



## CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

<b>Purpose Permit number:</b>	CPS 8939/1
<b>Permit Holder:</b>	Public Transport Authority of Western Australia
<b>Duration of Permit:</b>	22 October 2020 to 22 October 2025

The Permit Holder is authorised to clear native vegetation subject to the following conditions of this Permit.

### PART I – CLEARING AUTHORISED

#### 1. Purpose for which clearing may be done

Clearing for the purpose of constructing rail infrastructure, rail stations with intermodal rail, bus, carpark and active transport facilities, rail turn-back, rail enabling and associated works.

#### 2. Land on which clearing is to be done

Lot 806 on Deposited Plan 407965, Whiteman  
Lot 807 on Deposited Plan 407965, Whiteman  
Lot 461 on Plan 21673, Noranda and Morley  
Lot 800 on Deposited Plan 26706, Morley  
Broun Avenue road reserve (PIN 12271751), Morley  
Tonkin Highway road reserve (PIN 12271748), Morley and Embleton  
Tonkin Highway road reserve (PIN 12271749), Embleton  
Lot 1 on Diagram 68888, Embleton

#### 3. Area of Clearing

The Permit Holder must not clear more than 1.23 hectares of native vegetation within the combined areas cross-hatched yellow on attached Plans 8939/1a, 8939/1b and 8939/1c.

#### 4. Application

This Permit allows the Permit Holder to authorise persons, including employees, contractors and agents of the Permit Holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit and approval from the Permit Holder.

#### 5. Type of clearing authorised

This Permit authorises the Permit Holder to clear native vegetation for the activities described in condition 1 of this Permit to the extent that the Permit Holder has the power to carry out works involving clearing for those activities under the *Railway (METRONET) Act, 2018* or any other written law.

### PART II – MANAGEMENT CONDITIONS

#### 6. Avoid, minimise and reduce the impacts and extent of clearing

In determining the amount of native vegetation to be cleared authorised under this Permit, the Permit Holder must have regard to the following principles, set out in order of preference:

- avoid the clearing of native vegetation;

- (b) minimise the amount of native vegetation to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

**7. Dieback and weed control**

When undertaking any clearing or other activity authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the introduction and spread of *weeds* and *dieback*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no *dieback* or *weed*-affected soil, *mulch*, *fill* or other material is brought into the area to be cleared; and
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

**8. Offset – Lot 301 on Plan 77559 (Lowlands Nature Reserve), Mardella**

- (a) By 22 April 2021, the Permit Holder shall provide to the *CEO* a copy of the executed change in purpose of the area hatched red on attached Plan 8939/1d within Lot 301 on Plan 77559, Mardella, to Class ‘A’ Conservation Reserve, to be managed by the Department of Biodiversity Conservation and Attractions.
- (b) In the event that the change in purpose of Lot 301 on Plan 77559, Mardella, is not achieved in accordance with condition 8(a):
  - (i) the Permit Holder must submit a new offset proposal for the *CEO*’s approval by 22 April 2021; and
  - (ii) in preparing an offset proposal in accordance with condition 8(b)(i), the Permit Holder must comply with the principles in the Government of Western Australia’s *WA Environmental Offsets Policy* (September 2011) and have regard to the *WA Environmental Offsets Guidelines* (August 2014).

**PART III – RECORD KEEPING AND REPORTING**

**9. Record keeping**

The Permit Holder must maintain the following records in relation to the clearing of native vegetation authorised under this Permit:

- (a) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
- (b) the date(s) that the area was cleared;
- (c) the size of the area cleared (in hectares);
- (d) purpose for which clearing was undertaken;
- (e) actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 6 of this Permit;
- (f) actions taken to minimise the risk of the introduction and spread of *dieback* and *weeds* in accordance with condition 7 of this Permit; and
- (g) actions taken in accordance with condition 8 of this Permit.

**10. Reporting**

- (a) The Permit Holder must provide to the *CEO* on or before 30 June of each year, a written report:
  - (i) of records required under condition 9 of this Permit; and
  - (ii) concerning activities done by the Permit Holder under this Permit between 1 January to 31 December of the preceding calendar year.
- (b) If no clearing authorised under this Permit was undertaken between 1 January to 31 December of the preceding calendar, a written report confirming that no clearing under this permit has been carried out, must be provided to the *CEO* on or before 30 June of each year.
- (c) Prior to 22 July 2025, the Permit Holder must provide to the *CEO* a written report of records required under condition 9 of this Permit where these records have not already been provided under condition 10(a) of this Permit.

## DEFINITIONS

The following meanings are given to terms used in this Permit:

**CEO** means the Chief Executive Officer of the Department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*;

**dieback** means the effect of *Phytophthora* species on native vegetation;

**fill** means material used to increase the ground level, or fill a hollow;

**mulch** means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation;

**weed/s** means any plant -

- (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*;  
or
- (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or
- (c) not indigenous to the area concerned.



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Meenu Vitarana  
A/MANAGER  
NATIVE VEGETATION REGULATION

*Officer delegated under Section 20  
of the Environmental Protection Act 1986*

28 September 2020

# Plan 8939/1a

115°55'2.280"E

115°55'5.520"E

115°55'8.760"E

115°55'12.000"E

115°55'15.240"E

31°51'13.050"S

31°51'16.164"S

31°51'19.278"S

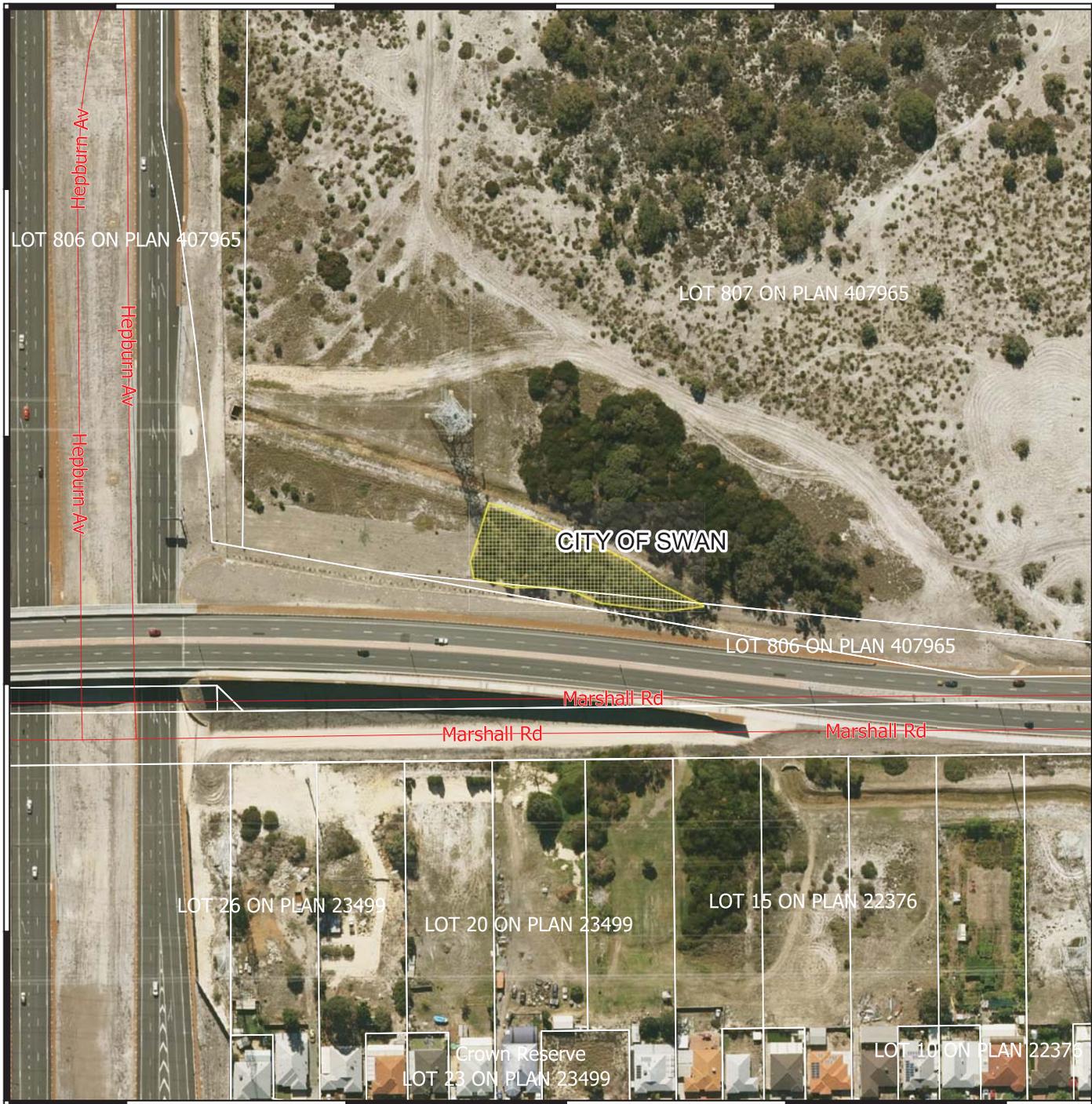
31°51'22.392"S

31°51'13.050"S

31°51'16.164"S

31°51'19.278"S

31°51'22.392"S



115°55'2.280"E

115°55'5.520"E

115°55'8.760"E

115°55'12.000"E

115°55'15.240"E

## CPS layers

CPS areas approved to clear

## base layers

Road Centrelines

Cadastre - LGATE 218

## Map Layers

Land Tenure LGATE - 226

Local Government Authorities



0 25 50 75 100 m



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MGA Zone 50  
Geocentric Datum of Australia 1994



