



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 7014/1
Permit type: Purpose

1.2. Proponent details

Proponent's name: Western Areas Ltd

1.3. Property details

Property: Mining Lease 77/458
Local Government Area: Shire of Kondinin
Colloquial name: South Quest Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
5		Mechanical removal	Mineral exploration

1.5. Decision on application

Decision on Permit Application: Granted
Decision Date: 15 September 2016

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description The application area has been mapped as the following Beard vegetation association:

511: Medium woodland: salmon gum & morrel

A Level 2 targeted threatened and priority flora survey of the application area was undertaken by PEK Enviro (2016) during the period 24 – 26 June 2016. The vegetation survey identified the following four vegetation types of the application area:

1. **EpM** - Isolated *Eucalyptus salmonophloia* trees over *Eucalyptus pileata* mallee over mixed shrubs,
2. **EIM** - *Eucalyptus longicornis* mallee over mixed shrubs,
3. **EfM** - *Eucalyptus flocktoniae* subsp. *flocktoniae* mallee over mixed shrubs, and
4. **EOm** - Isolated *Eucalyptus livida* mallee trees over *Eucalyptus olivina* mallee and mixed shrubs.

Clearing Description South Quest Project.
Western Areas Ltd (Western Areas) proposes to clear up to 5 hectares within an application area of approximately 633 hectares for the purpose of mineral exploration. The project is located approximately 80 kilometres east of Hyden within the Shire of Kondinin.

Vegetation Condition Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994).

Comment PEK Enviro (2016) reported the application area has been disturbed through existing and historical exploration activities. A wildfire in 1994 also impacted the application area. Many of the historic exploration gridlines and access tracks are now largely overgrown and are often barely discernible from the surrounding vegetation (PEK Enviro, 2016). Previously cleared areas including drill sites and access tracks will be used to undertake exploration activities. New drill sites and drill lines may be required in some cases and this will be dependent on exploration target locations (PEK Enviro, 2016).

The original application area consisted of two polygons totalling 1,382.22 hectares. However, during the course of the assessment, this was changed to one polygon of 633 hectares. The total clearing area proposed was also reduced from the original 10 hectares to 5 hectares.

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 not likely to be at variance to this Principle**
The application area is located within the Southern Cross sub-region of the Coolgardie Interim Biogeographic Regionalisation of Australia (IBRA) bioregion and in the Coolgardie Botanical District (GIS Database). The Southern Cross subregion has subdued relief and consists of undulating uplands dissected by broad valleys with bands of low greenstone hills. Diverse *Eucalyptus* woodlands (*Eucalyptus salmonophloia*, *E. salubris*, *E. transcontinentalis*, *E. longicornis*) rich in endemic eucalypts occur around salt lakes, on low greenstone hills, valley alluvials and broad plains of calcareous earths (CALM, 2002).

The application area and surrounding area have been disturbed by historical exploration activities and from wildfire which impacted the Forrestania area in 1994. The majority of vegetation in the area is considered to be in very good condition. One weed species was noted during the flora and vegetation survey (PEK Enviro, 2016). Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

The flora and vegetation survey undertaken by PEK Enviro (2016) identified no Threatened Ecological Communities (TEC's) occurring within the application area. However, one Priority Ecological Community (PEC) was identified within the application area. The boundary of the Ironcap Hills vegetation complexes PEC (Priority 3) is located over a large western portion of the application area (GIS Database). The PEC buffer is large and approximately 31,020.63 hectares in size. Some of the vegetation associations have the potential to be mixed heath vegetation associated with the PEC. The Species and Communities Branch of the Department of Parks and Wildlife (DPaW) provided advice in relation to the clearing proposal. DPaW acknowledged no accurate mapping of the PEC boundary currently exists and recommended that further, site specific survey of the PEC area be completed prior to vegetation clearing (DPaW, 2016).

