Ok Birim Tailings Storage Facility Project

Environmental and Social Impact Assessment

Attachment 3

Conceptual Closure and Rehabilitation Plan

TETRA TECH COFFEY

OK TEDI MINING

OK BIRIM TAILINGS STORAGE FACILITY PROJECT

Conceptual Closure Plan

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EXECUTIVE SUMMARY[1]

Overview and closure intent

This Conceptual Closure Plan (CCP) has been prepared for the proposed Ok Birim Tailings Storage Facility (TSF) project (the project) on behalf of Ok Tedi Mining Ltd (OTML). The Ok Tedi Mine is located in the mountainous western region of Papua New Guinea and has operated for more than 40 years. Historically, the mine has relied on riverine tailings and waste rock disposal, resulting in mine-derived sediment being discharged to the Ok Tedi and Fly River system. The proposed project represents a major change to tailings management by providing a new engineered, land-based TSF at Ok Birim to enable the long-term storage of tailings from 2030.

The proposed TSF is designed to accommodate tailings generated from the currently approved mine life and planned life-of-mine extensions up to 2050. The current project design includes a staged ring-dyke TSF comprising Cell 1 and Cell 2, with associated hydro-cyclone house, tailings pipeline, access roads and bridges, and ancillary infrastructure. Conceptual closure requirements have been incorporated into feasibility studies.

This CCP presents the conceptual closure framework for the proposed TSF and associated infrastructure. It has been prepared as a planning tool to support OTML in the eventual closure of the TSF and to guide the transition to a safe, stable, and environmentally sustainable post-closure condition. The plan establishes the closure objectives applicable to the project, outlines the proposed measures to achieve them, and identifies the closure strategy that will need to be progressively refined as the project advances.

The intent of the plan is that closure will be achieved in a way that minimises long-term environmental, social, safety, and financial risks, while also allowing closure areas to be relinquished or transferred when the relevant closure objectives and completion criteria have been demonstrated.

Closure risks

A preliminary risk assessment was conducted as an early-stage review to inform the closure concept design. Further work will be required to develop a comprehensive risk analysis with broader stakeholder input.

The review identified 15 preliminary closure risks across four main categories: health, safety and security; environmental; community and government; and closure execution. Key risks themes included:

- Embankment instability.
- Overtopping of the TSF impoundment.
- Internal erosion within embankments or foundations.
- Public access to unsafe or redundant infrastructure.
- Seepage and groundwater impacts.
- Erosion and landform evolution.
- Revegetation failure.
- Stakeholder opposition or low support.
- Future landform not compatible with intended post-closure land use.
- Socio-economic transition impacts.
- Uncertainty around asset transfer and relinquishment.

[1] This executive summary must be read in the context of the full report.

Closure framework and strategy

The closure framework is based on early integration of closure requirements into project planning. Closure-related design considerations have been incorporated from the feasibility stage to support safe, stable, and maintainable post-closure landforms and to reduce long-term environmental, social, safety, and financial liabilities.

The framework defines a closure vision, closure objectives, conceptual completion criteria, and indicators that will be used to demonstrate closure success. These criteria are intended to be measurable and verifiable, and they provide the basis for confirming when closure objectives have been achieved.

Closure is expected to occur in four stages:

- Operations: progressive rehabilitation integrated with ongoing TSF cycloned sand deposition.
- Closure execution: decommissioning, landform reshaping, cover placement, drainage works, and revegetation.
- Post-closure monitoring: ongoing monitoring and maintenance to confirm performance against closure criteria.
- Relinquishment: transfer or relinquishment of the closure area following demonstrated long-term stability and approval by the relevant authorities.

Closure planning has been developed on a domain basis, with each domain addressing the main project components requiring decommissioning, rehabilitation, transfer, or ongoing post-closure management. The main domains are:

- TSF.
- Hydro-cyclone house.
- Tailings pipeline.
- Access roads and bridges.
- Ancillary infrastructure, including camp accommodation, site offices, laydown areas, sewage treatment, water supply/storage, and power supply/distribution.

The closure strategy also includes site-wide aspects of decommissioning and demolition, and rehabilitation. The rehabilitation strategy is based on the principle that areas no longer required for operational use should be rehabilitated as soon as practicable, where this can be done safely and in a manner consistent with the overall closure design.

Community-related considerations are included in the closure framework, with attention to stakeholder consultation, access arrangements, compensation commitments where relevant, and continued community benefit where practicable.

Closure schedule

The indicative TSF schedule is as follows:

- 2027 to 2030: construction.
- 2030: operations commence.
- 2030 to 2049: operations with progressive rehabilitation.
- 2050 to 2053: closure execution and rehabilitation.
- 2053 to 2068: post-closure monitoring leading to relinquishment.

This staged schedule reflects the principle that closure is not a single end-of-life event, but a managed process that begins during operations and continues through to final relinquishment.

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TERMS AND ABBREVIATIONS

Acronyms/Abbreviations	Definition
CCP	conceptual closure plan
CEPA	Conservation Environment Protection Authority
DEC	Department of Environment and Conservation (PNG)
Environment Act	*Environment Act 2000*
EHS	environmental, health and safety
EIS	environmental impact statement
EIR	environmental inception report
EP	Environment permit
ESIA	environmental and social impact assessment
GISTM	Global industry standard for tailings management
ICMM	International Council on Mining and Metals
IFC	International Finance Corporation
ILO	International Labour Organization
IMS	Integrated management system
ITCS	Infrastructure Tax Credit Scheme
KCB	Klohn Crippen Berger Australia Pty Ltd
KP22	Kilometre point 22
LLG	local level government
MARP	Mine area rehabilitation plan
MPC	Mine closure plan
MPCU	Mine closure plan update
Ok Tedi Agreement	*Mining (Ok Tedi Agreement) Act 1976*
OTML	Ok Tedi Mining Ltd (project proponent)
OTEMA	*Ok Tedi Environment Management Act 2019*
PNG	Papua New Guinea
RL	reduced level
SIA	Socio-economic impact assessment
the Code	Ok Tedi Closure and Decommissioning Code 2001
the project	Ok Birim Tailings Storage Facility Project
TPP	tailings processing plant
TSF	tailings storage facility
UN	United Nations

UNITS AND SYMBOLS

Unit and symbols	Definition
%	percent
ha	hectare
km	kilometre
km/hr	kilometre per hour
m	metres
m^3	cubic metre
Mt	million tonnes
Mtpa	million tonnes per annum
MW	Megawatt
t	metric tonne

1. INTRODUCTION

This Conceptual Closure Plan (CCP) has been prepared by Tetra Tech Coffey Pty Ltd on behalf of Ok Tedi Mining Ltd (OTML) for the proposed Ok Birim Tailings Storage Facility Project (the project).

The project involves the development of a new engineered tailings storage facility (TSF) at Ok Birim for long-term land-based storage of tailings from 2030. The TSF is intended to replace the current riverine tailings disposal practice at the Ok Tedi Mine and reduce further mine-derived sediment inputs to the Ok Tedi and Fly River system. The project is in the northwestern corner of Western Province, south of the Central Cordillera Mountain range which runs east-west along the length of Papua New Guinea (PNG). The proposed TSF is approximately 1 km west of the confluence of the Ok Birim and Ok Tedi, and about 55 km south of the existing Ok Tedi Mine (90 km by road via the Kiunga-Tabubil Highway). Figure 1.1 shows the project location.

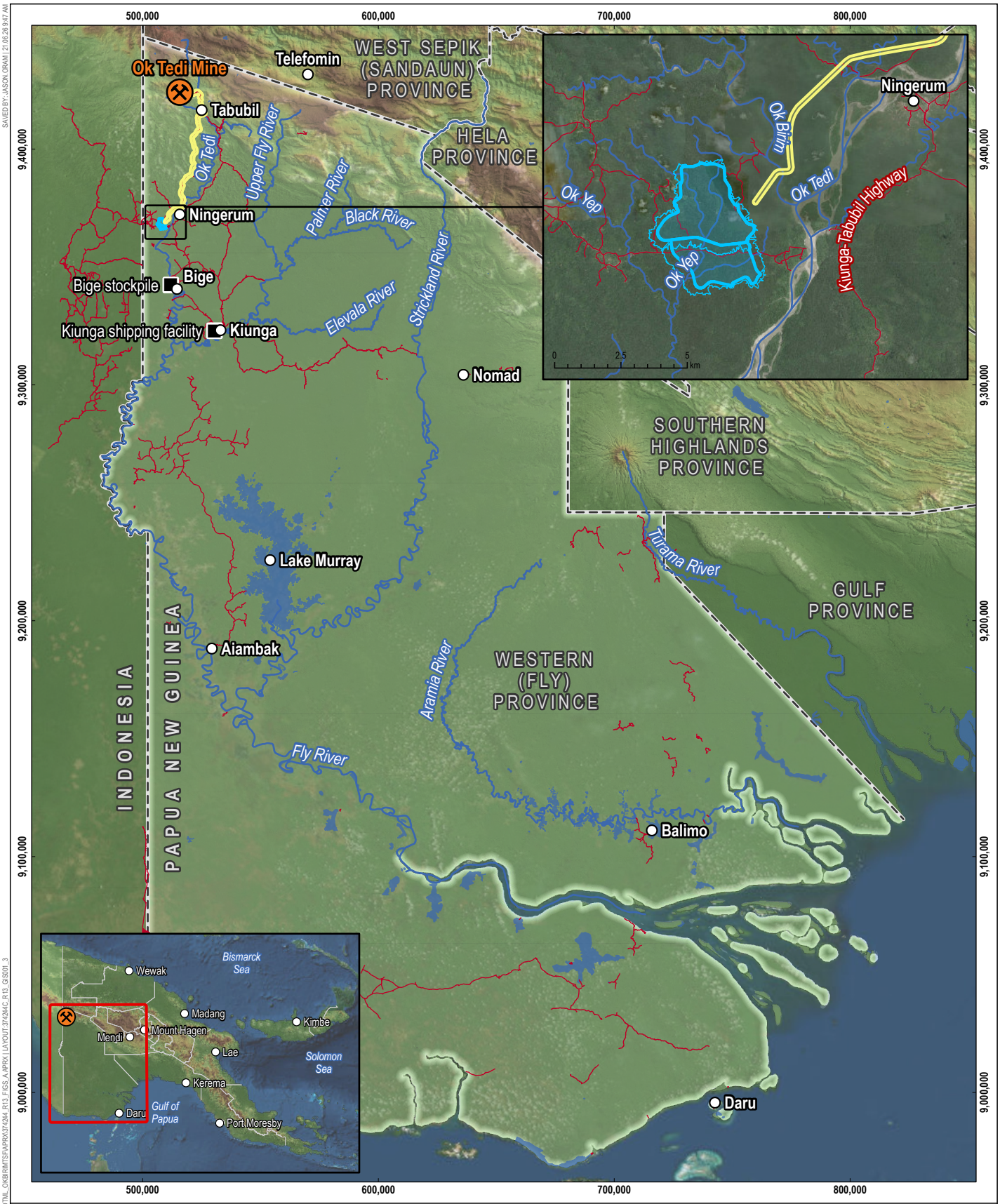
The Ok Tedi Mine at Mt Fubilan is an open-cut copper, gold and silver mine owned and operated by OTML since 1984. Ore is mined and processed at an on-site plant capable of treating up to 24 million tonnes per annum. Copper concentrate is transported via a 156 km pipeline to port facilities at Kiunga, where it is dried and shipped along the Fly River to Port Moresby for export. Pyrite concentrate produced at the tailings processing plant is transported via a 125 km pipeline to subaqueous storage pits at Bige, where it is kept permanently submerged to prevent oxidation and acid generation. Residue sand tailings are discharged via a 1.5 km tailings river disposal pipeline to Ok Kumiup, which flows into the Ok Tedi via Harvey Creek. Waste rock is also disposed to the creek system at the mine.

For more than 40 years, the Ok Tedi Mine has relied on riverine disposal of tailings and waste rock, resulting in substantial mine-derived sediment inputs to downstream river systems. By 2025, more than 2 billion tonnes of mine-derived sediment had been added to the Ok Tedi and Fly River system.

OTML is progressing a range of developments under its Growth 2050 strategy to improve long-term environmental performance and support potential mine life extension. Projected production to 2050 will generate additional tailings and waste rock, increasing pressure on the downstream river system. The proposed TSF is intended to provide a technically proven, environmentally sound and economically viable alternative to the current disposal practice, and to support continued mine operations to 2050.

An Environmental and Social Impact Assessment (ESIA) has been prepared for the project to meet the requirements of the *Ok Tedi Environment Management Act 2019* and to align with the Department of Environment and Conservation Guideline for Conduct of Environmental Impact Assessment and Preparation of Environmental Impact Statement (DEC, 2004), as well as good international industry practice, including the International Finance Corporation Performance Standards (2012) and Equator Principles 4.

The TSF is intended to accommodate tailings generated from the currently approved mine life and planned life-of-mine extensions up to 2050. The closure concept for the facility considers operational deposition as well as long-term post-closure performance, including stability, drainage, erosion resistance, rehabilitation and monitoring requirements.



LEGEND

- Ok Tedi Mine
- Key infrastructure
- Town
- Road/track
- Watercourse
- Waterbody
- Province boundary
- Proposed TSF footprint
- Proposed infrastructure corridor

OK TEDI MINING

0 25 50 km

SCALE **1:2,250,000**
PAGE SIZE: **A4**
PROJECTION: **PNG94 PNGMG94 Zone 54**

SOURCE
Proposed infrastructure from KCB and OTML.
Topographic features from OSM.
Provinces from NSO.
DEM from SRTM. Imagery from ESRI.

OK TEDI MINING LIMITED

OK BIRIM TAILINGS STORAGE FACILITY PROJECT

FIGURE 1.1

Project location

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1.1 SCOPE

Environment Permit (EP) L3(636) for the Ok Tedi Mine requires that closure and rehabilitation is undertaken in line with the Ok Tedi Mine Closure and Decommissioning Code 2001 (see Section 3.1), and this CCP has therefore been prepared in accordance with that Code. This CCP has also been prepared in alignment with OTML's Mine Area Rehabilitation Plan (MARP) and Mine Closure Plan (MCP). It builds on the closure objectives, rehabilitation principles, assumptions and commitments established by OTML, and applies them to the proposed TSF project.

The CCP covers the high-level closure planning requirements for the project and the associated infrastructure and development areas. It provides a conceptual framework for closure planning at this stage of the project, and will inform future detailed closure design, implementation and cost refinement. Specifically, the scope of this plan includes:

- The closure framework, including post-closure land use, closure objectives, conceptual completion criteria and governance arrangements.
- The conceptual closure strategy for the main project domains, comprising:
  - TSF.
  - Hydro-cyclone house.
  - Tailings pipeline.
  - Access roads and bridges.
  - Ancillary infrastructure.
- Rehabilitation considerations, including soil management, erosion and sediment control, landform design, revegetation, progressive rehabilitation and weed control.
- Management of assets that may be repurposed or transferred.
- Community-related closure, including workforce and supplier transition and stakeholder consultation.
- Planning for unanticipated closure scenarios, including sudden closure and temporary closure.
- Closure monitoring, maintenance and reporting requirements.

This plan does not provide detailed engineering design or final closure implementation arrangements. Rather, it establishes the conceptual basis for closure planning and identifies the key issues, assumptions and management measures that will need to be progressively refined as the project advances.

1.2 PURPOSE

This CCP has been prepared to present the conceptual closure framework for the proposed Ok Birim TSF. It serves as a planning tool to support OTML in the progressive rehabilitation and eventual closure of the TSF and associated infrastructure, and to guide the transition to a safe, stable and environmentally sustainable post-closure condition. The purpose of this plan is to:

- Establish the closure objectives applicable to the project and outline the conceptual closure strategy proposed to achieve them.
- Identify the site-specific environmental, social and stakeholder considerations that may influence closure planning and implementation.
- Document the stakeholder identification and consultation approach for the closure phase.
- Identify the completion criteria and requirements relevant to the project, based on applicable legislation, guidance, standards and project commitments.
- Provide a basis for the progressive review and updating of closure concepts, and to inform closure cost estimates and financial provisioning.

The CCP provides an overview of the conceptual closure strategy for the TSF and addresses the following principal closure considerations:

- Post-closure landform stability.
- Drainage and surface-water management.
- Seepage management and downstream water protection.
- Erosion and sediment management.
- Decommissioning and removal of non-essential infrastructure.
- Rehabilitation and vegetation establishment.
- Post-closure monitoring, maintenance, and relinquishment considerations.

The CCP is intended to provide a framework for progressive closure planning and to support future detailed design and closure implementation as the project advances through feasibility, construction, operation and closure.

