intelligent outcomes | respected experience

Native Vegetation Clearing Permit Application [Purpose Permit] - Supporting Documentation

Lots 37, 38, 39, 40 and 41 Barfield Road

Prepared for
Blokk Property Australia
by Strategen

July 2016

strategen
ENVIRONMENTAL

Native Vegetation Clearing Permit Application [Purpose Permit] - Supporting Documentation

Lots 37, 38, 39, 40 and 41 Barfield Road

Strategen is a trading name of
Strategen Environmental Consultants Pty Ltd
Level 1, 50 Subiaco Square Road Subiaco WA 6008
ACN: 056 190 419

July 2016

Limitations

Scope of services

This report ("the report") has been prepared by Strategen Environmental Consultants Pty Ltd (Strategen) in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Strategen. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

Reliance on data

In preparing the report, Strategen has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, Strategen has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Strategen has also not attempted to determine whether any material matter has been omitted from the data. Strategen will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Strategen. The making of any assumption does not imply that Strategen has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. Strategen disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

Client: Blokk Property Australia

Report Version	Revision No.	Purpose	Strategen author/reviewer	Submitted to Client	
				Form	Date
Draft Report	A	For client review	D White / D Panickar / D Newsome	Electronic	27/04/2016
Final Report	0	Issued for use	S Isbister / D Newsome	Electronic	24/06/2016
Final Report	1	Issued for use	C Courtauld / D Newsome	Electronic	19/07/2016

Filename: LEA15136_01 R004 Rev 0 - 19 July 2016

Table of contents

List of tables

List of figures

1. Introduction

1.1 Purpose

This Native Vegetation Clearing Permit (NVCP) application for a purpose permit has been prepared for assessment and approval to clear vegetation at Lots 37, 38, 39, 40 and 41 Barfield Road, Hammond Park (the site). This NVCP application relates to an area of approximately 1.41 ha, containing 0.88 ha of native vegetation proposed to be removed by Blokk Property Australia (Blokk Property) to facilitate the development of a 20 m wide mineral earth firebreak adjacent to the western boundary of the site (the proposed clearing area; Figure 1). The proposed clearing area is subject to a Western Power easement for high voltage power lines.

The firebreak is needed to meet the bushfire management requirements of *State Planning Policy 3.7: Planning in Bushfire Prone Areas* and associated *Guidelines for Planning in Bushfire Prone Areas* to facilitate the development of 171, 193, 205, 221 and Lot 16 Barfield Rd, Hammond Park which are zoned urban under the City of Cockburn Town planning Scheme No. 3 and the Metropolitan Region Scheme.

1.2 Proposal

Blokk Property propose to clear 0.88 ha of native vegetation to create a 20 m wide linear firebreak along the western boundary of Lots 37, 38, 39, 40 and 41, Barfield Road. This will allow for a strategic bushfire management measure comprised of low fuel defendable space between vegetation on Lots 37, 38, 39, 40 and 41, and adjacent residential development.

Based on the size of the urban zoned Lots and the bushfire risk posed by the Western Power easement; the proposal to establish the permanent 20 m wide firebreak is the most appropriate risk management solution that enables the achievement of the urban zoned land's intended purpose, and manages the risk of the landowners of the Western Power easement.

1.3 Ownership of land

Lots 37, 38 and 41 are owned by Electricity Networks Corporation, trading as Western Power and Lots 39 and 40 are owned by the Western Australian Planning Commission (WAPC). Permission to clear vegetation has been obtained from Western Power and WAPC.

