ENVIRONMENTAL ASSESSMENT

Sand Quarry, Myalup

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SUMMARY

Rocla is seeking approval to establish a yellow sand quarry within tenement M70/1307. The tenement is located approximately 130 km south of Perth, within the Shire of Harvey. The proposed extraction area covers approximately 1090 hectares.

Currently there is a shortage of basic raw materials, particularly fill, required for development in the south-west of Western Australia. The key strategic sites outlined in this report will provide an important resource in the region for the next 50–60 years. Silica sand utilised for use in domestic trade and international export.

There are several conservation category wetlands (CCWs), resource enhancement wetlands (REWs) *and Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* (EPP) lakes surrounding the mining tenement. Excavation areas have not been finalised at the time of this report; however, a proposed excavation area has been marked (see Figure 3) and has allowed for adequate buffers to be maintained from these areas at all times during construction and quarry operations.

The tenement will be mined in several stages. Exact staging will be discussed and confirmed with the Department of Environment and Conservation (DEC) and Forestry Products Commission (FPC) and will be addressed closer to excavation dates. Extraction of construction sand will be market driven and historically approximately 4.0 million tonnes of sand and 3.0 million tonnes of limestone is supplied annually to the south-west market (Preston Beach to Dunsborough). Different portions of the tenement will provide different types of sand to market, including: concrete, plastering, bricklaying and fill sand. The sand will be screened on site and then transported off site to customers. Quarrying is proposed to commence as soon as approval is issued and as required by market conditions.

Table A and Table B outline the key characteristics and management commitments of the project.

Table A: Project Key Characteristics

Project Component	Characteristic
Excavation	
Quarry life	50+ years
Total estimated material excavated	80 million m^3
Total area of exploration permit	5216 ha
Total area of mining tenement	1178 ha
Total area of excavation	1090 ha (proposed excavation area)
Estimated excavation rate	1000–2000 tonnes per day
Maximum pit depth	Initially, 5 m above the estimated future water table level
Screening plant	A screening plant will be used at each site to screen oversized rock and organic material.
Quarry Site Infrastructure	
Machinery	
Water Cart	18 kL capacity, used for dust suppression of haul road, pit floor and stockpiles.
Front end loaders	Three Volvo 150E or similar

Project Component	Characteristic
Semi-trailers	Variable. From 10 m^3 to 40 m^3 capacity. Will be provided by customers. Vehicles used will be classified as General Access by Main Roads Western Australia (i.e. total mass <42.5 tonnes)
Grader	One Cat 140G or similar. For maintaining roads, as required
Service truck	Truck with 5000 L fuel capacity and tanks for separate lubricants, including a waste oil tank and evacuation pump.
Light vehicles	Two for site operators.
Diesel generators	One suitably-sized diesel generator
Mobile screening plant	A washing and screening plant will be used to sort sand material after excavation
Transport	
Truck movements and hours	Approximately 50 to 100 return truck movements per day of operation (depending on truck sizes). Only include noise from within the site. Off-site noise is not included.
Workforce	
Operation	2–3 personnel during operation
Hours of Operation	0600 to 1900 daily

Table B: Summary of Commitments

Environmental Factor	Summary	Management Commitment
Flora and Vegetation	The proposed excavation area is comprised solely of pine plantation and no native vegetation will be cleared as part of the proposal.	▪ The potential spread of weeds and dieback, if present, during operations will be prevented. ▪ Dust will be managed during the quarrying operations to protect surrounding native vegetation. ▪ The extent of vegetation clearing will not extend past that of the FPC and stumps will be cleared in stages. ▪ Adequate buffers will be maintained between excavation areas and adjacent native vegetation and Bush Forever sites. ▪ Vehicles will be restricted to designated roads. ▪ At the completion of operations, FPC will replant pine.
Dieback	The site is considered un-interpretable, due to the absence of any indicator species. Hygiene guidelines will be implemented on site entry and exit. This policy will apply to all mobile excavation equipment as they have a high risk of carrying soil.	▪ All vehicles will be free of soil and plant material before entering the site. If any dirt or plant material has been picked up, the vehicle must be brushed down. ▪ Training programs and inductions will be conducted for site personnel. ▪ Area will be quarantined ahead of excavation. ▪ All surface water will be contained on site. Run-off from the quarry pit, stockpiles, cleaning down and haul roads will be contained, and not released into areas of native vegetation. ▪ Light vehicles and machinery will be restricted to access roads, tracks and the excavation area. ▪ No soil or vegetation will be brought on site. ▪ The site will be fenced to prevent uncontrolled access.
Fauna	A variety of threatened fauna species may occur within and adjacent to the proposed site. The quarry footprint is pine plantation so it is unlikely that suitable habitat for significant species will be directly disturbed by the project.	▪ No native vegetation will be cleared. ▪ Management measures will be implemented to reduce indirect disturbance of surrounding fauna habitat. ▪ Staged removal of pine stumps to allow for acclimatisation for any remaining fauna in the area. ▪ The control and monitoring of dust, noise and smoke. ▪ Induction of machinery operators involved in the operations and stump removal process. Operators will be advised to be alert for fauna, and to take steps to avoid impacts, where practical. ▪ Speed limits will apply on site to limit fauna fatalities. ▪ Non-native fauna will be prohibited from site.

Environmental Factor	Summary	Management Commitment
Groundwater Resources	Groundwater abstraction is likely to occur from groundwater bores to be installed on site, however pit dewatering will not be required as the maximum pit depth will remain above the water table.	▪ Quarry operations will not excavate to within 5 m (initially) of the estimated future maximum groundwater level (finished floor level). ▪ Monitoring bores will be installed across the site to assess water level, water quality. ▪ Bore data will be used to assess the finished floor level. ▪ Waste management to ensure all wastes are disposed of appropriately, minimising the risk of groundwater contamination. ▪ Surface water management will minimise the risk of contamination to groundwater via infiltration.
Acid Sulfate Soils	There is only one small area of high risk ASS within the proposed excavation area.	▪ An adequate buffer will be maintained to high to moderate ASS risk area at all times during operations. ▪ Excavation will not intersect the water table at any time during operations, minimising the risk of exposing potential ASS.
Noise	There are no residential dwellings within 500 m of the proposed excavation area. Rocla do not expect significant noise issues to arise for the duration of operations.	To protect the amenity of the receiving environments from noise impacts, the following key management measures will be implemented during the construction and operation phase: ▪ Limiting construction work; operating 0600 to 1900 daily. ▪ Design the mine excavation areas to provide enhanced landform and constructed noise screening (i.e. bunds), when within 500 m of a residence. ▪ Maintain noise suppression devices in good condition on all operational machinery. ▪ Shut down equipment when not in use. ▪ Operate machinery only within the designated hours of operation. ▪ Schedule activities to minimise the likelihood of noise nuisance. ▪ Use the dedicated transport route. Record any complaints received regarding noise disturbance and instigate follow-up action instigated immediately to minimise the cause, to the greatest possible extent.
Air Quality	There are no residential dwellings within 500 m of the proposed excavation area. Local residents may be affected by the transportation of material along transport routes. Dust monitoring will only be required in the event of a legitimate complaint.	To prevent or minimise dust generation during quarry operations, the following dust management measures will be implemented during the construction and operation phase: ▪ The excavation will occur in stages. A key objective is to minimise the disturbance or open area at any one time, as far as practicable. ▪ Maintain haul road surface in a good condition and with suitable grades. ▪ Restrict vehicle movements to defined roads. ▪ All vehicles leaving the site are required to have covered loads. ▪ Use water as appropriate to wet down roads and trafficked areas (a water licence will be obtained). ▪ Use dust suppressants where appropriate (either mixed with water to enhance dust suppression and vegetation cover, or applied periodically to specific areas). ▪ Limit the speed of vehicles on the site. ▪ Apply surface treatments (e.g. mulch, ground cover) to stabilise any bare areas which might be prone to wind erosion. ▪ Define buffer areas within the site to avoid any unnecessary disturbance of stabilised surfaces or vehicle traffic. ▪ Limit the quantity of machinery / vehicles in operation. ▪ Inducting all contractors working within the sites. Record any complaints received and instigate follow-up action instigated immediately to minimise the cause, to the greatest possible extent.

Environmental Factor	Summary	Management Commitment
Hydrocarbons and Waste	Hydrocarbons will be stored on site in a compliant bunded fuel tank and transported around the site in a mobile fuel tank. The following wastes may be produced by the proposed project: ▪ hydrocarbon and chemical contaminated waste ▪ general waste (e.g. kitchen waste, paper, cardboard) ▪ sewage and domestic wastewater.	▪ Procedures will be implemented for the correct handling, storage, spill management and clean up. ▪ Contaminated material will be removed and bio-remediated (if biodegradable) or disposed of at a licensed facility. ▪ Spill response equipment will be located in the vicinity of work areas, with site personnel trained in spill response management. ▪ The proposed fuel storage tanks to service the machinery will be required to comply fully with the *Australian Standard 1940:2004 The Storage and Handling of Flammable and Combustible Liquids*. This standard specifies requirements for security, bunding, signage, fire protection and handling.
Visual Amenity	It is not expected that the project will have a significant effect on the visual amenity of the nearest neighbours.	▪ The pit design will be such that natural topography and sand bunds will be utilised to shield the view of the mine from surrounding land uses. ▪ Vegetation surrounds a large portion of the site, which will not be cleared and will aid in maintaining the visual amenity of the site. ▪ Ensure barrier fences and gates are compatible with the semi-rural style of the surround land areas and natural landscape. ▪ Ensure orderly storage and removal of disused equipment or waste.
Aboriginal Heritage	There are no registered Aboriginal heritage sites within the proposed excavation area; there is one “other heritage site”.	▪ Any significant sites identified during construction will not be removed, damaged or altered without approval under Section 18 of the *Aboriginal Heritage Act 1972*. ▪ Training will be provided to all construction workers detailing the importance of avoiding heritage sites and reporting of any suspected heritage sites. Exclusion zones will also be identified and clearly communicated to project personnel in the event of a heritage site being uncovered.

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APPENDICES

1.0 INTRODUCTION

1.1 Location

The site is located approximately 130 km south of Perth (Figure 1). The tenement is located wholly within the Shire of Harvey and the proposed excavation area is located within the Myalup State Forest (Figure 2).

1.2 Background

Rocla Quarry Products Pty Ltd (Rocla) extracts, processes and distributes sands for pre-mixed concrete and concrete products for industrial uses, landscaping and other building and construction applications. In Western Australia, Rocla manage and operate a number of mine sites in the south-west and Pilbara areas and surrounds, including the sand extraction site proposed, within tenement M70/1307, in the area of pine plantation within the Myalup State Forest (see Figure 1 and Figure 2).

Rocla delineated an exploration permit area (E70/3294) on 3 September 2007 and have since defined the mining tenement (M70/1307) on 25 June 2012. Within the mining tenement, a proposed excavation area has been identified (Figure 2).

It is proposed that the site will be first cleared by the Forest Products Commission (FPC) before Rocla commences operations. As a result of this, Rocla's environmental impacts will not include those associated with clearing. However, because the Myalup State Forrest is an Environmentally Sensitive Area, a clearing permit may be required if an extended period of time expires between clearing of the pines and extraction activities.

1.3 Project Description

The objective of this project is to extract yellow and cream sand from within the "proposed excavation area" boundary (Figure 3). Some extraction of limestone may occur if encountered within the extraction area. If this occurs the limestone will be extracted and track crushed (or similar) to make the product suitable for market. A working footprint of approximately 20 ha is proposed at any one time, with a further area of approximately 5 ha utilised for site infrastructure, including, but not limited to:

- sand screening and washing plant
- fuel tanks
- weighbridge
- wash down facility
- site office.

The tenement will be mined in several stages; staging will be discussed and confirmed with DEC and FPC and will be addressed closer to excavation dates. Extraction of construction sand will be market driven and historically approximately 4.0 million tonnes of sand and 3.0 million tonnes of limestone is supplied annually to the south-west market (Preston Beach to Dunsborough). Different portions of the tenement will provide different types of sand to market, including: concrete, plastering, brick laying, fill sand and specialised sands for foundries, glass, grouts and other specialised uses.

The sand will be screened on site and then transported off site to customers. Quarrying is proposed to commence as soon as approval is issued and as required by market conditions.

Rocla has completed a drilling program and identified a proposed excavation area. The drilling program was extensive and incorporated 338 drill holes. Detailed resource modelling has identified a resource of significant state importance and has quantified 80 million m^3 of high grade construction sands suitable to supply to the south-west market for the next 50+ years. Limestone is also available and may be extracted from within the site.

1.4 Market Demand for Product

Currently, there is a shortage of basic raw materials, particularly fill required for development in the south-west. The key strategic sites outlined in this report will provide a key resource for the next 50–60 years. Historically, approximately 4.0 million tonnes of sand and 3.0 million tonnes of limestone is supplied annually to the south-west market (Preston Beach to Dunsborough).

1.5 Relevant State Legislation

The EPA undertakes the environmental impact assessment (EIA) of some proposals and schemes referred to it under Part IV of the *Environmental Protection Act 1986*. EIA is a systematic and orderly evaluation of a proposal and its impact on the environment. The assessment includes considering ways in which the proposal, if implemented, could avoid or reduce any impact on the environment.

Rocla intend to seek approval under Section 38(a) of the *Environmental Protection Act 1986* (WA).

1.6 Purpose of this Report

This report has been prepared as an environmental summary to accompany a Section 38a referral to the Environmental Protection Authority (EPA).

1.7 Environmental Policy

Rocla is committed to the protection of the environment and continuous improvement of production and environmental practices (Rocla 2002). In protecting the environment, Rocla will:

- meet all statutory requirements
- minimise waste
- take demonstrable action to ensure maintenance of effective minimum levels of environmental control
- give consideration to the use of recycled material
- assess the environmental impact of the operations, handling, storage and disposal of sand products
- undertake regular monitoring and risk assessment, wherever there is potential for adverse impact on the environment, employees or the community
- provide employee training programs in implementing the Environmental Policy.

(Rocla 2002)

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2.0 EXISTING ENVIRONMENT

2.1 Regional Setting

The Interim Biogeographic Regionalisation for Australia (IBRA) classification system divides Australia into 85 bioregions and 403 subregions. The bioregions and subregions are the reporting unit for assessing the status of native ecosystems, their protection in the national reserve system and for use in the monitoring and evaluation framework in the Australian Government's current Natural Resource Management initiatives (DSEWPC 2012a).

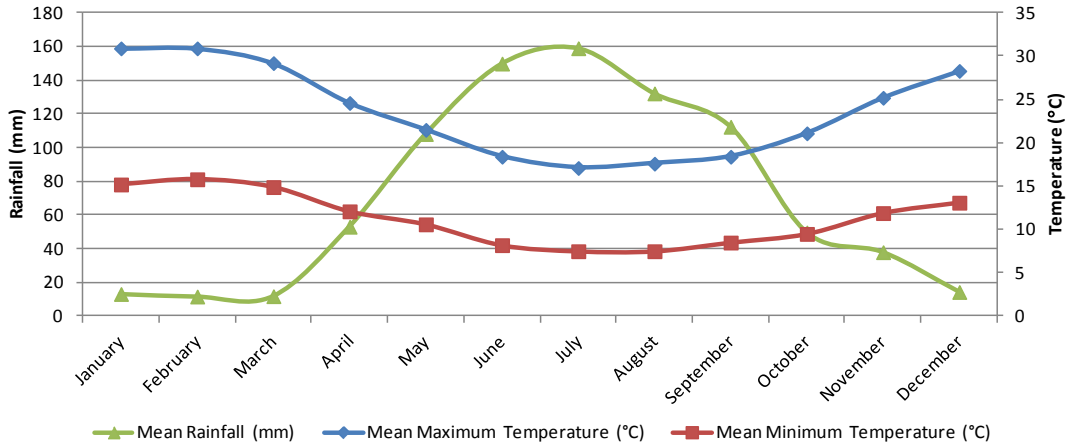
The site is located within the Swan Coastal Plain 2 (SWA2) subregion, which lies within the Swan Coastal Plain Bioregion.

The Swan Coastal Plain (SCP) is a low-lying coastal plain, mainly covered with woodlands. It is dominated by Banksia or Tuart on sandy soils, *Casuarina obesa* on outwash plains, and paperbark in swampy areas. In the east, the plain rises to discrusted Mesozoic sediments dominated by Jarrah woodland. The climate is warm Mediterranean. Three phases of marine sand dune development provide relief. The outwash plains, once dominated by *C. obesa*-marri woodlands and *Melaleuca* shrublands, are extensive only in the south. (Mitchell et al. 2002)

The Perth subregion is composed of colluvial and Aeolian sands, alluvial river flats and coastal limestone. Heath and/or tuart woodlands are present on the limestone, banksia and jarrah–banksia woodlands on Quaternary marine dunes of various ages, and marri on colluvial and alluvials. The region includes a complex series of seasonal wetlands and also includes Rottnest, Carnac and Garden Islands. Rainfall ranges between 600 and 1000 mm annually. The subregional area is 1,333,901 ha. (Mitchell et al. 2002)

2.2 Climate

The site is located approximately 130 km south of the Perth metropolitan area. The climate is classified as Mediterranean. The closest open climate station is located in Harvey, approximately 17 km east of the site. This area experiences hot, dry summers and cool, wet winters. Graph A below displays the average annual climate data for Harvey Station No. 009812 (BOM 2012).