1.3 DEFINITIONS

This section has been prepared to provide a clear and consistent understanding of the terminology used throughout the closure document. The following terms are particularly important for this project:

- **TSF:** an engineered structure used to store the waste material (tailings) generated from mineral processing operations.
- **Hydro-cyclone house:** The facility and associated hydro-cyclone systems used to separate tailings into coarse and fine fractions for TSF embankment construction and deposition.
- **Ancillary infrastructure:** Supporting infrastructure for the TSF, such as buildings, hardstands, access roads, services and related facilities.
- **Progressive rehabilitation:** Rehabilitation of disturbed areas that are no longer required for mining or operational use, carried out during operations to achieve the agreed post-mining land use.
- **Decommissioning:** The shutdown phase beginning at cessation of the TSF operations including isolation making plant and services safe, and removal from service of operational systems no longer required.
- **Demolition:** The physical dismantling, removal, or disposal of plant, structures, equipment, and services no longer required for closure, monitoring, maintenance or community use.
- **Post-closure monitoring and maintenance:** The period after closure execution during which monitoring data is collected and site conditions are reviewed to confirm closure objectives and criteria have been met, with maintenance completed where required.
- **Relinquishment:** The formal release of the company from obligations associated with the tenements once the regulatory authority is satisfied that closure objectives and criteria have been achieved.
- **Closure:** The full process by which the project reaches its final state following cessation of the TSF operations including progressive rehabilitation, decommissioning, post-closure monitoring and maintenance, and relinquishment.
- **Stewardship**: The care and management of the facility throughout its lifecycle, including during operations and, where relevant, after relinquishment.
- **Disturbance area:** The area of land occupied by project infrastructure, together with any buffer required for construction, maintenance and closure-related activities.
- **Closure execution:** The period of active closure works once operations have ceased, includes activities such as decommissioning and demolition, landform reshaping, TSF cover placement, drainage works and revegetation.

- **Closure objectives:** The intended environmental, social and safety outcomes that guide closure planning and implementation.
- **Completion criteria:** The measurable or verifiable conditions that must be met to demonstrate that closure objectives have been achieved.
- **Post-closure land use:** The agreed condition or use of the site after closure, which informs rehabilitation, access management and long-term site planning.

2. PROJECT OVERVIEW

The proposed project layout has a total disturbance footprint of approximately 1,900 ha. Project activities will primarily occur in the following two areas:

- TSF development area (approximately 1,500 ha) – This includes the TSF footprint, hydro-cyclone house and ancillary infrastructure, surface water management facilities and internal roads and tracks. The area is within a lowland setting with regional topography gently sloping to the south. The TSF site is in a sub-catchment of the Ok Yep, to the west and south of Ok Birim and Ok Tedi confluence. The northern part of the TSF site is approximately 1 km west of this confluence. The TSF site is generally flat with undulated shallow valleys ranging in elevation from approximately 40 m to 80 m above mean sea level (AMSL).
- Infrastructure corridor development area (approximately 400 ha) – This includes the proposed pipeline access road, bridges and water/ravine crossings, tailings pipeline and supporting facilities outside the TSF development area. The infrastructure corridor development area varies from the rugged, steep-sided valleys near the mine to the more gently undulating terrain and floodplains towards the TSF site.

Key components of the project are:

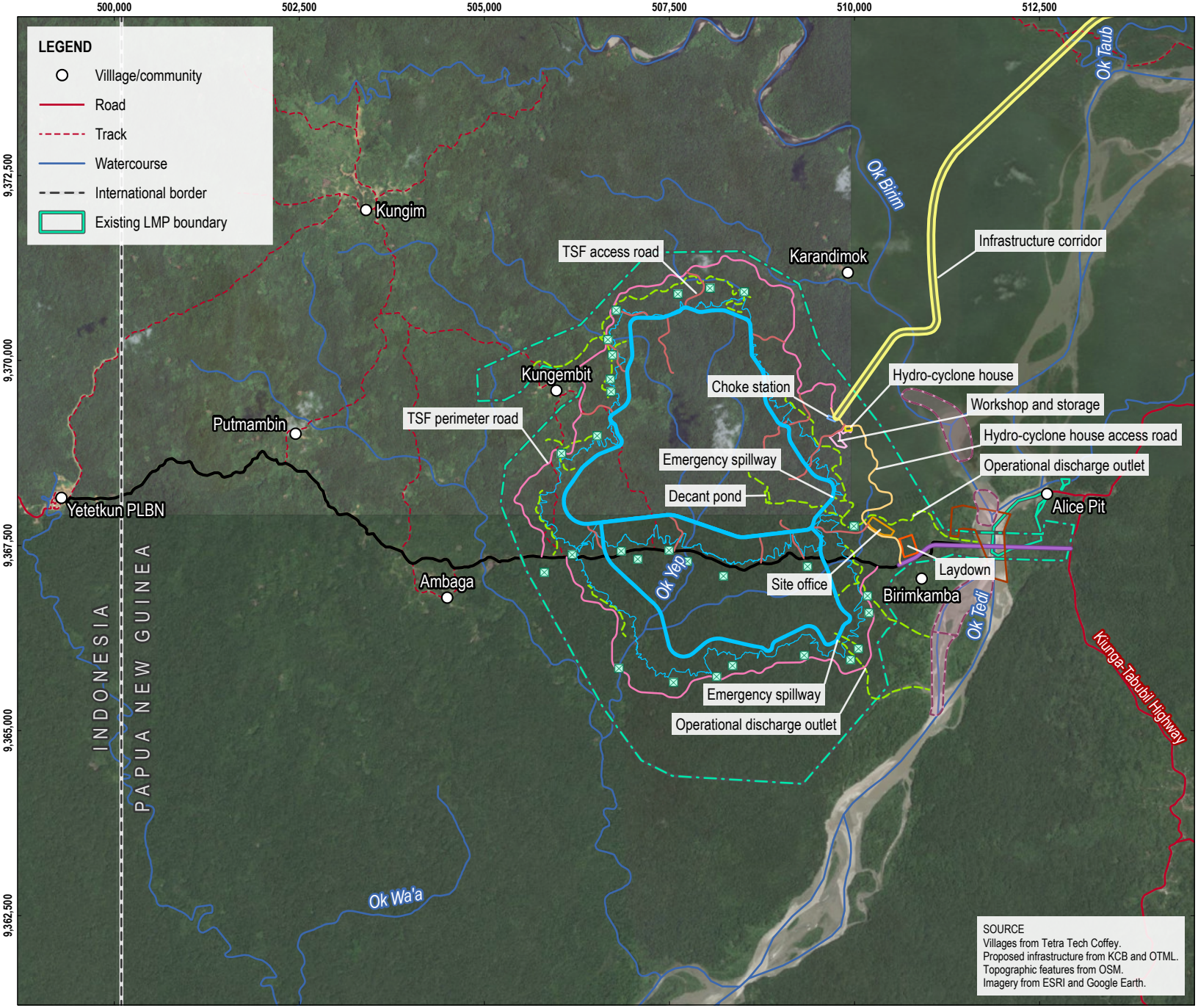
- A hydro-cyclone house for separating coarse and fine tailings, with coarse underflow used for embankment construction and fine overflow directed to the TSF impoundment.
- A ring-dyke TSF comprising internal storage cells developed progressively, with embankments primarily constructed using cyclone underflow sand.
- An 87-km-long tailings delivery pipeline from the existing tailings processing plant (TPP) at Ok Tedi Mine to the proposed TSF site, including associated pumping and piping distribution systems (i.e., one pump station at the mine site and two intermediate choke/valve stations).
- A pipeline access road corridor including three bridges and several minor water/ravine crossings.
- Ancillary infrastructure including site offices, laydown areas, workshops, maintenance stations, waste and sewage management facilities, fuel storage, borrow and gravel pits and accommodation camps (as required).
- Power supply primarily from on-site diesel generators, with an installed capacity of up to 11 MW during operations.
- Water supply sourced from existing mine site supply, TSF decant water during operations, supplemented by rainfall and potential abstraction from nearby watercourses or groundwater for construction and potable water (if required).

Table 2.1 provides a high-level summary of key project components. Figure 2.1 and Figure 2.2 present the proposed location and layout of the TSF development area and infrastructure corridor development area route.

Table 2.1 Overview of the project

Aspect	Description
TSF	
Tailings volume	Current TSF design provides storage for approximately 368 Mt of tailings material.
Hydro-cyclone house and TSF design and staging	• The hydro-cyclone house will separate the tailings underflow (to be used for embankment construction) and overflow (to be deposited into the TSF impoundment). Decant water from the TSF will be re-used as process water via dedicated pumping and piping distribution infrastructure. • TSF will be developed in stages, with two defined storage cells to be constructed, operated and closed consecutively. • TSF starter embankment constructed using suitable borrow fill material sourced from bulk earthworks and local borrow and gravel pits along the Ok Tedi (subject to suitability testing). Embankments will then be primarily constructed using suitable cyclone underflow sand. • Centerline-raised embankments of cyclone underflow primarily via hydraulic cell construction, compacted to the density specified in the design to retain cyclone overflow and uncycloned tailings. • TSF ultimate embankments will reach a maximum height of 36 m with a final crest elevation of 80 m RL.
TSF water management	• TSF lies entirely within the Ok Tedi catchment to minimise introducing new impacts to other catchments such as the Ok Birim, which remains unaffected by current mining activities. • TSF has been positioned above the high banks of the Ok Birim and Ok Tedi to minimise flood interaction. • Surface water diversions will be established to divert existing streams and clean surface water flows away from the TSF during all phases of the project. Sedimentation ponds will be constructed strategically to limit fugitive sediment. • During operations, the TSF will operate as a flow-through system with excess decant water reporting to the Ok Tedi in a controlled manner via a siphon system. Each TSF cell will incorporate a siphon discharge system, associated pipelines and outlet, and emergency spillway to enable planned and emergency release of excess TSF decant water. • No permanent water cover is expected to be required for tailings in the TSF impoundment area as the tailings are non-acid forming based on current geochemical characterisation results. • Planned discharge of excess TSF decant water will flow to the Ok Tedi after reduction of suspended solids via sedimentation ponds. • Seepage collection at the south (downstream) of the TSF will be transferred to a sedimentation pond, while un-intercepted seepage is expected to report to the Ok Tedi.
Infrastructure corridor development area	
Access roads	Construction and upgrade of access roads/tracks, including an 87-km-long pipeline access road from the Ok Tedi Mine to the proposed TSF (comprising 22 km along the existing highway from the mine to Tabubil and 65 km of new road), three permanent bridges over the Ok Tedi, Ok Taub and Ok Birim, and several minor water/ravine crossings. Generally two-lane, unsealed roads with an all-weather road base, with single lane sections and passing bay areas where required. Gravel will be applied as needed for dust suppression, such as near villages. Single or two-lane bridges will be provided with dedicated pedestrian footpaths. A speed limit of 40 km/hr for internal roads/tracks and 65 km/hr for roads shared with the community with appropriate road safety signage where needed.
Tailings pipeline	Construction of 87-km-long pipeline to transport final tailings from the TPP at the Ok Tedi Mine to the proposed TSF. Approximately 80% buried and 20% above ground. Pipeline is expected to be constructed along the pipeline access road for the entire route.

Source: Adapted from Ok Birim TSF Pre-Feasibility Study Update Capital and Sustaining Cost Estimate (GRES 2024).



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LEGEND

Proposed layout

- Sediment pond
- TSF access road
- TSF perimeter road
- Hydro-cyclone house access road
- Hydro-cyclone house
- Site office
- Laydown
- Choke station
- Workshop and storage
- Riverine extraction support
- Diversion drain
- Borrow source
- TSF footprint
- Infrastructure corridor
- LMP boundary

ITCS road project (separately approved)

- Alice Pit bridge
- Road

0 1 2 km

SCALE **1:75,000**
PAGE SIZE: **A4**
PROJECTION: **PNG94 PNGMG94 Zone 54**

OK TEDI MINING LIMITED

OK BIRIM TAILINGS STORAGE FACILITY PROJECT

FIGURE 2.1

Tailings storage facility – proposed location and indicative layout

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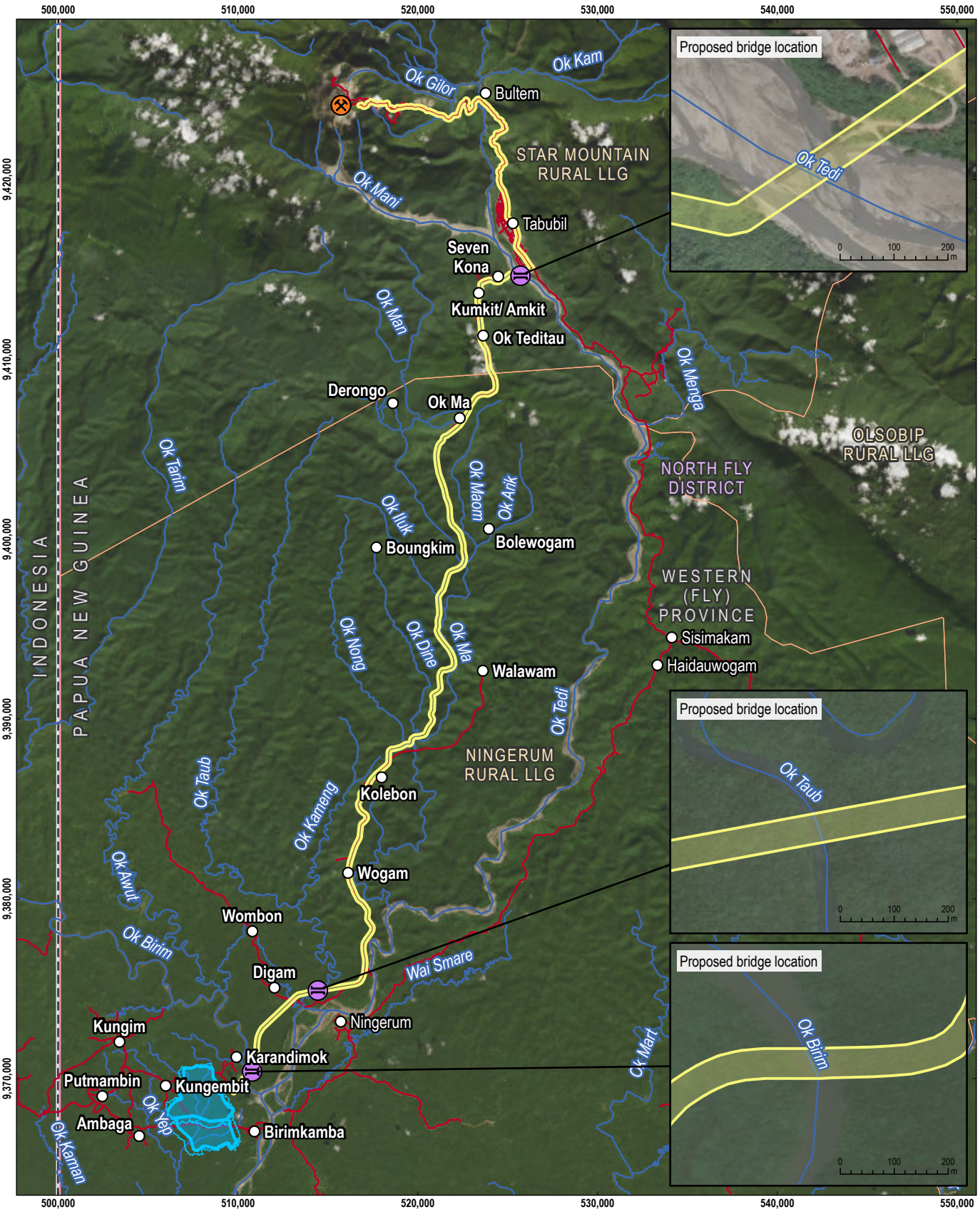

LEGEND

- Ok Tedi Mine
- Villlage/community
- Road/track
- Watercourse
- LLG boundary
- District boundary
- Province boundary

Proposed layout

- Bridge (to be finalised)
- TSF footprint
- Infrastructure corridor

OK TEDI MINING

0 2.5 5 km

SCALE **1:300,000**

PAGE SIZE: **A4**

PROJECTION: **PNG94 PNGMG94 Zone 54**

SOURCE
Villages from Tetra Tech Coffey.
Proposed infrastructure from KCB and OTML.
Topographic features from OSM. Admin boundary from NSO.
DEM from SRTM. Imagery from ESRI.

OK TEDI MINING LIMITED

OK BIRIM TAILINGS STORAGE FACILITY PROJECT

FIGURE 2.2

Infrastructure corridor – proposed route and indicative layout overview

TETRA TECH COFFEY

DATE: **21.06.26** PROJECT: **754-MELEN374244** FILE: **374244C_R13_F02.02_GIS**

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3. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This chapter outlines the legislative and policy framework relevant to closure planning for the project. It provides an overview of the national laws, international standards and guidelines, and environmental agreements that relate to the CCP.

3.1 RELEVANT LEGISLATIVE FRAMEWORK

This section outlines the relevant requirements for project closure. Unlike other mining operations in PNG, the Ok Tedi Mine operates under a project-specific legal regime. The *Mining (Ok Tedi Agreement) Act 1976* (Ok Tedi Agreement) and supplemental agreements under this act set the legal foundation for the Ok Tedi operations, while the *Ok Tedi Environment Management Act 2019* (OTEMA) establishes a standalone environmental management framework tailored to the Ok Tedi Mine.

Under OTEMA, the project will require a major amendment to OTML's existing Environment Permit, EP L3(636). This CCP has been prepared in accordance with OTEMA and addresses the environmental and social impact assessment (ESIA) requirements specific to TSF closure. The CCP is also aligned with the *Mining Project Rehabilitation and Closure Guidelines Papua New Guinea* (IGF 2019).

3.1.1 Ok Tedi Environment Management Act 2019

OTEMA is the principal legislation for regulating the environmental and social effects of the Ok Tedi Mine and is administered by the PNG Conservation Environment Protection Authority (CEPA). OTEMA established a comprehensive environmental management framework governing the Ok Tedi Mine, under which EP L3(636) was granted.

The project constitutes changes to the Ok Tedi Mine that will trigger the first permit amendment under OTEMA. OTEMA contains limited but specific closure provisions. It recognises Mine Closure Plans under the Ok Tedi Mine Closure and Decommissioning Code 2001 and Section 36 provides CEPA with enforcement powers where there is non-compliance with the approved Mine Closure Plan.

