Clearing Impact Assessment and Vegetation Management Plan

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Mitchell Freeway Southbound – Hodges Drive on-ramp (H659)

July 2020

EOS No.1969

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Contents

Amendments

Report Compilation & Review	Name and Position	Document Revision	Date
Author:	E Associate / Consultant	Rev A	15 May 2020
Reviewer:	Principal Environmental Officer	Rev A	
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Reviewer:	Principal Environmental Officer	Rev B	
Author:	Associate	Rev 0	May 2020
Reviewer:	Senior Environment Officer	Rev 0	13 July 2020

1 SUMMARY

1.1 Project Information

Project Name: Mitchell Freeway Southbound – Hodges Drive on-ramp

Project Location(s): The project area is located on the Hodges Drive on-ramp (H659) SLK 0.12 to SLK 0.40 and Mitchell Freeway (H016) between SLK 25.67 to SLK 25.38 within the local government authority boundary of the City of Joondalup (Figure 1).

Project Purpose / Components: Main Roads Western Australia (Main Roads) proposes to upgrade the Hodges Drive on-ramp to allow for future ramp signals.

Note that this assessment is ONLY for the clearing of native vegetation for above project activities.

Area Proposed to be Cleared: The project will require clearing of up to 0.035 hectares (ha) of remnant vegetation

Temporary Clearing Required: None

A detailed Clearing Impact Assessment (CIA) of the project clearing activities was undertaken. The CIA outlined the key activities associated with the project, the existing environment and an assessment of native vegetation clearing. This assessment provided an evaluation of the vegetation clearing impacts associated with the project using the ten clearing principles and strategies used to manage vegetation clearing. Key items associated with the clearing impact assessment are listed below.

- Flora and Vegetation
  - Clearing of 0.035 ha of remnant native vegetation, of which 0.031 ha is in a 'Degraded' condition and 0.004 ha in 'Good' condition.
  - Clearing of 0.025 ha of Banksia Woodlands of the Swan Coastal Plain TEC.
  - Clearing of 0.034 ha of Banksia woodlands of the Swan Coastal Plain PEC.
- Terrestrial Fauna
  - The project has the potential to impact Black Cockatoo species, specifically Carnaby's and Forest Red-tailed Black Cockatoo through the removal of 0.035 ha of foraging habitat; due to the altered state of vegetation and the sporadic and isolated distribution of known foraging species, it is not considered quality foraging habitat as defined in the referral guidelines (Department of Sustainability Environment Water Population and Communities 2012).
  - No potential breeding trees (those of a suitable species with greater than the 500 mm DBH) will be impacted as a result of clearing.
- The project is not likely to be at variance with any of the ten clearing principles.
- A Vegetation Management Plan has been prepared for this work and is appended to this document (Appendix B).

Main Roads Statewide Purpose Clearing Permit CPS 818 will be used to undertake native vegetation clearing for the project. Project clearing will be undertaken in accordance with the conditions of CPS 818 and detailed records of native vegetation clearing will be maintained as required under the permit.

2 ASSESSMENT SCOPE

This clearing impact assessment involved a desktop analysis of environmental aspects and impacts, a site investigation, a biological assessment and an assessment of native vegetation clearing impacts. The study area is confined to a local area of a 10 km radius. This assessment determined the need to develop and obtain approvals from the Department of Water and Environmental Regulation (DWER) for a Revegetation Plan, a Vegetation Management Plan (VMP), a Dieback Management Plan or an Offset Proposal.

3 PROJECT DESCRIPTION

Table 1 describes the project in detail, including the full extent of the proposed work and all the components of the proposal.

Table 1. Project Description

Project Components	Clearing Required (Y/N)	Estimated Clearing Area (ha) *TBC if unknown*
Road Widening(H659) SLK 0.12 to SLK 0.40 and (H016) between SLK 25.67 to SLK 25.38	Y	0.035 ha
Pre-construction works/service Relocations	Y	Within the 0.035 ha

3.1 Project Location

The project area is located on the Hodges Drive on-ramp (H659) SLK 0.12 to SLK 0.40 and Mitchell Freeway (H016) between SLK 25.67 to SLK 38 within the local government authority boundary of the City of Joondalup (Figure 1).

Start
Latitude: -31.755797°
Longitude: 115.765562°

End
Latitude: -31.758930°
Longitude: 115.768143 °

The location and boundaries of the study area (10 km radius) for the project are shown in Figure 2.

Legend:

- Project area
- Roads (MRWA)

0 50 100
metres
Scale 1:2,500 at A4

Coord. Sys. GDA 1994 MGA Zone 50

Job No: 58540

Client: Main Roads

Version: A | Date: 12-May-2020

Drawn By: esutherland | Checked By: AH

Hodges Drive and Mitchell Freeway Perth,WA

PROJECT AREA

FIGURE 1

strategen JBS&G

File Name: W:\Projects\1)Open\Main Roads\58540 Mitchell Freeway Widening\GIS\Maps\Hodges_CIA_Rev_A\58540_01_ProjectArea.mxd
Image Reference: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend:

- Project area
- 10km buffer
- State roads (MRWA)

Scale 1:110,000 at A4 (0 1 2 Kilometres)		**Hodges Drive and Mitchell Freeway Perth,WA**
Coord. Sys. GDA 1994 MGA Zone 50		**PROJECT AREA AND STUDY AREA**
Job No: 58540		
Client: Main Roads		**FIGURE 2**
Version: A	Date: 12-May-2020	strategen JBS&G
Drawn By: cthatcher	Checked By: AH	

File Name: W:\Projects\1)Open\Main Roads\58540 Mitchell Freeway Widening\GIS\Maps\Hodges_CIA_Rev_A\58540_02_ProjectArea_StudyArea.mxd
Image Reference: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

4 Methodology

4.1 Preliminary Desktop Study

A preliminary desktop study was undertaken as part of the CIA, to assess the proposed native vegetation clearing and potential constraints associated with the project. The desktop assessment included viewing GIS shapefiles, reviewing government agency managed databases (where necessary) and consulting with relevant stakeholders.

The methodology used when completing an assessment of the clearing principles is provided in Section 5.3. Mapping was completed using ArcMap or Main Roads Integrated Mapping System (IMS).

4.2 Detailed Clearing Impact Assessment

Further environmental assessment of the impacts of native vegetation clearing was undertaken and a CIA report completed. The CIA included a site visit to verify desktop information and a biological survey to delineate key environmental elements of the project area. A summary of the outcome of the survey is provided in Section 6.

The methodology used for the biological survey is provided in the *Mitchell Freeway Widening Southbound and PSP Mitchell Freeway Gaps Hodges Drive to Reid Highway Biological Survey September/October 2019,* Astron (2020) report in Appendix A.

5 Clearing of Native Vegetation

Native vegetation describes all indigenous aquatic and terrestrial vegetation (living or dead). The term does not include vegetation that was intentionally sown, planted or propagated unless it was required under a statutory condition.

Apart from activities that are exempt under the clearing regulation (Section 5 – Prescribed Clearing), all native vegetation clearing completed by Main Roads will be undertaken using a permit.

5.1 Measures to Avoid, Minimise, Mitigate and Manage Project Clearing Impacts

The design and management measures implemented to avoid and minimise the project clearing impacts are provided in Table 2.

Table 2. Justification of Avoiding, Minimising, Mitigating and Managing Project Clearing Impacts

Design or Management Measure	Applied to Current Design	Discussion and Justification
Steepen batter slopes	Yes	Batters will be steepened beyond standard practice to ensure that clearing doesn't extend outside the proposed footprint.
Installation of safety barriers	Yes	Installation of safety barriers is required in order to comply with road safety requirements.
Alignment to one side of existing road	Yes	All widening is to the verge, which has already been heavily disturbed
Alternative alignment to follow existing road (or) to preferentially locate within pasture or a degraded area	No	Widening of the on-ramp must go into the verge and disturb native and planted vegetation.
Installation of kerbing	No	Kerbing will not reduce the area of impact.
Simplification of design to reduce number of lanes and/or complexity of intersections	No	Road design must allow for ramp metering and sufficient capacity on the ramp to allow for the metering. This is unfortunately complicated and is being simplified as far as possible.
Preferential use of existing cleared areas for access tracks, construction storage and stockpiling	Yes	No vegetation to be cleared for temporary works.
Drainage modification	Yes	The project will utilise the existing drainage in place for this section of Hodges Drive and Mitchell Freeway.
Other design treatment	No	No other design treatment is appropriate for the required work. The project involves the widening and upgrade of an existing on-ramp. No design alternatives exist to achieve the same outcome while reducing clearing requirements.

In addition to the elements discussed in Table 1, the following avoidance and minimisation action have been applied to this project:

- The clearing area will be demarcated prior to the commencement of native vegetation clearing.
- The project design was refined to avoid clearing any potential cockatoo roosting trees.
- Where possible vegetation will be pruned as opposed to removed.
- Further project clearing will be avoided as the site office, materials storage areas, construction vehicles/machinery and access tracks will be located on previously disturbed or cleared areas.

5.2 Vegetation Details

5.2.1 Project Site Vegetation Description

The project area is predominately in a Good to Completely Degraded condition with two native vegetation units present, described by Astron (2020) as:

- ***Banksia Woodland***: *Allocasuarina fraseriana* and *Banksia attenuata* low open woodland over *Banksia sessilis* and *Jacksonia sternbergiana* tall open shrubland over *Xanthorrhoea preissii* and *Olearia axillaris* sparse mid shrubland over *Hibbertia hypericoides*, *Synaphea spinulosa* and *Tricoryne elatior* low shrubland over *Mesomelaena pseudostygia*, *Conostylis aculeata* subsp. *aculeata* and *Alexgeorgea nitens* sparse sedgeland over *Ehrharta calycina* and *Avena fatua* sparse tussock grassland.
- **Jarrah Woodland 1:** *Eucalyptus marginata, Allocasuarina fraseriana* and *Banksia attenuata* mid open forest to low woodland over *Xanthorrhoea preissii* (+/- *Jacksonia sternbergiana/Allocasuarina humilis*) mid open shrubland over *Hibbertia hypericoides* low open shrubland over *Mesomelaena pseudostygia* and/or *Lepidosperma calcicola* and/or *Desmocladus flexuosus* sparse sedgeland over a tussock grassland of introduced grasses.

Tables 3 and 4 provide details of the Pre-European Vegetation Associations with the project area and the remaining extents of these associations.

For a full description of the existing vegetation, refer to the Biological Assessment Report (Astron, 2020) in Appendix A.

Table 3. Summary of Project Area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 1007 described as a Mosaic: Shrublands; *Acacia lasiocarpa* & *Melaleuca acerosa* heath / Shrublands; *Acacia rostellifera* & *Acacia cyclops* thicket (Government of Western Australia, 2019).	Clearing of up to 0.031 ha for road widening, Hodges Drive on-ramp.	Degraded (0.031 ha) condition (Astron, 2020)	Vegetation description and condition determined from biological survey (Astron, 2020).
Vegetation Association 998 described as a Medium woodland: tuart (Government of Western Australia, 2019).	Clearing of up to 0.004 ha for road widening, Hodges Drive on-ramp.	Good condition (0.004 ha) (Astron, 2020)	Vegetation description and condition determined from biological survey (Astron, 2020).

Table 4. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 1007	**Statewide**	30,407.75	20,691.11	68.05	10.04
	IBRA Bioregion Swan Coastal Plain	30,109.89	20,679.62	68.68	10.13
	IBRA Sub-region Perth	30,109.89	20,679.62	68.68	10.13
	Local Government Authority City of Joondalup	2,760.85	221.65	8.03	0.00
Veg Assoc No. 998	**Statewide**	51,015.33	18,492.63	36.25	17.65
	IBRA Bioregion Swan Coastal Plain	50,867.50	18,492.32	36.35	17.70
	IBRA Sub-region Perth	50,867.50	18,492.32	36.35	17.70
	Local Government Authority City of Joondalup	2,841.13	273.43	9.62	0.60

5.2.2 Vegetation Complexes and Representation

Vegetation Complexes within the project area have been defined by Heddle et al. (1980) and are based on vegetation in association with landforms and underlying geology. Native vegetation complexes as described by Heddle et al. (1980) within the Project area comprise:

- **Cottesloe Complex** – Central and South: mosaic of woodland of *Eucalyptus gomphocephala* (Tuart) and open forest of *Eucalyptus gomphocephala* (Tuart) - *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri); closed heath on the Limestone outcrops.

This complex is above the minimum threshold of 10% target for the retention of vegetation complexes in constrained areas on the Swan Coastal Plain (EPA, 2000). The current remaining extent of this vegetation complex (GoWA, 2019) is detailed in Table 5.

Table 5. Vegetation Complexes (Heddle/Mattiske) within the Project Area

Heddle/Mattiske Veg Complex	Pre-European Extent (ha)	2013 Vegetation Extent	% Remaining
Cottesloe Complex – Central and South	45,299.6	14,567.9	32.2

5.3 Assessment against the Ten Clearing Principles

In assessing whether the project's proposed clearing is likely to have a significant impact on the environment, the project was assessed against the ten clearing principles (EP Act 1986, Schedule 5).

Each principle has been assessed in accordance with DWER's 'A Guide to the Assessment of Applications to Clear Native Vegetation'.

The proposed clearing is not likely to be at variance with the 10 clearing principles.

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

Comments	**Proposed clearing is not likely to be at variance to this Principle**
	Clearing as a result of the project is not likely to be at variance with this Principle. The project requires the clearing of up to 0.035 ha of native vegetation (Figure 3). Astron (2020) delineated two vegetation units within the project area as: • **Banksia Woodland:** *Allocasuarina fraseriana* and *Banksia attenuata* low open woodland over *Banksia sessilis* and *Jacksonia sternbergiana* tall open shrubland over *Xanthorrhoea preissii* and *Olearia axillaris* sparse mid shrubland over *Hibbertia hypericoides*, *Synaphea spinulosa* and *Tricoryne elatior* low shrubland over *Mesomelaena pseudostygia*, *Conostylis aculeata* subsp. *aculeata* and *Alexgeorgea nitens* sparse sedgeland over *Ehrharta calycina* and *Avena fatua* sparse tussock grassland; and • **Jarrah Woodland 1:** *Eucalyptus marginata, Allocasuarina fraseriana* and *Banksia attenuata* mid open forest to low woodland over *Xanthorrhoea preissii* (+/- *Jacksonia sternbergiana/Allocasuarina humilis*) mid open shrubland over *Hibbertia hypericoides* low open shrubland over *Mesomelaena pseudostygia* and/or *Lepidosperma calcicola* and/or *Desmocladus flexuosus* sparse sedgeland over a tussock grassland of introduced grasses. The vegetation was assessed to be in a 'Degraded' to 'Good' condition with the majority of the vegetation in a 'Degraded' condition (Figure 4). Two vegetation units were mapped during the detailed field survey, as shown above in section 5.2.1 (Astron 2020). No State or Federally listed Threatened or Priority flora species were recorded within the Project area. The project will impact on approximately 0.025 ha of the Commonwealth listed Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (TEC) from a contiguous patch of 6.19 ha. Within the project area, the majority of vegetation been assessed as a 'Degraded' to 'Completely Degraded' (0.031 ha) condition. Noting this, it is considered that the vegetation within the project area is representative of a diverse native vegetation remnant that comprises the whole, or a part of, a significant occurrence of an ecological community; or native vegetation that has a higher diversity than other examples of an ecological community in the region. This is not considered to result in a significant impact as clearing represents a reduction of less than 1% of the TEC within the survey area (Figure 5). One state listed Priority Ecological Community (PEC), Banksia dominated Woodlands of the Swan Coastal Plain IBRA Region PEC was recorded within the project area. Clearing for the project will impact 0.035 ha of the PEC from a contiguous patch of 6.19 ha. This is not

	considered to result in a significant impact as clearing represents a reduction of less than 1% of the PEC within the survey area (Figure 5). Within the project area, approximately 0.035 ha of potentially suitable black cockatoo foraging habitat was recorded (Figure 6). The black cockatoo assessment undertaken by Astron (2020) determined that no quality foraging habitat as defined referral guidelines (Department of Sustainability Environment Water Population and Communities 2012) is present, due to the altered state of vegetation and the sporadic and isolated distribution of known foraging flora species. No potential breeding trees (those of a suitable species with greater than the 500 mm DBH) were observed within the project area. No suitable hollows were observed during the survey and no evidence of breeding was recorded at the time of the survey. Furthermore, the project is outside of the known breeding range of Carnaby's Cockatoo and considered unlikely to support breeding for the Forest Red-tailed Black Cockatoo due to the absence of intact woodland or forest habitat. Based on the findings of the survey and that clearing area is small; is not in better condition or representative of an area of higher biodiversity value than the area surrounding, it is considered that the clearing is unlikely to result in any significant impact to the environment and is not likely to be at variance to this clearing principle. **Assessed Outcome:** **Clearing for this project is not likely to be at variance to this principle.**
Methodology	MRWA Shapefiles DBCA shapefiles DSEWPaC (2012) NatureMap (February, 2020) EPA (2016) Biological Survey (October, 2019)

