ENVIRONMENTAL SOLUTIONS

YANDAN GOLD MINE
POST MINE LAND USE PLAN

PREPARED FOR

STRAITS GOLD PTY LTD

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LIST OF ABBREVIATIONS

AARC	AARC Environmental Solutions Pty Ltd
AMD	acid mine drainage
CBR	California Bearing Ratio
cm	centimetre
DES	Department of Environment and Science
EA	Environmental Authority
EHP	Department of Environment and Heritage Protection
ESD	ecologically sustainable development
FA	Financial Assurance
ha	hectare
km	kilometre
m	metre
mm	millimetre
ML	Mining Lease
PMLUP	Post Mine Land Use Plan
ROM	run of mine
Straits	Straits Gold Pty Ltd
TDS	total dissolved solids
TSF	Tailings Storage Facility

1.0 INTRODUCTION

AARC Environmental Solutions Pty Ltd (AARC) has been commissioned by Straits Gold Pty Ltd (Straits) to prepare a Post Mine Land Use Plan (PMLUP) for the Yandan Gold Mine (the Project). The PMLUP seeks to satisfy condition F3-1 of the Project's Environmental Authority (EA) EPML00771913 (formerly MIN100902609).

The Yandan Gold Mine is located in central Queensland, approximately 50 km west of the township of Mount Coolon and 150 km south-east of Charters Towers. The Project occupies two mining leases (MLs): ML1095 (Yandan West) and ML1096 (Yandan East).

1.1 PURPOSE

The purpose of this PMLUP is to fulfil the requirements of the Project's EA and detail the methodology by which the rehabilitation of the Project site will be undertaken. The PMLUP details the rehabilitations goals, objectives, indicators, completion criteria and success criteria to direct rehabilitation and assess progress.

The PMLUP will be reviewed and updated with each subsequent Plan of Operations.

1.2 SCOPE

In accordance with condition F3-1 of the EA, this PMLUP incorporates the following elements:

- Schematic representations of final land form inclusive of drainage features;
- Slope, cover and drainage designs;
- Erosion controls proposed on reformed land;
- Description of experimental design for monitoring of analogue and rehabilitated areas inclusive of statistical design;
- Proposed revegetation criteria, including:
    - Species diversity, abundance and composition;
    - Projective cover;
    - Dry matter production; and
    - Stocking rates to ensure self-sustaining vegetation is maintained;
- Proposed revegetation methods inclusive of plant species selection, re-profiling, re-spreading soil, soil ameliorants/amendments, surface preparation and method of propagation;
- Materials balance including available top soil and low permeability capping material;
- Research program and associated milestones;
- Geotechnical, geochemical and hydrological studies;
- Chemical, physical and biological properties of soil and water;

- Clear objectives and success criteria for the each land unit including establishment in accordance with outcomes stipulated in the Administering Authority's Guideline for Rehabilitation Requirements for Mining Projects;

- Measurable completion criteria for each rehabilitation indicator (for each land unit) that enables determination of rehabilitation success for each disturbance type (or land unit); and

- Rehabilitation monitoring program.

2.0 PROJECT DESCRIPTION

The Yandan Gold Mine is a former open cut gold mine and processing project that is currently in care and maintenance. The Project commenced in 1992 (by Ross Mining NL) and involved the mining of three open-cut pits and the operation of a process plant and heap leach. Since ceasing operations in 1998, the Project has remained in Care and Maintenance, pending final closure works.

The Project is located in the Drummond Basin in central Queensland, approximately 50 km west of the township of Mount Coolon and 150 km south-east of Charters Towers, as indicated Figure 1.

2.1 PROJECT INFRASTRUCTURE

Project operational areas / disturbances on ML 1095 and ML 1096 (Figure 2) that will or have already been rehabilitated include the following:

- Open cut pits and bunds:
    - Main pit;
    - East Hill pit;
    - Backfilled South Pit;
    - Main pit flood bund;
- Tailings Storage Facility Cells A and B;
- Dams (refer to Figure 2):
    - Runoff dam;
    - Water storage dam;
    - Mine process water dam;
    - Tailings return water dam;
    - Water harvest trench;
- Heap leach pads and ponds:
    - Heap leach stormwater pond;
    - Heap leach liquor ponds;
- Diversion structures (Yandan Creek / Suttor River);
- Topsoil stockpiles;
- Stockpile area;
- ROM pad;
- Processing plant;

- Village infrastructure (ML 1096);
- Borrow pit;
- Exploration areas;
- Infrastructure (ML 1095):
    - Plant site and office; and
    - Airstrip and roads.

Figure 1 Project Location

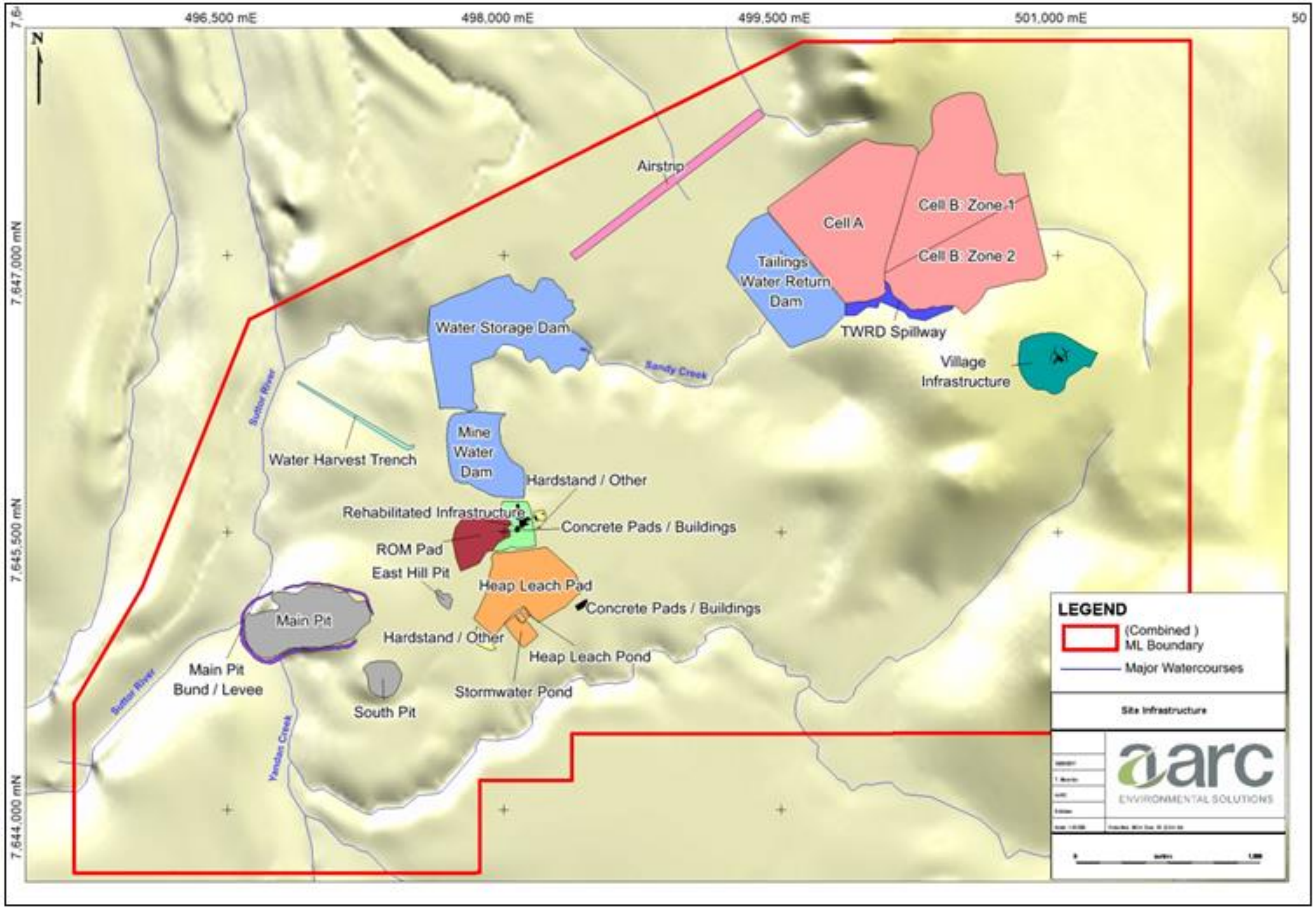

Figure 2 Yandan Gold Mine Layout

3.0 DESCRIPTION OF EXISTING ENVIRONMENT

Mine Closure Plans have previously been developed for the Yandan Gold Mine. These reports, while outdated, provide background information of the existing environment of the site. The reports include:

- Preliminary Mine Reclamation and Closure Plan Mining Leases ML 1095 & ML 1096 Yandan Gold Mine (HLA-Envirosciences Pty Ltd 2000);
- Report for Yandan Gold Mine: Mine Closure Plan (GHD 2008); and
- Yandan Gold Mine Post Mine Land Use Plan (AARC 2015).

