



EXTRACTIVE INDUSTRY APPLICATION MANAGEMENT REPORT (GRAVEL & HARD ROCK)

LOT 3938 & 7971 CATTERICK ROAD, CATTERICK

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1 INTRODUCTION

1.1 Application Summary

Jim Cross (the applicant) is proposing to extract gravel and clay from an area approximately 11.7 hectares (ha) in size and extract hard rock from an area approximately 2 ha in size located within Lot 3938 (HSE 406) and Lot 7971 Catterick Road, Catterick (herein referred to as the subject site) (refer to **Figure 1**). The subject site is located within the municipality of the Shire of Bridgetown- Greenbushes approximately 5.7 km south east of Greenbushes.

This application is made for a ten year period however, the exact life of the project is difficult to estimate as it will be dependent on supply and demand trends.

The available volume of gravel and clay (*insitu* volume of approximately 350,000 m³) is to be extracted in six cells ranging from 1.9 to 2 ha in size to ensure that no more than 2 ha is disturbed at any time. Works will commence in the north east (cell 1) and then continue in a south-westerly direction (refer to **Figure 2**). The available volume of hard rock (*insitu* volume of approximately 300,000 m³) is to be extracted in one cell, approximately 2 ha in size. Excavation of both gravel and hard rock may occur concurrently.

This document has been submitted to fulfil the relevant requirements provided within the Shire of Bridgetown – Greenbush’s *Town Planning Scheme No. 4 (TPS4)* and the Shire of Bridgetown – Greenbushes’ *Land Use and Planning Policy No. 11 Extractive Industry Policy*. It is intended to provide the Shire of Bridgetown - Greenbushes, the public and relevant government agencies with an understanding of the proposal and the environmental strategies and commitments proposed to address various environmental and social issues.

2 SITE DESCRIPTION AND SURROUNDS

2.1 Property Description

2.1.1 Property Details and Location

The subject site is located within Lot 3938 (HSE 406) and Lot 7971 Catterick Road, Catterick. The subject site is located within the municipality of the Shire of Bridgetown- Greenbushes, approximately 5.7 km south east of Greenbushes (refer to **Figure 1**). The property is zoned 'Rural 2 – General agriculture' pursuant to the Shire of Bridgetown – Greenbushes' *Town Planning Scheme No. 4*. The proposed extractive industry is not permitted by the Scheme unless Planning Consent is granted by the council.

2.1.2 Area(s)/Certificate of Title

The Certificate of Titles are provided within **Appendix A**.

2.1.3 Ownership

The subject site is wholly owned by Jim Cross.

2.1.4 Existing Land Use

The subject site contains a recently cleared blue gum plantation along with areas of previously farmed land.

2.2 Physical Features

2.2.1 Topography

The current topography of the subject site can be described as sloping with the elevation ranging from approximately 280 m Australian Height Datum (AHD) in the south, sloping to a gully containing the Hester Brook at approximately 190 m AHD. The topography to the north of the Hester Brook is relatively stable ranging between 190 m AHD to 200 m AHD in the north of the property. The subject site is located at elevations ranging from approximately 280 m AHD to 210 m AHD (refer to **Figures 3 and 4**).

2.2.2 Vegetation

The vegetation within the subject site is in a 'completely degraded' condition (Keighery 1994) due to prolonged land degradation processes including land clearing, livestock grazing and recently a blue gum plantation.

A search for known rare and Priority flora within or in proximity to the subject site was undertaken through review of the following databases:

- DBCA's NatureMap database; and
- EPBC Act Protected Matters database.

A total of seven species of conservation significance have the potential to occur within the subject site based on the database mapping, four of which are orchids. In consideration of the previous and current land use (blue gum plantation) which has resulted the complete absence of native vegetation, it is considered unlikely that the subject site contains flora species of conservation significance.

2.2.2.1 Threatened Ecological Communities

An ecological community is defined as “a naturally occurring assemblage that occurs in a particular type of habitat” (PWS 2015). A Threatened Ecological Community (TEC) is one that has declined in area or was originally limited in distribution. Uncommon ecological communities that do not strictly meet TEC defined criteria, or are inadequately defined, are listed by the DBCA as a Priority Ecological Community (PEC).

As well as protection under State legislation, selected ecological communities are also afforded statutory protection at a Federal level pursuant to the EPBC Act. The EPBC Act provides for the protection of TECs, which are listed under section 181 of the Act, and are defined as “Critically Endangered”, “Endangered” or “Vulnerable” under Section 182.

A search of the DBCA’s and EPBC databases found one TEC endorsed under State and Commonwealth legislation and policy possibly recorded within proximity to the subject site, the *Empodisma peatlands of southwestern Australia*. Given the presence of gravel soils within the subject site it is unlikely this TEC is present. Furthermore, given the absence of native vegetation, the subject site does not contain any conservation significant vegetation communities.

2.2.2.2 Environmentally Sensitive Areas

Section 51B of the *Environmental Protection Act 1986* (EP Act) allows the Minister to declare an Environmentally Sensitive Area (ESA). Once declared, the exemptions to clear native vegetation under the regulations do not apply in these areas. TEC’s areas within 50 m of any Declared Rare flora (DRF) and defined wetland areas constitute ESAs. However, a number of other areas of environmental significance are also listed. Current declared ESAs are listed in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*.

The subject site is not mapped within an ESA and there are no ESAs in proximity to the subject site.

2.2.3 Fauna

A search of the DBCA NatureMap database was undertaken to establish whether species declared as ‘Rare or likely to become extinct’ (Threatened), ‘Birds protected under an international agreement’ (International Agreement (IA)) and ‘Other specially protected fauna’ (S) as listed under the *Biodiversity Conservation Act 2016* (BC Act) have been recorded in proximity to the subject site. Seven fauna species listed as ‘Threatened’ species and two ‘specially protected fauna’ species have been recorded within a 10km radius of the subject site. Additionally, the DBCA Priority fauna database identified three Priority 4 and one Priority 3 fauna species within this radius (refer to **Table 1**).

The EPBC Act *Protected Matters Search Tool* also identified several threatened and migratory species that could potentially occur within or in proximity to the subject site. This included seven species classified as ‘Vulnerable’, three ‘Endangered’ species and two ‘Critically Endangered’ species (refer to **Table 1**).

Table 1: Significant fauna potentially occurring within proximity of the subject site as identified by State and Commonwealth database searches.

Species	DBCA Status	EPBC Act Status	Likelihood of Occurrence
<i>Aphelocephala leucopsis</i> (Southern Whiteface)		Vulnerable	Unlikely. Absence of preferred, good quality habitat.
<i>Calidris acuminata</i> (Sharp-tailed Sandpiper)		Vulnerable	Unlikely. Absence of preferred, good quality habitat.
<i>Calidris ferruginea</i> (Curlew Sandpiper)	-	Critically Endangered	Unlikely. Absence of preferred, good quality habitat.

Species	DBCA Status	EPBC Act Status	Likelihood of Occurrence
<i>Calyptorhynchus banksii naso</i> (Forest Red Tailed Black Cockatoo)	Vulnerable	Vulnerable	Unlikely. Absence of preferred habitat
<i>Zanda baudinii</i> (Baudin's Cockatoo)	Endangered	Endangered	Unlikely. Absence of preferred habitat
<i>Zanda latirostris</i> (Carnaby's Cockatoo)	Endangered	Endangered	Unlikely. Absence of preferred habitat
<i>Ctenotus delli</i> (Dell's skink)	P4	-	Unlikely. Absence of preferred habitat
<i>Dasyurus geoffroyi</i> (Chuditch)	Vulnerable	Vulnerable	Unlikely. Absence of preferred, good quality habitat.
<i>Hydromys chrysogaster</i> (water-rat, rakali)	P4	-	Unlikely. Absence of preferred habitat
<i>Isodon fusciventer</i> (quenda, southwestern brown bandicoot)	P4	-	Unlikely. Absence of preferred habitat
<i>Macrotis lagotis</i> (bilby, dalgyte)	Vulnerable	Vulnerable	Unlikely. Absence of preferred habitat
<i>Myrmecobius fasciatus</i> (Numbat)	Endangered	Endangered	Unlikely. Absence of preferred, good quality habitat.
<i>Notamacropus Irma</i> (western brush wallaby)	P4	-	Unlikely. Absence of preferred habitat
<i>Phascogale calura</i> (red-tailed phascogale)	CD	Vulnerable	Unlikely. Absence of preferred habitat
<i>Phascogale tapoatafa wambenger</i> (south-western brush-tailed phascogale)	CD	-	Unlikely. Absence of preferred habitat
<i>Pseudocheirus occidentalis</i> (Western Ringtail Possum)	Critically Endangered	Critically Endangered	Unlikely. Absence of preferred habitat
<i>Setonix brachyurus</i> (Quokka)	-	Vulnerable	Unlikely. Absence of preferred, good quality habitat.
<i>Tyto novaehollandiae</i> (Masked Owl)	P3	-	Unlikely. Absence of preferred habitat

The identified fauna habitat is in a completely degraded condition, largely a consequence of historical clearing and ongoing blue gum plantations. Given the degree of disturbance, the original fauna assemblage within the subject site is completely depauperate.

Of the abovementioned conservation significant species, based on preferred habitat types, no conservation species are likely to rely on habitat within the subject site for their persistence.

2.2.4 Soils

The subject site is located within the Western Darling Range Zone landform consisting of “moderately dissected lateritic plateau on granite with deeply incised valleys. Soils are formed in laterite, lateritic colluvium and weathered in-situ granite and gneiss”, and the Lowden Valleys System described as “Deep gneissic valleys, in the south of the Western Darling Range containing loamy earth, loamy duplex, gravel and stony soils.” (Tille 2006).

Within the Lowden Valleys System, the subject site is located within the following sub-systems:

- Grimwade Subsystem – Moderately deep valleys (30-70) in granite. Soils are loamy earths and loamy gravels.
- Ballingup moderate slopes phase (Balingup Subsystem) – moderate slope phase, slopes 15-35% relief 60-120 m.

2.2.4.1 Acid sulfate soils

Acid Sulfate Soils (ASS) is the common name given to naturally occurring soil and sediment containing iron sulfides. They have become a potential issue in land development projects on the Swan Coastal Plain when the naturally anaerobic conditions in which they are situated are disturbed and they are exposed to aerobic conditions and subsequently oxidise. When oxidised, ASS produce sulfuric acid, which can result in a range of impacts to the surrounding environment. ASS that has oxidised and resulted in the creation of acidic conditions are termed “Actual ASS” (AASS), and those that have acid generating potential but remain in their naturally anaerobic conditions are termed “Potential ASS” (PASS).

National ASS risk mapping prepared by the CSIRO from the Australian Soil Resource Information System (ASRIS 2024) indicates that there is an ‘Extremely low probability of occurrence’ risk of ASS occurring within the subject site.

Accordingly, the potential impacts associated with ASS are expected to be low and therefore no further investigations regarding ASS are considered necessary.

2.2.5 Water (Surface and Groundwater)

2.2.5.1 Groundwater

The subject site is located within the Karri Groundwater Area. The Archaen host rocks of the region are generally considered as relatively low yielding groundwater sources. Localised faults and fractures can provide increased yields and isolated aquifers but there is no evidence of large – scale water movement in fractured rocks at Greenbushes (GHD, 2018).

Groundwater resources are limited within the area due to the low permeability of the sub-surface materials and the elevation of the subject site. It is expected that groundwater may be present at depth below the weathered clays. This may be at between 15 to 20 m below ground level (BGL) at the base of the clay layer which is part of the laterite profile (De Silva *et al* 2000).

Information provided in the *Site Details Report* from the *Water Information Reporting* (WIR) website maintained by DWER for an onsite well named ‘Catterick – Well 1685’ indicates the presence of approximately 0-3 m topsoil and gravel, followed by very hard clay at 3-4 m with water beneath in the soft material. It is likely that this clay level is impermeable and groundwater is unlikely to be present within the gravel soils above. This well is located at an elevation of approximately 202 m AHD, which is at least 2m lower than the lowest elevation within the gravel extraction area, with the majority of the extraction area at much greater elevations. Given that the maximum depth of excavation proposed is 3 m below ground level (BGL), it is considered that adequate separation between groundwater and the maximum depth of excavation can be achieved.

Furthermore, test pitting in the gravel extraction area was undertaken in October 2024 to a depth of approximately 4 m BGL whereby no groundwater was encountered (refer to **Appendix B**). The base of all test pits was observed to be clay materials. As previously discussed, it is likely that the clay layer is the confining layer and groundwater is situated below in softer materials. Therefore, given the maximum depth of excavation is 3 m BGL, no interactions with groundwater area expected at any time of the year.

Test pitting undertaken in the proposed drill and blast area demonstrated loamy topsoils over clay and then gneiss, dolerite or saprolite (refer to **Appendix C**). The extraction area has been located to ensure extraction is concentrated over the dolerite containing areas. The impermeable nature of this formation is likely to restrict the formation of aquifers and therefore no interaction with groundwater in this area is expected.

2.2.5.2 Surface Water

The subject site is located in the Hester Brook subarea of the Middle Blackwood surface water area. The subject site is not proclaimed under the *Country Areas Water Supply Act 1947* as a public drinking water source area.

The Hester Brook is located within the property. A buffer of approximately 100 m will be maintained between the extraction area and the watercourse at all times.

2.3 Existing Infrastructure/Services

2.3.1 Roads/Bridges

The subject site is serviced by an existing gravel track which joins to Catterick Road. A bridge is located on Catterick Road between the subject site and the South Western Highway. No bridges are located within the subject site.

2.3.2 Water

No water infrastructure is located in proximity to the subject site.

2.3.3 Power

Overhead power distribution lines are connected to buildings on the property to the north of the subject site. No overhead power distribution lines are located within the proposed extraction area.

2.3.4 Telecommunications

No active telecommunications infrastructure is in proximity to the subject site.

2.4 Surrounding Land

2.4.1 Freehold

The subject site is located between land zoned 'Rural 2 – General Agriculture' to the north, south and west. Blocks zoned as State Forest are located to the south east and north west of the Lots.

2.4.2 Crown/Reserves

The block directly to the south east of the subject site is mapped as State Forest. A buffer of 40 m will be maintained from the State Forest at all times. The common boundary fencing between the subject site and the State Forest will be maintained in good condition to ensure no accidental vehicle encroachment to the State Forest will occur. Furthermore, no use of chemicals or hydrocarbons and no refuelling operations will occur within the 40 m buffer.

3 LEGISLATION AND POLICIES

3.1 Town Planning Scheme

3.1.1 Zoning

The subject site is zoned “Rural 2 – General agriculture” under the Shire of Bridgetown – Greenbushes’ *Town Planning Scheme No. 4* (TPS4).

3.1.2 Current Land Use

The subject site currently contains an area recently cleared of blue gum plantation and an area of pasture previously used for grazing.

3.1.3 Scheme Provisions

The proposed extractive industry is not permitted by the Scheme unless planning Consent is granted by the Council.

The proposal falls within the definition of an extractive industry pursuant to Section 5.2 of the TPS4 as follows:

“Means an industry which involves:

- a) The extraction of sand, gravel, clay, turf, soil, rock, stone, minerals or similar substance from the land, and also the storage, treatment or manufacture of products from those materials where extracted or on land adjacent thereto; or
- b) The production of salt by the evaporation of sea water.”

3.2 Shire of Bridgetown- Greenbushes Policies

3.2.1 Extractive Industry Policy

Pursuant to the Shire of Bridgetown - Greenbushes *LUP 11 Extractive Industry Policy* the proposed operation will be a ‘Large Operation’ with a possible maximum extraction volume of greater than 10,000m³ per year. This policy outlines the following objectives:

- To facilitate the prudent use of basic raw materials, recognising that resources (clay, gravel, sand, stone etc) are finite;
- To protect and maintain wherever reasonable, the existing landscape character, water resources, natural resources, general amenity of the Shire and productive agricultural land use by the appropriate location and operation of extractive industries;
- To control and minimise the operational impact of extractive industry including, dust, sand drift, noise, vibration, water management, drainage and land clearing upon neighbouring land uses by the application of development standards, conditions of approval and operational requirements;
- To ensure that extractive industries operate in an environmentally sustainable manner with appropriate development control, and do not have a detrimental impact on the ecological integrity of the environmental attributes of the site and surrounding area, during and at the completion of the extractive industry operations; and
- To allow extractive industries in areas where the road infrastructure is compatible with the expected road usage resulting from the land use, or the road network can be upgraded by the applicant to meet appropriate standards prior to the use commencing.

3.2.2 Environmental Policy

The Shire of Bridgetown – Greenbushes *LUP 11 Extractive Industry Policy* has been developed with regard to the Shire of Bridgetown – Greenbushes *EM 1 – Managing the Natural Environment Policy* which outlines the following objectives relevant to this application:

- Within planning decisions promote conservation of ecological systems and the biodiversity they support including ecosystems, habitats, species and genetic diversity;
- Within planning decisions assist in the conservation and management of natural resources including air quality, energy, waterways and water quality, landscape, agriculture and minerals to support both environmental quality and sustainable development over the long term;
- Within planning decisions adopt a risk-management approach that aims to avoid or minimise environmental degradation and hazards;
- Prevent or mining environmental problems that might arise as a result of siting incompatible land uses together;
- Outline what matters Council will address through the planning system and outline which matters are addressed through other legislation and other agencies; and
- Within planning decision encourage other stakeholders to fulfill their responsibilities to NRM through an environmentally sustainable approach.

This document details the environmental impacts associated with the proposed development and provides management measures to ensure their impact is reduced as far as practicable.

3.3 State and Federal Legislation, Policies and Guides

3.3.1 State Planning Strategy 2050

The *State Planning Strategy 2050* comprises a range of strategies, actions, policies and plans to guide the planning and development of regional and local areas in Western Australia.

In relation to Basic Raw Materials (BRM), the key outcome of the Strategy is ‘*accessible and affordable supplies of BRM are available close to demand*’.

The proposal is consistent with this outcome as a nearby and environmentally unconstrained resource will be provided to the south west region.

3.3.2 State Planning Policy 2.5 – Agricultural and Rural Land Use Planning

The *State Planning Policy 2.5* is the basis for planning and decision-making for rural and rural living land across Western Australia. One of the key objectives of the policy is to carefully manage natural resources by:

- a) Assisting in the wise use of resources including energy, mineral and basic raw materials;
- b) Preventing land and environmental degradation during the extraction of minerals and basic raw materials; and
- c) Incorporating land management standards and sequential land use change in the land use planning and development process.

Management actions will be put in place to ensure land and environmental degradation will not occur during the extraction of the gravel from the site and the land will be returned to pasture to allow for the land to be used for agricultural purposes post works.

3.3.3 Warren Blackwood Rural Strategy

The *Warren Blackwood Rural Strategy* was developed to provide a planning framework to address the rural land use, land management, agricultural productivity, environmental protection and resource rehabilitation issues that were unable to be results in the *Warren-Blackwood Regional Planning Strategy*. The primary objective of the Strategy is to facilitate ongoing rural development within the region on the basis of sustainability in terms of economic, social and environmental parameters and consistent with the opportunities and constraints of the region's natural resources.

Extractive industry operations are allowed in the Strategy at the discretion of the local government requiring planning approval.

4 EXTRACTION PROPOSAL

4.1 Existing Site

4.1.1 Land Surface

The current topography of the property can be described as sloping with the elevation ranging from approximately 280 m Australian Height Datum (AHD) in the south, sloping to a gully containing the Hester Brook at approximately 190 m AHD. The topography to the north of the Hester Brook is relatively stable ranging between 190 m AHD to 200 m AHD in the north of the property. The subject site is located at elevations ranging from approximately 280 m AHD to 205 m AHD (refer to **Figures 3 and 4**).

4.1.2 Previous Activities

The subject site has previously been used as a WAPRES blue gum plantation and for cropping and livestock. There is no native vegetation located within the subject site.

4.2 Proposed Works and Extraction Plan

4.2.1 Material Extraction – Gravel/Clay

The gravel and clay quarry will cover an area of approximately 11.7 ha, with a current maximum elevation ranging from 263 m AHD to 205 m AHD. It will be excavated to a maximum depth of 3.0 m BGL.

It is estimated that the total maximum volume of material to be removed from the six cells will be approximately 350,000 m³ with approximately 35,000 m³ excavated each year, depending on supply and demand.

The material within the subject site can be removed with an excavator or loader without the need for blasting. The material will then be crushed and screened to produce products of the correct size.

A summary of the proposed extraction activities is provided below:

- Prior to excavation commencing the site will be ground surveyed, the excavation footprint marked out and a 1 metre contour plan developed.
- All topsoil will be removed for spreading directly onto areas to be revegetated and screening or perimeter bunds. If direct spreading is not possible the topsoil will be stored in low dumps, for spreading at a later date.
- Soil and overburden will then be removed and either directly transferred to a rehabilitation area or stored in low dumps for later rehabilitation use.
- An excavator or front-end loader will be used to excavate the gravel material.
- A loader will then transfer the laterite rock into the crusher where it would be reduced to smaller sizes and transferred to an adjoining screener. The screener then sorts the gravel into various sizes for stockpiling. On an as needed basis, gravel product will be loaded on to road trucks of various configurations for transport off-site.
- An excavator or front-end loader will then be used to excavate the clay material for stockpiling. On an as needed basis, clay product will be loaded on to road trucks of various configurations for transport off-site or combined with the hard rock excavated to produce required products.
- All static and other equipment, such as crushers and screens (where used), will be located on the floor of the quarry to provide visual and acoustic screening.

- Upon completion of each section of the quarry, the section will be reformed and back filled, where subgrade material is available, to achieve the proposed final contours.
- At the end of excavation, the floor of the quarry will be deep ripped, covered by overburden and topsoil, and rehabilitated to a constructed soil.

The planned end use of the quarry is to restore a natural soil profile and return the area to pasture, ensuring that there is no net loss of productive agricultural land.

4.2.1.1 Staging/Timing

Material will be excavated to a maximum depth of 3.0 m BGL in six cells, ranging from 1.9 ha to 2.0 ha in size. Indicative stage locations are shown within **Figure 2** to illustrate their relative scale.

4.2.2 Material Extraction – Hard Rock

The hard rock quarry will cover an area of approximately 2 ha, with a current maximum elevation ranging from 240 m AHD to 205 m AHD. It will be excavated to a maximum depth of 15.0 m BGL.

It is estimated that the total maximum volume of material to be removed from the initial 2 ha cell will be approximately 300,000 m³ with approximately 30,000 m³ excavated each year, depending on supply and demand.

The material within the subject site will require blasting prior to removal with an excavator or loader. The material will then be crushed and screened to produce products of the correct size. Where required, the hard rock material will be mixed with clay sourced from within the onsite gravel/clay pit.

