

EXCAVATION – REHABILITATION MANAGEMENT PLAN

SAND QUARRY

LOT 100 TRANSIT ROAD and
LOT 6 JARRAHDAL ROAD
JARRAHDAL

URBAN RESOURCES PTY LTD

Shire of Serpentine - Jarrahdale

February 2023



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Summary

The proposed pit has been approved and operated previously,

The original Approval for the project was provided by the State Administrative Tribunal on 9 December 2013. The approval was conditional. {2013} WASAT 199.

This management plan provides for Dust Management generally and to the two closest sensitive premises.

The resource lies on an area where no remnant vegetation occurs. In addition there is an opportunity to improve the pasture by removing the most leached sand, to leave more earthy sand that has better nutrient and water holding capability. There is also excess sand on site for the fill required for subdivision of the land at some point in the future.

This proposed sand excavation has been modified to incorporate any items arising from the past approvals.

Following that approval some sand has been excavated, but the majority of the resource remains.

The excavation area, proposed methods of excavation, scope and scale of the excavation have not changed. The remaining sand resource is restricted to Lot 100 Transit and Lot 6 Jarrahdale Roads, Jarrahdale.

There is a real shortage of sand for fill within the south eastern corridor. Sand for fill is very price sensitive and therefore in the interests of sustainability and minimising costs for housing it is essential that where there is excess sand on a particular site, that the sand is used prior to it being sterilised.

On this site there remains approximately 160 000 cubic metres of sand The resource covers approximately 7 hectares to a depth of between 2 – 4 metres.

Removal of the sand will take the most leached sand, leaving more earthy sand which will improve the soil moisture availability and increase the land capability of the reconstructed soil. The final end use will be a return to pasture.

It is anticipated that with one large contract an average of 7 laden truck movements per hour over the day when large contracts are won, with lesser average truck numbers for smaller contracts. The same as previously approved.

Access will continue to be from Jarrahdale Road at the previously constructed and approved entrance to the site.

The sand pit will be small and temporary, and with the growth of the tree belts is not likely to be significantly visible from Transit Road, South Western Highway or Jarrahdale Road.

PROJECT SUMMARY

ASPECT	PROPOSAL CHARACTERISTIC
EXCAVATION	
Area of proposed new excavation	Approximately 7 hectares over up to 5 years.
Rate of Extraction	Depends on the contracts won. Possibly 50 000 tonnes per year
Total estimated resource	Around 160 000 cubic metres
Life of project	Up to 5 years
Rehabilitation	Progressive. As the pit progresses the completed area behind will be closed and rehabilitated. Screening belts are in place along South Western Highway and Transit Road.
Dewatering requirements	None
Maximum depth of excavations	2 – 4 metres
PROCESSING	
Sand	No on site processing
Water requirements	1 500 kL in summer
Water supply source	Brought to site as required
INFRASTRUCTURE	
Total area of plant and stockpiles	No screening of the sand is proposed, although a sea container may be located on site for secure storage.
Waste water	Serviced portable toilet will be provided when the site is operating if there is no suitable alternative. All stormwater will be retained within the pit.
Area of settling ponds	Not required
Fuel storage	Not required, mobile tankers will be used.
TRANSPORT	
Truck movements	Variable but approximately 7 laden trucks per hour maximum when filling a large contract.
Access	The existing access road to Jarrahdale Road to the east of dwellings, is located as a compromise between sight lines and distance from sensitive premises. Main Roads did not object to the proposal
WORKFORCE	
Operation	2 – 4 depending on the contracts and nature of the operations which will change from time to

	time.
Hours of operation	Monday - Friday 7.00 am to 5.00 pm excluding public holidays.

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1.0 Introduction and Planning Context

1.1 Background and Proposal

Past Approval

This proposal is the same as the one approved by the State Administrative Tribunal on 9 December 2013. The approval was conditional. {2013} WASAT 199.

Following that approval some sand was excavated, but not all of the resource was taken. This proposal is to take the remaining suitable fill sand resource.

The resource of suitable fill sand is limited on the subject land. Whilst there is additional sand a portion of it has too much clay to be readily porous and readily used for fill sand.

The tree buffer that was offered in the original proposal along South Western Highway and Transit Roads was planted and has established, making the current proposal less visually intrusive as the potential visual impacts are now largely mitigated.

Importance and Rationale

The local area is undergoing rapid development with the extension of the freeway. This has resulted in increasing urban development within the south eastern corridor, much of which is on lower lying land that requires sand fill.

There is a real shortage of fill sand within the south eastern corridor. Sand for fill is very price sensitive and therefore in the interests of sustainability and minimising costs for housing it is essential that where there is excess sand on a particular site, the sand is used prior to it being sterilised and where the sand is close to the construction site.

Closer proximity ensures less road impacts and reduced green house gas emissions from transport.

This documentation provides the background for an application for Planning Approval and Extractive Industries Licence.

As part of this proposal the site has been assessed on several occasions by Lindsay Stephens of Landform Research, who mapped the geology, soils hydrogeology and vegetation.

An analysis of the development needs for the next 20 years has been conducted by the Department of Planning in *Directions 2031 and Beyond*. Similar analyses were produced in the planning document, Outer Metropolitan Perth and Peel Sub-regional Strategy.

Availability of Sand

Whilst sand might seem common, its distribution is locally very limited.

The Geological Survey of Western Australia resources mapping on Geoview only shows large sand resources and not strategically important local resources such as this site.

Sand in the local area, that is free from excessive clay, is not common and is restricted to small pockets, a number of which are covered by remnant vegetation.

This site is important as a resource because it was originally a pine plantation which has been cleared and will be returned to pasture.

The resource lies on an area where no remnant vegetation occurs. In addition there is an opportunity to improve the pasture by removing the most leached sand, to leave more earthy sand that has better nutrient and water holding capability. There is also excess sand on site for the fill required for subdivision of the land at some point in the future.

1.2 Statutory and Planning Context

Background

The relevant State Planning Policies are very clear in the need for local authorities to assess their needs for basic raw materials and then to ensure that there is sufficient supply and that such resources are protected for community use.

Local Authorities are required by the *Planning and Development Act 2005* to incorporate State Planning Policies into their Local Planning Schemes under Division 3 Section 77 (1)(a) *Every local government in preparing or amending a local planning scheme (a) is to have due regard to any State planning policy which affects its district;*

In Part 9, Section 124 any Local Planning Scheme is to reflect the intent and be consistent with a region planning scheme.

State Planning Policies that specify the need to identify, protect and use wisely, basic raw materials, are listed below. This is not to say that environmental and other matters should not be taken into account, but rather the Shire of Serpentine Jarrahdale needs basic raw materials, in this case sand, and it then becomes a matter of where are the best resources of sand that can be extracted in the most sustainable and environmentally friendly manner.

State Government Policies and Planning Schemes

The State Planning Policy Framework provides for the implementation of a planning framework through the recognition and implementation of Regional Planning Policies above Local Planning Schemes and Policies.

Within each layer of planning, there are a number of key policies and strategies to provide guidance to planning and development to enable sustainable communities to develop, expand and prosper without compromising the environment and future generations.

Planning is governed under the *Planning and Development Act 2005*. This Act enables Government to introduce State and Regional Planning Schemes, Policies and Strategies to provide direction for future planning. The State and Regional Schemes sit above Town Planning Schemes and Strategies introduced by Local Government.

Strategies and Policies provide guidance on how planning is to be undertaken and how proposed developments are to be considered. These Strategies and Policies are at the State, Regional and Local levels.

Schemes are gazetted documents that provide for consideration and approval of proposed developments. These are normally at the Regional and Local Level.

In addition to the documents produced under the *Planning and Development Act 2005*, the *Local Government Act 1995* provides Local Governments with a mechanism to prepare Local Laws to manage issues of local significance.

With respect to the supply of sand, the overarching document is the;

- State Planning Policy 1.0 State Planning Framework.

The State Planning Policy Framework provides for the implementation of a planning framework through the recognition and implementation of Regional Planning Policies above Local Planning Schemes and Policies.

A number of State Policies have been released under the State Planning Framework Policy.

*State Planning Policy 2.0, Environment and Natural Resources Policy
State Planning Policy 2.4, Basic Raw Materials
State Planning Policy No 2.5, Agricultural and Rural Land Use Planning
State Planning Policy No 4.1, State Industrial Buffer Policy*

State Planning Policy 2.0, Environment and Natural Resources Policy

This policy provides for the protection of all natural resources under a number of sections;

- 5.1 General Measures
- 5.2 Water Quality including stormwater and wetlands
- 5.3 Air Quality
- 5.4 Soil and Land Quality
- 5.5 Biodiversity
- 5.6 Agricultural Land and Rangelands
- 5.7 Minerals Petroleum and Basic Raw Materials
- 5.8 Marine Resources and Aquaculture
- 5.9 Landscape
- 5.10 Greenhouse Gas Emissions and Energy Efficiency.

In addition to recognising the importance of protecting air quality, soil and land quality, water and wetlands and landscapes, the importance of Basic Raw Materials to the community is identified with reference to *SPP 2.4 Basic Raw Materials 2021*, *State Gravel Strategy 1998* and *State Lime Strategy 2001*.

Section 5.7 of SPP 2.0, deals with Minerals, Petroleum and Basic Raw Materials.

Part of Section 5.7 states;

Basic raw materials include sand, clay, hard rock, limestone and gravel together with other construction and road building requirements. A ready supply of basic raw materials close to development areas is required in order to keep down the cost of land development and the price of housing.

Planning strategies, schemes and decision making should:

- ii. Identify and protect important basic raw materials and provide for their extraction and use in accordance with State Planning Policy No 10 (2.4); Basic Raw Materials.*
- iii. Support sequencing of uses where appropriate to maximise options and resultant benefits to community and the environment.*

The other factors of the natural environment are provided with the best protection possible, by this management plan, by selection of the site, operational staging and footprint and rehabilitation, bearing in mind the constraints of excavating and processing the resource.

State Planning Strategy, 2050 (2014)

The Western Australian Planning Commission (WAPC) released the *State Planning Strategy 2050*. It comprises a range of strategies, actions, policies and plans to guide the planning and development of regional and local areas in Western Australia and assists in achieving a coordinated response to the planning challenges and issues of the future by State and Local Governments.

The State Planning Strategy contains key principles. These are:

- Economic Development
- Physical Infrastructure
- Social Infrastructure
- Environment
- Security

The extraction of resources are essential for economic development, for the construction of facilities, for the Social Infrastructure of dwellings and communities, and the Physical Infrastructure such as roads and transport corridors.

The extraction of the resources is to be undertaken in an environmentally acceptable manner, which in this location means reduced haulage route for the sand to the growing Local Region, minimising transport and greenhouse gas impacts.

The approach in the strategy considers Basic Raw Materials as listed below.

ELEMENT	2050 OUTCOMES	MEASUREMENT	ASPIRATIONS
Basic raw material (BRM) supply	Accessible and affordable supplies of BRM are available close to demand	The cost of supplying basic raw materials to the building and construction industry	<p>Appropriate polices are in place to manage existing and future BRM supplies over the long term.</p> <p>BRM are optimally used for their highest purpose.</p> <p>The securing of BRM sites is managed through robust strategic sequential land use planning and development control prior to final land use</p> <p>Demand for BRM is partly managed through compact settlement structures that contain high-density built form.</p>

The environmental management of the quarry has been developed to minimise short and long term impacts on the local community and environment.

The operations have been designed to continue to provide good environmental management that minimises environmental change and enables continued rural land uses.

SPP 2 Environmental and Natural Resources Policy

Section 5.7 of SPP2 deals with Minerals, Petroleum and Basic Raw Materials.

Part of Section 5.7 states;

Basic raw materials include sand, clay, hard rock, limestone and gravel together with other construction and road building requirements. A ready supply of basic raw materials close to development areas is required in order to keep down the cost of land development and the price of housing.

Planning strategies, schemes and decision making should:

- iii. Identify and protect important basic raw materials and provide for their extraction and use in accordance with State Planning Policy No 10 (2.5); Basic Raw Materials.
- iv. Support sequencing of uses where appropriate to maximise options and resultant benefits to community and the environment.

State Planning Policy 2.4, Basic Raw Materials, 2021

SPP 2.4 requires that resources be staged and taken prior to sterilisation by other land uses.

The need for sand is also recognised by the Chamber of Commerce and Industry in their comprehensive summary of Basic Raw Materials, (*Managing the Basic Raw materials of the Perth and Outer Metropolitan Region, April 1996*).

The site is a very valuable community asset, as sand can continue to be extracted with minimal community inconvenience in the local region and has previously been approved.

SPP 2.4 supports the principle that basic raw materials should be taken before they become sterilised by development. It provides guidelines to local government to recognise the importance of not permitting conflicting land uses to impinge on the operation and enable the resource to be taken in a staged manner.

This policy makes many statements on the intent and actions which local authorities should use to protect and manage basic raw materials.

The Western Australian Geological Survey has produced new mapping identifying Strategically Important Basic Raw Materials across private land and State Forest, but that mapping used cut offs that excluded this site as being too small.

SPP 2.4 (2021) has the following policy objectives;

5 POLICY OBJECTIVES

The objectives of this policy are to:

- (a) ensure BRM and its regional importance is considered at the earliest stages of the planning process;
- (b) protect BRM in SGS areas and ES by avoiding encroachment from incompatible land uses;
- (c) ensure BRM resources are used efficiently in land use planning and development;
- (d) identify BRM extraction opportunities through sequential land use without compromising the final intended land use; and
- (e) ensure the extraction of BRM avoids, minimises or mitigates any adverse impacts on the community, water resources and biodiversity values.

SPP 2.5 Agricultural and Rural land Use Planning

SPP 2.5 Agricultural and Rural land Use Planning is relevant because the subject land is zoned Rural, and Rural land is the only land use Zone from which sand can be extracted. Section 5 Policy Measures, (5.1)(i)(d) *identify and protect key natural resources, including water and its dependant ecosystem, vegetation, minerals and basic raw materials.*

The Policy Objectives provide for the *prevention of land and environmental degradation during the extraction of basic raw materials (Section 4(4)(d)).*

However the position is clearly put in Section 5.4.3 Mineral and Basic Raw Material Resource Areas.

- i. Town Planning schemes should make provisions for the protection of basic raw materials, mineral and energy resources identified in the local planning strategy.*

- ii. *Town planning schemes should include provisions for the extraction of basic raw materials, mineral and energy resources. These provisions should include the development of appropriate local policies and requirements, particularly buffer requirements, that the extraction industries will be subject to: sequential land use proposals; and environmental management activities.*
- iii. *These activities should be regarded as generally acceptable, subject to assessment on their individual merits in rural areas.*

State Planning Policy No 4.1, State Industrial Buffer Policy

SPP 4.1 discusses the need to consider adjoining land uses when locating buffers but does not prescribe set buffers for operations such as this. The development and processing of the resource has been designed to maintain maximum buffer distances. In situations where the buffers are less, actions such as the provision of perimeter bunding to provide visual and noise management, tree planting and operational procedures, are used to mitigate and reduce impacts.

This is discussed further in Section 5.1 Surrounding Landuses Buffers of this document.

Directions 2031 and Beyond (WAPC 2010)

Directions 2031 and Beyond provides data on the land uses and growth of the Perth Metropolitan and Peel areas over the 20 years to 2031.

Perth and Peel @ 3.5 million

Perth and Peel @ 3.5million, developed by the Western Australian Planning Commission has determined that the Metropolitan Area will grow significantly between 2012 and 2050 by around 600 000 dwellings (Updated October 2015).

North West Corridor	114 923
Central	215 000
North East Corridor	76 547
South and Peel	205 493

The construction of dwellings needs sand for developments, for preparing the individual lots, in addition to concrete and other products that include some sand.

Metropolitan Region Scheme

The Metropolitan Region Scheme lies under the umbrella of the Planning and Development Act 2005.

It provides overall direction to planning through the Metropolitan Region Scheme. Approvals are required under the Scheme but are normally delegated to the Local Authority. However in the case of Extractive Industries the delegated authority was revoked and all extractive industries are assessed by the Western Australian Planning Commission and issued with a separate and additional approval under the Metropolitan Region Scheme.

The Western Australian Planning Commission will issue a separate Planning Consent for this application which will be referred to the WAPC by the Shire of Serpentine Jarrahdale. See Figure 4.

The proposal complies with the Metropolitan Region Scheme.

1.3 Local Government Policies and Planning Schemes

- **Shire of Serpentine Jarrahdale Town Planning Scheme 2**

The Shire of Serpentine Jarrahdale Town Planning Scheme 2 lists the Subject land as “Rural”.

“Industry Extractive” is an AA use in the Rural Zone which means that Council, at its discretion, may permit the use of an extractive industry.

The intent and purpose of the Rural Zone is to “allocate land and to accommodate the full range of rural pursuits and associated activities.

The proposal complies with the Shire of Serpentine – Jarrahdale Town Planning Scheme 2.

- **Shire of Serpentine – Jarrahdale Extractive Industry Local Law 1999**

Even though Planning Consent will be provided by the Shire, the Shire normally also provides an Extractive Industry Licence prior to commencement.

The proposed quarry is designed to be compliant with the Local Law.

- **Local Planning Policy 4.10 Extractive Industries (including Extraction of Mineral Sand and Minerals)**

The purpose of the policy is stated as “to guide the assessment and comment on extractive industries”.

The Policy is issued under the umbrella of Shire of Serpentine – Jarrahdale Town Planning Scheme 2, and requires all matters related to the proposed quarrying operations to be considered. Guidelines are provided on how the Shire will consider and determine an application for Extractive Industries.

The design and proposed management of the proposed considers all factors raised by the policy and specifically addresses them through the various sections of the documentation

- **Local Planning Policy No 67 – Landscape and Vegetation**

The proposed quarry has been designed to comply with this policy where possible. The Policy Objectives have been considered and incorporated into the proposal. Tree belts are planted and in place. The operations are designed to minimise visual exposure.

The proposed quarry is designed to be compliant with the Landscape and Vegetation Policy by minimising those environmental impacts.

- **Local Planning Policy No 68 – Sustainability Assessment**

The principles and objectives of sustainability have been incorporated into the quarry operations. The opening of the quarry is related to sustainability of the Perth Metropolitan Area with respect to the sourcing of basic raw materials.

Sustainability has been incorporated into the proposal where possible by way of reducing the footprints and impacts.

1.4 Current Land use

Lots 100 and 6 are cleared to pasture.

An agricultural industry (cactus farm?) lies to the west across South Western Highway. Figures 4 and 5.

To the south across Transit Road is a camp stay facility.

The main land local uses are grazing and rural living.

There have been no apparent changes to the adjoining land uses since 2013.

1.5 End Use

At this stage the resource area site is to be returned to pasture which is the predominant land use in the local area.

The extraction of sand is seen as an interim use prior to a return of the area to pasture, with native vegetation tree belts around the western and southern perimeter.

This would enable continued rural land uses. Any use other than rural will require rezoning of the land.

1.6 Requested Planning Approval

An Extractive Industries Licence and Development Approval for the site, for a period of 5 years, is requested to ensure all the sand is removed.

1.7 Legislative Framework - Stakeholders

There have been no significant changes to the scale and nature of the local land uses over the past few years. Sand excavation has been approved to the south and the adjoining lot to the east.

