



## CLEARING PERMIT

*Granted under section 51E of the Environmental Protection Act 1986*

<b>Purpose Permit number:</b>	CPS 9491/1
<b>Permit Holder:</b>	Western Australian Land Authority's (T/A DevelopmentWA)
<b>Duration of Permit:</b>	From 17 February 2022 to 17 February 2027

The permit holder is authorised to clear *native vegetation* subject to the following conditions of this permit.

### **PART I – CLEARING AUTHORISED**

#### **1. Clearing authorised (purpose)**

The permit holder is authorised to clear *native vegetation* for the purpose of upgrading road intersections (Quill Way and Cockburn Road).

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

Lot 4621 on Deposited Plan 221219,  
Cockburn Road reserve (PINs 1203917, 1303208, 1203918, 1319504, 1345434),  
Quill Way road reserve (PIN 11920632),  
Cockburn Road reserve (PIN 11242126),  
Quill Way road reserve (PINs 1385853, 11242124)

#### **3. Clearing authorised**

The permit holder must not clear more than 1.3848 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.

### **PART II – MANAGEMENT CONDITIONS**

#### **4. Avoid, minimise, and reduce impacts and extent of clearing**

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

- (a) 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.

## 5. Weed and dieback management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of 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 known *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.

## 6. Directional clearing

The permit holder must conduct clearing activities in a directional, slow and progressive manner to allow fauna to move into adjacent *native vegetation* ahead of the clearing activity.

## **PART III - RECORD KEEPING AND REPORTING**

## 7. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

**Table 1: Records that must be kept**

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	<ol style="list-style-type: none"><li>(a) the species composition, structure, and density of the cleared area;</li><li>(b) 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;</li><li>(c) the date that the area was cleared;</li><li>(d) the size of the area cleared (in hectares);</li><li>(e) actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 4; and</li><li>(f) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>dieback</i> in accordance with condition 5</li></ol>

## 8. Reporting

The permit holder must provide to the *CEO* the records required under condition 7 of this permit when requested by the *CEO*.

## DEFINITIONS


In this permit, the terms in Table 2 have the meanings defined.

**Table 2: Definitions**

Term	Definition
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
fill	means material used to increase the ground level, or to fill a depression.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
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.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
weeds	means any plant – (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> ; 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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## END OF CONDITIONS

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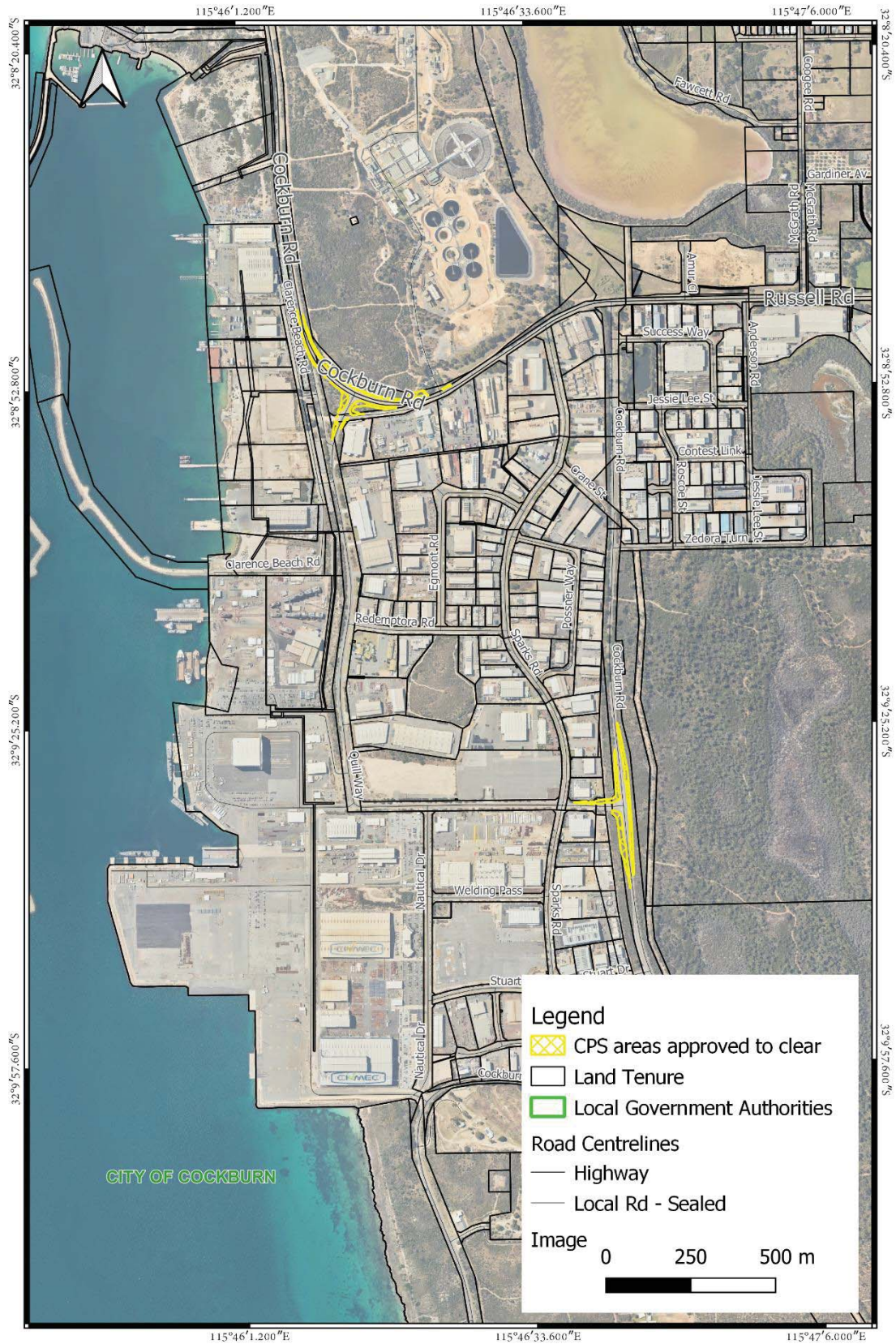
Ryan Mincham  
MANAGER  
NATIVE VEGETATION REGULATION

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

25 January 2022

# Schedule 1

The boundary of the area authorised to be cleared is shown in the map below (Figure 1).



**Figure 1: Map of the boundary of the area within which clearing may occur**



## Clearing Permit Decision Report

### 1.1. Permit application details

<b>Permit number:</b>	CPS 9491/1
<b>Permit type:</b>	Purpose permit
<b>Applicant name:</b>	Western Australian Land Authority (T/A DevelopmentWA)
<b>Application received:</b>	12 November 2021
<b>Application area:</b>	1.3848 hectares of native vegetation
<b>Purpose of clearing:</b>	Upgrading road intersections (Quill Way and Cockburn Road)
<b>Method of clearing:</b>	Mechanical Removal
<b>Property:</b>	Lot 4621 on Deposited Plan 221219, Cockburn Road Reserve (PINs 1203917, 1303208, 1203918, 1319504, 1345434), Quill Way Road Reserve (PIN 11920632), Cockburn Road Reserve (PIN 11242126), Quill Way Road Reserve (PINs 1385853, 11242124)
<b>Location (LGA area/s):</b>	City of Cockburn
<b>Localities (suburb/s):</b>	Munster, Henderson

### 1.2. Description of clearing activities

The area proposed to be cleared is 1.3848 ha within a 2.04664 ha footprint. The vegetation proposed to be cleared is distributed across 2 separate areas and is for the purpose of upgrading the north and south intersections of Cockburn Road and Quill Way (see Figure 1 & 2, Section 1.5). The intersection upgrades are required to accommodate the increased traffic into the Henderson Australian Marine Complex.