The applicant has since completed a Targeted Threatened and Priority flora survey of the application area (PEK Enviro, 2016). Western Areas have reduced the application area and removed the western polygon located entirely within the PEC area. The clearing area has also been reduced to 5 hectares and is located further east of the PEC area. It is unlikely that the vegetation complexes associated with the PEC will be impacted as the mixed heath vegetation associated with the PEC is not located within the application area (PEK Enviro, 2016). PEK Enviro (2016) concluded that the proposal is not likely to impact the values of the PEC. Given the clearing activities will avoid the mixed heath vegetation associated with the PEC and the clearing area has been reduced it is unlikely that the clearing will have a detrimental impact on Ironcap Hills vegetation complexes.

The flora and vegetation survey identified four vegetation types within the application area (PEK Enviro, 2016). A total of 73 species (including subspecies and varieties) from 36 genera and 22 families were recorded during the flora survey (PEK Enviro, 2016). No Threatened flora species were recorded during the flora survey (PEK Enviro, 2016). Two Priority flora species were recorded during the survey. These include; *Acacia asepala* (P2) (618 individuals recorded in the survey area) and *Microcorys* sp. Forrestania (V. English 2004) (P4) (342 individuals recorded in the survey area) (PEK Enviro, 2016). The flora survey report confirms clearing activities have the potential to impact approximately 59 individuals of *A. asepala* and approximately 54 individuals of *M. sp.* Forrestania (V. English 2004) (PEK Enviro, 2016). There are 17 records of *A. asepala* and 35 records of *M. sp.* Forrestania (V. English 2004) in the surrounding area indicating these two species are not locally restricted (WA Herbarium, 2016). Western Areas (2016) confirm clearing of Priority flora individuals will be avoided where possible by demarcation of individuals using a 10 metre buffer. Where clearing of the Priority flora species is unavoidable, liaison with DPaW will be undertaken (Western Areas, 2016).

A desktop fauna survey of a broader survey area (1,376 hectares) identified 360 fauna species potentially occurring within the application area, indicating the area is highly diverse. However, the on-site fauna survey located a small number of reptile species (two species), a large number of bird species (36 species), a small number of mammal species (three species including one introduced species were identified) and no short range endemic (SRE) species within the application area (Australasian Ecological Services, 2015).

The fauna survey report confirmed suitable foraging and breeding habitat (mallee over shrubland) for Malleefowl (*Leipoa ocellata* – Vulnerable) within the application area (Australasian Ecological Services, 2015). Large areas (approximately 730 hectares) of mallee habitat exist in the broader fauna survey area which contain suitable nesting and foraging habitat for Malleefowl species (Australasian Ecological Services, 2015). However, the fauna survey reported a large amount of similar habitat is located nearby and the proposed clearing is unlikely to adversely impact on habitat required for the Malleefowl population (Australasian Ecological Services, 2015).

Breeding and foraging habitat was identified in the application area for Carnaby's Cockatoo (*Calyptorhynchus latirostris* – Endangered). Although, no Carnaby's Cockatoo individuals were confirmed during the fauna survey, suitable potential, nesting habitat and suitable foraging habitat for the species was located in the application area. Salmon Gum trees which are potential nesting trees for Carnaby's Cockatoos are located in the application area (Australasian Ecological Services, 2015). The fauna survey report confirms it is unlikely the proposed clearing would have a significant impact on the species as large amounts of similar habitat are located nearby, the application area is not critical habitat for the species, the clearing area is small and temporary in nature (Australasian Ecological Services, 2015).

Due to the small size and temporary nature of the proposed clearing, and the fact the vegetation proposed to be cleared is well represented in the surrounding area, it is unlikely the proposal will result in the clearing of native vegetation that has higher biodiversity values than the surrounding, undisturbed vegetation.

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

Methodology Australasian Ecological Services (2015)
CALM (2002)
Department of Natural Resources and Environment (2002)
DPaW (2016)

DotEE (2016)
PEK Enviro (2016)
Western Areas (2016)
Western Australian Herbarium (2016)

GIS Database:
- Threatened Fauna
- Threatened and Priority Flora
- TEC/PEC – Buffer
- TEC/PEC – Boundaries

(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 not likely to be at variance to this Principle

A Level 1 fauna survey was conducted over the application area. Based on the results of this survey the following five broad fauna habitat types have been recorded in the application area (Australasian Ecological Services, 2015).

