



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 6492/1
Permit type: Area Permit

1.2. Proponent details

Proponent's name: **Hanson Construction Materials Pty Ltd**

1.3. Property details

Property: Mining Lease 70/915
Local Government Area: City of Kwinana

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
16.25		Mechanical Removal	Site Remediation and Sand Extraction

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 27 October 2016

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Beard vegetation associations have been mapped for the whole of Western Australia. One Beard vegetation association is located within the application area (GIS Database):

Beard association 1001 - Medium very sparse woodland; jarrah, with low woodland; banksia & casuarina.

A Level 2 flora and vegetation assessment was conducted by RPS consultants and Coffey Environments completed the flora identification and reported the results (Coffey Environments, 2008). Four vegetation types were identified as occurring within the application area:

1) Low Woodland of *Allocasuarina fraseriana*, *Banksia attenuata* and *Banksia menziesii* to 9m over Tall Open Shrubland of *Adenanthos cygnorum* subsp. *cygnorum* to 5m over Low Shrubland of *Bossiaea eriocarpa*, *Corynotheca micrantha* var. *micrantha*, *Gompholobium tomentosum*, *Hibbertia hypericoides* and *Leucopogon conostephioides* to 0.4m over Very Open Grassland of **Briza maxima*, **Ehrharta calycina*, and *Neurachne alopecuroidea* to 0.8m over Open Hermland of *Gyrostemon ramulosus*, *Hybanthus calycinus* and *Sowerbaea laxiflora* to 0.4m.

2) Low Woodland to Low Open Woodland of *Banksia attenuata* and *Banksia menziesii* to 2m with scattered *Allocasuarina fraseriana* and *Nuytsia floribunda* over an Open Shrubland to Tall Open Shrubland of *Adenanthos cygnorum* subsp. *cygnorum*, *Jacksonia furcellata* and *Kunzea glabrescens* to 3m over Open Heath to Low Open Shrubland of *Bossiaea eriocarpa*, *Corynotheca micrantha* var. *micrantha*, *Gompholobium tomentosum* and *Macarthuria australis* to 1.5m over Very Open Grassland of *Amphipogon turbinatus*, **Avena barbata* and **Briza maxima* to 0.3m over Hermland of *Anigozanthos manglesii*, *Burchardia congesta*, *Conostylis aculeata* subsp. *aculeata*, *Dampiera linearis*, *Dasyogon bromeliifolius*, *Patersonia occidentalis* and **Ursinia anthemoides* to 0.8m.

3) Low Open Woodland of *Allocasuarina fraseriana*, *Banksia menziesii* and *Banksia attenuata* to 9m over Low Shrubland of *Gompholobium tomentosum*, *Hemiandra pungens*, *Hibbertia hypericoides* and *Stirlingia latifolia*, to 1m over Very Open Grassland of *Amphipogon turbinatus*, **Briza maxima* and **Ehrharta calycina* to 0.8m over Open Hermland of *Anigozanthos manglesii*, *Burchardia congesta*, *Conostylis aculeata* subsp. *aculeata*, *Dasyogon bromeliifolius*, *Gyrostemon subnudus*, *Hybanthus calycinus*, *Patersonia occidentalis* and **Ursinia anthemoides* to 1m over Sedgeland of *Lyginia barbata* and *Phlebocarya ciliata* to 1m.

4) Low Open Woodland of *Banksia attenuata* and *Banksia menziesii* to 4.5m over Tall Open Shrubland of *Jacksonia furcellata* to 3m over Low Open Shrubland of *Corynotheca micrantha* var. *micrantha* and *Macarthuria australis* to 0.35m over Very Open Grassland of *Amphipogon turbinatus*, *Austrostipa compressa* and **Ehrharta calycina* to 0.6m over Open Hermland of *Anigozanthos manglesii* and **Ursinia anthemoides* to 0.6m over a Sedgeland of *Lyginia imberbis* to 0.4m.

*Denotes a weed species.

Clearing Description Hanson Construction Materials Pty Ltd proposes to clear up to 16.25 hectares for the purpose of site remediation and sand extraction. The project is located approximately 34 kilometres south of the Perth CBD in the City of Kwinana.

Vegetation Condition Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).

To:

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).

Comment The vegetation condition was derived from a Level 2 flora and vegetation survey report prepared by Coffey Environments (2008).

3. Assessment of application against Clearing Principles

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments **Proposal is at variance to this Principle**

The application area is located within the Perth subregion of the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) (GIS Database). The Perth subregion is characterised by Heath and/or Tuart woodlands on limestone, *Banksia* and Jarrah-*Banksia* woodlands on Quaternary marine dunes of various ages, and Marri on colluvial and alluvials. The Perth subregion forms part of the South West Botanical Province which has a very high degree of species diversity (Mitchell et al., 2002).

A flora and vegetation survey conducted by RPS consultants in 2007 and reported by Coffey Environmental in 2008, recognised a total of 176 plant taxa (including subspecies and varieties) from 119 genera and 47 families within the application area. This total is comprised of 139 native species and 31 introduced (weed) species (Coffey Environmental, 2008a). Weed species recorded in the application area included species such as *Arctotheca calendula*, *Briza maxima*, *Ehrharta calycina*, *Gladiolus caryophyllaceus*, *Hypochaeris glabra*, *Petrorhagia dubia*, *Romulea rosea*, *Sonchus oleraceus* and *Ursinia anthemoides* (Coffey Environments, 2008a). Dieback (*Phytophthora cinnamomi*) has also been identified along fire breaks in the north-east corner and the southern boundary of the application area (Glevan Consulting, 2008). The spread of dieback and weeds has the potential to significantly change the dynamics of a natural ecosystem and lower the biodiversity of an area. The proponent has committed to a weed control and a dieback management plan which is outlined within the supporting information provided by PGV Environmental (2015). Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed and dieback management condition.

A flora survey of the application area (targeting conservation significant flora) commissioned by the City of Kwinana and conducted by GHD during November 2013, identified a total of 138 flora taxa from 49 families and 112 genera. This total included 104 native species and 34 introduced (weed) species (GHD, 2014).

Four dominant vegetation types were identified within the application area and whilst there are parts of the application area where the condition of the vegetation ranges from 'Degraded' to 'Completely Degraded' such as the cleared perimeter boundary lines, sand tracks dissecting the site, the historic rifle range and sand quarry, the majority of the vegetation is considered to range from 'Excellent' to 'Very Good' condition (Coffey Environmental, 2008a; GHD, 2015).

No Threatened Flora species are known to occur within the vicinity of the application area; however there are records of two Priority 1, one Priority 2 and seven Priority 3 flora species (DPaW, 2015a). No Threatened Flora or Priority listed flora species were recorded within the application area during the flora and vegetation survey (Coffey Environments, 2008a). In addition to this, during a flora survey conducted by GHD (2014) targeting conservation significant species, no Threatened or Priority listed flora species were recorded.

The flora and vegetation survey by Coffey Environments (2008a) was undertaken during the appropriate season and quadrats were established as recommended, although no additional scorings (such as statistical analysis of the quadrats) was completed. Appropriate statistical analysis is recommended to determine Floristic Community Types (FCTs) on the Swan Coastal Plain (DPaW, 2015b), as FCTs are distinctive assemblages of vegetation at a particular recording site that are identified based on statistical analysis of quadrat data. The species richness of the application area is reasonably high and an analysis conducted by the Department of Parks and Wildlife, Species and Communities Branch on key combinations of species and habitat factors indicates that FCT 23a is reasonably likely to be present within the application area (DPaW, 2015b). FCT 23a has no recorded special significance and is not listed as a Priority Ecological Community (PEC) or a Threatened Ecological Community (TEC). Other FCTs are also possible, but TECs are unlikely (DPaW, 2015b).

