REFERRAL OF A PROJECT FOR A DECISION ON THE NEED FOR ASSESSMENT UNDER THE *ENVIRONMENT EFFECTS ACT 1978*

REFERRAL FORM

The *Environment Effects Act 1978* provides that where proposed works may have a significant effect on the environment, either a proponent or a decision-maker may refer these works (or project) to the Minister for Planning for advice as to whether an Environment Effects Statement (EES) is required.

This Referral Form is designed to assist in the provision of relevant information in accordance with the *Ministerial Guidelines for assessment of environmental effects under the Environment Effects Act 1978* (Seventh Edition, 2006). Where a decision-maker is referring a project, they should complete a Referral Form to the best of their ability, recognising that further information may need to be obtained from the proponent.

It will generally be useful for a proponent to discuss the preparation of a Referral with the Impact Assessment Unit (IAU) at the Department of Environment, Land, Water and Planning (DELWP) before submitting the Referral.

If a proponent believes that effective measures to address environmental risks are available, sufficient information could be provided in the Referral to substantiate this view. In contrast, if a proponent considers that further detailed environmental studies will be needed as part of project investigations, a more general description of potential effects and possible mitigation measures in the Referral may suffice.

In completing a Referral Form, the following should occur:

- Mark relevant boxes by changing the font colour of the 'cross' to black and provide additional information and explanation where requested.
- As a minimum, a brief response should be provided for each item in the Referral Form, with a more detailed response provided where the item is of particular relevance. Cross-references to sections or pages in supporting documents should also be provided. Information need only be provided once in the Referral Form, although relevant cross-referencing should be included.
- Responses should honestly reflect the potential for adverse environmental effects. A Referral will only be accepted for processing once IAU is satisfied that it has been completed appropriately.
- Potentially significant effects should be described in sufficient detail for a reasonable conclusion to be drawn on whether the project could pose a significant risk to environmental assets. Responses should include:
    - a brief description of potential changes or risks to environmental assets resulting from the project;
    - available information on the likelihood and significance of such changes;
    - the sources and accuracy of this information, and associated uncertainties.
- Any attachments, maps and supporting reports should be provided in a secure folder with the Referral Form.
- A CD or DVD copy of all documents will be needed, especially if the size of electronic documents may cause email difficulties. **Individual documents should not exceed 2MB as they will be published on the Department's website.**

- A completed form would normally be between 15 and 30 pages in length. Responses should not be constrained by the size of the text boxes provided. Text boxes should be extended to allow for an appropriate level of detail.
- The form should be completed in MS Word and not handwritten.

The party referring a project should submit a covering letter to the Minister for Planning together with a completed Referral Form, attaching supporting reports and other information that may be relevant. This should be sent to:

Postal address

Minister for Planning
GPO Box 2392
MELBOURNE VIC 3001

Couriers

Minister for Planning
Level 20, 1 Spring Street
MELBOURNE VIC 3001

In addition to the submission of the hardcopy to the Minister, separate submission of an electronic copy of the Referral via email to ees.referrals@delwp.vic.gov.au is required. This will assist the timely processing of a referral.

PART 1 PROPONENT DETAILS, PROJECT DESCRIPTION and LOCATION

1. Information on proponent and person making Referral

Name of Proponent:	WIM Resource Pty Ltd
Authorised person for proponent: **Position:** **Postal address:** **Email address:** **Phone number:** **Facsimile number:**	Michael Winternitz Project Manager, Senior Geologist Suite 2004, Level 20, 201 Elizabeth Street, Sydney, 2000 mwinternitz@wimresource.com.au 0467 515 100 NA
Person who prepared Referral: **Position:** **Organisation:** **Postal address:** **Email address:** **Phone number:** **Facsimile number:**	Dr John Yeates Environmental and Approvals Manager WIM Resource Pty Ltd Suite 2004, Level 20, 201 Elizabeth Street, Sydney, 2000 jyeates@wimresource.com.au 0416 034 159 NA
Available industry and environmental expertise: (areas of 'in-house' expertise and consultancy firms engaged for project)	**WIM Resource Pty Ltd - Proponent** WIM Resource (WIM) is an emerging major producer of mineral sands products in Victoria. WIM has: • WIM Resource holds one of the largest mineral sands resource portfolios in the world, with nearly 1 billion tonnes of defined ore across Victoria over several projects. WIM's Board have experience & an excellent track record in mineral sands rehabilitation, in other projects in Australia. • A Corporate team with extensive experience in mineral sands new mine development and an excellent track record in mineral sands mine site rehabilitation • A technical team with significant experience in mineral sands exploration, resource development and approvals **External advisers** WIM has an experienced and diverse team of external advisors in corporate, mine development, mine engineering and environmental management, including: • Yeates Consulting (approvals management) • ERM (air quality) • AECOM & GHD (groundwater) • Okologie Pty Ltd (ecology) • Landskape Pty Ltd (Cultural Heritage) • Ecology Australia Pty Ltd (Flora & Fauna) • SGS (radiation) • Mineral Technologies Downer EDI – (engineering)

- Utting & Muhor Environmental (UAME – Tailings)
- Tonkin Consulting (soil assessment)
- University of Adelaide (acid sulfate soils)

List of Figures

	List of Appendices: **Appendix 1** Preliminary Flora & Fauna Field Survey Report (Okologie Consulting, 2017) **Appendix 2.** Preliminary Flora & Fauna Assessment Report (Ecology Australia, 2018a) **Appendix 3**. Avonbank Mineral Sands Project: Survey Findings 2018 (Ecology Australia, 2018b) **Appendix 4.** Preliminary Hydrological Assessment (GHD, 2018) **Appendix 5.** 2019 Hydrogeology Summary Report, Avonbank Heavy Mineral Sands Project (AECOM 2019) **Appendix 6.** Preliminary Cultural Heritage Assessment (Landskape, 2017) **Appendix 7**. Preliminary Soils & Landform assessment (Tonkin, 2018)

2. Project – brief outline

Project title: Avonbank Heavy Mineral Sands Project

Project location: (describe location with AMG coordinates and attach A4/A3 map(s) showing project site or investigation area, as well as its regional and local context)

WIM is proposing to develop the Avonbank Heavy Mineral Sands Project between the townships of Dooen and Jung, 15 km north-east of the rural Victorian City of Horsham. Refer to **Figures 1**, **2 and 3.**

Short project description (few sentences)**:**

The Avonbank project ('**project'** or '**Avonbank'**) hosts a world-class mineral sands deposit that will enable WIM to supply premium quality zircon, rare earths and titanium into overseas markets. Avonbank has an expected life of mine of at least 30 years. WIM plans to commence mining works once necessary approvals have been obtained.

WIM does not propose to establish on-site accommodation facility. Staff will be employed on a permanent basis, preferably from Horsham and the surrounding area.

Avonbank will bring significant employment opportunities to Horsham and the region, as well as significant economic growth & diversification for the Wimmera & the State of Victoria.

Avonbank is projected to produce between 350,000 and 600,000 tonnes per annum (t/a) of mineral concentrate using standard dry mineral sands mining and conventional processing techniques.

The total project area is comprised of a Retention Licence covering 6,440 hectares (ha), which contains the Avonbank deposit, a consistent sheet like body, covering approximately 4000 ha. The proposed 30-year mining footprint is within this area and is approximately 2,500 ha (**see Figure 1**).

3. Project description

Aim/objectives of the project (what is its purpose / intended to achieve?):

WIM plans to establish a world-class mining operation and concentration plant targeting the Avonbank Heavy Mineral Sands Deposit, which will produce a high-quality mineral concentrate for export overseas.

The Avonbank mineral concentrate (produced by simple wet gravity concentration of the ore) will be of premium grade and quality, and contain zircon, rare earths and titanium minerals, for which there is significant demand from downstream processors and end users of these respective products.

Background/rationale of project (describe the context / basis for the proposal, e.g. for siting):

Location & Infrastructure
Avonbank is extremely well located with respect to existing critical infrastructure, including:

- existing freight rail line running through the centre of the project
- an existing intermodal terminal in the centre of the project
- major surface water supply trunk line within 3-4 km of process plant
- high voltage power line at site
- existing major roads
- 15km from the city of Horsham
- access to multiple Ports using the existing rail line and intermodal terminal

Figure 4 provides an overview of the existing infrastructure within the project area and its surrounds.

Deposit Description and Reserve Statement

The project area contains the Avonbank Deposit, for which WIM holds Proven & Probable Reserves of 311.8 Million Tonnes @ 4.3% Heavy Mineral content (JORC, 2012).

Coupled with excellent existing infrastructure – this world-class Reserve positions Avonbank as one of the world's best undeveloped Zircon Mineral Sands Projects.

WIM has conducted over 30,000 metres of air core drilling across the project retention lease (RL 2014) and has a very high confidence level in the geological modelling for the project.

Following major bulk sample process design studies, WIM successfully conducted extensive product test work, marketing and placement studies and has demonstrated that the Avonbank products will be of premium quality for which there is high market demand. The main minerals that Avonbank will produce include:

- Zircon - which has extensive markets within the ceramics industry, the largest user of zircon worldwide. Zircon is also used in the following industries: electronics, glass and refractories, metals, chemicals and catalysts. Avonbank has high zircon levels

- Ilmenite – mainly used for paint pigment production. Avonbank Ilmenite is well suited as a high-quality feedstock to produce chloride-grade titanium slag and high purity iron, confirmed through extensive product development pilot studies

- Rare Earth minerals - well suited to produce rare earth oxides and metals, which are used in a broad range of industries including: energy production, energy reduction, energy efficiency and lifestyle (gadgets, hardware and medical services). Avonbank has premium quality rare earth minerals, confirmed by extensive pilot scale downstream studies.

The proposed mining footprint will be minimal at any one time, as the proposed mining cell method supports a direct overburden return, rapid rehabilitation methodology.

In addition to be located at the site of the resource, there are other major siting advantages:

- There is a major surface water supply pipeline within 3-4 km, able to supply sufficient volumes of water for the project from the existing GWM surface water allocation.
- High voltage electrical power supply lines (220kV & 66kV) run through the centre of the project area and adjacent to the proposed Wet Concentration Plant (**WCP**).
- The WCP is proposed to be located adjacent to the existing rail line and intermodal facility, which is located at the centre of the project area. This is expected to significantly streamline the operation, reduce traffic and support a more efficient operation over the life of mine for the Avonbank project.
- Avonbank has direct access to multiple ports from the rail siding, adjacent to the WCP. WIM proposes to load and then transport the mineral concentrate directly to the Ports of Melbourne or Portland (**refer to Figure 3**), or possibly to the Port of Geelong or Port Adelaide.

Main components of the project (nature, siting and approx. dimensions; attach A4/A3 plan(s) of site layout if available):

Overview of operations

WIM proposes to move between approximately 9 – 15 million tonnes of ore, per annum. This will be fed directly into a mining unit plants, located within the pit.

The project is intended to operate 24 hours a day, 365 days per year, to ensure suitable throughput and operational efficiencies. Mining will be undertaken in small cells (approximately 300mX300m) which will enable the mine face to be progressively rehabilitated, using a 'moving hole' concept, which also will minimise material movements (**refer to Figure 14**).

The proposed mining footprint will be minimal at any one time, as the proposed mining method supports a direct return, rapid rehabilitation methodology. The active mine path is proposed to be prepared through the removal, transport and separate stockpiling of top and sub soil.

WIM proposes to employ a direct return rehabilitation methodology, whereby the overburden, upper soil units (top and sub soil) will be mined and placed directly over a previous mining cell and will therefore not be stockpiled.

Topsoil, subsoil and overburden removal

Conventional earth moving equipment, including land planes and scrapers will be used in earthmoving, to preserve the integrity of the upper soil units. After topsoil & sub soil removal and separate stockpiling, overburden material will be stripped using conventional earth-moving equipment to an average depth of 12-15m from surface, where the ore body will be intercepted.

Once tailings have sufficiently consolidated in the mining cell, overburden will be returned directly into the mining cell via a direct return mining method (refer to **Figure 14**). Rehabilitation of the soils to facilitate ongoing agricultural land use will rapidly follow once the deposited tailings reach a suitable strength will occur, typically within approximately 12 - 18 months.

Mining

Ore will be mined using standard mineral sands mining equipment, likely with a dozer-push mining technique, coupled with truck and excavator were required. The project is intended to operate 24 hours a day, 365 days per year, to ensure suitable throughput and operational efficiencies.

Ore will be mined by conventional dry mineral sands mining techniques and equipment, including excavators, bull dozers, scrapers, front-end loaders and trucks.

The ore will be mined through in-pit Mining Unit Plants (**MUP**) and processed through a WCP to remove approximately 5%-7% of the ore, which will report to a Heavy Mineral Concentrate (**HMC**) (refer to the Processing section below).

Minor dewatering will be required for the bottom third of the ore body, via the use of in-pit toe drain sumps. Groundwater that enters the pit will be combined and used with water sourced from GWM Water surface water allocations, recycled water, and incident rainfall (**process water**). The process water will be used for wet separation of ore components, in the MUP and the WCP. Process water dams are proposed to be located at the WCP site.

WIM proposes a rapid rehabilitation mining technique, known as a moving hole concept. Overburden will be direct returned from one mining cell to another and this this will reduce the footprint of the active mine footprint and allow WIM to return the land to its pre-mined land use as soon as practically possible (**refer to Figure 14**).

Processing

The Wet Concentration Plant (**WCP**) will use wet gravity techniques to separate valuable heavy minerals into a Heavy Mineral Concentrate (HMC) with approximate grade of 84-94% Total Heavy Mineral (**THM**), recovering approximately 70-80% of the THM in the mined ore.

The WCP will be located as centrally as possible to the life of mine footprint (refer **to Figure 1**), adjacent to the existing rail line and intermodal facility within the Wimmera Intermodal Freight Terminal (**WIFT**) Precinct, which lies in the centre of the project area (**Figure 4).**

The WIFT Precinct is subject to Schedule 9 of the Special Use Zone in the Horsham planning scheme. Sub-precinct 2 of the WIFT Precinct is specifically dedicated to mineral sands-related activities, although storage and handling of mineral sands ore is also permitted within some other parts of the WIFT Precinct. Given the integrated planning of the WIFT Precinct and the fact that mineral sands activities are permissible or encouraged, it is possible that WIM will seek to excise this location from its mining licence area and seek planning permission for activities within the WIFT Precinct.

WIM has undertaken detailed process design metallurgical studies on representative ore. The on-site processing main stages are at this stage contemplated to include:

- Feed Preparation: two in-pit MUPs will screen oversized material and scrub (wash) to disaggregate sand and heavy metal particles to form a slurry
- The feed preparation circuit (FPC) slurry will be transported via a series of pipelines to the WCP, and the sand tailings returned to the mine pit
- Secondary trommel will remove +2mm oversize at the WCP
- Ore will be deslimed via cyclosizer at the WCP
- Deslimed slurry will be processed via a series of spirals using water and wet gravity techniques to separate lighter heavy minerals and other gangue material to produce an HMC for direct export overseas
- Slimes tailings (-20µm) will be thickened and disposed along with sand tailings into the mine cell

Tailings Management

The WCP will produce two tailings streams, a fine fraction (slimes) and a coarser sand fraction (sand tails). Following primary separation by the WCP the slimes will be thickened and deposited, with sand tailings into the mining cell for during the life of the mine, following secondary dewatering. Before disposal into the mining cell, the tailings will undergo secondary dewatering to assist with recovery of water for mining and processing, and to assist with the tailings reaching a suitable density for rehabilitation to take place.

At the commencement of the project there will be a delay before tailings can be placed back into the mining cell. This delay will be minimised by initially mining and stockpiling ore, before wet processing is commenced.

Once tailings have settled, overburden will be returned and contoured, followed by sub soil and topsoil. It is expected that, within approximately 12-18 months of mining commencing within one cell, it will be fully rehabilitated to a state that permits its ongoing agricultural use.

Waste management

Chemicals are not proposed to be used during wet processing, apart from small amounts of non-toxic flocculants added to assist with tailings dewatering. Waste products will include general waste from the site office, laboratory and workshop, and on-site septic sewerage.

Water supply infrastructure

WIM has undertaken detailed consultation with Grampians Wimmera (**GWM**) Water, as there are multiple existing surface water pipeline supply systems that run close to the location of the proposed WCP, shown on **Figure 4**. Project requirements for water are estimated at 3-6 G/L pa. This includes both potable water and the process water requirements to service the MUPs and WCP. WIM expects that this water will be sourced from GWM Water's surface water entitlements. Discussions with GWM Water confirm that there is sufficient surface water available to supply the projects process water requirements.

Power infrastructure

The Avonbank operation is estimated to have power demands of between 20,000,000 – 30,000,000 kW per annum. Power supply to Avonbank will be via the Victorian electricity power grid through the Powercor Australia Ltd high-voltage transmission line that traverses the project area, as shown on **Figure 4**. It is anticipated that the electricity will be stepped off the main power supply to 20-22 kV at an onsite electrical substation, located within the WIM processing base area, and provided via overhead lines to the MUP. The WCP and associated site infrastructure will be connected via an underground cable network.

The site has excellent mobile phone reception through existing networks. This will facilitate easy and fast communications within the site, and for external emergency and other communications.

Road and Rail Transport

The proposed wet concentration plant (**WCP**) is well located with respect to existing road and rail infrastructure. WIM's preference is to load final mineral concentrate directly from the WCP onto rail at the existing rail siding, within the WIFT Precinct, and then transport the mineral concentrate to Port of Melbourne or Port of Portland.

WIM will look to site the WCP within the Wimmera Industrial Freight Precinct (**WIFT**). This is located within the project area, shown on **Figure 4.** The WIFT Precinct has an existing operating intermodal facility that has direct rail connection to Port of Melbourne and access to Port of Portland.

Port Facilities

The Avonbank Project is very well serviced by via direct rail connection, from the WCP to existing major ports, including the Ports of Portland, Melbourne, Adelaide and Geelong, refer to **Figure 3**.

WIM's preferred port option is the Port of Portland (**PoP**), which is a deep-water port that has the facilities and experience in handling mineral sands concentrates. Discussions with PoP confirm that there is capacity to receive, store and load Avonbank concentrate using existing port facilities. PoP is well serviced by road and rail from the project area, via existing roads and rail.

The Port of Portland is strategically located between the Ports of Melbourne and Adelaide. It is located approximately 240 km from the Avonbank Project area. The port has bulk handling capabilities, offering an on-site HMC storage shed service for direct loading onto Panamax size vessels.

Once the mineral concentrate is received at the PoP, WIM plans to export mineral via bulk transport. The mineral concentrate will be unloaded at a China based port and transported via truck to a

Mineral Separation Plant, where the HMC will undergo mineral separation. Final products will be dispatched in accordance with local applicable laws and regulations.

Workers' Accommodation

The project is located within 15 km from the city of Horsham. WIM, at this stage does not propose to have an on-site camp style accommodation facility. Instead, staff will be employed on a permanent basis, preferably from Horsham and surrounding area. Adequate parking will be available at the plant site, or buses will be provided for shift changes.

