



## **Attachment to Section 2.4**

EPBC Act Referral: Attachment 1

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## Appendices

Appendix A South Capel Remediation Project: Assessment against Significance Guidelines with respect to Matters of National Environmental Significance (Harewood 2018c)

# 1 Western Ringtail Possum

## 1.1 Potential impact to Western Ringtail Possum

Fauna surveys carried out by Harewood (2018a, 2018b) identified the presence of the Western Ringtail Possum (*Pseudocheirus occidentalis*) listed as threatened (Critically Endangered) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the South Capel Remediation Project (the proposed action).

### 1.1.1 Capel Dry Plant

The Capel Dry Plant (CDP) remediation area was historically used for storage of by-products and is vegetated with planted and regrowth vegetation. This vegetation represents habitat of some type (i.e. refuge, foraging or dispersal) for WRPs (Harewood 2018a). The area of planted vegetation with a dense midstorey component surrounding the artificial lake and gardens surrounding the administration buildings would appear to be the best quality area given it is characterised by a coherent canopy structure, and provides good drey building opportunities and the widest variety of potential food sources (Harewood 2018a). The condition of the vegetation is Completely Degraded (Ecoedge 2015). Much of the native vegetation located near the site would be WRP habitat (i.e. various vegetation complexes containing woodland dominated vegetation units with a midstorey component). A significant portion of this vegetation is located within areas of reserved vegetation (Harewood 2018c) and is expected to be better quality vegetation and habitat for WRPs compared to the site.

About 1.3 ha of WRP habitat at CDP will be cleared as a consequence of the proposed works (**Figure 1**). Based on historic aerial data, the area was agriculture (pasture) prior to developing the CDP, therefore the vegetation in the area is not a remnant patch (i.e. vegetation is planted or grown from planted species). Connectivity to other areas of bushland is also very limited with the patchy, degraded bushland along Gavin's Road providing a tenuous linkage to vegetation within the railway reserve to the east (Harewood 2018a). This (limited) habitat linkage will not be cleared, avoiding potential fragmentation.

As this clearing is for remediation activities at the site, the clearing has been minimised to the extent possible to safely access and excavate the known and suspected extent of by-product required to be removed (to ameliorate groundwater quality).

### 1.1.2 South Capel

The South Capel area was historically mined, and also used for processing and storage of by-products. It has been previously cleared for these activities and therefore, the native vegetation in the area is not a remnant patch (i.e. vegetation is regrowth). The majority of the South Capel area represents unsuitable habitat for WRPs due to either a complete lack of vegetation or low sparse vegetation in areas where revegetation / regeneration has been poor (Harewood 2018b). The area dominated by peppermint open forest, which contains the densest mid-storey component, is likely to be the best quality habitat for WRP (Harewood 2018b). Areas of banksia, melaleuca and kunzea also appear to be favoured, with the majority of WRPs individuals being observed in units dominated by these species and peppermint (Harewood 2018b). Approximately 7.1 ha of WRP habitat are proposed to be cleared for the proposed action (**Figure 2**).

The condition of the vegetation is Degraded (Endemic 2013). Much of the native vegetation located near the site would be WRP habitat (i.e. various vegetation complexes containing woodland dominated vegetation units with a midstorey component). A significant portion of this vegetation is located within areas of reserved vegetation (Harewood 2018c) and is expected to be better quality vegetation and habitat for WRPs compared to the site.

The vegetation that extends outside of the boundaries of the South Capel site will maintain any existing linkage value the remnant vegetation in the area may have (Harewood 2018c).

As this clearing is for remediation activities at the site, the clearing has been minimised to the extent possible to safely access and excavate the known and suspected extent of by-product required to be removed (to ameliorate groundwater quality) and to accommodate the consolidated storage area.

## 1.2 Assessment of significance

### 1.2.1 Referral Guidelines

The *Significant Impact Guidelines for the vulnerable western ringtail possum (Pseudocheirus occidentalis) in the southern Swan Coastal Plain, Western Australia* (Commonwealth of Australia 2009a) provides guidance on the actions that would be considered likely to have a significant impact on western ringtail possums (WRP). The guidelines identify the following indicators of potential significant impact in Area 3 – Supporting habitat (where both parts of the project is located):

- clearing in a remnant habitat patch that is greater than 0.5 ha;
- clearing of more than 50% of a remnant habitat patch that is between 0.2 and 0.5 ha; or
- fragmentation of existing habitat linkages.

As discussed in Section 1.1 as the remediation areas are within the boundaries of historic processing / mining sites and an assessment of historical aerial photography showed the entire area to have been previously cleared, the remediation areas are therefore not remnant vegetation. Clearing will not fragment any linkages to other areas (Harewood 2018c). Areas of reserved vegetation (such as the Capel Nature Reserve and the Tuart Forest National Park), much of which would be WRP habitat, are present in adjacent nearby locations (Harewood 2018c). Therefore, none of the indicators of potential significant impact to WRPs are present.

In addition, within the background paper to the guidelines (Commonwealth of Australia 2009b), an action is deemed likely to have a significant impact on WRP in the southern Swan Coastal Plain region if it:

- reduces the ability of the region to support the persistence of the WRP;
- modifies, destroys, removes or isolates important remnant habitat patches, or decreases the availability or quality of remnant habitat patches;
- adversely affects connections between important areas; or
- interferes substantially with the ability of the area to effectively contribute to the recovery of the species.

An assessment of each of these criteria and a summation of the potential for a significant impact with respect to the proposed action is provided in **Table 1**.

**Table 1 Assessment of Significant Impact for WRP in the Southern Swan Coastal Plain Region**

Criteria	Assessment of Significant Impact on WRP	
	Capel Dry Plant	South Capel
Reduces the ability of the region to support the persistence of the WRP	<p>The wider region at CDP contains habitat suitable for WRP. Whilst the vegetation in the wider area has not been specifically assessed for its suitability as habitat for WRP, there are approximately 8,195 ha of native vegetation within 12 km of the CDP; a high percentage is very likely to be suitable for WRPs (Harewood 2018a). Harewood (2018a) also states his own personal database shows 301 WRP records within a 12 km radius of the CDP, with additional observations noted on NatureMap<sup>1</sup>.</p> <p>The remediation works will involve the clearing of ~1.3 ha of WRP habitat at CDP (0.02% of the regional habitat) (Harewood 2018c). The loss of WRP habitat in the region will have no measurable impact on its ability to support the persistence of WRPs (Harewood 2018c).</p> <p>Therefore, no impact is anticipated on the region's ability to support the persistence of the WRP as a result of the proposed action.</p>	<p>The wider region at South Capel contains habitat suitable for WRP. Whilst the vegetation in the wider area has not been specifically assessed for its suitability as habitat for WRP, Harewood (2018a, 2018b) states his own personal database shows 411 WRP records within a 12 km radius from South Capel, with additional observations noted on NatureMap. There are approximately 7,920 ha of native vegetation within 12 km of the South Capel site; a high percentage of this wider vegetation is believed to be suitable for supporting WRPs (Harewood 2018b).</p> <p>The remediation works will involve the clearing of ~7.1 ha at South Capel (0.08% of the regional habitat) (Harewood 2018c). The loss of WRP habitat in the region will have no measurable impact on its ability to support the persistence of WRPs (Harewood 2018c).</p> <p>Therefore, no impact is anticipated on the region's ability to support the persistence of the WRP as a result of the proposed action.</p>
Modifies, destroys, removes or isolates important remnant habitat patches, or decreases the availability or quality of remnant habitat patches.	<p>The habitat to be cleared is not remnant habitat as it is within the boundaries of a historic processing site. The CDP site only supports a small number of WRPs and is unlikely to represent important remnant habitat patches (Harewood 2018c). Removal of ~1.3 ha of vegetation will not result in the isolation, or the reduction of availability or quality of other remnant habitat patches (Harewood 2018c).</p> <p>Therefore, no impact is anticipated on important remnant habitat patches as a result of the proposed action.</p>	<p>The habitat to be cleared is not remnant habitat as it is within the boundaries of a historic mining and processing site. The South Capel site only supports a small number of WRPs and is unlikely to represent important remnant habitat patches (Harewood 2018c). Removal of ~7.1 ha of fragmented vegetation will not result in the isolation, or the reduction of availability or quality of other remnant habitat patches (Harewood 2018c).</p> <p>Therefore, no impact is anticipated on important remnant habitat patches as a result of the proposed action.</p>
Adversely affects connections between important areas.	<p>Removal of ~1.3 ha of vegetation will not compromise the existing linkage value (connections) to important areas (Harewood 2018c).</p> <p>As mentioned in Harewood (2018a), the vegetation along Gavin's Road provides a tenuous link to the vegetation to the east within the railway reserve. The proposed action design has been amended from original designs to retain this vegetation, ensuring this connection is maintained (refer to Section 4.1 of the EPBC Act referral form).</p> <p>Therefore, no impact is anticipated on connections between important areas as a result of implementing the proposed action.</p>	<p>The removal of ~7.1 ha of vegetation will not compromise the areas existing linkage value (connections) to other areas of habitat or decrease the availability or quality of remnant habitat patches (Harewood 2018c).</p> <p>Vegetation extends outside of the South Capel boundaries and will maintain any existing linkage value the remnant vegetation in the area may have (Harewood 2018c).</p> <p>Therefore, no impact is anticipated on connections between important areas as a result of implementing the proposed action.</p>