3.1 SOIL

The north-west region of the Project site is characterised by undulating low hills and foot slopes with rocky outcrops. In contrast, the south-east of the site is characterised by clay plains will some gilgai microrelief in low areas. (GHD 2008)

Most soils within the MLs are shallow alkaline red-bleached duplex soils. Alluvial soil is present on the floodplain of the Suttor River (HLA-Envirosciences 2000). Laboratory analysis has indicated that soils exhibit a relatively low potential for dispersion. Tunnel and sheet erosion, particularly in areas where vegetation has been removed, has been noted as a historical concern for the site, “reflecting the hard-setting nature of the surface and low infiltration rate.” (GHD 2008, p.7)

GHD (2008) noted the low fertility of the soil across the site, resulting in low quality pasture and production. Historical overgrazing has also contributed to erosion and low soil productivity.

3.2 SURFACE WATER

The Project site is situated on the east bank of the Suttor River in proximity to a junction with two minor ephemeral tributaries – Yandan Creek and Sandy Creek – within the Suttor River catchment (HLA-Envirosciences 2000). Yandan Creek has a catchment of approximately 7,200 ha, while Sandy Creek has a catchment of approximately 900 ha. The Suttor River drains into Lake Dalrymple, formed by the damming of the Burdekin River (HLA-Envirosciences 2000).

3.3 GROUNDWATER

Groundwater flows west towards the Suttor River, exhibiting strong hydraulic discontinuities (GHD 2008). Historical drilling has indicated that groundwater is approximately 8 m below the bed of the Suttor River (approximately RL 158 m), with little indication of surface water / groundwater connection.

Groundwater in the region is of poor quality for stock use and generally not suitable for domestic use or use as irrigation (GHD 2008). Total dissolved solids (TDS) recorded at bores prior to Project development were in the range of 4,000 – 15,000 mg/L, while concentrations of copper, lead and zinc exceeded the respective ANZECC (2000) 95% protection trigger values for the protection of aquatic ecosystems. Concentrations of arsenic, copper, lead, sulphate and zinc remained below the ANZECC (2000) Livestock Drinking Water Quality contaminant limits (GHD 2008). More recent sampling conducted in July 2008 indicated continued high TDS and high levels of sulphate (>1,000 mg/L in some instances) (GHD 2008).

4.0 LAND USE

4.1 PRE-MINING LAND USE

Low-intensity beef cattle grazing is the primary land use for the region, with much of the naturally occurring open forest and woodlands cleared for this purpose. Limitations of the soil, together with low rainfall and high rainfall variability render the stock carrying capacity relatively low. Information obtained from the Department of Primary Industries indicated that the carrying capacity of the land is approximately one beast per 15 ha (GHD 2008).

4.2 POST-MINING LAND USE

In accordance with EA condition F2-1, land disturbed by mining activities must be rehabilitated in accordance with Table 1 and the goals, objectives, indicators and completion criteria detailed in Section 5. Table 2 explains the post mine land use classifications.

Table 1 Post Mine Land Description

EA Disturbance Class	EA Surface Area (ha)	Actual Disturbance Type (Figure 2)	Actual Disturbance area (ha)	Post Mine Land Use	Post Mine Land Classification
Backfilled pit	4	South Pit	3.1	Open pasture	VII
Tailings dam	114	Cell A Cell B (Z1 & Z2) TWRD Spillway	111.9	Open pasture	VII
Stockpile area	8.3	Topsoil Stockpile	11	Open pasture	VII
Runoff dam	16.6	Mine Water Dam	14.2	Water storage	VIII
ROM pad	3.8	ROM Pad	6.1	Low hill	VII
Processing plant	1.8	Hardstand Area	1.6	Open pasture	VII
Open pit	18.8	Open Pit	18.4	Lake	Void (Non Use Management Area)
Infrastructure	79.8	Tailings Water Return Dam Water Storage Dam Water Harvest Trench Roads Airstrip	83.8	Open pasture	VII
Heap leach	21	Heap Leach HL Ponds HL SW Dam	18.85	Low hill	VII

EA Disturbance Class	EA Surface Area (ha)	Actual Disturbance Type (Figure 2)	Actual Disturbance area (ha)	Post Mine Land Use	Post Mine Land Classification
Borrow pit	8	Borrow Pit	10	Open pasture	VII
Exploration	4.5	Exploration Areas	0	Open pasture	VII
Village Infrastructure	15	Village Infrastructure	9.5	Open pasture	VII
Total	**295.6**		**288.45**	**-**	**-**

Table 2 Land Capability Classification

Class	Description
Class I	Land suitable for all agricultural and pastoral uses
Class II	Land suitable for all agricultural uses with slight restrictions to cropping
Class III	Land suitable for all agricultural uses with moderate restrictions to cropping
Class IV	Land primarily used for pastoral uses but can be carefully cropped occasionally
Class V	Land primarily used for pastoral uses but can be carefully cropped if limitations were removed
Class VI	Land not suited to cultivation but well suited to pasture improvement
Class VII	Land not suitable for cultivation and only careful pastoral use possible
Class VIII	Land not suitable for agricultural or grazing purposes

5.0 REHABILITATION GOALS, OBJECTIVES AND CRITERIA

5.1 REHABILITATION HIERARCHY

The *Guideline: Rehabilitation Requirements for Mining Projects* (EHP 2014) defines the rehabilitation hierarchy, in order of decreasing capacity to prevent / minimise environmental harm, as the following:

1. Avoid disturbance that will require rehabilitation;
2. Reinstate a 'natural' ecosystem as similar as possible to the original ecosystem;
3. Develop an alternative outcome with a higher economic value than the previous land use;
4. Reinstate previous land use (e.g. grazing or cropping);
5. Develop lower value land use; and
6. Leave the site in an unusable condition or with a potential to generate future pollution or adversely affect environmental values.

5.2 REHABILITATION GOALS

The *Guideline: Rehabilitation Requirements for Mining Projects* (EHP 2014) specifies rehabilitation goals which are consistent with the National Strategy for Ecologically Sustainable Development. All land subject to mining activities must be rehabilitated to be:

- Safe to humans and wildlife;
- Non-polluting;
- Stable;
- Able to sustain the agreed post-mining land use.

5.3 REHABILITATION OBJECTIVES

5.3.1 General

Rehabilitation objectives have been developed for the Project to facilitate the realisation of the goals described above. In accordance with the *Guideline: Rehabilitation Requirements for Mining Projects* (EHP 2014), general rehabilitation objectives include:

1. Ensure mine sites are rehabilitated to sound environmental and safety standards, and to a level at least consistent with the condition of surrounding land;
2. Provide appropriate community returns for using mineral resources and achieve better environmental protection and management in the mining sector; and
3. Improve community consultation and information, improve performance in occupational health and safety, and achieve social equity objectives.

5.3.2 Site-Specific

For the purpose of determining rehabilitation indicators and completion criteria, and assessing rehabilitation success, mine sites are typically divided into domains, which encompass a number of mine features. Table 3 outlines the domains and mine features for the Project.

Table 3 Mine Domains and Mine Features

Domain	Mine Features

Mine Areas	• Open-cut Pits
	  ○ Backfilled pit
	  ○ Residual void
	• ROM pad
	• Exploration areas

Stockpiles and Waste	• Tailings dams & spillway • Topsoil stockpile
Processing Areas	• Processing plant • Heap leach pads • HL ponds & Dam • Hardstand
Dams	• Runoff dam • Mine water dam • Tailings return water dam • Water storage dam
Infrastructure	• Infrastructure Area • Village infrastructure • Office • Airstrip • Roads • Borrow pit • Water harvest trench • Bund walls

Site-specific rehabilitation objectives have been developed for the Project in order to satisfy the rehabilitation goals described in Section 5.2. Objectives include the following, however, not all objectives are relevant to all mine domains:

- Sites are safe for humans and animals now and in the foreseeable future;
- Hazardous and contaminated material adequately managed;
- Polluted runoff and seepage contained on site;
- Acid mine drainage (AMD) will not cause serious environmental harm;
- Dams to remain on closure will not contribute contaminants to the environment;

- Rehabilitated dams will not contribute contaminants to the environment;
- Establish safe and stable waterbodies with a low risk of environmental harm;
- Landform design achieves appropriate erosion rates;
- Minimal probability of wall failure or rock falls that will cause significant environmental harm;
- Adequate vegetation cover to minimise erosion;
- Very low probability of slope slippage with serious consequences;
- Soil properties that support and will continue to support desired land use; and
- Self-sustaining vegetation cover and species similar to adjoining undisturbed areas.

Table 4 provides a comprehensive summary of Yandan Gold Mine rehabilitation objectives for each domain.

5.4 REHABILITATION INDICATORS

The EA holder maintains responsibility for determining appropriate rehabilitation indicators to achieve the objectives and goals for each mine domain.

For all indicators that are selected, the EA holder must:

- State what objective(s) the indicator relates to;
- Justify the selection of the indicator, including how the relationship between the indicator and the objective has been established (supported by references to authoritative sources or relevant monitoring data);
- State how the indicator is to be measured; and
- State how the results will be reported and interpreted.

Table 4 provides a comprehensive summary of Yandan Gold Mine rehabilitation indicators for each domain.

5.5 COMPLETION CRITERIA

Completion criteria are defined in the Guideline: Rehabilitation Requirements for Mining Projects (EHP 2014) as the standards which define successful rehabilitation. They are typically measurable benchmarks or values which can be verified by measurement or assessment of the associated rehabilitation indicator.

Table 4 provides a comprehensive summary of Yandan Gold Mine completion criteria for each domain.