(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	**Proposed clearing is not likely to be at variance to this Principle**
	Clearing as a result of the project is not likely to be at variance with this Principle. Within the study area there are known records of 61 protected fauna species. The biological survey identified that there were three conservation species present within the wider survey area. These are: • *Calyptorhynchus latirostris* (Carnaby's Cockatoo) -Threatened • *Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo) -Threatened • *Isoodon obesulus* subsp. *fusciventer* (Southern Brown Bandicoot) - Priority 4 Within the project area, Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo are considered to potentially utilise the area. No evidence of Quenda presence within the project area was recorded (Astron, 2020). **<u>Black Cockatoo</u>**

	The project area is within the known distribution range of the Carnaby's Cockatoo, but outside its known breeding range. The project area is outside of the modelled distribution of the Forest Red-tailed Black Cockatoo (Department of Sustainability, Environment, Water, Population and Communities 2012). Given the small area of potential habitat and its poor condition, it is considered unlikely to be significant habitat for foraging or breeding for Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo. Within the project area, approximately 0.035 ha of potentially suitable foraging habitat was recorded (Figure 5). The black cockatoo assessment undertaken by Astron (2020) determined that no quality foraging habitat as defined in referral guidelines (Department of Sustainability Environment Water Population and Communities 2012) is present, due to the altered state of vegetation and the sporadic and isolated distribution of known foraging flora species. No potential breeding trees (those greater than the 500 mm DBH) were observed within the project area. No suitable hollows were observed during the survey and no evidence of breeding was recorded at the time of the survey. Furthermore, no evidence of roosting was recorded within the project area. Within 4 km of the project area there is approximately 657 ha of suitable habitat within Local or State Government reserves which would provide significantly higher quality habitat for this black cockatoos (Figure 7). These reserves consist of: • Woodvale Nature Reserve (Bush Forever Site 407) (35 ha); • Yellagonga Regional Park (Bush Forever Site 299) (380 ha); • Whitfords Avenue Bushland, Craigie/Padbury (Bush Forever Site 303) (215 ha); and • Conti Road Bushland, Wanneroo (Bush Forever Site 164) (27 ha). Additionally, Neerabup National Park (944 ha) is located 4 km to the north of the project area consisting of potential habitat for this species. Clearing as a result of the project represents less than 0.01% of potentially available habitat for Black Cockatoos within 4 km of the project area. **<u>Other Conservation Significant Species</u>** The Southern Brown Bandicoot (Quenda) occurs in wet or dry sclerophyll forest through to open woodland and scrubby, dense vegetation on sandy soils. This species was identified within the wider survey area in close proximity to the Woodvale Nature Reserve, approximately 2.7 km south-east of the project area. It is considered unlikely that the small area of vegetation to be cleared as a result of the project constitutes significant habitat for the species, which is more likely to be in larger pockets of native vegetation associated with the reserves listed above. **Assessed Outcome:** **Clearing for this project is not likely to be at variance to this principle.**
Methodology	DBCA Shapefiles DBCA website DSEWPaC (2012) EPA (2016) Biological Survey (October, 2019) Aerial Photography

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

Comments	Proposed clearing is not at variance to this Principle
	Clearing as a result of the project is not at variance with this Principle. A total of 207 vascular flora species, from 47 families and 127 genera, were recorded in the wider survey area, between Hodges Drive and Reid Highway (Astron 2020). No State or Federally listed threatened flora species were recorded within the project area. **Assessed Outcome:** **Noting the above, clearing for this project is not at variance to this principle.**
Methodology	DBCA shapefiles Florabase (February, 2020) Biological Survey (October, 2019)

(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	Proposed clearing is not at variance to this Principle
	Clearing as a result of the project is not at variance with this Principle. Astron (2020) did not record any State listed Threatened Ecological Communities (TEC) in the Project area. The likely State listed TEC present in the regional area would be *Banksia attenuata* woodland over species rich dense shrublands (SCP 20a) and *Melaleuca huegelii — Melaleuca systena* shrublands on limestone ridges (SCP26a). The nearest known locations of SCP20a are located at Neerabup and Koondoola within the City of Wanneroo, approximately 10km and 11 km, respectively from the project area (DEC, 2012). For SCP26a, this community occurs on significant limestone ridges, predominately located in Yanchep within the City of Wanneroo, approximately 20 km from the project area (CALM, 2009). **Assessed Outcome:** **Clearing for this project is not at variance to this principle.**
Methodology	DBCA shapefiles Biological Survey (October, 2019)

(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	Proposed clearing is not likely to be at variance to this Principle
	Clearing as a result of the project is not likely to be at variance with this Principle. The project area is mapped as Vegetation Association 998 described as a Medium woodland: tuart and Vegetation Association 1007 described as a Mosaic: Shrublands; *Acacia lasiocarpa* & *Melaleuca acerosa* heath / Shrublands; *Acacia rostellifera* & *Acacia cyclops* thicket. The project proposes to clear up to 0.035 ha of native vegetation, of this, 0.031 ha (89%) has been assessed as 'Degraded' (Astron, 2020). **Table 5.1. Pre-European Vegetation Representation**

Pre-European	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves

Vegetation Association					
Veg Assoc No. 1007	**Statewide**	30,407.75	20,691.11	68.05	10.04
	IBRA Bioregion Swan Coastal Plain	30,109.89	20,679.62	68.68	10.13
	IBRA Sub-region Perth	30,109.89	20,679.62	68.68	10.13
	Local Government Authority City of Joondalup	2,760.85	221.65	8.03	0.00
Veg Assoc No. 998	**Statewide**	51,015.33	18,492.63	36.25	17.65
	IBRA Bioregion Swan Coastal Plain	50,867.50	18,492.32	36.35	17.70
	IBRA Sub-region Perth	50,867.50	18,492.32	36.35	17.70
	Local Government Authority City of Joondalup	2,841.13	273.43	9.62	0.60

Table 5.2. Vegetation Complexes (Heddle/Mattiske) within the Project Area

Heddle/Mattiske Veg Complex	Pre-European Extent (ha)	2013 Vegetation Extent	% Remaining
Cottesloe Complex – Central and South	45,299.6	14,567.9	32.2

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001). The project area is within a constrained area of the Swan Coastal Plain and as such retention objectives of at least 10 per cent apply (EPA, 2016).

As shown in Table 5.1 and 5.2, vegetation association 1007 and 998 and the vegetation complex Cottesloe (Central and South) are above the 10 per cent threshold in a constrained area (Government of Western Australia, 2019). Vegetation associations 1007 and 998 are below the 10% threshold within City of Joondalup, however retention at the scale of local government authority has not been taken into consideration in recent assessments by DWER that have rather focussed on the IBRA region scale (e.g. CPS 8796).

Furthermore, given the condition of the vegetation, it is not considered to be representative of native vegetation that is significant as a remnant in an area that has been extensively cleared.

Assessed Outcome:

Clearing for this project is not likely to be at variance to this principle.

Methodology	EPA (2016) Biological Survey (October, 2019) Government of Western Australia (2019) Perth Biodiversity Project (2013) Shepherd (2009) Aerial photography

(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	Proposed clearing is not at variance to this Principle
	Clearing as a result of the project is not at variance with this Principle. Interrogation of DBCA and DWER hydrological and wetland datasets determined that no wetlands or watercourses are mapped within the project area. The nearest mapped wetland is Lake Joondalup, located approximately 1.7 km from the project area. In addition, the Astron (2020) biological survey concluded that no remnant vegetation considered to represent riparian vegetation was recorded from the project area. **Assessed Outcome:** **Clearing for this project is not at variance to this principle.**
Methodology	DWER and DBCA shapefiles Biological Survey (October, 2019)

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

Comments	Proposed clearing is not at variance to this Principle
	Clearing as a result of the project is not at variance with this Principle. The Department of Primary Industries and Regional Development (DPIRD), provides a series of soil degradation risk mapping at the sub-system level. The project area is located within two subsystems of the Spearwood Dunes soil systems as follows: • Karrakatta Sand Yellow Phase subsystem of the Spearwood Dunes soil system. It is described as low hilly to gently undulating terrain. Yellow sand over limestone at 1-2 m. Banksia spp. woodland with scattered emergent *E. gomphocephala* and *E. marginata* and a dense shrub layer; and • Karrakatta Shallow Soils Phase subsystem. It is described as low hills and ridges. Bare limestone or shallow siliceous or calcareous sand over limestone. Dense low shrub dominated by *Banksia sessilis*, *Melaleuca huegelii* and species of *Grevillea* (DPIRD, 2018). The table below summaries the soil degradation risk within the project area.

Aspect	**Degradation risk**	
	Karrakatta Sand Yellow Phase	Karrakatta Shallow Soils Phase
Wind Erosion	98%	60%
Waterlogging	0%	0%
Water Erosion	0%	0%
Salinity	0%	0%
Flood Risk	0%	0%

Wind erosion is the only potential soil degradation aspect relevant to the project area, due to the deep yellow sands associated with the area. It is unlikely that the project will cause appreciable land degradation given the relatively small amount of clearing and the implementation of appropriate measures to mitigate and manage potential wind driven erosion during construction.

Assessed Outcome:

	Clearing for this project is not at variance to this principle.
Methodology	GIS shapefiles Biological Survey (October, 2019) Natural Resource Management SLIP Soil Systems (Accessed May 2020)

(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	**Proposed clearing is not at variance to this Principle**
	Clearing as a result of the project is not at variance with this Principle. The nearest conservation area to the project is the Yellagonga Regional Park which occurs approximately 1.25 km to the east of the project area and has no direct links to the project area. It is not considered that the project area contains vegetation which represents a significant ecological linkage for fauna to move between conservation reserves. Noting the above and that the project area is contained to the road reserve, the proposed clearing will not result in impacts to any adjacent or nearby conservation area. **Assessed Outcome:** **Clearing for this project is not at variance to this principle.**
Methodology	DBCA shapefiles EPA (2016)

(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	**Proposed clearing is not at variance to this Principle**
	Clearing as a result of the project is not at variance with this Principle. There are no major or minor watercourses mapped within the project area. The project will not change the hydrology of the area. Given the small scale of clearing and that no dewatering or drainage modifications are required; it is considered that there will be very little to no deterioration of underground water quality. **Assessed Outcome:** **Noting the above, clearing for this project is not at variance to this principle.**
Methodology	DWER and DBCA shapefiles Biological Survey (October, 2019)

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

Comments	**Proposed clearing is not at variance to this Principle**
	Clearing as a result of the project is not at variance with this Principle. This project proposes to clear up to 0.035 ha of vegetation over an approximately 0.45 km stretch of road. The removal of such a small area of vegetation makes it unlikely that the incidence or intensity of flooding will increase. NRM SLIP identifies that the area has 0% risk of flooding in the area, largely attributed to presence of sandy soil and fast infiltration rates.

	Given the small amount of clearing, that vegetation will remain in the surrounding area and that the project area will be sealed it is unlikely that this project will cause or exacerbate the incidence or intensity of flooding. **Assessed Outcome:** **Noting the above, clearing for this project is not at variance to this principle.**
Methodology	Natural Resource Management SLIP Soil Systems (Accessed June 2020)

6 SUMMARY OF BIOLOGICAL SURVEYS

A Detailed biological survey of the area of the Mitchell Freeway median and eastern verge from Hodges Drive in the north to Warwick Train Station was undertaken in 2019 and 2020 (Astron, 2020). The project area subject to this CIA is a small fraction of this survey area. A summary of the findings from the survey are presented below.

Vegetation:

- Five remnant native vegetation types were defined and included:
    - One Banksia Woodland;
    - Two *Eucalyptus marginata* (jarrah) woodlands; and
    - two *Eucalyptus gomphocephala* (tuart) forests.
- Remnant vegetation types were mapped across 6.4 ha (19 %) of the survey area. The remaining 27.6 ha of the survey area was either cleared (3.0 ha, 9 %) or planted vegetation (24.6 ha, 72 %).
- Remnant vegetation in the survey area was in Good to Completely Degraded condition, with the majority considered Completely Degraded as it consisted of scattered remnant species only. It is expected that quality of these remnants has been declining over time due to significant edge effects.
- Vegetation inferred to represent the EPBC Act listed 'Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain' TEC was recorded within the survey area, but not within the project area.
- Vegetation inferred to represent the EPBC Act listed 'Banksia Woodlands of the Swan Coastal Plain' TEC was recorded within the survey area.
- Vegetation considered to represent the State listed PEC 'Tuart (*Eucalyptus gomphocephala*) woodlands of the Swan Coastal Plain' was not recorded within the project area; 'Banksia dominated woodlands of the Swan Coastal Plain IBRA Region' PEC was recorded within the survey area and within the project area across 0.035 ha.

Flora:

- A total of 207 vascular flora species, from 47 families and 127 genera, were recorded in the survey area. No EPBC Act listed flora were recorded, one priority flora species of significance was recorded: *Jacksonia sericea* P4 (outside current project area).
- The survey area has considerable disturbance and limited floristic diversity which further limits the potential for any threatened or priority flora species to occur.
- Sixty-three weed species were recorded within the survey area, accounting for 30% of the species recorded. Three are listed as WoNS (Australian Weeds Committee 2012) (**Asparagus asparagoides*, **Lantana camara* and **Genista linifolia*) and three are declared pest plants in Western Australia under the BAM Act (Department of Agriculture and Food Western Australia 2016).

Fauna:

- Twenty-four conservation significant vertebrate species were identified in the desktop assessment, and three species (quenda, Carnaby's cockatoo and forest red-tailed black cockatoo) were recorded within the survey area, one species were considered to have a 'moderate' likelihood and 20 species were considered to have a 'low' likelihood of occurrence.
- Based upon the current distributions for the three threatened species of black cockatoo, only the Carnaby's cockatoo (*Calyptorhynchus latirostris*) and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) are likely to occur within the vicinity of the survey area.
- Three hundred and twenty-nine black cockatoo potential breeding trees (259 Tuarts, 42 jarrah, 16 dead stags and 12 marri) with a diameter at breast height of over 50 cm were recorded within the survey area (none within current project area) including 15 trees (nine Tuarts and six dead stags) considered to have suitable hollows for Carnaby's cockatoos to breed in.
- Twenty-seven known foraging resource species for the Carnaby's cockatoo and three known foraging resource species for the forest red-tailed black cockatoo were recorded within the survey area; however, only the marri, jarrah and Banksia species are considered key species for foraging Carnaby's cockatoos. Two individual Carnaby's cockatoos were observed foraging on *Banksia prionotes* and jarrah within the survey area.

One individual quenda roadkill and multiple diggings in the same area were recorded within the survey area (outside current project area). The sighting was recorded 228 m south of the Woodvale Open Space, and it is likely that this individual was from of a larger quenda population within Woodvale Open Space.

7 ADDITIONAL ACTIONS REQUIRED

Table 6 summarises what further pre-clearing impact assessment and vegetation management is required in accordance with CPS 818.

