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WESTERN AUSTRALIA

Clearing Assessment Report – CPS 818

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Report Amendments

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1 PROPOSAL

1.1 Purpose and Justification

Main Roads Western Australia (Main Roads) proposes to upgrade the intersection of Indian Ocean Drive (IOD) and Cervantes Road. The proposal is in response to a crash investigation report that found that traffic on the IOD left turn slip lane masks the sightline for traffic turning out of Cervantes Road.

The proposal is to reconfigure the existing left-turning pocket to eliminate the masking issue by introducing a median island between the through lane and left turning lane. IOD will be widened and streetlights will be relocated to accommodate the upgrade. The outcome of the proposal is to reduce crashes and near misses by improving sightlines for turning traffic.

1.1.1 Main Roads Approach to Road Safety and the Environment

Main Roads is committed to minimising the environmental impacts of all of its activities, and manages the State road network to achieve balanced economic, social, safety and environmental benefits for the community. Main Roads recognises that Western Australia's environment is significant from a global perspective and the unique conservation values that are contained within its road reserve. Main Roads' road network often adjoins natural areas and in some locations, the reserve itself hosts remnant vegetation with high environmental values. Although the reserves were not established for this purpose, Main Roads recognises that it has a responsibility to conserve the environmental values that occur within the State's road network and minimise the impact its proposals have on the environment. In addition to providing a safe and efficient road network for all people using the roads under its control, Main Roads is also committed to protecting and enhancing the natural environment.

In accordance with National and State Government road safety policies, Main Roads is also committed to substantially reducing road trauma on the road network through Safe System principles. The Safe System approach acknowledges that more than two thirds of all serious crashes are due to human error rather than deliberate risk taking (e.g. speeding or drink driving) and seeks to improve behaviour through education and enforcement while managing the safety of vehicles, speeds and the road and road infrastructure. It is shown that improving sub-optimal road formation will substantially reduce the likelihood and severity of road crashes. For example, according to the Road Safety Management Guideline, increasing the sealed shoulder from 0.5 m to 2 m will reduce Killed and Seriously Injured numbers by more than 50%.

As the statutory authority responsible for providing and managing a safe and efficient main road network in Western Australia, Main Roads focuses on improving road safety by thoroughly considering all environmental, economic and community benefits and impacts. It operates on a hierarchy of avoiding, minimising, reducing and then, if required, offsetting our environmental impacts. This has been achieved through changes in proposal scope and design. Main Roads regularly reduces its clearing footprint by restricting earthworks limits for proposals, steepening batters, installing barriers, establishing borrow pits in cleared paddocks and avoiding temporary clearing for storage, stockpiles and turn around bays to avoid and minimise its impacts.

Further details on measures to avoid, minimise and reduce are provided in Section 1.5.

1.2 Proposal Scope

The proposed upgrade to the IOD and Cervantes Road intersection will comprise the following components:

- Widen IOD to accommodate a channelised left turning lane.
- Construct new median island and kerbing.
- Relocate streetlights.
- Land clearing and earthworks.

The proposed upgrade will utilise existing construction materials, water sources and stockpiling locations in the local area.

1.3 Proposal Location

The clearing area is located on IOD at Straight Line Kilometre (SLK) 144.19, approximately 2 km east of Cervantes in the Shire of Dandaragan, as shown in Figure 1.

1.4 Clearing Details

Proposed clearing to be undertaken using CPS 818: 0.15 ha.

The proposed temporary clearing under CPS 818: 0 ha.

Areas of Native Vegetation Clearing: The areas of native vegetation to be cleared are shown Figure 1.

Type of Native Vegetation: The type of vegetation to be cleared under this proposal is *Acacia xanthina*, *Melaleuca cardiophylla* tall open shrubland over *Melaleuca huegelii* subsp. *huegelii*, *Spyridium globulosum*, *Myoporum insulare* mid open shrubland over *Acacia lasiocarpa* var. *lasiocarpa*, *Melaleuca systena* low open shrubland and *Gahnia trifida* low sparse sedgeland (**AxMhAI**). This is shown in Figure 2.



Figure 1. Proposal Area and Native Vegetation Clearing Boundary



Figure 2. Vegetation Type

1.5 Alternatives to Native Vegetation Clearing Considered During Proposal Development

The following alternatives to clearing were considered during the development of the proposal:

- Do not upgrade the road, however this will potentially result in a poorer safety outcome and may result in future fatalities or serious injuries and further degradation of the State road asset.
- Reducing the speed limit along this section of IOD to minimise clearing requirements, however this will not achieve the safety outcome of the project as reducing traffic speed will not eliminate the sightline masking issue that is currently present.
- Reconfiguring the intersection within the boundary of the existing cleared shoulder was investigated however there is insufficient area to accommodate the new left turning lane, drainage and relocation of services and streetlights.

1.6 Measures to Avoid, Minimise, Reduce and Manage Proposal Clearing Impacts

The design and management measures implemented to avoid and minimise the potential clearing impacts of the Proposal are provided in Table 1.