Graph A: Climatic Means from Harvey Station from 2000 to 2012 (BOM 2012)

2.3 Physical Environment

2.3.1 Geology and Soils

The SCP consists of Pliocene to Quaternary sediments (collectively termed "superficial formations" which comprise Aeolian, alluvial, swamp, estuarine and shoreline sediments) that were deposited on a gently seaward-sloping unconformity surface on top of Mesozoic sedimentary rocks (Bettany et al. 1960). The latter rocks include the Leederville Formation (Cretaceous) and the Yarragadee Formation (Jurassic). The major dune systems, oriented in a north–south direction, transect the SCP. The Bassendean dunes are the oldest (Pleistocene), lowest and most leached of the series. To the west of the Bassendean dune system are the calcareous Quindalup dunes, the youngest unit (Bettany et al. 1960). The superficial formations (i.e. sands, sandstone and limestone) support Perth's two major aquifers: the Gnangara mound north of the Swan River, and the Jandakot mound south of the river.

Regional geology mapping (Figure 4) indicates that the proposed excavation area is predominantly Qts (sand associated with Tamala limestone, high dunes) with a small pocket of Qhw (swamp deposits; mainly peaty sands) in the north. There is also a small pocket of Qpb (Bassendean sand; low, rounded dunes) and Qbp/Qpa (thin Bassendean sand over Guildford Formation) in the east.

2.3.1.1 Acid Sulfate Soils

Acid Sulfate Soils (ASS) are naturally occurring soils and sediments containing iron sulfides, most commonly pyrite. When ASS are exposed to air the iron sulfides in the soil react with oxygen and water to produce a variety of iron compounds and sulfuric acid. The resulting acid can release other substances, including heavy metals, from the soil and into the surrounding environment. These materials are characterised by bright yellow or straw coloured mottles of the mineral jarosite and often contain dark reddish coloured streaks. Actual ASS have a soil pH of 4 or less. (DoE 2003).

The site is identified in Western Australian Planning Commission (WAPC 2003) Planning Bulletin 64 as having (Figure 5):

- a "moderate to low risk of Acid Sulfate Soil (ASS) within 3 m of the natural soil surface (or deeper)" along the western boundary of the proposed excavation area
- a small area of "high to moderate risk of Acid Sulfate Soil (ASS) within 3 m of the natural soil surface (or deeper)" located in the northern portion of the proposed excavation area
- "moderate to low risk of Acid Sulfate Soil (ASS) within 3 m of the natural soil surface (or deeper)" interspersed with "high to moderate risk of Acid Sulfate Soil (ASS) within 3 m of the natural soil surface (or deeper)" to the west and east of the proposed excavation area.

2.3.1.2 Contaminated Sites

A search of the DEC Contaminated Sites database (DEC 2012) returned no contaminated sites within the mining tenement. The closest contaminated site is approximately 3.5 km to the north, with hydrocarbons present beneath the portion of site used as a service station (site 6043 – Old Coast Road Myalup 6220). The contaminated site is classified as "Contaminated – Remediation Required".

Due to the distance between the mining tenement and contaminated site, it is considered unlikely that the contaminated site would impact the mining tenement.

2.3.2 Topography

The site varies in height from 10 m Australian Height Datum (AHD) to 20 mAHD (Figure 4).

2.3.3 Hydrology

2.3.3.1 Surface Water

The Peel-Yalgorup system, located approximately 4 km west of the site, is a RAMSAR Wetland of International Significance. The Yalgorup Lakes System, part of this RAMSAR wetland, is a nationally important wetland.

Within the exploration permit area there are 23 conservation category wetlands (CCWs), 12 resource enhancement wetlands (REWs), and nine *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* (EPP) lakes (Figure 6). There are no CCWs, REWs or EPP lakes within the proposed excavation area boundary.

The Harvey Diversion Drain passes directly through the centre of the proposed excavation area running in a generally east–west direction (Figure 6).

2.3.3.2 Groundwater

The water use in this area is predominantly from the Superficial Aquifer (Myalup, Wellesley and Kemerton Industrial Park North sub-areas) as the Leederville Aquifer and Cattamarra Coal Measures have poorer water quality (saline). (DoW 2009)

Groundwater flow is generally westwards from the Darling Scarp. Seasonal variations in the water table are about one to two metres and can usually be correlated with the variations in rainfall. Groundwater discharges locally to watercourses, swamps and wetlands (including Myalup Swamp), the Wellesley River and Leschenault Inlet. There is also leakage to the underlying Leederville aquifer and to the Indian Ocean across a saline interface. (DoW 2009)

The Bunbury Groundwater Area was proclaimed under s. 26B of the *Rights in Water and Irrigation Act 1914* (RiWI Act) on 20 June 1975 and subdivided into seven sub-areas. The South-west Coastal Groundwater Area was proclaimed on 22 April 1977 and subdivided into 11 sub-areas. (DoW 2007)

A proclaimed groundwater area under the RiWI Act prohibits the construction of water bores and the taking of groundwater without a licence issued by the department, other than for domestic and stock purposes from the superficial aquifer. (DoW 2007)

2.4 Biological Environment

2.4.1 Vegetation and Flora

It is important to note that Rocla will not be undertaking any clearing as part of this proposal, which will occur in areas of pine plantation after clearing is undertaken by the FPC. However, a clearing permit may be required if any regrowth occurs after the pines are cleared as the Myalup State Forrest is an Environmentally Sensitive Area.

Mitchell et al. (2002) note that the southern half of the SWA2 region is cleared to a similar degree to the Avon Wheatbelt (although there is a greater proportion of remnant vegetation in the northern third of the subregion) and the stress value is quite high.

Threatening processes include salinity, acidification, eutrophication and dieback. In addition, weeds like Watsonia and bridle creeper are spreading and feral animals, particularly rabbits and pigs, are pervasive (Mitchell et al. 2002).

2.4.1.1 Vegetation Complexes

Regional vegetation mapped by Heddle et al. (1980) which occurs across the exploration permit area is discussed below (locations of these complexes are provided as Figure 7). The percentage of vegetation remaining of all of these complexes is over the proposed percentage of protection (WAPC 2000).

Table C: Vegetation Complexes (WAPC 2000)

Vegetation Complex	Description	Pre-European Extent (ha)	Remaining Area (ha)	Per Cent Remaining (%)	Proposed Protection (%)
Yoongarillup Complex	Woodland to tall woodland of *Eucalyptus gomphocephala* with *Agonis flexuosa* in the second storey. Less consistently an open forest of E. *gomphocephala, E. marginata* and *E. calophylla.*	664	478	72	61
Karrakatta Complex Central and South	Predominantly open forest of *Eucalyptus gomphocephala*, *E. marginata* and *E. calophylla* and woodland of *E. marginata, E. calophylla* and woodland of *E. marginata* and Banksia species.	34,532	6,275	18	8
Bassendean Complex Central and South	Woodland of *E. marginata, Casuarina fraseriana* and *Banksia* spp to low woodland of Melaleuca species and sedgelands on the moister sites.	46,220	10,919	24	13
Serpentine River Complex	Closed scrub of *Melaleuca* species and fringing woodland of *E. rudis* and *M. rhaphiophylla* along streams	4,445	398	9	4
Guildford Complex	Mixture of Open Forest to Tall Open Forest of Wandoo (*Eucalyptus wandoo*), Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*), and Woodland of Wandoo (with rare occurrences of *Eucalyptus lane poolei*). Minor components include Flooded Gum (*Eucalyptus rudis*).	24,153	1,369	6	3

2.4.1.2 Significant Flora and Vegetation

A search of the EPBC Protected Matters Search Tool with an 8 km radius returned no TECs; however, previous mapping and documentation indicates a TEC within Byrd Swamp Nature Reserve (located to the south-east of the site, but outside the proposed excavation area). The search did return seven species of threatened plants and 10 species of weeds that are likely to occur in the area (Appendix 1).

A NatureMap search with an 8 km radius revealed 222 species of Dicotyledon, two species of Gymnosperm, 155 species of Monocotyledon, two species of Pteridophyte and one species of water mould (Appendix 2).

2.4.2 Fauna

A search of the Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) website for matters of National Environmental Significance (NES) protected under the Environmental Protection and Biodiversity Conservation

(EPBC) Act (undertaken in March 2012) returned 44 threatened species of birds (including 10 marine and 27 migratory species) and seven mammals (including three threatened and four invasive species) that potentially utilise the areas within the exploration permit area (Appendix 1).

A Naturemap database search of DEC Threatened Species was undertaken in March 2012 and identified one species of amphibian, 70 species of birds, one species of fish, eight species of mammals and 13 species of reptiles potentially occurring within the exploration permit area (Appendix 2). Species of conservation significance under Western Australian legislation (*Wildlife Conservation Act 1950*) that may occur within the site are detailed in Table1.

A number of species present on regional species lists rely on specific habitat requirements (e.g. marine). Whilst these habitats were present within the broader region, they are not present within the tenement and it is therefore unlikely that these species are present within the tenement. As such, these species were excluded from discussion, however are listed in Appendix 1.

2.5 Social Environment

2.5.1 Land Use and Tenure

The entire proposed excavation area consists of pine plantation, both cleared and uncleared areas. Surrounding the proposed excavation area, there are several rural properties, market gardens and the Harvey Golf Course. In addition, Byrd Swamp Nature Reserve is located to the southeast of the proposed excavation area.

The Desalination pipelines crosses through the southern portion of the proposed excavation area and includes a 70 m buffer.

2.5.2 Aboriginal Heritage

A search of the EPBC Protected Matters Search Tool returned no known internationally significant indigenous sites (Appendix 1).

A search of the Aboriginal Heritage Enquiry System (DIA 2012) returned no known Aboriginal Heritage sites within the exploration permit area. However, seven "other heritage places" were defined (Appendix 3). Five of these seven sites are located within the exploration permit area; however, only one of the sites is included within the proposed excavation area (see Figure 8).

2.5.3 Natural Heritage

A search of the EPBC Protected Matters Search Tool returned three sites on the Register of National Estate; South-west Irrigation Area, Crampton Nature Reserve and Yalgorup National Park (Appendix 1).

3.0 IMPACTS AND MANAGEMENT

3.1 Proposed Excavation Area

Figure 3 indicates the proposed excavation area, which considers all relevant environmental and social restrictive areas and their associated buffers. All impacts associated with mining activities undertaken on this site will relate to only this area.

3.1.1 Buffers

The proposed excavation area has been drafted to avoid all environmentally sensitive areas and has incorporated the following buffers:

- A 50 m buffer will be maintained from all CCWs.
- A 50 m buffer will be maintained from all REWs (only 30 m is required).
- A 50 m buffer will be maintained from all DoW bores.
- A 50 m buffer will be maintained from all "high to moderate risk" areas.
- A 50 m buffer will be maintained from all heritage sites.
- A 50 m buffer will be maintained from all road reserves.
- A 50 m buffer will be maintained from the Harvey Diversion Drain.
- A 70 m buffer will be maintained from the desalination pipe.
- A 50 m buffer will be maintained between mining activities and areas of native vegetation.
- A 50 m buffer will be maintained between mining activities and rural properties on the western and eastern proposed excavation area boundaries.

3.1.2 Site Infrastructure

Access to and from the site will be along Myalup Road and Forestry Road, which then link to the Forest Highway and South West Highway for delivery to the south-west region (see Figure 9).

3.2 Environmental

3.2.1 Geology, Soils and Landforms

3.2.1.1 Acid Sulfate Soils

Acid Sulfate Soils (ASS) are naturally occurring soils and sediments that contain sulfide minerals, commonly in the form of pyrite (iron disulfide). In an undisturbed state below the water table, these soils are benign and non-acidic. However, if the soils are drained, excavated or exposed by lowering of the water-table, the sulphides can react with oxygen to form sulfuric acid.

Soil disturbance in ASS risk areas that involve excavation, lowering the water table, compacting saturated soils or disturbing previously saturated sediments, may result in soil, groundwater and surface water acidity, as well as the release of metals and precipitates (DoE 2004b). The possible impacts relate to the potential for oxidation of excavated or in situ PASS generating acidic conditions, and possibly releasing metals into groundwater.

However, potential impacts from ASS on site can be readily managed as most of the area proposed for mining either has no potential ASS risk or is identified as having moderate to low risk of ASS occurring within 3 m of the natural ground surface (or deeper) (WAPC Bulletin 64).

In accordance with DEC ASS Investigation guidelines, any dewatering or soil disturbance, compaction or lateral displacement in ASS risk areas will require a Preliminary Site Investigation to determine whether or not ASS is present.

3.2.2 Hydrology

3.2.2.1 Surface Water

A 50 m buffer will be maintained along the entire length of the Harvey Diversion Drain that passes through the excavation area at all times.

Flooding and inundation of vegetation can cause vegetation stress and death; however, such impacts are unlikely from this project. Surface water may cause some temporary pooling in surrounding areas, although this pooling is expected to be of short duration due to the high infiltration rates and the likely short duration of any significant rain events. This temporary and infrequent pooling is unlikely to have a negative impact on surrounding vegetation outside of the tenements.

Potential surface water impacts include:

- erosion or scour at drainage outlets, occurring when surface flows are channelised by drainage design

- changes to natural hydrology (surface flows, erosion, inundation and surface/groundwater interaction)
- changes in surface water flows to nearby wetlands and lakes
- contamination of surface water with hydrocarbons or chemicals.

To manage the potential impacts the project site will be designed, constructed and operated to avoid disruption of surface water flows and ensure that potential contaminants are not released into any surrounding wetlands or lakes.

To manage the potential impacts on water quality from the discharge of stormwater with elevated sediment levels or any other contaminants, the following practices will be implemented:

- A 50 m buffer will be maintained from all CCWs.
- A 50 m buffer will be maintained from all REWs.
- Tree stumps will be retained as long as possible.
- Stockpiles of erodible material will be located away from roads and pavements to minimise sediment transport in run-off.
- Each stage will be rehabilitated at completion of excavation.
- Spill response equipment will be available at each site.
- Bunds and drains will be established along the access roads to contain run-off.
- Hydrocarbon management measures will ensure surface water contamination does not occur.

3.2.2.2 Groundwater

The excavation will take place into the hillside and will not intersect the water table.

The main potential impact to groundwater is contamination via hydrocarbons and sewerage. There are minimal hydrocarbons and chemicals to be stored on site, reducing the likelihood of any major groundwater contamination.

The *Kemerton sub-areas groundwater management plan 2007* applies in this sub-area. Abstraction may have restrictions (management zone 6) to maintain the water quality and minimise the impacts on wetlands and other water bodies (DoW 2009). Monitoring of water quality will occur annually from six bores installed across the proposed excavation area (see Figure 9).

The monitoring bores will also allow for determination of the depth to groundwater within the excavation areas and, as a result, the finished floor level.

Management measures that will be implemented include:

- finished floor level clearance of 5 m to the estimated future maximum groundwater level, in the absence of on-site groundwater elevation data. After two years of monitoring has occurred, the finished floor level will have a clearance of 2 m to the estimated future maximum groundwater level
- 50 m buffers will be maintained surrounding DoW bores
- contamination and spills management (with correct storage and handling there is little risk that a spill would move off site, or infiltrate groundwater beneath the site)
- surface water management (Section 3.1.2.1) will minimise the risk of contamination to groundwater via infiltration
- waste management (Section 3.1.4) to ensure that all wastes are disposed of appropriately, minimising the risk of groundwater contamination
- installation of six monitoring bores to measure water levels and water quality (refer Figure 9).

In conjunction with the water level monitoring, it is proposed to monitor baseline groundwater quality. The future groundwater quality resulting from the excavation works can then be compared with the baseline data to assess any impacts associated with the site activities. Table D summarises the proposed monitoring program, which will be conducted over the 18 month period that water levels are recorded.

Table D: Proposed Baseline Monitoring Program

Location	Proposed Analytes	Potential Source	Frequency
Three bores adjacent to excavation	Total Petroleum Hydrocarbons	Hydrocarbon spill/ leak	Twice over water level monitoring period (winter high and summer low).
Three bores adjacent to excavation	pH, Total Iron, Total Aluminium	Acidic Groundwater from Regional Area	
Three bores adjacent to excavation	Total N, Total P	On-site toilets	
All bores	Water levels	Regional	Monthly

The specifics of this monitoring program may be adjusted pending results over the interim period. Final details will be provided to DoW in order to establish the appropriate excavation depth and water quality parameters for monitoring.

A 500,000 kL water licence will be applied for to allow for the washing of sand to meet market requirements. This water allowance will also assist with dust management. In discussions with Richard Watson (pers. comm. late 2011) it was advised that suitable water is available in the "Harvey" and "Wellesley" sub-areas. Rocla requested an expression of interest in applying for a water licence and were told in correspondence that once the mining lease was granted this would be forthcoming (Appendix 4).

3.2.3 Hydrocarbons

Without appropriate management procedures there is the potential for incorrect storage of hydrocarbons and spillages to result in the contamination of soil, surface water and groundwater. Rocla will ensure that current management procedures based on *Australian Standard AS 1940–2004: The storage and handling of flammable and combustible liquids* are implemented to prevent any potential hydrocarbon contamination to the environment. Hydrocarbons will be managed during construction and operation to prevent any contamination to the surrounding environment.

3.2.3.1 Fuel Management

Rocla is committed to ensuring that its extraction activities do not adversely impact the local groundwater resources and this section outlines the site specific fuel management measures.

Several guidelines have been utilised in the development of fuel management measures, including:

- Statewide Policy No. 1: Policy and Guidelines for Construction and Silica Sand Mining in Public Drinking Water Source Areas (WRC 1999)
- Water Quality Protection Guidelines No. 1 – Water Quality Management in Mining and Mineral Processing: an overview (WRC 2000a)
- Water Quality Protection Note 60 – Tanks for mobile fuel storage in PDWSAs (DoW 2008)
- Water Quality Protection Note 65 – Toxic and hazardous substances: storage and use (DoW 2006)
- *Australian Standard AS 1940: 2004. The storage and handling of flammable and combustible liquids*.