Table 4 Summary of Rehabilitation Goals, Objectives, Indicators and Completion Criteria

Table 5

Domain	Mine Feature	Rehabilitation Objective	Rehabilitation Indicator	Completion Criteria
Rehabilitation Goal: Safe Site				
Mine Areas	Pits	Final pits are safe for humans and animals now and in the foreseeable future.	Safety assessment of final landform by an appropriately qualified person.	Certification in rehabilitation report that ground is structurally sound and safe to people and animals.
			Safety barriers and signage assessed against requirements of the *Mining and Quarrying Safety and Health Act 1999*.	Evidence in rehabilitation report that all safety precautions have been implemented in accordance with the relevant legislation.
	ROM Pad	Rehabilitated ROM pad is safe for humans and animals now and in the foreseeable future.	Safety assessment of final landform by an appropriately qualified person.	Certification in rehabilitation report that ground is structurally sound and safe to people and animals.
	Exploration Areas	Exploration sites are safe for humans and animals now and in the foreseeable future.	Safety assessment of final landform by an appropriately qualified person.	Evidence in rehabilitation report that ground is structurally sound and safe.
Overburden & Waste	Tailings Dams, Topsoil Stockpiles, Stockpile Areas	Overburden and waste sites are safe for humans and animals now and in the foreseeable future.	Safety assessment of final landform by an appropriately qualified person.	Evidence in rehabilitation report that ground is structurally sound and safe.
Processing Areas	Processing Plant, Heap Leach Pads & Ponds	Sites are safe for humans and animals now and in the foreseeable future.	Safety assessment of final landform by an appropriately qualified person.	Evidence in rehabilitation report that ground is structurally sound and safe.
Dams	Runoff Dam, Water Storage Dam, Mine Process Water Dam,	Retained dam sites are safe for humans and	Safety assessment of final landform by an appropriately qualified person.	Certification in rehabilitation report that ground is structurally sound and safe to people and animals.

Domain	Mine Feature	Rehabilitation Objective	Rehabilitation Indicator	Completion Criteria
	Tailings Return Water Dam, Water Harvest Trench	animals now and in the foreseeable future.		
Infrastructure	Village Infrastructure, Plant Site & Office, Airstrip, Roads, Borrow Pit	Infrastructure sites are safe for humans and animals now and in the foreseeable future.	Safety assessment of final landform by an appropriately qualified person.	Evidence in rehabilitation report that ground is structurally sound and safe.
Rehabilitation Goal: Non-polluting				
Mine Areas	Pits, ROM Pad, Exploration Areas	Hazardous and contaminated material adequately managed.	Contaminated land assessment and site inspection.	Evidence of remediated landform in a contaminated land assessment report.
			Rehabilitation monitoring plan in place to monitor downstream surface, groundwater and stream sediments.	Evidence in the rehabilitation report that post-closure monitoring shows the final landform is non-polluting.
		Polluted runoff and seepage contained on site.	Monitoring of surface water and groundwater.	Evidence that monitoring data meet specified criteria relevant to potential contaminants.
Overburden & Waste	Tailings Dams, Topsoil Stockpiles, Stockpile Area	Hazardous and contaminated material adequately managed.	Contaminated land assessment and site inspection.	Evidence of remediated landform in a contaminated land assessment report.
			Rehabilitation monitoring plan in place to monitor downstream surface, groundwater and stream sediments.	Evidence in the rehabilitation report that post-closure monitoring shows the final landform is compliant with limits in the relevant Environmental Protection Policies or other agreed limits.
		AMD will not cause serious environmental harm.	Technical design of barriers.	Engineer's certification of construction and maintenance to specified design performance.
			Geochemically characterisation to ensure rehabilitation facilitates a geochemically stable landform.	Evidence that rehabilitated landform will be geochemically stable and not result in serious environmental harm.
		Polluted runoff and seepage contained on site.	Monitoring of surface water and groundwater.	Evidence that monitoring data meet specified criteria relevant to potential contaminants.

Domain	Mine Feature	Rehabilitation Objective	Rehabilitation Indicator	Completion Criteria
Processing Areas	Processing Plant, Heap Leach Pads & Ponds	Hazardous and contaminated material adequately managed.	Contaminated land assessment and site inspection.	Evidence of remediated landform in a contaminated land assessment report.
			Rehabilitation monitoring plan in place to monitor downstream surface, groundwater and stream sediments.	Evidence in the rehabilitation report that post-closure monitoring shows the final landform is compliant with limits in the relevant Environmental Protection Policies or other agreed limits.
		Polluted runoff and seepage contained on site.	Monitoring of surface water and groundwater.	Evidence that monitoring data meet specified criteria relevant to potential contaminants.
Dams	Runoff Dam, Water Storage Dam, Mine Process Water Dam, Tailings Return Water Dam, Water Harvest Trench	Dams to remain on closure will not contribute contaminants to the environment.	Rehabilitation monitoring plan in place to monitor water in the dam and downstream surface/ground water.	Evidence in the rehabilitation report that post-closure monitoring shows the final landform is compliant with limits in the relevant Environmental Protection Policies or other agreed limits.
		Hazardous and contaminated material adequately managed.	Contaminated land assessment and site inspection.	Evidence of remediated landform in a contaminated land assessment report.
			Rehabilitation monitoring plan in place to monitor downstream surface, groundwater and stream sediments.	Evidence in the rehabilitation report that post-closure monitoring shows the final landform is compliant with limits in the relevant Environmental Protection Policies or other agreed limits.
		Polluted runoff and seepage contained on site.	Monitoring of surface water and groundwater.	Evidence that monitoring data meet specified criteria relevant to potential contaminants.
Infrastructure	Village Infrastructure, Plant Site & Office, Airstrip, Roads, Borrow Pit	Hazardous and contaminated material adequately managed.	Contaminated land assessment and site inspection.	Evidence of remediated landform in a contaminated land assessment report.
			Rehabilitation monitoring plan in place to monitor downstream surface, groundwater and stream sediments.	Evidence in the rehabilitation report that post-closure monitoring shows the final landform is compliant with limits in the relevant Environmental Protection Policies or other agreed limits.
		Polluted runoff and seepage contained on site.		Evidence that monitoring data meet specified criteria relevant to potential contaminants.

Domain	Mine Feature	Rehabilitation Objective	Rehabilitation Indicator	Completion Criteria
			Monitoring of surface water and groundwater.	
Rehabilitation Goal: Stable Landform				
Mine Areas	Residual Void	Establish safe and stable waterbody with a low risk of environmental harm.	Monitoring of water level and quality in the residual void.	Evidence in rehabilitation report that adequate water levels are maintained in the residual void.
		Landform design achieves appropriate erosion rates.	Engineer’s assessment of design and construction of structures to control water flow.	Engineer certification in rehabilitation report that water management structures are sufficient to control water flow and runoff.
	Backfilled Pit, ROM Pad, Exploration Areas	Minimal probability of wall failure or rock falls that will cause significant environmental harm.	Geotechnical studies of final landform.	Evidence in rehabilitation report of geotechnical studies that confirm the final landform is stable.
			Risk assessment of final landform.	Evidence in rehabilitation report that appropriate risk assessment and control measures have been undertaken.
		Landform design achieves appropriate erosion rates.	Engineer’s assessment of design and construction of structures to control water flow.	Engineer certification in rehabilitation report that decommissioned sites have the required structures to control water flow and runoff.
		Adequate vegetation cover to minimise erosion.	Vegetation assessment.	Evidence in the rehabilitation report that the revegetation meets the limits set by the analogue sites.
Overburden & Waste	Tailings Dams	Minimal probability of wall failure or rock falls that will cause significant environmental harm.	Geotechnical studies of final landform.	Evidence in rehabilitation report of geotechnical studies to determine whether final landform is stable.
			Risk assessment of final landform.	Evidence in rehabilitation report that appropriate risk assessment and control measures have been undertaken.

Domain	Mine Feature	Rehabilitation Objective	Rehabilitation Indicator	Completion Criteria
		Very low probability of slope slippage with serious consequences.	Geotechnical, geochemical and hydrological studies of existing structures (outer batter slopes of tailings storage facilities).	Evidence in rehabilitation report that appropriate risk assessment has been undertaken and control measures are in place that will continue to meet agreed requirements.
		Landform design achieves appropriate erosion rates.	Engineer's assessment of design and construction of structures to control water flow.	Engineer certification in rehabilitation report that infrastructure sites (both remaining and decommissioned) have the required structures to control water flow and runoff.
		Adequate vegetation cover to minimise erosion.	Vegetation assessment.	Evidence in the rehabilitation report that the revegetation meets the limits set by the analogue sites.
	Topsoil Stockpiles, Stockpile Area	Landform design achieves appropriate erosion rates.	Engineer's assessment of design and construction of structures to control water flow.	Engineer certification in rehabilitation report that infrastructure sites (both remaining and decommissioned) have the required structures to control water flow and runoff.
		Adequate vegetation cover to minimise erosion.	Vegetation assessment.	Evidence in the rehabilitation report that the revegetation meets the limits set by the analogue sites.
Processing Areas	Processing Plant, Heap Leach Pads & Ponds	Landform design achieves appropriate erosion rates.	Engineer's assessment of design and construction of structures to control water flow.	Engineer certification in rehabilitation report that infrastructure sites (both remaining and decommissioned) have the required structures to control water flow and runoff.
		Adequate vegetation cover to minimise erosion.	Vegetation assessment.	Evidence in the rehabilitation report that the revegetation meets the limits set by the analogue sites.
Dams	Runoff Dam, Water Storage Dam, Mine Process Water Dam,	Establish safe and stable waterbody with a low risk of environmental harm.	Risk assessment of remaining dam landform.	Evidence in rehabilitation report that appropriate risk assessment and control measures have been undertaken.