3.1.2 Mining (Ok Tedi Agreement) Act 1976

The *Mining (Ok Tedi Agreement) Act 1976* provided the legal framework to facilitate the development, exploration and extraction of resources at Ok Tedi Mine. The Act regulates the ongoing mining operations, including the supplemental agreements, and governs OTML's tenure, rights and obligations through a binding contractual framework with the State. The Act also includes end-of-termination provisions under Clause 35, including Clause 35.1(a), which requires the Company to leave the Mining Area in a safe condition to the reasonable satisfaction of a mining inspector, and Clauses 35.2 to 35.3, which address the removal or transfer of structures, installations, plant, equipment and other assets upon termination. The Act has been supplemented by various agreements over the years to address evolving operational, environmental, and social issues related to the mine. Social responsibility, compensation and benefit-sharing have also been a key focus area of the supplemental agreements.

3.1.3 Mining (Ok Tedi Mine Continuation (Ninth Supplemental) Agreement) Act 2001

The *Mining (Ok Tedi Mine Continuation (Ninth Supplemental) Agreement) Act 2001* established the legislative basis for the Ninth Supplemental Agreement relating to the Ok Tedi Mine, formalising the continuation arrangements for the mine. The Act gave statutory effect to the negotiated terms governing mine operation, associated State obligations, and the framework for social and environmental commitments linked to the

mine's extended life. It is a key regulatory instrument for mine closure, as it anchors closure-related obligations in an enforceable statutory context through the Ok Tedi Mine Closure and Decommissioning Code 2001.

3.1.3.1 Ok Tedi Mine Closure and Decommissioning Code 2001

The Ok Tedi Mine Closure and Decommissioning Code 2001 is part of the statutory framework created by the *Mining (Ok Tedi Mine Continuation (Ninth Supplemental) Agreement) Act 2001*. This code sets out the principal technical and procedural requirements for closure planning, decommissioning, and rehabilitation of the mine and associated infrastructure. The Code sets out requirements for the development of the MCP, including regulatory requirements (Clause 3), MCP contents (Clause 4) and provision for staged development of the MCP over the life of the mine (Clause 4.3). It also addresses financial assurance, including the requirement for an estimation of financial assurance (Clause 4.3) and the establishment of a reserve account (the Ok Tedi Financial Assurance Fund) (Clause 5.3).

3.1.4 Mining Project Rehabilitation and Closure Guidelines Papua New Guinea 2019

The Mining Project Rehabilitation and Closure Guidelines Papua New Guinea (IGF2019) provide a guidance framework for mine closure planning in PNG. The Guidelines are intended to direct the development and implementation of Rehabilitation and Mine Closure (RMC) Plans over the mine life. They provide guidance for the administration, regulation and monitoring of closure obligations, with the underlying expectation that tenement holders are responsible for planning, implementing, and funding closure in accordance with sustainable development principles.

3.2 OTHER LEGISLATION AND REGULATIONS

A wide range of Papua New Guinean legislation and regulations is relevant to the project. Table 3.1 summarises other acts and regulations relevant to this CCP.

Table 3.1 Other legislation and regulations

Legislation and regulations	Description and applicability
Legislation	
Fauna (Protection and Control) Act 1966	This Act provides for the protection of native wildlife. It is relevant where closure, rehabilitation or post-closure land use may affect wildlife habitat or recovery of disturbed areas.
Forestry Act 1991	This Act governs forest resource management, including clearing of forested land. It is relevant where closure or rehabilitation activities involve vegetation removal, re-establishment of forest cover or coordination with forestry authorities.
Industrial Safety, Health and Welfare Act 1961	This Act governs occupational safety and health standards in industrial settings. It is relevant to worker safety during decommissioning, rehabilitation and other closure-related activities.
Land Act 1996	The Land Act regulates land tenure, leasing, and compulsory acquisition, particularly for State and customary land. It is relevant to post-closure land access, relinquishment, rehabilitation areas and any compensation or land-use transition issues associated with the TSF and supporting infrastructure.
Local-level Governments Administration Act 1997	This Act supports participatory governance through ward and district development planning. It is relevant to stakeholder engagement and coordination with local authorities and affected communities during closure planning.
Mining (Safety) Act 1977 and Regulation	This Act governs the occupational health and safety requirements for mining operations in PNG. It is relevant to TSF stability, residual hazards, decommissioning and closure-related risk management.

Legislation and regulations	Description and applicability
National Cultural Property (Preservation) Act 1965	This Act protects archaeological and cultural heritage sites of national significance. It is relevant where closure, rehabilitation or decommissioning activities may disturb identified heritage sites within the TSF footprint or associated disturbance areas.
Road Maintenance Act 1971	This Act provides for the classification and maintenance of public roads. It is relevant where closure or decommissioning affects public road infrastructure, access arrangements or road rehabilitation requirements.
Road Traffic Act 2014	This Act regulates vehicle operations, traffic safety, and load limits on public roads. It is relevant where closure activities involve heavy vehicle movements, transport logistics and traffic management on public roads.
Regulations	
Environment (Water Quality Criteria) Regulation 2002	This regulation sets enforceable water quality standards for effluent discharges into PNG's freshwater and marine environments. It is relevant to seepage control, surface water management, post-closure drainage and the protection of downstream water quality associated with the TSF.
Public Health Act & Public Health (Drinking Water) Regulation 1984	These instruments define standards for safe drinking water and sanitation. They are relevant where closure-related seepage, drainage or water quality changes may affect community water sources or downstream users.

3.3 INTERNATIONAL ENVIRONMENTAL AGREEMENTS

Table 3.2 summarises international agreements to which Papua New Guinea is a signatory and that are relevant to the project. These agreements inform the management of environmental and social impacts where they have been enacted through national legislation. Their principles also guide good practice, particularly where aligned with national laws and regulatory expectations.

Table 3.2 International environmental agreements to which PNG is a signatory

Agreements	Description and relevance
Convention on Biological Diversity (1993)	Supports the protection of biodiversity, ecosystems, and species. For closure, it is relevant to rehabilitation, habitat restoration, post-closure ecological monitoring, and any biodiversity offset or residual-impact commitments associated with final landform and relinquishment.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes (1989)	Global treaty on hazardous and other wastes, aimed at protecting human health and the environment. For closure, it is relevant to the classification, packaging, transport and environmentally sound disposal of hazardous wastes; it becomes directly important if waste is moved across borders.
Waigani Convention (1995)	Regional South Pacific treaty that bans import of hazardous and radioactive wastes into Forum Island Countries and controls hazardous waste movements within the region. For closure, it is relevant if hazardous closure wastes are proposed for off-site disposal or any transboundary movement within the Pacific region.
Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention, 1972)	Protects cultural and natural heritage of outstanding universal value. It is relevant for the CCP if closure works could affect identified heritage places, landscapes or values.
Ramsar Convention on Wetlands of International Importance (1971)	Framework for the conservation and wise use of wetlands. For closure, it is relevant where tailings seepage, drainage, water balance changes or rehabilitation works may affect wetlands, riparian areas, floodplains or groundwater-dependent ecosystems.
Convention on the Conservation of Migratory Species (1979)	Global treaty for migratory species and their habitats. For closure, it is relevant if closure activities may affect migratory birds, fish or other listed species using the site or adjacent habitats.

Agreements	Description and relevance
International Labour Organization (ILO) Convention 169 on Indigenous and Tribal Peoples (not ratified, but ILO principles inform free, prior and informed consent)	While PNG is not a signatory, the principle of free, prior and informed consent is still widely applied in social and human rights assessments aligned with the International Finance Corporation (IFC) Performance Standard (PS) 7. For closure, it is relevant as a good-practice reference for consultation, land access, livelihood transition and culturally appropriate closure engagement.
United Nations Declaration on the Rights of Indigenous Peoples (2007)	Though not a treaty, PNG supports this declaration. Relevant to human rights and Indigenous engagement obligations in social and cultural assessments. For closure, it is relevant as a good-practice reference for consultation, land access, livelihood transition and culturally appropriate closure engagement, but it is not a direct PNG treaty obligation unless ratified.
International Plant Protection Convention (1976)	Promotes international cooperation to control pests and diseases of plants and plant products. For closure, it is relevant to rehabilitation and revegetation, especially where seed, nursery stock, mulch, soil, timber or other plant material is moved and could introduce pests or diseases.
Vienna Convention for the Protection of the Ozone Layer (the Vienna Convention) (1993)	Protection of the ozone layer. For closure, it is relevant where decommissioning removes equipment containing ozone-depleting substances or related refrigerants.

3.4 RELEVANT INTERNATIONAL STANDARDS, GUIDELINES AND CORPORATE POLICIES

This section outlines the international standards, guidelines, and OTML corporate policies considered in the CCP. These frameworks have guided the scope, method and proposed closure measures so that the CCP reflects international good practice for TSF closure and aligns with lender and stakeholder expectations.

3.4.1 International standards and guidelines

Table 3.3 summarises the international standards and guidelines that have informed the scope, method, and content of this CCP.

Table 3.3 Relevant international standards and guidelines

Standards and guidelines	Description and applicability
Performance Standards on Environmental and Social Sustainability (IFC 2012)	The IFC Performance Standards comprise eight performance standards that detail commitments, roles and responsibilities relating to environmental and social sustainability. The relevance of the performance standards to the CCP are: • Performance Standard 1 – Assessment and management of environmental and social risks and impacts: Framework for identifying, assessing, managing and monitoring environmental and social risks across the project lifecycle, including closure and post-closure. • Performance Standard 2 – Labor and working conditions: Requirements for workforce management, OHS and contractor control during closure, decommissioning and rehabilitation. • Performance Standard 3 – Resource efficiency and pollution prevention: Requirements for efficient resource use and pollution prevention, including water management, seepage control, erosion control, waste management and hazardous material handling. • Performance Standard 4 – Community health, safety, and security: Requirements for managing community risks associated with closure activities and the final landform. • Performance Standard 6 – Biodiversity conservation and sustainable management of living natural resources: Requirements relevant to rehabilitation, habitat recovery and biodiversity protection during closure and post-closure.

Standards and guidelines	Description and applicability
	• Performance Standard 7 – Indigenous peoples: Requirements for consultation and engagement where closure may affect customary land interests, cultural values, access to resources or community rights. • Performance Standard 8 – Cultural heritage: Requirements for identifying and managing cultural heritage values affected by closure works.
IFC Environmental, Health and Safety (EHS) Guidelines (2007)	The EHS Guidelines provide sector-specific and general performance benchmarks for environmental protection, occupational health and safety, and community safety. For the CCP, the guidelines are relevant to dust suppression, water quality management, seepage control, hazardous materials handling, decommissioning activities, worker safety, and the protection of surrounding communities during closure and post-closure periods.
The Copper Mark	The Copper Mark is a voluntary assurance framework that promotes responsible production and sourcing of copper. Copper Mark assists copper producers to demonstrate their commitment to environmental, social, and governance (ESG) standards. OTML is seeking to align with this framework. For the CCP, it is relevant as a benchmark for responsible closure planning, rehabilitation, residual risk reduction, stakeholder engagement, monitoring and post-closure stewardship.
Global Industry Standard for Tailings Management (GISTM) (ICMM et al. 2020)	The GISTM establishes global best practice for the governance, design, operation, closure and post-closure management of tailings facilities. For the CCP, the standard informs the closure basis for the TSF, including long-term stability, residual risk management, monitoring, financial provisioning, and the development of measures intended to support safe and sustainable post-closure conditions.
Voluntary Principles on Security and Human Rights (Voluntary Principles Association 2000)	The Voluntary Principles on Security and Human Rights provide guidance for extractive companies on maintaining the safety and security of operations in a way that respects human rights. For the CCP, these principles are relevant where closure activities may require access control, security management, interaction with affected communities, and the management of residual safety risks.
International Council on Mining and Metals (ICMM) Tailings Management Good Practice Guide (ICMM 2021)	The ICMM Tailings Management Good Practice Guide provides practical guidance for the safe and responsible management of tailings facilities throughout the lifecycle, including closure and post-closure. For the CCP, the guide informs the conceptual closure approach for the TSF, including closure success criteria, long-term stability, governance arrangements, monitoring, rehabilitation and the integration of closure considerations into tailings facility planning and design.
Guiding Principles on Business and Human Rights (UN 2011)	The UN Guiding Principles on Business and Human Rights outline the corporate responsibility to respect human rights and provide access to remedy for affected people. For the CCP, the principles are relevant to closure planning where TSF closure may affect land access, community consultation, Indigenous rights, livelihoods and access to remedy for affected persons and groups.

3.4.2 Corporate policies and standards

OTML is committed to responsible environmental management and supporting sustainable livelihoods for its communities and workforce. This includes safeguarding the health, safety, and security of the communities in which it operates, as well as the wellbeing of its employees.

This commitment is put into practice through OTML's integrated management system (IMS), which includes a suite of systems, standards, processes and procedures covering all areas of the business, including mining operations, environmental sustainability, community relations, occupational health and safety, finance, people management and security.

OTML's IMS Standard 3.07 – Rehabilitation and Closure (OTML 2019) sets out the company's formal approach to mine closure and rehabilitation. Its core purpose is to ensure that, throughout the life of the project, OTML maintains a closure plan that addresses both environmental and socioeconomic impacts, including the long-term post-closure condition of the site. Table 3.4 summarises the requirements of OTML's rehabilitation and closure standard.

Table 3.4 Requirements of OTML's IMS Standard 3.07 – Rehabilitation and Closure

Requirement	Description
Corporate commitment	Rehabilitation and closure activities will be carried out in compliance with all legal requirements.
Socially responsible closure	OTML commits to documenting and implementing closure measures that support socially responsible mine closure.
Integrated planning	OTML management is required to demonstrate an active commitment to integrated closure planning across all project stages, with input from operational disciplines and relevant external stakeholders.
Legal framework	OTML's closure obligations are governed by the Ok Tedi Mine Closure and Decommissioning Code (the code), which is tied to the Mining (Ok Tedi Mine Continuation (Ninth Supplemental) Agreement) Act 2001 and referenced in EP-L3(636).
Required closure instruments	The code requires a Mine Closure Plan, a Mine Area Rehabilitation Plan, and Financial Assurance provisions.
Stakeholder engagement	OTML will consult with government and affected communities, provide planning information for comment, and consider stakeholder views in closure planning.
Planning basis	Closure plans should be based on robust environmental and social risk and opportunity assessments and consider wider community, regional, and national development plans.
Progressive rehabilitation	OTML will rehabilitate disturbed areas during operations, including stabilisation, revegetation, and decommissioning of redundant infrastructure, to reduce future closure liability.
Review and update cycle	The Mine Closure Plan and Mine Area Rehabilitation Plan will be reviewed every two years, with updated plans submitted to government. Detailed decommissioning plans are required at least four years before expected cessation of commercial production.

Source: adapted from OTML 2019.

4. ENVIRONMENTAL SETTING

This chapter section summarises the existing physical and biological environment within and around the project. It provides the regional and local context, with emphasis on climate, topography, geology, hydrology, water quality, aquatic and terrestrial ecology, air quality and noise.

4.1 CLIMATE

The project area lies in a wet tropical climatic setting, with conditions strongly influenced by elevation, rainfall, humidity and local topography. OTML has collected climate data in the region through a network of weather stations, including near the mine site and near the proposed TSF. The key climate parameters for the TSF development area are:

- **Air temperature:** Based on historical records from 2019 to 2023 at Bige, the average annual temperature was approximately 27.8°C, with a minimum temperature of 24.8°C recorded in August 2019 and a maximum temperature of 31.1°C recorded in November 2020.
- **Rainfall:** High annual rainfall across the region, with monthly rainfall varying substantially through the year. The nearest rainfall monitoring point at Karandimok Village (about 1.6 km northeast of the TSF development area) recorded an average of 20 mm/day and 7,434 mm/year (based on data from May 2018 to January 2024 (OTML 2025)). For comparison, the average annual rainfall at the PMP59 and Bige stations is approximately 6,650 mm and 5,500 mm, respectively; and 9,800 mm at the Edinburgh station near the Ok Tedi Mine (KCB 2024).
- **Evaporation:** The nearest evaporation station located at Bige recorded an annual evaporation (US Class A evaporation pan) of approximately 770 mm between 2006 and 2008. Based on these measurements, the annual evapotranspiration at the TSF development area is estimated at 535 mm (KCB 2024). Rainfall is sufficiently high that it strongly shapes runoff, drainage behaviour and environmental conditions within the project area.
- **Wind speed and direction:** Wind conditions are seasonally variable. From January to March, relatively calm conditions at 9 am are typical, with mild breezes from the northwest (morning winds being a downslope wind from the mountains). By 3 pm, the winds generally strengthen from the west, consistent with the Northwest Monsoon westerly winds. From July to September, winds are predominantly south-easterly throughout the day, reflecting the prevailing seasonal Southeast Trade Winds that dominate during this period (KCB 2024).

4.2 CLIMATE-RELATED NATURAL HAZARDS

The dominant climate-related hazards in the project area are seasonal floods, severe storms, drought and bushfires. The area is not directly exposed to tropical cyclones because it is inland and distant from cyclone tracks (BOM 2023); the cyclone hazard is therefore classified as low (GFDRR 2020), although severe storms can still bring heavy rainfall, strong winds and localised flooding that may affect infrastructure, settlements, public health and the environment (CFE-DM 2025a). The project area is subject to riverine flood risk, particularly in surrounding lowlands (GFDRR 2020) and along the Fly-Strickland River watershed. Seasonal flooding and riverbank erosion can disrupt transport and operations (CFE-DM 2025b). In addition, although the area's water scarcity hazard is classified as very low (GFDRR 2020), extended droughts can reduce river levels in the Fly River and Ok Tedi channels, affecting shipping and supply access (OTML 2023). Bushfire risk is comparatively lower than in some other parts of Western Province (GFDRR 2020), but prolonged dry conditions and local traditional burning practices can still increase the likelihood of localised fires (NASA 2018); high rainfall throughout the year helps suppress fire spread.