Although the tenement is not within a priority source protection area, fuel management measures are important and will include:

- The site will consist of a self bunded above ground fuel tank.

- All care should be taken when coupling and uncoupling hoses between vehicles to minimise any loss of liquids.

- An emergency response plan should be prepared to address any spill that may result from a mobile refuelling vehicle or storage tank. The plan should be made available to all personnel on site.

- Provision of an adequate buffer separation distance between fuel storage facilities and conservation valued wetlands.

- A 2 m buffer zone of undisturbed sand profile will be maintained to the water table.

- No fuel storage tanks shall be installed in a wellhead protection zone.

- No ground storage tank system shall be installed within a wellhead protection zone.

3.2.3.2 Fuel Storage

The proposed mining operation will incorporate storage of hydrocarbons on site; one 17,500 L self-bunded tank is proposed for the site. The proposed fuel storage tanks to service the machinery will be required to comply fully with the *Australian Standard 1940:2004 The Storage and Handling of Flammable and Combustible Liquids.* A mobile service truck will be used to transport fuel to machinery on site.

3.2.3.3 Fuel Spill Prevention

The management practices which will be implemented to prevent fuel spillage to the soil and underlying water resources include:

- Fuel transfer points (delivery into tank and machine refuelling) will be located on concrete hardstand to capture potential fuel spills or leaks.

- Fuel transfer will be undertaken by hand to ensure that fuel is managed carefully without spillage. Connector hoses/funnels will be used to prevent fuel spillage.

- The nearest wetland (REW) is located on the eastern border of the proposed excavation area; a refuelling buffer of at least 350 m will apply to this wetland.

- Site personnel and operators of heavy machinery will be advised of the protocol in relation to refuelling, and actions to be undertaken in the event of a spillage. A copy of an Emergency Response Plan will be contained within each vehicle for quick access if required.

As specified in WRC (1999) a buffer of at least 2 m of undisturbed soil will be maintained to the water table to minimise the risk of contamination of groundwater from hydrocarbons and allow time for remediation to take place.

The following protocol will be applied in the case of a fuel spillage:

- The area of soil impacted is to be removed immediately. This may be undertaken via hand shovel or use of mechanical equipment if necessary. A shovel is to be kept on the service vehicle at all times).
- Visual analysis to confirm all impacted soil has been removed.
- The operating team are to phone the Operations Manager immediately to report the spillage.
- The Operations Manager is to inform the Department of Environment and Conservation of the spillage and remedial action undertaken.
- Should the spillage exceed 20 L, the Operations Manager will also contact the Water Corporation (1800 626 636) to advise of the spillage and remedial action proposed/undertaken. Laboratory testing of soils from the remediated area will also be undertaken to confirm all fuel was removed.
- Rocla Quarry Products "Incident Report" to be prepared and submitted to the Resource and Development Manager and the Health and Safety Advisor.
- Contaminated soil will be taken off site by a licensed waste contractor in accordance with relevant legislation.
- Contaminated absorbent material and soil will be disposed of to a licensed landfill facility in accordance with legal requirements.

3.2.3.4 Proposed Water Quality Monitoring Program

As specified in Section 3.2.2.2, it is proposed to monitor baseline groundwater quality. The monitoring will include hydrocarbon monitoring in bores that will be installed across the site. Table D (Section 3.2.2.2) summarises the proposed monitoring program, which will be conducted over the 18 month period that water levels are recorded.

3.2.4 Waste

It is important to manage waste properly to reduce the impacts to visual amenity, groundwater, soil and surface water contamination and human health issues. The following wastes will potentially be produced by the proposed project:

- hydrocarbon and chemical contaminated wastes
- general domestic waste
- sewerage and domestic wastewater.

The following waste management strategies will be implemented during operations:

- Hydrocarbons and chemical containers will be removed from site and disposed of at a licensed landfill facility at regular intervals.
- Sewage waste will be transported off site for treatment and disposal by a licensed contractor.
- Site personnel will be informed of on-site waste management procedures.
- Mobile machinery will store all waste oil and remove it from site daily.

3.2.5 Vegetation and Flora

No clearing of native vegetation is proposed to be undertaken as the proposed excavation area is located solely within pine plantation. The areas of pine plantation will be cleared by the FPC and Rocla will commence operations after clearing has occurred. However, a clearing permit may be required in the event of regrowth of native vegetation post-clearing of the pines.

During operations, the following management procedures will be followed:

- Adequate buffers will be maintained to all remnant vegetation surrounding the site and nearby wetlands.
- Vehicles will be restricted to designated access roads.
- Areas will be cleared of tree stumps in stages, as they help stabilise the soil.

The extraction areas will be revegetated with pine plantation by the FPC after operations are complete in each area as part of their forestry management program.

3.2.5.1 Dieback

The arrival and spread of dieback disease, otherwise known as *Phytophthora* root-rot, in Western Australia has been catastrophic for the biota of a number of south-west Australian ecosystems. It has also been a major problem for road construction, timber harvesting, mining and other industries since land managers realised that the movement of soil is the most important method of spread of the soil-borne pathogen (which is actually a water mould, not a fungus as previously believed). There are several species of *Phytophthora* present in native vegetation in the south-west of Western Australia, but by far the most widespread and destructive is *Phytophthora cinnamomi* thought to have been introduced soon after European settlement. (Dieback Consultative Council 2012)

Due to the removal of native vegetation during the 1920s to establish pine plantation within the mining tenement area and the absence of dieback indicator species, it is not possible to detect whether dieback is present or not; the site is un-interpretable. As a result, the site will be managed by way of the precautionary principle and as such,

hygiene guidelines will be implemented prior to entry and exit of the site. Mobile excavation equipment will be targeted for dieback management as they hold the greatest risk of transporting soil.

The aim of dieback management during operations is to minimise the risk of entry of dieback to the site. This is achieved by preventing the import of any soil or plant material on mobile equipment and vehicles. The risk of this transportation is low due to the vehicles and machinery travelling on sealed roads prior to entering site.

Management strategies for dieback control are very similar to that of weed control and the two practices should be considered together. Several of the practices outlined below are recommended for un-interpretable sites in the Management of *Phytophthora* Dieback in Extractive Industries document (Dieback Working Group 2005).

- Unauthorised and/or unhygienic entry must not be permitted into the site. This may be achieved via restrictive fencing, and provision of parking areas off site. Similarly a boundary fence around the site will minimise the risks associated with boundary breaches.

- All vehicles or equipment entering the compound are to be "clean on entry", and therefore are required to be washed down prior to entering the site. Once clean, vehicles and equipment can move around within the site without hygiene restrictions. All footwear should also be clean upon entry to the site.

- The Rocla "Machinery and Inspection Check Sheet" form (Appendix 5) will be returned by the supplier to the Site Supervisor prior to the machine arriving on site.

- Training programs and inductions shall be conducted for all site personnel.

- Areas will be "quarantined" ahead of excavation.

- All surface water and wash-down water will be contained. Run-off from the quarry pit, stockpiles and haul roads will be contained, and not released into areas of native vegetation.

- Light vehicles and machinery will be restricted to access roads, tracks and fire breaks, if present. Off-road driving will be prohibited and excavation equipment will be restricted to excavation areas only.

- Vehicles which travel off the limestone tracks must be cleaned down at the designated "clean down bay" – refer to figure 2. clean down will consist of
  - in dry soil conditions
    - use a brush and/or blow with air to remove clods of soil and a metal bar or spade to remove compacted soil, where necessary

- dust adhering to the sides of vehicles does not need to be removed
- material removed shall be collected on the limestone pad in the clean down bay and periodically covered with fresh limestone

– alternately (in wet soil conditions)
  - wash down using a suitable hose to remove all clods of soil
  - clean wash-down water will be provided in an on-site mobile tank filled via water truck from an external clean source (mains water)
  - wastewater will be collected in a limestone lined controlled area within the clean down bay and allowed to drain through the limestone base.

- No soil or vegetation will be brought on site, except that for use in rehabilitation. Only certified *Phytophthora* dieback free materials (e.g. soil, mulch and compost) will be brought to the site. Plants will be purchased from accredited nurseries and direct seeding would be considered, rather than planting seedlings.

3.2.5.2 Weeds

Earthworks, topsoil and overburden transportation, vehicle movement and several other factors have the potential to introduce additional weeds and spread existing populations of introduced flora within the proposed quarry sites. A weed is a non-native plant in any particular area or region and is considered a nuisance due to excessive growth and/or disturbance to the local ecosystem. The management strategies for weed management are similar to those of plant disease and generally, if dieback management procedures are followed, weeds will also be controlled.

The majority of the tenement consists of pine plantation or cleared areas of land. Databases searches have returned potential weed species within the tenement. The site will be monitored at the conclusion of operations for any signs of weeds and if they are found they will be removed, buried or sprayed with herbicide.

The following strategies will assist in minimising the risk of introducing weeds:

- All vehicles or equipment entering the compound are to be "clean on entry", and therefore are required to be washed down prior to entering the site. Once clean, vehicles and equipment can move around within the site without hygiene restrictions. All footwear should also be clean upon entry to the site.
- Any illegally dumped rubbish located during operations will be removed and disposed of as soon as practicable, as rubbish is a major source of weed species.

- Vegetation and topsoil from weed infested areas will be stripped and stockpiled separately from non-weed infested areas.

- Site personnel will be educated and inducted on weed risk reduction methods and the identification of problem species.

3.2.6 Fauna

The proposed site has been planned to eliminate the requirement for clearing of native vegetation. The quarry footprint will be located within an area of cleared pine plantation and as a result it is unlikely that significant fauna habitat species will be impacted by the project. Some localised loss of fauna is possible due to the additional traffic around the quarry sites and between the quarry and customer locations. However, this impact is considered so minimal it is unlikely to be of any significance to the conservation status of any fauna that may be found within the region.

Other potential impacts to fauna include contaminated water consumption or coming into contact with hazardous substances resulting in sickness or death. In addition, stygofauna and troglofauna, if present, may also be affected by contamination, excavation, altering of groundwater levels and soil compaction by site machinery.

Management strategies that will be employed during operations include:

- no clearing of native vegetation

- rehabilitation of disturbed areas will occur, by the FPC, once each stage is complete

- speed limits will apply on site to limit accidental road kill

- all site personnel will be informed of avoidance measures and the importance of avoiding causing harm to significant species. In addition, positive sighting of any significant species will be reported to the DEC as soon as practical

- no non-native fauna will be permitted on the sites

- no excavation will occur below the water table, meaning impacts to any stygofauna and troglofauna that may be present is avoided.

3.2.7 Noise

The proposed operations are likely to generate some noise pollution as a result of the operation of earthmoving equipment, traffic along transport routes and noise generated by the screening machinery. However, the tenements are quite isolated and not adjacent to any sensitive premises.

Noise associated with quarrying falls under the *Mines Safety and Inspection Act 1994* and Regulations 1995. Management generally includes necessary hearing protection and conducting inductions and education for all site personnel.

Given the geology of the local area, no blasting or breaking of a dense duricrust will be required. The noise levels emitted from quarrying sand is expected to be much less in comparison to other forms of mining. Disturbance from vibrations is also expected to be minimal as no blasting is proposed.

Significant noise impacts are not expected from the operations across the five tenements and Rocla will ensure that all emissions comply with the requirements of the Environmental Protection (Noise) Regulations 1997 and the *Mining Act 1978* at all times. The distance between dwellings and screening bunds in place will offer sufficient buffers to not adversely impact nearby residents.

Research on noise impacts to fauna is limited, however, it is understood that fauna will adapt quickly to man-made noise in the absence of other significant threats. The noise generated by operations at the sites is unlikely to impact local fauna.

In general, sound travels along a line-of-sight and as a result the majority of noise management strategies involve locating equipment and plant in a topographical depression or behind stockpile bunds to reflect/absorb the noise. The following strategies will be implemented to reduce noise impacts:

- The screening plant and excavation areas will be located behind stockpiles to reduce noise impacts to nearby residents, where required and where excavations are within 500 m of a residence.
- Operations will occur between 0600–1900 daily.
- All mobile equipment will be maintained with efficient mufflers and noise shielding devices.
- Mobile equipment without audible reversing alarms will be utilised where possible.
- All personnel will be provided with appropriate noise protection equipment and will be inducted on safe work practices.
- Access roads and tracks will be maintained to a suitable standard to reduce traffic noise as a result of empty trucks entering the site.
- Should a justifiable noise complaint be received during operations, Rocla commit to contracting an acoustic consultant to identify the noise source and provide possible solutions. Any complaints received regarding noise will be investigated immediately.

3.2.8 Dust

Excessive dust may impact the health of site personnel and surrounding vegetation. However, the tenements are quite isolated and not adjacent to any sensitive premises.

Dust generated from the proposed quarry operations is likely to be minimal and localised and may be caused by:

- earthworks during construction and operation
- clearing and stripping
- excavation
- screening
- loading and transport
- vehicle movement
- wind erosion of exposed surfaces.

The EPA Guidance Statement 18: *Prevention of Air Quality Impacts from Land Development Sites* (EPA 2000) outlines control of dust and smoke from land development sites. Assessments of potential dust impacts were undertaken using the Draft Guideline for the Development and Implementation of a Dust Management Program (DEC 2008).

The following factors were taken into account when calculating the dust risk of the proposed quarries:

- nuisance potential of yellow sand when disturbed
- topography
- exposed area on site
- nature of works
- proximity to sensitive receptors
- effect of prevailing winds.

The proposed quarries were assessed and resulted in an overall "low" site dust risk potential, predominantly due to the coarse material properties. Minimal control and contingency measures are required for this level of risk (DEC 2008).

Allowances will be made for water cart operation, utilising groundwater in accordance with a future water licence, and Rocla will ensure the disturbed area exposed is kept to a minimum at all times. Adhering to the requirements of the *Mines Safety and Inspection Act 1994* and Regulations 1995, with respect to occupational health risks resulting from dust exposure, Rocla will ensure all personnel working on site will have access to adequate and efficient dust masks at all times.

Standard dust suppression measures will be implemented during construction and operations to minimise the impacts on surrounding vegetation. Management strategies that will be undertaken include:

- Dust suppression measures, such as water sprays, are implemented as necessary, in the event that high levels of dust are observed.
- Visual monitoring of dust will be undertaken daily.
- Tree stumps will be cleared in stages to assist with soil stabilisation.
- Access roads will be constructed of crushed limestone and well maintained.
- Activities will high dust generating potential will not be undertaken during adverse weather conditions.
- Vehicles will be confined to designated roads and tracks, with speed limits enforced.
- Material drop heights between loaders and trucks, and trucks to stockpiles, will be kept to the minimum practical height.
- Any complaints will be investigated immediately.

Pine plantation areas will be cleared in stages by the FPC to meet their requirements and markets. Once cleared, Rocla will extract from the area with approximately 20 ha open area at any given time. On completion of the extraction activities, the FPC will replant pines as part of their forestry management; this approach will minimise the size of open areas and in turn, minimise dust nuisance (refer Figure 10).

3.3 Social

3.3.1 Local Community

The local community may be impacted by noise, dust and truck movements to and from the sites (refer Figure 9). In the event of a community complaint, Rocla will investigate and take immediate action to remediate.

In line with management measures outlined in the EPA Guidance No. 3: *Separation Distances between Industrial and Sensitive Land Uses* (EPA 2005) a 300–500 m (depending on the size of the quarry) buffer will be maintained at all times.

3.3.2 Visual Amenity

Visual impact can occur when the operation is visible from neighbouring properties or roads. Impacts are greatest when operations occur high in the landscape, too close to neighbours, or if they have insufficient visual screening. The mining tenement is within areas of pine plantation and therefore excavation areas will be surrounded by pine plantation that has not been cleared for this proposal. In the event that excavation areas are adjacent to rural properties or area of native vegetation, a 50 m buffer will be maintained to any mining activity.

In addition, there is significant native vegetation surrounding the majority of the proposed excavation area. Therefore it is unlikely that visual amenity will be impacted.

Potential management strategies include:

- rehabilitation of cleared pine plantation areas when excavation works are completed
- ensure barrier fences and gates are compatible with the semi-rural style of the surround land areas and natural landscape
- locate the screening plant so the stockpile area and fringing vegetation screen it from local residents or well-used roads
- locate buildings and other site infrastructure in areas of low visual impact
- locate stockpiles to create screening bunds
- adopt good house-keeping practices, such as orderly storage and removal of disused equipment or waste.

3.3.3 Aboriginal Heritage

Whilst there are no Aboriginal heritage sites recorded within the exploration permit area, there were seven "other heritage sites" within or close to the mining tenement. Only one "other heritage site" is located within the proposed excavation area; a 50 m buffer will be maintained to the site at all times.

While it is possible that there are other sites present that have not been registered, it is very unlikely given the duration of the current land use (pine plantation). Extraction and the associated operations have the potential to damage Aboriginal artefacts if they exist in the proposed excavation area.

Should any evidence of early aboriginal occupation be uncovered during works, all activities will be stopped in compliance with the *Aboriginal Heritage Act 1972–1980* pending an assessment by a recognised consultant. If it is unavoidable that the operations will disturb a site, a Section 18 application will be made to the Department of Indigenous Affairs under the *Aboriginal Heritage Act 1972*.