Table 1: Legislative Framework

Legislation	Environmental Factor regulated/affected	Discussion	Action
<i>Aboriginal Heritage Act 1972.</i>	Aboriginal heritage sites.	Recorded Heritage Sites A database search of DPLH has been conducted and no site recorded	The e resources site has been disturbed cleared and grazed. The creekline such as Manjedal Brook which can have significance to the traditional owners has been excluded from the proposal with a >50 metres setback provided that includes revegetation back to local native vegetation. In the event of any potential site being found, a commitment is made to halt activities that may impact on a site if any is found during excavation, pending assessment by consultants.
<i>Aboriginal Cultural Heritage Act 2021</i>	Aboriginal heritage sites and Input of traditional owners in the identification, protection and management of heritage sites.		The Regulations under the Act are still being developed by Government, with the traditional provisions of the Act to end mid 2023. At this time the process under the Act is a little unclear, so the heritage investigations are being undertaken in a manner that anticipates the requirements of the legislation. Urban Resources will comply with the legislation.
<i>Heritage Act 2018</i>	Heritage	No heritage matters are identified locally or on quarry footprint. DPLH databases were searched.	Noted.
<i>Planning and Development Act 2005</i>	Development approvals for on site constructions and any ensuing environmental impacts.	Planning Consent is required from the Shire of Serpentine - Jarrahdale and the WAPC.	A concurrent application for development approval is lodged with the Shire of Serpentine - Jarrahdale for both Development Approval and an Extractive Industry Licence.
<i>Shire of Serpentine - Jarrahdale Extractive Industries Local Law 1999</i>	The operations of the quarry are regulated by both the Planning Approval and Extractive Industries Licence	An Extractive Industries Licence is required.	A concurrent application for development approval is lodged with the Shire of Serpentine - Jarrahdale for both Development Approval and an Extractive Industry Licence.
<i>Health Act 1911</i>	Environmental and health impacts from waste water treatment and community health.	No matters of significance that would trigger this legislation have been identified.	The proposal complies with the Health Department Guideline for Dust separation. (See Dust Management) No waste materials will be disposed of on site.
<i>Department of Planning, Land</i>	New developments may need to consider	This is an existing operation with no	No assessment is required because there are no significant changes to the transport

Legislation	Environmental Factor regulated/affected	Discussion	Action
<i>and Heritage Transport Impact Guidelines 2016</i>	transport options.	changes to the access and scale of activities or transport.	operations. cess road from Jarrahdale Road will be used.
Western Australian Planning Commission Planning Bulletin 111/2016	New developments may need to consider fire risk and mitigation such as a bushfire policy and BAL attack document.	This is an existing operation with no changes to the access and scale of activities or transport or fire risk. The pit acts as a fire management zone as it is devoid of vegetation.	No assessment is required because there are no significant changes to the fire risk. Whilst the pit will be progressively worked, the excavation will involve land clearing and replanting to pasture which will maintain the potential fire risk rather than increase it.
<i>Environmental Protection Act 1986 Part IV - Assessment</i>	Referred to the EPA if the project is or may constitute a significant environmental impact.	The proposed reopening of the pit does not represent a new "Significant" environmental impact.	The reopening of the pit will not trigger referral under the <i>Environmental Protection Act 1986 Part IV</i> .
<i>Environmental Protection Act 1986 Part V – DWER Licence</i>	Environmental factors that may be significantly impacted related to Prescribed Premises. Processing and Screening	If a screening plant required for in excess of 5 000 tonnes per year screened, the operation will require a Department of Water Environment Regulation Licence under the EPA Act Part (V).	No screening of the sand is proposed and therefore a Licence under the <i>Environmental Protection Act 1986 Part (V)</i> will not be required.
<i>Environmental Protection (Noise) Regulations 1997</i>	Noise impacts.	There are no changes from the past approved pit and no changes to the nearby sensitive premises.	Noted. See Noise Management. The proposed pit complies with the EPA Generic Buffer Guidelines. The existing operations comply with the <i>Environmental Protection (Noise) Regulations 1997</i>
<i>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</i>	Clearing and disturbance of native vegetation.	Clearing Permit under the <i>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</i> is required under the Regulations.	The site is cleared to pasture. A Clearing permit will not be required.
<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>	Matters listed on the EPBC database.	There are no listed matters affecting this site.	The site is cleared to pasture. No referral under the <i>EPBC Act 1999</i> is required.
<i>Conservation and Land Management Act 1984</i>	Parks and Reserves and issues relating to flora and fauna.	There are no issues that trigger this legislation. The land does not adjoin any Reserved land or Conservation Areas.	The site is cleared to pasture. A Bush Forever Site 71 is located to the south west across South Western Highway and will not be impacted by the excavation of sand.

Legislation	Environmental Factor regulated/affected	Discussion	Action
<i>Biodiversity Conservation Act 2016</i>	The legislation seeks to protect and manage biodiversity in all its forms through regulation, conservation and restoration.	There are no issues that trigger this legislation.	The site is cleared to pasture. Bush Forever Site71 is located to the south west across South Western Highway and will not be impacted by the excavation of sand.
<i>Waterways Conservation Act 1976</i>	Water quality and management of surface water	There are no watercourses on site.	Water Management is included.
<i>Rights in Water and Irrigation Act 1914</i>	Water quality and management of surface water	There are no watercourses on site.	Noted
<i>Country Areas Water Supply (CAWS) Act 1947</i>	Water supplies	The site does not lie within a surface or groundwater control area.	Noted
State Agreement Acts	Specific acts that relate to certain large projects that may impact on some locations.	Not applicable	
<i>Contaminated Sites Act 2003</i>	Contaminated materials that may arise from excavation or be used in excavation and processing.	The only factor that is likely to fall under this category is the storage and use of maintenance items and on site maintenance.	No materials are present or to be used which would trigger this legislation apart from normal fuel and maintenance. Water Management has been prepared that includes commitments to remove any contaminated soils or other material regularly and at the end of excavation as part of the closure actions.
<i>Dangerous Goods Safety Act 2004</i>	Potential for dangerous good to impact on the environment.	Refers to fuel, which is required and blasting under the <i>Dangerous Goods Safety (Explosives) Regulations 2007</i> .	Urban Resources will comply with the requirements for fuel through management plans that will be implemented. Fuel and Servicing is included under Water Management Plan.
<i>Work Health and Safety Act 2020 and the Work Health and Safety (Mines) Regulations 2022.</i>	Safety and management of mining operations which in turn may impact on the environment.		Mine Safety The site will be registered under the SRS and a Project Management Plan, Risk Assessment and Emergency plans approved. The Project Management Plan addresses all aspects of mining. The SRS System addresses ongoing Health and Safety.
Project Management Plan – SRS System	Safety and management of mining operations which in turn may impact on the environment.	Compliance with the Project Management Plan when it is submitted and approved.	Mine Safety The site is registered under the SRS and a Project Management Plan, Risk Assessment and Emergency plans approved. See Above

1.8 Responsible Authorities

A number of state and local government authorities are responsible for overseeing the safety and management of sand quarries in the area. Other authorities have an interest in the proposal but may not hold any responsibility.

Shire of Serpentine - Jarrahdale

- Provides Planning Consent and issues the Extractive Industries Licences for the quarry.
- Oversees all aspects of environmental impact and management.
- Regulates land zonings in conjunction with the Western Australian Planning Commission.
- Required by State Planning Policies to identify, protect and provide for staged use of basic raw materials. See State Planning Policies in Section 1.1.
- Has a number of Local Planning Policies that may apply to the site; LPP8 Landscape Protection.

Department of Mines Industry Regulation and Safety

- Oversees the safety and methods of extraction.
- Provides input on the need for basic raw materials through the Geological Survey of Western Australia.

Department of Water Environmental Regulation

- Issues licences for crushing and screening plants which are not proposed. A DWER Licence under *Part V of the Environmental Protection Act 1986* will not be required.
- Controls clearing of vegetation. No Clearing Permit is required in this case.
- Has control over the management of ground water in the area.
- Licences water bores if used. No bore is proposed.

Department of Planning Land and Heritage and Western Australian Planning Commission

- Metropolitan Region Scheme Approval .
- In conjunction with the local authority assists with the preparation of structure plans.
- State Planning Policy 2.4 Basic Raw Materials, State Planning Policy (SPP) 2 Environment and Natural Resources Policy, and State Planning Policy No 2.5, Agricultural and Rural Land Use Planning. State Planning Policies in Section 1.1.
- Oversees Aboriginal Heritage

1.9 Surrounding Landuses and Buffers

Consideration of nearby sensitive premises

The quarry is designed to maximise the setbacks to the closest sensitive premises. Figures 4 and 5.

As part of the development of the management plans for the proposed quarry extensive analysis of the local landform, land uses and location of sensitive premises were made by Landform Research from the available sources of published information, aerial photography, historical aerial photography, site mapping, review of the nearby and surrounding land uses, local and regional planning and local and wider environmental attributes.

The main environmental issues identified in relation to buffers and setbacks to sensitive premises, in addition to those generally recognised by the various Government and Published guidance's are;

- Visual amenity
- Dust management
- Noise management
- Blasting
- Local amenity
- Cumulative impacts of quarries

➤ **Separation to Dwellings**

State Planning Policy No 2.5, Agricultural and Rural Land Use Planning, makes provision for the extraction of basic raw materials as does State Planning Policy 2.4 Basic Raw Materials.

Both policies have similar aims. SPP 2.5 in Point 9 states that "The location of rural residential and rural small holdings should avoid unacceptable impacts on, or sterilisation of natural primary resources including prospective areas for mineralisation and basic raw materials".

The issue of appropriate buffers is a matter of the distance and protection measures to prevent impact on adjoining land users. This applies mainly to noise, dust and visual impact, all of which are treated separately.

State Planning Policy No 4.1, State Industrial Buffer Policy, (draft July 2004) discusses the need to consider adjoining land uses when locating buffers but does not prescribe set buffers for operations such as this.

Generic buffer requirements were developed by the Victorian Government and used by the Environmental Protection Authority as the basis for a Draft guideline on recommended buffer distances. These formed the basis of EPA Guidance Statement Number 3, Separation Distance between Industrial and Sensitive Land Uses, June 2005.

EPA guidance "Separation Distances between Industrial and Sensitive Land Uses", June 2005 lists the generic buffers for sand and limestone pits as 300 - 500 metres depending on the extent of processing. A generic buffer relates to the distance at which there are unlikely to be any problems without some further investigations and does not mean that smaller buffers are not acceptable. EPA Guidance for the Assessment of Environmental Factors No 3 June 2005 provides for a case by case separation, based on the potential impacts.

The issue of appropriate buffers is a matter of the distance and protection measures to prevent impact on adjoining land users. This applies mainly to noise, dust and visual impact, all of which are treated separately.

Sand excavation, which does not include screening or processing, would be at the lower end of the generic buffer.

The closest premises is 200 metres to the south across Transit Road. The southern 1 hectare of the sand pit lies between 200 and 300 metres from that premises. Excavation in that area should be completed within a 2 – 4 week time frame if that portion of sand was taken in one contract or several concurrent smaller contracts. This is the same as the previous approvals. Figures 4 and 5.

There is a commercial operation (cactus farm?) that may be poultry sheds or similar. This is 100 metres from the edge of the sand excavation, across South Western Highway, and separated by two dense belts of trees along both sides of South Western Highway.

40 metre buffer zones will be retained along the perimeter boundaries with the surrounding roads of Jarrahdale Road, South Western Highway and Transit Road. The west and south have been planted with tree belts. Figures 12, 13 and 14.

For comparison the majority of sand quarries across the State and within the Perth Metropolitan Area all have approvals and operate at much closer distances than 300 metres.

In sand excavation the only mobile plant is a loader and road trucks. The examples provided below show that the distances between the active pit and a dwelling on the proposed operation are consistent with operations in other locations.

Operator	Location	Resource and buffer
WA Limestone	Wattleup Road Hope Valley	Limestone and sand
Italia Stone Group	Wattleup, Hope Valley	Limestone
NLG Sand Supplies	Jandakot Road Jandakot	Sand 40 – 80 metres
Boral Bricks	Wandena Road, Muchea	Clay 250 metres
NLG Sand Supplies	Coyle Road Oakford	40 metres
Cockburn Cement	Fancote Road, Munster	Sand and Limestone 70 metres
WA Limestone	Kerosene Lane, Medina	Limestone, 150 metres

Excavation will continue to be worked from inside out on the floor of the pit working below natural ground level. Figure 9.

The main issues are the potential generation of dust and noise.

There are not proposed to be any changes to the past operations on site.

1.10 Heritage

A search of the DPLH database does not reveal aboriginal sites on Lots 100 or 6.

The site has been an operating farm for many years, with ongoing soil disturbances through that time.

The Regulations under the *Aboriginal Cultural Heritage Act 2021* are still being developed by Government, with the traditional provisions of the Act to end mid 2023.

At this time the process under the Act is a little unclear, so the heritage investigations are being undertaken in a manner that anticipates the requirements of the legislation. Urban Resources will comply with the legislation.

Should any archaeological site be uncovered, work will cease in that area pending an assessment of the site by an independent consultant, traditional owners and the Department of Planning Lands and Heritage as required.

1.11 Complaints Mechanism

A complaints procedure is proposed for the sand excavation.

- The contact details will be displayed at the entrance to the operations.
- A complaints book will be provided and maintained.
- Upon receipt of a complaint it will be investigated and action taken if the complaint is determined to be legitimate.
- When a complaint is found to be legitimate, any reasonable actions to mitigate the cause of the complaint will be taken, to prevent a recurrence of the situation in the future.
- Details of any complaints, the date and time, means by which the complaint was made, the nature of the complaint, the complainant, investigations and any resulting actions and the reasons, will be recorded in the Complaints Book.
- The Shire of Serpentine - Jarrahdale will be informed of any complaint or any other report provided to a Government Department within 24 hours by email.
- The complaints book will be made available for viewing or requested details made available to the Shire or any other official upon request.

2.0 Description of the Resource

2.1 Nature of the resource

A sheet of sand covers most of Lots 100 and 6 but in most places it has less than 1 metre of white or pale yellow and gravelly sand over more earthy yellow sand. The more earthy yellow sand is less suitable for use as fill sand, but, combined with the other sand, is very capable of providing good foundation stability for future development on the subject land. Figures 5, 11 and 12.

The majority of the sand is not thick enough to be extracted and will be retained on site.

There is, however, a swale of sand in the west of Lots 100 and 6, that is significantly deeper, down to approximately 4 metres. This sand is medium grained, grey to white, and pale yellow sand grading to earthy yellow sand. The swale represents an area of sand that is excess to the requirements for future development of Lots 100 and 6. Figure 10.

Therefore in keeping with the relevant Government Policies, the sand should be used for fill sand for the developing south eastern corridor, prior to sterilisation.

The sand resource occupies an area of about 7 hectares and is up to 4 metres deep. In total there is about 160 000 cubic metres of sand. It is anticipated that this will be taken as one contract for fill for a local subdivision.

The resource has been tested by excavating holes with a backhoe in 2010 and by hand auger in early 2012 and backhoe in 2014. Figure 5, 8 and 10.

Uses

The sand is proposed to be used for a variety of purposes such as fill sand, construction sand, and as a potential specialty sand for some applications such as filter sand. Predominantly it is anticipated that it will be used for fill sand.

At this stage there is no plan to wash and screen the sand for specialty uses.

2.2 Aims of the Proposal

The aims of the proposal are to;

- Remove the excess sand prior to sterilisation by future development.
- Provide an additional source of fill and other sand locally.
- Comply with State Planning Policies No 2.4 and 2.5 which state that basic raw materials should be taken prior to sterilisation of the area by development.
- Restore the excavated area and the remainder of Lots 100 and 6 to productive agricultural land.

- Maintain the tree belt along the south western portion of the site to add to the roadside tree belt along South Western Highway.

2.3 Proponent

The proponent is Urban Resources Pty Ltd.

Contact can be made through;

Urban Resources Pty Ltd
PO Box 1528
Bibra Lake DC WA 6965
Phone 08 9368 1299

2.4 Location and Description

Lot 100 Transit Road and Lot 6 Jarrahdale Road, Jarrahdale.

- Lot 6 Diagram 60877, Volume 1598, Folio 8735.
- Lot 100 Deposited Plan 406564, Volume 2895, Folio 796.

The site is located on the south eastern corner of Jarrahdale Road and South Western Highway.

3.0 Existing Environment

3.1 Climate

Climate is a typically Mediterranean climate with hot dry Summers and cool wet Winters.

Rain falls mainly in Winter with 80% falling in the five months May to September inclusive. Mean annual rainfall at Whitby Falls is 975 mm. Evaporation exceeds rainfall in all but the four wettest months May to August. Figure 1.

In Summer the prevailing winds are easterly in the morning and south westerly in the afternoon. In Winter the dominant wind direction is less distinct. Of particular significance are the strong katabatic easterly air flows occurring on summer mornings which can add additional dust management issues.

At Perth Airport summer prevailing winds at 9.00 am are easterly for 57% of the time. At 3.00 pm, winds are westerly to south westerly for 64% of the time. In winter the winds are lighter and more variable in direction. Figure 2.

Temperature inversions can occur on still winter mornings and may influence the distance noise is transmitted. Data from Perth Airport shows that 90% of inversions are broken up by solar heating alone by 12.30 pm, and 100% by 2.00 pm.

Of local significance are the katabatic winds that blow from the Scarp on summer mornings. At Kelmscott the katabatic winds blow from midnight to midday, with the strongest winds between 4.00 and 6.00 am.

Accordingly the study area is characterised by hot dry summers with strong easterly winds in summer.

The perimeter bunds and vegetation provide effective wind breaks and wind screening. Winds crossing the site are slowed by the perimeter tree and shrub vegetation. This reduces the speed of the winds across the floor of the pit.

When winds exit the pit or cross out of the pit they have to travel across a vegetated buffer that slows the speed of the wind and allows the coarser particles to drop from suspension.