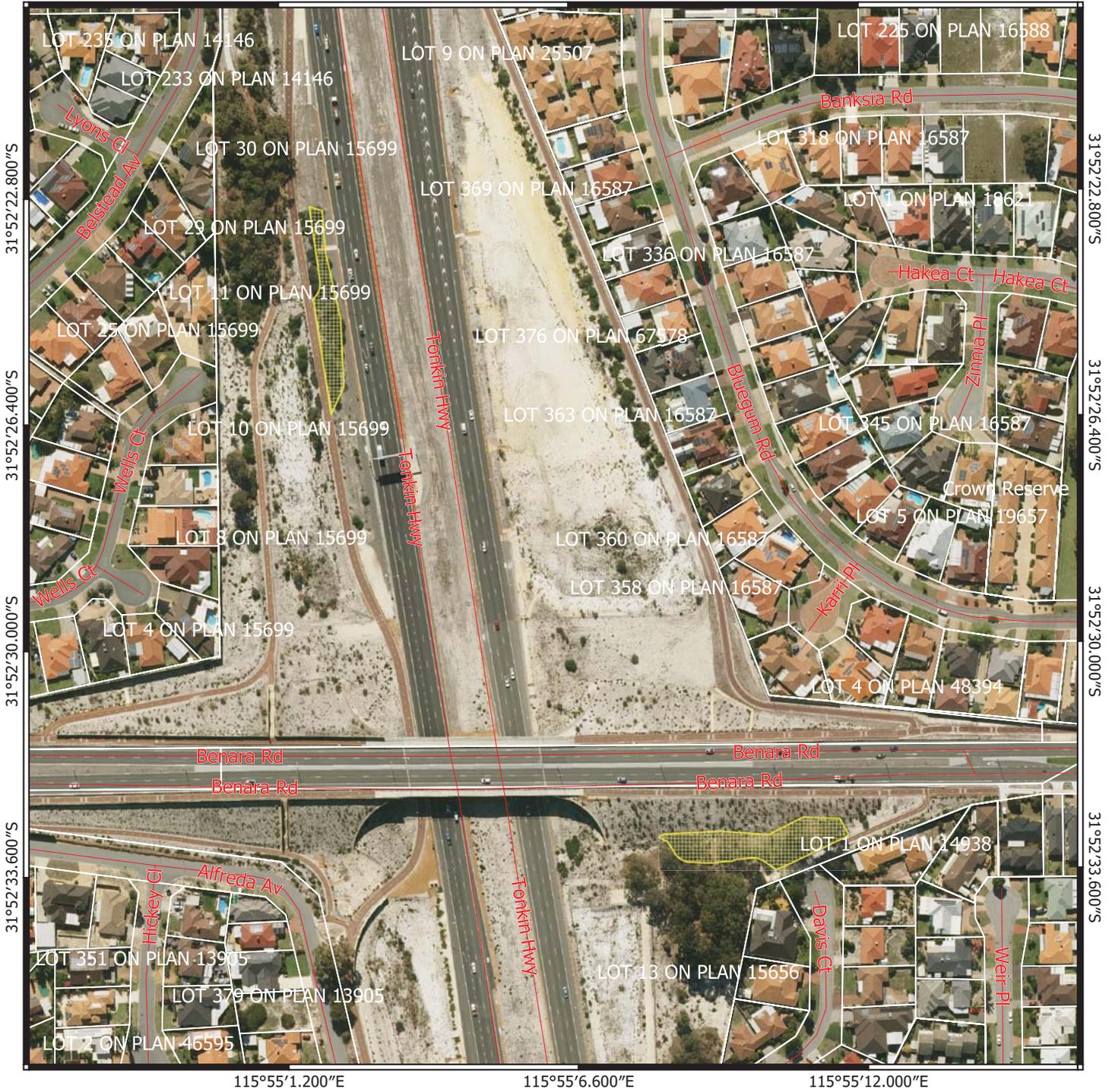
GOVERNMENT OF  
WESTERN AUSTRALIA

# Plan 8939/1b

115°55'1.200"E

115°55'6.600"E

115°55'12.000"E



## CPS layers

 CPS areas approved to clear

## base layers

 Road Centrelines

 Cadastre - LGATE 218

## Map Layers

 Land Tenure LGATE - 226

 Local Government Authorities



0 50 100 150 200 m



  
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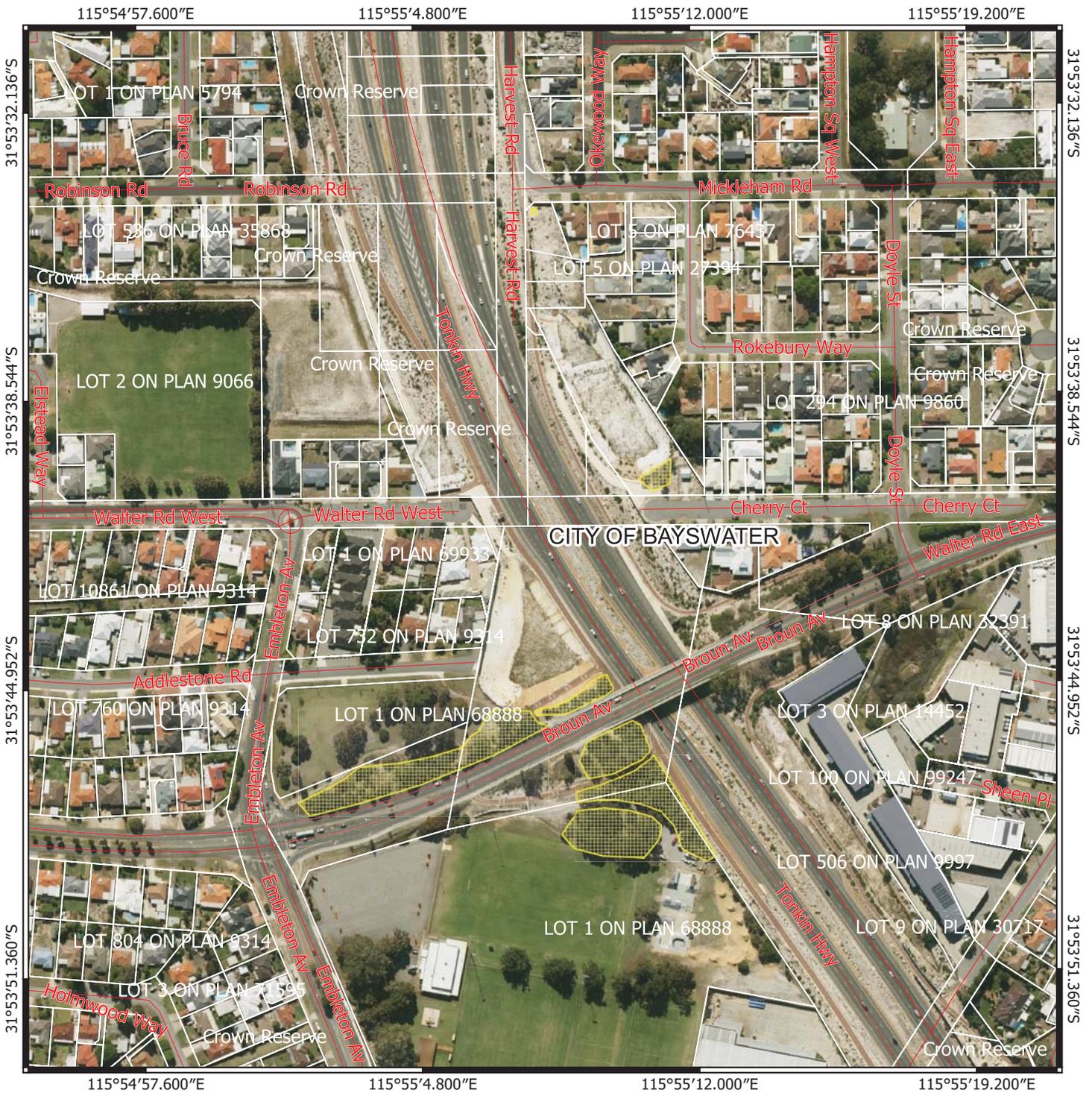
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of the Environmental Protection Act 1986

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MGA Zone 50  
Geocentric Datum of Australia 1994



# Plan 8939/1c



## CPS layers

 CPS areas approved to clear

## base layers

 Road Centrelines  
 Cadastre - LGATE 218

## Map Layers

 Land Tenure LGATE - 226  
 Local Government Authorities



1:3600

MGA Zone 50  
 Geocentric Datum of Australia 1994



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 of the Environmental Protection Act 1986



# Plan 8939/1d

115°54'14.400"E

115°54'21.600"E

115°54'28.800"E

32°18'28.800"S

32°18'28.800"S

32°18'36.000"S

32°18'36.000"S

32°18'43.200"S

115°54'14.400"E

115°54'21.600"E

115°54'28.800"E



CPS Areas subject to conditions

Cadastre - LGATE 218



Local Government Authority (LGA) Boundaries (LGATE-233)

Image



MGA Zone 50  
Geocentric Datum of Australia 1994

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Environmental Protection Act 1986

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GOVERNMENT OF  
WESTERN AUSTRALIA



# Clearing Permit Decision Report

## 1. Application details and outcome

### 1.1. Permit application details

<b>Permit number:</b>	CPS 8939/1
<b>Permit type:</b>	Purpose permit
<b>Applicant name:</b>	Public Transport Authority of Western Australia
<b>Application received:</b>	9 June 2020
<b>Application area:</b>	1.23 hectares (ha) of native vegetation
<b>Purpose of clearing:</b>	Construction of rail infrastructure, rail stations with intermodal rail, bus, carpark and active transport facilities, rail turn-back, rail enabling and associated works.
<b>Method of clearing:</b>	Mechanical
<b>Property:</b>	Lot 806 on Deposited Plan 407965, Whiteman Lot 807 on Deposited Plan 407965, Whiteman Lot 461 on Plan 21673, Noranda and Morley Lot 800 on Deposited Plan 26706, Morley Broun Avenue road reserve (PIN 12271751), Morley Tonkin Highway road reserve (PIN 12271748), Morley and Embleton Tonkin Highway road reserve (PIN 12271749), Embleton Lot 1 on Diagram 68888, Embleton
<b>Location (LGA area/s):</b>	City of Bayswater City of Stirling
<b>Localities (suburb/s):</b>	Whiteman Noranda Morley Embleton

### 1.2. Description of clearing activities

The vegetation applied to be cleared includes a total of 1.23 hectares of native vegetation distributed across nine separate areas along Tonkin Highway, to facilitate the Bayswater to Malaga Rail Works under Part 1 of the Morley-Ellenbrook railway line project (MEL) included within the METRONET program (see Figure 1, Section 1.5). The clearing of 1.23 hectares of native vegetation is proposed for the purpose of constructing of 9 kilometres of permanent rail infrastructure, two rail stations at Morley and Noranda, each with intermodal rail, bus, carparks and active transport facilities (cycling and walking) at each station, and a rail turn-back facility.

### 1.3. Decision on application and key considerations

<b>Decision:</b>	Granted
<b>Decision date:</b>	28 September 2020
<b>Decision area:</b>	1.23 hectares of native vegetation, as depicted in Section 1.5, below.

#### 1.4. Reasons for decision

This clearing permit application was made in accordance with section 51E of the *Environmental Protection Act 1986* (EP Act) and was received by the Department of Water and Environmental Regulation (DWER) on 9 June 2020. DWER advertised the application for public comment and no submissions were received.

In undertaking their assessment, and in accordance with section 51O of the EP Act, the Delegated Officer has given consideration to the Clearing Principles in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments, and any other pertinent matters they deemed relevant to the assessment (see Sections 3 and 4).

The Delegated Officer also took into consideration that the purpose of the clearing is to facilitate Part 1 of the Morley- Ellenbrook railway line project (MEL), included within the METRONET program.

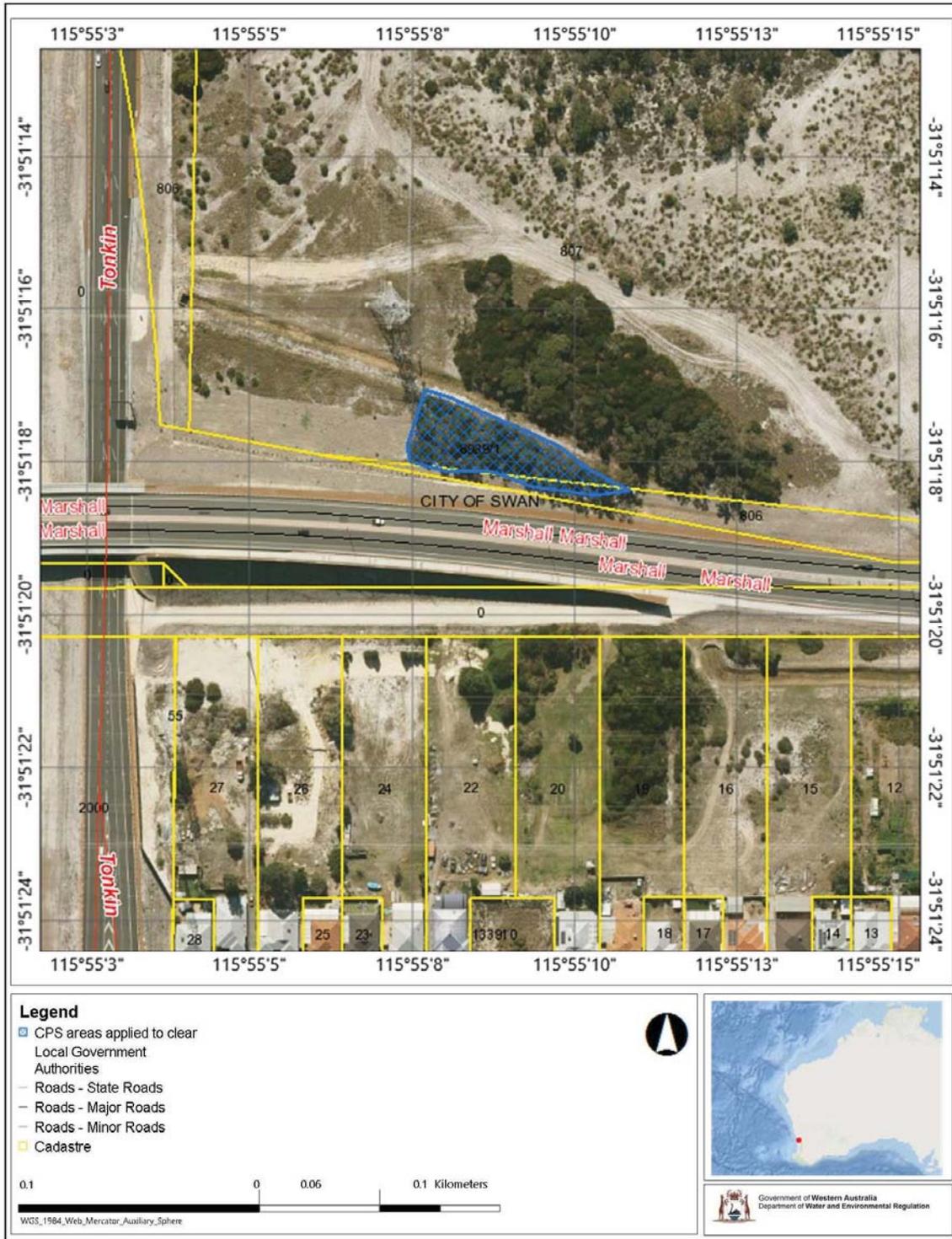
In particular, the Delegated Officer has determined that:

- the applicant has suitably demonstrated avoidance and minimisation measures (see Section 3.1);
- the implementation of a suitable weed and dieback management condition is appropriate to mitigate the impact of spreading weeds and dieback into adjacent vegetation (see Section 3.2.4);
- the clearing is likely to have a significant residual impact through the loss of 0.803 hectares of significant foraging habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*) and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) (see section 3.2.1); and
- the conservation of 3.12 hectares of Lot 301 on Plan 77559 (Lowlands Nature Reserve) as an offset, is sufficient to counterbalance the significant residual impacts to Carnaby's cockatoo and forest red-tailed black cockatoo foraging habitat (see Section 4).

In determining to grant a clearing permit subject to avoid and minimise, weed and dieback, offset, and reporting and recording conditions, the Delegated Officer found that the proposed clearing is not likely to lead to an unacceptable risk to the environment.