<sup>1</sup> NatureMap database accessible via <https://naturemap.dpaw.wa.gov.au/>

Criteria	Assessment of Significant Impact on WRP	
	Capel Dry Plant	South Capel
Interferes substantially with the ability of the area to effectively contribute to the recovery of the species	<p>The remediation works will involve the clearing of ~1.3 ha of WRP habitat (0.02% of the regional habitat) supporting a small number of individual WRPs (Harewood 2018a, 2018c) within the boundaries of a historic processing site. Harewood (2018c) has stated that it is unlikely that this represents habitat critical for the survival of the species, as WRPs are relatively common in the Bunbury / Capel / Busselton area.</p> <p>In addition, Harewood (2018a) states his own personal database shows 301 WRP records within a 12 km radius of the CDP, with additional observations noted on NatureMap.</p> <p>There are approximately 8,195 ha of native vegetation within 12 km of the CDP; much of which is believed to be suitable for supporting WRPs (Harewood 2018a; 2018c).</p> <p>The intent of the proposed action is to improve the quality of the environment by consolidating and containing by-products to ameliorate groundwater quality, which will improve the general condition of the environment and therefore, would be of benefit to WRPs.</p> <p>Therefore, clearing will not interfere substantially with the ability of the area to effectively contribute to the recovery of the species as a result of the proposed action.</p>	<p>The remediation works will involve the clearing of ~7.1 ha at South Capel (0.08% of the regional habitat) supporting a small number of individual WRPs (Harewood 2018b, 2018c) within the boundaries of a historic mining and processing site. Harewood (2018c) has stated that it is unlikely that this represents habitat critical for the survival of the species, as WRPs are relatively common in the Bunbury / Capel / Busselton area.</p> <p>In addition, Harewood (2018b) states his own personal database shows 411 WRP records within a 12 km radius from South Capel, with additional observations noted on NatureMap.</p> <p>There are approximately 7,920 ha of native vegetation within 12 km of the South Capel site, much of which is believed to be suitable for supporting WRPs (Harewood 2018b, 2018c).</p> <p>The intent of the proposed action is to improve the quality of the environment by consolidating and containing by-products to ameliorate groundwater quality, which will improve the general condition of the environment and therefore, would be of benefit to WRPs.</p> <p>Therefore, clearing will not interfere substantially with the ability of the area to effectively contribute to the recovery of the species as a result of the proposed action.</p>
Is a Significant Impact Expected?	<p>Based in the above criteria and available information, the proposed action will have no impact on WRPs. This is because both areas to be cleared are:</p> <ul style="list-style-type: none"> <li>- mostly planted or regrowth vegetation of poor quality;</li> <li>- within the boundaries of a historic mining and / or processing sites;</li> <li>- very small compared to the available WRP habitat within 12 km of each site, most of which is within Reserves and National Parks, and is expected to be of better quality than the site;</li> <li>- expected to contain only a small number of WRPs and individuals will be relocated ahead of clearing activities;</li> <li>- not fragmenting links to other areas.</li> </ul> <p>In addition, there are large areas of habitat in adjoining and nearby areas known to also support WRPs; WRPs are expected to persist in these adjoining and nearby areas.</p>	

### 1.2.2 Significant Impact Guidelines

The *Matters of National Environmental Significance, Significant Impact Guidelines 1.1, EPBC Act 1999* (Commonwealth of Australia 2013) provides more detailed guidance related to what may constitute a significant impact. An assessment of each of the criteria for critically endangered species contained within the significant impact guidelines with respect to the potential impact to WRPs for the proposed action is provided in **Table 2**. The impacts are delineated for each site and an overall summary is provided at the end of the table.

**Table 2 Assessment of Significant Impact Using Criteria for Critically Endangered Species**

Criteria	Assessment of Significant Impact on WRP	
	Capel Dry Plant	South Capel
Lead to a long-term decrease in the size of a population?	<p>Harewood (2018a) estimated that the area proposed to be cleared is currently being used by around three WRPs. These individuals will be relocated to nearby vegetation prior to works commencing, under the guidance of a qualified fauna specialist.</p> <p>Harewood (2018a) states that their database shows 301 WRP records within a 12 km radius of the CDP with additional observations noted on NatureMap. In addition, WRPs are relatively common in the Bunbury / Capel / Busselton area with Harewood's (2018c) database showing greater than 4,000 observations at 100 unique locations in the last five years.</p> <p>The loss of 1.3 ha of WRP habitat is not expected to be significant given the presence of a large amount (8,195 ha) of surrounding remnant vegetation within 12 km of the site, a high percentage of which is believed to be suitable for supporting WRPs (Harewood 2018a, 2018c). A significant portion of this vegetation is located within the Tuart Forest National Park (3,030 ha) and the Capel Nature Reserve (94 ha).</p> <p>Therefore, the clearing will not impact the size of a population as a result of the proposed action.</p>	<p>Harewood (2018b) estimated that the area proposed to be cleared is currently being used by around 10 WRPs. These individuals will be relocated to adjacent vegetation prior to works commencing, under the guidance of a qualified fauna specialist.</p> <p>Harewood (2018b) states that their database shows 411 WRP records within a 12 km radius of South Capel with additional observations noted on NatureMap. In addition, WRPs are relatively common in the Bunbury / Capel / Busselton area with Harewood's (2018c) database showing greater than 4,000 observations at 100 unique locations in the last five years.</p> <p>The loss of 7.1 ha of WRP habitat is not expected to be significant given the presence of a large amount (7,920 ha) of surrounding remnant vegetation within 12 km of the site, a high percentage of which is believed to be suitable for supporting WRPs (Harewood 2018b, 2018c). A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve.</p> <p>Therefore, the clearing will not impact the size of a population as a result of the proposed action.</p>
Reduce the area of occupancy of the species?	<p>The area of occupancy of WRPs will not reduce in any material way as a consequence of the proposed action considering the very small size of the area to be affected.</p> <p>The loss of 1.3 ha of WRP habitat is not expected to result in an overall decrease in area of occupancy given the presence of a significant amount (8,195 ha) of surrounding remnant vegetation within 12 km of the site, a high percentage of which is believed to be suitable for supporting WRPs (Harewood 2018a, 2018c).</p> <p>The proposed clearing is for remediation within the boundaries of a historic processing site. There is limited scope to reduce the area affected considering the location of historic stockpiles, dams and infrastructure requiring remediation. The clearing has been minimised as much as reasonably practicable to safely access and excavate the known and suspected extent of by-product required to be removed to ameliorate groundwater quality and to retain linkages to areas of WRP habitat (refer to Section 4.1 of the EPBC Act referral form).</p> <p>Therefore, the clearing will not impact the area of occupancy of the species as a result of the proposed action.</p>	<p>The area of occupancy of WRPs will not reduce in any material way as a consequence of the proposed action considering the very small size of the area to be affected.</p> <p>The loss of 7.1 ha of WRP habitat is not expected to result in an overall decrease in area of occupancy given the presence of a significant amount (7,920 ha) of surrounding remnant vegetation within 12 km of the site, a high percentage of which is believed to be suitable for supporting WRPs (Harewood 2018b, 2018c).</p> <p>The proposed clearing is for remediation within the boundaries of a historic mining and processing site. There is limited scope to reduce the area affected considering the location of historic stockpiles, dams and infrastructure requiring remediation. The placement and design of the HRCF Extension and subsequent clearing footprint has been strategically located as much as reasonably practicable to retain as much WRP habitat as possible (refer to Section 4.1 of the EPBC Act referral form).</p> <p>Therefore, the clearing will not impact the area of occupancy of the species as a result of the proposed action.</p>

