EPBC Referral

Wimmera Project

Prepared for Iluka Resources Limited
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Wimmera Project

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1.1 Title of proposal

Wimmera Project, Victoria

1.2 Project industry type

Mining, mineral processing and refining

1.3 Provide a detailed description of the proposed action, including all proposed activities.

1.3.1 Overview

Iluka Resources Limited (Iluka) propose to develop the Wimmera Project, a mine and processing plant to extract mineral sands from the WIM100 deposit (Victorian Exploration Licence (EL) 4282) and refine them onsite to produce zircon, titanium dioxide and rare earth products.

Project activities include construction, mineral sand mining, processing, refining, decommissioning and rehabilitation of the mineral sands and rare earths mine and associated infrastructure.

The WIM100 deposit contains approximately 12 million tonnes of heavy mineral sands ore. From this it is estimated that the Project will produce 192 kilotonnes per annum (ktpa) of recoverable mineral product, comprising of the following:

- zircon product (approximately 60 ktpa);
- titanium dioxide mineral products (approximately 125 ktpa); and
- rare earth oxide equivalent as a mixed concentrate (approximately 7 ktpa).

The mine life is estimated at 25 years. The proposed mine and associated mineral processing and refining is a stand-alone Project.

Mined areas will be progressively restored and rehabilitated as the mine advances as agreed with the regulator and with a view to achieving the desired final land use.

1.3.2 Mineral deposit

The WIM100 deposit is located in the southern part of the Murray Basin in Western Victoria (Figure 1).

Drilling data and literature suggest the regional geology comprises the following key units (from youngest to oldest; Figure 2):

- Shepparton Formation (Late Tertiary to Quaternary) – The formation comprises poorly-consolidated, grey-brown and red-brown sandy clays (approximately 5 m thick);

- Loxton-Parilla Sands (LPS; Late Tertiary) – The LPS comprises grey-brown sand with some minor clays, these representing a depositional sequence of foreshore, surf-zone and offshore sediments (approximately 20 to 25 m thick). The mineralisation is hosted within the Lower LPS unit and is characterised by extensive sheets of very fine-grained sediments within well sorted clayey sand. The Lower LPS Unit is approximately 10 metres (m) thick and covers an area of about 25 square kilometres (km^2). Heavy mineral grades in the Lower LPS range from 1 to 15%. The LPS unit is considered a regionally-significant, unconfined aquifer that receives rainfall-derived recharge. The mineralisation in the Lower LPS is almost entirely beneath the water table, which is approximately 15-18 m below ground level (mBGL). Dewatering will therefore be required to allow mining;

- Murray Group Limestone (MGL; Mid-Tertiary) – The unit comprises highly fossiliferous limestones and calcareous sandstones, and may be present to the southwest of the study area (to be verified during a groundwater well drilling program in mid-2019); and

- Geera Clay, Winnambool, and Ettrick Formations (Mid-Tertiary) – All of these units may be represented at depth, potentially dependent on location. The Geera Clay comprises carbonaceous dark grey-black silts and plastic clays with an estimated clay content of 75% (approximately 20 m thick). The Geera Clay is associated with the Winnambool and Ettrick Formations, all of which were deposited during marine transgressions (Jacobs, 2018b). All these units overlie Palaeozoic basement.

Acid generation resulting from pit dewatering is not expected to occur. The occurrence of Acid Sulphate Soils (ASS) and Acid Sulphate Rock (ASR) have been assessed via the sampling and geochemical analysis of samples collected during an exploration drilling program undertaken in March 2018. A total of four samples were collected from the southern half of the deposit (approximately 2 km south of the test pit site) for analysis via the chromium reducible sulfur suite and net acid generating (NAG) NAGpH. The results of the analysis were compared to the criteria in Publication 655.1 (EPA 2009) and the classification criteria set out in the *Acid Rock Drainage Test Handbook* (AMIRA 2002). The results provide no indication of the presence of acid sulfate soils or acid sulfate rock. The analysis results and assessment are described in the report *WIM100 Test Pit – Preliminary Dewatering Assessment* (Jacobs 2018b). Furthermore, no evidence of acid generation has been observed in the groundwater monitoring results for samples obtained during and following dewatering activities at the test pit site.

The nature of the mineralisation makes it difficult to separate the heavy minerals from the ore using traditional, widely-applied mineral sands processing techniques. Therefore, recovery of the heavy minerals will require the application of froth flotation systems. The heavy mineral concentrate produced will be further refined to produce zircon and a rare earth concentrate. A flotation reagents impact assessment is planned for the second half of 2019 to identify and understand the implications of the proposed processing approach.

1.3.3 Project footprint

The **indicative mineralised extent** is the area comprising the economically extractable mineralised resource, and totals 1,509 hectares (ha). The extent of this area may change depending on the results of the 2019 drilling program.

The **indicative mining extent** is the extent of the economically extractable mineralised resource proposed to be mined, and totals 1,308 ha. The final footprint may change depending on the results of the 2019 drilling program and on Iluka's decision to exclude additional areas due to environmental value or due to existing built assets (eg main transport routes).

The **plant area development envelope** is the area within which the starter Tailings Storage facility (TSF), mineral separation plant, zircon refinery, rare earth refinery and supporting infrastructure will be located, and totals 455 ha. Final location and disturbance area within this envelope is yet to be determined.

The **Project site** corresponds to the **mine layout development envelope**. This area totals 2,580 ha and comprises the indicative mining extent, the plant development envelope, and additional area associated with haul roads, soil stockpiles, surface drainage and other supporting infrastructure. These areas are shown in Figure 3.

Smaller areas outside of the Project site will also be disturbed as part of infrastructure development (eg for extensions to pipelines power lines, and the construction camp). The exact locations and footprint will be determined as investigations progress during the second half of 2019. Indicative alignments and locations were assessed via the on-line Protected Matters Search Tool (Section 2.4).

Iluka completed an infill resource drilling program in early 2019 to better define the edges of the deposit and the grade variability and enable an Indicated resource to be declared in accordance with the *Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves* (the JORC Code). This will help with advancing the mine pit designs and overall mine layout footprint (expected to be finalised in Quarter 3, 2019), with the potential for disturbance areas to vary slightly from those indicated above. Another resource drilling program is planned for early 2020 in order to improve resource definition to a Measured ore reserve including sterilisation drilling of infrastructure areas. Mine layouts will be finalised following this 2020 drilling program.

The baseline ecology report (Cardno 2019) identifies the potential for three EPBC Act-listed threatened ecological communities (TECs) to occur in the baseline ecological study area (Figure 4):

- Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (Grey Box TEC);
- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions (Buloke TEC); and
- Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains (Wetlands TEC).

Within the indicative mineralised extent, all three communities have potential to occur in the Jallumba Marsh Flora Reserve. No EPBC Act-listed communities are predicted to occur within Red Gum Swamp (Figure 4). The indicative mineralised extent includes portions of the Jallumba Marsh Flora Reserve and the Red Gum Swamp. Iluka has chosen to exclude these areas from the mine layout development envelope (Figure 3).

The design and layout of the processing plant and associated infrastructure are the subject of ongoing studies. While the exact locations are not yet known, they are expected to be within the plant area development envelope shown in Figure 3.

The starter tailings storage facility (TSF), processing plant and associated infrastructure will likely be located within the 455 ha plant area development envelope; final locations and disturbance area within this envelope are yet to be determined. The area required for the plant and associated infrastructure is approximately 232 ha, and will comprise approximately:

- processing plant and associated areas (36 ha);
- refinery evaporation ponds and tailing storage facilities (TSFs) (96 ha), required for the on-ongoing operation of the refinery throughout the life of the operation; and
- the starter TSF (100 ha), required for deposition and storage of tailings from the Mineral Separation Plan prior to mine void space becoming available.

Together, the indicative mining area, plant area development envelope and additional areas associated with soil stockpiles, haul roads and site drainage infrastructure are referred to as the 'Project site'. The Project site footprint will be approximately 2,580 ha.

In 2018 Iluka developed a test pit in the central part of the site, on the eastern side of the Natimuk-Hamilton Road, to extract ore for metallurgical testing. The recently completed test pit development, resource drilling, and transport of ore associated with the inter-state metallurgical testing is regulated under Victorian mineral and radiation legislation and is not part of the referred action. The test pit location is shown in Figure 3.

Likewise, other exploration activities such as resource drilling, hydrogeological investigation programs and environmental assessments currently underway or proposed are also regulated under Victorian mineral and water legislation and are not part of the referred action.

1.3.4 Project components

The Project site will include:

- a conventional open pit mine and ore handling system (covering an area of approximately 1,308 ha);
- processing plants comprising:
  - a mineral separation plant (MSP);
  - a zircon refinery; and
  - a rare earth refinery.
- supporting infrastructure.

Infrastructure in the mine area will include:

- an ore receival and liquefaction system;
- water pipelines;
- pit dewatering infrastructure;
- mine by-products transport and containment infrastructure; and
- electricity supply infrastructure.

The process plant and infrastructure area will include:

- a mineral separation plant:
  - screening and clay separation;
  - froth flotation and physical separation equipment; and
  - water recovery (thickener and tails water recovery).
- refinery:
  - zircon refining;
  - rare earth refining;
  - product storage and out-loading;
  - refinery by-product disposal infrastructure;
  - reagent storage; and
  - residue treatment and water recovery plants.

Site infrastructure will include:

- administration buildings, meeting and training rooms;
- first aid facilities;
- ablutions block and crib rooms;
- workshop and plant maintenance areas;
- water storage dams;
- fuel storage areas;
- internal access and haul roads;
- laydown areas; and
- car parks.

Offsite Project components will potentially include:

- a temporary construction village during the construction phase (location yet to be determined);
- a new water pipeline connected into the existing Rocklands-Douglas pipeline close to the Douglas mine (see 'Water supply and management' section);
- a new power line connected into the existing 66-kV line along the Wonwondah-Toolondo Road to the infrastructure area (see 'Electricity supply' section);
- new access roads (see 'Local road infrastructure' section);
- public road intersection upgrades if required; and
- a new gas pipeline (approximately 33–45 km long) connected to the existing pipeline at Horsham (subject to study outcomes in late 2019).

The disturbance footprint required for offsite infrastructure has not yet been determined. Once the preferred alignments for water pipelines, electricity lines and any required gas pipeline are known, baseline studies and technical impact studies will be undertaken for these areas, as applicable.

1.3.5 Mining method

The mining method has not been finalised, however it is likely that the deposit will be progressively mined using mobile earthmoving equipment.

It is likely that scrapers will be used for the removal and replacement of topsoil, subsoil, and that bulldozers will be used for overburden removal and replacement, and for the extraction of ore. The mine will progress in strips approximately 75-m wide. The mining void will be approximately 28-m deep prior to the overburden replacement.

It is estimated that the mine advance rate will be approximately 20 m per day, resulting in an annual pit disturbance area of approximately 30–55 ha. It is anticipated that, on average, a total of approximately 17.0 million m^3 of material will mined annually. Further disturbance will be associated with haul roads, stockpiles surface water management systems and other ancillary supporting infrastructure.

1.3.6 Mine production

Mine production rates are estimated to be as follows:

- overburden: an average of approximately 12 million bank cubic metres (bcm) per year;
- ore: an average of approximately 5 million bcm (approximately 10 million tonnes per annum (Mtpa)); and
- recoverable mineral product: an average of approximately 192 kilotonnes per annum (ktpa).

1.3.7 Stockpiles

Topsoil and subsoil will be stripped and stockpiled separately to facilitate future rehabilitation. Overburden will be mined and initially stockpiled, with direct return of overburden to the mined-out pit utilised wherever practicable. Stockpiled overburden will be progressively returned to the mine void to be progressively covered with subsoil and topsoil.

1.3.8 Mineral processing

Approximately 9–10 Mtpa of ore and its host material will undergo multiple stages of chemical and physical treatment in the ore processing and mineral separation plant to separate the ore from the non-valuable host material. Treatments will include wet screening, clay separation and froth flotation to produce titanium dioxide mineral products and heavy mineral concentrate (HMC) (containing zircon and rare earth concentrates). The HMC will be further chemically refined to produce purified zircon and a mixed rare earth product.

The product will then be packaged and transported via road, rail and/or ship to customers.

The processing plant inputs and outputs are summarised in Figure 5 and Figure 6. Note that these are conceptual figures and final volumes and configurations may be subject to change.

A general arrangement plan and a plot plan of the processing plant are provided in Appendix A. Again, these are conceptual figures and the layouts may change.

1.3.9 Tailings and refining waste materials

Approximately 9.6 Mtpa of combined tailings (a mixture of sand and clay materials) will be generated as a by-product from the ore processing and mineral separation plant. Initially, some combined tailings will be placed into a surface tailing storage facility (or facilities) prior to the mine void space being available. Thereafter, the combined tailings will be placed within tailings cells within the mine void (and the tailing storage facility). Once each cell is complete it will be made geotechnically stable, and then will be capped with overburden, subsoil and topsoil.