Table 6. Summary of Additional Management Actions Required by CPS 818

Impact of Clearing	Yes/No or NA	*Further Action Required*
1. The PCIA indicates that the clearing is 'Seriously at Variance', At Variance' or 'May be at Variance' with one or more of the clearing principles.	**No**	No further action required
2. The PCIA indicates that the 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 project involves clearing for temporary works (as defined by the permit under Condition 11 of CPS 818).	**No**	No further action required
4a. The project is in part of a region that has annual rainfall greater than 400mm and is south of the 26th parallel of latitude. **4b.** The project will require movement of soil in conditions other than dry conditions.	**Yes** **No**	**4a.** Yes **4b.** 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. The proposal requires referral to either the WA EPA or the Commonwealth DAWE.	**No**	No further action required.
7a. The vegetation within the area to be cleared and/or the surrounding vegetation in a good or better condition **7b.** Are weeds likely to spread to and result in environmental harm to adjacent areas of native vegetation that are in good or better condition	**No**	**7a.** Yes. Some of the surrounding vegetation is expected to be in good or better condition and some good condition vegetation will be cleared. **7b.** No. Weed management will be addressed in the VMP/CEMP to avoid weed spread.

8 STATEMENT ADDRESSING STAKEHOLDER SUBMISSIONS

Condition 7 of CPS 818/14 requires Main Roads WA to invite submissions from a number of parties when the proposed clearing is considered likely to be seriously at variance, at variance or may be at variance with one or more of the clearing principles.

As the assessment has determined that the proposed clearing is not at variance with any of the clearing principles, no stakeholder submission is required.

9 VEGETATION MANAGEMENT

Main Roads will avoid clearing native vegetation where possible. Where clearing cannot be avoided then this clearing is kept to a minimum. A VMP has been developed to manage and minimise vegetation clearing for the project (refer to Appendix B).

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11 APPENDICES

Appendix	Title
Appendix A	Biological Assessment
Appendix B	Vegetation Management Plan
Appendix C	Constraints Mapping

Appendix A: Biological Survey Report

Appendix B: Vegetation Management Plan

HODGES DRIVE ON-RAMP

Purpose and Scope

This Vegetation Management Plan (VMP) has been prepared by Main Roads for the purpose of managing native vegetation clearing impacts associated with the Mitchell Freeway Southbound Widening – Hodges Drive On-ramp project (the project).

The project will involve the upgrade a portion of the Hodges Drive on-ramp to accommodate an additional lane as part of the wider Mitchell Freeway Southbound Widening project.

In specified circumstances, Main Roads VMP is required to be approved by Department of Water and Environmental Regulation (DWER) as a condition of Main Roads Statewide Clearing Permit CPS 818.

Action

Appendix B1 contains the standard Principal Environmental Management Requirements (PEMRs) that will be utilised for all projects that involve clearing to avoid, mitigate and manage the environmental impacts of the project.

Timeframes

Actions shall be undertaken in accordance with those described in the relevant PEMR and the Project Specific Environmental Management Requirements.

Responsibilities

It is the responsibility of the Superintendent's Contract Management Team that the requirements are implemented by the Contractor. This shall be done by adhering to the Environmental Measurement and Evaluation Checklist.

Appendix B1 – Principal Environmental Management Requirements (PEMR's)

B1.1 Clearing

STANDARD MANAGEMENT REQUIREMENTS
PRE WORKS 1. The Contractor must prepare, implement and maintain processes to ensure that the movement of all vehicles, plant and machinery does not occur outside of the Limits of Vegetation Clearing. This must include all turnaround areas. 2. The Contractor must minimise vegetation clearing and the area of disturbance on ground by utilising existing cleared area where possible.
DURING WORKS 1. The Contractor must report any damage to vegetation beyond the Limits of Vegetation Clearing as an Environment Incident. 2. The Contractor must ensure Movements are confined to the Limits of Vegetation Clearing during the works 3. The Contractor must undertake the clearing in accordance with the Fauna PEMR.
POST WORKS 1. NIL

B1.2 Dieback Management

STANDARD MANAGEMENT REQUIREMENTS
PRE WORKS 1. Contractor's Pre-starts must detail the requirements from the DMP/HMP, where relevant, dieback management areas and the requirements of each area, maps of infested and uninfected locations, and hygiene requirements 2. Where relevant a copy of the DMP/HMP must be onsite. This plan will include maps of management areas and obligatory control actions 3. Prescribe where vehicles, machinery and plant are going to be stored/parked during the works. 4. Use the Plant, Vehicle and Equipment Hygiene Checklist or equivalent Hygiene form to check that all machinery and vehicles are clean on entry (i.e. free of soil and vegetation).
DURING WORKS 1. If required, locations of dieback infested or dieback free areas and hygiene control locations marked on site in accordance with contract HMP or DMP. 2. Hygiene works to be undertaken as per the HMP or DMP, where required. 3. Restrict movement of machines and other vehicles to the Limits of Vegetation Clearing.

4. Ensure no known weed affected soil, mulch, fill or other material is brought into the Limits of Vegetation Clearing.
5. Ensure cleared materials are stockpiled or disposed at waste at the locations approved by the Superintendent.

POST WORKS

1. Record that the project was undertaken in dry soil conditions (unless an approved DMP authorises otherwise).
2. Use the Plant, Vehicle and Equipment Hygiene Checklist to check that all machinery and vehicles are clean on exit (i.e. free of soil and vegetation).

B1.3 Erosion and Sedimentation Control

STANDARD MANAGEMENT REQUIREMENTS

PRE WORKS

1. The Contractor must develop, implement and maintain processes and procedures to ensure that:
   - The Contractor is responsive to and addresses incidents of erosion and sedimentation within and adjacent to the work areas.
   - Prevent water and wind soil erosion within and adjacent to the works areas.
   - Prevent the sedimentation and siltation of watercourses located within and adjacent to the works area.
   - Ensure that sedimentation and siltation of drainage lines due to the removal of riparian vegetation is avoided, minimised and mitigated.
   - Ensure that loose surfaces and recently cleared areas are protected from wind and soil erosion.
   - Minimise exposed soil working surfaces or protect them from stormwater erosion.
   - Ensure material such as gravel, crushed rock and excavated material is stockpiled away from drainage paths and covered to prevent erosion.
   - Ensure that water quality monitoring is undertaken when turbidity and sedimentation is an issue.

DURING WORKS

1. Implement, monitor and adhere to the sedimentation and erosion processes developed to address the requirements in the pre-works.

POST WORKS

1. If required, the Contractor must continue to monitor water quality until the turbidity/sedimentation dissipates.
2. The Contractor must ensure that disturbed areas are stabilised as soon as is practicable after construction activities are completed.

B1.4 Fauna

STANDARD MANAGEMENT REQUIREMENTS

PRE WORKS

1. The Contractor must ensure that fauna management requirements are communicated to the crew undertaking the clearing works during the induction and pre-start meeting.
2. Where active nests, burrows or dens are identified, works must not proceed until the Contractor obtains the Superintendents approval of the management of active nests, burrows or dens adheres to the Superintendents advice.

DURING WORKS

1. The Contractor must undertake the clearing in the following manner to allow fauna to move out of the clearing area;
   i. Prior to the clearing activities commencing, use machinery to tap large trees with habitat hollows to encourage any animals evacuate.
   ii. Undertake the clearing in one direction and towards areas of native vegetation to allow the animals to escape to adjacent habitat.
2. The Contractor must ensure that all onsite personnel undertake visual monitoring and are vigilant to the presence of fauna. Any sightings of fauna, including injury or fatality, must be reported as an Environmental Incident.
3. The Contractor must ensure that;
   i. No pets, traps or firearms are brought into the project area.
   ii. Fauna are not fed
   iii. Fauna are not intentionally harmed or killed
   iv. Fauna that venture into the work area are encouraged to leave in a manner that does not harm the animal or operator (loud noise, slowly approaching in a vehicle etc.)
4. The Contractor must ensure that in the event that sick, injured or orphaned native wildlife are located on the project site, the WILDCARE Helpline ((08) 9474 9055) will be contacted for assistance. The Contractor must maintain records of any animal taken to a wildlife carer.

POST WORKS

1. The Contractor must provide any records of fauna impact to the Superintendent.

B1.5 Machinery and Vehicle Management

STANDARD MANAGEMENT REQUIREMENTS

PRE WORKS

1. The Contractor must ensure that all areas associated with the storage, parking, servicing, wash down and refuelling of all vehicles, plant and machinery is located within the Limits of Clearing and approved by the Superintendent.
2. The Contractor must ensure that all vehicles, machinery and plant are clean on entry (i.e. free of all soil and vegetation material) and comply with the requirements of 204.B.32.

3. The Contractor must ensure that vehicle servicing and refuelling will be undertaken at designated areas approved by the Superintendent.
4. The Contractor must ensure that all staff suitably qualified and competent to undertake works, especially refuelling activities.

DURING WORKS

1. The Contractor must maintain records of checking all vehicles, machinery and plant are clean on entry.

POST WORKS

B1.6 Mulch and Topsoil Management

STANDARD MANAGEMENT REQUIREMENTS

PRE WORKS

1. The Contractor must ensure that the movement of soil and vegetation is only undertaken in dry conditions unless otherwise approved and / or directed by the Superintendent.
2. The Contractor must ensure that poor quality topsoil and mulched vegetation does not contaminate the good quality topsoil and vegetation.

DURING WORKS

1. The Contractor must ensure that all machinery used in the removal of weed-infested topsoil must be cleaned down before and between operations to prevent the introduction and spread of weeds.
2. The Contractor must ensure the movement of large equipment over topsoil materials is avoided to minimise compaction.
3. The Contractor must ensure that Dieback and weed infected topsoil and mulch vegetation must be handled separately to minimise the risk of spreading dieback and weed species across the site and stockpiles.
4. The Contractor must ensure that stockpiling operations must occur in a manner to ensure that the properties of the topsoil are not degraded and the topsoil made unsuitable for use in revegetation.

POST WORKS

B1.7 Pegging and Flagging

STANDARD MANAGEMENT REQUIREMENTS

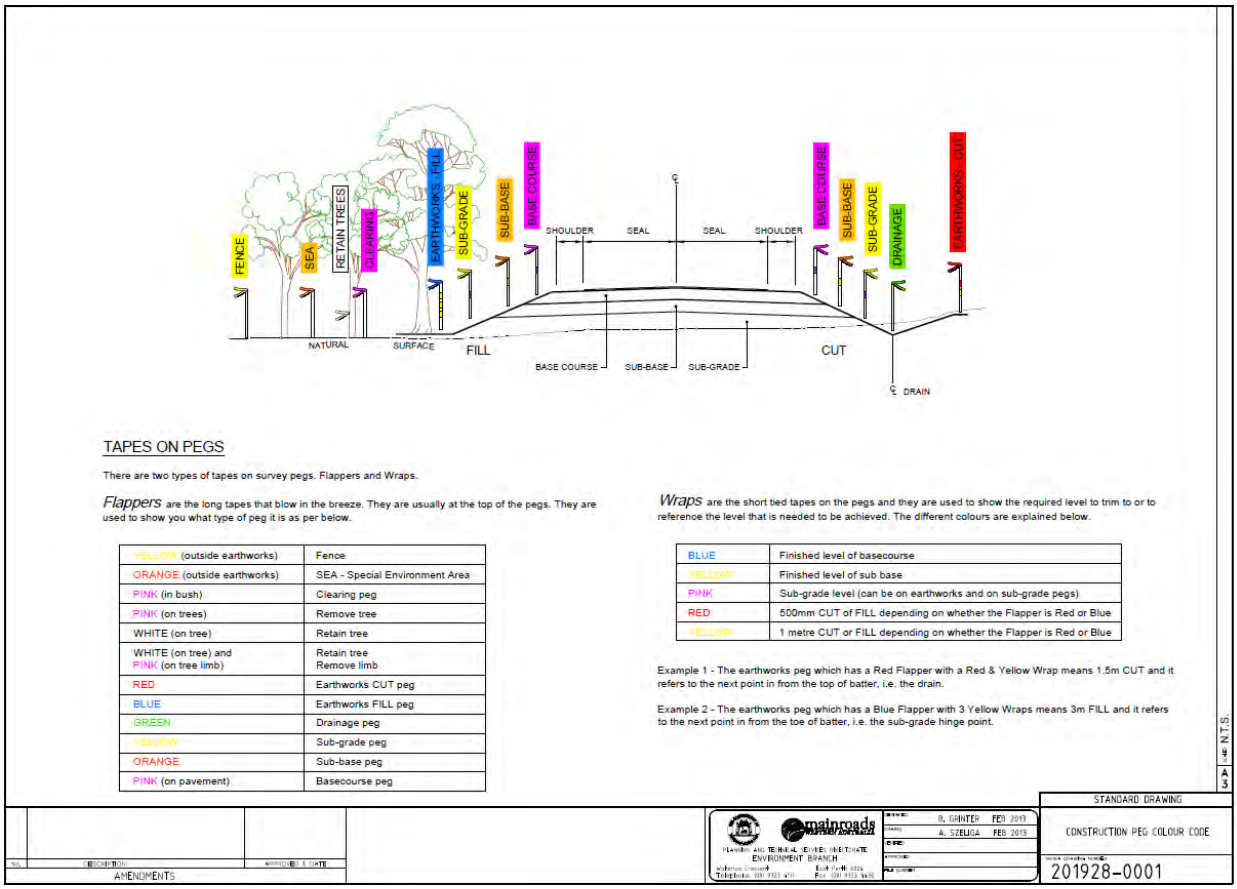
1. Pegging must be done in accordance with the requirements detailed in Specification 301.
2. The Contractor must clearly communicate, either at the pre-start meeting or equivalent, to the crew undertaking the clearing works, through clear maps and other additional means, what the Pegging represents.

DURING WORKS

1. The Contractor must peg the Limits of Clearing by PINK flagging tape.
2. The Contractor peg/demarcate vegetation proposed to be retained is demarcated by WHITE flagging tape.
3. The Contractor must ensure that the vegetation demarcated with PINK and WHITE flagging tape is consistent with the approved clearing areas.

POST WORKS

1. The Contractor remove and dispose of appropriately any demarcation, pegging or flagging once project works are completed.



B1.8 Water Drainage Management

STANDARD MANAGEMENT REQUIREMENTS

PRE WORKS

1. Use pollution control and containment strategies for project activities in Public Drinking Water Source Areas (PDWSAs) / Underground Water Pollution Control Areas (UWPCAs) and liaise with the DWER where necessary

DURING WORKS

1. Existing natural drainage paths and channels along the road or the vicinity of the project area will not be unnecessarily blocked or restricted.

2. Temporary drainage systems may be installed to carry surface water away from the areas where excavation and foundation construction work is taking place or from any other area where the accumulation of water could cause delay or damage to the work.
3. Maintain these drainage systems in proper working order at all times.
4. Runoff from disturbed areas must be managed to minimise adverse impacts on surrounding vegetation, watercourses and properties.
5. Booms and silt fences must be used when working over or adjacent to areas of surface water in order to protect the quality of surface water from construction impacts.

POST WORKS

1. Water quality monitoring to be undertaken (if turbidity/ sedimentation is an issue).
2. Prior to backfilling the completed pipe work certify that the entire system is flushed clean and tested
3. Disturbed areas will be stabilised soon after construction activities are completed.
4. Culvert and drainage structures will be free of all grass, weeds, silt and debris

B1.9 Weed Management

STANDARD MANAGEMENT REQUIREMENTS

PRE WORKS

1. The Contractor must remove or kill any weeds growing in project area that are likely to spread and result in environmental harm to adjacent areas of native vegetation that are in good or better condition.
2. The Contractor must develop, implement and maintain procedures to identify and control declared and invasive weed species within the Contract areas, to the satisfaction of the Superintendent.
3. The Contractor must prepare a weed control program, for nominated weed species for control and disposal, to the satisfaction of the Superintendent.
4. The Contractor must undertake weed management in Stockpiles as directed by the Superintendent.

DURING WORKS

1. The Contractor must implement the weed control procedures and management plan and record and manage records of its implementation.
2. The Contractor must treat nominated weed infestations as many times as necessary to control and eradicate the weed species in accordance with the approved weed control program
3. The contractor must ensure that no known weed, pest or diseased affected soil, mulch, fill or other material is brought into the Site.

POST WORKS

1. The relevant Vegetation Maintenance Record Sheets available at: https://www.mainroads.wa.gov.au/BuildingRoads/Contracting/Pages/ReportingForms.aspx must be completed and sent to the Superintendent.