The areas to be cleared are largely isolated patches of native vegetation within road reserves, parts of which have been previously disturbed during the construction of the intersections and subsequently landscaped. At the northern intersection, the vegetation on the north side of Cockburn Road is connected to a larger area of native vegetation located within the Woodman Point Wastewater Treatment Plant. At the southern intersection, the vegetation to be cleared on the western side of Cockburn Road has connectivity to the larger vegetated area of Beeliam Regional Park, however, is not located within the Bush Forever site.

### 1.3. Decision on application

<b>Decision:</b>	Granted
<b>Decision date:</b>	25 January 2022
<b>Decision area:</b>	1.3848 hectares of native vegetation, as depicted in Section 1.5, below.

### 1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix A), relevant datasets (see Appendix I.1), the findings of a flora, vegetation and fauna survey (see Appendix F), the clearing principles set out in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration the purpose of the clearing is to upgrade the intersections between Quill Way (north and south) and Cockburn Road in Henderson (the site) to facilitate the increased traffic movement associated with the Australian Marine Complex (AMC).

The assessment identified that the proposed clearing will result in:

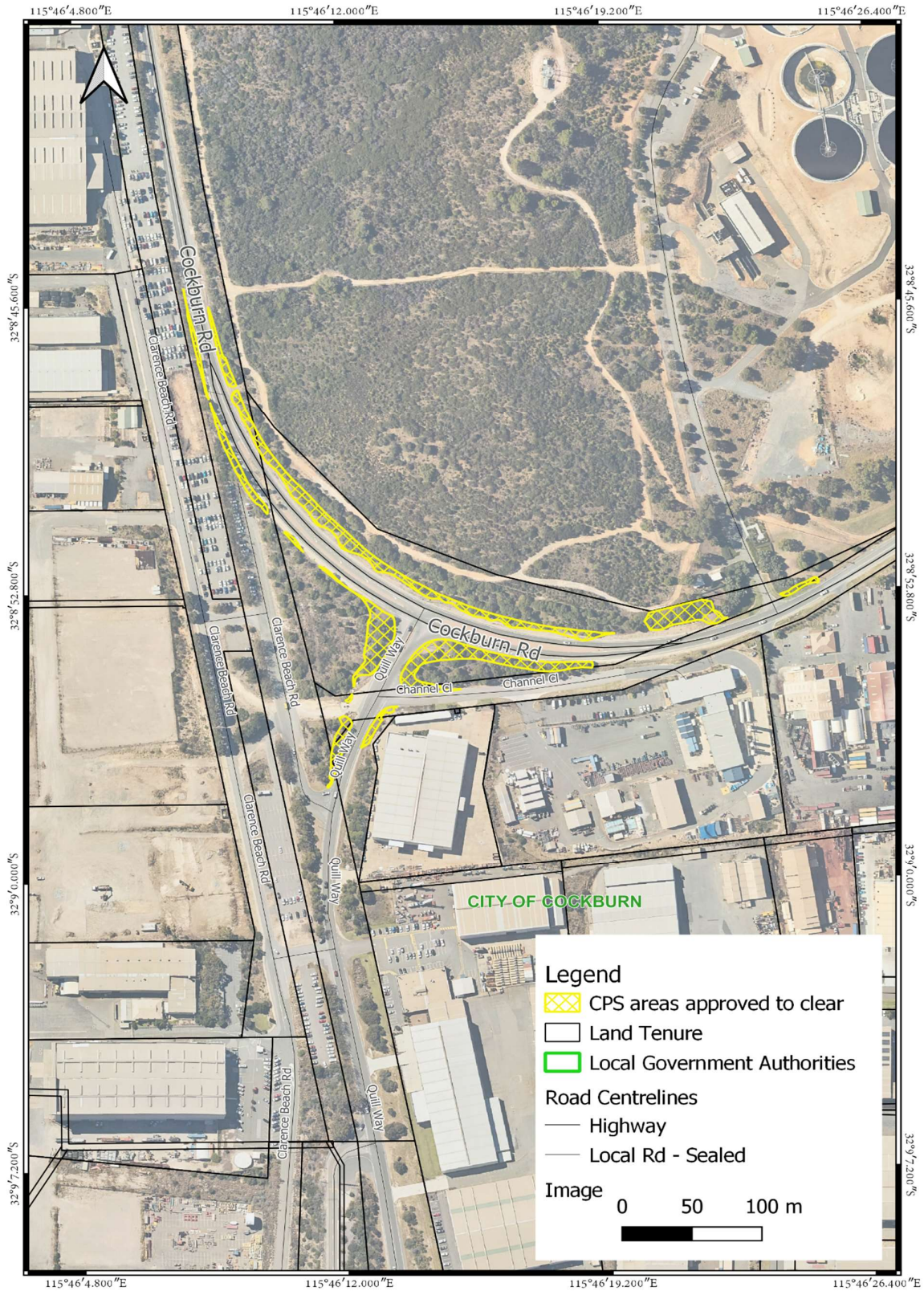
- potential spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values. The likelihood of spread of weed and dieback would be reduced by applying weed and dieback management measures
- the application area may be utilised by conservation significant fauna, including black cockatoos (*Calyptorhynchus sp*). However, given the habitat conditions, the proximity of larger remnant vegetation patches in better condition and the limited extent of proposed clearing, it is unlikely to comprise significant habitat within the context of the local area (10 kilometre radius from the centre of the area proposed to be cleared).

After consideration of the available information, the Delegated Officer determined that given the size and location of the clearing, and the Degraded to Completely Degraded condition of the vegetation present, the proposed clearing is unlikely to have any further significant environmental impacts and is not likely to lead to an unacceptable risk to the environment.

