



**NSW
Resources
Regulator**

FWP0001280

BALRANALD MINERAL SANDS PROJECT FORWARD PROGRAM

Monday 1 January 2024 to Thursday 31 December 2026

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Summary

DETAIL

Mine	Balranald Mineral Sands Project
Reference	FWP0001280
Forward program commencement date	Monday 1 January 2024
Forward program end date	Thursday 31 December 2026
Forward program revision (if applicable)	
Contact	Brendan Isaacs
Mining leases	ML 1855 (1992), ML 1736 (1992)
Project location	ILUKA RESOURCES LIMITED
Date of submission	Wednesday 28 February 2024

Important

The department may make the information in your program and any supporting information available for inspection by members of the public, including by publication on its website or by displaying the information at any of its offices. If you consider any part of your program to be confidential, please communicate this to the department via the message function on this submission within the NSW Resources Regulator Portal.

Three-year forecast – surface disturbance activities

Project description

Iluka have approval to develop a mineral sands mine in south-western NSW, known as the Balranald Mineral Sands Project. It includes construction, open-cut mining, primary processing, and rehabilitation of two linear mineral sand deposits, known as the West Balranald and Nepean deposits, located approximately 12 kilometres (km) and 66 km north-west of the town of Balranald, respectively. The Balranald Project also included undertaking an approved bulk sampling activity at the West Balranald deposit to trial the use of underground mining methods. On 21 December 2022, Iluka were granted approval to modify the consent (MOD1) to expand the underground mining trial which includes an additional area of disturbance to the approved Balranald Project area to enable primary processing of the ore into heavy mineral concentrate (HMC) and transport of HMC offsite for secondary processing at Iluka's facilities in Victoria and/or WA.

Description of surface disturbance activities

Exploration activities

Prior to mining the northern faulted area, a grade control drill program consisting of between 10 to 16 AC drill holes will be required to refine the strand geometry and this is proposed to be completed in late 2025 or 2026. Further Sonic drilling will be required in 2025 – 2026 to support conversion of Indicated Resources to Measured Resource classification in advance of mining.

Construction activities

Construction of the Balranald Minerals Sands Underground Mining operation commenced on 7 August 2023. Construction will continue in 2024 and involves the clearing of native vegetation and soil stripping within ML1736 and ML1855, with the following infrastructure proposed to be located within this area:

- processing plant infrastructure, comprising wet concentrator plant (WCP), flotation plant and wet high intensity magnetic separation plant (WHIMS);
- product and tails pad(s);
- process water, potassium amyl xanthate (PAX) and fines dams;
- underground mining infrastructure;
- temporary stockpiles (topsoil, subsoil and overburden);
- timber stockpiles (felled vegetation);
- hardstand and laydown areas;
- site offices, warehousing, workshops, amenities and carparking;
- services and utilities infrastructure;
- fuel storage and dispensing area;
- telecommunications tower;
- mine access road and accommodation camp; and
- internal access tracks and roadways.

Mining schedule

Mining development method and sequencing and general mine features.

Mineral ore will be extracted to surface by utilising underground bore hole mining technology developed during previous bulk sampling activities. The predicted processing rate is anticipated to be between 50 and 200 tph, consistent with the previous bulk sampling activity. Mining stopes and drill pads will be developed at strategic locations within the mining panels to accommodate the directional drill rigs for the extraction of ore and re-injection of fine tailings and slimes. An underground pillar will be left after every 11th underground stope or approximately 500m to ensure stability and maintain ground monitoring infrastructure. The extension of the underground mining trial has been approved for up to six years with mining operations scheduled to commence during 2025.

Areas identified for emplacements, the sequencing of emplacements, construction, and management.