The HMC will be further processed in the refinery to produce zircon product and rare earth products. The refinery will generate approximately 260 ktpa of waste, largely comprising:

- 100 ktpa of salt brine - the remnant salt (predominantly sodium sulphate) remaining after desalination water recovery and evaporation of the saline discharge; and
- 160 ktpa of gypsum residue - a precipitated solid predominately comprised of calcium sulfate dihydrate (gypsum), but also incorporating radionuclides and heavy metals. The gypsum residue will contain 300–500 becquerels per gram (Bq/g) total activity and is classified as low-level radioactive waste, as per the International Atomic Energy Agency's *Classification of Radioactive Waste General Safety Guide No. 1.*

The disposal method for the refinery waste streams is yet to be determined, pending the outcome of further hydrometallurgical studies and impact assessments which are expected to be completed during 2019. Conceptually, the two disposal options for the refinery by-product streams are:

- option A - placed in engineered, lined cells within the Project site for permanent storage (Figure 5); or
- option B - placed into the mine voids with the combined ore processing/MSP tailings (Figure 6).

In option B, the 260 ktpa of refinery waste will be mixed with the 9.6 Mtpa of combined tailings, thereby diluting the gypsum residue portion to approximately 1.6% of the overall by-product stream. This will dilute radioactivity levels to below that of the in-situ ore.

Option B offers the benefit of no ongoing required maintenance of engineered structures after the rehabilitation phase.

Radiation will be managed in accordance with Iluka's Radiation Management Licence (no. 300042022) as issued by the Victorian Department of Health and Human Services, and the Murray Basin Operations Radiation Management Plan and Radioactive Waste Management Plan required as a condition of licence. An addendum to the existing Radiation Management Plan will be prepared for the Wimmera Project. Iluka's licence and radiation management plans are regulatory documents approved by the Victorian Government under the *Radiation Act 2005*.

The low-level radioactive waste will be permanently stored onsite in a manner that ensures exposure to people and the environmental is as low as reasonably achievable (the ALARA principle), in accordance with Iluka's Radiation Management Licence.

Further detail about radiation management is provided in Sections 2.10, 4.1.4 and 4.2.2.

1.3.10 Other wastes

Non-hazardous waste (eg construction and domestic waste) will be collected for recycling where practicable or collected and disposed of offsite by a licensed contractor. No onsite landfill is proposed.

Hazardous and liquid waste (eg hydrocarbons and waste oils) will be transported offsite for disposal by licensed contractors.

1.3.11 Water supply and management

An overall process and site water balance is being developed. However, it is anticipated that the mine will require approximately 5.5 gigalitres (GL) per year of water, primarily for mineral processing, tailings disposal, dust suppression and rehabilitation with the bulk being required for processing.

Potential sources of water include:

- the Rocklands Reservoir (using the existing Douglas mine allocation of 5 GL per year, subject to an approved licence transfer);
- the existing Strathlynn Borefield (using the existing Douglas mine allocation of 3 GL per year, subject to an approved licence transfer); and
- a new borefield closer to the Project mine site.

Discussions with Grampians Wimmera Mallee (GWM) Water have commenced regarding the infrastructure required to deliver water to the Project site. The preferred option includes a new pipeline connected into the existing Rocklands-Douglas pipeline close to the Douglas mine to utilise the existing Rocklands Reservoir and Strathlynn Borefield allocations. GWM Water are currently undertaking a reliability study to determine the required size of allocation to guarantee the water supply for the Project.

Dewatering of the mine pits will be required to allow mining of ore below the groundwater table. Any excess groundwater not utilised for processing or dust suppression will be returned to the aquifer via infiltration or, if the need is determined, via re-injection, and will offset total water demand.

Water will be stored in a series of dams across the Project site that will segregate water of varying quality.

1.3.12 Rehabilitation

Rehabilitation is required by the *Mineral Resources (Sustainable Development) Act 1990* to be undertaken by the mining licensee in accordance with a rehabilitation plan approved by Earth Resources Regulation. Iluka will also be required by this Act to provide a rehabilitation bond to the satisfaction of Earth Resources Regulation.

Mined areas will be progressively restored and rehabilitated as the mine advances, as agreed with the regulator and with a view to achieving the desired final land use.

Where practicable, overburden will be returned directly to the mine void to minimise the requirement for overburden stockpiles outside of the void. The progressive return of overburden to the void will allow subsoil and topsoil replacement and rehabilitation to commence as soon as possible and will minimise the area disturbed at any given time.

Vegetation will be reinstated following placement of mining by-products, overburden, subsoil and topsoil.

At the end of mining activities, infrastructure will be removed, and the area rehabilitated so that it is safe and stable, except where such infrastructure supports the approved post-mining land use, or regulators request or agree that some infrastructure components are retained.

1.3.13 Material transport

Processing plant/refinery chemicals, and potentially gas, will be sourced from a range of locations and transported to the site via road and/or rail. A gas pipeline to the site may be constructed.

Mine products will be transported via road and/or rail to port for export, most likely from Iluka's existing facilities at Portland.

The zircon and rare earth products are expected to have an activity content over 1 Bq/g and would therefore be considered radioactive in accordance with the Victorian *Radiation Act 2005* and associated *Radiation Regulations 2017*. These products will be temporarily stored at site prior to transport.

The likely transport routes and potential traffic impacts will be determined as part of the preliminary design and impact assessment.

1.3.14 Local road infrastructure

The mine access points and interaction with local roads will be dependent on the mine layout. The layout will seek to minimise interaction with local roads.

Access between and within properties will be maintained through the construction of diversions, detours and/or road upgrades.

1.3.15 Electricity supply

Electricity supply requirements are estimated at 20-25 MW. However, this is subject to further study and definition.

Electricity is proposed to be sourced from the grid. This may include the construction of a dedicated 66-kV line along Jallumba-Mockinya Road from the existing 66-kV line along the Wonwondah-Toolondo Road to the infrastructure area, depending on the final refinery location. An engineering options study for the location of the refinery and alignment of associated offsite services such as electricity supply is currently underway.

1.3.16 Employment

It is currently estimated that during the construction phase, the Project will directly employ approximately 300–350 people full time equivalent (FTE). During the operation phase, the Project will directly employ approximately 280–350 people FTE at the mine, processing plant and refinery. The majority of the jobs in the operations phase will relate to the refinery.

The Project will also generate indirect engineering and technical services positions in the local region and Victoria.

It is anticipated that a purpose-built temporary offsite accommodation village will be required to house the construction workforce, many of whom will require specialist construction skills and who may be onsite for only part of the construction period.

It is anticipated that the majority of the operations workforce will be drawn from the region and use of an accommodation village during the operational phase of the project is not proposed. Regional housing availability and requirements will be assessed as part of the pre-feasibility study (PFS).

The Wimmera Project offers the potential to generate a significant long-term employment opportunity in the region and to diversify and further develop the regional skillset.

1.3.17 Operating hours

The mine, processing plant and refinery are expected to operate 24 hours a day, 365 days per year.

1.4 What is the extent and location of your proposed action? Use the polygon tool on the map below to mark the location of your proposed action.

The approximate coordinates for the Project site are outlined in Table 1.1.

Table 1.1 Coordinates

Location point	Latitude			Longitude		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
1	36	59	20.26S	141	54	39.68E
2	36	52	24.59S	141	55	44.91E
3	36	52	58.23S	142	0	19.68E
4	36	58	29.024S	141	59	42.14E
5	36	59	15.607S	141	58	42.11E
6	36	59	29.642S	141	56	09.09E

The location of other infrastructure and services outside of the Project site, including electricity or water supply, will be determined through options analysis and will be informed by the outcome of further environmental impact assessment studies and stakeholder consultations.

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland).

The Project site is located at the locality of Jallumba, about 40 km south-west of Horsham, 35 km north-east of Balmoral in the southern Wimmera region Western Victoria. It is approximately 325 km west of Melbourne central business district (Figure 1).

The Project site is located just to the north of the Toolondo Reservoir and the associated small settlement of Toolondo
(Figure 1). Nearby towns are shown in Figure 7.

The Iluka Echo and Douglas mines are approximately 5 km to the east and 20 km to the south-west of the Project site respectively (Figure 1).

Preliminary environmental (surface water, ecological, noise, vibration) and cultural heritage assessments have been conducted across a study area that is approximately 5,600 ha. The study area is bound by Quick Sinclair Russells Road to the east, in part by Mitchells Road to the south, Clarkes Road to the west and farming land to the north (Figure 3), and was defined to:

- utilise landmarks that were easily identifiable in the field as the Project area boundaries (such as road reserves or lot boundaries);
- be sufficiently large to incorporate the likely Project site; and
- enable assessment of existing environmental values on adjacent land.

Due to the lack of existing monitoring bores in the area local to the Project site, and the assessment of groundwater flow patterns requiring a more regional approach, the groundwater study area was defined to capture a sufficient number of existing groundwater bores that have associated monitoring data, and totals 78,380 ha.

The Project site is relatively flat with topography ranging from 150 m Australian height datum (AHD) and 200 m AHD.

The Project site is within the Horsham Rural City Local Government area, which has a population of approximately 19,800, with three-quarters of the population living in the city of Horsham. In the vicinity of the Project site dry-land agriculture (mixed broad acre cereal, pulse and oilseed cropping, with some grazing) is the predominant land use, and the population can be generally described as a low-density agricultural community.

The Project site and surrounding land is predominantly zoned as Farming Zone (FZ) under the Horsham Planning Scheme (2018). Smaller portions of the Project site are zoned Public Conservation and Resource Zones (PCRZ) (in relation to the Jallumba Marsh Nature Conservation Reserve and the Red Gum Swamp, Jallumba Wildlife Reserve), and Road Zone Category 1 (RDZ1) (in relation to roads).

The following planning overlays, identified in the Horsham Planning Scheme, occur across the Project site:

- BMO Bushfire management overlay;
- ESO4 Environmental significance 4 - Water catchment protection;
- ESO5 Environmental significance 5 - Channel and reservoir protection; and
- LSIO Land subject to inundation.

The following additional overlays have been identified within the region of the Project site:

- ESO2 Environmental significance - Natimuk Douglas wetlands; and
- ESO3 Environmental significance - Watercourse protection.

The land tenure in the Project site is largely freehold properties. There are six residences with associated ancillary sheds within the mine layout development envelope and a further four residences with associated ancillary sheds in close proximity (Figure 3). A derelict holiday shack at the northern end of Red Gum Swamp is also located within the indicative mineralised extent.

Some Crown land is also present on the Project site, associated with roads, roadside reserves, Red Gum Swamp and the Jallumba Marsh Flora Reserve (Figure 8). There is also some Crown land associated with easements for some of the now decommissioned water distribution channels.

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

The Project site will have a footprint of approximately 2,580 ha, comprising approximately 1,308 ha of mining area, approximately 232 ha of plant, refinery and associated infrastructure, and the balance associated with haul roads, soil stockpiles, surface drainage and other supporting infrastructure. Not all of the footprint will be disturbed.

Smaller areas outside of the Project site will also be disturbed as part of infrastructure development (eg for pipelines and power lines). The exact locations and footprint will be determined as investigations progress during 2019.

Iluka will progressively rehabilitate the open pit mine to minimise the amount of disturbed area at any given time.

1.7 Is the proposed action a street address or lot?

The Project site covers multiple lots, as outlined in Table 1.2.

Table 1.2 Land title details

Volume	Folio	Title plan number	Plan of subdivision	Lot plan number
4051	146	792081N		
4489	670	680008Y		
8104	144	334741E		
9474 (Part)	254 (Part)		444334S	
3006	027		444334S	
4344	773	391533P		
4133	509	411917P		
7070	881			136566

1.8 Primary jurisdiction

The Wimmera Project is in Victoria.

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this Project?

No.

1.10 Is the proposed action subject to local government planning approval?

To be determined.

1.11 Provide an estimated start and estimated end date for the proposed action.

Start date: 2021

Finish date: 2062

1.12 Provide details of the context, planning framework and State and/or Local government requirements.

The Project, including offsite aspects such as water and electricity supply, will be referred to the Victorian Minister for Planning under the *Environment Effects Act 1978* for a decision on whether an Environment Effects Statement (EES) will be required. It is anticipated that this will be the case.

In the event the Project is determined to be a Controlled Action that requires assessment and approval under the EPBC Act, it is anticipated that the Project will be assessed under the bilateral agreement between the Commonwealth and Victorian Governments in accordance with Part 5 of the EPBC Act.

In addition to the EES process, Iluka will require the following secondary approvals to construct and operate the Project:

- Under the Mineral Resources (Sustainable Development) Act 1990, Iluka will require:
  - a Mining Licence;
  - an Approved Work Plan, which must also include a rehabilitation plan;
  - a rehabilitation bond;
  - an approved environmental offset plan;
  - public liability insurance; and
  - owners/occupiers written consent or a registered compensation agreement.
- Under the *Crown Land (Reserves) Act 1978*, Iluka will require a Crown land licence to use any Crown land reserved.
- Under the *Aboriginal Heritage Act 2006*, Iluka will require an approved cultural heritage management plan (CHMP).