Table 1. Measures Undertaken to Avoid, Minimise, Reduce and Manage the Proposal Clearing Impacts

Design or Management Measure	Discussion and Justification
Alignment to one side of existing road	The proposal is to reconfigure the existing intersection between IOD and Cervantes Road to improve the sightlines for turning traffic off Cervantes Road. The proposal will involve widening IOD to accommodate a channelised left turning lane. The widening will occur on one side of the road (LHS) and incorporate the existing cleared shoulder. Any further realignment of either IOD or Cervantes Road to improve sightlines would likely result in more clearing.
Alternative alignment located within pasture or degraded areas	The proposed intersection design incorporates existing cleared areas as much as possible. There are no alternative alignments that would result in less clearing, such as pastures or degraded areas.
Simplification of design to reduce number of lanes and/or complexity of intersections	The approach adopted in the design was to ensure the left-turning vehicles were shifted to the left sufficiently such that the safe intersection sight distance (SISD) to the right for a vehicle exiting Cervantes Road was achieved. The design is very simple keeping the new work within the existing cleared area where possible. The intersection widening works cannot be further simplified since the design adopted should be fit for an intended purpose.
Steepen batter slopes	The batter slope of 6:1 is adopted in the design keeping consistent with the existing batter slope on the highway. The batter slopes should be traversable for trucks during installation, operation, and maintenance of streetlight poles, which are proposed to relocate on the new verge. Therefore, steepen batter slopes are not considered in the design.
Installation of barriers	The installation of safety barriers is not applicable for this project. The project includes the relocation of streetlight poles on the new verge and adequate width of the verge must be provided for accommodating light poles, power cable pit, control box including installation, operation and maintenance of light poles. Hence, installation of safety barriers would not reduce the clearing footprint.
Installation of kerbing	This project has considered kerbing the entire length of the new left turning pocket to avoid the construction of 1m sealed and 0.5m unsealed shoulder, benefit in lessening the construction footprint.

Design or Management Measure	Discussion and Justification
Use of existing cleared areas for access tracks, construction storage and stockpiling	The new turning pocket will utilise the existing cleared areas on the approach up to SLK 144.10 however around the turning area at the intersection, clearing is required for the construction of pavement batter. No clearing will be required for the construction equipment storage, stockpiling and access track. Construction storage and stockpiling will be located in existing cleared areas.
Drainage modification	To limit the earthwork extent into the existing vegetation and to maintain the current drainage regime, the design considered grading the verge behind the kerb at 2% away from the kerb. This will limit water draining onto the pavement that may take the debris with it. The design will provide the adequate number of kerb openings to drain water to existing vegetation as per the existing drainage regime.

1.7 Approved Policies and Planning Instruments

The clearing of native vegetation in Western Australia is regulated under the *Environmental Protection Act 1986* (EP Act) and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act, Main Roads has also had regard to the below instruments where relevant.

Other Legislation potentially relevant for assessment of clearing and planning/other matters:

- *Biodiversity Conservation Act 2016* (WA) (BC Act).
- *Conservation and Land Management Act 1984* (WA) (CALM Act).
- *Country Areas Water Supply Act 1947* (WA) (CAWS Act).
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).
- *Planning and Development Act 2005* (WA) (P&D Act).
- *Soil and Land Conservation Act 1945* (WA).
- *Rights in Water and Irrigation Act 1914*.
- *Aboriginal Heritage Act 1972* (WA).

Environmental Protection Policies:

- Environmental Protection (Peel Inlet - Harvey Estuary) Policy 1992.
- Environmental Protection (Western Swamp Tortoise Habitat) Policy 2011.

Other relevant policies and guidance documents:

- Environmental Offsets Policy (Government of Western Australia, 2011).
- A guide to the assessment of applications to clear native vegetation (Government of WA, December 2014).
- Procedure: Native vegetation clearing permits (Government of WA, October 2019).
- Environmental Offsets Guidelines (Government of Western Australia, 2014).
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (Environmental Protection Authority (EPA), 2016).
- Technical guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA), 2020).
- Approved conservation advice under section 266B of the EPBC Act for threatened flora/fauna/vegetation communities.
- EPBC Act Referral guidelines for three Threatened black cockatoo species (Commonwealth of Australia, 2012).

2 SCOPE AND METHODOLOGY OF CLEARING ASSESSMENT

Native vegetation will be cleared to accommodate this proposal. This clearing will be undertaken using the Main Roads Statewide Clearing Permit CPS 818.

To comply with CPS 818, Main Roads must prepare a Clearing Assessment Report (CAR).

The CAR outlines the key activities associated with the proposal, the existing environment and an assessment of native vegetation clearing. This assessment provides an evaluation of the vegetation clearing impacts associated with the proposal using the ten Clearing Principles listed under s51 of the EP Act and strategies used to manage vegetation clearing.

2.1 Report Terminology and Sources

The following terms are used in this CAR:

- **Native Vegetation Clearing Area** – The maximum amount of native vegetation to be cleared for the proposal that will accommodate the designed earthworks and, typically, a nominal buffer to allow for the safe movement of machinery during construction.
- **Proposal Area** – The total footprint of the proposal including both cleared and uncleared areas. This is based on the current design. It usually includes a buffer to allow for constructability and the movement of machinery during construction.
- **Study Area** – The area covered by the desktop assessment. The study area for the proposal is confined to a local area of a 20 km radius. This is shown in Figure 3.
- **Survey Area** – The area covered by the biological and dieback surveys.

2.2 Desktop Assessment

A desktop assessment of the clearing area was undertaken by viewing internal datasets and other government agency managed databases, and consulting with relevant stakeholders where necessary.

GIS layer viewing and mapping is done using ArcGIS Pro. Referencing of the GIS layers accessed is done under the relevant methodology section of each Clearing Principle. Government managed databases were searched to locate additional information, which are found under References in Section 9.