Domain	Mine Feature	Rehabilitation Objective	Rehabilitation Indicator	Completion Criteria
	Tailings Return Water Dam, Water Harvest Trench	Minimal probability of wall failure or rock falls that will cause significant environmental harm.	Geotechnical studies of final landform.	Evidence in rehabilitation report of geotechnical studies to determine whether final landform is stable.
			Risk assessment of final landform.	Evidence in rehabilitation report that appropriate risk assessment and control measures have been undertaken.
		Landform design achieves appropriate erosion rates.	Engineer's assessment of design and construction of structures to control water flow.	Engineer certification in rehabilitation report that remaining infrastructure sites have the required structures to control water flow and runoff.
Infrastructure	Village Infrastructure, Plant Site & Office, Airstrip, Roads, Borrow Pit	Landform design achieves appropriate erosion rates.	Engineer's assessment of design and construction of structures to control water flow.	Engineer certification in rehabilitation report that infrastructure sites (both remaining and decommissioned) have the required structures to control water flow and runoff.
		Adequate vegetation cover to minimise erosion.	Vegetation assessment.	Evidence in the rehabilitation report that the revegetation meets the limits set by the analogue sites.
Rehabilitation Goal: Sustains Agreed Land Use				
Mine Areas	Backfilled Pit	Soil properties that support and will continue to support desired land use.	Soil monitoring program in place to ensure remaining soil is able to support post-mining land use. Monitoring of chemical, physical and biological properties of soil.	Evidence in rehabilitation report that all soil chemical, physical, and biological properties of are within acceptable limits that ensure soil is able to support post-mining land use.
		Self-sustaining vegetation cover and species similar to adjoining undisturbed areas.	Vegetation assessment to determine: • Presence of key species; • Species type and diversity; and • Abundance of weeds.	Certification within the rehabilitation report that key species are present, suitable diversity has been achieved and cover/density is adequate. Evidence that weed management has been successful.
	Residual Void		Hydrological studies to establish water levels and quality.	Evidence in rehabilitation report that adequate water levels will be maintained in the residual void.

Domain	Mine Feature	Rehabilitation Objective	Rehabilitation Indicator	Completion Criteria
		Establish specified waterbody with low risk of environmental harm.	Rehabilitation monitoring plan in place to monitor void water quality.	Evidence in rehabilitation report that water quality at surface is meeting livestock contaminant limits and that no risk to wildlife exists.
			Structural report on integrity of residual void.	Evidence in report of the integrity of the final landform, certified by an engineer.
	ROM Pad, Exploration Areas	Soil properties that support and will continue to support desired land use.	Soil testing program to characterise the chemical, physical and biological properties of soil to ensure its suitability for post-mining land use prior to placement.	Evidence in rehabilitation report that all soil chemical, physical, and biological properties of are within acceptable limits that ensure soil is able to support post-mining land use.
		Self-sustaining vegetation cover and species similar to adjoining undisturbed areas.	Vegetation assessment to determine: • Presence of key species; • Species type and diversity; and • Abundance of weeds.	Certification within the rehabilitation report that key species are present, suitable diversity has been achieved and cover/density is adequate. Evidence that weed management has been successful.
Overburden & Waste	Tailings Dams, Topsoil Stockpiles, Stockpile Area	Soil properties that support and will continue to support desired land use.	Soil testing of chemical, physical and biological properties to ensure soil is able to support post-mining land use before placement.	Evidence in rehabilitation report that all soil chemical, physical, and biological properties of are within acceptable limits that ensure soil is able to support post-mining land use.
		Self-sustaining vegetation cover and species similar to adjoining undisturbed areas.	Vegetation assessment to determine: • Presence of key species; • Species type and diversity; and • Abundance of weeds.	Certification within the rehabilitation report that key species are present, suitable diversity has been achieved and cover/density is adequate. Evidence that weed management has been successful.
Process Plant	Processing Plant, Heap Leach Pads & Ponds	Soil properties that support and will continue to support desired land use.	Soil testing of chemical, physical and biological properties to ensure soil is able to support post-mining land use before placement.	Evidence in rehabilitation report that all soil chemical, physical, and biological properties of are within acceptable limits that ensure soil is able to support post-mining land use.
		Self-sustaining vegetation cover and species similar	Vegetation assessment to determine: • Presence of key species; • Species type and diversity; and	Certification within the rehabilitation report that key species are present, suitable diversity has been

Domain	Mine Feature	Rehabilitation Objective	Rehabilitation Indicator	Completion Criteria
		to adjoining undisturbed areas.	• Abundance of weeds.	achieved and cover/density is adequate. Evidence that weed management has been successful.
Dams	Runoff Dam, Water Storage Dam, Mine Process Water Dam, Tailings Return Water Dam, Water Harvest Trench	Establish safe and stable water body with a low risk of environmental harm.	Water quality established by monitoring or modelling validated by monitoring.	Evidence in the rehabilitation report that the dams meet water quality guidelines.
			Structural report on integrity of structure.	Engineers certificate of structure.
Infrastructure	Village Infrastructure, Plant Site & Office, Airstrip, Roads, Borrow Pit	Soil properties that support and will continue to support desired land use.	Soil testing of chemical, physical and biological properties to ensure soil is able to support post-mining land use before placement.	Evidence in rehabilitation report that all soil chemical, physical, and biological properties of are within acceptable limits that ensure soil is able to support post-mining land use.
		Self-sustaining vegetation cover and species similar to adjoining undisturbed areas.	Vegetation assessment to determine: • Presence of key species; • Species type and diversity; and • Abundance of weeds.	Certification within the rehabilitation report that key species are present, suitable diversity has been achieved and cover/density is adequate. Evidence that weed management has been successful.

5.6 MAINTENANCE OF REHABILITATED AREAS

Maintenance and monitoring activities will be undertaken on rehabilitated areas. Maintenance will ensure the following:

- The stability of rehabilitated landforms;
- Continued effectiveness of erosion control measures;
- No negative effects to environmental values of any waters as a result of stormwater runoff and seepage from rehabilitated areas; and
- Evidence of healthy growth and recruitment of plants.

In addition, management of rehabilitated areas will ensure drainage lines remain stable and will aim to minimise the introduction and spread of species not consistent with the rehabilitation objectives and the post mine land use.

Ongoing rehabilitation maintenance and monitoring activities will continue until such time that completion criteria are met for three consecutive years, after which time a residual risk assessment will be conducted.

5.6.1 Assessment of Residual Risk

Meeting completion and success criteria for a number of years does not preclude the possibility of failure at a future point in time. The *Guideline: Rehabilitation Requirements for Mining Projects* (EHP 2014) recommends conducting a risk assessment to determine the 'residual risk' of rehabilitation, that is, the risk of rehabilitation failing in the future. The following factors are considered in an assessment of residual risk:

- Hazards: the components of rehabilitation that are most likely to fail the completion criteria;
- Likelihood: the likelihood that one of these components will fail; and
- Consequence: the consequences that will occur if these components of rehabilitation fail (typically in monetary terms).

The threshold for consequences of rehabilitation failure to be considered in the risk assessment is to be consistent with the definition of 'material environmental harm' – i.e. $5,000. In accordance with *Guideline: Rehabilitation Requirements for Mining Projects* (EHP 2014), "the probability of rehabilitation failure will usually be established from estimates of the minimum time before the rehabilitation has a 50 percent probability of failure and the variance of that estimate".

A residual risk assessment will be completed at the completion of the rehabilitation works. If any significant residual risks are identified, further remedial rehabilitation works and monitoring will be undertaken, and the risk assessment updated for submission to the DES.

6.0 REHABILITATION DESIGN AND METHODOLOGY

6.1 RECOMMENDED CLOSURE STRATEGY FOR CELL A

Cell A is constructed from oxide tailings and presents a low risk source of contamination. Rehabilitation design aims to eliminate the hazards associated with the sunken central portion of Cell A by the placement of fill and creation of a water shedding landform. Fill is planned to be excavated from the TWRD, followed by topsoil and re-profiling. A water shedding landform will prevent infiltration from rainfall and unexpected capillary rise of salts into the topsoil surface. Drainage channels will be constructed around the resultant water-shedding central mound, directing water towards the existing drainage channel that exits the TSF and flows to the TWRD.

Past rehabilitation works at Cell A indicate that salt rise into the growth medium, or other contaminants in the tailings, is not a significant hazard in areas with adequate surface drainage (preventing long-term ponding of water). Much of Cell A has been successfully revegetated by seeding directly into the oxide tailings, without the use of a capillary break cover. However, the application of topsoil / growth medium across the entirety of Cell A (estimated at 42.35ha) will likely generate improved results for grazing pasture and erosion. As such, a 200mm surface layer of topsoil is proposed across the whole of Cell A (totalling 84,700 m^3 of topsoil material to be carted and spread). Further to this, Cell A will also undergo earthworks to ensure all surface water is directed to the drainage system at the south west of the dam.