1.5. Site maps

(a)



(b)



(c)

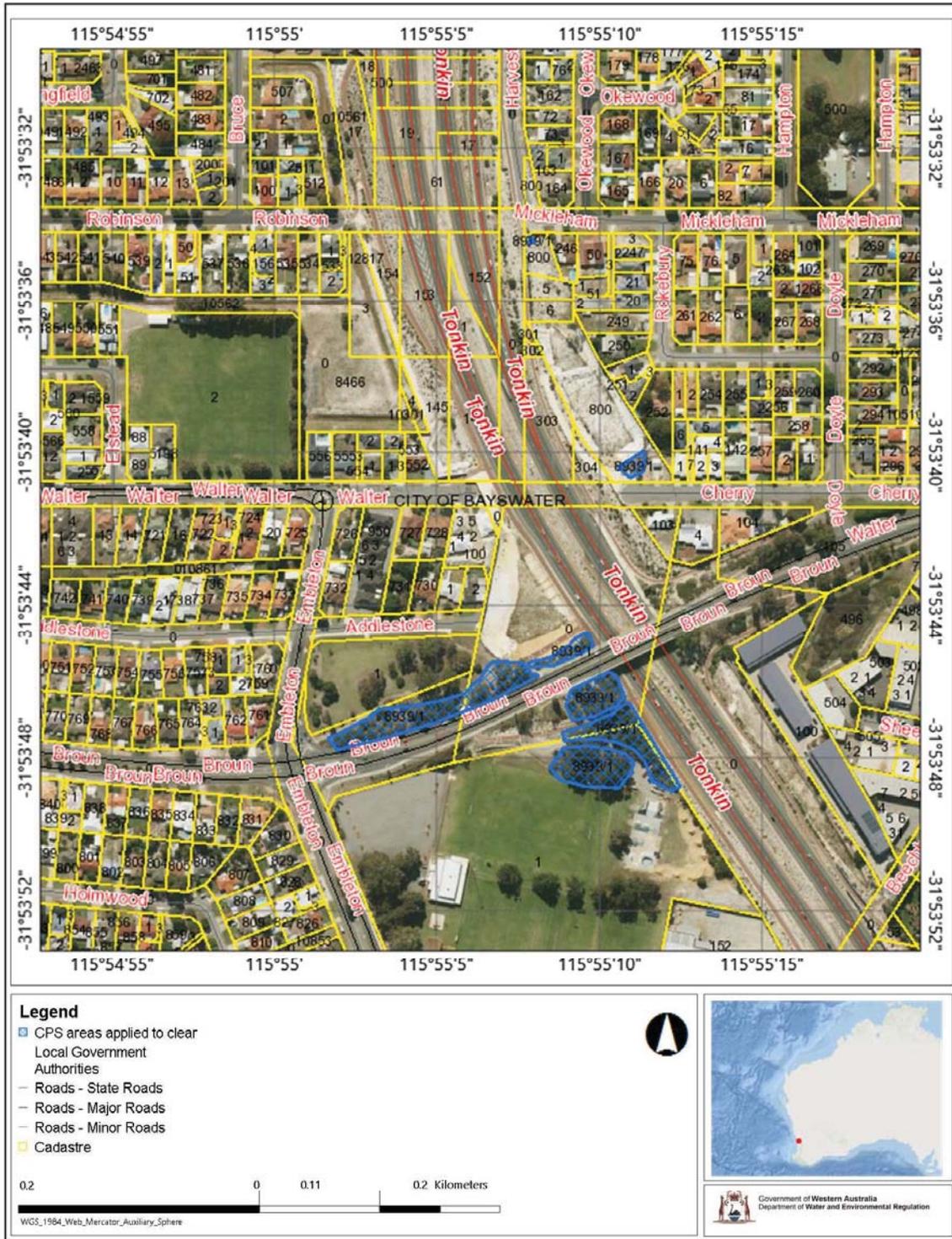


Figure 1. The areas cross-hatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

## 2. Legislative context

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), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

1. the precautionary principle;
2. the principle of intergenerational equity; and
3. the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)

Relevant policies considered during the assessment were:

- *Environmental Offsets Policy* (2011)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- *Environmental Offsets Guidelines* (August 2014)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

## 3. Detailed assessment of application

### 3.1. Avoidance and mitigation measures

An outline of a proposed Construction Environmental Management Plan to be implemented on ground during the proposed works was submitted by the Public Transport Authority of Western Australia (PTA), demonstrating that the mitigation hierarchy had been employed in regards to reducing the impacts of the proposed clearing to fauna, flora, vegetation and ecological communities, as well as reducing the risk of spreading dieback and weeds (PTA, 2020a). The proposed environmental management measures are as follows:

- Flora, vegetation and communities
  - Measures undertaken to avoid the clearing of native vegetation in regards to significant flora, vegetation and communities:
    - The greater development envelope has been aligned with the Tonkin Highway road reserve, where the clearing of vegetation has previously occurred and the landform has been significantly altered for road infrastructure;
    - 24 Native Vegetation Retention Areas (NVRAs) with a total area of 11.42 hectares have been identified within the development envelope, where no clearing or direct disturbance will occur. The NVRAs have been selected to ensure better condition vegetation, i.e. vegetation in Very Good to Degraded (Keighery, 1994) condition is retained; and
    - Approximately 0.186 hectares of vegetation representative of the “*Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region*” priority ecological communities will be retained with a NVRA.
  - Measures undertaken to minimise the clearing of native vegetation in regards to significant flora, vegetation and communities:
    - Existing cleared areas will be utilised for temporary construction areas, where practicable; and
    - The PTA has advised that it will aim to minimise the native vegetation clearing footprint further during the detailed design phase, where practicable, to minimise the overall clearing impacts associated with the proposal.
  - Management strategies outlined in the Construction Environmental Management Plan to reduce direct and indirect impacts to significant flora, vegetation and communities:
    - Provision of coordinates for clearing extents;
    - In-field demarcation of native vegetation clearing boundaries, clearing extents and NVRA’s;
    - Environmental inductions for all site staff and sub-contractors;
    - Access control measures to restrict access to environmentally sensitive areas;

- Waste management protocols including regular inspections;
    - Procedures to manage risk of causing fire during construction;
    - Soil and wind erosion control;
    - No dewatering or abstraction will occur between Reid Highway and Hepburn Avenue, to avoid potential impacts to the adjacent vegetation,
    - Dust prevention and control measures; and
    - Planning of site access, wash down areas, parking areas, drainage and fencing.
- Fauna
  - Measures undertaken to avoid the clearing of native vegetation in regards to significant fauna values:
    - Approximately 2.83 hectares of fauna habitats, including 2.46 ha of moderate to high quality black cockatoo foraging habitat, will be retained within NVRAs;
    - Up to 104 potential black cockatoo breeding trees will be retained within NVRAs;
    - Rail infrastructure will be predominantly located within the existing Tonkin Highway road reserve; and
    - Existing cleared areas will be utilised for temporary construction areas, where practicable.
  - Measures undertaken to minimise the clearing of native vegetation in regards to significant fauna values:
    - Clearing footprint has been minimised to 1.23 hectares, with a total area of 11.42 hectares within NVRAs;
    - The native vegetation clearing footprint will be further evaluated and if practicable minimised during the detailed design phase, to reduce potential impacts on fauna and fauna habitats; and
    - The PTA will minimise the clearing of black cockatoo foraging habitat and potential breeding habitat, where practicable.
  - Management strategies outlined in the Construction Environmental Management Plan to reduce direct and indirect impacts to significant fauna values:
    - Demarcation native vegetation clearing boundaries, clearing extents and NVRA's, as well as demarcation of potential black cockatoo breeding trees to be retained;
    - Inspection of areas to be cleared by a fauna specialist prior to clearing and relocation of any fauna species found to NVRAs;
    - Artificial nest boxes proposed to be removed will be relocated to an appropriate location following advice from the relevant Local Government Authority and the Department of Biodiversity Conservation and Attractions (DBCA); and
    - Fauna mortality from construction activities or vehicle strike will be documented and reported to DBCA.
- Weeds and dieback
  - Management strategies outlined in the Construction Environmental Management Plan:
    - Documentation and implementation of weed and pathogen hygiene management protocols;
    - Inductions for personnel on weed and pathogen management protocols;
    - Earth moving machines vehicles and equipment will be cleaned of soil and vegetation prior to entering and leaving areas to be cleared;
    - No weed affected soil, mulch fill or other material will be moved into the area to be cleared; and
    - Movement of machinery, vehicles and equipment will be restricted to the limits of the areas to be cleared (PTA, 2020a).

The PTA advised that the majority of the clearing required under Part 1 of the Morley-Ellebrook railway line project (MEL), is located at the site of the proposed Morley Station; Lot 1 on Diagram 6888, Embleton (PTA, 2020b). In regards to the proposed Morley Station, the PTA have advised that the location of the station facilities, such as the carpark, were developed to provide the necessary infrastructure, whilst avoiding the Wotton Reserve playing fields and the acquisition of privately owned land (PTA, 2020b). The PTA have advised that, given the constrained construction area, clearing of native vegetation at the proposed Morley Station could not be avoided in order to allow the connection from the carpark and proposed Morley Station to meet *Disability Discrimination Act 1992* requirements, as well as the construction of necessary infrastructure including the required number of car and motorcycle bays, excavation for foundations, site laydown and installation of a services corridor (PTA, 2020b). The PTA advised that the Management Measures as outlined above will be implemented for the clearing of vegetation at the proposed Morley Station, and that the PTA will work closely with the construction contractor during the detailed design phase to further minimise the clearing footprint and retain native vegetation, where possible (PTA, 2020b).

The PTA have also advised that, given the proposal is for the construction and operation of permanent linear rail infrastructure and noting the operational and safety requirements within the railway corridor, there are limited opportunities for rehabilitation (PTA, 2020a). However, the PTA have advised that the operational railway corridor will be managed by the PTA in perpetuity, in accordance with the PTA's Urban Rail Reserve Vegetation Management Plan (PTA, 2016), and that landscaping opportunities that incorporate local native species will be investigated where these opportunities are practical and meet operational safety requirements (PTA, 2020a).

After consideration of avoidance and mitigation measures, it was determined that an offset to counterbalance the significant residual impacts to significant foraging habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*) was necessary (see section 3.2.1). In accordance with the WA State Government's *Environmental Offsets Policy* and *Environmental Offsets Guidelines*, these significant residual impacts have been addressed through the conditioning of environmental offset requirements on the permit. The nature and suitability of the offset provided is summarised in Section 4.

### **3.2. Assessment of environmental impacts**

In assessing the application in accordance with section 51O of the EP Act, the Delegated Officer has examined the application and site characteristics (Appendix B) and considered whether the clearing poses a risk to environmental values. The assessment against the Clearing Principles is contained in Appendix C.

This assessment identified that the clearing may pose a risk to the environmental values of suitable habitat for conservation significant flora and fauna species, significant remnant vegetation, and land and water resources, and that these required further consideration. The detailed consideration and assessment of the clearing impacts against the specific environmental values is provided below. Where the assessment found that the clearing presents an unacceptable risk to environmental values, conditions aimed at controlling and/or ameliorating the impacts have been imposed under sections 51H and 51I of the EP Act. These are also identified below.

#### **3.2.1. Environmental value: biological values (fauna) – Clearing Principle (b)**

Assessment: According to available databases and with consideration of the site characteristics of the proposed clearing area, as well as the results of fauna surveys, the proposed clearing area is likely to contain suitable habitat for the forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*), Baudin's cockatoo (*Calyptorhynchus baudinii*), and Carnaby's cockatoo (*Calyptorhynchus latirostris*), collectively known as black cockatoo species (see Appendix B).

Black cockatoo species are known to nest in hollows of live and dead trees, including marri (*Corymbia calophylla*), jarrah (*Eucalyptus marginata*), karri (*Eucalyptus diversicolor*), wandoo (*Eucalyptus wandoo*), tuart (*Eucalyptus gomphocephala*), flooded gum (*Eucalyptus rudis*), and other *Eucalyptus* spp. (Commonwealth of Australia, 2012). 'Breeding habitat' for black cockatoos includes trees of these species that either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow, where suitable DBH for nest hollows is 500 millimetres for most tree species (Commonwealth of Australia, 2012). While breeding, black cockatoos also generally forage within a 6 to 12 km radius of their nesting site (Commonwealth of Australia, 2012). According to available datasets, mapped potential black cockatoo feeding habitat is recorded within 12 kilometres of the application area, making it a suitable location for breeding if appropriate hollows are present. The application area is mapped within the known breeding range of Carnaby's cockatoo and within the potential breeding range for the forest red-tailed black cockatoo (Commonwealth of Australia, 2012). The application area is mapped outside of the known breeding range for Baudin's cockatoo (Commonwealth of Australia, 2012), and is not considered to comprise potential breeding habitat for this species.

A targeted fauna survey and black cockatoo habitat assessment was undertaken by Eco Logical Australia between November 2019 and February 2020, which covered the greater development envelope and included all areas proposed to be cleared (Eco Logical Australia, 2020). This survey identified a total of 145 potential breeding trees of suitable DBH within the greater development envelope, of which four contain potential breeding hollows (Eco Logical Australia, 2020). All four hollow-bearing trees have been excluded from the application area and will be retained within NVRAs (PTA, 2020a). Of the 145 potential breeding trees identified, 95 are considered native vegetation, and approximately 14 occur within the proposed clearing area (Eco Logical Australia, 2020). None of the 14 potential breeding trees proposed to be cleared contain suitable hollows for black cockatoo species (Eco Logical Australia, 2020). The survey also noted that the potential breeding trees identified within the development envelope are likely to represent suitable roosting habitat for black cockatoo species, however no evidence of roosting was observed (Eco Logical Australia, 2020). Noting that all hollow-bearing trees have been excluded from the application area and that adjacent potential breeding trees within the development envelope will be retained within NVRAs, the proposed clearing area is not considered to comprise significant breeding habitat for either the forest red-tailed black cockatoo or Carnaby's cockatoo and is not considered likely to significantly impact breeding or roosting habitat for black cockatoo species in the local area.