- Under the *Water Act 1989,* Iluka will require the following licences:
    - to install bores Iluka will require a licence to construct, decommission or alter a bore;
    - to extract water as part of pit dewatering or for water supply a groundwater take and use licence will be required;
    - to harvest and use surface water, Iluka will require a licence to use surface water and to operate works (also referred to as a 'take and use licence');
    - to construct and operate a dam, Iluka will require a Works licence; and
    - drainage works to be connected (directly or indirectly) to a designated waterway must not occur without the permission of Wimmera Catchment Management Authority through a Works on Waterways Licence. Furthermore, drainage works that are connected to designated waterways cannot be altered or removed without the permission of the Wimmera Catchment Management Authority.
- Under the *Radiation Act 2005*, Iluka will require a variation to its existing Radiation Management Licence. An approved Radiation Management Plan and an approved Radioactive Waste Management Plan are required as conditions of the Radiation Management Licence.
- Under the *Environment Protection Act 1970,* Iluka will require an Environment Protection Authority (EPA) licence if it is decided to discharge excess groundwater from pit dewatering into an aquifer via re-injection. It is understood that the *Environment Protection Act 1970* will be replaced on 1 July 2020 by the *Environment Protection Act 2017. If the new Act is in operation,* Iluka may require a development licence and operational licence under the new Act.

Various additional approvals may also be required:

- Under the *Planning and Environment Act 1987,* if any remnant of an Ecological Vegetation Class (EVC) of 'very high conservation significance' needs to be cleared, approval will be required from the Minister for Environment and Climate Change under *Victoria's Native Vegetation Management Framework - A Framework for Action* (NVMF).
- Mine works that have been assessed in an EES and by the Minister for Planning do not require a planning permit under the *Planning and Environment Act 1987.* However, works outside the mining licence area, such as the development of water and electricity supply infrastructure or road upgrades, will be subject to the Horsham Planning Scheme. Iluka will either seek planning permits for these works or request an amendment to the Horsham Planning Scheme to provide a "one stop shop" planning control for works undertaken outside the mine licence area, as is typical for mining projects in Victoria.
- VicRoads may require a cost recovery condition be applied to the EES approval under the *Road Management Act 2004*. Iluka may be required to contribute to road maintenance based on a $/km/tonne basis, and/or the upgrade of intersections or bridges. If so, Iluka would be required to complete a 'Works within road reserves' application form and sign a road maintenance agreement. If works are proposed within a road reserve, consent will be required from the relevant road authority under this Act.
- Horsham Rural City Council may require Iluka to contribute to the maintenance of Council owned roads, via a road maintenance agreement under the *Local Government Act 1989*.
- Iluka will require a Works Approval and an EPA licence under the *Environment Protection Act 1970* if Iluka proposes to extract material for the construction of access roads and hardstand areas and if the extraction

location is not assessed within the approved EES and within the Mine Licence Area. It is highly unlikely that this will be the case. It is possible that a Works Approval and EPA Licence will be required in relation to stack emissions from the refinery.

- Iluka may require a dangerous goods licence under the *Dangerous Goods Act 1985*, depending on the quantity of gas, diesel or other dangerous goods stored.

- It has been determined that Native title does not apply to any part of the Project area (refer Federal Court Number VID6002/1998 and NNTT Number VCD2005/001 determined 13/12/2005). While the Jallumba Marsh Flora Reserve and the eastern half of Red Gum Swamp were considered in the case, they were considered to fall into Determination Area B where Native Title does not exist.

- Iluka will require a permit under the *Flora and Fauna Guarantee Act 1988* (FFG Act) to remove fauna species that are protected under the FFG Act. A licence may also be required under the FFG Act to remove or destroy flora species located on public land.

- Iluka would be required to obtain a licence to construct and operate a pipeline under the *Pipelines Act 2005*, if it plans to construct and operate a 'high transmission' pipeline that has a maximum design pressure exceeding 1,050 kilopascals (kPa) (gaseous hydrocarbons).

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Aboriginal stakeholders.

Iluka has engaged with the local community, councils and government agencies since 2003 in relation to the nearby Douglas and Echo mines and the Hamilton Mineral Separation Plant.

Iluka commenced consultation on the Wimmera Project (formerly called the 'Fine Minerals Project') in 2018. This has included:

- circulation of the quarterly Murray Basin Newsletter - including articles introducing the Project in the May 2018, November 2018 and June 2019 editions - to local members of parliament, Horsham Rural City Council, Buloke Shire Council, Shire of Yarriambiack, Shire of Southern Grampians, Barenji Gadjin Landcare Council, Wimmera Development Association, Cavendish Police Station, Douglas Environment Representative Committee members, Regional Development Victoria, Douglas Land Access Compensation Agreement (LACA), various local landholders and lessees, media, Department of Economic Development, Jobs, Transport and Resources (DEDJTR), Wimmera Catchment Management Authority and other interested stakeholders;

- circulation of the quarterly Wimmera Project Update No. 1 (February 2019) to local members of parliament, Horsham Rural City Council, Buloke Shire Council, Shire of Yarriambiack, Shire of Southern Grampians, Barenji Gadjin Landcare Council, Wimmera Development Association, Cavendish Police Station, Douglas Environment Representative Committee members, Regional Development Victoria, Douglas LACA, local landholders and lessees, media, DEDJTR, Wimmera Catchment Management Authority and other interested stakeholders;
- presentation to a State government interagency workshop in April 2019;
- participation in a State Government working group, commencing May 2019;
- presentation to the Horsham Rural City Council in June 2019;
- targeted consultation (emails, meetings and phone calls) with affected landowners from November 2018 through to January 2019 regarding land access to conduct baseline study assessments and drilling (ecology, noise, groundwater, surface water and Aboriginal heritage);
- project updates at the quarterly Douglas Environmental Review Committee meetings in May, August and November 2018 and in February 2019;
- tours of the test pit;
- media releases;
- establishment of a staffed drop-in information centre at Horsham Real Estate (13–17 Firebrace Street Horsham). This centre opened in February 2019 and is open Tuesdays and Fridays 9.30 am–2.30 pm or by appointment;
- establishment of a staffed drop-in information centre at Natimuk (details to be confirmed but likely to be one day a week, commencing in July 2019);
- the community information line (telephone 1800 201 113) which is available for members of the community to discuss the Project with Iluka;
- implementation of the *WIM100 Test Pit Community Engagement Plan* (August 2018) which outlines Iluka's consultation program for the test pit. The plan outlines the key stakeholders identified, their potential concerns, the proposed communications strategy and the proposed schedule. A copy of the test pit consultation plan is included as Appendix B;
- a stakeholder perception survey in 2018 of Iluka's Australian operations, including those in the Murray Basin; and
- discussions with Government agencies, as detailed in Table 1.3.

Table 1.3 Consultation with Government agencies

Agency	Date	Regarding
DEDJTR	February 2018	Preparation of an Exploration Work Plan in relation to the test pit.
VicTrack and DEDJTR	May 2018	Permission to construct a temporary access road for the test pit across decommissioned Balmoral rail corridor in relation to the test pit.
Environment Protection Authority Victoria (EPA)	July 2018	Permits for the disposal of water associated with the test pit.
Horsham City Rural Council planning department and VicRoads	August 2018	Permission to construct a temporary access road in relation to the test pit.
Grampians Wimmera Mallee Water (GWM Water)	October 2018	Application for a water carting permit in relation to the test pit dewatering and also the construction of groundwater bores.
EPA	November 2018	Air quality monitoring requirements.
Department of Health and Human Services	November 2018	Introduction to the Project.
Wimmera Catchment Management Authority	November 2018	Potential surface water impacts associated with the test pit.
Regional Development Victoria	February 2019	Introduction to the Project.
Horsham City Rural Council, Mayor and CEO	March 2019	Introduction to the Project.
Regional Development Victoria, Department of Jobs, Precincts and Regions, Department of Premier and Cabinet, Energy Earth Resources, Environment Protection Authority Victoria, Horsham Rural City Council, Transport for Victoria and Resources Economic Development, Department of Environment, Land, Water and Planning, Department of Health and Human Services and Invest Victoria	April 2019	Introduction to the Project.
Regional Development Victoria, Department of Jobs, Precincts and Regions, Environment Protection Authority Victoria, Department of Environment, Land, Water and Planning Department of Health and Human Services Invest Assist.	May 2019 and July 2019	Project update.
Department of Environment, Land, Water and Planning Department of Energy and Environment	May 2019	Provision of draft EES referral document for review and comment Provision of draft EPBC referral document for review and comment

Iluka is committed to high levels of community engagement, beyond that required by the approvals process. A community consultation plan is being prepared for the Wimmera Project to ensure that stakeholder interests are heard and actioned where reasonable.

Iluka will work in partnership with the Victorian State Government, Horsham Rural City Council and the local community to develop a long-term, inclusive growth plan with a view to maximise benefits for local communities.

Aboriginal stakeholder consultation related to the Project is outlined in Table 1.4.

Table 1.4 Consultation with Aboriginal stakeholders

Agency	Date	Regarding
Barengi Gadjin Land Council (BGLC) Chief Executive Officer, Michael Stewart	September 2018	Initial meeting to discuss the cultural heritage aspects of the proposed test pit and broader Project.
BGLC Registered Aboriginal Party (RAP) Manager, Darren Griffin	October 2018	Initial meeting to discuss the desktop cultural heritage assessment (cultural heritage predictive modelling) undertaken by Iluka's Aboriginal cultural heritage consultants, GHD, including: the test pit works, the desktop cultural heritage assessment, proposed protocols to implement if cultural heritage material was found during the test pit works. The proposed approach regarding the cultural heritage management plan (CHMP) for the broader Project was also discussed.
BGLC	December 2018	A meeting to discuss the deliverables from the desktop cultural heritage assessment.
BGLC	February 2019	The first day of a two-day standard assessment (non-ground intrusive field survey) was undertaken. The survey was undertaken by two Registered Aboriginal Party (RAP) representatives. An Iluka representative and two GHD cultural heritage experts were also in attendance.
BGLC	April 2019	The second day of the two-day standard assessment survey was undertaken.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the Project.

As outlined in Section 1.11, the Project will be referred, including offsite aspects such as the temporary construction accommodation village and the water and electricity supply, to the Victorian Minister for Planning under the *Environment Effects Act 1978* for a decision on whether an Environment Effects Statement (EES) will be required. It is anticipated that it will need to be assessed under an EES. It is also anticipated that the Project will be assessed under the bilateral agreement between the Commonwealth and Victorian governments in accordance with Part 5 of the EPBC Act.

The following baseline environmental assessments have been undertaken to inform Project design:

- Cardno (2019), *Iluka baseline ecological assessments - WIM100 ecology report*;
- GHD (2018), *WIM100 Desktop cultural heritage assessment*;
- GHD (2019), *Wimmera project baseline noise assessment*;
- GHD (2019), *Wimmera project baseline vibration assessment*;
- GHD (2019), *Wimmera project meteorological assessment*;
- Jacobs (2018), *WIM100 East preliminary baseline groundwater assessment*;

- Jacobs (2018), *WIM100 Test Pit - Phase 2 dewatering assessment*; and
- Water Technology (2018), *Baseline surface water assessments - WIM100*.

Baseline assessments for radiation, air quality and soil are in progress. Targeted ecological assessments, based on the recommendations of the baseline ecological assessments, are about to commence.

In addition to the baseline assessments outlined above, the following investigations and assessments are underway or proposed:

- road and traffic impact assessment;
- air quality impact assessment;
- surface water impact assessment;
- groundwater impact assessment;
- ecological impact assessment;
- noise and vibration impact assessment;
- socioeconomic impact assessment;
- landscape, visual and lighting impact assessment;
- hazard assessment;
- geotechnical assessment;
- radiological impact assessment; and
- flotation reagent impact assessment

These investigations and assessment will be prepared in accordance with Victorian Government scoping requirements that are anticipated to be issued for the Project.

Once the alignments, locations and disturbance footprints for the offsite infrastructure components such as the water pipeline, gas pipeline, temporary construction accommodation village and electricity line are known, baseline studies and technical impact studies will be undertaken for these areas, as applicable.

1.15 Is this action part of a staged development (or a component of a larger Project)?

No, this action is not part of a staged development. Development of the WIM100 deposit, mineral processing plant and refinery is a stand-alone project and not reliant on other projects or the future development of other deposits.

1.16 Is the proposed action related to other actions or proposals in the region?

No.

2 Matters of National Environmental Significance

2.1 Is the proposed action likely to have ANY direct or indirect impact on the values of any World Heritage properties?

No. There are no World Heritage properties in the vicinity of the Project.

2.2 Is the proposed action likely to have ANY direct or indirect impact on the values of any National Heritage places?

No. There are no National Heritage places in the vicinity of the Project.

2.3 Is the proposed action likely to have ANY direct or indirect impact on the ecological character of a Ramsar wetland?

No. The nearest Ramsar wetland, Lake Albacutya is 100–150 km downstream (north) of the Project.