The Priority Ecological Community (PEC) 'Banksia Dominated Woodlands of the Swan Coastal Plain' (P3) is also indicated at the site. This community is currently being assessed for listing as a TEC under the EPBC Act (DPaW, 2015b). GHD (2014) found that the vegetation present within the application area is considered equivalent to the PEC 'Banksia dominated woodlands of the Swan Coastal Plain'.

The vegetation within the application area is considered to provide particularly high habitat value for fauna species due to the variety of microhabitats and various resource niches available, such as fallen logs, hollow logs, leaf litter and sandy soil (GHD, 2014). A total of 96 vertebrate fauna species, which included 54 birds (of which two are introduced), 25 reptiles, three amphibians, nine native mammals and five introduced mammals were recorded within the application area during a spring/summer level 2 vertebrate survey (GHD, 2014). Of these species recorded within the application area, six were conservation significant species (GHD, 2014; GHD, 2015).

A follow up level 2 vertebrate fauna survey conducted in Autumn, provided further evidence that suggests the application area provides high habitat value for local fauna. A total of 61 vertebrate fauna species were recorded, including four species not previously recorded during the spring/summer survey (two of which were amphibians) (GHD, 2015). Previously recorded conservation significant species that were again recorded

utilising the application area included the Carnabys Black Cockatoo, Forest Red-tailed Black Cockatoo, Quenda and Rainbow Bee Eater (GHD, 2015). During both surveys a total of 100 species were recorded, ninety three of which were native species. Despite the application area being fully fenced, seven introduced species were recorded; This figure includes ground dwelling introduced fauna such as dogs, cats and the European rabbit (GHD, 2014; GHD, 2015).

Based on the vertebrate fauna identified within the application area, the vegetation under application has excellent biodiversity values for its size and within the region (GHD, 2015). The application area may also be important supportive habitat for local amphibian species, given that five species were recorded during surveys and the application area is situated within close proximity to nearby wetlands (GHD, 2015). The proponent has committed to a staged rehabilitation plan which is outlined within the supporting information provided by PGV Environmental (2015). Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a rehabilitation condition.

GHD Pty Ltd also identified a number of locally significant bird, reptile and mammal species as utilising the application area (GHD, 2014; GHD, 2015). The continued clearing of native vegetation on the Swan Coastal Plain may impact these species; however the proposed clearing of 16.25 hectares of native vegetation is unlikely to result in significant impacts to such species. Nevertheless, the presence of these species does contribute to the overall biodiversity of the application area.

It was noted that a greater number fauna species may utilise the application area, given that in order for fauna assessments to capture the full spectrum of species in an area, numerous surveys over different seasons and multiple years are required (GHD, 2014).

In addition to providing foraging habitat and refuge for a large number of fauna species (including conservation significant species), the application area contributes to a regionally significant ecological linkage (WAPC, 2007; Ironbark, 2008; Local Biodiversity Program, 2012-2014) and provides an important dispersal route for local fauna.

Based on the above, the proposed clearing is at variance to this Principle.

To reduce the potential impacts associated with the proposed clearing, the proponent has reduced the area to be cleared from 17.359 ha to 16.25 ha and will retain a 8.7 hectare buffer around the perimeter of Mining Lease 70/915 in order to maintain ecological linkages to adjacent vegetation and preserve a potential roosting site for Black cockatoo species. All areas cleared (ranging in condition from Completely Degraded to Excellent) will be revegetated following the completion of sand extraction activities. Revegetation of the site will be conducted using methods developed by Kings Park and Botanic Garden and contained within the Site Restoration Management Plan. The Site Restoration Plan formulates part of the Mining Act approval documents, which have been imposed as tenement conditions.

In addition to management and mitigation measures that the proponent has committed to implement, to counterbalance the significant residual impacts the proposed clearing will have on biological diversity, the proponent has agreed to an offset which consists of:

- Revegetation of 1.1 hectares of on-site degraded areas outside the area proposed to be cleared; and
- Provision of funds to the Department of Parks and Wildlife (DPaW) for the acquisition of 59.41 hectares of land as part of a larger parcel comprising vegetation in similar (Very Good to Excellent) or better condition.

Methodology CALM (2002)
Coffey Environments (2008a)
DPaW (2015a)
DPaW (2015b)
GHD (2014)
GHD (2015)
Glevan Consulting (2008)
Ironbark (2008)
Local Biodiversity Program (2012-2014)
Mitchell et al. (2002)
PGV Environmental (2015)
WAPC (2007)

GIS Database:
- IBRA Australia
- Pre-European vegetation
- Threatened Ecological Sites Buffered

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Comments Proposal is at variance to this Principle

A Level 1 fauna survey was carried out over the application area by Coffey Environments (2008b). The application area was inspected on 14 May 2008. The survey included an inspection of the major fauna habitats/land systems within the application area and adjacent areas. The majority of the vegetation under application is considered to be in an 'Excellent' to 'Very Good' condition (Coffey Environments, 2008a; 2008b).

Based on habitat types and the Level 1 fauna survey conducted within the application area, the following species of conservation significance, listed as either threatened species under the *Environment Protection and Biodiversity Conservation Act (EPBC) 1999* or protected under Western Australian legislation (*Wildlife Conservation Act 1950 (WC)*) are likely, or have the potential, to occur within the application area or local area (DPaW 2014; Coffey Environments 2008b):

- Forest red-tailed black-cockatoo (*Calyptorhynchus banksii naso* - Vulnerable);
- Baudin's black cockatoo (*Calyptorhynchus baudinii* - Vulnerable);
- Carnaby's black cockatoo (*Calyptorhynchus latirostris* - Endangered);
- Rainbow Bee-eater (*Merops ornatus* - Marine, Migratory);
- Curlew sandpiper (*Calidris ferruginea* – Critically Endangered; Marine, Migratory);
- South-western brush-tailed phascogale (*Phascogale tapoatafa subsp. tapoatafa* –Threatened);
- Chuditch (*Dasyurus geoffroii* - Vulnerable)
- Carter's freshwater mussel (*Westralunio carteri* - Vulnerable)

PGV Environmental (2014) conducted a black cockatoo habitat assessment on 18 November 2013 and identified that the application area contains 17 hectares of 'Very Good' foraging habitat for Black Cockatoo species, in the form of Banksia woodland. Banksia woodland is known to be significant habitat for Carnaby's black cockatoos and all areas of remnant Banksia woodland may be significant to the species (DPaW, 2015c). The habitat is more significant to Carnaby's black cockatoos than to the Forest red-tailed black cockatoos as the foraging habitat is predominantly Banksia, which is preferred by Carnaby's black cockatoos, whereas the Forest red-tailed black cockatoos prefer eucalypts (DPaW, 2015c).

The Baudin's black cockatoo is unlikely to be impacted by the proposed clearing, as the application area is not within the modelled distribution for this species (PGV, 2014). DPaW (2015c) has advised that it is possible that Baudin's cockatoo's occasionally utilise the application area on an opportunistic basis, although given the distance from, and lack of connectivity to the jarrah forest, this is unlikely.