Ancillary components of the project (e.g. upgraded access roads, new high-pressure gas pipeline; off-site resource processing):

WIM proposes to locate the Wet Concentration Plant (**WCP**) and most of the ancillary components of the project within the WIFT Precinct. This WIFT Precinct lies in the centre of the project area and is subject to Schedule 9 of the Special Use Zone in the Horsham Planning Scheme. The WIFT Precinct includes a dedicated sub-precinct for mineral sands activities, although mineral sands activities are also permissible in some other parts of the Precinct (refer to **Figures 4 and 15**). This will be accessible from an existing Highway.

The site office area is proposed to consist of several demountable buildings and would act as the control point of the entire mining operation.

The mine laboratory is proposed to comprise several demountable buildings and would be used to analyse samples from the various stages of separation and the final HMC to ensure the QA/QC is maintained throughout processing, in addition to supporting grade control drilling and sampling. The laboratory will use a mixture of both X-Ray fluorescence (XRF) and heavy media separation techniques.

A separate series of workshops will be required for storage of spare parts and maintenance of pumps, pipelines and equipment.

Other ancillary components are anticipated to include:

- Onsite electrical substation
- Site workshop for storage and maintenance
- Minor internal roads
- Water and slurry pipelines
- Contractor machinery yard, with an above ground diesel tank
- Laydown yard.

The site offices will likely be located nearby to the WCP, which will form the main operational centre for the project.

It is also possible that the project will include the construction of a dedicated rail siding or loop. WIM will also need to construct some internal access roads within the project area. The 'Generalised Preliminary Site Layout' (Figure 15) shows a 500m spur line (as labelled) that runs off the main existing rail line. WIM is also examining a 1km rail loop, that simply extends further, within the WIFT Precinct

Key construction activities:

The key construction activities are expected to include:

- Site establishment and installation of the WCP within the WIFT Precinct
- Site establishment and installation of an electricity substation and associated overhead and underground lines
- Installation of a process water offtake pipeline from the existing GWM trunk line
- Installation of process water and associated dams may be located adjacent to the WCP (refer to Figure 15).

- Secondary process water dams maybe located at other yet to be determined locations within the project area.
- Access roads within the mine site
- Site offices, sheds
- Upgrade or extension of existing siding
- Potentially a rail loading facility
- Potentially a dedicated rail siding or loop.

Construction activities at the mine site will involve:

- Erection of a fence around the active mine site and process plant area to exclude unauthorised access
- Transport of construction equipment and materials to site
- Removal and stockpiling of topsoil and subsoil for reuse in rehabilitation
- Construction of site drainage and water management systems including in pit sump, tailings pond, and process water dam.
- Limited native vegetation clearing and establishment of mine site.
- Construction of access tracks and internals roads and minor upgrade of current dry weather roads and haul roads on private paddocks within the project area.
- Transport and assemblage of the processing plant components (two MUPs, WCP, and thickener).
- Associated components including the HMC loading at the rail sliding loop.
- Construction of additional mine infrastructure including a site office and amenities, water, fuel and tailings storage facilities, a maintenance shed, contractor machinery yard and site workshop
- Construction of slurry pipeline access under the rail line and highway, as required
- Reinstatement and rehabilitation of temporary work sites and laydown areas progressively.

Key operational activities:

- The ore would be fed through in-pit (or ex-pit) Mining Unit Plants (**MUP**) that will operate simultaneously within a mining cell of approximately 300m x 300m. The MUP will separate oversize material from the ore which would then be pumped as a slurry to the WCP.

- Mining in temporary cells will enable the mine face to be progressively rehabilitated, using a 'moving hole' concept that would minimise material movements.

- The WCP will be located as centrally as possible to the life of mine footprint. The WCP will use conventional wet gravity techniques (water only) to undertake primary separation of the ore and aim to produce a mineral concentrate with an approximate grade of 84-94% THM, recovering approximately 70-80% of the THM.

- Slimes are proposed to be thickened and secondary dewatered, with the sand tailings fraction into the existing mining void. The tailings would be dosed with flocculants to assist with water recovery and to assist with the tailings reaching a suitable density for rehabilitation to occur.

Key decommissioning activities (if applicable):

All mined land will be progressively rehabilitated back to agricultural land as the mine path progresses, over the 30-year mine life. The rehabilitation method will be developed, and detailed in a rehabilitation plan, which is a statutory requirement under the *Mineral Resources (Sustainable Development) Act 1990*. Key decommissioning activities are likely to include the removal of buildings and plant associated with the project. The plant and associated demountable office buildings are likely to be modular, which will be easy to remove from the project area.

Is the project an element or stage in a larger project?

☒ No ☒ Yes If yes, please describe:

The overall project strategy is for delivery of all stages and components over 30 years mining a total of 2500 ha; the concept design is for the overall project; and the intended scheduling of the design and development is for all of project stages

Is the project related to any other past, current or mooted proposals in the region?

☒ No ☒ Yes If yes, please identify related proposals.

4. Project alternatives

Brief description of key alternatives considered to date (e.g. locational, scale or design alternatives. If relevant, attach A4/A3 plans):

WIM has undertaken significant resource, mining engineering and receptor-based studies to define the proposed 30-year mine footprint. This has been an iterative process in which numerous alternatives have been evaluated and will continue to be as the project evolves.

There may be an extension to the projected 30-year mine life, based on project economics as the project development progresses – as the total JORC compliant mineral resource does encompass close to 4,000 hectares. The proposed 30-year mine life is based on detailed optimisation and mining engineering studies that were completed as part of the Avonbank Pre-Feasibility Study (PFS). WIM has examined other mine path alternatives that encompass a greater area of the existing Retention Lease held by WIM, up to the limits of the current global resource estimate outline as shown by (Figures 1 and 6), but not including the proposed exclusion areas (as listed in this section, and Section 7).

However, based on WIM's PFS, the current 30-year plan (and sequence) is the most likely PFS base case.

There are no alternative locations for the mining void, as the proposed mining footprint and resource area entirely encompasses the Avonbank deposit. This is a discrete ore body that occurs only in this location.

The mining footprint has been designed to avoid sensitive receptors, including the 220kV powerline easement, WIFT Precinct and the Wimmera Highway and railway line. WIM has also excluded the Longerenong College grounds from the proposed mine life footprint.

Brief description of key alternatives to be further investigated (if known)**:**

Power Supply

WIM will consider the feasibility of generating or purchasing renewable energy, within or near the project area, to supply power to the Avonbank project. A small wind energy facility may provide greater energy efficiency and reduce the carbon footprint of the project.

Diesel generated power is also an option that may be assessed, given it may likely have a lower carbon footprint than connecting directly to the existing grid. The alternative of diesel would be to provide total power supply and/or support project main power supply during the life of mine.

Transport & Logistics

An alternative to utilising the existing intermodal terminal may include the installation of further rail sidings by the current operator of the freight terminal, to facilitate more efficient loading of the mineral concentrate. WIM has had detailed & positive discussions with the operator of the Dooen freight terminal, Wimmera Container Lines (WCL), around this option.

WIM will also consider the installation of a dedicated rail loop or siding within the WIFT Precinct that would enable efficient loading of mineral concentrate. This would enable less rehandling and more direct loading of the Avonbank mineral concentrate onto rail. The transport of mineral concentrate to the Port of Portland, via road, may also be considered, as part of the feasibility study. This is however a lower ranked option due to the size of the operation and lower efficiency of road as a mode of transport when compared to rail.

Port Options

An alternative port option to the Port of Portland (PoP) would be Port of Melbourne (PoM), which is a major container and general cargo port that handles approximately 2.5 million containers annually with around 3050 ship visits each year. The port loading facilities are 319 km by direct rail line from the Avonbank project area. Under this scenario, WIM would likely transport the mineral concentrate to PoM via containers. An alternative may involve the use of rota box technology, whereby bulk loading of concentrate may be possible at non deep-water ports, where traditionally containers are employed.

A third alternative Port option is Port Adelaide, which caters mainly for containerised goods. However, there have been successful cases of rota box technology enabling the loading of bulk concentrate at the port. The Port of Geelong is a fourth alternative, however not WIM's preferred option.

A detailed transport and export strategy study, to identify the preferred modes of transport and export, is to be undertaken. The selected option(s) will be based on economic and environmental considerations.

Mining Method

Different approaches to the proposed mining method will be considered, including the use of conveyor belts to assist with direct return of overburden units, rather than standard truck and shovel methods. WIM may also consider alternatives to the method of stripping overburden units – including scrapers rather than truck and shovel.

WIM may elect to locate the MUPs' ex-pit, should operational or engineering studies demonstrate this will support a more efficient operation. With respect to ore mining, WIM will consider using alternatives to the mining and feed stage of the operation to the FPC units. WIM may pre-mine and stockpile some ore at the commencement of mining, to allow for in-pit deposition of tailings, once the WCP commences operation.

Subject to further geotechnical and hydrogeological investigations, WIM may also require some form of advanced dewatering bore field to assist with the pit stability and trafficability.

Mine Schedule

Different approaches to the proposed mining path and schedule layout will also be considered, to assist with optimising the mining sequence. One of these may involve the mining of multiple (albeit smaller) active mining cells simultaneously.

Processing and Tailings Treatment

The WCP will produce a Heavy Mineral Concentrate(s) with a grade of approximately 83%-94% Total Heavy Minerals (**THM**) for export overseas. An alternative option that may be included as part of the WCP is the inclusion of a concentrate upgrade circuit - which would involve the addition of extra stages of wet gravity separation and Wet High Intensity Magnetic Separation (WHIMS) to allow optimization of transport costs.

Relocating the WCP at some stage during the mine life, to assist with optimising the mining operation, is also an alternative that may be considered. WIM will also consider the practicability and merit of having some degree of pre-concentration close to the active pit.

An alternative to the feed preparation circuit (FPC), which is a component of the WCP, may be location of the feed preparation plants alongside the active mining cell or within the pit.

WIM may consider having an external tailings storage facility to service the start-up stages of the mine, before in-pit deposition of tailings takes place, in later stages. WIM may also consider a range of mechanical dewatering techniques, to assist with secondary dewatering.

The above alternatives are minor changes to the layout and very minor to the overall footprint of the project, and would not have a significant impact on power, water, emissions or the environment, though it is recognised that further or adapted studies may be required if these alternatives are pursued. **Not Proceeding with the Project** This will result in the following negative outcomes: • Victoria will forego royalty payments; • Loss of employment and prosperity for the Horsham area; • Loss of a consistent, high quality source of zircon, Rare Earth Minerals and Titanium for • the world; • Loss of additional freight revenue and opportunities to the Intermodal Freight Hub; and • Loss of a potentially significant part of the WIFT Precinct for the Horsham Council.	

5. Proposed exclusions

Statement of reasons for the proposed exclusion of any ancillary activities or further project stages from the scope of the project for assessment:

Exploration & Resource Development Studies

WIM Resource will be conducting various exploration & resource development studies, that will contribute towards a bankable feasibility study (BFS) and design for the project, including:

- Resource definition grade & mineralogy drilling
- Exploration test pit and pilot studies - for bulk sample studies
- Detailed mineralogy studies
- Geotechnical studies
- Hydrogeological studies
- Tailings deposition studies
- Soil and rehabilitation studies
- Transport studies
- Stakeholder and community engagement work
- Other feasibility and environmentally related studies

The completion of a BFS is a standard pathway for any mining project and will be completed over the next 2 years. All these BFS related studies will be excluded from the scope of this referral.

A bulk sample of mineralised material has been removed from an exploration test pit, for exploration and resource development purposes only and will be important for WIM to complete as part of its feasibility studies. This exploration study has been approved by ERR and excavation works were undertaken in June 2019 (PLN -001156).

6. Project implementation

Implementing organisation (ultimately responsible for project, i.e. not contractor)**:**

WIM Resource Ltd Pty
Suite 2004, Level 20, 201 Elizabeth Street, Sydney, NSW 2000
ABN 59 159 389 929

Implementation timeframe:

The proposed timeframe for project implementation is from construction beginning in 2021-2022, for commissioning and first production in 2022-2023 to a projected end of mine life of 2052-2053 (30 years of production).

Proposed staging (if applicable):

Project activity	**Timing**
BFS	2018-2020
Impact assessment and specialist studies	2018-2020
Construction	2021-2022
Commission	2023
Full production	2023
Decommissioning and closure	Post 2050

7. Description of proposed site or area of investigation

Has a preferred site for the project been selected?

☐ No ☒ Yes If no, please describe area for investigation.

If yes, please describe the preferred site in the next items (if practicable).

General description of preferred site, (including aspects such as topography/landform, soil types/degradation, drainage/ waterways, native/exotic vegetation cover, physical features, built structures, road frontages; attach ground-level photographs of site, as well as A4/A3 aerial/satellite image(s) and/or map(s) of site and surrounds, showing project footprint):

Topography/landform

The total proposed 30-year mine footprint is approximately 2,500 hectares and is located approximately 5 km northeast of the township of Dooen, 15 km north-east of the City of Horsham, in the Wimmera district of Victoria. It is bound by private property to the north, Drung-Jung Road to the east, Longerenong Road to the south and Henty Highway to the west (**Figures 1-3**).

The topography of the project area is generally flat, comprising low undulating landforms. Most of the project area is located on private properties used primarily for broad acre continuous cropping. The project area falls within the Wimmera bioregion, the Wimmera Catchment Management Authority boundary and the Horsham Rural City Council (HRCC).

Native vegetation has been largely cleared from the project area, from historical agricultural activities. Remaining native vegetation is limited to isolated remnant patches and scattered trees in paddocks or along road reserves.

Geology and soil types

On a regional scale, the project area is located within the south-eastern margin of the Murray Geological Basin (MB). The Avonbank deposit is hosted by fine grained, silty sands of the Loxton-Parilla Sands. The stratigraphic position and fine grain size distribution of the Heavy Mineral is indicative that the sediments were laid down in a lower energy marine setting. The Avonbank mineralisation forms a sheet-like body, that extends for 9.5 km north-south by 6.5 km east-west, with an average thickness of 10 m.

The project area has clayey vertosols formed on the underlying alluvial Shepparton Formation parent material. Subsoils are medium to heavy soils which are coasted by a layer of loose and friable self-mulching topsoil (Tonkin, 2018).

Surface soils generally comprise brown medium-heavy clays in the southern section and light-medium clays in the northern section of the project area. Soil acidity is slightly alkaline to moderately alkaline surface soils (7.2-8.5 pH). The project area falls within the Warracknabeal Murtoa Salinity Province, which has a low priority status with regards to salinity problems.

Hydrogeology

The Parilla Sands Aquifer (**PSA**) system forms the upper water table aquifer system in the project area. The lower aquifer present in the project area is the Renmark Group Aquifer (**RGA**). The Geera Clay forms an aquitard that separates the overlying PSA from the underlying Renmark Group Aquifer system, in the project area.

WIM has drilled over 1000 drill holes in the Avonbank deposit and has demonstrated based on the drilling data that the Geera Clay is present and is on average 35m thick at the project. WIM does not propose to mine below the Geera Clay, as the economic mineralisation ends 1-2m above the Geera Clay.

The RGA system is present at a depth of around 70-80m at the site, with thickness varying between 40m to the north-west. The RGA is less thick to the east project area, outside of the proposed mine footprint.

Within the proposed mine footprint, the depth to groundwater is approximately 10m at the southern end of the proposed mining footprint and increases to around 28-30 metres depth to the north. The regional groundwater elevation varies from approximately 110m to 125m AHD, driving groundwater flow generally in a north-west direction (GHD, 2018; AECOM (2019) **(Appendices 4 and 5**)

Rainfall

The mean average rainfall recorded for Longerenong, located within the southern portion of the deposit, is 412 mm/a, with the wettest months typically May-October where rainfall exceeds 40 mm/month. The mean maximum temperature for the project area is 21.5 degrees Celsius.

Drainage and waterways

There are no permanent waterways or Groundwater Dependent Ecosystems (**GDEs**) within the mining footprint However, some minor ephemeral drainage lines run across the project area (**Figures 7-10**).

There are three main drainage features located outside of the mine footprint, but close to the southern boundary of project area, and include Yarriambiack Creek (approximately 3 km to the east), Two Mile Creek to the south/south - east and the Wimmera River approximately 3 to 5 km to the south (**see Figure 10**).

Vegetation cover

The preliminary mine footprint has been extensively cleared and is mainly used for broad acre cropping. Native vegetation is limited to remnant patches of Plains Woodland, Plains Savannah and Plains Grassland and scattered trees in paddocks or along road reserves (**Figures 11 and 12; Appendices 1-3**).

A preliminary ecological assessment by Okologie Consulting (2017) indicated approximately 10-15 ha of native vegetation may be impacted by the proposed years 1-30 mine footprint **(Figure 11**).This has been refined by recent desktop and detailed field work by Ecology Australia (2018a,b) **(Appendices 2 and 3)** which identified that;

- The Retention Lease area is mostly a cropped landscape with modified remnants restricted to roadsides and paddocks;
- 9.07 ha is within the proposed 30-year mining footprint; and
- A further approximately 15.6ha is outside the 30-year mining footprint, but inside the Retention Lease (which will not be disturbed during mining).

Dooen Swamp, which supports a substantial redgum (*Eucalyptus camaldulensis*) community, and Darlot Swamp, characterised by a Black Box *(Eucalyptus largiflorens)* woodland and associated ephemeral wetland vegetation occur well-outside the area proposed to be mined in the 30 year project area (2.0 km and 1.9 km respectively. Dooen Swamp lies partially within the current Retention Licence area, and Darlot Swamp is approximately 600m outside the retention licence area (Ecology Australia, 2018) (**Appendix 2**).

Physical features and built structures

Land throughout the project area is mostly flat (less than 20m elevation change across the site) and used for broad acre farming. Within the mining footprint there are two residential receptors for potential noise, air quality and visual impacts. Within the retention lease (RL 2014) there are approximately 12 residential receptors.

Other sensitive receptors also include the WIFT, and the Longerenong Agricultural College. The College and BASF operate a Wheat and Oilseeds Breeding Centre at Longerenong College in addition to agricultural diploma and certificate courses. The centre is located in the southeast corner of the project area (Figure 6). Viterra operates a grain receivable and storage facility on the south-west boundary of the RL.

WIM has excluded the WIFT Precinct area (including the Regional Load out Hub), the Longerenong Agricultural College (including the Wheat and Oilseeds Breeding Centre) and the Wimmera Hwy, the Rail Line and main 220kV power lines (Figure 4) from the mining footprint road frontages

Significant road frontages include:
Highways

- Wimmera Highway
- Henty Highway

Main Roads

- Longerenong Road
- Greenhills Road
- Max Johns Road
- Tuckers Road
- Drung-Jung Road
- Jung N Road
- Jung West Road
- Freight Terminal Road
- Molyneux Road
- Creamery Road

Roads within the project area are shown in **Figures 1, 2 and 3**.

Site area (if known):

The total preliminary mine footprint is approximately 2,500 hectares and total Retention Licence area covers 6,449 hectares. The active mine path will only disturb a very small proportion of the total mine footprint at any one time and will be temporary in nature.

Current land use and development:

The proposed mining area has been almost entirely cleared of native vegetation and is mainly used for continuous dryland cropping with wheat and pulse crops.

Description of local setting (e.g. adjoining land uses, road access, infrastructure, proximity to residences and urban centres):

The project area is bound by private property to the north. The Dooen Landfill, an EPA licenced listed groundwater monitoring site (Licence 12067), is located 2.2km west of the most westerly extension of the proposed 30-year mine footprint. Several rural homesteads and related non-residential structures are located within RL lease area, and two within the mining footprint **(Figure 6**).