4.0 APPROACH TO ENVIRONMENTAL ASSESSMENT

4.1 Stakeholder Consultation

Rocla attended a meeting with the EPA in March 2011 to discuss the approach for the referral of this proposal. It was discussed that should the proposal be assessed by the Office of the EPA under Part IV of the *Environmental Protection Act 1986* (WA) the likely outcome would be an Assessment on Proponent Information (API), depending on the level of information provided with the referral.

In consultation with the FPC (Russell Warnes, pers. comm. late 2011) it was discussed that Rocla would manage and plan their operations to align with FPC forestry management and planning; Rocla will extract from recently harvested pine plantation areas. When extraction activities are completed, the FPC will replant pine. A 20 ha mine footprint is expected to be required for Rocla's operations.

Table E: Stakeholder Consultation

Stakeholder/ Organisation	Contact	Comment/Outcome
DEC	Owen Donovan	Various letter correspondence (2010–2011) regarding approvals for access to site for drilling program
DEC	Grant Lamb	Written correspondence (2010–2011) regarding gaining approval from Minister for Environment and exploratory drilling programs
DMP	Mike Freeman	Meeting on 17 June 2011 to discuss the proposal approach and requirement for material due to market demand
DoP	Geoff Findlay	Discussions regarding proposal in late 2010
DoW	James Mackintosh	Discussions and correspondence regarding groundwater, separation levels and exploration works (2010–2011)
EPA	Anthony Sutton, Darren Foster	Assessment of the proposal, referral approach and likely outcomes discussed at meetings on 11 March 2011 and 31 October 2011
FPC	Michael Lobb	Excavation activities will be planned and managed to coincide with forestry management and planning
Gnaala Karla Booja Native Title Group	N/A	A site visit was conducted on 20 August 2010 and the group were supportive of the development. Ongoing discussions with this group are occurring.

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5.0 MINE CLOSURE

5.1 Post-mining Land Use

After the completion of sand extraction, the land will be rehabilitated in accordance with a rehabilitation plan prepared in concurrence with the DEC.

5.2 Closure Plan

FPC will replant with pine plantation post-extraction. Rocla commit to decommissioning all infrastructures.

A formal Closure Plan will be submitted to the DMP as part of the Mining Proposal.

5.2.1 Landform Reconstruction

Once quarrying of each stage is complete, the excavation area will be backfilled and reshaped utilising overburden that will be spread evenly over the excavated area and then profiled, ready for the FPC to continue the pine plantation activities.

As part of the final landform reconstruction, surface drainage lines will be established to control surface run-off and minimise potential erosion.

5.2.2 Decommissioning

At the end of the quarries" lives, Rocla will undertake the following actions to decommission the sites:

- all buildings and infrastructure removed
- any hard stand surfaces will be removed and used to backfill the pit
- overburden and scalps (oversized screened material) will be used as backfill
- the area will have the slopes and soils constructed to allow for pine plantation management.

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6.0 MONITORING AND REPORTING

All quarry activities and potential environmental impacts require ongoing monitoring to ensure legislation, policies, standards and guidelines are being met.

6.1 Inspections and Audits

Monthly environmental, health and safety (EHS) inspections will be undertaken by a suitably appointed EHS representative, using a pre-determined checklist. All corrective actions will be logged and must be completed.

6.2 Annual Reporting

Under the *Mining Act 1978*, mining lease holders are required to submit an Annual Environmental Report (AER) to the Department of Mines and Petroleum (DMP) each year. An AER will also be submitted to the DEC for the Works Approval Licence.

An AER will be prepared for each site and shall include:

- excavation progress, including volume of sand removed
- volume of material screened
- contingency actions and outcomes
- environmental incidents, if any
- community complaints and responses, if any.

6.3 Incidents and Complaints

Rocla commit to reporting any environmental incidents that may occur on site during operations. An environmental incident is any event that could or does result in an impact to the environment, including, but not limited to, the following:

- water (surface or ground) contamination
- soil contamination
- incorrect waste disposal
- illegal clearing of native vegetation
- wildlife fatalities
- hazardous material spills
- unauthorised land disturbance, including clearing or disturbance of heritage sites
- community complaints.

Rocla will systematically investigate any incidents that occur, identify the cause and implement management measures to eradicate the possibility of the incident reoccurring.

7.0 ENVIRONMENTAL SUMMARY

Table F: Summary of Potential Impacts and Management Measures

Environmental Factor	Environmental Objective	Potential Impacts	Management Measures	Predicted Outcome
Flora and Vegetation	To maintain abundance, diversity, geographic distribution interconnectedness and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.	▪ Disturbance to nearby conservation significant flora ▪ Changes to wetland hydrology ▪ Introduction and spread of weeds ▪ Introduction and spread of dieback ▪ Dust emission and deposition	▪ The potential spread of weeds and dieback, if present, during operations will be prevented. ▪ Dust will be managed during the quarrying operations to protect surrounding native vegetation. ▪ The extent of vegetation clearing will not extend past that of the FPC and stumps will be cleared in stages. ▪ Adequate buffers will be maintained between excavation areas and adjacent Bush Forever sites. ▪ Vehicles will be restricted to designated roads. ▪ At the completion of operations, FPC will replant pine.	▪ This proposal does not involve any native vegetation clearing and will therefore have minimal impact on this environmental factor. ▪ Detailed vegetation rehabilitation management for five rehabilitated sites
Fauna	To maintain abundance, diversity, geographic distribution, interconnectedness and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.	▪ Habitat fragmentation and disturbance and impacts due to loss and degradation of habitat through clearing. ▪ Physical Injury or Fatality ▪ Indirect Effects on Adjacent Habitats	▪ Rehabilitation of potential fauna habitat species after the completion of operations, dependent on FPC requirements ▪ Management measures will be implemented to reduce indirect disturbance of surrounding fauna habitat. ▪ Staged removal of pine stumps to allow for acclimatisation for any remaining fauna in the area. ▪ The control and monitoring of dust, noise and smoke. ▪ Induction of machinery operators involved in the operations and stump removal process. Operators will be advised to be alert for fauna, and to take steps to avoid impacts, where practical. ▪ Speed limits will apply on site to limit fauna fatalities. ▪ Non-native fauna will be prohibited from site.	▪ No fauna species will cease to exist or have their conservation status adversely affected as a result of the implementation of this proposal. ▪ The proposal area (cleared pine plantation) does not contain any critical habitats for protected species or populations. ▪ The proposal will result in the reduction in the general availability of habitat (including fragmentation) for those fauna species that are present in the area.
Groundwater Resources	To maintain the integrity, ecological functions and environmental values of GDEs to ensure that any impacts are appropriately managed	▪ Impacting on GDEs in the area ▪ Oxidation of Potential Acid Sulfate Soils (no to low risk) ▪ Impact to Subterranean Fauna (from changes in GW level and direct impact)	▪ Quarry operations will not excavate to within 5 m (initially) of the estimated future groundwater level (finished floor level). ▪ A Groundwater Management and Monitoring Plan (GMMP) will be developed and implemented when the quarries are operational. When groundwater elevation data has been collected the separation distance will reduce to 2 m to the future groundwater level. It will include ongoing groundwater quality monitoring and the establishment of appropriate water quality criteria. The plan will be developed with input from DoW and DEC, with threshold levels being consistent with the intent of the ANZECC / ARMCANZ guidelines and the DoW guidelines: The Plan will also include provision for timely and appropriate responses to contingent events, including responses to possible temporary episodes of reduced water quality. ▪ Waste management to ensure all wastes are disposed of appropriately, minimising the risk of groundwater contamination. ▪ Surface water management will minimise the risk of contamination to groundwater via infiltration.	There will be minimal, if any, impact to groundwater levels or water quality resulting from quarry operations.
Acid Sulfate Soils	To maintain the integrity, ecological functions and environmental values of the soil and landform.	▪ Increase in heavy metal concentrations ▪ Loss of visual amenity	▪ An adequate buffer will be maintained to high to moderate ASS risk area at all times during operations. ▪ Excavation will not intersect the water table at any time during operations, minimising the risk of exposing potential ASS.	The management measures will ensure that the risk of potential impacts occurring as a result of the quarrying operations is minimal.
Noise	To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring the noise levels meet statutory requirements and acceptable standards.	▪ Construction noise impacts upon local residents and workers. ▪ Ongoing operational noise impacts upon local residents and workers.	To protect the amenity of the receiving environments from noise impacts, the following key management measures will be implemented during the construction and operation phase: ▪ Limiting construction work; operating 6.00 am to 7.00 pm, daily. ▪ Design the mine excavation areas to provide enhanced landform and constructed noise screening (i.e. bunds), when within 500 m of a residence. ▪ Maintain noise suppression devices in good condition on all operational machinery. ▪ Shut down equipment when not in use. ▪ Operate machinery only within the designated hours of operation. ▪ Schedule activities to minimise the likelihood of noise nuisance. ▪ Use the dedicated transport route. Record any complaints received regarding noise disturbance and instigate follow-up action instigated immediately to minimise the cause, to the greatest possible extent.	▪ The sand quarry site is relatively isolated from surrounding land uses. ▪ The predicted outcome of the proposed operations is that that the amenity of residents is unlikely to be affected by construction or operation noises.

Environmental Factor	Environmental Objective	Potential Impacts	Management Measures	Predicted Outcome
Air Quality	To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards	▪ Dust emissions may occur as a result of the excavation. ▪ Minor levels of exhaust emissions are anticipated from mine equipment. ▪ Vehicle movements associated with the quarry operations will result in exhaust emissions and potential dust emissions from unsealed roads.	To prevent or minimise dust generation during quarry operations, the following dust management measures will be implemented during the construction and operation phase: ▪ The excavation will occur in stages. A key objective is to minimise the disturbance or open area at any one time, as far as practicable. ▪ Maintain haul road surface in a good condition and with suitable grades. ▪ Restrict vehicle movements to defined roads. ▪ All vehicles leaving the site are required to have covered loads. ▪ Use water as appropriate to wet down roads and trafficked areas (a water licence will be obtained). ▪ Use dust suppressants where appropriate (either mixed with water to enhance dust suppression and vegetation cover, or applied periodically to specific areas). ▪ Limit the speed of vehicles on the site. ▪ Apply surface treatments (e.g. mulch, ground cover) to stabilise any bare areas which might be prone to wind erosion. ▪ Define buffer areas within the site to avoid any unnecessary disturbance of stabilised surfaces or vehicle traffic. ▪ Limit the quantity of machinery / vehicles in operation. ▪ Inducting all contractors working within the sites. Record any complaints received and instigate follow-up action instigated immediately to minimise the cause, to the greatest possible extent.	▪ The predicted outcome is that emissions are unlikely to adversely affect the area's environmental values or the health, welfare and amenity of neighbouring residences. The objective of ensuring that emissions from construction works do not adversely affect environmental values or the health, welfare and amenity of people and land uses will be met through managing potentially adverse construction and operation impacts as per the air quality management measures.
Hydrocarbons and Waste	Ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards	▪ Contamination of local soil, groundwater or surface waters as a result of waste materials generated by construction and operation and the possible inadequate handling, storage or disposal of hydrocarbons and chemicals ▪ Sewerage and waste discharge adding nutrients and pollutants to the soil and groundwater.	▪ Procedures will be implemented for the correct handling, storage, spill management and clean up. ▪ Contaminated material will be removed and bio-remediated (if biodegradable) or disposed of at a licensed facility. ▪ Spill response equipment will be located in the vicinity of work areas, with site personnel trained in spill response management. ▪ The proposed fuel storage tanks to service the machinery will be required to comply fully with the Australian Standard 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids*. This standard specifies requirements for security, bunding, signage, fire protection and handling.	▪ The objective of ensuring that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land will be met through managing adverse construction impacts in accordance with Australian Standard 1940-2004, Guideline No. 1: Controlling Waste Generators (DoE, 2004a). ▪ The management of general and hazardous waste is expected to result in negligible environmental impacts.
Visual Amenity	To ensure that aesthetic values are considered and measures are adopted to reduce visual impacts on the landscape to as low as reasonably practicable.	Views of "natural" vegetation will be altered by the addition of a "man-made" excavation pit	▪ The pit design will be such that natural topography and sand bunds will be utilised to shield the view of the mine from surrounding land uses. ▪ Ensure barrier fences and gates are compatible with the semi-rural style of the surround land areas and natural landscape. ▪ Ensure orderly storage and removal of disused equipment or waste.	▪ The predicted outcome of the quarry operations will be a minor change in the nature of the natural vegetation in each area with an increased element of "man-made" structures impacting on the viewscape. ▪ Considering the limited surround land uses, the impact on visual amenity is expected to be minimal.
Aboriginal Heritage	To ensure that changes to the biophysical environment do not adversely affect historical and cultural associations and comply with relevant heritage legislation.	Damage or loss to Aboriginal heritage sites	▪ Any significant sites identified during construction will not be removed, damaged or altered without approval under Section 18 of the *Aboriginal Heritage Act 1972*. ▪ Training will be provided to all construction workers detailing the importance of avoiding heritage sites and reporting of any suspected heritage sites. Exclusion zones will also be identified and clearly communicated to project personnel in the event of a heritage site being uncovered.	▪ Significant sites identified from the Aboriginal Sites register and during construction will not be removed, damaged or altered without approval under Section 18 of the *Aboriginal Heritage Act 1972*. ▪ Only one registered "other heritage site" occurs within one of the tenements, so impact is expected to be minimal.

8.0 REFERENCES

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FIGURES

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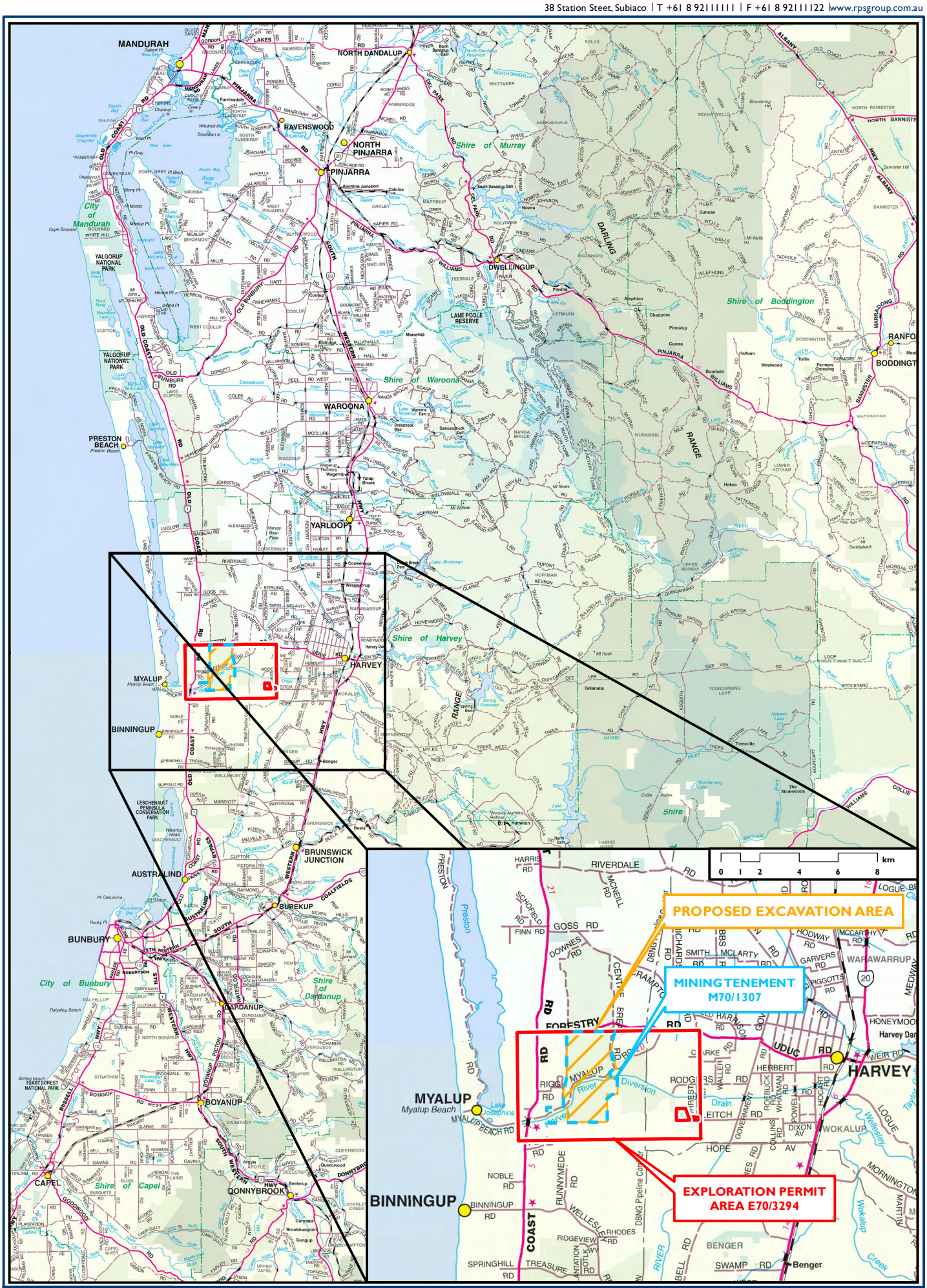

RPS

Job Number: L11438
Date: 25.10.12
Scale: Map - 1:500000 @ A4 Inset 1:250000 @ A4
Version: A
Drafted by: SC
Source: Landgate, 2008

Figure 1

Site Location

38 Station Steet, Subiaco | T +61 8 92111111 | F +61 8 92111122 | www.rpsgroup.au

LEGEND

- Exploration Permit Area E70/3294 (5216ha)
- Mining Tenement M70/1307 (1178ha)
- Proposed Excavation Area (1090ha)
- Myalup State Forest