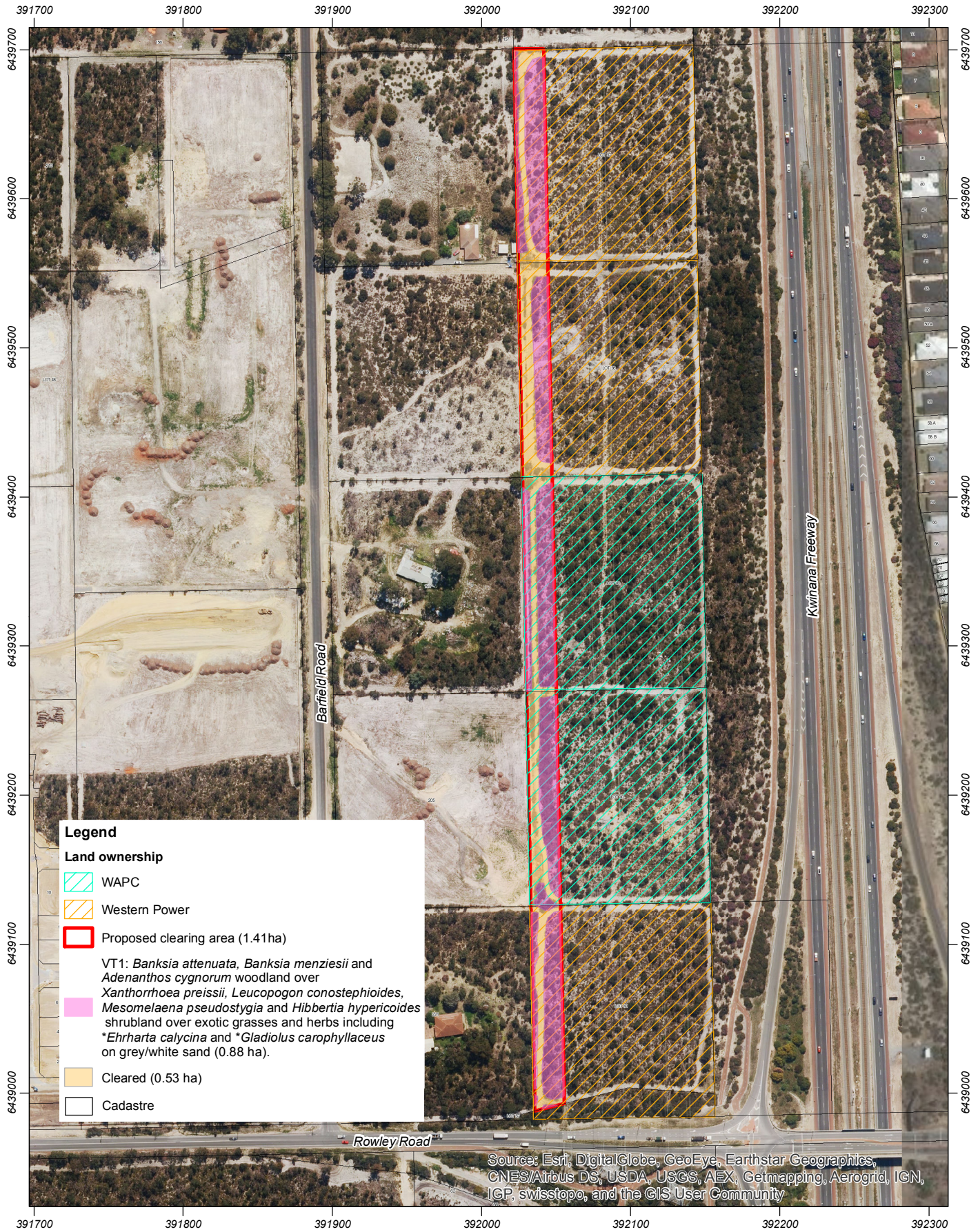

Figure 1: Lot 221 Barfield Road clearing permit - proposed clearing area

Scale 1:3,500 at A4

0 20 40 60 80 m

N

Coordinate System: GDA 1994 MGA Zone 50
Note that positional errors may occur in some areas
Date: 19/07/2016
Author: DWhite
Source: Aerial image: Landgate, flown September 2015. Cadastre: SLIP, landgate 2015.

Path: Q:\Consult\2015\LEA\LEA15136\ArcMap_documents\R004\RevA\LEA15136_01_R004_RevA_F001v2.mxd

strategen ENVIRONMENTAL
info@strategen.com.au
www.strategen.com.au

2. Overview of existing environment

A flora and vegetation survey was conducted by Strategen on 15 October 2015 within the proposed clearing area (Strategen 2016). A summary of the survey results is provided below.

2.1 Vegetation

2.1.1 Regional vegetation

Vegetation occurring within the region was initially mapped at a broad scale (1:1 000 000) by Beard during the 1970s. This dataset has formed the basis of several regional mapping systems, including physiographic regions defined by Beard (1981); System 6 Vegetation Complex mapping undertaken by Heddle et al. (1980); the biogeographical region dataset (Interim Biogeographic Regionalisation for Australia, IBRA) for Western Australia (DotE 2016a).