A summary of the proposed extraction activities is provided below:

- Prior to excavation commencing the site will be ground surveyed, the excavation footprint marked out and a 1 metre contour plan developed.
- All topsoil will be removed for spreading directly onto areas to be revegetated and screening or perimeter bunds. If direct spreading is not possible the topsoil will be stored in low dumps, for spreading at a later date.
- Soil and overburden will then be removed and either directly transferred to a rehabilitation area or stored in low dumps for later rehabilitation use.
- A 1m high perimeter bund will be constructed for safety and stormwater management purposes.
- Stormwater detention basins will be constructed on the northern boundary to contain water and protect onsite watercourses.
- A drill rig will be used to undertake pattern drilling and then blasting of the face will occur.
- An excavator or front-end loader will be used to excavate the material.
- A loader will then transfer the blasted material into the crusher where it would be reduced to smaller sizes and transferred to an adjoining screener. The screener then sorts the material into various sizes for stockpiling. On an as needed basis, rock product will be loaded on to road trucks of various configurations for transport off-site.
- Depending on the product required, clay product may be combined with the hard rock excavated prior to being loaded on to road trucks of various configurations for transport off-site.
- All static and other equipment, such as crushers and screens (where used), will be located on the floor of the quarry to provide visual and acoustic screening where space permits.
- Upon completion of each section of the quarry, the section will be reformed and back filled, where subgrade material is available, to achieve the proposed final contours.

- At the end of excavation, the floor of the quarry will be deep ripped, covered by overburden and topsoil, and rehabilitated to a constructed soil.

The planned end use of the quarry is to restore a natural soil profile and return the area to pasture, ensuring that there is no net loss of productive agricultural land.

4.2.2.1 Staging/Timing

Material will be excavated to a maximum depth of 15.0 m BGL in one cell of approximately 2.0 ha in size. It is expected that blasting will occur twice a month for a 3 month campaign to harvest the hard rock material.

4.2.3 Operating Times

Typical operating hours for quarries will be adopted for the subject site which involves 7:30 am to 5:30 pm each Monday to Friday and Saturdays 7:30 am to 1 pm (if required), excluding public holidays. The subject site will be worked by 3 - 5 persons, depending on market demand.

4.2.4 Stockpiling

Using a loader, the topsoil (nominally 15 cm of the soil profile) will be stripped and placed in stockpiles less than 2 m high. Overburden, if present, will be removed using a dump truck and stockpiled to the perimeter of the proposed pit area.

4.2.5 Blasting/Crushing/Screening

Blasting will occur during excavation of the hard rock material only. All material will then be crushed and screened to produce products of the correct size. A works approval and licence will be sought from DWER to enable this.

4.2.6 Vegetation and Topsoil

The subject site has been cleared of remnant native vegetation. A blue gum plantation with no understorey or mid storey has recently been removed. Once extraction works commence the topsoil will be placed in stockpiles less than 2 m high.

4.3 Ancillary

4.3.1 Equipment

All operational equipment will work on the quarry floor to provide maximum sound and visual screening. All equipment and infrastructure will be fully portable to facilitate movement throughout the site required for staged quarrying operations. The property will be secured by locked gates when it is not being actively worked. The boundary fencing will be maintained to prevent inadvertent and unauthorised entry.

Equipment and facilities that may be used onsite are provided in the Table below.

Table 2. Equipment.

Equipment	Description
Site office/crib room and/or containers	May be required for the management and security of small items.
Ablution block	A portable toilet may be required on site.

Equipment	Description
Water tanker	Used for dust suppression on the access roads and working floors when required.
Caterpillar 982 Front End Loader (or similar)	Loaders will be used for the movement of gravel, feed material and crushed rock; and loading road trucks.
Caterpillar D9 and D8 Dozer (or similar)	Used in specified areas for the movement of materials during site establishment, prestrip etc.
Caterpillar 352/3363/306 Excavator (or similar)	An excavator may be used for the removal of gravel material, loading the crusher, general material handling, rock breaking oversize rock.
Terex Finlay 1-140 or Metso LT1213S Impact Crusher (or similar)	Used for the crushing of gravel, dolerite and gneiss.
Terex Finlay 693 Supertrak/Metso ST 4.10 Triple Deck Screener/Metso S4.11 Reclaimer HD Screen (or similar)	Used for the screening of crushed gravel.
Anaconda/ Telestack 424x/Telestack 624R Radial Stockpiler	Used for stockpiling crushed gravel.
Tamrock Drill Rig (or similar)	Used for drilling blast holes for hard rock extraction.
Fuel storage	No fuel will be stored onsite.
Service Truck	Used for service and maintenance of equipment.
Light vehicles	Access to and around the site.
Metso LT120 Jaw Crusher	Crushing of hard rock.
Metso LT350HP with TK Prescreen Cone Crusher	Crushing of hard rock.
Semi Water Cart	Used for dust suppression.
Caterpillar 140M Grader	Used in road maintenance and rehabilitation.

4.3.2 Onsite fuel storage/servicing

Hydrocarbons and a small amount of the chemicals used for the drill and blast operations are the only dangerous goods that will be utilised within the proposed extraction area. However, storage of hydrocarbons on the site will not occur. All fuel for refuelling will be brought to site by a fully contained mobile refuelling truck containing separate tanks for lubricants including a waste oil tank an evacuation pump in accordance with the *WQPG No. 10 Mining and Mineral Processing, Above-ground fuel and chemical storage*. This truck is designed with appropriate containment measures to prevent spills, drips and leaks of contaminants and will only be on site when required for refuelling or for undertaking minor servicing or urgent repairs.

The mobile refuelling truck is equipped with equipment for the containment and clean-up of spills including adsorbent mats and products such as attapulgate to be used in the event of spills.

Major servicing of machinery and equipment will not occur onsite further reducing the possibility of contamination.

4.3.3 Amenities/infrastructure

The subject site does not currently contain any infrastructure. A farm shed and associated infrastructure is located adjacent to the gravel resource.

4.3.4 Water Sources

The Hester Brook runs through the property to the west of both extraction areas. A buffer of at least 100m will be maintained at all times.

Water is only required for dust suppression within the quarry and the gravel access road. Water will be sourced either from onsite detention basins or purchased from offsite and trucked to site on an as needs basis.

4.3.5 Access/Egress

Access to the subject site will be restricted to existing internal tracks and the existing crossover on Catterick Road, as shown in **Figure 5**.

4.3.6 Vehicle Types and Movement

Anticipated truck movements are calculated by the method described in the City of Busselton's *Local Planning Policy No. 2.3 Extractive Industries* (2015) as follows:

It is proposed to extract a maximum of approximately 35,000 m³ or bank cubic metres (BCM) of gravel per year. The average daily extraction rate:

$$\begin{aligned} &= 35,000 \text{ BCM} / 52 \text{ weeks} / 5 \text{ working days per week} \\ &= 135 \text{ BCM per day.} \end{aligned}$$

It is estimated that approximately 70% of the haulage is proposed to be undertaken from October to May (8 months). Therefore, the average daily extraction rate (main season):

$$\begin{aligned} &= 35,000 \text{ BCM} \times 70\% / 32 \text{ weeks} / 5 \text{ working days} \\ &= 153 \text{ BCM per day.} \end{aligned}$$

The average daily extraction rate (LCM):

$$\begin{aligned} &= 153 \text{ BCM} \times 1.15 \\ &= 176 \text{ LCM} \end{aligned}$$

It is proposed to utilise a range of truck configurations with the smallest being a 25 tonne semi-trailer with a capacity of approximately 13.9 LCM of gravel and the largest being two 25 tonne semi-trailers with a capacity of approximately 27.8 LCM of gravel. Accordingly, the minimum average daily truck movements during the main season are as follows:

$$\begin{aligned} &= 176 \text{ LCM} / 13.9 \text{ LCM truck capacity} \\ &= 13 \text{ truck movements per day} \times 2 \text{ (to and from)} \end{aligned}$$

Given the demand on the resource will be variable from day to day in the peak season. It is reasonable to assume that peak day truck loads may be twice the average estimated truck trips. Therefore,

$$\begin{aligned} &= 26 \text{ trips per day} \times 2 \text{ (peak fluctuations)} \\ &= 52 \text{ trips per day (260 trips per week) maximum.} \end{aligned}$$

It is proposed to extract a combined maximum of approximately 30,000 m³ or bank cubic metres (BCM) of crushed hard rock per year. The average daily extraction rate:

$$= 30,000 \text{ BCM} / 52 \text{ weeks} / 5 \text{ working days per week}$$

= 115 BCM per day.

It is estimated that approximately 70% of the haulage is proposed to be undertaken from October to May (8 months). Therefore, the average daily extraction rate (main season):

= 30,000 BCM x 70% / 32 weeks / 5 working days
= 131 BCM per day.

The average daily extraction rate (LCM):

= 131 BCM x 1.15
= 151 LCM

It is proposed to utilise a range of truck configurations with the smallest being 25 tonne semi-trailers with a capacity of approximately 13.9 LCM of gravel and the largest being two 25 tonne semi-trailers with a capacity of approximately 27.8 LCM of crushed hard. Accordingly, the minimum average daily truck movements during the main season are as follows:

= 151 LCM / 13.9 LCM truck capacity
= 11 truck movements per day x 2 (to and from)

Given the demand on the resource will be variable from day to day in the peak season. It is reasonable to assume that peak day truck loads may be twice the average estimated truck trips. Therefore,

= 22 trips per day x 2 (peak fluctuations)
= 44 trips per day (220 trips per week) maximum.

As hard rock and gravel extraction may occur simultaneously, the total number of truck movements per day may be up to 96 single 25 tonne semi-trailers or 48 double 25 tonne semi-trailers. It should be noted that this is a high estimation given that the calculations allow for 70% of the extraction to occur during a 32 week period and then doubles the number as a further safety measure to allow for additional demand during peak operations.

4.3.7 Haulage Route

Access from the property will be via Catterick Road and onto South Western Highway (refer to **Figure 5**). South Western Highway is an unconditional Main Roads Level 1 road, this road has therefore already been assessed and considered suitable for this type of haulage. A Transport Impact Assessment (PTG Consulting 2026) has been prepared for the subject site which further discusses the suitability of the subject site for the proposed operations (refer to **Appendix D**).

4.3.8 Road Upgrading and Maintenance

As discussed in **Section 4.3.7**, South Western highway has been assessed and considered suitable for the proposed haulage therefore no upgrades are required. Catterick Road is mapped as a minor unsealed road. The proponent is willing to contribute to the maintenance and upgrade of the road if required after discussion with the Shire of Bridgetown- Greenbushes. Options available for the maintenance of Catterick Road will include the below:

- Maintenance grading involving a water cart and a Caterpillar 140M Grader will be undertaken when the haulage operations degrade the road.

- A water cart will be deployed on the road when required to minimise dust generation from hauling activities.
- If the road becomes degraded, where maintenance grading is inadequate, then segments of the road can be remediated. Suitable gravel material will be sourced from the operations. Equipment that may be required to conduct the remediation works includes water cart, roller (smooth and pad foot), graders, tip trucks, loader and excavators.

Once the quarry operation is established, and the scale and frequency of haulage reach a point, contributions towards the sealing of segments of Catterick Road may be considered. Contributions considered may be the supply of sealing aggregates (supplied by the quarry), and the preparation of the road surface prior to sealing. All engineering support, project management and the cost of emulsion and the sealing crew would be borne by the Shire. Portions of the road that would be prioritised would be either side of residents driveways and areas of the road that require regular repair. Further road maintenance requirements are discussed within **Appendix D**.

4.4 Proposed Decommission and Rehabilitation Plan

4.4.1 Proposed Final Contours

The slope of the final contours of the quarry will be an undulating surface, mirroring the existing ground surface minus the excavated material at between approximately 260 m AHD and 202 m AHD for the gravel resource area, and 225 m AHD to 190 m AHD for the hard rock resource area which is consistent with the adjoining land (refer to **Figure 6** and **Figure 7**).

Where batters are required, they will be retained at 1:5 vertical to horizontal with the primary objective of ensuring a consistent landform across the property.

Where benching has occurred within the hard rock extraction area, the benches will be left in place but back filled with overburden with the brow remaining as a rocky outcrop. Blasting will be used to break down the crest and some of the brows to give the appearance of a sloping landform with the rock being used for backfill. Approximately 600 mm of overburden and topsoil will be reinstated over the entire extraction area to ensure adequate soil is present for the successful rehabilitation to pasture.

4.4.2 Rehabilitation

Rehabilitation will occur on a progressive basis. The objective is to return the land to a condition capable of supporting agricultural activities. This will include dryland pasture with a variety of species.

Table 3. Rehabilitation Objectives

Land Use	Closure Objectives	Completion Criteria	Performance Criteria	Measurement Tool
Agriculture	A self sustaining cover of pasture	Crops cover the entire stage after completion of the rehabilitation works.	Less than 20% bare ground	Annual monitoring as provided in Section 4.4.2.6

Land Use	Closure Objectives	Completion Criteria	Performance Criteria	Measurement Tool
	Weed levels that are not likely to impact on the viability of the reconstructed soils	No declared weed species are present. Weed species are not competing with cover crop across the site.	Declared weed species absent from the rehabilitation area.	Annual monitoring as provided in Section 4.4.2.6
	A safe and stable landform suitable for the proposed future land use	No areas of erosion or soil collapse are observed.	Rehabilitation surface remains flat and stable, with no evidence of surface erosion.	Annual monitoring as provided in Section 4.4.2.6

4.4.2.1 Site Preparation

To ensure the success of the revegetation works, site preparation should occur well before planting is undertaken. This includes landform reconstruction and contouring measures as outlined in **Section 4.4.1** and the implementation of a weed control programme as outlined in **Section 4.4.2.2**.

In the event that compacted areas are identified within the gravel revegetation area, contour ripping may be required. Ripping loosens soil aggregates and provides a softer soil surface for the establishment of plant roots. Ripping also promotes aeration of soil, assisting in the breakdown of organic matter and water infiltration.

4.4.2.2 Weed Management

The invasion of weeds and disease is a key threat to the conservation values of the subject site and the surrounding vegetated areas. Subsequently, the implementation of measures to limit or control weed infestation is necessary.

4.4.2.3 Weed Control

The primary objective of a weed control program is to prevent weed species competing with pasture species for light, nutrients and moisture.

Pre-seeding weed control is only likely to be required where topsoils are used that contain weed species. Given the current land use, it is not anticipated that weed control will be other than normal agriculture practice. If required, weed control will only be conducted after overburden and topsoil have been spread and any seeds have been allowed to germinate.

A Dieback and Weed Management Plan has been prepared for the subject site and is provided in **Appendix E**. This Plan documents the proposed weed management measures associated with the extraction industry operation.

4.4.2.4 Revegetation

As far as possible, topsoil will be placed along the contour to help reduce erosion. Placing the topsoil in such a manner will reduce the down slope flow of water and increase water storage. The final landform will resemble the pre-mining landform where practicable (minus the excavated material). The overburden storage area will take into consideration the surrounding landform and as far as practicable match the surrounding features.

While no specific soil preparation is anticipated, the requirement for the application of lime and/or fertiliser can be determined by soil testing once the landform has been rehabilitated.

For pasture revegetation it is essential that the species are matched to the soil types and rainfall. The location falls into the “High Rainfall Coastal” planting regime with sandy to gravelly soils. Suitable perennial legumes include birdsfoot trefoil, lucerne, strawberry clover and sulla. Perennial pasture includes perennial ryegrass, phalaris, cocksfoot and Rhodes grass. Annual pasture species include ryegrass, serradella and subterranean clover.

The actual species used will be determined by the individual season, nature of the rainfall in the preceding months and stocking/hay production proposed by the landholder which may change from time to time.

Seeding rates are 2 – 5 kg/ha depending on the species used; for example, ryegrass is seeded at 3 kg/ha whereas Rhodes grass is seeded at 4 kg/ha. Seed will be broadcast uniformly within the marked areas in overlapping passes using mechanical equipment to allow for complete and even seed coverage of the prepared area.

4.4.2.5 Maintenance

Maintenance will be undertaken following planting/seeding with all activities to be conducted in response to the maintenance inspections and monitoring (as discussed below). The key elements associated with maintenance works will include suppression of smothering weeds and infill planting. The requirement to implement revegetation maintenance and infill planting measures will be determined following each monitoring event.

4.4.2.6 Monitoring and Reporting

A program of monitoring of the rehabilitation works is required to ensure that the objectives are achieved. Maintenance inspections will be undertaken annually in spring by the applicant to determine the requirement for maintenance measures.

During these monitoring events, the area will be assessed to determine pasture and weed coverage within areas that have been rehabilitated.

4.4.2.7 Completion Criteria

To achieve the rehabilitation objectives and ensure that future management is minimised, the measurable goals for rehabilitated areas are as follows:

- Self-sustaining crop cover with less than 20% bare ground;
- No declared weed species; and
- Rehabilitation surface remains flat and stable, with no evidence of surface erosion.

Maintenance will continue to be undertaken as required until this criterion has been achieved or as otherwise agreed with the Shire of Bridgetown - Greenbushes. Following the successful completion of the rehabilitation program, the Shire will refund the rehabilitation bond.

4.4.2.8 Scheduling

The rehabilitation will be undertaken on a progressive basis, depending on the completion of excavation cells. Accordingly, a definitive timeline for rehabilitation is not prescribed, but rather a commitment to establish pasture by the first month of October, following completion of a stage.

Rehabilitation works will be undertaken at the following specified times of year:

1. Spring/summer:
 - Excavated area to be graded to levels and contours conforming to the adjacent unaffected areas minus the thickness of the excavated material.
 - Deep ripping along the contour at 1 m intervals.
 - Stockpiled topsoil will be spread over the shaped surface.
2. Autumn:
 - Pre-seeding weed control.
3. Autumn/winter:
 - Seeding with appropriate agricultural seed mix.
 - If sufficient vegetation does not germinate following initial seeding, the area will be re-seeded.
4. Spring:
 - Maintenance inspections to determine extent of maintenance requirements.

4.4.2.9 Decommissioning

Following completion of the extraction activities, the applicant will undertake the following actions to decommission the site:

- All buildings and infrastructure will be removed;
- Any hard stand surfaces will be removed and used to backfill the pit;
- Overburden will be used as backfill;
- The area will have the slopes and soils constructed to allow for the future proposed land use.

5 IMPACTS AND MANAGEMENT

5.1 Economic Impacts

5.1.1 Employment Opportunities

The subject site will be worked by 3 – 5 persons, depending on market demand.

5.1.2 Surrounding Attractions

There are no attractions located in proximity to the subject site. Operations at the site are not expected to impact any surrounding attractions.

5.2 Social Impacts

5.2.1 Community Services & Health

The subject site has been designed to maximise setbacks to the closest sensitive receptors, where possible. This has involved extensive analysis of the local landform, environmental characteristics, land uses and location of sensitive receptors.

The key amenity issues for sensitive premises associated with the proposal are:

- Visual amenity;
- Dust; and
- Noise.

The Environmental Protection Authority's (EPA) *Guidance for the Assessment of Environmental Factors* (June 2005) provides generic separation distances to assist in the determination of suitable buffers where industry may have the potential to affect the amenity of a sensitive land use. In particular, for gravel extractive industries including grinding or milling works, the buffer distance should be determined on a case by case basis. For hard rock extractive industries, a buffer distance of 1,000 m is recommended from sensitive land uses.

The closest residential dwellings to the subject site are provided below and shown in **Figure 8**.

Table 4. Residential dwellings within 1,000 m of the subject site.

Resident No.	Distance to subject site (m) (Gravel/Clay)	Distance to subject site (m) (Hard Rock)
1	415 m	1360 m
2	440 m	1139 m
3	610 m	1746 m
4	740 m	1640 m

The closest residential dwelling to the subject site is located 415 m to the north of the gravel extraction area. The applicant will commence consultation with residents 1 and 2 during the application period and will continue to do so over the life of the quarry. Consultation has occurred with the remaining surrounding residents with no objections received.

Management measures associated with noise and dust are discussed in further detail in **Sections 5.5** and **5.6**, respectively.

5.2.2 Visual Impacts

Visual impact can occur in a number of circumstances, by the operation being set too high in the landscape, by being too close to neighbours and by insufficient visual protection.

The subject site is visible from Catterick Road. However, existing native vegetation located within the road reserves and throughout the property assist in obscuring the view of the subject site. Surrounding State Forest obscures the view of the operations from all residents excepting the dwelling located at 385 Catterick Road and to a lesser extent 195 Eastcott Road. The hard rock operations will occur at a lower elevation and views of this part of the operation will be obscured by the natural topography of the property.

The locality has been extensively developed for agricultural land uses and therefore is not located in a visually sensitive landscape. Rehabilitation will be progressive, and the subject site will be returned to pasture. Accordingly, no further management measures are proposed for potential visual impacts.

5.2.3 Traffic Conflict

Catterick Road is not a school bus route. Furthermore, no other traffic conflicts have been identified. This is further discussed in **Appendix D**.

5.2.4 Pedestrian/ Cyclist Safety Heritage Impacts

The haulage route is not likely to be frequented by pedestrians or cyclists. This is further discussed in **Appendix D**.

5.2.5 Aboriginal Heritage

All Aboriginal sites in Western Australia are provided protection under the *Aboriginal Heritage Act 1972* in which it is an offence for anyone to excavate, damage, destroy, conceal or in any way alter an Aboriginal site without the Minister's permission.

An online search for relevant Aboriginal heritage information was undertaken using the Department for Planning, Lands and Heritage *Aboriginal Inquiry System* that incorporates both the heritage site register and the heritage survey database (DPLH 2021). The Aboriginal Heritage Site Register is maintained pursuant to Section 38 of the *Aboriginal Heritage Act 1972* and contains information on over 22,000 listed Aboriginal sites throughout Western Australia.

Results of the database search revealed that an Aboriginal heritage site associated with the Blackwood River (Place ID 20434) is mapped over the Hester Brook which runs through the property. A 100 m buffer will be maintained to the Brook, therefore no impacts on Aboriginal Heritage are expected.

5.2.6 Post-settlement Heritage

No heritage sites were identified within the Site during the desktop review of the Australian Heritage Database, National Trust, State Register and Local Government's Municipal Inventory. On this basis, no Post-settlement heritage sites will be impacted as a result of the proposal.

6 ENVIRONMENTAL IMPACTS AND MANAGEMENT

6.1 Flora and Fauna

6.1.1 Vegetation/Habitat

As described in **Section 2.2.2**, the subject site has been cleared of remnant native vegetation and is not likely to support flora or fauna.

No impacts to groundwater will result from the proposal and therefore any potential impacts to stygofauna or troglafauna are considered unlikely.

Based on available mapping there is about 15,500 ha of remnant native vegetation within 20 km of the subject site. Given the absence of habitat and the proximity of quality habitat, the proposed operation will not present a significant impact to fauna species.