The application area is unlikely to be utilised as a breeding site for black cockatoo species, as Carnaby's black cockatoos do not usually use jarrah for nesting and there are no suitable trees for Forest red-tailed black cockatoos to nest (GHD, 2014). Forest red-tailed black cockatoos will use jarrah for nesting; however this species requires hollows of larger size. Suitable hollows can take from 120 to 150 years to develop for Carnaby's black cockatoos and trees will typically have a Diameter at Breast Height (DBH) of greater than 680 mm (DoE, 2015a). Forest red-tailed black cockatoo's require larger, older trees to breed, around 200 years old with an average DBH of 2.89 metres (DoE, 2015b). Trees smaller than 680 mm DBH are considered to have the potential to develop hollows and are therefore also important resources for Carnaby's black cockatoos (DoE, 2015a).

PGV Environmental (2014) identified seven native flora species present within the application area that are recognised as foraging habitat for Carnaby's black cockatoos. These included; *Eucalyptus marginata*, *Banksia attenuata*, *Banksia menziesii*, *Allocasuarina fraseriana*, *Xanthorrhoea preissii* and *Jacksonia furcellata*. All but *Allocasuarina fraseriana* are also recognised by DPaW (2011a) as plants used by Carnaby's. Guildford Grass (*Romulea rosea*) was also identified in the application area, on which Carnaby's black cockatoos have been recorded feeding. The application area also provides some foraging habitat for the Forest red-tailed black cockatoo. The Forest red-tailed black cockatoo's diet is comprised mainly of the seeds from Marri (*Corymbia calophylla*) and Jarrah (*Eucalyptus marginata*) fruits but they do feed on other species including *Allocasuarina fraseriana* (DEC, 2008), which is present within the application area.

No evidence of roosting, breeding or foraging was observed within the application area during the black cockatoo habitat assessment (PGV Environmental, 2013). While some breeding has been documented on the Swan Coastal Plain, Carnaby's are believed to breed predominately in the wheatbelt region between the months of July to September (DPaW, 2015d) and return to coastal areas around late December (Shah, 2006). The seasonal movements of the Forest red-tailed black cockatoo are much more irregular (DoE, 2015b). Evidence of Black cockatoo's foraging within the application area was documented and observed by GHD during later surveys (GHD, 2014; 2015).

If any of the jarrah trees within the application area provide roosting sites, then the site may be very significant habitat for black cockatoo's (DPaW, 2015c). It is possible that a roost site may be present in one of the jarrah trees in the northern portion of the application area (GHD, 2014). Further survey work is required to determine whether jarrah trees are used as cockatoo roosting sites. Any future survey performed should follow the methodology set out in the 'Birdlife Australia Great Cocky Count'. Prior to further surveys, all trees associated with a potential roost site should be retained (DPaW, 2015c).

PGV Environmental (2014) concluded that the proposed clearing will have an impact on Carnaby's black

cockatoo and Forest red-tailed black cockatoo habitat, but when assessed against the criteria set out by DoE (2013) within the "Matters of National Environmental Significance; Significant impact guidelines 1.1," PGV Environmental considered that mitigation measures will reduce the risk of any significant impacts resulting from the proposed clearing to 'Low.' The retention of a buffer, which includes potential breeding habitat trees and 'Excellent' foraging habitat, will reduce potential impacts on both species of Black cockatoos (PGV Environmental, 2013). Mining Lease 70/915 covers an area of approximately 25 hectares and approximately 8.7 hectares of native vegetation will remain uncleared. DPaW (2015c) has reviewed the black cockatoo habitat assessment and has advised that the proposed clearing will reduce the current extent of feeding/foraging habitat for Carnaby's cockatoo's. DPaW (2015c) also noted that the PGV Environmental report did not provide sufficient detail of the survey methodology used when conducting the survey and that the preferred survey season for Carnaby's black cockatoos on the Swan Coastal Plain is autumn.

DPaW (2015c) acknowledged that the proposed retention of vegetation in 'excellent' condition as a buffer around the property perimeter will include foraging habitat and that the sand mining and post extraction rehabilitation proposal includes revegetation with flora species that are known to be cockatoo foraging species. Therefore it may be considered that the proposed clearing is only a temporary loss of foraging habitat, however, this re-planted foraging habitat will not be available to black cockatoo's until it has reached maturity and begins producing cones and nuts in sufficient quantities (DPaW, 2015c). In the meantime, it will be a lost resource and may impact on black cockatoo species, as all three species of black cockatoo's may opportunistically forage and visit the application area periodically (DPaW, 2015c).

There are other areas of remnant bushland in reserves and bush forever sites in the local area that may be utilised by black cockatoos for foraging and roosting habitat. However, due to the historical extent of clearing of vegetation, in particular Banksia woodland, in the local area, east of the site, and generally historic and current clearing on the Swan Coastal Plain, all remaining remnants of this woodland may be very significant for the species (DPaW, 2015c).

While the Chuditch is known from the local area, this species is highly mobile, capable of utilizing a wide variety of habitat and is known to travel considerable distances (DoE, 2015c). Given the mobile nature of this species, the absence of recent records within the local area and given that the application area lacks ideal habitat, this species is unlikely to be impacted by the proposed clearing. The proposed clearing is also unlikely to impact the Carter's Freshwater Mussel, as the nearest known record is located in a water body more than 5 kilometres from the application area.

The Curlew sandpiper is not of concern due to its migratory nature. A further eleven species of migratory birds have been recorded within the local area (DPaW, 2015a). The only migratory species likely to be impacted by the proposed clearing is the Rainbow Bee-eater. The Rainbow Bee-eater is a common migrant that moves southwards during summer to breed. It breeds in burrows dug into sandy banks, including sand pushed up along tracks. This species is known to occur nearby (DER, 2016) and evidence of breeding within the application area has been observed (GHD, 2015).

Two species listed as Priority 3, recognised by DPaW as being of conservation significance, have also been recorded from the local area (DPaW, 2015a); the Perth slider, Lined skink (*Lerista lineata*) and the Black-striped snake (*Neelaps calonotos*). The aforementioned Priority 3 species, as well as the Masked owl (*Tyto novaehollandiae* subsp *novaehollandiae*), may occur within the application area (Coffey Environments, 2008b).

In addition to the above-mentioned species, there are several Priority 4 listed fauna species that are known from the local area (DPaW, 2015a). Two species of particular interest are the Quenda (P4) (*Isoodon obesulus fusciventer*) and the Graceful Sun-Moth (P4) (*Synemon gratiosa*). A flora and vegetation survey of the application area identified the presence of *Lomandra hermaphrodita* and *Lomandra maritima* (Coffey Environments, 2008a), which are known host breeding plants for Graceful Sun-Moth (DPaW, 2011b), however a targeted survey found no Graceful Sun-Moths within the application area (Coffey Environments, 2010).

During a site inspection conducted by the then Department of Environment and Conservation in 2012, of an adjacent Lot, numerous Quenda (P4) diggings were observed (DER, 2016). Coffey Environmental (2008b) considered that quendas were likely to occur at low densities within the application area, utilising areas where a dense understorey persists.