Criteria	Assessment of Significant Impact on WRP	
	Capel Dry Plant	South Capel
Fragment an existing population into two or more populations?	<p>There will be no adverse impacts to connections between WRP habitat. As mentioned in Harewood (2018a, 2018c), the vegetation along Gavin's Road provides a tenuous link to the vegetation to the east within the railway reserve. The project design has been amended (refer to Section 4.1 of the EPBC Act referral form) to ensure this vegetation is not removed and the connection is maintained.</p> <p>Therefore, the clearing will not fragment an existing population into two or more populations as a result of the proposed action.</p>	<p>The clearing will not disrupt connections between important surrounding areas such as the Capel Nature Reserve, Coolilup State Forest, Ludlow State Forest and the Tuart Forest National Park. The vegetation to remain at the South Capel site is connected to the regional surrounding vegetation and will remain, maintaining existing linkage values to the wider area (Harewood 2018c).</p> <p>Therefore, the clearing will not fragment an existing population into two or more populations as a result of the proposed action.</p>
Adversely affect habitat critical to the survival of a species?	<p>It is unlikely that the 1.3 ha of WRP habitat to be cleared represents habitat critical for the survival of the species, as vegetation is within the boundaries of a historic processing site and is largely comprised of planted trees and shrubs that has been used to revegetate the site after the historical site works (Harewood 2018c).</p> <p>There are approximately 8,195 ha of native vegetation within 12 km of the CDP, a high percentage of which is believed to be suitable for supporting WRPs (Harewood 2018a, 2018c).</p> <p>Therefore, the clearing will not impact habitat critical to the survival of a species as a result of the proposed action.</p>	<p>It is unlikely that the 7.1 ha of WRP habitat to be cleared represents habitat critical for the survival of the species, as vegetation is within the boundaries of a historic mining and processing site and appears to be largely comprised of a regrowth of peppermint that has regenerated after the historical mining and processing operations (Harewood 2018c).</p> <p>There are approximately 7,920 ha of native vegetation within 12 km of South Capel, a high percentage of which is believed to be suitable for supporting WRPs and contained within Reserves and National Parks (Harewood 2018b).</p> <p>Therefore, the clearing will not impact habitat critical to the survival of a species as a result of the proposed action.</p>
Disrupt the breeding cycle of a population?	<p>Harewood (2018c) notes that a small number of WRP individuals may be displaced as a consequence of the proposed action and therefore, it is possible that the breeding cycle of some individuals may be disrupted. However, the number of individuals affected is likely to be small (Harewood 2018a, 2018c).</p> <p>Therefore, the clearing will not impact the breeding cycle of a population as a result of the proposed action.</p>	<p>Harewood (2018c) notes that a small number of WRP individuals may be displaced as a consequence of the proposed works and therefore, it is possible that the breeding cycle of some individuals may be disrupted. However, the number of individuals affected is likely to be small (Harewood 2018b, 2018c).</p> <p>Therefore, the clearing will not impact the breeding cycle of a population as a result of the proposed action.</p>

Criteria	Assessment of Significant Impact on WRP	
	Capel Dry Plant	South Capel
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<p>It is unlikely that the 1.3 ha of WRP habitat to be cleared within the boundaries of a historic processing site will lead to a decline in the species (Harewood 2018c). Whilst the area is in use by around three WRPs, Harewood (2018a) states his own personal database shows 301 WRP records within a 12 km radius of the CDP with additional observations noted on NatureMap. Further, WRPs are relatively common in the Bunbury / Capel / Busselton area with Harewood's (2018c) database showing greater than 4,000 observations at 100 unique locations in the last five years.</p> <p>There are approximately 8,195 ha of native vegetation within 12 km of the CDP, a high percentage of which is believed to be suitable for supporting WRPs and contained within Reserves and National Parks (Harewood 2018a).</p> <p>The proposed clearing is for remediation within the boundaries of a historic processing site. There is limited scope to reduce the area affected considering the location of historic stockpiles, dams and infrastructure requiring remediation. The clearing has been minimised as much as reasonably practicable to safely access and excavate the known and suspected extent of by-product required to be removed to ameliorate groundwater quality and to retain linkages to areas of WRP habitat (refer to Section 4.1 of the EPBC Act referral form).</p> <p>Therefore, the clearing will not impact the availability or quality of habitat to the extent that the species is likely to decline as a result of the proposed action.</p>	<p>It is unlikely that the 7.1 ha of WRP habitat to be cleared is within the boundaries of a historic mining and processing site will lead to a decline in the species (Harewood 2018c). Whilst it is in use by around 10 WRPs, Harewood (2018b) states his own personal database shows 411 WRP records within a 12 km radius of South Capel with additional observations noted on NatureMap. Further, WRPs are relatively common in the Bunbury / Capel / Busselton area with Harewood's (2018c) database showing greater than 4,000 observations at 100 unique locations in the last five years.</p> <p>There are approximately 7,920 ha of native vegetation within 12 km of South Capel, a high percentage of which is believed to be suitable for supporting WRPs and contained within Reserves and National Parks (Harewood 2018b).</p> <p>The proposed clearing is for remediation within the boundaries of a historic mining and processing site. There is limited scope to reduce the area affected considering the location of historic stockpiles, dams and infrastructure requiring remediation. The placement and design of the HRCF Extension and subsequent clearing footprint has been strategically located as much as reasonably practicable to retain as much WRP habitat as possible (refer to Section 4.1 of the EPBC Act referral form).</p> <p>Therefore, the clearing will not impact the availability or quality of habitat to the extent that the species is likely to decline as a result of the proposed action.</p>
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or endangered species' habitat?	<p>The proposed works are unlikely to introduce any new invasive species (Harewood 2018c). The site and surrounding areas already include species posing a risk to WRPs such as foxes and cats (Harewood 2018a) which predate upon WRPs, and the Common Brushtail Possum (<i>Trichosurus vulpecula</i>) (Harewood 2018a), which competes with WRPs for habitat.</p> <p>Invasive plants such as bridal creeper (<i>Asparagus asparagoides</i>) have been recorded adjacent to the remediation area (Ecoedge 2015). The vegetation in the CDP area is composed primarily of exotic weed or pasture species with marri and flooded gum (Ecoedge 2015). Works at the site will be restricted to ensure that movement between the work area and outside areas does not occur, as outlined clearing controls in Section 4 of the EPBC Act referral form.</p> <p>Therefore, the clearing will not result in the introduction of further invasive species as a result of the proposed action.</p>	<p>The proposed works are unlikely to introduce any new invasive species (Harewood 2018c). The site and surrounding areas already include species posing a risk to WRPs such as foxes and cats (Harewood 2018a) which predate upon WRPs, and the Common Brushtail Possum (<i>Trichosurus vulpecula</i>) (Harewood 2018a), which competes with WRPs for habitat.</p> <p>Invasive plants such as bridal creeper (<i>Asparagus asparagoides</i>) have been recorded adjacent to the remediation area (Endemic 2013). The remediation area is cleared / regenerating vegetation considered by Endemic (2013) is Degraded to Completely Degraded according to Keighery (1994) indicating the flora in the area likely contains weeds (Endemic 2013). Works at the site will be restricted to ensure that movement between the work area and outside areas does not occur, as outlined clearing controls in Section 4 of the EPBC Act referral form.</p> <p>Therefore, the clearing will not result in the introduction of further invasive species as a result of the proposed action.</p>

Criteria	Assessment of Significant Impact on WRP	
	Capel Dry Plant	South Capel
Introduce disease that may cause the species to decline?	The proposed action is unlikely to introduce a disease that would impact upon WRPs (Harewood 2008c). Due to the historical disturbance at the site, <i>Phytophthora</i> species may already be present.	The proposed action is unlikely to introduce a disease that would impact upon WRPs (Harewood 2008c). Due to the historical disturbance at the site, <i>Phytophthora</i> species may already be present.
Interfere substantially with the recovery of the species.	<p>Harewood (2018a) estimated that the site is currently being used by around 10 WRPs. These individuals will be relocated to surrounding vegetation prior to works commencing.</p> <p>The loss of 1.3 ha of WRP habitat is not expected to interfere substantially with the recovery of the species given the presence of a significant amount (8,195 ha) of surrounding native vegetation within 12 km of the site, a high percentage of which is believed to be suitable for supporting WRPs (Harewood 2018a, 2018c). A significant portion of this vegetation is located within the Tuart Forest National Park (3,030 ha) and the Capel Nature Reserve (94 ha) (Harewood 2018c).</p> <p>The intent of the proposed action is to improve the quality of the environment by consolidating and containing by-products to ameliorate groundwater quality, which will improve the general condition of the environment and therefore, would be of benefit to WRPs.</p> <p>Therefore, the clearing will not impact the recovery of the species as a result of the proposed action.</p>	<p>Harewood (2018b) estimated that the site is currently being used by around 20 WRPs. These individuals will be relocated to surrounding vegetation prior to works commencing.</p> <p>The loss of 7.1 ha of WRP habitat is not expected to interfere substantially with the recovery of the species given the presence of a significant amount (7,920 ha) of surrounding remnant vegetation within 12 km of the site, a high percentage of which is believed to be suitable for supporting WRPs (Harewood 2018b). A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve (Harewood 2018c).</p> <p>The intent of the proposed action is to improve the quality of the environment by consolidating and containing by-products to ameliorate groundwater quality, which will improve the general condition of the environment and therefore, would be of benefit to WRPs.</p> <p>Therefore, the clearing will not impact the recovery of the species as a result of the proposed action.</p>

Criteria	Assessment of Significant Impact on WRP within the South Capel Remediation Project
Is a Significant Impact Expected?	<p>Based on available information, the proposed action will not have an impact on WRP populations or species. Both areas to be cleared are unlikely to:</p> <ul style="list-style-type: none"> <li>- lead to a significant long-term decrease in the size of a population;</li> <li>- significantly reduce the area of occupancy of the species;</li> <li>- fragment existing populations;</li> <li>- adversely affect habitat critical to the survival of the species;</li> <li>- significantly disrupt the breeding cycle of a population;</li> <li>- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;</li> <li>- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or endangered species' habitat;</li> <li>- introduce disease that may cause the species to decline; or</li> <li>- interfere substantially with the recovery of the species.</li> </ul> <p>This conclusion is supported by the fact that proposed clearing in both areas is largely regrowth or planted vegetation from previous mining or mining related activities, the works footprint in both cases is relatively small and the area is only being utilised by a small number of WRPs.</p> <p>WRPs present at both sites are not near the limit of the species range, and the small numbers of individuals present are also unlikely to represent key source populations (Harewood 2018c). Given the small number of individuals likely to be present at each location, they are also unlikely to be necessary for maintaining genetic diversity in the species (Harewood 2018c). Individuals are to be relocated nearby and their genetic contribution will therefore be maintained and not lost.</p> <p>The removal of the vegetation will not fragment any linkages to other areas (Harewood 2018c). There are large areas of habitat in adjoining and nearby areas likely to also support WRPs (Harewood 2018c). Only a small number of WRPs will be displaced at each site and the species can be expected to persist in adjoining and nearby areas (Harewood 2018c).</p>

## 1.3 Summary

The vegetation at CDP and South Capel is of poor quality, being largely regrowth or planted vegetation from previous mining or mining related activities (Endemic 2013, Ecoedge 2015). The magnitude of clearing WRP habitat is relatively small (~8.4 ha). The proposed action areas contain only a small number of WRPs; approximately 13 individuals as observed within the proposed action footprint (Harewood 2018c).