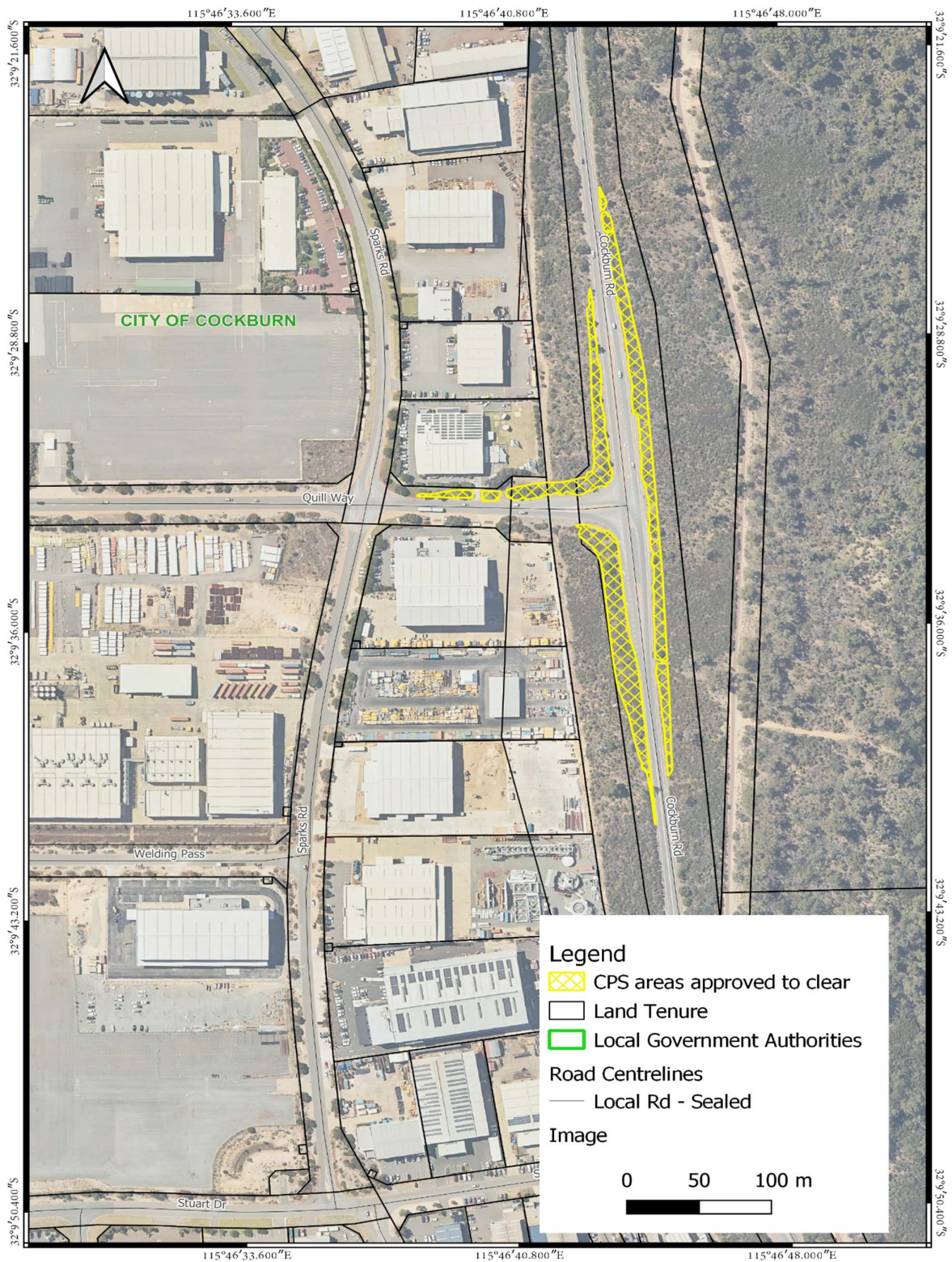
The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing;
- undertake slow, progressive one-directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity; and
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback.

## 1.5. Site maps



**Figure 1** Map of the application area - Northern intersection.



**Figure 2** Map of the application area - Southern intersection.

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

- the precautionary principle
- the principle of intergenerational equity
- 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)
- *Planning and Development Act 2005* (WA) (P&D Act)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- 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

The applicant has investigated and advised that due to space constraints and the safety requirements of sightlines, no further opportunities for avoidance of clearing have been identified. The Delegated Officer was satisfied that the applicant has given reasonable consideration to measures which could be undertaken to avoid and minimise potential impacts of the proposed clearing on environmental values. The applicant has indicated that landscaping, where appropriate, will take place on the road batter after completion of works.

### 3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix A) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix D) identified that the impacts of the proposed clearing present a risk to biological values (fauna, adjacent flora and vegetation) and ecological communities. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

#### 3.2.1. Biological values – Flora and ecological communities - Clearing Principles (a), (c) and (d)

##### Assessment

According to available databases, no Threatened or Priority flora (P) taxa have been recorded within the application areas, or within 1.5 kilometres of the application areas. The closest Priority flora taxa, the Priority 4 *Dodonaea hackettiana*, has been recorded approximately 1.51 kilometres north of the northern intersection.

The reconnaissance flora and vegetation survey undertaken by PGV Environmental in July 2021 (Appendix F), rated the vegetation over the application area is in a Degraded to Completely Degraded condition based on the condition scale of Keighery (1994), and indicated that based on the composition and structure of the dominant species rather than based on geomorphology (vegetation complexes), it consisted of five native vegetation types, as well as vegetation comprising species used for landscaping purposes (Appendix A1 and F).

A total of 51 plant species were recorded, comprising of 24 native and 27 introduced species (PGV, 2021). Given the Degraded to Completely Degraded condition of the vegetation, it is considered that a spring survey would not record many more native species (PGV, 2021). Most native vegetation occurred at the southern intersection area, with *Banksia sessilis*/*Acacia rostellifera* Heath to Shrubland present in the road reserves (PGV, 2021).

All of the vegetation in the northern intersection site is dominated by planted native species following the construction of the Quill Way intersections with Cockburn Road in 2000. Very little regeneration of native shrubs has occurred in these areas (PGV, 2021).

Assessment of spatial data and available records indicated that based on soil, vegetation and habitat type, one priority flora species may potentially occur within both of the application areas (see Appendix A.3). Given the degraded condition and small size of the clearing areas and that no priority flora were found during a flora survey of the site, it is unlikely this species will be present within the application area or be impacted by the clearing activities (PGV, 2021).

The application area is located in close proximity of mapped occurrences of two Threatened Ecological Communities (TEC's), namely "Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Bioregion" (Banksia Woodland) and "Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain" (Tuart Forest) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The application area itself is not mapped as a TEC, however, it is located within a mapped occurrence of a Priority Ecological Community (PEC), namely Northern Spearwood shrublands and woodlands (SCP24) (Priority 3).

None of the vegetation in Degraded to Completely Degraded condition is able to be assessed as a Floristic Community Type (FCT) (PGV, 2021). Therefore, no FCTs that are a TEC, or PEC occur in the area (PGV, 2021). Some Banksia trees occur in the western road reserve at the southern intersection. The Banksias may have been planted. The area containing Banksia trees does not meet the definition of the Banksia Woodlands of the Swan Coastal Plain ecological community as the area is Degraded and therefore below the minimum condition threshold of Good, to qualify as the Banksia Woodland TEC (PGV, 2021).

Some scattered Tuart trees occur in the southern intersection road reserve. The trees are considered too far apart, and the understorey too degraded, for that area to meet the criteria for the Tuart Woodlands and Forests of the Swan Coastal Plain TEC. The small area of Tuart Woodland in the northern intersection area is too small (0.04ha), isolated and degraded to meet the criteria for the Tuart Woodland TEC (PGV, 2021).

Given the condition of the vegetation and absence of understorey diversity, the vegetation does not meet the criteria for listing as a TEC under the EPBC Act (DEE, 2016). When considered in the context of the small clearing area, there is not likely to be any significant adverse impacts to the adjacent areas mapped as the Banksia Dominated Woodlands of the Swan Coastal Plain or Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain.

### Conclusion

Considering the above assessment and the small size and degraded condition of the application areas, in the event that any threatened or priority flora are present within the application area, it is unlikely that there will be any significant residual impact to these species as a result of the proposed clearing.

Given the Degraded to Completely Degraded condition of the vegetation over the application areas (Keighery 1994), the small scale of clearing and the lack of Priority and Threatened flora taxa recorded in the area, it is unlikely that the application area comprises a high level of biodiversity. Vegetation is also not consistent with any key diagnostic criteria for any TECs or PEC's, on which basis the proposed clearing is not likely to be at variance with Clearing Principles (a), (c), or (d). Based on the above assessment, the Delegated Officer has determined that the proposed clearing is considered acceptable subject to the conditions imposed on the permit.