Some temporary stockpiling of materials will be required, with topsoil stockpiled to a maximum height of 2m to preserve soil biota and minimise compaction. Subsoil will be stockpiled to a maximum height of 10m, dependent on soil properties and condition. Stockpile attributes will be recorded including location, placement date, originating vegetation community, material strip depth, soil type, stripping conditions and volumes. Stockpiles will be managed in accordance with the erosion and sediment control measures outlined in the Water Management Plan. Vehicle access to stockpiles will be controlled to prevent further compaction and erosion. Weeds will be managed on topsoil stockpiles to minimise weed seed accumulation and spread. During mining operations topsoil, subsoil and approximately 2m of overburden will be pre-stripped from the mine path and stockpiled for use in the rehabilitation phase. Sand tailings from ore processing will be placed within the pre-stripped mining voids and the next phase of pre-stripping volumes direct placed. This includes overburden, subsoil and some topsoil from the proceeding mining voids. A temporary landform will be constructed approximately 1-2m above natural surface to account for expected subsidence. Final land form establishment works will be undertaken once subsidence has stabilised according to monitoring results. A direct strip and replace approach will then be adopted as the general mining practice where reasonably practicable.

Processing infrastructure activities and the location of tailings facilities and schedule for emplacement.

The processing plant will have a number of circuits including the screening, wet concentrator plant, flotation plant and wet high intensity magnetic separation plant. The ore will be concentrated through the processing plant to generate two primary product streams, magnetic Heavy Mineral Concentrate (HMC) and non-magnetic HMC. HMC will be temporarily stockpiled on site and transported to an off-site location for processing. Two primary tailings streams will be generated. These are fine particle (slimes) which is combined with floatation plant waste, and courser sand tails. The coarse sand tails will be dewatered and stockpiled

prior to being mechanically placed in the pre-stripped voids ahead of underground mining. The topsoil, subsoil and overburden pre-stripped from these areas prior to the emplacement of the coarse sand tails will be returned in order to achieve a sustainable rehabilitation outcome. The majority of the fine sand and flotation process tails will be reinjected underground in accordance with processes and management measures outlined in the Water Management Plan. Processing is scheduled to commence in 2025 shortly after underground mining commences.

Waste disposal and materials handling operations.

Putrescible waste generation will be disposed of in onsite skip bins, bins will remain covered at all times and replaced on a regular basis by a third party contractor who will dispose of the waste to an appropriately licenced waste facility. There may be an opportunity to manage putrescible waste onsite, this will be identified through potential long-term recycling initiatives developed during the operational phase. Liquid hydrocarbons will be stored within purpose built bunds that can contain 120% of the largest container to fully contain any leakage. Other hydrocarbon waste such as oil filters, fuel filters, oily rags and spill absorbents will be stored separately in plastic bins to prevent leakage of hydrocarbons. Hydrocarbon waste will be collected by a licenced third party contractor and disposed of at an appropriately licenced waste facility. Soils contaminated with hydrocarbons will be collected by scraping up the minimum amount of soil necessary and storing in plastic bins or 1000L shuttles for collection by a licenced third party contractor and disposal to an appropriately licenced waste facility. For larger amounts of contaminated soil, a lined sump may be used to temporarily store contaminated soil for either onsite remediation and disposal in pit below the overburden layer or disposal offsite to an appropriately licenced facility.

Key production milestones

MATERIAL	UNIT	YEAR 1	YEAR 2	YEAR 3
Stripped topsoil (if applicable)	(m ³)	355,000	120,000	60,000
Rock/overburden	(m ³)	155,000	475,000	265,000
Ore	(Mt)	0	0.18	1.04
Reject material¹	(Mt)	0	0.09	0.54
Product	(Mt)	0	0.09	0.5

¹ This includes coarse rejects, tailings and any other wastes resulting from beneficiation.

Three-year rehabilitation forecast

Rehabilitation planning schedule

Rehabilitation planning schedule

Planning for the initial resource recovery (topsoil, subsoil and timber) will occur during 2024 prior to the commencement of clearing and stripping works. A mine plan will be developed to depict where temporary topsoil, subsoil and timber stockpiles are to be constructed. Prior to the commencement of mining operations in 2025 a direct replacement plan for overburden, subsoil and topsoil will be established that includes sequencing and scheduling of material movements ahead of underground mining. Subsidence monitoring programs will be developed prior to commencement of underground mining in 2025 to monitor areas where underground mining has concluded to understand the rate of subsidence and when maximum subsidence is reached to allow final land form establishment to be undertaken.