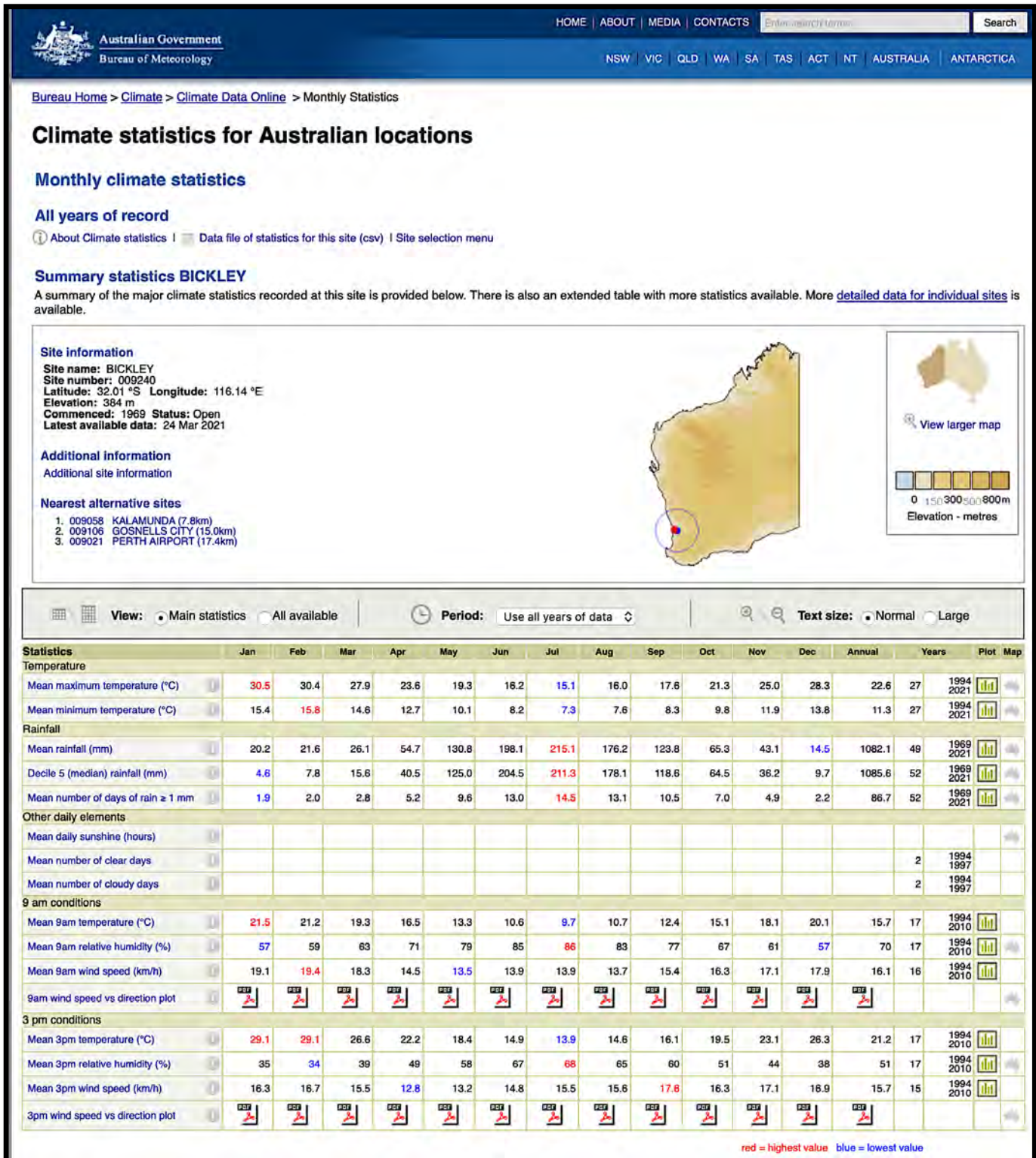
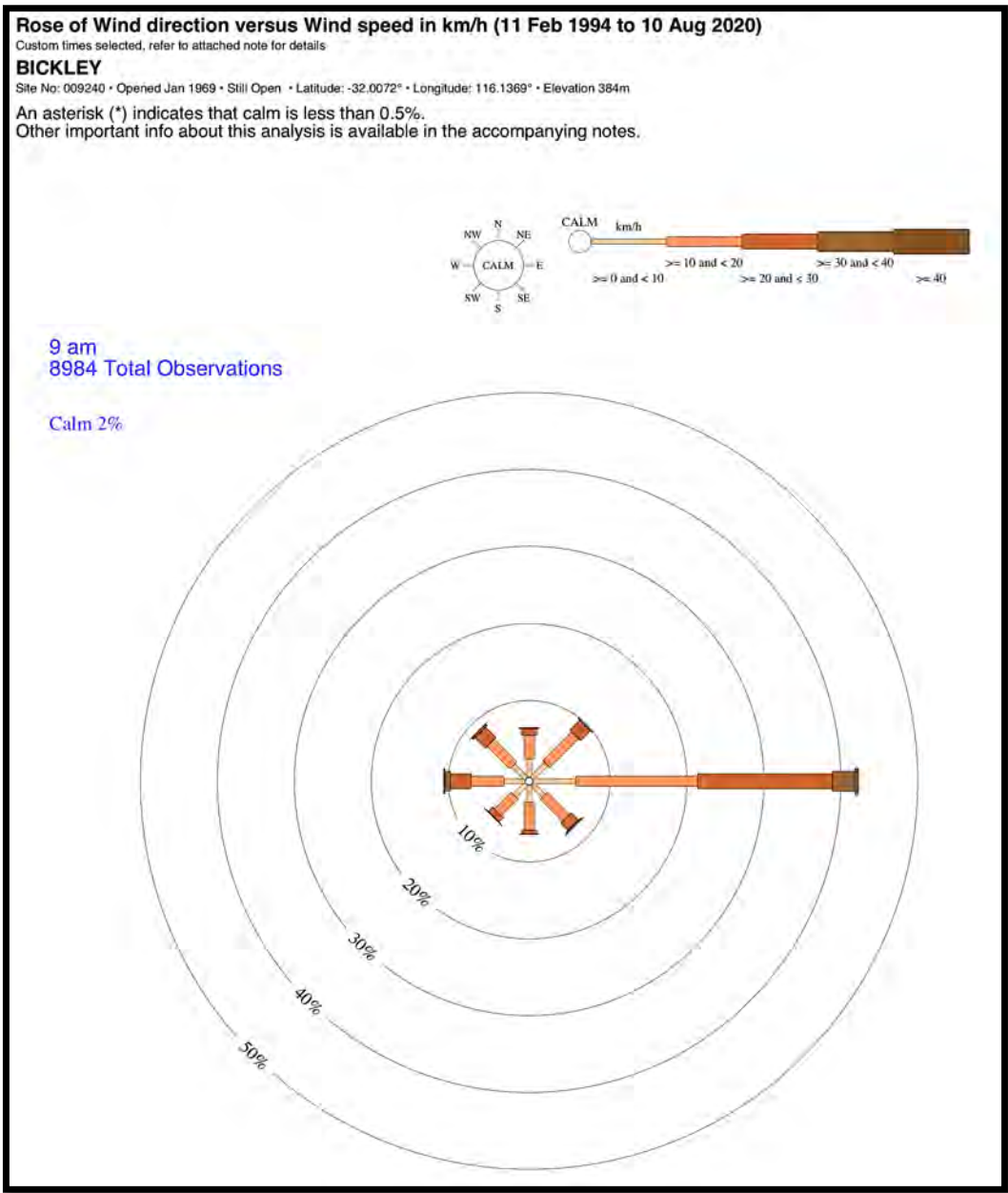


Figure 1: Climate data



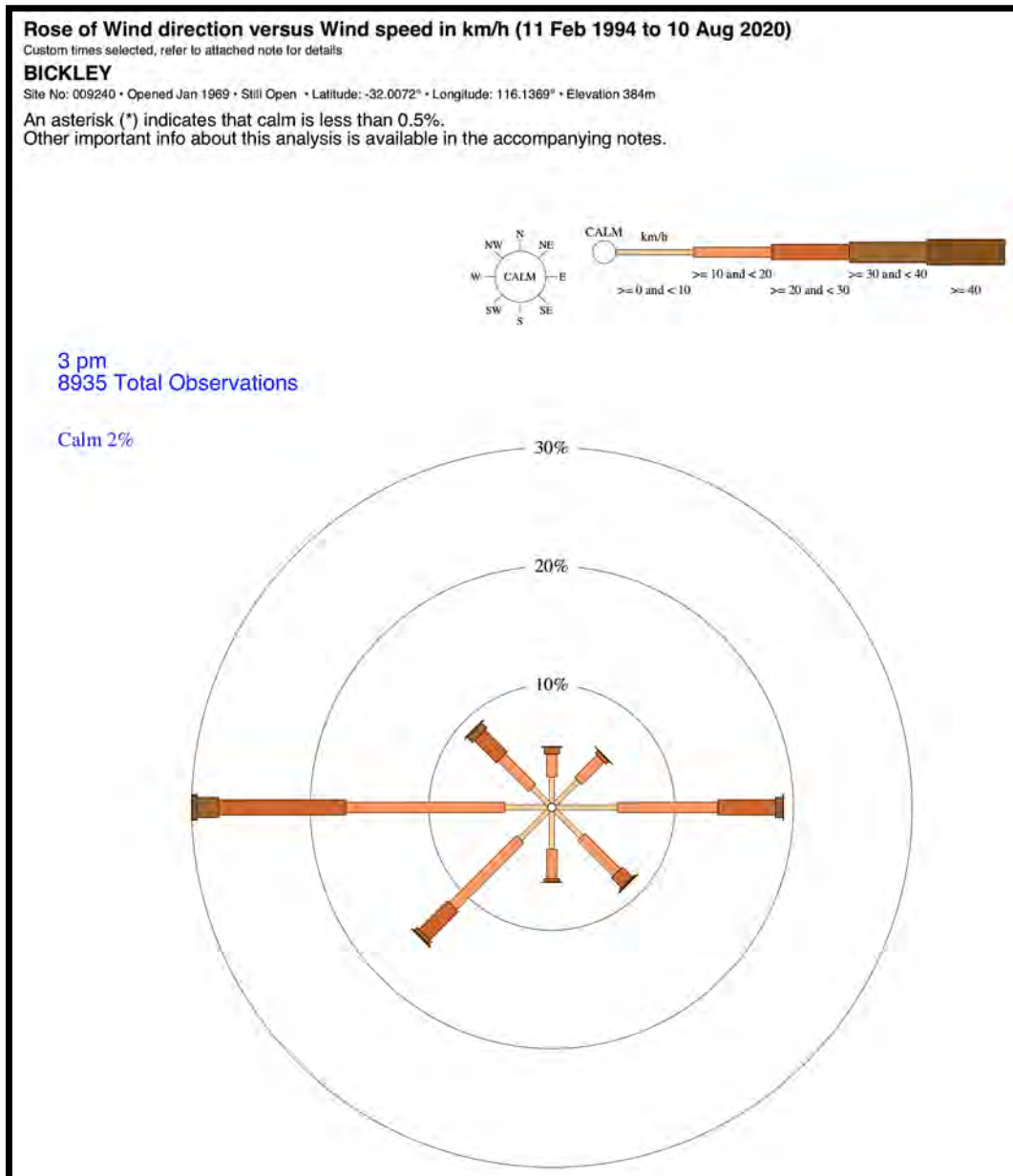


Figure 2: Wind patterns

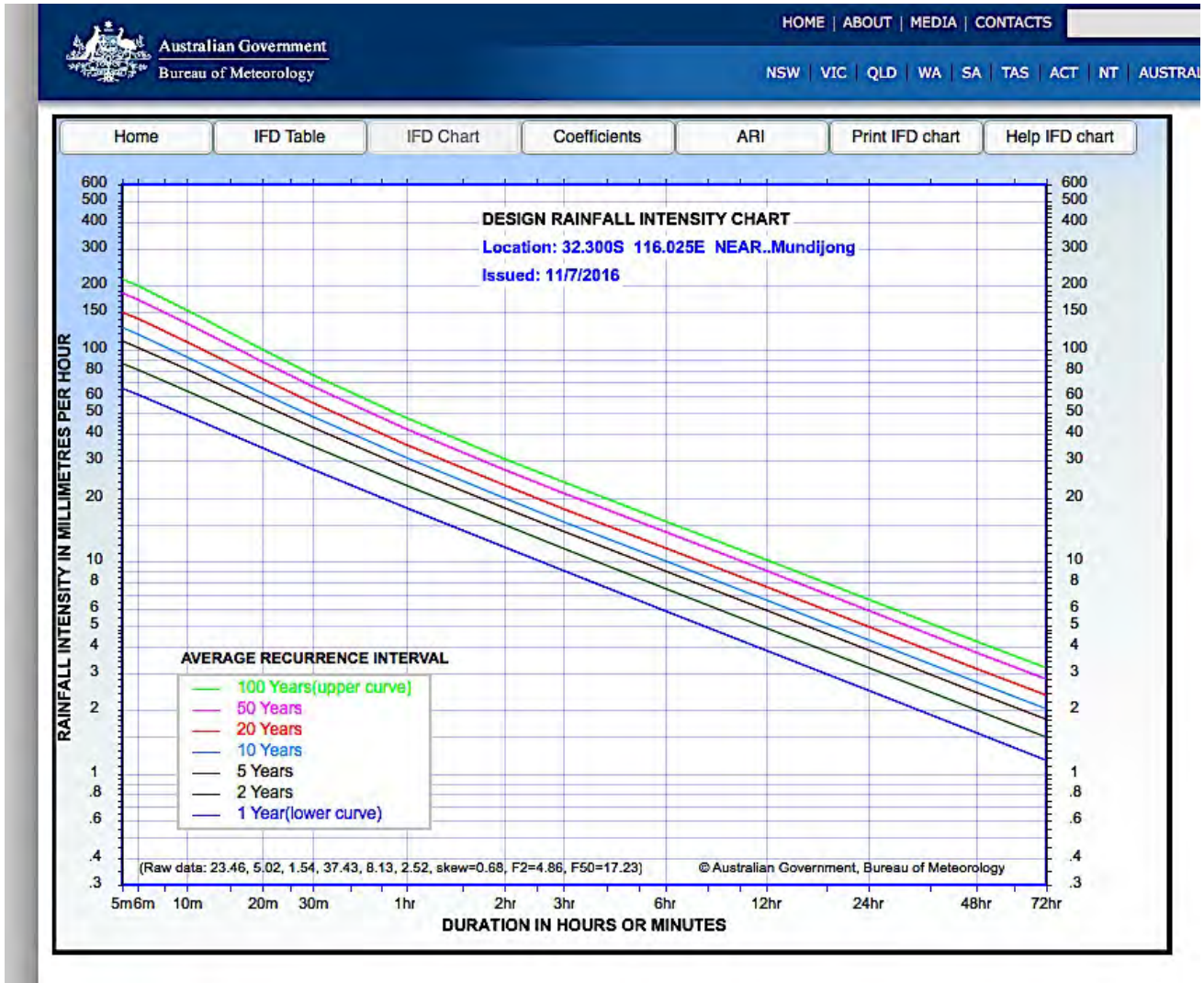


Figure 3: Rainfall intensity

3.2 Geology and Geomorphology

The subject land has been mapped by Lindsay Stephens of Landform Research and Urban Resources using backhoe and hand auger inspection holes in addition to extensive field mapping.

The site lies on the degraded Darling Scarp just back from the Darling Fault, at the exit of Medulla Brook through the Scarp. Figures 4, 5 and 11.

The land rises up the southern side of Medulla Brook, from 57 metres AHD at the northern edge at Jarrahdale Road rising to 100 metres at the south eastern corner of to the south east Lot 4. Figures 4 and 5.

Granite gneiss basement rocks of the Balingup Terrane of the Yilgarn Craton outcrop to the south east outside Lot 6. The granite basement occupies all the land to the Darling Fault and underlies most of the extraction area. Figure 11.

West of the Darling Fault is the Perth Basin, which is filled with sediments that in this location are predominantly colluvial, being related to erosion as a result of down faulting of the Darling Fault.

Overlying the granite is Yoganup Formation, formed as shoreline alluvial and marine sands that are feldspathic and now carry significant clay content at depth, These are deep yellow earthy sands that are variably leached of clay and iron oxides at the surface to form lighter yellow sands and white sands of the sand resource. Figure 11.

Tertiary to recent laterite development has formed gravel in these sands as part of the leaching processes.

3.3 Soils

The soils are dominated by yellow earthy sands of the Yoganup Formation. These occupy the whole western two thirds of the land and occur on the sand resource. Figures 5 and 11.

The soils are variably leached to form lighter yellow sands, leach white sands and yellow gravelly sands due to later laterisation. Figure 5 and 10.

The basal soils horizons of yellow earthy sand provide good future foundation stability and improved agricultural soil capability for agricultural purposes.

The additional small amounts of clay and higher traces of iron oxides in the basal sand will ensure that the post mine soils have higher nutrient retention capability than the current soils.

The soil profile is leached white or yellow sand to 100 – 400 mm depth over weak yellow sandy gravel to depths of 200 – 1500 mm. This overlies deep yellow sands that become darker yellow earthy sands that contain a small amount of clay at depth. The subsoils are dark earthy yellow sands. The soils are gently sloping and well drained. Figures 5 and 10.

The subsoils have high Phosphate Retention Indices (PRI) of 20 - 50, based on Chemistry Centre information and comparisons to the databases held by Landform Research, see Allen and Jeffrey 1990. A PRI of 50 means that 42 kg P is able to be absorbed and stored per m³ soil. The sand that will be removed as part of the sand resource has reduced phosphorous retention ability leaving sand of higher phosphate retention capability.

Acid sulfate

There has been an increased interest in acid sulfate soils since the release of WAPC Planning Bulletin 64.

However the interest has been over reactive and conditions and risk applied in many areas where there is no geological risk or evidence of acid sulfate.

The most definitive survey procedure was produced by the Acid Sulfate Soil Management Advisory Committee NSW, 1998, in their *Acid Sulfate Manual* and *DWER Guidelines*. This Manual forms the basis for all assessment procedures in Australia, including those adopted by the Western Australian Planning Commission and the Department of Environment and Conservation. The *Acid Sulfate Manual* adopts the procedure of reviewing the published data followed up by field assessment, which has been completed for this site. If a geological risk is determined, then a Preliminary Acid Sulfate Assessment is conducted. The recognition and treatment is also considered in the NSW guidelines.

Acid sulphate potential was considered in the Western Australian Planning Commission Planning Bulletin 64. This document contained maps that are broad based from aerial photography and not site specific. The mapping does not extend to this location.

It is not known on what basis the Department of Planning mapping shows part of the site as having Low to Moderate Risk of Acid sulphate, but as a large area of that mapping was completed from aerial photography with limited field work and site assessment, then interpretation of the photography is likely to be in error. Even so it is puzzling why such an elevated, obviously no risk area, was nominated by the mapping officers.

Acid Sulfate Soils can potentially form under reducing conditions when there is a source of carbon and a source of sulfur (normally from sea or saline water). Micro-organisms are thought to play an important role in reducing the sulfates within the sediments to form the iron sulfide. It is a natural phenomena, that can be exacerbated by disturbance.

Potential acid sulfate conditions most commonly form under reducing conditions under current or past estuarine conditions, peaty conditions, some organoferricretes, and may also result from weathering of some geological formations and situations which contain sulfides. Carbon is normally required and a lack of oxygen is always required to create the reducing conditions.

Materials at risk under reducing conditions are normally grey in colour or have been grey with no brown or red brown iron oxides. Where exposed to the atmosphere there is a change to brown iron oxides, with yellow jarosite and other alteration minerals that are distinctive.

None of these conditions occur on site.

On this site the geology of the soils is highly oxygenated well drained sands.

Therefore there is no potential for acid conditions to develop in this ecological or geomorphological situation.

3.4 Hydrology

Surface Water

The site is elevated and well drained and consists of a sloping area of deep permeable sandy soils.

The site is a gently sloping sandy site from which there is no surface water runoff except in heavy storm events when surface water will congregate and flow for a short distance before spreading out and soaking into the ground. Figures 6, 9 and 11.

The main hydrological feature is the valley of Medulla Brook to the north of Jarrahdale Road.

The soils are free draining, elevated and not susceptible to winter wet conditions.

There is no waterlogging, surface water runoff and no watercourses, wetlands or dams on site. An old soak present to the north east outside the site is dry. It has probably dried through reduced rainfall in recent years and evapotranspiration of the pines that were previously planted on site.

Any surface water from storms is fresh with no evidence of salinity.

In winter there is potential on the extreme west for a very small area of white sand to have a temporary perched water table for small intermittent periods in some winters.

With excavation the walls of the pit will enable all water to be retained within the excavation area.

At the end of excavation, the land surface will be reformed to be similar to that existing prior to excavation with similar soils. That is, in storm events some minor surface flows might occur in heavy storms before soaking into the ground. Figures 6 and 7.

Groundwater

There is no evidence of groundwater availability on site and, as the site is underlain by granitic basement which has a steep slope as a result of the Darling Fault and erosion through past geological times, there is unlikely to be any groundwater available on site.

The site has been investigated by mapping, hand drill auger holes to 3.5 metres on the excavation area, mapping from backhoe excavation, site geological mapping and examination of Geological Survey of Western Australia and DWER maps. Figure 11.

Perth Groundwater Atlas produced by DWER shows the groundwater to the west is at an elevation of 30 metres AHD. Medulla Brook to the north is at an elevation of 55 metres AHD.

Groundwater data from bores on the Swan Coastal Plan is not really relevant to the site, and neither is any groundwater from bores on the Scarp because they would either be in fractured zones or ponded groundwater.

The site itself is underlain by granite basement. Groundwater forming on that would simply flow off the basement by subsurface flow to the porous sediments that underlay the Swan Coastal Plan. Figures 6 and 11.

The geological considerations show that the groundwater could not possibly be close to the surface under the site. Under the sand resource the groundwater is geologically deep and interpreted to be at least 10 metres below the base of the sand resource. Further the lowest part of the pit has already been excavated and is dry and does not intersect water even in the wettest winters.

The subject area is located within the Serpentine Groundwater Area as proclaimed under the *Rights in Water and Irrigation Act 1914*. Any groundwater abstraction in this proclaimed area, for purposes other than domestic and/or stock watering, taken from the superficial aquifer is subject to licensing by the DWER. No bore is proposed.

3.5 Vegetation

The only remnant vegetation on Lots 100 and 6 are the planted tree belts and a few isolated trees in the north western corner that will not be impacted. Figure 4.

Scattered *Acacia saline* have been planted at the northern end of the pit. Figure 13.

Additional tree buffers have been planted along south western Highway and portion of Transit Road. These have grown well and are now providing good visual screening.

The roadside along South Western Highway is well vegetated with local native species and will not be impacted.

A small area of land to the south west across South Western Highway is classified as Bush Forever Area 71 - Transit Road Bushland, Jarrahdale (BFA71). Bush Forever Site 71 is a narrow strip of road verge that extends along the edge of the agricultural industry and south on the western side of South Western Highway.

The native vegetation on that site is representative of Forrestfield Complex, of which 9% is remaining and 5% is proposed for protection on the Swan Coastal plain of the Perth Metropolitan Region (2000 data).

The proposal does not abut Bush Forever Site 71. The sand excavation is set back 40 metres from South Western Highway. Then there is the road reserve of the Highway and in total a separation of 60 metres from the roadside vegetation on the west of South Western Highway and approximately 130 metres from the corner of the main vegetation in Bush Forever Site 71.

There will continue to be no potential for impact on the Bush Forever Site.

3.6 Fauna

The fauna on site will already be significantly depleted because the site is cleared.

4.0 Project Description

4.1 Extraction and Processing

The excavation procedures are not anticipated to be any different to those operating in other local quarries or from what was used when extraction was taking place previously.

Excavation Methods

Excavation methods are to be carried out as a sequence.