The individuals likely to be present are also unlikely to represent key source populations and are also unlikely to be necessary for maintaining genetic diversity in the species (Harewood 2018c); therefore, the local population of WRPs will not be sensitive to this clearing.

The remediation works will involve the clearing of ~1.3 ha of WRP habitat at CDP (0.02% of the regional habitat) and ~7.1 ha at South Capel (0.08% of the regional habitat) (Harewood 2018c). The geographic extent of the clearing is very small compared to the available habitat likely to be present within adjoining and nearby areas, and within areas further afield (12 km) of each site, most of which is within Reserves and National Parks (Harewood 2018c). The WRPs are not near the limit of the species range and are common within the Bunbury / Capel / Busselton area (Harewood 2018c). Clearing of the small areas will not affect the regions ability to provide suitable habitat in enough quantity to support the persistence of the WRP.

The removal of the vegetation will not fragment any linkages to other areas (Harewood 2018c). There are large areas of habitat in adjoining and nearby areas likely to also support WRPs (Harewood 2018c). Only a small number of WRPs will be displaced at each site and the species can be expected to persist in adjoining and nearby areas (Harewood 2018c). Individuals are to be relocated nearby and their genetic contribution will therefore be maintained and not lost.

The proposed action will not have an impact on WRP populations or species.

## 2 Black cockatoos

### 2.1 Potential impact to black cockatoos

Fauna surveys carried out by Harewood (2018a, 2018b) identified the presence or likely presence of the following black cockatoo species (or their habitat) listed as threatened (Vulnerable to Endangered) under the EPBC Act for the proposed action:

- *Calyptorhynchus latirostris*, Carnaby's Cockatoo – Endangered;
- *Calyptorhynchus baudinii*, Baudin's Cockatoo – Endangered; and
- *Calyptorhynchus banksii naso*, Forest Red-tailed Black Cockatoo – Vulnerable.

#### 2.1.1 Capel Dry Plant

Within the remediation area, 22 trees with a Diameter at Breast Height (DBH) of >50 cm are present (**Figure 1**). Six trees were marri and nine were tuart, with 10 unidentified non-endemic eucalypt trees represented by at least two, presumed eastern states, species; it is not confirmed that these tree species have the propensity to develop hollows suitable for black cockatoos (Harewood 2018a). None of the trees appeared to contain hollows of any size (Harewood 2018a).

The fauna survey by Harewood (2018a) showed evidence of Baudin's Black Cockatoo and Forest Red-tailed Black Cockatoo. No evidence of Carnaby's Black Cockatoo was observed; however, the species is known to frequent the general area and so may occur at least occasionally (Harewood 2018b).

Foraging evidence was observed at the site in the form of chewed marri fruits from Forest Red-tailed Black Cockatoo and Baudin's Black Cockatoo. Marri, flooded gum, tuart and bottlebrush (*Callistemon* sp.) are known to be used as a direct food source (i.e. fruits or flowers) by one or more species of black cockatoo. However, while flooded gum, tuart and bottlebrush are tree species documented as being fed upon by black cockatoos, these would not represent a significant proportion of any one birds' diet as these tree species are a high effort, low yield food source (Harewood 2018a). Marri is only represented by a small portion of the vegetation present within the CDP remediation area (~0.23 ha of Marri woodland) with only a few individuals (i.e. six trees).

Overall, the area is not regarded as representing quality foraging habitat for black cockatoos because of the general absence of favoured foraging species (Harewood 2018a).

No existing roosting trees were positively identified during the survey (Harewood 2018).

#### 2.1.2 South Capel

Within the remediation area, 29 trees with a DBH of >50 cm will be removed (**Figure 2**). Only one of the trees proposed to be removed contains hollows; however, the tree is dead and the hollow is too low (<5 m high) and too shallow to be considered suitable for use by black cockatoos (Harewood 2018b). One tree containing two hollows possibly suitable for use by black cockatoos (Harewood 2018b) is within the boundary of the proposed action area however, it will be demarcated and retained (refer to Section 4.1 of the EPBC Act referral form).

The fauna survey by Harewood (2018b) showed evidence of Carnaby's Black Cockatoo and Baudin's Black Cockatoo. No evidence of Forest Red-tailed Black Cockatoo was observed; however, they are known to frequent the general area and so may occur at least occasionally (Harewood 2018b).

Approximately 0.70 ha of potential black cockatoo habitat foraging habitat (i.e. woodland areas containing marri, jarrah and/or banksia) is proposed to be cleared. Clearing has been minimised to the extent possible to safely access and excavate the known and suspected extent of by-product required to be removed.

Foraging evidence has been observed at the site in the form of chewed marri fruits from Carnaby's Black Cockatoo and Baudin's Black Cockatoo. Marri, flooded gum, jarrah, banksia, pine and bottlebrush (*Callistemon* sp.) have been recorded at South Capel and are known to be used as a direct food source (i.e. fruits or flowers) by one or more species of black cockatoo (Harewood 2018b). However, while flooded gum and bottlebrush are tree species documented as being fed upon by black cockatoos, these would not represent a significant proportion of any one birds' diet as these plant species are a high effort, low yield food source (Harewood 2018b). Marri and banksia are only represented by a small portion of the vegetation present and only a small number of pine trees (<5) are present.

Overall, the area is not regarded as representing quality foraging habitat for black cockatoos because of the general absence of favoured foraging species (Harewood 2018b).

No existing roosting trees were positively identified during the survey (Harewood 2018b).

## 2.2 Assessment of significance

### 2.2.1 Referral Guidelines

The *EPBC Act referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered) Calyptorhynchus latirostris, Baudin's cockatoo (vulnerable) Calyptorhynchus baudinii, Forest red-tailed black cockatoo (vulnerable) Calyptorhynchus banksii naso* (Commonwealth of Australia 2012) provides guidance on the actions that have the potential for a significant impact on black cockatoos, these being:

- Actions that have a high risk of significant impacts:
  - 1 Clearing of any known nesting tree.
  - 2 Clearing or degradation of any part of a vegetation community known to contain breeding habitat.
  - 3 Clearing of more than 1 ha of quality foraging habitat.
  - 4 Clearing or degradation (including pruning the top canopy) of a known night roosting site.
  - 5 Creating a gap of greater than 4 km between patches of black cockatoo habitat (breeding, foraging or roosting).
- Actions that have and uncertain risk of significant impacts:
  - 6 Degradation (such as through altered hydrology or fire regimes) of more than 1 ha of foraging habitat. Significance will depend on the level and extent of degradation and the quality of the habitat.
  - 7 Clearing or disturbance in areas surrounding black cockatoo habitat that has the potential to degrade habitat through introduction of invasive species, edge effects, hydrological changes, increased human visitation or fire.
  - 8 Actions that do not directly affect the listed species but that have the potential for indirect impacts such as increasing competitors for nest hollows.
  - 9 Actions with the potential to introduce known plant diseases such as *Phytophthora* spp. to an area where the pathogen was not previously known.
- Actions that have a low risk of significant impacts:
  - Actions that do not affect black cockatoo habitat or individuals.
  - Actions whose impacts occur outside the modelled distribution of the three black cockatoos.

An assessment of each of these criteria with respect to the proposed development is provided in **Table 3**.