Source of Materials for Cell A:

The area of the central, poorly drained portion of Cell A is 4.5 Ha. To achieve a free draining contour with a slope of around 0.5% however, the area of fill placement is considerably larger. The volume estimate by a 0.1m contour level is estimated as 29,000 m^3 of loose fill (Table 6). There will be approximately 35,000 m^3 of sediment spoil to be removed from the TWRD and directly deposited on Cell A, so there is easily sufficient material available to achieve the re-contouring in the centre of the cell.

Table 6 Fill Quantity Estimate for Centre of Cell A

Contour	Estimated Area (m^2)	Estimated Fill Volume Placed (m^3)
190.5m RL	24,441	2,400
190.4m RL	86,294	8,600
190.3m RL	96,220	9,600
190.2m RL	56,130	5,600
190.1m RL	27,93	2,800
Totals	-	29,000

Topsoil required for Cell A will be taken from existing stockpiles located around the TSF. Topsoil requirements in excess of that contained in the stockpiles will be recovered from borrow pits located adjacent to the TSF area (if needed)

6.2 RECOMMENDED CLOSURE STRATEGY FOR CELL B

A cover design has been adopted from a preliminary conceptual cover design produced by O'Kane Consultants – an engineering firm that specialises in integrated mine waste management and closure services. This design report has been submitted to DES as an attachment to the Plan of Operations.

Geochemical Considerations for Cell B Cover Design

As part of the development of the conceptual cover system for Cell B, the results of a geochemical assessment commissioned by Straits Gold in 2014 was reviewed (RGS Environmental 2015 – noting this has been previously submitted to DES). As part of the assessment, 85 soil, oxide tailings and sulphide tailings samples from the TSF were submitted for static and kinetic geochemical testing.

Static test results for all samples had Sulphur values between 0.02- 0.53%. Results suggested that the majority of sulphur present is as sulphate sulphur. Therefore, the majority of acidity in the TSF occurs as stored acidity, which will report to the environment as a function of net percolation. Cover system design should therefore focus on reducing net percolation.

Soluble metal leach tests were used to determine the likely concentrations of major ions and trace metals in water extracts. These tests showed the majority of samples had a pH of less than 5. Salinity values were typically in the range suitable for use as irrigation water. Concentrations of metals were typically below levels for livestock drinking water, with some minor exceptions for Cd, Fe and Mn in soil samples. The report states that the levels suggest that direct surface water runoff and seepage could exceed ANZECC aquatic ecosystem guidelines (RGS, 2015). However, RGS notes that this is unlikely to be an issue due to dilution by rainfall, runoff and seepage from the TSF catchment. This opinion is supported (in the report) by water quality data from the return water dam, which shows neutral to alkaline pH and relatively low EC values.

The report also notes that 'there has not been accumulation of soluble elements from the tailings into the trial soil cover through capillary action; if this had occurred the soluble concentrations of major ions would have been higher in the soil.' (RGS, 2015, p.26)

Cation Exchange Capacity (CEC) tests were performed on seven samples from soil and oxide tailings. The CEC values were very low, averaging 4.7 and 2.1 meq/100g, respectively. This suggests that soils may be low in fertility and susceptible to soil acidification (RGS, 2015). RGS recommended that oxide tailings in Cell B may require soil cover prior to revegetation. Exchangeable Sodium Percentage (ESP) tests suggest samples have low sodicity and are not likely to be susceptible to erosion and dispersion. Exchangeable Ca:Mg results indicate an average ratio of 4.5, which suggests that amelioration may be required in some areas to provide a reasonable growth medium if no topsoil cover was to be placed.

Kinetic test results were found (in summary) to typically have low pH (4-5), with concentrates of most elements decreasing over time, but remaining elevated for Al, Mn and Ni. However, RGS conclude that a capillary break is not likely to be required as 'it is considered unlikely that the tailings contain a sufficient mass of soluble ions to significantly affect the overlying soils, due to the effects of capillary rise' (RGS, 2015, p.30). This conclusion is supported by the success of revegetation trials on Cell B.

Whilst the report concludes that a capillary break is not likely to be required, it is noted that the proposed cover system for Cell B has provided for an inert sized gravel layer between the tailings and topsoil.

Site Climate Considerations for Cell B Cover Design

The Yandan Gold Mine semi-arid tropical climate is characterised by a hot wet season and mild dry season, highly variable rainfall, high evaporation rates and low humidity. A Silo Data Drill was obtained from the Queensland government for climate data specific to the Yandan mine site. A preliminary assessment of the obtained data was performed, with the main elements presented below. For the purposes of the initial proposal, O'Kane used data dating back to 1913. Monthly averages for precipitation and potential evaporation are presented in Figure 3.

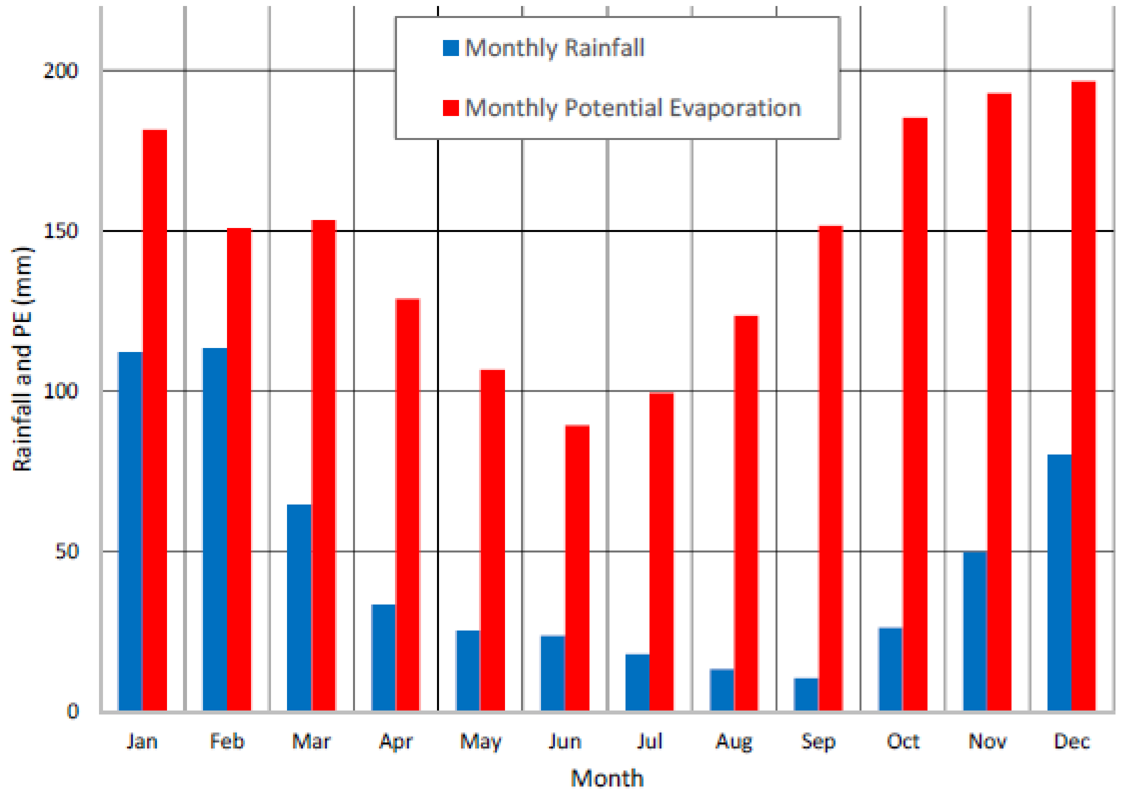

Figure 3 Yandan Site Average Monthly Rainfall and Potential Evaporation (1913 – 2014)

Average annual rainfall for the site is 559 mm (from the Bureau of Meteorology 'Bruslee' station), falling largely during the wet season (November to March). Drought is regarded as a common occurrence in the region; however, the area can be subject to heavy rainfall and flooding as tropical cyclones irregularly cross the coast and become rain-bearing depressions.

Annual rainfall regularly breaks 1,000 mm, with the maximum recorded annual rainfall being 1,157 mm. Figure 4 presents monthly rainfall and potential evaporation for 'wet years', which are defined as years when annual rainfall was over two standard deviations above the average for the entire data set.

The minimum recorded annual rainfall was 212 mm. Under the Koppen-Geiger classification system, the mine site is classified as BSh, corresponding to a hot semi-arid climate. According to current worst-case climate change scenarios (A1F1 under the IPCC SRES), this classification will remain the same for the 2076-2100 period.

Potential evaporation (PE) at the site (calculated using the FAO56 method) is approximately 1755 mm per year, which is approximately triple the average annual rainfall. PE is higher than rainfall for all months of the year. Average daily maximum temperatures range between 35°C in the summer months and 22°C in the winter months.