Black cockatoo species are noted to forage on a range of plant species, predominantly the seeds and flowers of marri, jarrah and proteaceous species (e.g. *Banksia* spp., *Hakea* spp. and *Grevillea* spp.) (Commonwealth of Australia, 2012). As the application area contains marri, *Banksia* spp., *Allocasuarina* spp., and various *Eucalyptus* spp., is mapped within 12 kilometres of known breeding and roosting sites, and occurs within the known foraging area for Baudin's cockatoo and the predicted occurrence range for both the forest red-tailed black cockatoo and Carnaby's cockatoo, the application area is likely to provide suitable foraging habitat for black cockatoo species. The black cockatoo habitat assessment included estimates of the quality of foraging habitat present within the application area, using parameters broadly consistent with the Commonwealth of Australia's draft referral guidelines for black cockatoo species. This survey identified that the application area includes a total of 0.803 hectares of foraging habitat for black cockatoo species, including 0.241 hectares of moderate to high quality, 0.403 hectares of moderate quality, and 0.159 hectares of low quality foraging habitat (Eco Logical Australia, 2020). The black cockatoo habitat assessment also identified foraging evidence including chewed marri nuts, pine cones and *Banksia* cones, and directly observed two forest red-tailed black cockatoos foraging within the greater development envelope (Eco Logical Australia, 2020). Noting the above, it is considered likely that the proposed clearing area is utilised as foraging habitat for black cockatoo species.

Critical habitat for both Baudin's cockatoo and the forest red-tailed black cockatoo is defined as all marri, karri and jarrah forests, woodlands and remnants in the south-west of Western Australia receiving more than 600 millimetres of annual average rainfall (DEC, 2008). Given the application area includes remnant *Eucalyptus*, *Banksia* and *Melaleuca* dominated woodlands on the Swan Coastal Plain, the application area is not likely to meet the definition of critical habitat for these species and, while the application area may have foraging value, it is unlikely to be significant for the ongoing maintenance of these species. However, critical habitat for Carnaby's cockatoo includes any habitat that provides for feeding, watering, regular night roosting and potential for breeding (DPAW, 2013). Noting that the application area includes 0.803 hectares of foraging habitat, occurs within 12 kilometres of known breeding areas for Carnaby's cockatoo, includes trees that may be suitable for roosting, is located in close proximity to several watercourses, and that evidence of foraging has been observed within the development envelope, it is likely that the proposed clearing area includes critical habitat for Carnaby's cockatoo.

It is noted that approximately 2.46 hectares of moderate to high value foraging habitat will be retained within NVRAs in the greater development envelope (PTA, 2020a). However, maintaining foraging habitat irrespective of size has been noted as particularly important within the Perth Metropolitan Region, due to the role of these feeding areas in the survival of young birds and the maintenance of the population between breeding seasons, coupled with the lack of habitat remaining in this region and its connectivity values for birds migrating between regions (Commonwealth of Australia, 2012). As assessed under section 3.2.3, the application area is not considered extensively cleared as it falls within the constrained Perth Metropolitan Region (EPA, 2008). However, remnant vegetation is sparse within the local area and, according to available databases, potential foraging habitat for Carnaby's cockatoo in the local area is limited to a subset of these remaining remnants. Given the application area is likely to meet the definition of critical habitat for Carnaby's cockatoo, that evidence of foraging has been observed within the greater development envelope, that forest red-tailed black cockatoos have been directly observed foraging within the development envelope, and noting the extent of clearing in the local area, the application area is considered likely to represent significant foraging habitat for Carnaby's cockatoo and may represent significant foraging habitat for forest red-tailed black cockatoo. Noting the above, the loss of 0.803 hectares of foraging habitat, of which majority is considered moderate or moderate to high quality, may represent a significant impact to Carnaby's cockatoo and forest red-tailed black cockatoo.

An offset to conserve 3.12 hectares of foraging habitat for black cockatoos within Lot 301 on Plan 77559, Mardella, is considered to address the residual impacts to Carnaby's cockatoo and forest red-tailed black cockatoo foraging habitat resulting from the proposed clearing (see Section 4).

Noting that the local area is highly modified and a large degree of historical clearing has occurred, the application area may also provide an ecological linkage for black cockatoo species moving through the local area. Given forest red-tailed black cockatoos were observed within the development envelope during targeted fauna surveys and previous observations of Carnaby's cockatoos flying over the development envelope were noted (Eco Logical Australia, 2020), it is likely that black cockatoos are using the proposed clearing area as an ecological linkage. However, given 11.42 hectares of vegetation within the development envelope will be retained within NVRAs, it is unlikely that the proposed clearing of 1.23 hectares will significantly reduce the capacity of the remaining vegetation within the development envelope to act as an ecological linkage. Therefore, it is unlikely that the proposed clearing will result in significant impacts to black cockatoo species moving through the local area.

It should also be noted that seven trees within the application area contain artificial nesting boxes, including two south of the proposed Noranda Station (south of Benara Road), one within Tonkin Highway road reserve (north of Morley Drive), and four near the proposed Morley Station (south of Broun Avenue) (GHD, 2020b). The nesting boxes at the proposed Morley Station were assessed by a fauna specialist, who found that the nesting boxes were unsuitable for use for breeding by black cockatoo species given the small entrance size or internal space, and no

signs of use by black cockatoo species was observed (Kirkby, 2020). However, it is noted that these nesting boxes may provide habitat for other fauna species and enhance the environmental values of the trees proposed to be cleared. To mitigate impacts to fauna, the PTA has committed to relocating nesting boxes within the proposed clearing area to an appropriate location following advice from the relevant Local Government Authority and the Department of Biodiversity Conservation and Attractions (DBCA) (PTA, 2020a).

**Outcome:** Based on the above assessment, the Delegated Officer has determined that the proposed clearing will result in the loss of 0.803 hectares of significant foraging habitat for Carnaby's cockatoo and forest red-tailed black cockatoo. The Delegated Officer has determined that a suitable environmental offset is sufficient to address the residual impacts resulting from the proposed clearing.

**Conditions:** To address the above impacts, the following conditions will be added to the permit:

- Offset – Lot 301 on Plan 77559 (Lowlands Nature Reserve), ensuring the conservation of 3.12 hectares of foraging habitat for black cockatoo species within a Class 'A' Conservation Reserve.

### 3.2.2. Environmental value: biological values (flora and vegetation) – Clearing Principles (a) and (c)

**Assessment:**

**Vegetation:** According to available databases and with consideration of the site characteristics of the proposed clearing area (see Appendix B), a state-listed priority ecological community (PEC), the "*Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region*" (Banksia WL SCP), is considered likely to occur within the greater development envelope. The Banksia WL SCP is considered a Priority 3 ecological community under the BC Act and is listed as a threatened ecological community (TEC) with the status of Endangered under the Commonwealth EPBC Act. Several targeted flora and vegetation surveys undertaken within the development envelope between 2013 and 2020, confirmed that vegetation type VT06, described as *Eucalyptus tottiana*, *Corymbia calophylla*, *Allocasuarina fraseriana* and *Banksia menziesii* low open woodland, was consistent with the Banksia WL SCP PEC, and occurs at two locations within the development envelope (360 Environmental, 2014; GHD, 2014; Woodman, 2015; GHD, 2020b). One of these locations, an isolated remnant comprising 0.185 hectares of the PEC with vegetation in Good to Degraded (Keighery, 1994) condition will be retained, while the other, comprising 0.37 hectares of the PEC with vegetation in Degraded to Completely Degraded (Keighery, 1994) condition, occurs within the proposed clearing area. Noting this, the application area is likely to fall below the minimum patch size and condition thresholds to be considered as part of the EPBC Act listed TEC (TSSC, 2016), however is still considered to be consistent with the Banksia WL SCP PEC.

Given the above, the proposed clearing will result in the loss of 0.37 hectares of vegetation representative of the Banksia WL SCP PEC. However, given the 0.37 hectare patch occurs within a highly developed and disturbed local area and has been subject to significant disturbance from weed invasion, as well as adjacent road and residential infrastructure, it is likely that this vegetation will be subject to ongoing degradation from edge effects. Further, given the small patch size of the occurrence, its isolation from other remnants of vegetation, the existing vegetation condition, and the highly disturbed surrounding land uses, it is unlikely that the 0.37 hectares of vegetation representative of the Banksia WL SCP PEC will be viable in the future. The applicant has also committed to retaining 0.185 hectares of higher condition vegetation representative of Banksia WL SCP PEC within the development envelope. Given the above, it is unlikely that the application area is necessary for the maintenance of the Banksia WL SCP or that the proposed clearing will significantly impact the extent or conservation status of this PEC.

**Flora:** According to available databases and with consideration of the site characteristics of the proposed clearing area, the application area may provide suitable habitat for three threatened flora species; *Caladenia huegelii*, *Conospermum undulatum* and *Macarthuria keigheryi* (see Appendix B). *Caladenia huegelii* is a perennial herb with green, cream and red flowers, associated with woodlands dominated by *Eucalyptus* spp., *Agonis flexuosa* (peppermint) and *Banksia* spp. over low heath or shrub, within brown to grey sandy soils (Western Australian Herbarium, 1998-). *Caladenia huegelii* flowers from September to October, and outside of this period, persists as an underground tuber (Western Australian Herbarium, 1998-). *Conospermum undulatum* is a perennial, compact shrub standing up to 2 metres tall, with white flowers occurring between May and October, is associated with woodlands dominated by *Eucalyptus* spp. and *Banksia* spp. over heath, within orange to grey sandy soils, and has been observed in degraded remnant vegetation (Western Australian Herbarium, 1998-). *Macarthuria keigheryi* is a perennial herb or shrub with flowers occurring between September and December or February to March, is associated with Banksia woodlands, often with an overstorey of marri or *Eucalyptus* spp., over mixed shrubland or heath within grey to white sandy soils, and has been observed in degraded remnant vegetation (Western Australian Herbarium, 1998-). Noting that these species are listed as threatened flora under the BC Act, the presence of individuals within the application area would be considered significant.

An appropriately timed level 1 flora survey, including vegetation mapping and systematic searches, was undertaken by 360 Environmental Pty Ltd within the development envelope between September and October 2013 (360

Environmental Pty Ltd, 2014). This survey identified no threatened or priority flora occurring within the proposed clearing area or greater development envelope. As discussed above, several targeted flora and vegetation surveys have been undertaken within or intersecting the development envelope between 2013 and 2020, to support and confirm the findings of this initial flora survey by 360 Environmental Pty Ltd (360 Environmental, 2014; GHD, 2014; Woodman, 2015; GHD, 2020b). No subsequent surveys have identified the presence of any threatened or priority flora species within the proposed clearing area or the greater development envelope. Noting the timing of the aforementioned survey and the number of repeat surveys of the area undertaken between 2013 and 2020, it is likely that the three threatened flora species would have been recorded, if present within the application area or greater development envelope.

Noting that several targeted flora surveys have been undertaken and have not identified individuals within the application area, that the proposed clearing areas are isolated remnants in a highly developed and extensively cleared local area, and that the application area is highly disturbed and predominantly in Good to Degraded (Keighery, 1994) condition, the application area is not considered likely to comprise significant habitat for any threatened or priority flora species.

**Summary:** Noting the above, the application area may comprise a high level of biodiversity as it includes vegetation representative of the Banksia WL SCP PEC. However, the proposed clearing is not considered likely to comprise significant habitat for any threatened or priority flora species. Further, impacts to the Banksia WL SCP PEC are not likely to be significant, given the highly disturbed and developed local area, as well as the isolated nature and degraded condition of the remnants proposed to be cleared.

**Outcome:** Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered acceptable in relation to this environmental value.

### **3.2.3. Environmental value: significant remnant vegetation and conservation areas – Clearing Principles (e) and (h)**

**Assessment:** 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). Noting that the current vegetation extent for both the mapped Swan Coastal Plain vegetation complexes within the proposed clearing area and vegetation extent within the local area fall below the 30 per cent threshold (see Appendix B), the application area is considered to be a remnant within an extensively cleared landscape. Noting that the application area includes vegetation that may comprise significant foraging habitat for black cockatoo species and is representative of a PEC, the application area is considered to be a significant remnant of vegetation.

However, the Environmental Protection Authority (EPA) recognises the Perth Metropolitan Region to be a constrained area, within which a minimum 10 per cent representation threshold for ecological communities is recommended (EPA, 2008). The current vegetation extent for the Swan Coastal Plain IBRA Bioregion, the Bassendean Complex – Central and South, the Southern River Complex and the local area are all above the 10 per cent threshold for constrained areas (see Appendix B). Further, the proposed clearing area comprises less than 0.02 per cent of vegetation remaining in the local area, and less than 0.0001 per cent of current vegetation extent for the Swan Coastal Plain IBRA Bioregion, the Bassendean Complex – Central and South, and the Southern River Complex. It is also noted that the application area comprises several small, isolated remnants of native vegetation in Good to Completely Degraded (Keighery, 1994) condition, within a highly urbanised and developed local area, which are likely to be subject to ongoing disturbance and degradation. Noting the above, the proposed clearing is not considered likely to have a significant impact on vegetation extent within the extensively cleared local area.

It is noted that, as the application area is in Good to Completely Degraded (Keighery, 1994) condition and has been subject to weed invasion, the proposed clearing may facilitate the spread of weeds and dieback to remnant vegetation in the local area, including adjacent retained areas. A weed and dieback condition is considered to minimise this risk.

**Outcome:** Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered acceptable subject to relevant conditions (see below) in relation to this environmental value.

**Conditions:** To address the above impacts, the following condition will be added to the permit:

4. Dieback and weed control, which ensures protocols are put in place to limit the introduction and transportation of dieback- and weed-affected materials.