Beard (1990) Botanical Subdistrict

The proposed clearing area occurs within the Drummond Botanical Subdistrict which is characterised by low *Banksia* woodlands on leached sands; *Melaleuca* swamps on poorly-drained depressions; and *Eucalyptus gomphocephala* (Tuart), *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri) woodlands on less leached soils (Beard 1990).

IBRA subregion

IBRA describes a system of 85 'biogeographic regions' (bioregions) and 403 subregions covering the entirety of the Australian continent (Thackway & Cresswell 1995). Bioregions are defined on the basis of climate, geology, landforms, vegetation and fauna.

The proposed clearing area occurs within the Swan Coastal Plain 2 IBRA subregion which is dominated by *Banksia* or Tuart on sandy soils, *Casuarina obesa* on outwash plains and paperbark (*Melaleuca*) in swampy areas (Mitchell et al. 2002).

System 6 and vegetation system association mapping

System 6 mapping refers to vegetation mapping undertaken at a Vegetation Complex scale by Heddle *et al.* (1980). This is the primary source of information used to calculate potential impacts of proposals to clear native vegetation on the Swan Coastal Plain. The proposed clearing area occurs within the Bassendean – Central and South vegetation complex which is described as:

> woodlands of Jarrah (*Eucalyptus marginata*)–Sheoak (*Allocasuarina fraseriana*)–*Banksia* spp. to low woodlands of *Melaleuca* spp. and sedgelands on the moister sites.

At a finer scale, the proposed clearing area falls within the Bassendean 1001 vegetation system association '*Medium very sparse woodland; jarrah, with low woodland; Banksia & Casuarina'* as defined in Government of Western Australia (2014):

2.1.2 On-site vegetation

One vegetation type (VT) was identified within the proposed clearing area. This VT encompasses 0.88 ha (0.52 ha of vegetation in Lots 37, 38 and 41 owned by Western Power and 0.36 ha of vegetation in Lots 39 and 40 owned by WAPC) and is comprised of *Banksia attenuata*, *Banksia menziesii* and *Adenanthos cygnorum* woodland over *Xanthorrhoea preissii, Leucopogon conostephioides*, *Mesomelaena pseudostygia* and *Hibbertia hypericoides* low shrubland over exotic grasses and herbs including **Ehrharta calycina* and **Gladiolus caryophyllaceus* on grey/white sand (Figure 1). The balance of the proposed clearing area (0.53 ha) is cleared (Figure 1).

Vegetation condition within the proposed clearing area ranged from “Good-Degraded” to “Very Good-Good” in vegetated areas (Keighery 1994), with majority of the proposed clearing area (approximately 31%) mapped to be in “Good” condition.

2.2 Flora

A Naturemap search within a 3 km radius of the proposed clearing area was undertaken to determine the likelihood of any Threatened or Priority Flora species occurring therein (Parks and Wildlife 2007-; Strategen 2016). Seven Threatened flora and eight Priority flora species that have the potential to occur within the proposed clearing area. Of these, based on specific habitat requirements, two Threatened flora species (*Caladenia huegelii* and *Drakaea micrantha*) and one Priority 3 species (*Jacksonia gracillima*) were considered to have the potential to occur. These species were actively searched for during the field survey.

A total of 30 native vascular plant taxa from 24 plant genera and 16 plant families were recorded within the proposed clearing area. The majority of taxa were recorded within the Proteaceae (6 taxa) and Fabaceae (5 taxa) families.

No Threatened flora species as listed under section 178 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or pursuant to Schedule 1 of the *Wildlife Conservation Act 1950* (WC Act) and as listed by Parks and Wildlife (2015) or Priority flora species as listed by Western Australian Herbarium (1998-) were recorded within the proposed clearing area.

A total of 6 introduced (exotic) taxa were recorded within the proposed clearing area:

- **Briza maxima*
- **Chamelaucium uncinatum*
- **Ehrharta calycina*
- **Gladiolus caryophyllaceus*
- **Hypochaeris glabra*
- **Ursinia anthemoides.*

None of these species are listed as a Declared Plant species in Western Australia pursuant to Section 22 of the *Biosecurity and Agriculture Management Act 2007* (BAM Act; DAFWA 2015).