1. Topsoil will be removed and recovered for spreading directly onto areas to be revegetated.
2. Overburden will be pushed to the edges of the proposed pit to provide low perimeter bunding.
3. Sand will then be excavated from the floor of the pit to a depth of 2 – 4 metres. It is possible that in some areas excavation will go 1 – 2 metres deeper but the final land surface is anticipated to be a maximum of only 4 metres below natural land surface following final contouring.

4. The sand used for fill will be loaded directly to road truck by loader.
5. Access will be from Jarrahdale Road with trucks driving up the slope unladen and rolling down slope laden.
6. Loading will be completed in a dedicated area on the floor of the pit. Trucks will enter in an anticlockwise pattern and park waiting to be loaded. They will then drive forwards out of the pit.
7. At the end of excavation the floor of the quarry will be contoured and covered by a layer of overburden and top soil and rehabilitated with pasture.

Details of the Rehabilitation are Listed under 5.9 Rehabilitation.

Processing

8. No processing of sand is proposed.

4.2 Staging and Timing

It is anticipated that there is up to 160,000 tonnes of sand on site.

The pit will be staged to enable sequencing of clearing topsoil followed by overburden and then the restoration of the land surface.

As the sand is anticipated to be removed in one or several contracts a five year approval is all that is required and proposed.

Similarly it is not known in what time frame any sand delivered under contract will be required, and therefore an estimate on daily truck numbers is difficult to predict at this stage.

It must be remembered that there is a finite and limited amount of sand.

With an average truck load of a conservative 30 tonnes, and a total of 160,000 tonnes this amounts to a total of 5,333 total laden truck movements. Obviously with larger trucks the number of laden movements will be smaller. For example at 40 tonne average the total number of laden truck movements is 4,000.

If the sand is taken within a 6 month period, then this amounts to an average less than 7 laden truck movements per hour at the busiest time. Although contracts cannot be pre-empted, the number of laden movements is a reasonable estimate. Excavating at a slower rate will increase the number of days worked. Similarly increasing the excavation rate, reduces the amount of time the pit will be worked. In all there will be about 6 months transport, whether in one campaign or split into several campaigns.

At other times there will be no activity on site.

The access and loading of each truck will normally take approximately 8 minutes.

Therefore even on busy days the level of activity is anticipated to be low with only one loader and an average of one truck on site at any one time. To excavate at a faster rate, two loaders will be required and there will be times when two trucks will be on site with a truck perhaps parked, waiting on site.

The small area of the pit and short time frame make staging difficult.

In order to provide the best visual management excavation will commence in the north and progress upslope to the south.

If excavation is to take place in wetter months the southern most stage will be taken as a first or intermediate stage to provide more easy dust management closer to the sensitive premises to the south and south west.

4.3 Final Contours

The final excavated land surface over the majority of the site will be unchanged. The 7 hectare excavation area in the central west will be lowered by up to 4 metres in the centre grading back to natural ground elevation at the perimeters. Figures 6 and 7.

The surface will continue to be gently sloping, and at the end of excavation there should be little discernable indication that the site has been excavated.

4.4 Hours of Operation

Hours of operation are proposed to be 7.00 am to 5.00 pm Monday to Friday inclusive, excluding public holidays.

The request for Saturday transport has been withdrawn. This will however mean that the length of the transport campaigns may be slightly longer because of the shorter time frame.

In turn there will be no weekend traffic from the sand excavation along Jarrahdale or other roads.

4.5 Access, Transport and Security

The quarry will be accessed from Jarrahdale Road via a temporary access road to be constructed to the pit.

The access point has been selected as having the best sight lines along Jarrahdale Road.

The minutes of the Council Meeting of 11 February 2013 record that the proposal was referred to Main Roads by the Shire and that Main Roads did not object to the proposal subject to the area defined in the MRS future road works maintaining the existing levels to allow for future road widening.

As a consequence the access road was constructed and approved by the Shire of Serpentine Jarrahdale.

The proposed excavation lies outside the proposed works area and the Tonkin Highway alignment.

The entrance is constructed to the standards required by the Shire of Serpentine – Jarrahdale Engineer and at the agreed location. Figures 5, 14 and 15.

4.6 Equipment

All static and operational equipment will work on the quarry floor to provide maximum sound and visual screening.

Site office and/or containers	Unlikely to be required, but a transportable building may be required for the management and security of small items.
Toilet system	A serviced portable system is proposed to be used when the site is operating when no suitable alternative is available.
Washing plant	Not proposed.
Screening plant	Not proposed.
Water tanker	Used for dust suppression on the access roads and working floors when required. This will normally only be required for summer operations.
Loader	Loading and excavating sand. If a large contract is filled a second loader may be required from time to time.
Fuel Storage	Fuel will be sourced from a mobile tanker. No fuel will be stored on site.
Maintenance	Apart from minor lubrication and the change of hydraulic hoses there will be no maintenance on site.
Weighbridge	A weighbridge is not required or proposed.

4.7 Workforce

The workforce will vary, depending on the level of operation and market demands, but usually 2 to 4 persons can be expected to be working on site.

4.8 Water Usage

Water will only be required in the event of dust suppression for the access road.

Water will be sourced offsite from a licenced bore from another site or scheme water as required. It is anticipated that a maximum of around 1,500 kL water will be required annually in drier months for the access road.

An on site bore is not proposed at this stage, because of the apparent lack of groundwater availability on site.

Drinking water will be brought to the site as needed.

4.9 Safety

It is anticipated that the deepest excavation will be a maximum of 4 metres below natural ground level. Faces will be left in compliance with the *Work Health and Safety (Mines) Regulations 2022*, at times when the site is unattended

Final contours of any batter slopes will be gently sloping.

5.0 Environmental Impacts and Management

5.1 Aesthetics

The WAPC *Visual Landscape Planning in Western Australia* has been viewed and the project considered against that document.

The location of the extractive industry is determined by the presence of the sand and cannot be relocated to another site.

The excavation areas are set back from Jarrahdale Road. Figures 5 and 13. The excavation is setback 40 metres from the lot boundaries from South Western Highway and Transit Roads.

The site lies on a gently sloping ridge/spur. The proposed excavation occupies a small portion of the subject land and with shallow excavation there will be no alteration to local features, roads, access, zonings, ridge lines or natural features.

The Tonkin Highway extension will enter the site on Lot 6, north of the proposed sand pit. The proposed sand excavation will not impact on that alignment.

An analysis of the potential impacts is provided in the attached figures which include aerial photography, ground photography and sections.

The proposal is for a short term sand pit of perhaps 6 months total in three or more campaigns. It covers 7 hectares to a depth of between 2 – 4 metres. With an average depth of 3 metres there will be minimal impact on the excavated landform.

The land is cleared to pasture.

The tree buffer along South Western Highway will prevent most of the operations from being visible from that road. Figures 12 and 13. Site photographs from South Western Highway are provided in Figure 13. From adjoining locations on South Western Highway only glimpses of the overburden bund will be visible through the trees as cars rush by at 110 kph.

With a proposed perimeter bund of 2 – 3 metres of overburden it is unlikely that the operations will be seen from South Western Highway when driving past the tree lined area.

The excavation may also be visible from parts of Jarrahdale Road, and will be visible from higher elevations north of Jarrahdale Road, but at a distance.

The operations may visible from Transit Road, but, with the planted tree belt, a perimeter bund of overburden pushed to the perimeter of the excavation, and the break of slope the excavation is unlikely to be seen. Figures 9 and 14. Views from the camp will be minimised by the slope of the land which drops downslope about the southern edge of the southern extension near Transit Road. The change of slope combined with the proposed perimeter bund and planted tree belt will block most views of the excavation from that direction.

The perimeter bund will have natural seeds within it that will germinate in the first winter and visually match the adjoining pasture.

The reduced time frame for operations should only cause temporary impact, with only the southern part of the excavation near Transit Road.

From observations on the sand excavations, the pit will not be able to be seen from the dwelling to the south west that is associated with the rural industry.

The *Shire of Serpentine – Jarrahdale LPP8 Landscape Protection Policy* may apply to the operations. With the excavations unlikely to be visible from most of South Western Highway, the setback from Jarrahdale Road and the short nature of the operations, it is considered that whilst there may be some short term conflict with the intent of the policy the use of the sand for fill for local developments provides substantial environmental offsets in costs, transport impacts and reduced greenhouse gas emissions when compared to sourcing sand from further away.

Some comments relating to *Shire of Serpentine – Jarrahdale LPP8 Landscape Protection Policy* were raised by a submitter to the Shire during the advertising period for the original proposal.

Comments on the items raised are made below. The text in Italics is taken from the submitter's comments who sourced their comments from LPP8.

The objectives of the policy as stated are:

"To preserve the amenity deriving from the scenic value of the Darling Scarp;"

Response

The extraction of sand is a short term landuse with minimal impact by being so shallow and relatively small. It will not compromise the LLP8 Landscape Protection Policy. The proposal is compatible with points 1 – 3 under the policy LLP8 after the short term excavation.

The land has previously been used for plantation, and it is proposed that future planning and use of the site will provide good outcomes as rural land. By rehabilitating the site to pasture the site will remain compatible with the surrounding land and LPP8.

"To maintain the integrity of landscapes within the Landscape Protection Area;"

Response

A short term extractive industry will temporarily reduce the landscape value of a small portion of the site from some land, mostly to the north.

However the needs of the community must be considered in any decision making. By sourcing the sand from here for anticipated use within the Shire the truck movements to supply that sand will be significantly reduced in length assisting the amenity of residents within the Shire and helping to keep development costs of new urban land to more affordable levels. Every decision contains compromises and Urban Resources believes that the benefits to the community out way the short term local impact.

Compared to other sand pits and quarries this is a very small low impact operation.

The visual consideration shows that the excavation will not have a large impact on the local area.

“To maintain the integrity of landscapes in the line of sight view corridor along identified scenic routes in the Shire, including but not limited to South West Highway,... Jarrahdale Road,... both the North-South and East-West Railway lines and natural water courses;”

Response

As noted above this is a small short term operation. The visual analysis suggests that the potential impacts from local roads and land will be small.

“Development Considerations ... the following will also be considered when assessing a development application within the Landscape Protection Area: The 'seen area' of the development from the coastal plain, major roads and tourist routes, and major recreation areas;”

Response

As noted above the impacts from view corridors will be small and short term. This is offset by reductions in the length of transport routes required to supply the same amount of sand to developments within the Shire.

“The visual intrusiveness of the development within the 'seen area';”

Response

The colour of the sand is yellow to brown, a natural colour. With perimeter bunding formed by pushing the overburden to the perimeter of the pit visual impact will be minimised. The overburden is the natural soil currently on site.

“The landscape values of the area;”

Response

This is addressed above under other issues raised. The landscape values will be impacted on from some locations for a short period of time.

*“All development (including access roads) in the policy area shall not be permitted:
“1. On ridge lines or spur, bluff or knoll, escarpments, hill tops or visually exposed areas...”*

Response

The land is on a gently sloping rise but is relatively well screened from the adjoining roads, although some parts of the pit are likely to be seen for a relatively short time. The site is not part of the skyline.

The site is not a ridgeline, bluff, knoll or escarpment. There will be no change to the viewscape at the end of excavation with the removal of 2 – 4 metres of sand from the western flank of the ridge. The proposal is compatible with the development guidelines mentioned.

“In areas having a generalised slope greater than 25 percent.”

Response

The land, the subject of the Application, fails to meet the slope requirements.

The slope of the excavation area varies from a 10 metre rise in 160 metres to a 10 metre rise in 140 metres. That is 4.17% to 6.25% . Figure 9.

“Developments

Screening around proposed extractive and industrial developments or operations will be required to minimise visual impacts.”

Response

Screening is proposed given the constraints provided by the short term nature of the proposal.

“These types of developments are not to be seen from the coastal plain, major roads and tourists routes, and major recreation areas”

Response

As noted earlier the visual impact will be relatively small for a short time.

“Approval for these types of development will not be given unless the visual impact of the proposal on the Darling Scarp has been addressed to Council's satisfaction”.

Response

Council will determine a development application such as this on its merits. The need for sand, and the State Government Policies that require that basic raw materials are identified and extracted prior to sterilisation. The benefits, of sourcing sand locally is also a mitigating circumstance in terms of transport impacts, costs to the community and greenhouse gas emissions as a result of transport. This is in addition to the relatively small scale of the operation.

5.2 Noise

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

Offsite noise is governed by the *Environmental Protection (Noise) Regulations 1997*.

The *Environmental Protection (Noise) Regulations 1997*, require that sensitive premises including dwellings in non industrial and rural areas, are not subjected to general noise levels (excluding blasting), during the hours 7.00 am to 7.00 pm Monday to Saturday that exceed 45 dBA. Allowable noise to 55 dBA is permitted for up to 10% of the time and to 65 dBA for 1% of the time. Noise levels are not to exceed 65 dBA during normal working hours.

Between 9.00 am and 7.00 pm on Sundays and Public Holidays, and between 7.00 pm and 10.00 pm on all days, the base level is 40 dBA.

At night, between 10.00 pm and 7.00 am Mondays to Saturday, and before 9.00 am on Sundays and Public Holidays the permitted level drops to 35 dBA.

The 10% and 1% “time above” allowances apply at night and on Sundays and Public Holidays as well.

There are penalties for tonality of 5 dB, modulation 5 dB and 10 dB for impulsiveness, that are added to the permitted levels. That is, if the noise is tonal or modulated the permitted levels drop by 5 dB. Impulsiveness is not likely to be relevant for the quarry under normal circumstances.

The Noise Regulations provide for Construction Noise exemptions to enable construction of the site such as the building of the screening bund and opening the pits.

Influencing factors that raise the allowable noise levels are activities such as external industrial noise, some nearby land uses and busy roads. These are not relevant to this site.

Under Schedule 1 of the Noise Regulations the premises on which the extraction of basic raw materials are extracted, is classified as Industrial Land for the purposes of calculating influencing factors. This was defined as the whole cadastral boundaries in State Administrative Tribunal decision {2013} WASAT 139, Bushbeach v City of Mandurah. In this case the premises is quite small and approximates the area of disturbance and will have little impact on the influencing factors.

At a distance greater than 15 metres from the sensitive premises (eg dwelling), and commercial premises, a base level of 60 dBA applies at all times, with the 10% time permitted to be up to 75 dBA and the 1% permitted to be up to 80 dBA. For industrial premises the base level is 65 dBA at all times with the 10% time permitted to be up to 80 dBA and the 1% permitted to be up to 90 dBA.

The types of equipment proposed to be used are listed below. Not all plant will be on site at any one time and that provides for contingencies to reduce the operational noise on site if necessary at certain times.

Herring Storer completed an Acoustic Report which although prepared for the last application, remains valid because the parameters of the Noise Regulations and type of mobile plant have not change in that time. The Acoustic Report is attached.

Based on the experience of Landform Research, the Herring Storer Acoustic Report and the past operations the proposed renewal of sand excavation will continue to comply with the Noise Regulations at the closest dwellings.

Equipment	Sand Extraction
Rubber tyred loader (Komatsu WA 430 or similar)	Loading sand from the face – No change from previous approval.
Semi trailer or other road trucks	Transporting product – No change from previous approval

General Noise Management		
OPERATIONAL PROCEDURES	COMMITMENTS	MANAGED RISK
Comply with the <i>Environmental Protection (Noise) Regulations</i>	Urban Resources are committed to compliance with the Regulations.	Noted

1997.	<p>The proponent will comply with the Regulations.</p> <p>Herring Storer assessed the potential noise impacts and found that the proposed excavation and transport of sand will comply with the Regulations. See attached report which remains valid.</p> <p>The past operations complied with the Noise Regulations</p>	
Open communication with nearby residents.	The proponent will meet with the owners of the sensitive premises in Transit Road and to the west of South West Highway to explain the short term nature of the project and open a means of communication for the resolution of any issues prior to commencement.	NA
Maintain adequate buffers to sensitive premises.	<p>The closest premises is 200 metres to the south across Transit Road.</p> <p>The southern 1 hectare of the sand pit lies between 200 and 300 metres from that premises.</p> <p>Perimeter bunding will be used in that area and excavation should be completed within a 2 – 4 week time frame if that portion of sand was taken in one contract or several concurrent smaller contracts.</p>	Low
Locate exposed features behind natural barriers and landform.	Perimeter bunding is proposed to provide maximum noise screening and safety protection.	Low
Operate from the floor of the pit below natural ground level.	This is proposed, but the nature of the ground topography means that the operations will be visible from parts of Transit Road and potentially Jarrahdale Road from a distance.	Low
Maintain all plant in good condition with efficient mufflers and noise shielding.	<p>This is committed to.</p> <p>All plant is to be maintained in sound condition.</p>	Low
Maintain haul road and hardstand surfaces in good condition (free of potholes, rills and product spillages) and with suitable grades.	<p>No changes to the access roads are proposed.</p> <p>The crossover is sealed and the access road was used previously.</p> <p>Access will be from Jarrahdale Road at a location agreed with the Shire and to the specification of the Shire Director Engineering.</p>	Low
Implement a site code outlining requirements for operators and drivers for noise management.	<p>A site code is to be implemented.</p> <p>Urban Resources is committed to site induction and training for all personnel for all parts of the operations.</p>	Low
Scheduling activities to	Operations will be intermittent when a truck is	

minimise the likelihood of noise nuisance.	loaded. The excavation of sand is for a limited time of perhaps 6 months total although this may be spread over several years depending on contracts won. Operations are proposed to be Monday to Friday, excluding Public Holidays.	
Shut down equipment when not in use.	Shutdown is normally used and proposed to save fuel and maintenance costs in addition to noise minimisation.	Low
Fit warning lights, rather than audible sirens or beepers, on mobile equipment wherever possible.	Lights or low frequency frog beepers are to be used rather than high pitched beepers to restrict noise intrusion.	Low
Avoid the use of engine braking on product delivery trucks in built up areas.	Truck drivers will be instructed to minimise the use of engine braking when delivering their loads.	Low
Provide a complaints recording, investigation, action and reporting procedure.	A complaints recording and investigation procedure is proposed and will be implemented and maintained. All complaints relating to dust are to be investigated immediately on receipt of a complaint. <i>See Section 1.11 Complaints.</i>	Low
Conduct training programs on noise minimisation practices.	The proponent will implement site induction and training for all personnel.	NA
Provide all workers with efficient noise protection equipment.	All personal noise protection equipment will be provided to staff as required.	Low
Minimise and conduct at the least disruptive times.	Quarrying is to be conducted during the approved working hours.	Low

5.3 Occupational Noise

Occupational noise associated with the quarrying processes falls under the *Work Health and Safety (Mines) Regulations 2022*.

The management of occupational noise is normally handled by providing all necessary hearing protection, as well as conducting worker inductions and educational programs for all staff. Regular site audits of quarry and mining operations are normally conducted by the Department of Mines Industry Regulation and Safety.

As part of its commitments, Urban Resources are pro-active with its worker safety awareness;

- by providing all necessary safety equipment such as ear protection,
- identifying sections of the plant where hearing protection is required, as well as,
- conducting induction and educational programs for its staff.

Warning signs are used to identify areas of potential noise associated with mobile plant.

5.4 Dust

Background

The climate consists of warm to hot dry summers and cool wet winters. Average summer maxima are near 31°C and winter minima are near 6°C. Rainfall average is near 975 mm, with 80% of the rain falling in the months May to September inclusive.

Winds are the main local impact. The closest recording station for wind is Perth Airport, which, although in a similar geomorphological location, is further from the Scarp than the study area.

At Perth Airport summer prevailing winds at 9.00 am are easterly for 57% of the time. At 3.00 pm, winds are westerly to south westerly for 64% of the time. In winter the winds are lighter and more variable in direction. Figure 2.

Of local significance are the katabatic winds that blow from the Scarp on summer mornings. At Kelmscott the katabatic winds blow from midnight to midday, with the strongest winds between 4.00 and 6.00 am

Accordingly the study area is characterised by hot dry summers with strong easterly winds in summer.

The perimeter bunds and vegetation provide effective wind breaks and wind screening. Winds crossing the site are slowed by the perimeter tree and shrub vegetation. This reduces the speed of the winds across the floor of the pit.

When winds exit the pit or cross out of the pit they have to travel across a vegetated buffer that slows the speed of the wind and allows the coarser particles to drop from suspension.

Dust Guidelines

Dust emissions fall under the *Guidance for the Assessment of Environmental Factors, EPA, March 2000*. Assessments of the potential dust risk are normally made using the Land development sites and impacts on air quality, *Department of Environmental Protection and Conservation Guidelines, November 1996*.