### **4.1.1. Environmental value: land and water resources – Clearing Principles (f), (g), and (i)**

**Assessment:** According to available databases, the application area does not intersect any natural source of surface water. However, the northernmost portion of the application area, north of Marshall Road, is directly adjacent to the Emu Swamp Main Drain, and the proposed clearing areas intersect two mapped multiple-use wetlands; an un-named sumpland and an un-named dampland (see Appendix B). It is noted that these wetlands may be historical records

and are likely to have been highly modified, given the highly disturbed and developed local area. A targeted vegetation assessment identified that the northernmost portion of the application area, occurring adjacent to a man-made drainage line and within a mapped wetland, consists of characteristic riparian species, described as VT02 - flooded gum (*Eucalyptus rudis*) open woodland over shrubland and sedgeland (GHD, 2020b). Noting the above, the vegetation within the northernmost portion of the application area, VT02, may be growing in association with an environment associated with a watercourse or wetland. However, given the extent of the proposed clearing, that VT02 is in Degraded to Completely Degraded (Keighery, 1994) condition, the distance from the closest natural source of surface water, that vegetation to the north of Emu Swamp Main Drain will be retained, and that the application area occurs within a highly disturbed and developed local area, the proposed clearing is not considered likely to result in any long-term impacts to the ecological values of the vegetation communities associated with the man-made drainage line or wetlands associated with the application area.

The application area is mapped within the Swan River System surface water area and the Perth Groundwater Area, both proclaimed under the *Rights in Water and Irrigation Act 1914* (the RIWI Act). Noting that the proposed clearing area is adjacent to the Emu Swamp Main Drain, there is the potential that the proposed clearing may initially increase turbidity and sedimentation of this surface water resource. However, given the vegetation adjacent to the Emu Swamp Main Drain is in Degraded to Completely Degraded (Keighery, 1994) condition, the local area is highly disturbed and developed, that the extent of the proposed clearing is minimal, and that vegetation to the north of Emu Swamp Main Drain will be retained, it is unlikely that the proposed clearing will result in any long-term or off-site impacts to surface water within the Swan River System. In regards to groundwater resources, groundwater salinity within the application area is fairly low and mapped at 500 to 1000 milligrams per litre total dissolved solids. Given the extent of the proposed clearing, that the vegetation is in Good to Completely Degraded (Keighery, 1994) condition, that the application area is mapped at a low risk of land degradation resulting from salinity, and that the local area is highly urbanised and developed, the proposed clearing is not considered likely to cause deterioration is groundwater quality within the Perth Groundwater Area.

The soil types present within the application area are mapped at low risk of land degradation resulting from water erosion, salinity, and flooding (see Appendix B). However, the soil types are mapped at upwards of 50 per cent, moderate to extreme risk of land degradation, for wind erosion, waterlogging, phosphorus export and subsurface acidification (see Appendix B). While the proposed clearing may contribute to increased waterlogging, phosphorus export and soil acidification within the application area, it is considered that these impacts are likely to be minimal, given the proposed clearing involves the removal of several small, isolated remnants of native vegetation in Good to Completely Degraded (Keighery, 1994) condition, within a highly urbanised and developed local area. Given the soils are highly susceptible to wind erosion, the proposed clearing may result in significant erosion if cleared areas are left exposed for extended periods. However, noting the extent of the proposed clearing and that cleared areas will be replaced with infrastructure associated with rail construction, rail stations or hard stand areas, it is unlikely that the proposed clearing will result in appreciable wind erosion. Further, the applicant has committed to retaining a total of 1.47 hectares of higher quality vegetation over several areas within the development envelope, which are likely to provide a buffer against the land degradation risks outlined above. Given the above, it is unlikely that the proposed clearing will result in appreciable land degradation.

- Outcome: Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered acceptable in relation to this environmental value.

#### **4.2. Relevant planning instruments and other matters**

The clearing permit application was advertised on the Department of Water and Environmental Regulation's website on 19 June 2020, inviting submissions from the public within a 21 day period. No submissions were received in relation to this application.

This proposal was referred to the Environmental Protection Authority (EPA) in November 2019 (PTA, 2020a). The EPA determined not to formally assess the proposal and advised that the proposed native vegetation clearing was to be assessed under Part V Division 2 of the *Environmental Protection Act 1986* (the EP Act) (PTA, 2020a).

The Public Transport Authority (PTA) have advised that Lot 1 on Diagram 68888, Embleton, will be acquired to facilitate the proposed works, in accordance with the *Railway (METRONET) Act, 2018* (PTA, 2020b). Noting that the PTA are in the process of acquiring the land through the Department of Planning, Lands and Heritage (DPLH) and given the authority held under the *Railway (METRONET) Act, 2018*, the Delegated Officer considers there to be a high level of confidence that the PTA will acquire and obtain legal authority to access Lot 1 on Diagram 68888, Embleton, to facilitate the proposed works. The Delegated Officer notes that any clearing proposed within Lot 1 on Diagram 68888, Embleton, under CPS 8939/1 is subject to legal authority to access this land being obtained through the land acquisition process. The Delegated Officer advises that it is the responsibility of the Permit Holder to ensure

legal authority to access has been obtained, prior to any clearing authorised under CPS 8939/1 being undertaken within Lot 1 on Diagram 68888, Embleton.

Development approval under the *Planning and Development Act 2005* (issued by the City of Stirling and the City of Bayswater) will be required for the construction of the Morley and Noranda rail stations, car parks and public transport interchange facilities (PTA, 2020b). The PTA have advised that the proposed clearing under CPS 8939/1 will facilitate the initial construction of the railway line, and that the development applications for the associated facilities will be progressed in 2021 (PTA, 2020b). The railway line required for the proposed land use will be constructed under the *Railway (METRONET) Act, 2018* (PTA, 2020a).

The City of Swan advised DWER that the proposed clearing was consistent with the City of Swan Local Biodiversity Strategy, noting that the proposed clearing was unlikely to have significant impacts to the local area (City of Swan, 2020). The City of Swan advised that it did not have any objections to the clearing, as illustrated in the plan provided for the purposes of the METRONET program (City of Swan, 2020).

The City of Bayswater advised DWER that it is not in support of the proposed clearing of native vegetation under CPS 8939/1, specifically the clearing proposed to occur within Lot 1 on Diagram 68888, Embleton (City of Bayswater, 2020). The City of Bayswater expressed that, despite the degraded condition of the vegetation, the proposed clearing area positively contributes to the environmental values of the local area, noting the City of Bayswater has a limited amount of remaining remnant vegetation (City of Bayswater, 2020). The PTA advised that the potential to avoid and minimise the clearing of vegetation within Lot 1 on Diagram 68888, Embleton, has been extensively considered (see Section 3.1). However, given the constrained construction area, the PTA advised that minimal clearing was required within Lot 1 on Diagram 68888, Embleton, to allow the connection from the carpark and proposed Morley Station to meet *Disability Discrimination Act 1992* requirements, as well as for the construction of necessary infrastructure including the required number of car and motorcycle bays, excavation for foundations, site laydown and installation of a services corridor (PTA, 2020b). The PTA advised that it will work closely with the construction contractor to minimise the clearing footprint and retain vegetation where possible, and will aim to reduce the clearing footprint further during the detailed design phase (PTA, 2020b).

The City of Bayswater acknowledged the efforts taken to avoid and minimise the clearing required within Lot 1 on Diagram 68888, Embleton, and requested that, should the clearing be approved, the PTA undertake revegetation within the City of Bayswater and the vicinity of the clearing area, including offsetting the loss of native vegetation at a rate of 2:1, and replacing any trees removed at a rate of 5:1 (City of Bayswater, 2020). The City of Bayswater also requested that if trees containing nesting boxes are to be cleared under CPS 8939/1, the nesting boxes are removed and re-installed within the vicinity of the clearing area (City of Bayswater, 2020). The PTA have committed to relocating nesting boxes within the City of Bayswater, and have advised that they will undertake revegetation or investigate the potential for acquiring vegetated land for conservation within the City of Bayswater (PTA, 2020b). The Delegated Officer considers the specifications of mitigation measures to be undertaken to be a matter of discussion and agreement between the PTA and the City of Bayswater.

According to available databases, portions of the application area intersect two known contaminated sites, noted to contain Acid Sulfate Soils (ASS). The PTA have advised that the management of these areas will be undertaken in accordance with the *Contaminated Sites Act 2003*, and pre-works site inspections will be undertaken to identify areas intersecting ASS, or known or suspected contamination sites (PTA, 2020a). The PTA have also advised that the proposal has been developed to avoid excavation and large-scale dewatering in ASS risk areas, where an ASS and Dewatering Management Plan will be developed and implemented to manage risks associated with earthworks and dewatering (PTA, 2020a).

The proposed clearing area intersects two mapped Aboriginal Sites and Heritage places; Site ID 4039 (Broun Avenue) and Site ID 3692 (Bennett Brook in toto), and is adjacent to several others which occur within the greater development envelope. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

## **5. Suitability of offsets**

Through the detailed assessment outlined in Section 3.2 above, the Delegated Officer has determined that a significant residual impact remains after the application of the avoidance and mitigation measures summarised in Section 3.1, specifically the loss of 0.803 hectares of significant foraging habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*) and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*).

The applicant proposed an environmental offset consisting of 3.12 hectares of high-quality foraging habitat for Carnaby's cockatoo and forest red-tailed black cockatoo within Lot 301 on Plan 77559, Mardella.

Lots 300 and 301 on Plan 77559, Mardella, were purchased by the Western Australian Government from a private landholder in 2014, for the purposes of providing advanced environmental offsets for a range of Government projects, were applied a Class 'A' conservation status in 2015, and both lots were subsequently termed Lowlands Nature Reserve (Public Transport Authority, 2020c; 2020d). Lot 300 on Plan 77559, Mardella, was determined to be a suitable environmental offset for the Gateway WA project (Clearing Permit CPS 5242/5) in 2014 (Public Transport Authority, 2020d). Lot 301 on Plan 77559, Mardella, remained as a "pre-impact" or "banked" offset, as outlined in the *Environmental Offsets Guidelines* (2014), and was intended for use as an environmental offset for the Government's strategic assessment of the Perth and Peel Regions of Western Australia (SAPPR) project, within which the environmental impacts for a number of METRONET rail projects were included in overall impact calculations (Public Transport Authority, 2020d).

The applicant has committed to securing a 3.12 hectare portion of the existing banked offset site within Lowlands Nature Reserve, to counterbalance the significant residual impacts of the proposed clearing. Lowlands Nature Reserve will be managed in perpetuity by the Department of Biodiversity Conservation and Attractions (DBCA) and ongoing management will be funded by the applicant between 2021 and 2027 (Public Transport Authority, 2020c). The environmental values represented within Lowlands Nature Reserve are summarised in Table 1.

While it is noted that Lowlands Nature Reserve is approximately 46 kilometres south of the proposed clearing area for CPS 8939/1, noting it is to be used as a strategic offset for several other METRONET projects, and noting its location within an extensively cleared landscape despite the distance to the proposed clearing, the proposed offset is considered to deliver an adequate environmental benefit to counterbalance the impacts of the proposed clearing.

**Table 1.** Lowlands Nature Reserve environmental values (Public Transport Authority, 2020c).

Environmental Value	Description of Environmental Value
Native vegetation	The site consists of approximately 1001.5 ha of native vegetation, in Excellent to Degraded condition, with the majority of the vegetation in Excellent or Very Good condition. The site is mostly covered by vegetation, with some access tracks and fire breaks.
Regional vegetation complexes	Southern River Complex; Dardanup Complex; Guildford Complex; and Bassendean Complex-Central and South Complexes are present at the site.
Vegetation types	The following vegetation types are present at the site: <ul style="list-style-type: none"> <li>• 712.6 ha - <i>Eucalyptus Banksia</i> woodland (EBw) (FCT21a and 23a);</li> <li>• 63.2 ha - <i>Allocasuarina Banksia</i> woodland (ABw) (FCT21c);</li> <li>• ha - <i>Banksia ilicifolia</i> woodland (Biw) (FCT22);</li> <li>• 14.4 ha - <i>Corymbia calophylla</i> open woodland (Cw);</li> <li>• 143.9 ha - <i>Banksia Kunzea</i> woodland (BKw) (FCT21c);</li> <li>• 19.7 ha - <i>Eucalyptus Melaleuca</i> woodland (EMw) (FCT4);</li> <li>• 36 ha - <i>Eucalyptus rudis</i> forest (Ef) (FCT11);</li> <li>• 4.8 ha - <i>Melaleuca</i> woodland (Mw) (FCT5);</li> <li>• 0.6 ha - Tuart woodland (Tw);</li> <li>• 120.6 ha - Scattered natives over weeds (Sn); and</li> <li>• 16.9 ha - Tracks.</li> </ul>
Vegetation condition	The vegetation condition of the site varies largely by vegetation type: <ul style="list-style-type: none"> <li>• <i>Eucalyptus Banksia</i> woodland (EBw) (FCT21a and 23a) consists of 312.7 ha in Excellent, 300.44 ha in Very Good and 99.45 ha in Good (Keighery, 1994) condition;</li> <li>• <i>Allocasuarina Banksia</i> woodland (ABw) (FCT21c) consists of 42.18 ha in Excellent and 21.05 ha in Very Good (Keighery, 1994) condition;</li> <li>• <i>Banksia ilicifolia</i> woodland (Biw) (FCT22) consists of 3.27 ha in Good (Keighery, 1994) condition;</li> <li>• <i>Corymbia calophylla</i> open woodland (Cw) consists of 14.37 ha in Good (Keighery, 1994) condition;</li> <li>• <i>Banksia Kunzea</i> woodland (BKw) (FCT21c) consists of 82.5 ha in Very Good; 63.06 ha in Good, and 1.35 ha in Degraded (Keighery, 1994) condition;</li> </ul>