Based on the above, the proposal will not result in any direct impacts to native flora, vegetation or fauna, and therefore no management measures are proposed.

6.1.2 Declared Rare Flora/ Threatened Ecological Communities

As described in **Section 2.2.2** no declared rare flora or TEC are located within the subject site.

Based on the above, the proposal will not result in any direct impacts to any rare flora or ecological communities, and therefore no management measures are proposed.

6.1.3 Clearing Permit

Given the absence of native vegetation from the site no clearing permit is required.

6.2 Ground Pollution/Contamination

6.2.1 Hydrocarbons

Hydrocarbons and small amount of the chemicals associated with the drill and blast operations are the only dangerous goods that will be utilised within the proposed extraction area. However, storage of hydrocarbons on the site will not occur.

Major servicing of machinery and equipment will not occur onsite further reducing the possibility of contamination.

There is the minor possibility for soil and water contamination as a result of an incidental hydrocarbon leakages or spills during the operation of machinery. Accordingly, management measures for hydrocarbons and dangerous goods spills are provided in the *Water Management Plan* (refer to **Appendix F**).

6.2.2 Silt

The current water cycle within the subject site consists of inputs from rainwater being infiltrated on site or flowing within the minor and major drains to the wider drainage system. The development will maintain this process, with all surface water being retained within the excavated areas to enable infiltration through the base of the pits to ensure water quality to the watercourses is maintained.

A *Water Management Plan* has been prepared for the subject site and is provided in **Appendix F**. This Plan documents the proposed surface water management measures associated with the extractive industry operation.

6.3 Weeds and Pathogens

6.3.1 Environmental Weeds

The proposed extraction area has been recently cleared of a blue gum plantation and consists largely of pasture grasses and some weed species. Accordingly, weed management will be undertaken largely in collaboration with the proposed dieback management measures.

Earthworks, transportation of topsoil and overburden, and vehicle movement have the potential to introduce additional weeds and spread existing populations of introduced flora within the extraction area. Given that weeds are already present within the extraction area, management measures will be implemented to assist in controlling and maintaining existing populations and prevent the introduction of new species.

A *Dieback and Weed Management Plan* has been prepared for the subject site and is provided in **Appendix E**. This Plan documents the proposed weed management measures associated with the extraction industry operation.

6.3.2 Dieback (*Phytophthora cinnamomi*)

Given that native vegetation has been removed from the extraction area to enable the establishment of the plantation, dieback indicator species are absent and therefore it is not possible to detect whether dieback is present or absent. On this basis, it is reasonable to classify the site as ‘uninterpretable’, denoting that a precautionary management approach should be adopted.

The primary objective of dieback management during operations is to minimise the risk of entry of dieback to the subject site. This can be achieved by preventing the importation of soil or plant material to and from the site. The risk of transportation via vehicles and equipment is low given that sealed roads will be utilised prior to entering the site.

A *Dieback and Weed Management Plan* has been prepared for the subject site and is provided in **Appendix E**. This Plan documents the proposed dieback management measures associated with the extraction industry operation.

6.4 Water

6.4.1 Drainage

As discussed in **Section 6.2.2**, the current water cycle within the subject site consists of inputs from rainwater being infiltrated on site or flowing within the minor and major drains to the wider drainage system.

A *Water Management Plan* has been prepared for the subject site and is provided in **Appendix F**. This Plan further details the drainage management measures associated with the extractive industry operation.

6.4.2 Surface Water

Surface water features within the property are restricted to the presence of the Hester Brook. A buffer of at least 100 m from the excavation area to all surface water features will be maintained at all times.

A *Water Management Plan* has been prepared for the subject site and is provided in **Appendix F**. This Plan documents the proposed surface water management measures associated with the extractive industry operation.

6.4.3 Groundwater

Groundwater will not be extracted or dewatered during the operation of the quarry and therefore, no impacts to groundwater levels are proposed.

Groundwater resources are limited within the area due to the low permeability of the sub-surface materials and the elevation of the subject site. It is expected that groundwater may be present at depth below the weathered clays, between 15 to 20 m BGL (De Silva *et al* 2000). Maximum excavation levels in the extraction areas will be 3 m BGL and 15 m BGL in the gravel/clay and hard rock areas, respectively. Accordingly, no interaction with groundwater is expected during excavation works. Furthermore, a separation of at least 1.0 m between the final contours and the maximum groundwater elevation will be maintained.

Accordingly, no impacts to groundwater are expected as a result of this proposal.

6.5 Noise and Vibration

Noise can originate from various operations and may impact on onsite workers, or travel offsite and impact nearby sensitive premises. Both potential noise impacts are addressed by reducing the noise generated from the quarrying and processing operations.

Ground vibration levels were modelled as part of the *Noise Assessment* (Lloyd George, 2024) and were predicted to be well below levels where building damage might occur (5mm/s), and therefore, impact and damage to surrounding homes is unlikely to result from blasting activities (Lloyd George, 2024). Furthermore, extraction activities will only be undertaken during standard hours of operation (in accordance with the conditions of the Extractive Industry Approval).

6.5.1 Buffers

The preliminary screening assessment (Part 1) of the *Environmental Noise Screening Tool*, located at Appendix 1 in DWER's *Draft Guideline on Environmental Noise for Prescribed Premises* (May 2016) indicates there is no requirement for a detailed noise emission assessment and that noise impacts on residences in the area will be complied with given that the distance to the nearest sensitive land use is greater than the recommended separation distance (1,000 m for hard rock extraction).

The applicant will ensure that all noise emissions comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* at all times. A *Noise Management Plan* has been prepared for the subject site and is provided in **Appendix G**. This Plan documents the proposed noise management measures associated with the extraction industry operation.

6.5.2 Sensitive Land Uses

The subject site has been designed to maximise setbacks to the closest sensitive receptors. This has involved extensive analysis of the local landform, environmental characteristics, land uses and location of sensitive receptors.

The Environmental Protection Authority's (EPA) *Guidance for the Assessment of Environmental Factors* (June 2005) provides generic separation distances to assist in the determination of suitable buffers where industry may have the potential to affect the amenity of a sensitive land use. In particular, for hard rock extractive industries, a buffer distance of 1000 m is recommended from sensitive land uses.

The closest residential dwellings to the subject site are provided in **Section 5.2.1** and shown in **Figure 8**. The closest residential dwelling (Resident No. 1) is located 415 m from the gravel/clay resource. There are

four residential dwellings within 1,000 m of the proposed gravel/clay extraction area (measured from the closest point).

6.6 Airborne Pollution

6.6.1 Onsite Dust

The proposed extraction activities will involve the disturbance of large quantities of soil and earthen material. Specifically, this may include the following activities:

- Earthworks during extraction activities;
- Topsoil stripping;
- Loading and transportation of material;
- Crushing and screening of material;
- Blasting of rock faces;
- Vehicle movement within the site; and
- Wind erosion of exposed surfaces.

These activities have the potential to generate dust that, if not adequately controlled, can cause nuisance and safety risks. In-pit operations tend to generate less dust than surrounding activities due to the reduced airflow within the pit. The removal and replacement of topsoil material has the highest risk associated with dust generation due to the large volumes of material involved and generally lower levels of soil moisture.

6.6.2 Offsite Dust

Vehicle movement along Catterick Road has the potential to generate dust above that generated whilst travelling along the South West Highway.

A *Dust Management Plan* has been prepared for the subject site and is provided in **Appendix H**. This Plan documents the proposed dust management measures associated with the extraction industry operation.

6.7 Bushfire and Emergencies

6.7.1 Bushfire

Although there is minimal vegetation present within the proposed extraction areas, the patches of native vegetation in neighbouring Lots and the State Forest mean the risk of fire within the subject site is present. All Shire of Bridgetown fire regulations including harvest bans will be adhered to with works ceasing during high and extreme FDI. In accordance with the Shire of Bridgetown- Greenbushes Extractive Industry Policy, no excavation will be undertaken on days of catastrophic, extreme or severe fire danger rating or on days where a harvest ban is declared. All site vehicles will be fitted with a fire extinguisher and all staff in control of equipment and machinery will be trained in their use in the event of a small fire. A water truck will be present on site for dust control which could assist in fire suppression if required.

In the event of a large scale bushfire in the area, the subject site will be evacuated.

6.7.2 Flooding

According to mapping available from the Department of Primary Industries and Regional Development (DPIRD), the subject site is not located in an area prone to flooding.

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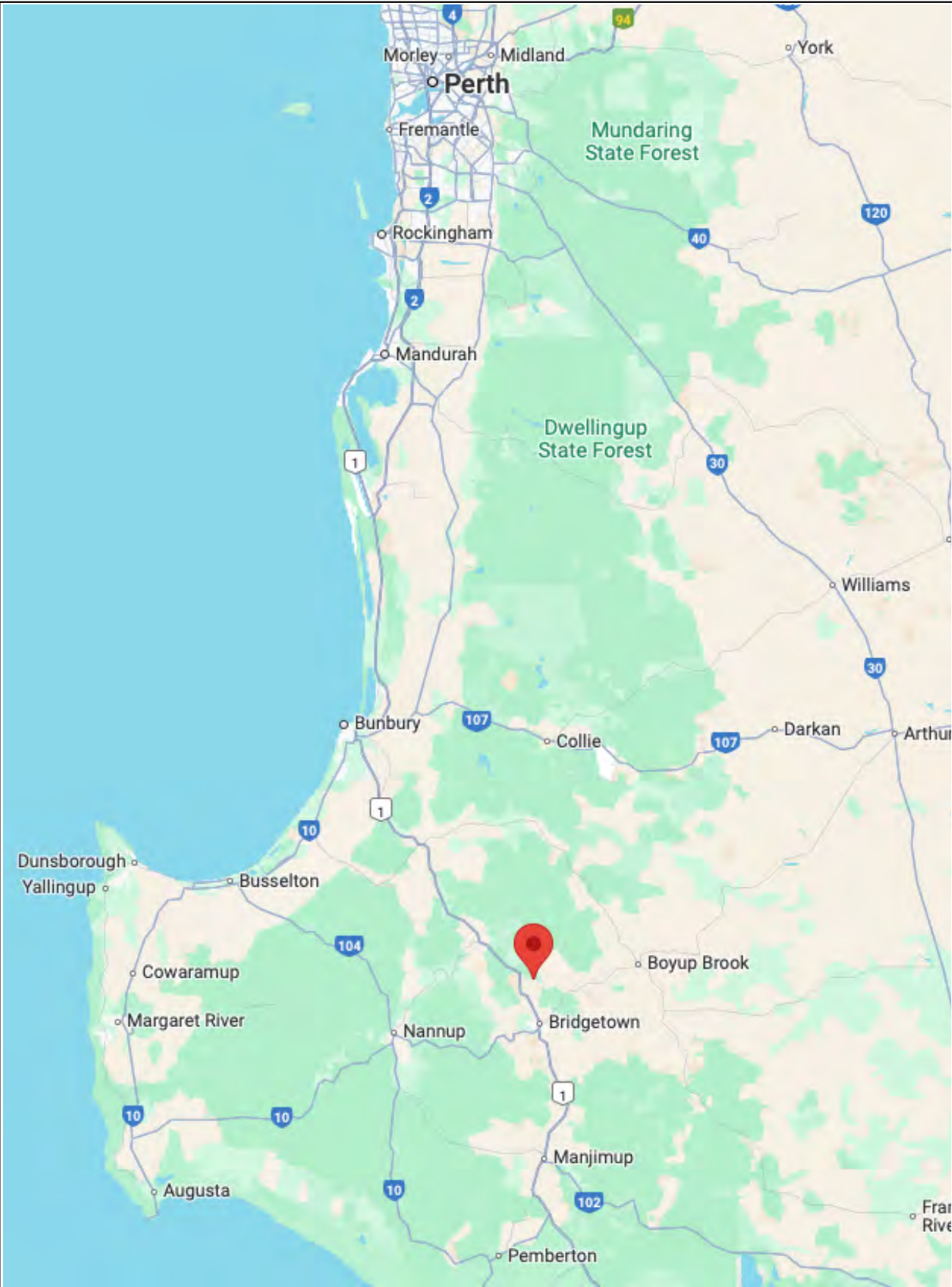
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FIGURES



PROJECT Catterick Road

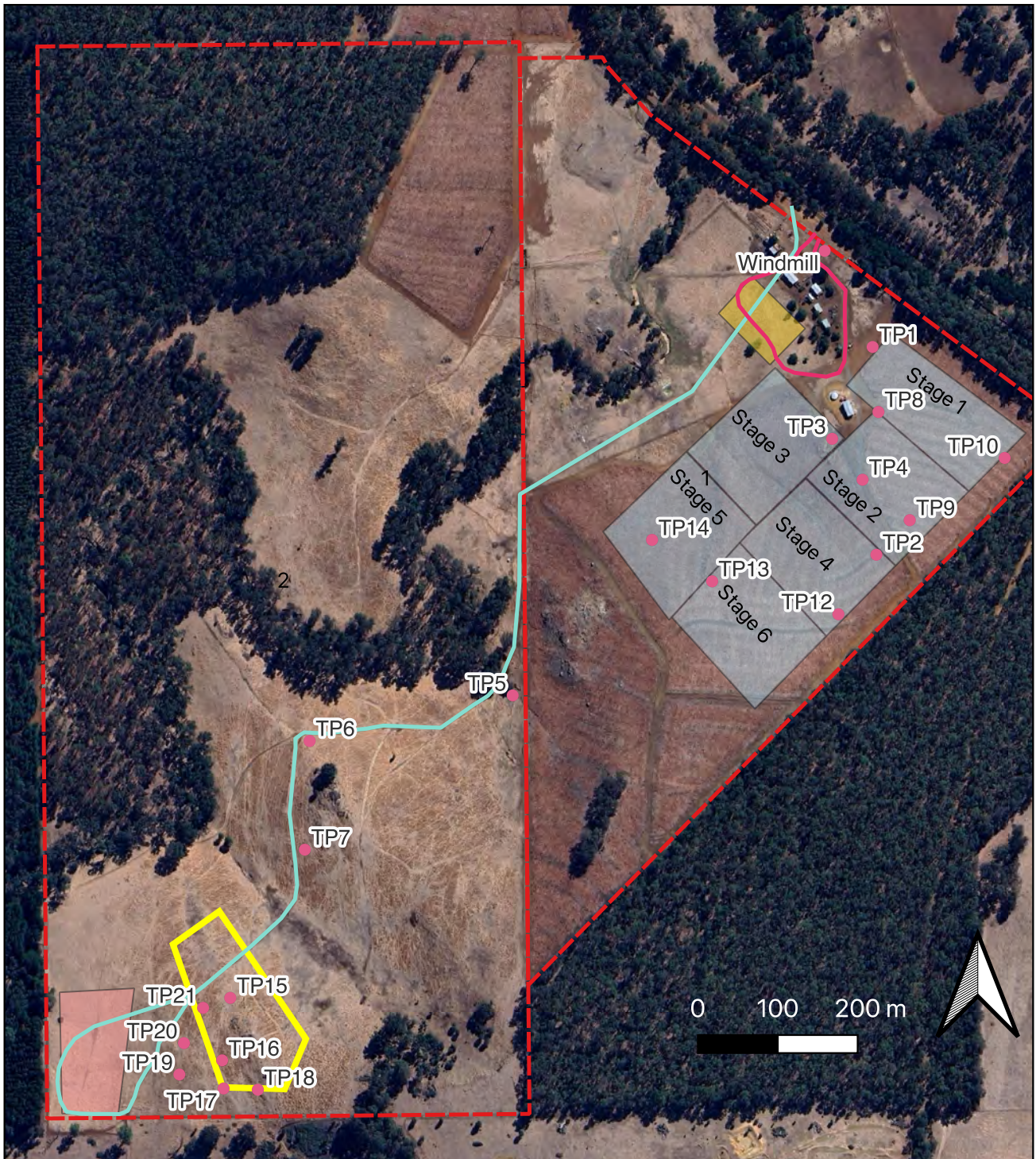
DRAWING TITLE Figure 1 – Site Locality

CLIENT Jim Cross



PO Box 5178
West Busselton
Western Australia 6280
Mobile 0418 950 852

Project Number	2409	Drawing Number	Figure 1	Revision	A
Designed	PN	Checked			
Drawn	PN	Approved			
Date	25/11/2024				
Local Authority	Shire of Bridgetown –				
Sheet 1 of 1	Greenbushes				



Legend

 	Lot boundary	ROM, Stockpile and Laydown areas	
 	Gravel/clay extraction	 	Gravel/clay ROM, stockpile and laydown areas
	Hard rock haulage route	 	Hard Rock ROM, stockpile and laydown areas
	Gravel/clay haulage route	●	Test Pits

PROJECT Caterick Road

DRAWING TITLE Figure 2 – Site Extent

CLIENT Jim Cross



Project Number	2409	Drawing Number	Figure 2	Revision	A
Designed	PN	Checked			
Drawn	PN	Approved			
Date	25/11/2024				
Local Authority	Shire of Bridgetown Greenbushes				
Sheet 1 of 1					



PROJECT Catterick Road

DRAWING TITLE Figure 3 – Site topography (gravel/clay)

CLIENT Jim Cross



Project Number
2409

Designed PN
Drawn PN

Date
Local Authority
Sheet 1 of 1

Drawing Number
Figure 3

Checked
Approved

25/11/2024
Shire of Bridgetown Greenbushes

Revision
A



PROJECT Catterick Road

DRAWING TITLE Figure 4 – Site topography (hard rock)

CLIENT Jim Cross



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West Bussellton
Western Australia 6280
Mobile 0418 950 852

Project Number 2409

Designed PN
Drawn PN

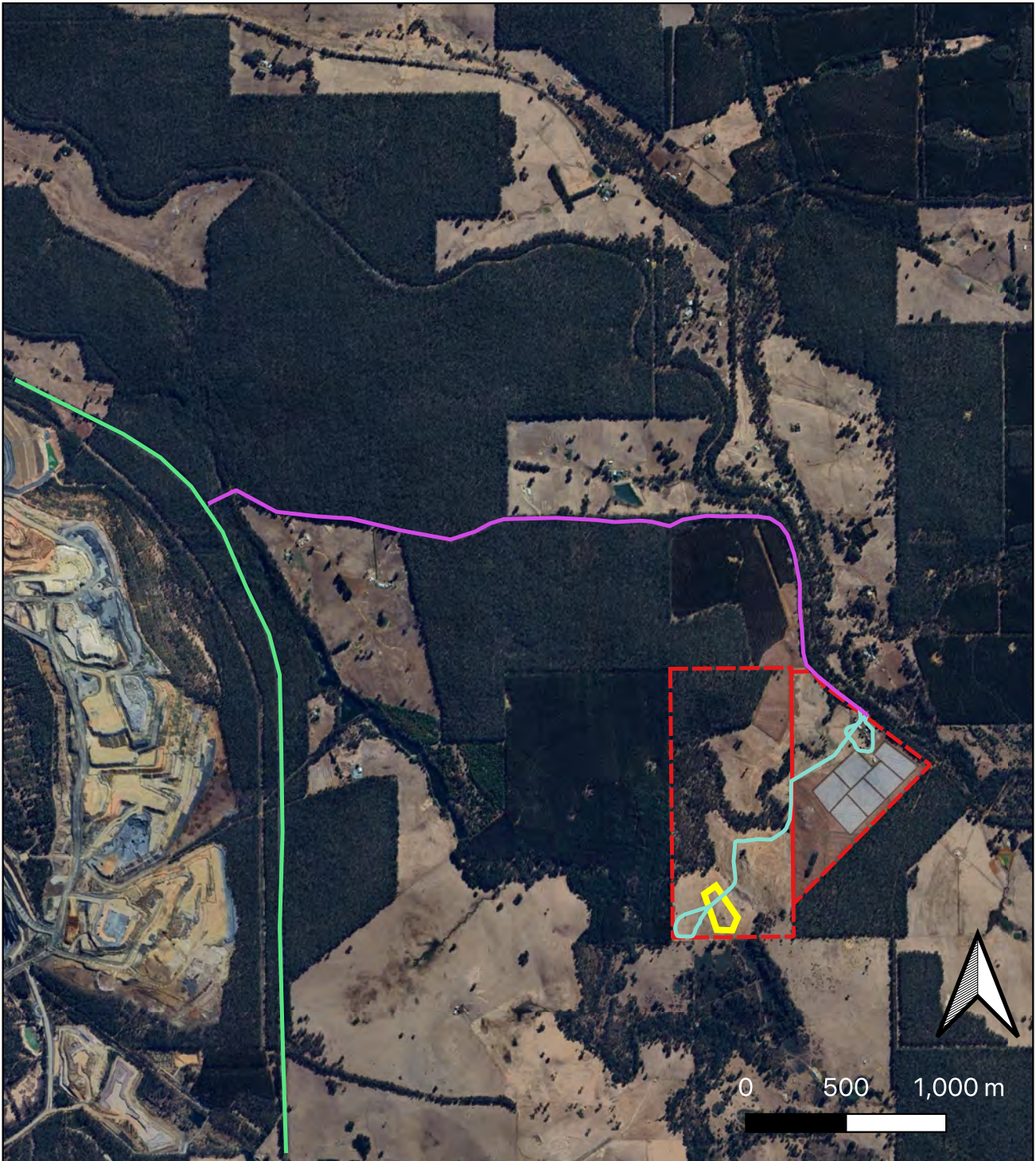
Date 25/11/2024
Local Authority Shire of Bridgetown Greenbushes
Sheet 1 of 1

Drawing Number Figure 4

Checked
Approved

Revision A

25/11/2024
Shire of Bridgetown Greenbushes



Legend

Haulage Routes

— Hard rock

— Gravel

— Catterick Road

Lot boundary

Gravel and clay extraction area

Hard rock extraction area

PROJECT Catterick Road

DRAWING TITLE Figure 5 – Haulage Routes

CLIENT Jim Cross



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Project Number 2409

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Drawn PN

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Drawing Number Figure 5

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Revision A

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PROJECT Catterick Road

DRAWING TITLE Figure 6 - Final contours (gravel and clay)

