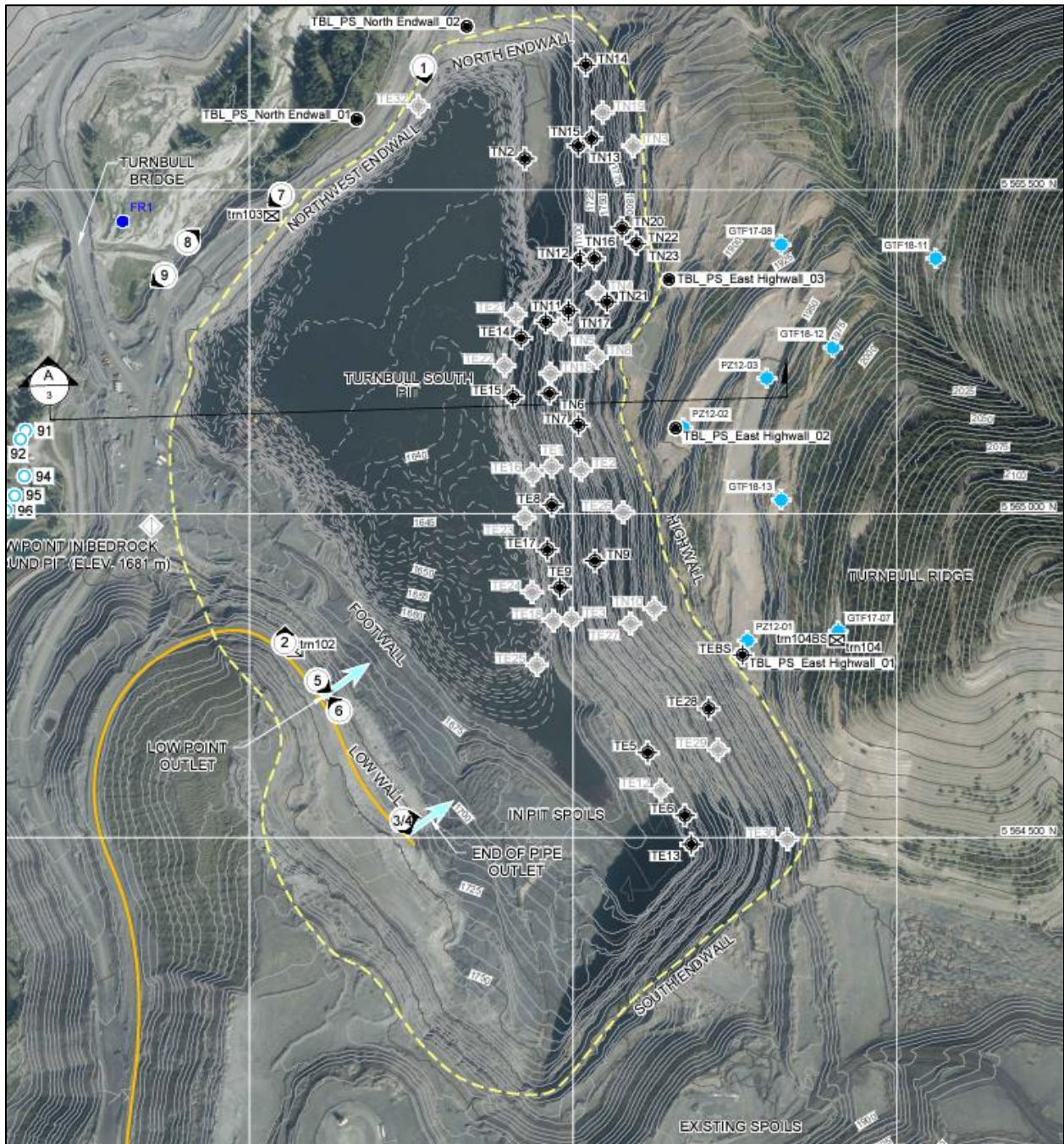


Figure 1: Turnbull TSF Site Plan

## 2. Consequence of Failure

All Teck tailings facilities are assessed for credible failure modes, and the outcomes from these credible failure scenario assessments inform our risk management activities. For the purposes of assigning a facility consequence classification, the downstream consequences of *potential* failure modes (not considering whether they are credible or not) are used, as per the Canadian Dam Association (CDA) guidelines and the requirements of the jurisdictions in which we operate. The Global Industry Standard on Tailings Management (GISTM) bases consequence classification on credible failure modes only, which may result in a lower stated classification.

Consequence classification should not be confused with risk, as risk also requires the consideration of the likelihood of the event occurring. To better understand the risk that a tailings facility presents, it is necessary to consider both the likelihood and the consequences of a potential failure event. That analysis is performed through our risk assessment process described in the next section.