Planning context (e.g. strategic planning, zoning and overlays, management plans):

The project area is subject to the Horsham Planning Scheme **(Figure 5)**. Zones and overlays currently applying to the project area include:

- Farming Zone: covers the majority of the project area
- Special Use Zone Schedule 9: To facilitate the use and development of the WIFT Precinct for freight, logistics, transport related activities, industry, manufacturing and other related commercial activities (including mineral sands processing)
- Road Zone – Category 1: Wimmera and Henty highways
- Public Use Zone 4 (Transport): Railway line
- Public Use Zone 2 (Education): Longerenong College
- Land Subject to Inundation Overlay: This covers a small area of the project to the north of Molyneaux Road (also known as Creamery Road). It also extends into the lower south-east corner of the land but outside the current proposed mining area.
- Design and Development Overlay Schedule 11: To ensure the design objectives of the WIFT Precinct Structure Plan are achieved
- Development Plan Overlay Schedule 9: To ensure the development objectives of the WIFT Precinct Structure Plan are achieved
- Environment Significance Overlay Schedule 7: To prevent the development of sensitive uses within the buffer area surrounding the WIFT Precinct.

Local government area(s):

The project site area falls within the Horsham Rural City Council. The Port of Portland is within the Glenelg Shire Council while the Port of Melbourne is within the City of Melbourne. Rail and road transport routes go through a number of rural and metropolitan local authority areas.

8. Existing environment

Overview of key environmental assets/potential sensitivities in project area and vicinity (general description of project site/study area under Section 7)**:**

Hydrogeology and Surface Water

A baseline groundwater monitoring bore network has been installed across the project area. Fourteen of these bores access the Parilla Sands Aquifer (**PSA**), and three additional bores access the Renmark Formation Aquifer (**RGA**). From the monitoring bore data, the saturated thickness of the PSA aquifer system was be approximately 4m to 8m through the project area.

Average groundwater salinity, as measured in the network was approximately 9,000 mg/L TDS, with a maximum of approximately 11,100 mg/L and a minimum of 5,100 mg/L (GHD, 2018) **(Appendix 3)**. There are 42 registered groundwater bores within five kilometres of the project area, with the majority of the bores being used for groundwater investigation/observation purposes and only two bores registered for domestic and stock purposes. The low level of groundwater use reflects the relatively high groundwater salinity in the aquifer system, which precludes crop irrigation.

Recharge from the project area to the PSA system is minimal, if any, as reflected by the relatively high groundwater salinity. Low rainfall and high evaporation rates result in minimal recharge to the system, with diffuse recharge probably occurring during wet years, and localised recharge occurring in areas where the PSA has relatively high permeability. To the south and outside of the Retention Licence Area, around the Wimmera River, the overlying Shepparton Formation becomes saturated and forms the water table aquifer (GHD, 2018).

There are no Ramsar wetlands in the project area or within 100km. The Darlot Swamp Wildlife Reserve, and the Dooen Swamp Bushland Reserve, approximately 2-3 km south of the proposed mining footprint. The closest Wetlands of National Importance are located approximately 30km to the west on the Wimmera River.

Further details regarding these potential GDEs are outlined in Sections 11 and 13 of this referral, and the location of surface water features is depicted in **Figures 8-10**).

AECOM undertook groundwater bore drilling, and additional groundwater monitoring further site investigations in 2019, concluding that;

- Parilla Sands Aquifer beneath the proposed mine footprint is brackish (salinity generally 6,000 to 13,000 mg/L TDS) with limited users in the vicinity of the area (only two registered stock and domestic bores within a 5 km radius);
- Groundwater within the upper aquifer shows a general increase in salinity down flow path (northwards), away from the surface drainage features present south of the proposed Mine;
- There is little change in hydro-geochemistry between up-gradient bores (south), bores adjacent to surface drainage features, bores screened within the mineralised zone and down gradient outside of the mineralised zone (north);
- The depth to groundwater beneath the lowest points of Darlot and Dooen Swamps is greater than 5m (measured in March 2019 at 5.9m and 6.2m respectively);
- Downward vertical gradient immediately adjacent to swamps

Figures 8-10 indicate bores drilled, and inferred groundwater elevation gradient in the vicinity of RL 2014 (GHD 2018) the further findings of AECOM 2019 **(Appendices 4 and 5),**

Biodiversity

The proposed mining footprint has been extensively cleared of native vegetation (**Figures 11 and 12)**.

Desktop assessments and preliminary site surveys by Okologie Consulting (2017) and Ecology Australia, (2018a,b), **(Appendices 1-3)** identified remnants of the following former dominant Ecological Vegetation Classes listed as endangered remain scattered within roadsides and paddocks:

- Plains Savannah
- Plains Grassland
- Plains Woodland

Okologie Consulting (2017) concluded that the Plains Grassland within the RL 2014 area did not meet the condition thresholds to be considered as the Natural Grasslands of the Murray Valley Plains ecological community. Ecology Australia further assessed these areas in Spring 2018 (Ecology Australia 2018a,b) (**Appendices 2 and 3**).

The following EPBC Act listed communities are known in the project area;

- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions (Endangered)
- Natural Grasslands of the Murray Valley Plains (Critically Endangered)

One threatened flora species – Buloke (*Allocasuarina luehmannii)* – was identified to occur within the project area, and another threatened species, Buloke Mistletoe *(Amyema linophylla)*, was considered to have a high likelihood of occurrence. A further 22 threatened flora species have a moderate likelihood of occurrence within the RL 2014 area.

For fauna, the area within a 25km radius of the centre of the project area is known to support 10 threatened fauna, while three species have a high likelihood of occurrence, and 10 species have a moderate likelihood of occurrence.

However, within the proposed mining footprint there is limited fauna habitat. Most listed threatened fauna in the greater investigation area are associated with the Dooen and Darlot Swamps, which are outside of the proposed mining footprint (refer to **Figures 6-8**).

Based on a desktop assessment (Ecology Australia 2018) **(Appendix 2**), the following were identified as possibly present within RL 2014;

- Striped Legless Lizards (SLL) *Delma impar*- listed as vulnerable under the EPBC Act, listed as threatened under the FFG Act and is classified as endangered in Victoria (DSE 2013).
- Golden Sun Moth (GSM) *Synemon plana* - listed as critically endangered under the EPBC Act, listed as threatened under the FFG Act and is classified as critically endangered in Victoria (DSE 2009)
- Growling Grass Frog *Litoria raniformis* - listed as vulnerable under the EPBC Act, listed as threatened under the FFG Act and is classified as endangered in Victoria (DSE 2013).
- The Pale Sun Moth *Synemon selene* - classified as critically endangered in Victoria (DSE 2009).
- The Reddish Orange Sun Moth *Synemon jcaria* - classified as critically endangered in Victoria (DSE 2009).
- Waterbird Surveys – several waterbird species listed under the EPBC Act and/or FFG Act, listed under the EPBC Act Marine and Migratory Schedules, or classified as threatened in Victoria are known from the Retention Lease, or may occur in the Retention Lease.

Subsequently, Ecology Australia was commissioned in 2018 to undertake targeted spring ecological assessments in the Avonbank Mineral Sands Project area, based on the results of a desktop survey (Ecology Australia 2018b) (**Appendix 3)**.

The key findings of these targeted field surveys are provided in the text and tables below.

Flora

- The Retention Lease area is mostly a cropped landscape with modified remnants restricted to roadsides and paddocks
- 9.07ha of remnant vegetation is within the proposed 30-year mining footprint
- Approximately 15.6ha of remnant vegetation is present outside the 30-year mining footprint, but within the Retention Lease
- The dominant EVCs are Plains Grassland and Plains Savannah, both of which are endangered, listed under the FFG Act and potentially under the EPBC Act.
- Plains Grassland EVC does not meet the condition thresholds for EPBC Act listing.
- Plains Savannah EVC does not have patch and condition thresholds under the EPBC Act, but is likely to represent a degraded version of the listed community (Buloke Woodlands of the Riverina and Murray Darling Depression Bioregions)
- No plant species listed under the EPBC Act or FFG Act were recorded in the Retention Lease area, however Buloke has an advisory list classification of endangered and is common.
- Darlot and Dooen Swamps support several threatened wetland EVCs in good condition.
- Both Swamps were dry at the time of sampling and one threatened species was recorded.

Ecological Vegetation Class within the proposed mining footprint	Area (ha)	EVC Conservation Status	EPBC Act	FFG Act
Plains Savannah 826	4.77	Endangered	✓	✓
Black Box Lignum Woodland 663	0.34	Endangered		
Plains Grassland 132	1.27	Endangered	✓	✓
Plains Grassland 132	2.48	Endangered	✓	✓
Plains Grassland 132	0.11	Endangered	✓	✓
Plains Grassland 132	0.10	Endangered	✓	✓
TOTAL	**9.07**			

The following areas of EVCs were identified outside the proposed 30-year mining footprint, but inside the RL 2014 area.

Ecological Vegetation Class outside the mine footprint, inside RL 2014	Area (ha)	EVC Conservation Status	EPBC Act	FFG Act
Plains Savannah 826	4.62	Endangered	✓	✓
Plains Savannah 826	2.07	Endangered	✓	✓
Plains Grassland 132	8.94	Endangered	✓	✓
TOTAL	**15.63**			

Fauna

Striped Legless Lizards (SLL) and Golden Sun Moth (GSM) were not recorded during targeted surveys. Both GSM and SLL inhabit native temperate grasslands, and within the mining footprint approximately 99.5% of native temperate grasslands have been destroyed or severely degraded due to agricultural and urban development. In particular, both species have been impacted through intense grazing, pasture improvement, ploughing or other heavy disturbance. In addition, weeds and inappropriate fire regimes have further reduced habitat quality for both of these species.

Removal of native vegetation and cultivation mean that the majority of habitat within the project area was assessed as most likely unsuitable for SLL and GSM. Following the targeted surveys, the likelihood of SLL and GSM being present within the project area has changed from moderate to low.

Ten bird species listed under the Marine Schedule of the EPBC Act, two species listed under the Migratory Schedule of the EPBC Act and three species classified on Victorian Advisory List were recorded in the Retention Lease.

Dry conditions prevented meaningful surveys for Growling Grass Frogs and waterbirds. Surveys for Pale Sun Moth and Reddish-Orange Sun Moths were not undertaken.

Cultural heritage

A desktop study of cultural heritage of the Avonbank project area conducted by Landskape Pty Ltd found that:

- No Aboriginal cultural heritage places have previously been recorded in the proposed 30 year mine footprint
- Three Aboriginal cultural heritage places (stone artefact scatter sites) occur southwest of the project area, at Dooen Swamp which is 2 km outside the area proposed to be mined.
- Predictive modelling shows there is a low to moderate potential for Aboriginal cultural heritage to occur in an area of depression in the north-west of the project area. This area has not been included in Figure 13, which shows Aboriginal Victoria's Victorian Aboriginal Heritage Register (VAHR) sites.

The project area is not within an area of cultural heritage sensitivity as defined by Division 3 of the *Aboriginal Heritage Regulations 2007*.

Aesthetic Receptors

Human receptors as outlined in Section 7 would be sensitive to a range of amenity impacts such as those potentially resulting from noise, air emissions and visual impact. These potential impacts will be identified through current and future studies and addressed through environmental impact management plans.

9. Land availability and control

Is the proposal on, or partly on, Crown land?

☐ No ☒ Yes If yes, please provide details.

There is one small area of Crown land within the project area, approximately 1.5 km to the north of Longerenong College, which is currently used for cropping. The railway reserve is also Crown land but will not be impacted by mining disturbance. As discussed earlier, access may be required to the rail siding (**refer to Figure 4**).

Current land tenure (provide plan, if practicable):

Land tenure and zoning within the project area is shown in **Figure 5.**

The project area is secured by Retention Licence 2014 (100% owned by WIM Resource)

Intended land tenure (tenure over or access to project land):

WIM intends securing access to the land required through a combination of acquiring freehold land, leasing and/or associated registered Land Access Compensation Agreements. WIM will also require a Mining Licence to develop and operate the Avonbank project.

Other interests in affected land (e.g. easements, native title claims):

There are no applications for or registered or granted Native Title claims over the area. Most of the land is in private ownership, with small areas of crown land.

10. Required approvals

State and Commonwealth approvals required for project components (if known):

The project is likely to require the following Victorian state approvals:

- Mineral Resources (Sustainable Development) Act 1990: The project will require grant of a Mining Licence and approval of a mine work plan. A rehabilitation bond will also be required
- A bulk surface water entitlement allocation will need to be allocated to WIM to allow for process water requirements.
- Water Act, 1989. A licence will be required from groundwater monitoring bores and for dewatering.
- Aboriginal Heritage Act, 2006: A Cultural Heritage Management Plan will be required if the project requires an EES
- Radiation Act 2005: It is likely the project will require a Radiation Management Plan covering radiation safety related aspects of operations.
- If the WCP is located outside the Mining Licence, a planning permit may be required under the Planning and Environment Act 1987 for the WCP and associated storage and loading activities, as well as any out-of-licence infrastructure connections and road upgrades
- Export Licence
- Flora and Fauna Guarantee Act (FFGA): A permit will be required for clearing FFG – listed flora species, flora that are members of listed communities or protected flora from public land.
- Guidelines for the removal, destruction or lopping of native vegetation (DELWP 2017) – The Guidelines are incorporated into the Victorian Planning Provisions and all planning schemes in Victoria. The policy regulates the clearing of native vegetation and must be applied when a permit is required under Clause 52.16 or 52.17 of planning scheme.
- *Environment Protection and Biodiversity Conservation Act (EPBCA)*: Approval may be required for clearing EPBC – listed ecological communities or species.

Have any applications for approval been lodged?

☒ No ☒ Yes If yes, please provide details.

Approval agency consultation (agencies with whom the proposal has been discussed):

- DELWP (Department of Environment, Land, Water and Planning)
- EPA (Environment Protection Authority)
- ERR (Earth Resources Regulation)
- GWM Water
- Horsham Rural City Council
- Department of Health & Human Services
- Registered Aboriginal Party (RAP) (Barengi Gadjin Land Council Aboriginal Corporation) – identified

Other agencies consulted:

Below is a list of agencies that will in the future be consulted or currently in talks with.

- Heritage Victoria
- Horsham Rural City Council
- Wimmera Catchment Management Authority
- Powercor Australia Ltd
- Commonwealth Department of the Environment and Energy

PART 2 POTENTIAL ENVIRONMENTAL EFFECTS

11. Potentially significant environmental effects

Overview of potentially significant environmental effects (identify key potential effects and comment on their significance and likelihood, as well as key uncertainties):

Soils and landform

A preliminary soil and landform desktop level study for the Avonbank Project was completed by Tonkin Consulting (Tonkin, 2018).

The study found that there is low to moderate potential for the proposed operations to have an effect on soil erosion, as the grey cracking clay in both the St Helens and Doon Soil Landform Units identified in the project area has low erodibility to water and wind. Combined with the estimated low rainfall (416 mm/yr on average), relatively flat topography and small area of exposure due to the proposed mining method - degradation due to erosion is likely to be limited and is not considered a likely significant impact of mining activities,

During stockpiling, the risk of degradation increases due to leaching of clay and stabilising salts, such as calcium, deeper into the stockpile. This can occur within months for sand but can take years for clay. Erosion of the stockpile surface can lead to loss of soil materials for rehabilitation. Given the low grades and distance to surface water, erosion is unlikely to result in contamination of surface water at Avonbank project. Soil erosion will need careful management, particularly for the subsoil stockpiles which are likely to be dispersive.

Preliminary assessment undertaken as part of the test pit work has identified soils in that locality to have approximately 12 cm of sandy clay loam topsoil, underlain by some 60 cm of sandy clay to heavy clay upper subsoil, lying over alkaline clay soils to depth. Tonkin (2018) concluded that the sub soil may have higher erodibility, due to its sodicity, as the subsoil is subnatric (sodicity 6-10%) compared to the non-sodic topsoil. Poor stripping and stockpiling of the materials could result in the sodic subsoil mixing with the non-sodic topsoil. Upon rehabilitating the site, if the topsoil has not been protected from mixing, this could result in waterlogging and structural decline resulting in reduced agricultural productivity of the rehabilitated site.

In summary, Tonkin (2018) concluded that unless carefully rehabilitated, impacts could include reduced capability in soils, due to degradation of soil structure, formation of unfavourable soil chemistry and alterations of landform. WIM's proposed direct return and rapid rehabilitation mining method will ensure that the top and sub soil will not be mixed during mining activities. Direct return refers to the practice of returning upper soil units and overburden that has been mined, to the previous mining cell - without stockpiling - and without mixing of top and sub soil units (**Figure 15**), This is expected to ensure the land is returned to agricultural productivity.

Detailed soil and landform assessment will be undertaken prior to commencement of mining, and the results will be critical to rehabilitation planning.

The total surface area WIM expects to disturb over the 30-year mine life will be approximately 2,500 ha, but only a small fraction of this area will be disturbed at any one time due to the progressive, direct rehabilitation mining sequence. The different soil horizons will be stockpiled separately before being backfilled in the correct order.

Surface Water and Drainage

There are no natural waterways, wetlands or marine environments located within the project area or mining footprint (**Figures 6-8**). Despite some minor ephemeral lines being mapped to occur as part of the drainage network of the project area, these have been largely decommissioned (filled in and no longer used for water transport), following the installation of the GWM Pipeline network.

A preliminary hydrological study undertaken by GHD (2018) indicated that the project activities are unlikely to result in significant impacts on local waterways or related ecosystems (GHD, 2018) **(Appendix 4)**.

Potential Groundwater Dependent Ecosystems (**GDEs**) identified within approximately 5km of the project area;

- Dooen Swamp – considered a losing feature 2km from the mining footprint with a low potential for an aquatic GDE, but with potential for a terrestrial GDE;
- Darlot Swamp – considered a losing feature (1.9km from the proposed mining footprint) with a low potential for an aquatic GDE;
- Yarriambiack Creek – considered mostly a losing feature, 3km from the mining footprint, with a high potential for an aquatic GDE
- Two Mile Creek – considered a losing feature, 1.2 km from the mining footprint, with a high potential for a terrestrial GDE; and
- Wimmera River – considered a losing feature 4km from mining footprint, potentially a gaining feature when river is low, and a high potential for an aquatic GDE.

Further work was conducted by AECOM in early 2019, (AECOM 2019) **(Appendix 5),** focussed on the potential GDEs adjacent to RL 2014 area. The outcomes of this work are summarised below.

Groundwater

WIM has installed an extensive network of groundwater monitoring bores throughout the project area and has commenced detailed baseline monitoring of the bores for water levels & chemistry.

Preliminary studies to date indicate that, on average the bottom third of the deposit is saturated by groundwater and that the groundwater salinity of the Parilla Sand Aquifer is approximately 9,600 mg/L TDS and classified as Segment C under the State Environment Protection Policy (SEPP) (Groundwaters of Victoria - GoV). Therefore, the groundwater within the Parilla Sands aquifer, within the mining footprint has very little and indeed limited beneficial use. The process water in the deposited tailings are expected to be lower that the surrounding native groundwater salinity and WIM therefore expects low potential impact of the operations to impact on groundwater salinity or quality.