CLIENT Jim Cross

Project Number
2409

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Drawn PN

Date
Local Authority
Sheet 1 of 1

Drawing Number
Figure 6

Checked
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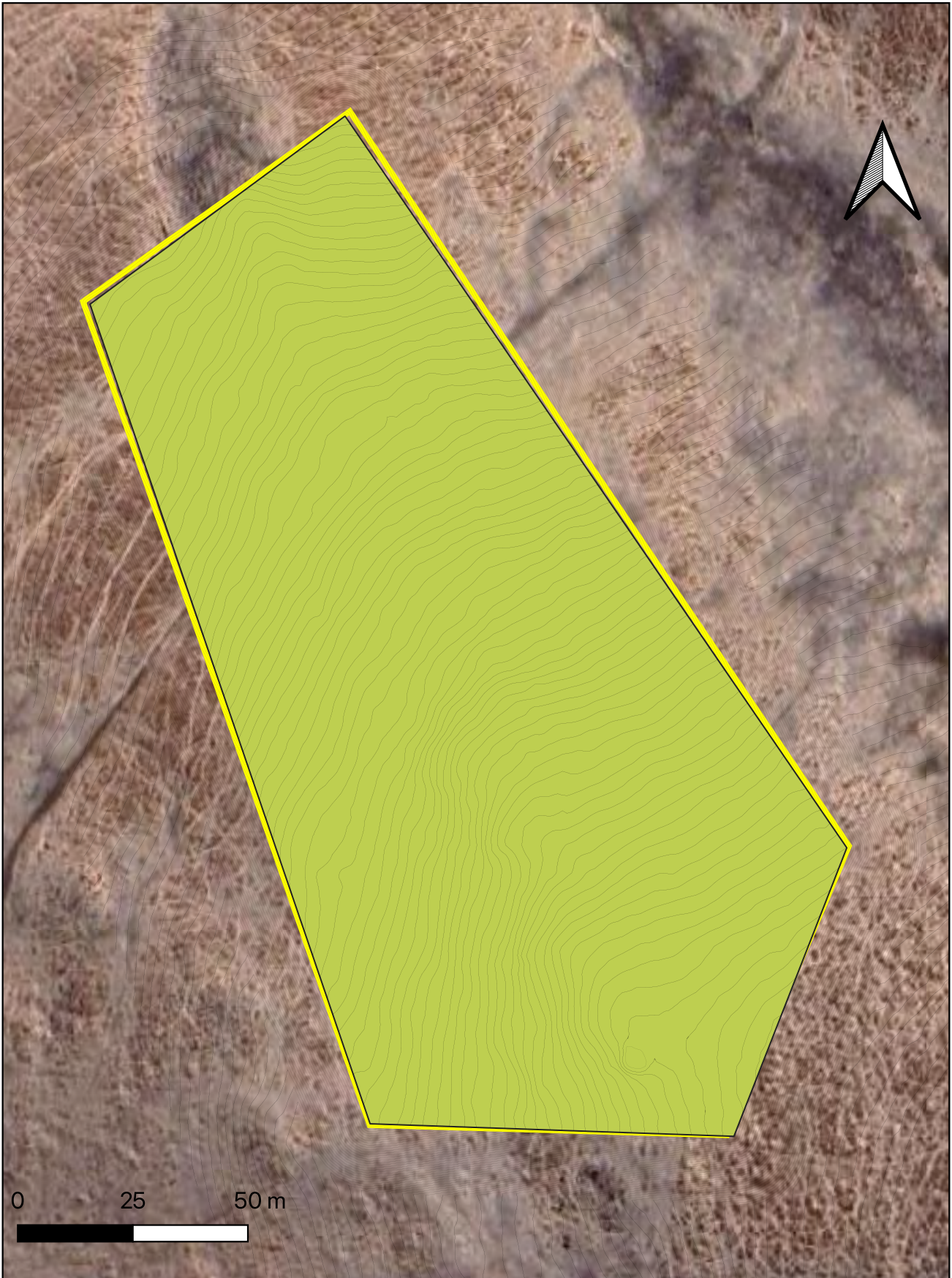
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PROJECT Catterick Road

DRAWING TITLE Figure 57 - Final Contours (hard rock)

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Project Number
2409

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Date
Local Authority
Sheet 1 of 1

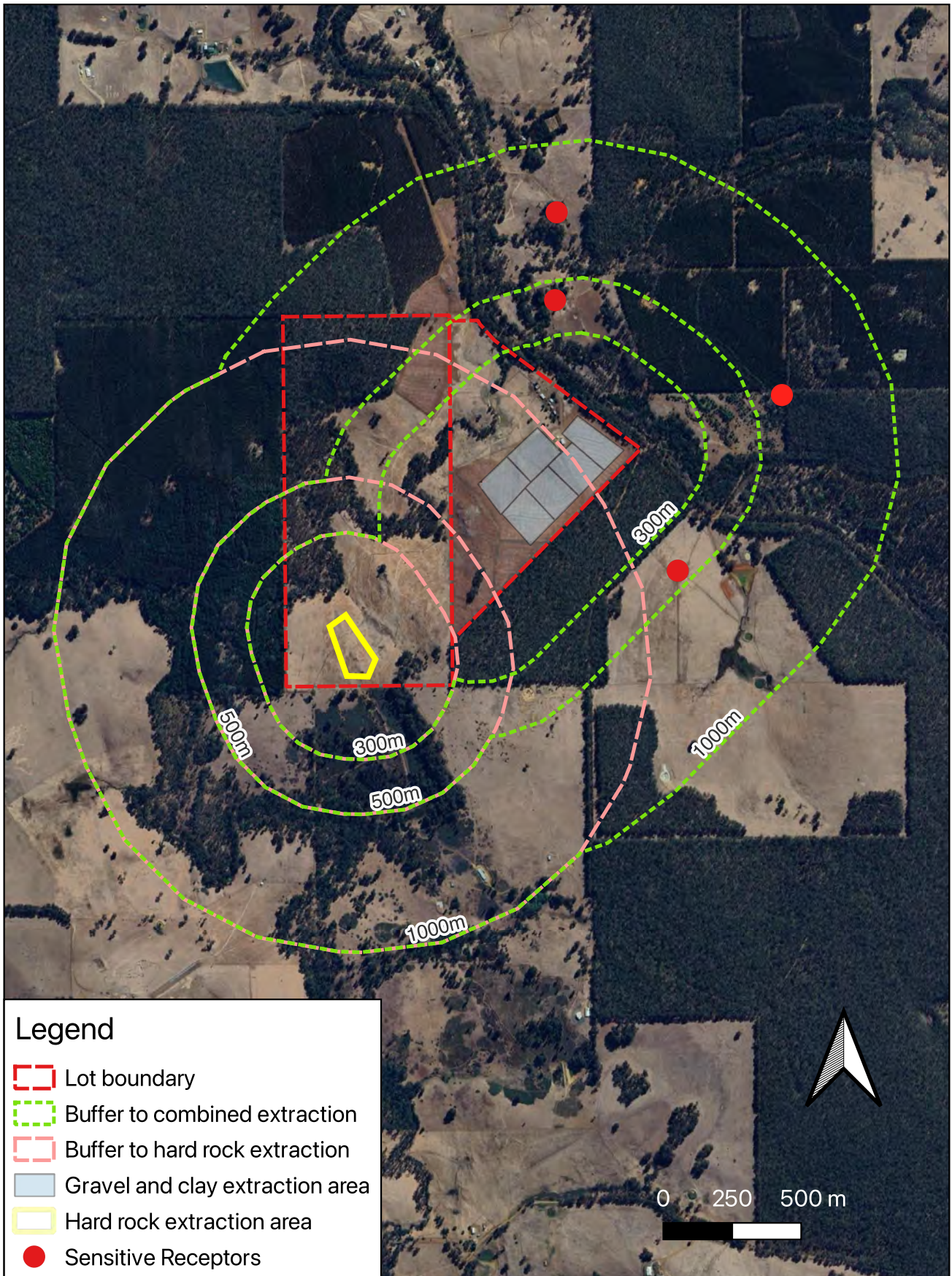
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Figure 7

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Legend

- Lot boundary
- Buffer to combined extraction
- Buffer to hard rock extraction
- Gravel and clay extraction area
- Hard rock extraction area
- Sensitive Receptors

PROJECT Catterick Road

DRAWING TITLE Figure 8 – Sensitive Receptors

CLIENT Jim Cross



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Project Number
2409

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Local Authority
Sheet 1 of 1

Drawing Number
Figure 8

Checked
Approved

25/11/2024
Shire of Bridgetown Greenbushes

Revision
A

APPENDIX A – CERTIFICATE OF TITLE

WESTERN



AUSTRALIA

TITLE NUMBER

Volume Folio

1165 319

RECORD OF CERTIFICATE OF TITLE UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES



LAND DESCRIPTION:

LOT 7971 ON DEPOSITED PLAN 201585

REGISTERED PROPRIETOR: (FIRST SCHEDULE)

IRON HORSE PASTORAL PTY LTD OF 406 CATTERICK ROAD CATTERICK WA 6255

(T P989078) REGISTERED 14/5/2024

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS: (SECOND SCHEDULE)

1. P989079 MORTGAGE TO JUDO BANK PTY LTD OF LEVEL 3 40 CITY ROAD SOUTHBANK VIC 3006
REGISTERED 14/5/2024.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 1165-319 (7971/DP201585)
PREVIOUS TITLE: 1179-90
PROPERTY STREET ADDRESS: NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY: SHIRE OF BRIDGETOWN-GREENBUSHES

WESTERN



AUSTRALIA

TITLE NUMBER

Volume

Folio

1102

778

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

BGRoberts
REGISTRAR OF TITLES



THIS IS A MULTI-LOT TITLE

LAND DESCRIPTION:

LOT 3939 ON DEPOSITED PLAN 81885
LOT 3938 ON DEPOSITED PLAN 81886

REGISTERED PROPRIETOR: (FIRST SCHEDULE)

IRON HORSE PASTORAL PTY LTD OF 406 CATTERICK ROAD CATTERICK WA 6255
(T P989078) REGISTERED 14/5/2024

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS: (SECOND SCHEDULE)

1. P989079 MORTGAGE TO JUDO BANK PTY LTD OF LEVEL 3 40 CITY ROAD SOUTHBANK VIC 3006
REGISTERED 14/5/2024.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

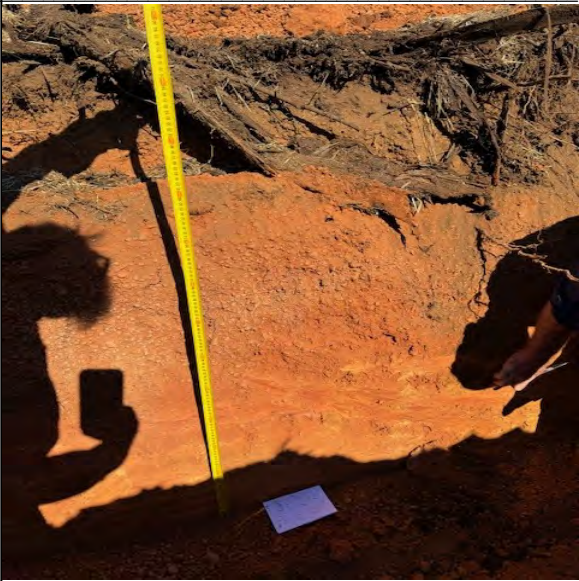
SKETCH OF LAND: 1102-778 (3939/DP81885), 1102-778 (3938/DP81886)
PREVIOUS TITLE: 1025-929, 1032-260
PROPERTY STREET ADDRESS: 406 CATTERICK RD, CATTERICK (3938/DP81886).
LOCAL GOVERNMENT AUTHORITY: SHIRE OF BRIDGETOWN-GREENBUSHES

APPENDIX B – SOIL LOGS (GRAVEL/CLAY)

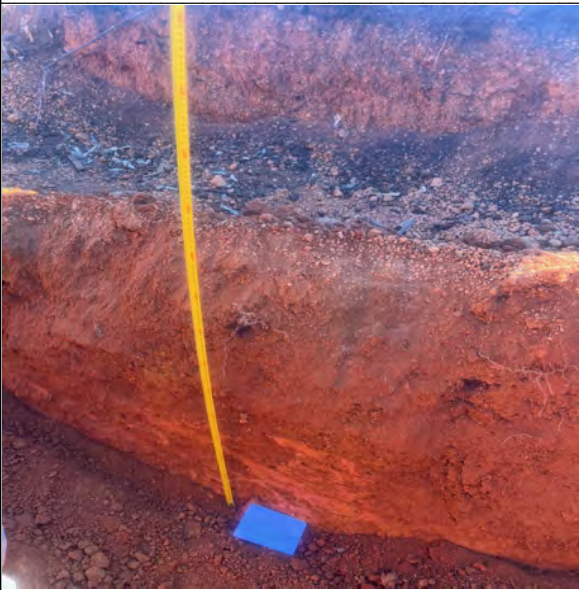
SOIL LOG

PROJECT NUMBER CAT1		BORE NAME CTP1		COORDINATES 418716.3E 6252805.9N	
PROJECT NAME CATTERICK		CONDITIONS Fine Sunny		COORD SYS MGA 94-50	
CLIENT		TOTAL DEPTH 1.5		LOGGED BY J Muir	
DATE 17/05/24		DEPTH TO WATER N/A			
METHOD Excavation					
COMMENTS					
Depth (m)	Samples	Analysed	Graphic Log	Material Description	Moisture
0.1				Brown Topsoil, well sorted medium grain size, Peozolite Stone composition	
0.2				Brown peozolite gravels uo to 25mm stone	
0.3					
0.4					
0.5					
0.6					
0.7					
0.8				Orrangy red coarse peosolite gravels upto 60mm	
0.9					
1					
1.1					
1.2					
1.3				Peozolitic clay	
1.4					
1.5				No groundwater encountered	
1.6					
1.7					
1.8					
1.9					
2					
2.1					
2.2					
2.3					
2.4					

SOIL LOG

PROJECT NUMBER CAT1		BORE NAME CTP2		COORDINATES 418716.3E 6252805.9N	
PROJECT NAME CATTERICK		CONDITIONS Fine Sunny		COORD SYS MGA 94-50	
CLIENT		TOTAL DEPTH 1.5		LOGGED BY J Muir	
DATE 17/05/24		DEPTH TO WATER N/A			
		METHOD Excavation			
COMMENTS					
Depth (m)	Samples	Analysed	Graphic Log	Material Description	Moisture Additional Observations
				Brown organic topsoil, well sorted medium grain some peozolite stone composition	NA
0.2				Loose res/brown peozolite gravels uo to 25mm stone	
0.3					
0.4					
0.5					
0.6					
0.7					
0.8					
0.9				Orrangy red coarse sparingly peosolite gravels upto 60mm	
1					
1.1					
1.2					
1.3					
1.4				Peozolitic clay No groundwater encountered	
1.5					
1.6					
1.7					
1.8					
1.9					
2					
2.1					
2.2					
2.3					
2.4					

SOIL LOG

PROJECT NUMBER CAT1		BORE NAME CTP3		COORDINATES 418665.7E 6252691.0N	
PROJECT NAME CATTERICK		CONDITIONS Fine Sunny		COORD SYS MGA 94-50	
CLIENT		TOTAL DEPTH 1.5		LOGGED BY J Muir	
DATE 17/05/24		DEPTH TO WATER N/A			
		METHOD Excavation			
COMMENTS					
Depth (m)	Samples	Analysed	Graphic Log	Material Description	Moisture Additional Observations
				Brown organic topsoil, well sorted medium grain some peozolite stone compsiton	NA
0.2				Loose res/brown peozolite gravels uo to 25mm stone	
0.3					
0.4					
0.5					
0.6					
0.7					
0.8				Orrangy red coarse sparingly peosolite gravels upto 60mm	
0.9					
1					
1.1					
1.2					
1.3				Peozolitic clay	
1.4				No groundwater encountered	
1.5					
1.6					
1.7					
1.8					
1.9					
2					
2.1					
2.2					
2.3					
2.4					

SOIL LOG

PROJECT NUMBER CAT1		BORE NAME CTP4		COORDINATES 418703.7E 6252639.8N	
PROJECT NAME CATTERICK		CONDITIONS Fine Sunny		COORD SYS MGA 94-50	
CLIENT		TOTAL DEPTH 1.5		LOGGED BY J Muir	
DATE 17/05/24		DEPTH TO WATER N/A			
		METHOD Excavation			
COMMENTS					
Depth (m)	Samples	Analysed	Graphic Log	Material Description	Moisture Additional Observations
				Brown organic topsoil, well sorted medium grain some peozolite stone compstion	NA
0.2				Loose res/brown peozolite gravels uo to 25mm stone	
0.3					
0.4					
0.5					
0.6					
0.7					
0.8					
0.9				Orrangy red coarse sparingly peosolite gravels upto 60mm	
1					
1.1					
1.2					
1.3					
1.4				Peozolitic clay No groundwater encountered	
1.5					
1.6					
1.7					
1.8					
1.9					
2					
2.1					
2.2					
2.3					
2.4					

CTP8

0-0.1m	topsoil with gravel and organics
0.1-1.3m	gravel
1.3-1.6m	gravelly clay
1.6-4.2m	red orange clay.

CTP9

0-0.1m	topsoil with gravel and organics
0.1-1.5m	gravel
1.5-1.9m	gravelly clay
1.9-4.1m	red orange clay.

CTP10

0-0.2m	topsoil with gravel and organics
0.2-1.6m	gravel
1.6-1.9m	gravelly clay
1.9-4m	red orange clay.

CTP12

0-0.2m	topsoil with gravel and organics
0.2-1.6m	gravel
1.6-1.9m	gravelly clay
1.9-4m	red orange clay.

CTP13

0-0.2m	topsoil with gravel and organics
0.2-1.6m	gravel
1.6-1.9m	gravelly clay

1.9-4m red orange clay.

CTP14

0-0.3m loamy topsoil with gravel and organics

0.3-2.2m red orange clay 1.6-1.9m

2.2-3.2m white clay rich saprolite (weathered Gneiss)

APPENDIX C – SOIL LOGS (HARD ROCK)

Sample ID: CTP5

Co-ordinates

418266 mE

6252370 mN



Sample ID: CTP6

Co-ordinates

418012 mE

6252313 mN



Sample ID: CTP7

Co-ordinates

418006 mE

6252177 mN



CTP15

0.0-0.05	loamy top soil
0.05-0.4m	chocolate loam clay with blocky rubblely dolerite
0.4-0.9m	blocky saprock dolerite
0.9m	EOH – fresh dolerite - refusal



CTP16

0.0-0.05m	loam topsoil
0.05-0.3m	chocolate loam with Dolerite fragments
0.3-1.2m	orange brown clay
1.2-3.8m	tan green clay (Dolerite upper saprolite)
3.8-4.2m	green tan deeply weathered Dolerite



CTP17

0.0-0.05m	loam topsoil
0.05-0.4m	chocolate loam with Dolerite fragments
0.3-1.8m	red orange clay
1.8-2.6m	hard digging lower saprolite, sericite rich Gneiss
2.6m	EOH- couldn't dig deeper- refusal



CTP18

0.0-0.15m	loamy chocolate topsoil
0.15-0.5m	chocolate loam with Dolerite fragments
0.5-1.9m	green tan clay
1.9-2.4m	blocky weathered saprock dolerite
2.4m	EOH- fresh Dolerite.



CTP19

0.0-0.2m	loamy top soil
0.2-0.7m	red orange loamy clay
0.7-3.8m	tan orange clay
3.8-5.0m	gneiss lower saprolite, sericite (mica) rich.
5.0m EOH	



CTP20

0.0-0.4m loamy chocolate topsoil with blocks of fresh Dolerite

0.4-1.6m chocolate clay

1.6-1.9m tan clay - deeply weathered gneiss

1.9-2.8m lower saprolite gneiss



CTP21

0.0-0.4m	chocolate loam topsoil with minor dolerite fragments
0.4-0.8m	dark chocolate clay
0.8-1.9m	greeny tan clay
1.9-2.3m	Dolerite sap rock
2.3m	EOH refusal



APPENDIX D – TRANSPORT IMPACT ASSESSMENT

PTG.04756

Transport Impact Assessment Proposed Extractive Industry Lots 3938 & 7971 Catterick Road, Catterick

2 July 2026 | Revision A
Prepared for Iron Horse Pastoral Pty Ltd

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REPORT DETAIL

Unique Document Identification

	Information
Document Title	Transport Impact Assessment – Proposed Extractive Industry – Lots 3938 & 7971 Catterick Road, Catterick
Project Number	PTG.04756
Document ID	R001 - Rev A
Client	Iron Horse Pastoral Pty Ltd

PTG Consulting Office Details

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Revision Details

Revision No.	Date	Comments	Author	Approve/Review
A	2/07/26	For Issue	SC/BS	SL

1 INTRODUCTION

1.1 Background

PTG Consulting (PTG) has been commissioned by Iron Horse Pastoral Pty Ltd ('the Client') to prepare a Transport Impact Assessment (TIA) for a proposed extractive industry development located at Lots 3938 & 7971 Catterick Road, Catterick.

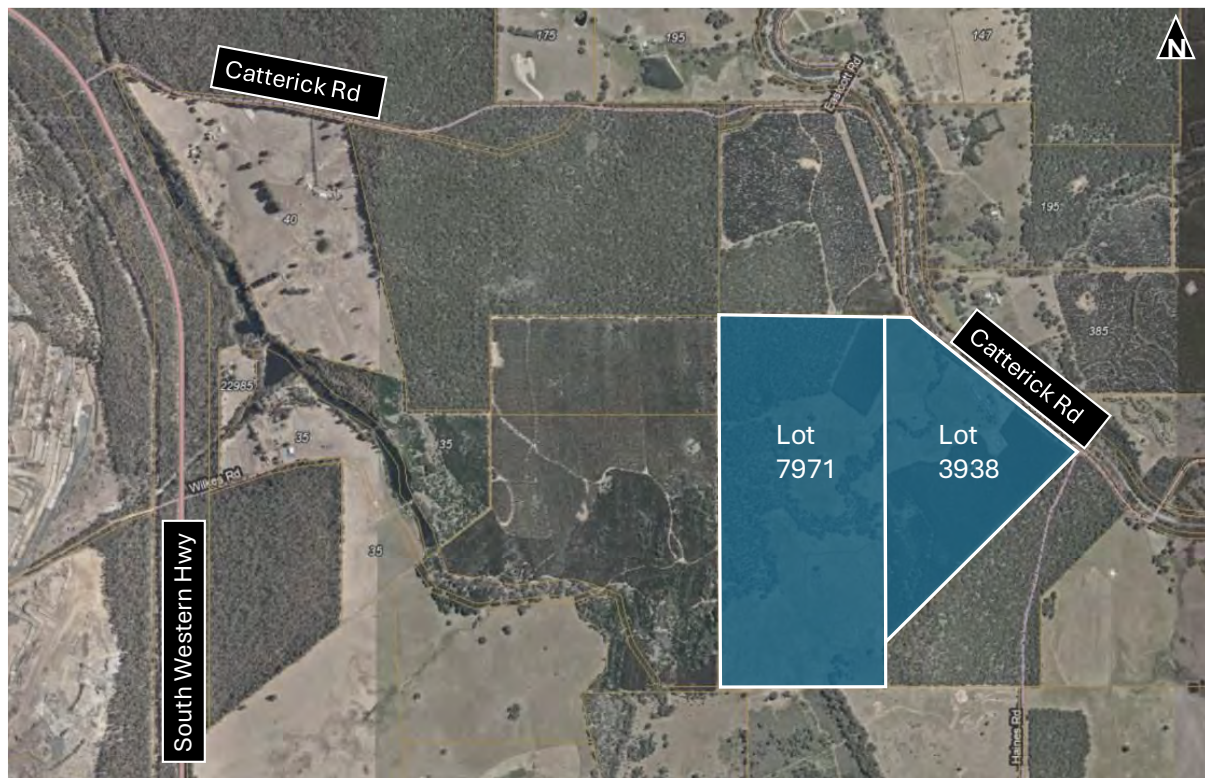
This report has been prepared in accordance with the *Western Australian Planning Commission (WAPC) Transport Assessment Guidelines for Developments: Volume 4- Individual Developments (2016)* and the *Shire of Bridgetown-Greenbushes Policy Manual – Land Use and Planning Policy No. 11 – Extractive Industry Policy*. The WAPC TIA Checklist is included in **Appendix A**.