Appendix C: Constraints Mapping

Project area

Vegetation association

Banksia Woodland: *Allocasuarina fraseriana* and *Banksia attenuata* low open woodland over *Banksia sessilis* and *Jacksonia sternbergiana* tall open shrubland over *Xanthorrhoea preissii* and *Olearia axillaris* sparse mid shrubland over *Hibbertia hypericoides, Synaphea spinulosa* and *Tricoryne elatior* low shrubland over *Mesomelaena pseudostygia, Conostylis aculeata* subsp. *aculeata* and *Alexgeorgea nitens* sparse sedgeland over *Ehrharta calycina* and *Avena fatua*sparse tussock grassland.

Jarrah Woodland 1: *Eucalyptus marginata, Allocasuarina fraseriana* and *Banksia attenuata* mid open forest to low woodland over *Xanthorrhoea preissii* (+/- *Jacksonia sternbergiana/Allocasuarina humilis*) mid open shrubland over *Hibbertia hypericoides* low open shrubland over *Mesomelaena pseudostygia* and/or *Lepidosperma calcicola* and/or *Desmocladus flexuosus* sparse sedgeland over a tussock grassland of introduced grasses.

Roads (MRWA)

Scale 1:1,000 at A4

0 10 20
metres

Coord. Sys. GDA 1994 MGA Zone 50

Job No: 58540

Client: Main Roads

Version: A

Date: 12-May-2020

Drawn By: cthatcher

Checked By: AH

Hodges Drive and Mitchell Freeway Perth,WA

VEGETATION ASSOCIATIONS

FIGURE 3

strategen JBS&G

File Name: W:\Projects\1)Open\Main Roads\58540 Mitchell Freeway Widening\GIS\Maps\Hodges_CIA_Rev_A\58540_03_VegAssoc.mxd
Image Reference: www.nearmap.com© - Imagery Date: 2 March 2020

Legend

- Project area

Vegetation condition

- Good
- Degraded to completely degraded
- Completely degraded
- Roads (MRWA)

Scale 1:1,000 at A4 (0, 10, 20 metres)		**Hodges Drive and Mitchell Freeway Perth,WA**
Coord. Sys. GDA 1994 MGA Zone 50		**VEGETATION CONDITION**
Job No: 58540		
Client: Main Roads		**FIGURE 4**
Version: A	Date: 12-May-2020	strategen JBS&G
Drawn By: cthatcher	Checked By: AH	

File Name: W:\Projects\1)Open\Main Roads\58540 Mitchell Freeway Widening\GIS\Maps\Hodges_CIA_Rev_A\58540_04_VegCond.mxd
Image Reference: www.nearmap.com© - Imagery Date: 2 March 2020

Legend

- Project area

Fauna habitat

- Banksia Woodland
- Jarrah Woodland 1
- Roads (MRWA)

Scale 1:1,000 at A4 (0, 10, 20 metres)		**Hodges Drive and Mitchell Freeway Perth,WA**
Coord. Sys. GDA 1994 MGA Zone 50		**BLACK COCKATOO HABITAT**
Job No: 58540		
Client: Main Roads		**FIGURE 5**
Version: A	Date: 12-May-2020	strategen JBS&G
Drawn By: cthatcher	Checked By: AH	

File Name: W:\Projects\1)Open\Main Roads\58540 Mitchell Freeway Widening\GIS\Maps\Hodges_CIA_Rev_A\58540_05_BCHabitat.mxd
Image Reference: www.nearmap.com© - Imagery Date: 2 March 2020

Legend

- Project area
- 4km buffer
- Carnaby's Black Cockatoo foraging habitat (DBCA)
- State roads (MRWA)

Scale 1:45,000 at A4

0 0.5 1
Kilometres

Coord. Sys. GDA 1994 MGA Zone 50

Job No: 58540

Client: Main Roads

Version: A | Date: 12-May-2020

Drawn By: cthatcher | Checked By: AH

Hodges Drive and Mitchell Freeway Perth,WA

BLACK COCKATOO HABITAT WITHIN 4 KM OF THE PROJECT AREA

FIGURE 6

strategen JBS&G

File Name: W:\Projects\1)Open\Main Roads\58540 Mitchell Freeway Widening\GIS\Maps\Hodges_CIA_Rev_A\58540_06_BCHabitat_4km.mxd
Image Reference: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community www.nearmap.com© - Imagery Date: 2 March 2020

Legend

Project Area

Threatened/Priority Ecological Community

EPBC TEC Banksia Woodlands of the Swan Coastal Plain ecological community

WA PEC Banksia dominated woodlands of the Swan Coastal Plain

Scale 1:2,500 at A4

0 25 50
metres

Coord. Sys. GDA 1994 MGA Zone 50

Job No:

Client:

Version: A | Date: 13-Jul-2020

Drawn By: esutherland | Checked By:

Hodges Drive and Mitchell Freeway
Perth, WA

Threatened and Priority Ecological Communities

FIGURE 6

strategen JBS&G

File Name: W:\Projects\1)Open\Main Roads\58540 Mitchell Freeway Widening\GIS\Maps\Hodges_CIA_Rev_A\58540_0x_Calculations.mxd
Image Reference: www.nearmap.com© - Imagery Date: January 2020. SLIP Public Services Locate 2020.

Clearing Assessment Report – CPS 818

We're working for Western Australia.

Mitchell Freeway Southbound – Construction of Noise Walls and Principal Shared Path (PSP) between Hepburn Avenue and Warwick Train Station

November 2022

D20#713066

Contents

Amendments

Report Compilation & Review	Name and Position	Document Revision	Date
Author:	Environmental Consultant - JBS&G	Draft v1	27/10/2022
Reviewer:	Senior Environment Officer	Rev 0	16/11/2022
Author:	Environmental Consultant - JBS&G	Rev 1	24/11/2022
Reviewer:	Principal Environment Officer	Rev 1	13/12/2022

1 PROPOSAL

1.1 Purpose and Justification

The purpose of this Clearing Assessment Report (CAR) is to provide a report detailing the assessment of native vegetation clearing that is proposed to be undertaken using the Statewide Clearing Permit CPS 818 issued to Main Roads Western Australia (Main Roads).

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

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 1.6.

1.2 Proposal Scope

Project Name: Mitchell Freeway Southbound Upgrade Optional Works 2.

Project Purpose / Components: Main Roads Western Australia (Main Roads) proposed to upgrade of the verge of Mitchell Freeway between Hepburn Avenue and Warwick Train Station which incorporates the construction of the following elements:

- A principle shared path (PSP) to connect with existing PSPs and upgrading existing PSPs to modern standards;
- The construction of a noise wall; and
- Drainage modifications

During delivery, detailed engineering design work has been conducted for the PSP and noise walls and further consultation with affected landholders has taken place. This has identified the need for minor realignments of the PSP and noise walls. Connection of ITS infrastructure has also been added to the scope of works (Additional Project). The Additional Project area is shown in Figure 1.

1.3 Proposal Location

The project is situated approximately 20 km north west of Perth within the Local Government Area of City of Joondalup. The Project area is located between Hepburn Avenue (H016 SLK 18.39) and Warwick Train Station (SLK 15.30) (Figure 1).

Start
Latitude: -31.776817°
Longitude: 115.780886°

End
Latitude: -31.785953°
Longitude: 115.781839°

The location and boundaries of the study area (10 km radius) for the Project are shown in Figure 2.

1.4 Clearing Details

The proposed clearing undertaking using CPS 818 is: The Project area will require 2.40 ha of native vegetation.

The proposed temporary clearing undertaking using CPS 818 is: None.
A detailed CAR of the Project clearing activities was undertaken. The Clearing Assessment Report (CAR) was endorsed by Main Roads on 8 February 2021 (D21#256690). The CAR was updated to include the Additional Project in November 2022.

The CAR outlines the key activities associated with the entire Project, the existing environment and an assessment of native vegetation clearing. This assessment provided an evaluation of the vegetation clearing impacts associated with the Project using the ten clearing principles and strategies used to manage vegetation clearing. Key items associated with the clearing impact assessment are listed below.

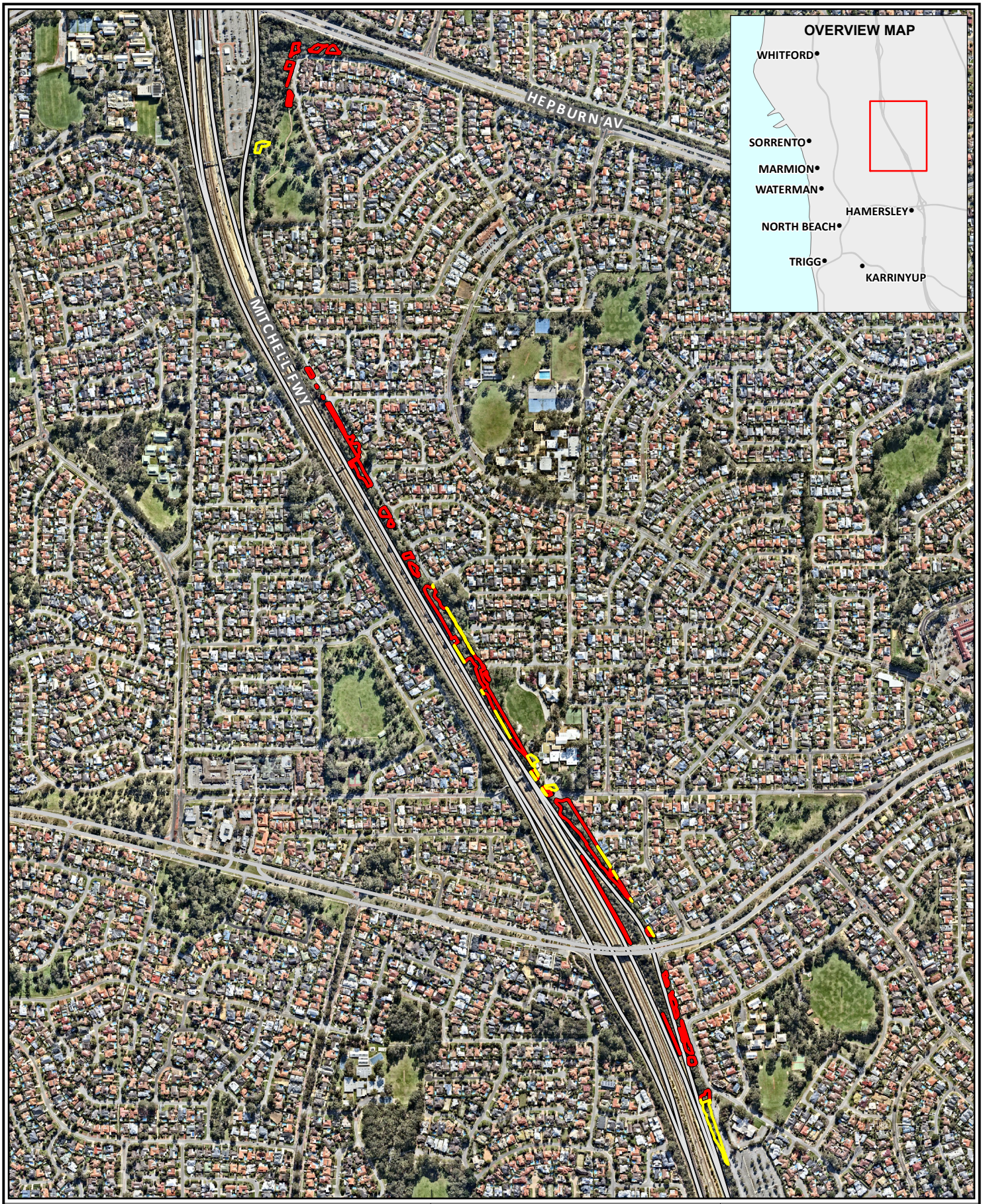
- Flora and Vegetation

  - Clearing of a total 2.40 ha of remnant native vegetation, of which 2.09 ha has been mapped as in a 'Degraded' to 'Completely Degraded' condition.

- Terrestrial Fauna
  - The native vegetation clearing has the potential to impact Carnaby's Black Cockatoo through the removal of up to 2.40 ha of low-quality foraging habitat and up to 57 suitable habitat trees with a diameter at breast height (DBH) greater than 500 mm (Suitable DBH Trees), none of which contain hollows suitable for Black Cockatoo use.

The Project is not likely to be at variance with any of the clearing principles.

Main Roads Statewide Purpose Clearing Permit CPS 818 will be used to undertake native vegetation clearing for the Project. Project clearing will be undertaken in accordance with the conditions of CPS 818 and detailed records of native vegetation clearing will be maintained as required under the permit.



Legend

- Approved project area
- Proposed additional project area
- Highways
- Main road

Scale 1:12,000 at A4

0 100 200
metres

Coord. Sys. GDA 1994 MGA Zone 50

Job No: 63847

Client: Main Roads Western Australia

Version: A | Date: 24-Nov-2022

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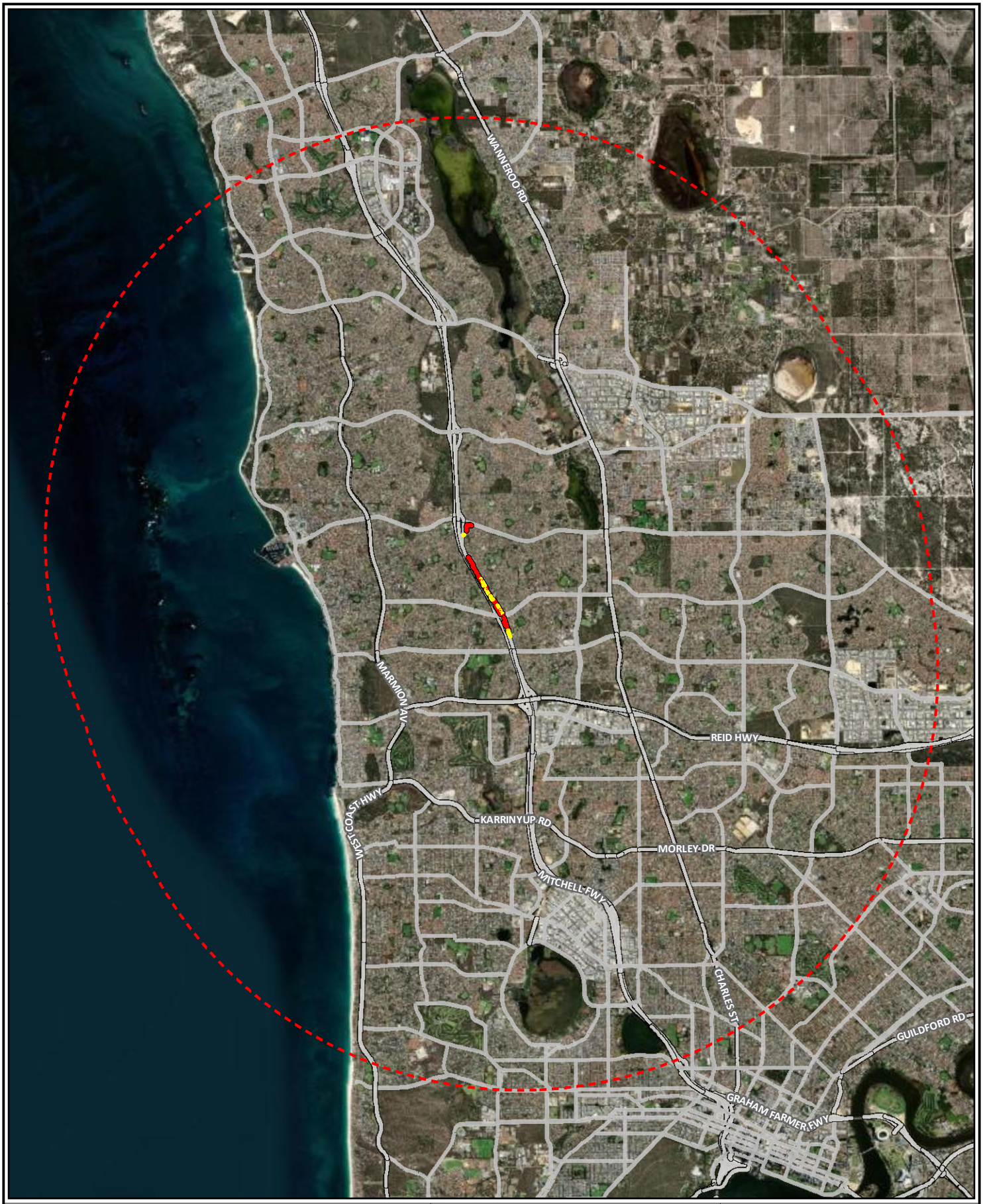
Optional Works 2
Hepburn Ave - Warwick Train Station

PROJECT AREA

FIGURE 1

strategen JBS&G

File Name: \\008PMPMR004V001.jbsg.aust\JBS Perth\Projects\1)Open\Main Roads\63847 Mitchell Fwy Southbound updates\GIS\Maps\R01_Hepburn_CAR\63847_01_ProjectArea.mxd
Image Reference: www.nearmap.com© - Imagery Date: 30 August 2022.