1. Mallee over shrubland (low to high mallee over mostly *Melaleuca*, *Acacia*, *Triodia*);
2. Mallee over shrubland (mixed Eucalyptus over dwarf shrubland);
3. Open woodland over shrublands;
4. Mallee over *Melaleuca/Allocasuarina* community on gravel and slopes; and
5. Mallee over *Triodia*.

The most widespread fauna habitat type of the application area was mallee over shrubland (low to high mallee over mostly *Melaleuca*, *Acacia*, *Triodia*) (Australasian Ecological Services, 2015).

A search of available biological databases was undertaken and no Threatened fauna were recorded in the application area (GIS Database). A desktop survey of fauna species potentially occurring in the region was undertaken prior to the fauna survey (Australasian Ecological Services, 2015).

The desktop fauna survey of a broader survey area (1,376 hectares) identified 360 fauna species potentially occurring within the application area, indicating the area is highly diverse. However, the on-site fauna survey located a small number of fauna species including two reptiles species, 36 bird species and three mammal species (including one introduced species). No short range endemic (SRE) species were located in the application area (Australasian Ecological Services, 2015).

Based on previous surveys and database searches, 14 fauna species of conservation significance were identified as potentially occurring within the application area. Of these conservation significant fauna species, ten were bird species. The remaining conservation significant fauna species identified as potentially occurring in the application area included, the Western Quoll (*Dasyurus geoffroii* – Vulnerable), Lake Cronin Snake (*Paroplocephalus atriceps* – Priority 3), Western Brush Wallaby (*Macropus irma* – Priority 4) and the Southern Brown Bandicoot (*Isodon obesulus* subsp. *fusciventer*) (Australasian Ecological Services, 2015). Of these conservation significant species, most were not recorded in the application area and none of the species are dependent on the area as large areas of preferred habitat are located in surrounding areas. For these reasons the potential impact on each species was considered to be low, negligible or medium (Australasian Ecological Services, 2015).

The fauna survey recorded suitable foraging habitat (shrublands and woodlands) for the Rainbow Bee-eater (*Merops ornatus* - Migratory), within the application area (Australasian Ecological Services, 2015). The fauna survey also reported the potential for breeding habitat in the application area (Australasian Ecological Services, 2015). However, no evidence of breeding was recorded in the application area during the fauna survey (Australasian Ecological Services, 2015).

It is unlikely Rainbow Bee-eater individuals would rely on the application area as this species often require close proximity to a permanent water source and no permanent or semi-permanent watercourses were recorded during the fauna survey (Australasian Ecological Services, 2015; DotEE, 2016). Rainbow Bee-Eaters are highly mobile and widely distributed around Australia, therefore the application area is not considered to be significant habitat for the species (Australasian Ecological Services, 2015; DotEE, 2016).

No Malleefowl (*Leipoa ocellata* – Vulnerable) individuals or mounds were identified in the application area during the fauna survey (Australasian Ecological Services, 2015). However, the fauna report confirmed suitable foraging and breeding habitat (mallee over shrubland) for Malleefowl is recorded in the application area (Australasian Ecological Services, 2015). Large areas (approximately 730 hectares) of mallee habitat exist in the broader survey area which contain suitable nesting and foraging habitat for Malleefowl species (Australasian Ecological Services, 2015).

The fauna report confirms the loss of tree and shrubland fauna habitats would remove a very small area of breeding and feeding habitat for Malleefowl individuals in the area (Australasian Ecological Services, 2015). According to the fauna survey report a large amount of similar habitat is located nearby and the proposed clearing is unlikely to adversely impact on habitat required for the Malleefowl population (Australasian

Ecological Services, 2015). According to Western Areas (2016) a number of management strategies will be implemented to prevent potential impacts to important Malleefowl habitat, including pre-clearing searches of conservation significant species, all clearing to be minimised and the use of existing access tracks and previously cleared areas, where possible. In the event that an active Malleefowl mound is located, no clearing activities are to be undertaken within the mound area and a 100 metre avoidance buffer from the mound area will be implemented (Western Areas, 2016).