**Table 3 Assessment of Significant Impact using Criteria for Black Cockatoos**

Criteria	Assessment of Significant Impact on Black Cockatoos	
	Capel Dry Plant	South Capel
<i>Actions that have a high risk of significant impacts</i>		
Clearing of any known nesting tree.	The proposed action will not impact upon any known nesting tree.	The proposed action will not impact upon any known nesting tree.
Clearing or degradation of any part of a vegetation community known to contain breeding habitat.	<p>Overall, the proposed action will remove 22 habitat trees (i.e. trees with a DBH &gt;50 cm) at CDP. None contain hollows of any size.</p> <p>There is significant amount of native vegetation within 12 km of the subject sites, much of which would also contain habitat trees (Harewood 2018c). The removal of these 22 trees will have no measurable impact on black cockatoos (Harewood 2018c).</p> <p>Therefore, no significant impact is anticipated as a result of the proposed action.</p>	<p>Overall, the proposed action will remove 28 habitat trees (i.e. trees with a DBH &gt;50 cm) at South Capel. Only one tree proposed to be removed contains hollows; however, the tree is dead and the hollow is too low (&lt;5 m high) and too shallow to be considered suitable for use by black cockatoos (Harewood 2018b). One tree containing two hollows possibly suitable for use by black cockatoos (Harewood 2018b) is within the boundary of the proposed action area; however, it will be demarcated and retained (see Section 4.1 of the EPBC Act referral form).</p> <p>The probability that this or any of the other identified potential breeding trees would ever be used by cockatoos for breeding can be considered to be very low (Harewood 2018c).</p> <p>There is significant amount of native vegetation within 12 km of the subject sites, much of which would also contain habitat trees (Harewood 2018c). The removal of these 28 trees will have no measurable impact on black cockatoos (Harewood 2018c).</p> <p>Therefore, no significant impact is anticipated as a result of the proposed action.</p>
Clearing of more than 1 ha of quality foraging habitat.	The proposed clearing will not impact on more than 1 ha of quality foraging habitat.	The proposed clearing will not impact on more than 1 ha of quality foraging habitat.
Clearing or degradation (including pruning the top canopy) of a known night roosting site.	The proposed clearing will not impact on any known roosting trees.	The proposed clearing will not impact on any known roosting trees.
Creating a gap of greater than 4 km between patches of black cockatoo habitat (breeding, foraging or roosting)	The proposed clearing will not create a gap of greater than 4 km between patches of black cockatoo habitat.	The proposed clearing will not create a gap of greater than 4 km between patches of black cockatoo habitat.
<i>Actions that have and uncertain risk of significant impacts</i>		
Degradation (such as through altered hydrology or fire regimes) of more than 1 ha of foraging habitat. Significance will depend on the level and extent of degradation and the quality of the habitat.	The proposed clearing will not result in the degradation of any adjoining or nearby areas of black cockatoo foraging habitat (Harewood 2018c).	The proposed clearing will not result in the degradation of any adjoining or nearby areas of black cockatoo foraging habitat (Harewood 2018c).

Criteria	Assessment of Significant Impact on Black Cockatoos	
	Capel Dry Plant	South Capel
Clearing or disturbance in areas surrounding black cockatoo habitat that has the potential to degrade habitat through introduction of invasive species, edge effects, hydrological changes, increased human visitation or fire.	<p>The proposed clearing will not result in the clearing or disturbance of any adjoining or nearby areas of black cockatoo foraging habitat (Harewood 2018c).</p> <p>The remediation project is seeking to ameliorate groundwater quality and therefore, the groundwater available to downstream receptors will increase in quality and quantity. Drainage features to be constructed (especially at south Capel) will ensure that surface water flows are maintained, reducing the potential for flooding (upstream) or water reduction (downstream). Fencing will be erected to discourage human visitation and use of the areas.</p>	<p>The proposed clearing will not result in the clearing or disturbance of any adjoining or nearby areas of black cockatoo foraging habitat (Harewood 2018c).</p> <p>The remediation project is seeking to ameliorate groundwater quality and therefore, the groundwater available to downstream receptors will increase in quality and quantity. Drainage features to be constructed (especially at south Capel) will ensure that surface water flows are maintained, reducing the potential for flooding (upstream) or water reduction (downstream). Fencing will be erected to discourage human visitation and use of the areas.</p>
Actions that do not directly affect the listed species but that have the potential for indirect impacts such as increasing competitors for nest hollows.	<p>The proposed clearing a will not result in any indirect impacts on black cockatoos or their habitat with impact being strictly confined to the proposed action footprint (Harewood 2018c). The proposed action areas are not used for breeding and would not increase competition for nest hollows.</p> <p>The intent of the proposed action is to improve the quality of the environment by consolidating and containing by-products to ameliorate groundwater quality, which will improve the general condition of the environment and therefore, would be of benefit to black cockatoos.</p>	<p>The proposed clearing a will not result in any indirect impacts on black cockatoos or their habitat with impact being strictly confined to the proposed action footprint (Harewood 2018c). The proposed action areas are not used for breeding and would not increase competition for nest hollows.</p> <p>The intent of the proposed action is to improve the quality of the environment by consolidating and containing by-products to ameliorate groundwater quality, which will improve the general condition of the environment and therefore, would be of benefit to WRPs. black cockatoos.</p>
Actions with the potential to introduce known plant diseases such as <i>Phytophthora</i> spp. to an area where the pathogen was not previously known.	<p>The proposed clearing has little or no potential to spread plant diseases into black cockatoo habitat areas where they are currently not present (Harewood 2108c). Due to the historical disturbance at the site, <i>Phytophthora</i> species may already be present.</p>	<p>The proposed clearing has little or no potential to spread plant diseases into black cockatoo habitat areas where they are currently not present (Harewood 2108c). Due to the historical disturbance at the site, <i>Phytophthora</i> species may already be present.</p>
Risk of Significant Impact?	<p>Based in the above criteria and available information, the proposed action will not have an impact on black cockatoo habitat. The removal of potential habitat trees is not considered to be a significant impact considering (Harewood 2018c):</p> <ul style="list-style-type: none"> <li>- the small areas involved;</li> <li>- poor quality of much of the habitat;</li> <li>- lack of current breeding activity; and</li> <li>- the presence of thousands of hectares of better quality habitat in nearby areas, much of it located within Reserves and National Parks.</li> </ul> <p>In addition, the proposed action is not at the range extent for all three of the black cockatoo species habitat as the Capel area is well within their range (Commonwealth of Australia 2012).</p>	

## 2.2.2 Significant Impact Guidelines

The Significant Impact Guidelines 1.1 (Commonwealth of Australia 2013) provides more detailed guidance related to what may constitute a significant impact. An assessment of the criteria contained within the significant Impact guidelines document with respect black cockatoos and the proposed development are provided in **Table 4**.

The criteria in the significant impact guidelines refer to ‘populations’ and ‘important populations’. It should be noted that these terms have not been defined for black cockatoos, due to the mobile and widely-distributed nature of these species, and the variation in flock compositions (for example, between breeding and non-breeding seasons). The Department of the Environment and Energy therefore recommends that for black cockatoos, it is more appropriate to consider significance in terms of impacts on habitat rather than a resident population (Commonwealth of Australia 2012).

For this reason, the assessment provided in **Table 4** addresses criteria with respect to possible habitat loss and not direct impacts on individual birds or populations of birds, though some criteria may be considered irrelevant for assessing impact on black cockatoos given their non-sedentary habits.

**Table 4 Assessment of Significant Impact using Criteria for Vulnerable/Endangered Species**

Criteria	Assessment of Significant Impact on Black Cockatoos	
	Capel Dry Plant	South Capel
Lead to a long-term decrease in the size of an important population / population of a species?	<p>The area of potential / existing habitat that may be lost as a consequence of the proposal proceeding is relatively small; 22 habitat trees and a small area (~0.23 ha – woodlands containing marri) of foraging habitat. The removal of the vegetation is unlikely to impact on a significant number of cockatoos or result in long term decrease in population numbers (Harewood 2018c).</p> <p>The clearing area contains no trees with hollows possibly suitable for breeding. The probability that any of these ‘potential breeding trees’ (DBH &gt;50 cm) would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low (Harewood 2018c).</p> <p>The foraging habitat present is only likely to provide sufficient food to support a very small number of cockatoos per year (Harewood 2018c).</p> <p>The proposed clearing will not result in the clearing or disturbance of any adjoining or nearby areas of black cockatoo foraging habitat (Harewood 2018c).</p> <p>There is approximately 8,195 ha of native vegetation and ~445 ha of pine plantations within 12 km of the CDP area. A significant portion of this vegetation is located within the Tuart Forest National Park (3,030 ha) and the Capel Nature Reserve (94 ha). A high percentage of the remnant vegetation in the general vicinity is likely to represent potential black cockatoo habitat and it is anticipated that black cockatoos will continue to utilise these areas despite any development of the proposed action (Harewood 2018c).</p> <p>Therefore, the clearing will not impact the size of a population as a result of the proposed action.</p>	<p>The area of potential/existing habitat that may be lost as a consequence of the proposal proceeding is relatively small; up to 29 habitat trees and a small area (~0.70 ha – areas of woodland containing marri, jarrah and/or banksia) of foraging habitat. The removal of this vegetation is unlikely to impact on a significant number of cockatoos or result in long term decrease in population numbers Harewood 2018c).</p> <p>The proposal will not clear trees with hollows possibly suitable for breeding. The probability that any of these ‘potential breeding trees’ (DBH &gt;50 cm) would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low (Harewood 2018c).</p> <p>One tree containing two hollows possibly suitable for use by black cockatoos (Harewood 2018b) is within the boundary of the proposed action area. Despite no evidence for its use as a breeding tree (Harewood 2018b), it will be demarcated and retained.</p> <p>The foraging habitat present is only likely to provide sufficient food to support a very small number of cockatoos per year (Harewood 2018c).</p> <p>There is approximately 7,920 ha of native vegetation and ~500 ha of pine plantations within 12 km of the South Capel area. A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve. A high percentage of the remnant vegetation in the general vicinity is likely to represent potential black cockatoo habitat and it is anticipated that black cockatoos will continue to utilise these areas despite any development at the subject site (Harewood 2018c).</p> <p>Therefore, the clearing will not impact the size of a population as a result of the proposed action.</p>