Legend

- Approved project area
- Proposed additional project area
- 10km study area
- Highways
- Main road

Scale 1:120,000 at A4

0 1 2
Kilometers

Coord. Sys. GDA 1994 MGA Zone 50

Job No: 63847

Client: Main Roads Western Australia

Version: A | Date: 24-Nov-2022

Drawn By: ianandagoda | Checked By: CT

Optional Works 2
Hepburn Ave - Warwick Train Station

PROJECT AREA 10 KM STUDY AREA

FIGURE 2

strategen JBS&G

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Image Reference: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1.5 Alternatives to Native Vegetation Clearing Considered During Proposal Development

Within the road reserve there is limited space available for development of infrastructure required for the broad Smart Freeway project, which includes widening the freeway, installing the PSP and noise walls, as well as installation of services and signage for Intelligent Transport Systems (ITS). Consequently, there were limited options available for positioning of the PSP and noise wall alignment.

Where possible the PSP and noise wall alignment has utilised previously cleared land to avoid clearing of native vegetation. This has included investigating options using previously cleared land, such as realignment through existing firebreak and parks. Alternative design approaches have also been considered such as avoiding cut options that may impact native vegetation, where practicable.

Where native vegetation clearing cannot be avoided it will be minimised. The Project area represents the maximum extent of disturbance for the proposal. Where possible, vegetation and fauna habitat will be retained during detailed design and construction. The PSP has also been positioned in its ultimate alignment where possible, to minimise potential for future clearing of native vegetation.

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

The design and management measures implemented to avoid and minimise the clearing impacts by the project are provided in Table 1.

In addition, impacts to vegetation will be minimised through the implementation of the following measures:

- The clearing area will be demarcated prior to the commencement of native vegetation clearing;
- Where possible vegetation will be pruned as opposed to removed;
- Further Project clearing will be avoided as the site office, materials storage areas, construction vehicles/machinery and access tracks will be located on previously disturbed or cleared areas; and
- Development and implementation of a site-specific Construction Environmental Management Plan (CEMP) which will establish the following vegetation management actions including:
    - Clearing and access control measures (such as demarcation of clearing boundaries);
    - Weed and dieback management;
    - Landscaping of earth-worked areas;
    - Erosion and sediment control;
    - Waste and fire management;
    - Topsoil management;
    - Dust control; and
    - Tree and vegetation retention where possible.

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

Design or Management Measure	Discussion and Justification
Steepen batter slopes	Batters will be steepened beyond standard practice to reduce the amount of clearing required and ensure clearing doesn't extend outside the proposed footprint. Where steepening the batters is impractical and installation of retaining walls is practicable, retaining walls will be used to reduce the clearing requirement.
Installation of safety barriers	Installation of safety barriers is required in order to comply with road safety requirements. Where possible, safety barriers will be installed in previously cleared land within the road reserve.
Alignment to one side of existing road	Having the PSP on the eastern side of the freeway is a design requirement and therefore the project was constrained to stay within this verge. Design has utilised previously cleared land within the verge as much as possible and native vegetation clearing will only to place when it cannot be avoided.
Alternative alignment to follow existing road (or) to preferentially locate within pasture or a degraded areas	To minimise clearing required, the PSP and noise wall alignment will be positioned within existing cleared areas such as firebreaks and along batters impacted by construction of the existing freeway.
Installation of kerbing	Freeway surfacing with Open Graded Asphalt may prevent kerbing from being effective. Kerbing requirements are not likely to have a significant impact on the amount of native vegetation clearing required for a PSP.
Simplification of design to reduce number of lanes and/or complexity of intersections	Alignment has been chosen to follow existing PSP and utilise cleared areas wherever possible. Where practicable, the PSP has been positioned in its ultimate alignment to avoid future clearing of native vegetation.
Preferential use of existing cleared areas for access tracks, construction storage and stockpiling	Cleared areas will be used for access tracks, construction storage and stockpiling, with no vegetation to be removed for temporary works.
Drainage modification	The Project will modify the existing drainage for this section of Hepburn Avenue and Mitchell Freeway to increase basin capacity. Drainage alternatives have been incorporated into the design to reduce clearing requirements such as the use of levees to avoid or reduce the size of drainage basins. Where practicable existing basins will be deepened to avoid additional clearing requirements.
Other design treatment	To reduce the clearing requirements, cut and fill alternatives have been considered as part of the design where possible any cut options that would require additional clearing have been avoided.

1.7 Approved Policies and Planning Instruments

The clearing of native vegetation in Western Australia is regulated under the 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 (see Section 1.3), Main Roads has also had regard to the below instruments.

Other Legislation of relevance 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)
- Town Planning and Development Act 1928

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 (DEC, December 2014)
- Procedure: Native vegetation clearing permits (DWER, October 2021)
- Environmental Offsets Guidelines (Government of Western Australia, August 2014)
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (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
- Approved Recovery Plans for threatened species
- EPBC Act Referral guidelines for the three threatened black cockatoo species
- Strategic advice - EPA

2 SCOPE AND METHODOLOGY OF CLEARING

Native vegetation will be cleared to accommodate this Proposal. This clearing will be undertaken using the Main Roads Statewide Clearing Permit CPS 818 or a project-specific Clearing Permit.

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 *Environmental Protection Act 1986* (EP Act) and strategies used to manage vegetation clearing.

2.1 Report Terminology and Sources

The following terms are used in this Clearing Report:

- **Native Vegetation Clearing Area** – The maximum amount of native vegetation to be cleared for the Project that will accommodate the designed earthworks and, typically, a nominal buffer to allow for the safe movement of machinery during construction.

- **Study Area** – Area covered by the Desktop Assessment. The Study Area for the Proposal is confined to a local area of a 10km radius.

- **Survey Area** – Area covered by the Biological Survey, which is typically larger that the Development Envelope.

2.2 Desktop Assessment

A desktop assessment of the Development Envelope 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 ArcMap and/or Main Roads corporate mapping system known as iMaps. 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 **Error! Reference source not found.**.

2.3 Surveys and Assessments

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

- Mitchell Freeway Widening Southbound and PSP Mitchell Freeway Gaps Hodges Drive to Reid Highway Biological Survey (Astron, 2020).
- Targeted Black Cockatoo habitat assessment (Tony Kirkby 2020).
- Phytophthora Dieback Assessment (Terratree, 2020)

A summary of the methodology and the results of the above surveys are provided in Section **Error! Reference source not found.**.

3 SUMMARY OF SURVEYS

3.1 Biological Survey

A detailed biological survey of the area (survey area wider than the current Project area) was undertaken in 2019 (Astron, 2020). A summary of the findings from the survey are presented below.

A Black Cockatoo survey was subsequently undertaken by Tony Kirkby (2020) to provide an additional investigation into habitat trees of interest from the results of Astron (2020), between the 15th and 27th June 2020.

A summary of these surveys is provided in Sections 3.1.1 to 3.1.2 below.

3.1.1 Biological Survey (Astron 2020)

Astron (Astron 2021) undertook a detailed biological survey that concluded:

Vegetation:

- Five remnant native vegetation types were defined and included:
  - One Banksia Woodland;
  - Two *Eucalyptus marginata* (jarrah) woodlands; and
  - Two *Eucalyptus gomphocephala* (tuart) forests.
- Remnant vegetation types were mapped across 6.40 ha (19 %) of the survey area. The remaining 27.60 ha of the survey area was either cleared (3.00 ha, 9 %) or planted vegetation (24.60 ha, 72 %).
- Remnant vegetation in the survey area was in Good to Completely Degraded condition, with the majority considered Completely Degraded as it consisted of scattered remnant species only. It is expected that quality of these remnants has been declining over time due to significant edge effects.
- Vegetation inferred to represent the EPBC Act listed 'Tuart *(Eucalytptus gomphocephala*) woodlands and forests of the Swan Coastal Plain' TEC was recorded within the survey area, with none within the Project area.
- Vegetation considered to represent the State listed PECs 'Tuart *(Eucalyptus gomphocephala*) woodlands of the Swan Coastal Plain' and '*Banksia* dominated woodlands of the Swan Coastal Plain IBRA Region' PEC was recorded within the survey area across 4.70 ha and 1.30 ha respectively, with none within the Project area.

Flora:

- A total of 207 vascular flora species, from 47 families and 127 genera, were recorded in the survey area. No EPBC Act or State listed threatened flora were recorded. Three priority flora species were recorded: *Ricinocarpos tuberculatus* (P2), *Grevillea olivacea* (P4) and *Jacksonia sericea* (P4).
- The survey area has considerable disturbance and limited floristic diversity which further limits the potential for any threatened or priority flora species to occur.

- Sixty-three weed species were recorded within the survey area, accounting for 30% of the species recorded. Three are listed as WoNS (Government of Australia, 2012) (**Asparagus asparagoides*, **Lantana camara* and **Genista linifolia*) and three are declared pest plants in Western Australia under the BAM Act (DPIRD, 2016).

Fauna:

- 24 conservation significant vertebrate species were identified in the desktop assessment, and three species (Quenda, Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo) were recorded within the survey area, one species was considered to have a 'moderate' likelihood and 20 species were considered to have a 'low' likelihood of occurrence.

- Based upon the current distributions for the three threatened species of black cockatoo, only the Carnaby's Cockatoo (*Zanda latirostris*) and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) are likely to occur within the vicinity of the survey area.

- 329 Black Cockatoo trees (259 Tuart, 42 Jarrah, 16 dead stags and 12 Marri) with a diameter at breast height of over 50 cm were recorded within the survey area including 15 trees (nine Tuarts and six dead stags) considered to have suitable hollows for Carnaby's Cockatoos to breed in.

- Twenty-seven known foraging resource species for the Carnaby's Cockatoo and three known foraging resource species for the Forest Red-tailed Black Cockatoo were recorded within the survey area; however, only the marri, jarrah and Banksia species are considered key species for foraging Carnaby's Cockatoos. Two individual Carnaby's Cockatoos were observed foraging on *Banksia prionotes* and jarrah within the survey area.

- One individual Quenda roadkill and multiple diggings in the same area were recorded within the survey area. The sighting was recorded 228 m south of the Woodvale Open Space, and it is likely that this individual was from of a larger quenda population within Woodvale Open Space.

3.1.2 Black Cockatoo Habitat Assessment (Kirby 2020)

Tony Kirkby (2020) undertook a specific assessment of all trees identified during the biological survey completed by Astron (2020) to provide further clarification of potentially suitable hollows. All trees with a DBH greater than 500 mm were inspected from the ground using binoculars, and further inspected using a pole camera where necessary. The findings of this assessment are summarised below.

Breeding habitat:
Of the 329 trees identified by Astron (2020), four were deemed of interest (tree numbers 103, 190, 230 and 290). These trees were all located outside of the Project area for Optional Works 2. The trees of interest were described by Kirkby (2020) as:

- Tree 103: *Eucalyptus gomphocephala* – small hollow with chewed entrance. Unlikely to be Black Cockatoo breeding hollow
- Tree 190: Dead Stag – top entry hollow with chewing at entrance. Top section of hollow in poor condition however may be sufficiently deep to provide Black Cockatoo hollow
- Tree 230: *Eucalyptus gomphocephala* dead stag – hollow with entrance large enough for Black Cockatoo however no signs of use around the rim or internally. Unlikely to be a breeding hollow, possibly too shallow
- Tree 290: *Eucalyptus gomphocephala* – hollow with suitable entrance for Black Cockatoo with chew marks at entrance. Closer inspection using pole camera not possible due to presence of feral bees in nearby hollow

None of the trees identified to have potential or suitable hollows for Black Cockatoo use were recorded within the Project area.

Foraging habitat:
Foraging habitat was found to range from poor to completely degraded within the survey area, with remaining understorey foraging species being *Banksia sessilis, B. nivea, Hakea lissocarpha, H. prostrata, H. trifurcata*, and *Xanthorrhoea pressii*. Canopy cover was considered good, with Jarrah, Marri, Tuart, *Allocasuarina fraseriana* (Sheoak) and *Banksia* spp. present. This is of note as being particularly relevant for Forest Red-tailed Black Cockatoo which rarely feeds below the canopy level. Foraging residue from Marri and *Banksia* spp. were present. No breeding sites are located within 6 km of the Project area; therefore, this foraging habitat is not significant in supporting breeding individuals.

Roosting habitat:
No roosting sites are known from the Project area, and no signs of Black Cockatoo roosting was noted within the survey area.

3.2 Summary of Dieback Survey

Terratree (2020) completed a Phytophthora Dieback Assessment of Mitchell Freeway on the 9th of June 2020, covering an area broader than the Project area.

Terratree (2020) concluded:

- Desktop review of Dieback Information Data Management System identified no positive sample results for *Phytophthora* species within the assessment area
- Two soil and tissue samples taken during the assessment returned negative results for any *Phytophthora* species
- 0.60 ha (1.8%) of the assessment area was mapped as 'infested'
- 0.90 ha of the assessment area was mapped as 'uninfested'
- Most of the assessment area was excluded from assessment due to the vegetation being classified as Degraded or Completely Degraded (Astron 2020)

No evidence of dieback was recorded within the Project area, with the site reported as uninfested or uninterpretable.

4 VEGETATION DETAILS

4.1.1 Project Site Vegetation Description

The Project area is predominately in 'Degraded' to 'Completely Degraded' condition with one native vegetation unit present:

- ***Tuart Forest 2:*** *Eucalyptus gomphocephala* mid open to closed forest over *Eucalyptus marginata* (+/- *Banksia attenuata*, *Allocasuarina fraseriana*, *Corymbia calophylla*) mid to low woodland to open woodland over *Xanthorrhoea preissii* (+/- *Acacia rostellifera, Jacksonia sternbergiana*, *Allocasuarina humilis*) mid shrubland to isolated shrubs over *Mesomelaena pseudostygia* and *Lepidosperma calcicola* sparse sedgeland over an introduced tussock grassland.

Table 2 and Table 3 provide details of the Pre-European Vegetation Associations within the Project area and the Additional Project area and the remaining extents of these associations.

Table 2. Summary of Project Area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 6 described as a Medium woodland: tuart and jarrah (GoWA, 2019a).	**Initial Project area:** Clearing of up to 2.06 ha for construction of noise barriers and a PSP.	Completely Degraded (0.90 ha), Degraded to Completely Degraded (0.49 ha), Degraded (0.36 ha), Degraded to Good (0.24 ha), Good (0.07 ha).	Vegetation description and condition determined from biological survey (Astron, 2020).
	Additional Project area: Additional clearing of up to 0.34 ha for construction of noise barriers and a PSP.	Completely Degraded (0.34 ha).	Vegetation description and condition inferred from desktop analysis of additional clearing.

Table 3. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 6	**Statewide**	56,343.01	13,362.25	23.72	5,322.03 ha (9.45%)
	IBRA Bioregion Swan Coastal Plain	56,343.01	13,362.25	23.72	5,322.03 ha (9.45%)
	IBRA Sub-region Perth	56,343.01	13,362.25	23.72	5,322.03 ha (9.45%)
	Local Government Authority City of Joondalup	2,294.47	326.68	14.24	30.38 ha (1.32%)

4.1.2 Vegetation Complexes and Representation

Vegetation Complexes within the Project area have been defined by Heddle et al. (1980) and are based on vegetation in association with landforms and underlying geology. Native vegetation complexes as described by Heddle et al. (1980) within the Project area comprise:

- **Karrakatta Complex** – Central and South: Predominately open forest of *Eucalyptus gomphocephala* (Tuart), *E. marginata* (Jarrah), *Corymbia calophylla* (Marri) and woodland of *E. marginata* and *Banksia* species.