Breeding and foraging habitat was identified in the application area for Carnaby's Cockatoo (*Calyptorhynchus latirostris* – Endangered). Although, no Carnaby's Cockatoo individuals were confirmed during the fauna survey, suitable potential, nesting habitat (Salmon Gum trees) and suitable foraging habitat (proteaceous plant species) for Carnaby's Cockatoos were located in the application area (Australasian Ecological Services, 2015). Large areas (approximately 843 hectares) of *Eucalyptus salmonophloia* - Open Tall to Open Woodland and Mixed *Eucalyptus* spp. Woodland which is suitable nesting habitat for Carnaby's Cockatoos (approximately 615 hectares) exists in the broader survey area of 1,376 hectares (PEK Enviro, 2015). The survey identified the possible loss of breeding habitat if large trees are cleared and minor loss of foraging habitat if Eucalyptus and proteaceous shrublands are cleared (Australasian Ecological Services, 2015).

It is unlikely the proposed clearing would have a significant impact on the species as large amounts of similar habitat are located nearby and the clearing area is small (5 hectares). Australasian Ecological Services (2015) reported the habitat in the application area is not critical to the survival of Carnaby's Cockatoo species. Western Areas (2016) have prepared a Ground Disturbance Procedure for the proposal which outlines the necessary management strategies to be implemented in order to minimise impacts to threatened fauna. Some of these strategies include avoiding disturbance to large habitat trees (Western Areas, 2016).

Given the small amount of native vegetation clearing required and the large amount of suitable mallee, shrubland and Eucalyptus woodland habitat located in the region and surrounding area, the potential impact on conservation fauna species is considered to be low (Australasian Ecological Services, 2015).

The area proposed to be cleared does not contain significant habitat for fauna species indigenous to Western Australia.

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

Methodology Australasian Ecological Services (2015)
DotEE (2016)
PEK Enviro (2015)
Western Areas (2016)

GIS Database:
- Threatened Fauna

(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

A search of available databases was undertaken and no Threatened flora have been recorded in the application area (GIS Database). A flora survey was undertaken by PEK Enviro (2016) and no species of Threatened flora were recorded in the application area. The native vegetation proposed to be cleared is not likely to contain or is not necessary for the continued existence of rare flora.

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

Methodology PEK Enviro (2016)

GIS Database:
- Threatened and Priority Flora

(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 is not likely to be at variance to this Principle

According to available databases no Threatened Ecological Communities (TEC's) occur within the application area (GIS Database). PEK Enviro (2016) reported no vegetation communities considered to be a TEC within or near the application area as a result of the flora survey.

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

Methodology PEK Enviro (2016)

GIS Database:
- TEC/PEC - Buffers

(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 not at variance to this Principle**
 The application area falls within the Coolgardie Interim Biogeographic Regionalisation of Australia (IBRA) bioregion in which approximately 97.96% of the pre-European extent of vegetation remains in Western Australia (refer to table below) (Government of Western Australia, 2014; GIS Database). As large areas of the pre-European extent of native vegetation remain within the Coolgardie IBRA region, the vegetation is considered to be of 'least concern' with regards to conservation status (Department of Natural Resources and Environment, 2002).

The native vegetation located in the application area has been mapped as Beard vegetation association 511 (GIS Database). This vegetation association has not been extensively cleared as over 74% remains at the State level and over 93% remains at the bioregional level (refer to table below) (Government of Western Australia, 2014).

Large areas of vegetation have been cleared in the broader Wheatbelt region. However, in the north-eastern Wheatbelt and the area surrounding this proposal there are large areas of intact native vegetation (GIS Database). The application area is not considered to be significant as a remnant in an area that has been extensively cleared (GIS Database).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in All DPaW Managed Land
IBRA Bioregion – Coolgardie	12,912,204	12,648,491	~ 97.96	Least Concern	15.89
Beard veg assoc. – State					
511	700,692	520,624	~74.30	Least Concern	15.37
Beard veg assoc. – Bioregion					
511	464,423	435,177	~ 93.70	Least Concern	19.35

* Government of Western Australia (2014).