MYALUP STATE FOREST
UDUC
COOKERNUP
WARAWARRUP
GOVERNMENT RD
LAKE PRESTON
MYALUP
MYALUP RD
FORESTRY RD
HARVEY
UDUC RD
OLD COAST RD
BINNINGUP
WELLESLEY
WOKALUP
SOUTH WESTERN HWY
BENGER

RPS

Job Number: L11439
Date: 25.10.12
Scale: 1:50,000 @ A3
Revision: 0
Drafted by: SC
Source: Orthophoto - Landgate, 2012 State Forest - DEC, 2012

0 0.25 0.5 1 1.5 2 km

Figure 2

Site Context

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LEGEND

- Exploration Permit Area E70/3294
- Mining Tenement M70/1307
- Proposed Excavation Area
- 70m Desalination Water Pipeline Buffer
- Major Road
- 50m Road Buffer
- Harvey Diversion Drain
- 50m Harvey Diversion Drain Buffer
- Aboriginal Heritage Site
- 50m Aboriginal Heritage Site Buffer
- High to Moderate Risk ASS
- 50m High to Moderate Risk of ASS Buffer
- Conservation Category Wetland
- Resource Enhancement Wetland
- 50m Conservation Category Wetland Buffer
- 30m Resource Enhancement Wetland Buffer

FORESTRY RD

MYALUP RD

S00235 S00346 S00347 S00348 S00349 S00359 S00561

RPS

Job Number: L11439
Date: 25.10.12
Scale: 1:25000 @ A3
Revision: 0
Drafted by: SC
Source: Orthophoto & Cadastre - Landgate, 2012 Wetlands - DEC, 13.06.12 ASS - DEC, 25.01.10 Heritage - DIA, 2012 Desal Pipe - Survey Graphics

0 0.125 0.25 0.5 0.75 1 km

Figure 3

Proposed Excavation Area

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LEGEND

- Exploration Permit Area E70/3294
- Mining Tenement M70/1307
- Proposed Excavation Area
- Cadastre

Geology

- Qg, Lagoonal deposits; muds, silts, shell beds
- Qhs, SAFETY BAY SAND
- Qhw, Swamp deposits; mainly peaty sands
- Qpa, GUILDFORD FORMATION; mainly alluvial sandy clays
- Qpb, BASSENDEAN SAND; low, rounded dunes
- Qpb/Qpa, Thin Bassendean Sand over Guildford Formation
- Qtl, TAMALA LIMESTONE; eolian and marine calcarenite, beneath thin sand cover
- Qts, Sand associated with Tamala Limestone, high dunes
- Water,

FORESTRY RD

MYALUP RD

RPS

Job Number: L11438
Date: 25.10.12
Scale: 1:30000 @ A3
Revision: A
Drafted by: SC
Source: Contours & Cadastre - Landgate, 2012 Geology - DoIR, 1999

0 0.125 0.25 0.5 0.75 1 km

Figure 4

Geology

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LEGEND

- Exploration Permit Area E70/3294
- Mining Tenement M70/1307
- Proposed Excavation Area
- Cadastre

Acid Sulfate Soil Risk Mapping

- High to Moderate Risk
- Moderate to Low Risk

LAKE PRESTON

FORESTRY RD

MYALUP RD

OLD COAST RD

Job Number: L11438
Date: 25.10.12
Scale: 1:30000 @ A3
Revision: A
Drafted by: SC
Source: Contours & Cadastre - Landgate, 2012 ASS - DEC, 25.01.10

0 0.1250.25 0.5 0.75 1 km

RPS

Figure 5

Acid Sulfate Soil Mapping

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LEGEND

- Exploration Permit Area E70/3294
- Mining Tenement M70/1307
- Proposed Excavation Area
- Cadastre
- EPP Lake Boundary
- Myalup State Forest
- Harvey Diversion Drain
- 70m Desalination Water Pipeline Buffer

Wetland Mapping

- Conservation Category Wetland
- Resource Enhancement Wetland
- 50m Conservation Category Wetland Buffer
- 30m Resource Enhancement Wetland Buffer

FORESTRY RD

MYALUP STATE FOREST

MYALUP RD

Job Number: L11439
Date: 25.10.12
Scale: 1:25000 @ A3
Revision:0
Drafted by: SC
Source: Orthophoto & Cadastre - Landgate, 2012 Wetlands - DEC, 13.06.12 EPP Lakes - DEC, 1997 Desal Pipe - Survey Graphics

0 0.125 0.25 0.5 0.75 1 km

RPS

Figure 6

Hydrology

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LEGEND

- Exploration Permit Area E70/3294
- Mining Tenement M70/1307
- Proposed Excavation Area
- Cadastre

Heddle Vegetation Complexes

- Bassendean Complex - Central & South
- Dardanup Complex
- Guildford Complex
- Karrakatta Complex - Central & South
- Serpentine River Complex
- Yoongarillup Complex

FORESTRY RD

MYALUP RD

OLD COAST RD

Yoongarillup Complex

Karrakatta Complex-Central And\South

Bassendean Complex-Central And\South

Serpentine River Complex

Dardanup Complex

Guildford Complex

Job Number: L11439
Date: 25.10.12
Scale: 1:25,000 @ A3
Revision: 0
Drafted by: SC
Source: Orthophoto & Cadastre - Landgate, 2012 Heddle , et. al. - DEC, 1980

0 0.125 0.25 0.5 0.75 1 km

RPS

Figure 7

Heddle Vegatation

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LEGEND

- Exploration Permit Area E70/3294
- Mining Tenement M70/1307
- Proposed Excavation Area
- Cadastre
- Aboriginal Heritage Site - Other

S00561 - Artefacts / Scatter

S00346 - Artefacts / Scatter

S00235 - Artefacts / Scatter

S00347 - Artefacts / Scatter

S00349 - Artefacts / Scatter

S00348 - Artefacts / Scatter

S00359 - Artefacts / Scatter

FORESTRY RD

MALUP RD

OLD COAST RD

Job Number: L11439
Date: 25.10.12
Scale: 1:25,000 @ A3
Revision: 0
Drafted by: SC
Source: Orthophoto & Cadastre - Landgate, 2012 Heritage Sites - DIA, June 2012

0 0.125 0.25 0.5 0.75 1 km

RPS

Figure 8

Aboriginal Heritage Sites

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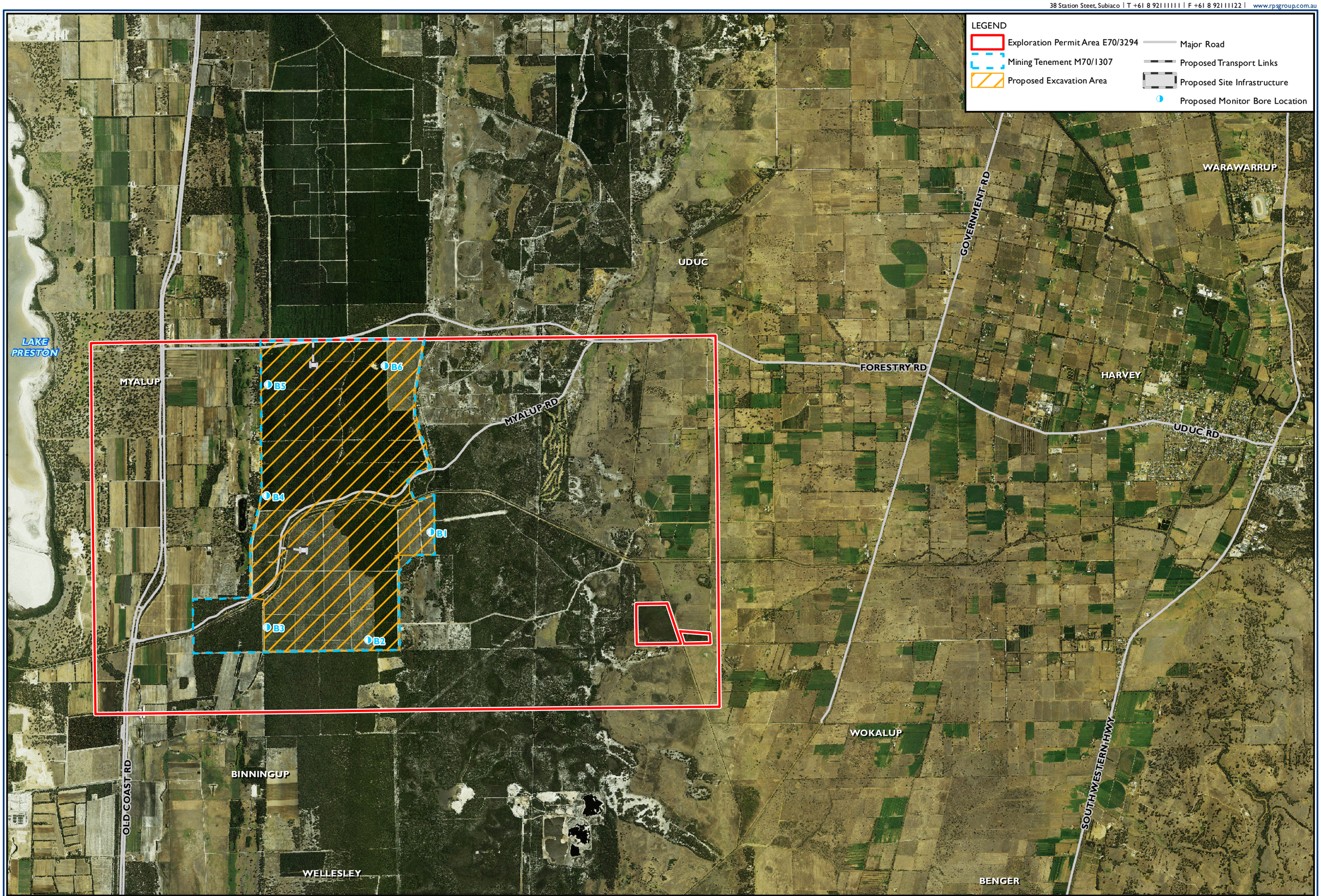

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Job Number: L11439
Date: 25.10.12
Scale: 1:50,000 @ A3
Revision: 0
Drafted by: SC
Source: Orthophoto & Cadastre - Landgate, 2011

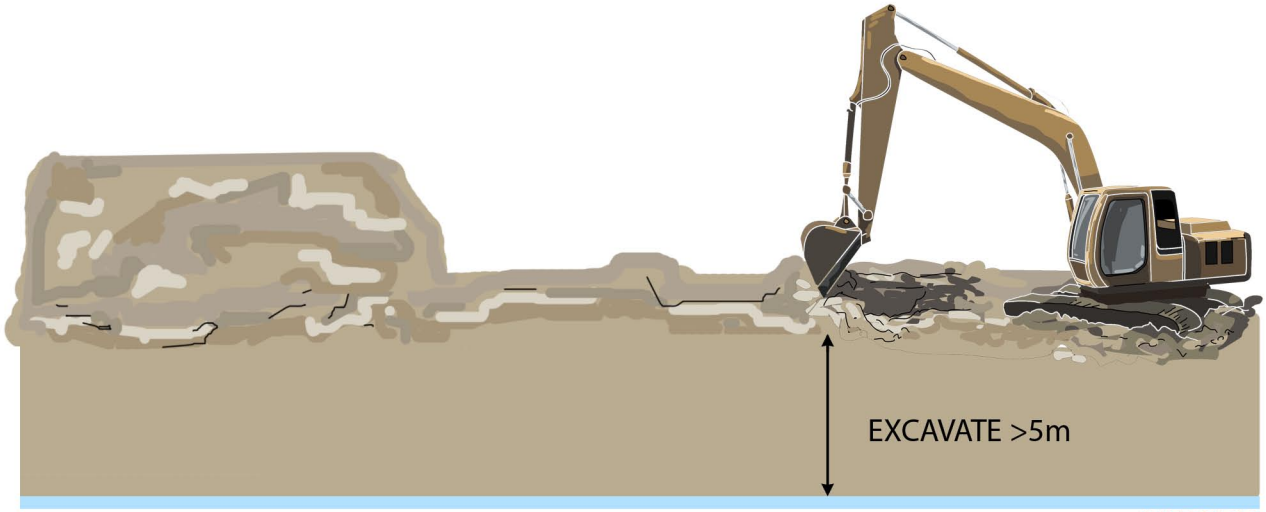
0 0.25 0.5 1 1.5 2 km

Figure 9

Proposed Site Infrastructure and Transport Routes

PINE PLANTATION

HARVEST (Forestry Products Commission)



EXCAVATE (Rocla)

REPLANT PINE PLANTATION (Forestry Products Commission)

RPS

Job Number: L11439
Date: 28.06.12
Scale: Not to Scale @ A4
Revision: 0
Drafted by: SC
Source: RPS

Figure 10

Pine Plantation Cycle

RPS

APPENDIX 1

EPBC Protected Matters Search Results

Australian Government

Department of Sustainability, Environment, Water, Population and Communities

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.environment.gov.au/epbc/assessmentsapprovals/index.html

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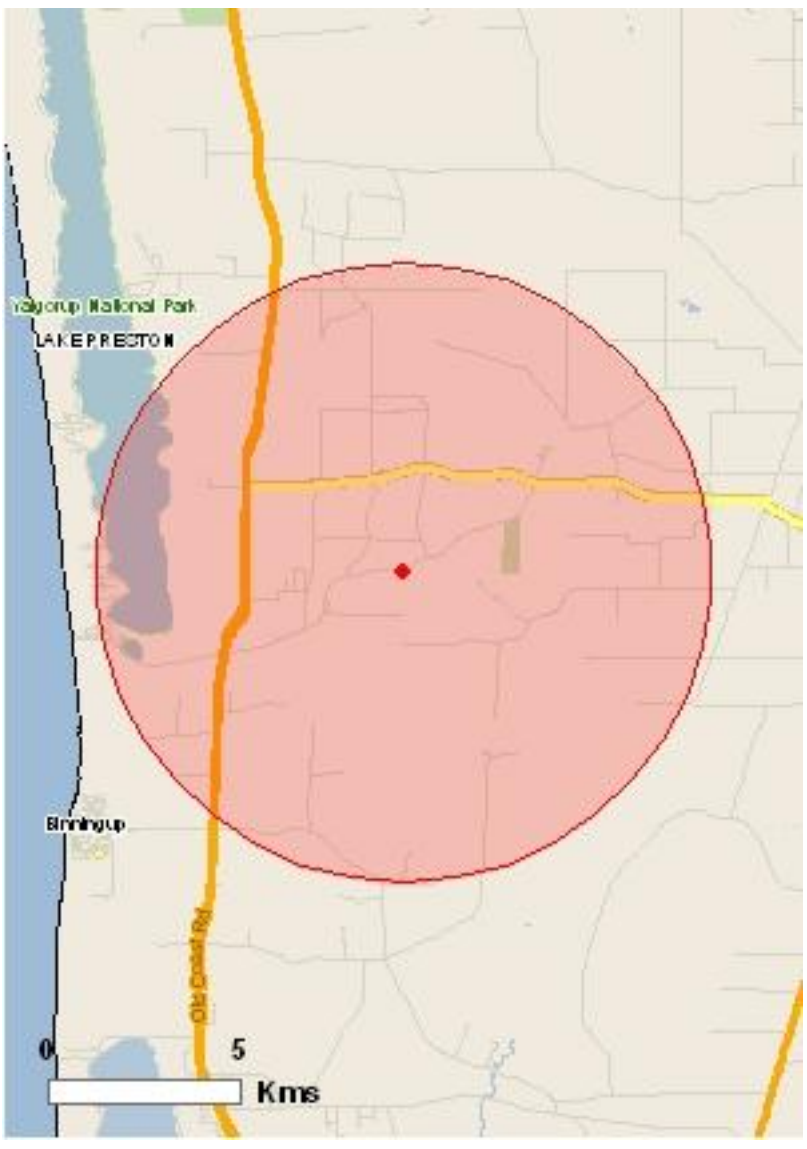
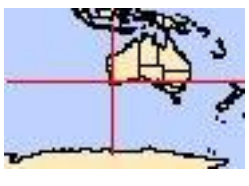


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 8.0Km



Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	None
Threatened Species:	17
Migratory Species:	29

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage/index.html

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	36
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

Place on the RNE:	3
State and Territory Reserves:	5
Regional Forest Agreements:	None
Invasive Species:	14
Nationally Important Wetlands:	1

Details

Matters of National Environmental Significance

Wetlands of International Significance (RAMSAR)	[Resource Information]
Name	Proximity
Peel-yalgorup system	Within Ramsar site

Threatened Species		[Resource Information]
Name	Status	Type of Presence
BIRDS		
Botaurus poiciloptilus		
Australasian Bittern [1001]	Endangered	Species or species