The TBS is classified as a “Very High” consequence under both the CDA guidelines and the GISTM.

## 3. Summary of Risk Assessment Findings

Teck applies risk-based design approaches, whereby risk assessments are used to demonstrate the resilience of our facilities to extreme loading criteria, and to inform decisions to manage risks to as low as reasonably practicable (ALARP). This approach focuses our efforts on credible failure modes, reducing risks at our facilities by reducing the likelihood of occurrence and mitigating downstream impacts, regardless of the consequence classification from hypothetical embankment failures.

The most recent risk assessment for the TBS TSF was conducted in 2023, assessing potential failure modes for hazards up to and including extreme events (i.e., an event that occurs once in 10,000 years). As part of this assessment, failure modes are deemed as credible or non-credible, considering the greatest combination of events or operational errors, and then the risk of such events are evaluated.

All failure modes are sorted according to Teck’s risk matrix, with risk mitigation controls identified and tracked. These failure modes are also described in the publicly available Annual Facility Performance Reports. These risk assessments are prepared with assistance from the Engineer of Record and are reviewed by the Independent Tailings Review Board. Teck regularly updates these detailed risk assessments, and the key findings from the most recent assessment are described below.

The TBS TSF has a potentially credible failure mode that is of very low likelihood. A summary of the material risks (high or extreme consequences, regardless of likelihood) that is being managed, the existing controls that are in place, and additional risk mitigation measures that are planned are summarized below.

### Pit Highwall Failure Triggered by a Large Rainfall Event or Large Earthquake

*What could happen:*

- A highwall failure or spoil failure into the TBS tailings facility could cause a wave that displaces water and tailings into the Fording River.

*What we are doing and planning to do to control the risk:*

- The stability of the pit wall is actively monitored for deformation and water pressures within the wall.

- Additional instrumentation will be installed to establish real time monitoring of the highwall with an automated total station. In addition, we plan to complete a detailed geotechnical risk assessment for highwall failure modes and implement restricted access zones in wave inundation zones in the event that movement is detected.

The above risks, and the results of the performance monitoring and surveillance program that monitors these risks are described in more detail in the Annual Facility Performance Report at [www.teck.com/tailings](http://www.teck.com/tailings).

#### **4. Summary of Impact Assessments and of Human Exposure and Vulnerability to Tailings Facility Credible Flow Failure Scenarios**

The consequences of a wave generated by a pit highwall failure have been characterized qualitatively in the risk assessment. An assessment of human exposure (potential for a person to be located in the inundation area) and vulnerability (existing physical, social, economic and environmental conditions that make people and the environment more susceptible to the impacts) was undertaken for the TBS TSF area of influence to understand the severity of the effects of a highwall or spoil failure. Results of the assessment are summarized below.

The potential effects to people and the environment in the highly unlikely scenario of a highwall or spoil failure of the TBS tailings facility may include loss of life of FRO workers in the immediate area, impacts to water supply, public health and safety, aquatic and terrestrial environment, current use of land and waterways, and infrastructure. Vulnerability factors include drinking water sources, recreationalists in the area of influence and livelihoods tied to the area of influence. The area of influence for the TBS tailings facility includes the on-site work area downstream of the facility, the Fording River floodplain and low lying areas within the floodplain.

*What are we doing to control the risk:*

- The controls and mitigations that have been implemented to reduce the likelihood and consequences of a potential tailings incident at the TBS TSF are described in Section 3 above. Further, measures have been taken to protect potentially affected people, including sharing of information. Teck has a plan in place to assess the capacity of the communities to respond to emergencies, and co-develop emergency response measures with provincial agencies and project-affected people to improve preparedness.

## 5. Description of the Design for all Phases of the Tailings Facility Lifecycle

General design information regarding the TBS TSF design for the operational phase is summarized in the table below. An updated closure design for the TBS TSF is under development.

Table 2: TBS TSF Design Information Summary

Structure	Turnbull South In-Pit TSF
Containment or Design Type	In Pit
Estimated Crest El. (m)	1,681 (bedrock lowpoint)
Current Height (m)	N/A
Initial Operation	2016
Final Permitted Height (m)	N/A
Current Tailings Volume (Mm <sup>3</sup> )	10.1
Final Permitted Tailings Capacity (Mm <sup>3</sup> )	19.6
Crest Length (m)	N/A
Overall Downstream Slope	N/A
Design Storm Event	1/3 between 1:1,000 and Probable Maximum Flood (PMF)
Design Earthquake	1:2,500 AEP or 0.122 g

## 6. Summary of material findings of Annual Facility Performance Reports (AFPRs) and Dam Safety Reviews (DSR)

Annual Facility Performance Reports (AFPRs) are compiled each year by a third-party Engineer of Record to summarize the past year's monitoring and surveillance information into a concise review. Dam Safety Reviews (DSRs) are performed every 5 years by an independent reviewer in order to provide an independent assessment of the design and performance of the tailings facility. These reports document the safe operation, maintenance, and surveillance of the facility and identify and make any recommendations for continual improvement. Recommendations from these reports are tracked in the site tailings management system through to completion.