No further conservation significant flora searches were deemed to be necessary for the proposed clearing area as the survey was undertaken during the prime flowering time for those species with the potential to occur and none were recorded.

2.3 Fauna

A Naturemap search within a 3 km radius of the proposed clearing area was undertaken to determine Threatened and Priority Fauna species known to occur in the broader area (Parks and Wildlife 2007-). The likelihood of these species occurring within the proposed clearing area is presented in Table 1.

Table 1: Likelihood of Threatened and Priority Fauna species occurring in proposed clearing area

Species	Conservation status	Habitat requirements	Likelihood of occurrence in proposed clearing area
Calidris ferruginea (Curlew Sandpiper)	T	This species is migratory. Known habitat includes intertidal mudflats in sheltered coastal areas, such as estuaries and non-tidal swamps and lakes near the coast (DotE 2016b). The species has been recorded less often inland around lakes, dams and bore drains with bare edges of mud or sand (DotE 2016b). The distribution of the species is limited by land clearing and disturbance at roost and feeding sites (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Calyptorhynchus banksii subsp. *naso* (Forest Red-tailed Black-Cockatoo)	T	Known habitat includes dense Jarrah, Karri and Marri forests receiving more than 600 mm average rainfall annually (DotE 2016b. Although most records are in Jarrah-Marri forests, the subspecies has been observed in a range of other forest and woodland types, including Blackbutt, Wandoo, Tuart, Albany, Yate and Flooded Gum (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Calyptorhynchus baudinii (Baudin's Cockatoo)	T	Known habitat includes remnant eucalypt woodlands, especially Jarrah, Marri and Karri forest. The species is also known from the Perth metropolitan area and in remnant patches of native vegetation on land cleared for development or agriculture (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Calyptorhynchus latirostris (Carnaby's Cockatoo)	T	Known habitat includes remnant eucalypt woodlands, and shrubland or kwongan heathland dominated by *Hakea, Dryandra, Banksia* and *Grevillea* species. The species is known from the Perth metropolitan area and in remnant patches of native vegetation on land cleared for agriculture (DotE 2016b).	**Possible** due to the presence of known foraging plants (*Banksia* spp.) with in the proposed clearing area.
Dasyurus geoffroii (Chuditch, Western Quoll)	T	Current habitat largely restricted to the southwest forests. The distribution of the species is limited by land clearing and predation by feral cats and foxes (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Myrmecobius fasciatus (Numbat)	T	The remaining populations of the Numbat are in eucalypt forests and woodlands dominated by Jarrah, Marri and Wandoo (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Phascogale tapoatafa subsp. *tapoatafa* (Southern Brush-tailed Phascogale)	T	Habitat for this species occurs in dry sclerophyll forests and open woodlands that contain hollow-bearing trees (Parks and Wildlife 2012a).	**Unlikely** due to absence of preferred habitat.

Species	Conservation status	Habitat requirements	Likelihood of occurrence in proposed clearing area
Ardea modesta (Eastern Great Egret)	IA	This species is migratory and inhabits a wide range of wetland habitats including swamps and marshes, margins of rivers and lakes, damp or flooded grasslands, pastures or agricultural lands, reservoirs, sewage treatment ponds etc. (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Calidris acuminata (Sharp-tailed Sandpiper)	IA	This species is migratory. Known habitat includes shallow fresh or brackish wetlands and ephemeral wetlands. In Australia, this species is known to occur in sub coastal and coastal plains of the Pilbara region to the south-west and east Kimberley Division. The greatest threat to this species is indirect and direct habitat loss (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Calidris melanotos (Pectoral Sandpiper)	IA	This species is migratory and inhabits shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Calidris ruficollis (Red-necked Stint)	IA	This species is migratory. Known habitat includes sheltered coastal and intertidal areas. The greatest threat to this species is indirect and direct habitat loss (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Calidris subminuta (Long-toed Stint)	IA	This species is migratory and is a summer visitor to Australia. Known habitat includes terrestrial wetlands. Habitat loss is the main threat to this species (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Haliaeetus leucogaster (White-bellied Sea-Eagle)	IA	This species is migratory and inhabits coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Limosa limosa (Black-tailed Godwit)	IA	This species is migratory and is known to visit the coastal regions of Australia and is rarely found inland. Habitat loss is the main threat to this species (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Merops ornatus (Rainbow Bee-eater)	IA	Known habitat is within sandy, disturbed areas throughout Australia (DotE 2016b). Introduced predators and habitat loss remain a key threat to this species (DotE 2016b).	**Possible** as majority of the proposed clearing area is sandy and disturbed thus may represent suitable habitat for the species.
Plegadis falcinellus (Glossy Ibis)	IA	This species is migratory and inhabits fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Tringa Glareola (Wood Sandpiper)	IA	This species is migratory and inhabits well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes (DotE 2016b).	**Unlikely** due to absence of preferred habitat.
Tringa nebularia (Common Greenshank)	IA	This species is migratory and is known to occur along the coast of Western Australia and a wide variety of inland wetlands (DotE 2016b).	**Unlikely** due to absence of preferred habitat.