A preliminary study from AECOM (2019) **(Appendix 5)** concluded that:

- The ephemeral swamps (Dooen and Darlot) are losing systems, whereby they recharge the underlying aquifer whenever they fill with surface water flows;
- The depth to groundwater, vertical hydraulic gradient and groundwater salinity profile indicates that within Dooen Swamp and Darlot Swamp there is:
  - no potential for aquatic GDEs;
  - potential for terrestrial GDEs, but only if there exists deep rooted (phreatophyte) type vegetation that requires more than periodic flooding and is tolerant of brackish water
- The mining of mineral sands within the project area will require minor dewatering the upper aquifer (PSA by less than 10m - see Mining under Section 3 of this referral). The extent of the resultant cone of depression will likely be limited, by the relatively low permeability (GHD, 2018; AECOM 2019) and temporal period of dewatering;
- The brackish nature and limited users of the upper aquifer (PSA) across the Mine footprint mean the consequences are likely to be minor; and
- Limited risks to the underlying Renmark Group aquifer (RGA) from either dewatering or mounding in the upper aquifer (UTAM) given the nature and occurrence of the mapped Geera Clay aquitard.

WIM will undertake a surface water study as part of the Workplan development to better understand local surface water flow across the project site, determine potential environmental impacts and operational issues and develop management plans as required. WIM is aware of work undertaken by Water Technology (Warracknabeal and Brim Flood Investigation – Hydrology and Hydraulics 2015) for the Wimmera Catchment Management Authority (WCMA) which is of relevance to the project area and will discuss this further with WCMA in developing the project Workplan.

These conclusions will be verified by detailed groundwater modelling to be undertaken prior to mining commencement. The flora and faunal ecological values of the Dooen and Darlot swamps and related wetlands ecosystems outside of the mining footprint will be assessed against potential changes to ground water and/or surface hydrology which may occur during mining. WIM will undertake detailed groundwater modelling prior to mining and will monitor groundwater levels during the life of mine will better determine potential impacts on these swamps and related wetlands.

Based on the studies undertaken to date, WIM understands that any deep leads associated with the Renmark Group Aquifer are outside of the project area. Regardless, WIM does not plan to extract any groundwater from the PSA or Renmark group aquifers or related deep leads.

Flora and Fauna

The mining footprint has been extensively cleared of native vegetation (Ecology Australia, 2019).

Preliminary studies undertaken by Okologie Consulting (2017) identified approximately 10-15 ha of native vegetation within the 30-year mine footprint (**Figures 11 and 12; Attachment 1**).

Further work by Ecology Australia (2018b) **(Appendix 3**) has confirmed 9.07 ha of Flora and Fauna Act (FFG Act) endangered ecological vegetation class (EVC) communities - Plains Grassland (syn. Northern Plains Grassland Community), and Buloke Woodland (syn. Semi-Arid Northwest Plains Buloke Grassy Woodland Community), within the mine footprint.

Ecology Australia noted a further 15.6 ha outside the mine footprint, but inside the retention lease. Scattered trees, mostly buloke, which is an FGGA listed threatened flora species, are also present across the site.

Okologie (2017) identified two EPBC Act listed communities (refer to Sections 7 and 8 of this referral) and potential habitat for a number of threatened species, notably Growling Grass Frog, Sun Moths (three species) and Striped Legless Lizard. Losses associated with the project are likely to be direct removal, and the potential to avoid or minimise impacts on these potential habitats is yet to be determined.

Further work, including field surveys were conducted by Ecology Australia (2018a,b) **(Appendices 2 and 3**) are described in Section 12 of this referral.

Cultural heritage

The highly disturbed state of the landscape and the lack of recorded cultural heritage places within the proposed mine footprint means that the proposed operations are unlikely to result in any adverse impacts on cultural heritage values.

A desktop study was conducted by Landskape (2017; **Attachment 4**) which identified three Aboriginal cultural heritage places at Dooen Swamp, within the southwestern boundary of the Avonbank RL 2014 but outside the mining footprint.

The project area is not within an area of cultural heritage sensitivity as defined by Division 3 of the *Aboriginal Heritage Regulations 2007*. Predictive modelling showed that there is a low to moderate potential for Aboriginal cultural heritage to occur in the proposed mine footprint area. Further field survey work will be undertaken to confirm this finding.

Air Quality

There are two main residential properties within the proposed mining footprint and an additional 12 residences within the project area. Other potential sensitive land uses in the project area of surrounding region include: the Dooen Intermodal Freight Terminal, the Longerenong Agricultural College, and the townships of Dooen and Jung.

Dust generation from the proposed operation will be managed through site controls to assist in reducing impacts on air quality. The mining feed preparation and transport of raw ore to the process

plant is proposed to be completed in a water slurry to ensure that dust generation potential will be low. Dust generation from earth works and topsoil and overburden stockpiling will be mitigated via water suppression trucks and soil surface stabilization measures.

WIM has engaged with Victorian EPA regarding air monitoring requirements, and a baseline Level 1 Air Quality assessment, overviewed by a third party, is being conducted. The results of the assessment will be used in air quality modelling to meet Victoria EPA requirements as part of the Workplan for the proposed project.

Noise

The project will operate 24 hours a day and will generate noise. WIM has engaged with the Victorian EPA on requirements for a noise background study, as input into impact assessment and noise modelling for the project. Noise mitigation measures will be implemented based on the results of this work, as required. A preliminary baseline study has been commenced.

Radiation

Based on development test work, the ore and tailings are expected to have a very low radionuclide content. WIM has engaged with the Victorian Department of Health and Human Services, and has appointed SGS, and has completed a detailed radiation study as part of its impact assessment.

A comprehensive baseline radiation study across the proposed mine footprint has been commenced but not yet been completed.

Traffic

Ore will be transported in a slurry from the active mine face to the WCP through a temporary pipeline, and not by trucking. For product (concentrate from the WCP) export WIM intends to primarily use existing rail infrastructure adjacent to the WCP, within the WIFT Precinct for rail transport directly to port shipside, at either the Port of Portland, Port of Melbourne, Port Adelaide or Port of Geelong. Rail export is not expected to have a significant impact on traffic conditions.

WIM will also assess construction its own dedicated rail loading facility, from the existing main rail line adjacent to its processing facility (**Figure 15**).

As an alternative to rail transport, WIM will also assess the economics of road transport to port, via a route to be assessed. A dedicated project transport and traffic study will be conducted to further assess the feasibility and impact of this transport option.

Traffic impacts as a result of construction and operation are likely to be low but will be quantitatively assessed as part of the proposed Transport and Traffic study for the project. Workers will generate nominal volumes of traffic driving to the mine site from Horsham or other regional centres. Mine site vehicles will be entering and exiting the processing site, as well as between the mining lay down yard and the active mine path. The exact location of the mining laydown yard will vary across the life of mine, as the mine path progresses. It is expected that some of the laydown yard will be at the WCP and some nearer the active mine cell. This may involve minor upgrade of current dry weather roads and haul roads on private paddocks.

Landscape and Visual Impact

The proposed operations are unlikely to have a significant long-term impact on the visual amenity and landscape features within the visual envelope of the site. The rapid rehabilitation mining method and temporary nature of the active mine cell will assist to mitigate any medium-long term impacts on the landscape and visual amenity.

However, the mining operation will result in localised and relatively short-term changes to the physical landform and associated visual landscape, as well as impacts on the views from roadways used by tourist traffic and other road users. The flat topography of the area, and the moving pit method of the mine will however assist in ensuring that these impacts are localised to the temporary

and active mining area only. These impacts will be addressed as part of the proposed Landscape and Visual Impact studies.

Associated mining processing infrastructure will be located within WIFT Precinct, zoned for special use, which has an existing impact on the landscape and visual amenity. Currently, there is;

- an existing intermodal terminal that services the existing rail line running through the centre of the project area;
- significant stacks of shipping containers temporarily stored at the intermodal terminal, adjacent to the rail head; and
- overhead power lines already present, with some additional lines expected to be installed

Due to the pre-existing infrastructure and the presence of an industrial precinct within the centre of the proposed project area, it is anticipated that the visual effect of newly constructed transmission lines will be low. Potential mitigation measures available to assist with reducing impacts of the WCP on visual amenity will include landscape screening around the proposed processing plant (**refer to Figure 15**).

Night operations are likely to be a source of light overspill. However, given that once in operation, there is not expected to be any residential receptors within the proposed mining footprint. This not expected to have a significant impact on the visual amenity.

Land Use Change

The project is not expected to have a significant long-term impact on land use. This is due to the short-term, temporary nature and relatively small active mine footprint that is proposed at any one time. WIM anticipates being able to rehabilitate the mined cells so to enable mined land to be returned to agricultural use within 12 -18 months of it being mined.

12. Native vegetation, flora and fauna

Native vegetation

Is any native vegetation likely to be cleared or otherwise affected by the project?

☐ NYD ☐ No ☒ Yes If yes, answer the following questions and attach details.

What investigation of native vegetation in the project area has been done? (briefly describe)

Okologie Consulting completed a Preliminary Ecological Assessment and field survey for the Avonbank Heavy Mineral Sands Project Horsham, Victoria (Okologie Consulting, 2017) **(Appendix 6)**

Ecology Australia undertook a wider assessment of flora and fauna values within and outside of the project area, and subsequently conducted further survey work (Ecology Australia, 2018a,b) **(Appendices 3 and 4)**

The objectives of these studies were to identify terrestrial ecological values and identify legislative requirements for the project area. The methodology used included:

- Desktop assessment: The Biodiversity Interactive Map, Planning Schemes Online, the VBA for threatened species, The Protected Matters Search Tool, Relevant environmental legislation, polices and strategies;
- Field Assessments: Undertaken on foot and vehicle, vegetation polygons and points were mapped with GPS to determine EVCs, and a review of remnant vegetation in the local area was conducted

What is the maximum area of native vegetation that may need to be cleared?

☐ NYD Estimated area 9.07 hectares under the proposed 30-year mine footprint

How much of this clearing would be authorised under a Forest Management Plan or Fire Protection Plan?

☒ N/A …… ……0…….. approx. percent (if applicable)

Which Ecological Vegetation Classes may be affected? (if not authorised as above)

☐ NYD ☒ Preliminary/detailed assessment completed. If assessed, please list.

As per Section 8 of this referral, Ecology Australia (2018b) **(Appendix 4**) identified the following EVCs within the current 30-year mine footprint, which would need to be cleared;

Ecological Vegetation Class within the proposed mining footprint	Area (ha)	EVC Conservation Status	EPBC Act	FFG Act
Plains Savannah 826	4.77	Endangered	✓	✓
Black Box Lignum Woodland 663	0.34	Endangered		
Plains Grassland 132	1.27	Endangered	✓	✓
Plains Grassland 132	2.48	Endangered	✓	✓
Plains Grassland 132	0.11	Endangered	✓	✓
Plains Grassland 132	0.10	Endangered	✓	✓
TOTAL	**9.07**			

The following areas of EVCs were identified outside the proposed 30-year mining footprint area, but inside the RL2014 area.

Ecological Vegetation Class outside the mine footprint, inside RL2014	Area (ha)	EVC Conservation Status	EPBC Act	FFG Act
Plains Savannah 826	4.62	Endangered	✓	✓
Plains Savannah 826	2.07	Endangered	✓	✓
Plains Grassland 132	8.94	Endangered	✓	✓
TOTAL	**15.63**			

The RL is approximately 6440 ha, the known resource 4000 ha and the area currently proposed to be mined is 2500 ha.

EVCs outside the currently proposed 30-year mining footprint would only be impacted if the current mine footprint was extended to include areas of known resource not currently planned to be mined (refer to Figure 1).

The additional area of EVCs impacted with a change of mine plan would be assessed and may include part of the 15.63 ha indicated above. However, any change in the currently proposed mining footprint as a result of ongoing project economic feasibility studies would need to be fully assessed as part of the project approvals process.

Have potential vegetation offsets been identified as yet?

☒ NYD ☐ Yes If yes, please briefly describe.

Other information/comments? (e.g. accuracy of information)

Further surveys will be required for species not yet targeted, and management plans developed to ensure mining activities do not impact areas outside the mine footprint**.**

NYD = not yet determined

Flora and fauna

Have any threatened or migratory species or listed communities been recorded from the local area?

☒ NYD ☐ No ☒ Yes If yes, please:

- List species/communities recorded in recent surveys and/or past observations.
- Indicate which of these have been recorded from the project site or nearby.

Based on preliminary studies undertaken to date, the following listed (EPBC Act 1999 and/or FFG Act 1988) species or communities have been recorded within or in the general region of the project area:

Ecological Communities

Section 8 above provides details of flora and fauna recorded from the site and potentially impacted by the project.

They are, as recorded by Ecology Australia 2018b **(Appendix 3)**;

EPBC Act 1999 listed

- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregion
- Natural Grasslands of the Murray Valley Plains

FFG Act 1988 listed

- Semi-arid Northwest Plains Buloke Grassy Woodland Community (incorporated into EPBC listing)
- Northern Plains Grassland Community (incorporated into EPBC listing).

Plant Species

- No plant species listed under the EPBC Act or FFG Act were recorded in the Retention Lease, however Buloke has an advisory list classification of endangered and is common.
- One species (Buloke) is known from the project area.

Fauna Species

- No Striped Legless Lizards or Golden Sun Moth were recorded during targeted surveys
- Dry conditions and lack of any surface water features within the mine footprint, prevented meaningful surveys for Growling Grass Frogs and waterbirds.
- Ten bird species listed under the Marine Schedule of the EPBC Act, two species listed under the Migratory Schedule of the EPBC Act and three species classified on Victorian Advisory List were recorded in the Retention Lease.

If known, what threatening processes affecting these species or communities may be exacerbated by the project? (e.g. loss or fragmentation of habitats) Please describe briefly.

Potential issues may be exacerbated by the project include:

- loss of vegetation and habitat;
- weed infestations

Are any threatened or migratory species, other species of conservation significance or listed communities potentially affected by the project?

☒ NYD ☒ No ☒ Yes If yes, please:

Refer above and to Section 8 of this referral

Is mitigation of potential effects on indigenous flora and fauna proposed?

☒ NYD ☒ No ☒ Yes If yes, please briefly describe.

During its ongoing design of the Avonbank Project, WIM will endeavour to avoid and minimise impacts to native vegetation and listed fauna habitat as much as practicably possible, given the nature of the proposed mining. A Vegetation Management Plan will be prepared which sets out measures to mitigate the impact of the Project on indigenous flora and fauna.

Other information/comments? (e.g. accuracy of information)

More detailed seasonal ecological studies are planned.

13. Water environments

Will the project require significant volumes of fresh water (e.g. > 1 Gl/yr)?

☐ NYD ☐ No ☒ Yes If yes, indicate approximate volume and likely source.

The project will require between approximately 3.0 – 6.0 giga litres (G/L) of process water per annum. This includes both potable water and the water requirements to service the MUP and WCP.

Based on detailed consultation with GWM Water, WIM intends sourcing these process water requirements from existing surface water allocations. A small volume of groundwater will also contribute to the project water supply, via in-pit dewatering.

The Avonbank project area is very well located with respect to existing surface water main pipelines. The WCP has access to two major trunk pipeline supply systems (with sufficient supply and pumping capacity) that run within 3-4km to the proposed WCP, as shown on **Figure 4**.

A smaller dedicated offtake pipeline from this supply system would allow WIM to fill the proposed process water dam at the proposed process plant location and supply the project's water needs.

Will the project discharge wastewater or runoff to water environments?

☐ NYD ☒ No ☐ Yes If yes, specify types of discharges and which environments.

No offsite discharge of wastewater is proposed. Natural water flows will be diverted around the mining panels. As part of the development of the Workplan for the project, a Surface Water Management Plan will be developed to manage potential surface flows acre the project site.

Are any waterways, wetlands, estuaries or marine environments likely to be affected?

☐ NYD ☒ No ☐ Yes If yes, specify which water environments, answer the following questions and attach any relevant details.

Work by GHD (2018) identified no natural waterways, permanent surface wetlands marine environments or listed groundwater dependent ecosystems (GDE) located within the project area or mining footprint (see Section 8 of this referral), and no RAMSAR wetlands within 100km of the project area. Some minor ephemeral lines are mapped to occur as part of the drainage network of the project area, that have been decommissioned as a function of the installation of the GWM Pipeline network.

All available evidence suggests a low likelihood of any significant impact on surface water or drainage paths as a result of the proposed operations, though there may be a small degree of groundwater interaction and drawdown within the vicinity of the mining pit which may have a limited impact on local waterways or related ecosystems.

Are any of these water environments likely to support threatened or migratory species?

☒ NYD ☐ No ☐ Yes If yes, specify which water environments.

Dooen and Darlot swamps are ephemeral shallow marsh/grasslands which may provide habitat for threatened or migratory species but are outside the proposed mining footprint and are not expected to be impacted by project activities. Refer to **Section 12, and Appendices 1,2 and 3** for further details.

Are any potentially affected wetlands listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'?

☐ NYD ☒ No ☐ Yes If yes, please specify.

Could the project affect stream flows?

☒ NYD ☐ No ☐ Yes If yes, briefly describe implications for stream flows.

Refer to above.

Could regional groundwater resources be affected by the project?

☒ NYD ☒ No ☒ Yes If yes, describe in what way.

Groundwater resources are not expected to be significantly affected by the project. Groundwater studies completed to date indicate the proposed mining operation is likely to intercept groundwater only in the lower third of the ore body at some locations (GHD, 2018; AECOM 2019). This assessment is based on groundwater levels, as measured from a network of monitoring bores installed across the project area in the Parilla Sands Aquifer (**Figures 8 and 9**).

Preliminary aquifer parameter test work indicates that in-pit sump dewatering will be sufficient for managing groundwater inflows, which is expected during mining. The proposed dewatering will cause groundwater drawdown immediately around the pit, However, hydraulic conductivity of the PSA is generally low (GHD 2018; AECOM 2019) which means the distance from the pits that drawdown occurs is expected to be low, but will be further assessed and modelled prior to operations.

Groundwater for the PSA is also poor quality (salinity generally >6,000 mg/L TDS) and there are limited users in the vicinity of the mine plan area (only two stock and domestic bores within a 5 km radius). Therefore, regional groundwater resources are not expected to be adversely affected by the proposed project.

See also Part 2, Section 11 of the referral, and **Appendices 4 and 5**)

Tailings disposal into the existing mining void may likely result in seepage of water from the tailings entering the aquifer system. Seepage into the aquifer system from disposal of tailings into the pit has a low potential to impact on groundwater quality, as the salinity of the process water will be lower than the in-situ groundwater, which has little beneficial use due to the existing salinity.

Potential impacts may include groundwater mounding, which could increase the risk of salinity in upper layers. A preliminary assessment conducted by GHD (2018) indicates that the likelihood of increased soil salinity being a major risk is low, as the ore is generally >12m depth and tailings will be returned to the pit and the tailings will not be close to the surface when rehabilitated (i.e. mounding will not be significantly above the top of the tailings layer).

Could environmental values (beneficial uses) of water environments be affected?