A Level 2 vertebrate fauna survey of the application area conducted by GHD (2014) in spring/summer of 2013 identified the vegetation under application as providing particularly high habitat value for fauna species due to the variety of microhabitats and various resource niches available, such as fallen logs, hollow logs, leaf litter and sandy soil (GHD, 2014). During the Level 2 fauna survey, a total of 89 native vertebrate fauna species, were recorded within the application area, this included six conservation significant species; the Carnaby's Black cockatoo, Forest red-tailed black cockatoo, Black-striped snake, Perth lined skink, Quenda and the Rainbow Bee-eater. A Southern brush-tailed phascogale was also observed within 1 kilometre of the application area (GHD, 2014). The high number of fauna species and individuals captured and observed support the high value of the habitat to the local fauna (DPaW, 2015c).

A follow up Level 2 vertebrate fauna survey conducted in Autumn, provided further evidence that the application area provides high habitat value for fauna. A total of 61 vertebrate fauna species were recorded, including four species not previously recorded during the spring/summer survey (GHD, 2015). Previously recorded conservation significant species that were again recorded included the Carnabys Black Cockatoo, Forest red-tailed Black cockatoo, Quenda and Rainbow Bee-eater (GHD, 2015). During both surveys a total of

100 species were recorded comprised of 93 native species and seven introduced species (GHD, 2014; GHD, 2015). The proponent has committed to a fauna trapping and relocation program which is outlined within the supporting information provided by PGV Environmental (2015) and is included within the approved Mining Proposal, which has been imposed as a tenement condition.

It must be noted that no Rainbow Bee-eaters were recorded within the application area during the Autumn survey due to their migration north, however an old burrow was found in one of the old rifle range mounds that was likely utilised in the 2014/2015 breeding season, which demonstrates that breeding does occur within the application area (GHD, 2015). The proponent has committed to limiting clearing during breeding season.

The vegetation under application is also considered to be an important part of a regional ecological linkage under the Jandakot Structure Plan (WAPC, 2007), the Shire of Serpentine-Jarrahdale Local Biodiversity Strategy (Ironbark, 2008) and has been mapped as a Perth regional ecological linkage on the Local Biodiversity Program (2012-2014) environmental planning tool database.

Given that the vegetation under application is utilised by a number of indigenous fauna species, including species of conservation significance, appears to be an area of high species diversity, and is important as part of an regional ecological linkage, the vegetation under application is considered to comprise significant habitat for fauna indigenous to Western Australia.

Based on the above, the proposed clearing is at variance to this Principle.

To reduce the potential impacts associated with the proposed clearing, the proponent has reduced the area to be cleared from 17.359 ha to 16.25 ha and will retain a 8.7 hectare buffer around the perimeter of Mining Lease 70/915 in order to maintain ecological linkages to adjacent vegetation and preserve a potential roosting site for Black cockatoo species. All areas cleared (ranging in condition from Completely Degraded to Excellent) will be revegetated following the completion of sand extraction activities. Revegetation of the site will be conducted using methods developed by Kings Park and Botanic Garden and contained within the Site Restoration Management Plan. The Site Restoration Plan formulates part of the Mining Act approval documents, which have been imposed as tenement conditions.

In addition to management and mitigation measures that the proponent has committed to implement, to counterbalance the significant residual impacts the proposed clearing will have on fauna habitat, the proponent has agreed to an offset which consists of:

- Revegetation of 1.1 hectares of on-site degraded areas outside the area proposed to be cleared; and
- Provision of funds to the Department of Parks and Wildlife (DPaW) for the acquisition of 59.41 hectares of land as part of a larger parcel comprising vegetation in similar (Very Good to Excellent) or better condition.

Methodology	Coffey Environments (2008a) Coffey Environments (2008b) Coffey Environments (2010) DEC (2008) DER (2016) DoE (2013) DoE (2015a) DoE (2015b) DoE (2015c) DPaW (2011a) DPaW (2011b) DPaW (2015a) DPaW (2015c) DPaW (2015d) GHD (2014) GHD (2015) Ironbark (2008) Keighery (1994) Local Biodiversity Program (2012-2014) PGV Environmental (2014) PGV Environmental (2015) Shah (2006) WAPC (2007)
--------------------	---

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Comments Proposal is not likely to be at variance to this Principle

According to available databases, there are no known records of Threatened Flora within the application area (GIS Database). A search of the Department of Parks and Wildlife's Threatened and Priority Flora databases identified eight Threatened Flora species as occurring within a 10 kilometre radius of the application area

(DPaW, 2015a). These included:

- *Caladenia huegelii*
- *Calectasia cyanea*
- *Diuris micrantha*
- *Diuris purdiei*
- *Drakaea elastica*
- *Synaphea* sp. Pinjarra Plain
- *Synaphea* sp. Serpentine
- *Tetralia australiensis*

In order to assess the suitability of the application area as habitat for Threatened flora, a Level 2 flora and vegetation survey was conducted. RPS consultants conducted the field survey and Coffey Environments completed the identification and reported the results. The flora survey was appropriately timed, with the survey occurring in late September/October of 2007, after adequate winter rains provided conditions considered optimal for the identification of the majority of annual and ephemeral species, including four of the Threatened orchid species listed above, *Caladenia huegelii*, *Diuris micrantha*, *Diuris purdiei* and *Drakaea elastica* (Coffey Environments, 2008a).

During the flora survey no Threatened flora were recorded within the application area (Coffey Environments, 2008a). In addition to this, during a flora survey conducted by GHD (2014) targeting conservation significant species, no Threatened flora species were recorded. The targeted survey took place on 9 September, 7 October and 19 November 2013.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology DPaW (2015a)
Coffey Environments (2008a)
GHD (2014)

GIS Database
- Threatened and Priority Flora List

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Comments Proposal may be at variance to this Principle

According to available datasets, there are no Threatened Ecological Communities (TECs) within the application area. However the application area falls within the buffer zone of a known TEC. An occurrence of the TEC - Assemblages of plants and invertebrate animals of tumulus (organic mound springs) of the Swan Coastal Plain, has been recorded approximately 650m south east of the application area. This TEC occurs on different soil and vegetation type to that of the application area but is the southernmost occurrence of this TEC on the Swan Coastal Plain and unlike the other known occurrences, its hydrology is not driven by the Gnangara Mound which is declining due to water extraction (DER, 2016).

Groundwater modelling was undertaken by RPS consulting in February 2012; to assess potential impacts to the organic mound spring that may result from nearby clearing activities (located approximately 70 metres north of the TEC), where the clearing of 11.6 hectares of native vegetation was proposed but has since been granted. In order to verify these results, the then Department of Environment and Conservation (now known as the Department of Environment Regulation) undertook a reconnaissance ground geophysical investigation using the electromagnetic method in May 2012. DEC's investigation indicated that the discharging spring and mound spring are constrained spatially by a change in lithology that is likely to be influencing both local and regional groundwater flows, therefore, the TEC responds to local as well as regional groundwater changes (DER, 2016).

Additional groundwater modelling and hydrological assessments were undertaken by RPS consulting in conjunction with the Department of Parks and Wildlife in order to determine potential impacts to the TEC. The hydrological assessment concluded that the hydrology of the TEC is significantly controlled by anthropogenic factors. Groundwater modelling of the proposed clearing indicates that groundwater levels are predicted to increase by up to 0.14 meters during the proposed clearing (RPS, 2015).

On basic principles the topographic characteristics of the application area and immediate vicinity slope towards the south west and south (DPaW, 2015b). Groundwater flow is likely to follow this gradient which would indicate that the proposed clearing within Mining Lease 70/915 probably poses less risk to the mound spring than the adjacent clearing permit application which was recently granted by the Department of Environment Regulation, and is located approximately 70 metres from the spring and immediately up gradient (DPaW, 2015b). The proposed clearing within Mining Lease 70/915 and removal of sand dunes could however alter the direction and quantities of water flows and hence influence the spring's hydrology (DPaW, 2015b).