2.3 Surveys and Assessments

The following surveys/assessments were undertaken to inform this CAR:

- Reconnaissance vegetation and flora survey.
- Dieback assessment.

A summary of the methodology and the results of the above surveys are provided in Section 3.



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3 SUMMARY OF SURVEYS

3.1 Overview of Surveys

Biological and targeted surveys conducted for the proposal are outlined in Table 2. A summary of the findings in these reports are presented in Sections 3.2 and 3.3.

Table 2. Summary of Biological and Targeted Surveys Relevant to the Proposal

Consultant & Survey Name	Survey Details

3.2 Summary of Flora and Vegetation Surveys

A reconnaissance flora and vegetation survey was undertaken along the south-west corner of the IOD and Cervantes Road intersection. The survey described one vegetation type in the survey area:

AxMhAI - *Acacia xanthina*, *Melaleuca cardiophylla* tall open shrubland over *Melaleuca huegelii* subsp. *huegelii*, *Spyridium globulosum*, *Myoporum insulare* mid open shrubland over *Acacia lasiocarpa* var. *lasiocarpa*, *Melaleuca systema* low open shrubland and *Gahnia trifida* low sparse sedgeland.

Vegetation was in very good condition. Part of the survey area was in the existing cleared maintenance zone and was devoid of native vegetation.

No significant ecological communities listed under the EPBC Act, the BC Act or by DBCA occur or were inferred to occur within the survey area.

A total of 45 plant taxa (36 native and nine introduced) from 25 families and 39 genera were recorded across the survey area. No Threatened flora species listed under the EPBC Act or BC Act, or Priority flora listed by DBCA were recorded in the survey area. No significant flora species were considered as possibly occurring following the field survey.

None of the introduced flora species recorded represent a Weed of National Significance (WoNS) or Declared Pest under the *Biosecurity and Agriculture Management Act 2007* (BAM Act).

3.3 Summary of Dieback Survey

As the clearing envelope is within a susceptible area to *Phytophthora* dieback, a dieback assessment was undertaken along the south-west corner of the IOD and Cervantes Road intersection.

No dieback infestations were observed during the survey and the vegetation within the proposal area was classified as uninterpretable due to an absence of reliable indicator species [REDACTED]

No obvious signs of vegetation decline were observed at the survey area. There was evidence of recent disturbance on the road reserve at the IOD and Cervantes Road intersection, however the remainder of the vegetation in the survey area was in very good condition. Approximately 0.07ha of the survey area was excluded from assessment due to being devoid of vegetation.

All the uninterpretable vegetation mapped during the survey is considered protectable.

4 VEGETATION DETAILS

4.1 Proposal Site Vegetation Description

The vegetation to be cleared comprises one vegetation type, described as *Acacia xanthina*, *Melaleuca cardiophylla* tall open shrubland over *Melaleuca huegelii* subsp. *huegelii*, *Spyridium globulosum*, *Myoporum insulare* mid open shrubland over *Acacia lasiocarpa* var. *lasiocarpa*, *Melaleuca systena* low open shrubland and *Gahnia trifida* low sparse sedgeland. The vegetation is typical of low, coastal heathland on sand and limestone found in the local area. The vegetation in the proposal area is in very good condition. Disturbances in the proposal area include the presence of weeds, grazing and adjacent roads/tracks (edge effects).

Table 3 and Table 4 provide details of the vegetation types and their condition within the proposal area and the remaining extents of these associations.

For a full description of the existing vegetation, refer to the flora and vegetation reconnaissance survey found at D22#260067.

Table 3. Summary of Vegetation Types within Clearing Area

Vegetation Type	Extent within Clearing Area (ha)	Total Extent Mapped (ha) within Survey Area	Vegetation Condition (EPA 2016)
AxMhAl	0.15 ha	0.51 ha	Very Good

Table 4. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre-European Extent (ha)	Current Extent (ha)	% Remaining	% Current Extent in DBCA Managed Land (proportion of pre-European Extent)
Veg Assoc No. 1026	Statewide	70,700.48	65,560.67	92.73	51.06
	IBRA Bioregion Swan Coastal Plain	58,419.39	54,819.58	93.84	52.27
	IBRA Sub-region Perth	58,419.39	54,819.58	93.84	52.27
	Local Government Authority Shire of Dandaragan	52,458.27	48,697.11	92.83	51.88

5 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

In assessing whether the proposal's proposed clearing is likely to have a significant impact on the environment, the Proposal was assessed against the ten Clearing Principles (EP Act, Schedule 5).

Each principle has been assessed in accordance with the former Department of Environment Regulation (now Department of Water and Environmental Regulation (DWER) '[A Guide to the Assessment of Applications to Clear Native Vegetation](#)' (Department of Environment Regulation, 2014) and other relevant clearing permit application decision reports prepared by DWER.

The proposed clearing is not likely to be at variance with the ten Clearing Principles.

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

Proposed clearing is not likely to be at variance to this Principle.

Assessment

The proposal area is located on the southwest corner of the IOD and Cervantes Road intersection. A total of 0.15 ha of vegetation in very good condition will be cleared for the proposed intersection upgrade. The vegetation has been affected by edge effects from adjacent roads and tracks, including weeds and grazing.

The clearing area comprises of one vegetation type, which is generally described as *Acacia xanthina* and *Melaleuca cardiophylla* tall open shrublands. The vegetation composition is considered typical of low, coastal heathland on sand and limestone found in the local area (ELA, 2022).