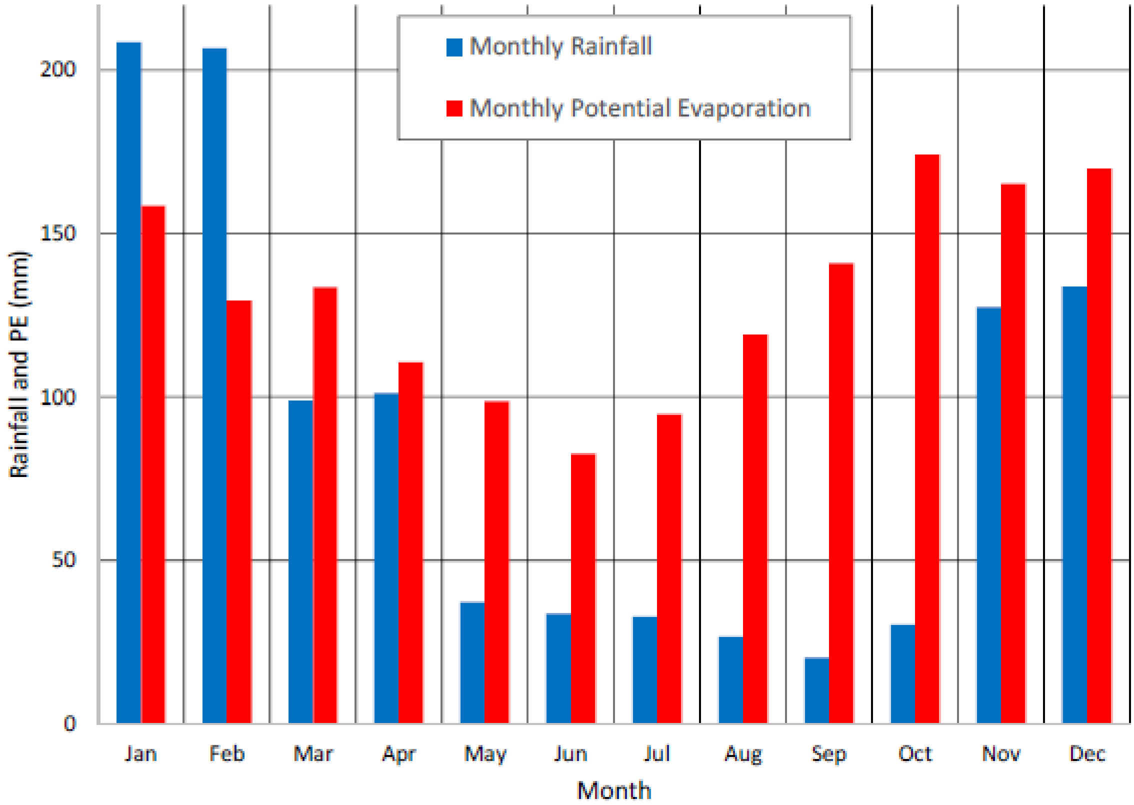

Figure 4 Yandan Site 'Wet Years' (~1 in 20) Rainfall and Potential Evaporation (1913 – 2014)

Groundwater Considerations for Cell B Cover Design

Groundwater in the area is of poor quality for stock watering, and considered unsuitable for irrigation and domestic use (GHD 2008). Groundwater flow is towards the Suttor River, on the banks of which the water table is approximately 8m below the riverbed at RL 158m. There is no known connection between the groundwater aquifer and surface water in this area.

Groundwater monitoring bores located around the TSF show the water table to be between 7m and 11m below the surface (May 2018), except to the east of Cell B where the water table is only 2.34m below the surface. This is likely due to the presence of an old creek blocked by the construction of the Cell B tailings dam. Surface water commonly pools at this location.

Design Objectives Specific to the Cover System for Cell B

The following objectives specific to the conceptual cover system have been developed. The cover system aims to:

1) Create clean surface runoff from the TSF Cell B surface;
2) Limit upward movement of oxidation products and salts;
3) Limit net percolation to limit flushing of stored acidity;
4) Form a stable landform with limited erosion; and

5) Support vegetation and final land use:

    a) Cattle grazing

    b) Avoid deep rooted vegetation (trees).

Conceptual Landform Design for Cell B

Prior to the placement of the cover system materials, the tailings surface will be reshaped and regraded to create a landform that promotes surface water runoff towards the current outlet located to the southwest of Cell B, as well as eliminating low areas that would promote water accumulation. Re-shaping the subgrade prior to construction of the cover system allows for maintaining a regular cover profile over the entire facility, with similar layer thickness throughout.

As demonstrated on previously rehabilitated areas over Cell A and the trial areas on Cell B, adequate re-sloping of the landform surface is required to promote surface runoff and avoid surface water accumulation within the TSF. It is proposed to regrade the tailings surface to create a minimum 0.5% slope towards the south.

Conceptual Cover System Design for Cell B

The cover system to be put in place will consist of two layers: a topsoil / growth medium layer at the surface; overlying a gravel drainage layer. The cover system material properties assumed for the development of the conceptual cover system design are shown in Table 7. These are assumed properties that will require verification during the detailed design of the cover system and in situ testing of the material's field saturated permeability. Detailed design has been provided for in FA calculations.

Table 7 Assumed Cover System Material Properties

Parameter	Topsoil / growth medium	Gravel	Coarse Rock	Tailings
Texture	Finer	Coarser	Very Coarse	Fine
Hydraulic Conductivity (Ksat)	10^{-4} cm/s	10^{-1} cm/s	10^{-1} cm/s	10^{-4} cm/s
Available Water Storage Capacity	1.5 mm/cm	n/a	n/a	n/a

The cover system design is split in two zones as per Figure 5. The separate zones are based on the potential water table within the tailings which is expected to be higher within Zone 2. This assumption stems from water levels recorded outside the TSF as part of groundwater monitoring for the site. The water table just east of the facility, within the creek area upstream of the dam wall, has been recorded at less than one metre below the surface. It is expected that the water table within the facility would range across similar levels within Zone 2.

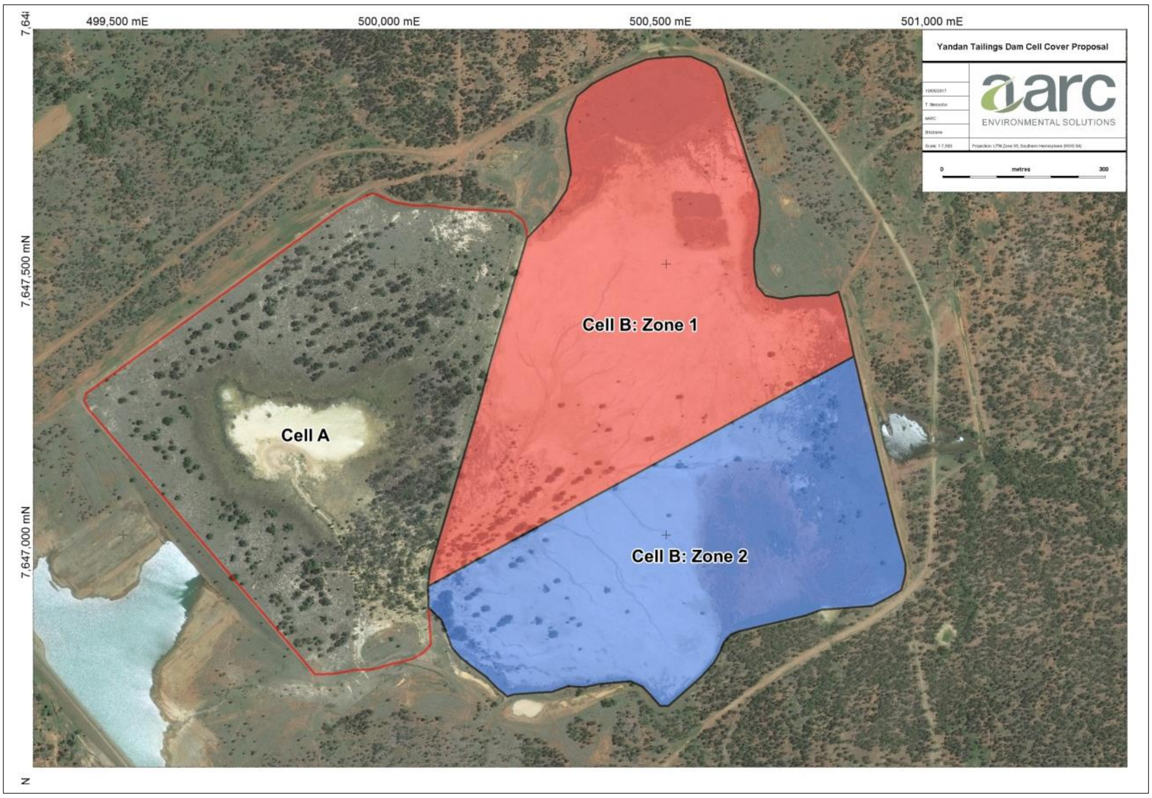

Figure 5 TSF Cell B Zoning for Cover Design

The cover systems designed for Zone 1 and Zone 2 differ in the granular material used for the drainage layer. Figure 6 shows the conceptual cover systems for Zone 1 and Zone 2, respectively.