Stakeholder consultation

Balranald Shire Council will be consulted in 2024 to finalise the Voluntary Planning Agreement and Road Maintenance Agreement required under condition 18 of Schedule 2 and condition 25 of Schedule 3 for the Balranald Mineral Sands Project Development Consent (SSD-5285). Balranald Shire Council and Transport for NSW will be consulted during 2024 regarding the required public road upgrades required under Condition 22 of Schedule 3 for the Balranald Mineral Sands Project Development Consent (SSD-5285). Consultation with RAPs will continue to maintain the Aboriginal Cultural Heritage Working Group. The group will meet at least twice per year, and will be an advisory committee which Iluka will work with in relation to ongoing management of Aboriginal heritage associated with the project. Community consultation will be undertaken over the next three years, including attending community events, providing project updates and responding to queries or complaints during the construction phase.

Rehabilitation studies, risk assessments and/or design work

A risk assessment will be conducted to identify risks associated with preparing a landform ahead of underground mining. Monitoring results and studies from previous underground mining trials will be used to better understand subsidence behavior and stability issues after the extraction of mineral sands at depth. The outcome of the studies will inform how the final landform will present and any re-work required prior to ecosystem establishment. The land prepared in front of underground mining operations will be constructed approximately 1-3m above natural surface and be informed by these studies and local geology.

Rehabilitation research and trials

RRT NUMBER	PROJECT/TRIAL NAME	OBJECTIVE OF TRIAL/PROJECT	METHODOLOGY	EXPECTED DATE OF COMPLETION	STATUS
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Rehabilitation maintenance and corrective actions

No rehabilitation activities were undertaken during the last reporting period due to the site being in care & maintenance and therefore no rehabilitation maintenance or corrective actions are planned to be carried out during the current reporting period. Inspections and control of declared weeds will continue at the site during care & maintenance as will erosion and sediments controls. The site will be inspected after significant rain events to ensure drainage structures are working effectively and there is no significant erosion occurring to land or stockpiled materials. Maintenance of drainage and erosion control infrastructure will be undertaken as necessary.

Rehabilitation schedule

During the construction period resource recovery including felled vegetation, topsoil and subsoil will be implemented for later use in rehabilitation phases. During 2024 and 2025 rehabilitation (prehab) will be undertaken ahead of the underground mining operations to ensure there is 50m between underground mining and surface disturbance activities. Topsoil, subsoil and overburden will be removed ahead of mining to create a shallow void (approx. 2.5m) and stockpiled adjacent the mine path. Sand tailings from the processing plant will be returned to the mining pits for encapsulation. Once there is a sufficient buffer, soil will be stripped and direct replaced onto the pre-prepared mining pits approximately 1-3m above natural surface to encapsulate the tailings that have been returned to the void. The final landform once underground mining is completed will be allowed to subside with any final land forming to be completed when a risk assessment informs it is safe to do so. Final land forming may involve minor shaping and contour ripping of batter slopes as required to create a safe, stable and non-polluting landform. Seeding methodologies may include dozer seeding, drone seeding or hand seeding native species onto prepared topsoil.

Subsidence remediation for underground operations

Monitoring of pre-prepared areas ahead of underground mining will be undertaken from 2025 to establish the rate of subsidence and expected maximum subsidence. This will inform the timing of final landform establishment and the extent of re-work required for ecosystem establishment.