4.3 TOPOGRAPHY, GEOLOGY AND SOILS

The project area is located in a tectonically active region and is subject to ongoing seismic and slope-instability hazards. Earthquake hazard across the project area is assessed as medium, while landslide hazard is highest in the mountainous areas around the mine and reduces towards the flatter TSF development area (GFDRR 2020; PSM 2024). The TSF development area is relatively low-lying and gently sloping, situated mainly on intricately dissected relict alluvial plains, with eastern portions extending onto meander floodplains (KCB 2024).

Geologically, the TSF development area and much of the infrastructure corridor development area are underlain predominantly by consolidated non-calcareous mixed or undifferentiated sedimentary rocks. Other rock types present along the infrastructure corridor development area include local igneous, limestone and alluvial deposits. In the TSF development area, the main sequence comprises Quaternary transported deposits overlying the Awin Formation, Birim Formation and Warre Limestone Member of the Pnyang Formation, with weathering generally decreasing and rock strength increasing with depth (KCB 2024; KCB 2015). Soils vary according to landform and drainage setting (Bryan and Shearman 2008), with TSF investigations identifying residual ridgeline clays and tributary alluvial soils (KCB 2026). Although the soils are strongly acidic and some screening results indicated possible sulfidic material, the tested samples did not meet acid sulfate soil criteria (KCB 2026). Along the infrastructure corridor development area, soil testing identified variable acidity, salinity, nutrient and metal concentrations, with the highest metal concentrations at near the mine area. Most sampled soils exhibited strong aggregate stability, with only limited areas showing moderate erosion susceptibility.

4.4 PHYSICAL RIVERINE ENVIRONMENT

The project area lies within the Ok Tedi–Fly River riverine system, including the mine-area creeks, the Ok Tedi, the infrastructure corridor development area watercourses, the TSF development area watercourses and the downstream Fly River system. The area receives high rainfall and runoff (PSM 2024), and long-term mining has substantially altered hydrology and sediment transport through tailings and waste rock disposal, erosion from disturbed areas, and landslide-derived inputs (OTML 2025a). Aggradation remains a key process in the Middle Ok Tedi (OTML 2024), while dredging at Bige continues to manage sediment transport in the Lower Ok Tedi (Pickup 2024).

Mine-area creeks and the Ok Tedi have been significantly modified by mine-derived sediment, with Sulphide Creek, Harvey Creek and Ok Mani receiving waste dump and tailings-related inputs, and the Lower Ok Tedi altered by historic aggradation and dredging-related changes to channel form (OTML 2025a). Watercourses in the infrastructure corridor development area and TSF development area are generally less directly affected, although backwater effects may deposit contaminated sediment into the lower Ok Yep during high flows (SLR 2026). The Fly River floodplain system remains strongly connected to main channels and tie channels, with mine-derived sediment influencing levee growth, drainage efficiency and floodplain deposition, although the Strickland River remains the dominant suspended sediment source in the Lower Fly.

Water and sediment quality are generally circumneutral to slightly alkaline in the Ok Tedi–Fly River riverine system, with copper remaining the main contaminant of concern, although concentrations have generally declined in recent years and are lower in the Fly River than in the Ok Tedi (OTML 2025a). Sulfur concentrations have reduced since pyrite extraction from tailings commenced in 2008, and acid neutralising capacity (ANC) has increased, indicating improved buffering capacity and a reduced acid generation risk across much of the system (OTML 2025a). Low sediment-metal concentrations were recorded in the infrastructure corridor development area, with isolated elevated metals in the TSF development area likely reflecting backwater deposition from the Ok Tedi during high-flow conditions (SLR 2026).

4.5 GROUNDWATER

Groundwater information was collected by KCB through hydrogeological studies completed in 2014 and 2025/2026 (KCB 2026c). Key hydro-stratigraphic units are identified within the TSF development area:

- Residual soil and highly weathered rock of the Awin Formation.
- Unconsolidated alluvium adjacent to the Ok Tedi.
- Sandstone and conglomerate units of the Awin Formation.
- Siltstone and mudstone units of the Awin Formation.

Permeability generally increases with coarser material and higher degrees of weathering, with the residual/weathered zone, alluvium and sandstone/conglomerate as the principal groundwater-bearing units. Siltstone and mudstone may locally restrict groundwater flow, while structural features west of the TSF development area may either enhance flow or act as barriers.

Groundwater flow trends from north to south, broadly following regional topography. Recharge occurs through rainfall infiltration, localised recharge beneath rivers and streams, vertical leakage through semi-confined units, and interflow/throughflow within the shallow subsurface. Recharge is expected to be greatest on sandy and gravelly ridges and reduced in areas underlain by low-permeability mudstones and shales or steeper slopes. There are some mixing and interaction of older, deeper groundwater and younger, shallower groundwater as natural recharge processes occur. Groundwater discharge is expected near streams, where water levels are commonly close to the ground surface.

Shallow groundwater is highly responsive to rainfall, with rapid rises and subsequent drainage over hours to days. Deeper groundwater generally reflects recharge from the shallow system, with a downward hydraulic gradient observed between shallow and deep bore pairs across the site. Locally confined and artesian conditions were recorded in deeper sections at some locations, indicating the presence of low-permeability layers and hydraulic separation within the subsurface.

Groundwater is generally fresh, near neutral pH, and commonly of calcium-bicarbonate to sodium-bicarbonate type, with deeper groundwater tending towards sodium-bicarbonate composition. Most samples have low dissolved solids and low chloride and sulphate, with many metals at or below detection limits. Manganese and iron are present in several samples. Trace amounts of barium and strontium are common, indicating interaction with clay and/or carbonate rich lithologies, as expected due to the abundant presence of clayey soils and rocks.

Groundwater is used by local communities for drinking, cooking, washing, gardening, livestock and other domestic purposes, mainly via dug wells, springs and a limited number of supply bores. Shallow aquifers also support baseflow to the Ok Birim and Ok Tedi, as well as local springs and seeps, particularly during dry periods.

4.6 AQUATIC ECOLOGY

The TSF development area includes the tributary and headwater creek systems within and adjacent to the proposed TSF footprint, while the infrastructure corridor development area includes the Ok Ma watercourses and the main Ok Birim channel intersected by the pipeline alignment (OB1 to OB4). In the 2025 surveys conducted by SLR (2026), aquatic habitats within the TSF development area, were found to vary between coarse-substrate in the main channel sites and finer-substrate forested creeklines. The aquatic flora was limited to two taxa, *Nymphaea cf. elleniae* and *Vallisneria* sp. Fish surveys recorded 27 freshwater fish species and one crayfish species, including 25 native and two introduced species. Although smaller tributary and headwater creeks supported fewer species overall, they contained several species of conservation significance, including the endangered Fly River rainbowfish (*Melanotaenia sexlineata*), the Endangered

swamp gudgeon (*Oxyeleotris stagnicola*), and the recently described Kiunga blue-eye (*Kiunga leucozona*), which was largely restricted to creek habitats (SLR 2026).

At the time of the ESIA preparation, laboratory analysis of the 2025 macroinvertebrate samples was still in progress and results were not yet available. Accordingly, baseline interpretation relies on the 2014/15 survey, which documented macroinvertebrate communities across the broader Ok Birim study area, including adjacent creeks within and downstream of the TSF footprint. The Ok Ma study area was not included in that survey. Macroinvertebrate communities in the Ok Birim were diverse, with 226 taxa across 25 sites (WRM 2016), and richness was higher in more heterogeneous habitats, indicating the importance of habitat complexity for aquatic invertebrates (Bis et al. 2000; Miserendino 2001, cited in WRM 2016).

For the infrastructure development corridor, the main Ok Birim channel was characterised by a wide, deep, fast-flowing channel with cobbles and pebbles, while Ok Ma supported open-channel, fast-flowing freshwater habitats with larger substrate and sand and silt between coarse material. Similar to the TSF development area, the aquatic flora was limited to two taxa, *Nymphaea cf. elleniae* and *Vallisneria* sp (SLR 2026). The main Ok Birim channel supported the highest fish abundance and diversity, including 31 species and 563 individuals, while Ok Ma recorded 16 species and 238 individuals, majority native (SLR 2026). Conservation-significant species recorded in the infrastructure corridor development area included the Critically Endangered Ok Tedi rainbowfish (*Melanotaenia oktediensis*), the Near Threatened Robert's goby (*Glossogobius robertsi*), and an unidentified *Neosilurus* sp. considered potentially new to science. Ok Ma also appears to function as refuge habitat for species displaced from the more impacted Ok Tedi system.

Fish tissue analysis generally showed low concentrations of arsenic, cadmium, copper and lead relative to guideline values, while selenium was elevated in some species but was not considered to indicate adverse ecological or human-health impacts under typical consumption patterns. Zinc also remained below realistic dietary risk thresholds, and arsenic was below detection limits. Introduced species were recorded in both areas, including tilapia (*Oreochromis* spp.) and striped snakehead (*Channa striata*), which are recognised as invasive and tolerant of disturbed freshwater environments (Papua New Guinea Department of Conservation 2017).

4.7 TERRESTRIAL ECOLOGY

Vegetation in the project area was dominated by forest inventory management system (FIMS) communities of Medium/Small Crowned Forest, Mixed Medium and Small Crowned Forest, and Large/Medium Crowned Forest, with the infrastructure corridor development area generally supporting taller, more intact forest and the roadside area showing only narrow strips of regenerating secondary vegetation. The Large/Medium Crowned Forest type in the infrastructure corridor development area is considered more disturbed than Mixed Medium and Small Crowned Forest and Medium Crowned Forest / Small Crowned forest types (Hammermaster and Saunders 1995).

The TSF development area supported 477 vascular plant species from 97 families, including 39 flora species of conservation significance and four taxa likely new to science. A total of 195 species were recorded at Site 4 in the infrastructure corridor development area and 138 at Site 5, including species listed by the International Union for Conservation of Nature (IUCN) as Endangered and Vulnerable. Two invasive flora species, *Decalobanthus peltatus* and *Piper aduncum*, were recorded along the Infrastructure Tax Credit Scheme (ITCS) road and were largely confined to disturbed roadside vegetation. Fauna surveys recorded a diverse assemblage of mammals, birds, frogs, reptiles and odonates, including conservation-significant species and several taxa of uncertain taxonomy or potentially new to science. In the TSF development area, notable records included the Bulmer's fruit bat, eastern long-beaked echidna, New Guinea harpy eagle, Pesquet's parrot, and several restricted-range frogs and damselflies (BMT WBM 2015). The infrastructure corridor development area supported additional bat, bird, amphibian and odonate species, including species associated with caves and intact forest streams (BMT WBM 2016).

Overall, the project area contains a high number of conservation-significant taxa, including 54 flora species of conservation significance, multiple threatened or protected fauna species, and numerous undescribed or taxonomically uncertain species. This includes threatened birds such as the New Guinea harpy-eagle and Pesquet's parrot, threatened mammals such as the eastern long-beaked echidna, and a range of data-deficient or potentially new amphibians and odonates. The TSF development area also contains 20 culturally significant plant species used by local communities for food, construction, medicine, weapons and craft, including sago, *Pometia pinnata* and *Terminalia kaernbachii*.

4.8 AIR QUALITY

PNG's near-equatorial location results in relatively stable temperatures and limited seasonal variation, while high rainfall for much of the year suppresses dust generation. Air quality across the project area is influenced primarily by local and regional meteorological conditions, which affect wind patterns and the dispersion of airborne particulates. Air quality around the TSF development area is considered generally good, with low background anthropogenic influence. Local emission sources include fugitive dust and particulates from OTML activities, village land use, exposed surfaces and unsealed roads, smoke from seasonal burning and household cooking, and exhaust emissions from vehicles and river boat motors.

No air quality monitoring has been undertaken within the project area as ambient conditions are anticipated to be consistent with other rural locations in the region that share similar environmental characteristics. In 2022, OTML conducted a dust monitoring study along the Tabubil-Kiunga Highway and at Bige stockpiles to assess dust concentrations associated with the highway traffic and OTML's operational activities, and their influence on air quality (OTML 2023). The study findings indicated that existing regional sources of dust emissions associated with Tabubil-Kiunga Highway traffic and Bige operations are not of significant concern for air quality around the TSF development area. However, short-term elevated dust levels may occur between July and September when prevailing southeasterly winds potentially transport fugitive dust from the Bige stockpiles, particularly during dry weather. These levels are not significant given their short duration and the frequent rainfall that naturally suppresses dust.

4.9 NOISE

The noise environment in the project area is expected to be typical of a remote rural setting, with low background levels influenced mainly by natural sources. The main ambient noise sources are likely to include insects, birds, wildlife, rainfall, wind and occasional village activity. Because the area is remote and distant from major urban or industrial centres, baseline noise levels are expected to be relatively low, although the climate supports year-round insect activity and therefore a persistent natural background soundscape.

Current noise levels around the TSF development area are also influenced by traffic on local roads and tracks, including cars, trucks and river boats. No baseline noise monitoring has been undertaken within the project area, but conditions are expected to be comparable to other rural PNG locations, where LA90 levels are typically around 30 to 50 dBA and average noise levels are generally 40 to 60 dBA, with higher noise levels often occurring at night when insects are most active.

5. SOCIO-ECONOMIC SETTING

This chapter summarises the existing socio-economic environment. The purpose of this chapter is to describe the communities, livelihoods, infrastructure and social values that may be affected by closure activities. The study area for the social characterisation includes communities that may be affected by the project through construction, operations and decommissioning. For closure planning, the relevant social sub-areas are:

- **TSF communities:** the seven villages identified in the social characterisation, which may experience direct effects from the TSF and associated closure activities.
- **Infrastructure corridor communities:** communities located along the transport and infrastructure corridor development area that may be affected by access changes, rehabilitation works and removal of infrastructure.
- **Regional service centres:** settlements such as Kiunga, Ningerum and Tabubil, which may experience indirect effects through employment, supply chains, services and migration patterns.

Socio-economic characterisation was undertaken as part of the socio-economic impact assessment (SIA) (Tetra Tech Coffey 2026b). The TSF communities are the most rural, subsistence-based, and directly exposed to project-related changes, while the infrastructure corridor communities are more transitional, remaining largely rural but shaped by roadside settlement patterns, access routes and links to nearby services. The regional service centres are the most urbanised and service-rich, attracting greater migration and economic activity. Table 5.1 summarises the main different characterisation across the three sub-areas.

Table 5.1 Socio-economic characterisation across the social sub-areas

Feature	TSF communities	Infrastructure corridor communities	Regional service centres
Demographics	Relatively young to middle-aged; mostly male-skewed populations; lower dependency ratios than provincial average; some vulnerability linked to older residents, single mothers, and people with disabilities.	More mixed and settlement-based; demographics shaped by relocation, roadside settlement, and movement toward services; less uniform than TSF villages.	More densely populated and more migratory; attracts in-migration from rural areas, other provinces, and Indonesia; less kin-based and more urban in profile.
Land use	Dominated by subsistence gardening and customary land use; gardens, sago, hunting, fishing, and cash crops tied closely to clan boundaries and river systems.	Shaped by roadside settlement and access, and mixed gardening/forest/river use; land use influenced by movement along the highway and adjacent areas.	More urban and service-oriented; land used for housing, commerce, administration, transport, and institutional functions rather than customary subsistence.
Economy	Largely subsistence-based and resource-driven; gardening, cash cropping, casual labour, artisanal and small-scale mining, and compensation payments are key income sources.	More mixed livelihoods; subsistence remains important, but roadside trade, market access, and some alluvial mining are more prominent.	More cash-based and service-driven; employment, trade, administration, business, and mine-linked activity are more important than subsistence production.
River use	Rivers and creeks are central to food collection, transport, and resource gathering; strong dependence on fish, prawns, turtles, edible plants, and canoe movement.	River use remains important, especially in river- and creek-based settlements, but is shared with road and bridge access.	River use is secondary to road-based transport and services, though it still supports regional connectivity and some trade.
Education	Limited access and relatively low attainment; primary schooling is most common, with barriers to secondary and tertiary progression.	Better practical access than TSF villages due to schools located along the infrastructure corridor development area, but secondary education still requires travel to regional centres.	Strongest access to education; regional centres contain secondary, technical, and other higher-level facilities.
Health	Very limited local services; strong reliance on nearby centres for more serious care; maternal health and communicable diseases are key concerns.	Constrained but somewhat better access than TSF villages through local aid posts and nearby centres such as Tabubil and Ningerum.	Most developed health services, including hospitals and clinics, but also highest service pressure and demand.
Governance and law and order	Local leaders are the main first point of contact; limited formal policing and no village courts; some concerns about sorcery, alcohol/drugs and disputes.	Governance is also locally based, but boundary issues, settlement patterns, and mobility make disputes and access control more complex.	Stronger formal police presence, but also more visible law-and-order challenges linked to higher population pressure and urban activity.
Cultural heritage	Heritage is deeply tied to clan identity, ancestral settlement, burial places, sacred sites, and living customary practice.	Heritage is also significant, with many recorded tangible and intangible sites within the infrastructure corridor development area, including oral tradition, boundaries, and settlement remains.	Cultural heritage is less dominant as a land-use feature, but centres are important regional meeting and service nodes for surrounding communities.
Transport	Most constrained; travel mainly by foot, canoe, dinghy, or a combination of walking, canoe/boat and public motor vehicle, often taking hours to reach service centres.	Better than TSF villages due to the highway, footbridges, and boat access, though still constrained in some places.	Best connected; centres sit on the main regional transport network and function as movement hubs.