Criteria	Assessment of Significant Impact on Black Cockatoos	
	Capel Dry Plant	South Capel
Reduce the area of occupancy of an important population / population of the species?	<p>The area of occupancy of black cockatoos will not reduce in any material way as a consequence of the proposed action considering the very small size of the area to be affected. Approximately 0.003% of the potential / existing black cockatoo habitat, including pines, within 12 km of the site will be disturbed, therefore, black cockatoos will persist in the area (Harewood 2018c).</p> <p>In addition, the proposed action is not at the range extent for all three of the black cockatoo species habitat as the Capel area is well within their range (Commonwealth of Australia 2012).</p>	<p>The area of occupancy of black cockatoos will not reduce in any material way as a consequence of the proposed action considering the very small size of the area to be affected. Approximately 0.008% of the potential / existing black cockatoo habitat, including pines, within 12 km of the site will be disturbed, therefore, black cockatoos will persist in the area (Harewood 2018c).</p> <p>In addition, the proposed action is not at the range extent for all three of the black cockatoo species habitat as the Capel area is well within their range (Commonwealth of Australia 2012).</p>
Fragment an existing important population / population into two or more populations?	<p>The proposed clearing of cockatoo habitat covers a very small area and will not create a barrier to black cockatoo movement in the area, and therefore, will not fragment populations (Harewood 2018c).</p>	<p>The proposed clearing of cockatoo habitat covers a very small area and will not create a barrier to black cockatoo movement in the area, and therefore, will not fragment populations (Harewood 2018c).</p>
Adversely affect habitat critical to the survival of a species?	<p>The area of potential / existing habitat that may be lost as a consequence of the proposed action is relatively small; 22 habitat trees and a small area ~0.23 ha of foraging habitat. The removal of the vegetation is unlikely to impact on a significant number of cockatoos (Harewood 2018c).</p> <p>The clearing area contains no trees with hollows possibly suitable for breeding. The probability that any of these potential breeding trees would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low (Harewood 2018c).</p> <p>The foraging habitat present has a limited extent and is only likely to provide sufficient food to support a very small number of cockatoos per year (Harewood 2018c).</p> <p>There is approximately 8,195 ha of native vegetation and 445 ha of pine plantations within 12 km of CDP. A significant portion of this vegetation is located within the Tuart Forest National Park (3,030 ha) and the Capel Nature Reserve (94 ha). A high percentage of the remnant vegetation in the general vicinity is likely to represent potential black cockatoo habitat and it is anticipated that black cockatoos will continue to use these areas despite development of the proposed action (Harewood 2018c).</p> <p>The proposed clearing of cockatoo habitat covers a very small area and will not create a barrier to black cockatoo movement in the area, and therefore, will not fragment populations (Harewood 2018c).</p> <p>Therefore, the clearing will not impact habitat critical to the survival of a species as a result of the proposed action.</p>	<p>The area of potential / existing habitat that may be lost as a consequence of the proposal proceeding is relatively small; 29 habitat trees and ~0.70 ha of foraging habitat. The vegetation onsite is unlikely to represent habitat critical to the survival of black cockatoos (Harewood 2018c).</p> <p>The proposal will not clear trees with hollows possibly suitable for breeding. The probability that any of these potential breeding trees would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low (Harewood 2018c).</p> <p>One tree containing two hollows possibly suitable for use by black cockatoos (Harewood 2018b) is within the boundary of the proposed action area. Despite no evidence for its use as a breeding tree (Harewood 2018b), it will be demarcated and retained.</p> <p>The foraging habitat present has a limited extent and is only likely to provide sufficient food to support a very small number of cockatoos per year (Harewood 2018c).</p> <p>There is approximately 7,920 ha of native vegetation and ~500 ha of pine plantations within 12 km of South Capel. A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve. A high percentage of the remnant vegetation in the general vicinity is likely to represent potential black cockatoo habitat and it can be expected that black cockatoos will continue to use these areas despite development of the proposed action (Harewood 2018c).</p> <p>The proposed clearing of cockatoo habitat covers a very small area and will not create a barrier to black cockatoo movement in the area, and therefore, will not fragment populations (Harewood 2018c).</p> <p>Therefore, the clearing will not impact habitat critical to the survival of a species as a result of the proposed action.</p>

Criteria	Assessment of Significant Impact on Black Cockatoos	
	Capel Dry Plant	South Capel
Disrupt the breeding cycle of an important population / population?	<p>The clearing area contains no trees with hollows possibly suitable for breeding. The probability that any of the potential breeding trees would ever develop hollows of a suitable size for use by cockatoos for breeding can be considered to be very low (Harewood 2018c).</p> <p>There is approximately 8,195 ha of native vegetation and 445 ha of pine plantations within 12 km of the subject site. A significant portion of this vegetation is located within the Tuart Forest National Park (3,030 ha) and the Capel Nature Reserve (94 ha). A high percentage of the remnant vegetation in the general vicinity is likely to represent potential black cockatoo habitat and it is anticipated that black cockatoos will continue to use these areas despite development of the proposed action (Harewood 2018c).</p> <p>Therefore, the clearing will not impact the breeding cycle of an important population / population as a result of the proposed action.</p>	<p>No trees with hollows possibly suitable for breeding will be cleared. The probability that any of the potential breeding trees would ever develop hollows of a suitable size for use by cockatoos for breeding can be considered to be very low (Harewood 2018c).</p> <p>One tree containing two hollows possibly suitable for use by black cockatoos (Harewood 2018b) is within the boundary of the proposed action area. Despite no evidence for its use as a breeding tree (Harewood 2018b), it will be demarcated and retained.</p> <p>There is approximately 7,920 ha of native vegetation and ~500 ha of pine plantations within 12 km of the subject site. A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve. A high percentage of the remnant vegetation in the general vicinity is likely to represent potential black cockatoo habitat and it is anticipated that black cockatoos will continue to use these areas despite development of the proposed action.</p> <p>Therefore, the clearing will not impact the breeding cycle of an important population / population as a result of the proposed action.</p>

Criteria	Assessment of Significant Impact on Black Cockatoos	
	Capel Dry Plant	South Capel
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<p>The area of potential / existing habitat that may be lost as a consequence of the proposed action is relatively small; 22 habitat trees and a small area ~0.23 ha of foraging habitat. The removal of the vegetation is unlikely to impact on a significant number of cockatoos (Harewood 2018c).</p> <p>The clearing area contains no trees with hollows possibly suitable for breeding. The probability that any of these potential breeding trees would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low (Harewood 2018c).</p> <p>The foraging habitat present has a limited extent and is only likely to provide sufficient food to support a very small number of cockatoos per year (Harewood 2018c).</p> <p>The area of occupancy of black cockatoos will not significantly reduce as a consequence of the proposed action considering the very small size of the area to be affected. Approximately 0.003% of the potential / existing black cockatoo habitat, including pines, within 12 km of the site will be disturbed, therefore, black cockatoos will persist in the area (Harewood 2018c). The proposed clearing of cockatoo habitat will not create a barrier to black cockatoo movement in the area (Harewood 2018c).</p> <p>Therefore, the clearing will not impact habitat to the extent that the species is likely to decline as a result of the proposed action.</p>	<p>The area of potential / existing habitat that may be lost as a consequence of the proposal proceeding is relatively small; 29 habitat trees and ~0.70 ha of foraging habitat. The vegetation onsite is unlikely to represent habitat critical to the survival of black cockatoos (Harewood 2018c).</p> <p>The proposal will not clear trees with hollows possibly suitable for breeding. The probability that any of these potential breeding trees would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low (Harewood 2018c).</p> <p>One tree containing two hollows possibly suitable for use by black cockatoos (Harewood 2018b) is within the boundary of the proposed action area. Despite no evidence for its use as a breeding tree (Harewood 2018b), it will be demarcated and retained.</p> <p>The foraging habitat present has a limited extent and is only likely to provide sufficient food to support a very small number of cockatoos per year (Harewood 2018c).</p> <p>The area of occupancy of black cockatoos will not significantly reduce as a consequence of the proposed action considering the very small size of the area to be affected. Approximately 0.008% of the potential / existing black cockatoo habitat, including pines, within 12 km of the site will be disturbed, therefore, black cockatoos will persist in the area (Harewood 2018c). The proposed clearing of cockatoo habitat will not create a barrier to black cockatoo movement in the area (Harewood 2018c).</p> <p>Therefore, the clearing will not impact habitat to the extent that the species is likely to decline as a result of the proposed action.</p>
Result in invasive species that are harmful to a vulnerable / endangered species becoming established in the vulnerable / endangered species' habitat?	<p>The proposed action is unlikely to result in introduction of any new harmful invasive species; the area is already inhabited by foxes, cats and corellas (Harewood 2018c).</p>	<p>The proposed action is unlikely to result in introduction of any new harmful invasive species; the area is already inhabited by foxes, cats and corellas (Harewood 2018c).</p>
Introduce disease that may cause the species to decline?	<p>The proposed action is unlikely to introduce a disease that would impact on black cockatoos (Harewood 2018c).</p>	<p>The proposed action is unlikely to introduce a disease that would impact on black cockatoos (Harewood 2018c).</p>