☒ NYD ☒ No ☒ Yes If yes, identify waterways/water bodies and beneficial uses (as recognised by State Environment Protection Policies)

The quality of the water returned to the pit with the tailings is likely to be less saline than the *in-situ* groundwater (and therefore have a possible positive environmental impact) as the process water is a combination on groundwater (from dewatering) and piped water from the GMW pipeline.

It is proposed to use biodegradable flocculants to minimise and risk of groundwater quality impacts. Therefore there is a low overall likelihood that the environmental value of the water environments, will be adversely affected.

Could aquatic, estuarine or marine ecosystems be affected by the project?

☒ NYD ☒ No Yes If yes, describe in what way.

It is not expected that aquatic or marine ecosystems will be affected by the project. The rationale for this has been outlined earlier in this referral. However, as a part of the impact assessment process, a Surface and a Groundwater Management Plan will be developed to determine management measures to mitigate any potential impacts of the proposed project on nearby aquatic ecosystems, from groundwater or surface water.

Is there a potential for extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems over the long-term?

☒ No ☒ Yes If yes, please describe. Comment on likelihood of effects and associated uncertainties, if practicable.

Is mitigation of potential effects on water environments proposed? ☐ NYD ☐ No ☒ Yes If yes, please briefly describe. A comprehensive Environmental Management Plan will be developed as part of the work plan for the project, which will contain mitigation measures for management of water related impacts such as erosion controls groundwater.
Other information/comments? (e.g. accuracy of information) The above is based on project risk assessments and studies that have been completed to date, and those continuing as part of the detailed assessment of the project.

14. Landscape and soils

Landscape

Has a preliminary landscape assessment been prepared?

☒ No ☐ Yes If yes, please attach.

A landscape assessment has not been completed. However, a preliminary soils and landform study has been completed by Tonkin Consulting (2018) **(Appendix 6).**

Is the project to be located either within or near an area that is:

- **Subject to a Landscape Significance Overlay or Environmental Significance Overlay?**

  ☐ NYD ☐ No ☒ Yes If yes, provide plan showing footprint relative to overlay.

Environment Significance Overlay Schedule 7, Horsham Planning Scheme. The purpose of this Overlay is to prevent the development of sensitive uses within the buffer area surrounding the WIFT Precinct, refer to **Figure 5**.

- **Identified as of regional or State significance in a reputable study of landscape values?**

  ☐ NYD ☒ No ☐ Yes If yes, please specify.

- **Within or adjoining land reserved under the *National Parks Act 1975*?**

  ☐ NYD ☒ No ☐ Yes If yes, please specify.

- **Within or adjoining other public land used for conservation or recreational purposes?**

  ☐ NYD ☐ No ☒ Yes If yes, please specify.

Dooen Swamp, Darlot Swamp and Two-Mile Creek are classified as Public Conservation and Resource Zone (PCRZ). In addition, parts of Dooen Swamp are also zoned under Public Park and Recreation (PPRZ). However, these zones are located outside of the project area (RL2014), and the mining footprint and will not be disturbed during the proposed works.

Is any clearing vegetation or alteration of landforms likely to affect landscape values?

☒ NYD ☐ No ☐ Yes If yes, please briefly describe.

Is there a potential for effects on landscape values of regional or State importance?

☒ NYD ☐ No ☐ Yes Please briefly explain response.

Is mitigation of potential landscape effects proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

Impacts to landscape effects and values will be minimal due to the proposed mining procedure methods (progressive rehabilitation of the mining panels), and then presence of the existing WIFT.

A Landscape and Visual Impact study and measures to manage visual impact from mining activities will be further developed in the project Workplan.

Other information/comments? (e.g. accuracy of information)

Soils

Is there a potential for effects on land stability, acid sulphate soils or highly erodible soils?
☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

There is low likelihood that the project will have a significant effect on acid sulphate soils or lead to acid mine drainage issues (ASS).

A preliminary Acid Sulphate Soils study for the Avonbank Project (University of Adelaide, 2018) conducted on Avonbank drill samples of each major stratigraphic horizon showed soils from the Shepparton Formation and Loxton Parilla Sand are unlikely to present an ASS hazard. However, soils from the Geera Clay (below the planned mining depth) would likely to present a higher ASS hazard if disturbed, but these will not be exposed by WIM's mining activities

Salinity measurements of selected stratigraphic horizons indicate the potential for all lithological units to generate saline runoff that could affect the integrity of topsoils and sub soil units. However, the proposed mining method will be a direct return method whereby overburden is returned to the previous mining cell. As such, the potential for overburden units to generate saline runoff and for this to impact the upper soil units integrity will be low.

Surface soils and sediments associated with Darlot and Dooen Swamps are considered to have a high probability of ASS occurring but as these areas are located well outside of the mining footprint and they are not considered to be an ASS project risk.

Are there geotechnical hazards that may either affect the project or be affected by it?
☒ NYD ☐ No ☐ Yes If yes, please briefly describe.

WIM has completed a preliminary geotechnical study in conjunction with ATC Williams. This indicates that the pit slope stability will be the main potential geotechnical hazard to manage. WIM expects that typical mine pit slope safety precautions and pit slope management will mitigate any effects that may arise.

Other information/comments? (e.g. accuracy of information)

15. Social environments

Is the project likely to generate significant volumes of road traffic, during construction or operation?

☐ NYD ☒ No ☐ Yes If yes, provide estimate of traffic volume(s) if practicable.

WIM anticipates that the construction of the project infrastructure will take approximately 12 months. It is likely that during construction, in the order of 200 to 300 personnel will be employed, with the majority of these employees on site 24/7, on a rotational roster. WIM expects to be able to mitigate the impact of traffic from employee movement through using shift buses that will transport staff from Horsham and surrounding regional centres to the mine site.

During the operational phase of the project, there will be moderately significant volumes of road traffic. Traffic from employees could be managed through the use of shift buses, if necessary. There will also be moderate levels of traffic introduced by mine site vehicles into the processing yard and between the mining lay down yard and the active mine path. This may involve minor upgrade of current dry weather roads and haul roads on private paddocks.

As per **Section 3** of this referral, WIM's preferred option for transporting mineral concentrate from site is by rail within the WIFT Precinct. However, if this option is not logistically or economically viable, 40-60 container/truckloads of mineral concentrate per day, will need to be transported by road to the export port. This would have an increase in traffic flow within the WIFT Precinct and likely along the Wimmera Hwy. Should WIM elect to transport some or all of its mineral concentrate to Port via truck, then this would result in similar numbers of truck movements on a daily basis from the mine site to port.

Construction and operational traffic will be addressed as part of the Traffic and Transport study proposed for the project

Is there a potential for significant effects on the amenity of residents, due to emissions of dust or odours or changes in visual, noise or traffic conditions?

☒ NYD ☐ No ☐ Yes If yes, briefly describe the nature of the changes in amenity conditions and the possible areas affected.

There is a low potential for significant effects on the amenity of residents due to the emissions of dust or odour or changes in visual, noise or traffic conditions.

Noise

The operations will generate noise via machinery movements and plant operation. However, there are a small number of residential properties within or surrounding the proposed mining footprint (**Figure 6**). WIM has commenced a detailed noise baseline study and has sought advice on requirements form the Victorian EPA.

Air quality

Dust will be generated from earth works and site vehicle movement. Dust generation from earth works will be mitigated via water suppression trucks, as part of the projects air quality management measures. Mining feed preparation and transport of raw ore to process plant will be as a water slurry with very low dust generation.

WIM has engaged with Victorian EPA regarding air monitoring requirements and is currently undertaking a Level 1 Air Quality assessment, the results of which will be used in modelling and development as required of mitigation measures for the project Workplan.

Odour

WIM does not expect there to be a significant impact on amenity of residents due to emissions of odours, as no chemicals will be used during processing.

Visual amenity

The project will lead to changes in the visual amenity of the landscape. However, as discussed in **Section 3** (and shown in **Figure 15)**, the proposed process plant and loading of mineral concentrate is proposed to be within the WIFT Precinct, zoned special use for industrial related industry. Based on this, the impact of the process plant is not expected to be significant.

WIM expects to mitigate the visual impact of the WSP via a fence line and/or a plantation surrounding the site. The visual impact associated with mining machinery is not expected to be significant, as where very large machinery is commonly employed for farming.

Traffic

See above, which addresses potential construction and operational traffic impacts**.**

Other

A social impact assessment will be carried out as part of project development. The study will include aspects of the potential for short and long-term impacts from change in the land use and employment in the areas surrounding the project, and potential impacts on housing availability and price, and local services from the increase in local employment generated by the project.

Is there a potential for exposure of a human community to health or safety hazards, due to emissions to air or water or noise or chemical hazards or associated transport?

☒ NYD ☐ No ☐ Yes If yes, briefly describe the hazards and possible implications.

WIM does not expect there to be potential for exposure of a human community to health or safety hazards, due to emissions to air, water or noise emissions, chemical hazards (including radiation) or associated transport. However, further studies including a transport and traffic study will be undertaken to quantify any potential impacts and develop appropriate mitigation measures if required.

Is there a potential for displacement of residences or severance of residential access to community resources due to the proposed development?

☒ NYD ☐ No ☐ Yes If yes, briefly describe potential effects.

Residences

Two residences will be removed, as a result of the mine path overlying them. WIM expects that at least five residences will be removed/re-located due to close proximity to mine path.

Severance to access

Jung Township will lose Jung-West Rd and Green Hills Rd but alternative access to affected properties will be available via Wimmera Hwy. Other minor roads within the mine footprint, will also require relocation during various stages of the mine's life.

WIM has engaged a Land Liaison Officer to assist with on-going consultation with affected residences and wider stakeholders for the project, is establishing a Community Reference Group, and has commenced development of a formal Stakeholder Engagement Plan.

Are non-residential land use activities likely to be displaced as a result of the project?

☐ NYD ☐ No ☒ Yes If yes, briefly describe the likely effects.

Farming activities will temporarily be disrupted as the mining panel progresses across farming areas. The mined area will be fully rehabilitated and returned to its pre-existing land use.

Do any expected changes in non-residential land use activities have a potential to cause adverse effects on local residents/communities, social groups or industries?

☒ NYD ☐ No ☐ Yes If yes, briefly describe the potential effects.

A small number of residents within the mining footprint will be temporarily impacted due to mining operations. Local agricultural land use will be temporarily impacted as the mining panels move across the project area. WIM expects that the net impact of the proposed operation will bring significant benefit the local and regional economy.

Is mitigation of potential social effects proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

Stakeholder Engagement is an integral component of WIM's project development planning. Community and stakeholder views on project design and mitigation of social effects of the project will be elicited and, where practical, implemented.

Properties directly impacted by project activities will be purchased by WIM or will be leased for the duration of mining on impacted areas.

Other information/comments? (e.g. accuracy of information)

The information provided in Section 15 is based on WIM's preliminary assessment of relevant topics. Studies are ongoing, or will, be commenced where required as part of the Workplan development for the project.

Cultural heritage

Have relevant Indigenous organisations been consulted on the occurrence of Aboriginal cultural heritage within the project area?

☐ No If no, list any organisations that it is proposed to consult.

☒ Yes If yes, list the organisations so far consulted.

WIM engaged Dr Matt Cupper of Landskape Pty Ltd in late 2016 to conduct as part of the cultural heritage desktop study of the Avonbank project. The cultural heritage manager acting for the Barengi Gadjin Land Council Aboriginal Corporation, the Registered Aboriginal Party for the project area, has been consulted.

What investigations of cultural heritage in the project area have been done?
(attach details of method and results of any surveys for the project and describe their accuracy)

As indicated in Part 2, Section 11 of this referral, a review of the Victorian Aboriginal Heritage Register and developed a general predictive model of the potential for Aboriginal heritage to be present within the project area. **(Appendix 6.)** The mining area is not within an area of cultural heritage sensitivity as defined by Division 3 of the Victorian *Aboriginal Heritage Regulations 2007*.

The preliminary desktop study found that no Aboriginal cultural heritage places have been previously identified within the mining footprint. There are three stone artefact scatters on the lunette of Dooen Swamp in the southwestern corner of the project area, 2 km outside and south of the mining footprint. There are also a number of scarred trees at Darlot Swamp, 1.9 Km east of the project area. The closest of these are two scarred trees (VAHR place numbers 7324-0363 and 7324-0364), approximately 800-1000 m east of the project area. Areas of cultural heritage sensitivity are shown in **Figure 13**.

The report noted that, based on predictive modelling, there is a low to moderate potential for Aboriginal cultural heritage to occur in the project area. The report identified the need for further site investigations in the ephemeral depression in the northern portion of the project area marked by Grey Box trees, to ensure the project is compliant with the Aboriginal Heritage Act 2006.

An Aboriginal Cultural Heritage Management Plan (CHMP) is not mandatory unless the Avonbank project requires an EES. If a CHMP is required, WIM will engage with the Barengi Gadjin Land Council Aboriginal Corporation in relation to the requirements for the preparation of a CHMP.

Is any Aboriginal cultural heritage known from the project area?

☐ NYD ☐ No ☒ Yes If yes, briefly describe:

- Any sites listed on the AAV Site Register
- Sites or areas of sensitivity recorded in recent surveys from the project site or nearby
- Sites or areas of sensitivity identified by representatives of Indigenous organisations

Refer to above.

Are there any cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the *Heritage Act 1995* within the project area?

☐ NYD ☒ No ☐ Yes If yes, please list.

The nearest listed heritage site is at the Dooen Hall which is well outside the project area

Is mitigation of potential cultural heritage effects proposed?

☒ NYD ☐ No ☐ Yes If yes, please briefly describe.

This will depend on the outcome of further field assessments.

Other information/comments? (e.g. accuracy of information)

16. Energy, wastes and greenhouse gas emissions

What are the main sources of energy that the project facility would consume/generate?

- ☒ Electricity network. Estimated power requirement is 20,000,000 – 30,000,000 kW per annum
- ☒ Natural gas network. If possible, estimate gas requirement/output ……..
- ☒ Generated on-site. If possible, estimate power capacity/output …….
- ☒ Other. Please describe.

Please add any relevant additional information.

Power supply to the Avonbank HMS Project will be via the Victorian electricity power grid through the PowerCor Australia Ltd high-voltage transmission line. It is anticipated that the electrical power will be stepped off the main power supply to 20-22kV at an onsite electrical substation, located within the WIM processing base area. It is anticipated that overhead lines will feed power to the MUP and the WCP, and associated site infrastructure will be connected to the substation via an underground cable network.

WIM is also considering purchasing renewable energy supply options, such as from wind energy suppliers to supply power to the project.

Diesel power generation may also be considered, based on economic assessment of other alternatives.

What are the main forms of waste that would be generated by the project facility?

- ☒ Wastewater. Describe briefly.
- ☒ Solid chemical wastes. Describe briefly.
- ☒ Excavated material. Describe briefly.
- ☒ Other. Describe briefly.

Please provide relevant further information, including proposed management of wastes.

Most of processing water will be recycled, although some water will not be recovered from the tailings. (See **Section 3** of this referral)

Disposal methods of mining will see excavated material and overburden being returned to the mining void for final placement during rehabilitation. (Section 3). Tailings is a process stream from the WCP and is a gangue material that will be deposed into mining cells, and not transported off-site (refer to other sections of this referral).

The volumes and types of waste to be generated by the project, including construction waste, will be assessed during the development of the Workplan for the project

What level of greenhouse gas emissions is expected to result directly from operation of the project facility?

- ☒ Less than 50,000 tonnes of CO_2 equivalent per annum
- ☒ Between 50,000 and 100,000 tonnes of CO_2 equivalent per annum
- ☒ Between 100,000 and 200,000 tonnes of CO_2 equivalent per annum
- ☒ More than 200,000 tonnes of CO2 equivalent per annum

Please add any relevant additional information, including any identified mitigation options.

The response to this question is a preliminary estimate of NGER Scope 1 emissions. Definitive greenhouse gas emissions predictions have not yet been carried out, but this will be undertaken as part of further studies if required.

17. Other environmental issues

Are there any other environmental issues arising from the proposed project?

☒ No ☐ Yes If yes, briefly describe.

18 Environmental management

What measures are currently proposed to avoid, minimise or manage the main potential adverse environmental effects? (if not already described above)

☒ Siting: Please describe briefly

Siting of the project is based on presence of the economic mineral resource. Siting and sequencing of specific mining panels is dependent on mine planning.

The WCP and load out facilities will be sited close to critical infrastructure, and away from most sensitive receptors, minimising visual and other impacts.

☒ Design: Please describe briefly

Mining and processing.

The proposed mine will avoid to the extent possible area of environmental sensitivity (native vegetation, water bodies etc), but some vegetation clearing will be required, as described in Section 12 of this referral document.

The mining method is based on a progressive mining and land rehabilitation sequence and return of land to agricultural use to minimise long term impacts on agricultural productivity. Mining in small panels will enable the mine face to be progressively rehabilitated, using a 'moving hole' concept and will minimise material movements and environmental impacts.

Water will be sourced from existing pipelines supplying surface water. Groundwater extraction will be limited to minor pit dewatering. All tailings will be returned to the mining voids, and no water will be discharged to the environment from mining or processing operations.

The WCP the plant is unlikely to generate significant adverse environmental or amenity impacts and as it is situated remotely from most sensitive receivers. The process is undertaken as a slurry (no crushing of ore required), and it is anticipated that very little noise or dust will be generated. No chemicals or additives (apart from water and flocculants) are required for processing.

Transport.

Construction traffic will be managed via a transport management plan. Product from the mining and processing operation is proposed to be rail, with minimal impacts on road users.

Laboratory.

The chemicals used are well understood and have been used for mineral sand analysis for the past twenty years with no known environmental effects. All the chemicals used are recovered during the process for approved off-site disposal, and/or reused.

☒ Environmental management: Please describe briefly.

WIM's project design applies the principles of 'avoid and minimise' to reduce identified environmental and social impacts to the extent practicably possible within the economic constraints of the project. A comprehensive environmental management plan will be developed to cover all aspects of the project

☒ Other: Please describe briefly

Add any relevant additional information.

WIM has undertaken formal and informal risk assessment as part of its exploration and project planning and feasibility work, including;

- engineering risk
- financial risk
- social risk
- environmental risk

These risk assessments will be formalised as part of the development of the project Workplan and plans to manage these risks will be developed.

19. Other activities

Are there any other activities in the vicinity of the proposed project that have a potential for cumulative effects?

☒ NYD ☒ No ☒ Yes If yes, briefly describe.

There is potential for cumulative noise impacts with other developments in the WIFT Precinct.

20. Investigation program

Study program

Have any environmental studies not referred to above been conducted for the project?

☒ No ☐ Yes If yes, please list here and attach if relevant.

Has a program for future environmental studies been developed?

☐ No ☒ Yes If yes, briefly describe.

A comprehensive program for further studies has been developed, based on assessed relevant project risks to environmental and social values. Major proposed study areas either currently being undertaken or proposed are:

- Surface and groundwater
- Project Impacts on Soils and Agricultural Productivity
- Geotechnical studies
- Air quality
- Noise
- Radiation
- Traffic and transport
- Stakeholder engagement
- Flora and fauna studies
- Cultural heritage
- Landscape and visual impact
- Impacts on infrastructure and surrounding land uses
- Economic and social impact
- Rehabilitation

Each study will consist of assessment of existing (baseline) conditions, assessment of relevant risks to environmental and/or social values, and development of management and mitigation measures for each identified risk. The Workplan for the project will address each significant risk, and detail management and mitigation measures to avoid or minimise each risk.