This report aims to assess the operations of the proposed development, its connections to the adjacent road network, and the proposed haulage route.

1.2 Site Location

The site is located at Lots 3938 & 7971 Catterick Road, Catterick, as shown in **Figure 1**. The Site is located within the municipality of the Shire of Bridgetown-Greenbushes, approximately 5.7 km southeast of Greenbushes.

Figure 1 – Site Location



Source: Landgate Locate V5

2 EXISTING SITUATION

2.1 Existing Site Use

According to the Client, the subject site contains a recently cleared blue gum plantation along with areas of previously farmed land. The western section of the Site (Lot 7971) is mostly vacant, as shown in Figure 2.

Figure 2 - Existing Site Use



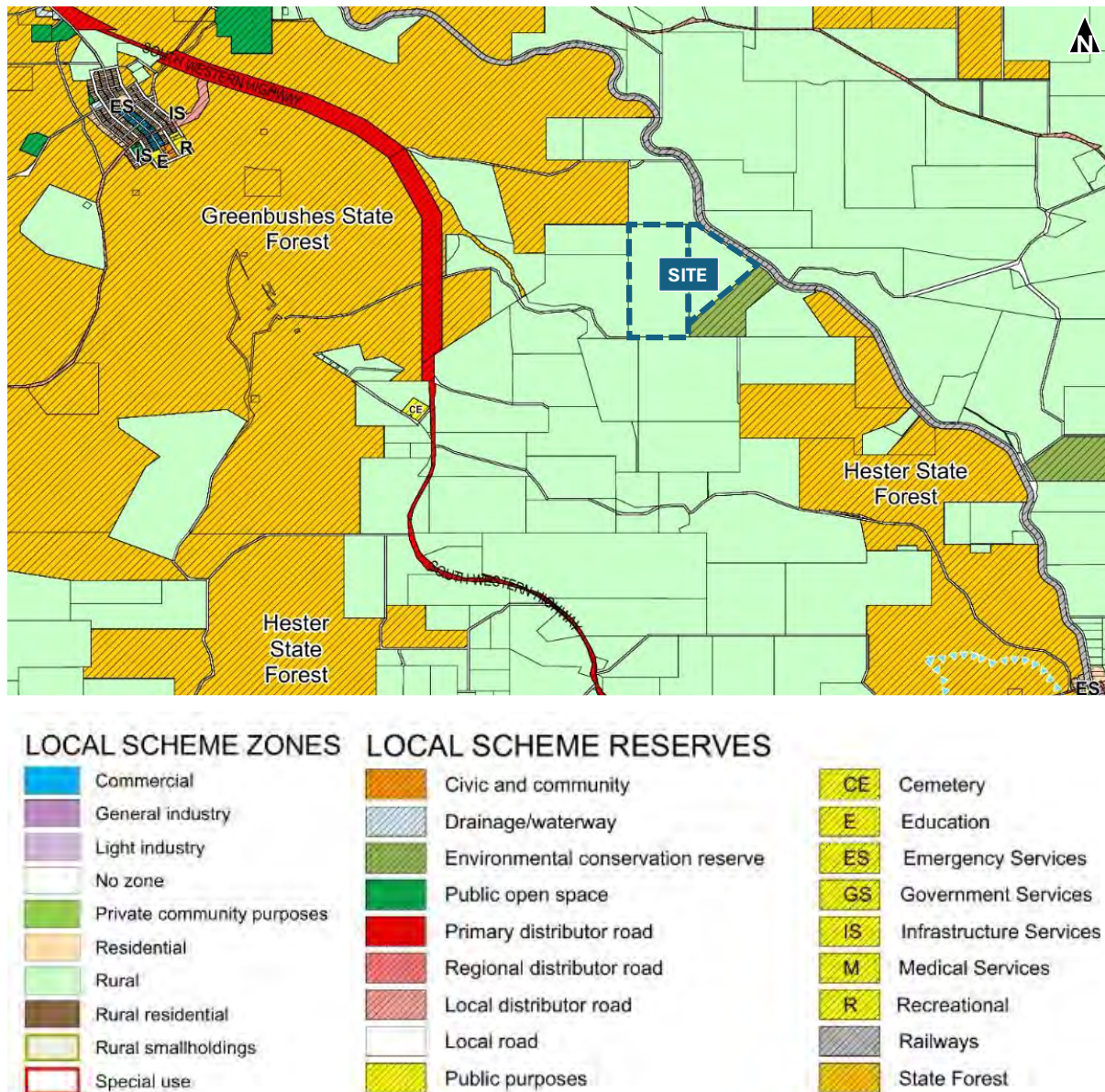
Source: Landgate Locate V5

2.2 Surrounding Land Uses

The Shire of Bridgetown-Greenbushes' *Local Planning Scheme No. 6 (Draft for Public Comment, 2026)* classifies the Site for 'Rural' uses, as shown in Figure 3. Properties immediately surrounding the Site are similarly zoned for rural uses as well, with some lots classified for 'Environmental Conservation Reserve' and as 'State Forest'.

According to the Shire's *Draft LSP No. 6 Table 17 Zoning Table*, use of land for extractive industries within 'Rural' zones are not permitted unless the local government exercises its discretion to grant development approval.

Figure 3 - Land Uses Adjacent to the Subject Site



Source: Shire of Bridgetown-Greenbushes Local Planning Scheme No. 6 (Draft for Advertising, 2026)

2.3 Existing Parking and Demand

With the current use of land within the Site, generation for parking demand is expected to be minimal to none.

2.4 Existing Access Arrangements

Access to the Site is provided through an existing crossover at the northeastern side of Lot 3938 along Catterick Road, as shown in Figure 4. The access is approximately 4km from South Western Highway and 4.9km from Greenbushes – Boyup Brook Road.

Figure 4 - Existing Access Point



Source: Landgate Locate V5

2.5 Existing Site Traffic

With the current use of land within the Site, generation of vehicular trips is expected to be minimal to none.

2.6 Existing Road Network and Traffic Management

2.6.1 Road Hierarchy

The road network within Western Australia is defined by Main Roads WA Road Hierarchy, which describes the function, characteristic and management of each type of road. A description of each road type as per Main Roads WA Road Hierarchy criteria is summarised in **Table 1** below.

Table 1 – Road Hierarchy Description

Road Type	Description
Primary Distributors	Provide for major regional and inter-regional traffic movement and carry large volumes of generally fast-moving traffic. Some are strategic freight routes and all are State Roads. They are managed by Main Roads Western Australia.
District Distributor A	Carry traffic between industrial, commercial and residential areas and generally connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by local government.
District Distributor B	Perform a similar function to type A District Distributors but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These are often older roads with a traffic demand in excess of that originally intended. District Distributor A and B roads run between land-use cells and generally not through them, forming a grid which would ideally space them around 1.5 kilometres apart. They are managed by local government.
Regional Distributor	Roads that are not Primary Distributors but which link significant destinations and are designed for efficient movement of people and goods within and beyond regional areas. They are managed by local government.

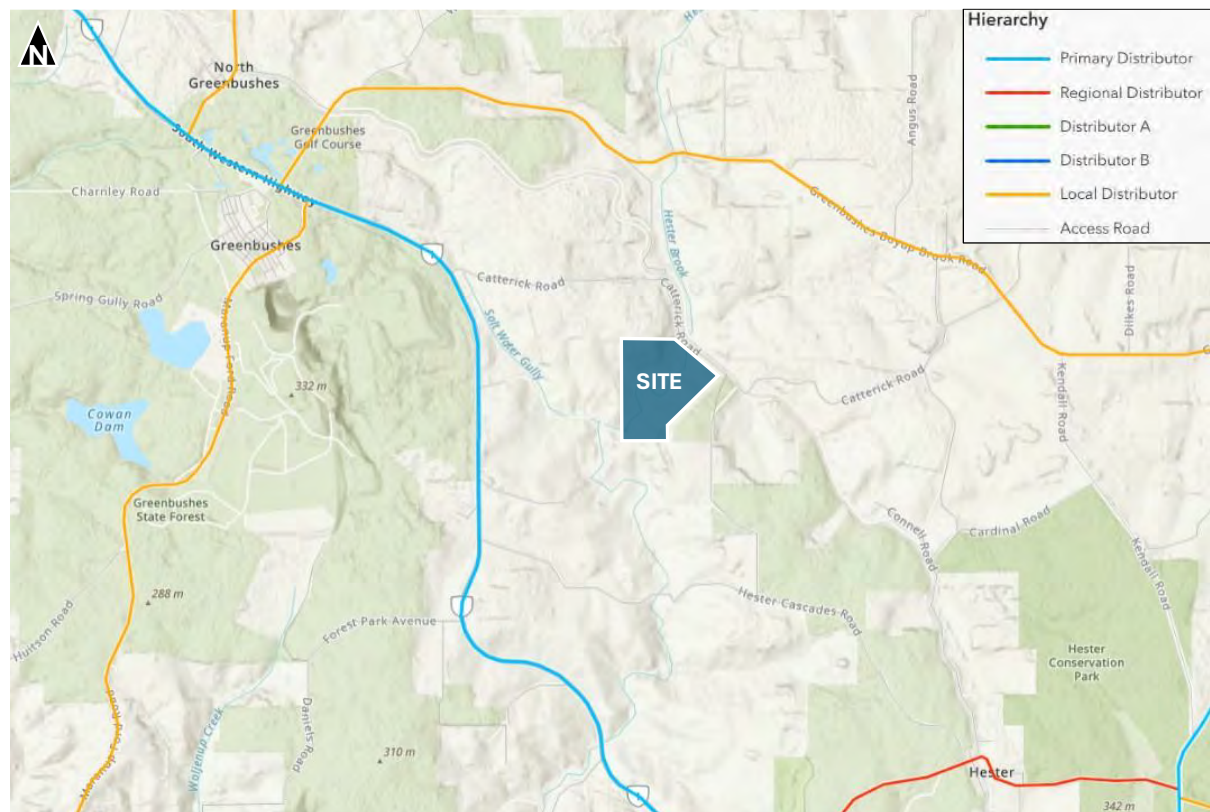
Local Distributor (Urban)	Roads that carry traffic within a cell and link District Distributors or Regional Distributors at the boundary, to access roads. The route of Local Distributors should discourage through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. Urban Local Distributor roads are managed by local government.
Local Distributor (Rural)	Connect to other Rural Distributors and to Rural Access Roads. Not Regional Distributors, but which are designed for efficient movement of people and goods within regional areas. Rural Local Distributor roads are managed by local government.
Access Roads	Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by local government.

Figure 5 and Figure 6 shows the road hierarchy and speed of the surrounding roads, respectively. Table 2 provides a summary of the characteristics of the surrounding road network. Based on remote investigation, Catterick Road is primarily unsealed, except for the first 100-metre (estimated) sealed section from South Western Highway.

Table 2 - Road Network Classification

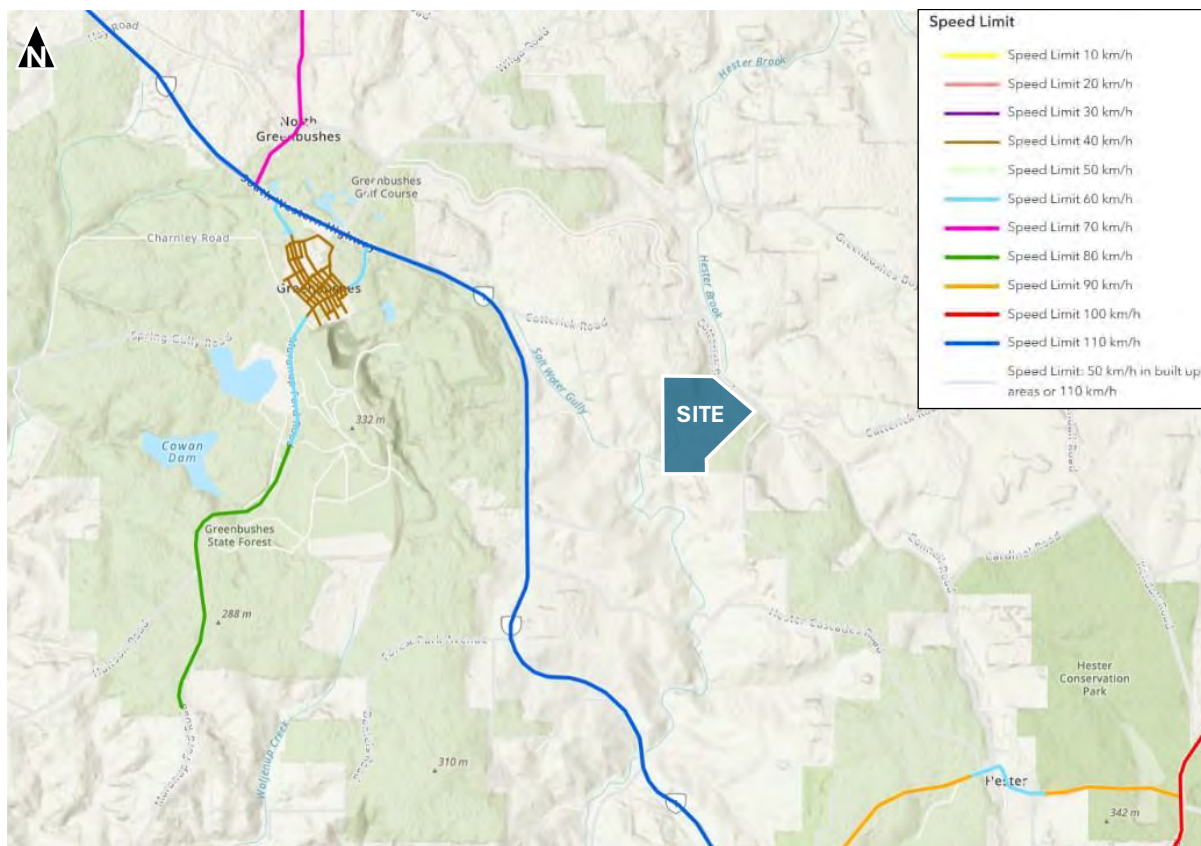
Road Name	Hierarchy	Jurisdiction	No. of Lanes	No. of Footpaths	Sealed Width (m)	Speed Limit (km/h)
South Western Highway	Primary Distributor	MRWA	2	N/A	~12.0	110
Catterick Road	Access Road	Local Government	2	N/A	~4.0 for 100m sealed section	110 (rural default)

Figure 5 - Road Hierarchy of the Surrounding Road Network



Source: MRWA Road Information Mapping

Figure 6 – Speed Limit on the Surrounding Road Network



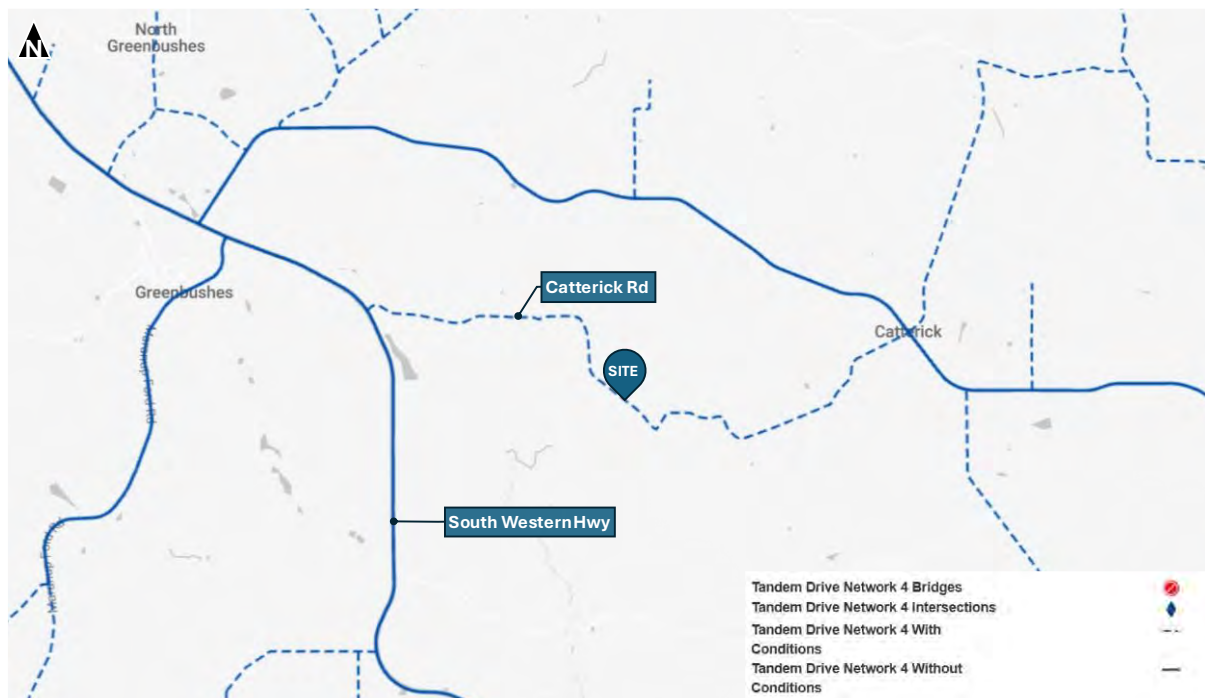
Source: MRWA Road Information Mapping

2.6.2 Existing RAV Network

The existing RAV Network in the vicinity of the Site is shown in **Figure 7**. Both South Western Highway and Catterick Road are currently approved for Tandem Drive Network 4 which allow vehicles up to 27.5m long to access these roads. However, Catterick Road (from SLK 0.0 to SLK 9.16) is approved for Tandem Drive Network 4 given that the following operating conditions are followed:

- » Headlights are to be switched on at all times,
- » Low volume (LV),
- » Maximum speed is set at 40km/h,
- » When travelling at night, the RAV must travel at a maximum speed of 40km/h and display an amber flashing warning light on the prime mover, and
- » Direct radio contact must be maintained with other restricted access vehicles to establish their position on or near the road (suggested UHF channel 40).

Figure 7 - Existing RAV Network



Source: MRWA HVS Network Map

2.7 Traffic Volumes on Surrounding Roads

Existing traffic volumes on the surrounding road network were sourced from MRWA's Traffic Map database and are summarised in **Table 3**. While no counts were available for Catterick Road, during the site visit which lasted close to 2 hours, only 1 vehicle was noted using the road, a truck entering from South Western Highway and accessing a farm property approximately 1.7km from the highway.

Table 3 – Existing Traffic Volumes

Road Name	Count Year	Weekday AM Peak Volume	Weekday PM Peak Volume	Weekday Avg. Daily Volume	% Heavy Vehicles
South Western Highway <i>South of Daronchs Rd</i>	2024/2025	272	355	3,970	36.6
South Western Highway <i>North of Blackwood Park Rd</i>	2025/2026	254	319	3,551	23.4

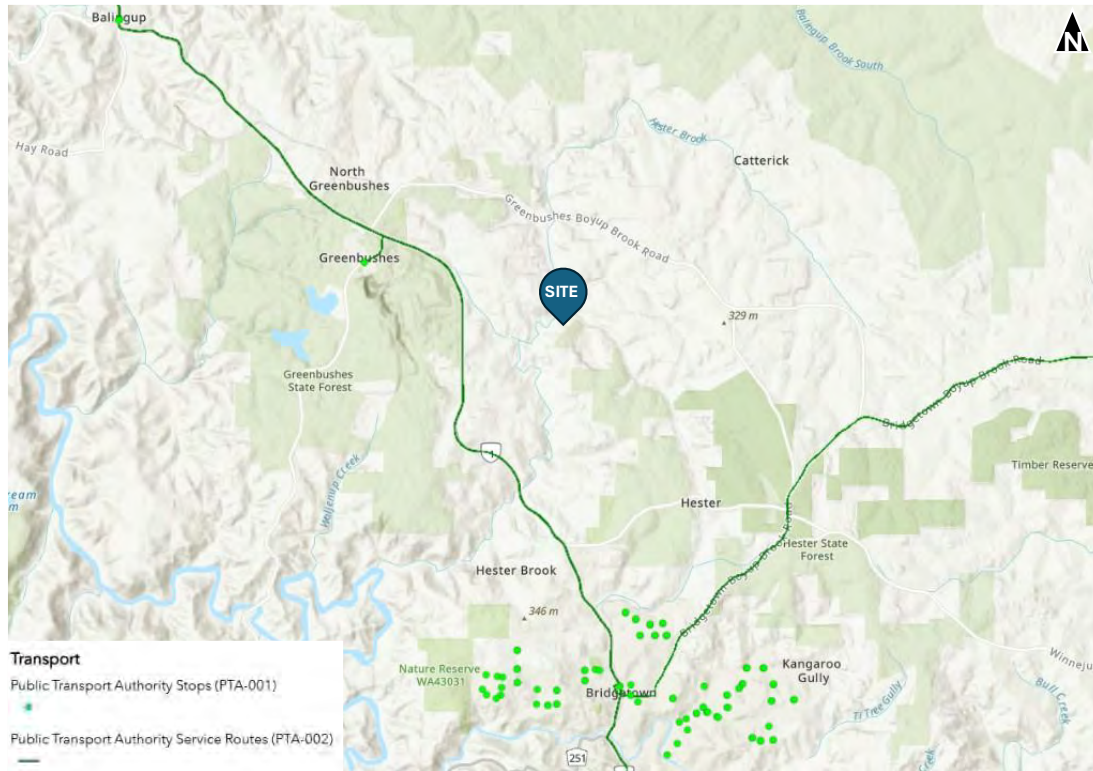
2.8 Existing Pedestrian/Cycle Networks

There are no existing footpaths and cycling paths along South Western Highway or Catterick Road.

2.9 Existing Public Transport Services

TransWA operates several regional bus routes along South Western Highway as shown in **Figure 8**, with the nearest bus stop at Greenbushes, approximately 6.0km away (linear distance) from the Site. TransWA bus services and stops are also currently present at Bridgetown but are at least 10.0km from the Site.