Name	Status	Type of Presence
		habitat known to occur within area
Calyptorhynchus banksii naso		
Forest Red-tailed Black-Cockatoo [67034]	Vulnerable	Species or species habitat may occur within area
Calyptorhynchus baudinii		
Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Species or species habitat likely to occur within area
Calyptorhynchus latirostris		
Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Vulnerable	Species or species habitat may occur within area
Sternula nereis nereis		
Fairy Tern (Australian) [82950]	Vulnerable	Species or species habitat may occur within area
MAMMALS		
Dasyurus geoffroii		
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Pseudocheirus occidentalis		
Western Ringtail Possum [25911]	Vulnerable	Species or species habitat likely to occur within area
Setonix brachyurus		
Quokka [229]	Vulnerable	Species or species habitat may occur within area
PLANTS		
Andersonia gracilis		
Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area
Caladenia procera		
Carbunup King Spider Orchid [68679]	Critically Endangered	Species or species habitat known to occur within area
Centrolepis caespitosa		
[6393]	Endangered	Species or species habitat likely to occur within area
Chamelaucium sp. Gingin (N.G.Marchant s.n. 4/11/1988)		
Gingin Wax [64649]	Endangered	Species or species habitat may occur within area
Darwinia foetida		
Muchea Bell [83190]	Critically Endangered	Species or species habitat likely to occur within area
Drakaea micrantha		
Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
Synaphea stenoloba		
Dwellingup Synaphea [66311]	Endangered	Species or species habitat may occur within area

Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		

Name	Threatened	Type of Presence
Apus pacificus Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Foraging, feeding or related behaviour known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Foraging, feeding or related behaviour known to occur within area
Calidris alba Sanderling [875]		Foraging, feeding or related behaviour known to occur within area
Calidris canutus Red Knot, Knot [855]		Foraging, feeding or related behaviour known to occur within area
Calidris ferruginea Curlew Sandpiper [856]		Foraging, feeding or related behaviour known to occur within area
Calidris ruficollis Red-necked Stint [860]		Foraging, feeding or related behaviour known to occur within area
Calidris tenuirostris Great Knot [862]		Foraging, feeding or related behaviour known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]		Foraging, feeding or related behaviour known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]		Foraging, feeding or related behaviour known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Foraging, feeding or related behaviour known

Name	Threatened	Type of Presence
		to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Foraging, feeding or related behaviour known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Foraging, feeding or related behaviour known to occur within area
Limosa limosa Black-tailed Godwit [845]		Foraging, feeding or related behaviour known to occur within area
Numenius madagascariensis Eastern Curlew [847]		Foraging, feeding or related behaviour known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area
Rostratula benghalensis s. lat. Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area
Tringa glareola Wood Sandpiper [829]		Foraging, feeding or related behaviour known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Foraging, feeding or related behaviour known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Foraging, feeding or related behaviour known to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Calidris acuminata Sharp-tailed Sandpiper [874]		Foraging, feeding or related behaviour known to occur within area
Calidris alba Sanderling [875]		Foraging, feeding or related behaviour known to occur within area
Calidris canutus Red Knot, Knot [855]		Foraging, feeding or related behaviour known to occur within area
Calidris ferruginea Curlew Sandpiper [856]		Foraging, feeding or related behaviour known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Foraging, feeding or related behaviour known to occur within area
Calidris ruficollis Red-necked Stint [860]		Foraging, feeding or related behaviour known to occur within area
Calidris subminuta Long-toed Stint [861]		Foraging, feeding or related behaviour known to occur within area
Calidris tenuirostris Great Knot [862]		Foraging, feeding or related behaviour known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]		Foraging, feeding or related behaviour known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]		Foraging, feeding or related behaviour known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Foraging, feeding or related behaviour known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Foraging, feeding or related behaviour known to occur within area
Himantopus himantopus Black-winged Stilt [870]		Foraging, feeding or related behaviour known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Foraging, feeding or related behaviour known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Limosa limosa Black-tailed Godwit [845]		Foraging, feeding or related behaviour known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew [847]		Foraging, feeding or related behaviour known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area
Numenius phaeopus Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Foraging, feeding or related behaviour known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Foraging, feeding or related behaviour known to occur within area
Rostratula benghalensis s. lat. Painted Snipe [889]	Vulnerable*	Species or species habitat may occur within area
Thinornis rubricollis Hooded Plover [59510]		Foraging, feeding or related behaviour known to occur within area
Tringa glareola Wood Sandpiper [829]		Foraging, feeding or related behaviour known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Foraging, feeding or related behaviour known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Foraging, feeding or related behaviour known to occur within area
Tringa totanus Common Redshank, Redshank [835]		Foraging, feeding or related behaviour known to occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
South West Irrigation Area	WA	Indicative Place
Crampton Nature Reserve	WA	Registered

Name	State	Status
Yalgorup National Park	WA	Registered

State and Territory Reserves [Resource Information]

Name	State
Byrd Swamp	WA
Crampton	WA
Unnamed WA1086	WA
Wellard	WA
Yalgorup	WA

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit,

Name	Status	Type of Presence
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat may occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtiji		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Yalgorup Lakes System	WA

Coordinates

-33.08797 115.76511

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia

-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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RPS

APPENDIX 2

NatureMap Search Results

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 13/03/2012

Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Circle'
Centre	115°45' 54" E,33°05' 17" S
Buffer	8km
Group By	Species Group