Given that there are two applications for sand mining (one of which has been granted) within close proximity to the TEC, it remains a possibility that the TEC will be adversely altered by the cumulative impacts of proposed activities. A Hydrology Management Strategy will be implemented by the proponent to minimise potential

impacts that could arise from clearing, mining activities and revegetation at the adjacent clearing permit area (RPS, 2016). Management strategies in place for the adjacent clearing permit (CPS 4935/1) will likely reduce concerns around cumulative impacts.

Based on the above, the proposed clearing may be at variance to this Principle.

Methodology DER (2016)
DPaW (2015b)
RPS (2015)

GIS Database:

- Threatened Ecological Sites Buffered
- Threatened and Priority Ecological Communities Buffers
- Threatened and Priority Ecological Communities Boundaries

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments Proposal is at variance to this Principle

The application area occurs within the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) bioregion, in which approximately 39.15% of the pre-European vegetation remains (see table below) (GIS Database; Government of Western Australia, 2015).

The vegetation within the application area has been mapped as Beard vegetation association 1001 (GIS Database). Approximately 22.4% of Beard vegetation association 1001 remains at a state, bioregional and subregional level (Government of Western Australia, 2015). More detailed vegetation mapping has occurred for parts of the Swan Coastal Plain. The Heddle Vegetation Complex present within the application area is mapped as Bassendean Complex-Central And/South, of which, approximately 26% remains (DPaW, 2015e). The national objectives and targets for biodiversity conservation in Australia includes a target to prevent clearance of ecological communities with an extent below 30% of pre-European settlement levels (Commonwealth of Australia, 2001). However, the EPA (2006) recognises the Swan Coastal Plain of the Perth Metropolitan Region as a 'constrained area.' A constrained area is an area where there is a reasonable expectation that development will be able to proceed and within such areas, the representation of an ecological community should not fall below 10% of the pre-European extent (EPA 2006).

The mapped vegetation types present within the application are above the minimum recommended threshold (EPA, 2006), however, the vegetation under application is considered to be an important part of a regional ecological linkage under the Jandakot Structure Plan (WAPC, 2007), the Shire of Serpentine-Jarrahdale Local Biodiversity Strategy (Ironbark, 2008) and has been mapped as a Perth regional ecological linkage on the Local Biodiversity Program (2012-2014) environmental planning tool database. Therefore the vegetation under application is considered to be a significant remnant in an extensively cleared area.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in DPaW Managed Lands (and post clearing %)
IBRA Bioregion - Swan Coastal Plain	1,501,222	579,162	~38.6	Depleted*	~17.6 (37.5)
IBRA Subregion - Perth	1,117,757	465,552	~41.6	Depleted*	~20.0 (38.2)
Local Government - Kwinana	12,012	4,142	~35.5	Depleted*	~4.2 (10.9)
Beard vegetation associations - State					
1001	57,410	12,880	~22.4	Vulnerable*	~6.4 (13.6)
Beard vegetation associations - Bioregion					
1001	57,410	12,880	~22.4	Vulnerable*	~6.4 (13.6)
Beard vegetation associations - subregion					
1001	57,410	12,880	~22.4	Vulnerable*	~6.4 (13.6)
Heddle Vegetation Complex***					
Bassendean Complex-Central	87,318.09	24,610.06	~28.2%	Vulnerable*	~6.8 (3.5)

And/South					
-----------	--	--	--	--	--

* Government of Western Australia (2015)

** Department of Natural Resources and Environment (2002)

*** DPaW (2015e)

Based on the above, the proposed clearing is at variance to this principle.

To reduce the potential impacts associated with the proposed clearing, the proponent has reduced the area to be cleared from 17.359 ha to 16.25 ha and will retain a 8.7 hectare buffer around the perimeter of Mining Lease 70/915 in order to maintain ecological linkages to adjacent vegetation and preserve a potential roosting site for Black cockatoo species. All areas cleared (ranging in condition from Completely Degraded to Excellent) will be revegetated following the completion of sand extraction activities. Revegetation of the site will be conducted using methods developed by Kings Park and Botanic Garden and contained within the Site Restoration Management Plan. The Site Restoration Plan formulates part of the Mining Act approval documents, which have been imposed as tenement conditions.

In addition to management and mitigation measures that the proponent has committed to implement, to counterbalance the significant residual impacts the proposed clearing will have on remnant vegetation, the proponent has agreed to an offset which consists of:

- Revegetation of 1.1 hectares of on-site degraded areas outside the area proposed to be cleared; and
- Provision of funds to the Department of Parks and Wildlife (DPaW) for the acquisition of 59.41 hectares of land as part of a larger parcel comprising vegetation in similar (Very Good to Excellent) or better condition.

Methodology Commonwealth of Australia (2001)
 Department of Natural Resources and Environment (2002)
 DPaW (2015e)
 EPA (2006)
 Government of Western Australia (2015)
 Ironbark (2008)
 WAPC (2007)
 Local Biodiversity Program (2012-2014)

GIS Database:
 - IBRA Australia
 - Pre-European Vegetation

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments Proposal is not at variance to this Principle

There are no mapped watercourses within the application area (GIS Database). A flora and vegetation survey of the application area confirmed this to be accurate and did not identify any vegetation growing in association with a watercourse or wetland (Coffey Environments, 2008a). Therefore, vegetation within the application area is not considered to be riparian in nature.

Based on the above, the proposed clearing is not at variance to this Principle.

Methodology Coffey Environments (2008a)

GIS Database:
 - Hydrography, linear

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Comments Proposal may be at variance to this Principle

The application area is located within the Perth subregion of the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). The Perth subregion is characterised by Heath and/or Tuart woodlands on limestone, *Banksia* and Jarrah-*Banksia* woodlands on Quaternary marine dunes of various ages, and Marri on colluvial and alluvials (Mitchell *et al.* 2002).

According to available databases, the soils of the application area are mapped as subdued dune-swale terrain: chief soils are leached sands on the low dunes. Associated are small areas of other sandy soils. Given the sandy nature of the soils, wind erosion and nutrient export is likely to occur. Potential degradation as a result of the proposed clearing may be minimised by the implementation of a staged clearing condition.

Based on the above, the proposed clearing may be at variance to this Principle.

Methodology Mitchell *et al.* (2002)

GIS Database:
- IBRA Australia
- Soils, statewide

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Comments **Proposal may be at variance to this Principle**

The application area is not located in a conservation area (GIS Database). However, there are seven Bush Forever sites and a Nature Reserve located within a 5 kilometres radius of the application area. The closest Bush Forever Site (Site No. 68), is situated 500 metres north-east. Banksia Nature Reserve, which is part of the Jandakot Regional Park and is listed on the Register of National Estate, is located approximately 600 metres north-east of the application area.

The vegetation under application is considered to be an important part of a regional ecological linkage under the Jandakot Structure Plan (WAPC, 2007), the Shire of Serpentine-Jarrahdale Local Biodiversity Strategy (Ironbark, 2008) and has been mapped as a Perth regional ecological linkage (Local Biodiversity Program, 2012-2014).

Given that the application area occurs in a highly fragmented landscape and contributes to a regional ecological linkage, it is likely that the vegetation proposed to be cleared aids faunal dispersal on a local and regional scale, and therefore contributes to the environmental values of adjacent or nearby conservation areas.