	<ul style="list-style-type: none"> <li>• <i>Eucalyptus Melaleuca</i> woodland (EMw) (FCT4) consists of 3.4 ha in Very Good, 15.57 ha in Good, and 0.55 ha in Degraded (Keighery, 1994) condition;</li> <li>• <i>Eucalyptus rudis</i> forest (Ef) (FCT11) consists of 34.51 ha in Very Good and 1.53 ha in Good (Keighery, 1994) condition;</li> <li>• <i>Melaleuca</i> woodland (Mw) (FCT5) consists of 4.66 ha in Good and 0.17 ha in Degraded (Keighery, 1994) condition;</li> <li>• Tuart woodland (Tw) 0.57 ha in Good (Keighery, 1994) condition;</li> <li>• Scattered natives over weeds (Sn) consists of 120.66 ha in Degraded (Keighery, 1994) condition; and</li> <li>• Tracks consists of 16.69 ha in Completely Degraded (Keighery, 1994) condition.</li> </ul>									
Conservation significant communities	<p>Four conservation significant ecological communities are represented at the site:</p> <ul style="list-style-type: none"> <li>• Banksia woodlands of the SCP TEC;</li> <li>• Low lying <i>Banksia attenuata</i> woodlands or shrublands (SCP21c) PEC;</li> <li>• Banksia dominated woodlands of the SCP IBRA region PEC; and</li> <li>• Tuart (<i>Eucalyptus gomphocephala</i>) woodlands of the SCP PEC.</li> </ul>									
Priority flora	<p>Four conservation significant flora have historically been recorded within the survey area:</p> <ul style="list-style-type: none"> <li>• <i>Caladenia huegelii</i> (listed as Endangered under the EPBC Act and Critically Endangered under the BC Act);</li> <li>• <i>Drakaea elastica</i> (listed as Endangered under the EPBC Act and Critically Endangered under the BC Act);</li> <li>• <i>Johnsonia pubescens</i> subsp. <i>cygnorum</i> (P2) listed by DBCA; and</li> <li>• <i>Dillwynia dillwynioides</i> (P3) listed by DBCA.</li> </ul> <p>During the field survey a new location of <i>Johnsonia pubescens</i> subsp. <i>cygnorum</i> (Priority 2) was recorded.</p>									
Fauna habitat types	<p>Four broad fauna habitats were identified within the survey area based on the mapped vegetation types:</p> <ul style="list-style-type: none"> <li>• Mixed <i>Eucalyptus Banksia</i> woodland;</li> <li>• Flooded Gum <i>Melaleuca</i> woodlands;</li> <li>• Riparian; and</li> <li>• Pasture with scattered trees.</li> </ul>									
Black cockatoo habitat	<p>Carnaby's cockatoo were seen and heard calling by GHD (2020a) during the environmental survey. Forest red-tailed black cockatoos were also observed feeding at two locations during the field survey (GHD, 2020a).</p> <p>GHD (2020a) identified the following habitats as suitable for foraging for both Carnaby's cockatoos and forest red-tailed black cockatoos at Lowlands:</p> <ul style="list-style-type: none"> <li>• Mixed <i>Eucalyptus Banksia</i> woodland (940.3 ha), and</li> <li>• Pasture with scattered trees (120.6 ha).</li> </ul> <p>Foraging evidence (chewed marri, jarrah, <i>Banksia</i> and <i>Allocasuarina</i> nuts) was recorded extensively throughout the Mixed <i>Eucalyptus Banksia</i> Woodlands and pasture with scattered trees habitat types. Foraging evidence showed the presence of both Carnaby's cockatoo and forest red-tailed black cockatoo distinctive mandible marks (GHD, 2020a).</p> <p>A summary of the Black cockatoo habitat is provided below (GHD 2020a):</p> <table border="1"> <thead> <tr> <th>Habitat Type</th> <th>Extent (ha)</th> <th>Comments</th> </tr> </thead> <tbody> <tr> <td>Breeding</td> <td>1,122</td> <td>Each of the habitat types provides for potential breeding habitat.</td> </tr> <tr> <td>Foraging</td> <td>1,122</td> <td>The Mixed <i>Eucalyptus Banksia</i> Woodland provide high foraging potential, and the scattered natives, Flooded Gum <i>Melaleuca</i></td> </tr> </tbody> </table>	Habitat Type	Extent (ha)	Comments	Breeding	1,122	Each of the habitat types provides for potential breeding habitat.	Foraging	1,122	The Mixed <i>Eucalyptus Banksia</i> Woodland provide high foraging potential, and the scattered natives, Flooded Gum <i>Melaleuca</i>
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Foraging	1,122	The Mixed <i>Eucalyptus Banksia</i> Woodland provide high foraging potential, and the scattered natives, Flooded Gum <i>Melaleuca</i>								

			woodlands and Riparian habitat provide low to moderate potential foraging habitat.
	Roosting	36.6	Only the Riparian habitat was identified as being suitable for roosting activities.
Wetlands and watercourses	<p>According to GHD (2020a) and based on the DBCA Geomorphic Wetlands SCP database (DBCA 2020), there are eight wetlands that occur within or intersect the Lowlands site:</p> <ul style="list-style-type: none"> <li>• Two CCWs totalling 4.6 ha (3.17 ha - UFI 7296; 1.43 ha - UFI 14848 )</li> <li>• Four REWs totalling 10.64 ha (1.77 ha - UFI 7244; 1.6 ha - UFI 14744; 6.42 ha - UFI 14749; and 0.85 ha - UFI 14846); and</li> <li>• Two MUWs totalling 104.89 ha (31.67 ha - UFI 15250; and 73.22 ha – UFI 16021).</li> <li>• Serpentine River is located within the Lowlands site.</li> </ul>		

Noting the above, the proposed offset area of 3.12 hectares within Lowlands Nature Reserve includes the following environmental values and qualities:

- 3.12 hectares of mixed Eucalyptus and Banksia woodland habitat in Good (Keighery, 1994) condition;
- 3.12 hectares of high-quality foraging habitat for Carnaby's cockatoo and forest red-tailed black cockatoo;
- Potential breeding and roosting habitat for all three black cockatoo species; and
- Proximity to water resources through the Serpentine River.

The Delegated Officer considers that the proposed offset is consistent with the *Environmental Offsets Policy* (2011) and the *Environmental Offsets Guidelines* (2014), and adequately counterbalances the significant residual impacts to Carnaby's cockatoo and forest red-tailed black cockatoo foraging habitat.

The justification for the values used in the offset calculation is provided in Appendix E.

#### Appendix A – Additional information provided by applicant

Summary of comments	Consideration of comment
Additional information regarding the history of flora and vegetation surveys conducted over the project area was provided by the applicant on 6 July 2020.	This information was considered in the assessment of impacts to environmental values (refer to Section 3.2.2).
Further information regarding avoidance and minimisation measures undertaken around the proposed Morley Station was provided by the applicant on 7 August 2020.	This information was included in the consideration of avoidance and minimisation measures (refer to Section 3.1) and the consideration of relevant planning instruments and other matters (refer to Section 3.3).
An offset proposal was provided by the applicant on 2 September 2020.	This information was considered in the assessment of impacts to environmental values (refer to Section 3.2.1), assessment of offset suitability (refer to Section 4), and outlined further in Appendix E.

## Appendix B – Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to DWER at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix C.

### 1. Site characteristics

Site characteristic	Details
Local context	<p>The proposed clearing area comprises nine isolated patches of remnant native vegetation in the Perth Metropolitan Area, ranging in size from 0.001 hectares to 0.311 hectares, and totalling 1.23 hectares. These patches are adjacent to Tonkin Highway, from just south of Broun Avenue to just north of Marshall Road, and are surrounded by previously cleared residential, industrial and park land, as well as extensive road infrastructure. The proposed clearing area occurs within a greater development envelope of 204 hectares, to facilitate Part 1 of the Morley-Ellenbrook railway line (MEL) project included within the METRONET program.</p> <p>The proposed clearing area includes small, isolated remnants in a highly cleared landscape and does not provide connectivity to larger remnants of native vegetation in the local area. Spatial data indicates the local area (10 kilometre radius of the proposed clearing area) retains approximately 12.4 per cent of the original native vegetation cover.</p>
Vegetation description	<p>A targeted vegetation assessment undertaken by GHD in April 2020 indicates that the greater development envelope for Part 1 of the METRONET program comprises 2.7 hectares of native vegetation, 12.6 hectares of non-native vegetation and 188.63 hectares of previously cleared areas (GHD, 2020b). Within the 2.7 hectares of native vegetation, GHD identified nine broad native vegetation types, of which six occur within the 1.23 hectare proposed clearing area (GHD, 2020b). The following vegetation types were identified within the proposed clearing area:</p> <ul style="list-style-type: none"> <li>• VT02, described as <i>Eucalyptus rudis</i> open woodland over <i>Acacia longifolia</i> tall shrubland over mixed low shrubland/sedgeland;</li> <li>• VT04, described as <i>Banksia attenuata</i>, <i>Banksia menziesii</i> and <i>Nuytsia floribunda</i> low open woodland;</li> <li>• VT06, described as <i>Eucalyptus tottiana</i>, <i>Corymbia calophylla</i>, <i>Allocasuarina fraseriana</i> and <i>Banksia menziesii</i> low open woodland;</li> <li>• VT07, described as <i>Melaleuca preissiana</i> open woodland over <i>Hakea varia</i> and <i>Acacia saligna</i> over <i>Xanthorrhoea preissii</i> and <i>Regelia ciliata</i> open shrubland;</li> <li>• VT08, described as <i>Corymbia calophylla</i> open woodland over <i>Allocasuarina humilis</i> and <i>Xanthorrhoea preissii</i> open shrubland; and</li> <li>• VT09, described as parkland cleared. Individual trees or small patches of native <i>Eucalyptus</i> species including <i>Corymbia calophylla</i>, <i>Eucalyptus rudis</i>, and <i>Eucalyptus gomphocephala</i> over completely cleared understorey (GHD, 2020b).</li> </ul> <p>The full survey descriptions are available in Appendix F.</p> <p>This is consistent with the mapped Swan Coastal Plain vegetation types:</p> <ul style="list-style-type: none"> <li>• Bassendean Complex – Central and South, described as woodland to low woodland and sedgeland; and</li> <li>• Southern River Complex, described as open woodland and remnant vegetation (Hedde et al., 1980).</li> </ul>
Vegetation condition	<p>A targeted vegetation assessment undertaken by GHD in April 2020 indicates that the vegetation within the proposed clearing area ranges from Good to Completely Degraded (Keighery, 1994) condition, described as:</p> <ul style="list-style-type: none"> <li>• Good: Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it;</li> </ul>

Site characteristic	Details																																							
	<ul style="list-style-type: none"> <li>Degraded: Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management; and</li> <li>Completely Degraded: The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs (Keighery, 1994).</li> </ul> <p>The full Keighery condition rating scale is provided in Appendix D, below. A full survey description and condition mapping are available in Appendix F.</p>																																							
Soil description	<p>The application area is mapped within the following soil types:</p> <ul style="list-style-type: none"> <li>EnvGeol S8 Phase (212Bs_S8), described as sand - very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well-sorted of eolian origin, which comprises approximately 58 per cent of the application area;</li> <li>EnvGeol S10 Phase (213Pj_S10), described as sand - as S8 as relatively thin veneer over sandy clay to clayey sand, of eolian origin, which comprises approximately 14 per cent of the application area;</li> <li>EnvGeol Cps Phase (212Bs_Cps), described as peaty clay - dark grey and black, soft, variable organic content, some quartz sand in places, of lacustrine origin, which comprises approximately 14 per cent of the application area; and</li> <li>Bassendean, Joel Phase (212Bs_J), described as poorly drained depressions. Humus podzols. Scattered <i>Melaleuca preissiana</i>, <i>Eucalyptus rudis</i> and <i>Banksia ilicifolia</i> with a dense shrub layer, which comprises approximately 14 per cent of the application area (DPIRD, 2017).</li> </ul>																																							
Land degradation risk	<p>Land degradation risk (DPIRD, 2017) for the mapped soil types are summarised in the following table:</p> <table border="1" data-bbox="402 1045 1427 1841"> <thead> <tr> <th data-bbox="402 1045 581 1119">Risk categories</th> <th data-bbox="581 1045 792 1119">EnvGeol S8 Phase (212Bs_S8)</th> <th data-bbox="792 1045 1003 1119">EnvGeol S10 Phase (213Pj_S10)</th> <th data-bbox="1003 1045 1214 1119">EnvGeol Cps Phase (212Bs_Cps)</th> <th data-bbox="1214 1045 1427 1119">Bassendean, Joel Phase (212Bs_J)</th> </tr> </thead> <tbody> <tr> <td data-bbox="402 1119 581 1245">Wind erosion</td> <td data-bbox="581 1119 792 1245">50-70% of map unit has a high to extreme wind erosion risk</td> <td data-bbox="792 1119 1003 1245">30-50% of map unit has a high to extreme wind erosion risk</td> <td data-bbox="1003 1119 1214 1245">10-30% of map unit has a high to extreme wind erosion risk</td> <td data-bbox="1214 1119 1427 1245">10-30% of map unit has a high to extreme wind erosion 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Site characteristic	Details				
	Phosphorus export	30-50% of map unit has a high to extreme phosphorus export risk	30-50% of map unit has a high to extreme phosphorus export risk	>70% of map unit has a high to extreme phosphorus export risk	>70% of map unit has a high to extreme phosphorus export risk
Waterbodies	<p>The desktop assessment and aerial imagery indicated that the proposed clearing areas do not intersect any natural sources of surface water. The closest natural waterbody, a non-perennial tributary of the Swan River, occurs approximately 500 metres north-east of the northernmost extent of the application area, and is separated from the proposed clearing area by previously cleared land and road infrastructure. However, the northernmost portion of the application area, north of Marshall Road, is directly adjacent to the Emu Swamp main drain, a man-made drainage line. According to available databases, the proposed clearing areas also intersect two mapped Geomorphic Wetlands of the Swan Coastal Plain; an un-named sumpland and an un-named dampland which intersect the existing Tonkin Highway, likely to be historical wetland areas.</p> <p>The application area is also mapped within the Jandakot Consanguineous Wetland Suite, the Swan River System surface water area and the Perth Groundwater Area. Both the Swan River System and the Perth Groundwater Area are proclaimed under the <i>Rights in Water and Irrigation Act 1914</i> (the RIWI Act).</p>				
Conservation areas	<p>According to available databases, several conservation areas occur within one kilometre of the proposed clearing areas, including:</p> <ul style="list-style-type: none"> <li>• Bush Forever Site 304, located approximately 438 metres north;</li> <li>• Freehold Department of Biodiversity Conservation and Attractions (DBCA) managed land, located approximately 440 metres south-east;</li> <li>• Bush Forever Site 307, located approximately 470 metres west; and</li> <li>• Bush Forever Site 480, located within the development envelope, approximately 925 metres from the nearest proposed clearing area. It should be noted that previous clearing activities have been undertaken in Bush Forever Site 480.</li> </ul> <p>All of the above conservation areas are separated from the proposed clearing area by previously cleared residential land, parkland cleared areas and existing road infrastructure. The application area does not provide connectivity to any local conservation areas or between these areas and any larger remnants of native vegetation in the local area.</p>				
Climate and landform	<p>The proposed clearing area occurs within a Mediterranean climate, with an average annual rainfall of 731 millimetres, an average annual evapotranspiration rate of 700 millimetres, and average monthly maximum temperatures ranging from 19.2°C to 34.6°C.</p> <p>The topography of the proposed clearing area is predominantly flat, with a slight slope and peak at the southern extent of the application area around Broun Avenue.</p>				