6. STAKEHOLDERS

This section summarises the stakeholder identification, engagement activities and outcomes relevant to closure planning, and future engagement activities.

6.1 STAKEHOLDER IDENTIFICATION AND CONSULTATION

Stakeholder identification and consultation have been undertaken to inform project affected communities and other relevant parties of the Project, its potential impacts, and the proposed management measures. The engagement process is structured to support transparent communication, meaningful participation, and a collaborative approach to issue identification and response. Consultation will continue as an ongoing process throughout the full project lifecycle, including planning, construction, operations, closure and post-closure, to capture and address stakeholder concerns, changing circumstances and emerging issues. The engagement framework is intended to meet statutory requirements and is consistent with principles of informed, accessible and culturally appropriate consultation.

6.1.1 Stakeholder identification

Stakeholder identification and mapping have been completed to determine the key groups with an interest in the project closure and those that may experience direct or indirect impacts. The stakeholder register was informed by the project footprint, specialist studies, household surveys, landowner identification activities, and discussions with community leaders during initial engagement in mid-2025.

The stakeholder groups that may be affected by, influenced, or have an interest in project activities are presented in Table 6.1.

Table 6.1 Key stakeholder groups

Stakeholder group	Stakeholder description
Affected landowners and project affected communities	Affected landowners and project affected communities comprise customary landowner groups and other communities impacted by, or near, project infrastructure and closure activities. They are: • Landowners and communities within the seven villages surrounding the TSF site, comprising Kungim, Ambaga, Birimkamba, Karandimok, Kungembit, Putmambin, and Komokpin. • Communities and businesses in Alice Pit, located on the eastern side of the Ok Tedi. • Communities and business along the infrastructure corridor development area, including Kumkit, Ankit, Ok Teditau, Boungkim, Wombon, Digam, Ningerum Tamaro, Bolewogam and Wogam. It also includes those within approximately 26 villages located along Tabubil-Kiunga Highway between Alice Pit and Ok Tedi Mine. • Communities and businesses along the proposed transport route between Kiunga and Alice Pit, including those within approximately 19 villages located along the Tabubil-Kiunga Highway. • Communities, businesses and other stakeholders within the regional centres of Tabubil, Ningerum and Kiunga.
Community services and NGOs	This group comprises government and non-government service providers (e.g., health, education, police) that service the project affected communities, and non-government organisations such as research, religious, and environmental and social interest groups. OTML currently engages with a range of stakeholders around operational, environmental, livelihood and social issues, including environmental groups, church organisations, Ok Tedi Development Foundation, PNG Sustainable Development Program, and PNG Chamber of Resources and Energy.

Stakeholder group	Stakeholder description
Provincial, district and local level governments	The following provides a summary of the main infrastructure and activities in each of the local level government (LLGs): • Ningerum Rural LLG – proposed TSF site, proposed tailings pipeline from south of the Ok Menga to the proposed TSF site, and proposed transport access north of Ok Mart at Bige. • Star Mountain LLG – proposed tailings pipeline from north of the Ok Menga to the Ok Tedi Mine. • Kiunga Rural LLG, which includes the proposed transport route south of Ok Mart to Kiunga town, and Komokpin village located south of the proposed TSF site. • Kiunga Urban LLG, which is the location of Kiunga shipping facility that will be used for transport of materials and equipment, and the proposed transport route through Kiunga town. The North Fly District Development Authority was established in 2014 under the *District Development Authority Act 2014*. It is responsible for coordinating and implementing development plans and projects in the North Fly District, which includes the communities of Ningerum, Olsobip, Star Mountains and Kiunga. The capital and administrative headquarters for the Western Province is Daru. Other major townships in the province include: • Tabubil, which is the headquarters for OTML and the Star Mountain LLG. • Ningerum, which is the headquarters of the Ningerum Rural LLG. • Kiunga, with is the headquarters of the Kiunga Urban LLG.
PNG Central Government	Comprises key agencies responsible for regulating and managing resource developments, including mine closure. OTEMA, administered by CEPA. recognises the MCPs as a formal legal instrument and makes compliance with it enforceable through CEPA's regulatory powers. The MRA is the PNG National Government agency responsible for the management of mineral resources in PNG. The Ok Tedi Mine Closure and Decommissioning Code 2001 requires OTML to submit the MCP to MRA for approval. The plan must address rehabilitation, decommissioning, closure costs and socio-economic impacts of mine closure Engagement with these departments is mandated by legislation for some closure-related activities.
Other parties	This includes stakeholders with a broader interest in the project, such as OTML employees, contractors, suppliers, PNG media (e.g., newspaper, radio, television), lender organisations, people of the wider North Fly District and Western Province, and the general public.

Communication and consultation methods are tailored to the needs, language, and literacy levels of each stakeholder group. OTML maintains an established complaints and grievance management system to capture and address stakeholder feedback in a structured manner.

6.1.2 Stakeholder consultation

Stakeholder engagement is critical to mine closure planning. There has been, and continues to be, a range of stakeholder consultation conducted in relation to the project. The key objectives of stakeholder engagement conducted to date were to inform potentially affected communities and other interested stakeholders about the project and its impacts, receive input regarding physical and social effects, maintain a continued partnership with stakeholders, and meet applicable statutory requirements.

Engagement has been guided by principles consistent with a free, prior and informed consent approach. These include the provision of clear and accessible information, the use of meaningful and effective engagement methods, respect for privacy and confidentiality, and scheduling that aligns with community governance and decision-making processes.

Stakeholder engagement for the ESIA has included project briefings, simplified technical presentations, public hearings, and ESIA/EIS roadshows. The engagement with project affected communities and other stakeholders will continue throughout the project lifecycle, including during construction and through to closure.

6.1.2.1 Summary of outcomes and closure-relevant issues

The outcomes of the stakeholder consultation conducted as part of the ESIA (Tetra Tech Coffey 2026a) indicate that the most significant issues relate to land access, livelihood security, environmental risk, and long-term community wellbeing. Communities near the TSF raised concerns about the loss of land used for hunting, fishing, and gardening, as well as the need to preserve access for future generations. Concerns about TSF safety, flood and earthquake risk, in-migration, and the potential erosion of traditional practices and local governance capacity were also raised.

These issues are important for closure planning because they will inform the final land use outcomes, rehabilitation objectives, post-closure safety management, and the acceptability of relinquishment arrangements. In particular, land and livelihood concerns may require closure measures that support alternative access, compensation, or livelihood transition, while long-term TSF safety concerns support the need for robust closure design, monitoring, and clearly defined post-closure responsibilities.

OTML's grievance mechanism and future engagement activities, including consultation on compensation, construction impacts, and closure, will be important in addressing these concerns and supporting closure planning.

6.1.2.2 Future engagement activities

Engagement with project affected communities and other stakeholders is ongoing and will include:

- Mine closure information sharing through consultation patrols, coordinated by OTML with the Environmental Department, Ok Tedi Development Foundation and government officials, reaching approximately 170,000 people across 158 villages from the mine area to the South Fly (OTML 2025b).
- Public disclosure of the EIS and EIS roadshow in conjunction with CEPA and MRA to present the findings of the ESIA.
- Project updates and stakeholder briefings to provide information on key project decisions and milestones.
- Engagement with customary landowners of land directly impacted by the project, to provide information on landowner compensation.

General mine closure messages have also been communicated to key stakeholders through newsletters, presentations, conferences, annual review reports and newspaper articles, and this communication will continue (OTML 2025b). If the project proceeds, engagement will continue during the construction phase to provide information on construction activities, potential impacts and proposed management measures. This engagement will then continue throughout the life of the project, including leading up to, during and after closure.

7. CLOSURE RISKS

This chapter presents the preliminary risk assessment for project closure. The preliminary risks are drawn from the Ok Tedi Mine Closure Plan Risk Assessment (OTML 2022) and the KCB Lowlands Tailings Storage Facility Closure Concept Design Report (KCB 2026b). The risks identified in these reports were reviewed and, where relevant, incorporated into this CCP.

The first comprehensive Ok Tedi mine closure risk assessment was undertaken by OTML as part of the Mine Closure Plan Risk Assessment (OTML 2009) using a workshop-based methodology. The process included multidisciplinary review sessions, risk brainstorming, reassessment of the existing risk register, and ranking of risks using the OTML Ok Tedi Risk Analysis Matrix (RMI 2023). The assessment classified risks as low, medium, significant, or high based on their potential social, environmental, and financial consequences, and the likelihood of those consequences occurring. OTML last updated the mine closure risk assessment in 2025 (OTML 2025b) and prior to mitigation, 29 high and 28 significant risks were identified. Following mitigation, only two high risk and 21 significant risks remained, of which four of the significant risk were relevant to the project context.

KCB reviewed OTML's mine closure risk assessment and completed a preliminary TSF closure risk assessment (KCB 2026b). In total, 11 key closure risks were identified and assessed. These risks informed the development of the closure design for the TSF.

The preliminary closure risks identified for this CCP should be considered an early-stage conceptual assessment to support the closure concept design rather than a completed closure risk assessment. Further work is required to undertake a more comprehensive closure risk analysis, including broader stakeholder input.

This preliminary risk assessment identified 15 risks showed in Table 7.1, and these were grouped into the following categories:

1. **Health, safety and security:** Public access to unsafe areas; failure of embankment stability; overtopping; unstable slopes; construction/decommissioning hazards.
2. **Environment:** Seepage and groundwater impacts; surface water quality impacts; erosion; landform evolution; revegetation failure; metal uptake.
3. **Community and government:** Social licence; community opposition; future land use mismatch; approvals and obligations; stakeholder expectations; socio-economic transition.
4. **Closure execution:** Infrastructure decommissioning; asset transfer; closure sequencing; unplanned closure; contingency management; closure implementation constraints.

Table 7.1 Preliminary TSF closure risks

Categories	Attribute	Risks	Source
Health, safety and security	Tailings runout / flowability	• Static and seismic-induced liquefaction of foundations or embankments. • Internal erosion.	KCB 2026b
	Flood routing and drainage	• Overtopping of impoundment facility leading to loss of containment. • Erosion of embankment toe.	KCB 2026b
	Public access	• Access by future land users exposes tailings. • Redundant aging infrastructure creating a risk to people.	KCB 2026b
Environment	Landform erosion	• Erosion and landform evolution. • Weather events beyond design.	KCB 2026b
	Groundwater and seepage flow and quality	• Material impact to groundwater users. • Material impact to environmental values.	KCB 2026b
	Surface water flow and quality	Material impact to downstream surface water users.	KCB 2026b
	Soil / vegetation metal uptake	Vegetation within the tailings area may accumulate elevated concentrations of metals through root uptake, which could pose a pathway for exposure to humans and wildlife if consumed.	KCB 2026b
	Progressive revegetation	• Vegetation does not become self-sustaining. • Vegetation is not compatible with future land use. • Vegetation is damaged by fire, particularly during the early stages of rehabilitation. Reasons include soil physical/chemical properties and quantities, inappropriate final landform, lack of maintenance and management, contamination, fire or weather events beyond design.	KCB 2026b
	Riverine systems	Impacts to riverine systems may be worse than modelling/predictions post closure.	OTML 2025b
	Extreme weather	El Niño and La Niña-driven rainfall variability may result in weather events beyond design assumptions, with potential impacts to erosion, flooding, revegetation and water quality.	-
Community and government	Community and government	New third-party owners of infrastructure may not have the capacity/capability to manage infrastructure effectively after OTML has departed.	OTML 2025b
		The State may mandate that public assets must remain after closure, even though OTML and partners have agreed to remove assets.	OTML 2025b
		Cross-border migration or informal settlement near restricted areas may increase encroachment and safety/security risks and may affect relinquishment outcomes.	-

Categories	Attribute	Risks	Source
	Roads and bridges access	Loss of access of Kiunga-Tabubil road due to road failure.	OTML 2025b
		Loss of access to the Ok Tedi bridges, particularly the bridge near Ningerum.	-
	Stakeholder support	Failure to meet internal and/or external stakeholder (communities, regulators, current workforce, Indigenous peoples) expectations and/or obtain support for closure strategy.	KCB 2026b
	Socio-economic transition	Loss of TSF-related employment opportunities post-closure may negatively affect local livelihoods, reducing community support for closure and increasing social, reputational, and relinquishment risks.	KCB 2026b
Closure execution	Asset transfer	Regulatory uncertainty regarding the closure and relinquishment process and outcomes.	KCB 2026b

Sources: OTML 2022 and KCB 2026.

8. CLOSURE FRAMEWORK

Early integration of closure requirements into project planning is essential to minimise long-term environmental, social, and safety risks and to reduce rehabilitation and post-closure management costs. The TSF has been conceptually designed with closure in mind, with closure-related design considerations incorporated at feasibility stage to support safe, stable and maintainable post-closure landforms.

The closure framework provides the basis for defining closure objectives, conceptual completion criteria, and indicators that will be used to guide implementation and demonstrate closure success. The framework is iterative and will continue to be refined as the project advances through detailed design, construction, operation and closure.

The closure framework is structured around three linked elements:

- **Objectives,** which define the environmental, physical, chemical and social intent of closure.
- **Criteria,** that describe the measurable or verifiable conditions required to achieve each objective.
- **Indicators,** that provide the evidence used to confirm that completion criteria have been met and that the landform is performing as intended.

The proposed closure framework is consistent with the Global Industry Standard on Tailings Management (2020) and Integrated Mine Closure: Good Practice Guide (ICMM 2025).

8.1 CLOSURE VISION AND OBJECTIVES

This CCP consolidates the closure vision and objectives developed by OTML (OTML 2025b), the closure objectives identified by KCB (KCB 2026b), and additional closure objectives relevant to the project. OTML developed a mine closure vision in the 2009 DMCP, which remains relevant to this CCP. The mine closure vision states:

> *Rehabilitated areas will support self-sustaining vegetation dominated by native species and will be suitable for use consistent with that of surrounding natural areas, at a lower intensity. Operational assets retained after closure will be operated and maintained by a new owner.*

In order to achieve the vision, OTML developed a number of key overarching objectives. These objectives, together with those identified by KCB and the additional objectives included in this CCP, provide an integrated closure framework for long-term closure planning. Table 8.1 shows the consolidated closure objectives for the project.

Table 8.1 Closure objectives

Aspect	Closure Objective	Source
Rehabilitation / land use	After closure, areas physically impacted by the project that have been rehabilitated, will be suitable for the agreed post-closure land use.	OTML 2025b / KCB 2026b
Rehabilitation / biodiversity	Accessible areas will be progressively rehabilitated during operation, to support self-sustaining, perennial vegetation that is dominated by native species; other areas will be allowed to naturally revegetate.	OTML 2025b
Infrastructure / decommissioning	Operational assets left after closure will have the capacity to function, while other above-ground infrastructure and below-ground infrastructure where practical, will have been removed.	OTML 2025b
Waste / contamination	Wastes will have been stored to minimise off-site impacts and contaminated sites will have been treated appropriately.	OTML 2025b

Aspect	Closure Objective	Source
Geotechnical stability / erosion	Areas will have geotechnical stability appropriate for their post-closure purpose and the potential for accelerated erosion will have been minimised.	OTML 2025b
	Prevent dam failure and tailings release.	KCB 2026b
Environmental protection	Protect air, land and water receptors to acceptable levels.	KCB 2026b
Social outcomes	Provide the local communities with long-term, sustainable opportunities following closure.	-

Sources: Adapted from KCB Lowlands Tailings Storage Facility Closure Concept Desing Report (KCB 2026b) and Ok Tedi Mining Mine Closure Plan 2025 (OTML 2025b).

8.2 CONCEPTUAL COMPLETION CRITERIA

Completion criteria are used to demonstrate that closure objectives have been achieved. They provide a measurable framework of environmental and social indicators against which rehabilitation and closure outcomes can be assessed. Once these criteria are met, and confirmed through an appropriate monitoring programme, the rehabilitated site can be shown to have achieved the required closure requirements.

Two categories of completion criteria are typically applied:

- Design and construction criteria, which define the intended design parameters and quality assurance requirements during implementation.
- Outcome or completion criteria, which demonstrate whether closure has been successful in practice.

These criteria will be progressively refined to ensure they are Specific Measurable Achievable Relevant Time-bound (SMART), support sustainable development principles, and reflect the outcomes of additional studies, monitoring data and stakeholder consultation.

The process begins with defining the intended post-rehabilitation land and water uses in consultation with stakeholders, and translating these uses into performance requirements for the rehabilitated area. Detailed closure designs are then developed to meet the design basis criteria, followed by quantitative assessment to test whether the design is likely to achieve the required closure outcomes. If needed, the design is revised, and the key completion criteria are refined.

Following implementation, site monitoring and progressive rehabilitation data are used to refine completion criteria and assess whether the completed works are performing as intended. Where monitoring shows that criteria are not being met, remedial actions are developed and implemented to restore compliance with the required closure performance standards.

Draft conceptual completion criteria that are applicable for the TSF domains are outlined in Table 8.2. These will be refined based on experienced and knowledge gained during construction and operation, and through the completion of targeted closure investigations.