*Phytophthora* dieback is known to be a threat to vegetation in the Perth region. The proposed clearing may indirectly impact the surrounding vegetation due to introduction of dieback and weeds. It is considered that the impacts of the proposed clearing to flora and vegetation can be managed through the implementation of weed and dieback hygiene management conditions.

### Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- avoid, minimise to reduce the impacts and extent of clearing; and
- take hygiene steps to minimise the risk of the introduction and spread of weeds.

## **3.2.2. Biological values - Fauna - Clearing Principles (b)**

### Assessment

The local area contains a total of 3,128 records from 73 different species of conservation significant fauna. These species are either listed under the state BC Act and/or Commonwealth EPBC Act, as Priority species by DBCA, or are migratory species listed under International Agreements. Any aquatic marine species would be unlikely to be

directly impacted by the proposed clearing. Migratory birds may use the vegetation in the proposed clearing area in their transits. Given the small clearing extent and presence of similar vegetation within the local area, the vegetation proposed to be cleared is unlikely to comprise significant habitat for the migratory birds. *Isoodon fusciventer* (Quenda, southwestern brown bandicoot) is the most common recorded species with 867 records, with *Calyptorhynchus latirostris* (Carnaby's cockatoo) comprising 490 records. The nearest record of conservation significant fauna is for a Quenda, located directly within the southern intersection.

Of the conservation significant fauna species recorded within the local area, the following have the potential to be found within the application area based on habitat preferences (see Appendix A.4):

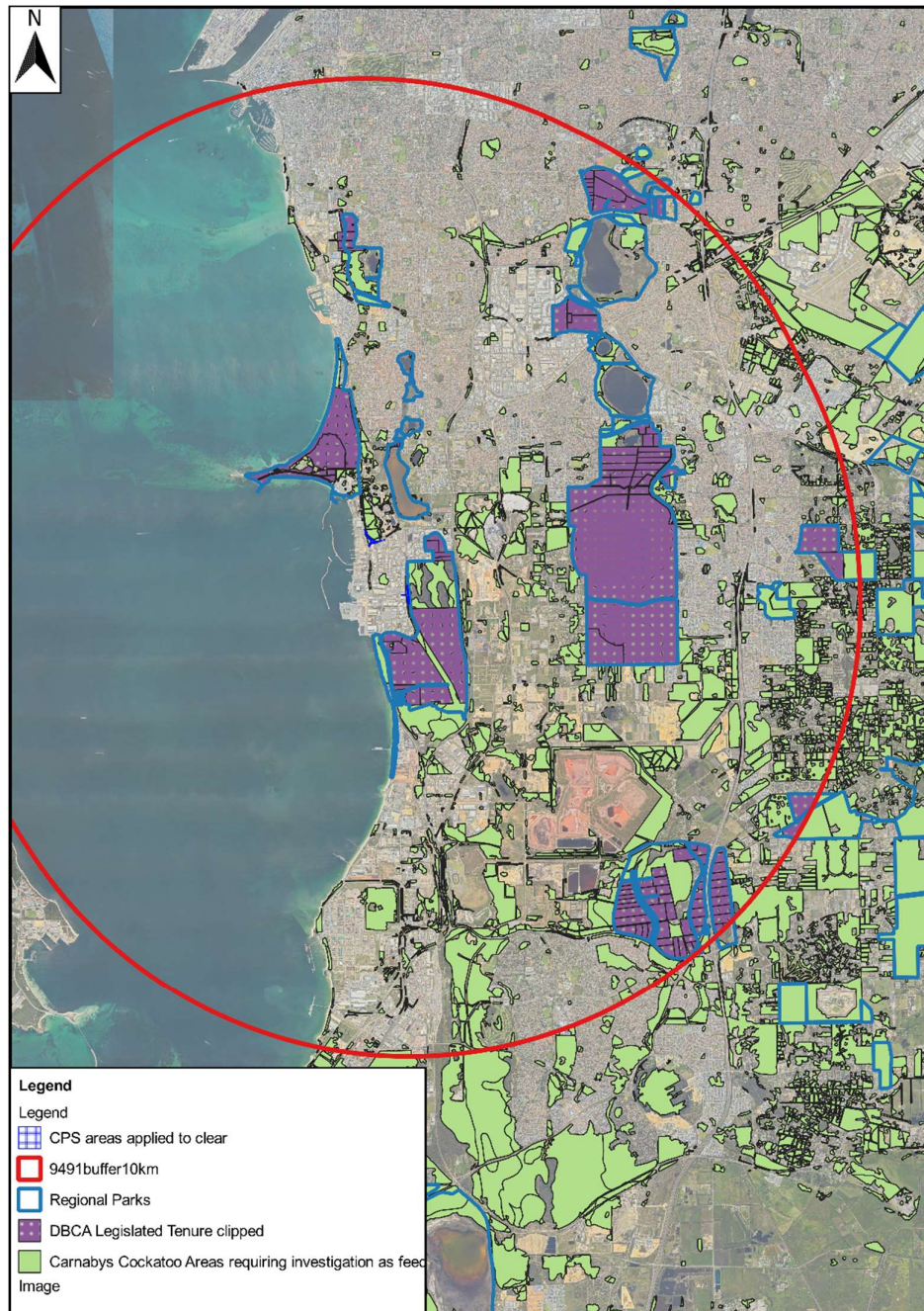
- *Calyptorhynchus latirostris* (Carnaby's cockatoo)
- *Calyptorhynchus baudinii* (Baudin's cockatoo)
- *Falco peregrinus* (Peregrine falcon)
- *Isoodon fusciventer* (Quenda)
- *Neelaps calonotos* (Black-striped snake, black-striped burrowing snake)
- *Ninox connivens connivens* (Barking owl (southwest subpop.))
- *Tyto novaehollandiae novaehollandiae* (masked owl (southwest))

### **Black Cockatoos**

The forest red-tailed black cockatoo, Baudin's cockatoo and Carnaby's cockatoo, collectively known as 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, 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-kilometre radius of their nesting site (Commonwealth of Australia, 2012). According to available datasets, mapped black cockatoo foraging habitat is recorded within a 12-kilometre radius of the application area, making it a suitable location for breeding if appropriate hollows are present (Commonwealth of Australia, 2012). According to available databases, the closest potential breeding site is approximately 10 kilometres northeast of the application area.

There are *Calyptorhynchus latirostris* (Carnaby's Cockatoo) roosting sites within the local area, with the closest site recorded approximately 700 m away from the northern intersection. Roosting is typically noted to occur within suitable trees close to an important water source and within an area of quality foraging habitat (Commonwealth of Australia, 2012). The site does not contain any tall trees that could be used for roosting or breeding by Black Cockatoos (PGV, 2021).

A significant amount of area mapped as feeding habitat for Black Cockatoos surrounds the application area (see Figure 3). The Parrot Bush (*Banksia sessilis*) heath and some scattered young Banksia trees provide approximately 0.536 ha foraging habitat for Carnaby's and Baudin's Black Cockatoos, this is below the 1 ha threshold that could lead to a significant impact and therefore require a referral under the EPBC Act (PGV, 2021). Evidence of foraging by Black Cockatoos on Parrot Bush was observed in the southern road reserve (PGV, 2021). The clearing area represents a very small proportion (approximately 0.008%) of the mapped feeding habitat within the local area. The DBCA legislated estate, Beeliar Regional Reserve, provides a substantially larger amount (approximately 5%) of higher quality foraging habitat available within the local area.