## 2. Flora, fauna and ecosystem analysis

A review of available databases determined that a total of 52 threatened or priority flora have been recorded within the local area, comprising six Priority 1 (P1) flora, nine Priority 2 (P2) flora, 20 Priority 3 (P3) flora, 11 Priority 4 (P4) flora, and six threatened flora (Western Australian Herbarium, 1998-). None of these existing records occur within the application area. According to available databases, four state-listed threatened ecological communities (TECs) and three priority ecological communities (PECs) are recorded within the local area. With consideration for the site characteristics set out above, relevant datasets (see Appendix F), existing records, and survey information (GHD, 2020b), the following conservation significant flora species and ecological communities may be impacted by the proposed clearing, if present.

Species / Ecological Community	Distance of closest record to application area (kilometres)	Suitable soil type?	Suitable vegetation type?	Are surveys adequate to identify? (Y, N, N/A)
<b>Flora</b>				
<i>Caladenia huegelii</i>	Approx. 0.83	Y - Application area consists of suitable grey or brown sand to clay loam soils.	Y - Application area includes consistent vegetation, e.g. woodland and heath of <i>Eucalyptus</i> spp. and <i>Banksia</i> spp.	Y – targeted flora and vegetation surveys undertaken, identified no individuals.
<i>Conospermum undulatum</i>	Approx. 5.03	Y - Application area consists of suitable grey or yellow-orange clayey sand.	Y - Application area includes consistent vegetation, e.g. woodland, heath and shrubland of <i>Eucalyptus</i> spp., <i>Banksia</i> spp. and <i>Melaleuca</i> spp.  Species has been recorded in degraded vegetation.	Y – targeted flora and vegetation surveys undertaken, identified no individuals.
<i>Macarthuria keigheryi</i>	Approx. 5.96	Y - Application area consists of suitable grey sandy soils.	Application area includes consistent vegetation, e.g. <i>Banksia</i> woodland over mixed shrubland.  Species has been recorded in degraded vegetation.	Y – targeted flora and vegetation surveys undertaken, identified no individuals.
<b>Ecological Communities</b>				
Banksia WL SCP - Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Intersecting application area	Y - Application area consists of suitable sandy soils with areas within the Bassendean dune system.	Y - Application area includes representative vegetation, e.g. <i>Banksia menziesii</i> with a canopy of <i>Eucalyptus tottiana</i> , <i>Corymbia calophylla</i> , and <i>Allocasuarina fraseriana</i> .	Y - targeted flora and vegetation surveys undertaken, confirmed presence.

A total of 56 threatened or priority fauna species have been recorded within the local area, including 21 threatened fauna species, 16 priority fauna species, 16 faunal species protected under international agreement, and three other specially protected fauna species (DBCA, 2007-). None of these records occur within the application area. Noting the site characteristics set out above, relevant datasets (see Appendix F), and targeted fauna survey information (Eco Logical Australia, 2020), the following conservation significant fauna species may be impacted by the proposed clearing, if present.

Species	Distance of closest record to application area (kilometres)	Suitable habitat features (fauna)	Surveys adequate to identify? (Y, N, N/A)
Forest red-tailed black cockatoo ( <i>Calyptorhynchus banksii naso</i> )	Approx. 0.5	Y - Application area includes hollow-bearing marri and <i>Eucalyptus</i> spp., potentially suitable foraging, breeding and roosting habitat.	Y – targeted black cockatoo survey undertaken, identified individuals and suitable habitat.

Species	Distance of closest record to application area (kilometres)	Suitable habitat features (fauna)	Surveys adequate to identify? (Y, N, N/A)
Baudin's cockatoo ( <i>Calyptorhynchus baudinii</i> )	Approx. 2.96	Y - Application area includes hollow-bearing marri and <i>Eucalyptus</i> spp., potentially suitable foraging, breeding and roosting habitat.	Y – targeted black cockatoo survey undertaken, identified suitable habitat.
Carnaby's cockatoo ( <i>Calyptorhynchus latirostris</i> )	Approx. 0.53	Y - Application area includes hollow-bearing marri and <i>Eucalyptus</i> spp., potentially suitable foraging, breeding and roosting habitat.	Y – targeted black cockatoo survey undertaken, identified suitable habitat.

### 3. Vegetation extent

#### Vegetation representation statistics (Government of Western Australia, 2019).

	Pre-European (ha)	Current Extent (ha)	Remaining (%)	Current Extent in DBCA Managed Lands	
				(ha)	(%)
<b>IBRA Bioregion</b>					
Swan Coastal Plain	1,501,221.93	579,813.47	38.62	222,916.97	14.85
<b>Swan Coastal Plain vegetation complex</b>					
Bassendean Complex - Central and South	87,476.26	23,508.66	26.87	4,377.36	5.00
Southern River Complex	58,781.48	10,832.18	18.43	960.36	1.60
<b>Local Area</b>					
10 kilometre radius	40,273.35	4,994.71	12.40	-	-

### Appendix C – Assessment against the Clearing Principles

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<b>Environmental value: biological values</b>		
<p><u>Principle (a):</u> "Native vegetation should not be cleared if it comprises a high level of biodiversity."</p> <p><u>Assessment:</u> The proposed clearing area may comprise significant habitat for fauna (see Principle (b) below) and includes a regionally significant ecological community; the Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region (Banksia WL SCP).</p>	May be at variance	Yes Refer to Section 3.2.2 above.
<p><u>Principle (b):</u> "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."</p> <p><u>Assessment:</u> The proposed clearing area contains significant foraging habitat and may function as an ecological linkage for three conservation significant fauna species (see Appendix B).</p>	Is at variance	Yes Refer to Section 3.2.1 above.

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<p><u>Principle (c):</u> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u> The proposed clearing area may comprise suitable habitat for three threatened flora species (see Appendix C). Targeted flora and vegetation surveys were undertaken to confirm that these species were not present within the application area.</p>	Not likely to be at variance	Yes Refer to Section 3.2.2 above.
<p><u>Principle (d):</u> <i>“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.”</i></p> <p><u>Assessment:</u> Noting the site characteristics (see Appendix B) and the findings of several targeted flora and vegetation surveys, the proposed clearing area is not considered likely to be representative of any threatened ecological community listed under the <i>Biodiversity Conservation Act 2018</i>.</p>	Not likely to be at variance.	No
<b>Environmental values: significant remnant vegetation and conservation areas</b>		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u> The extent of the mapped vegetation type and native vegetation in the local area is inconsistent with the national objectives and targets for biodiversity conservation in Australia (Commonwealth of Australia, 2001).</p>	May be at variance	Yes Refer to Section 3.2.3 above.
<p><u>Principle (h):</u> <i>“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.”</i></p> <p><u>Assessment:</u> Given the distance and separation from the nearest conservation areas (see Appendix B), the proposed clearing is not likely to have an impact on the environmental values of any nearby conservation areas.</p>	Not likely to be at variance.	No
<b>Environmental values: land and water resources</b>		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u> Given that the proposed clearing area occurs within mapped historical wetlands, is adjacent to the Emu Swamp main drain, and contains riparian flora species, the proposed clearing may include species growing in association with an environment associated with a watercourse or wetland.</p>	May be at variance.	Yes Refer to Section 3.2.4 above.
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u> The mapped soils are not susceptible to land degradation resulting from water erosion, salinity, and flooding, but have a moderate risk of land degradation resulting from waterlogging and phosphorus export, and are highly susceptible to wind erosion and subsurface acidification.</p>	Not likely to be at variance.	Yes Refer to Section 3.2.4 above.
<p><u>Principle (i):</u> <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.”</i></p> <p><u>Assessment:</u> Given the proposed clearing area is mapped within surface and groundwater areas proclaimed under the <i>Rights in Water and Irrigation Act</i></p>	Not likely to be at variance.	Yes Refer to Section 3.2.4 above.

Assessment against the Clearing Principles	Variance level	Is further consideration required?
1914 (the RIWI Act), the proposed clearing area may impact surface or ground water quality.		
<p><u>Principle (j):</u> "Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."</p> <p><u>Assessment:</u> The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding. Further, given the application area consists of highly disturbed and degraded vegetation in a heavily urbanised and developed area, the proposed clearing is not considered likely to cause, or exacerbate, the incidence or intensity of flooding.</p>	Not likely to be at variance.	No

#### Appendix D – Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

##### Measuring Vegetation Condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very Good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

## Appendix E – Offset calculator value justification

### Offset Calculation 1 - Lowlands Nature Reserve

Note: Complete the following calculation for each relevant residual impact.

Field Name	Description	Field Name
IUCN Criteria	The IUCN criteria for the value being impacted	1.2% - offset mitigates the loss of vegetation that comprises significant foraging habitat for Carnaby's cockatoo (Endangered under EPBC Act), which has annual probability of extinction 1.2%. NOTE this offset also mitigates the loss of vegetation that may comprise significant foraging habitat for the forest red-tailed black cockatoo (Vulnerable under the EPBC Act)
Area of impact (habitat/community) or Quantum of impact (features/individuals)	The area of habitat/community impacted or number of features/individuals impacted	0.803 - application area in hectares considered to comprise significant foraging habitat, identified through black cockatoo habitat assessment.
Quality of impacted area (habitat/community)	The quality score for area of habitat/community being impacted - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	5 - Native vegetation condition ranges from Completely Degraded to Good condition, however vegetation value is considered higher as the black cockatoo habitat assessment identified the vegetation to include 0.644 (approximately 80%) moderate or moderate to high quality foraging habitat, evidence of foraging has been observed within the development envelope and foraging habitat is restricted in the local area.
Time over which loss is averted (habitat/community)	This describes the timeframe over which changes in the level of risk to the proposed offset site can be considered and quantified	20 year - The proposed offset is a Class 'A' conservation reserve in secure tenure, therefore the maximum of 20 years is applied.
Time until ecological benefit (habitat/community) or Time horizon (features/individuals)	This describes the estimated time (in years) that it will take for the main benefit of the quality (habitat/community) or value (features/individuals) improvement of the proposed offset to be realised	0 year - The offset site is already a Class 'A' conservation reserve in secure tenure, the reserve will be under management by DBCA from January 2021, so ecological benefit is immediate.
Start area (habitat/community) or Start value (features/individuals)	The area of habitat/community or number of features/individuals proposed to offset the impacts	3.12 hectares - reverse-calculated using the 'what if' function to achieve 100% offset based on assumptions.
Start quality (habitat/community)	The quality score for the area of habitat/community proposed as an offset - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	8 - Native vegetation at the offset site is in Good condition, but comprises high-quality and significant foraging habitat for Carnaby's cockatoo and forest red-tailed black cockatoo, and is a significant remnant within an extensively cleared area.
Future quality without offset (habitat/community) or Future value without offset (features/individuals)	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site without the offset	7 - Without ongoing management from DBCA through the offset, the vegetation at the offset site may experience some degradation from weed incursion and dieback.
Future quality with offset (habitat/community) or Future value with offset (features/individuals)	This predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site with the offset	8 - As the offset site already exists and ongoing management will occur through the offset, it is expected that the quality of the vegetation is unlikely to change.
Risk of loss (%) without offset (habitat/community)	This describes the chance that the habitat/community on the proposed offset site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future without an offset	15% - Prior to acquisition by the State, the offset site was privately owned rural zoned land. However, the site was recognised as having high conservation value, and was classified as Bush Forever Site 388, limiting the potential for development. Therefore, there is a low risk that the offset site would be developed.
Risk of loss (%) with offset (habitat/community)	This describes the chance that the habitat/community on the proposed offset site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future with an offset	5% - It is considered that the risk of development will be significantly reduced with the designation of Class 'A' conservation reserve over the offset site. Risk of catastrophic events still remain (e.g. bush fire, dieback).
Confidence in result (%) - risk of loss (habitat/community)	The capacity of measures to mitigate risk of loss of the proposed offset site	90% - It is considered that there is a high level of confidence that the level of risk of future development is low, given the designation of Class 'A' conservation reserve over the offset site.
Confidence in result (%) - Change in quality (habitat/community) or Change in value (features/individuals)	The level of certainty about the successful achievement of the proposed change in quality (habitat/community) or value (features/individuals)	85% - Given ongoing management from DBCA, it is considered that there is a high level of confidence that vegetation quality will be maintained.
% of impact offset	% of the significant residual impact that would be offset by the proposed offset (note: the offset calculations combined should equate to 100% for each residual impact)	100% - reverse-calculated using the 'what if' function to achieve 100% offset based on assumptions.
Other comments	Include here any relevant additional comments (e.g. the size of offset required to offset 100% of the residual impacts)	100% of the residual impacts resulting from the clearing of 0.803 hectares of significant foraging habitat for Carnaby's cockatoo will be offset through the acquisition of 3.12 hectares of native vegetation within a Class 'A' conservation reserve.