Indicative alignments/footprints for offsite infrastructure were used within the Department's on-line Protected Matters Search Tool (PMST) to identify species that may be, are likely, or are known to be present within an associated infrastructure corridor. Infrastructure corridors for pipelines were defined as a line with a 1 km buffer within the PMST.

Following consultation with Horsham Rural City Council, options for the location of the construction camp on the southern fringes of Horsham are being investigated. As the specific location of the proposed construction camp has not yet been confirmed, a polygon with a 1 km buffer was delineated over the southern half of Horsham within the PMST, and the resulting PMST report attached is as Appendix F.

The PMST reports for the offsite infrastructure (pipelines, power line extension and construction accommodation village) indicate that up to two Wetlands of International Importance may occur in or relate to the nominated corridors and footprints, being:

- the Glenelg River estuary and Discovery Bay wetlands (for the potential water pipeline); and
- Lake Albacutya.

In both cases the PMST reports note that these wetland complexes are located more than 100 km away from the offsite infrastructure corridors or footprints.

2.4 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

Yes. Table 2.1 summarises the potential habitat extents for listed species or threatened ecological communities within the baseline ecological study area (Cardno 2019a), which is of larger extent than the likely final mine layout and disturbance footprint. The mine layout plan will be developed in the second half of 2019.

Groundwater drawdown is not anticipated to affect any groundwater dependent ecosystems (GDEs) that support EPBC Act listed species or threatened ecological communities; this will be verified by the groundwater impact assessment to be undertaken during late 2019/early 2020.

Table 2.1 Habitat extents for listed species or threatened ecological communities within the baseline ecological study area

Protected matter	Potential area of habitat impact
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Up to 55.3 ha of potential habitat
Grey Box (*Eucalyptus microcarpa*) Woodlands and Derived Native Grasslands of South Eastern Australia	Up to 55.4 ha of potential habitat
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	Up to 56.5 ha of potential habitat
Growling Grass Frog (*Litoria raniformis*)	Up to 346.3 ha of potential habitat (foraging) and 59.9 km of drainage lines (breeding and dispersal habitat)
Red-tailed Black Cockatoo (south-eastern form) (*Calyptorhynchus lathami graptogyne*)	Up to 529.9 ha of potential habitat
Swamp Everlasting (*Xerochrysum palustre*)	Up to 245.9 ha of potential habitat
Red-lored Whistler (*Pachycephala rufogularis*)	Up to 272.1 ha of potential habitat
Painted Honeyeater (*Grantiella picta*)	Up to 529.9 ha of potential habitat
Curlew Sandpiper (*Callidris ferruginea*)	Up to 334.4 ha of potential habitat
Australasian Bittern (*Botaurus poiciloptilus*)	Up to 334.4 ha of potential habitat
Swift Parrot (*Lathamus discolor*)	Up to 272.1 ha of potential habitat

The ecological impacts associated with the indicative mineralised extent versus an indicative mining extent that excludes the Jallumba Marsh and Red Gum Swamp areas were assessed by Cardno in a letter dated 21/07/2019 (Appendix D). Ecological values present or likely to be present were identified for the following areas:

- baseline ecological assessment study area (an upper limit, assumes the entire 5,600 ha ecological study area is disturbed);
- indicative mineralised extent (totalling 1,509 ha, including the overlap areas with Jallumba Marsh Flora Reserve and Red Gum Swamp); and
- indicative mining extent (ie the indicative mineralised extent with the overlap areas of Jallumba Marsh Flora Reserve and Red Gum Swamp excluded, totalling 1,308 ha. This is referred to as the revised mineralised extent in the Letter of Advice (Cardno 2019b).

Ecological values considered in the assessment related to threatened species, threatened ecological communities, and native vegetation (Appendix D), and the associated scenario testing offset requirements report (Ensym) sourced from DELWP (also in Appendix D).

The letter (Appendix D) stated that threatened species (classed either as endangered or vulnerable) are more likely to be impacted by the potential development footprint than the modified footprint (with the Jallumba Marsh and Red Gum Swamp areas excluded), and that differences in habitat impacts are largely attributed to the exclusion of Jallumba Marsh. There was little difference in impact relating to Red Gum Swamp between the two footprints.

A number of threatened ecological communities (TECs) were identified as having potential to occur in Jallumba Marsh and/or Red Gum Swamp. By excluding these areas from the potential development footprint, the total area with potential for TECs to occur is reduced from approximately 99 ha to less than 1 ha, as shown in Table 2.2.

Table 2.2 Area of EPBC threatened ecological community potentially impacted by the three disturbance options

Community	Baseline study area (ha)	Indicative mineralisation extent (ha)	Indicative mining extent (ha)
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	56.67	39.91	<0.01
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	56.61	40.18	0.11
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	57.85	19.37	0.00
Total	**171.13**	**99.46**	**0.11**

Similarly, native vegetation areas impacted reduce from approximately 93 hectares to less than 1 hectare by excluding Jallumba Marsh and Red Gum Swamp from the potential mine footprint (Table 2.3). It should be noted that for the purposes of the exclusion area assessment native vegetation removed is based on native patches and did not include scattered trees, which have not yet been fully assessed in the field. Field assessment of scattered trees will be undertaken as part of the targeted ecological assessment works scheduled for the second half of 2019.

Table 2.3 Area of EVC potentially impacted by the three disturbance options

Ecological vegetation classes	Bioregional conservation status	Baseline study area (ha)	Indicative mineralisation extent (ha)	Indicative mining extent (ha)
WIM_0125	Endangered	56.50	19.37	0.00
WIM_0292	Vulnerable	280.40	33.38	0.06
WIM_0653	Endangered	23.40	0.00	0.00
WIM_0803	Endangered	88.00	40.51	0.17
	Total	**448.30**	**93.26**	**0.23**

Further advice was sought from Cardno (Appendix E) to understand the ecological impacts and offset implications associated with the larger mine layout development envelope (Section 1.3.3); this development envelope totals 2,580 ha and comprises the indicative mining extent, the plant development envelope, and additional area associated with haul roads, soil stockpiles, surface drainage and other supporting infrastructure. The offset requirements within the mine layout development envelope were calculated by DELWP using the following information as Scenario 1:

- the extents of native vegetation patches as mapped by Cardno (2019a), and their associated habitat hectare condition scores as modelled by Cardno; and
- current wetlands as mapped by DELWP (all assumed to comprise Red Gum Swamp EVC 292), and their associated condition scores as modelled by DELWP.

While field verification of individual scattered trees has not yet been undertaken, it was estimated from aerial photography that 836 large scattered trees are located within the mine layout development envelope and were included in the offset calculations as Scenario 2.

The resulting offset requirements for Scenarios 1 and 2 were reported in Cardno's letter dated 26/06/2019 regarding o*ffset implications for the development footprint* (Cardno 2019b) (Appendix E) and the associated DELWP Ensym reports attached as Appendices A and B respectively of Appendix E. Table 2.4 summarises the total area of each EVC located within the mine layout development envelope as determined in the DELWP Ensym report.

Table 2.4 Area of EVC potentially impacted within the mine layout development envelope

Ecological vegetation classes	Bioregional conservation status	Area of EVC (ha)
WIM_0125	Endangered	0.00
WIM_0292	Vulnerable	27.09
WIM_0653	Endangered	0.00
WIM_0803	Endangered	11.92
	Total	**39.01**

The resulting offset requirements as determined by the DELWP Ensym report are summarised in Table 2.5.

Table 2.5 Summary of offset requirements for removal of patches within the mine layout development envelope

	Scenario 1 (patches and current wetlands)	Scenario 2 (patches, current wetlands and scattered trees)
General offset amount	0.155 general habitat units	1.003 general habitat units
Vicinity	Wimmera Catchment Management Authority (CMA) or Horsham Rural City Council	
Minimum strategic biodiversity value score	0.094	0.124
Large trees	0 large trees	836 large trees
Species offset amount	16.952 species units of habitat for Erect Peppercress, *Lepidium pseudopapillosum* 19.579 species units of habitat for Inland Pomaderris, *Pomaderris paniculosa* subsp. *paniculosa*	30.030 species units of habitat for Hairy-pod Wattle *Acacia glandulicarpa* 26.120 species units of habitat for Erect Peppercress, *Lepidium pseudopapillosum* 29.919 species units of habitat for Inland Pomaderris, *Pomaderris paniculosa* subsp. *paniculosa*

Engineering options studies to identify the requirement, preferred location and location/alignment of offsite infrastructure are underway, and hence potential impacts associated with such works are unknown.

As noted earlier, indicative alignments for the following offsite infrastructure were used within the Department's on-line PMST to identify species that may be, are likely, or are known to be present within an associated infrastructure corridor:

- Water pipeline of approximate length 30 km from the existing Rocklands Douglas pipeline to the Project site. Assuming an infrastructure corridor disturbance width of 40 m the total disturbance area is approximately 120 ha.

- Power line extension from the Toolondo-Wonwondah Road to the Project site, using one of the following alignment options:
  - along Nurrabiel Church Road (5,400 m).
  - along Jallumba-Mockinya Road (4,900 m).
- Gas pipeline of approximate length 37 km from the Western Highway letdown point to the Project site. Assuming an infrastructure corridor disturbance width of 40 m the total disturbance area is approximately 149 ha.

The infrastructure corridors were defined as a line with a 1 km buffer within the PMST. The PMST reports are attached as Appendix F.

The PMST reports for the offsite infrastructure (pipelines, power line extension and construction camp) indicate that up to 11 migratory species, 26 listed threatened species and 3 listed ecological communities may occur in or relate to the nominated indicative corridors and footprints, however as specific alignment locations are yet to be determined the likelihood of significant impact is not known.

Following consultation with Horsham Rural City Council, options for the location of the construction camp on the southern fringes of Horsham are being investigated. As the specific location of the proposed construction camp has not yet been confirmed, a polygon with a 1 km buffer was delineated over the southern half of Horsham within the PMST, and the resulting PMST report attached is as Appendix F.

The Commonwealth's significant impact guidelines and the 'avoid, minimise and offset' principle will underpin the decision process for identifying preferred locations and routes for both onsite and offsite infrastructure.

2.4.1 Do you consider this impact to be significant?

In the absence of the results of the detailed ecological field surveys, detailed Project design and location/alignment of offsite infrastructure (all due in the second half of 2019), it is conservatively assumed that the Project may have a significant impact on listed species, threatened ecological communities, and/or their habitat.

2.5 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed migratory species, or their habitat?

Yes. Species that may occur in the Project site on an occasional basis are:

- Common Sandpiper (*Actitus hypoleucos*);
- Sharp-tailed Sandpiper (*Calidris acuminata*);
- Pectoral Sandpiper (*Calidris melanotos*); and
- Latham's Snipe (*Gallinago hardwickii*); and Common Greenshank (*Tringa nebularia*).

The Project site does not contain important sites for these species (DoEE 2019), and therefore they would not be significantly impacted. Non-breeding habitat (foraging only) may be impacted by the Project if wetland areas including the Red Gum Swamp, Toolondo Channel, the Jallumba Marsh Flora Reserve (Figure 10) and wetlands 18262, 18264 and 18265 (Figure 11) are impacted by the Project.

While located either fully within (wetland 18264) or partially within (wetlands 18262 and 18265) the baseline ecological study area, all three wetlands are located to the west of a north-south trending ridge that comprises the western boundary of the potential disturbance footprint. Therefore, no direct impact to these wetlands by disturbance, or indirect impact through changes in surface water flow regimes, will occur.

Exclusion of the Jallumba Marsh Flora Reserve and Red Gum Swamp from the potential disturbance footprint prevents direct impact on these areas, however indirect impact is possible due to proximity to the active mine site, and potential for changes in surface water regimes. These potential impacts will be considered during impact assessments to be undertaken during late 2019/early 2020.

The PMST reports for the offsite infrastructure (pipelines, power line extension and construction camp) indicate that up to 11 listed migratory species may occur in or relate to the nominated indicative corridors and footprints, however as specific alignment locations are yet to be determined the likelihood of significant impact is not known.

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

No.

2.7 Is the proposed action to be taken on or near Commonwealth land?

No.

2.7.1 Is the proposed action likely to have ANY direct or indirect impact on the Commonwealth land?

No.

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

No.

2.9 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

No.

2.10 Is the proposed action a nuclear action?

Possibly, as described in Table 2.6.

2.10.1 If yes, describe the nature and extent of the likely impact on the whole of the environment.

All heavy mineral sand deposits contain traces of naturally occurring uranium (U_{nat}) and thorium (Th_{nat}), also known as naturally occurring radioactive material, or NORM. NORM in mineral sands primarily comprises of Thorium-232 (Th^{232}) and its decay chain progeny, and Uranium-238 (U^{238}) and its decay chain progeny; Uranium-235 (U^{235}) and its decay chain progeny typically comprises approximately 0.72% of U_{nat}. As the head of chain radioisotopes, U^{238} and Th^{232} have the longest half-lives in their respective decay chains at 4.5 billion years and 14 billion years respectively. With reference to the *Environmental Protection and Biodiversity Conservation Regulations 2000* the NORM associated with mineral sands is considered to be a mixture of unsealed nuclides.