Dust particles readily stopped by tree belts and distance, with which the site complies. Tree belts slow the wind and allow the dust to settle. See *Planning Guidelines Separating Agricultural and Residential Land Uses, Department of Natural Resources Queensland 1997(Pages 65 – 111)* and *Department of Health WA, 2012, Guidelines for Separation of Agricultural and Residential Land Uses which uses the same criteria (Pages 112 – 118)*.

The Queensland Guidelines predominantly relate to agricultural spray drift, but based on particle size also relate to dust.

The Guidelines provide for a buffer of 300 metres for open agricultural land, dropping down to 40 metres where an effective tree belt is in place. The Western Australian Department of Health also uses the same guidelines.

The Guidelines are based on field studies and demonstrate the effectiveness of tree belts in providing screening against particulate travel.

The excavation has good buffers of trees on the western and southern side and therefore complies with the 40 metre recommended vegetated buffer to the west of the excavation for the prevailing winds for the southern portion of the pit. The western sensitive premises is only affected by the easterly winds for the southern portion of the excavation.

There are also good buffers south of Transit Road separating the sensitive premises in that direction. That sensitive premises is not in line with the prevailing winds.

The main risk assessment used is *DEC (DWER) 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities*.

Dust Risk

Excessive dust has the potential to impact on both the workers and the adjoining land.

The main risk from dust is not sand, but rather the fine particles that are generated during transport along access roads and traffic areas and moving and reinstating topsoil during dry conditions.

The sand grains are too large and will be trapped by vegetation and the perimeter bunding.

Through the winter months of May to September inclusive, there is little dust risk because rainfall exceeds evaporation. The rainfall is sufficient to wet the whole soil profile to depth, with excess water reaching the water table.

In summer, when evaporation exceeds rainfall, soils dry out and the road base on the access roads can be crushed by repeated vehicle movements.

Without the traffic, areas of earthy sand stay in lumps that do not degrade or produce fine dust particles. The earthy sand readily crusts and is stabilised. It is only trafficked areas of dry clay and the gravel roads that develop fine dust from the grinding of wheels.

The other time when dust may be an issue is during land clearing and reinstatement, but this will only occur once for each part of the excavation.

However in elevated and dry hardstand areas or trafficked areas where the clay can dry out and be crushed there is potential for dust to be generated. Most of this dust is regarded as nuisance dust.

The sensitive premises to the south of Transit Road is not affected by the prevailing winds but could be affected by strong northerly winds ahead of a cold front in autumn.

The premises to the west is only affected by the prevailing winds when operating in the southern portion of the site.

The proposed 2 metres high perimeter bunding of overburden will assist in reducing wind speed on the floor of the pit and thus the potential for wind erosion and dust generation.

The screening belts of trees along the west and south are providing a wind break.

The other time when dust may be an issue is during land clearing and reinstatement, but this will only occur once for each part of the excavation.

The site has operated in the past and demonstrated that effective dust management is in place and has proven to be effective.

The category of dust risk is included in *DEC 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities*.

Table 2: DWER 2011 Dust Risk Assessment Dust Risk Assessment from DEC 2011

PART A Number	Item	Score	
		With no dust management in place	With effective management in place
1	Nuisance potential of the material	Medium when disturbed Low when trafficked and untreated – 4	Very Low with effective water sprays and wetting down - 1
2	Topography and vegetation screening	Well screened - 1	Well screened - 1
3	Area of site activities	Trafficked areas are 1 to 5 - 3	Trafficked areas are 1 to 5 - 3
4	Type of work being undertaken	Bulk earthworks - 6	Bulk earthworks - 6
	Summer total without dust measures	14	11

PART B Number	Item	Score (With no dust management in place)	
		Sand excavation	Loading and stockpiling
1	Distance to sensitive premises	100 – 500 metres - 12	100 – 500 metres - 12
2	Effect of prevailing wind	Dwelling west - Isolated land use partially affected by one wind direction – 6 Dwelling south not affected - 1	Dwelling west - Isolated land use partially affected by one wind direction – 6 Dwelling south not affected - 1
	Summer total without dust measures	18 or 7	18 or 7

Activity	Calculated Score	Allocated Risk of Dust
Land Clearing and excavation without dust suppression.	98 - 252	Classification 2 Low Risk, No recommended actions or contingencies required for the dwellings. Dust management will be required for pit best practice and worker environment.
Excavation with dust suppression	77 - 198	Classification 1 Negligible Risk, No recommended actions or contingencies required for the dwellings. Dust management will be required for pit best practice and worker environment.

A water tanker or other means of water treatment will be available on site for watering the access road and internal work areas as necessary to minimise dust generation.

Dust Management

ACTIVITY	POSSIBLE RISK SEVERITY and FREQUENCY	OPERATIONAL PROCEDURES AND COMMITMENTS	RISK AFTER MANAGEMENT
EARTHWORKS			
Land Clearing, construction earthworks and building the bund	Low - Occasionally to open new ground	This involves removing the topsoil for use in revegetation and topping the screening bunds, followed by removal of the overburden. Clearing will be conducted to only remove the area required for immediate mining to expose the resource and construct the operational features. If winds are sufficiently strong, or other weather conditions are unacceptable to negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved. Visual monitoring of the visual dust is the best and fastest method of monitoring dust risk and dust generation and faster response can be achieved than alarms or monitors. If visual dust is significant then smaller particles may also be present.	Low
Land restoration	Low - Once per year or less frequent	Land restoration is infrequent and normally conducted only once per year. Scheduled activities such as ripping, overburden and topsoil spreading will be conducted at times of low dust risk, such as when the soils are moist or at lower risk of dust generation.	Low
EXCAVATION			
Excavation	Low - Frequent	There are no changes to the sand excavation methods used and approved previously. The amount of ground open at any one time will be minimised. Equipment that is not required will be shut down.	Low

		<p>The area ground being subject to traffic will be minimised.</p> <p>The existing access road will continue to be used.</p> <p>The pit will be operated to reduce wind speed and potential dust lift off.</p> <p>Effective setbacks will be maintained.</p> <p>Perimeter screening bunds will be used to reduce wind speed.</p> <p>The screening tree belts will be maintained. The belts to the west and south provide compliance with Government Guidelines for dust management.</p> <p>If required wind break fencing generally on top of bunds will be used.</p> <p>A secure, fenced site, to prevent illegal access will be maintained.</p> <p>Excavation will be conducted on the floor of the pit to provide maximum shelter for dust protection.</p> <p>The site will be left wind resistant where possible each night and weekend.</p> <p>Operations will be temporarily halted when the wind is sufficiently strong to produce excessive dust.</p>	
Loading and stockpile creation	Low - Frequent and in campaigns	<p>Loading from the face produces little dust and is covered under excavation.</p> <p>Stockpiles are not required.</p>	Low
TRANSPORT			
Road condition	Low - Frequent	<p>The access road crossover is sealed with the remainder gravel.</p> <p>All loads for transport outside the pit are required to be covered.</p> <p>The existing access road and crossover will be maintained in good condition (free of potholes, rills and product spillages).</p>	Low
MONITORING			
Monitoring	NA	<p>A readily auditable trigger of no visible dust to cross the property boundary in line with DWER Licence and best practise in WA.</p> <p>The trigger for dust management is the generation of excessive visual dust.</p> <p>The loader operator will determine the amount of dust being generated as they are in the best position to assess dust generation and to direct remediation.</p> <p>On site induction training will include observation and mitigation measures to assess and manage dust emissions.</p> <p>Operations will temporarily cease if conditions occur where dust cannot be managed.</p> <p>The latest weather conditions will be reviewed to assist the awareness of dust risk.</p>	NA
Complaints	NA	<p>All complaints relating to dust are to be investigated immediately on receipt of a complaint. <i>See Section 1.11 Complaints.</i></p> <p>A record of all dust complaints is to be maintained together with the mitigation measures to be used to reduce the dust impacts.</p>	NA

Local Landowner Liaison

The contact details for the operator will be provided on a sign located at the entrance to the site from Jarrahdale Road, prior to commencement of operations.

5.5 Water Management and Hydrogeology

Summary of the Site Characteristics

Sand excavation is a clean industry permitted in Priority 1 Groundwater Source Protection Areas such as Gngara at separations of 3 metres to the water table. This site far exceeds that requirement. Attached is a copy of the DOW Guidelines for Priority Groundwater areas and shows that Extractive Industries are permitted activities in all Priority 1 – 3 areas with the only restriction being the management of fuel and maintenance. That is the proposed sand excavation complies with DWER Guidelines.

Surface Water

The main hydrological feature is the valley of Medulla Brook to the north of Jarrahdale Road. From there it drains to the Peel - Harvey Estuary.

The soils are free draining, elevated and not susceptible to winter wet conditions. They were assessed by hand auger and backhoe to 3.5 metres at the base of the sand resource where the sand becomes more earthy.

The site is elevated and well drained and consists of a sloping area of deep permeable sandy soils. There is no runoff from the sandy soils.

Groundwater

The subject area is located within the Serpentine Groundwater Area as proclaimed under the *Rights in Water and Irrigation Act 1914*. Any groundwater abstraction in this proclaimed area, for purposes other than domestic and/or stock watering, taken from the superficial aquifer is subject to licensing by the Department of Water. The issuing of a groundwater licence is not guaranteed but if issued will contain a number of conditions that are binding upon the licensee.

There is no evidence of groundwater availability on site and, as the site is underlain by granitic basement which has a steep slope as a result of the Darling Fault and erosion through past geological times, there is unlikely to be any groundwater available on site. This statement is based on a review of the mapping of the site, drill auger holes to 3.5 metres on the excavation area, mapping from backhoe excavation, site geological mapping and examination of Western Australian Geological Survey and Department of Water maps.

The Perth Groundwater Atlas produced by the DWER shows the groundwater to the east is at an elevation of 30 metres AHD. Medulla Brook to the north is at an elevation of 55 metres AHD. Figure 11.

When the land was first cleared and the vegetation removed, the recharge will have increased. However the planting of the pines will have led to a small reduction in recharge and with a return to pasture the recharge will return to the cleared situation.

That is there will be no net change to recharge when the pasture is restored compared to the cleared condition of the land at the time of planting the pines.

It is estimated that considering the soils and rainfall of 975 mm per year (Whitby Falls) depth to the water table and well known recharge rates, such as outlined in EPA Bulletin 788, currently and after excavation approximately 20% of rainfall will contribute to recharge of the groundwater. The proposed excavation will have no impact on that figure.

The proposed operation complies with all Government Policies and Guidelines.

There will be no alteration to drainage lines, and neither surface water nor ground water will be affected.

Guidelines

The protection of water, whether groundwater or surface water, is an important part of the management of quarries.

Guidance on the quality of water can be found in;

- *WQPN 15 Basic Raw Materials Extraction.*

The sand excavation complies with WQPN 15. The location of the sand and its proposed excavation complies with all Advice and recommendations, of the policy

Water Management

ACTIVITY	POSSIBLE RISK SEVERITY and FREQUENCY	OPERATIONAL PROCEDURES AND COMMITMENTS	RISK AFTER MANAGEMENT
WATER			
Surface Water	Low - Occasionally during heavy storm events	Surface water runoff will only occur under extreme events and for short distances before the water soaks into the sand. The pit will be designed to retain any surface water that might occur during heavy rain. At the end of excavation the land surface will be reformed to be similar to that existing prior to excavation with similar soils. That is, in storm events some minor surface flows might occur in heavy storms before soaking into the ground. As the site lies within the Peel - Harvey Catchment, the management of hydrocarbons will mitigate any flow to the Peel Harvey watercourses. With such porous soils defined detention basins and sumps and dams	Low

		will not be required.	
Ground Water	Low - During operations	Surface water is clean and will soak into the sandy soils. All water will be retained in the pit for infiltration. Dewatering will not be necessary and is not proposed. Hydrocarbons and waste will be managed to mitigate impacts on the soils and water.	Low
HYDROCARBONS			
Refuelling	Low - Frequent during operations	<p><i>The operations will comply with WQPN 15 Basic Raw Materials Extraction.</i></p> <p>Mobile tankers will be used, which are approved double skinned facilities. There will be no onsite fuel storage.</p> <p>The operators of the mobile refuelling facilities (SWP) are trained in re-fuelling duties including the management of any spills. The mobile facilities are equipped with adsorbent mats and products (eg attapulgate) to be used in the event of spills.</p> <p>Minor spills and drips will be quickly degraded by soil microbial matter.</p> <p>Where obviously any drips or minor fluid spills will be scooped up with the sand and sent offsite for on the ground bacterial remediation; the most commonly used method of dealing with small spills.</p> <p>The only other risk is from a tank rupture, but tanks are designed to manage this eventuality. Soil contaminated by large spills will be removed from the site to an approved disposal area.</p> <p>Refuelling and lubricating activities are to occur in the base of the pit, and equipment for the containment and cleanup of spills is to be provided.</p> <p>Spillage will be contained in plant and working areas by shutting down plant or equipment if the plant or equipment is the source of the spill (provided it is safe to do so).</p> <p>Any spills will be contained by the excavation. Soil and resource will quickly be placed around the spill to contain it in as small an area as possible. When contained, the contaminated sand will be scooped up and removed to an approved landfill or other approved site.</p> <p>All significant adverse incidents (such as a fuel spill of >5 litres) in one dump, are to be recorded, investigated and remediated. A record is to be kept of incidents, and DWER and Shire of Serpentine Jarrahdale notified within 24 hours of an incident.</p> <p>In the event of a spill or adverse incident, activities will be stopped in that area until the incident is resolved.</p>	Low
Servicing	Low - Occasional during operations	<p>All major servicing of vehicles will be conducted off site, and maintenance using dedicated trucks with oil and waste recovery systems will be used.</p> <p>Waste oil and other fluids derived from the routine maintenance of mobile machinery, will be transported off site and disposed of at an approved landfill site. Grease canisters, fuel filters, oil filters and top-up oils will be stored in appropriate containers in a shed or brought to the site as required.</p> <p>Vehicle washdown is not proposed.</p> <p>Regular inspections and maintenance of fuel, oil and hydraulic fluids in</p>	Low

		<p>storages and lines will be carried out for wear or faults.</p> <p>Servicing plant and equipment will be in accordance with a maintenance schedule.</p> <p>Accidental spill containment and cleanup protocol will be implemented as necessary.</p> <p>Rubbish generated is to be recycled wherever possible and periodically disposed of at an approved landfill site.</p> <p>The site will be maintained in a tidy manner by removing all rubbish regularly offsite.</p>	
WASTES			
Resource Wastes	Low - During operations	<p>There will be no washing of products.</p> <p>There will be no waste rock or tailings.</p> <p>Subgrade materials will be used for subsoil restoration or used for perimeter bunding and landform restoration.</p>	Low
Illegal Dumping	Moderate - At any time	<p>Access is restricted by current farm fencing and locked gates. Fences will be maintained.</p> <p>Any illegally dumped materials are to be removed promptly to an approved landfill or other suitable site, depending on the nature of the material.</p>	Low
Ablutions	Low - During operations	An approved serviced portable toilet facility will be provided when the site is manned, unless alternative approved facilities are available.	Low
MONITORING			
Monitoring	NA	<p>Monitoring will concentrate in two areas;</p> <ul style="list-style-type: none"> • Supervision and management of the operations. • Monitoring of soils for spills and leakages. <p>Soils found to be contaminated will be dealt with as outlined above.</p> <p>Being such a small short term operation, that complies with WPQN15 Guidelines, no water monitoring is proposed. It is most unlikely that any bore would be able to intersect ground water on the western boundary.</p> <p>The best means of water management is due operational diligence because the time taken for any contaminant to reach any such water would be substantial and at that stage no action could be taken.</p>	NA
Complaints	NA	<p>All complaints relating to dust are to be investigated immediately on receipt of a complaint. <i>See Section 1.11 Complaints.</i></p> <p>A record of all dust complaints is to be maintained together with the mitigation measures to be used to reduce the dust impacts.</p>	NA

5.6 Flora and Fauna

Native Vegetation

The excavation area is pasture. Native vegetation occurs along the road verge of South Western Highway outside the excavation area.

A small area of land to the south west across South Western Highway is classified as Bush Forever Area 71 - Transit Road Bushland, Jarrahdale (BFA71). Bush Forever Site 71 is a narrow strip of road verge that extends along the edge of the agricultural industry and south on the western side of South Western Highway.

The proposal does not abut Bush Forever Site 71. The sand excavation is set back 40 metres from South Western Highway. Then there is the road reserve of the Highway and in total a separation of 60 metres from the roadside vegetation on the west of South Western Highway and approximately 130 metres from the corner of the main vegetation in Bush Forever Site 71.

Weed Management

This plan utilises the most appropriate on ground measures to minimise the risk of spread of Declared and Environmental weeds. The information provided here summarises the key points of the on ground management.

Currently a small number of cattle are agisted on site.

The thrust of the weed management will be to minimise the risk of species that may become weeds spreading on site.

Dieback Management

Dieback of vegetation is often attributed to *Phytophthora cinamomi* even though there are other *Phytophthora* species and other diseases such as *Armillaria* that can cause dieback like symptoms. Microscopic soil-borne fungi of the genus *Phytophthora* kill a wide range of native plants and can cause severe damage to many vegetation types, particularly those from the families Proteaceae, Epacridaceae, Xanthorrhoeaceae and Myrtaceae.

There are several guides to the management of Dieback which form the basis for management.

- Department of Biodiversity Conservation and Attractions, 2020, *Phytophthora Dieback Management Manual FEM079*.
- Dieback Working Group, 2021, *Best Practise Guidelines for Management of Phytophthora Dieback in Basic Raw Materials Industries*.

The site has been part of a rural property for some decades and in more recent times used for grazing and Pine plantation. Currently there are no local native species on the excavation site. No obvious dieback conditions appear to have been introduced into local adjoining vegetation.

From this it would appear that the site is uninterpretable but with a very low risk for dieback impacted sand. Currently the sand resource to be excavated carries no susceptible species to harbour dieback.

The access road is hard gravel. Traffic will be restricted to the made access road unless the traffic is associated with normal farming activities.

Even so as a matter of good environmental management the proponent will use practices that will minimise the introduction of weeds or plant pathogens. These will be incorporated into the normal farm management.

The aim of dieback management during excavation is therefore to minimise the risk of entry of dieback into the site. In many ways the management of the site for dieback is similar to that for the management of weeds, and the two management practices should be considered together.

Dieback and Weed Management

ACTIVITY	POSSIBLE RISK SEVERITY and FREQUENCY	OPERATIONAL PROCEDURES AND COMMITMENTS	RISK AFTER MANAGEMENT
DIEBACK			
Dieback	Low - Occasionally during heavy storm events	<p>The principles of Department of Biodiversity Conservation and Attractions, 2020, <i>Phytophthora Dieback Management Manual FEM079 and</i></p> <p>Dieback Working Group, 2021, <i>Best Practise Guidelines for Management of Phytophthora Dieback in Basic Raw Materials Industries will be implemented</i></p> <p>Road vehicles will be restricted to the access road and loading area.</p> <p>Quarry traffic is to be restricted to the excavation, processing areas and access roads. The only time they will travel anywhere else is to annually clear the firebreak.</p> <p>The pit will effectively be worked as a quarantine and split operation.</p> <p>Only the loader on site will be used during topsoil clearing and land reinstatement.</p> <p>No soil and vegetation will be brought to the site apart from that to be used in rehabilitation.</p> <p>Native vegetation areas will be excluded from quarry vehicles by instructions to operators, temporary fencing, signage and flagging, as appropriate.</p> <p>The rehabilitated surface will be free draining and not contain wet or waterlogged conditions.</p> <p>No plant, soil, weed rubbish or other materials will be brought to the site apart from that used for rehabilitation.</p> <p>Materials to be used in rehabilitation will be dieback free.</p> <p>No contaminated or suspect soil or plant material will be brought onto the site.</p> <p>Vehicles and earth moving equipment brought to the they are to be cleaned prior to entering the site if they originate from a dieback</p>	Low

		<p>affected area.</p> <p>The loader to be used on site will generally remain on site. If taken offsite it will be cleaned by washing or brushing prior to returning to site.</p> <p>Compliance with the weed management program.</p>	
Weeds	<p>Low</p> <p>-</p> <p>During operations</p>	<p>The Dieback Management Actions will be used to assist weed management.</p> <p>Inspections will be conducted to monitor the presence and introduction of Environmental and Declared Weeds on an annual or more frequent basis. On identification, Declared and significant environmental weeds will either be removed, buried, or sprayed with a herbicide.</p> <p>In autumn the rehabilitated areas will be monitored and a spraying program implemented for the rehabilitated surface prior to additional seeding and planting.</p> <p>Large plants such as Castor Oil plant will be grubbed out or spot sprayed with a herbicide. Smaller weeds will be sprayed.</p> <p>Weed affected top soils may need to be taken offsite, used in weed affected areas, buried by 500 mm soil/overburden or taken offsite.</p> <p>Site inspections will be carried out at least twice per year in spring and autumn, at times suitable for weed treatment.</p> <p>All vehicles and equipment to be used during land clearing or land reinstatement, are to be clean and free from soil or plant material when arriving at site.</p> <p>When clearing land or firebreaks, vehicles are to work in conjunction with dieback principles.</p> <p>No plant, soil or fill material will be brought to the site, unless for rehabilitation, weed free or is clean and to be used for hardstand.</p> <p>The site is secured by locked gates to prevent illegal dumping of rubbish.</p> <p>Rubbish is to be removed promptly.</p>	Low

5.7 Fire Protection

The sand pit will form a natural fire break.