Species	Conservation status	Habitat requirements	Likelihood of occurrence in proposed clearing area
Lerista lineata (Perth Slider, Lined Skink)	P3	Habitat for this species on the Swan Coastal Plain is restricted to white or pale sands (specifically landforms S7 and S8) which support Banksia associated woodlands, heathlands and shrublands on the Bassendean and Spearwood dune vegetation complexes. This species has a preference for areas supporting a low percentage of clay and does not occur in areas of heavily waterlogged soils, such as dampland and swamp areas (Phoenix 2010).	**Possible** as majority of the proposed clearing area is comprised of Banksia woodlands on Bassendean sands.
Neelaps calonotos (Black-striped Snake)	P3	Habitat for this species is in Banksia woodlands and sandy area sof the Perth region (Western Australian Museum 2016).	**Possible** as majority of the proposed clearing area is comprised of Banksia woodlands on sand.
Falsistrellus mackenziei (Western False Pipistrelle)	P4	Habitat for this species occurs in wet sclerophyll forest dominated by Karri, and in the high rainfall zones of the Jarrah and Tuart forests. It has also been recorded in mixed Tuart-Jarrah tall woodlands on the adjacent coastal plain (Environment Australia 1999).	**Unlikely** due to absence of preferred habitat.
Hydromys chrysogaster (Water-rat)	P4	The Water Rat occupies habitats in the vicinity of permanent water (Parks and Wildlife 2012b).	**Unlikely** due to absence of preferred habitat.
Oxyura australis (Blue-billed Duck)	P4	Habitat for this species occurs in deep freshwater rivers and lakes with dense vegetation (Perth Zoo 2016).	**Unlikely** due to absence of preferred habitat.
Phaethon rubricauda (Red-tailed Tropicbird)	P4	This species is largely known from marine areas and nests on coastal cliffs (Environment & Heritage 2016).	**Unlikely** due to absence of preferred habitat.
Synemon gratiosa (Graceful Sunmoth)	P4	Habitat for this species is known from Coastal heathland on Quindalup dunes and Banksia woodland on Spearwood and Bassendean dunes, where *Lomandra hermaphrodita* is widespread (DotE 2016b).	**Possible** as majority of the proposed clearing area is comprised of Banksia woodlands with occurrences of *L. hermaphrodita.*
Isoodon obesulus (Southern Brown Bandicoot)	P5	Broad habitat requirements ranging from dense scrubby vegetation and forests, to cropland/pastures containing or adjacent to dense native vegetation. Southern Brown Bandicoots are often associated with wetlands on the Swan Coastal Plain (DEC 2012).	**Unlikely** due to absence of preferred habitat.
Isoodon obesulus subsp. fusciventer (Quenda, Southern Brown Bandicoot)	P5	Broad habitat requirements ranging from dense scrubby vegetation and forests, to cropland/pastures containing or adjacent to dense native vegetation. Quenda are often associated with wetlands on the Swan Coastal Plain (DEC 2012).	**Unlikely** due to absence of preferred habitat.
Macropus eugenii subsp. *derbianus* (Tammar Wallaby [WA subsp])	P5	This species inhabits coastal scrub, heath, dry sclerophyll forest and thickets in mallee and woodland (Parks and Wildlife 2012c).	**Possible** as preferred habitat occurs within the proposed clearing area.