Species Group	Species	Records
Amphibian	1	11
Bird	70	245
Dicotyledon	222	575
Fish	1	76
Gymnosperm	2	11
Mammal	8	23
Monocotyledon	155	362
Pteridophyte (Fern)	2	4
Reptile	13	67
Water Mould	1	21
TOTAL	**475**	**1395**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Amphibian					
1.	25410	*Heleioporus eyrei (Moaning Frog)*			
Bird					
2.	24260	*Acanthiza apicalis (Broad-tailed Thornbill)*			
3.	24262	*Acanthiza inornata (Western Thornbill)*			
4.	25544	*Aegotheles cristatus (Australian Owlet-nightjar)*			
5.	24312	*Anas gracilis (Grey Teal)*			
6.	24316	*Anas superciliosa (Pacific Black Duck)*			
7.	24561	*Anthochaera carunculata (Red Wattlebird)*			
8.	24285	*Aquila audax (Wedge-tailed Eagle)*			
9.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
10.	24319	*Biziura lobata (Musk Duck)*			
11.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
12.	24779	*Calidris acuminata (Sharp-tailed Sandpiper)*			
13.	24784	*Calidris ferruginea (Curlew Sandpiper)*			
14.	24788	*Calidris ruficollis (Red-necked Stint)*			
15.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black-Cockatoo)*		T	
16.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo)*		T	
17.	25575	*Charadrius leschenaultii (Greater Sand Plover)*			
18.	24376	*Charadrius rubricollis (Hooded Plover)*		P4	
19.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
20.	24321	*Chenonetta jubata (Australian Wood Duck)*			
21.	24288	*Circus approximans (Swamp Harrier)*			
22.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
23.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
24.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
25.	25592	*Corvus coronoides (Australian Raven)*			
26.	24671	*Coturnix pectoralis (Stubble Quail)*			
27.	25595	*Cracticus tibicen (Australian Magpie)*			
28.	25596	*Cracticus torquatus (Grey Butcherbird)*			
29.	24322	*Cygnus atratus (Black Swan)*			
30.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*			
31.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
32.	24818	*Eudyptula minor subsp. novaehollandiae*			
33.	25622	*Falco cenchroides (Australian Kestrel)*			
34.	25623	*Falco longipennis (Australian Hobby)*			
35.	25727	*Fulica atra (Eurasian Coot)*			
36.	25729	*Gallinula tenebrosa (Dusky Moorhen)*			
37.	25530	*Gerygone fusca (Western Gerygone)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
38.	24735	*Glossopsitta porphyrocephala (Purple-crowned Lorikeet)*			
39.	24443	*Grallina cyanoleuca (Magpie-lark)*			
40.	24295	*Haliastur sphenurus (Whistling Kite)*			
41.	25734	*Himantopus himantopus (Black-winged Stilt)*			
42.	24491	*Hirundo neoxena (Welcome Swallow)*			
43.	24581	*Lichenostomus virescens (Singing Honeyeater)*			
44.	25661	*Lichmera indistincta (Brown Honeyeater)*			
45.	25654	*Malurus splendens (Splendid Fairy-wren)*			
46.	25748	*Ninox novaeseelandiae (Boobook Owl)*			
47.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
48.	25679	*Pachycephala pectoralis (Golden Whistler)*			
49.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
50.	25682	*Pardalotus striatus (Striated Pardalote)*			
51.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
52.	25697	*Phalacrocorax carbo (Great Cormorant)*			
53.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
54.	25699	*Phalacrocorax varius (Pied Cormorant)*			
55.	24409	*Phaps chalcoptera (Common Bronzewing)*			
56.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
57.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
58.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
59.	25722	*Polytelis anthopeplus (Regent Parrot)*			
60.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
61.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
62.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
63.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
64.	30948	*Smicrornis brevirostris (Weebill)*			
65.	25705	*Tachybaptus novaehollandiae (Australasian Grebe)*			
66.	24331	*Tadorna tadornoides (Australian Shelduck)*			
67.	24844	*Threskiornis molucca (Australian White Ibis)*			
68.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
69.	24803	*Tringa brevipes (Grey-tailed Tattler)*			
70.	24808	*Tringa nebularia (Common Greenshank)*			
71.	25765	*Zosterops lateralis (Grey-breasted White-eye)*			
Dicotyledon					
72.	3294	*Acacia dentifera*			
73.	3331	*Acacia extensa (Wiry Wattle)*			
74.	3339	*Acacia flagelliformis*		P4	
75.	3374	*Acacia huegelii*			
76.	3409	*Acacia lasiocarpa (Panjang)*			
77.	3482	*Acacia paradoxa (Kangaroo Thorn)*	Y		
78.	3502	*Acacia pulchella (Prickly Moses)*			
79.	15481	*Acacia pulchella var. glaberrima*			
80.	3504	*Acacia pycnantha (Golden Wattle)*	Y		
81.	30036	*Acacia saligna subsp. stolonifera*			
82.	3537	*Acacia semitrullata*		P4	
83.	3557	*Acacia stenoptera (Narrow Winged Wattle)*			
84.	3602	*Acacia willdenowiana (Grass Wattle)*			
85.	1790	*Adenanthos meisneri*			
86.	1791	*Adenanthos obovatus (Basket Flower)*			
87.	5316	*Agonis flexuosa (Peppermint)*			
88.	2648	*Alternanthera denticulata (Lesser Joyweed)*			
89.	2655	*Amaranthus albus (Tumbleweed)*	Y		
90.	4585	*Amperea ericoides*			
91.	25844	*Andersonia caerulea subsp. caerulea*			
92.	3686	*Aotus cordifolia*			
93.	3688	*Aotus gracillima*			
94.	20283	*Astartea scoparia*			
95.	7851	*Asteridea pulverulenta (Common Bristle Daisy)*			
96.	6323	*Astroloma ciliatum (Candle Cranberry)*			
97.	6334	*Astroloma pallidum (Kick Bush)*			
98.	1800	*Banksia attenuata (Slender Banksia)*			
99.	1819	*Banksia grandis (Bull Banksia)*			
100.	1822	*Banksia ilicifolia (Holly-leaved Banksia)*			
101.	15037	*Bartsia trixago*	Y		
102.	3165	*Billardiera variifolia*			
103.	11612	*Boronia capitata subsp. gracilis*		P3	
104.	4413	*Boronia crenulata (Aniseed Boronia)*			
105.	4417	*Boronia dichotoma*			
106.	16633	*Boronia juncea subsp. juncea*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
				P1	
107.	4438	*Boronia ramosa*			
108.	4441	*Boronia spathulata (Boronia)*			
109.	14397	*Bossiaea aquifolium subsp. laidlawiana*			
110.	3710	*Bossiaea eriocarpa (Common Brown Pea)*			
111.	18497	*Bossiaea sp. Waroona (B.J. Keighery & N. Gibson 229)*			
112.	6341	*Brachyloma preissii (Globe Heath)*			
113.	30142	*Brachyloma preissii subsp. obtusifolium*			
114.	30136	*Brachyloma preissii subsp. preissii*			
115.	4717	*Callitriche stagnalis (Common Starwort)*	Y		
116.	5415	*Calothamnus lateralis*			
117.	5439	*Calytrix angulata (Yellow Starflower)*			
118.	5458	*Calytrix flavescens (Summer Starflower)*			
119.	5460	*Calytrix fraseri (Pink Summer Calytrix)*			
120.	2957	*Cassytha racemosa (Dodder Laurel)*			
121.	2889	*Cerastium glomeratum (Mouse Ear Chickweed)*	Y		
122.	3754	*Chorizema diversifolium*			
123.	2929	*Clematis pubescens (Common Clematis)*			
124.	4552	*Comesperma confertum*			
125.	4564	*Comesperma virgatum (Milkwort)*			
126.	16853	*Conospermum capitatum subsp. glabratum*			
127.	6348	*Conostephium pendulum (Pearl Flower)*			
128.	6349	*Conostephium preissii*			
129.	7945	*Cotula coronopifolia (Waterbuttons)*	Y		
130.	17926	*Craspedia arenicola*			
131.	3137	*Crassula colorata (Dense Stonecrop)*			
132.	7454	*Dampiera linearis (Common Dampiera)*			
133.	7484	*Dampiera trigona (Angled-stem Dampiera)*			
134.	5508	*Darwinia citriodora (Lemon-scented Darwinia)*			
135.	6218	*Daucus glochidiatus (Australian Carrot)*			
136.	3807	*Daviesia divaricata (Marno)*			
137.	3834	*Daviesia polyphylla*			
138.	3863	*Dillwynia dillwynioides*		P3	
139.	18541	*Diplopeltis huegelii subsp. huegelii*			
140.	7961	*Dittrichia graveolens (Stinkwort)*	Y		
141.	3095	*Drosera erythrorhiza (Red Ink Sundew)*			
142.	3097	*Drosera gigantea (Giant Sundew)*			
143.	3098	*Drosera glanduligera (Pimpernel Sundew)*			
144.	3106	*Drosera macrantha (Bridal Rainbow)*			
145.	14298	*Drosera macrantha subsp. macrantha*			
146.	13216	*Drosera menziesii subsp. penicillaris*			
147.	3118	*Drosera pallida (Pale Rainbow)*			
148.	29178	*Drosera porrecta*			
149.	8911	*Drosera rosulata*			
150.	3131	*Drosera stolonifera (Leafy Sundew)*			
151.	6219	*Eryngium pinnatifidum (Blue Devils)*			
152.	5659	*Eucalyptus gomphocephala (Tuart)*			
153.	5708	*Eucalyptus marginata (Jarrah)*			
154.	13547	*Eucalyptus marginata subsp. marginata (Jarrah)*			
155.	5763	*Eucalyptus rudis (Flooded Gum)*			
156.	3872	*Euchilopsis linearis (Swamp Pea)*			
157.	3880	*Eutaxia virgata*			
158.	3936	*Genista linifolia (Flaxleaf Broom)*	Y		
159.	4339	*Geranium molle (Dove's Foot Cranesbill)*	Y		
160.	4340	*Geranium retrorsum*			
161.	4341	*Geranium solanderi (Native Geranium)*			
162.	3948	*Gompholobium capitatum*			
163.	3957	*Gompholobium tomentosum (Hairy Yellow Pea)*			
164.	2179	*Hakea marginata*			
165.	2212	*Hakea sulcata (Furrowed Hakea)*			
166.	2214	*Hakea trifurcata (Two-leaf Hakea)*			
167.	2216	*Hakea varia (Variable-leaved Hakea)*			
168.	3961	*Hardenbergia comptoniana (Native Wisteria)*			
169.	3016	*Heliophila pusilla*	Y		
170.	6710	*Heliotropium europaeum (Common Heliotrope)*	Y		
171.	6839	*Hemiandra pungens (Snakebush)*			
172.	6859	*Hemigenia microphylla*		P3	
173.	5135	*Hibbertia hypericoides (Yellow Buttercups)*			
174.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			
175.	5172	*Hibbertia stellaris (Orange Stars)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
176.	5173	*Hibbertia subvaginata*			
177.	5176	*Hibbertia vaginata*			
178.	6222	*Homalosciadium homalocarpum*			
179.	3968	*Hovea trisperma (Common Hovea)*			
180.	12741	*Hyalosperma cotula*			
181.	5216	*Hybanthus calycinus (Wild Violet)*			
182.	6226	*Hydrocotyle callicarpa (Small Pennywort)*			
183.	6229	*Hydrocotyle diantha*			
184.	5817	*Hypocalymma angustifolium (White Myrtle)*			
185.	35070	*Hypocalymma angustifolium subsp. Swan Coastal Plain (G.J. Keighery 16777)*			
186.	5825	*Hypocalymma robustum (Swan River Myrtle)*			
187.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
188.	3992	*Isotropis cuneifolia (Granny Bonnets)*			
189.	8092	*Ixiolaena viscosa (Sticky Ixiolaena)*			
190.	4012	*Jacksonia furcellata (Grey Stinkwood)*			
191.	4017	*Jacksonia horrida*			
192.	4029	*Jacksonia sternbergiana (Stinkwood)*			
193.	4044	*Kennedia prostrata (Scarlet Runner)*			
194.	5832	*Kunzea ericifolia (Spearwood)*			
195.	15498	*Kunzea glabrescens (Spearwood)*			
196.	5835	*Kunzea micrantha*			
197.	29046	*Lactuca serriola forma serriola*	Y		
198.	18585	*Lagenophora huegelii*			
199.	5038	*Lasiopetalum membranaceum*		P3	
200.	4052	*Latrobea tenella*			
201.	2342	*Leptomeria cunninghamii*			
202.	2350	*Leptomeria pauciflora (Sparse-flowered Currant Bush)*			
203.	6360	*Leucopogon australis (Spiked Beard-heath)*			
204.	6374	*Leucopogon conostephioides*			
205.	6436	*Leucopogon propinquus*			
206.	6440	*Leucopogon racemulosus*			
207.	19579	*Leucopogon sp. Murdoch (M. Hislop 1037)*			
208.	6444	*Leucopogon sprengelioides*			
209.	6445	*Leucopogon squarrosus*			
210.	6454	*Leucopogon verticillatus (Tassel Flower)*			
211.	34736	*Lysinema pentapetalum*			
212.	5281	*Lythrum hyssopifolia (Lesser Loosestrife)*	Y		
213.	2839	*Macarthuria australis*			
214.	33638	*Meionectes tenuifolia*		P3	
215.	5926	*Melaleuca lateritia (Robin Redbreast Bush)*			
216.	20297	*Melaleuca osullivanii*			
217.	5946	*Melaleuca pauciflora*			
218.	5952	*Melaleuca preissiana (Moonah)*			
219.	5978	*Melaleuca teretifolia (Banbar)*			
220.	5980	*Melaleuca thymoides*			
221.	5987	*Melaleuca viminea (Mohan)*			
222.	8106	*Millotia tenuifolia (Soft Millotia)*			
223.	4666	*Monotaxis occidentalis*			
224.	6193	*Myriophyllum echinatum*		P3	
225.	6201	*Myriophyllum verrucosum (Red Water Milfoil)*			
226.	2401	*Nuytsia floribunda (Christmas Tree)*			
227.	8133	*Olearia elaeophila*			
228.	8143	*Olearia paucidentata (Autumn Scrub Daisy)*			
229.	7348	*Opercularia hispidula (Hispid Stinkweed)*			
230.	4113	*Ornithopus compressus (Yellow Serradella)*	Y		
231.	7122	*Orobanche minor (Lesser Broomrape)*	Y		
232.	4349	*Oxalis corniculata (Yellow Wood Sorrel)*	Y		
233.	30375	*Oxalis exilis*			
234.	4352	*Oxalis glabra*	Y		
235.	4355	*Oxalis perennans*			
236.	7090	*Parentucellia viscosa (Sticky Bartsia)*	Y		
237.	4343	*Pelargonium capitatum (Rose Pelargonium)*	Y		
238.	6006	*Pericalymma ellipticum (Swamp Teatree)*			
239.	16477	*Pericalymma ellipticum var. ellipticum*			
240.	13911	*Persicaria decipiens*			
241.	2273	*Persoonia saccata (Snottygobble)*			
242.	2299	*Petrophile linearis (Pixie Mops)*			
243.	18529	*Philotheca spicata (Pepper and Salt)*			
244.	4675	*Phyllanthus calycinus (False Boronia)*			
245.	5261	*Pimelea rosea (Rose Banjine)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
246.	18117	*Pimelea rosea subsp. rosea*			
247.	6249	*Platysace compressa (Tapeworm Plant)*			
248.	4524	*Platytheca galioides*			
249.	8175	*Podolepis gracilis (Slender Podolepis)*			
250.	8182	*Podotheca angustifolia (Sticky Longheads)*			
251.	4691	*Poranthera microphylla (Small Poranthera)*			
252.	4181	*Pultenaea reticulata*			
253.	8195	*Quinetia urvillei*			
254.	18547	*Rhadinothamnus anceps*			
255.	13312	*Rhodanthe pyrethrum*			
256.	2906	*Sagina apetala (Annual Pearlwort)*	Y		
257.	20063	*Salix babylonica*	Y		
258.	7602	*Scaevola calliptera*			
259.	7614	*Scaevola globulifera*			
260.	2909	*Silene gallica (French Catchfly)*	Y		
261.	8225	*Siloxerus humifusus (Procumbent Siloxerus)*			
262.	6988	*Solanum americanum (Glossy Nightshade)*	Y		
263.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
264.	20348	*Sphaerolobium calcicola*		P3	
265.	4211	*Sphaerolobium vimineum (Leafless Globe Pea)*			
266.	4733	*Stackhousia monogyna*			
267.	7678	*Stylidium adnatum (Common Beaked Triggerplant)*			
268.	7693	*Stylidium brunonianum (Pink Fountain Triggerplant)*			
269.	7696	*Stylidium calcaratum (Book Triggerplant)*			
270.	7734	*Stylidium guttatum (Dotted Triggerplant)*			
271.	7742	*Stylidium inundatum (Hundreds and Thousands)*			
272.	7745	*Stylidium junceum (Reed Triggerplant)*			
273.	7772	*Stylidium perpusillum (Tiny Triggerplant)*			
274.	7774	*Stylidium piliferum (Common Butterfly Triggerplant)*			
275.	7785	*Stylidium repens (Matted Triggerplant)*			
276.	7798	*Stylidium schoenoides (Cow Kicks)*			
277.	7806	*Stylidium utricularioides (Pink Fan Triggerplant)*			
278.	4535	*Tetratheca hirsuta (Black Eyed Susan)*			
279.	5105	*Thomasia triphylla*			
280.	6280	*Trachymene pilosa (Native Parsnip)*			
281.	8251	*Trichocline spathulata (Native Gerbera)*			
282.	4292	*Trifolium campestre (Hop Clover)*	Y		
283.	4298	*Trifolium hirtum (Rose Clover)*	Y		
284.	1141	*Trithuria submersa*			
285.	33438	*Trymalium odoratissimum subsp. trifidum*			
286.	8255	*Ursinia anthemoides (Ursinia)*	Y		
287.	7157	*Utricularia violacea (Violet Bladderwort)*			
288.	6101	*Verticordia nitens (Morrison Featherflower)*			
289.	4325	*Viminaria juncea (Swishbush)*			
290.	7389	*Wahlenbergia preissii*			
291.	8282	*Waitzia suaveolens (Fragrant Waitzia)*			
292.	6289	*Xanthosia huegelii*			
293.	2331	*Xylomelum occidentale (Woody Pear)*			
Fish					
294.	34027	*Galaxiella nigrostriata (Black-stripe Minnow)*		P3	
Gymnosperm					
295.	85	*Macrozamia riedlei (Zamia)*			
296.	87	*Pinus pinaster (Pinaster Pine)*	Y		
Mammal					
297.	24092	*Dasyurus geoffroii (Chuditch)*		T	
298.	24189	*Falsistrellus mackenziei (Western False Pipistrelle)*		P4	
299.	24153	*Isoodon obesulus subsp. fusciventer (Quenda)*		P5	
300.	24071	*Kogia sima (Dwarf Sperm Whale)*			Y
301.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
302.	24133	*Macropus irma (Western Brush Wallaby)*		P4	
303.	24099	*Phascogale tapoatafa subsp. tapoatafa (Southern Brush-tailed Phascogale)*			
304.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum)*		T	
Monocotyledon					
305.	184	*Aira caryophyllea (Silvery Hairgrass)*	Y		
306.	187	*Aira praecox (Early Hairgrass)*	Y		
307.	154	*Alisma lanceolatum (Water Plantain)*	Y		
308.	200	*Amphipogon turbinatus*			
309.	1063	*Anarthria scabra*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
310.	1411	*Anigozanthos manglesii (Mangles Kangaroo Paw)*			
311.	1117	*Aphelia cyperoides*			
312.	38480	*Austrostipa bronwenae*		P1	
313.	17240	*Austrostipa flavescens*			
314.	234	*Avena fatua (Wild Oat)*	Y		
315.	743	*Baumea juncea (Bare Twigrush)*			
316.	748	*Baumea vaginalis (Sheath Twigrush)*			
317.	244	*Briza maxima (Blowfly Grass)*	Y		
318.	245	*Briza minor (Shivery Grass)*	Y		
319.	12770	*Burchardia congesta*			
320.	1385	*Burchardia multiflora (Dwarf Burchardia)*			
321.	1276	*Caesia micrantha (Pale Grass-lily)*			
322.	1277	*Caesia occidentalis*			
323.	1586	*Caladenia discoidea (Dancing Orchid)*			
324.	1592	*Caladenia flava (Cowslip Orchid)*			
325.	15348	*Caladenia flava subsp. flava*			
326.	1599	*Caladenia latifolia (Pink Fairy Orchid)*			
327.	17760	*Caladenia nobilis*			
328.	18038	*Caladenia procera*		T	
329.	13862	*Caladenia speciosa*		P4	
330.	1213	*Calectasia cyanea (Blue Tinsel Lily)*		T	
331.	1162	*Cartonema philydroides*			
332.	1120	*Centrolepis alepyroides*			
333.	1121	*Centrolepis aristata (Pointed Centrolepis)*			
334.	1125	*Centrolepis drummondiana*			
335.	1132	*Centrolepis mutica*			
336.	1280	*Chamaescilla corymbosa (Blue Squill)*			
337.	763	*Chorizandra enodis (Black Bristlerush)*			
338.	1418	*Conostylis aculeata (Prickly Conostylis)*			
339.	12109	*Conostylis aculeata subsp. preissii*			
340.	1436	*Conostylis juncea*			
341.	1438	*Conostylis laxiflora*			
342.	12945	*Corybas recurvus*			
343.	1285	*Corynotheca micrantha (Sand Lily)*			
344.	768	*Cyathochaeta avenacea*			
345.	16245	*Cyathochaeta teretifolia*		P3	
346.	815	*Cyperus tenellus (Tiny Flatsedge)*	Y		
347.	10916	*Cyrtostylis huegelii*			
348.	1218	*Dasypogon bromeliifolius (Pineapple Bush)*			
349.	299	*Deyeuxia quadriseta (Reed Bentgrass)*			
350.	1259	*Dianella revoluta (Blueberry Lily)*			
351.	11313	*Dianella revoluta var. revoluta*			
352.	1287	*Dichopogon capillipes*			
353.	12944	*Diuris amplissima*			
354.	10796	*Diuris drummondii (Tall Donkey Orchid)*		T	
355.	1634	*Diuris laxiflora (Bee Orchid)*			
356.	1635	*Diuris longifolia (Common Donkey Orchid)*			
357.	12939	*Diuris magnifica*			
358.	1639	*Drakaea elastica (Glossy-leaved Hammer Orchid)*		T	
359.	1640	*Drakaea glyptodon (King-in-his-carriage)*			
360.	13635	*Drakaea micrantha*		T	
361.	11105	*Echinochloa crus-galli (Barnyard Grass)*	Y		
362.	332	*Echinochloa frumentacea (Siberian Millet)*	Y		
363.	338	*Echinochloa telmatophila (Swamp Barnyard Grass)*	Y		
364.	349	*Ehrharta longiflora (Annual Veldt Grass)*	Y		
365.	822	*Eleocharis acuta (Common Spikerush)*			
366.	1643	*Elythranthera brunonis (Purple Enamel Orchid)*			
367.	1644	*Elythranthera emarginata (Pink Enamel Orchid)*			
368.	1646	*Eriochilus dilatatus (White Bunny Orchid)*			
369.	835	*Evandra pauciflora*			
370.	894	*Fimbristylis velata*			
371.	18392	*Freesia alba x leichtlinii*	Y		
372.	907	*Gahnia trifida (Coast Saw-sedge)*			
373.	1518	*Gladiolus angustus (Long Tubed Painted Lady)*	Y		
374.	17043	*Glyceria declinata*	Y		
375.	444	*Holcus lanatus (Yorkshire Fog)*	Y		
376.	445	*Holcus setiger (Annual Fog)*	Y		
377.	1070	*Hypolaena exsulca*			
378.	1503	*Hypoxis occidentalis*			
379.	20198	*Isolepis fluitans var. fluitans*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
380.	917	*Isolepis marginata (Coarse Club-rush)*	Y		
381.	1295	*Johnsonia acaulis*			
382.	1177	*Juncus articulatus (Jointed Rush)*	Y		
383.	1178	*Juncus bufonius (Toad Rush)*	Y		
384.	1180	*Juncus capitatus (Capitate Rush)*	Y		
385.	1188	*Juncus pallidus (Pale Rush)*			
386.	20019	*Lachnagrostis filiformis*			
387.	19955	*Lachnagrostis plebeia*			
388.	1309	*Laxmannia squarrosa*			
389.	925	*Lepidosperma angustatum*			
390.	937	*Lepidosperma longitudinale (Pithy Sword-sedge)*			
391.	945	*Lepidosperma squamatum*			
392.	1653	*Leporella fimbriata (Hare Orchid)*			
393.	1085	*Lepyrodia glauca*			
394.	1090	*Lepyrodia muirii*			
395.	1223	*Lomandra caespitosa (Tufted Mat Rush)*			
396.	1228	*Lomandra hermaphrodita*			
397.	1232	*Lomandra micrantha (Small-flower Mat-rush)*			
398.	1234	*Lomandra nigricans*			
399.	1236	*Lomandra odora (Tiered Matrush)*			
400.	1243	*Lomandra sericea (Silky Mat Rush)*			
401.	1246	*Lomandra suaveolens*			
402.	1198	*Luzula meridionalis (Field Woodrush)*			
403.	1097	*Lyginia barbata*			
404.	18049	*Lyginia imberbis*			
405.	17679	*Meeboldina coangustata*			
406.	17747	*Meeboldina decipiens*			
407.	17677	*Meeboldina roycei*			
408.	17694	*Meeboldina scariosa*			
409.	953	*Mesomelaena graciliceps*			
410.	485	*Microlaena stipoides (Weeping Grass)*			
411.	1658	*Microtis atrata (Swamp Mignonette Orchid)*			
412.	10954	*Microtis media (Tall Mignonette Orchid)*			
413.	15419	*Microtis media subsp. media*			
414.	533	*Paspalum vaginatum (Salt Water Couch)*	Y		
415.	1550	*Patersonia occidentalis (Purple Flag)*			
416.	30472	*Patersonia occidentalis var. occidentalis*			
417.	536	*Pennisetum clandestinum (Kikuyu Grass)*	Y		
418.	1173	*Philydrella pygmaea (Butterfly Flowers)*			
419.	1478	*Phlebocarya ciliata*			
420.	571	*Poa annua (Winter Grass)*	Y		
421.	1669	*Prasophyllum cyphochilum (Pouched Leek Orchid)*			
422.	1671	*Prasophyllum elatum (Tall Leek Orchid)*			
423.	1672	*Prasophyllum fimbria (Fringed Leek Orchid)*			
424.	1677	*Prasophyllum macrostachyum (Laughing Leek Orchid)*			
425.	11118	*Pterostylis pyramidalis (Snail Orchid)*			
426.	1693	*Pterostylis recurva (Jug Orchid)*			
427.	12217	*Pterostylis sanguinea*			
428.	1698	*Pterostylis vittata (Banded Greenhood)*			
429.	16367	*Pyrorchis nigricans (Red beaks)*			
430.	973	*Schoenus asperocarpus (Poison Sedge)*			
431.	984	*Schoenus curvifolius*			
432.	985	*Schoenus discifer*			
433.	986	*Schoenus efoliatus*			
434.	992	*Schoenus grandiflorus (Large Flowered Bogrush)*			
435.	1006	*Schoenus odontocarpus*			
436.	17614	*Schoenus plumosus*			
437.	17731	*Schoenus sp. Waroona (G.J. Keighery 12235)*		P3	
438.	1020	*Schoenus sublateralis*			
439.	1023	*Schoenus tenellus*			
440.	1312	*Sowerbaea laxiflora (Purple Tassels)*			
441.	1036	*Tetraria octandra*			
442.	10856	*Thelymitra benthamiana (Cinnamon Sun Orchid)*			
443.	1707	*Thelymitra flexuosa (Twisted Sun Orchid)*			
444.	11143	*Thelymitra graminea*			
445.	1710	*Thelymitra mucida (Plum Orchid)*			
446.	1319	*Thysanotus arenarius*			
447.	1339	*Thysanotus multiflorus (Many-flowered Fringe Lily)*			
448.	1343	*Thysanotus patersonii*			
449.	1351	*Thysanotus sparteus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
450.	1354	*Thysanotus tenellus*			
451.	1481	*Tribonanthes australis*			
452.	1485	*Tribonanthes violacea*			
453.	1361	*Tricoryne elatior (Yellow Autumn Lily)*			
454.	15820	*Triglochin linearis*			
455.	33537	*Vallisneria australis*	Y		
456.	722	*Vulpia bromoides (Squirrel Tail Fescue)*	Y		
457.	724	*Vulpia myuros (Rat's Tail Fescue)*	Y		
458.	1251	*Xanthorrhoea brunonis*			
459.	1256	*Xanthorrhoea preissii (Grass tree)*			
Pteridophyte (Fern)					
460.	4	*Phylloglossum drummondii (Pigmy Clubmoss)*			
461.	57	*Pteridium esculentum (Bracken)*			
Reptile					
462.	25011	*Acritoscincus trilineatum*			
463.	24980	*Christinus marmoratus (Marbled Gecko)*			
464.	30893	*Cryptoblepharus buchananii*			
465.	25119	*Hemiergis quadrilineata*			
466.	25133	*Lerista elegans*			
467.	25147	*Lerista lineata*		P3	
468.	25005	*Lialis burtonis*			
469.	25191	*Morethia lineoocellata*			
470.	25248	*Neelaps bimaculatus (Black-naped Snake)*			
471.	25253	*Parasuta gouldii*			
472.	25370	*Pelamis platura (Yellow-bellied Sea-snake)*			
473.	25511	*Pseudonaja affinis (Dugite)*			
474.	25207	*Tiliqua rugosa subsp. rugosa*			
Water Mould					
475.		*Phytophthora cinnamomi*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

RPS

APPENDIX 3

Aboriginal Heritage Search Results

Search Criteria

7 sites in a search box. The box is formed by these diagonally opposed corner points:

MGA Zone 50	
Northing	Easting
6334996	380252
6341195	389414

Disclaimer

Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist. Consultation with Aboriginal communities is on-going to identify additional sites. The AHA protects all Aboriginal sites in Western Australia whether or not they are registered.