The recommendations from the AFPRs and DSRs are considered 'material'<sup>1</sup> findings' when the observation relates to credible failure modes of the facility that could result in a very high or extreme consequence, regardless of the likelihood of such an occurrence. It is important to note that a 'material finding' does not mean a high probability of occurrence. The urgency with which recommendations are to be addressed are defined by the Engineer of Record or independent reviewer by assigning a priority rating, which then informs the timeline to complete the action.

The most recent AFPR for this facility was completed for the period of September 2021 through August 2022 and the most recent DSR was performed in 2022. An AFPR for this facility is completed annually, and the next DSR will be performed in 2026.

There were no high priority recommendations identified in either the 2022 AFPR or 2022 DSR that would indicate any tailings facility safety issues. The 'material findings' from the reports are described in the AFPR, and summarized below.

- **Quantification of risk from pit highwall or spoil failure:** it was recommended to update the risk assessment related to the pit highwall failure to better quantify the risk from tailings exiting the facility, and to update the OMS manual and EPRP, if necessary.
  - Action: Updated estimates of wave generation have been completed, and the development of monitoring plans and updates to the OMS manual and EPRP are in progress.

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<sup>1</sup> Material: Important enough to merit attention or having an effective influence or bearing on the determination in question. For the Standard, the criteria for what is material will be defined by Operator, subject to the provisions of local regulations, and evaluated as part of any audit or external independent assessment that may be conducted on implementation. (GISTM, 2020)



## 7. Summary of Material Findings of the Environmental and Social Monitoring Program

There were no material findings associated with TBS from the 2022 social monitoring program. Key indicators of interest include feedback from the community and our annual sustainability report.

As part of ongoing efforts to continuously improve our social performance, FRO recently completed human rights, human exposure, and vulnerability assessments of credible failure scenarios. Further, a socio-economic profile was updated in 2023 to ensure the mine has updated knowledge for the area of influence of TBS. An updated Global Industry Standard on Tailings Management (GISTM) Engagement Plan was created and is in the process of being implemented. This Plan outlines the activities that will be undertaken to inform and gather feedback from identified project affected people (PAP) and local emergency response organizations. All feedback gathered is tracked and continually updated within the Knowledge Base. Material findings from social monitoring across the site in general can be found in the Teck Sustainability Report.

FRO has implemented an Environmental Management System (EMS) that is certified to the ISO 14001:2015 standard and applicable Teck corporate standards for health, safety, environment and community (HSEC) management. Teck is committed to environmental management best practices and to achieve continual improvement in our environmental performance. Through this policy FRO commits to:

- Complying with applicable legal, regulatory and other requirements which relate to the operations' identified environmental aspects.
- Ensuring effective implementation, maintenance, and documentation of the EMS.
- Setting environmental objectives which measure progress towards continual improvement and utilizing accepted assessment processes.
- Prevention of pollution.
- Minimizing environmental impacts of activities and services related to mining operations.
- Making this policy available to employees, persons working on Teck's behalf and the public.
- Raising the environmental awareness of employees and those working on Teck's behalf.

Monitoring and review requirements defined in the EMS are tracked to verify the overall effectiveness in controlling environmental impacts, verifying conformance with operational controls, tracking regulatory compliance status, and progress toward achieving objectives and targets. Audits are also conducted at least annually from external or third parties.

Teck has a robust internal audit program to monitor compliance to legal and internal requirements. These audits are conducted once every three years. In 2022 the audit scope included tailings facilities at FRO.

The TBS EMS was also externally audited by a third party in 2022. This resulted in no major non-conformances, and there were no findings associated with the TBS.

## 8. Summary Version of the Tailings Facility Emergency Preparedness and Response Plan (EPRP)

The TBS TSF is included in the site-specific Fording River Operations Mine Emergency Preparedness and Response Plan. This plan identifies hazards associated with credible failure scenarios and describes actions to prepare for and respond to emergencies arising from those hazards. The plan describes roles and responsibilities of site personnel and of provincial emergency response organizations, alert and notification procedures including off-site contacts, an inventory of response equipment, and training requirements for site personnel.

The EPRP program is linked to the tailings facility specific trigger action response plans (TARP), which are associated with the tailings surveillance and monitoring program. The objectives of the EPRP are:

- Establish procedures for emergency preparation, including escalating levels of response,
- Respond to developing, imminent or actual tailings facility failure scenarios in a way that reduces potential consequences; and,
- Identify training and testing requirements for effective implementation of the EPRP.