Progressive mining and rehabilitation statistics

Three-yearly forecast cumulative disturbance and rehabilitation progression

FORECAST	UNIT	YEAR 1	YEAR 2	YEAR 3
A Total surface disturbance footprint	(ha)	215.96	254.5	283.32
B Total active disturbance	(ha)	215.96	254.5	283.32
P Total new area of land proposed for active rehabilitation	(ha)	0	0	0

Rehabilitation key performance indicators (KPIs)

FORECAST	UNIT	YEAR 1	YEAR 2	YEAR 3
O Total new active disturbance area	(ha)	177.06	38.54	28.81
P Total new area of land proposed for active rehabilitation during the reporting period	(ha)			
Q Annual rehabilitation to disturbance ratio				

Attachment 1 – Reporting Definitions

REPORTING CATEGORY	DEFINITION
<p>A Total disturbance footprint – surface disturbance</p>	<p>All areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to surface disturbance activities.</p> <p>The total disturbance footprint is the sum of the total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem and land use establishment, ecosystem and land use development and rehabilitation completion (see definitions below).</p> <p>Underground mining operations should not include the footprint of underground mining areas/subsidence management areas in the total disturbance footprint.</p>
<p>B Total active disturbance</p>	<p>Includes on-lease exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste rock emplacements (active/unshaped/in or out-of-pit), tailings dams (active/unshaped/uncapped) and temporary stabilised areas (e.g. areas sown with temporary cover crops for dust mitigation and temporary rehabilitation).</p>
<p>C Rehabilitation – land preparation</p>	<p>Includes the sum of all disturbed land within a mining lease that have commenced any, or all, of the following phases of rehabilitation – decommissioning, landform establishment and growth medium development.</p> <p>Refer to the glossary of terms in this document for the definition of these phases of rehabilitation.</p>
<p>D Ecosystem and land use establishment</p>	<p>Includes the area which has been seeded/planted with the target vegetation species for the intended final land use. However, vegetation has not matured to a stage where it can be demonstrated that it will be sustainable for the long term and or require only a maintenance regime consistent with target reference/analogue sites.</p> <p>Typically, rehabilitation areas would be in this phase for at least two years (and usually more) before rehabilitation can be classified as being in the ecosystem and land use development phase. This phase does not apply to infrastructure areas that are being retained as part of final land use for the site.</p>

REPORTING CATEGORY	DEFINITION
O	The area of any new active disturbance that will be created during the next three years, as defined under definition A1 (definition A1 Table 5).
P	The sum of any new rehabilitation to be commenced in the next three years. These areas may be in the phases “Rehabilitation - Land Preparation” or the “Ecosystem & Land Use Establishment” (definitions C & D in Table 5).
Q	The rehabilitation to disturbance ratio (S / R) indicates how many hectares of new rehabilitation are undertaken for each hectare of land disturbed during the three years. A ratio of 1/1 indicates that the area of new rehabilitation and disturbance in that period are the same.

Attachment 2 – Definitions

WORD	DEFINITION
Active	In the context of rehabilitation, land associated with mining domains is considered ‘active’ for the period following disturbance until the commencement of rehabilitation.
Active mining phase of rehabilitation	In the context of rehabilitation, the active mining phase of rehabilitation constitutes the rehabilitation activities undertaken during mining operations such as salvaging and managing soil resources, salvaging habitat resources, and native seed collection. This phase also includes management actions taken during operations to manage risks to rehabilitation and enhance rehabilitation outcomes such as selective handling of waste rock and management of tailings emplacements.
Analogue site	In the context of rehabilitation, an analogue site is a ‘reference site’ that represents an example of the defining characteristics (such as vegetation composition and structure or agricultural productivity) of the final land use. Characteristics of analogue sites can be assessed to develop the rehabilitation objectives and completion criteria for final land use domains.
Annual rehabilitation report and forward program	As described in the Mining Regulation 2016.
Annual reporting period	As defined in the Mining Regulation 2016.
Closure	A whole-of-mine-life process, which typically culminates in the relinquishment of the mining lease. It includes decommissioning and rehabilitation to achieve the approved final land use(s).
Decommissioning	The process of removing mining infrastructure and removing contaminants and hazardous materials.
Decommissioning Phase of Rehabilitation	Activities associated with the removal of mining infrastructure and removal and/or remediation of contaminants and hazardous materials. In the context of the rehabilitation management plan this phase of rehabilitation may also include studies and assessments associated with decommissioning and demolition of infrastructure or works carried out to make safe or ‘fit for purpose’ built infrastructure to be retained for future use(s) following lease relinquishment.