Figure 8 - Location of Existing Bus Stops and Services

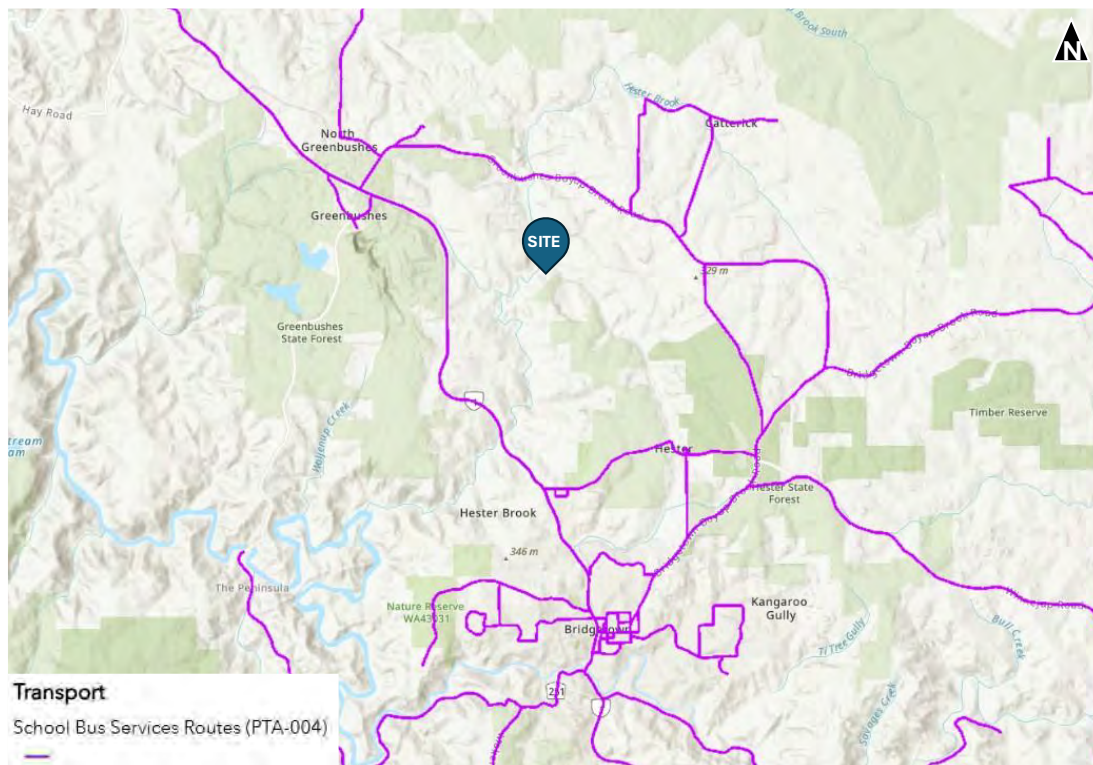


Source: Landgate Locate V5

2.10 Existing School Bus Routes

South Western Highway is identified as a school bus route, as shown in Figure 9. Catterick Road is not identified as a school bus route.

Figure 9 – Existing School Bus Route

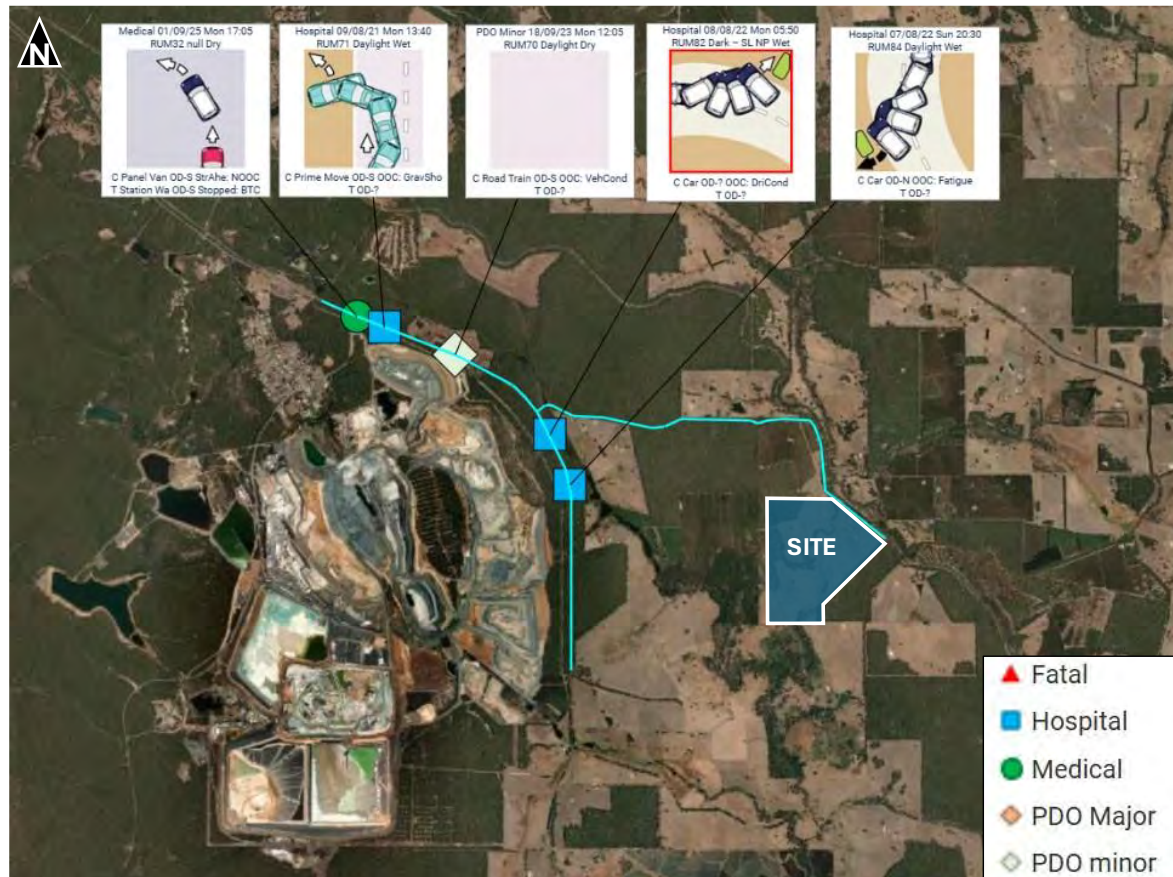


Source: Public Transport Authority

2.11 Crash Assessment

Crash data between 1st January 2021 and 31st December 2025 was obtained from MRWA's Crash Reporting Centre database. Sections along South Western Highway and Catterick Road were considered for this assessment. Findings are summarised in Table 4 and location of the crashes are illustrated in Figure 10.

Figure 10 – Location of Crashes in the Surrounding Area



Source: MRWA Crash Map

Table 4 – Crash Assessment Summary

Crash Nature	Fatal	Hospital	Medical	PDO Major	PDO Minor	Total Crashes
Rear End	-	-	1	-	-	1
Hit Object	-	2	-	-	-	2
Non-collision	-	1	-	-	1	2
Total Crashes	-	3	1	-	1	5

Crash findings are summarised as follows:

- » No crashes recorded along Catterick Road between the Site access and South Western Highway.
- » No serious or fatal injuries were reported in the assessed road sections, particularly at the intersection of South Western Highway and Catterick Road and along Catterick Road up to the Site. Crashes recorded along South Western Highway includes:
 - o Two Hit object crashes resulted in Hospital severity
 - o Two non-collision crashes, one resulted in Hospital severity, and another resulted in property damage minor only.
 - o One rear end crash resulted in Medical severity.

3 PROPOSED DEVELOPMENT

3.1 Proposed Land Use

The proposed development seeks the extraction of gravel, clay, and hard rock at specific areas within the Site, as shown in **Figure 12**.

The gravel and clay quarry will cover an area of approximately 11.7 hectares, with a current maximum elevation ranging from 263m to 205m of the Australian Height Datum (AHD). Materials will be excavated to a maximum depth of 3.0m below ground level (BGL) in six cells, ranging from 1.9 ha to 2.0 ha in for each cell. It is estimated that the total maximum volume of gravel and clay material to be removed from the six cells will be approximately 350,000m³, with approximately 35,000m³ excavated each year, depending on supply and demand.

The hard rock quarry will cover an area of approximately 2 hectares, with a current maximum elevation ranging from 240m AHD to 205m AHD. It will be excavated to a maximum depth of 15.0m BGL in only one cell of approximately 2.0 ha in size. It is expected that blasting will occur twice a month for a 3-month campaign to harvest the hard rock material. The estimated total maximum volume of hard rock material to be removed from the initial 2-hectare cell will be approximately 300,000m³, with approximately 30,000m³ excavated each year, depending on supply and demand.

Overall, the Client seeks to extract approximately 650,000m³ of materials over 10-20 years period, or a combined volume of up to 65,000m³ annually. According to the Client, extraction of either materials within the Site can be concurrent, depending on supply and demand. A high-resolution version of the proposed extraction site extent plan is included in **Appendix B**.

Figure 11 – Proposed Extraction Site Extent



Legend

- | | |
|---------------------------|--|
| Lot boundary | ROM, Stockpile and Laydown areas |
| Gravel/clay extraction | Gravel/clay ROM, stockpile and laydown areas |
| Hard rock haulage route | Hard Rock ROM, stockpile and laydown areas |
| Gravel/clay haulage route | Test Pits |

Source: Accendo Australia Pty Ltd (2024)

3.2 Hours of Operation

According to the Client, typical operating hours for quarries will be adopted for the Site which starts at 7:30AM and ends at 5:30PM every Monday to Friday, and Saturdays between 7:30AM to 1:00PM upon necessity. The Site will not be operating during public holidays. The Site will be worked by 3 to 5 persons, depending on market demand.

3.3 Access Arrangements

Access to the Site is primarily proposed along the existing crossover on Catterick Road including existing internal tracks within the Site, as shown in **Figure 12**. Haulage of extracted materials is anticipated to be undertaken by semi-trailers (19m) and B-doubles (27.5m). Vehicles are expected to utilise Catterick Road to move extracted materials out of the Site and to delivery destinations via South Western Highway.

As discussed in **Section 2.6.2**, both South Western Highway and Catterick Road are currently classified for RAV 4 which allows vehicle access on these roads up to a length of 27.5m. As such, improvements at the intersection of South Western Highway and Catterick Road are not proposed.

Figure 12 – Proposed Access Arrangement



Legend

Haulage Routes

— Hard rock

— Gravel

— Catterick Road

□ Lot boundary

□ Gravel and clay extraction area

□ Hard rock extraction area

Source: Accendo Australia Pty Ltd (2024)

3.4 Parking Provision

3.4.1 Parking Requirements

No formalised parking is proposed on the extractive site. Suitable informal areas for the parking of light and heavy vehicles will be developed in accordance with operational requirements.

3.4.2 Bicycle Parking and End-of-Trip Facilities

As the site is located in a rural area and used for an extractive industry (gravel/clay and hard rock), no end-of-trip facilities will be provided.

4 INTEGRATION WITH SURROUNDING AREA

4.1 Surrounding Major Attractors/ Generators

Bridgetown is the closest major town from the Site, which is located approximately 18km to the south. The Bridgetown Hospital is a public hospital located at the northern periphery of the town, which is accessible by vehicle through South Western Highway.

The closest town from the Site is Greenbushes, approximately 7km northwest of the Site. Attractions and town facilities are primarily mine-oriented as the town is adjacent to a large open-pit mine.

Figure 13 illustrates the key attractors and generators surrounding the Site.

Figure 13 – Surrounding Attractors/Generators

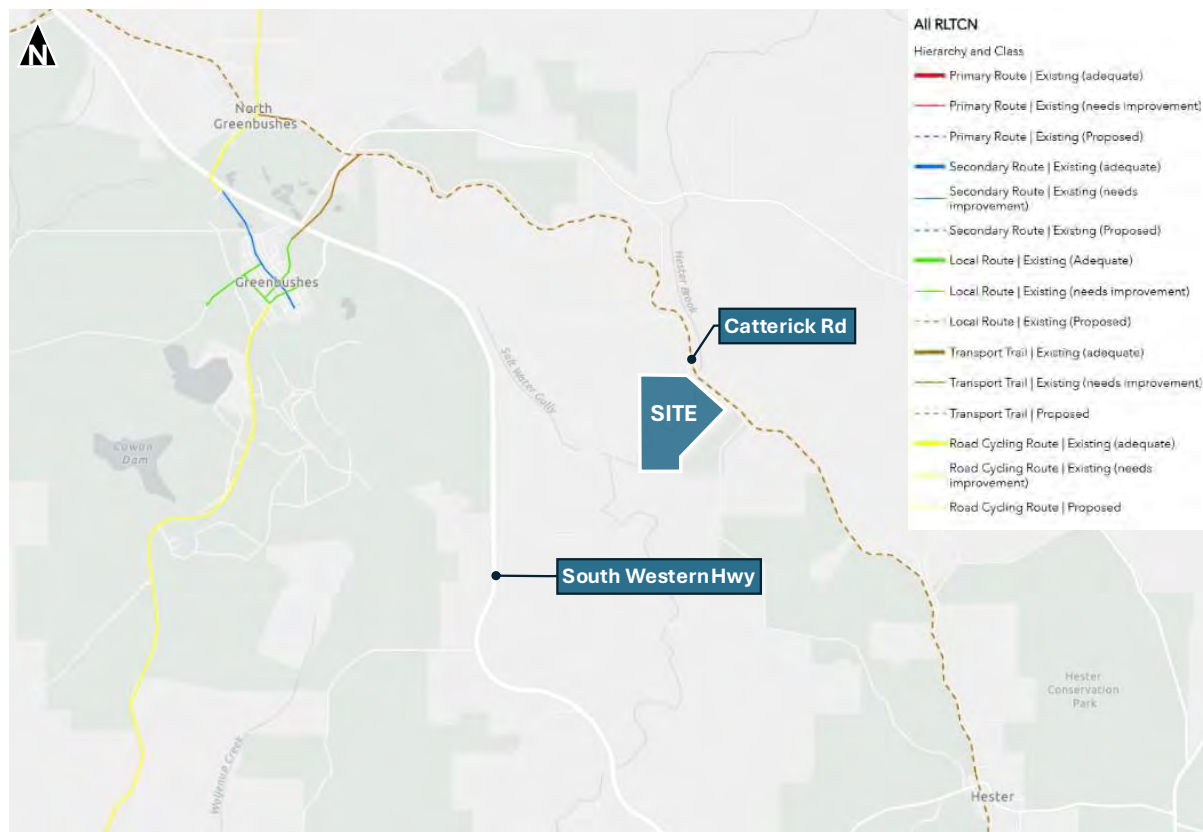


Source: Landgate Locate V5

4.2 Committed Development and Transport Proposals

Figure 14 shows the bicycle routes as identified in the Regional Long-Term Cycle Network (RLTCN) Map. Catterick Road is primarily identified as a proposed 'Transport Trail'. According to the Department of Transport, 'Transport Trails' provide long-distance, off-road (predominantly unsealed) riding experiences through natural settings, away from motorised traffic. They often support recreational and tourism trips between towns and regions. It is noted that this is a long-term aspirational strategy, and funding or timeframe for the implementation of these works are uncertain and have not materialised yet.

Figure 14 – Regional Long-Term Cycling Network



Source: Department of Transport

PTG is not aware of any other future development and transport proposals in the vicinity of the Site.

4.3 Proposed Changes to Land Uses within 1200 metres

There are no planned changes to the land uses within the surrounding area of the Site.

4.4 Adequacy and Deficiencies of the Existing Transport Network

The existing transport network in the vicinity of the Site is adequate for the current and known future land uses.

5 TRAFFIC GENERATION AND DISTRIBUTION

5.1 Calculation of the Number of Truck Trips Generated

To demonstrate that the annual volume of extracted material can be accommodated within the anticipated truck haulage specifications specified by the Client, this report has undertaken the estimation for the number of truck trips using the methodology specified in the *City of Busselton's Local Planning Policy No. 2.3 – Extractive Industries*. The calculation of truck trips is split into two (2) sections considering that the proposal seeks to extract both clay/gravel and crushed hard rock materials.

5.1.1 Clay/Gravel Extraction

The following assumptions are noted in the estimation of the number of truck trip generated by the extraction of clay and/or gravel:

- » The maximum haulage volume of clay/gravel is 35,000 Bank Cubic Metres (BCM) annually,
- » 70% of the annual haulage volume will be undertaken between October to May (main extraction season), which translates to 32 weeks of haulage,
- » With only five (5) working days per week, and
- » A 15% bulking factor is considered for excavated materials.

The **average daily extraction rate** during the main extraction season is $35,000\text{BCM} \times 70\% / 32 \text{ weeks} \times 5 \text{ working days per week} \times 1.15 \text{ (bulking factor)} = \mathbf{178 \text{ Loose Cubic Metre (LCM) per day}}$

To estimate the number of truck trips per day, the following truck capacities were considered in this assessment:

- » 13.9 LCM per truck for 19m trucks (25-tonne capacity), and
- » 27.8 LCM per truck for 27.5m trucks (50-tonne capacity)

The estimated number of truck trips are:

- » Using 19m trucks: $178 \text{ LCM per day} / 13.9 \text{ LCM per truck} \times 2 \text{ (in and out trips)} = 26 \text{ truck movements per day}$
- » Using 27.5m trucks: $178 \text{ LCM per day} / 27.8 \text{ LCM per truck} \times 2 \text{ (in and out trips)} = 14 \text{ truck movements per day}$

The *City of Busselton's LPP No. 2.3 – Extractive Industry Policy* considers that the demand for extracted materials may vary day to day during the peak extraction season and that it is reasonable to assume that peak day truck trips may be twice the of the estimated average daily truck trips. As such, the policy recommends that a factor of two (2) should be applied to derive the peak daily truck trips. For robustness, this report will consider the peak factor multiplier as specified within the City of Busselton's guidelines. As such, the indicative peak-day daily truck trips are as follows:

- » Using 19m trucks: $26 \text{ trucks per day} \times 2 \text{ (peak factor multiplier)} = \mathbf{52 \text{ truck trips per day}}$ during peak day of the main extraction season, and/or
- » Using 27.5m trucks: $14 \text{ trucks per day} \times 2 \text{ (peak factor multiplier)} = \mathbf{28 \text{ truck trips per day}}$ during peak day of the main extraction season.

5.1.2 Crushed Hard Rock Extraction

Following the same pattern in the previous section, the estimation of the number of truck trips generated by the extraction of crushed hard rock considers the following:

- » The maximum haulage volume of clay/gravel is 30,000 Bank Cubic Metres (BCM) annually,
- » 70% of the annual haulage volume will be undertaken between October to May (main extraction season), which translates to 32 weeks of haulage,
- » With only five (5) working days per week, and
- » A 15% bulking factor is considered for excavated materials.

The **average daily extraction rate** during the main extraction season is $30,000\text{BCM} \times 70\% / 32 \text{ weeks} \times 5 \text{ working days per week} \times 1.15 \text{ (bulking factor)} = \mathbf{152 \text{ Loose Cubic Metre (LCM) per day}}$

Two (2) trucks are being considered for haulage movements to and from the Site; 19m trucks with a semi-trailer and 27.5m trucks with double semi-trailers. To estimate the number of truck trips per day, the hauling capacities of these trucks were considered and are detailed as follows:

- » 13.9 LCM per truck for 19m trucks (single semi-trailers with 25-tonne capacity), and
- » 27.8 LCM per truck for 27.5m trucks (double semi-trailers with 50-tonne capacity)

The estimated number of truck trips are:

- » Using 19m trucks: $152 \text{ LCM per day} / 13.9 \text{ LCM per truck} \times 2 \text{ (in and out trips)} = 22 \text{ trucks per day}$
- » Using 27.5m trucks: $152 \text{ LCM per day} / 27.88 \text{ LCM per truck} \times 2 \text{ (in and out trips)} = 10 \text{ trucks per day}$

Considering the same peak factor multiplier as specified within the *City of Busselton's LPP No. 2.3 – Extractive Industry Policy*, the indicative peak-day daily truck trips are as follows:

- » Using 19m trucks: $22 \text{ trucks per day} \times 2 \text{ (peak factor multiplier)} = \mathbf{44 \text{ truck trips per day}}$ during peak day of the main extraction season, and/or
- » Using 27.5m trucks: $12 \text{ trucks per day} \times 2 \text{ (peak factor multiplier)} = \mathbf{20 \text{ truck trips per day}}$ during peak day of the main extraction season.

5.1.3 Combined Material Extraction

Table 5 summarises the estimated truck trips generated for both extracted materials within the Site, considering either 19m or 27.5m haulage trucks. According to the Client, extraction of both materials within the Site can be concurrent, depending on supply and demand.

Table 5 – Estimated Truck Trip Generation

		Clay/Gravel	Crushed Hard Rock	Combined Material
Annual Maximum Haulage Volume	BCM per year	35,000	30,000	65,000
Average Daily Extraction Rate	LCM per day	178	152	330
Estimated Truck Movements during peak day of the main extraction season	With 19m trucks single semi-trailer with 25-tonne capacity	52 truck trips per day	44 truck trips per day	96 truck trips per day
	With 27.5m trucks double semi-trailers with 50-tonne capacity	28 truck trips per day	20 truck trips per day	48 truck trips per day

5.2 Calculation of Trips Generated by Staff/Employees

The estimation of trips generated by on-site staff or employees (using cars or light vehicles) considers the following assumptions:

- » According to the Client, the number of on-site staff may vary between 3 to 5 people depending on market demand and supply. For robustness, this report will consider the maximum number of on-site staff which is five (5) people at any given time.
- » It is assumed that staff movements to and from the Site will occur at least four (4) times within the workday: arriving in the morning, heading out for lunch, returning from lunch, and leaving in the afternoon.
- » Staff movements are considered to occur outside of the Site's peak-hour traffic generation but are included in the daily trips.

As such, the trip generation of staff/employees are summarised below in **Table 6**.

Table 6 – Estimated Staff/Employee Trip Generation

	Peak Hour		Daily	
	IN	OUT	IN	OUT
Staff/Employee using cars or light vehicles	0	0	10	10
	0		20	

Staff/employee trip generation is estimated to be 20 vehicle trips daily. Light vehicle trips generated by on-site staff / employees are expected to occur outside of the typical network peak periods.

5.3 Development Traffic Generation

With the discussions of traffic generation from haulage trucks and staff/employee movements in the previous sections, the overall peak-hour and daily traffic generation of the Site is summarised in **Table 7**. The estimated development-generated trips further consider the following assumptions:

- » The indicative peak day truck trip is likely to occur during the peak period of the year, which occurs within the main extraction season, between October to May,
- » During the rest of the season and outside of the main extraction season, the average daily truck trips volume is expected to be lower.
- » Peak haulage movements are expected to occur during the first hour of operation (7:30am to 8:30am), with an estimated maximum of **12 truck trips** within the hour for 19m haulage trucks and an estimated maximum of **8 truck trips** for 27.5m haulage trucks.
- » It is expected that the remaining haulage movements will be spread out across the rest of the 9-hour workday.