In the highly unlikely event of an imminent tailings facility failure, response actions would be taken to save human lives and reduce the potential downstream consequences. The actions identified in the EPRP generally include:

- Immediate physical actions that could potentially be taken in response to an unexpected triggering event to prevent further deterioration of the situation or condition toward embankment failure.
- Emergency call out procedures to establish internal and external communication lines. These contact lists are verified annually to confirm accurate contact information. The groups that would be contacted include, but are not limited to:
  - Emergency Management BC
  - Indigenous Government Organizations
  - Potentially affected downstream communities
  - Teck Corporate Crisis Response Team
  - The Engineer of Record
- Procedures for coordination with Emergency Management BC in order to conduct an evacuation of downstream potentially affected areas.

As part of Teck's preparation for emergencies, simulations and training exercises are conducted annually, and include participation by emergency preparedness agencies and representatives of the downstream project affected people. During these exercises, Fording River Operations will request input on the capability and capacity of emergency response services of downstream communities and project affected people to respond in an evacuation situation. As part of our commitment to continuous improvement, Fording River Operations EPRP will continue to develop over time in collaboration with project affected people to improve the state of preparedness for emergencies.

## **9. Independent Reviews**

The Independent Tailings Review Board meets three times annually. The most recent meeting was in July 2023, and the next one is scheduled for November 2023.

## **10. Financial Capacity**

Teck confirms that it has adequate financial capacity to cover estimated costs of planned closure, early closure, reclamation, and post-closure of the TBS TSF and its appurtenant structures. These costs are disclosed annually in aggregate form in our annual financial statements contained within our [Annual Report](#). These cost estimates are based on the tailings facility closure designs described in Section 5.

Further, Teck maintains insurance for our tailings facilities to the extent commercially available.

## **11. Conformance to the Global Industry Standard on Tailings Management**

Teck has performed a self-assessment of conformance to the Global Industry Standard on Tailings Management (GISTM) for the TBS TSF at FRO. This self-assessment has been performed in accordance with the ICMM Conformance Protocols issued in May 2021.

Categories of conformance for individual Requirements in the GISTM are set out below. These take into account guidance from ICMM. Where some requirements represent ongoing community engagement or other ongoing activities, and the systems and/or practices are substantively implemented such that the intended outcome is functionally achieved, and there is no physical risk to tailings facility safety, then these requirements can be considered conformance with the GISTM.

Table 3: Categories of Conformance

Conformance Level	Description
Meets	Systems and/or practices related to the Requirement have been implemented and there is sufficient evidence that the Requirement is being met.
Meets with plans in place	Where an Operator is required to undertake engineering work or other measures to conform to some Requirements (e.g., for Requirements 4.7 or 5.7, which might include remedial engineering measures for existing facilities), the expectation is that these shall be carried out as soon as reasonably practicable. It is not necessary for such measures to be complete by the implementation deadlines for an Operator to be in conformance, but both the measures and associated timelines should be clearly documented by an Accountable Executive.
Partially meets	Systems and/or practices related to meeting the Requirement have been only partially implemented. Gaps or weaknesses persist that may contribute to an inability to meet the Requirement, or insufficient verifiable evidence has been provided to demonstrate that the activity is aligned to the Requirement.
Does not meet	Systems and/or practices required to support implementation of the Requirement are not in place, are not being implemented or cannot be evidenced.
Not applicable	The specific Requirement is not applicable to the context of the asset.

For the TBS TSF at FRO, all requirements have been met, or are met with a plan in place, for Principles 1 to 3 and 6 to 15. Ongoing work to meet all requirements in Principles 4 and 5 will continue beyond August 5, 2023, and these principles are considered partially met. Importantly, there are no immediate physical safety risks at the facility related to the work in progress. The ongoing work to address the outstanding recommendations is as follows:

- Principle 4 & 5: Work is ongoing to further quantify the risk related to the potential for a wave generated by pit highwall or spoil failure triggered by large storm or earthquake events to displace water and tailings from the facility, and to demonstrate that the risk is mitigated to as low as reasonably practicable (ALARP), as discussed in section 6. Design options are in development and will need to consider interactions with site water management activities and to mitigate any potential environmental impacts associated with activities near or in the river. Evaluation of design options to reduce risks to ALARP is expected to be complete by the end of 2024.
- Principle 5: Closure designs are being updated to account for the additional requirements introduced by the GISTM, and to provide long term mitigations to the risk from pit highwall or spoil failure. Design work is ongoing, with closure Design Basis Reports and updated cost estimates expected by the end of 2023.