This complex is above the minimum threshold of 10% target for the retention of vegetation complexes in constrained areas on the Swan Coastal Plain (EPA, 2015). The current extent within the local area (10 km of the Project) is more restricted, with 9.86% remaining. The current remaining extent of these vegetation complexes (GoWA, 2019b) is detailed in Table 4.

Table 4. Vegetation Complexes (Heddle/Mattiske) within the Project Area

Heddle/Mattiske Veg Complex	Pre-European Extent (ha)	2019 Vegetation Extent	% Remaining
Karrakatta Complex - Central and South	53,080.99	12,467.20	23.49

5 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

In assessing whether the project's proposed clearing is likely to have a significant impact on the environment, the project was assessed against the ten Clearing Principles (Environmental Protection Act 1986, Schedule 5).

Each principle has been assessed in accordance with DWER's 'A Guide to the Assessment of Applications to Clear Native Vegetation' and other relevant CPS Decision Reports prepared by DWER.

The proposed clearing is not likely to be at variance to Principles (a) and (b) and not at variance to the remaining clearing principles.

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

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

Comment:
The Project involves the clearing of up to 2.40 ha of native vegetation comprised of the following mapped vegetation unit:

- **Tuart Forest 2**: *Eucalyptus gomphocephala* mid open to closed forest over *Eucalyptus marginata* (*Banksia attenuata*, *Allocasuarina fraseriana*, *Corymbia calophylla*) mid to low woodland to open woodland over *Xanthorrhoea preissii* (*Acacia rostellifera*, *Jacksonia sternbergiana, Allocasuarina humilis*) mid shrubland to isolated shrubs over *Mesomelaena pseudostygia* and *Lepidosperma calcicola* sparse sedgeland over an introduced tussock grassland.

The vegetation proposed to be cleared is in 'Completely Degraded' to 'Good' condition, with the majority (2.09 ha; 87.1%) in 'Degraded' to 'Completely Degraded' condition. The Project area represents poorer quality native vegetation in comparison to that in the surrounding area. Vegetation within the Project area comprises a linear fragment, separated from surrounding patches by main roads and residential land use.

No State of Federally listed Threatened or Priority ecological communities were recorded within the Project area.

No State or Federally listed Threatened flora species were recorded within the Project area.

One population of *Grevillea olivacea* (P4), comprising of 20 individuals, was recorded immediately adjacent to the Project area. *G. olivacea* is a common horticultural species in the Perth metropolitan region and is considered to have been established via seed mix during previous revegetation work. The Project area is approximately 120 km south of the species' natural range (Astron, 2021).

Astron (2021) observed the presence of three conservation significant fauna species within the survey area, including the Carnaby's Black Cockatoo (foraging individuals), Forest red-tailed Black Cockatoo (foraging evidence), and Quenda (roadkill and diggings) however,no observations were reported within the Project area.
The Project area is within the known distribution range of the Carnaby's Black Cockatoo, but outside of its known breeding range, and is outside of the modelled distribution of the Forest Red-tailed Black Cockatoo (DAWE, 2022).

Approximately 2.40 ha of potentially suitable foraging habitat was recorded by Astron (2021). The black cockatoo assessment undertaken by Astron (2021) determined that no quality foraging habitat as defined referral guidelines (DAWE, 2022) is present, due to the degraded state of vegetation and the sporadic and isolated distribution of known foraging flora species. A total of 57 trees of a suitable species for Black Cockatoo breeding with a DBH greater than 500 mm were recorded within the Project area. None of these

trees contained potentially suitable hollows (Kirby 2020). The presence of foraging habitat surrounding Suitable DBH Trees may increase the significance of that habitat.

The native vegetation to be cleared is not considered to comprise a high level of biological diversity. This is based on the vegetation being predominantly in 'Degraded' to 'Completely Degraded' condition, having a small size and high level of fragmentation, and the occurrence of similar remnant vegetation in equal or better quality in the local area.

Assessed Outcome:

- Noting the above, clearing for this Project is not likely to be at variance to this principle.

Methodology

MRWA Shapefiles
DBCA shapefiles
DAWE (2022)
NatureMap (February, 2020)
EPA (2016)
Astron (2021)

(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.

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

Comment:

Native vegetation contained within the Project area is predominantly (2.09 ha; 87.1%) in 'Completely Degraded' to 'Degraded' condition, and is separated from surrounding habitat patches by roads, pathways and residential land use. The vegetation to be cleared is not considered likely to provide significant habitat for most fauna species in the local area, however does contain some Carnaby's Black Cockatoo (*Zanda latirostris*), Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) and Quenda (*Isoodon fusciventer*) foraging habitat.

Astron (2020) identified the Carnaby's Cockatoo, Forest Red-tailed Black Cockatoo and Quenda within the broader survey area. The vegetation within the Project area contains some value for Carnaby's Black Cockatoo, as discussed below.

Black Cockatoo:

The Project area is within the known distribution range of the Carnaby's Black Cockatoo, but outside of its known breeding range, and is outside of the modelled distribution of the Forest Red-tailed Black Cockatoo (DAWE, 2022).

Within the Project area, habitat suitable for Carnaby's Black Cockatoos comprises of 2.40 ha of potentially suitable foraging and 57 Suitable DBH Trees, none of which contain suitable hollows (Kirkby, 2020;).

Kirkby, 2020 observed foraging residue from Carnaby's Cockatoo from Marri and Banksia from within the Project area. Astron (2020) recorded 2.06 ha of potentially suitable foraging habitat. The Black Cockatoo assessment undertaken by Astron (2020) determined that no quality foraging habitat as defined by the referral guidelines (DAWE, 2022) was present, due to the degraded state of vegetation and the sporadic and isolated distribution of known foraging flora species. While Carnaby's will utilise occurrences of Marri and Banksia within the Project area, the vegetation is considered unlikely to be significant to support the local population.

Within 6 km and 12 km of the Project area, there is approximately 919.04 ha and 3,858.30 ha of potential foraging habitat (DBCA, 2020). Clearing as a result of the Project represents 0.26% and 0.06% of the foraging habitat within 6 and 12 km of the Project area, respectively.

While the Project area contains suitable foraging species and potential breeding habitat, the quality of this habitat is 'Low' (Astron 2021) and is outside of the modelled breeding range for the species. The closest known breeding site for Carnaby's Cockatoo is at the Edith Cowan University Campus, approximately 7.5 km north of the Project area.

With regards to Forest Red-tailed Black Cockatoo, Marri is the most important breeding tree throughout their range, however breeding has also been recorded in Tuarts (DAWE, 2022). Suitable breeding trees are large and mature Marris, approximately 120-150 years in age and a mean overall height of 20.24 m (Johnston, Kirkby and Sarti, 2013). The closest known Forest red-tailed Black Cockatoo breeding site is 30 km South-east in the Darling Range (Kirkby, 2020) and are not expected to utilise the Project area for breeding.

Within the Peel-Perth region, foraging and water resources within 6 km, as well as overlapping foraging within 12 km, are required to support roosting and breeding sites and maintain habitat connectivity to facilitate movement through the landscape (Groom, 2015). EPA (2019) note that the proximity of foraging and water is critical to support roosting and breeding sites.

Two roost sites are located within 1 km of the Project, and a further 20 occur within 6 km. No evidence of roosting within the Project area was recorded and is unlikely to occur due to the long linear nature of the native vegetation to be cleared.

Berry (2008) observed that Carnaby's Cockatoo prefer roosting at sites within close proximity to known food and water sources. Energy expenditure could be reduced where they are able to feed and drink close to (within a 6 km radius around a roost site) roost sites before and after nocturnal roosting (Berry 2008).

Le Roux (2017) determined that a greater area of Banksia and pine vegetation was associated with roost sites that had high Black Cockatoo counts. This highlights the importance of Banksia and pine in supporting significant roost sites, an observation that has been supported in a number of Carnaby's Cockatoo related studies (Valentine and Stock 2008, Finn et al. 2009, Johnston et al. 2016).

Within the local area, several habitat patches are likely to provide higher quality foraging habitat, consisting of greater abundance and quality of banksia species and in close proximity wetlands and waterbodies. The Project area is therefore considered of poorer habitat value in the context of the local area, and Black Cockatoo populations will continue to be supported by more locally significant habitat resources once clearing has been undertaken.

Flocks of Black Cockatoos move through the landscape by following vegetated corridors whilst actively avoiding cleared or open areas including dense urban areas. Ecological linkages are therefore required to facilitate this movement between habitat nodes. The Project area is not located within any Regional Ecological Linkages. Clearing associated with the Project is unlikely to have a significant impact on the available foraging habitat within 6 km of nearby roosting sites or impede the movement of individuals through the landscape.

Vegetation within the Project area is considered unlikely to provide significant habitat for foraging or breeding for Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo due to its narrow, linear configuration poor condition, and the sporadic and isolated distribution of known foraging species.

Other Conservation Significant Species:
The Southern Brown Bandicoot (Quenda) occurs in wet or dry sclerophyll forest through to open woodland and scrubby, dense vegetation on sandy soils. This species was identified within the survey area near the Woodvale Nature Reserve, approximately 3.6 km north of the Project area.

It is considered unlikely that the small area of native vegetation to be cleared located in isolated pockets amongst planted vegetation, constitutes significant habitat for any species..

Assessed Outcome:

- Noting the above, given the low quality of the habitat, its small fragmented extent and presence of larger areas of remnant vegetation in a better condition, clearing for this Project is not likely to be at variance to this principle.

Methodology

DBCA Shapefiles
DBCA website
DAWE 2022
EPA (2016)
Astron (2021)
Aerial Photography

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

Proposed clearing is not at variance to this Principle

Comment:

A total of 207 vascular flora species, from 47 families and 127 genera, were recorded in the wider survey area (Astron 2020). No threatened flora species listed under the *Biodiversity Conservation Act* 2016 occur within the project area.

Assessed Outcome:

- Project clearing is not at variance to this Principle.

Methodology

DBCA shapefiles
Florabase (February, 2020)
Astron (2021)

(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 at variance to this Principle

Comment:

No threatened ecological communities listed under the *Biodiversity Conservation Act* 2016 were recorded within the Project area.

Assessed Outcome:

- Project clearing not at variance to this Principle.

Methodology

DBCA shapefiles
Astron (2021)

(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 likely at variance to this Principle

Comment:
The Project area is mapped as Vegetation Association 6, described as a Medium Woodland: Tuart and Jarrah. The Project proposes to clear up to 2.40 ha of native vegetation. Of this, 2.09 ha (87.1%) has been assessed as 'Completely Degraded' to 'Degraded', 0.24 (10.0%) as 'Good to Degraded', and 0.07 ha (2.9%) as 'Good'.
The national objectives and targets for biodiversity conservation in Australia have a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (EPA, 2015). The Project area is within a constrained area of the Swan Coastal Plain and as such retention objectives of at least 10 per cent apply (EPA, 2016).

Summary of Project Area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 6 described as a Medium woodland: tuart and jarrah (GoWA, 2019a).	Clearing of up to 2.06 ha for construction of noise barriers and a PSP.	Completely Degraded (0.90 ha), Degraded to Completely Degraded (0.49 ha), Degraded (0.36 ha), Degraded to Good (0.24 ha), Good (0.07 ha).	Vegetation description and condition determined from biological survey (Astron, 2020).
	Clearing of up to 0.34 ha for construction of noise barriers and a PSP.	Completely Degraded (0.34 ha)	Vegetation description and condition inferred from desktop analysis of additional clearing area.

Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 6	**Statewide**	56,343.01	13,362.25	23.72	5,322.03 ha (9.45%)
	IBRA Bioregion Swan Coastal Plain	56,343.01	13,362.25	23.72	5,322.03 ha (9.45%)
	IBRA Sub-region Perth	56,343.01	13,362.25	23.72	5,322.03 ha (9.45%)
	Local Government Authority City of Joondalup	2,294.47	326.68	14.24	30.38 ha (1.32%)

As shown in Tables above, Vegetation Association 6 and the Vegetation Complex Karrakatta (Central and South) are above the 10 per cent threshold in a constrained area (GoWA 2019a; GoWA, 2019b).

Given the highly degraded condition of the vegetation, the vegetation within the Project area is not considered representative of native vegetation that is significant as a remnant in an area that has been extensively cleared.

Assessed Outcome:
- Project clearing not at variance to this Principle.

Methodology
EPA (2016)
Aston (2021)

GoWA (2019a)
GoWA (2019b)
WALGA (2013)
Aerial photography

(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

Comment:

. Interrogation of DBCA and DWER hydrological and wetland datasets determined that no wetlands or watercourses are mapped within the Project area. The nearest mapped wetland is Little Carine Swamp, located approximately 600m from the Project area and will not be impacted.

In addition, the Astron (2021) biological survey concluded that no remnant vegetation considered to represent riparian vegetation was recorded from the Project area.

Assessed Outcome:

- Project clearing not at variance to this Principle.

Methodology

DWER and DBCA shapefiles
Astron (2021)

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

Proposed clearing is not at variance to this Principle

Comment:

The Department of Primary Industries and Regional Development (DPIRD), provides a series of soil degradation risk mapping at the sub-system level. The Project area is located within the Karrakatta Sand Yellow Phase subsystem of the Spearwood Dunes soil system. It is described as low hilly to gently undulating terrain. Yellow sand over limestone at 1-2 m. *Banksia* spp. woodland with scattered emergent Tuart and Jarrah and a dense shrub layer (DPIRD, 2020).

The table below summarises the soil degradation risk within the Project area.

Aspect	Degradation risk
Wind Erosion	98%
Waterlogging	0%
Water Erosion	0%
Salinity	0%
Flood Risk	0%

Wind erosion is the only potential soil degradation aspect relevant to the Project area, due to the deep yellow sands associated with the area. It is unlikely that the Project will cause appreciable land degradation given the relatively small amount of clearing and the implementation of appropriate measures to mitigate and manage potential wind driven erosion during construction.

Assessed Outcome:

- Project clearing is not at variance to this principle.

Methodology

GIS shapefiles
Astron (2021)
Natural Resource Management SLIP Soil Systems; accessed April 2020 (DPIRD, 2020)

(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

Comment:

Two Nature Reserves (Woodvale Nature Reserve and Lake Joondalup Nature Reserve) are within 6 km of the Project area, along with a number of Crown Reserves managed by DBCA.

In addition to these areas, several small local government reserves are present. The nearest conservation area to the Project area is the Craigie bushland area (Bush forever Site 303) which occurs approximately 550 m to the north of the Project area, and Carine Open Space (Bush forever Site 203) which is approximately 500 m to the south. These sites are both on the other side of the freeway and have no direct links with the Project area.

It is not considered that the Project area contains vegetation which represents a significant ecological linkage for fauna to move between conservation reserves, and no ecological linkages will be disrupted by the proposed clearing.

Noting the above and that the Project area is contained to the road reserve, the proposed clearing is will not result in any significant impacts to an adjacent or nearby conservation area.

Assessed Outcome:

- Project clearing not at variance to this Principle.

Methodology

DBCA, WALGA and DOP shapefiles
EPA (2016)

(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

Comment:

There are no major or minor watercourses mapped within the Project area.

The Project will not change the hydrology of the area. Given the small scale of clearing and that no significant dewatering or drainage modifications are required; it is considered that there will be very little to no deterioration of underground water quality.

Assessed Outcome:

- Project clearing not at variance to this Principle.

Methodology

DWER and DBCA shapefiles
Astron (2021)

(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 at variance to this Principle

Comment:

The Project will clear up to 2.40 ha of native vegetation over an approximately 3 km stretch of road. The removal of such a small area of vegetation makes it unlikely that the incidence or intensity of flooding will increase. NRM SLIP identifies that the area has 0% risk of flooding in the area, largely attributed to presence of sandy soil and fast infiltration rates.

Given the small amount of clearing, that vegetation will remain in the surrounding area and that the Project area will be sealed it is unlikely that this Project will cause or exacerbate the incidence or intensity of flooding. Assessed Outcome: • Project clearing is not at variance to this principle.
Methodology Natural Resource Management SLIP Soil Systems; accessed June 2020 (DPIRD, 2020)

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

Condition 8 of CPS 818/15 requires Main Roads WA to invite submissions from a number of parties when the proposed clearing is considered likely to be seriously at variance, at variance or may be at variance with one or more of the clearing principles.