Consultation program

Has a consultation program conducted to date for the project?

☐ No ☒ Yes If yes, outline the consultation activities and the stakeholder groups or organisations consulted.

WIM developed a preliminary stakeholder engagement plan during exploration and project planning for the Avonbank project, and has undertaken significant stakeholder and community consultation:

- Proactive focus from project acquisition in late 2012
- Community Exhibit at annual Wimmera Field Days
- Continuous 1:1 meetings with affected land holders
- Annual formal update to landholders
- Quarterly update meetings with Horsham City Council
- Annual stakeholder hampers and updates
- Quarterly meetings with Regional Development Victoria
- Dialogue with state government approvals team
- Dialogue with state government project assistance team
- Dialogue with DELWP

Has a program for future consultation been developed?

☒ NYD ☐ No ☐ Yes If yes, briefly describe.

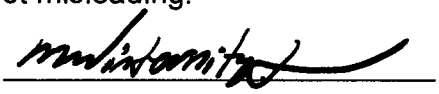
WIM is developing a comprehensive Stakeholder Engagement Plan, building on extensive community and other stakeholder interaction already undertaken as referenced above.

A formal Community Reference Group (CRG) is currently being formed consisting of a range of local and regional stakeholders and will meet regularly throughout the duration of project development. It is also intended to establish a community environmental review group once the project is approved

Authorised person for proponent:

I, Michael Winternitz (full name), Project Manager & Senior Geologist

(position), confirm that the information contained in this form is, to my knowledge, true and not misleading.

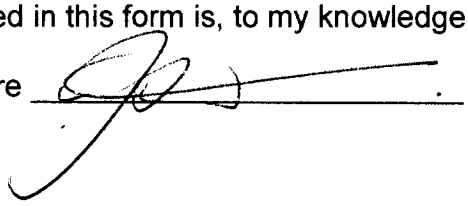
Signature 

Date 05/07/2019

Person who prepared this referral:

I, John Yeates (full name),

Principal (Environmental and Approvals Manager), confirm that the information contained in this form is, to my knowledge, true and not misleading.

Signature 

Date 05/07/2019

Figure 1. Avonbank Project Location Plan

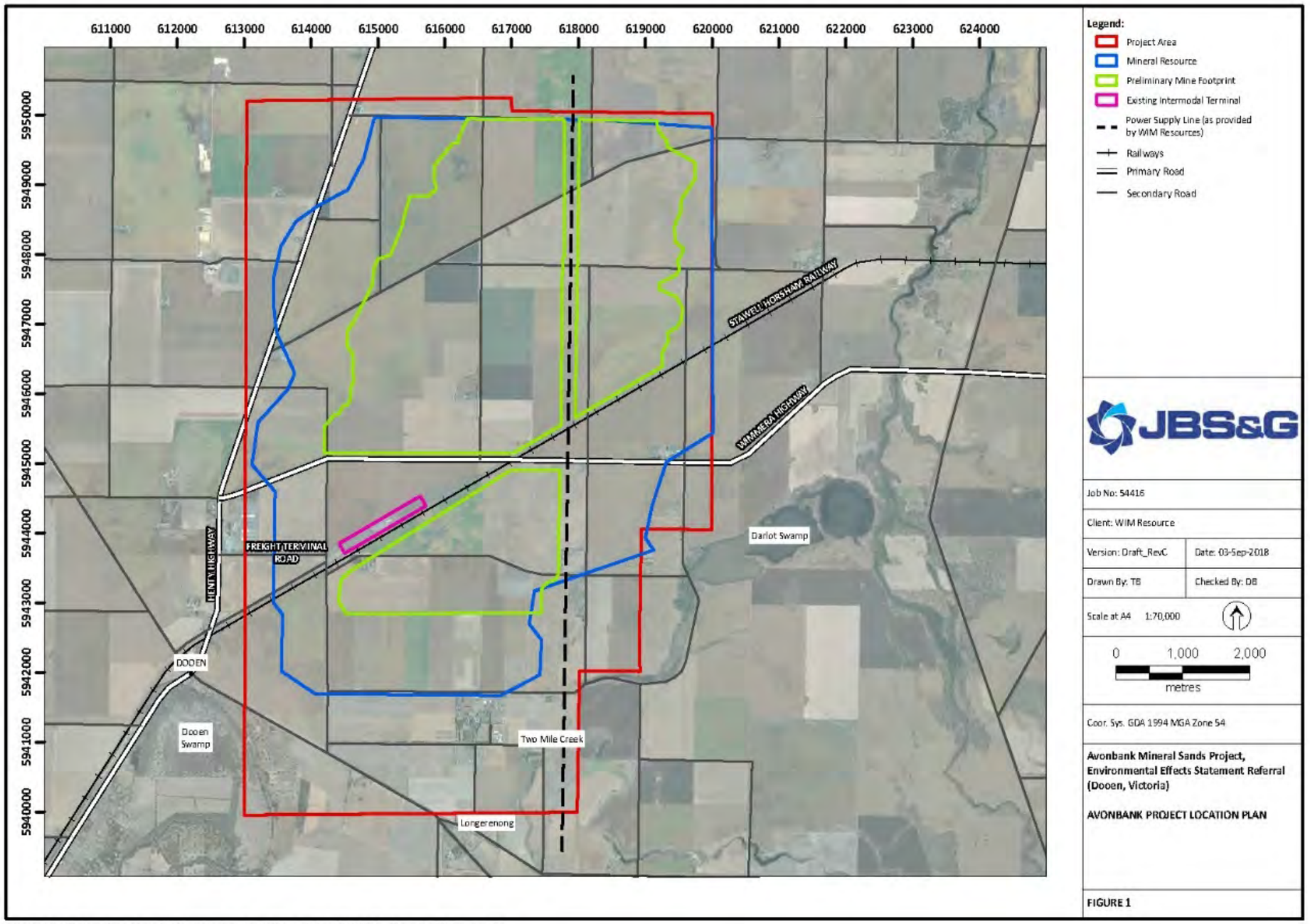


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Image Reference: Google Maps © 2017
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Figure 2. Avonbank Project Scale and Regional Location Plan

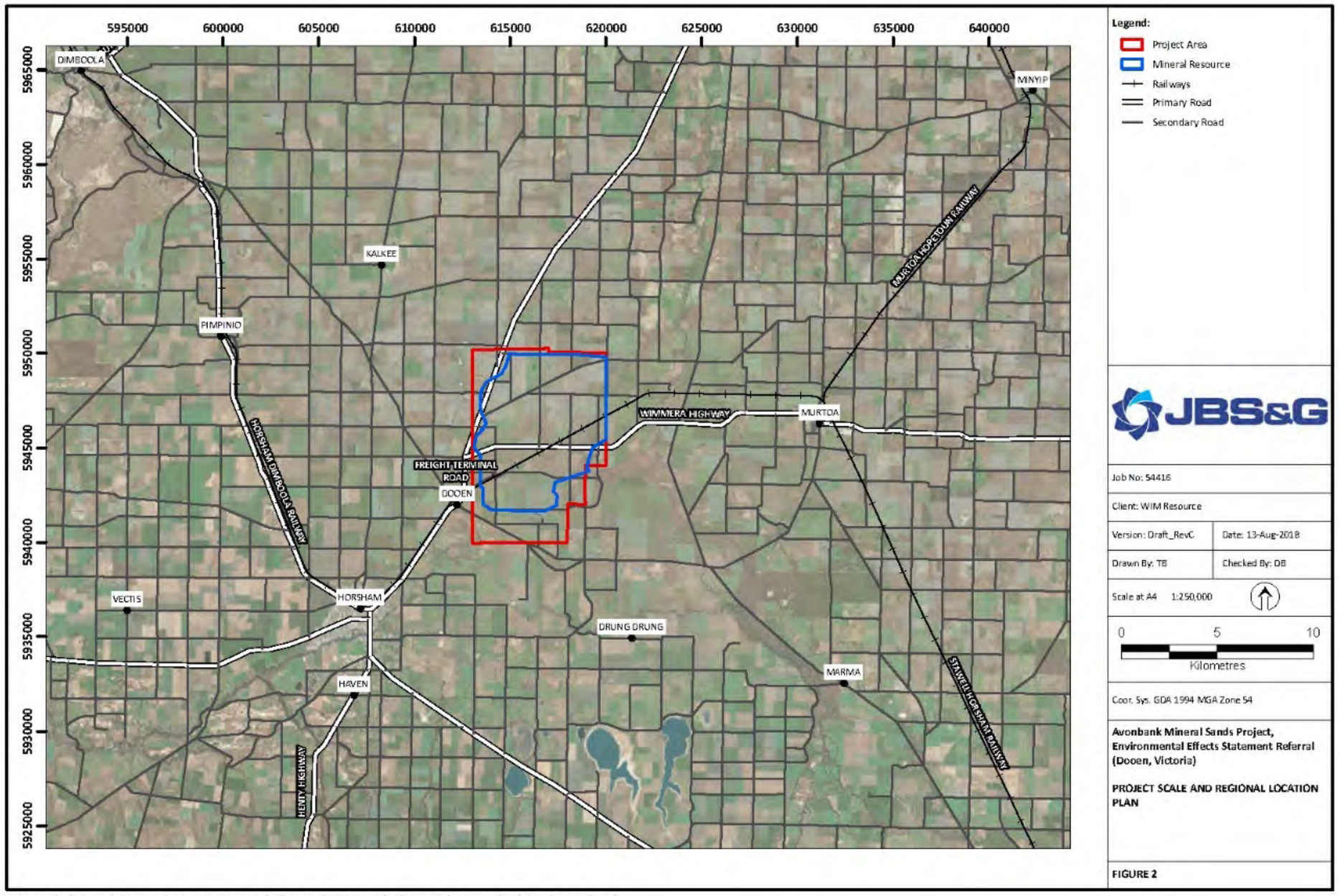

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Image Reference: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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Figure 3. Avonbank Project State Location Plan

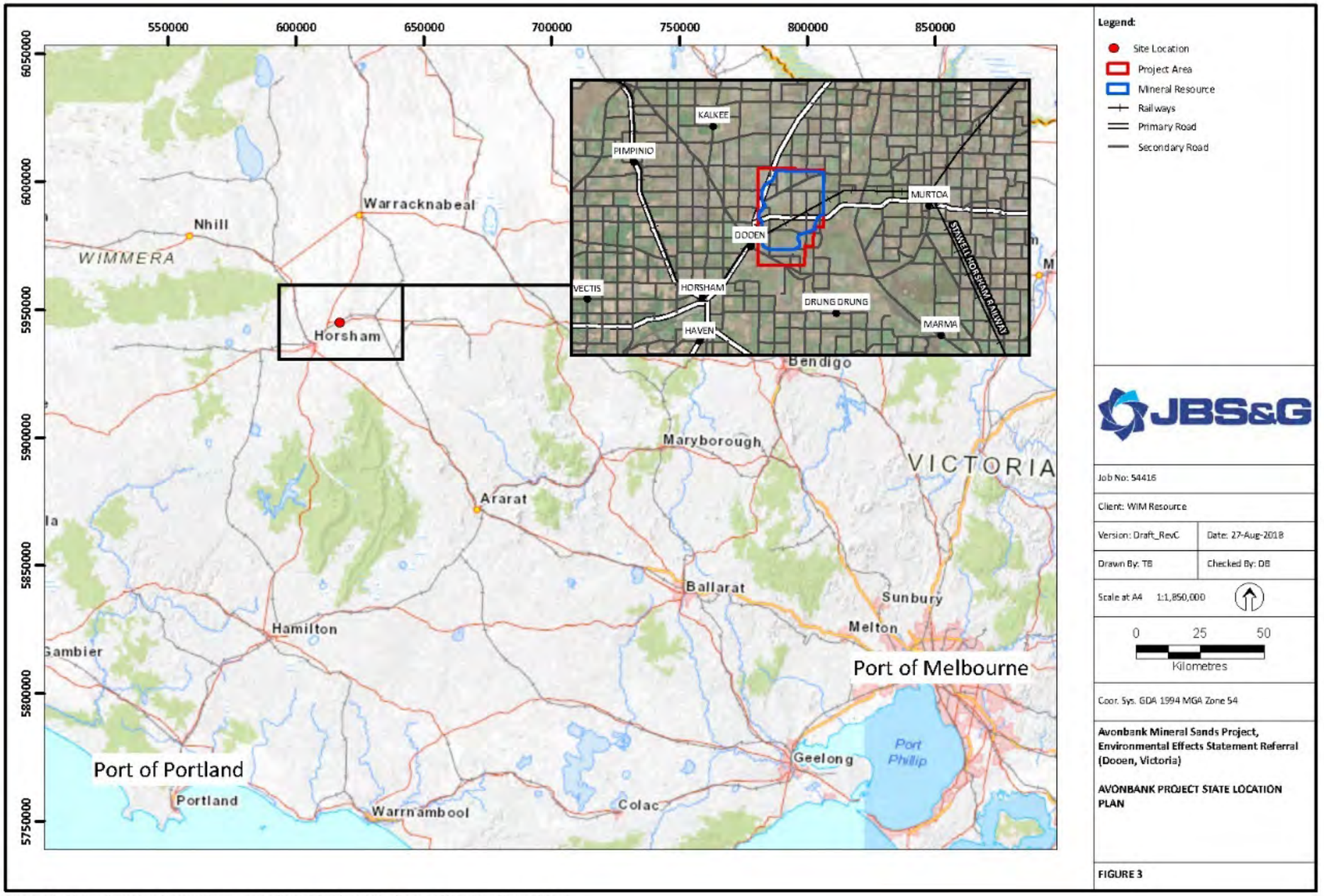

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Image Reference: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 4. Existing Infrastructure

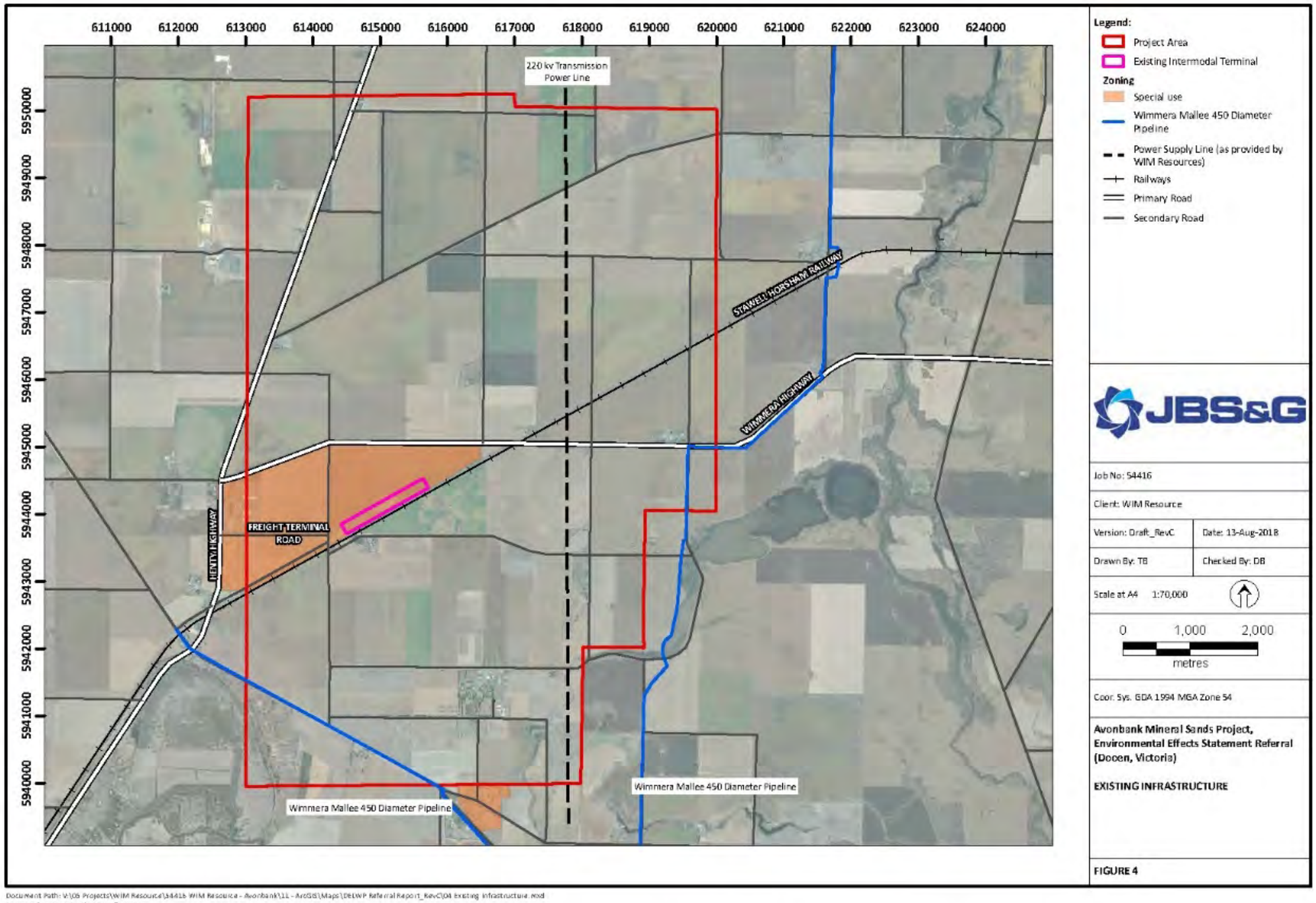

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Figure 5. Zoning

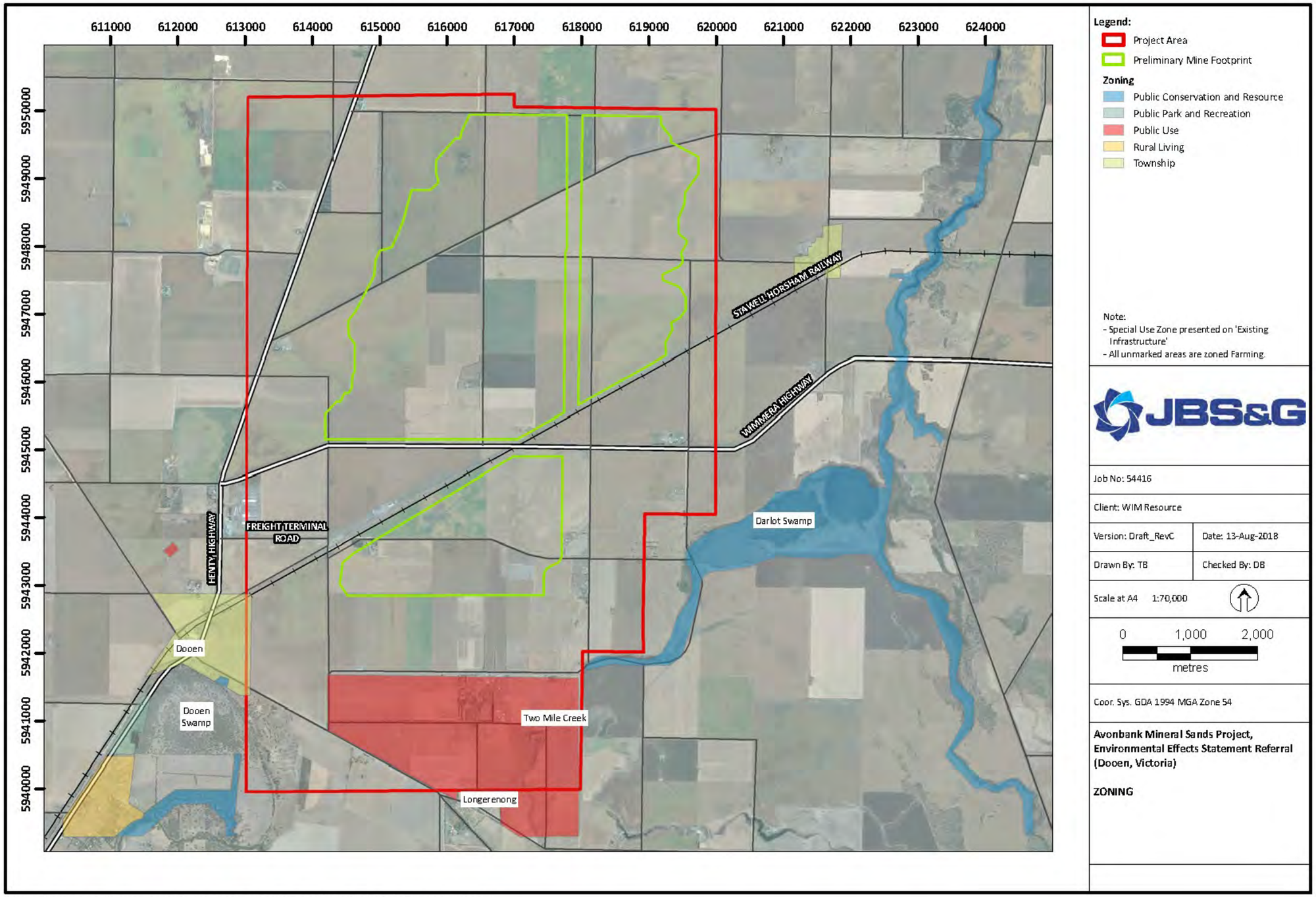

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Figure 6. Avonbank Project Environmental Features and Receptors