The U_{nat} and Th_{nat} is contained within the solid mineral grains of the mineral monazite, xenotime, zircon and some ilmenites. Radioactivity is predominately associated with the rare earth phosphate mineral monazite, which typically contains 0.1 to 0.3% uranium and 5 to 7% and thorium. An overview of the mineral streams and associated distribution of radioactivity throughout the proposed mineral sands mining, processing and refining stages is presented as Figures 5 and 6.

The ore processing and mineral separation plant (MSP) will physically separate the ore (~25 parts per million (ppm) U_{nat}, ~250 ppm Th_{nat}, with a resultant head of chain activity of ~1.34 Bq/g) from the host material to form heavy mineral concentrate (HMC) and about 9.6 Mtpa combined tailings. There will be no chemical changes to the minerals within the mineral separation plant. The HMC will contain the vast majority of the monazite originally present in the ore. After initial out-of-pit storage, this material will be returned to the mine void.

The HMC will be further processed within the rare earth and zircon refinery. This will involve chemical processing which will generate about 100 ktpa of salt brine and 160 ktpa gypsum residue. The gypsum residue will contain elevated uranium and thorium concentrations resulting in 300–400 Bq/g total activity and will be classified as low-level radioactive waste.

The disposal method for the refinery by-product streams is yet to be determined, pending the outcome of further hydrometallurgical studies and impact assessments expected to be completed during 2019. Conceptually, the two disposal options for the refinery by-product streams are:

- option A - placed in engineered, lined cells within the Project site for permanent storage (Figure 5); or
- option B - placed into the mine voids with the combined ore processing and MSP tailings (Figure 6).

In option B, the refinery by-products will be mixed with the 9.6 Mtpa of combined ore processing and MSP tailings, thereby diluting the gypsum residue portion to approximately 1.6% of the overall by-product stream. This has the potential to dilute radioactivity levels to below the threshold for legally controllable radioactive material within the meaning of the Victorian *Radiation Act 2005*, with the resultant combined tailing stream having a radioactivity lower than the ore prior to extraction.

Option B offers the benefit of no ongoing required maintenance of the engineered structures after the rehabilitation phase.

Due to the presence of radioactive elements, a review of whether the Wimmera Project could be a nuclear action under section 22 the EPBC Act was undertaken. A nuclear action which will have or is likely to have a significant impact on the environment requires approval under the Act. Based on a review of the EPBC Act, the EPBC Regulations and similar matters it is understood that:

- mining of mineral sands and rare earths is exempted under the uranium mining and milling trigger, as described in the EPBC Explanatory Memorandum 1998 Clause 22, paragraph (69) https://www.legislation.gov.au/Details/C2004B00223/Explanatory%20Memorandum/Text;
- a waste or by-product that exceeds the activity levels specified in the EPBC regulations which is stored in a defined facility is defined as a nuclear action;
- the definition of a facility is generally deemed to be a purpose built / engineered storage facility to store the radioactive waste; and
- the storage or placement of the waste or by-product, irrespective of its activity levels, back into the mine void as part of the mining operation is not defined as a nuclear action.

The application of the EPBC Act definitions of a nuclear action to the Wimmera Project are presented in Table 2.6.

Table 2.6 Nuclear action applicability

EPBC Act definition of nuclear action	Applies to Wimmera Project?
Establishing or significantly modifying a nuclear installation.	No
Transporting spent nuclear fuel or radioactive waste products arising from reprocessing.	No
Establishing or significantly modifying a facility for storing radioactive waste products arising from reprocessing.	No
Mining or milling uranium ores, excluding operations for recovering mineral sands or rare earths.	No, the Project involves recovery of minerals sands and rare earths.
Establishing or significantly modifying a large-scale disposal facility for radioactive waste. A decision about whether a disposal facility is large scale will depend on factors including: • the activity of the radioisotopes to be disposed of • the half-life of the material • the form of the radioisotopes • the quantity of isotopes handled.	Possibly. The combined ore processing/MSP tailings material replaced in the mining void at a rate of about 9.6 Mtpa will have a lower radioactivity than the original in-situ ore, and is not a nuclear action by virtue of the storage or placement of the combined tailings stream into mine voids as opposed to a purpose built/engineered storage facility. The gypsum residue will be generated at a rate of about 160 kpta, will be low-level radioactive waste and will be stored in one of two ways; Option A being lined facilities onsite, or Option B being diluted with combined ore processing/MSP tailings and placed in mine voids. If Option A is the final preferred option then the use of a purpose built/engineered storage facility means that the nuclear action criteria will apply. If Option B is the preferred option then it is not a nuclear action by virtue of the storage or placement of the combined tailings streams into mine voids as opposed to a purpose built/engineered storage facility.
Decommissioning or rehabilitating any facility or area in which an activity described above has been undertaken.	Possibly. If Option A outlined above is used the gypsum residue storage facilities will be progressively decommissioned and rehabilitated in a manner that ensures that any increases in radiation exposure level to the public are As Low As Reasonably Achievable (the ALARA principle), and do not exceed 0.3 mSv/yr. If Option B outlined above is used no decommissioning and rehabilitation of a purpose built/engineered facility will be required
Any other type of action set out in the EPBC Regulations.	No. All other Project operations are associated with recovery of minerals sands and rare earths. Stockpiles used for the temporary storage of ore or saleable products are not considered a facility.

2.10.2 Do you consider this impact to be significant?

No. Significant impacts will be avoided through the appropriate design, construction, operation, progressive decommissioning and rehabilitation of the gypsum residue storage facilities such that any increases in radiation exposure level to the public are As Low As Reasonably Achievable (the ALARA principle), and do not exceed 0.3 mSv/yr.

2.11 Is the proposed action to be taken by the Commonwealth agency?

No.

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage Place Overseas?

No.

2.13 Is the proposed action likely to have ANY direct or indirect impact on any part of the environment in the Commonwealth marine area?

No.

3 Description of the project area

3.1 Describe the flora and fauna relevant to the project area.

A baseline ecological assessment has been undertaken by Cardno (2019a, Appendix C) to inform design of the Project and future detailed surveys. The assessment was based on a review of biodiversity databases and spatial datasets, preliminary vegetation mapping and field-based habitat assessments to identify threatened species and communities that may occur in the Project site.

As part of the desktop assessment a likelihood of presence assessment was undertaken for all 97 threatened species identified via the Victorian Biodiversity Atlas (VBA) and EPBC Protected Matters Search Tool (PMST) search. Each species was assigned one of the following likelihood of presence ratings, based on the location, date and number of records, as well as modelled EVC data:

- **known:** species has been recorded in the study area by a qualified ecologist in the past 20 years;
- **likely:** suitable habitat for the species occurs in the study area and species has been recorded proximate to the study area;
- **possible:** suitable habitat for the species occurs in the study area but no recent records from the study area or proximate areas, OR, suitable habitat for the species may occur in the study area and there are recent records for the species proximate to the study area; and
- **unlikely:** suitable habitat for the species does not occur in the study area and no recent records from the study area or proximate areas.

Baseline surveys were conducted across multiple sites within the ecological study in November 2018. The surveys confirmed the presence of one ecological community listed under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), namely Victorian Temperate Woodland Bird Community and likely presence of two further ecological communities, namely Semi-arid Northwest Plains Buloke Grassy Woodland Community and Red Gum Swamp Community No. 1. (Figure 4).

Five species listed under the FFG Act were also recorded: Buloke (*Allocasuarina luehmannii*), Magpie Goose (*Anseranus semipalmata*), Diamond Firetail (*Stagnopleura guttata*), Whiskered Tern (*Chlidonyas hybrida*) and Brown Toadlet (*Pseudophryne bibronii*).

Three threatened ecological communities listed under the EPBC Act, namely Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions, Grey Box (*Eucalyptus microcarpa*) Woodlands and Derived Native Grasslands of South Eastern Australia and Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains, were potentially recorded during baseline surveys. Detailed field surveys and data analysis are required to confirm the presence and extent of these listed communities.

The likelihood of presence ratings for threatened flora and fauna species identified during the desktop assessment were revised after the field assessment. Twelve species were assessed as 'known' in the study area, four species were assessed as 'likely' to occur, 33 as 'possible' and 48 as 'unlikely'. The likelihood of presence assessment is presented as Appendix A of the Cardno baseline ecological assessment report (Appendix C).

Targeted surveys for species listed under the EPBC Act have not yet been conducted. However, the Red-tailed Black Cockatoo *(Calyptorhynchus banksii graptogyne),* Growling Grass Frog *(Litoria raniformis)* and Australasian Bittern *(Botaurus poiciloptilus)* have been previously recorded in the locality and are considered likely to occur given the presence of suitable habitat including woodlands and wetlands (Figure 9).

Detailed targeted surveys will be undertaken during optimal seasonal conditions in 2019 to verify the presence of the potentially occurring listed species and ecological communities.

3.2 Describe the hydrology relevant to the Project area (including water flows).

3.2.1 Groundwater

Locally, the upper stratigraphy at the Project site is characterised by yellow-grey-brown sandy clays of the Shepparton Formation. The Shepparton Formation is underlain by grey-brown orange sands and clayey sands of the Loxton Parilla Sands (LPS). The LPS is underlain by dark grey-brown sandy clays of the Geera Clay, which is over 30-m thick.

The regional water table in the LPS is around 15–18 mBGL. The mineralised zone within the LPS tends to occur below the regional water table (Figure 2).

The majority of surface water features throughout the region occur in depressions that overlay impermeable clays of the Shepparton Formation. It is conceptualised that surface water that is pooled in such areas slowly infiltrates into the Shepparton Formation and subsequently, into the underlying LPS (Jacobs 2018a). As a result, groundwater dependent ecosystems (GDEs) in the proximity of these surface water features are likely to rely on perched or local groundwater, rather than the underlying regional groundwater.

Hydraulic testing of the Shepparton Formation, LPS or Geera Clay has yet to be undertaken at the Project site, with the exception of slug testing undertaken on the two monitoring wells installed at the test pit. The hydraulic testing will be part of ongoing detailed hydrogeological investigations. Available and inferred hydraulic head data suggests the LPS aquifer is unconfined at the Project site.

Groundwater levels and flow directions at the Project site have been estimated as part of initial investigations and modelling (Jacobs 2018b). The prevailing groundwater flow direction is interpreted to be north to north-west, declining from greater than 150 m AHD near Red Gum Swamp (near the southern boundary of the site), to less than 135 m AHD near Cooks Lane (the northern boundary of the site).

In 2018, a test pit was constructed on the Project site, with a maximum depth of 26 mBGL. Initial groundwater modelling for the test pit predicted that the maximum groundwater inflow rates to the test pit was likely to range between 0.2 and 11 L/s, resulting in a maximum drawdown distance of approximately 550 m (for the scenarios considered) (Jacobs 2018b). However, slug tests performed on monitoring wells constructed at the test pit site, and site observations during the test pit excavation, suggested that the maximum groundwater inflow rate to the test pit was at the lower end of the predicted range (modelling Scenario 3), with a corresponding drawdown distance of approximately 180 m. Pump testing of the production well that was constructed at the test pit site in late 2018 is proposed during 2019 to obtain more aquifer hydrogeological data at the site.

Regional groundwater salinity mapping of the area (DELWP 2014) indicates groundwater salinity ranges between 3,500 mg/L and 13,000 mg/L total dissolved solids (TDS). However, site-specific results obtained during exploration drilling activities indicate TDS ranges between 2,300 and 3,400 mg/L at the site. As such, groundwater at the Project site is likely to require management under segments B and C of the State Environment Protection Policy (SEPP) Waters of Victoria (EPA 2018) and would need to be protected against the beneficial uses listed under those segments, as outlined in Table 3.1.

Table 3.1 SEPP Waters of Victoria (2018) – groundwater segment classification and beneficial uses

Beneficial use	Segment B (1,201 – 3,100 mg/L TDS)	Segment C (3,101 – 5,400 mg/L TDS)
Water dependent ecosystems	✓	✓
Potable water supply	-	-
Potable mineral water supply	✓	✓
Agriculture and irrigation (irrigation)	✓	-
Agriculture and irrigation (stock watering)	✓	✓
Industrial and commercial	✓	✓
Primary contact recreation	✓	✓
Traditional owner cultural values	✓	✓
Cultural and spiritual values	✓	✓
Buildings and structure	✓	✓
Geothermal properties	✓	✓

To date, no active groundwater users have been identified within a 5 km radius of the test pit site (the test pit location is shown in Figure 3).

The Murray Group Limestone is used for irrigation in the western Murray Basin. The Victorian Aquifer Framework identifies the Murray Group Limestone or equivalent units in the general site area. However, bore logs in the vicinity of the ore body and construction of the test pit do not show a distinct limestone unit. Further investigation is required to determine the degree of connection between the units in the vicinity of the ore and the regional limestone resource (Jacobs 2018a).