According to the desktop assessment, the clearing area intersects the buffer of the 'Stromatolite community of stratified hypersaline coastal lake (Lake Thetis)' Threatened Ecological Community (TEC). This TEC is listed as Vulnerable under the BC Act. As discussed in principle (d), the clearing area does not contain this community, and the proposed clearing will not result in any direct or indirect impacts.

The desktop assessment also identified the following in the study area:

- Banksia Dominated Woodlands of the Swan Coastal Plain TEC.
- Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain Priority Ecological Community (PEC).

The reconnaissance survey did not record any TECs or PECs in the clearing area.

A total of 36 native flora taxa from 25 families and 39 genera were recorded in the survey area. The survey did not record any Threatened or Priority species in the survey area. A post survey likelihood of occurrence assessment did not consider any significant flora species likely or possible to occur in the survey area (ELA, 2022).

According to DBCA Threatened and Priority fauna database search, 37 significant fauna species have been previously recorded in the study area however non have been previously recorded in the clearing area. While some of these species may use the clearing area for foraging habitat, the vegetation to be cleared is linear in nature and contiguous with surrounding native vegetation

and fauna will not be reliant on the clearing area for habitat. The clearing area is unlikely to contain a relatively higher level of fauna diversity than surrounding vegetation.

The clearing area is in an area that may be susceptible to *Phytophthora* dieback. Dieback can impact the biodiversity of an area by causing the loss of susceptible species and fauna habitat. No dieback infestations were observed during the dieback assessment and the vegetation within the survey area was classified as uninterpretable due to an absence of reliable indicator species [REDACTED]. All uninterpretable vegetation mapped during the survey is considered to be protectable.

The potential risk of the introduction and spread of dieback can be adequately managed by implementing standard management actions via the Construction Environmental Management Plan (CEMP).

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

Methodology

- Biological Survey (undertaken 29/10/2021)
- Dieback Survey (undertaken 07/06/2022)
- BoM Website (accessed 02/06/2022)
- DAWE Protected Matters Search Tool Report (accessed 20/12/2021)
- Government GIS Shapefiles:
 - DBCA Threatened and Priority Ecological Community database search (accessed 09/06/2022)
 - DBCA Threatened and Priority flora database search (accessed 09/06/2022)

(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.

Proposed clearing is not likely to be at variance to this Principle.

Assessment

The proposal area comprises one vegetation type which is generally described as Acacia and Melaleuca tall shrublands. The vegetation is considered typical of the local area. Based on a review of aerial imagery, there are extensive areas of native vegetation in the study area that will likely provide similar habitat to the clearing area.

The desktop assessment (DBCA Threatened and Priority fauna database search, DAWE Protected Matters Search Tool) identified 37 significant fauna species as potentially occurring within the proposal area, comprising of 13 Threatened, 5 priority, and 19 other specially protected species. Many of these species are marine or migratory species not relevant to the proposal as the area does not contain suitable habitat (closest surface water feature is 1.2km away) and no significant fauna species have been previously recorded in the clearing area.

It is unlikely that the proposal area represents significant habitat for any of these species as the proposal involves the removal of small linear sections of vegetation along a previously disturbed road corridor. There are large amounts of intact vegetation remaining in the area, that will act as a corridor for fauna. No linkages are likely to be broken by the proposal activities.

Although none of the significant fauna species identified as potentially occurring have been recorded in the clearing area, the following may occur based on the proximity of the proposal area to suitable habitat:

- *Calyptorhynchus latirostris* (Carnaby's Cockatoo – T).
- *Leipoa ocellata* (Malleefowl – T).
- *Falco peregrinus* (Peregrine Falcon - OS).
- *Austrosaga spinifer* (Spiny Katydid (Swan Coastal Plain) – P2).
- *Hylaeus globuliferus* (Woollybush Bee – P3).
- *Isodon fusciventer* (Quenda, Southwestern Brown Bandicoot – P4).
- *Notamacropus eugenii derbianus* (Tammar Wallaby – P4).
- *Synemon gratiosa* (Graceful Sunmoth – P4).

Carnaby's Cockatoo

The clearing area is in the non-breeding range for Carnaby's cockatoo (Commonwealth of Australia, 2012) and the vegetation reconnaissance survey did not record any vegetation types conducive to producing nesting hollows. No trees in the proposal area provided sufficient height or canopy to be considered potential roost locations for this species. It is also considered that no trees within the area could be deemed as current or future potential habitat trees for this species. The proposed clearing will not affect Carnaby's cockatoo breeding or roosting habitat.

Carnaby's Cockatoo foraging habitat generally comprises native shrubland, kwongan heathland and woodlands dominated by proteaceous plants species such as *Banksia*, *Hakea* and *Grevillea* (Commonwealth of Australia, 2012). The survey recorded one vegetation type in the clearing area comprising of Acacia and Melaleuca shrublands. This vegetation type is not considered suitable foraging habitat. While some isolated foraging individuals may be present in the proposal area, the removal of the small linear strip of native vegetation adjacent to the existing road is not considered to provide high quality foraging habitat or habitat crucial for this species. Therefore, it is unlikely that this species will be significantly impacted by the proposal activities.