WORD	DEFINITION
Department	The Department of Regional NSW.
Disturbance	See Surface Disturbance.
Disturbance area	<p>An area that has been disturbed and that requires rehabilitation.</p> <p>This may include areas such as on-licence exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste emplacements (active/unshaped/in or out-of-pit), tailings dams (active/unshaped/uncapped), and areas requiring rehabilitation that are temporarily stabilised (i.e. managed to minimise dust generation and/or erosion).</p>
Domain	<p>An area (or areas) of the land that has been disturbed by mining and has a specific operational use (mining domain) or specific final land use (final land use domain). Land within a domain typically has similar geochemical and/or geophysical characteristics and therefore requires specific rehabilitation activities to achieve the associated final land use.</p>
Ecosystem and Land Use Development	<p>This phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving the approved rehabilitation objectives and completion criteria.</p> <p>For vegetated land uses this phase may include processes to develop characteristics of functional self-sustaining ecosystems, such as nutrient recycling, vegetation flowering and reproduction, and increasing habitat complexity, and development of a productive, self-sustaining soil profile.</p> <p>This phase of rehabilitation may include specific vegetation management strategies and maintenance such as tree thinning, supplementary plantings and weed management.</p>
Ecosystem and Land Use Establishment	<p>This phase of rehabilitation consists of the processes to establish the approved final land use following construction of the final landform.</p> <p>For vegetated land uses this rehabilitation phase includes establishing the desired vegetation community and implementing land management activities such as weed control. This phase of rehabilitation may also include habitat augmentation such as installation of nest boxes.</p>
Exploration	Has the same meaning as that term under the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.

WORD	DEFINITION
Final landform and rehabilitation plan	As defined in the Mining Regulation 2016.
Final land use	As defined in the Mining Regulation 2016.
Form and way	Means the form and way approved by the Secretary. Approved form and way documents are available on the Department's website.
Growth Medium Development	<p>This phase of rehabilitation consists of activities required to establish the physical, chemical and biological components of the substrate required to establish the desired vegetation community (including short lived pioneer species).</p> <p>This phase may include spreading the prepared landform with topsoil and/or subsoil and/or soil substitutes, applying soil ameliorants to enhance the physical, chemical and biological characteristics of the growth media, and actions to minimise loss of growth media due to erosion.</p>
Habitat	Has the same meaning as that term under the <i>Biodiversity Conservation Act 2016</i> and the <i>Fisheries Management Act 1994</i> (as relevant).
Indicator	An attribute of the biophysical environment (e.g. pH, topsoil depth, biomass) that can be used to approximate the progression of a biophysical process. It can be measured and audited to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completion criterion (i.e. defined end point). It may be aligned to an established protocol and used to evaluate changes in a system.
Land	As defined in the <i>Mining Act 1992</i> .
Landform Establishment	<p>This phase of rehabilitation consists of the processes and activities required to construct the final landform.</p> <p>In addition to profiling the surface of rehabilitation areas to the approved final landform profile this phase may include works to construct surface water drainage features, encapsulate problematic materials such as tailings, and prepare a substrate with the desired physical and chemical characteristics (e.g. rock raking or ameliorating sodic materials).</p>
Large mine	As defined in the Mining Regulation 2016.
Lease holder	The holder of a mining lease.