Bureau of Meteorology mapping suggests there are a number of terrestrial and aquatic ecosystems in the Project site with potential to be groundwater dependant ecosystems (Jacobs 2018a and 2018b). However, while these ecosystems have a potential to be groundwater dependant, the regional water table is expected to be greater than 15 mBGL, ie below the root depth of vegetation. As a result, these ecosystems are unlikely to be reliant on the regional groundwater and are not expected to be affected by any local changes in groundwater levels.

Further detailed hydrogeological investigations for the Project site and surrounding area will be undertaken during the next phase of study to confirm site hydrostratigraphy, aquifer properties, groundwater levels, flow, quality and receptors. These investigations will include assessment of the likelihood of a useable groundwater supply option being present to the west of the Project area, and, if the presence of such a groundwater source is confirmed, the potential environmental impacts should that source be incorporated into the proposed water supply for the Project.

As noted in Section 1.3.11, the Strathlynn Borefield may be used as part of the potential water supply for the Project. The hydrogeological properties of the Strathlynn borefield have previously been established and informed the licence conditions relating to abstraction of groundwater including annual abstraction volumes and triggers levels to cease pumping. Variation of the conditions of licence is not required or proposed, and hence no further hydrogeological assessment for the Strathlynn Borefield is proposed as part of this Project.

A copy of the groundwater baseline assessment is provided as Appendix G and a copy of the test pit dewatering assessment is provided as Appendix H.

3.2.2 Surface water

i Around Project site

There is a chain of lakes and swamps through the Douglas Depression, located 10 km to the west of the Project area, most of which are saline (Jacobs 2018a), including White Lake, Brooskbys Swamp, Centre and North Lake, Lake Bow, Clear Lake and Boundary Swamp (Figure 3).

There are a number of ephemeral creeks to the north of the Project site, including Noradjuha Creek, Natimuk Creek and Darragan Creek. These drain to the north, forming series of minor tributaries to the Wimmera River (Jacobs 2018a).

The Toolondo Reservoir (also known as Lake Toolondo) is located less than 1 km from the southern boundary of the Project site. This off-stream reservoir and trout fishery receives inflows from a small catchment to the west of the Black Ranges via Mt Talbot Creek. The reservoir is the terminal discharge point of Mt Talbot Creek and its only discharge is via the Rockland Channel to the south (Jacobs 2018a).

The Glenelg River is located approximately 15 km to the south of the Project site.

Rainfall in the area averages 497 mm per annum. Evapotranspiration monitors at Horsham (approximately 40 km to the north-east of the Project site) indicate average evapotranspiration rates of less than 40 mm per month in June to over 200 mm per month between December and February (Jacobs 2018a).

ii Within Project site

The Project site is characterised by a relatively flat and open topography with a lack of well-defined surface water channels (Water Technology 2018). The Project site is situated on a mostly cleared and cultivated landscape featuring scattered paddock trees, some patches of remnant native vegetation and several wetlands.

Site topography ranges from 150 m AHD and 200 m AHD. The high point is a slight ridge along the western boundary and the low points comprise the Jallumba Marsh Flora Reserve and Red Gum Swamp.

The major barriers to overland flood water flow include the western ridge, the road network (predominantly the Jallumba-Mockinya Road, Natimuk Hamilton Road and Jallumba-Douglas Road) and the transfer channels network comprising the Natimuk Channel (decommissioned), Arapiles Channel (decommissioned), Toolondo Channel and the Rocklands Toolondo Channel (Figure 3).

Three sub-catchments have been identified at the Project site (Water Technology 2018):

- approximately 80% of the Project site is comprised of the northern sub-catchment. The western ridge forms the western catchment divide, while the fringing lunette dune on the north and north-east side of Red Gum Swamp forms the southern catchment boundary. Surface water flows leave the catchment to the north and east, contributing to various downstream wetlands;
- approximately 10% of the Project site is comprised of the southern sub-catchment where surface water flows into the site from the south and flows toward Red Gum Swamp; and
- the remaining 10% of the Project site is comprised of the western sub-catchment. The western ridge forms the eastern catchment divide, which prevents overland flow to the east. Surface water flows leave the catchment towards north-west.

The baseline surface water assessment considered water quality results for two samples obtained from the Red Gum Swamp and a small dam within the Jallumba Marsh. A single sample was taken at each site and both samples were taken from standing water as no actively flowing water was available.

The following exceedances were recorded against water quality indicator limits set out in the State Environment Protection Policy (SEPP) Waters of Victoria (EPA 2018):

- pH and total phosphorous for both sites; and
- total nitrogen for the Jallumba Marsh site.

The following exceedances were recorded against the water quality indicator limits set out in the Australian and New Zealand Environment Conservation Council (ANZECC) guidelines (toxicant default guideline values for protecting aquatic ecosystems 2018):

- aluminium, arsenic, boron, chromium, copper, lead and zinc for both sites (total concentrations);
- ammonia for the Jallumba Marsh site; and
- nickel for the Red Gum Swamp site.

Since the baseline surface water assessment was completed water quality results have become available for a further six samples obtained from the Jallumba Marsh dam, and a further three samples obtained from Red Gum Swamp. For this larger dataset the following exceedances were recorded against water quality indicator limits set out in SEPP Waters of Victoria (EPA 2018):

- pH (both above the upper limit and below the lower limit) and total phosphorous for both sites; and
- total nitrogen for the Jallumba Marsh site.

For the larger dataset the following exceedances were recorded against the water quality indicator limits set out in the Australian and New Zealand Environment *Guidelines for Fresh and Marine Water Quality* (2018) (toxicant default guideline values for protecting aquatic ecosystems):

- aluminium, arsenic, boron, chromium, copper, lead, nickel, silver, uranium and zinc at both sites (total concentrations);
- ammonia for the Jallumba Marsh site; and
- nickel and selenium for the Red Gum Swamp site.

Further surface water monitoring and baseline assessment of surface water chemistry will be undertaken as part of ongoing investigations.

A copy of the surface water baseline assessment is provided as Appendix I.

3.3 Describe the soil and vegetation characteristics relevant to the Project area.

The Project site is located in the Wimmera bioregion in the far west of central Victoria. The Wimmera bioregion is typified by flat to gently undulating plains in the east, with black and grey cracking clay soils. Plains Woodland, Plains Grassy Woodland, Plains Grassland, Red Gum Wetland and Grassy Woodland are the dominant ecosystems. The western part of the Wimmera bioregion is typified by ancient stranded beach ridges with interspersed with clay plains (where there are a mixture of swamp, lakes, lagoons and lunettes in the south) with cracking clay soils and red texture contrast soils (vertosols and sodosols). The vegetation on these less fertile plains is dominated by Heathy Woodland and Shallow Sands Woodland.

However, due to the considerable long-term disturbance of the Project site through agricultural activity, the predominant form of vegetation within the Project site is exotic vegetation such as introduced economic crops, grasses, weeds, and some patches of degraded native vegetation, as well as two conservation reserves, discussed in Section 3.4.

Preliminary sampling in association with the test pit provided no indication that acid sulfate soils or acid sulfate rock occur (Jacobs 2018b) (Section 1.3.2).

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the Project area.

The Project site has been subjected to considerable long-term disturbance through previous agricultural activity, leaving much of the native vegetation degraded and containing exotic vegetation. However, the Project site contains two conservation reserves, namely Jallumba Marsh Flora Reserve and Red Gum Swamp (Jallumba Wildlife Reserve) (Figure 3). These areas were reserved for their natural values and for wildlife hunting, comprising a large area of Plains Grassy Wetland at Jallumba Marsh Flora Reserve and a 100 ha swamp at Red Gum Swamp (Jallumba Wildlife Reserve). As previously noted, Iluka has chosen to exclude the Jallumba Marsh Flora Reserve and Red Gum Swamp from the mine layout development envelope and therefore avoid direct impact associated with these areas.

Other reserves and state parks located in the broader area are as follows, measured from the nearest applicable boundary of the Environment study area (Figure 7):

- Lake Carchap Wildlife Reserve: 8 km to the west.;
- John Smith Memorial Fauna Reserve: 10 km to the north-east;
- Jilpanger Nature Conservation Reserve: 10 km to the west;
- Mount Arapiles-Tooan State Park: 12 km to the north-west;
- Black Range State Park: 15 km to the south-east;
- Ti Tree Swamp Wildlife Reserve: 20 km to the south-west;
- Grassflat Swamp Flora and Fauna Reserve: 23 km to the north-west;
- Mitre Lake Flora and Fauna Reserve: 23 km to the north-west; and
- Oliver's Lake Fauna Reserve: 25 km to the north.

3.5 Describe the status of native vegetation relevant to the Project area.

Ecological Vegetation Classes (EVC) are the standard unit for classifying vegetation types in Victoria. EVCs are described through a combination of floristics, lifeforms and ecological characteristics, and through an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities (ie lower level in the classification) that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating.

Five EVCs were recorded during baseline surveys, comprising:

- EVC 125 Plains Grassy Wetland – occurs at Wetland ID 18316, 18262 and 18265 in the Project area (Figure 10). One location is heavily grazed but still supports representative native species of the EVC including *Ranunculus sessiflorus* and Woolly-heads (*Myriocephalus rhizocephalus*). The wetlands in Jallumba Marsh Flora Reserve (Figure 2.3) support a diverse range of herbs including Prickfoot (*Eryngium vesiculosum*) and Yellow Balls (*Craspedia variabilis*).
- EVC 292 Red Gum Swamp – characterised by large River Red Gums (*Eucalyptus camaldulensis*) and occurs mainly in conservation reserves but also in small patches in road reserves and within paddocks. The ground layer is highly disturbed and is dominated by exotic grasses.

- EVC 803 Plains Woodland – the canopy in this EVC is dominated by Grey Box (*Eucalyptus microcarpa*), Yellow Gum (*Eucalyptus leucoxylon*) and Buloke.
- EVC 653 Aquatic Herbland – characterised by aquatic herbs and grasses.
- EVC 682 Permanent Open Freshwater – this only occurs at Red Gum Swamp and contains open fresh water that would be dry after low rainfall periods.

3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the Project area.

The Project site consists of low-level plains above flood level (GHD 2018), ranging from 150 m AHD and 200 m AHD. The high point is a slight sandy ridge running north to south along the western boundary and the low points comprise the Jallumba Marsh Flora Reserve and Red Gum Swamp.

Regionally, the Black Range is a topographic high point of greater than 400 m AHD to the south-east of the assessment area, and the northern trending Douglas Depression forms a topographic low along the western boundary of the study area (GHD 2018).

3.7 Describe the current condition of the environment relevant to the Project area.

The predominant land use in and around the Project site is agriculture (mixed cropping and sheep grazing).

The Project site is dissected by a series of road networks and constructed open channels including the Natimuk Channel (decommissioned), Arapiles Channel (decommissioned), Toolondo Channel and the Rocklands Toolondo Channel (Figure 3).

Remnant native vegetation exists mainly as scattered trees within paddocks and along road reserves; however, there are some larger patches on private and Crown land. The Project site contains a number of perennial or ephemeral wetlands including those present at Jallumba Marsh Flora Reserve and Red Gum Swamp (Jallumba Wildlife Reserve) (Figure 11).

A number of minor roads traverse the study area (Figure 3), including:

- Peaches Flat Lane – Nurrabiel Church Road (running east-west);
- Jallumba-Clear Lake Road – Jallumba-Mockinya Road (running east-west);
- Carchap Land – Toolondo Gun Club Road (running east-west);
- Quick Sinclair Russells Road (running north-south);
- Natimuk-Hamilton Road (a main transport route, managed by VicRoads, running north-south); and
- Jallumba-Douglas Road (running west from Natimuk-Hamilton Road).

Key infrastructure near the Project site includes:

- a gas pipeline at Horsham, approximately 33–45 km to the north-east of the Project site;
- an overhead 66-kv electricity powerline along the Wonwondah-Toolondo Road, approximately 5 km to the east of the Project site;
- the Rocklands-Douglas water supply pipeline close to the Douglas mine, approximately 23 km to the south-west of the Project site;

- an underground telecommunication cable located within the Hamilton-Natimuk Road reserve that runs north-south through the western portion of the Project site;
- Port of Portland, a deep-water bulk port, approximately 200 km to the south of the Project site;
- an operational (standard gauge) rail line runs from Hamilton (approximately 100 km to the south of the Project site) to Portland (approximately 200 km to the south of the Project site);
- a disused rail line runs from Jallumba to Hamilton;
- Horsham airport, approximately 41 km to the north-east of the Project site;
- Wimmera Base Hospital in Horsham, approximately 40 km to the north-east of the Project site;
- Hamilton Base Hospital, approximately 100 km to the south of the Project site; and
- Toolondo reservoir, approximately 4 km to the south of the Project site.

3.8 Describe any Commonwealth Heritage Places or other places recognised as having heritage values relevant to the Project area.

Not applicable.