## Appendix F – Biological survey information excerpts

**Table 2.** Vegetation types identified within the proposed clearing area for CPS 8939/1 and greater development envelope (GHD, 2020b).

	Broad vegetation type	Location	Total area (ha)	Photograph
<b>NATIVE</b>				
VT01	<i>Melaleuca preissiana</i> low woodland with scattered <i>Corymbia calophylla</i> .  Vegetation condition: Degraded. High weed cover with edge effects.	North of Marshall Road, northbound.	0.128	
VT02	<i>Eucalyptus rudis</i> open woodland over * <i>Acacia longifolia</i> tall shrubland over mixed low shrubland/sedgeland.  Vegetation condition: Degraded to completely degraded. Highly modified, mixed with some planted species. High weed cover with edge effects.	North of Marshall Road, southbound.  Along Emu Swamp main drain	0.169	
VT03	<i>Melaleuca preissiana</i> scattered trees over <i>Jacksonia furcellata</i> * <i>Acacia longifolia</i> and <i>Adenthanthos cygnorum</i> open shrubland.  Vegetation condition: Completely degraded. Highly modified, some planted species, high weed cover with edge effects.	South of Reid Highway, southbound.	0.120	
VT04	<i>Banksia attenuata</i> , <i>Banksia menziesii</i> and <i>Nuytsia floribunda</i> low open woodland.  Vegetation condition mapped as Good to Degraded with high weed cover and reduced understorey with edge effects and rubbish dumping.	North of Benara Road, northbound.	0.241	

VT05 *Corymbia calophylla* open woodland over *Melaleuca preissiana* and *Banksia grandis* low open woodland.

Vegetation condition: Good to degraded with high weed cover and limited understorey with edge effects and rubbish dumping.

North of Benara Road, northbound.

0.295



VT06 *Eucalyptus tottiana*, *Corymbia calophylla*, *Allocasuarina fraseriana* and *Banksia menziesii* low open woodland.

Vegetation condition mapped as Degraded to Completely Degraded with some planted species, high weed cover and reduced understorey with edge effects and rubbish dumping.

Along the northern side of Broun Ave.

0.384



VT07 *Melaleuca preissiana* open woodland over *Hakea varia* and *Acacia saligna* over *Xanthorrhoea preissii* and *Regelia ciliata* open shrubland.

Vegetation condition: Good to Completely Degraded with high weed cover and reduced understorey with edge effects.

South of Broun Ave, northbound.

0.192



VT08 *Corymbia calophylla* open woodland over *Allocasuarina humilis* and *Xanthorrhoea preissii* open shrubland.

Vegetation condition: Degraded with high weed cover and limited understorey with edge effects.

South of Broun Ave, northbound

0.293



VT09 Parkland cleared. Individual trees or small patches of native *Eucalyptus* species including *Corymbia calophylla*, *Eucalyptus rudis*, and *Eucalyptus gomphocephala* over completely cleared understorey.  
Vegetation condition: Completely degraded.

Scattered locations throughout the survey area.

0.879



**NON-NATIVE**

Planted/ non-native Areas which have previously been cleared and revegetated with a mix of introduced and native species (local and non local species). Established planted trees include *Eucalyptus camaldulensis* and *Melelaueca quinquenervia*.

Scattered locations throughout the survey area.

12.602

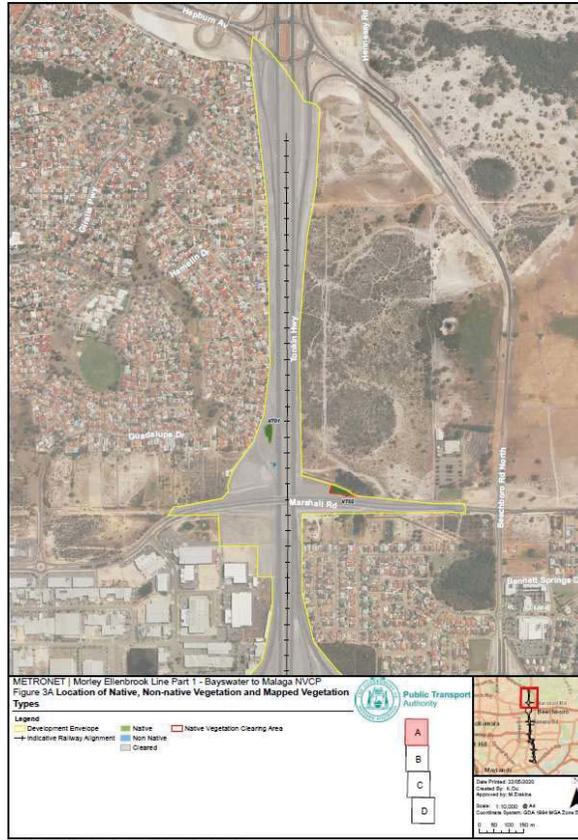


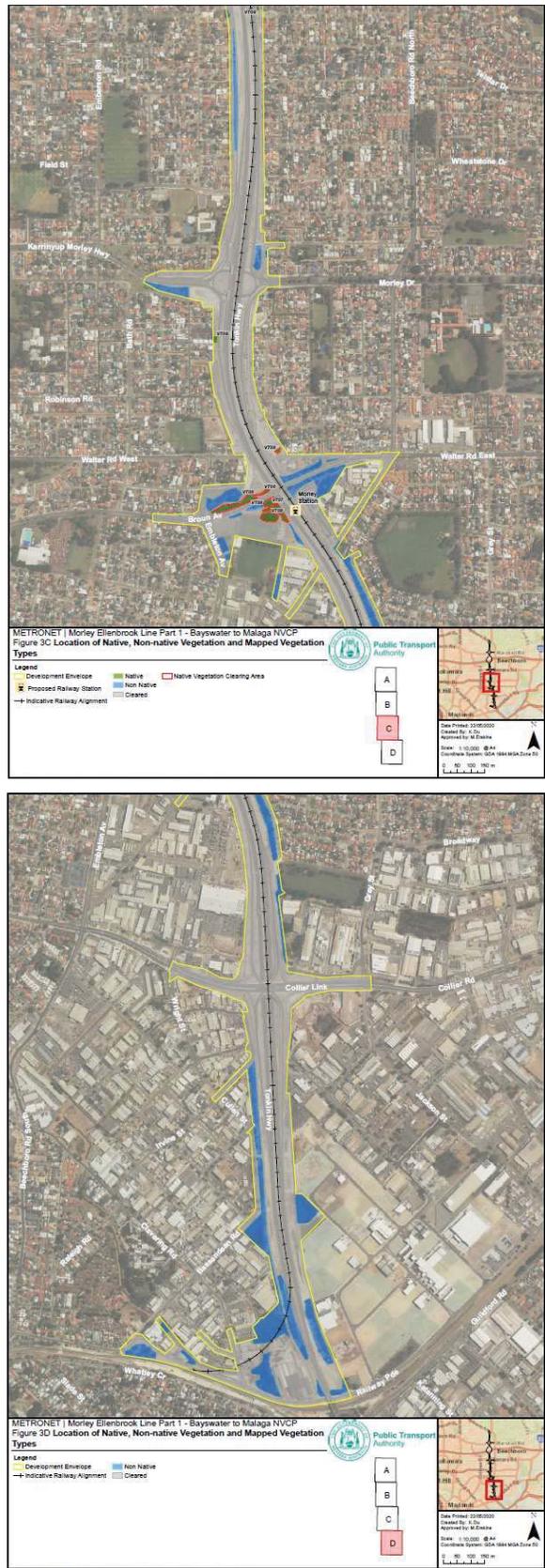
Cleared Completely cleared or modified areas. Includes existing road network infrastructure and recently revegetated areas. Some scattered planted trees but no intact native vegetation.

Entire length of the survey area.

188.632

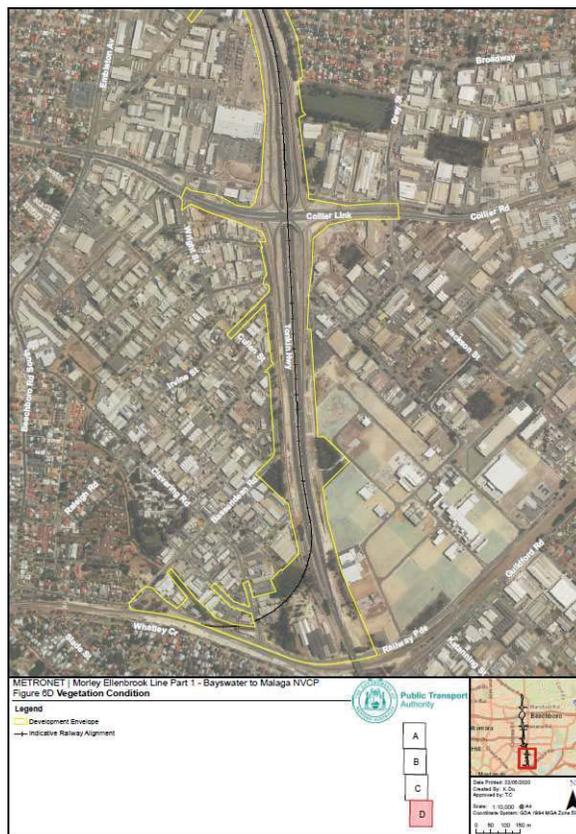






**Figure 2.** Location of mapped vegetation types within the proposed clearing area for CPS 8939/1 and greater development envelope (Public Transport Authority, 2020a).





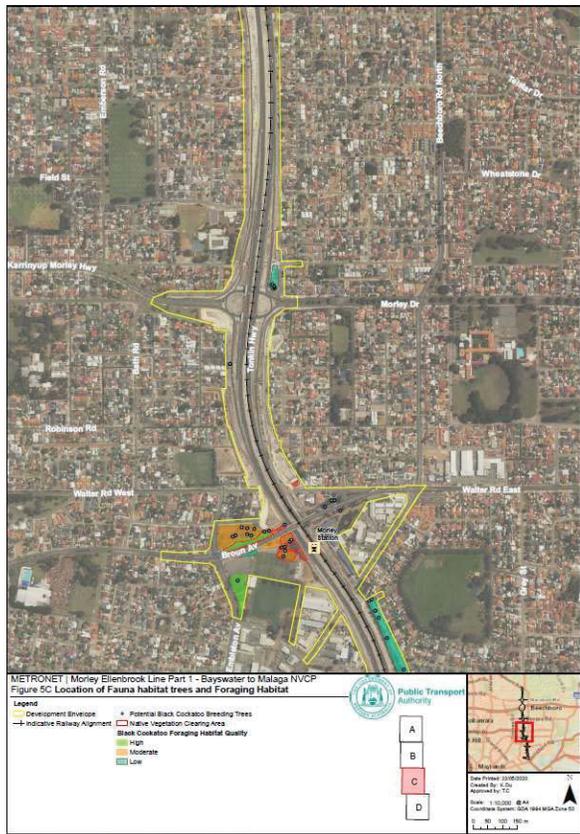
**Figure 3.** Vegetation condition within the proposed clearing area for CPS 8939/1 and greater development envelope (Public Transport Authority, 2020a).





**Figure 4.** Location of native vegetation retention areas (NVRAs), priority ecological communities, and proposed clearing area for CPS 8939/1, within the greater development envelope (Public Transport Authority, 2020a).





**Figure 5.** Location of habitat trees and fauna habitat within the proposed clearing area for CPS 8939/1 and greater development envelope (Public Transport Authority, 2020a).

## Appendix G – References and databases

### 1. GIS datasets

Publicly available GIS Databases used (sourced from [www.data.wa.gov.au](http://www.data.wa.gov.au)):

- Aboriginal Heritage Places (DPLH-001)
- Bush Forever Areas 2000 (DPLH-019)
- Cadastre Address (LGATE-002)
- CAWSA Part 2A Clearing Control Catchments (DWER-004)
- Consanguineous Wetlands Suites (DBCA-020)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- DBCA Statewide Vegetation Statistics
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography Linear (Hierarchy) (DWER-031)
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Vegetation Extent (DPIRD-005)
- Pre-European Vegetation (DPIRD-006)
- Public Drinking Water Source Areas (DWER-033)
- Regional Parks (DBCA-026)
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Rivers (DWER-036)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil and Landscape Mapping – Best Available
- Soil Landscape Land Quality datasets
- Vegetation Complexes - Swan Coastal Plain (DBCA-046)

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System)– Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

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