Based on the above, the proposed clearing may be at variance to this Principle.

To reduce the potential impacts associated with the proposed clearing, the proponent has reduced the area to be cleared from 17.359 ha to 16.25 ha and will retain a 8.7 hectare buffer around the perimeter of Mining Lease 70/915 in order to maintain ecological linkages to adjacent vegetation and preserve a potential roosting site for Black cockatoo species. All areas cleared (ranging in condition from Completely Degraded to Excellent) will be revegetated following the completion of sand extraction activities. Revegetation of the site will be conducted using methods developed by Kings Park and Botanic Garden and contained within the Site Restoration Management Plan. The Site Restoration Plan formulates part of the Mining Act approval documents, which have been imposed as tenement conditions.

In addition to management and mitigation measures that the proponent has committed to implement, to counterbalance the significant residual impacts the proposed clearing will have on ecological linkages to nearby conservation areas, the proponent has agreed to an offset which consists of:

- Revegetation of 1.1 hectares of on-site degraded areas outside the area proposed to be cleared; and
- Provision of funds to the Department of Parks and Wildlife (DPaW) for the acquisition of 59.41 hectares of land as part of a larger parcel comprising vegetation in similar (Very Good to Excellent) or better condition.

Methodology Ironbark (2008)
Local Biodiversity Program (2012-2014)
WAPC (2007)

GIS Database:
- DEC Tenure

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Comments **Proposal may be at variance to this Principle**

The application area is not located within a Public Drinking Water Source Area (PDWSA), however it is located within the proclaimed Serpentine groundwater area under the *Rights in Water and Irrigation Act 1914* (GIS Database). Any groundwater extraction and/or taking or diversion of surface water for the purposes other than domestic and/or stock watering is subject to licence by the Department of Water.

The clearing of native vegetation has the potential to destabilise soils and cause temporary sedimentation to watercourses. No watercourses are mapped as occurring within the application area, the closest is a minor drainage line, located more than 1 kilometre east. However, there are two EPP wetlands located nearby; one is located approximately 300 metres to the west, the other approximately 300 metres to the south (GIS Database).

Groundwater modelling has been conducted for an adjacent clearing permit application (CPS 4935/1), where the proposed clearing is of a similar size to that proposed under this application. It was estimated that the groundwater table would rise by 0.15 metres in the wetland areas south of the application area (DER, 2016). While this modelling was not deemed appropriate to determine impacts to nearby wetlands (DER, 2016), it did highlight a deficiency in information relating to potential impacts to surface water quality.

Additional groundwater modelling and hydrological assessments were undertaken by RPS consulting in conjunction with the Department of Parks and Wildlife for the adjacent clearing permit application (CPS 4935/1), which assessed impacts to the wetland areas south of the application area, that could arise from activities associated with CPS 4935/1. Groundwater modelling indicated that groundwater levels are predicted to increase by up to 0.14 meters (RPS, 2015; 2016). Given that there are two applications for sand mining (one of which has been granted) within close proximity to the wetlands, it remains a possibility that the proposed clearing may alter hydrological regimes, increase the groundwater table level, which in turn could impact the quality of nearby wetlands. A Hydrology Management Strategy will be implemented by the proponent to minimise potential impacts that could arise from clearing, mining activities and revegetation at the adjacent clearing permit area (CPS 4935/1) (RPS, 2016). This should alleviate concerns surrounding cumulative impacts to southern wetland areas; however impacts to the EPP wetland west of the application area have not been assessed.

Based on the above, the proposed clearing may be at variance to this Principle.

Methodology DER (2016)
RPS (2015)
RPS (2016)

GIS Database:
- Groundwater Salinity, Statewide
- Hydrography, linear
- Public Drinking Water Source Areas (PDWSAs)
- RIWI Act, Groundwater Areas

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Comments **Proposal may be at variance to this Principle**

Mean annual rainfall for Kwinana is approximately 755 mm (BoM, 2016). The Swan region has a warm Mediterranean climate (Mitchell et al. 2002), receiving the majority of its rainfall during winter months (BoM, 2016). Given the free draining nature of sandy soils, waterlogging is unlikely to occur within the application area and therefore the incidence of flooding onsite is negligible.

The application area is situated at a slightly more elevated position to that of the nearby wetlands; a Swan Coastal Plain wetland and an EPP lake are located 70 metres and 300 metres west respectively (GIS Database). Groundwater and hydrological assessments for adjacent areas suggest that major alterations to the flooding regimes of nearby wetlands are unlikely, given the positioning of existing infrastructure (i.e. roads and drains), however groundwater levels were predicted to increase by up to 0.14 meters (RPS, 2015; 2016), which may influence the incidence or intensity of flooding at nearby wetlands.

Potential increases in the incidence or intensity of flooding in nearby areas as a result of the proposed clearing may be minimised by the implementation of a staged clearing condition. Progressive rehabilitation of cleared areas will further reduce the likelihood of flooding on or offsite.

Based on the above, the proposed clearing may be at variance to this Principle.

Methodology BoM (2016)
Mitchell et al. (2002)
RPS (2015)
RPS (2016)

GIS Database:
- Hydrographic Catchments – Catchments

Planning instrument, Native Title, RIWI Act Licence, EP Act Licence, Works Approval, Previous EPA decision or other matter.

Comments

There are two native title claims over the application area (WC2003/006 and WC1998/058) (GIS Database; DAA, 2016). However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are no registered Aboriginal Sites of Significance located within the application area (GIS Database; DAA, 2016). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

It is the proponent's responsibility to liaise with the Department of Environment Regulation, the Department of Parks and Wildlife and the Department of Water, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

It is noted that the proposed clearing may impact on a protected matter under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). The proponent referred the project to the (Federal) Department of the Environment (DoE) for environmental impact assessment under the EPBC Act (EPBC Number 2015/7438) and DoE has declared the proposed action to be a controlled action that will require assessment under the EPBC Act.

Mining Act approval documents have been imposed as tenement conditions and must be adhered to by the proponent. Mining Act approval documents include specific management documents such as the Remedial Action and Management Plan and the Site Restoration Plan.

The site was previously a rifle range and the land has been contaminated with lead shot and clay pigeon fragments. The Department of Environment Regulation (Contaminated Sites Regulation Group) has provided informal advice on the proposed management and remediation plan for the site and has stated that approving bodies are required to seek DER's advice prior to approving any works at the site (in accordance with section 58(6) of the *Contaminated Sites Act 2003*). An advice request was sent on 13 March 2015 by the Department of Mines and Petroleum, requesting comment on the proposed clearing. The Contaminated Sites Regulation Group did not wish to comment on the proposed clearing, instead providing advice through the Mining Act approval process.

The proponent has committed to environmental management practises outlined within the supporting information provided by PGV Environmental (2015). The proponent has also committed to remediate the application area and remove the lead contaminate. A Remedial Action and Management Plan was developed by SLR Consulting (2014). This management plan was reviewed by Ramboll Environ (2015) and was found to contain insufficient information and be deficient in key areas. The proponent has since undertaken consultation with DER's Contaminated Sites Regulation Group and an updated Remedial Action and Management Plan has been developed. The management plan formulates part of the approved Mining Proposal and Mine Closure Plan commitments.

A commitment to revegetate and rehabilitate the application area following sand mining activities has been made by the proponent within supporting information supplied for CPS 6492/1. Revegetation and rehabilitation commitments have also been provided within the approved Mining Proposal and Mine Closure Plan.