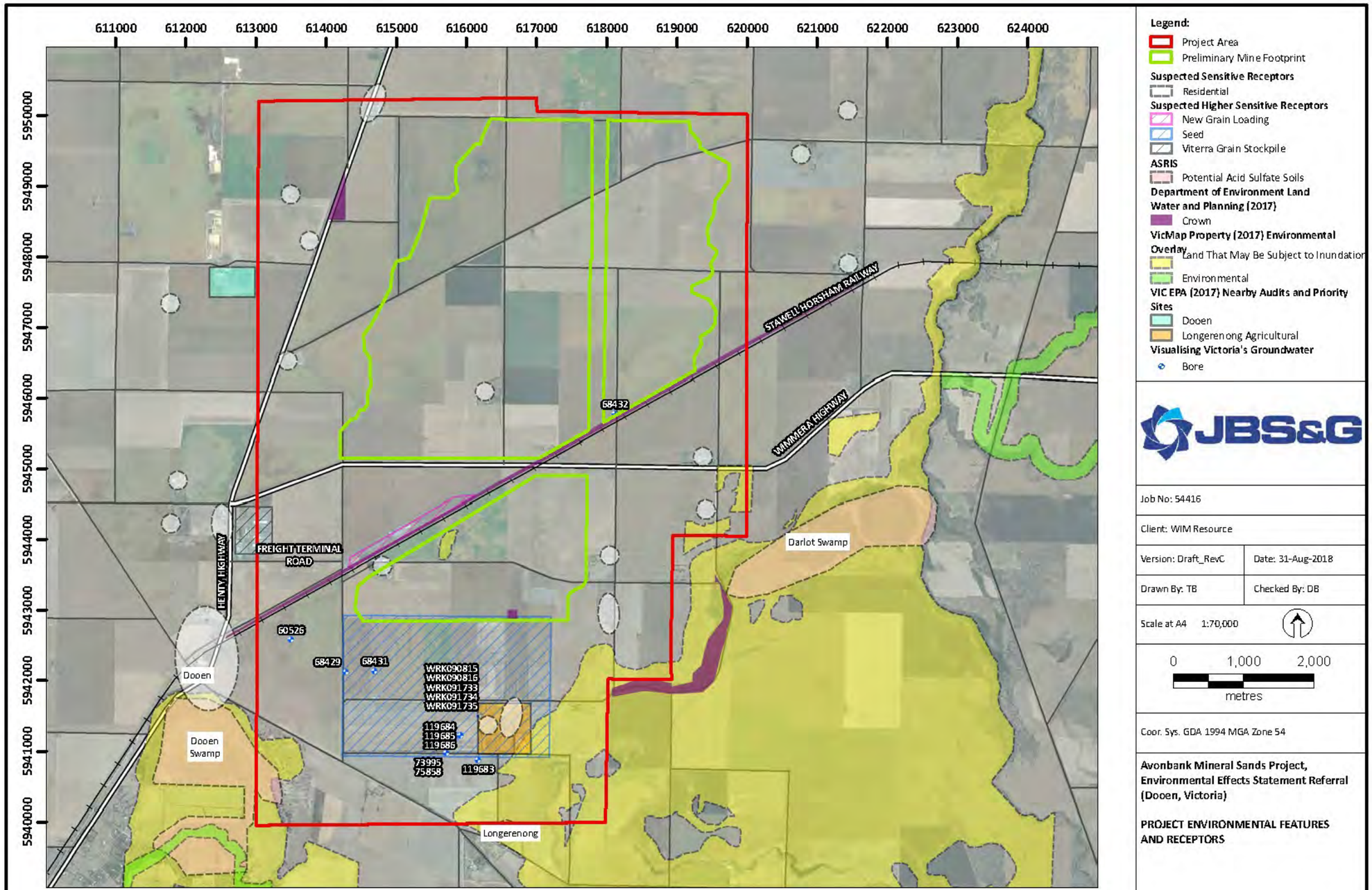

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Figure 7. Assessed Potential Regional Groundwater Dependant Ecosystems (GDEs) Map