3.9 Describe any Aboriginal heritage values relevant to the Project area.

The Registered Aboriginal Party (RAP) for the Project site is the Barengi Gadjin Land Council Aboriginal Corporation (Barengi Gadjin or BGLC).

A desktop assessment of the potential Aboriginal heritage values associated with the Project was undertaken in 2018. The study area included the Project area and surround and comprised an area of approximately 5,600 ha. The desktop assessment used available archaeological, geological, topographic and waterway mapping data to undertake archaeological predictive modelling across the project area. The predictive modelling indicated that there is:

- an area of high Aboriginal archaeological potential corresponding to the lunette dune fringing the northern and eastern flanks of Red Gum Swamp (ancestral human remains are known to be present at this site). This area may be a 'no-go' area;
- an area of high Aboriginal archaeological potential corresponding to the source bordering dunes to the north of the former Jallumba Marsh (ancestral human remains are potentially present at this site); and
- other areas of low to moderate Aboriginal archaeological potential across large portions of the optimised resource area that are likely to contain Aboriginal cultural material in low densities.

Day one of a two-day standard assessment (non-ground-intrusive field survey) was undertaken in February 2019 across selected portions of the Project site, including the western portion of the land bounded by Nurrabiel Church Road (north), Quick Sinclair Russells Road (east), Jallumba-Mockinya Road (south), and Natimuk-Hamilton Road (west). Survey was also conducted in selected areas south of the Jallumba-Mockinya Road including immediately east of the Jallumba Marsh Flora Reserve, and on the Redgum Swamp fringing lunette dune. The survey comprised a visual assessment to determine the presence of scar trees and/or surface artefacts and scatters. The survey identified a surface scatter of stone tools along the Redgum Swamp fringing lunette. No scar trees were identified. The results of the survey indicated that the areas that had been modelled to be of low to moderate Aboriginal archaeological potential are likely to be designated as low potential in the survey area and will therefore not require further investigation (complex assessment), however this is to be confirmed by the RAP.

In April 2019, the second day of the two-day standard assessment was undertaken across the remaining area north of the Jallumba-Mockinya Road and west of Quick Sinclair Russells Road. Level survey of a drain historically constructed through the Redgum Swamp fringing lunette dune and recording of surface artefacts was undertaken. The results of the survey indicated that the areas that had been modelled to be of low to moderate Aboriginal archaeological potential in the survey area are likely to be designated as low potential and will therefore not require further investigation (complex assessment), however this is to be confirmed by the RAP. The survey also confirmed that the potentially potential area associated with the source bordering dune to the north of the former Jallumba Marsh will require complex assessment to confirm the heritage values and whether or not these will be designated as 'no go' areas. Complex assessment generally involves ground-intrusive survey, however the use of geophysical survey has been discussed with the RAP as a potential alternative, with a trial scheduled during July 2019.

A copy of the desktop cultural heritage baseline report is provided as Appendix J.

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the Project area.

The land tenure in the Project site is largely freehold properties used for mixed cropping (cereals, pulses and oilseeds) and sheep grazing.

Some Crown land is present on the Project site, associated with roads, roadside reserves, Red Gum Swamp and the Jallumba Marsh Flora Reserve (Figure 8). The surrounding area is similar.

The Project site falls within Iluka's Exploration Licence (EL) 4282 area.

3.11 Describe any existing or any proposed uses relevant to the Project area.

The land in the Project site is largely used for mixed cropping and sheep grazing. There are six residences within the mine layout development envelope, with a further four residences in close proximity (Figure 3). As outlined in Section 3.10, some Crown land is also present on the Project site, associated with roads, roadside reserves, Red Gum Swamp and the Jallumba Marsh Flora Reserve (Figure 8).

The *Wimmera Southern Mallee Regional Growth Plan* (2014) (the Plan) provides a regional approach to land use planning in the Wimmera Southern Mallee region. This region includes the municipalities of Hindmarsh, Horsham, Northern Grampians, West Wimmera and Yarriambiack and, as such, is applicable to the Project site.

The Plan has been incorporated into the Victoria Planning Provisions. It identifies opportunities for accommodating growth and managing change over the next 30 years with a specific focus on using regional assets to facilitate economic diversification (to complement the agricultural sector) and build community resilience.

The Plan recognises that earth resources projects can contribute significantly to economic development and help to diversify the economy. It recognises mineral sand deposits as one of the key contributors to the region's future economy. It identifies mining to be amongst the largest sectors of the regional economy by 2031. The Plan proposes the following actions:

- identify, manage and facilitate access to locally sourced natural resources where appropriate, including sand, stone and minerals;
- avoid urban growth and rural living in areas of valuable earth resources; and
- identify housing, transport and infrastructure needs associated with mining at mineral sand deposits near Horsham and Donald and plan to manage any impacts in advance of the commencement of mining.

The *Wimmera Southern Mallee Regional Investment Plan* (2015) also identifies mining as one of the region's key investment opportunities. It recognises that mining will assist in regional employment diversification, increase local employment and attract new people to the region.

Mined areas will be progressively restored and rehabilitated as the mine advances, with the aim of restoring the land to at least its pre-mining land capability, or other end use as agreed with the regulator.

4 Measures to avoid or reduce impacts

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action.

4.1.1 Biodiversity

The Wimmera Project will be designed to recover the mineral sand resources as efficiently as possible minimising environmental impacts, as informed by baseline environmental studies.

In addition to the ecological field surveys undertaken in 2018, additional field surveys and data analysis will be undertaken in Spring 2019 to further define the extent of listed ecological communiti44es in the Project area and confirm the presence (or otherwise) of listed species and their habitats. The results of these detailed surveys will inform the Project design.

To manage potential biodiversity impacts, Iluka will seek to implement the following mitigation strategies:

- avoidance of direct impacts on Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains at Wetland and Grey Box (*Eucalyptus microcarpa*) Woodlands and Derived Native Grasslands of South Eastern Australia and potential habitat for the Red-tailed Black-cockatoo, Red-lored Whistler, Painted Honeyeater and Swift Parrot at Jallumba Marsh Flora Reserve;

- avoidance of direct impacts on potential habitat for the Swamp Everlasting, Growling Grass Frog, Curlew Sandpiper and Australasian Bittern at Red Gum Swamp and Jallumba Marsh Flora Reserve;

- avoidance of direct impacts on the Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains at Wetland 18262, 18264, 18265 and 18265 (located on the western edge of the Project area, and likely outside the mine development footprint), and potential habitat for Swamp Everlasting, Growling Grass Frog, Curlew Sandpiper and Australasian Bittern in those wetlands; and

- hydrological studies to determine potential impacts on surface flow to wetlands and groundwater dependent ecosystems and design appropriate mitigation strategies.

Where it is not possible to avoid disturbance, biodiversity offsets will be provided to compensate for the impacts.

4.1.2 Cultural heritage

A cultural heritage management plan (CHMP) will be prepared and implemented to manage issues relating to Aboriginal cultural heritage in the Project site. The CHMP will determine the extent (if any), nature and significance of Aboriginal heritage values in the Project area and provide conditions to avoid and/or mitigate harm to those values. The CHMP will need to be developed in consultation with and approved by Barengi Gadjin as the RAP for the region.

4.1.3 Tailings storage

Tailings storage facilities will be designed in accordance with the Department of Economic Development, Jobs, Transport and Resources *Technical Guideline - Design and Management of Tailings Storage Facilities* (April 2017). As part of the rehabilitation process, the tailings storage facilities will be made geotechnically stable then capped with overburden, subsoil and topsoil, with the final land surface in harmony with the surrounding environment.

4.1.4 Radiation

As discussed previously, by-products may be diluted to the extent they are not classified as low-level radioactive waste, or they may be stored separately in lined engineered facilities onsite. In either case, by-products will be permanently stored onsite to ensure radiation exposure to people and the environmental is As Low As Reasonably Achievable (the ALARA principle), in accordance with Iluka's Radiation Management Licence issued under the *Radiation Act 2005 (*radiation management plans are required as a condition of that licence).

The zircon and rare earth products produced at the refinery are expected to have an activity content over 1 Bq/g and would therefore be considered radioactive. These products will be temporary stored at site prior to transport to market.

Radiation will be managed in accordance with Iluka's approved Murray Basin Operations Radiation Management Plan. Management measures such as minimising exposure time, increasing distance from exposure sources, and shielding of sources will be used to ensure that radiation exposure to people and the environment meets prescribed statutory limits and is ALARA. A site-specific addendum to the Radiation Management Plan will be prepared that describes the combination of measures to be implemented for the Project.

4.1.5 General

All Iluka sites operate under an environmental management plan (EMP). A site-specific EMP will be prepared for the Wimmera Project covering the construction, operational, closure, rehabilitation and post-closure phases. The EMP will outline environmental performance criteria (where relevant) and mitigation measures for the following aspects:

- air quality;
- biodiversity;
- contaminated land management;
- erosion management;
- groundwater quality and management;
- heritage;
- noise;
- radiation;
- rehabilitation;
- soil quality;
- spill prevention and management;
- surface water quality and management;
- traffic and transport;
- visual amenity; and
- waste disposal and management.

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved.

4.2.1 Biodiversity

Iluka will implement the following measures to minimise the potential for unacceptable mine development-related impacts on biodiversity:

- as far as practicable, avoid impacts on native vegetation, prioritising retention of the largest patches, listed communities and species habitats;
- as far as practicable, avoid impacts on wetlands;
- consider the connectivity of native vegetation and waterways during mine planning, to reduce impacts related to altered hydrological regimes and impacts beyond the Project area;
- develop detailed environmental safeguards for listed species and communities once their extent and presence has been better defined (ie following detailed surveys);
- clearly identify the limit of approved disturbance areas on the ground using markers and ensure that all ground disturbing activities are only undertaken within approved areas;
- ensure that vegetation is removed in such a way to avoid damage to surrounding vegetation;
- undertake a pre-clearing inspection to identify and, where practicable, relocate nesting or roosting fauna;
- stockpile vegetation onsite where practicable for use during rehabilitation operations. Larger vegetation may be retained whole for use in rehabilitation operations on site or for regional biodiversity enhancement programs such as re-snagging of rivers;
- undertake weed management and pest control programs in consultation with surrounding landholders; and
- undertake progressive rehabilitation.

Biodiversity offsets will be provided to compensate for vegetation clearance that cannot be avoided. Iluka will also implement appropriate mitigation strategies for indirect biodiversity impacts.

Should this referral to the Commonwealth Minister for the Environment determine the proposed action to represent a Controlled Action, Iluka will also complete assessment necessary to assess the impact against the requirements of the EPBC Act, including the calculation of an appropriate offset, in accordance with the EPBC Environmental Offset Policy 2012 (or as amended).

4.2.2 Radiation

Radiation will be managed in accordance with Iluka's Radiation Management Licence (no. 300042022) as issued by the Victorian Department of Health and Human Services, and the Murray Basin Operations Radiation Management Plan and Radioactive Waste Management Plan required as a condition of licence.

An addendum to the existing approved radiation management plans will be prepared for the Wimmera Project, and will describe management measures such as minimising exposure time, increasing distance from exposure sources, and shielding of sources that will be used to ensure that radiation exposure to people and the environment meets prescribed statutory limits and is ALARA. These measures will be informed by:

- a radiological assessment for the Wimmera Project to be undertaken in the second half of 2019; and
- guidance documents such as the *Guide for Radiation Protection of the Environment – Guide G-1* (ARPANSA 2015). The purpose of the Guide is to provide best practice guidance on how to assess environmental exposures and demonstrate protection of the environment from the human activities, past and present, that give rise to such exposures.

Iluka's licence and radiation management plans are regulatory documents approved by the Victorian Government under the *Radiation Act 2005*.

5 Conclusion on the likelihood of significant impacts

5.1 World Heritage Properties

No.

5.2 National Heritage Places

No.

5.3 Wetlands of International Importance (declared Ramsar Wetlands)

No.

5.4 Listed threatened species or any threatened ecological community

Yes

5.5 Listed migratory species

Yes.

5.6 Commonwealth marine environment

No.

5.7 Protection of the environment from actions involving Commonwealth land

No.

5.8 Great Barrier Reef Marine Park

No.

5.9 A water resource, in relation to coal/gas/mining

No.

5.10 Protection of the environment from nuclear actions

Yes.

5.11 Protection of the environment from Commonwealth actions

No.

5.12 Commonwealth Heritage places overseas

No.

5.13 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action.

Not applicable.

6 Environmental record of the person proposing to take the action

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Please explain in further detail.

Yes. Iluka and its antecedent companies have over 60 years' experience in the mineral sands industry.

Iluka's core business is in the exploration, project development, operation and marketing of mineral sands. Iluka conducts activities in Eucla Basin (South Australia/Western Australia), Murray Basin (Victoria/New South Wales), Western Australia, Virginia, USA and Sierra Leone, West Africa. Iluka is committed to operating in a responsible manner to minimise the impact of mining and processing operations on the environment, while seeking to maintain environmental biodiversity, and facilitate successful rehabilitation of areas previously mined.