T – Threatened, P – Priority, IA – Protected under international agreement

3. Assessment against the ten clearing principals

An assessment of the proposed clearing against the ten clearing principles outlined in Schedule 5 of the EP Act is provided in Table 2. This assessment demonstrates that the proposed removal of 0.88 ha of native vegetation is not at variance with the any of the clearing principles. On this basis, Blokk Property anticipates that the proposed clearing of 0.88 ha of native vegetation can occur.

Table 2: Assessment against the ten clearing principals

Principle		Assessment	Implications if cleared
(a)	Native vegetation should not be cleared if it comprises a high level of biological diversity.	Vegetation within the proposed clearing area is highly disturbed, with over half of the proposed clearing area (approx. 60%) cleared of native vegetation. Only 30 native vascular plant taxa were recorded from vegetation within the proposed clearing area. The proximity of public roads, nearby infrastructure (including the Western Power powerlines and associated firebreaks), and previous clearing for land development has had an impact on the vegetation condition within the proposed clearing area, particularly evident by weed infestations where native vegetation has been cleared for firebreaks (Strategen 2016). The understory also comprises exotic grasses and herbs including **Ehrharta calycina* and **Gladiolus caryophyllaceus*. As a result, the proposed clearing area does not constitute a site with high level of biological diversity.	Removal of vegetation within the proposed clearing area is not considered to be at variance with this principle as it will not result in the removal of vegetation comprising a high level of biological diversity.
(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.	Vegetation within the proposed clearing area is highly disturbed with over half of the proposed clearing area (approx. 60 %) cleared of native vegetation. The proposed clearing area contains 0.88 ha of *Banksia attenuata*, *Banksia menziesii* woodland, which are suitable as foraging species for Carnaby's Black-Cockatoo. No suitable nesting tree species were present (Strategen 2016).	Removal of vegetation within the proposed clearing area is not considered to be at variance with this principle. Although the proposed clearing area contains known habitat species for Carnaby's Black-Cockatoo, removal of vegetation will result in the loss of a negligible amount (0.88 ha) of foraging habitat only. Additionally, clearing will not result in further habitat fragmentation due to the location of the proposed clearing area within an area close proximity to public roads, and is adjacent to existing infrastructure.
(c)	Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	No Threatened or Priority Flora species are known from the proposed clearing area (Strategen 2016).	Removal of vegetation within the proposed clearing area is not considered to be at variance with this principle, as it is unlikely that any Threatened or Priority Flora species are present. As such, removal of vegetation will not result in the removal of individuals or habitat of these species.
(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.	No Threatened Ecological Communities are known from within the proposed clearing area (Strategen 2016).	Removal of vegetation within the proposed clearing area is not considered to be at variance with this principle as it will not directly impact, or affect the function of, any Threatened Community.

Principle		Assessment	Implications if cleared
(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.	A total of 0.88 ha of native vegetation is proposed to be cleared within an area adjacent to infrastructure (including the Western Power powerlines and firebreaks), and previous clearing for land development.	Removal of vegetation within the proposed clearing area is not considered to be at variance with this principle as it will not result in the removal of a significant remnant of vegetation. Rather, the proposed clearing area represents a small amount of disturbed vegetation adjacent to existing infrastructure.
(f)	Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	The site inspection undertaken by Strategen on 15 October 2015 indicated that vegetation within the proposed clearing area is not associated with watercourses or wetlands.	Removal of vegetation within the proposed clearing area is not considered to be at variance with this principle as this vegetation is not associated with a watercourse or wetland.
(g)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The proposed clearing will affect a small amount of vegetation (0.88 ha). Vegetation within the proposed area to be cleared is also located adjacent to infrastructure (including the Western Power powerlines and firebreaks).	Removal of vegetation within the proposed clearing area is not considered to be at variance with this principle, as the small amount of vegetation to be cleared is unlikely to cause any appreciable land degradation.
(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.	The proposed clearing area is not within or adjacent to a conservation area.	The proposed clearing area is located greater than 700 m from any conservation area and therefore the proposed clearing is not considered to be at variance with this principle.
(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.	The amount of vegetation proposed to be cleared is minimal and the end land use of the proposed clearing area (i.e. limestone firebreak) will not cause deterioration in the quality of surface or groundwater.	Removal of vegetation within the proposed clearing area is not considered to be at variance with this principle, as the intent of the proposed clearing (to facilitate construction of a firebreak) is unlikely to cause deterioration in the quality of surface or groundwater.
(j)	Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	The proposed clearing will affect a small amount of vegetation, has previously been disturbed for land development and is alongside existing infrastructure.	Removal of vegetation within the proposed clearing area is not considered to be at variance with this principle, as the area to be cleared is negligible, and is not expected to cause or exacerbate flooding in the area.