Criteria	Assessment of Significant Impact on Black Cockatoos	
	Capel Dry Plant	South Capel
Interfere substantially with the recovery of the species.	<p>The population growth of the black cockatoos is primarily limited by factors associated with breeding. Consequently, priority areas for the recovery of the species are currently focused on known breeding sites (Cale 2003, as referenced by Harewood 2018c).</p> <p>The clearing area does not represent a known breeding site and it contains no trees with hollows possibly suitable for breeding. It is therefore unlikely that development of the site will interfere substantially with the recovery of any of the black cockatoo species (Harewood 2018c).</p> <p>The intent of the proposed action is to improve the quality of the environment by consolidating and containing by-products to ameliorate groundwater quality, which will improve the general condition of the environment and therefore, would be of benefit to black cockatoos.</p> <p>Therefore, the clearing will not impact the recovery of the species as a result of the proposed action.</p>	<p>The population growth of the black cockatoos is primarily limited by factors associated with breeding. Consequently, priority areas for the recovery of the species are currently focused on known breeding sites (Cale 2003, as referenced by Harewood 2018c).</p> <p>The clearing area does not represent a known breeding site and the proposal will not clear any trees with hollows considered suitable for breeding. One tree containing two hollows possibly suitable for use by black cockatoos (Harewood 2018b) is within the boundary of the proposed action area. Despite no evidence for its use as a breeding tree (Harewood 2018b), it will be demarcated and retained.</p> <p>The intent of the proposed action is to improve the quality of the environment by consolidating and containing by-products to ameliorate groundwater quality, which will improve the general condition of the environment and therefore, would be of benefit to WRP. black cockatoos.</p> <p>Therefore, the clearing will not impact the recovery of the species as a result of the proposed action.</p>
Criteria	Assessment of Significant Impact on Black Cockatoos	
Is a Significant Impact Expected?	<p>Based on available information, the proposed action will not have an impact on black cockatoo populations or species. Both areas to be cleared will not:</p> <ul style="list-style-type: none"> <li>- lead to a significant long-term decrease in the size of a population;</li> <li>- significantly reduce the area of occupancy of the species;</li> <li>- fragment existing populations;</li> <li>- adversely affect habitat critical to the survival of the species;</li> <li>- significantly disrupt the breeding cycle of a population;</li> <li>- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;</li> <li>- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or endangered species' habitat;</li> <li>- introduce disease that may cause the species to decline; or</li> <li>- interfere substantially with the recovery of the species.</li> </ul> <p>This conclusion is justified when considering the small areas involved, poor quality of much of the habitat, lack of current breeding activity and the presence of thousands of hectares of better quality habitat in nearby areas, much within Reserves and National Parks (Harewood 2018c).</p> <p>Clearing will not create a barrier to black cockatoo movement in the area nor fragment habitats (Harewood 2018c). The proposed action is not at the range extent for all three of the black cockatoo species habitat; the Capel area is well within their range (Commonwealth of Australia 2012).</p>	

## 2.3 Summary

The vegetation at CDP and South Capel is of poor quality, being largely regrowth or planted vegetation from previous mining or mining related activities (Endemic 2013, Ecoedge 2015).

The magnitude of clearing black cockatoo potential habitat trees at both CDP and South Capel is 51 trees (i.e. trees with a DBH >50 cm). No hollows observed in the majority (50) of these trees (Harewood 2018a, 2018b). Only one tree proposed to be removed contains hollows; however, the tree is dead and the hollow is too low (<5 m high) and too shallow to be considered suitable for use by black cockatoos (Harewood 2018b). One tree containing two hollows possibly suitable for use by black cockatoos (Harewood 2018b) is within the boundary of the proposed action areas; however, it will be demarcated and retained. No roosting trees were identified (Harewood 2018a, 2018b).

The magnitude of quality black cockatoo foraging habitat to be cleared is ~0.93 ha; a relatively small amount (Harewood 2018c). The remediation works will involve the clearing of ~0.23 ha of black cockatoo foraging habitat at CDP (0.003% of the regional habitat, including pines) and ~0.70 ha at South Capel (0.008% of the regional habitat, including pines) (Harewood 2018c). The geographic extent of the clearing is very small compared to the available habitat likely to be present within adjoining and nearby areas, and within areas further afield (12 km) of each site, most of which is within Reserves and National Parks (Harewood 2018c). Furthermore, the proposed action is not at the range extent for all three of the black cockatoo species habitat; the Capel area is well within their range (Commonwealth of Australia 2012).

The areas proposed to be cleared have limited value considering the small area to be cleared and the lack of breeding activity. Clearing will not create a barrier to black cockatoo movement in the area nor fragment habitats (Harewood 2018c).

The proposed action will not have an impact on black cockatoo populations or species.

### 3 References

Cale, B. (2003). Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan 2002-2012. CALM, Wanneroo.

Commonwealth of Australia (2009a). *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Policy Statement 3.10 "Significant Impact Guidelines for the vulnerable western ringtail possum (*Pseudocheirus occidentalis*) in the southern Swan Coastal Plain, Western Australia.*

Commonwealth of Australia (2009b). Background Paper to the *EPBC Act Policy Statement 3.10 – Nationally Threatened Species and Ecological Communities. "Significant Impact Guidelines for the vulnerable western ringtail possum (*Pseudocheirus occidentalis*) in the southern Swan Coastal Plain, Western Australia".*

Commonwealth of Australia (2012). *EPBC Act Referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered) *Calyptorhynchus latirostris*, Baudin's cockatoo (vulnerable) *Calyptorhynchus baudinii*, Forest red-tailed black cockatoo (vulnerable) *Calyptorhynchus banksii naso*.*

Commonwealth of Australia (2013). *EPBC Act - Principal Significant Impact Guidelines 1.1, Matters of National Environmental Significance. EPBC Act Policy Statement.*

Ecoedge 2015, *Report of Level 1 Flora and Vegetation survey at the Capel Dry Plant, Capel.* Prepared for Iluka Resources Ltd, Perth, Western Australia.

Endemic 2013, *South Capel Flora and Vegetation Assessment*, Prepared by for Iluka Resources Ltd, Perth, Western Australia.

Harewood, G. 2018a, *Fauna Assessment, Capel Dry Plant, South Capel Remediation Project*, Prepared for Iluka Resources Ltd. Perth, Western Australia.

Harewood, G. 2018b, *Fauna Assessment – South Capel*. Unpublished report for Iluka Resources.

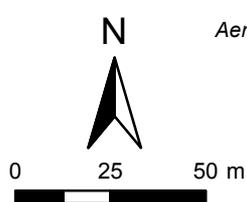
Harewood, G. 2018c, *South Capel Remediation Project: Assessment against Significance Guidelines with respect to Matters of National Environmental Significance*. Letter report prepared for Iluka Resources.





**Legend**

- Clearing Area
- WRP Habitat**
- Flooded Gum Open Woodland
- Planted endemic and non-endemic trees, exotic trees and shrubs
- WRP and BC Foraging Habitat**
- Marri Open Woodland
- BC Breeding Habitat**
- BC Potential Breeding Trees