**Figure 3** Aerial imagery showing the extent of black cockatoo foraging habitat within DBCA estate and Regional Parks surrounding the application areas.

Foraging habitat within a 12-kilometre radius of breeding sites and a 6-kilometre radius of roosting sites is noted as being of particular importance for black cockatoo species (Commonwealth of Australia, 2012). According to available datasets, the application area occurs approximately 10 kilometres from the closest potential breeding site (artificial breeding hollows) and 700 metres from the closest confirmed roost site.

Given the small scale of the proposed foraging habitat to be cleared (0.536 ha) and the extent of foraging resources available in adjacent remnant vegetation, the clearing is unlikely to present a significant impact to the local availability of foraging and roosting resources for Black Cockatoos, or impact on their ability to move through the landscape.

### **Peregrine falcon**

The species is found in most habitats, from rainforests to the arid zone and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites and prefers coastal and inland cliffs or open woodlands near water and may even be found nesting on high city buildings (Australian Museum, 2020). This species is widespread, highly mobile and is found in various habitats. The application area may comprise suitable habitat for this species but noting habitat preferences and the small extent of the proposed clearing, the application area is unlikely to comprise a significant habitat for this species.

### **Quenda**

Quenda are ground-dwelling marsupials, typically associated with forest or woodlands near watercourses, where understorey consists of dense scrub and leaf litter is abundant (DEC, 2012a). There may be some quenda in the surrounding bushland as they are known in the Woodman Point, Lake Coogee and the Bush Forever Site to the east of the southern intersection. The likelihood of Quenda occurring in the bush directly adjacent to Cockburn Road is low due to the presence of traffic (PGV, 2021). Further, the application area is located adjacent to larger remnants of suitable habitat for quenda including Beeliar Region Reserve, and it is expected that individuals will be able to disperse into this vegetation at the time of clearing, given the implementation of slow, progressive and directional clearing practices. Given the extent of the proposed clearing, the condition of the vegetation and the extent of suitable habitat available in the local area, the application area is not considered likely to comprise significant habitat for quenda.

### **Masked Owl and Barking Owl**

Both species are likely to be intermittent visitors, however, breeding habitat is not present on the site. The application areas do not provide significant habitat for either of these species.

### Conclusion

Based on the above assessment, the proposed clearing is unlikely to significantly impact breeding, roosting or feeding habitat for black cockatoo species or significant habitat for conservation significant fauna species in the local area. While not assessed as significant habitat, impacts to individuals of these species may occur at the time of clearing. It is considered that potential direct impacts to fauna resulting from the proposed clearing can be managed through a directional clearing condition.

### Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- Slow, directional clearing allowing fauna to move into adjacent vegetation ahead of the clearing activity to minimise impact to individuals.

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

Several Aboriginal sites of significance have been mapped within the application area. 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.

One heritage site ID 15840 is mapped as occurring in the north upgrade works (SLIP, 2021). A Regulation 10 request under the *Aboriginal Heritage Regulations 1974* and was submitted to Registrar at DPLH and was approved for works commencing December 2021 and is valid for 12 months (PGV Environmental (2021) Appendix F).

**End**

## Appendix A. Site characteristics

### A.1. Site characteristics

Characteristic	Details
Local context	<p>The area proposed to be cleared is a 1.3848 ha within a 2.04664 ha footprint. The area proposed to be cleared is part of isolated patches of varying sizes of native vegetation in the intensive land use zone of Western Australia. It is surrounded by a range of land uses, varying from industrial developments, waste treatment facilities to Bush Forever conservation sites. The proposed clearing areas are mainly within areas which are highly modified and adjacent to larger vegetation patches which are in better condition.</p> <p>Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 25 per cent of the original native vegetation cover.</p>
Ecological linkage	<p>The application areas are not mapped within any formal ecological linkages and do not provide any significant linkage function on a local scale.</p>
Conservation areas	<p>The southern intersection area is located adjacent to the Beelihar Regional Park (Bush Forever site 346).</p>
Vegetation description	<p>The vegetation within the application area is mapped as the Cottesloe Complex-Central and South (System 6 ID 52) (Hedde <i>et al.</i> 1980). The complex is described as a Mosaic of woodland of <i>Eucalyptus gomphocephala</i> (Tuart) and open forest of <i>Eucalyptus gomphocephala</i> (Tuart) - <i>Eucalyptus marginata</i> (Jarrah) - <i>Corymbia calophylla</i> (Marri), closed heath on limestone outcrops. The mapped vegetation type retains approximately 36.35 per cent of the original extent (Government of Western Australia, 2019).</p> <p>Five vegetation types were mapped on the site (Appendix F), including four native types and two landscaped or planted types namely:</p> <p><b>BsAr: <i>Banksia sessilis</i>/Acacia <i>rostellifera</i> Open Heath to Shrubland:</b></p> <p>This is the main vegetation type in the southern intersection area, occurring both sides of the Cockburn Road reserve. <i>Banksia sessilis</i> is the most common species, 1-2m high and varying in density from 20-50%. <i>Acacia rostellifera</i> is always present and ranges in density from sparse to more common than the <i>B. sessilis</i>. Native understorey species are few and include scattered <i>Hibbertia hypericoides</i>, <i>Calothamnus quadrifidus</i>, <i>Banksia dallanneyi</i> and <i>Phyllanthus calycinus</i>. Grassy weed species are common particularly <i>Ehrharta calycina</i> (Perennial Veldtgrass), <i>Avena fatua</i> (Wild Oats), <i>Lagurus ovatus</i> (Hare's Tail Grass) and <i>Bromus diandrus</i> (Great Brome).</p> <p><b>AsAr: <i>Acacia saligna</i>/A. <i>rostellifera</i> Closed Tall Scrub</b></p> <p>This vegetation type occurs at several small locations in the southern intersection area. <i>Acacia saligna</i> is up to 3m high and may have been planted as part of the landscaping works. Few native understorey species are present. Common introduced species include <i>Ehrharta calycina</i>, <i>Avena fatua</i>, <i>Lagurus ovatus</i>, <i>Bromus diandrus</i> and <i>Euphorbia terracina</i>.</p> <p><b>Ba: <i>Banksia attenuata</i> Low Open Woodland over <i>Grevillea crithmifolia</i> Low Open Shrubland</b></p> <p>A small area containing <i>Banksia attenuata</i> trees occurs at the north-western tip of the southern intersection area. The <i>Banksia</i> trees are mostly young and may have been planted. The understorey contains very few native species, including <i>Hibbertia hypericoides</i>, <i>Gompholobium tomentosum</i> and <i>Acacia pulchella</i>. <i>Grevillea crithmifolia</i> is present but is highly likely to have been planted. Weed species dominate including <i>Ehrharta calycina</i>, <i>Avena fatua</i>, <i>Cenchrus longisetus</i> (Fountain Grass), <i>Pelargonium capitatum</i> (Rose Pelargonium).</p> <p><b>ArCpMh: <i>Acacia rostellifera</i>/Callitris <i>preissii</i>/Melaleuca <i>huegelii</i> Shrubland to Tall Open Scrub over weeds</b></p> <p>This is the main vegetation type in the northern intersection area. Historical aerial photography shows that the areas containing this vegetation type were cleared around 2000 for the construction of the Cockburn Road/Quill Way intersection. The dominant trees, <i>Acacia rostellifera</i>, <i>Callitris preissii</i> (Rottnest Island Pine) and <i>Melaleuca huegelii</i> would all have been planted after the roadworks were completed. No native understorey species occurs in most of this vegetation type. The understorey is therefore dominated by weed species, particularly <i>Avena fatua</i>, <i>Bromus diandrus</i> and <i>Asparagus asparagoides</i> (Bridal Creeper).</p> <p><b>Eg: <i>Eucalyptus gomphocephala</i> Open Woodland over <i>Acacia rostellifera</i>/Callitris <i>preissii</i> Tall Shrubland over weeds</b></p> <p>One small stand containing Tuart (<i>Eucalyptus gomphocephala</i>) occurs in the south-west tip of the northern intersection area. Historical aerial photographs show that most of this area has been cleared in the past. The Tuart trees are all young (DHB &lt;30cm). Some native understorey species occur in the area as well as many weed species.</p> <p><b>Landscaping</b></p>