Malleefowl

There are four records of Malleefowl in the study area occurring south-east of the proposal area from 1976 and 2012 located 12 and 13.6 km away respectively. The proposal area comprises thick Acacia and Melaleuca scrub on a sandy substrate, which may be suitable for Malleefowl breeding and foraging. No obvious Malleefowl activity was observed at the time of the reconnaissance survey (pers. comm. ELA, 2022). While some potential Malleefowl habitat will be impacted by the proposed clearing, it is a relatively small amount of vegetation located on the very edge of the road. There are extensive areas of similar habitat in the surrounding area that will represent habitat of similar or better value. Therefore, it is unlikely that this species will be significantly impacted by the proposal activities.

Peregrine Falcon

Peregrine falcon is a highly mobile species and would not be reliant on the proposal area for habitat. Therefore, it is unlikely that this species will be significantly impacted by the proposal activities.

Spiny Katydid

The Spiny Katydid is known to hide in shrubs and sing at night (Rent 1993). There are four records of Spiny Katydid in DBCA's Threatened species list, 2 of which are 10.9 km away in Nambung National Park in 1982 and 1984. Given the limited clearing of this proposal (0.15 ha)

which is adjacent to road reserve, it is unlikely that the Spiny katydid would be reliant on the proposal area for habitat. Should the Spiny Katydid be present, it can still utilise adjacent areas of native vegetation in good or better condition with the nature reserve. Noting the limited clearing proposed, it is unlikely that this species will be significantly impacted by the proposal activities.

Woolybush Bee

This native bee has a wide distribution in WA from north of Eneabba, through the southern Wheatbelt, and east along the south coast to the Fitzgerald National Park (Moulds, 2021). The species was sighted north-east of the proposal area in 1996 at 18.6 and 23.5 kilometres away. Although a single specimen was recorded at Wireless Hill in the suburb of Ardross in 2017 which is over 184km away (Prendergast 2020). The Woolybush bee is known to be associated with *Adenanthos cygnorum* and *Banksia attenuata* among other native plants (Houston, 2018). Neither of these vegetation species were recorded during the vegetation reconnaissance survey. No impact to this species is anticipated.

Quenda

Quendas are known to live in dense understoreys such as those around swamps or in banksia and jarrah woodland (DBCA, 2017). The nearest listed observation was made in 2010 and is 2 kilometres north of the proposal area. The proposal area comprises thick Acacia and Melaleuca scrub on a sandy substrate, which may be suitable for Quenda habitat. While some habitat will be impacted by the proposed clearing, it is a relatively small amount of vegetation located on the very edge of the road. There are extensive areas of similar habitat in the surrounding area that will represent habitat of similar or better value. No impact to this species is anticipated.

Tammar Wallaby

The Tammar wallaby are known to inhabit dense, low vegetation for daytime shelter and open grassy areas for feeding. This species inhabits coastal scrub, heath, dry sclerophyll forest and thickets in mallee and woodland (DEC, 2012). The nearest listed observation was made in 2004 and is 7 kilometres south-east of the proposal area. The proposal area comprises thick Acacia and Melaleuca scrub on a sandy substrate, which may be suitable for Tammar wallaby shelter. While some habitat will be impacted by the proposed clearing, it is a relatively small amount of vegetation located on the very edge of the road. There are extensive areas of similar habitat in the surrounding area that will represent habitat of similar or better value. No impact to these species is anticipated.

Graceful Sunmoth

Sun-moths are most common in sedgelands, heathlands, woodlands and sometimes in open parts of forests where their 'foodplants' (various grasses, sedges and mat-rushes) are found. The nearest listed observation was made in 2004 and is 1.9 kilometres north-east of the proposal area. The Graceful sun-moth are known to only breed on two species of Lomandra mat-rushes (*L. maritima* and *L. hermaphrodita*) (DEC, 2011). As neither of these species were recorded during the vegetation reconnaissance survey, no impact from the proposal is anticipated.

All results from DBCA's Threatened species registered within a 20km radius of the proposal boundary can be seen in Appendix 1.

The vegetation to be cleared is small in size, linear in nature, and contiguous with surrounding native vegetation. The vegetation does not comprise of whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

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

Methodology

- Biological Survey (undertaken 29/10/2021)
- DAWE Protected Matters Search Tool Report (accessed 20/12/2021)
- Government GIS Shapefiles:
 - DBCA Threatened and Priority fauna database search (accessed 09/06/2022)

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

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

Assessment

The desktop assessment identified six Threatened flora with the potential to occur in the clearing area (DBCA, 2022; DAWE, 2022).

The reconnaissance flora survey did not identify any Threatened flora species within the clearing area. A post survey likelihood of occurrence assessment conducted as part of the survey concluded that no significant flora species are likely to occur within the survey area based on habitat requirements (ELA, 2022).

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

Methodology

- Biological Survey (undertaken 29/10/2021)
- Government GIS shapefiles:
 - DBCA Threatened flora database search (accessed 09/06/2022)
- Florabase (accessed 09/06/2022)

(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.

Proposed clearing is not likely to be at variance to this Principle.

Assessment

Lake Thetis is a permanent hyper-saline lake located approximately 1.5 kilometres south-west of the clearing area in Nambung National Park. According to DEC (2012), the community contains a distinctive and diverse group of benthic microbial assemblages, each producing a mat that is associated with one specific zone within the lake. This TEC is restricted to Lake Thetis and the reconnaissance survey confirmed this community does not occur in the clearing area (ELA, 2022). Therefore, the proposed clearing will not directly impact this TEC.