Table 8.2 Completion criteria for closure objectives

Aspect	Closure objective	Attribute / Performance indicator	Draft conceptual completion criteria	Verification method
Rehabilitation / land use	After closure, areas physically impacted by the project that have been rehabilitated, will be suitable for the agreed post-closure land use.	Post-closure land use	Post-closure land use is agreed with local communities.	Records of community consultation on the post-closure land use.
		Suitability for post-closure land use	Rehabilitated areas are suitable for the agreed post-closure land use.	Assessment by a suitably qualified professional.
Rehabilitation / biodiversity	Accessible areas will be progressively rehabilitated during operation, to support self-sustaining, perennial vegetation that is dominated by native species; other areas will be allowed to naturally revegetate.	Vegetation self-sustaining	• Achieve at least 80% total groundcover on slopes and tops, with no erosion gullies deeper than 1 m during the monitoring period. • Soil and vegetation indicators show progressive improvement or stabilisation, including increasing soil organic matter, mineralisable nitrogen, species diversity, late-successional (Group 3) species, culturally important species, and volunteer regeneration between planting islands. • Available copper remains below phytotoxic levels, and dominant vegetation reflects surrounding forest communities.	Vegetation performance monitoring and reporting by a suitably qualified professional.
		Weed establishment and control in rehabilitated areas	Rehabilitated areas are monitored and managed to minimise the establishment and spread of declared weeds, and exotic species are present only at low, non-dominant levels with no increasing trend over three consecutive monitoring events.	Annual weed and vegetation surveys and photo-monitoring.
Infrastructure / decommissioning	Operational assets left after closure will have the capacity to function, while other above-ground infrastructure and below-ground infrastructure where practical, will have been removed.	Asset decommissioning and retained asset transfer	All fixed assets and infrastructure are decommissioned and removed unless otherwise agreed to with relevant stakeholders. Retained assets to be formally transferred to agreed owners and uses.	Asset decommissioning records, transfer documentation, final inspection, and handover records.
Waste / contamination	Wastes will have been stored to minimise off-site impacts and contaminated sites will have been treated appropriately.	Land contamination	All wastes have been removed, stored, or disposed of in accordance with approved waste management requirements, and contaminated sites have been remediated to an acceptable level for the post-mining land use.	Waste disposal and treatment records and contaminated site assessment by a suitably qualified professional.

Aspect	Closure objective	Attribute / Performance indicator	Draft conceptual completion criteria	Verification method
Geotechnical stability / erosion	Areas will have geotechnical stability appropriate for their post-closure purpose and the potential for accelerated erosion will have been minimised.	General landform stability and erosion control	Final landforms are geotechnically stable and suitable for the approved post-closure land use, with no active instability, excessive slumping, or accelerated erosion that could compromise long-term performance.	Inspection and sign-off by a suitably qualified professional.
		TSF flood routing and drainage	Flood routing meets design criteria and functions as intended. Drainage configuration promotes free drainage conditions.	Dam safety review by suitably qualified professional.
		TSF landform erosion	No erosion resulting in material impact to dam stability including loss of containment. Long-term maximum erosion rates from the final landform are comparable to surrounding vegetated landforms (e.g., no gullies >1 m formed on crowns or slopes 80% ground cover achieved).	
	Prevent dam failure and tailings release.	Tailings runout / flowability.	The landform is performing in accordance with the final approved detailed designed intent; and is physically stable, considering: • Potential for flow failure beyond the immediate bounds of the facility cannot travel and impact people, property or protected environmental / cultural values. • Phreatic levels within the impounded tailings not increasing above trigger levels defined in the Operating, Maintenance, and Surveillance Manual (OMS). • No internal erosion that leads to a material impact. Allowable deformation.	Dam safety review by suitably qualified professional.
	Protect water receptors to acceptable levels.	Water quality	Surface water and groundwater quality meets relevant criteria at receptor locations.	Water quality monitoring records.
		Plant metal uptake	No acute or chronic risk of metal uptake for agreed post-mining land uses.	Assessment by a suitably qualified professional.
Social outcomes	Provide the local communities with long-term, sustainable opportunities following closure.	Community	Support post-closure land use and community development opportunities that provide affected communities with long-term sustainable outcomes.	Records from community consultation and development and/or transition programs.

Source: Adapted from KCB Lowlands Tailings Storage Facility Closure Concept Design Report (KCB 2026b) and Ok Tedi Mining Mine Closure Plan 2025 (OTML 2025b).

8.3 GOVERNANCE FRAMEWORK

Closure implementation will be managed through OTML's established corporate governance and closure-planning arrangements. At the corporate level, OTML's Board of Directors holds primary responsibility for governance, supported by the Appointment and Remuneration, Audit and Risk, and Environment, Safety and Governance committees (OTML 2026).

At the operational level, closure and rehabilitation activities are managed under OTML's integrated management system IMS Standard 3.07 Rehabilitation and Closure (OTML 2019). OTML's rehabilitation and closure standard requires mine closure planning to address both immediate and long-term post-closure impacts, to comply with legal requirements, to integrate input across operational disciplines, and to include consultation with government and affected communities. The implementation of the rehabilitation and closure standard is responsibility of the OTML's Environment Department. Environmental monitoring results will be reported to CEPA.

Review and assurance processes will be applied to key closure-related disciplines where long-term performance depends on landform stability, drainage performance, water management, infrastructure removal, and residual risk controls. Records, monitoring data, inspection reports, and closure approvals will be retained and maintained in an accessible format to support compliance, transition and eventual relinquishment.

8.4 SOCIO-ECONOMIC CONSIDERATIONS FOR CLOSURE

Closure of the TSF will have social and economic implications that extend beyond physical rehabilitation. These considerations are important because closure decisions may affect land access, livelihoods, community wellbeing, customary practices, and the future use or transfer of infrastructure. Accordingly, socio-economic factors must be considered alongside environmental, geotechnical and governance requirements to ensure that closure outcomes are practical and socially acceptable.

8.4.1 Key socio-economic issues for closure

A number of closure-relevant issues may influence how the project's final landform, infrastructure and management arrangements are perceived and experienced by affected communities. These issues relate primarily to continued land access, livelihood security, community wellbeing, environmental safety, customary practice and the future use of infrastructure. Table 8.3 summarises the main considerations for closure planning and highlights areas where early engagement and transition planning will be important.

Table 8.3 Key socio-economic features for closure

Feature	Closure relevance
Land access and future land use	Communities may be concerned about reduced access to land previously used for gardening, hunting, fishing and material gathering. Closure planning should therefore consider post-closure land use options that maintain safe and practical access where appropriate.
Livelihood security	Closure-related changes to employment, procurement and support services may reduce household income and local business activity. Closure planning should include workforce transition and supplier transition measures.
Community wellbeing	Closure may affect social stability, household resilience and perceptions of long-term wellbeing if it results in reduced land access, reduced services or uncertainty about future land use. Early and ongoing engagement will be important to manage expectations and support transition.

Feature	Closure relevance
Environmental risk and safety	Communities near the TSF have raised concerns regarding flood risk, earthquake risk and long-term TSF safety. Closure planning must demonstrate that the final landform will be stable, safe and suitable for long-term management.
Customary practices and governance	Communities identified the potential erosion of traditional practices and local governance capacity as a concern. Closure planning should support culturally appropriate engagement and, where possible, align closure decisions with community priorities and governance structures.
Infrastructure continuity	Where roads, access tracks or other infrastructure have ongoing community value, closure planning should consider whether these can be retained, safely transferred or repurposed. Where infrastructure is no longer required, decommissioning should avoid creating unnecessary barriers to future land use.

Source: Adapted from the ESIA community consultation (Tetra Tech Coffey 2026).

8.4.2 Post closure land use planning

At closure, the final landform of the TSF development area and the infrastructure corridor development area is expected to comprise a combination of rehabilitated containment areas, drainage features, and retained or repurposed infrastructure where appropriate, with end land uses to be confirmed through consultation with relevant stakeholders. This approach is consistent with established industry practice, particularly the ICMM (2025) guidance on multistakeholder approaches to socio-economic transition in mining, which supports coordinated planning, flexible decision-making, and continued assistance to communities throughout closure.

There is currently no agreed post-mining land use for the TSF, so the final landform should be capable of supporting a range of future uses that are compatible with surrounding land uses and beneficial to local communities (KCB 2025). The following options have been identified as potential post-closure land uses for the TSF development area:

- Community gardens and other low-intensity productive land uses.
- Mixed native vegetation and rehabilitation for conservation or low-intensity use.
- Controlled access areas for monitoring and maintenance.
- Government- or third-party-managed land uses where compatible with site conditions.
- Retained or repurposed infrastructure, including access roads or other assets, where safe and beneficial.
- Land uses that support food security, customary use, and local community needs.

Early agreement on end land use is important, as it will influence the design of decommissioning, demolition, rehabilitation, and access management measures. The identification of suitable post-closure land uses remains an important workstream to be completed through the closure planning process. This work will require that the project:

- Undertake, in consultation with relevant stakeholders, end land use options study for the TSF, hydro-cyclone area, and access roads.
- Assess potential post-closure land uses, including associated risks, opportunities, costs, practicality, and implementation requirements.
- Update the closure plan to reflect the agreed end land uses and management arrangements.

Most importantly, an agreement may be reached to transfer selected infrastructure, such as access roads or other suitable assets, to a third party where this is mutually beneficial and can be demonstrated to be safe and sustainable. Retention or transfer decisions should be based on long-term safety, maintainability, and value to future land users. Once infrastructure has been relinquished, responsibility for ongoing upkeep and associated liabilities would cease, subject to the agreed transfer arrangements.

8.5 UNCERTAINTIES AND ADDITIONAL WORK

As expected at this stage of the project, a number of closure uncertainties remain and will need to be resolved through further work as the project progresses.

Further work should include:

- Updating the obligations register and closure commitments as approvals progress.
- Refinement of stakeholder expectations.
- Assessment of post-closure land use options.
- Confirmation of the final closure vision and post-mining land use.
- Socio-economic impact assessment prior to closure to further develop social management requirements.
- Refinement of closure completion criteria and verification methods.
- Targeted closure investigations to support design development.
- Review of residual risks associated with drainage, erosion, long-term stability, roads and pipelines.
- Finalisation of long-term maintenance and stewardship arrangements.

9. CLOSURE STRATEGY

The closure strategy is developed on a domain basis, with each domain addressing the principal permanent and temporary project elements requiring decommissioning, rehabilitation, transfer, or ongoing post-closure management. The closure domains include the TSF, hydro-cyclone house, tailings pipeline, roads and bridges, and ancillary infrastructure.

Site-wide closure strategies for decommissioning and demolition, rehabilitation, and community infrastructure and development are also described in this chapter.

Closure will occur in four stages:

- **Operations:** progressive rehabilitation integrated with deposition planning.
- **Closure execution:** decommissioning and demolition, landform reshaping, TSF cover placement, drainage works and revegetation.
- **Post-closure monitoring:** ongoing monitoring and maintenance to confirm completion criteria have been met.
- **Relinquishment:** transfer or relinquishment of the closure area following demonstrated long-term stability and approval by the relevant authorities.

OTML's experience managing the Bige stockpiles has been used to inform the TSF closure approach because it provides a relevant precedent within a similar context, involving large engineered stockpiles, progressive rehabilitation and long-term performance monitoring. Rehabilitation trials undertaken at Bige have demonstrated that conditions conducive to ecosystem development can be established within five years, with monitoring also indicating a high likelihood of longer-term progression toward ecosystem equilibrium. The TSF closure concept is therefore not novel, but is informed by existing trial work and practical lessons learned at Bige, which have been incorporated into the design and implementation of the TSF closure strategy.

The disturbance areas and footprints associated with these domains are based on current estimates and will be refined as further information become available.

9.1 DECOMMISSIONING AND DEMOLITION

All fixed assets and infrastructure will be decommissioned and removed unless otherwise agreed with relevant stakeholders and approved through the closure process. Decommissioning and demolition include the following works:

- Prepare equipment and infrastructure for decommissioning.
- Isolate and de-energise equipment and infrastructure.
- Decontaminate equipment and infrastructure, and dispose of hazardous materials, including hydrocarbons and process residues.
- Demolish plant, buildings, and ancillary structures to foundation or concrete level where required.
- Pack equipment for transport, sale, transfer, donation or disposal.
- Transport equipment for reuse, sale, donation or scrap.
- Remove and dispose scrap materials and redundant infrastructure.
- Disassemble non-essential pipelines, services, and fittings.
- Remove temporary works and non-retained operational assets.

Decommissioning and demolition tasks relevant to specific closure domains are discussed in Sections 9.3 to 9.7. Detailed decommissioning and demolition requirements will be refined through progressive closure planning and updated prior to closure implementation.

For assets intended to remain in place after closure, OTML will:

- Ensure assets have agreed future owners and approved uses.
- Formalise ownership transfer and liability arrangements through transfer documentation.
- Hand over assets in safe and functional condition, where applicable.
- Provide available spares, drawings, and an operation and maintenance plan.
- Ensure retained assets are equipped and maintained for their intended post-closure function.

9.2 REHABILITATION

Rehabilitation generally comprises progressive landform construction to create a stable surface, followed by revegetation or another agreed land use, consistent with PNG rehabilitation and closure guidance and international good practice. Rehabilitation of the TSF will be implemented through a staged closure process, with Cell 1 being closed and rehabilitated once Cell 2 is operational. The closure concept includes decommissioning of non-essential infrastructure, landform reshaping, final cover placement, drainage works, and revegetation to establish a stable and self-sustaining landform consistent with the agreed post-mining land use. There is an opportunity for future studies to demonstrate that revegetation of the TSF development area can be achieved without a cover placement, subject to successful trial outcomes and regulatory approval. Progressive rehabilitation is integrated with deposition planning to reduce the extent of exposed surfaces at any one time and improve long-term closure performance (KCB 2026b).

Surface cover and landform stability may be established relatively quickly, with some objectives demonstrable within two to three years (OTML 2025c). From the Bige experience, monitoring has shown that groundcover development, species recruitment, increases in soil organic matter and improved species diversity can occur within approximately four to five years of establishment, while broader ecosystem function development may take 10 to 15 years under favourable rehabilitation conditions (OTML 2025c). These timeframes should be used as a reference only.

9.2.1 Rehabilitation phases

As part of the TSF rehabilitation and closure planning, the proposed work program has been divided into four phases. These phases are sequenced as follows:

1. Planning and design.
2. Implementation.
3. Ecosystem development and monitoring.
4. Relinquishment.

This phased approach has been adopted in previous MARPs and Mine Closure Plan Updates (MCPUs) for the broader Ok Tedi operations and has been retained for this TSF closure plan. It provides a structured framework for progressing rehabilitation activities and managing closure risks. Table 9.1 shows the proposed activities for each rehabilitation phase.

Table 9.1 Phases for rehabilitation

Rehabilitation Phase	Activity
1	Planning and design: • Final landform design • Drainage and erosion control design • Revegetation design • Completion criteria development.
2	Implementation: • Earthworks • Drainage construction • Revegetation establishment.
3	Ecosystem development and monitoring: • Monitoring against completion criteria • Vegetation establishment • Weed control • Erosion control and adaptive management.
4	Relinquishment: • Verification that closure objectives have been achieved • Handover in accordance with regulatory requirements.

Rehabilitation will be implemented across the TSF, hydro-cyclone house, pipeline, road and bridges, and ancillary infrastructure domains to make each area safe, stable, and suitable for long-term closure and relinquishment.

9.2.2 Rehabilitation landform design

The landform rehabilitation works will comprise:

- Mechanical reshaping to create the final geometry.
- Drainage installation to establish the surface-water control system.
- Where required, placement of a growth medium and erosion protection layers.
- Post-construction verification to confirm that the as-built landform conforms to the approved closure design.

9.2.3 Revegetation strategy

The revegetation strategy will adopt a staged ecosystem development approach, informed by the characterisation data collected for the ESIA (Tetra Tech Coffey 2026a) and lessons learned from the Bige rehabilitation program. The approach integrates ecological knowledge, indigenous knowledge, and practical rehabilitation methods to progressively establish a stable, self-sustaining native vegetation cover across the rehabilitated landform. The revegetation objective is to protect the TSF cover system, reduce erosion risk, support habitat recovery, and achieve a post-closure land capability consistent with the agreed closure intent (KCB 2026b; OTML 2025c).

The conceptual rehabilitation pathway is as follows:

- Pioneer species establishment to stabilise the substrate and begin organic matter development.
- Framework species establishment once pioneer cover is established, to increase structural complexity and wildlife value.

- Late-successional species establishment after sufficient shade and soil improvement, to support long-term forest recovery and cultural landscape values.

Revegetation will commence with the establishment of pioneer species and early successional groundcover to rapidly stabilise the substrate, reduce surface erosion, and initiate organic matter accumulation. Where practicable, tube-stock planting will be supported by soil and bark mulch to improve establishment success and surface protection. Vegetation development, erosion performance, and ecosystem function will be monitored, with infill planting and other maintenance interventions implemented where required (KCB 2026b; OTML 2025c).

As pioneer cover becomes established, framework species will be progressively introduced, initially in island planting patterns on flatter areas, to increase structural complexity and provide wildlife resources and other community-valued functions. Species of sago, Pometia, Artocarpus, and Terminalia are examples of framework species identified for this purpose. Community consultation at Bige included an ethnobotany study that identified culturally important plant species for inclusion in the rehabilitation species list, providing a useful precedent for revegetation planning. Once sufficient shade and soil improvement have developed, late-successional rainforest species will be introduced to support longer-term forest recovery, improve habitat value, and enhance cultural landscape function. Natural colonisation from surrounding forest is also expected to contribute to rehabilitation success as site conditions improve (KCB 2026b).