** Department of Natural Resources and Environment (2002).

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

Methodology Department of Natural Resources and Environment (2002)
 Government of Western Australia (2014)
 PEK Enviro (2015)
 Western Areas (2016)

GIS Database:
 - IBRA WA (Regions - Sub Regions)
 - 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 likely to be at variance to this Principle**
 There are no permanent watercourses or water bodies mapped within the application area (GIS Database). One minor, ephemeral watercourse is located in the southern portion of the application area (GIS Database). PEK Enviro (2016) report that the vegetation communities within the application area were not identified as growing in association with a watercourse. Therefore, the proposed clearing is not likely to be at variance to this Principle.

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

Methodology PEK Enviro (2016)

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 is not likely to be at variance to this Principle

Northcote, et al. (1960-68) describes the majority of soils in the application area as sandy, neutral and alkaline yellow mottled soils on gently undulating plains with broad, shallow drainage depressions (GIS Database). PEK Enviro (2016) reported the soils of the application area in the undulating plains as shallow, calcareous earths on the rises and colluvial deposits of deep, calcareous earths on intervening flats. These soils do not readily erode but may be subjected to minor wind erosion once vegetation has been cleared. Localised surface water run-off may occur following heavy rainfall events and if surface water drainage on-site is not managed. It is unlikely the proposal will alter surface water flows or soil salinity levels or impact on-site or off-site nutrient export. Clearing activities are not likely to cause adverse land degradation impacts.

The surrounding and regional areas have not been cleared of native vegetation. It is unlikely that the relatively small amount of clearing required for the proposal (5 hectares) within a 633 hectare boundary area will cause waterlogging, flooding or degradation of the land in the area.

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

Methodology Northcote, et al. (1960-68)
PEK Enviro (2016)

GIS Database:
- Hydrography, linear
- Rangeland Land System Mapping

(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 is not likely to be at variance to this Principle

The application area does not lie within any conservation areas or Department of Parks and Wildlife managed lands (PEK Enviro, 2016; GIS Database). The nearest conservation area is the Lake Cronin Nature Reserve which is located approximately 1 kilometre south of the application area (GIS Database). The proposed clearing is not likely to have any impacts on the environmental values of adjacent or nearby conservation areas.

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

Methodology PEK Enviro (2016)

GIS Database:
- DPaW 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 is not likely to be at variance to this Principle

No Public Drinking Water Source Areas (PDWSA) are located within or in the vicinity of the application area. (GIS Database). There are no permanent watercourses or wetlands located within the application area (PEK Enviro, 2015; GIS Database). The nearest permanent watercourse, Lake Cronin is located approximately 1 kilometre south of the application area (Western Areas, 2016; GIS Database). One minor, ephemeral watercourse occurs in the southern portion of the application area (GIS Database). This ephemeral watercourse drains south towards Lake Cronin (GIS Database).

Groundwater salinity within the application area is between 1,400 – 35,000 milligrams per litre of Total Dissolved Solids (TDS) (GIS Database). It would not be expected that the proposed clearing of 5 hectares within a permit boundary of 633 hectares would cause salinity levels within the application or surrounding area to alter. No changes to the pH of groundwater are expected as a result of the clearing. The proposed clearing is unlikely to cause deterioration in the quality of surface water including erosion or eutrophication of water bodies on-site or off-site.

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

Methodology PEK Enviro (2015)
Western Areas (2016)

GIS Database:
- Groundwater Salinity, Statewide
- Hydrography, linear
- Public Drinking Water Source 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 is not likely to be at variance to this Principle

Mean annual rainfall recorded at the nearest weather station located at Hyden recorded 275.6 millimetres during 2015 (BoM, 2016). The total average annual evaporation for the area is 2,400 millimetres (BoM, 2016). As the application area receives low rainfall and annual evaporation is high, there is likely to be little surface flow during normal seasonal rains.