Critical habitat for the Lake Thetis TEC includes local catchments for the surface waters and regional groundwater on which the community may depend (DEC, 2012). As discussed under principle (i), given the distance between Lake Thetis and the clearing area, and the small scale of the clearing, the proposal is unlikely to significantly alter surface or ground water levels or quality in the local area. As discussed in principle (e), the proposed clearing will not significantly reduce the extent of native vegetation in the local area. The proposed clearing is not expected to result in any indirect impacts on critical habitat.

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

Methodology

- Biological Survey (undertaken 29/10/2021)
- Government GIS shapefiles:
 - DBCA Threatened Ecological Community database search (accessed 09/06/2022)
- Main Roads Site Inspection (undertaken 19/05/2022)

(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.

Proposed clearing is not at variance to this Principle.

Assessment

The vegetation has been broadly mapped as vegetation association 1026, which is described as:

- Mosaic: Shrublands; *Acacia rostellifera*, *A. cyclops* (in the south) & *Melaleuca cardiophylla* (in the north) thicket / Shrublands; *Acacia lasiocarpa* & *Melaleuca acerosa* heath.

The National Objectives and Targets for Biodiversity Conservation recognise that the retention of 30 per cent or more of the pre-clearing extent of each ecological community is necessary if Australia's biological diversity is to be protected (Commonwealth of Australia, 2001). As indicated in Table 4, this vegetation association retains over 90% of the pre-European extent at all scales.

The clearing area is in the Swan Coastal Plain IBRA bioregion and Perth subregion, in which approximately 38.62% and 41.70% of vegetation extent remains. The study area (taking into account the terrestrial area) retains approximately 70% of native vegetation cover. The clearing area is contiguous with surrounding vegetation and does not form an ecological linkage across the landscape.

Based on the above, the clearing area is not significant as a remnant of native vegetation in an extensively cleared landscape. The proposed clearing is therefore not at variance to this principle.

Methodology

- Aerial photography
- Biological Survey (undertaken 29/10/2021)
- Government GIS shapefiles:
 - Pre-European vegetation (accessed 09/06/2022)
 - Vegetation complexes (accessed 09/06/2022)
- Statewide Vegetation Statistics (Government of Western Australia 2018)

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

Proposed clearing is not at variance to this Principle.

Assessment

According to the desktop assessment, no watercourses or wetlands are located within proximity to the clearing area. The closest surface water feature is Lake Thetis, which is located approximately 1.5 kilometres south-west of the clearing area. Lake Thetis is a conservation wetland and wetland of national importance. As discussed in principles (a) and (d), Lake Thetis also supports a TEC associated with unique microbial assemblages.

The conservation category wetland Wealacutta Pool is also 1.5 kilometres west of the clearing area.

The vegetation survey did not record any riparian vegetation in the clearing area. Noting the distance to these wetlands, the vegetation within the clearing area is not growing in association with a watercourse or wetland.

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

Methodology

- Biological Survey (undertaken 29/10/2021)
- Government GIS shapefiles:
 - Geomorphic Wetlands (accessed 09/06/2022)
 - Ramsar Wetlands (accessed 09/06/2022)
 - Important Wetlands (accessed 09/06/2022)
 - Watercourses (accessed 09/06/2022)
 - RIWI Act Rivers (accessed 09/06/2022)

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

Proposed clearing is not likely to be at variance to this Principle.

Assessment

The clearing area occurs in a landscape zone characterised by coastal sand dunes and calcarenite (DPIRD, 2022). Soils chiefly comprise hard neutral yellow mottled and red mottled soils (Northcote et al, 1960-1968).

According to DPIRD soil risk mapping, the clearing area has a low risk of land degradation from waterlogging, water erosion, salinity and flooding. The clearing area has a moderate susceptibility to wind erosion. Given the minor and linear nature of the clearing and exposed soils will be sealed and stabilised as part of the planned road upgrade, the proposed clearing is not likely to cause appreciable land degradation from an increase in wind erosion.

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

Methodology

- Biological Survey (undertaken 29/10/2021)
- Government GIS Shapefiles:
 - Acid Sulphate Soil Risk Map (accessed 09/06/2022)
 - Soil landscape land quality – Water Erosion Risk (accessed 09/06/2022)
 - Soil landscape land quality – Wind Erosion Risk (accessed 09/06/2022)
 - Soil landscape land quality – Salinity Risk (accessed 09/06/2022)
 - Soil landscape land quality – Surface Acidity (accessed 09/06/2022)
 - Soil landscape land quality – Waterlogging Risk (accessed 09/06/2022)
 - Soil landscape land quality – Flood Risk (DPIRD-007) (09/06/2022)

(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.

Proposed clearing is not likely to be at variance to this Principle.

Assessment

A search of ArcGIS shapefiles indicates a number of conservation areas are located within the study area. The nearest conservation areas to the proposal area are:

Nambung National Park

- IOD SLK 143.96 to SLK 144.06 – approximately 5.5m (at a minimum) to the west.
- IOD SLK 144.06 – SLK 144.20 – between 10m and 40m to the west.
- IOD SLK 143.96 – SLK 144.15 – approximately 40m east on the opposite side of the road.

Southern Beekeepers Nature Reserve

- IOD SLK 144.15 – SLK 144.20 – approximately 40m east on the opposite side of the road.

These conservation areas are discussed in further detail below.

Nambung National Park

The Nambung National Park is located adjacent to the proposed clearing area. At its closest to the proposal area (between IOD SLK 143.96 and SLK 144.06), the Nambung National Park is located approximately 5.5m (at a minimum) to the west of the proposed clearing area. No clearing will occur within the National Park.