Characteristic	Details				
	Several landscaped areas occur on the site. A variety of Australian native and some non-native plants have been planted.				
Vegetation condition	<p>Vegetation survey (Appendix F) indicates the vegetation within the proposed clearing area is in Degraded to Completely Degraded (Keighery, 1994) condition, described as:</p> <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. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.</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 are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.</li> </ul> <p>The full Keighery (1994) condition rating scale is provided in Appendix E. The full survey descriptions and mapping are available in Appendix F.</p>				
Climate and landform	<p>The climate experienced in the area is a Mediterranean climate, with dry, hot summers and cool, wet winters. Average rainfall is 816 millimetres per annum with the majority falling between June and August (BOM 2021).</p> <p>The landform consists of lower slopes of dune ridges with moderately deep to deep siliceous yellow-brown sands, or pale sands with yellow-brown subsoils, and minor limestone outcropping.</p>				
Soil description	<p>The soil is mapped as</p> <ul style="list-style-type: none"> <li>211Sp_S2a: Yellow deep sands, pale deep sands &amp; loams, calcareous deep sands &amp; yellow/brown shallow sands, semi-wet soil &amp; wet soil.</li> <li>211Sp_LS1 LIMESTONE - light, yellowish brown, fine to coarse-grained, sub-angular to well rounded, quartz, trace of feldspar, shell debris, variably lithified, surface kankar, of eolian origin. Minor heavy minerals.</li> </ul>				
Land degradation risk	<b>RISK</b>	<b>LIKELIHOOD</b>	<b>DESCRIPTION</b>	<b>PROPORTION OF APP AREA</b>	<b>RISK LEVEL</b>
	Water Erosion	L1	<3% of the map unit has a high to extreme water erosion risk	100%	LOW
	Wind Erosion	H2	>70% of the map unit has a high to extreme wind erosion risk	100%	HIGH
	Salinity	L1	<3% of the map unit has a high to extreme salinity risk or is presently saline	100%	LOW
	Flood	L1	<3% of the map unit has a moderate to high flood risk	100%	LOW
	Waterlogging	L1	<3% of the map unit has a high to extreme salinity risk or is presently saline	100%	LOW
	Subsurface Acidification	L2	3-10% of map unit has a high to extreme phosphorus export risk	50%	LOW
	Subsurface Acidification	L1	<3% of the map unit has a high to extreme salinity risk or is presently saline	50%	LOW
	Phosphorus Export	L2	3-10% of map unit has a high to extreme phosphorus export risk	50%	LOW
	Phosphorus Export	M1	10-30% of map unit has a moderate to very high waterlogging risk	50%	LOW
Waterbodies	The desktop assessment and aerial imagery indicated Sumpland SCP and Lake Coogee approximately 400 m east.				
Hydrogeography	<p>The application area is located within the Cockburn Groundwater Area proclaimed under the <i>Rights in Water and Irrigation Act 1914</i>.</p> <p>The application area is not located within a proclaimed surface water area.</p>				
Flora	No priority species have been recorded within the application area. There are records of 28 priority flora within the local area, three of which are found on the same soil type as the application area ( <i>Dodonaea hackettiana</i> , <i>Grevillea olivacea</i> and <i>Pimelea calcicola</i> ). Of these species, only <i>Grevillea olivacea</i> has been recorded in a similar vegetation type to that present within the application areas.				
Ecological communities	The scattered and individual native flora species present do not represent any ecological community. Two mapped TEC's occur within close proximity of the application areas; Banksia Woodlands of the Swan Coastal Plain and Tuart ( <i>Eucalyptus gomphocephala</i> ) Woodlands and Forests of the Swan Coastal Plain.				

Characteristic	Details
Fauna	<p>There are 2,087 records in the local area from 25 different fauna species of conservation significance (excluding marine and migratory species). The closest record is of a <i>Isoodon fusciventer</i> (<i>Quenda, southwestern brown bandicoot</i>) within the southern intersection.</p> <p>Due to the degraded nature of the native vegetation and the lack of native understorey, significant fauna habitat is not present within the application areas.</p>

## A.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Swan Coastal Plain	1,501,221.93	579,813.47	38.62	222,916.97	14.85
Post clearing calculation (delete if not required)					
Cottesloe Complex-Central and South (52)	45,299.61	14,567.87	32.16	6,606.12	14.58%
Local area (calculation - delete if not required)					
10 km radius	17,777.8	4458.18	25.01	-	-

\*Government of Western Australia (2019a)

\*\*Government of Western Australia (2019b)

## A.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix I.1), and biological survey information, impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Dodonaea hackettiana</i>	4	N	N	Y	1.56	26	Y
<i>Grevillea olivacea</i>	4	N	Y	Y	2.26	1	Y
<i>Lachnagrostis nesomytica subsp. paralia</i>	1	N	Y	N	8.06	2	Y
<i>Lepidium puberulum</i>	4	N	Y	N	9.64	2	Y
<i>Pimelea calcicola</i>	3	N	N	Y	4.34	3	Y
<i>Stylidium longitubum</i>	4	N	Y	N	6.59	1	Y



#### A.4. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Calyptorhynchus latirostris</i> (Carnaby's cockatoo)	EN	Y	0.44	490	Y
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo' (white-tailed black cockatoo)	EN		4.89	72	Y
<i>Falco peregrinus</i> (peregrine falcon)	OS	Y	0.47	22	Y
<i>Neelaps calonotos</i> (Black-striped snake, black-striped burrowing snake)	P3	Y	2.26	8	Y
<i>Ninox connivens connivens</i> (Barking owl (southwest subpop.))	P3	Y	8.85	3	Y
<i>Tyto novaehollandiae novaehollandiae</i> (masked owl (southwest))	P3	Y	0.34	3	Y
<i>Isodon fusciventer</i> (Quenda, southwestern brown bandicoot)	P4	Y	0.01	867	Y

#### A.5. Ecological community analysis table

Common name	Status (WA)	Status (Federal)	Proximity (km)
Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands and forests of the Swan Coastal Plain	P3	CR	~ 33 m
Northern Spearwood shrublands and woodlands	P3		Within
Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	P3	EN	~ 3.36 km
<i>Callitris preissii</i> (or <i>Melaleuca lanceolata</i> ) forests and woodlands, Swan Coastal Plain (floristic community type 30a as originally described in Gibson et al. (1994))	V		~ 1.09 km