The water tanker or other dust management actions will be available when excavation is in progress in drier months, as part of the dust management program.

The requirement for rural fire protection such as perimeter fire breaks, requirements for fire protection facilities on farm vehicles, such as tanks, pumps and fire extinguishers will be maintained and utilised.

5.8 Closure and Revegetation

Background

The site is to be returned to pasture which is in keeping with the rural zoning, surrounding land uses and Shire of Serpentine – Jarrahdale policies.

At the end of excavation the soils will be yellow earthy sands which will have higher agricultural capability than the slightly leached sands currently on the excavation area.

Completion Criteria

- Weed levels that are not likely to impact on the established pasture.
- Absence or control of Declared or environmental weeds.
- Pasture cover that stabilises the soils and provides a “rural” character and landuse, eg grazing.
- Rehabilitation is to be commenced within 12 months on any ground no longer required for excavation.
- Pasture will be perennial, to DPIRD Guidelines or an appropriate consultant. (Suggested mixture of species; Legumes such as lucerne, clover, lotus plus Grasses such as perennial rye, tall fescue, kikuyu, Rhodes grass)
- Maintenance of the established belts of trees along the western and southern sides of the pit during the life of the operations.

Topsoil and Overburden Removal

1. No clearing is required. The site is pasture.
2. Where possible topsoil and overburden will be directly transferred from an area being cleared to an area to be rehabilitated.
3. Overburden, as subgrade sand, will be pushed to the perimeters of the excavation, to assist with visual and noise screening. From there it will be pushed back across the excavated floor as part of the soil restoration.
4. Excavation will be worked progressively from north to south. The southern stage will be taken during the winter months if this is possible as this will minimise potential dust generation risk.
5. Where possible, topsoil clearing will be undertaken in drier months, but when the soils remain moist.

Landform Reconstruction and Contouring

1. All buildings, equipment and machinery will be removed from site.
2. All roads and hard stand will be removed, unless required for future access, and the location deep ripped and rehabilitated. The crossover and gate will be retained.
3. The final landform will be formed to the final concept plan.
4. The land surface will be as a gently sloping floor with minimal need for batter slopes, some 2 – 4 metres below natural ground level, with a similar form to natural ground.
5. No slope will be greater than 1 : 5 vertical to horizontal.
6. Where available a minimum of 100 mm of overburden will be spread over the surface to provide a substrate for agricultural soils, followed by topsoil.
7. Even in areas where topsoil and overburden is not available the yellow sand will provide a sufficient substrate for plant growth based on rehabilitation undertaken by Landform Research at Jandakot on similar soils.

Pre-Planting/Seeding Weed Control

Pre-seeding weed control is only likely to be required where topsoils are used that contain weed species.

1. If required, weed control will normally only be conducted after overburden and topsoil have been spread and any seeds have been allowed to germinate. Broadscale weed treatment can be detrimental to the germination and growth of some plant species but may be required if the weed load is to be reduced.
2. In May, after the first autumn rains, check for broadleaf weed germination.
3. Any weeds likely to significantly impact on the rehabilitation will be sprayed with Roundup or similar agriculture herbicide or grubbed out, depending on the species involved. Weed affected topsoil and overburden will be buried. The Weed Management Plan will form the basis of weed treatment. Depending on the nature of the planting substrate, a broad spectrum spraying program may be used.

Revegetation

1. The proponent will spread topsoil to increase the total organic carbon fraction, improving soil properties such as resistance to water and wind erosion and moisture retention.
4. Topsoil provides a useful source of seed for rehabilitation when the correct handling of the topsoil is used, stripped and replaced dry (autumn direct return).
5. Studies have shown that topsoil stripping and placement is best undertaken in summer for maximum germination, but this raises the potential for additional dust generation from the fine humus particles.

6. Topsoil will be spread directly from an area being cleared where possible, otherwise reclaimed from a low topsoil dump.
7. Revegetation will take place during the first winter months following the restoration earth works of each particular section of quarry. Leaving the completed earth works for one season will reduce the success of rehabilitation by at least 50 %, due to compaction effects.
8. Rehabilitation will progressively follow mining, with completed areas of the excavation being revegetated as soon as practicable. Revegetation is to commence within 12 months of the completion of each portion of the excavated pit.
9. Perennial pasture will be established for better ground cover and grazing. Pasture will be a mixture of species suited to DPIRD High Rainfall Zone, such as Legumes - lucerne, clover, lotus plus Grasses - perennial rye, tall fescue, kikuyu, Rhodes grass
10. Fertiliser is not always required. If used, a fertiliser containing nitrogen, phosphorous and potassium, and trace elements, is recommended to be spread at rates of up to 50 kg/hectare similar to normal agricultural practice, applied to rehabilitation areas in the year of planting.

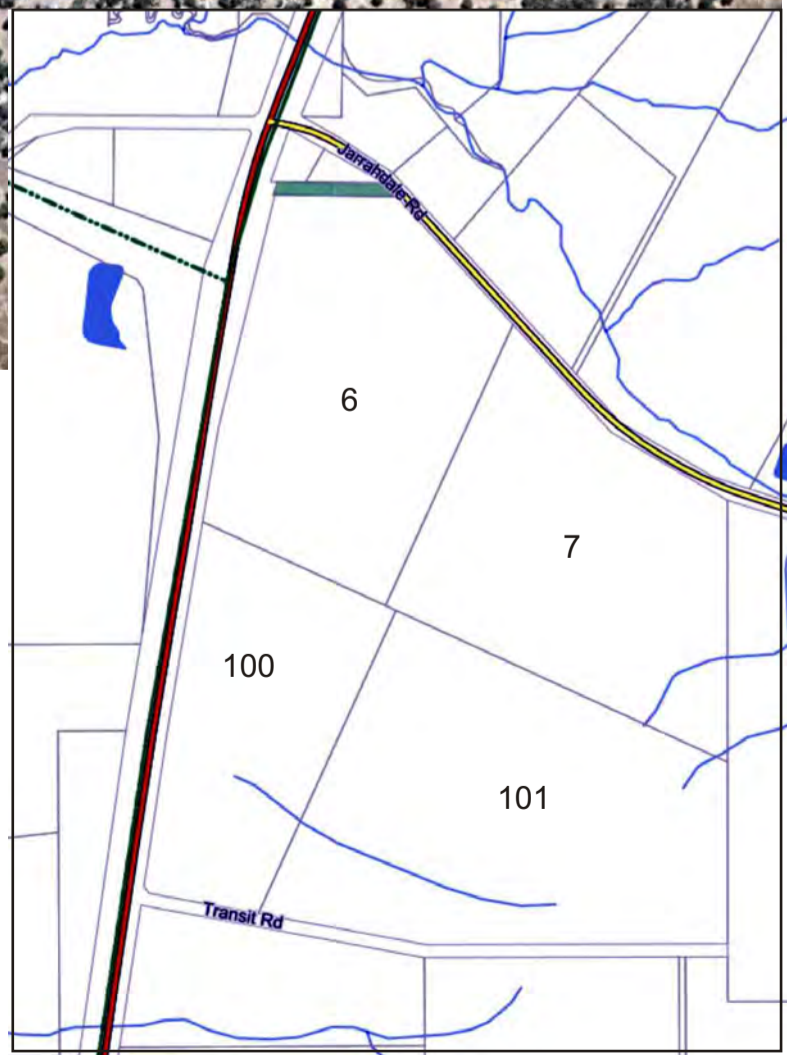
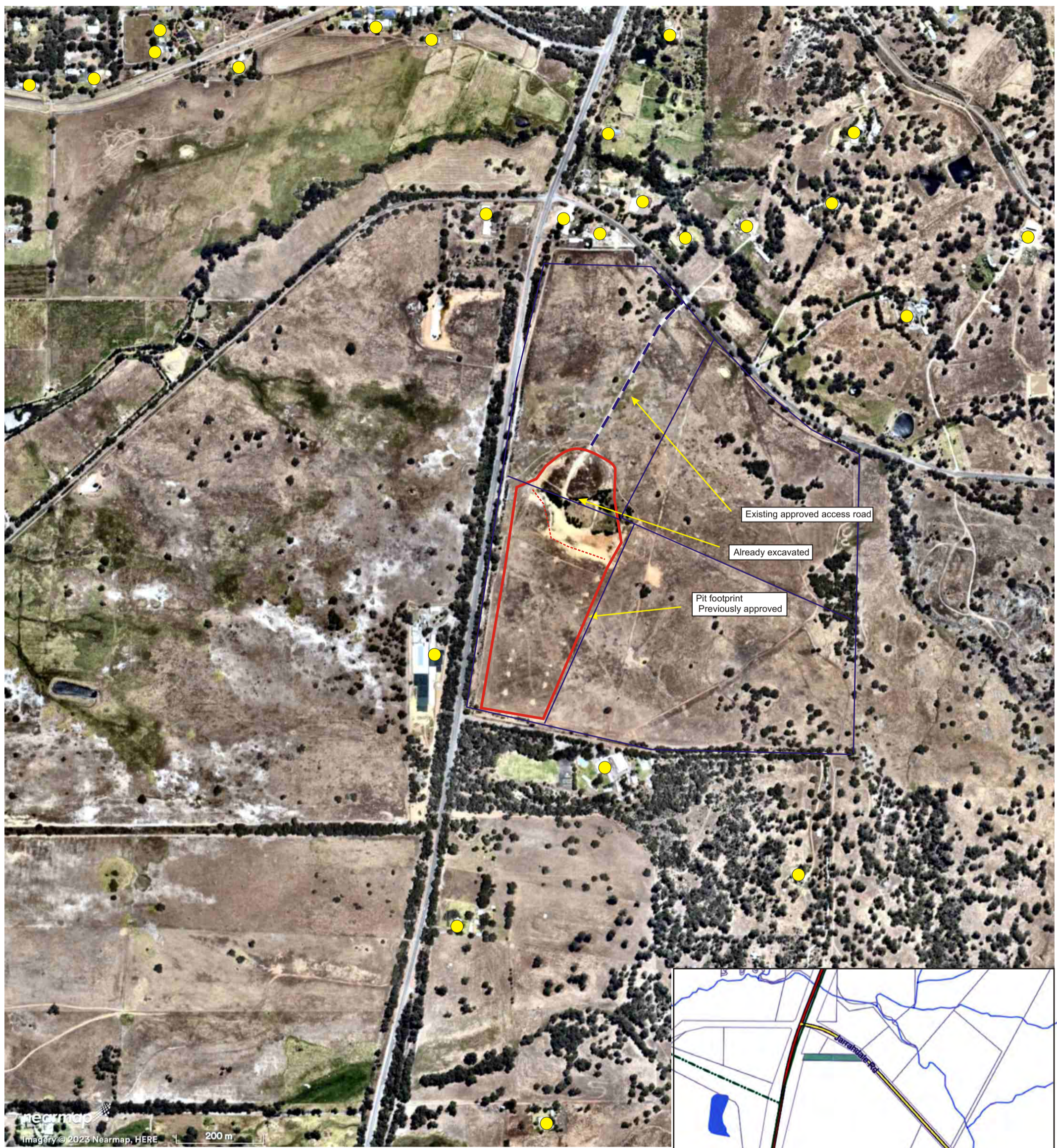
Erosion Control

1. The soils are very permeable and runoff is normally minimal unless surface materials become non-wetting. Even so experience shows that there is minimal non wetting and surface particle movement under such conditions.
2. Soil erosion occurs when soil is exposed and disturbed by wind or water. Erosion involves soil particles being detached from areas not adequately protected by vegetation, and moved down-slope. Water erosion is not normally a significant problem on flat or gently sloping sandy sites such as this, but wind erosion risk is high if the soils are not protected.
3. The key is to provide a plant cover progressively and as soon as possible after the completion of each stage of sand excavation.
4. Where sufficient pasture cannot be achieved and the soil/sand becomes susceptible to wind erosion, temporary wind breaks such as wind break fencing will be considered to stabilise the soils until a satisfactory vegetation cover can be achieved.
5. Seeding will be completed in late summer for winter germinating species. There may also be a place for summer growing perennial grass species.

Monitoring

1. During late summer an assessment of the success of the rehabilitation will be made to determine the rehabilitation requirements for the following winter.
2. Monitoring will be undertaken for a period of 3 years or until sufficient pasture cover is established to secure the sand and provide a basis for rural land pursuits.

3. Monitoring includes visual assessments and, where necessary, counts to determine the success of the rehabilitation and restoration, as follows;
 - plant density
 - plant growth
 - plant deaths
 - regeneration
 - weed infestation
4. As necessary steps will be taken to correct any deficiencies in the vegetation.
5. Rehabilitation of each stage will be monitored to ensure satisfactory establishment of pasture.
6. Ongoing weed management to identify and treat significant environmental weeds, or weeds likely to impact on the rehabilitation, will be undertaken.
7. In areas of rehabilitation that do not meet the completion criteria, measures are to be taken to increase the pasture density. This could include but not be limited to;
 - additional seeding,
 - planting additional tube plants,
 - additional use of fresh topsoil.



PROPOSED SAND EXCAVATION -
 LOT 6 JARRAHDAL ROAD - LOT 100 TRANSIT ROAD - JARRAHDAL
 SURROUNDING LAND USES




FIGURE 4



LOTS 6, 100 JARRAHDALE AND TRANSIT ROADS
JARRAHDALE

PROPOSED EXTRACTION AREA

Basemap NEARMAP 2022 Landform Research
Scale See Map February 2023

 Proposed extraction area
 Soil Test Hole Location 2013




KEY	SOIL TYPE	DESCRIPTION
S/GS	Sand over Gravelly Sand	Leached white or yellow sand to 100 – 400 mm depth over yellow sandy gravel with minor intermittent and weak gravel duricrust to depths of 200 – 1500 mm. Subsoils are deep yellow earthy sands that contain a small amount of clay. Developed on Yogannup Formation. Gently sloping and well drained.
YGS	Yellow Gravelly Sand	Similar to Sand over Gravelly Sand but with the gravel layer being weakly developed as gravelly sand and lacking duricrust. Developed on Yogannup Formation. Gently sloping and well drained.
YS	Yellow Sand	Pale deep yellow sand with minor gravel over deep yellow earthy sand. Developed on Yogannup Formation. Gently sloping and well drained.
GL	Gravelly Loam	Dark brown sandy gravel and gravelly sand to 250 mm, over brown and grey mottled clay that is free draining, and containing beds of boulders and cobbles imbedded in the clays. Probable valley fill or of Permian glacial remnant as the boulders are mixed rock types rounded and may be glacial erratics related to other similar boulder beds along the edge of the Darling Scarp.
LWS	Leached White Sand	Leached white sand in the upper horizons over yellow gravelly sand at depth with yellow earthy sand subsoils. Developed on Yogannup Formation. Gently sloping and well drained.
BL	Brown Loam	Dark brown loam over brown loam at 100 mm with yellow brown loam and loam clay to 1500 mm over yellow brown saprolite from weathering granite gneiss. May contain a shallow overlying sand layer and stone in the profile. D indicates the soil profile is more red brown and is developed on dolerite dyke. Developed on weathered granite gneiss basement. Well drained. Moderate slopes with minor steep areas.
RBL	Rocky Brown Loam	Same basic soils as Brown Loam but with scattered to abundant rock outcrop. Q indicates quartz vein as the dominant rock, + indicates granite gneiss as the rock basement. Very rocky with moderate slopes and minor steep areas. Development normally not recommended.
SRBL	Steep Rocky Brown Loam	Same as Brown Loam, but with steep slopes that will normally preclude development.

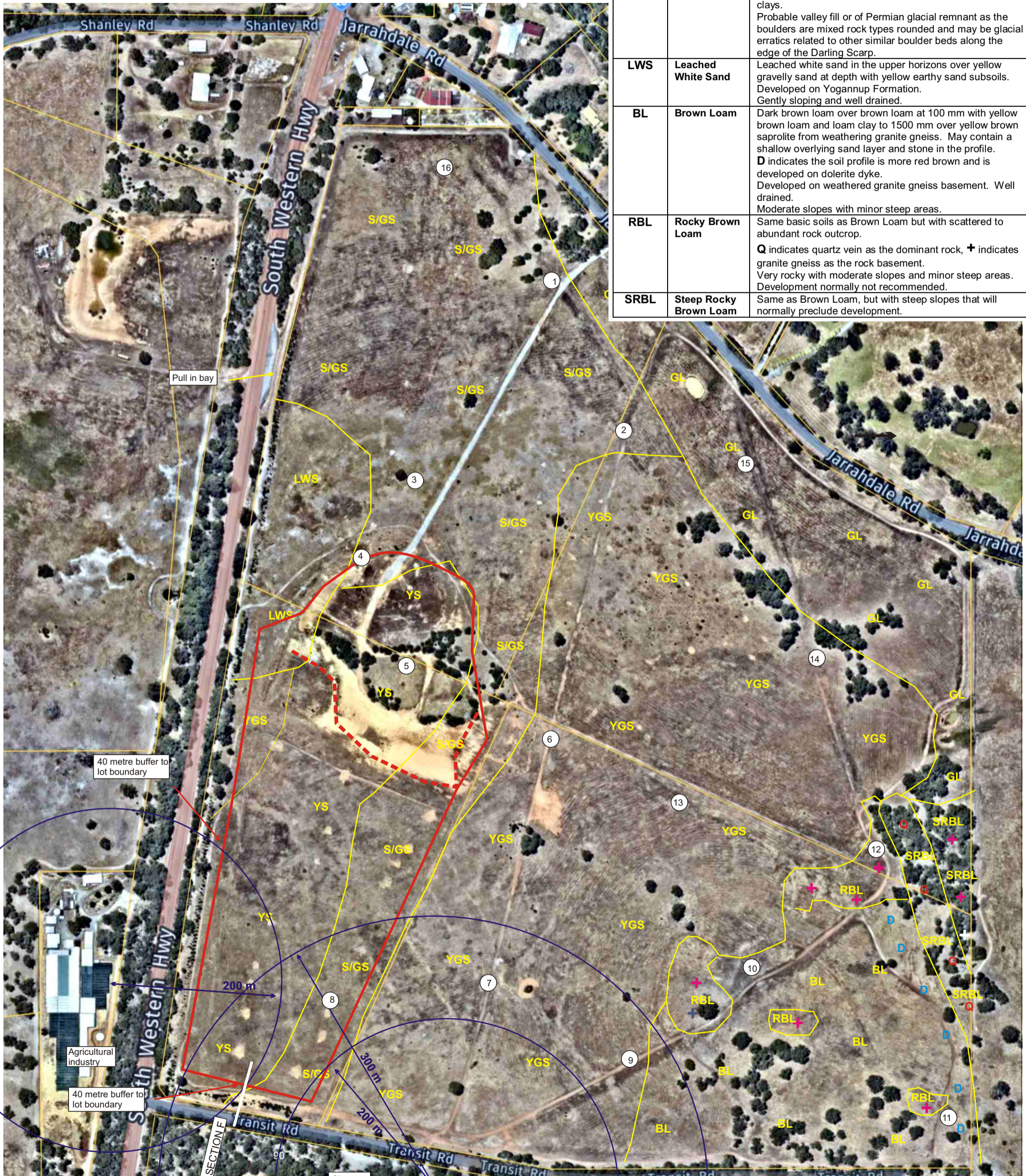
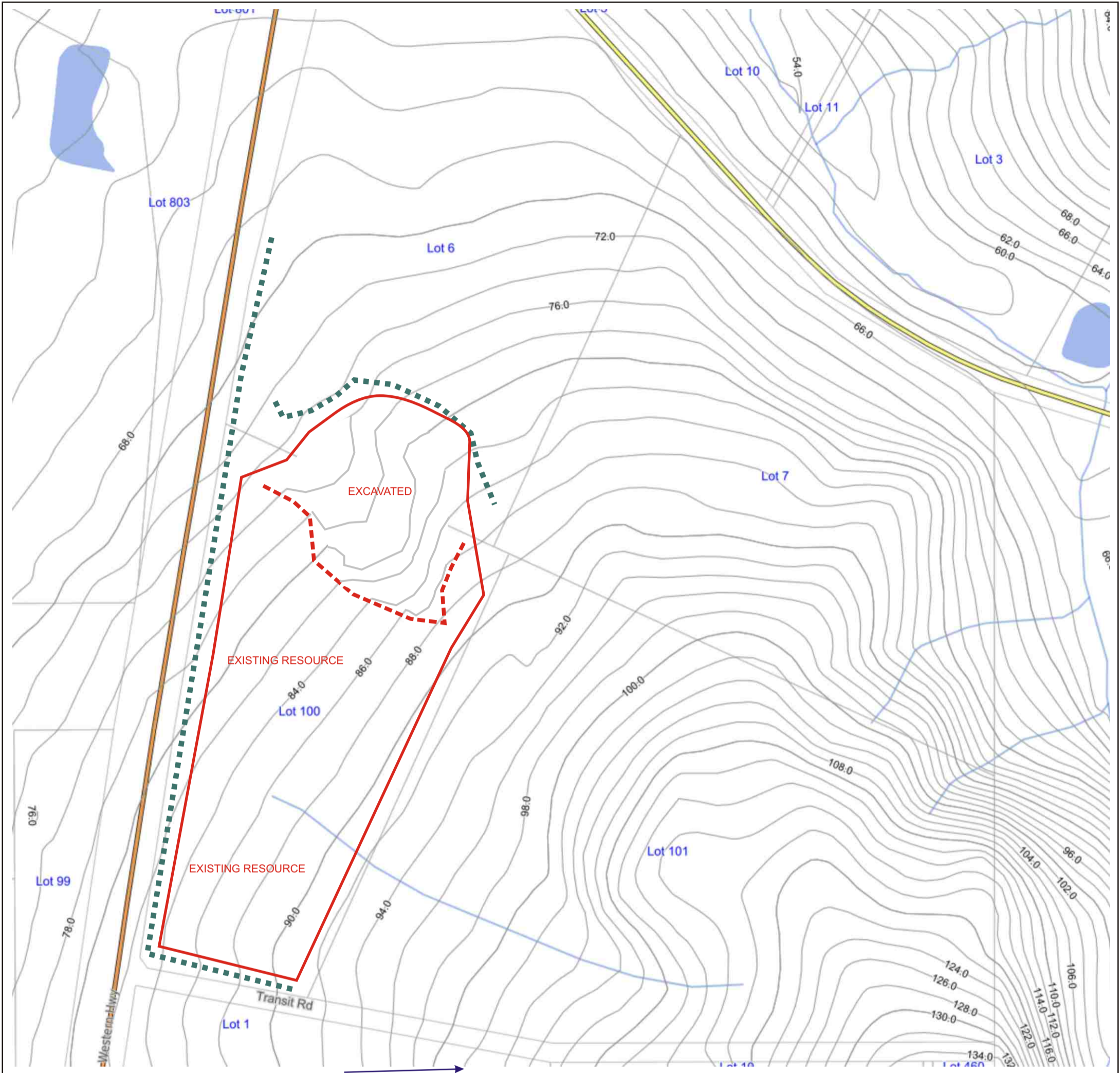