The area proposed for clearing is linear in nature and consistent with the already cleared landscape adjacent to IOD. The area proposed for clearing will not break any linkages and will ensure that a buffer of 5.5m – 40m of vegetation is maintained between the cleared road reserve and the Nambung National Park. Given the area proposed for clearing will ensure that a buffer of vegetation (5.5m – 40m) is maintained between the cleared road reserve and the Nambung National Park, and the minor nature of the works proposed (clearing of 0.15ha of native vegetation) it is unlikely that these works will directly impact any conservation areas in proximity to the proposal area.

Due to the location of Nambung National Park in relation to the clearing area, potential indirect impacts on the conservation area must be considered i.e. weeds, dieback etc. It is noted that no dieback infestations were observed during the dieback survey and the vegetation within the survey area was classified as uninterpretable due to an absence of reliable indicator species (Glevan, 2022). All of the uninterpretable vegetation is classified as protectable as such hygiene

measures will be required for clearing activity (Glevan 2022). Dieback risk to the Nambung National Park will be managed by implementing standard Dieback management actions during project execution outlined in the Standard Vehicle and Plant management actions and Vehicle and Plant Hygiene Checklists (e.g. vehicles and machinery should be clean when arriving on site).

Although nine introduced flora species were recorded during the flora and vegetation survey none of these were found to represent a WoNS or Declared Pest under the BAM Act. The clearing area is consistent with the already cleared landscape adjacent to the Nambung National Park. Standard management actions will therefore be included in the CEMP to manage weeds, and to ensure they do not spread to adjacent areas of native vegetation that are in good or better condition (including Nambung National Park).

Potential indirect impacts will therefore be avoided by the implementation of a CEMP, which will include vehicle hygiene, weed, dieback, surface water and hazardous materials management requirements.

Southern Beekeepers Nature Reserve

The Southern Beekeepers Nature Reserve is located directly north of the Nambung National Park on the opposite side of the road and is located at a distance of approximately 40m to the east of the clearing area. Given the project activities will be confined to the road reserve on the opposite side of the road, it is unlikely the project will directly or indirectly impact the Southern Beekeepers Nature Reserve.

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

Methodology

- Biological Survey (undertaken 29/10/2021)
- Dieback Survey (undertaken on 07/06/2022)
- Government GIS Shapefiles:
 - DBCA Legislated Lands and Waters & Lands of Interest (accessed 09/06/2022)
 - Geomorphic Wetlands (conservation category wetlands only) (accessed 09/06/2022)
 - Ramsar Wetlands (accessed 09/06/2022)
 - Important Wetlands (accessed 09/06/2022)

(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.

Proposed clearing is not likely to be at variance to this Principle.

Assessment

The clearing area is not located in a Public Drinking Water Source Area (PDWSA).

According to the desktop assessment, no watercourses or wetlands are located in the clearing area. The vegetation survey did not record any riparian vegetation in the clearing area.

Groundwater salinity in the local area is 500-1000 mg/l dissolved solids, which is marginally brackish. According to DPIRD risk mapping, the area has a low risk of salinity. According to CSIRO (2015), there is an extremely low likelihood of acid sulphate soils occurring in the clearing area. Given the minor extent and linear nature of clearing adjacent to an existing road, the proposed clearing is not likely to cause a deterioration in ground or surface water quality.

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

Methodology

- Biological Survey (undertaken 29/10/2021)
- Government GIS Shapefiles:
 - RIWI Act, Surface Water Areas and Irrigation Districts (accessed 09/06/2022)
 - CAWSA Part 2A Clearing Control Catchments (accessed 09/06/2022)
 - RIWI Act, Groundwater Areas (accessed 09/06/2022)
 - Soil landscape land quality - Salinity Risk (accessed 09/06/2022)
 - Groundwater Salinity Statewide (accessed 09/06/2022)
 - Soil Mapping (accessed 09/06/2022)
 - Acid Sulphate Soil risk mapping (accessed 09/06/2022)
 - Soil landscape land quality - Subsurface Acidification Risk (accessed 09/06/2022)

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

Proposed clearing is not likely to be at variance to this Principle.

Assessment

According to DPIRD risk mapping, the clearing area has a low waterlogging and flooding risk. The clearing area does not intersect with watercourses or wetlands. The clearing is not considered to be of a scale that would cause or exacerbate the incidence or intensity of flooding.

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

Methodology

- Biological Survey (undertaken 29/10/2021)
- BoM Website (accessed 02/06/2022)
- Government GIS Shapefiles:
 - Soil Mapping (accessed 09/06/2022)
 - Contours (accessed 09/06/2022)
 - Soil landscape land quality - Waterlogging Risk (accessed 09/06/2022)
 - Soil landscape land quality - Flood Risk (accessed 09/06/2022)

6 VEGETATION MANAGEMENT

Main Roads will avoid clearing native vegetation where possible. Where clearing cannot be avoided then this clearing is kept to a minimum.

7 STAKEHOLDER CONSULTATION

Main Roads will undertake stakeholder consultation in accordance with CPS 818/15 Condition 8.

8 COMPLIANCE WITH CPS 818

The clearing associated with the proposal is unlikely or not at variance with the Clearing Principles. Additional management actions under CPS 818 are detailed in Table 5.