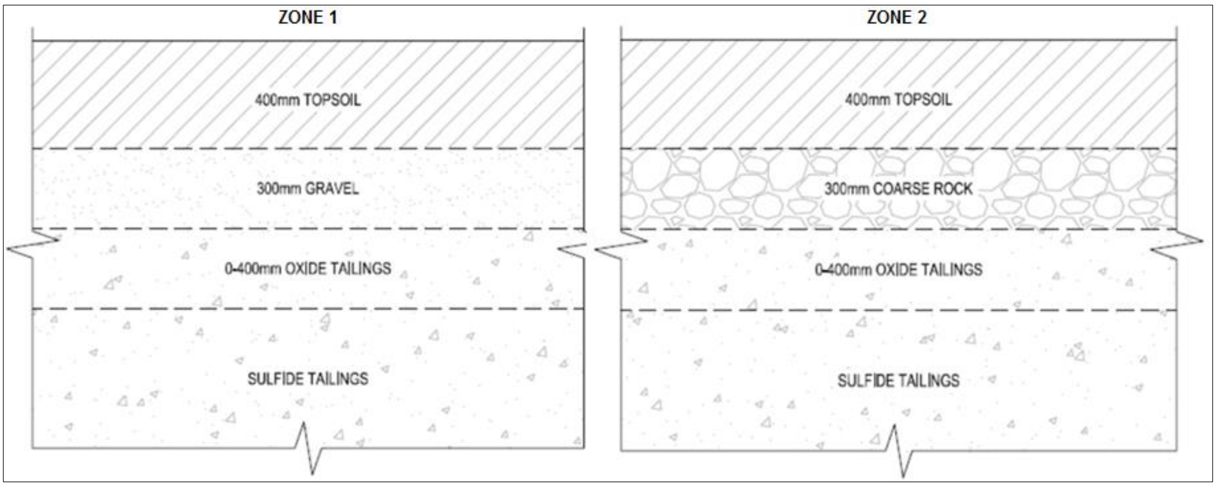

Figure 6 Conceptual Cover System Zones 1 & 2

Cover System Justification for Cell B

Meteoric water that reaches the surface of a cover system will either be intercepted by vegetation, run off, or infiltrate into the cover profile. A portion of the water that infiltrates will be stored in the 'active zone' which refers the region of soil/growth medium near the surface; in which the water content varies due to precipitation and evapotranspiration. This water will subsequently exfiltrate back to the surface and evaporate, or be removed from within the profile by transpiration. The infiltration can also move laterally downslope, within and below the active zone. A small percentage of the infiltrating water will migrate beyond the active zone as a result of gravity overcoming the influence of atmospheric forcing (i.e. evaporation) and result in net percolation to the underlying waste material. In cases where the second granular layer (cover layer no. 2 in Figure 7) has a higher hydraulic conductivity than the underlying and overlying materials, lateral percolation would be expected within this layer as well.

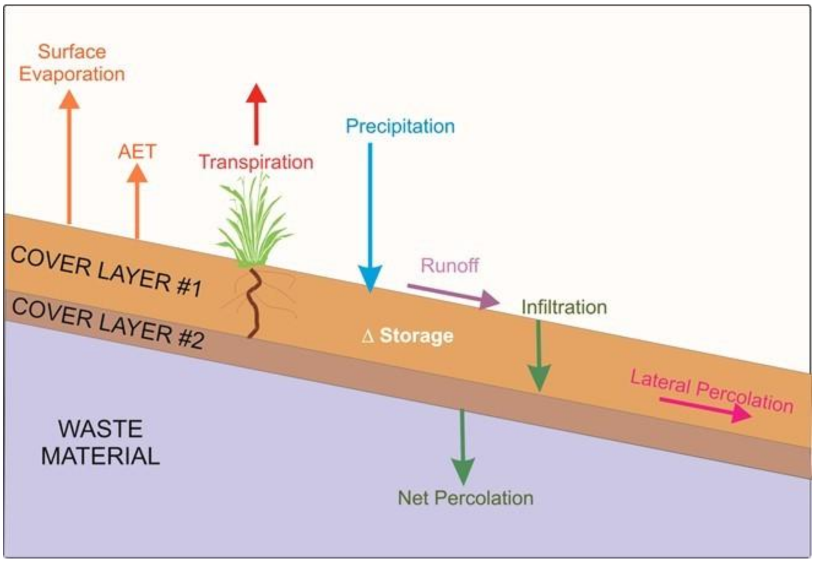

Figure 7 Schematic of hydrologic processes that influence performance of sloping mine waste cover systems

Figure 8 presents the water balance components for the conceptual model of the cover system. One goal of the cover system is to limit the amount of precipitation resulting in net percolation into the tailings material. In order to limit net percolation, the cover system promotes runoff and moisture storage within the topsoil layer while the gravel layer acts as a capillary break to limit moisture movement from the topsoil layer to the gravel layer and pore water uptake from the tailings material to the topsoil layer.

It is estimated that net percolation rates would be in the range of 10% to 15% for average annual rainfall conditions (for Yandan 1913 – 2014), and in the range of 30% to 35% for wetter years. This conceptual water balance is a broad estimate and makes conservative assumptions in regards to runoff rates (i.e. the percentage of rainfall reporting as runoff for these conditions is assumed to be relatively low at ~ 5% to 10% for an average year, and ~15% to 20% for a wetter year). It is important to note however, that this runoff will be 'clean', as it will be interacting with the topsoil surface. This is in contrast to current conditions where any runoff is adversely impacted by tailings surface conditions.

In addition to supporting vegetation for end land-use, the proposed 400 mm topsoil/growth medium layer offers a number of characteristics which support the cover system objectives presented. Conservatively, assuming the topsoil layer has a hydraulic conductivity of 10^{-4} cm/s, the infiltration rate into the topsoil layer during rainfall events would be in the range of 4 mm/hr.

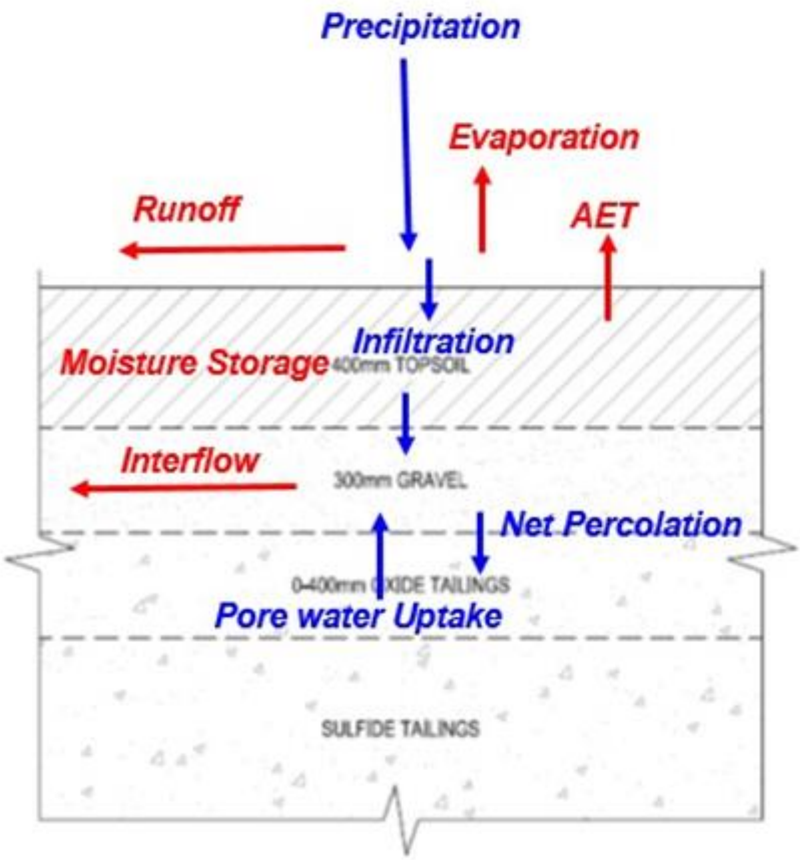

Figure 8 Conceptual Model of Cover System – Water Balance Components

As precipitation at the Yandan site is usually short and intense, it is expected that infiltration capacity may be exceeded on a regular basis, thus resulting in surface runoff. The field capacity of the topsoil, defined as the volumetric water content of the material at a soil matric suction of 33 kPa, is estimated to be 0.25. Assuming a permanent wilting point of approximately 0.10 (i.e. the volumetric water content of the material at a suction of 1,500 kPa), this equates to an available water storage capacity (AWSC) of ~1.5 mm of water per cm of soil. For a 400 mm layer of topsoil, this results in a storage capacity of 60 mm of water.

Although challenging to quantify on a conceptual basis, AWSC in the topsoil will be enhanced as a result of the textural contrast (i.e. the capillary break) at the gravel (or coarse rock) – topsoil interface. This enhancement is likely in the range of 15 to 20 mm (i.e. the field AWSC is likely to be in the range of 75 to 80 mm. This water storage capacity will be used up by vegetation and result in actual evapotranspiration (AET) while evaporation will reduce moisture storage from the soil surface. Furthermore, it is fundamental to appreciate that this water storage capacity can be utilised multiple times during the year, and particularly during the wet season. In other words, rainfall will infiltrate, be stored within the topsoil layer, and then evapotranspirate repeatedly throughout the year.

If infiltration volumes into the topsoil layer exceed the field capacity of the material, gravitational flow into the gravel layer is expected. However, net percolation into the tailings material will be limited by the storage capacity of the topsoil (and enhanced by the textural contrast), the lower permeability of the tailings, the strong evaporation potential at the site, and the runoff that occurs during intense and/or extreme rainfall events. Root uptake of tailings pore-water would be limited by the presence of the underlying textural contrast (i.e. the gravel layer) as well as provision of plant water use capacity within the topsoil layer.