As the assessment has determined that the proposed clearing is not at variance with any of the clearing principles, no stakeholder submission is required. Main Roads will continue to undertake stakeholder consultation in accordance with CPS 818 Condition 8.

8 COMPLIANCE WITH CPS 818

Table 5 summarises what further pre-clearing impact assessment and vegetation management is required in accordance with CPS 818.

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

Impact of Clearing	Yes/No or NA	*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. Clearing is at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality **and** (j) the incidence of flooding	**No**	No further action required.
4. The project involves clearing for temporary works (as defined by CPS 818).	**No**	No further action required.
5a. Project is within Region that: - Has rainfall greater than 400mm and - Is South of the 26th parallel and - Works are in 'Other than dry conditions' and - Works have potential for **uninfested** areas to be impacted	**Yes**	**4a.** No further action required. A dieback assessment was conducted (Terratree, 2020).
5b. Does the proposed works require clearing within or adjacent to DBCA estate in non-dry conditions?	**No**	**4b.** No further action required.
6. 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.
7. Weeds are likely to spread to and result in environmental harm to adjacent areas of native vegetation that are in good or better condition.	**Yes**	'Completely Degraded' (0.34 ha).

Impact of Clearing	Yes/No or NA	*Further Action Required*
		Weed management will be addressed in the VMP/CEMP to avoid weed spread.
8. Did an environmental specialist conduct the survey or field assessment?	**Yes**	The Environmental Specialist undertaking the biological assessments was suitably qualified and had more than three years' experience.
9. Did an environmental specialist prepare the Assessment Report and any other associated documentation including the VMP, Dieback Management Plan or Offset Proposal?	**Yes**	The Environmental Specialist preparing the Assessment Report and any other associated documentation including the VMP, Dieback Management Plan or Offset Proposal was suitably qualified and had more than three years' experience.

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Clearing Assessment Report – CPS 818

We're working for Western Australia.

Smart Freeways Mitchell Southbound-Hester to Warwick

March 2021

2071

D21#219051

Contents

Amendments

Report Compilation & Review	Name and Position	Document Revision	Date
Author:	Environment Officer	Draft v1	2/3/2021
Reviewer:	Environment Officer	Draft v1	10/03/2021
Author:	Environment Officer	Rev 0	10/3/2021
Reviewer:	Environment Officer	Rev 0	17/03/2021

1 PURPOSE

The purpose of this Clearing Assessment Report (CAR) is to provide a report detailing the assessment of native vegetation clearing that is proposed to be undertaken using the Statewide Clearing Permit CPS 818 issued to Main Roads Western Australia (Main Roads).

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

2 SCOPE

2.1 Project Scope

Project Name: Smart Freeways Mitchell Southbound (Hester to Warwick)

Project Purpose / Components: Main Roads is proposing to install intelligent transport systems (ITS) infrastructure on the Mitchell Freeway southbound, between Moore Drive and Warwick Road. The works will include the following:

- Ramp signalling on inbound freeway ramps
- Associated civil works, including required signage and gantries
- Variable speed limit signs for the freeway length
- Incident detection systems

The works will aim to improve freeway efficiency and reliability, improve network responsiveness, and flow control and increase capacity without additional widening. The installation of ITS infrastructure and the use of smart technologies will allow Main Roads to manage traffic on the freeway and entry ramps, reducing congestion, increasing safety, and improving travel times, resulting in 'Smart Freeways'.

The proposed clearing undertaking using CPS 818 is: 0.16 ha of native vegetation.

The proposed temporary clearing undertaking using CPS 818 is: None

Project Location(s): The project area occurs to the south of Burns Beach Road on Mitchell Freeway 29.16-29.39 SLK within the City of Joondalup as shown in Figure 1.

- Latitude: -31.7259
- Longitude: 115.7515

The location of the proposed works is at Figure 1.

2.2 Assessment Report Scope

The assessment area, see Figure 2, is confined to a local area of a 5 km radius.

Figure 1. Clearing Area

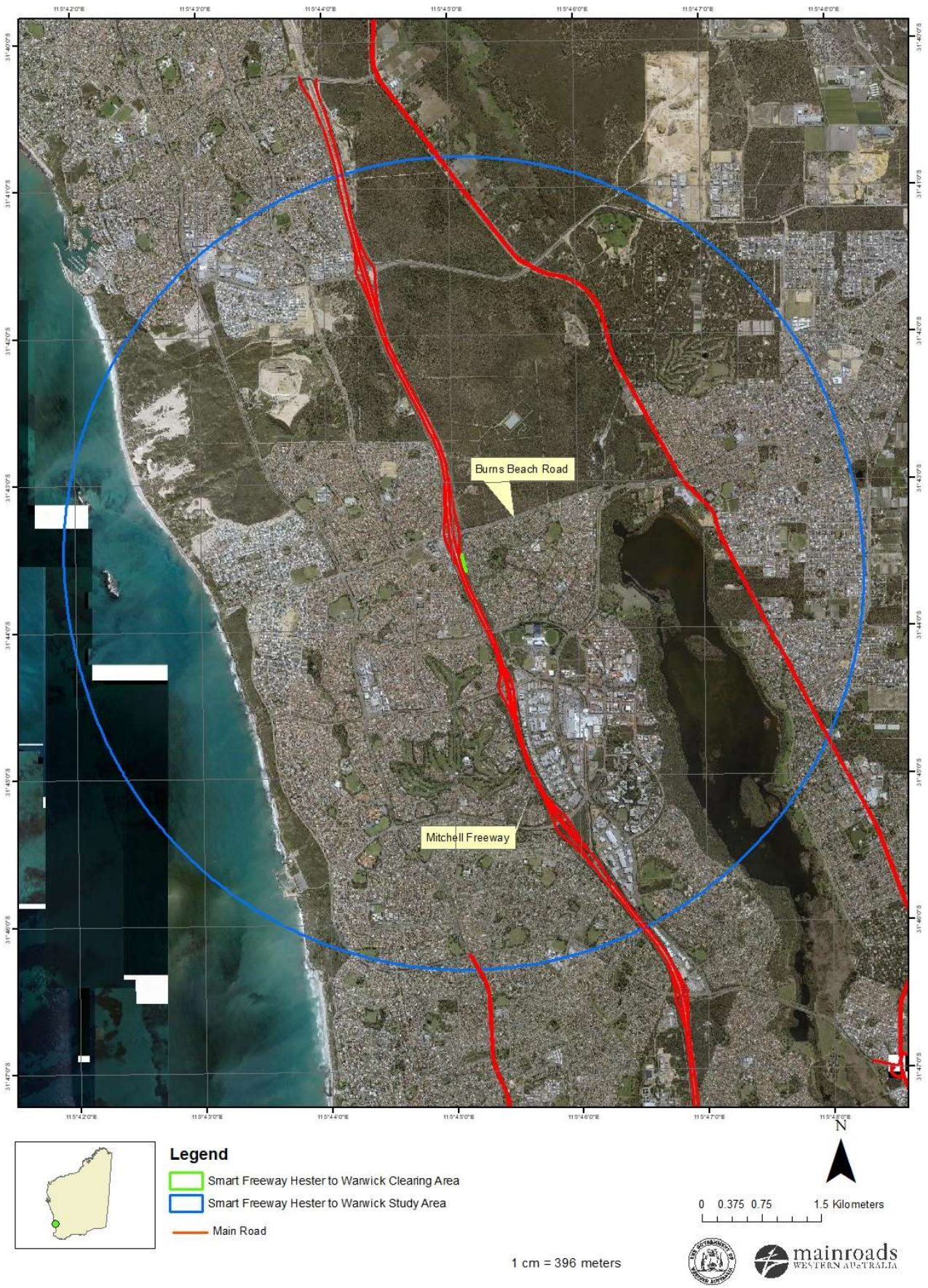

Figure 2. Assessment Area

2.3 Alternatives to clearing

Due to the tight constraints of the existing roads and housing in the area, there was no acceptable alternatives to clearing. Where possible the existing cleared areas are being utilised and clearing for access tracks, construction storage and stockpiling will not be required.

2.4 Measures to Avoid, Minimise, Reduce and Manage Project Clearing Impacts

The design and management measures implemented to avoid and minimise the clearing impacts by the project are provided in Table 1.

Table 1. Measures undertaken to Avoid, Minimise, Reduce and Manage the Project Clearing Impacts

Design or Management Measure	Discussion and Justification
Steepen batter slopes	Due to traffic volumes, vehicle type and posted speeds these batters cannot be changed significantly.
Installation of safety barriers	The installation of safety barriers would not reduce the clearing footprint due to the requirements of the roadside drainage. The road corridor contains minimal remnant vegetation.
Alignment to one side of existing road	The upgrade and widening of Mitchell Freeway has been aligned to only impact vegetation on the east of the existing road. This allows for the avoidance of any vegetation or ecological linkages on the western side of the road corridor.
Alternative alignment to follow existing road (or) to preferentially locate within pasture or a degraded areas	Road works can be developed within the existing road corridor. The surrounding areas are residential/industrial and therefore an alternative alignment is not viable.
Installation of kerbing	Not applicable.
Simplification of design to reduce number of lanes and/or complexity of intersections	The widening scope of works cannot be further simplified whilst retaining the necessary safety benefits.
Preferential use of existing cleared areas for access tracks, construction storage and stockpiling	Existing cleared areas will be used for access tracks, construction storage and stockpiling.
Drainage modification	Not applicable

2.5 Approved Policies and Planning Instruments

The clearing of native vegetation in Western Australia is regulated under the 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 (see Section 1.3), Main Roads has also had regard to the below instruments.

Other Legislation of relevance 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)
- *Town Planning and Development Act 1928*

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 (DEC, December 2014)
- Procedure: Native vegetation clearing permits (DWER, October 2019)
- Environmental Offsets Guidelines (Government of Western Australia, August 2014)
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (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
- Approved Recovery Plans for threatened species
- EPBC Act Referral guidelines for the three threatened black cockatoo species
- Strategic advice - EPA

3 SUMMARY OF SURVEYS

3.1 Biological Survey

Focused Vision Consulting conducted the Smart Freeways-Mitchell Southbound Biological Survey on 20- 23 October and 23-26 November 2020.

Section 3.1.1 contains the summary of the survey, which covers an 8.6 km stretch of the Mitchell Freeway between Hester Avenue and Hodges Drive of which the project area comprises a 226 m section.

3.1.1 Summary of Biological Survey

FOCUSED VISION consulting

EXECUTIVE SUMMARY

Main Roads Western Australia (Main Roads) is proposing to install Intelligent Transport Systems (ITS) infrastructure on the Mitchell Freeway southbound, between Hester Avenue and Vincent Street (the project area). The works will include the following:

- Ramp signalling on inbound freeway ramps between Hester Avenue and Vincent Street.
- Associated civil works, including required signage and gantries.
- Variable speed limit signs for the freeway length
- Incident detection systems.

Main Roads required a spring biological assessment for the entire project area. A number of biological surveys have been conducted in the freeway road reserves between Hester Avenue and Vincent Street over the years for various projects, however, some 'gaps' remain where survey data doesn't exist. Some of these surveys also pre-date the Federal listing of the Tuart woodland and forest TEC and so they may not conform to current survey requirements. Black-Cockatoo trees and habitat are also likely to require revisiting as part of the current scope of work. The current biological assessment was required to delineate key flora, fauna, soil and surface water values (wetlands) and potential sensitivity to impacts to native vegetation arising from proposed clearing for the project.

The scope of the biological assessment was to conduct:

- A desktop assessment, literature review and gap analysis for a 5 km buffer around the project area (the study area)
- Identify the potential need to revise existing Black-Cockatoo habitat within previously surveyed areas
- Detailed flora and vegetation assessment in accordance with Environmental Protection Authority (EPA) (2016a)
- Basic fauna assessment in accordance with EPA (2020)
- Targeted Banksia woodland assessment in accordance with TSSC (2016)
- Targeted Black-Cockatoo habitat assessment in accordance with DSEWPaC (2012).

The biological field assessment was completed during spring 2020 by Senior Botanist, Lisa Chappell, Senior Ecologist/Botanist, Jeni Alford and Botanist/Ecologist, Daniel Roberts assisted by Technician, Will Bauer-Simpson.

The key findings and conclusions arising from the flora, vegetation, fauna and habitat assessment within the project area are as follows:

- No Threatened flora listed under the *Biodiversity Conservation act 2016* (BC Act) or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were recorded. However, it is possible that the Threatened flora species, *Caladenia huegelii* occurs within the project area. Several sub-populations of a *Caladenia* with similar characteristics to the Threatened species were recorded in remnant vegetation south of Hodges Drive, however the floral material was inadequate to provide a definitive identification (Andrew Brown, pers. comm.). In the event that clearing may impact on these locations, further survey during mid-September to early October is recommended, to confirm the identity of these *Caladenia* plants.
- Two Priority flora, *Jacksonia gracillima* (Priority 3) and *Jacksonia sericea* (Priority 4) were recorded in abundant numbers within the project area.

BIOLOGICAL ASSESSMENT vi

- Two of the recorded weeds, **Echium plantagineum* and **Solanum linnaeanum*, are Declared Pests (weed) listed under the *Biosecurity and Agriculture Management Act 2007* (BAM Act). These species are not listed as Weeds of National Significance (WoNS) (DAWE 2020f) and as Declared Pests, are listed under the 'Exempt' category, whereby landholders are under no obligation to control infestations.
- The project area was found to support 14 remnant vegetation units of varying condition and one planted vegetation unit. The remnant vegetation units comprise three *Allocasuarina* Woodlands, three *Banksia* Woodlands, one *Eucalyptus / Banksia* Woodland and seven Woodlands.
- Nine of the recorded vegetation units, AfAf, BaJs, BaXp, EgAsp, EgBa, EgPS, EmBa, EmEg and EmXp were found to be characteristic of the *Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community* (Tuart woodlands and forests TEC), based on key characters as described in the Conservation Advice (DEE 2019b). All of these units, as well as EmBa, EmAf, CcXp and some areas of planted vegetation were also found to contain Tuart trees. However, assessment of condition thresholds for each Tuart woodland patch determined that only four patches are eligible for inclusion as the Threatened Ecological Community (TEC).
- Three vegetation units, BaJs, BaXp and EmBa, described and mapped within the project area, were determined to be characteristic of the *Banksia Woodlands of the Swan Coastal Plain IBRA region ecological community* (Banksia woodlands TEC) based on key characters as described in the Conservation Advice (TSSC 2016). However, assessment of condition thresholds for each Banksia woodland patch determined that only two patches are eligible for inclusion as the TEC.
- Of the eight remaining TECs and Priority Ecological Communities (PECs) determined to occur in the study area, two (SCP 24, the Northern Spearwood shrublands and woodlands (Commonwealth Endangered, DBCA Priority 3), and SCP 25, the Southern *Eucalyptus gomphocephala - Agonis flexuosa* Woodlands (DBCA Priority 3)) are considered to potentially be represented, although this is considered unlikely and due to a lack of certainty in analysis results, their presence in the project area is inconclusive.
- There is a depauperate fauna assemblage for the project area, due to factors such as habitat loss/fragmentation and predation by feral species. The project area is in a highly urbanised landscape, providing limited habitat for native terrestrial vertebrate fauna and few fauna species that would permanently occupy or directly utilise the majority of the area.
- Desktop and field results suggest that the Endangered Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) is a regular visitor within the study area and potentially also sections of the project area.
- The project area was found to support five key fauna habitats; Tall Woodland, Woodland, Rehabilitated and Planted Woodland, Planted Shrubland and Drain. Of these, only the Tall Woodland and Woodland habitats are representative or remnant vegetation and habitats. Few areas of remnant vegetation/habitat in relatively good condition remain and such areas provide value to fauna which is important, since it is limited in the local context.
- The project area supports suitable foraging habitat for Black-Cockatoos, ranging from 'High' (6) to 'Negligible/None' (0) foraging quality. The best quality foraging habitat is provided within the Tall Woodland and Woodland habitats, and the Rehabilitated and Planted Woodland habitat also provides some foraging habitat value. The limited availability of foraging habitat for Black-Cockatoos on the Swan Coastal Plain renders habitat that does remain to be of significance.
- No confirmed or unconfirmed Black-Cockatoo breeding sites occur within the project area, although a known breeding site occurs within 600 m of the project area boundary. No trees thought to provide suitable breeding hollows that also present evidence of Black-Cockatoo use were recorded within the project area, although four trees that support potentially suitable hollows (Rank 3) were recorded.