Table 7 – Estimated Development Trip Generation

	19m Trucks				27.5m Trucks			
	Peak Hour		Daily		Peak Hour		Daily	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Staff/Employee	0	0	10	10	0	0	10	10
Truck Haulage	6	6	48	48	4	4	24	24
Total	6	6	58	58	4	4	34	34
	12		116		8		68	

The proposed development is estimated to generate a maximum of approximately 116 vehicle trips daily and 12 vehicle trips in the peak-hour period, which considers utilisation of 19m trucks for haulage operations. The peak-hour trip generation slightly reduces to only 8 vehicle trips if 27.5m trucks will be used for haulage operations. It should be noted that during the Site's peak hour, trip generation is expected to come from truck movements only.

The estimated trip generation values associated with the development falls within the “moderate impact” range according to WAPC TIA guidelines, and no detailed intersection analysis is warranted.

5.4 Distribution of Generated Traffic

Haulage of extracted materials will primarily be undertaken via Catterick Road to access South Western Highway. It is estimated that half of these vehicles (50%) will travel to/from the north of Catterick Road while the remaining half (50%) will travel to/from the south along South Western Highway.

6 ANALYSIS OF TRANSPORT NETWORK

To inform the assessment, a site inspection of the crossover and haulage route was carried out by PTG on Friday, 08 June 2026. The weather at the time of the inspection was cloudy with occasional rain, and the road surface was wet.

6.1 Analysis of the Development Access

6.1.1 Geometry

The Site's existing crossover (at SLK 4.14) and the section of Catterick Road fronting the Site are currently unsealed with only wood fencing and a gate along the perimeter as physical obstructions to vehicle movements.

A swept path analysis was undertaken using the proposed 27.5m and 19m haulage trucks. As shown in **Figure 15** and **Figure 16**, the design vehicle can adequately manoeuvre in and out of the Site. However, two trucks will not be able to turn in/out at the crossover simultaneously. As the truck volumes are relatively low and spread evenly throughout the workday it is considered that this arrangement is acceptable for the proposed 10-year life of the pit with traffic management measures in place to manage arrivals and departures.

A high-resolution version of swept path plans is included in **Appendix C**.

Figure 15 – Swept Path Analysis – 27.5m Truck

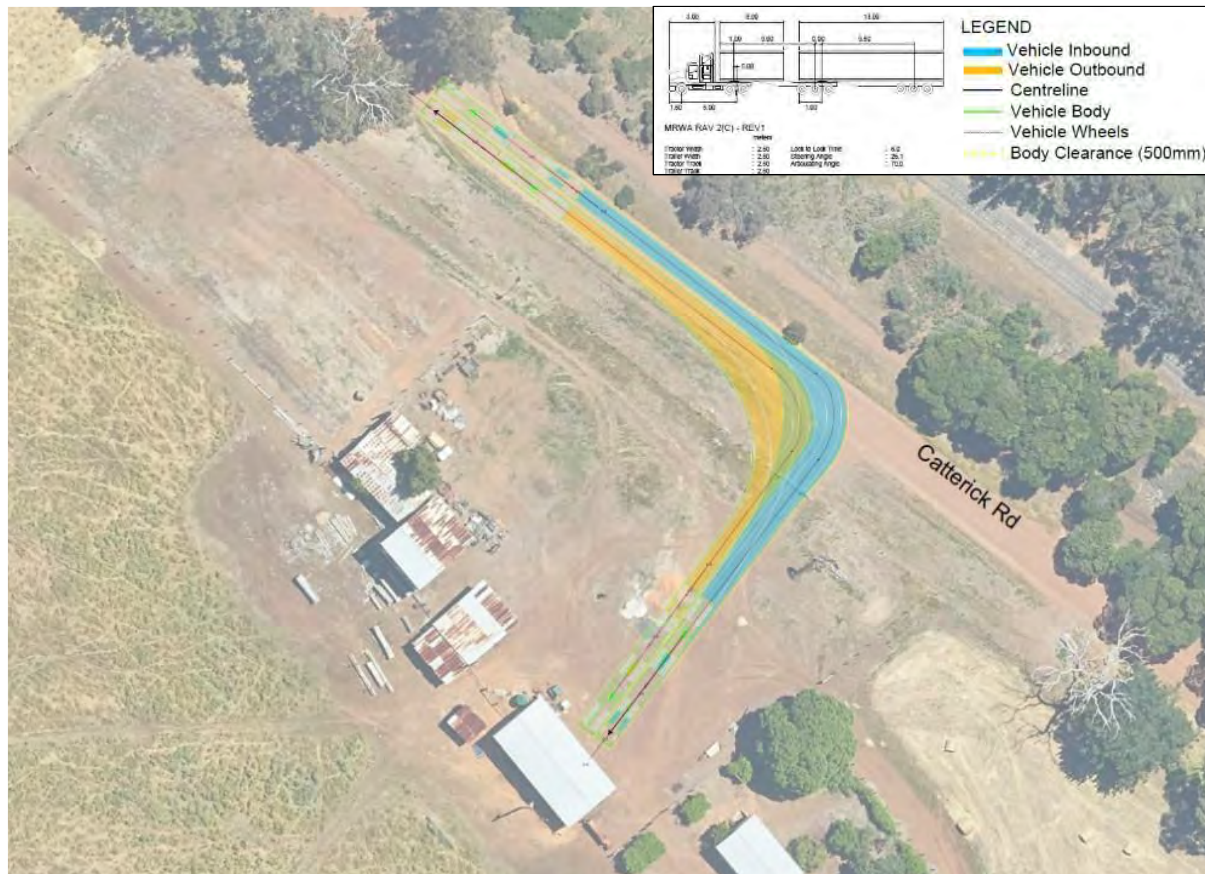
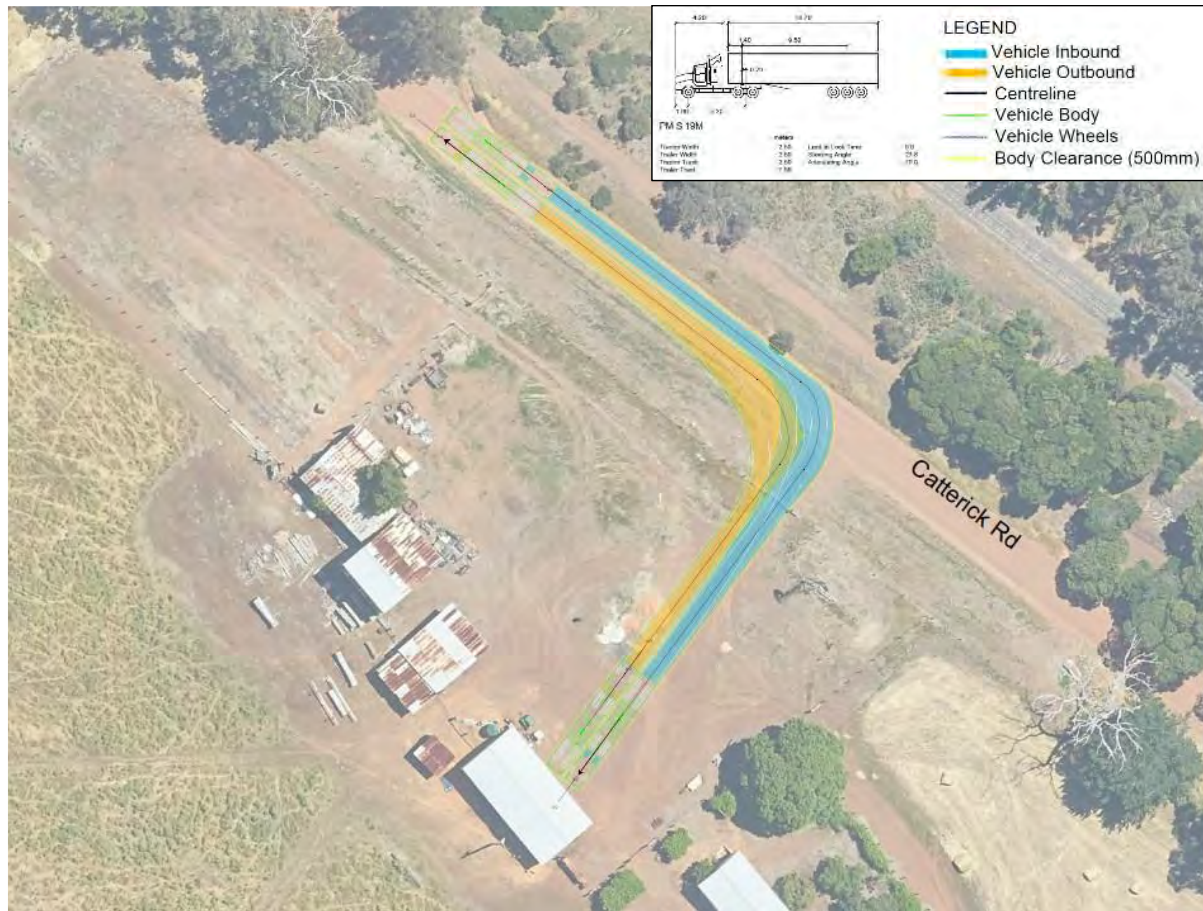


Figure 16 – Swept Path Analysis – 19m Truck



6.1.2 Existing Condition

Highlighted in yellow, **Figure 17** and **Figure 18** illustrates the condition of the existing crossover.

The existing first 20m of the crossover into the Site is unsealed and is measured to be approximately 5.0m wide along the property line. The section of Catterick Road fronting the Site is also unsealed and un-kerbed and is measured to be approximately 7.0m wide.

Figure 17 – Existing Crossover - Eastbound along Catterick Road



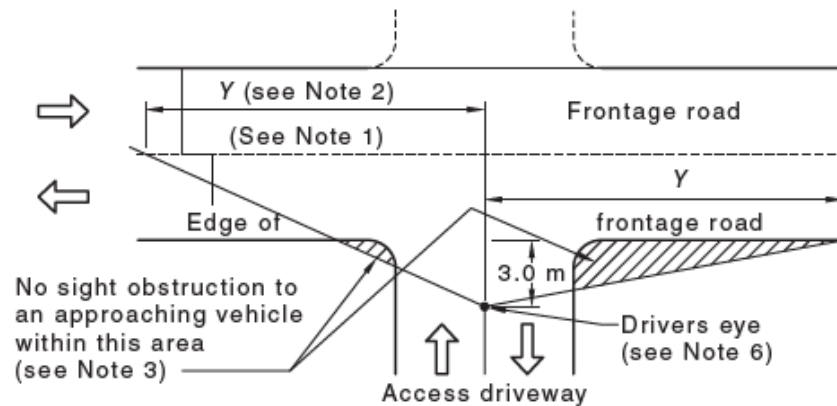
Figure 18 – Existing Crossover - Westbound along Catterick Road



6.1.3 Sight Distance

A sight distance assessment for commercial vehicles was undertaken for the access driveway in accordance with Australian Standards AS2890.2 – *Off-street Commercial Vehicle Facilities*. As shown in **Figure 19**, the required sight distance for a frontage road speed of 110km/h is **153m** for a 5-second gap and **244m** for an 8-second gap.

Figure 19 – Required Sight Distance



Frontage road speed (see Note 4) km/h	Distance (Y) along frontage road (see Note 5) m	
	5 s gap	8 s gap
40	55	89
50	69	111
60	83	133
70	97	156
80	111	178
90	125	200
100	139	222
110	153	244

Source: AS2890.2

As shown in **Figure 20** and **Figure 21**, large tree trunks and low-hanging tree branches partially obstructs the sightline towards the Site's existing crossover. Minor pruning of low-hanging tree branches and surrounding vegetation can improve the sightline towards the Site's access point. It is noted however that given the unsealed nature of Catterick Road and the general road geometry, vehicles using the road would likely be travelling at speeds significantly lower than 110km/h.

Figure 20 – Sightline at approximately 153m to the Site (at SLK 3.97)



Figure 21 – Sightline at approximately 244m to the Site (at SLK 3.89)



As shown in **Figure 22**, The minimum required sight distance of 153m is theoretically available to the right of the existing crossover since Catterick Road continues eastward in a linear horizontal alignment. However, due to the presence of dense vegetation along Catterick Road, the sightline may partially be obstructed. Minor pruning of low-hanging tree branches and surrounding vegetation may improve the sightline to and from the Site.

Figure 22 – Sight Distance to the Right of the Existing Crossover



Figure 23 shows the summary of the sight line assessment. Since it is anticipated that haulage trucks will exit the site and head towards South Western Highway, only the left side of the existing crossover was assessed for the required sight distance's viability along Catterick Road.

Overall, the minimum required sight distance of 153m to either side of the existing crossover is achievable and can be further improved by clearing the vegetation and low-hanging branches. A high-resolution version of the figure is provided in **Appendix D**.

Figure 23 - Sight Line Assessment



6.1.4 Summary of Recommended Works

Overall, it is considered that the existing crossover is suitable for the proposed development. However, vegetation should be cleared within the sight triangles to a height of 2.5m above road level to provide adequate sight lines.

6.2 Analysis of Catterick Road

6.2.1 Geometry

The section of Catterick Road fronting the Site is unsealed and unkerbed and is approximately 7.0m wide. The section of Catterick Road leading to South Western Highway is also unsealed and unkerbed, except for the last 100m leading into the highway (between SLK 0.0 to SLK 0.1). This sealed section of Catterick Road is approximately 9.0m wide and is also unkerbed.

Another sealed section of Catterick Road was identified between SLK 3.75 and SLK 3.85 and is approximately 100m in length. This sealed section of Catterick Road includes an existing bridge (3703A) that crosses the Hester Brook Creek and is measured to be approximately 7.0m wide. This bridge is also unkerbed as with the rest of the sealed section of Catterick Road.

Between South Western Highway and the Site Access, the widths of the unsealed sections of Catterick Road were measured to vary between 5.0m and 7.0m. The unsealed section approximately between SLK 1.75 and SLK 3.73 was generally observed to be narrow with at least 5.0m carriageway width. This section of road is surrounded by dense vegetation with thick tree trunks running along its unkerbed edges.

The traffic expected to be generated by the extractive site and existing traffic on Catterick Road is low. However, it is recommended that a few localised areas should be widened to facilitate two-way passing of vehicles within the narrow sections of Catterick Road. Majority of Catterick Road is unsealed and is surrounded by dense verge vegetation. As such, it is recommended that regular dust mitigation, verge clearing, and vegetation pruning measures be conducted during mining operations to reduce any potential impacts along Catterick Road.

6.2.2 Road Condition

An inspection of Catterick Road between SLK 0.0 (intersection with South Western Highway) and SLK 4.14 (Site Access) was undertaken during June 2026. This section of Catterick Road is already approved for Tandem Drive Network 4, which allows vehicle access up to 27.5m long (see **Section 2.6.2**).

Figure 24 to Figure 32 shows the general road conditions along the assessed section of Catterick Road.

Figure 24 – Catterick Road approaching South Western Highway (looking south east)



Figure 25 – Catterick Road approaching South Western Highway (looking north west)



Figure 26 – Catterick Road at SLK 2.31 (Narrow Unsealed Section)



Figure 27 – Catterick Road at SLK 2.41 (Narrow Unsealed Section)



Figure 28 – Catterick Road at SLK 2.42 (Narrow Unsealed Section)



Figure 29 – Catterick Road at SLK 3.21 (Narrow Unsealed Section)



Figure 30 – Catterick Road at SLK 3.32 (Narrow Unsealed Section)



Figure 31 – Catterick Road at SLK 3.74 (Existing Bridge crossing the Hester Brook Creek)



Figure 32 – Catterick Road at SLK 3.87 (Existing Bridge crossing the Hester Brook Creek)



6.2.3 Traffic Impact

As outlined in **Section 5.3**, the proposed development is estimated to generate a total of between 68 and 116 vehicle movements per day considering utilisation of 27.5m and 19m haulage trucks. Daily traffic movements will comprise of the following:

- » 20 light vehicle movements, and
- » Up to 24 laden and empty 27.5m truck movements, or
- » Up to 48 laden and empty 19m truck movements.

In terms of peak-hour traffic generation, it is estimated the Site will generate the following peak-hour vehicle movements considering the type of truck used for haulage:

- » 8 vehicle movements using 27.5m trucks, or
- » 12 vehicle movements using 19.0m trucks.

According to the WAPC TIA Guidelines, if a development's estimated peak-hour trip generation falls between 10 to 100 vehicle trips, a moderate impact is anticipated on the Site's surrounding road network. Low impact is anticipated if a development's peak-hour trip generation is estimated to be less than 10 vehicle trips.

6.2.4 Conclusion

Overall, the proposed extractive industry is unlikely to have a significant impact on the overall safety and operations of the surrounding road network.

Haulage movements can also follow a one-way flow along Catterick Road wherein trucks enter from the east of the Site and exit to the west heading to South Western Highway. In this way, impacts along the narrow sections of Catterick Road can be reduced. Using restricted access vehicles (RAVs) is also recommended as it results in less trips being generated for haulage operations. Since Catterick Road is currently approved for RAV operations under conditions specified in **Section 2.6.2**, the overall impact of the haulage operations along Catterick Road may be further mitigated.

6.3 Analysis of Catterick Road/South Western Highway Intersection

6.3.1 Geometry

The intersection of Catterick Road and South Western Highway entails simple turn treatments (Type SR & SL), as shown below in **Figure 33**.

Figure 33 – Aerial View of Catterick Road/South Western Highway Intersection



Source: Landgate Locate V5

A swept path assessment was conducted to verify turn movements of 19m and 27.5m haulage trucks at this intersection. **Figure 34** and **Figure 35** shows the swept paths diagrams of the haulage trucks as it enters and exits Catterick Road. A high-resolution version of swept path plans is included in **Appendix C**.

In general, the swept paths indicate that the existing intersection layout can accommodate the turning movements of either haulage trucks considered. However, the following specific findings were observed in using the haulage trucks at this intersection:

- » A lane-correct entry of a 27.5m truck into Catterick Road entails occupying almost the entire width of the Catterick Road approach leaving little to no space available for outgoing traffic heading into South Western Highway.
- » On the other hand, there seems to be enough space for outgoing traffic along Catterick Road when a 19m truck turns in.
- » A southbound (left-turning) 27.5m truck will need to occupy the opposing traffic lane of South Western Highway. For a right-turning truck, a portion of the sealed shoulder will be occupied momentarily before reaching the northbound lane of South Western Highway.
- » For a 19.0m truck, minimal to no encroachments were identified in any of the turning movements into South Western Highway.

Figure 34 – Swept Path at Existing Intersection – 27.5m Truck

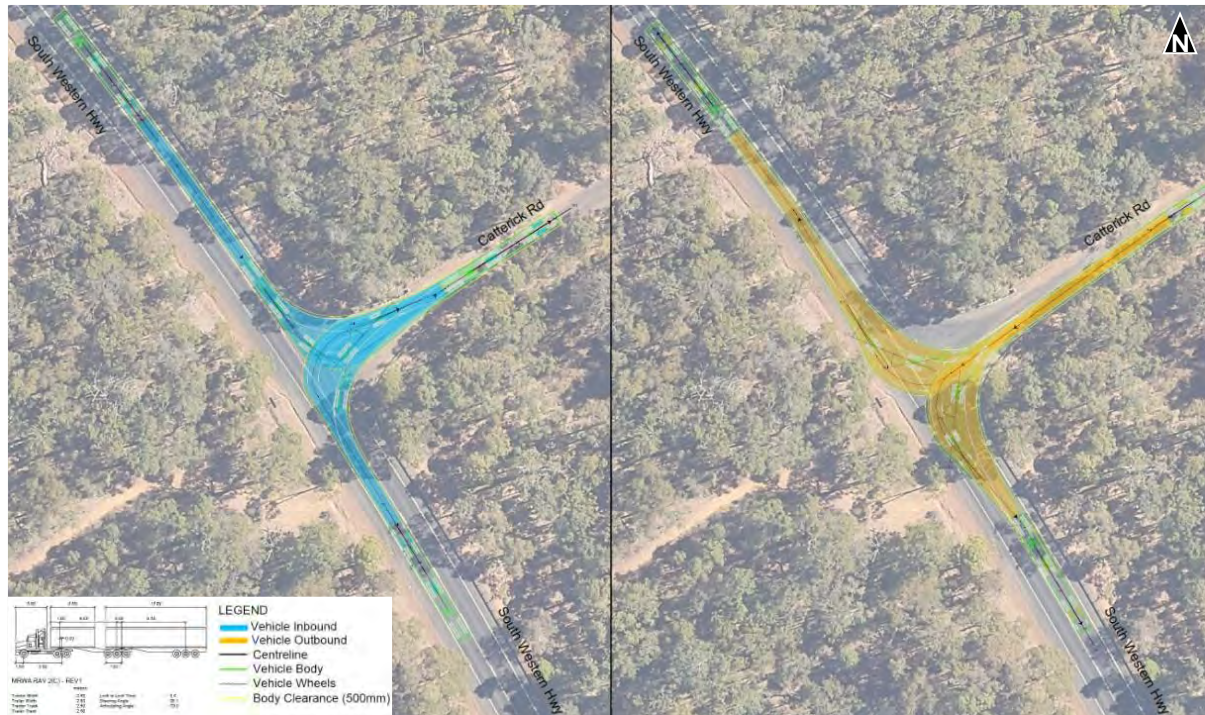


Figure 35 – Swept Path at Existing Intersection – 19.0m Truck



6.3.2 Intersection Analysis

As the traffic volumes generated by the proposed development are well below 100vph, no detailed intersection analysis (e.g. SIDRA) is warranted under the WAPC *Transport Assessment Guidelines*.

A turn warrant assessment was undertaken in accordance with the MRWA Supplement to Austroads Guide to Traffic Management Part 6, for Catterick Road/South Western Highway intersection for the Site's peak hour traffic volumes.

There are no existing traffic volumes on the intersection of Catterick Road and South Western Highway. As such, the peak-hour traffic flow along South Western Highway for the existing year (2026) was adopted from existing counts as summarised in **Table 3**. Since no traffic counts are available along Catterick Road, only development-generated trips were considered in this assessment.

As mentioned in **Section 5.4**, development traffic is equally distributed to/from South Western Highway (50% northbound and 50% southbound). These traffic volumes are used as an input for the turn warrant assessment in the existing year (2026) scenario to further verify the current turn treatments at this intersection. **Figure 36** and **Figure 37** illustrates the peak-hour volume inputs for the turn warrant assessment, considering usage of 27.5m and 19.0m haulage trucks.