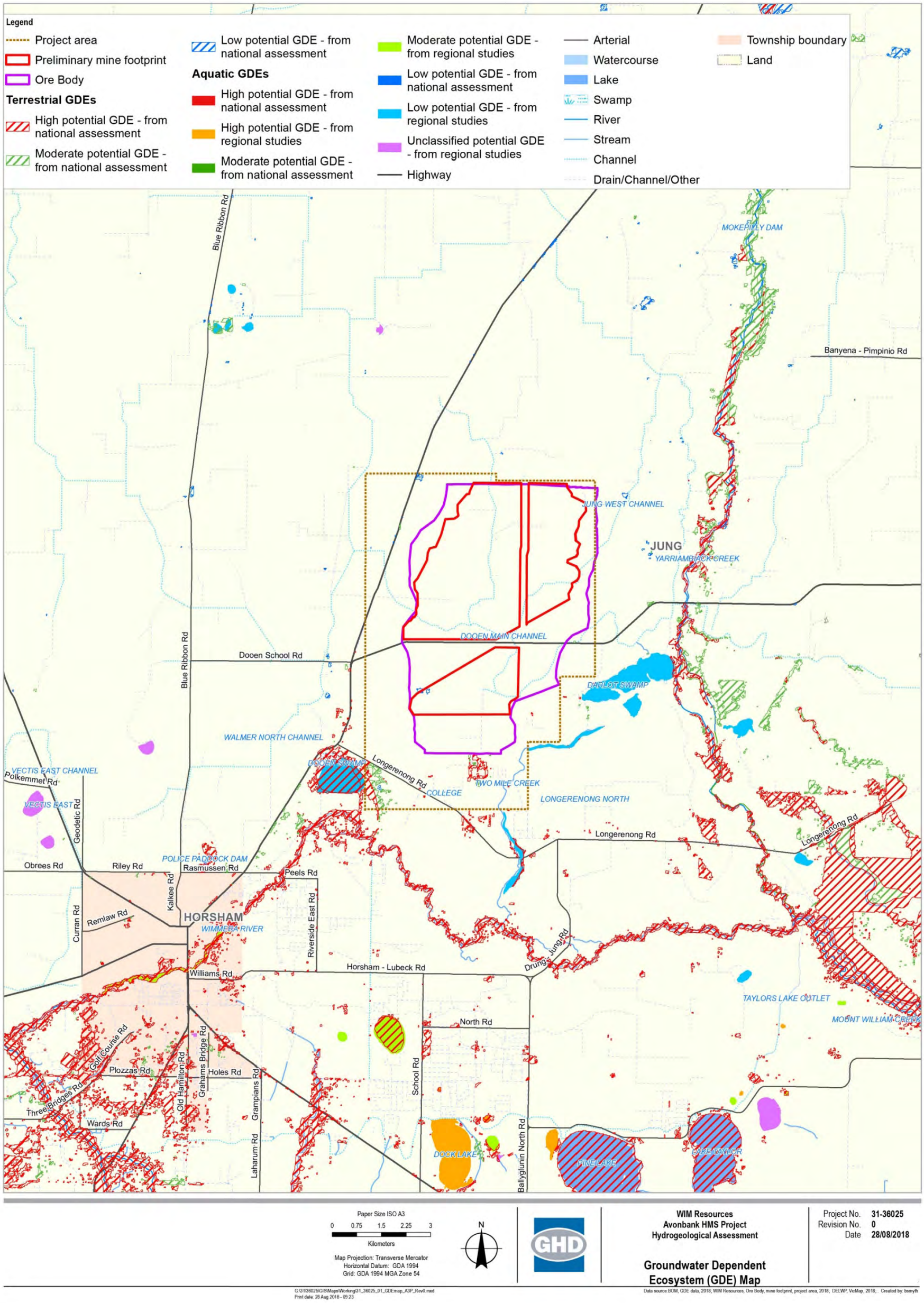

Figure 8. Site Features

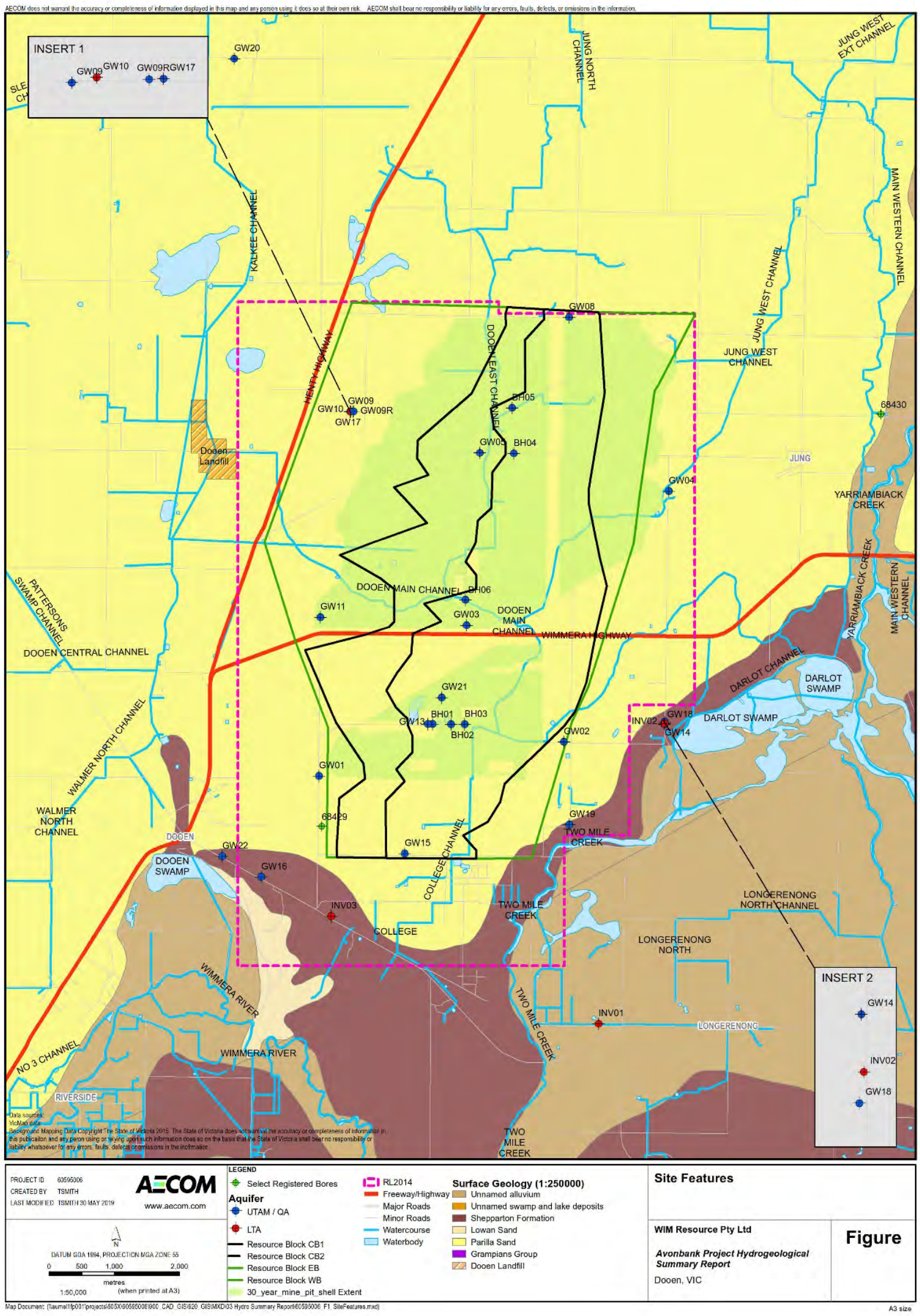

Figure 9. Groundwater Elevations and Water Table Contours – 24 March 2019

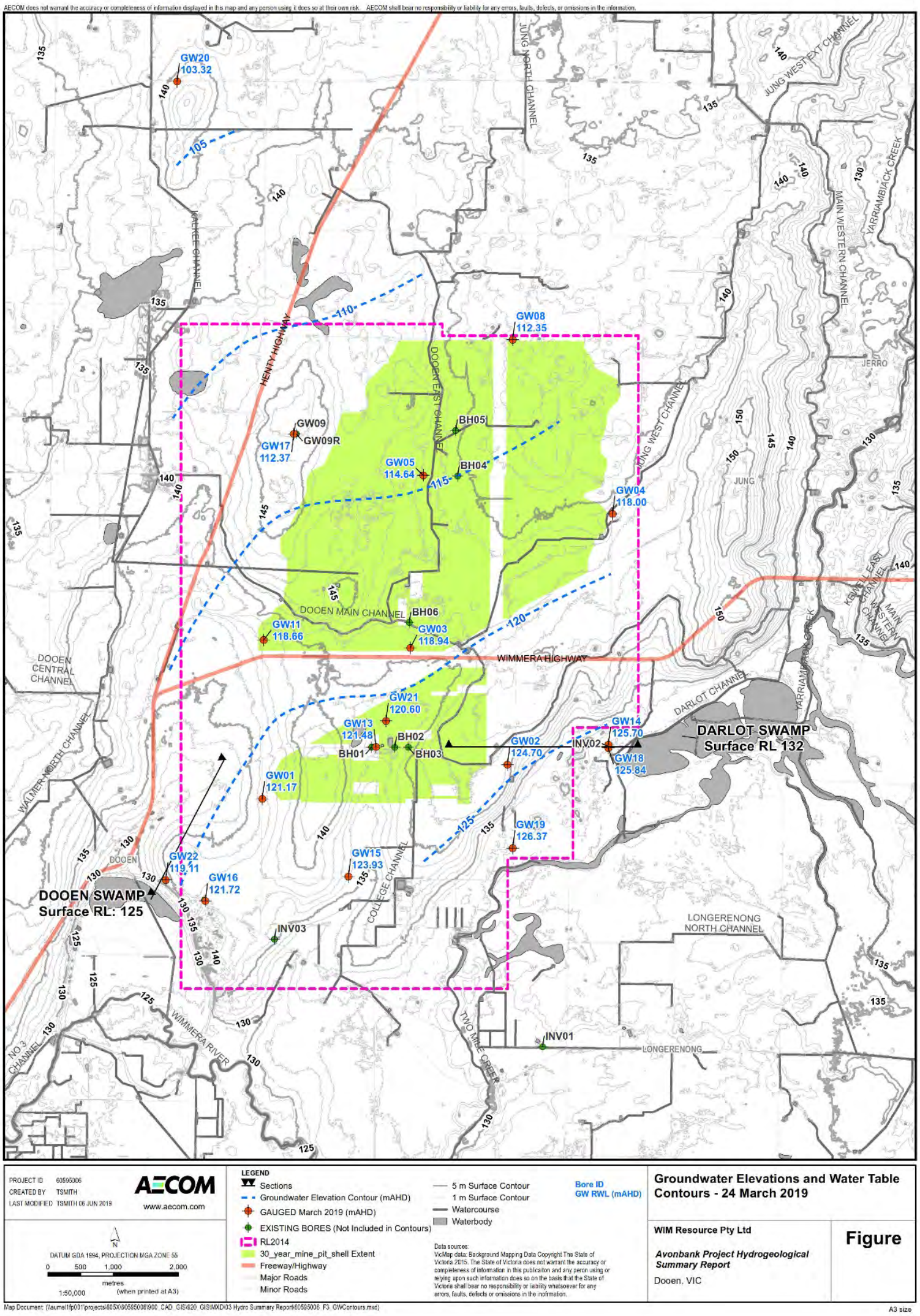

Figure 10. Surface Topography and Drainage Features

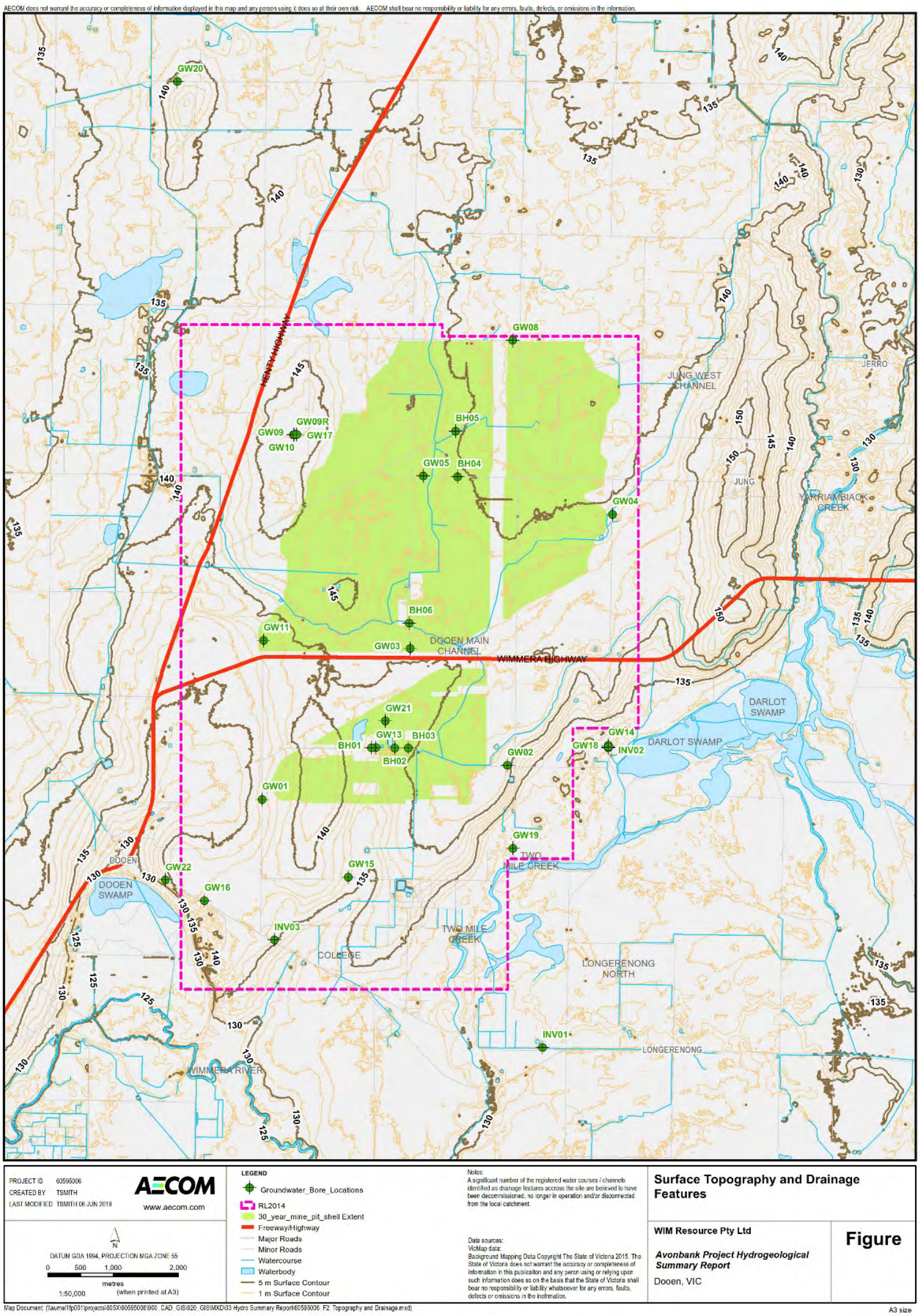

Figure 11. Avonbank Project Native Vegetation Within 30-Year Mine Plan

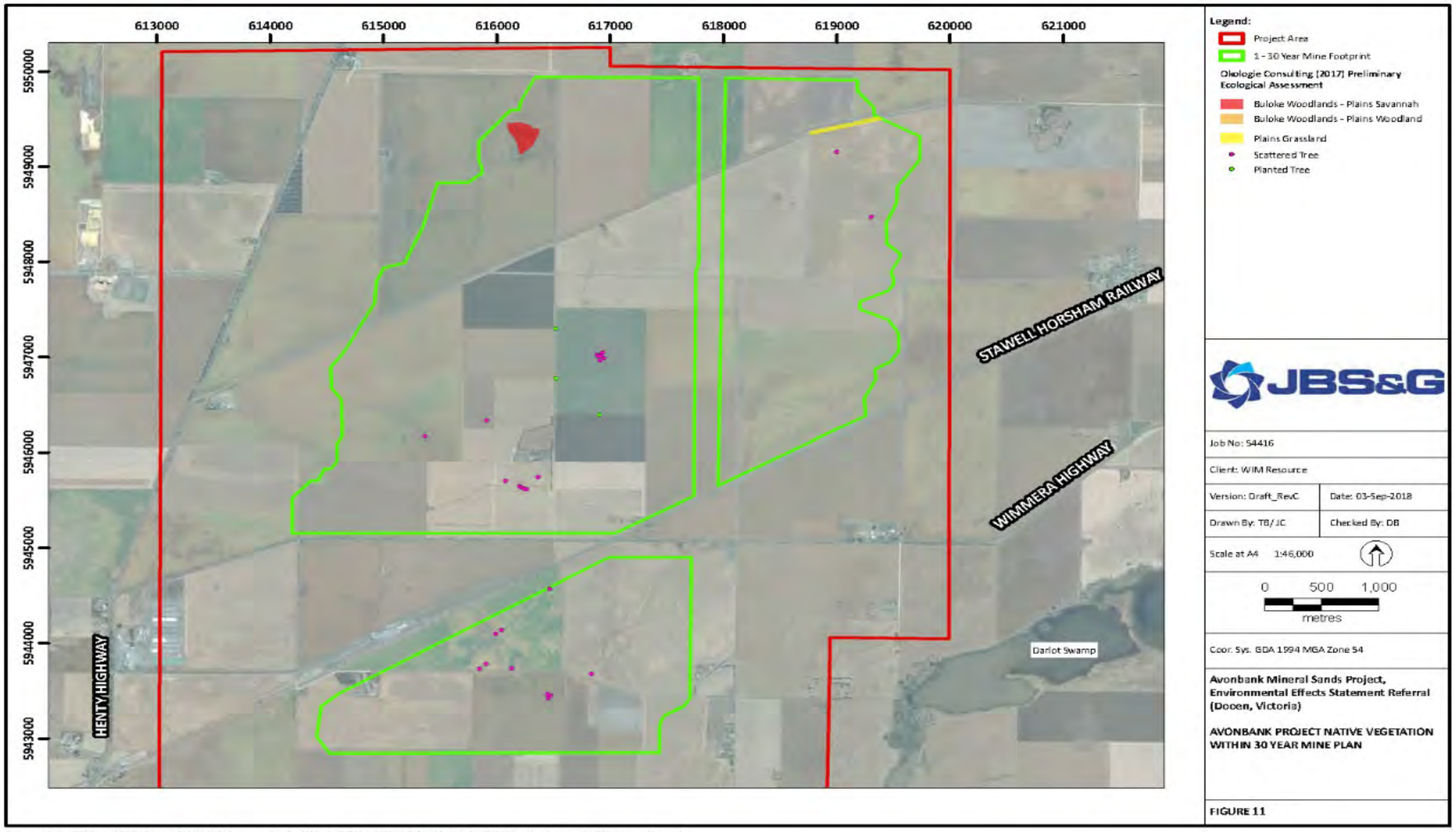

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Figure 12. Avonbank Project Important Ecological Areas

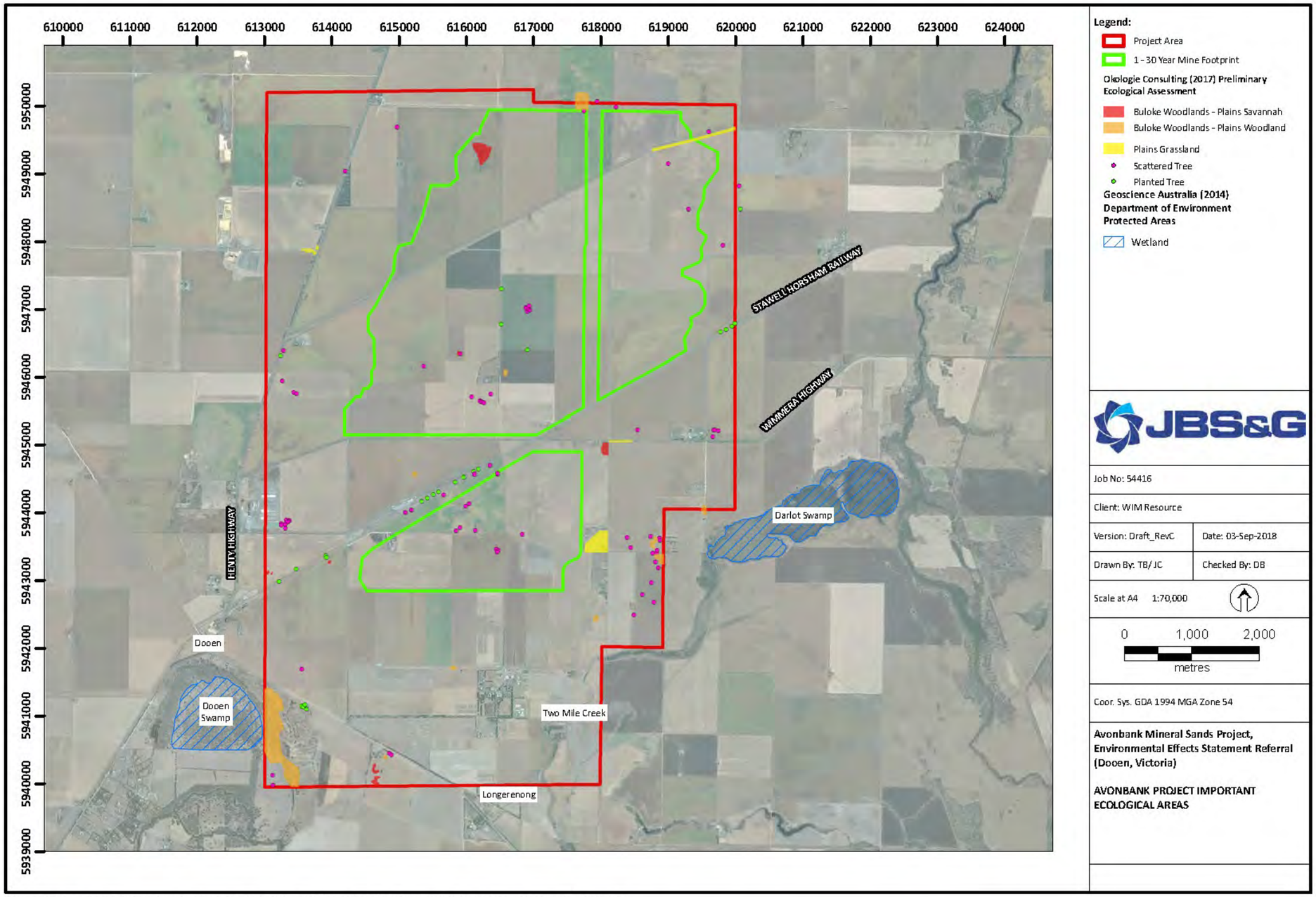

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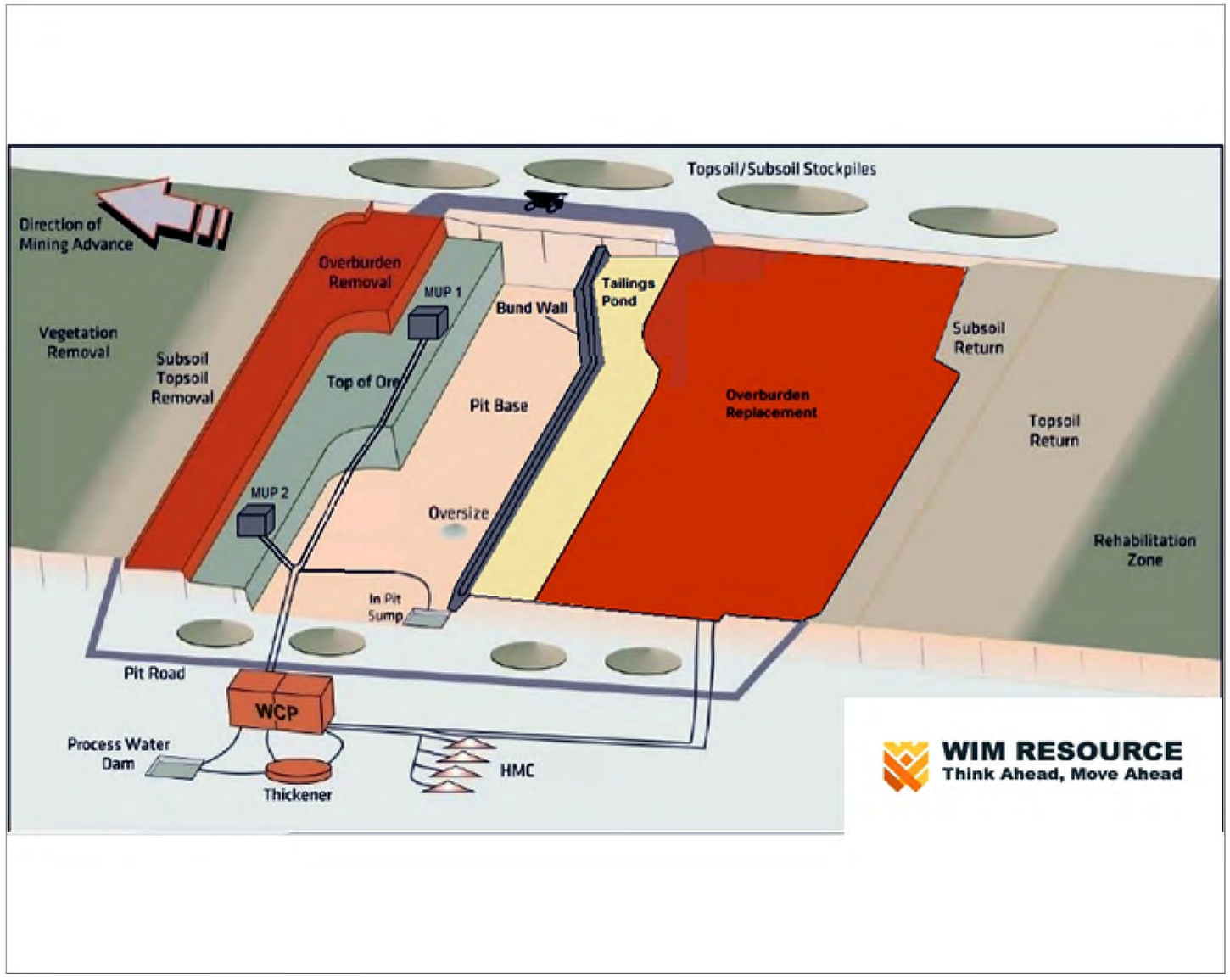
Figure 14. Proposed Mining Sequence Schematic



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Client: WIM Resource	
Version: Draft_RevB	Date: 10-Aug-2018
Drawn By: TB	Checked By: DB
Scale n/a	
Coor. Sys. n/a	

Avonbank Mineral Sands Project, Environmental Effects Statement Referral (Dooen, Victoria)

PROPOSED MINING SEQUENCE SCHEMATIC

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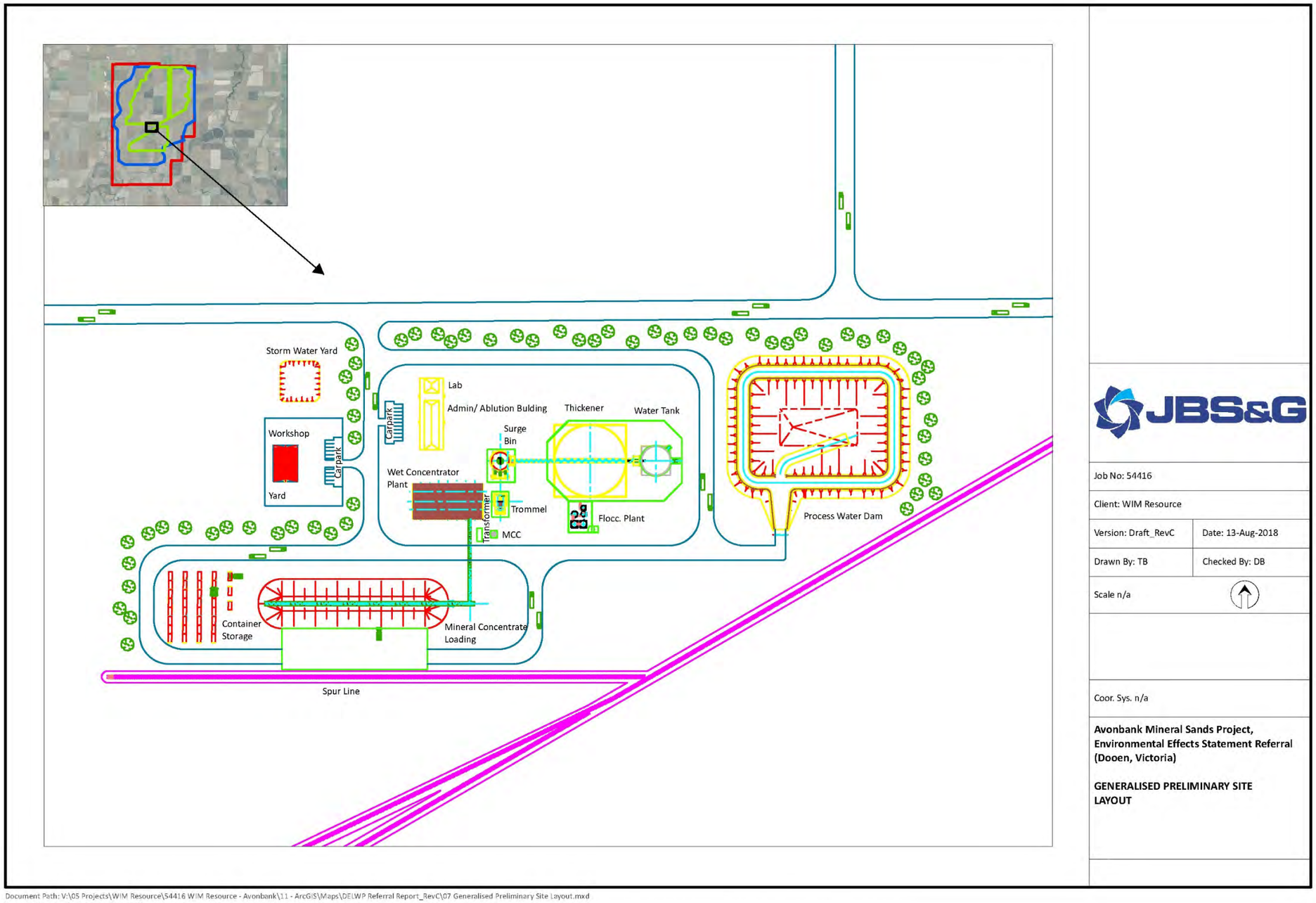
Figure 15. Generalised Preliminary Site layout



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Version: Draft_RevC | Date: 13-Aug-2018

Drawn By: TB | Checked By: DB

Scale n/a

Coor. Sys. n/a

Avonbank Mineral Sands Project, Environmental Effects Statement Referral (Dooen, Victoria)

GENERALISED PRELIMINARY SITE LAYOUT

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Appendix 1 Preliminary Flora & Fauna Field Survey Report (Okologie Consulting, 2017)

Appendix
1_Preliminary Flora &

Appendix 2. Preliminary Flora & Fauna Assessment Report (Ecology Australia, 2018a)

Appendix 2_
Preliminary Flora and

Appendix 3. Avonbank Mineral Sands Project: Survey Findings 2018 (Ecology Australia, 2018b)

Appendix 3_Avonbank Minera

Appendix 4. Preliminary Hydrological Assessment (GHD, 2018)

Appendix 4_
Preliminary Hydrolog

Appendix 5. 2019 Hydrogeology Summary Report, Avonbank Heavy Mineral Sands Project (AECOM 2019)

Appendix 5_
Hydrogeology Sumr

Appendix 6. Preliminary Cultural Heritage Assessment (Landskape, 2017)

Appendix 6
_Preliminary Cultural

Appendix 7. Preliminary Soils & Landform assessment (Tonkin, 2018)

Appendix 7_
Preliminary Soils and