Revegetation performance will be assessed through monitoring of vegetation cover and density, species composition, weed occurrence, surface condition, and evidence of erosion or instability. The ecological function assessment program will be used to determine whether rehabilitation is tracking toward the intended development trajectory and to inform adaptive management where performance falls below target. Relevant completion criteria include establishment of self-sustaining vegetation cover, progressive groundcover development, and the absence of significant erosion features such as gullies deeper than 1 m on crowns or slopes (KCB 2026b).

Community participation is an important component of implementation. Local communities are expected to contribute to seed collection, tube-stock propagation, planting, mulching, and weed control. Indigenous knowledge gathered through consultation at Bige has informed rehabilitation planning by identifying locally important plant species, traditional plant uses, and customary land-management practices such as selective plant retention, garden cycling, and natural forest regeneration. This knowledge base strengthens species selection and supports rehabilitation outcomes that are both ecologically functional and socially relevant (OTML 2025c).

9.2.4 Weed control

Weed control is required to maintain rehabilitation performance and protect the developing vegetation community from invasive species. Exotic species are present in older rehabilitation areas of the Bige stockpiles, including Spiked Pepper, Leucaena, Calapo, and Guinea Grass (KCB 2026b).

Weed management and monitoring will form part of the active maintenance period and continue until rehabilitation is self-sustaining. Weed control measures should be integrated with revegetation works, site maintenance, and adaptive management responses so that invasive species do not compromise groundcover development, ecological function, or the long-term land-use potential of the rehabilitated surface.

9.2.5 Progressive rehabilitation

Progressive rehabilitation is a core element of the closure strategy. Rehabilitation is integrated with deposition planning and staged so that closure works commence during operations rather than being deferred to the end of the mine life. This approach reduces the extent of exposed landform at any one time, allows rehabilitation

works to proceed while Cell 2 remains under construction or operation, and improves the opportunity to manage erosion, settlement and revegetation performance progressively (KCB 2026b).

The following TSF components will be progressively rehabilitated and closed:

- **Embankments** will be progressively converted from active deposition slopes into benched, drained and vegetated stable slopes, with progressive rehabilitation starting during construction and continuing throughout operations.
- **Cell 1** will be progressively closed and rehabilitated during operations once deposition in Cell 1 is complete. This will include reconfiguration of drainage and spillway features, installation of erosion protection where required, removal of temporary or redundant drainage infrastructure, and progressive cover placement and revegetation. Where the need for cover placement is confirmed through future rehabilitation performance and trial outcomes, cover works will generally include surface shaping, consolidation or drying where required, placement of the specified cover materials, and completion of the final closure cover profile. A key knowledge gap remains in confirming the timeframe for tailings to become trafficable for rehabilitation works, which will need to be established so that cover placement can commence in the following year of the active closure period.
- **Roads / pipeline corridor** will be progressively rehabilitated alongside construction, as each section of the road is completed and disturbed areas are no longer required for construction activities. This will include ripping, regrading and revegetation of temporary works areas and redundant sections.

Progressive rehabilitation will be undertaken in accordance with the timeline presented in Chapter 12.

9.3 DOMAIN 1: TSF

9.3.1 Description of domain

The TSF will be developed as a staged cyclone-sand ring-dyke facility, with the operational landform designed from the outset to support closure. The TSF will have a footprint of about 1,410 ha and will be comprised of two cells: Cell 1 (905 ha) and Cell 2 (505 ha).

9.3.2 Closure plan

The TSF closure design has been based on a 1,000 year closure design life, in alignment with ANCOLD (2012). At closure of each cell, tailings deposition will cease and the TSF will be configured for long-term stability. The final landform is expected to comprise benched embankment slopes with engineered drainage features, closure spillways, and controlled runoff pathways. A final cover system designed to support long-term landform stability, erosion resistance and revegetation will be incorporated, subject to field trials. The cover is intended to provide a growth medium and erosion protection, acting as a surface buffer to reduce loss of tailings from the impoundment and embankments and assist in limiting oxygen ingress to the underlying TSF materials. The final cover materials will be selected and confirmed through geotechnical, hydraulic, erosion and geochemical assessment to ensure suitability for long-term closure performance.

Closure of the TSF is proposed to be implemented progressively, with outer embankments built to a closure design and rehabilitated as the lifts are completed, and other activities completed once deposition ceases. Cell 1 will be rehabilitated once Cell 2 is operational, approximately 10 years after commissioning of the TSF. Final deposition will be managed to establish, as far as practicable, the final landform and a closure pond within each cell to provide capacity for flood-attenuation, as shown in Figure 9.1 and Figure 9.2. Geochemical testing (KCB 2026b) indicates that the tailings are NAF, with adequate neutralisation capacity relative to sulphide sulphur, and neutralisation potential ratios generally above 2 to 3. On this basis, the impoundment will be allowed to consolidate and settle before placement of a 1 m final cover using NAF growth media sourced from the OTML mill or locally sourced riverine materials. The coarser embankment materials may

remain partially unsaturated beneath the cover, with the long-term oxidised zone estimated to extend about 5 to 10 m below the surface.

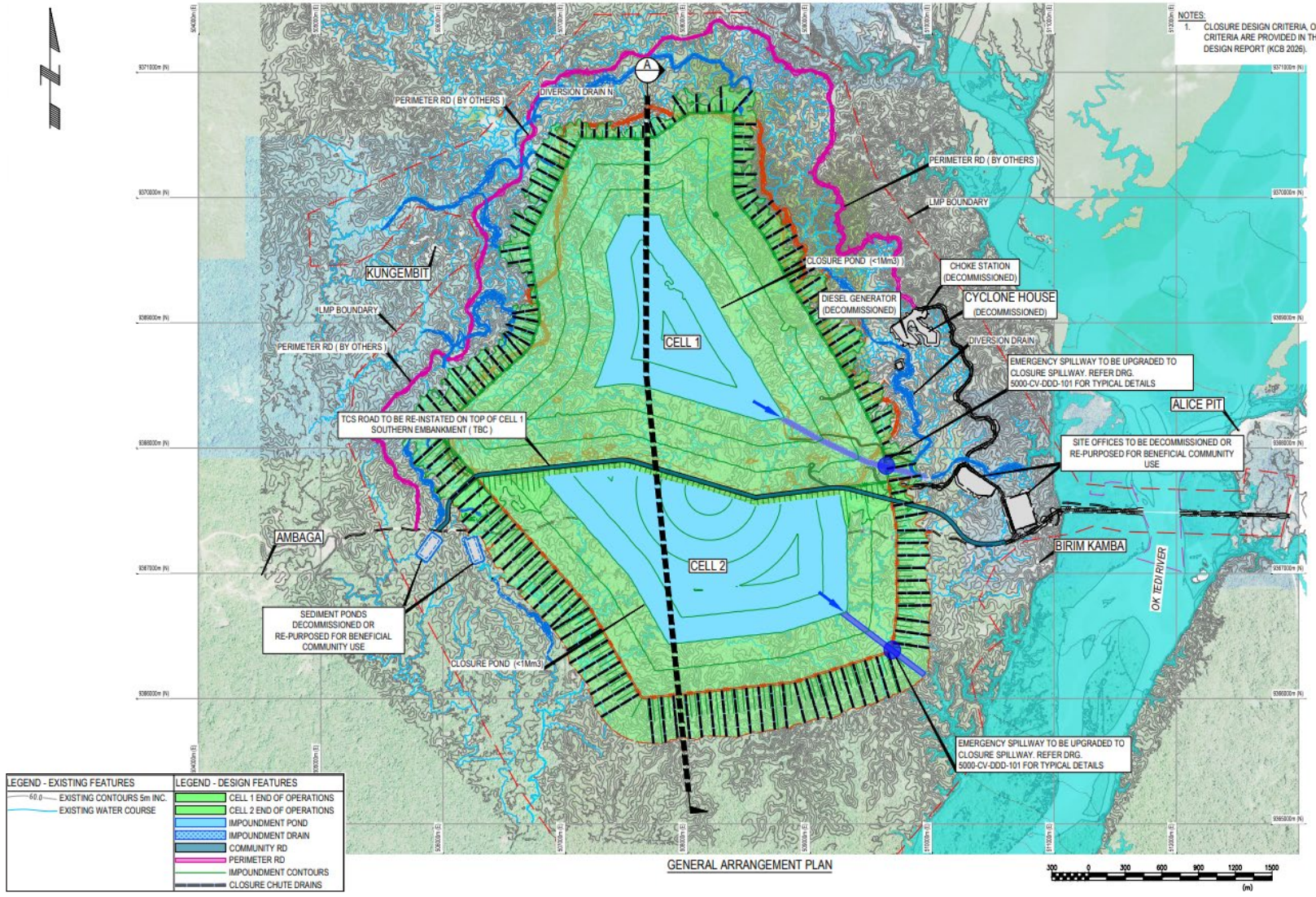
The cover is intended to support vegetation, improve erosion resistance, and form a stable, water-shedding final landform with long-term performance suitable for closure. Where available, organic materials such as mulch and woody residue may be incorporated to improve surface protection and early nutrient availability during vegetation establishment. Temporary bioengineering measures may also be applied to stabilise erosion-prone areas until vegetation cover is established, including gravel, live fascines, brush layering, geocells and erosion-control mats (KCB 2026b; OTML 2025c).

The final landform will be reprofiled to a flattened, benched embankment geometry, with slope lengths of approximately 25 to 30 m separated by benches of approximately 15 to 20 m, creating an overall slope of 1H:11V. Localised regrading or slope flattening will be applied where necessary to improve stability and remove erosion features such as rills, gullies and deposition zones. Table 9.2 summarises the TSF disturbance area and closure activities.

Table 9.2 TSF description and closure activities

Domain	Description	Disturbance area / footprint*	Closure activities
TSF	The TSF includes Cell 1 and Cell 2. The final TSF landform is designed for closure from the outset.	TSF development area: 1,410 ha. This includes: • Cell 1 = 905 ha. • Cell 2 = 505 ha.	• Cease tailings deposition and complete closure earthworks. • Re-shape the TSF into a stable, water-shedding, erosion-resistant landform with benched embankment slopes. • Maintain or construct closure spillways/chute drains and final drainage channels to safely route runoff. • Place growth medium / cover materials where required, revegetate, and progressively rehabilitate exposed slopes and margins. • Non-essential infrastructure within the TSF development area should be removed or repurposed, with contaminated areas remediated if present.

* Indicative only. Approximate disturbance footprint has been conservatively rounded up for reporting purposes; final footprint may be smaller pending further design work.



GENERAL ARRANGEMENT PLAN

SOURCE
KCB, 2026

NOTE
Former TSF design shown and should be treated as indicative only.

OK TEDI MINING LIMITED

OK BIRIM TAILINGS STORAGE FACILITY PROJECT

FIGURE 9.1

General arrangement: Post-closure conditions

TETRA TECH COFFEY

DATE: 21.06.26 PROJECT: 754-MELEN374244 FILE: 374244C_R13_F09.01_GRA

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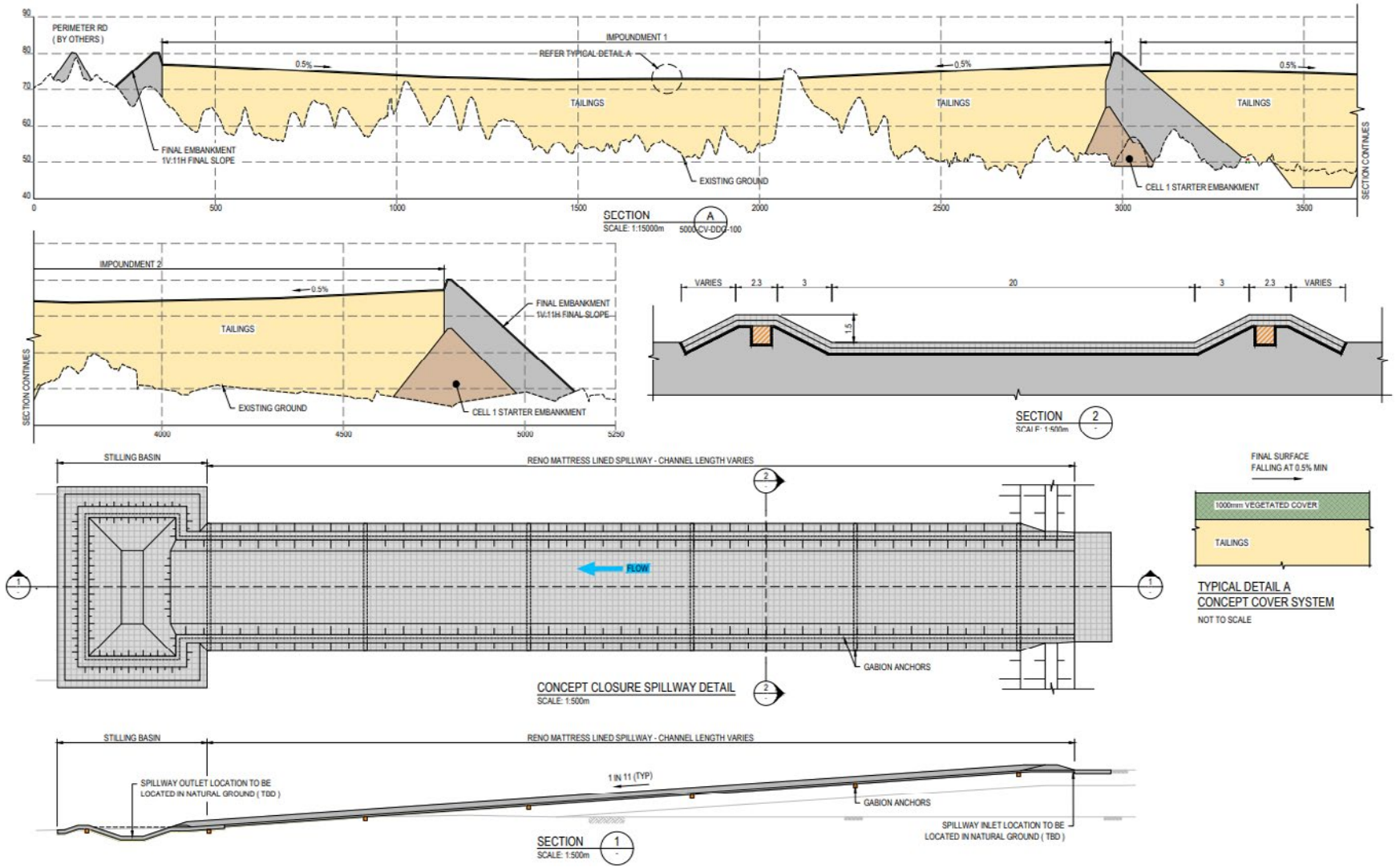

SOURCE
KCB, 2026

NOTE
Former TSF design shown and should be treated as indicative only.

OK TEDI MINING LIMITED

OK BIRIM TAILINGS STORAGE FACILITY PROJECT

FIGURE 9.2

Typical sections:
Post-closure conditions

TETRA TECH COFFEY

DATE: 19.06.26 PROJECT: 754-MELEN374244 FILE: 374244C_R13_F09.02_GRA

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9.3.3 TSF surface water and drainage

The TSF closure design is based on maintaining a stable drainage system that can safely pass a probable maximum flood (PMF). Existing emergency spillways will be upgraded to closure spillways, and Cell 1 and Cell 2 approach channels will be configured to direct flows safely to the closure spillway system, providing flood attenuation, reduced routing velocities, and controlled discharge paths as an integral part of the final landform (KCB 2026b). Surface-water management for the TSF is designed to work in conjunction with the closure cover system to reduce concentration of runoff, limit erosion and support water shedding across the rehabilitated landform. The closure spillways are designed with the following characteristics:

- Cell 1 closure spillway catchment area: 6.5 km².
- Cell 2 closure spillway catchment area: 4.3 km².
- Peak discharge: approximately 41 m³/s for Cell 1 and 40 m³/s for Cell 2.
- Spillway base width: 15 m.
- Spillway channel depth: 1 m.
- Spillway design slope: 9%.

The final TSF drainage configuration will direct surface water away from rehabilitated surfaces and towards the receiving environment through appropriately sized closure spillways and channels. During operations and progressive rehabilitation, surface water will be managed through engineered drainage controls, including reinforced channels, crest drains and toe drains, with post-closure reinstatement or minor regrading undertaken where required to maintain landform performance. Drainage elements may be refined over time in response to monitoring, catchment change and siltation, with rock armouring or other erosion protection installed where necessary (KCB 2026b; OTML 2025c).

The closure design also includes chute drains, impoundment drains, diversion drains and sediment control features. These will be maintained, upgraded, or decommissioned as required to provide long-term runoff stability and to minimise erosion and sediment transport. Seepage management infrastructure will be decommissioned once closure completion criteria have been achieved.

9.4 DOMAIN 2: HYDRO-CYCLONE HOUSE

9.4.1 Description of domain

The hydro-cyclone house is a core operational facility that separates piped tailings into coarse underflow and fine overflow prior to deposition in the TSF. The hydro-cyclone house is located within the TSF development area.

Ancillary infrastructure associated with the hydro-cyclone house (laydown area, camp, site offices, choke station and diesel generator) are addressed in Domain 5: Ancillary infrastructure (see Section 9.7).

9.4.2 Closure plan

At closure, the hydro-cyclone house, choke station and diesel generator will be decommissioned and removed or demolished. Ancillary water structures will also be removed unless required for final drainage or safe post-closure water management. Any concrete slabs, hardstands, or service pads not required for long-term use will be removed and rehabilitated, unless a decision is made through community consultation to leave them in place.