WORD	DEFINITION
Life of mine	The timeframe of how long a mine is approved to mine, from commencement to closure.
Mine rehabilitation portal	<p>Means the NSW Resources Regulator’s online portal that lease holders must use (via a registered account) to:</p> <ul style="list-style-type: none"> ■ upload rehabilitation geographical information system (GIS) spatial data ■ develop rehabilitation GIS spatial data (using online tracing functions) ■ generate rehabilitation plans and rehabilitation statistics using the map viewer and Rehabilitation Key Performance Indicator functionalities. <p>Data submitted to the mine rehabilitation portal is collated in a centralised geodatabase for use by the NSW Resources Regulator to regulate rehabilitation performance of lease holders.</p>
Mining area	As defined in the <i>Mining Act 1992</i> .
Mining domain	A land management unit with a discrete operational function (e.g. overburden emplacement), and therefore similar geophysical characteristics, that will require specific rehabilitation treatments to achieve the final land use(s).
Mining land	As defined in the <i>Mining Act 1992</i> .
Native vegetation	Has the same meaning as that term under section 60B of the <i>Local Land Services Act 2013</i> .
Overburden	Material overlying coal or a mineral deposit.
Performance indicator	An attribute of the biophysical environment (for example pH, slope, topsoil depth, biomass) that can be used to demonstrate achievement of a rehabilitation objective. It can be measured and audited to demonstrate (and track) the progress of an aspect of rehabilitation towards a desired completion criterion, that is, a defined end point. It may be aligned to an established protocol and used to evaluate changes in a system.

WORD	DEFINITION
Phases of rehabilitation	<p>The stages and sequences of actions required to rehabilitate disturbed land to achieve the final land use. The phases of rehabilitation are:</p> <ul style="list-style-type: none"> ■ active mining ■ decommissioning ■ landform Establishment ■ growth medium development ■ ecosystem and land use establishment ■ ecosystem and land use development.
Progressive rehabilitation	<p>The progress of rehabilitation towards achieving the approved rehabilitation completion criteria. This may be described in terms of domains, phases, performance indicators and rehabilitation completion criteria.</p>
Rehabilitation Completion	<p>The final phase of rehabilitation when a rehabilitation area has achieved the approved rehabilitation objectives and rehabilitation completion criteria for the final land use. Rehabilitation areas may be classified as complete when the NSW Resources Regulator has determined in writing that the relevant rehabilitation obligations have been fulfilled following submission of <i>Form ESF2 Rehabilitation completion and/or review of rehabilitation cost estimate</i> application by the lease holder.</p>
Rehabilitation Completion criteria	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation cost estimate	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation management plan	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation objectives	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation risk assessment	<p>As defined in the Mining Regulation 2016.</p>
Rehabilitation schedule	<p>The defined timeframes for progressive rehabilitation set out in the forward program.</p>

WORD	DEFINITION
Relevant stakeholders	<p>Means any persons or bodies who may be affected by the mining operations, including rehabilitation, carried out on the lease land, and includes:</p> <ul style="list-style-type: none"> ■ the relevant development consent authority ■ the local council ■ the relevant landholder(s) ■ community consultative committee (if required under the development consent) or equivalent consultative group ■ affected land holder(s) ■ government agencies relevant to the final land use ■ affected infrastructure authorities (electricity, telecommunications, water, pipeline, road, rail authorities) ■ local Aboriginal communities, and ■ any other person or body determined by the Minister to be a relevant stakeholder in relation to a mining lease.
Risk	The effect of uncertainty on objectives. It is measured in terms of consequences and likelihood (AS/NZS ISO 31000:2009).
Secretary	The Secretary of the Department.
Security deposit	An amount that a mining lease holder is required to provide and maintain under a mining lease condition, to secure funding for the fulfilment of obligations under the lease (including obligations that may arise in the future).
Surface disturbance	Includes activities that disturb the surface of the mining area, including mining operations, ancillary mining activities and exploration.
Tailings	A combination of the fine-grained solid material remaining after the recoverable metals and minerals have been extracted from the mined ore, and any process water ² .
Waste	Has the same meaning as that term under the <i>Protection of the Environment Operations Act 1997</i> .

² Commonwealth of Australia (DITR), 2007. *Tailings Management*.

Attachment 3 – Plans

Plan 2A_Forecast Data Year 1_2024.pdf

Plan 2B_Forecast Data Year 2_2025.pdf

Plan 2C_Forecast Data Year 3_2026.pdf

Forward Program (LARGE MINE) v2.1