4. References

Beard JS 1981, *Swan, 1:1000000 vegetation series: explanatory notes to sheet 7: the vegetation of the Swan area,* University of Western Australia Press, Nedlands, Western Australia.

Beard JS 1990, *Plant Life of Western Australia.* Kangaroo Press, Kenthurst, New South Wales.

Department of Agriculture and Food (DAFWA) 2015, *Declared Pests (s22) list,* [Online], Government of Western Australia, Available from: *http://www.biosecurity.wa.gov.au/organisms/export/PER-DP* [10 Oct 2015].

Department of the Environment (DotE) 2016a, *Interim Biogeographic Regionalisation for Australia, Version 7,* [Online], Australian Government, Available from: *http://www.environment.gov.au/topics/land/national-reserve-system/science-maps-and-data/australias-bioregions-ibra* [10 Feb 2016].

Department of the Environment (DotE) 2016b, *Species Profile and Threats Database* [Online], Australian Government, Available from: *http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59523* [10 Feb 2016].

Department of Parks and Wildlife (Parks and Wildlife) 2007-, *Naturemap, Mapping Western Australia's Biodiversity,* [Online], Government of Western Australia, Available from: *http://naturemap.dec.wa.gov.au/default.aspx* [10 Feb 2016].

Department of Parks and Wildlife (Parks and Wildlife) 2012a, *Fauna profiles: Brush-tailed Phascogale,* Government of Western Australia, Perth, Western Australia.

Department of Parks and Wildlife (Parks and Wildlife) 2012b, *Fauna profiles: Water Rat,* Government of Western Australia, Perth, Western Australia.

Department of Parks and Wildlife (Parks and Wildlife) 2012c, *Fauna profiles: Tammar Wallaby,* Government of Western Australia, Perth, Western Australia.

Department of Parks and Wildlife (Parks and Wildlife) 2015, *Wildlife Conservation (Threatened Flora) Notice 2015,* [Online], Government of Western Australia, Available from: *https://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/2015_flora_notice.pdf* [15 Jan 2015].

Environment Australia 1999, *The Action Plan for Australian Bats,* Canberra.

Heddle EM, Loneragan OW & Havel JJ 1980, *Darling System, Vegetation Complexes*, Forest Department, Perth.

Keighery B 1994, *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*, Wildflower Society of Western Australia (Incorporated), Perth, Western Australia.

Mitchell D, Williams K & Desmond A 2002, 'Swan Coastal Plain 2 (SWA2 – Swan Coastal Plain subregion)', in *A biodiversity audit of Western Australia's 53 Biogeographical Subregions in 2002,* eds Department of Conservation and Land Management, Perth, pp. 606-623.

Office of Environment & Heritage 2016, *Red-tailed Tropicbird – profile,* [Online], NSW Government, Available from: *http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10609* [10 Feb 2016].

Perth Zoo 2016, *Blue-billed Duck,* [Online], Perth Zoo, Available from: *http://perthzoo.wa.gov.au/wp-content/uploads/2012/02/Blue-billed-Duck-Fact-Sheet-2012.pdf* [10 Feb 2016].

Phoenix Environmental Sciences (Phoenix) 2010, *Vertebrate Fauna Survey for the Roe Highway Extension Project,* prepared for South Metro Connect, 2010.

Strategen 2016, *221 Barfield Road, Hammond Park Flora and Vegetation Survey,* prepared for Landwest, January 2016.

Thackway & Cresswell 1995, *An Interim Biogeographic Regionalisation for Australia: A framework for setting priorities in the National Reserves System Cooperative Program Version 4,* Australian Nature Conservation Agency, Canberra.

Western Australian Herbarium 1998-, *FloraBase – the Western Australian Flora*, [Online], Government of Western Australia, Available from: *http://florabase.dpaw.wa.gov.au/* [27 Nov 2015].

Western Australian Museum 2016, *Meet the Black-Striped Snake*, [Online], Government of Western Australia, Available from: *http://museum.wa.gov.au/western-adventurer/what-black-striped-snake* [10 Feb 2016].