Where the hydro-cyclone house has contaminated surfaces, residual process materials or hardstand areas, these will be decontaminated, broken up where appropriate, and rehabilitated to support stable drainage and revegetation. All concrete footings and foundations should be removed to an appropriate depth for the

proposed future land use, to avoid safety hazards, ponding, and long-term maintenance liabilities. Table 9.3 summarises the hydro-cyclone house disturbance area and closure activities.

Table 9.3 Hydro-cyclone house description and closure activities

Domain	Description	Disturbance area / footprint*	Closure Activities
Hydro-cyclone house	Includes the hydro-cyclone house, cyclone feed and underflow systems, decant water return piping, associated pumps, and nearby process components such as the choke station and diesel generator.	The hydro-cyclone house sits within the TSF development area. Hydro-cyclone footprint = 1 ha (KCB 2026).	• Decommission the hydro-cyclone house and associated process equipment. • Remove or salvage reusable plant and materials where practicable. • Any concrete pads or hardstand areas not retained for a future use will be broken up, removed where needed, and covered/ rehabilitated.

* Indicative only. Approximate disturbance footprint has been conservatively rounded up for reporting purposes; final footprint may be smaller pending further design work.

9.5 DOMAIN 3: TAILINGS PIPELINE

9.5.1 Description of domain

The tailings delivery pipeline is planned to transport slurry from the Ok Tedi mine to the TSF. The pipeline will be approximately 87-km-long, with approximately 80% buried and 20% above ground at creek and ravine crossings. The pipeline generally follows the Kiunga–Tabubil Highway for approximately 22 km (kilometre point (KP) 22), then turns south near Kumkit and continues along the proposed pipeline access road alignment to the TSF site (see Figure 2.2). From KP22 to the TSF site, the pipeline will be located within an infrastructure corridor which covers an approximate 410 ha construction footprint including the access road, reducing to approximately 130 ha during operations as areas no longer needed are progressively rehabilitated.

Roads associated with the tailings pipeline are addressed in Domain 4: Access roads and bridges (see Section 9.6)

9.5.2 Closure plan

At closure, the pipeline will be drained, isolated and decommissioned. Above-ground sections, including those at bridge, creek and ravine crossings, will be dismantled and removed, together with associated valves, pump stations, monitoring stations, inspection wells and other support infrastructure. Buried sections will be left in situ only where safe and environmentally acceptable or removed if required by final design and completion criteria. Disturbed areas within the pipeline corridor will be regraded, drainage reinstated, and topsoil or growth medium reapplied where practicable.

Table 9.4 summarises the tailings pipeline disturbance area and closure activities.

Table 9.4 Tailing pipeline description, footprints, and closure activities

Domain	Description	Disturbance area / footprint*	Closure Activities
Tailings pipeline	Tailings slurry pipeline from the existing TPP at the Ok Tedi Mine to the proposed TSF. The route generally follows the Kiunga–Tabubil Highway for about 22 km, then follows the infrastructure corridor to the TSF.	87 km pipeline length. Associated infrastructure corridor development area footprint from KP 22 to the TSF is ~410 ha during construction, reducing to ~130 ha operationally for the pipeline and the access road corridor.	• At closure, remove or decommission the pipeline and associated fittings, unless any section is specifically required for another approved long-term use. • Rehabilitate the corridor, remove above-ground supports, restore drainage, and stabilise disturbed crossings. • Temporary working pads, laydown areas, and any disturbed trench sections should be recontoured and revegetated.

* Indicative only. Approximate disturbance footprint has been conservatively rounded up for reporting purposes; final footprint may be smaller pending further design work.

9.6 DOMAIN 4: ACCESS ROADS AND BRIDGES

9.6.1 Description of domain

The road and bridge domain includes the pipeline access road and project access roads/tracks; three permanent bridges over the Ok Tedi, Ok Taub and Ok Birim; and several minor watercourse or ravine crossings. In summary this domain is composed by:

- Approximately 87 km of pipeline access road.
  - 22 km along the existing highway (closure of the existing highway is covered under the existing Ok Tedi MCP).
  - 65 km of new road.
- Three permanent bridges over the Ok Tedi, Ok Taub and Ok Birim.
- Several minor water/ravine crossings.
- TSF access roads with a combined footprint of 10 ha:
  - A 3 km two-way access road from the ITCS Road to the hydro-cyclone house.
  - A perimeter road constructed progressively in line with the TSF cell development stages to provide access to operational facilities around the TSF footprint.

The footprint of the pipeline access road is included in the infrastructure corridor development area footprint.

9.6.2 Closure plans

At closure, roads and bridges will be retained where they are required for post-closure access, monitoring, maintenance or agreed community use. Selected perimeter roads and the Cell 1 embankment Tax Credit Scheme (TCS) access track to the border may be maintained for ongoing community use, while roads, tracks and temporary facilities not required for post-closure access will be decommissioned.

At the end of the post-closure monitoring stage, roads that remain necessary for ongoing access will be transferred to the relevant third party and roads that are no longer required will be rehabilitated. Rehabilitation of roads will include ripping to reduce compaction, regrading to a free-draining surface, erosion control, and direct seeding or revegetation with appropriate species. Table 9.5 summarises the roads and bridges disturbance area and closure activities.

Table 9.5 Roads and bridges description and closure activities

Domain	Description	Disturbance area / footprint*	Closure Activities
Roads and bridges	This domain includes the main pipeline access road, bridge crossings, minor culverts/crossings, the TSF access road to the hydro-cyclone house, and any temporary access tracks or upgraded construction roads. Selected perimeter roads may remain for community use.	Includes: • 65 km new road. • Three permanent bridges over the Ok Tedi, Ok Taub, and Ok Birim, plus several minor water/ravine crossings. • 3 km access road from the ITCS Road to the hydro-cyclone house.	• Retain only roads and bridges required for approved long-term access or community use. • Decommission temporary access tracks and redundant road sections. • Where no longer needed, remove culverts/crossings, regrade embankments and batters, restore drainage, and revegetate roadside disturbed areas. • The Cell 1 embankment access road may be transitioned to community access, while redundant road sections are decommissioned.

* Indicative only. Approximate disturbance footprint has been conservatively rounded up for reporting purposes; final footprint may be smaller pending further design work.

9.7 DOMAIN 5: ANCILLARY INFRASTRUCTURE

9.7.1 Description of domain

Ancillary infrastructure includes site offices, laydown areas, contractor facilities, workshops, storage areas, waste and sewage facilities, fuel storage, accommodation camps, fencing, security infrastructure, sedimentation ponds, borrow and gravel extraction areas, and other supporting facilities. These components are within the TSF development area and infrastructure corridor development area.

9.7.2 Closure plan

Non-essential ancillary infrastructure will be demolished and removed, unless an asset is identified for beneficial community use or transfer. Where repurposing is agreed, the asset will be made safe, documented and handed over through a formal transfer process. Areas of concrete slab, foundations or hardstand will be removed, broken up or covered so that they do not inhibit drainage, revegetation or future land use.

Contaminated sites, if identified, will be remediated and verified as suitable for the intended post-closure condition. Any remaining structures will be left in a stable and safe condition, with the closure area regraded and revegetated to create a landform that is consistent with the surrounding environment and the selected post-closure land use. Table 9.6 summarises the ancillary infrastructure disturbance area and closure activities.

Table 9.6 Ancillary infrastructure description and closure activities

Domain	Description	Disturbance area / footprint*	Closure Activities
Ancillary infrastructure	Includes site offices, laydown area, workshop and storage areas, waste and sewage facilities, fuel storage, accommodation camp(s) as required, fencing/security infrastructure, sedimentation ponds, borrow and gravel pits, pump/choke stations, and the diesel generator.	These facilities are included within the TSF development area and, in some cases, in the infrastructure corridor development area. Ancillary infrastructure footprint: • Site offices = 4.6 ha. • Laydown areas = 5.8 ha. • Workshop and storage area = 5.1 ha. • Sedimentation ponds = 7 ha. • Borrow and gravel pit = 102 ha. • Pump/choke stations = 1.2 ha. Total ancillary infrastructure footprint = 125 ha.	• Demobilise temporary facilities and remove buildings, plant, waste, and stored materials. • Decommission services such as electricity, water supply, and sewage. • Deconstruct or dismantle non-essential buildings, break up slabs/hardstands where not retained, and remediate contaminated land if present. • Some items may be decommissioned or repurposed for beneficial community use. • Sedimentation ponds may be decommissioned after the TSF revegetation establishes and erosion is controlled.

* Indicative only. Approximate disturbance footprint has been conservatively rounded up for reporting purposes; final footprint may be smaller pending further design work.

9.8 COMMUNITY INFRASTRUCTURE AND DEVELOPMENT PROGRAMS

Ongoing maintenance of roads retained for community access and use will be undertaken to maintain safe and reliable connectivity until third-party transfer is complete. These measures are intended to support livelihood continuity, preserve access, and facilitate an orderly transition to post-closure land use arrangements.

Where practicable, OTML will support community infrastructure and development outcomes that may deliver long-term social and economic benefits during the closure and transition periods. Potential outcomes include the return of productive land for community gardens or other appropriate uses, as well as post-closure land uses that support food security and customary use. OTML will also seek to facilitate skills transfer through rehabilitation activities, thereby strengthening local capability and supporting community participation in land restoration and transition planning.

Stakeholder consultation will continue throughout the project lifecycle, including the closure phase. A SIA will be undertaken prior to closure to complement the existing socio-economic baseline and impact assessment, and to inform closure planning and mitigation measures.

10. UNANTICIPATED CLOSURE

Good-practice closure planning should include provision for unplanned or temporary closure. Unanticipated closure may occur due to unforeseen circumstances causing operations to cease. For the TSF, this would likely occur as part of unplanned or temporary closure of the entire Ok Tedi Mine operations. An unanticipated closure response should be immediate, practical, and focused on stabilisation, compliance, and risk reduction. The closure response should prioritise water management, dust suppression, environmental compliance, and temporary rehabilitation where needed until a more detailed closure execution approach is prepared.

10.1 UNPLANNED CLOSURE

Unplanned closure is a contingency condition in which operations cease suddenly before the life of the facility is complete. The response should remain consistent with existing permit conditions and other agreements and should be supported by actions to maintain environmental compliance. The TSF is designed with closure in mind, however in an unplanned closure scenario, the TSF may be only partially filled with tailings and the embankment may not have been constructed to its full design height. In this circumstance, the closure design would need to be revised to reflect the final lower embankment height at the time of closure. It may also be necessary to reprofile the tailings surface and/or adjust the spillway crest level to allow stable drainage and long-term landform performance. In an unplanned closure scenario the actions would likely include stabilising the TSF landform, maintaining drainage and erosion controls, and applying rehabilitation measures where necessary.

10.2 TEMPORARY CLOSURE

Temporary closure, or care and maintenance, may be implemented if construction or operations cease for a limited or uncertain period due to financial, operational, or other unforeseen constraints. Temporary cessation of mining activities could occur for several reasons associated with extreme climatic, commercial or civil unrest factors.

During temporary closure, the principal objective is to maintain safe and stable site conditions while preserving the option for future restart. This would require ongoing control of embankment stability, surface drainage, seepage, erosion and dust generation, together with continued environmental and social monitoring. Non-essential infrastructure would be isolated, secured or removed as appropriate, while any assets required for inspection, water management or site access would be retained and maintained. The temporary closure condition would be periodically reviewed so that the site can either resume operations under controlled conditions or transition to permanent closure if circumstances do not improve.

11. CLOSURE MONITORING, MAINTENANCE AND REPORTING

This section outlines the closure monitoring, maintenance and reporting requirements for the TSF to demonstrate that the approved closure objectives and completion criteria are met. It focuses on monitoring the performance of the final landform and identifying any need for maintenance or corrective action through adaptive management.

11.1 MONITORING

The TSF monitoring and maintenance program is designed to demonstrate that rehabilitated areas are progressing towards a stable, self-sustaining post-closure landform. The program will focus on the performance of the final landform, drainage controls, erosion protection measures, growth medium performance, vegetation establishment, weed control and long-term ecosystem development. Monitoring will be trend-based and will provide a basis for adaptive management where rehabilitation performance does not meet the agreed completion criteria (KCB 2026b; OTML 2025b).

The closure monitoring framework will be supported by accurate records of the timing and extent of rehabilitation works, including landform reshaping, drainage installation, cover placement, revegetation treatments, and maintenance interventions. Documentation shall be maintained to provide evidence of construction quality, implementation sequence, and conformance with the approved closure design. This shall include inspection test procedures, as-built drawings, GIS records and rehabilitation reports (OTML 2025b; KCB 2026b).

11.1.1 Monitoring approach

OTML will demonstrate performance against completion criteria in operational areas using both auditing and monitoring measures. Auditing will be used to demonstrate performance against criteria that can be measured at a fixed point in time either during or immediately after the decommissioning period.

Monitoring shall be undertaken to confirm that rehabilitation is developing in accordance with the approved closure objectives and to identify any emerging issues requiring maintenance or corrective action. For the TSF, the principal monitoring attributes will include:

- Landform stability and erosion performance.
- Surface-water drainage function.
- Cover integrity and surface condition.
- Vegetation cover, density and composition.
- Weed occurrence and spread.
- Evidence of instability, ponding, gullying, or surface failure.

Where appropriate, ecological monitoring should assess the performance of the rehabilitated ecosystem to determine whether rehabilitated areas are progressing towards a stable and self-sustaining vegetated system. This may include the use of vegetation trend data, surface condition observations, and broader ecosystem indicators to determine whether the rehabilitated surface is evolving as intended (OTML 2025b; KCB 2026b).

11.1.2 Monitoring records and validation

Validation of rehabilitation works should be undertaken following each major closure phase. This should include verification of completed landform works, drainage construction, growth medium placement, and revegetation establishment. Records should be retained in a controlled project file and made available for regulatory review. Validation documentation should comprise:

- Inspection test procedures.
- As-built drawings and survey records.
- GIS mapping of the rehabilitated area.
- Site photographs.
- Rehabilitation completion reports (OTML 2025c).

Monitoring will continue through the early post-closure period while the rehabilitated system is establishing and remain in place until completion criteria are demonstrated to be met. Where monitoring shows that targets are not being achieved, additional management measures should be triggered, including targeted rehabilitation works or revised maintenance controls.

11.2 MAINTENANCE

Immediately following closure and rehabilitation works, active maintenance should be conducted until plant and equipment are fully demobilised and the rehabilitated surfaces have stabilised. During this period, typical activities will include:

- Reinstatement or repair of surface-water controls.
- Repair of erosion gullies or rills.
- Local regrading or reshaping of failed surfaces.
- Application of additional growth medium or ameliorants where cover performance is poor.
- Reseeding or replanting where vegetation establishment has failed.
- Weed control to prevent invasive species from compromising rehabilitation success (KCB 2026b; OTML 2025c).

As the vegetation cover develops and the drainage network matures, the level of intervention should progressively reduce. Over the longer term, the operating model will transition from active site works to passive stewardship, with essential functions sustained through an appropriate funding mechanism. This should be sufficient to maintain critical drainage structures, preserve site safety, and support any residual environmental management obligations after relinquishment.

11.3 REPORTING

Reporting will be arranged around two closure milestones. The first is a rehabilitation completion assessment, prepared after execution works have been completed and aligned with the approved closure design. The second is a rehabilitation performance assessment, prepared against the agreed closure objectives and completion criteria, to demonstrate whether the site is suitable for consideration of relinquishment (KCB 2026b).

The reporting framework will provide clear evidence that monitoring outcomes are being reviewed, that any underperformance is being addressed, and that closure risks remain controlled. In practice, this means maintaining a documented record of inspections, monitoring results, maintenance actions, and any corrective measures implemented in response to observed trends or failures.

12. TIMELINE

The TSF timeline has four main stages: construction (2027 to 2030), operations with progressive rehabilitation (2030 to 2049), closure execution and rehabilitation (2050 to 2053), and post-closure monitoring leading to relinquishment (2053 to 2068). Table 12.1 shows the project timeline and proposed key activities.

Table 12.1 Project timeline and key activities

Period	Project phase	Key activities
2027 to 2030	Construction and progressive rehabilitation	Mobilisation of staff and equipment, establishment of temporary camps and laydown areas, site clearing, access road and crossing construction, starter dam construction for TSF Cell 1, tailings pipeline installation, fencing and security infrastructure, hydro-cyclone house and surface water management works. Embankments and roads / pipeline corridor progressive rehabilitation commences in 2027 and continues through the construction period into early operations.
2030	Operations commence	TSF enters operational phase following construction and commissioning.
2030 to 2049	Operations and progressive rehabilitation	Tailings deposition, staged TSF expansion, day-to-day operational management, maintenance and repairs. Embankments and roads / pipeline corridor progressive rehabilitation continues until 2032.
2030 to 2049	Revegetation development during operations	Progressive establishment of vegetation, drainage refinement, and trial-informed rehabilitation works. Rehabilitation of Cell 1 is expected to commence in 2041, with lessons applied to Cell 2.
2050 to 2053	Decommissioning, closure and rehabilitation	Approximately 36-month closure period following completion of tailings deposition. Works include decommissioning of infrastructure, landform reshaping, cover placement, drainage and erosion control, and revegetation. Embankments, spillway / drainage and TSF Cell 2 are rehabilitated during this phase.
2053 to 2068	Post-closure monitoring and completion assessment	After decommissioning, post-closure monitoring and completion assessment are expected to be achieved within 15 years.

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