The clearing permit application was advertised on 16 March 2015 by the Department of Mines and Petroleum inviting submissions from the public. There were 33 submissions received objecting to the proposed clearing. Issues raised related to: the cumulative impacts of clearing, the clearing of vegetation contributing to an ecological linkage, impacts to fauna species (including conservation significant species), potential impacts to the nearby Threatened Ecological Community (TEC) (organic mound spring) and wetlands, potential Threatened flora habitat, impacts to a Priority ecological community and a vegetation community under consideration for listing as a TEC under the EPBC act. These issues have been addressed within the relevant clearing principles. Concerns were also raised in relation to proposed revegetation activities that intend to link vegetation to areas where further clearing is proposed.

In addition to environmental concerns (which have been addressed within the relevant clearing principles) the following concerns were raised in the submissions received. These matters will be managed under other relevant approval processes, including the Mining Act and Contaminated Sites legislation:

- The site is included within the area covered by the Strategic Assessment of the Perth and Peel Regions (SAPPR) which includes consideration of the sites conservation value and the Basic Raw Material value. As the SAPPR process is not complete it is presumptuous to make a decision on the site that may approve clearing prior to the results of the SAPPR being finalised;
- The site has dieback and therefore the sand product present should not be considered 'clean fill' without laboratory testing;
- The disturbance of the top layer of soil are likely to increase the chances of water soluble lead moving within the soil profile and leaching to groundwater or moving with stormwater discharge;
- The site is a registered contaminated site. The proposed works can potentially expose the community to products of metallic lead degradation through activities that create dust such as transportation of

- contaminated waste, screening of soil and the clearing process;
- The *Contaminated Sites Act 2003* and regulations have not been appropriately considered or adhered to;
- Groundwater beneath the site is potentially contaminated and may not be suitable for dust suppression;
- As the site is a registered contaminated site, the proposal would require sign off by an approved WA contaminated sites auditor to ensure that the remediation activities are appropriately controlled, effective and do not increase public and community exposure;
- The proposal presents a risk to the community and a human health risk investigation would be appropriate prior to a clearing permit being approved; and
- The surrounding community have expressed concerns that the proposal would adversely impact on their lifestyle and will increase the likelihood of vehicle/truck/pedestrian conflict.

In 2009 the Environmental Protection Authority (EPA) assessed the proposal (CRN222010) and set the level of assessment as “Not Assessed – Public Advice Given - Managed Under Part V of the EP Act (Clearing).” An appeal was lodged on the level of assessment set by the EPA and was dismissed.

There is an adjacent application that was granted by the Department of Environment Regulation (CPS 4935/1) on 7 July 2016 subject to permit conditions and an offset. CPS 4935/1 is a modified proposal (submitted by Rocla Pty Ltd) that followed the refusal of CPS 2757/1. Both assessments have been reviewed.

CPS 2757/1 was refused due to potential impacts to the nearby TEC and wetlands, fauna species of conservation significance (including the Carnaby’s Black Cockatoo and Forest red-tailed Cockatoo), nearby conservation areas, and the vegetation was identified as contributing to a significant ecological linkage. At the time of the assessment, the land was also zoned ‘Rural’ which was not consistent with the proposed end land use.

The applicant appealed the decision to refuse CPS 2757/1 and an Appeal determination (CO21/09) occurred on 7 October 2010. The Minister for Environment dismissed the appeal but stated “If Rocla wish to pursue this proposal in the future, it should be identified how any clearing of the site would maintain the environmental values of the site, including ecological linkages. This may include identification of offsite vegetation which might be secured or restored to ensure ecological linkages are maintained” (Minister for Environment, 2010).

Advice obtained from the Department of Mines and Petroleum, Geosurvey Division (DMP, 2015), advised that Mining Lease 70/915 is shown on the current State Planning Policy 2.4 mapping as an ‘Extraction Area’ only. It is currently neither a ‘Priority Resource,’ nor a ‘Key Extraction Area’. However, Mining Lease 70/915 has recently been mapped as being part of a Regionally Significant Basic Raw Material (for sand) and there is reportedly between 2.5 and 3 million tonnes of sand resources in this locality. Sand south of Perth is in short supply and to reduce costs and haulage impacts, proximity of the resource to the end use is critical (DMP, 2015).

Due to the presence of a mining lease for sand, this area has been included in the Draft Green Growth Plan and identified as a ‘Future Resource Extraction Area’ (DPC, 2015).

Methodology DAA (2016)
Minister for Environment (2010)
Ramboll Environ (2015)
SLR Consulting (2014)

4. References

- BoM (2016) Climate Statistics for Australian Locations. A Search for Climate Statistics for Kwinana, Australian Government Bureau of Meteorology <<http://www.bom.gov.au>> Viewed October 2016.
- CALM (2002) A Biodiversity Audit of Western Australia’s 53 Biogeographical Subregions. Department of Conservation and Land Management.
- Coffey Environments (2008a) Flora and Vegetation Survey Lots 52 & 1320 Banksia Road, Wellard. Report prepared for Urban Resources Pty Ltd. Coffey Environments Pty Ltd, Perth, Western Australia.
- Coffey Environments (2008b) Level 1 Fauna Assessment, Lots 52 & 1320 Banksia Road, Wellard. Report prepared for Urban Resources Pty Ltd. Coffey Environments Pty Ltd, Perth, Western Australia.
- Coffey Environments (2010) Graceful Sun-Moth Assessment of Lot 52 & 1320 Banksia Road, Wellard. Report prepared for Urban Resources Pty Ltd. Coffey Environments Pty Ltd, Burswood, Western Australia.
- Commonwealth of Australia (2001) National Objectives and Targets for Biodiversity Conservation 2001-2005, Canberra.
- DAA (2016) Aboriginal Heritage Inquiry System, Department of Aboriginal Affairs, Perth < <http://maps.dia.wa.gov.au>> Viewed July 2016.
- DEC (2008) Forest Black Cockatoo (Baudin’s Cockatoo *Calyptorhynchus baudinii* and Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*) Recovery Plan. Department of Environment and Conservation, Western Australia
- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- DER (2016) Clearing Permit Decision Report for CPS 4935/1. Department Environment Regulation, Western Australia.
- DoE (2013) Matters of National Significance. Significant Impact Guidelines 1.1 Environmental Protection and Biodiversity Conservation Act 1999, Department of the Environment, Commonwealth of Australia, Canberra.
- DoE (2015a) *Calyptorhynchus latirostris* in Species Profile and Threats Database, Department of the Environment, Canberra,