The soils of the application area are not subject to waterlogging during normal seasonal rainfall (Northcote, et al. 1960-68; GIS Database). The application area receives low annual rainfall and high average annual evaporation (BoM, 2016). For these reasons, the relatively small amount of native vegetation clearing is unlikely to cause or exacerbate the incidence or intensity of localised or regional flooding. The surrounding area is also well vegetated further reducing the likelihood of or intensity of flooding (GIS Database).

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

Methodology BoM (2016)
Northcote, et al. (1960-68)

GIS Database:
- Hydrography, linear

Planning instrument, Native Title, Previous EPA decision or other matter.

Comments There are two native title claims (WC2000/007 and WC2003/006) over the application area (DAA, 2016). These claims have been registered with the National Native Title Tribunal on behalf of the claimant groups (DAA, 2016). However, the 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 within the application area (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, 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.

The clearing permit application was advertised on 11 April 2016 by the Department of Mines and Petroleum inviting submissions from the public. There were no submissions received.

Methodology DAA (2016)

4. References

- Australasian Ecological Services (2015) Level 1 Fauna Survey, Proposed Clearing Envelopes, South Quest Forresteria, Unpublished report prepared for Western Areas Ltd, December 2015.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Coolgardie2 (COO2 – Southern Cross subregion) Department of Conservation and Land Management, Perth, Western Australia.
- BoM (2016) Bureau of Meteorology Website - Climate Data Online, Hyden. Bureau of Meteorology. <http://www.bom.gov.au/climate/data/index.shtml>. (Accessed 13 September 2016).
- DAA (2016) Aboriginal Heritage Inquiry System. Department of Aboriginal Affairs. <http://maps.dia.wa.gov.au/AHIS2> (Accessed 7 September 2016).
- 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.
- DPaW (2016) Department of Parks and Wildlife Advice Regarding Clearing Permit CPS 7014/1 – Western Areas Ltd, South Quest Project. Correspondence dated 12 May 2016, Species and Communities Branch, Perth, Western Australia.
- DotEE (2016) *Merops ornatus* in Species Profile and Threats Database. Department of the Environment. <http://www.environment.gov.au/sprat>. Department of the Environment and Energy, Canberra. (Accessed 16 May 2016).
- Government of Western Australia (2014) 2014 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Western Australian Department of Parks and Wildlife, Perth, Western Australia.
- Keighery B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of Western Australia (Inc.). Nedlands, Western Australia.
- Northcote, K. H. with Beckmann G. G., Bettenay E., Churchward H. M., van Dijk D. C., Dimmock G. M., Hubble G. D., Isbell R. F., McArthur W. M., Murtha G. G., Nicolls K. D., Paton T. R., Thompson C. H., Webb A. A. and Wright M. J. (1960-68): 'Atlas of Australian Soils, Sheets 1 to 10, with explanatory data'. CSIRO and Melbourne University Press: Melbourne.
- PEK Enviro (2015) Forresteria Nickel Operations, Regional Exploration Program, Level 1 Vegetation and Flora Survey, South Quest Area. Report prepared for Western Areas Ltd by PEK Enviro, Perth, Western Australia, November, 2015.

PEK Enviro (2016) Forrestania Nickel Operations, Regional Exploration Program, Targeted Threatened and Priority Flora Survey, South Quest Area. Report prepared for Western Areas Ltd by PEK Enviro, Perth, Western Australia, August, 2016.

Western Areas (2016) Clearing Permit Application Supporting Document – Forrestania Nickel Operation, South Quest. Western Areas Ltd, Perth, Western Australia, March 2016.

WA Herbarium (2016) Florabase - the Western Australian Flora. Flora Species Search, Department of Parks and Wildlife, Western Australian Herbarium. <http://florabase.dpaw.wa.gov.au/> (Accessed 13 September 2016).

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
DotEE	Department of the Environment and Energy, 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 DotE)
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 (2015) **Conservation Codes for Western Australian Flora and Fauna. Department of Parks and Wildlife, Western Australia**:-

T	Threatened species: Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i> , 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 <i>Wildlife Conservation Act 1950</i> , 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 <i>Wildlife Conservation Act 1950</i> , 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 <i>Wildlife Conservation Act 1950</i> , 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.