Vegetation

The vegetation mix to be established on the Cell B TSF is expected to consist mainly of grasses to support the end land use of cattle grazing. As such, deep-rooted tree species are to be avoided over the area, reducing further the risk of tailings pore-water uptake from the rooting system.

Material Sources for Cell B

Coarse Rock:

Coarse rock for forming a drainage layer in Zone 2 will be sourced from the heap leach area. This is located 3.5km to the west of the TSF. Coarse rock will be recovered from the dump and screened to sort rock at approximately 50mm size. Excavation of the coarse rock will involve an excavator to take from the base of the heap and place for screening. Screen hire has been provided for in FA calculations. A tracked dozer will be required to push the dump material towards the excavator and screen. This dozing is in any case required to batter down the heap dump for final closure. Haulage of the rock by dump truck will be over a distance of 3.5km (one way) to deliver the coarse rock to the TSF.

The heap leach dump rock is Non Acid Forming (NAF) and contains lime that was dosed on the heap during processing. Analyses of 6 representative rock samples of this material shows that the pH was in the range of 8.1 to 10, EC was less than 500 µS/cm and the Acid Neutralising Capacity (ANC) was 3.8 to 33.3 kg H_2SO_4/t. Net Acid Producing Potential (NAPP) was -2.9 to -32.7 kg H_2SO_4/t, thus this rock is classified as NAF (barren). There is approximately 1 million m^3 of material in the heap leach. Material on the heap leach is run of mine blasted rock that has not been crushed and ranges in size from sandy fines to quite large rocks. As the material is salvaged from the heap leach dump and screened via a visual check, additional Net Acid Generation (NAG) testing will determine the suitability of the leached material for use as coarse rock cover.

Gravel:

Gravel is available to be excavated from borrow pits adjacent to the TSF. On the edge of hill slopes the topsoil will be removed and stockpiled to expose the rocky gravel material. This material has already been used with great success: as the inert cover material at the test rehabilitation plots. It is rocky with high porosity but with sufficient fines to retain rainwater to support growth. The borrow pits for the rocky gravel will all be close to the TSF, so haulage distance (one way) will be less than 1000m.

Topsoil:

There are significant stockpiles of topsoil located around the TSF. The largest is located on the eastern side of Cell B. Topsoil can also be burrowed from immediately outside the TSF area.

6.2.1 Water Dams

Both the Tailings Water Return Dam (TWRD) and Mine Process Water Dam (MPWD) will be cleaned (through the removal of any contaminated sediment) to minimise the possibility of environmental harm. The closure plan is to remove up to 500mm of material from the 7 ha deepest section of the TWRD, (an area of approximately 350m x 200m adjacent to the dam wall; constituting 35,000m^3 of material in total). The sediment and gravel will be utilised as fill on Cell A of the TSF and covered with 200mm of topsoil, as part of the TSF rehabilitation. These dams are seasonally dry, easily accessed and do not require dewatering prior to cleaning.

The MPWD located downstream of where the old processing plant was, has received minimal sediment deposition. Sediment removal will still occur however, focused on the area close to the dam wall. Approximately 250 mm of material will be taken, from an area of 4.8 ha. Disposal of the resulting 12,000m^3 of sediment, shall be achieved by placing into the nearby TSF.

The TWRD spillway area shall also require rehabilitation. This estimated surface area of the spillway is 3.1 ha. This area shall be cleared of sediment to an average depth of 0.25 m to remove any underlying contaminated sediment, with the resulting 7,750 m^3 of material to be deposited in the TSF. The area will then undergo structural earthworks to manage all surface water, including any required soil conservation earthworks.

The clean dams will subsequently be allowed to fill with natural surface water and will be retained as a valuable resource for the land holder. The WSD, Runoff Dam and Water Harvest Trench are also intended to remain on the Project site following decommissioning to be used by the landholder as a highly valued asset for stock watering. No remedial works are anticipated to be required during the rehabilitation stage.

6.2.2 Leach Dump Area

The old leach dump is neutral to alkaline in nature and presents a valuable source of rock for construction and/or rehabilitation. Prior to reshaping, suitable inert material from the heap leach dump will be removed from the eastern end of the leach dump, closest to the tailings cells, to be used for capping of Zone 2 of the Cell B TSF. It is estimated that approximately 85,000 m^3 shall be extracted before reshaping.

Three small ponds are present on the site adjacent to the leach dump (known as the 2 Heap Leach Ponds and the Stormwater Pond – Refer Figure 3). The water stored in the ponds will be progressively pumped to the MPWD for evaporation. The Stormwater Pond will be retained at closure, however the 2 Heap Leach Ponds will be decommissioned and rehabilitated.

The heap leach dump outside slope is to be flattened to a maximum slope of 17 degrees by dozer push. The work is all relatively high productivity down slope pushing with a dozer. Some additional pushing has been allowed to fill in and cover over the 2 Heap Leach Ponds, integrating them under the final land form.

Topsoil will be spread (200 mm), seeded and fertilised over the final land form. Topsoil stockpiles are found adjacent to the dump. A bulk dozer push of 27,400 m^3 is estimated and 37,700 m^3 of topsoil will be placed to complete closure of this facility. Final rehabilitated surface area is 18.85 ha.

6.2.3 Mining Pits and Main Pit Bund Wall / Levee

The Main Pit, situated adjacent to the Suttor River, will require the retention of a water layer that is sufficient to cover all potentially acid producing rock material in the pit's walls. The retention of this cover will rely on periodic inflows from the Suttor River to recharge the pit. Two spillways have been installed on the north-west and south-east walls of the pit, with the RLs of the spillways such that inflows are allowed at least once in two years.

Both spillways have been lowered to ensure inflows from the Suttor River maintain the water in the Main Pit, at levels greater than 160 m AHD. The principal spillway on the downstream side of the Main Pit is excavated in competent rock, with little erosion anticipated.

The bund wall / levee for the Main Pit is proposed to be disposed of into the Main Pit. This will be achieved by a major bulk push into the Main Pit during the dry season, allowing any resulting sedimentation time to settle before the wet season, minimising any chance of discharge into receiving waters. The bund wall / levee covers an estimated footprint of 2.1 ha and is estimated to have an average height of 5 m. The total bulk dozer push with be approximately 105,000 m^3, with the footprint area then topsoiled to a depth of 200 mm and seeded with pasture species. A small safety bund will be retained around the perimeter of the pit. Topsoil shall be sourced from the nearby leach dump stockpiles.

A security fence will be constructed around the small East Hill Pit; a safety bund and stock fence is already in place. Decommissioning will involve ensuring the bund and fencing are suitable for preventing livestock and human access, as well as erecting adequate warning signage. The pit will be partially backfilled with concrete removed from the plant and infrastructure sites, as well as sediment taken from the MPWD. The pit will be left in a safe condition by short dozing of surrounding minor waste dumps into the pit. An estimated 20,000m^3 of material will be required to achieve the final slope.

The South Pit has already been backfilled to blend in with the natural environment and is fully rehabilitated.

6.2.4 Infrastructure

The rehabilitation cost for the remains of the infrastructure area shall include appropriate Phase 1 contamination assessments where applicable. All remaining concrete footings (0.47 ha) will be removed and deposited in the old East Pit (for burial).

The majority of the previous buildings (such as the village accommodation camp and industrial areas) have already been removed, with areas rehabilitated (with the exception of some concrete footings). A small area of buildings utilised as the exploration camp/office (0.03 ha), and one small above-ground tank remain. These will be demolished and buried in the East Hill Pit before the underlying area is topsoiled and seeded. The residual small hardstand area will be ripped, topsoiled, and seeded with pasture species.

Approximately 4 ha of infrastructure and hardstand area has already been reshaped, topsoiled and rehabilitated. This will require only minor repairs and maintenance.

6.2.5 Borrow Pit

After being excavated as a source of gravel and topsoil material, the borrow pit area will then be reshaped, topsoiled and seeded with native grasses.

6.2.6 ROM

The ROM pad area has been previously rehabilitated and will require only minor rehabilitation repairs and maintenance. Monitoring of the rehabilitated landform is planned to demonstrate success against rehabilitation objectives.

6.2.7 Areas retained by the Landholder

By agreement with the landholder, and approval from the administrative authority, the following infrastructure shall be retained on site post closure:

- Roads
- Airstrip

- Water Storage Dam
- Tailing return dam
- Harvest Trench
- Runoff Dam

7.0 MATERIALS BALANCE

Based on available information, a materials balance has been undertaken as part of the Financial Assurance calculation for the project. This detail is provided through the FA calculator determinations and supporting material in the August 2018 Plan of Operations. In short, site supplies of the required material will substantiate final rehabilitation requirements; although a screen to grade coarse rock is required to deliver sufficient size gradients.

8.0 FURTHER STUDIES

It is a requirement of the Project's EA that the PMLUP facilitates a research program. Research to be undertaken includes further geotechnical, geochemical and hydrological studies to determine the conditions of final landforms to remain on the Project site. Much of this is occurring through ongoing rehabilitation trials. In addition, further ecology investigations will continue (through Rehabilitation Monitoring) to assess the adequacy of rehabilitation strategies and rehabilitation trials.

Completion criteria and rehabilitation strategies may be subject to change based on the results of further investigations.