FIGURE 5



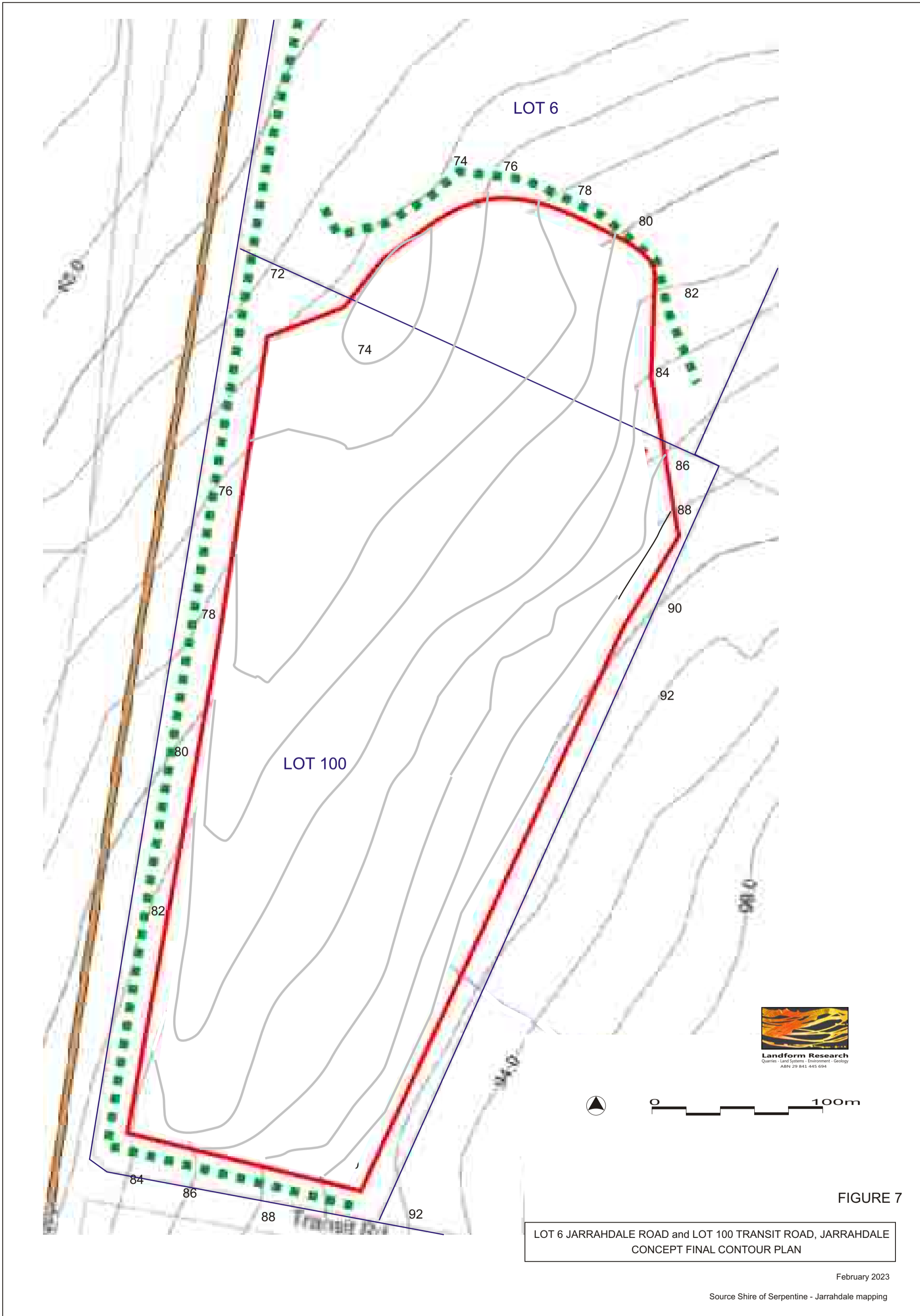
Drainage line does not exist as surface water dissipates into the sand before the pit

- Planted tree belt
- Pit Footprint

LOT 6 JARRAHDALE ROAD and LOT 100 TRANSIT ROAD, JARRAHDALE
EXISTING CONTOUR PLAN



FIGURE 6

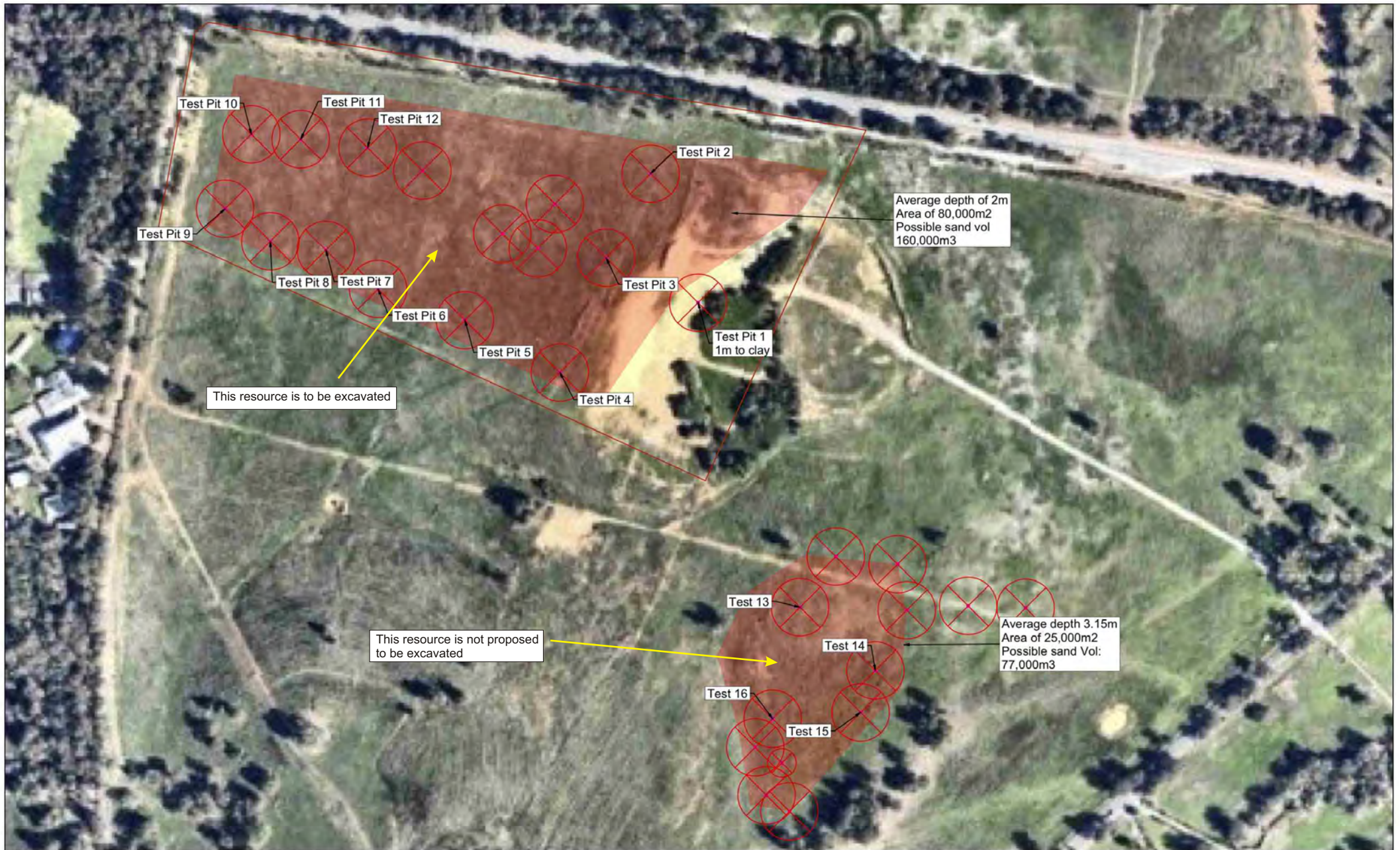


LOT 6 JARRAHDAL ROAD and LOT 100 TRANSIT ROAD, JARRAHDAL
CONCEPT FINAL CONTOUR PLAN

FIGURE 7

February 2023

Source Shire of Serpentine - Jarrahdale mapping



LOT 6 JARRAHDALE ROAD and LOT 100 TRANSIT ROAD, JARRAHDALE
URBAN RESOURCES TEST HOLES



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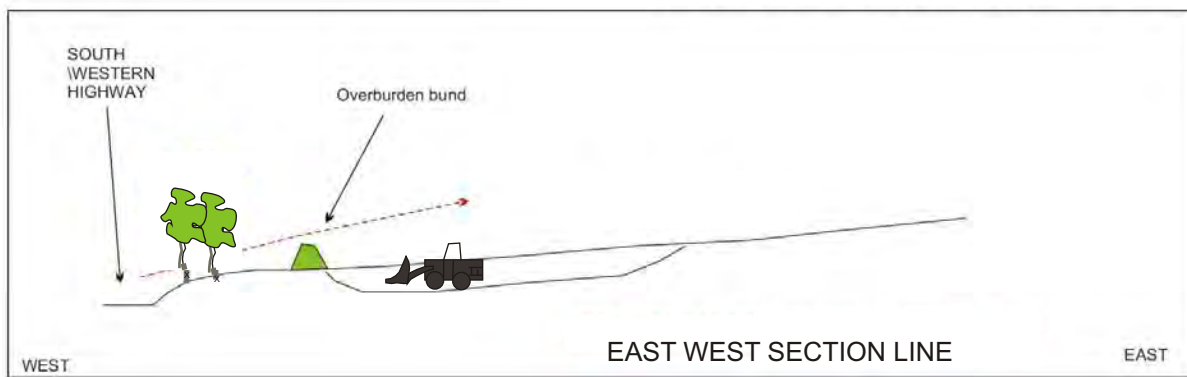
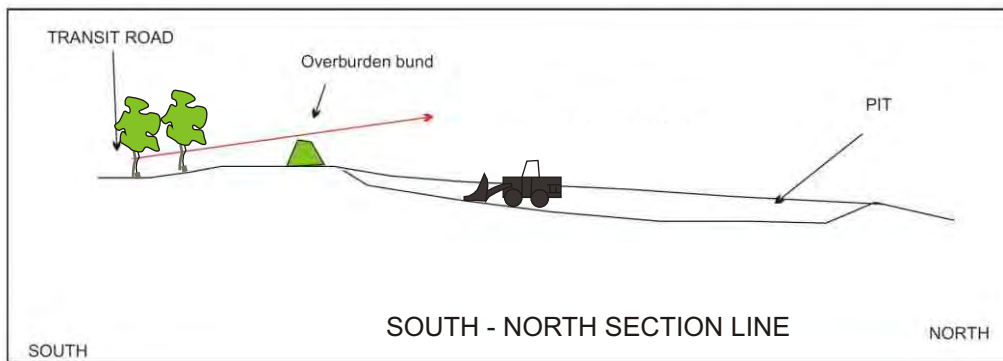
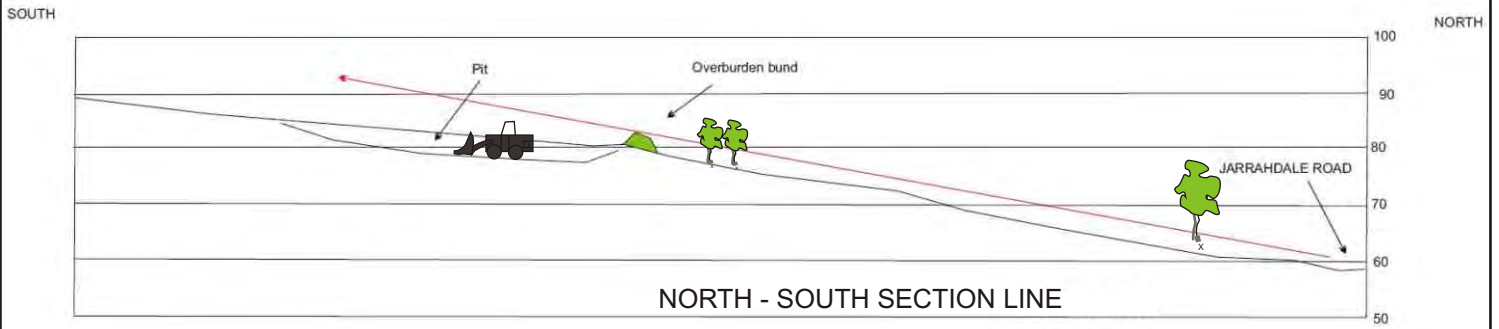
DESCRIPTION:

Jarrahdale Road
Test Hole
Volumes to Clean

SURVEYED: AH
DRAWN: AH

DATE:
06/09/22

FIGURE 8



LOT 6 JARRAHDALE ROAD - LOT 100 TRANSIT ROAD, JARRAHDALE
CONCEPT SECTION LINES





Dark yellow sand that is typical of the site with some leached sand in the background



Light yellow sand



Gravelly yellow earthy sand



Leached sand to shallow depth over gravelly sand and yellow earthy sand

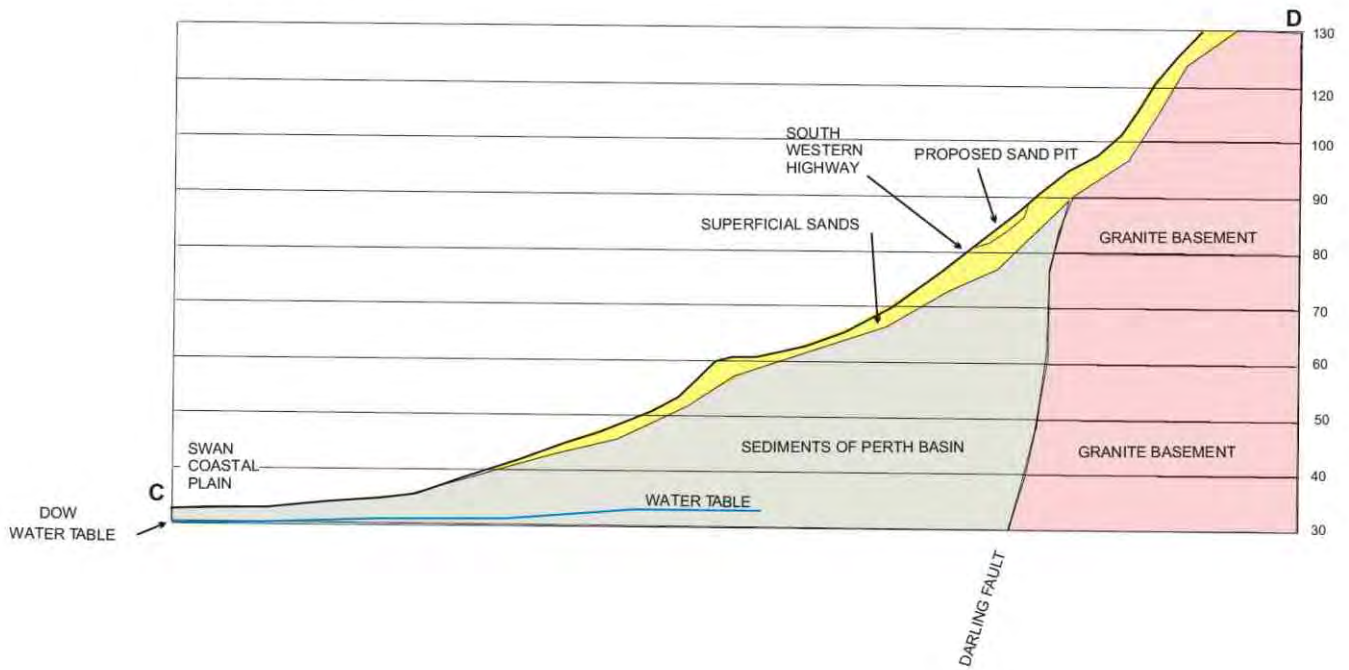
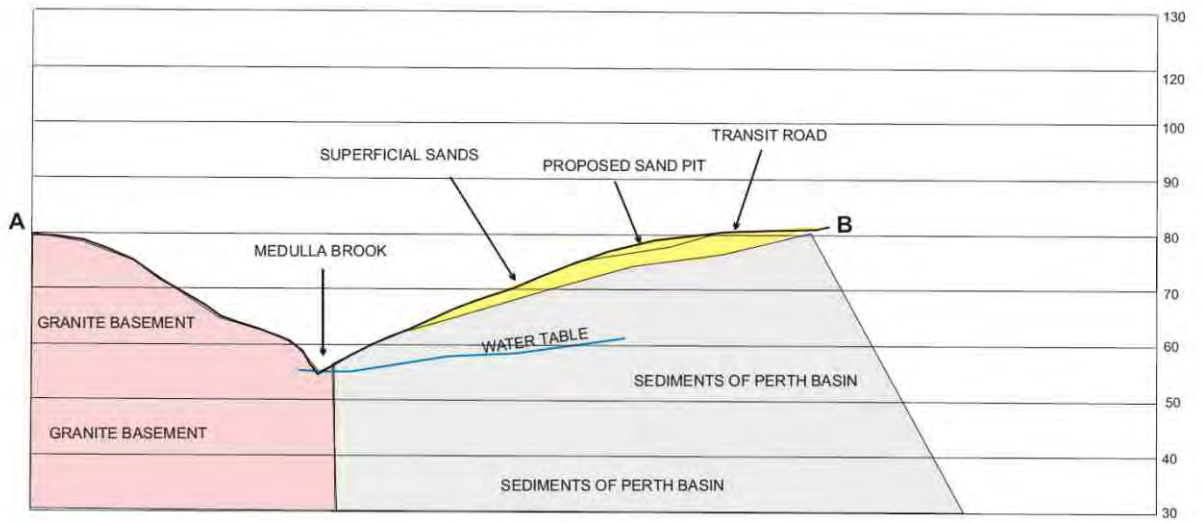