## Appendix D. 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> <i>“Native vegetation should not be cleared if it comprises a high level of biodiversity.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared is Degraded to Completely Degraded and does not contain locally or regionally significant flora, fauna or habitat types for significant flora or fauna (Appendix A1).</p> <p>The area proposed to be cleared is located in proximity to occurrences of the listed TEC “Banksia Dominated Woodlands of the Swan Coastal Plain IBRA region” and “Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain”. The condition of the vegetation within the application area does not meet the diagnostic criteria for classification of a TEC under the Approved Conservation. The application area is degraded to completely degraded with exotic species present and low native species diversity.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (b):</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 significant habitat for fauna.”</i></p> <p><u>Assessment:</u></p> <p>A total of 73 species (including marine and migratory) of conservation significance have been recorded within a ten-kilometre radius of the application area (Appendix A4)</p> <p>The area proposed to be cleared may contain potential foraging habitat for conservation significant fauna such as Black Cockatoos and Quenda. Given the small extent of clearing and the proximity to native vegetation remnants, it is unlikely this clearing will pose any significant risk to local fauna through habitat loss or displacement.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<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></p> <p>The area proposed to be cleared is in degraded to completely degraded condition and a survey undertaken by PGV Environmental (2021) did not detect the presence of any threatened flora.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<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></p> <p>The Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain is listed as a PEC (Priority 3) and Critically Endangered TEC under the EPBC Act. Banksia Woodlands of the Swan Coastal Plain is listed as a PEC (Priority 3) and Critically Endangered TEC under the EPBC Act. Due to the Degraded to Completely Degraded condition, no floristic community type can be assessed and therefore no TEC’s or PEC’s occur within the application areas.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<b>Environmental value: significant remnant vegetation and conservation areas</b>		

Assessment against the clearing principles	Variance level	Is further consideration required?
<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></p> <p>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 the year 1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001). Vegetation over the application area has been mapped as the Cottesloe Complex-Central and South (System 6 ID 52) (Appendix A2), however, vegetation within the application areas is Degraded to Completely Degraded (Keighery, 1994) condition and not considered to be representative of the mapped vegetation complex. Notwithstanding, the mapped vegetation complex retains approximately 32.2 per cent of its original extent, while the Swan Coastal Plain (IBRA) bioregion retains approximately 32.49 per cent of its pre-European vegetation extent (Government of Western Australia, 2019) (Appendix A2).</p> <p>The Environmental Protection Authority (EPA) recognises the Perth Metropolitan Region as a constrained area, which provides for the reduction of vegetation complexes to a minimum of 10 per cent of their pre-European extent (EPA, 2008). Within the local area, approximately 25 per cent native vegetation cover. Given the vegetation within the application areas in a Degraded to Completely Degraded condition, it is not assessed as being significant as a remnant of native vegetation.</p>	Not likely to be at variance	No
<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></p> <p>The southern application area is located adjacent to Bush Forever site 346, managed as the Beeliar Regional Park. Given the degraded to completely degraded condition of the vegetation proposed to be cleared and the minimal clearing that will occur, it is unlikely the clearing will compromise the environmental values of this Bush Forever site. The inclusion of weed and dieback management practices will mitigate potential for detrimental impacts to adjacent vegetation.</p>	Not likely to be at variance	No
<b>Environmental value: 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></p> <p>The application area is located in the Bartram Road Catchment of the Murray River basin (DPIRD, 2017). No wetlands or watercourses occur within the application areas. Native vegetation within the application areas is not growing in, or in association with, any watercourse or wetland.</p>	Not likely to be at variance	No
<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></p> <p>The mapped soils are moderately to highly susceptible to wind erosion. Noting the extent of the application areas and the condition of the vegetation, the proposed clearing is not likely to have an appreciable impact on land degradation.</p>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (i):</u> “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.”</p> <p><u>Assessment:</u></p> <p>The application area does not intersect any waterways and is not located within a proclaimed surface water area. Standard site management procedures for drainage and stormwater will mitigate risks to groundwater. Given that no watercourses or wetlands, or Public Drinking Water Sources Areas are recorded within 550 metres of the application area, the proposed clearing is unlikely to impact surface or groundwater quality.</p>	Not likely to be at variance	No
<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></p> <p>The mapped topographic contours within application and surrounding areas do not intersect any floodway, flood fringe, or flood development control area. The clearing of a small extent of highly degraded vegetation is not likely to cause, or exacerbate, the incidence or intensity of flooding.</p>	Not likely to be at variance	No

## Appendix E. 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.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.



### 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 F. Flora, Vegetation and Fauna survey information excerpts

The 2021 Reconnaissance Flora and Vegetation Survey and Level 1 Fauna Survey of areas proposed to be cleared for the upgrade of two intersections of Quill Way and Cockburn Road was done by PGV Environmental and resulted in the following findings:

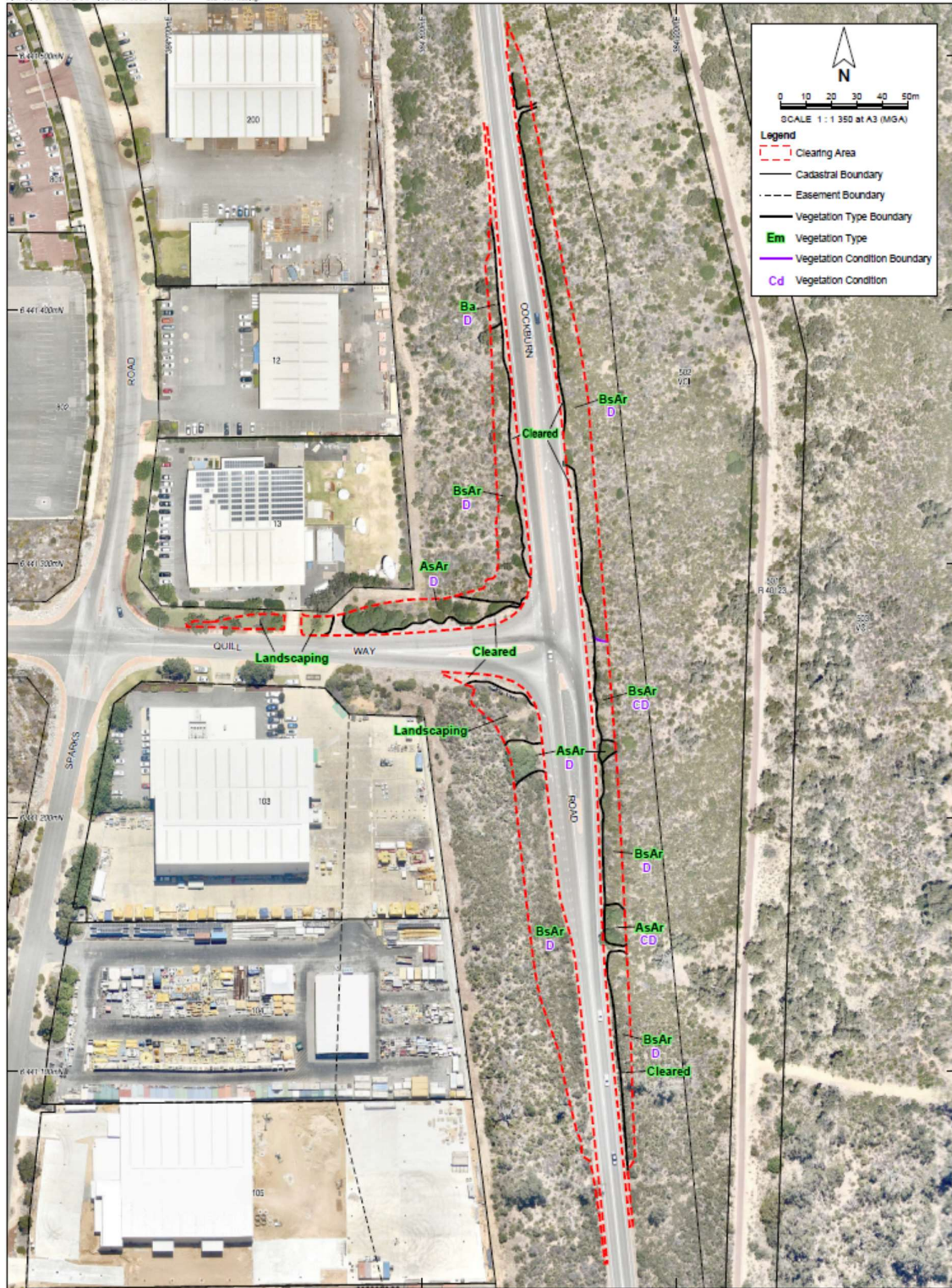
- The sites have been disturbed by previous clearing to construct Cockburn Road;
- Five vegetation types were mapped on the site, including four native types and two landscaped or planted types. Most native vegetation occurred at the southern intersection area with *Banksia sessilis*/*Acacia rostellifera* Heath to Shrubland present in the road reserves. All of the vegetation in the northern intersection site is dominated by planted native species following the construction of the Quill Way intersections with Cockburn Road in 2000. Very little regeneration of native shrubs has occurred in these areas;
- The condition of the vegetation on the site was all rated as Degraded to Completely Degraded;
- Most of the vegetation was too degraded to be assigned a Floristic Community Type. The areas containing *Banksia attenuata* plants were too degraded to meet the criteria of the Banksia Woodlands of the Swan Coastal Plain TEC. The stand of Tuart trees at the northern intersection, and the scattered Tuarts in the southern intersection are too small, fragmented and degraded to meet the criteria of the Tuart Woodlands and Forests of the Swan Coastal Plain TEC;
- The Reconnaissance survey recorded 51 plant species including 24 native and 27 (53%) introduced species. A spring survey would be unlikely to record many more native species due to the Degraded and Completely Degraded condition of the vegetation. No Threatened or Priority flora species were recorded on the site or are expected to be recorded in a spring survey;
- Two fauna habitats are described on the site. The fauna habitats are assessed as disturbed and highly degraded fauna habitat;
- Conservation significant species that may have habitat on the site include Carnaby's and Baudin's Black Cockatoo, three other bird species, one reptile, one bat and Quenda; and
- The site does contain foraging habitat for Carnaby's and Baudin's Black Cockatoo. Evidence of foraging on Parrot Bush (*Banksia sessilis*) was recorded during the survey. The total area of Parrot Bush proposed to be cleared is 0.5632ha which is below the threshold 1ha of quality foraging habitat that would likely require a referral under the Commonwealth EPBC Act. No roosting habitat or potential breeding habitat for Black Cockatoos occurs in the survey area.

Vegetation Type	Description	Photograph
<b>BsAr</b> <i>Banksia sessilis</i> / <i>Acacia rostellifera</i> Open Heath to Shrubland	This is the main vegetation type in the southern intersection area, occurring both sides of the Cockburn Road reserve. <i>Banksia sessilis</i> is the most common species, 1-2m high and varying in density from 20-50%. <i>Acacia rostellifera</i> is always present and ranges in density from sparse to more common than the <i>B. sessilis</i> . Native understorey species are few and include scattered <i>Hibbertia hypericoides</i> , <i>Calothamnus quadrifidus</i> , <i>Banksia dallanneyi</i> and <i>Phyllanthus calycinus</i> . Grassy weed species are common particularly <i>Ehrharta calycina</i> (Perennial Veldtgrass), <i>Avena fatua</i> (Wild Oats), <i>Lagurus ovatus</i> (Hare's Tail Grass) and <i>Bromus diandrus</i> (Great Brome).	
<b>AsAr</b> <i>Acacia saligna</i> / <i>A. rostellifera</i> Closed Tall Scrub	This vegetation type occurs at several small locations in the southern intersection area. <i>Acacia saligna</i> is up to 3m high and may have been planted as part of the landscaping works. Few native understorey species are present. Common introduced species include <i>Ehrharta calycina</i> , <i>Avena fatua</i> , <i>Lagurus ovatus</i> , <i>Bromus diandrus</i> and <i>Euphorbia terracina</i> .	

Vegetation Type	Description	Photograph
<b>Ba</b> <i>Banksia attenuata</i> Low Open Woodland over <i>Grevillea crithmifolia</i> Low Open Shrubland	<p>A small area containing <i>Banksia attenuata</i> trees occurs at the north-western tip of the southern intersection area. The <i>Banksia</i> trees are mostly young and may have been planted. The understorey contains very few native species, including <i>Hibbertia hypericoides</i>, <i>Gompholobium tomentosum</i> and <i>Acacia pulchella</i>. <i>Grevillea crithmifolia</i> is present but is highly likely to have been planted. Weed species dominate including <i>Ehrharta calycina</i>, <i>Avena fatua</i>, <i>Cenchrus longisetus</i> (Fountain Grass), <i>Pelargonium capitatum</i> (Rose Pelargonium).</p>	
<b>ArCpMh</b> <i>Acacia rostellifera/Callitris preissii/Melaleuca huegelii</i> Shrubland to Tall Open Scrub over weeds	<p>This is the main vegetation type in the northern intersection area. Historical aerial photography shows that the areas containing this vegetation type were cleared around 2000 for the construction of the Cockburn Road/Quill Way intersection. The dominant trees, <i>Acacia rostellifera</i>, <i>Callitris preissii</i> (Rottnest Island Pine) and <i>Melaleuca huegelii</i> would all have been planted after the roadworks were completed. No native understorey species occurs in most of this vegetation type. The understorey is therefore dominated by weed species, particularly <i>Avena fatua</i>, <i>Bromus diandrus</i> and <i>Asparagus asparagoides</i> (Bridal Creeper).</p>	

Vegetation Type	Description	Photograph
<b>Eg</b> <i>Eucalyptus gomphocephala</i> Open Woodland over <i>Acacia rostellifera/Callitris preissii</i> Tall Shrubland over weeds	<p>One small stand containing Tuart (<i>Eucalyptus gomphocephala</i>) occurs in the south-west tip of the northern intersection area. Historical aerial photographs show that most of this area has been cleared in the past. The Tuart trees are all young (DHB &lt;30cm). Some native understorey species occur in the area as well as many weed species.</p>	
<b>Landscaping</b>	<p>Several landscaped areas occur on the site. A variety of Australian native and some non-native plants have been planted.</p>	





		DevelopmentWA Clearing Permit Application QUILL WAY AND COCKBURN ROAD INTERSECTION UPGRADES	
Drawn: B. Heath Date: 4 Nov 2021 JMK 10434 Rpt 2021-080	Date: 4 Nov 2021 Revision: A	<b>VEGETATION TYPES AND CONDITION                  SOUTHERN INTERSECTION</b>	
CADASTRAL SOURCE: Landgate April 2021 AERIAL PHOTOGRAPH SOURCE: NearMap, flown February 2021 CLEARING AREA SOURCE: Porter Engineers, Dwg No. 2021-08-0107, Rev C, 14-08-21		Attachment 2	



## Appendix I. Sources of information

### I.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

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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