- <http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59523> Viewed 23 March 2015.
- DoE (2015b) *Calyptorhynchus banksii naso* in Species Profile and Threats Database, Department of the Environment, Canberra <<http://www.environment.gov.au>> Viewed March 2015
- DoE (2015c) *Dasyurus geoffroii* in Species Profile and Threats Database, Department of the Environment, Canberra <<http://www.environment.gov.au>> Viewed March 2015.
- DPC (2015) Perth and Peel Green Growth Plan for 3.5 million; Strategic Assessment of the Perth and Peel Regions. Draft Action Plan D: Basic Raw Materials. Government of Western Australia, Department of the Premier and Cabinet, December 2015 <<https://www.dpc.wa.gov.au>> Accessed October 2016.
- DMP (2015) Sand Resource Advice for CPS 6492/1 – Rocla Pty Ltd – Clearing of 17.359 ha of native vegetation within Mining Lease 70/915. Department of Mines and Petroleum, Resources Branch, East Perth, Western Australia.
- DPaW (2015a) NatureMap, Department of Parks and Wildlife <<http://naturemap.dec.wa.gov.au>> Viewed March 2015.
- DPaW (2015b) TEC and Flora Advice for CPS 6492/1 – Rocla Pty Ltd – Clearing of 17.359 ha of native vegetation within Mining Lease 70/915. Department of Parks and Wildlife, Species and Communities Branch, Kensington, Western Australia.
- DPaW (2015c) Black Cockatoo Advice for CPS 6492/1 – Rocla Pty Ltd – Clearing of 17.359 ha of native vegetation within Mining Lease 70/915. Department of Parks and Wildlife, Species and Communities Branch, Kensington, Western Australia.
- DPaW (2015d) Carnaby's Cockatoo *Calyptorhynchus latirostris* Fauna Profile, Department of Parks and Wildlife, <http://www.dpaw.wa.gov.au/images/documents/plants-animals/animals/animal_profiles/carnabys-cockatoo_2012.pdf> Viewed March 2015.
- DPaW (2015e) 2015 South West Forest and Swan Coastal Plain Vegetation Complex Statistics: a report prepared for the Department of Environment Regulation. Current as of March 2015. Department of Parks and Wildlife, Perth, Western Australia.
- DPaW (2011a) Plants Used by Carnaby's Cockatoo, Department of Parks and Wildlife <http://www.dpaw.wa.gov.au/images/documents/plants-animals/animals/p4c_plantlist_20110415.pdf> Viewed March 2015.
- DPaW (2011b) Graceful Sun-Moth (*Synemon gratiosa*) Information Sheet, Department of Parks and Wildlife <<http://www.dpaw.wa.gov.au/images/documents/about/science/pubs/infosheets/sdis041.pdf>> Viewed March 2015.
- EPA (2006) Guidance for the Assessment of Environmental Factors – level of assessment of proposals affecting natural areas within the System 6 region and Swan Coastal Plain portion of the System 1 Region. Report by the EPA under the Environmental Protection Act 1986. No. 10, Western Australia.
- GHD (2014) Banksia Road Reserve - Conservation Significant Flora and Fauna Trapping Assessment. Prepared for City of Kwinana. Unpublished report. GHD Pty Ltd, Western Australia.
- GHD (2015) City of Kwinana – Lot 53 and 1320 Banksia Road, Autumn Fauna Survey. Unpublished report. GHD Pty Ltd, Western Australia.
- Glevan Consulting (2008) Wellard Reserve Phytophthora cinnamomi Assessment, Glevan Consulting, Erskine, Western Australia.
- Government of Western Australia (2015) 2015 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report) Current as of June 2015. WA Department of Parks and Wildlife, Perth.
- Ironbark Environmental (2008) Shire of Serpentine-Jarrahdale Local Biodiversity Strategy, Final version 8 July 2008. Report prepared for the Shire of Serpentine-Jarrahdale, Perth, Western Australia.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Local Biodiversity Program (2012-2014) Environmental Planning Tool V4, Public Version <<http://lbp.asn.au/module/enviro>> Accessed March 2015.
- Minister for Environment (2010) Minister's Appeal Determination. Appeal against refusal to grant clearing permit 2757/1 - Lot 6 Banksia Road and Lots 300 and 301 Boomerang Road, Oldbury, Shire of Serpentine/Jarrahdale.
- Mitchell et al. (2002) Swan Coastal Plain 2 (SWA2 – Swan Coastal Plain subregion), Department of Conservation and Land Management.
- PGV Environmental (2008) Banksia Road Wellard, Black Cockatoo Habitat Assessment. Prepared for Rocla. PGV Environmental, Osborne Park, Western Australia.
- PGV Environmental (2014) Banksia Road Wellard, Black Cockatoo Habitat Assessment. Prepared for Rocla. PGV Environmental, Osborne Park, Western Australia.
- PGV Environmental (2015) Mining Lease 70/915, Banksia Road, Wellard, Clearing Permit Application. Prepared for Rocla. PGV Environmental, Osborne Park, Western Australia.
- Ramboll Environ (2015) Review of Remedial and Management Action Plan, Banksia Road Rifle Range. Provided to City of Kwinana. Ramboll Environ, East Perth, Western Australia.
- RPS (2015) Groundwater Profile modelling. Lot 6 Banksia Road and Lots 300 and 301 Boomerang Road, Oldbury. RPS Environment and Planning Pty Ltd. Rev 0. January 2015.
- RPS (2016) Groundwater Profile modelling. Lot 6 Banksia Road and Lots 300 and 301 Boomerang Road, Oldbury. RPS Environment and Planning Pty Ltd. Rev 2. March 2016.
- SLR Consulting (2014) Remedial Action and Management Plan Proposed Wellard Sand Quarry Wellard, WA (Revised Document Following Consultation) Report No: 610.13852-R1. Prepared for Rocla Pty Ltd by SLR Consulting, November 2014.
- Shah, B. (2006) Conservation of Carnaby's Black-Cockatoo on the Swan Coastal Plain, Western Australia. December 2006. Carnaby's Black-Cockatoo Recovery Project. Birds Australia, Western Australia.
- WAPC (2007) Jandakot Structure Plan: Final Report August 2007. Western Australian Planning Commission. Government of Western Australia, Perth, Western Australia.

5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia
DAFWA	Department of Agriculture and Food, Western Australia
DEC	Department of Environment and Conservation, Western Australia (now DPaW and DER)
DER	Department of Environment Regulation, Western Australia
DMP	Department of Mines and Petroleum, Western Australia
DRF	Declared Rare Flora
DoE	Department of the Environment, Australian Government
DoW	Department of Water, Western Australia
DPaW	Department of Parks and Wildlife, Western Australia
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DoE)
EPA	Environmental Protection Authority, Western Australia
EP Act	<i>Environmental Protection Act 1986</i> , Western Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
PEC	Priority Ecological Community, Western Australia
RIWI Act	<i>Rights in Water and Irrigation Act 1914</i> , Western Australia
TEC	Threatened Ecological Community

Definitions:

{DPaW (2015a) Conservation Codes for Western Australian Flora and Fauna. Department of Parks and Wildlife, Western Australia}:-

T **Threatened species:**
Published as Specially Protected under the *Wildlife Conservation Act 1950*, listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).

Threatened fauna is that subset of ‘Specially Protected Fauna’ declared to be ‘likely to become extinct’ pursuant to section 14(4) of the Wildlife Conservation Act.

Threatened flora is flora that has been declared to be ‘likely to become extinct or is rare, or otherwise in need of special protection’, pursuant to section 23F(2) of the Wildlife Conservation Act.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR **Critically endangered species**
Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

EN **Endangered species**
Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

VU **Vulnerable species**
Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

EX **Presumed extinct species**
Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.

- IA Migratory birds protected under an international agreement**
Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- CD Conservation dependent fauna**
Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- OS Other specially protected fauna**
Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- P Priority species**
Species which are poorly known; or
Species that are adequately known, are rare but not threatened, and require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.
- P1 Priority One - Poorly-known species:**
Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
- P2 Priority Two - Poorly-known species:**
Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
- P3 Priority Three - Poorly-known species:**
Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
- P4 Priority Four - Rare, Near Threatened and other species in need of monitoring:**
(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.