Leached sand to shallow depth over gravelly sand and yellow earthy sand



Gravelly yellow earthy sand



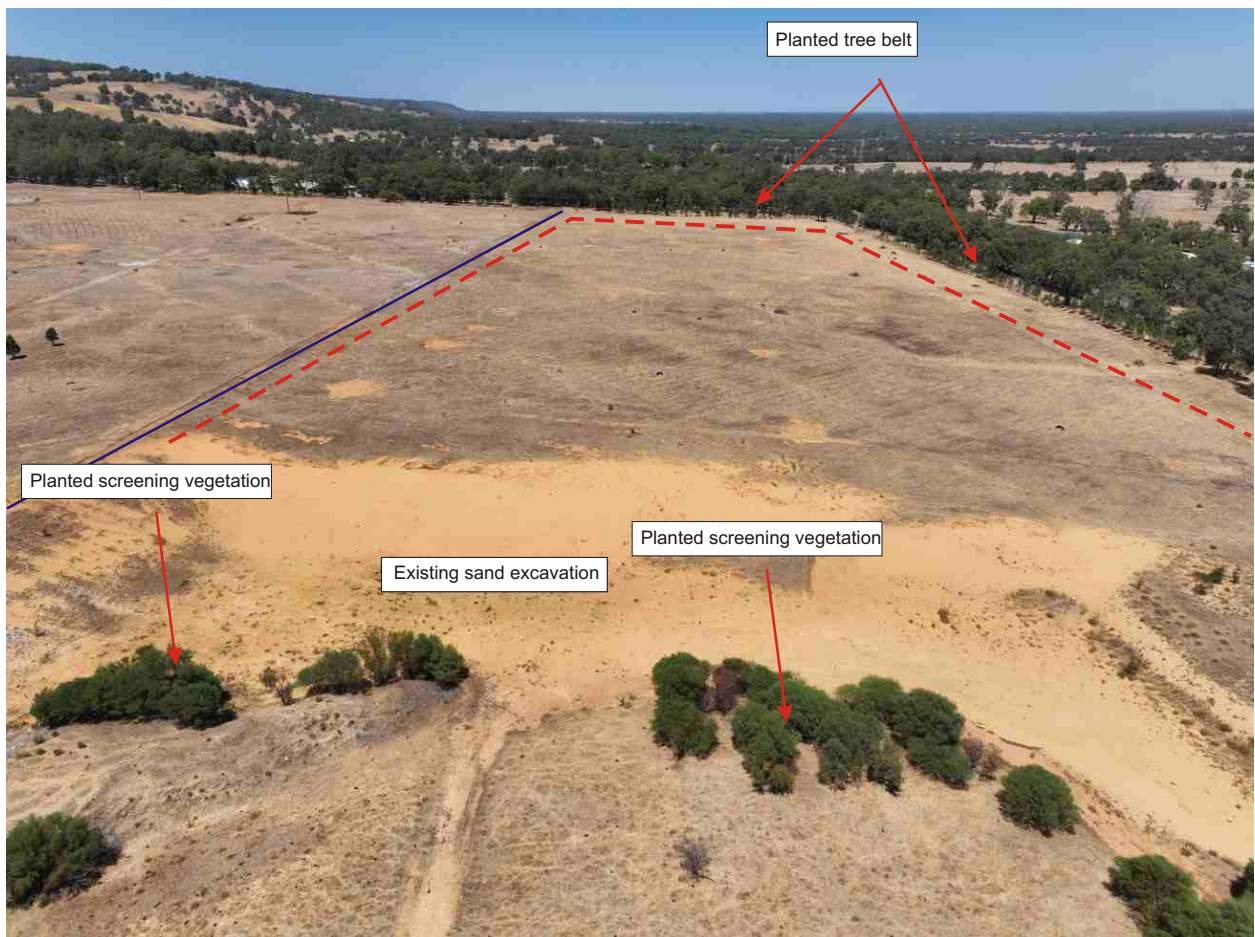


LOT 6 JARRAHDAL ROAD - LOT 100 TRANSIT ROAD, JARRAHDAL
 CONCEPT HYDROLOGICAL SECTIONS





Overview of the resource from the north east



Overview of the resource from the north



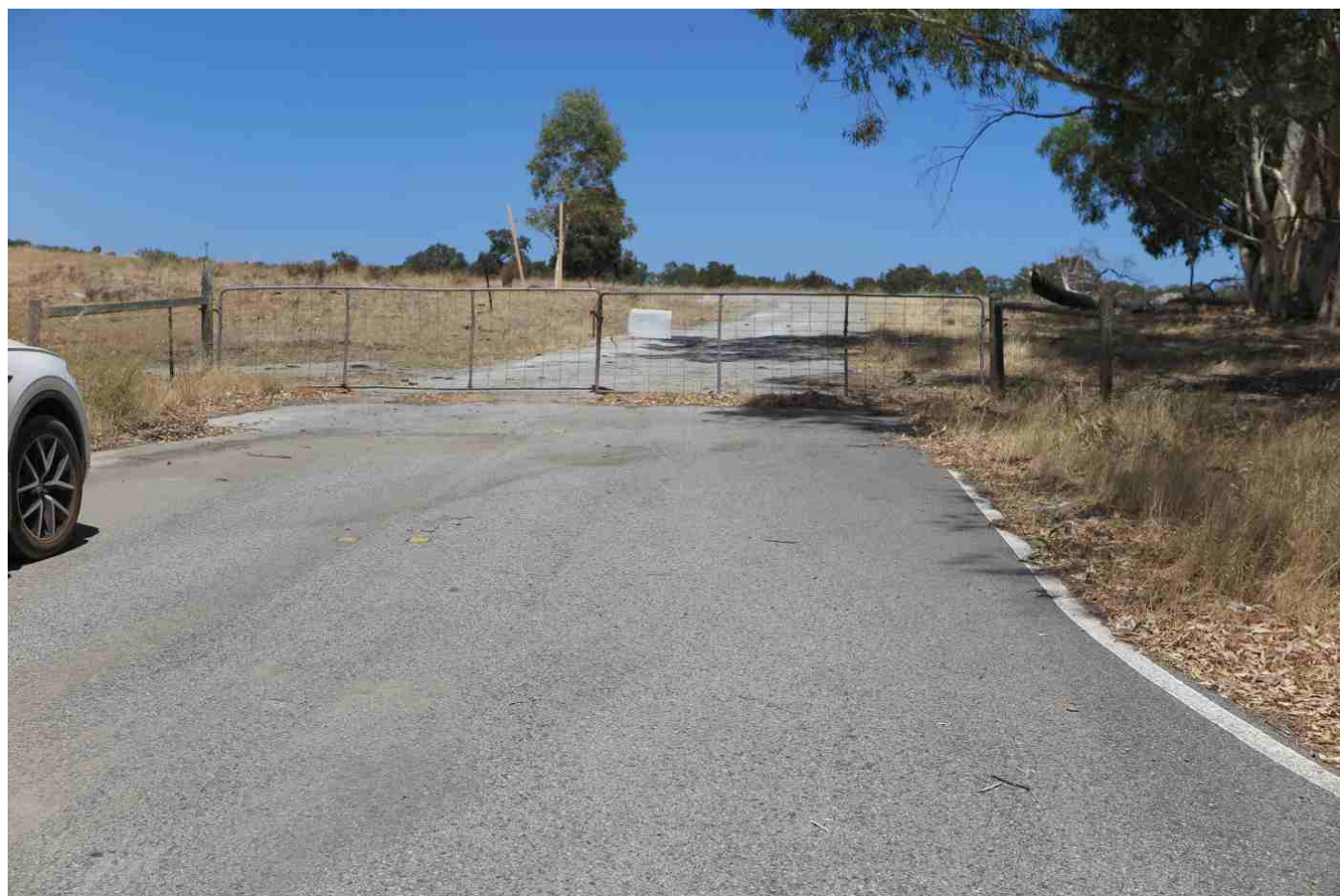
Access road and pit from the north



Planted tree belt along South Western Highway



Planted tree belt along Transit Road



Access road sealed cross over



Sight lines on Jarrahdale Road east from the access crossover



Sight lines on Jarrahdale Road west from the access crossover

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LANDFORM RESEARCH

LOTS 4 – 7 JARRAHDAL AND TRANSIT ROADS MARDELLA SAND PIT

NOISE ASSESSMENT

MAY 2013

OUR REF: 16273-1-13108



DOCUMENT CONTROL PAGE

NOISE ASSESSMENT MARDELLA

Job No: 13108

Document Reference : 16273-1-13108

FOR

LANDFORM RESEARCH

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This report has been prepared in accordance with the scope of services and on the basis of information and documents provided to Herring Storer Acoustics by the client. To the extent that this report relies on data and measurements taken at or under the times and conditions specified within the report and any findings, conclusions or recommendations only apply to those circumstances and no greater reliance should be assumed. The client acknowledges and agrees that the reports or presentations are provided by Herring Storer Acoustics to assist the client to conduct its own independent assessment.

CONTENTS

1.	INTRODUCTION	1
2.	SUMMARY	1
3.	CRITERIA	1
4.	QUARRY OPERATIONS	3
5.	MODELLING	3
6.	DISCUSSION	5

APPENDICIES

A	Locality Plan
B	Proposed Sand Extraction Plan

1. INTRODUCTION

Herring Storer Acoustics was commissioned by Landform Research to carry out an acoustical assessment of noise emissions of a sand pit located at Lots 4 – 7 Jarrahdale and Transit Roads, Mardella. The objectives of the study were to:

- Determine, by modelling, noise propagation from the pit.
- Assess the predicted noise levels received at the neighbouring noise sensitive premises, for compliance with the *Environmental Protection (Noise) Regulations 1997*.
- If exceedances are predicted, investigate possible noise control options that will reduce noise emissions to achieve compliance with the regulations.

For information a locality plan is attached in Appendix A.

2. SUMMARY

It is understood that the pit would only operate during the day period, therefore, noise emissions from the pit need to comply with the assigned day period noise levels at the neighbouring residences. As shown on the locality plan attached, the closest residences to the pit operations are located to the west and south. It is noted that access to the pit is via Jarrahdale Road, hence an assessment of noise received at the closest residence to the access road from trucks entering and leaving the site, was also undertaken.

Note : Under the Environmental Protection (Noise) Regulations 1997 noise emissions from vehicles travelling a gazetted road are exempt from the Regulations. Therefore, only noise emissions from trucks on the access road or within the pit have been assessed.

Given the close proximity of the South West Highway to the pit, it is likely that noise received at the neighbouring residence would be deemed not to contain any annoying characteristics, however to be conservative, the assessment includes a +5 dB(A) adjustment for tonality.

For the proposed operating hours and with the inclusion of the 2 metre bund, as outlined on the Figure attached in Appendix B (Proposed Sand Extraction), noise received at the neighbouring residence would, even with the inclusion of the +5 dB(A) penalty for a tonal component, comply with the requirements of the Environmental Protection (Noise) Regulations 1997. Noise received at the neighbouring residence from trucks entering and leaving the site would also comply with the Regulatory requirements.

3. CRITERIA

The *Environmental Protection (Noise) Regulations 1997* stipulate the allowable noise levels that can be received at a premise from other premises. The allowable noise level when received at a residence is determined by the calculations of an influencing factor, which is then added to base noise levels. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern.

TABLE 1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Noise sensitive premises	0700 - 1900 hours Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day Period)	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days (Evening)	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35 + IF	45 + IF	55 + IF

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.
IF is the influencing factor.

The assigned noise levels are also conditional on no annoying characteristics existing such as tonal components etc. If such characteristics exist, then any measured level is adjusted accordingly. The adjustments that apply are shown in Table 2.

TABLE 2 - ADJUSTMENTS TO MEASURED LEVELS

Where tonality is present	Where modulation is present	Where impulsiveness is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Note: these adjustments are cumulative to a maximum of 15 dB.

The Influencing Factor at these neighbouring noise sensitive premises of concern has been determined and is listed in Table 3.

TABLE 3 – CALCULATION OF NOISE INFLUENCING FACTOR

Description	Residence to West	Residence to South	Residence Adjacent to Access Road
Industrial (Inner Circle)	0% = 0 dB	8% = 1 dB	23% = +2 dB
Industrial (Outer Circle)	26% = +3 dB	21% = 2 dB	20% = +3 dB
Roads			
Major (Inner Circle)	-	-	-
Major (Outer Circle)	-	-	-
Secondary	(South West Hwy) +2 dB	-	-
TOTAL	+5 dB	+3 dB	+4 dB

Based on the above determinations of influencing factors, the assigned day period noise levels for the neighbouring residential locations would be as listed in Table 4.

Table 4 - Assigned Outdoor Day Period Noise Level At Residence

Residence	Assigned Level (dB)		
	L _{A10}	L _{A1}	L _{Amax}
West	50	60	70
South	48	58	68
Adjacent to Access Road	49	59	69

It is noted that under the regulation 3, noise emissions from vehicles travelling on roads are exempt from the Regulations. Hence it is only the noise received at the neighbouring from the truck movement on site that needs to be assessed under the Regulations.

4. PIT OPERATIONS

It is understood that the pit would only operate during the day period, including truck loading. Therefore, noise received at the neighbouring residence the pit operations only needs to comply with the assigned day period noise levels.

From information supplied, we understand that there would be one Front End Loader operating within the pit. It is also understood that there would be up to 7 trucks per hour. Given this number of truck movements, noise emissions from trucks movements on site would be for less than 10% of the time. Therefore, noise emissions from truck movements would need to comply with the assigned L_{A1} noise level at the neighbouring residence. However, the loader would operate for more than 10% of the time and hence needs to comply with the appropriate day period assigned L_{A10} noise level. The assigned noise levels for the Front End Loader and truck movements are listed in Table 5.

TABLE 5 - ASSIGNED DAY PERIOD NOISE LEVEL AT RESIDENCE FOR FEL AND TRUCK

Residence	Assigned Level (dB)	
	FEL (L_{A10})	Truck (L_{A1})
West	50	60
South	48	58
Adjacent to Access Road	49	59

5. MODELLING

Modelling of the noise emission propagation was carried out using "SoundPlan". SoundPlan uses the theoretical sound power levels determined from measured sound pressure levels to calculate the noise level received at a specific location. For this study, single point calculation were undertaken to determine the noise that would be received at the neighbouring residence.

The calculations used the following input data:

- a) Ground contours.
- b) Sound power levels as listed in Table 7.
- c) The ground contours within the pit were supplied by Landform Research.

Weather conditions for the modelling were as stipulated within the Environmental Protection Authority's "Draft Guidance for Assessment of Environmental Factors No. 8 - Environmental Noise" for the day period were as listed in Table 6.

TABLE 6 - WEATHER CONDITIONS

Condition	Day Period
Temperature	20 °C
Relative Humidity	50%
Pasquill Stability Class	E
Wind Speed	4m/s*

* From sources, towards receivers.

TABLE 7 - SOUND POWER LEVELS dB(A)

Item	Sound Power Level dB(A)
Front End Loader	105
Haulage Trucks	103

We understand that the pit would be worked from the north towards the south. Therefore, various scenarios were modelled to represent the worst case noise emissions. To determine the worst case noise levels received at the residence to the west and south of the pit, noise modelling was undertaken with extraction occurring opposite the residence to the west and at the south end of the pit.

The noise modelling also includes the 2 metre high bund that would be created around the pit area from the overburden.

The results of the modelling, for the worst case, are shown in Table 8 below.

TABLE 8 - CALCULATED NOISE LEVELS AT RESIDENCES

Residence	Calculated Noise Level dB(A)	
	FEL	Truck
West	36	41
South	38	44
Adjacent to access road	29	49

6. ASSESSMENT

Given the close proximity of the South West Highway, it is likely that noise received at the neighbouring residence would be deemed not to contain any annoying characteristics, however to be conservative, the assessment includes a +5 dB(A) adjustment for tonality.

Based on the above total calculated noise level, the following adjustments as listed in Tables 9 and 10 could be applicable.

Table 9 – Applicable Adjustments and Assessable Level of Noise Emissions – Front End Loader, dB(A)

Residence	Calculated Noise Level	Applicable Adjustments to Measured Noise Levels			Assessable Noise Level
		Where Noise Emission is NOT music			
		Tonality	Modulation	Impulsiveness	
West	36	+5	-	-	41
South	38	+5	-	-	43
Adjacent to access road	29	+5	-	-	34

Table 10 – Applicable Adjustments and Assessable Level of Noise Emissions – Trucks, dB(A)

Residence	Calculated Noise Level	Applicable Adjustments to Measured Noise Levels			Assessable Noise Level
		Where Noise Emission is NOT music			
		Tonality	Modulation	Impulsiveness	
West	41	+5	-	-	46
South	44	+5	-	-	49
Adjacent to access road	49	+5	-	-	54

Tables 11 and 12 summarise the applicable Assigned Noise Levels, and assessable noise level emissions for each identified noise.

Table 10 –Assessment of Front End Loader

Residence	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable LA ₁₀ Assigned Noise Level (dB)	Exceedance to Assigned Noise Level (dB)
West	41	0700 – 1900 hours Monday to Saturday	50	Complies
South	43	0700 – 1900 hours Monday to Saturday	48	Complies
Adjacent to access road	34	0700 – 1900 hours Monday to Saturday	49	Complies

Table 11 –Assessment of Trucks

Residence	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable LA ₁₀ Assigned Noise Level (dB)	Exceedance to Assigned Noise Level (dB)
West	46	0700 – 1900 hours Monday to Saturday	60	Complies
South	49	0700 – 1900 hours Monday to Saturday	58	Complies
Adjacent to access road	54	0700 – 1900 hours Monday to Saturday	59	Complies

7. DISCUSSION

The neighbouring residence of concern from the pit operations are located to the west (opposite side of South West Highway) and south (south of Transit Road), as shown on the locality plan attached. It is noted that access to the pit is via Jarrahdale Road, hence an assessment of noise received at the closest residence to the access road was also undertaken.

It is understood that the pit would only operate during the day period, therefore, noise emissions from the pit operations need to comply with the assigned day period noise at the neighbouring residences. From information supplied, we understand that there would be one Front End Loader operating within the pit. It is also understood that there would be up to 7 trucks per hour. Given this number of truck movements, noise emissions from trucks movements on site would be for less than 10% of the time. Therefore, noise emissions from truck movements would need to comply with the assigned LA_{A1} noise level at the neighbouring residence. However, the loader would operate for more than 10% of the time and hence needs to comply with the appropriate day period assigned LA₁₀ noise level.

Note : Under the Environmental Protection (Noise) Regulations 1997 noise emissions from vehicles travelling along gazetted roads are exempt from the Regulations. Therefore, only noise emissions from trucks on the acces road or within the pit has been assessed.

Given close proximity of the South West Highway, it is likely that noise received at the neighbouring residence would be deemed not to contain any annoying characteristics, to be conservative, the assessment includes a +5 dB(A) adjustment for tonality.

For the proposed operating hours and with the inclusion of the 2 metre bund, as outlined on the Figure attached in Appendix B (Proposed Sand Extraction), noise received at the neighbouring residence would, even with the inclusion of the +5 dB(A) penalty for a tonal component, comply with the requirements of the Environmental Protection (Noise) Regulations 1997. Noise received at the neighbouring residence from trucks entering and leaving the site would also comply with the Regulatory requirements.