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Legend

Restriction

N	No restriction
M	Male access only
F	Female access

Access

C	Closed
O	Open
V	Vulnerable

Coordinate Accuracy

Accuracy is shown as a code in brackets following the site coordinates.

[Reliable]	The spatial information recorded in the site file is deemed to be reliable, due to methods of capture.
[Unreliable]	The spatial information recorded in the site file is deemed to be unreliable due to errors of spatial data capture and/or quality of spatial information reported.

Status

L - Lodged		ACMC Decision Made
Information lodged, awaiting assessment	→	R - Registered Site I - Insufficient information S - Stored Data

Spatial Accuracy

Index coordinates are indicative locations and may not necessarily represent the centre of sites, especially for sites with an access code “closed” or “vulnerable”. Map coordinates (Lat/Long) and (Easting/Northing) are based on the GDA 94 datum. The Easting / Northing map grid can be across one or more zones. The zone is indicated for each Easting on the map, i.e. '5000000:Z50' means Easting=5000000, Zone=50.

Sites Shown on Maps

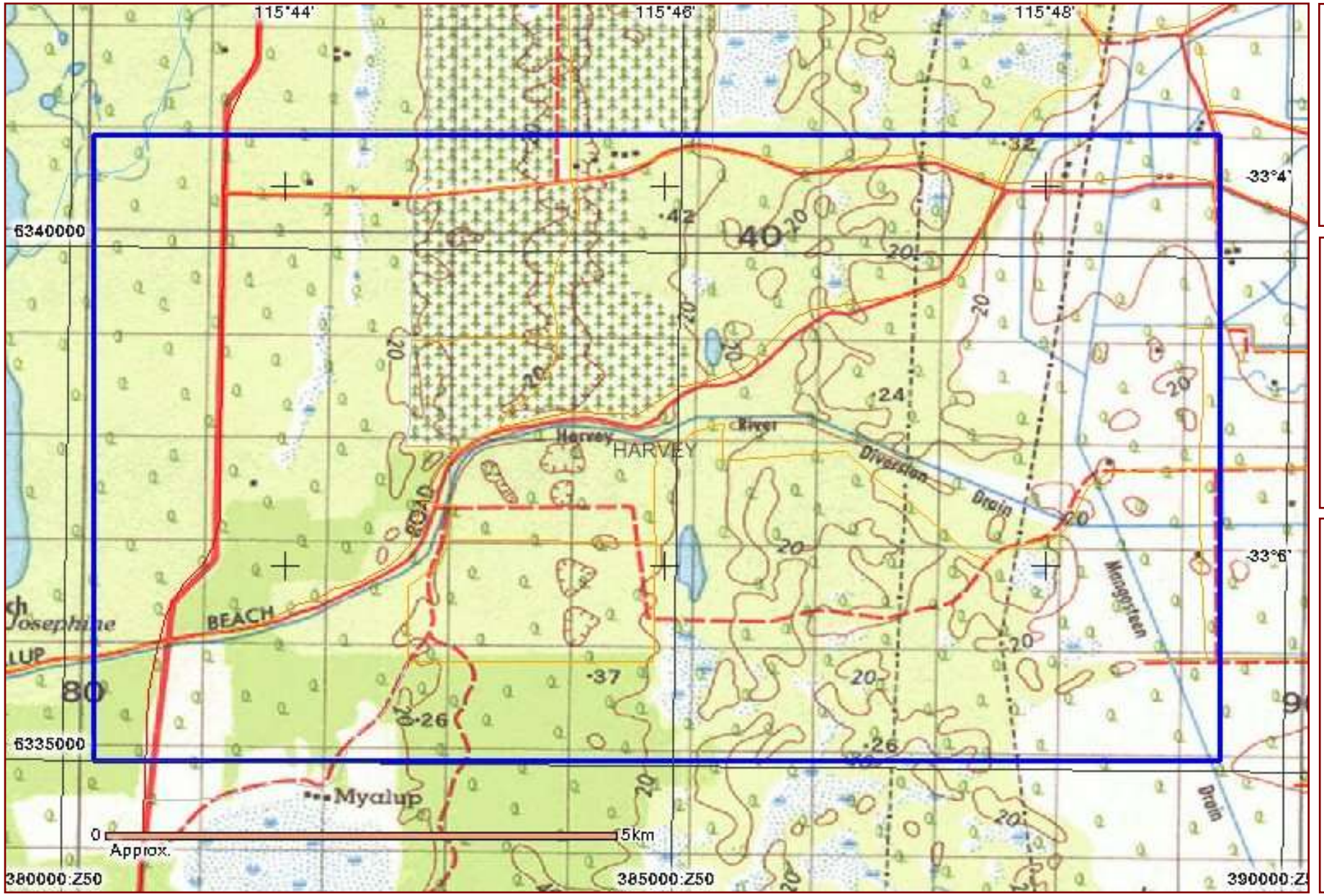
Site boundaries may not appear on maps at low zoom levels

List of Registered Aboriginal Sites with Map

No results

Aboriginal Heritage Inquiry System

Aboriginal Sites Database



Legend

Selected Heritage Sites

Registered Sites

Town

Map Area

Search Area

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List of 7 Other Heritage Places with Map

Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
5798	S	O	N	Harvey 46.	Artefacts / Scatter	Camp, [Other: ?]		381974mE 6340452mN Zone 50 [Unreliable]	S00345
5799	S	O	N	Harvey 47.	Artefacts / Scatter	Camp, [Other: ?]		382888mE 6340461mN Zone 50 [Unreliable]	S00346
5800	S	O	N	Harvey 48.	Artefacts / Scatter	Camp, [Other: ?]		387639mE 6340648mN Zone 50 [Unreliable]	S00347
5801	S	O	N	Harvey 49/myalup Beach Rd.	Artefacts / Scatter	Camp, [Other: ?]		381639mE 6336648mN Zone 50 [Unreliable]	S00348
5802	S	O	N	Harvey 50/myalup Beach Rd.	Artefacts / Scatter	Camp, [Other: ?]		387639mE 6338648mN Zone 50 [Unreliable]	S00349
5811	S	O	N	Harvey 60.	Artefacts / Scatter	Camp, [Other: ?]		380777mE 6336050mN Zone 50 [Reliable]	S00359
5843	S	O	N	Harvey.	Artefacts / Scatter	Camp, [Other: ?]		386639mE 6340648mN Zone 50 [Unreliable]	S00235

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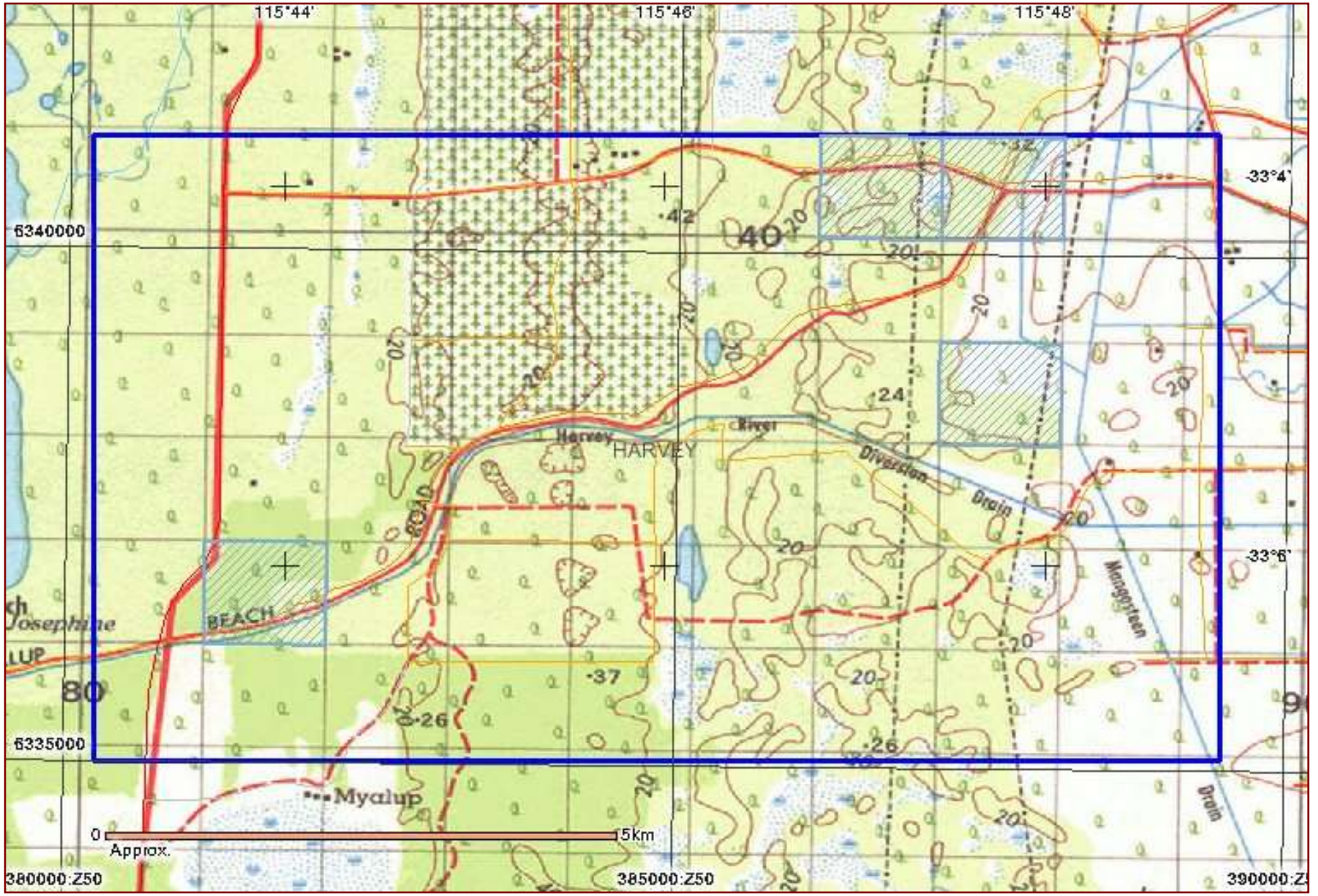

Legend

Selected Heritage Sites

Other Heritage Places

Town

Map Area

Search Area

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Map Showing Registered Aboriginal Sites and Other Heritage Places

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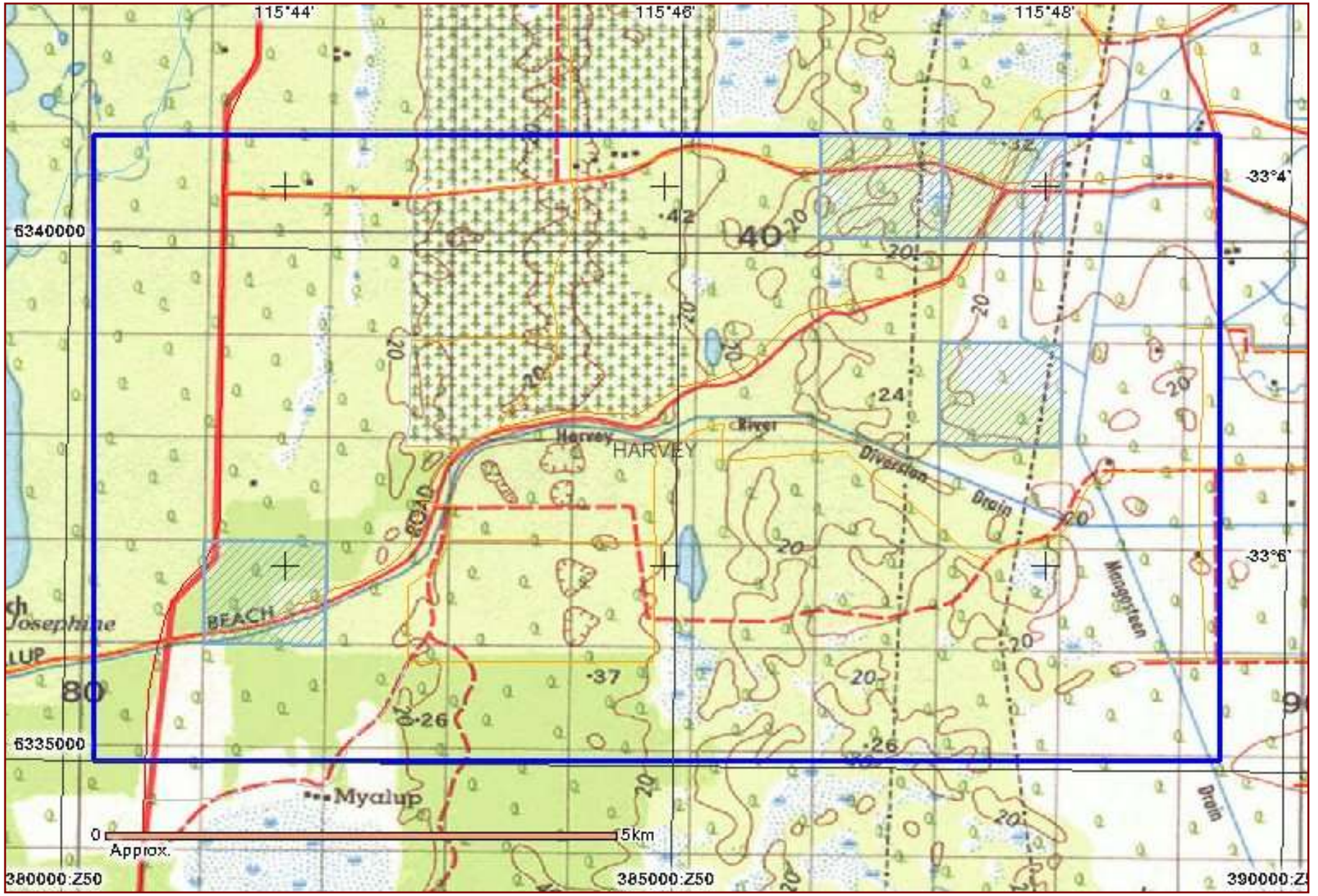

Legend

Selected Heritage Sites

- Registered Sites
- Other Heritage Places
- Town
- Map Area
- Search Area

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APPENDIX 4

Department of Water Letter

Government of **Western Australia**
Department of **Water**

looking after all our water needs

Your ref:
Our ref: RF7945
Enquiries: Richard Watson
9726 4165

Mr Vern Newton
Resource & Development Manager
Rocla Quarry Products
PO Box 469
CLOVERDALE WA 6985

RECEIVED 30 JAN 2012

Dear Vern

Re : Groundwater Licensing - Exploration Licence E70/3294, Myalup

Thank you for your letter received on 30 November 2011 outlining the progress of sand exploration activities on E70/3294 and requesting advice on groundwater licensing.

It is understood from your letter that final approvals may take approximately two years, and at this early stage the Department is reluctant to issue a *Licence To Construct* a bore until a clearer idea of the time-lines involved are available, for example any approvals or requirements of the EPA or other regulatory authorities.

Consequently, it is recommended that applications for a section 26D *Licence to Construct* a bore and section 5C *Licence to Take Water*, be delayed until further details of required approvals are available.

Please note that there is currently more than sufficient Superficial aquifer groundwater available in both the Harvey and Wellesley Subareas to satisfy your anticipated requirement of 500,000kL/y. However, it is recommended that the Department be kept up to date on the approvals progress so that Rocla can be notified if there is any significant change in the availability of water from these resources.

If you would like to discuss any of these points further, please contact Richard Watson at the Bunbury office on 9726 4165.

Yours sincerely

Mike McKenna
District Manager
Leschenault-Collie District
South West Region

25 January 2012

South West Region
35-39 McCombe Road Bunbury Western Australia 6230
PO Box 261 Bunbury Western Australia 6231
Telephone (08) 9726 4111 Facsimile (08) 9726 4100
www.water.wa.gov.au
wa.gov.au

XDWAL007

RPS

APPENDIX 5

Rocla Equipment Checklist

MACHINERY AND VEHICLE INSPECTION CHECK SHEET

Rocla Quarry Products (Rocla) recognise its vital role to minimize and manage the risk of introducing or spreading Phytophthora (Dieback or Weeds) in the planning and operation of basic raw materials (BRM) extraction areas. This document provides manageable actions in regards to the Dieback Protocol for Sites.

It is important that earthmoving machinery is in a acceptable condition before it enters any site, all machinery will be a cleaned down prior to coming to site and signed off by the supplier. This form will be returned to the Site Supervisor prior to the machine arriving.

***The equipment will be clean of the following ; Soil, Vegetation, Seeds and Hydrocarbons**

The Supplier will answer the following.

Inspection Date _____

Person doing the Inspection _____

Last Area where equipment was operating _____

Type of Equipment _____

Hours of the Equipment _____

Method used to clean down the equipment. _____
(I.e Brush Down / Blow Down / Wash Down)

Please Tick the appropriate box for the inspections;

	Yes	No
Was the machine cleaned before it left the last site.	☐	☐
Are the bucket, blade, tracks, scoop and frame clear of the above.(Note*)	☐	☐
Are the tyres clear of the above.(Note*)	☐	☐
Has the equipment a rotating beacon and reverse alarm .	☐	☐
Is the equipment free of fuel and oil leaks.	☐	☐
Has the equipment a UHF Radio installed.	☐	☐

Signature of the Supplier _____

It is important that earthmoving machinery is in a acceptable condition before it enters any site, all machinery will be a check by the Site Supervisor and signed off before the machine leaves the designated park up area for machines.
This includes transferring of equipment between sites, the machine will be cleaned down as of above prior to leaving.

Signature of the Supervisor _____

Comments

_____
_____
_____
_____
_____
_____