Iluka's environmental management is underpinned by the company's health, safety, environment and community system which guides the company in demonstrating leading practice in these areas through all business activities – from exploration, planning, research and project development, through to operation, rehabilitation and closure.

Activities are conducted such that adverse impacts on existing and potential environmental values, including ecosystem function, abundance, diversity, distribution, integrity and productivity, are understood and minimised. The individual environmental requirements of each site are considered, and site-specific procedures and work instructions are developed in compliance with Iluka's management system.

Iluka recognises that compliance with legislative requirements is a minimum standard that should be achieved while performing at, or beyond legal requirements.

Iluka publicly reports on its environmental management activities annually, including land rehabilitation and closure, water use, mineral waste management, biodiversity and product stewardship, via sustainability reporting (reporting period 1 January to 31 December).

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application.

There are no past or present proceedings against Iluka under Commonwealth or State environmental law.

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

Yes.

6.4 If the person taking the action is a corporation, please provide details of the corporation's environmental policy and planning framework.

Iluka has a Health, Safety, Environment and Community Policy signed by the chief executive officer. The policy reflects Iluka's values of commitment, integrity and responsibility by targeting high levels of performance and pursuing leading practice in the areas of health, safety, environment and community. A copy of Iluka's Health, Safety, Environment and Community Policy is attached as Appendix K.

Further information is available at www.iluka.com/sustainability.

6.5 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

Iluka has referred the following actions under the EPBC Act:

- 2018/8250, Mining/Multiple lots (Section 1.5)/Western Australia/South Capel Remediation Project, WA (18/07/2018).
- 2012/6509, ILUKA RESOURCES LTD/Mining/Balranald/New South Wales/Balranald Mineral Sands Project (16/08/2012).
- 2012/6408, Iluka Resources Limited/Mining/Eneabba/WA/IPL North Project - Eneabba Mineral Sands Mine, WA (31/05/2012).
- 2011/5862, Iluka Resources Limited/Exploration (mineral, oil and gas - non-marine)/220km NW of Ceduna, Yellabinna Regional Reserve /South Australia/Atacama program exploration drilling Yellabina Reserve (25/02/2011).
- 2010/5422, Iluka Resources Limited/Exploration (mineral, oil and gas - non-marine)/Yellabinna Regional Reserve/South Australia/Exploration Drilling Immana Program (30/03/2010).
- 2009/4929, Iluka Resources Limited/Exploration (mineral, oil and gas - non-marine)/N-Western Yellabinna Regional Reserve/SA/Mineral Sands Drilling (10/06/2009).
- 2009/4810, Iluka Resources Limited/Mining/Approx 54 km SW of Horsham and 105 km N of Hamilton/Victoria/Bondi East Far North Open Cut Mineral Sands Mine Project, Wimmera Region, Victoria (25/03/2009).
- 2008/4409, Mining/Tutunup Road 17 km east of Busselton/WA/Tutunup mineral sands mine (19/08/2008).
- 2008/4192, Iluka Resources Limited/Mining/Eneabba/WA/Expansion of mineral sand mine (5/05/2008) 2008/3977, ILUKA RESOURCES LTD/Mining/30 km south-west of Horsham, western Victoria/Victoria/Echo Sands Mineral Sands Mining Project (21/01/2008).
- 2008/3977, Mining/30 km south-west of Horsham, western Victoria/Victoria/Echo Sands Mineral Sands Mining Project (21/01/2008).
- 2007/3864, Iluka Resources Limited/Mining/EL3742, N-W corner of Yellabinna Reserve, near Lake Ifould /SA/Jacinth and Ambrosia Deposits Project within EL3742 (23/11/2007).
- 2007/3441, Iluka Resources Limited/Mining/Busselton/Western Australia/Tutunup South Mineral Sands Project (8/05/2007).

- 2007/3225, ILUKA RESOURCES LIMITED/Mining/Capel/Western Australia/Yoganup 215 mineral sands mine - Mining Lease 70/401 (5/01/2007).
- 2006/2707, Iluka Resources /Exploration (mineral, oil, gas)/Little Youngs Forest Reserve/VIC/Exploration Drilling for Heavy Mineral Bearing Sand (21/03/2006).
- 2005/2345, Iluka Resources Ltd/Mining/Waroona/WA/Waroona mineral sand mine (14/10/2005).
- 2005/2001, ILUKA RESOURCES LIMITED/Mining/Cataby Region/Western Australia/Mineral Sands Mine (16/02/2005).
- 2004/1636, ILUKA RESOURCES LIMITED/Mining/Ouyen/Victoria/Mineral Sands Mining - Woornack, Rownack, Rainlover, Pirro and Kulwin (12/07/2004).
- 2003/1119, Iluka Resources Limited/Mining/South West Mineral Field/Shire of Busselton and Capel/WA/Extension of Existing Sand Mining Operations Yoganup West Mining Leases ML70/672, ML70/467, ML70/1107 (7/07/2003).

7 Information sources

Reference source	Reliability	Uncertainties
AMIRA 2002, *Acid rock drainage test handbook,* Australian Mineral Industries Research Association.	Reliable	None
ARPANSA 2005, Code of practice and safety guide radiation protection and radioactive waste management in mining and mineral processing, Australian Radiation Protection and Nuclear Safety Agency.	Reliable	None
Australian stratigraphic units database. https://www.ga.gov.au/data-pubs/datastandards/stratigraphic-units Accessed 11/04/2019.	Reliable	None
Cardno 2019a, *Iluka baseline ecological assessments - WIM100 ecology report, Murray Basin fine mineral deposits,* report prepared for Iluka.	Moderate reliability given that only baseline studies have been undertaken to date, and targeted surveys are yet to be completed.	Area and extent of listed communities and the presence of listed species.
Cardno 2019b, *Letter of advice re ecological implications of exclusions from WIM100 mining (dated 21/06/2019), letter* prepared for Iluka.	Reliable	None
Cardno 2019c, *Letter of advice re offset implications for the development footprint* (dated 26/06/2019), letter prepared for Iluka.	Reliable	None
DEDJTR 2017, *Technical guideline - Design and management of tailings storage facilities,* Department of Economic Development, Jobs, Transport and Resources.	Reliable	None
DELWP 2014, *Wimmera Southern Mallee regional growth plan,* Department of Environment, Land, Water and Planning.	Reliable	None
DELWP 2014, *Victorian Department of State Development, Business and Innovation. Victoria - Water table mapping,* Department of Environment Land Water and Planning.	Reliable	None
EPA 1997, *State Environmental Protection Policy - Groundwaters of Victoria,* Environment Protection Authority Victoria.	Reliable	None
EPA 2018, *State Environment Protection Policy - Waters of Victoria*, Environment Protection Authority Victoria.	Reliable	None
GHD 2018, *WIM100 Desktop cultural heritage assessment,* report prepared for Iluka Resources Ltd.	Moderate reliability given that only baseline studies have been undertaken to date, and targeted surveys are yet to be completed.	Extent of high-risk areas.

Reference source	Reliability	Uncertainties
International Atomic Energy Agency 2009, *Classification of radioactive waste general safety guide no. 1.* https://www-pub.iaea.org/MTCD/publications/PDF/Pub1419_web.pdf Accessed 18/03/2019	Reliable	None
Jacobs 2018a, *WIM 100 East: Preliminary baseline groundwater assessment,* report prepared for Iluka.	Moderate reliability given that only baseline studies have been undertaken to date.	Limited data available on hydrochemistry, GDEs, groundwater levels, flowrates, presence of the Murray Group Limestone near the ore and the presence of beneficial users.
Jacobs 2018b, WIM100 Test Pit - Phase 2 dewatering assessment, report prepared for Iluka Resources.	Moderate reliability given that only baseline studies have been undertaken to date.	Model was ranked as being of low confidence. Limited data available on hydrochemistry, GDEs, groundwater levels, drawdown rates and the presence of beneficial users.
Water Technology 2018, *Baseline surface water assessments - WIM100,* report prepared for Iluka Resources Ltd.	Moderate reliability given that only baseline studies have been undertaken to date.	Seasonal flow patterns. Surface water users and receptors. Water quality. Location and extent of hydrological features, surface water catchments and flow pathways across the Project area.
WDA 2012, *Wimmera Southern Mallee mining sector plan*, Wimmera Development Association.	Reliable	None
WDA 2015, *Wimmera Southern Mallee regional investment plan*, Wimmera Development Association.	Reliable	None

8 Proposed alternatives

8.1 Provide a description of the feasible alternatives

Iluka holds tenements over three fine grained mineral sand deposits in the Murray Basin, namely the adjacent WIM50, WIM50 North and WIM100 deposits located within tenement EL4282 south of Horsham, and the Goschen South deposit located within tenement EL4191 just north of Wycheproof (Figure 12). Development of each of these deposits was considered, with the WIM100 deposit selected to progress into preliminary design and assessment because of its relative size and value and because it had fewer potential social, environmental and technical constraints.

Development of the WIM100 deposit, mineral processing plant and refinery is a stand-alone project. Final investment decision for the development of WIM100 will be based on a standalone WIM100 development and not include the value of any future development of the other two deposits.

Various high level mine layouts were considered including positioning of the process plant and refinery, including either north and north-east, north and north-west, or south-west of the deposit. The south-west option was discounted primarily due to the close proximity of the mineral processing and refining facilities to Lake Toolondo, and the associated environmental and recreational sensitivities. A northern location for the process plant and refinery (extending eastwards) appears to be the most efficient arrangement as indicated by the development envelope in Figure 3.

The option to process the Wimmera HMC offsite at the Hamilton MSP was considered, however this option was considered to be commercially sub-optimal as the Hamilton MSP was designed to separate mineral sand feedstock of coarser grain size and uses fundamentally different separation processes and technologies.

The option to establish the processing plant and refinery at another offsite location was assessed, however this option was not considered to be currently commercially feasible due to the cost involved in trucking the material from the mine site to the processing site.

Disposal of Wimmera waste material into the Douglas mine Pit 23 approximately 23 km to the south-west of the Project site was considered. This option is not being considered further as Pit 23 was not designed to receive the types and quantities of material that will be produced by the Wimmera Project refinery plant. Similarly, Pit 23 is required to provide a mineral sands by-products disposal location should the Hamilton MSP operations recommence.

While drilling results indicate that mineralisation occurs under portions of the Jallumba Marsh Flora Reserve and Red Gum Swamp, due to the high ecological and Aboriginal cultural heritage values Iluka has chosen to exclude these areas from the proposed mining footprint (Figure 3).

8.2 Select the relevant alternatives related to your proposed action

Not applicable.

9 Contacts, signatures and declarations

9.1 Is the person proposing to take the action an Organisation or an Individual?

Organisation.

9.1.1 Organisation

Iluka Resource Limited.

9.2 Job Title

Principal Environmental Specialist & Radiation Safety Officer, Murray Basin.

9.3 First Name

Marcus

9.4 Last Name

Little

9.5 E-mail

Marcus.Little@iluka.com

9.6 Postal Address

Locked Bag 1001

Hamilton Vic 3300

Australia

9.7 ABN/ACN

ABN 34 008 675 018

Entity name: Iluka Resource Limited

9.8 Organisation Telephone

Phone +61 3 5551 2360

Fax + 61 3 5551 2417

Mobile 0467 777 503

9.9 Organisation E-mail

Wimmeraproject@iluka.com

9.10 I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

Not applicable.

9.11 Small Business Declaration

Not applicable.

9.12 I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations

No.

9.13 Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made

Not applicable.

9.14 Is the Proposed Designated Proponent an Organisation or Individual?

Organisation.

9.15 Organisation

Iluka Resource Limited.

9.16 Job Title

Principal Environmental Specialist & Radiation Safety Officer, Murray Basin.

9.17 First Name

Marcus

9.18 Last Name

Little

9.19 E-mail

Marcus.Little@iluka.com

9.20 Postal Address

Locked Bag 1001

Hamilton Vic 3300

Australia

9.21 ABN/ACN

ABN 34 008 675 018

Entity name: Iluka Resources Limited

9.22 Organisation Telephone

Phone +61 3 5551 2360

Fax + 61 3 5551 2417

Mobile 0467 777 503

9.23 Organisation E-mail

Wimmeraproject@iluka.com

9.24 Proposed designated proponent - Declaration

I, Marcus Little, the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature:  Date: 12 July 2019

9.25 Is the Referring Party an Organisation or Individual?

Organisation.

9.26 Organisation

EMM Consulting Pty Limited.

9.27 Job Title

Associate Director.

9.28 First Name

Philip

9.29 Last Name

Towler

9.30 E-mail

ptowler@emmconsulting.com.au

9.31 Postal Address

20 Chandos St

St Leonards NSW 2065

9.32 ABN/ACN

ABN 141 736 558

Entity name: EMM Consulting Pty Limited

9.33 Organisation Telephone

02 9493 9500

9.34 Organisation E-mail

ptowler@emmconsulting.com.au

9.35 Referring Party - Declaration

I, Philip Towler, I declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.

Signature:  Date: 12 July 2019