Table 5. Summary of Additional Management Actions Required by CPS 818

Impact of Clearing	Yes/No	Further Action Required
1. The CAR indicates that the clearing is 'At Variance' or 'May be at Variance' with one or more of the Clearing Principles.	No	No further action required.
2. Clearing is at variance or may be at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality or (j) the incidence of flooding.	No	No further action required.
3. The Proposal involves clearing for temporary works (as defined by CPS 818).	No	No further action required.
4a. Proposal is within Region that: - Has rainfall greater than 400mm and - Is South of the 26th parallel and - Works are necessary in 'Other than dry conditions' and - Works have potential for uninfested areas to be impacted	Yes	Standard Vehicle and Plant management actions from Principal Environmental Management Requirements (PEMRs) and Vehicle and Plant Hygiene Checklists will be applied.
4b. Do the proposed works require clearing within or adjacent to DBCA estate in non-dry conditions?	No	Clearing will occur during dry conditions. No further action required.
5. Main Roads has been notified by DWER or an environmental specialist that the area to be cleared is susceptible to a pathogen other than dieback.	No	No further action required.
6. Weeds are likely to spread to and result in environmental harm to adjacent areas of native vegetation that are in good or better condition.	No	No further action required. CEMP requires that all vehicles and machinery arrive on site clean and that any weed infested mulch is removed from site, therefore there is a low risk of weed spread.
7. Did an environmental specialist conduct the survey or field assessment?	Yes	The Environmental Specialist undertaking the biological assessments were suitably qualified and had more than three years' experience.
8. Did an environmental specialist prepare the Assessment Report and any other associated documentation	Yes	The Environmental Specialist preparing the Assessment Report and any other associated documentation was suitably qualified and had more than three years' experience.

Impact of Clearing	Yes/No	Further Action Required
including the VMP, Dieback Management Plan or Offset Proposal?		

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10 APPENDICES

Appendix	Title
Appendix 1	DBCA Threatened Flora and Fauna Database Searches

Appendix 1: DBCA Threatened Flora and Fauna Database

Table 5: Fauna Species observed within 20km radius of the proposal area.

SCIENTIFIC NAME	COMMON NAME	CLASS	CONSERVATION CODE
<i>Megaptera novaeangliae</i>	Humpback Whale	MAMMAL	CD
<i>Bettongia penicillata ogilbyi</i>	Woylie, Brush-tailed Bettong	MAMMAL	CR
<i>Calidris ferruginea</i>	Curlew Sandpiper	BIRD	CR
<i>Calidris tenuirostris</i>	Great Knot	BIRD	CR
<i>Calidris canutus</i>	Red Knot	BIRD	EN
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	BIRD	EN
<i>Calyptorhynchus sp. 'white-tailed black cockatoo'</i>	White-tailed Black Cockatoo	BIRD	EN
<i>Charadrius mongolus</i>	Lesser Sand Plover	BIRD	EN
<i>Parantechinus apicalis</i>	Dibbler	MAMMAL	EN
<i>Carcharias taurus</i>	Grey Nurse Shark	FISH	VU
<i>Charadrius leschenaultii</i>	Greater Sand Plover, Large Sand Plover	BIRD	VU
<i>Dermochelys coriacea</i>	Leatherback Turtle	REPTILE	VU
<i>Leipoa ocellata</i>	Malleefowl	BIRD	VU
<i>Neophoca cinerea</i>	Australian Sea-Lion	MAMMAL	VU
<i>Dugong dugon</i>	Dugong	MAMMAL	OS
<i>Falco peregrinus</i>	Peregrine Falcon	BIRD	OS
<i>Austrosaga spinifer</i>	Spiny Katydid (Swan Coastal Plain)	INVERTEBRATE	P2
<i>Hylaeus globuliferus</i>	Woolybush Bee	INVERTEBRATE	P3
<i>Isoodon fusciventer</i>	Quenda, Southwestern Brown Bandicoot	MAMMAL	P4
<i>Notamacropus eugenii derbianus</i>	Tammar Wallaby	MAMMAL	P4
<i>Synemon gratiosa</i>	Graceful Sunmoth	INVERTEBRATE	P4
<i>Apus pacificus</i>	Fork-tailed Swift	BIRD	MI
<i>Ardenia pacifica</i>	Wedge-tailed Shearwater	BIRD	MI
<i>Arenaria interpres</i>	Ruddy Turnstone	BIRD	MI
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	BIRD	MI
<i>Calidris alba</i>	Sanderling	BIRD	MI
<i>Calidris melanotos</i>	Pectoral Sandpiper	BIRD	MI
<i>Calidris ruficollis</i>	Red-necked Stint	BIRD	MI
<i>Calidris subminuta</i>	Long-toed Stint	BIRD	MI
<i>Hydroprogne caspia</i>	Caspian Tern	BIRD	MI
<i>Limosa lapponica</i>	Bar-tailed Godwit	BIRD	MI
<i>Limosa limosa</i>	Black-tailed Godwit	BIRD	MI
<i>Pluvialis fulva</i>	Pacific Golden Plover	BIRD	MI
<i>Pluvialis squatarola</i>	Grey Plover	BIRD	MI
<i>Sterna dougallii</i>	Roseate Tern	BIRD	MI
<i>Thalasseus bergii</i>	Crested Tern	BIRD	MI

OFFICIAL

SCIENTIFIC NAME	COMMON NAME	CLASS	CONSERVATION CODE
<i>Tringa nebularia</i>	Common Greenshank, Greenshank	BIRD	MI