Figure 36 – Turn Warrant Assessment – Existing Year (2026) using 27.5m Trucks

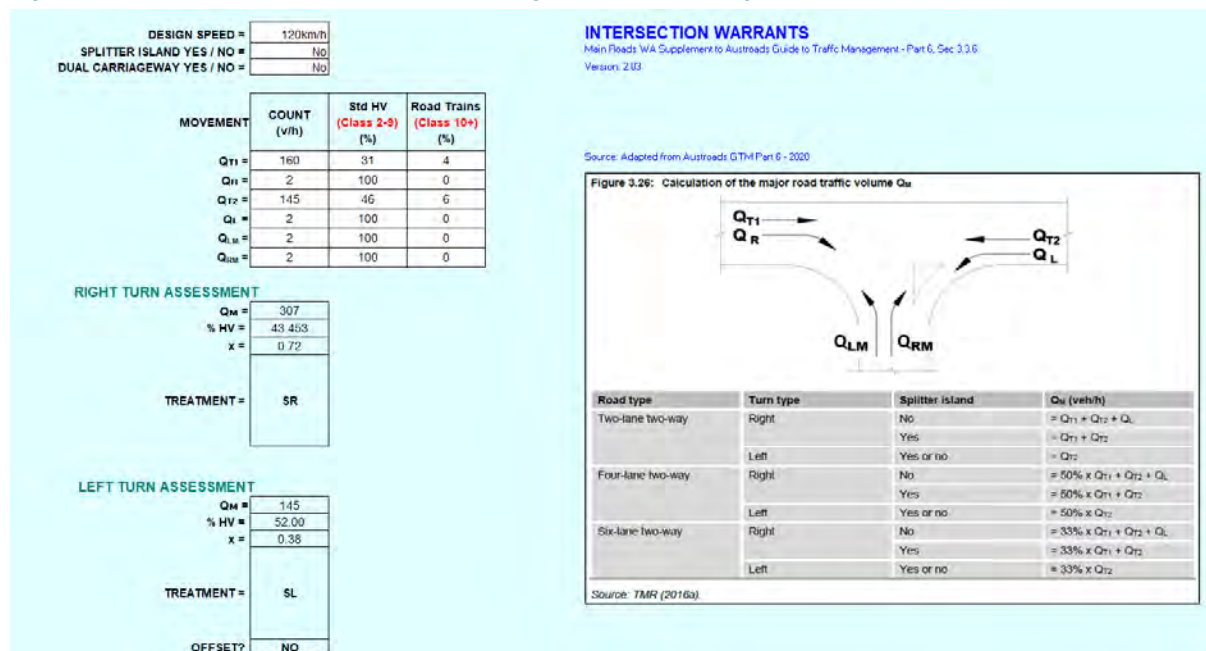
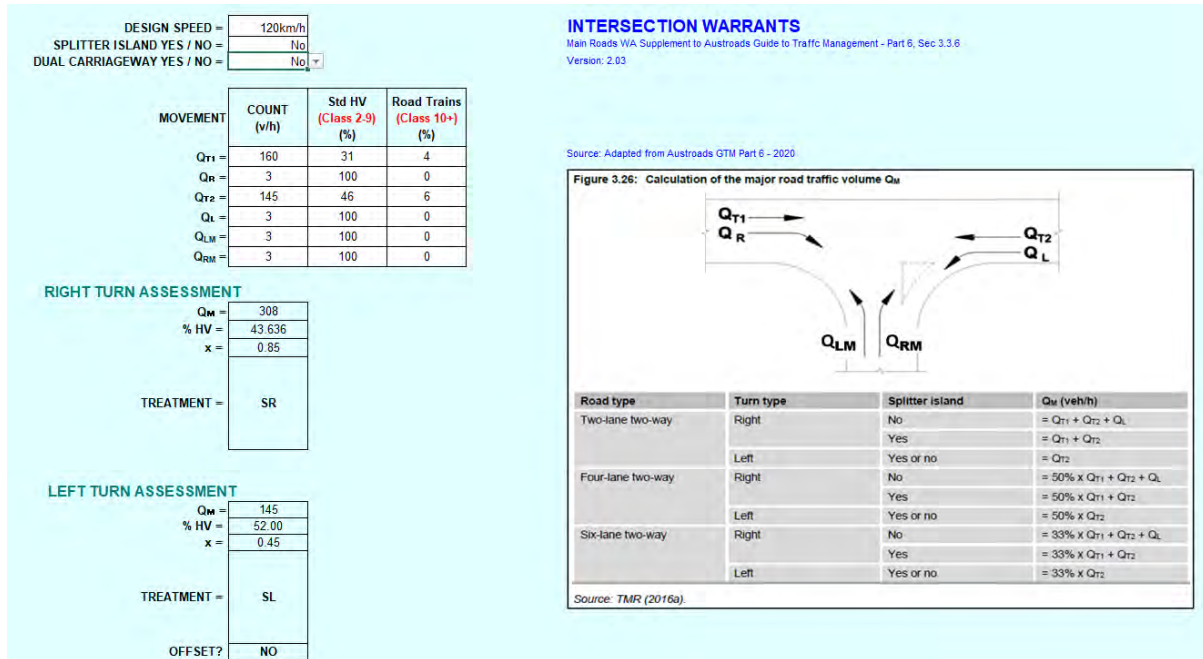


Figure 37 – Turn Warrant Assessment – Existing Year (2026) using 19.0m Trucks



The turn warrant assessments using the adopted existing year (2026) and development traffic volumes in the peak-hour period indicates that the required turn treatments are Simple Right (SR) and Simple Left (SL) treatments. It is noted that currently, this intersection entails both simple turn treatments (Type S). As such, the intersection already provides a suitable treatment that can accommodate the Site's peak-hour traffic movements. However, the turn warrant assessment did not consider background traffic growth along both South Western Highway and Catterick Road. Traffic counts should be conducted at this intersection to consider the background traffic movements in the existing and future year scenarios.

7 ROAD SAFETY AND ACCESSIBILITY IMPACT

7.1 Impact on Neighbouring Areas

A detailed analysis of traffic movements on Catterick Road and the cumulative impact of the proposed development is provided in **Section 6.2**.

As the proposed haulage route is located through a mostly rural area, the movement of haulage trucks, whether 27.5m or 19.0m in length, is consistent with the road environment of this road and the surrounding roads.

As overall volumes remain low, and the haulage times will not coincide with school bus pick-up and drop-off times and peak tourist times, impact on other road users is expected to be low. However, It is still recommended that haulage operations should occur outside of the school bus pick-up and drop-off times to avoid impacts particularly along South Western Highway.

7.2 Road Safety

The low volume of traffic movements generated by the proposed development is unlikely to have any material impact on road safety along Catterick Road as there were no recorded crashes on the proposed haulage route, particularly at the intersection of Catterick Road and South Western Highway.

7.3 Public Transport Access

Not applicable.

7.4 Pedestrian/ Cycle Access Amenity

Not applicable.

7.5 Analysis of Pedestrian/Cycle Network

Not applicable.

7.6 Safe Walk/ Cycle to School

Not applicable.

7.7 Traffic Management Plan

It is recommended that an operational Traffic Management Plan (TMP) be prepared to document operational requirements for internal and external haulage movements. The TMP should specify, but not be limited to, the following conditions:

- » Haulage time and days.
- » The size and payload of the trucks used for haulage.
- » Quarterly inspection of sight triangles at the site access and removal/pruning of vegetation to maintain adequate sight lines as required.
- » Installation of trucks turning warning signs (MR-WM-42) on Catterick Road on both approaches to the Site's access point.
- » Communication methods to manage the arrival and departure of trucks at the site to avoid conflicts at the site access crossover. For example, which UHF channel to use, which location(s) that drivers must 'call up' when arriving or departing, and the procedure for slowing or stopping to allow an entering truck to clear the crossover.

8 SUMMARY

This report has been prepared in accordance with the Western Australian Planning Commission (WAPC) *Transport Assessment Guidelines for Developments: Volume 4 – Individual Developments* (2016) and the *Shire of Bridgetown-Greenbushes Policy Manual – Land Use and Planning Policy No. 11 – Extractive Industry Policy*. The WAPC TIA Checklist is included in **Appendix A**.

The following conclusions can be drawn from this TIA:

- » The proposed development seeks to extract clay/gravel and crushed hard rock materials within the combined Lots 3938 and 7971 Catterick Road, Catterick. Approximately 650,000m³ of combined materials will be extracted within a ten-year period, or a combined volume of 65,000m³ annually. According to the Client, extraction of either materials within the Site can be concurrent, depending on supply and demand.
- » Typical operating hours for quarries will be adopted for the subject site which involves 7:30 am to 5:30 pm each Monday to Friday and Saturdays 7:30 am to 1 pm (if required), excluding public holidays. The subject site will be worked by 3 - 5 persons, depending on market demand.
- » Extracted material is proposed to be transported using 19m semi-trailers or 27.5m b-double trucks via an existing crossover along Catterick Road, then northwest along Catterick Road to South Western Highway.
- » The proposed haulage route is already approved for Tandem Drive Network 4, which allow vehicle access up to 27.5m long. However, Catterick Road is approved for Tandem Drive Network 4. However, Catterick Road (from SLK 0.0 to SLK 9.16) is approved for Tandem Drive Network 4 given that the following operating conditions are followed:
 - o Headlights are to be switched on at all times,
 - o Low volume (LV),
 - o Maximum speed is set at 40km/h,
 - o When travelling at night, the RAV must travel at a maximum speed of 40km/h and display an amber flashing warning light on the prime mover, and
 - o Direct radio contact must be maintained with other restricted access vehicles to establish their position on or near the road (suggested UHF channel 40).
- » The estimated number of daily trips generated by the proposed development consists of 20 light vehicle movements and 48 heavy vehicle movements (24 laden and 24 unladen) during peak day haulage periods using 27.5m trucks. The number of heavy vehicle movements rises to 96 (48 laden and 48 unladen) if haulage is conducted using 19.0m trucks. The Site's daily traffic generation is estimated to range between 68 and 116 vehicle movements during the peak day of the main extraction season.
- » Following WAPC TIA Guidelines, the peak-hour vehicle movements generated by the Site falls within low to moderate impact category. As such, the proposed extractive industry is unlikely to impose significant impacts on the overall safety and operations of the surrounding road network, particularly on Catterick Road and South Western Highway.
- » The existing width, alignment and sealing condition of Catterick Road have been examined and it is recommended that a few localised areas should be widened to facilitate two-way passing of vehicles. In addition, a Traffic Management Plan (TMP) should be prepared post-approval to further mitigate the impacts along Catterick Road and to further support the proposed mining and haulage operations.
- » The intersection of Catterick Road and South Western Highway currently entails simple turn treatments. Based on swept path assessments at this intersection, the current turn treatments are able to accommodate turning manoeuvres of both 27.5m and 19.0m haulage trucks. In addition, turn warrant assessments in the existing year (2026) indicate that the current turn treatments at this intersection are adequate to accommodate the Site's generated traffic, particularly the heavy vehicle movements in the peak-hour period. The turn warrant assessment was conducted considering adopted traffic volumes along South Western Highway and the estimated haulage traffic volumes on Catterick Road.
- » As the site is an extractive industry operation located in a rural area, public transport, pedestrian, and cycling facilities are not necessary or applicable.
- » Due to the low volume of traffic generated by the development and the absence of any recorded crashes involving heavy vehicles, it is envisaged that any impact on road safety would be minimal.

- » Overall, the site is considered suitable for the proposed development, subject to minor recommended works.

Based on the findings of this report, the following minor works are recommended:

- » Vegetation should be cleared within the sight triangles to a height of 2.5m above road level to provide adequate sight lines.

It is also recommended that a Traffic Management Plan (TMP) be prepared post-approval to document operational requirements for internal and external haulage movements. The TMP should specify, but not be limited to, the following conditions:

- » Haulage time and days.
- » The size and payload of the trucks used for haulage.
- » Quarterly inspection of sight triangles at the site access and removal/pruning of vegetation to maintain adequate sight lines as required.
- » Installation of trucks turning warning signs (MR-WM-42) on Catterick Road on both approaches to the Site's access point.
- » Communication methods to manage the arrival and departure of trucks at the site to avoid conflicts at the site access crossover. For example, which UHF channel to use, which location(s) that drivers must 'call up' when arriving or departing, and the procedure for slowing or stopping to allow an entering truck to clear the crossover.

APPENDIX A

WAPC CHECKLIST



Appendix A – WAPC Checklist

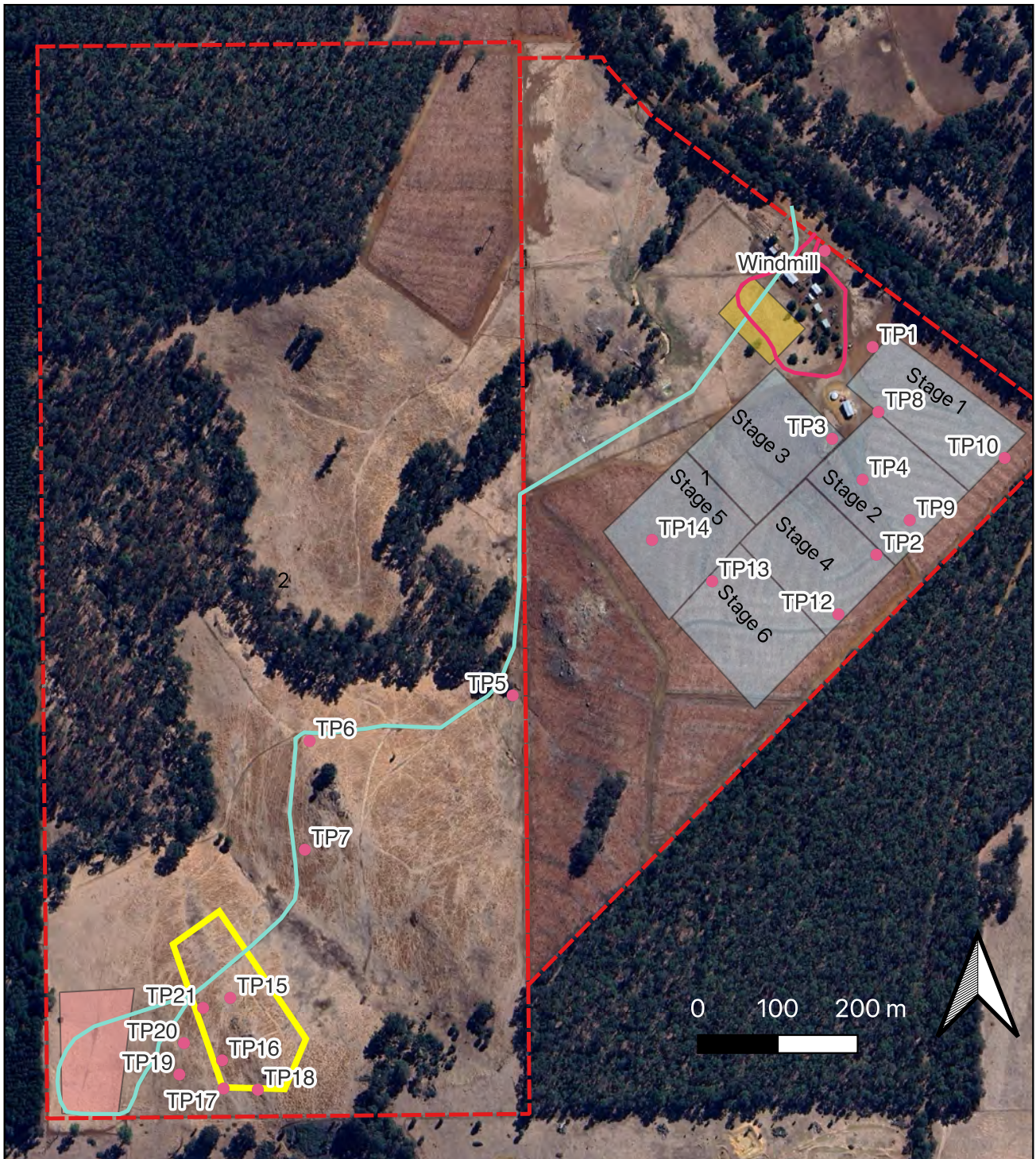
Item	Provided	Comments/ Proposals
Summary		
Introduction/Background		
Name of Applicant and Consultant	Section 1	
Development Location and Context	Section 1	
Brief Description of Development Proposal	Section 1	
Key Issues	N/A	
Background Information	Section 1	
Existing Situation		
Existing Site Uses (If Any)	Section 2	
Existing Parking and Demand (If Appropriate)	Section 2	
Existing Access Arrangements	Section 2	
Existing Site Traffic	Section 2	
Surrounding Land Uses	Section 2	
Surrounding Road Network	Section 2	
Traffic Management on Frontage Roads	N/A	
Traffic Flows on Surrounding Roads (Usually AM and PM Peak Hours)	Section 2	
Traffic Flows at Major Intersections (Usually AM and PM Peak Hours)	Section 2	
Operation of Surrounding Intersections	N/A	
Existing Pedestrian/Cycle Networks	Section 2	
Existing Public Transport Services Surrounding the Development	Section 2	
Crash Data	Section 2	
Development Proposal		
Regional Context	N/A	
Proposed Land Uses	Section 3	
Table of Land Uses and Quantities	Section 3	
Access Arrangements	Section 3	
Parking Provision	Section 3	
End of Trip Facilities	Section 3	
Any Specific Issues	N/A	
Road Network	N/A	
Intersection Layouts and Controls	N/A	
Pedestrian/Cycle Networks and Crossing Facilities	N/A	
Public Transport Services	N/A	
Integration With Surrounding Area		
Surrounding Major Attractors/Generators	Section 4	
Committed Developments and Transport Proposals	Section 4	
Proposed Changes to Land Uses Within 1200 Metres	Section 4	
Travel Desire Lines from Development to These Attractors/Generators	Section 4	

Adequacy of Existing Transport Networks	Section 4	
Deficiencies in Existing Transport Networks	Section 4	
Remedial Measures to Address Deficiencies	Section 4	
Analysis Of Transport Networks		
Assessment Years	Section 5	
Time Periods	Section 5	
Development Generated Traffic	Section 5	
Distribution of Generated Traffic	Section 5	
Parking Supply & Demand	N/A	
Base and "With Development" Traffic Flows	Section 6	
Analysis of Development Accesses	Section 6	
Impact on Surrounding Roads	Section 6	
Impact on Intersections	Section 6	
Impact on Neighbouring Areas	Section 7	
Traffic Noise and Vibration	Section 7	
Road Safety	Section 7	
Public Transport Access	Section 7	
Pedestrian Access/Amenity	Section 7	
Cycle Access/Amenity	Section 7	
Analysis of Pedestrian/Cycle Networks	Section 7	
Safe Walk/Cycle to School (For Residential and School Site Developments Only)	N/A	
Traffic Management Plan (Where Appropriate)	Section 7	
Conclusions	Section 8	

APPENDIX B

SITE PLANS





Legend

 	Lot boundary		ROM, Stockpile and Laydown areas
 	Gravel/clay extraction	 	Gravel/clay ROM, stockpile and laydown areas
	Hard rock haulage route	 	Hard Rock ROM, stockpile and laydown areas
	Gravel/clay haulage route	●	Test Pits

PROJECT Catterick Road

DRAWING TITLE Figure 2 – Site Extent

CLIENT Jim Cross

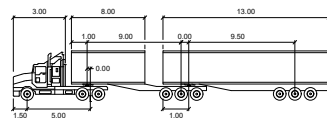


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Drawn	PN	Approved			
Date	25/11/2024				
Local Authority	Shire of Bridgetown Greenbushes				
Sheet 1 of 1					

APPENDIX C

SWEPT PATHS





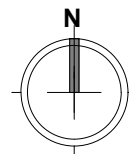
MRWA RAV 2(C) - REV1

Tractor Width	3.00	Lock to Lock Time	: 6.0
Tractor Track	1.50	Steering Angle	: 26.1
Trailer Width	8.00	Articulating Angle	: 70.0
Trailer Track	13.00		

LEGEND

- Vehicle Inbound
- Vehicle Outbound
- Centreline
- Vehicle Body
- Vehicle Wheels
- Body Clearance (500mm)

North



Prepared for
Iron Horse Pastoral Pty Ltd

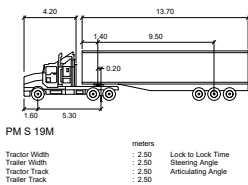
ptgi

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Level 4, 167 St George Terrace, Perth, WA, 6000
Tel: (08) 6188 4500
Web: www.ptgconsulting.com.au

Drawing Title:

SWEPT PATH DIAGRAM
27.5m Haulage Truck
Proposed Extractive Industry
Lots 3938 & 7971 Catterick Road, Catterick

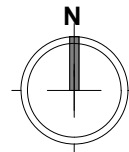
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Date 15/06/26	Project No. PTG.04756	DWG No. DWG-001	Revision A	



LEGEND

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- Vehicle Outbound
- Centreline
- Vehicle Body
- Vehicle Wheels
- Body Clearance (500mm)

North



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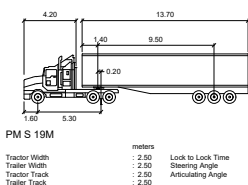
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Web: www.ptgconsulting.com.au

Drawing Title:

SWEPT PATH DIAGRAM
19.0m Haulage Truck
Proposed Extractive Industry
Lots 3938 & 7971 Catterick Road, Catterick

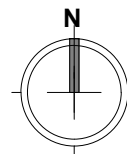
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SC	SC		NTS	DRAFT
Date	Project No.	DWG No.	Revision	
15/06/26	PTG.04756	DWG-002	A	



LEGEND

- Vehicle Inbound
- Vehicle Outbound
- Centreline
- Vehicle Body
- Vehicle Wheels
- Body Clearance (500mm)

North



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Drawing Title:
SWEPT PATH DIAGRAM
19.0m Haulage Truck
Proposed Extractive Industry
Lots 3938 & 7971 Catterick Road, Catterick

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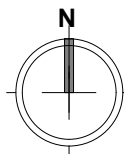
APPENDIX D

SIGHT DISTANCE ASSESSMENT





North



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Tel: (08) 6188 4500
Web: www.ptgconsulting.com.au

Drawing Title:

SIGHT DISTANCE ASSESSMENT
Existing Crossover
Proposed Extractive Industry
Lots 3938 & 7971 Catterick Road, Catterick

Drawn	Designed	Approved	Scale @ A4	Drawing Status
SC	SC		NTS	DRAFT
Date	Project No.	DWG No.	Revision	
30/06/26	PTG.04756	DWG-005	A	



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APPENDIX E -DIEBACK AND WEED MANAGEMENT PLAN