- No evidence of Black-Cockatoo roosting was observed during the field assessment and although there are numerous confirmed roosts within close proximity to the project area, roosting within the project area is considered unlikely.

4 VEGETATION DETAILS

4.1.1 Project Site Vegetation Description

During the biological survey, the vegetation in the project area was mapped as:
Banksia attenuata, Banksia menziesii and *Allocasuarina fraseriana* Low Woodland over *Xanthorrhoea preissii* and *Jacksonia sternbergiana* Sparse Shrubland over *Hibbertia hypericoides* Low Shrubland over *Mesomelaena pseudostygia* Open Sedgeland.

This project area was determined to be in degraded to completely degraded condition (EPA 2016).

Tables 2 and 3 provide details of the Pre-European Vegetation Associations with the project area and the remaining extents of these associations.

For a full description of the existing vegetation, refer to the Biological Survey Report at D21#190254.

Table 2. Summary of Project Area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 949 described as a Low woodland; banksia (Government of Western Australia, 2019)	Clearing of up to 0.16 ha for installation of intelligent transport systems on Mitchell Freeway, Joondalup.	Degraded-completely degraded condition (EPA 2016)	Vegetation description and condition determined from Focused Vision Biological Survey (2021) and aerial imagery.

Table 3. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 949	**Statewide**	218,193.94	123,104.02	56.42	31.52
	IBRA Bioregion Swan Coastal Plain	209,983.26	120,287.93	57.28	32.31
	IBRA Sub-region Perth	184,475.82	104,128.96	56.45	33.30
	Local Government Authority City of Joondalup	1,209.95	99.52	8.23	0

4.1.2 Vegetation Complexes and Representation

Table 4. Vegetation Complexes (Heddle/Mattiske) within the Project Area

Heddle/Mattiske Veg Complex	Pre-European Extent (ha)	2013 Vegetation Extent	% Remaining
Cottesloe Complex-Central and South	45,299.61	14,567.87	32.16

5 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

In assessing whether the project's proposed clearing is likely to have a significant impact on the environment, the project was assessed against the ten Clearing Principles (Environmental Protection Act 1986, Schedule 5).

Each principle has been assessed in accordance with DWER's 'A Guide to the Assessment of Applications to Clear Native Vegetation' and other relevant CPS Decision Reports prepared by DWER.

The proposed clearing is not likely to be at variance with the 10 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

Comment

This project involves the clearing of up to 0.16 ha of native vegetation. The Focused Vision 2021 biological survey mapped this vegetation as "*Banksia attenuata, Banksia menziesii* and *Allocasuarina fraseriana* Low Woodland over *Xanthorrhoea preissii* and *Jacksonia sternbergiana* Sparse Shrubland over *Hibbertia hypericoides* Low Shrubland over *Mesomelaena pseudostygia* Open Sedgeland." The vegetation in the project area is in degraded to completely degraded condition (EPA, 2016).

Within the study area there are known records of two threatened flora and 12 priority flora species within the DBCA datasets. The targeted search for Threatened and Priority flora identified no threatened or priority flora species within the project area. The *Jacksonia gracillima* identified within the biological survey was located over 4.5km to the south of the project area and the *Jacksonia sericea* was located over 12m south of the project area. Therefore, these species are unlikely to be impacted by the project activity.

A search of DBCA records within the study area identified that there are known records of 25 species of conservation significance. During the biological survey, the Weebil (*Smicrornis brevirostris*) and the New Holland Honeyeater (*Phylidonyris novaehollandiae*) were observed within the project area. Black Cockatoo species may also potentially occur in the project area. The remaining conservation significant species are unlikely to occur, as their preferred habitat is not present. Though the project area represents potential foraging habitat for the Carnaby's Cockatoo it is unlikely to be significant habitat as it is degraded in nature and the biological survey identified that this represents negligible to low foraging habitat value. There was no roosting or breeding trees identified within the clearing area. The surrounding roads and adjacent residential zone currently isolate the clearing area and vegetation removal for this project will not increase fragmentation in the area. Due to the fragmented and degraded nature of the project area, it is unlikely that the proposed clearing will reduce ecological functioning.

A search of the DBCA records within the study area identified seven threatened ecological communities (TEC)/priority ecological communities (PECs).

- Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain-State Priority 3 and Commonwealth Critically Endangered
- Banksia attenuata woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. (1994)) (SCP20a)-State and Commonwealth Endangered
- Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region (BWSCP)-State Priority 3 and Commonwealth Endangered
- Acacia shrublands on taller dunes-State Priority 3
- Coastal shrublands on shallow sands-State Priority 3
- Northern Spearwood shrublands and woodlands-State Priority 3
- Southern Eucalyptus gomphocephala-Agonis flexuosa woodlands-State Priority 3

Of these, only the BWSCP and SCP20a ecological communities have the potential to occur in the project area, the other TEC/PECs would not be present as the required habitat is not present. The biological survey concluded that the SCP20a TEC is not present within the project area because the floristics analysis are not

representative of this TEC. Similarly, the degraded nature of the project area means that vegetation to be cleared is not representative of the BWSCP TEC. Therefore, project clearing is unlikely to impact any TEC/PEC.

Given the above, it is unlikely that this project area represents an area of high biodiversity. Therefore, this project clearing is not likely to be at variance to this Principle.

Methodology
Biological Survey 2021
DBCA shapefiles
EPA (2016)
Government of WA (2019)
Main Roads GIS Shapefiles

(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

Comment
A search of DBCA records within the study area indicate there are known records of 25 species of conservation significance. During the biological survey, the Weebil (*Smicrornis brevirostris*) and the New Holland Honeyeater (*Phylidonyris novaehollandiae*) were observed within the project area. Black Cockatoo species may also potentially occur in the project area. The remaining conservation significant species are unlikely to occur, as their preferred habitat is not present.

The *Calyptorhynchus latirostis* (Carnaby's Black Cockatoo) has the potential to occur in the project area as it feeds on proteaceous species, which are present in the project area. However, given the completely degraded nature of the project area the foraging habitat is negligible to low value and is unlikely to be significant for this species. There are no potential roosting or breeding trees within the clearing area. Given the degraded nature of the vegetation and its proximity to the road/residential area, the small amount of clearing is unlikely to provide significant habitat for the Carnaby's Black Cockatoos. Therefore, this species is unlikely to be impacted by the project activities.

The project area is not contiguous with patches of better quality vegetation present in the region and does not provide linkages to any surrounding area as it is already fragmented by the existing roads and housing in the area. As such, removal of this small linear clearing area for the project will not impact any connectivity in the local area.

Given the clearing is of a small, isolated and degraded section of vegetation it is unlikely that the vegetation represents significant habitat for any fauna species. Therefore, this project clearing is not likely to be at variance to this Principle.

Methodology
Biological Survey 2021
DBCA Shapefiles
DBCA website
EPA (2016)

(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

Comment

A search of DBCA records within the study area identified that there are two known records of threatened flora. These are the *Marianthus paralius* and the *Eucalyptus argutifolia*. The nearest of the records occurs over 3km to the south of the project area. The *Marianthus paralius* prefers white sand over limestone and the *Eucalyptus argutifolia* prefers shallow soils over limestone.

A targeted search for Threatened and Priority flora during October/November (optimal season for biological surveys on the Swan Coastal Plain) identified no threatened flora within the project area. It is unlikely that suitable habitat is present in the project area for any threatened flora as the project is in completely degraded to degraded condition (EPA 2016) with a high weed load that would outcompete flora. Therefore, this area is unlikely to represent significant habitat for any threatened flora.

Given the biological survey identified no threatened flora in the project area and the degraded nature of the project area the clearing is not likely to be at variance to this Principle.

Methodology

Biological Survey 2021
DBCA shapefiles
EPA (2016)
Florabase (Accessed 16/2/2021)

(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

Comment

A search of DBCA shapefiles within the study area identified there is a known record of one threatened ecological community (TEC) this is the Endangered "Banksia attenuata woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. (1994))" (SCP20a). This TEC occurs over 4.9 km to the east of the project area. Given the distance to this TEC, it is unlikely to be impacted by the project activities.

The biological survey confirmed that there are no TECs within the project area. The floristics analysis undertaken during the biological survey identified that the SCP20a TEC is not present within the clearing area. Given the distance to the nearest TEC, the degraded nature of the project area and that no TECs were identified during the biological survey it is unlikely that any TECs will be impacted by the project activities. Therefore, the project clearing is not likely to be at variance to this Principle.

Methodology

Biological Survey 2021
DBCA shapefiles
EPA (2016)

(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 likely to be at variance to this Principle

Comment

The vegetation in the project area is mapped as Vegetation Association 949: Low woodland, banksia and Cottlesloe Complex Central and North: Mosaic of woodland of *Eucalyptus gomphocephala* (Tuart) and open forest of *Eucalyptus gomphocephala* (Tuart) - *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri); closed heath on the Limestone outcrops. The vegetation is in degraded to completely degraded condition (EPA 2016).

The biological survey confirms that the vegetation in the project area is a Banskia woodland, which is the same as the mapped pre-European Vegetation Association.

Summary of Project Area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 949 described as a Low woodland; banksia (Government of Western Australia, 2019)	Clearing of up to 0.16 ha for installation of intelligent transport systems on Mitchell Freeway, Joondalup.	Degraded-completely degraded condition (EPA 2016)	Vegetation description and condition determined from Focused Vision Biological Survey (2021) and aerial imagery.

Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 949	**Statewide**	218,193.94	123,104.02	56.42	31.52
	IBRA Bioregion Swan Coastal Plain	209,983.26	120,287.93	57.28	32.31
	IBRA Sub-region Perth	184,475.82	104,128.96	56.45	33.30
	Local Government Authority City of Joondalup	1,209.95	99.52	8.23	0

Heddle/Mattiske Veg Complex	Pre-European Extent (ha)	2013 Vegetation Extent	% Remaining
Cottesloe Complex-Central and South	45,299.61	14,567.87	32.16

Vegetation that has less than 10% remaining in the Perth Metropolitan region is said to represent an area that is significant as a remnant. It is evident from the tables above that the vegetation associations have over 10% remaining except in the local government authority area.

Up to 0.16ha of vegetation will be required to be cleared for this project. Using aerial imagery there is approximately 25% of the study area vegetated, with the largest patch of vegetation occurring over 275m to the north of the project area. As such, this project is within an area that has been extensively cleared. The vegetation to be cleared is isolated and fragmented by the surrounding roads and residential area and does not provide an ecological linkage to any of the vegetation in the surrounding area. Therefore, this area is not significant as a remnant and it is unlikely that its removal will reduce ecological functioning.

Given the above, this project clearing is not likely to be at variance to this Principle, as the clearing does not represent an area that is significant as a remnant.

Methodology
Aerial photography
Biological Survey 2021
EPA (2016)
Government of Western Australia (2019)
Perth Biodiversity Project (2013)
Shepherd (2009)

(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 likely to be at variance to this Principle

Comment
The nearest waterbody is Lake Joondalup that occurs over 1.9km to the east of the project area. The mapped vegetation association in the project area (949 described as a Low woodland; banksia) does not include any riparian vegetation. The biological survey confirmed that there are no water bodies within the project area nor was there any evidence of riparian vegetation present within the clearing area.

It is therefore considered unlikely that the native vegetation proposed to be cleared is growing in or in association with a watercourse or wetland and project clearing is not likely to be at variance to this Principle.

Methodology
Biological Survey 2021
DWER and DBCA shapefiles

(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

Comment

Aspect	Risk
Wind Erosion	>70%
Waterlogging	<3%
Water Erosion	3-10%
Salinity	<3%
Flood	<3%

It is evident from the table above that there is a low risk of land degradation (DAFWA, 2021). Only wind erosion has a high likelihood but as such a small area is to be cleared in a linear section and there are existing noise walls protecting this area, it is unlikely that this will cause appreciable land degradation. Since the project area is composed of a sand soil, it will have a high infiltration rate and waterlogging and water erosion are unlikely to be an issue. There will be no dewatering or excavation below the water table so it is unlikely that acid sulphate soils will be an issue in the area.

Given the soil properties and the small linear clearing required it is unlikely that this project clearing will cause appreciable land degradation. Therefore, this project clearing is not likely to be at variance to this Principle.

Methodology
DAFWA Shapefiles (Accessed 15/2/2021)

(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

Comment

Within the study area, there are four conversation areas. These are:

- Lake Joondalup Nature Reserve-located over 2 km to the east of the project area
- Marmion Marine Park-located over 3.1 km to the west of the project area
- Neerabup National Park-located over 589 m to the north east of the project area
- Un-named nature reserves-located 1.7 km to the east of the project area

Given the distance to the nearest reserve, it is unlikely that this project will significantly impact any reserves or conservation areas. Particularly as this vegetation is already isolated so clearing the area will not result in any ecological linkages being impacted.

Therefore, this project clearing is not likely to be at variance to this Principle.

Methodology

DBCA shapefiles

(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

Comment

The project occurs within the Perth Coastal and Gwelup Underground Water Pollution Control Area and the Perth Groundwater Area. There is no Proclaimed Surface Water Area overlying the project area. The nearest waterbody is Lake Joondalup that occurs over 1.9 km to the east of the project area.

It is unlikely that any surface water runoff will affect the quality of the surface water, as it will be captured within existing drainage. No dewatering, drainage modifications or surface water abstraction is required and therefore the quality of the surface or underground water is unlikely to be impacted by the project activities.

Given the existing drainage, small amount of vegetation to be removed and the distance to the nearest waterbody it is unlikely that this clearing will cause deterioration in the quality of surface or underground water. Therefore, this project clearing is not likely to be at variance to this Principle.

Methodology

DWER and DBCA shapefiles

(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

Comment

The project area is in a moderate rainfall area (730.9 mm average annual rainfall, BoM Perth Metro 2021). This area will have a high infiltration rate as the project area is composed of sand soils and DAFWA shapefiles identified that there is a <3% chance of flooding. Given the freeway has existing drainage, that

such a small area is to be removed and the soil is a well-draining soil it is unlikely that the clearing required for this project will cause or increase the chance of flooding. Given the above, this project clearing is not likely to be at variance to this Principle.
Methodology BoM-Perth Metro (2021) DAFWA shapefiles

6 ADDITIONAL ACTIONS REQUIRED

Table 5 summarises what further pre-clearing impact assessment and vegetation management is required in accordance with CPS 818.

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

Impact of Clearing	Yes/No or NA	*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. Where the clearing is at variance or may be at variance to Clearing Principle (f) and no other Clearing Principle, and the area of the proposed clearing is less than 0.5 hectares in size and the Clearing Principle (f) impacts only relate to: (i) a minor non-perennial watercourse(s); (ii) a wetland(s) classed as a multiple use management category wetland(s); and/or (iii) a wetland that is not a defined wetland; the preparation of an Assessment Report, as required by condition 6(e), is not required.	**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 project involves clearing for temporary works (as defined by CPS 818).	**No**	No further action required.
4 a. Project is within Region that: - Has rainfall greater than 400mm and - Is South of the 26th parallel and - Works are in 'Other than dry conditions' and - Works have potential for **uninfested** areas to be impacted	**No**	Proceed with standard Vehicle and Plant management actions from PEMR's and Vehicle and Plant Hygiene Checklists

Impact of Clearing	Yes/No or NA	*Further Action Required*
4b. Does the proposed works require clearing within or adjacent to DBCA estate in non-dry conditions?	**No**	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. The vegetation within the area to be cleared and/or the surrounding vegetation in a good or better condition and weeds 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.

7 STAKEHOLDER CONSULTATION

No stakeholder consultation was undertaken as part of the project.

8 VEGETATION MANAGEMENT

Main Roads will avoid clearing native vegetation where possible. Where clearing cannot be avoided then this clearing is kept to a minimum. A Construction Environmental Management Plan (CEMP) has been developed to manage and minimise vegetation clearing for the project.

9 REFERENCES

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