Aerial Photograph: Nov.2016

**CAPEL DRY PLANT**

**FAUNA HABITAT**



**ILUKA**

### Legend

Clearing Area

Fauna Survey boundary

Cadastre

### Black Cockatoo potential habitat trees

Habitat Tree - One or more large hollows possibly suitable for black cockatoos

Habitat Tree - One or more possible small/medium hollows

Habitat Tree - No hollows seen

### Fauna habitat

Banksia or Paperbark low woodland

Flooded Gum woodland

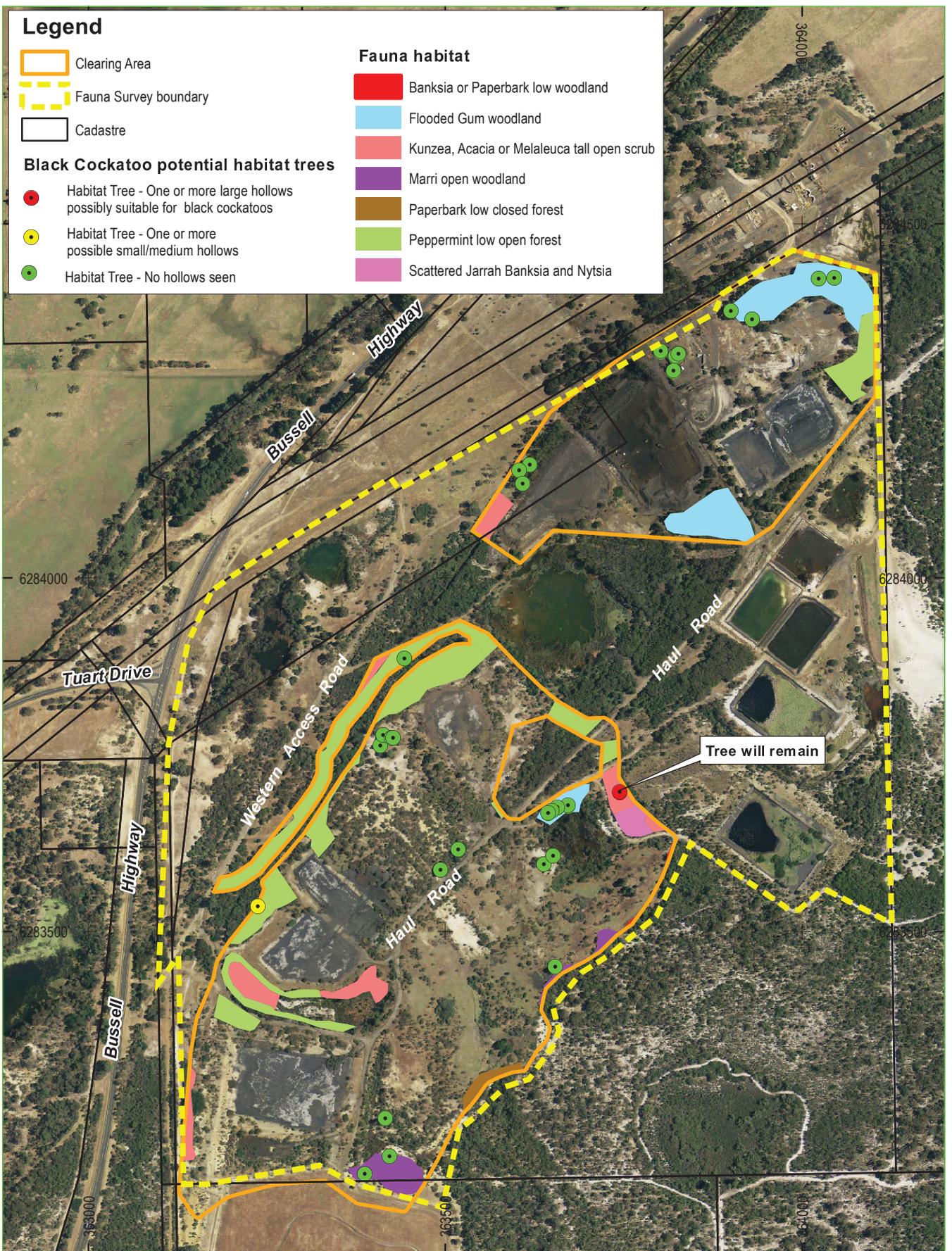
Kunzea, Acacia or Melaleuca tall open scrub

Marri open woodland

Paperbark low closed forest

Peppermint low open forest

Scattered Jarrah Banksia and Nyssia



N

Aerial Photograph: Dec. 2013



MGA Coordinates, GDA94

## SOUTH CAPEL REMEDIATION PROJECT

# FAUNA HABITAT



**ILUKA**

**Appendix A: South Capel Remediation Project: Assessment against Significance Guidelines with respect to Matters of National Environmental Significance (Harewood 2018c)**

Greg Harewood  
Zoologist  
PO Box 755  
BUNBURY WA 6231  
20 June 2018

Angela Bishop  
Manager Environmental Regulations  
Iluka Resources Limited  
140 St Georges Terrace  
PERTH WA 6000

Dear Angela

**South Capel Remediation Project (SCRP): Assessment against Significance Guidelines with respect to Matters of National Environmental Significance**

Fauna assessments have recently been carried out by the Author over areas of land located in South Capel and Capel which are associated with the South Capel Remediation Project (SCRP) (Figure 1 & 2). The assessments (Harewood 2018a & 2018b) identified the presence or likely presence of a number of fauna species listed as threatened under the federal *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act).

Iluka has evaluated options to remediate and/or manage the areas. The methods to be employed to remediate and/or manage the areas require the removal of some vegetation in use or possibly in use by the identified federally listed threatened species. This letter report provides an assessment of significant impact on these species that may occur as a consequence of this proposed action.

EPBC Act listed threatened fauna species (or their habitat) identified as being present in the subject site were:

- *Pseudocheirus occidentalis* Western Ringtail Possum – Critically Endangered<sup>1</sup>;
- *Calyptorhynchus latirostris* Carnaby's Cockatoo – Endangered;
- *Calyptorhynchus baudinii* Baudin's Cockatoo – Endangered; and
- *Calyptorhynchus banksii naso* Forest Red-tailed Black Cockatoo – Vulnerable.

No EPBC Act listed migratory fauna species (or their habitat) were identified as being present or likely to be present within the subject site.

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<sup>1</sup> The classification of the Western Ringtail Possum was changed from Vulnerable to Critically Endangered on 11 May 2018 (<http://www.environment.gov.au/news/2018/05/11/amendments-epbc-act-list-threatened-species>). The Harewood (2018a; 2018b) fauna survey reports were completed prior to this date and therefore these reports assign the original classification to the Western Ringtail Possum.

The following EPBC Act listed threatened/migratory fauna species (or their habitat) were determined as part of the fauna assessment not to be present in the subject site despite appearing in some database/literature searches. Their exclusion from the potential species list is primarily justified by an obvious lack of suitable habitat or known local extinction. It is also very unlikely that vegetation within the subject site represents habitat critical for the recovery of the respective threatened species in the area. These species will not be discussed further:

- *Nannatherina balstoni* Balston's Pygmy Perch – Vulnerable;
- *Leipoa ocellata* Malleefowl – Vulnerable;
- *Plegadis falcinellu* Glossy Ibis – Migratory;
- *Pandion haliaetus* Eastern Osprey – Migratory;
- *Botaurus poiciloptilus* Australasian Bittern – Endangered;
- *Apus pacificus* Fork-tailed Swift – Migratory;
- *Motacilla cinerea* Grey Wagtail – Migratory;
- *Dasyurus geoffroii* Chuditch – Vulnerable;
- *Macrotis lagotis* Greater Bilby – Vulnerable;
- *Setonix brachyurus* Quokka – Vulnerable;
- *Bettongia penicillata ogibyi* Woylie – Endangered; and
- Various other migratory shorebirds, wetland species or marine species.

Currently, for the species in question, “significant impact” and/or guidelines for referral are defined within four documents, these being:

- Commonwealth of Australia (2009a). Background Paper to the *EPBC Act* Policy Statement 3.10 – Nationally Threatened Species and Ecological Communities. “Significant Impact Guidelines for the vulnerable western ringtail possum (*Pseudocheirus occidentalis*) in the southern Swan Coastal Plain, Western Australia”.
- Commonwealth of Australia (2009b). *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* Policy Statement 3.10 “Significant Impact Guidelines for the vulnerable western ringtail possum (*Pseudocheirus occidentalis*) in the southern Swan Coastal Plain, Western Australia.
- Commonwealth of Australia (2012). *EPBC Act* referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered) *Calyptorhynchus latirostris*, Baudin's cockatoo (vulnerable) *Calyptorhynchus*

*baudinii*, Forest red-tailed black cockatoo (vulnerable) *Calyptorhynchus banksii naso*.

- Commonwealth of Australia (2013). *EPBC Act - Principal Significant Impact Guidelines 1.1, Matters of National Environmental Significance. EPBC Act Policy Statement.*

An assessment of significant impact on federally listed fauna species using criteria within the abovementioned documents are provided below.

## **Western Ringtail Possum**

At the Capel site, it has been estimated that about 1.3 hectares of vegetation used or potentially used by WRPs (i.e. marri and flooded gum woodland and areas of planted regrowth vegetation) will be impacted upon (Harewood 2018a).

At South Capel, potential WRP habitat within the proposed clearing area amounts to about 7.1 ha (i.e. all areas of woodland, forest or tall shrubland) (Harewood 2018b).

### **Referral Guidelines**

The document titled “Significant Impact Guidelines for the vulnerable western ringtail possum (*Pseudocheirus occidentalis*) in the southern Swan Coastal Plain, Western Australia” (Commonwealth of Australia 2009) summarises what scale of actions would be considered likely to have a “significant impact” on western ringtail possums (WRP).

Within the background paper to the policy statement, an action is deemed likely to have a significant impact on the WRP in the southern Swan Coastal Plain region if it:

- reduces the ability of the region to support the persistence of the WRP;
- modifies, destroys, removes or isolates important remnant habitat patches, or decreases the availability or quality of remnant habitat patches;
- adversely affects connections between important areas; or
- interferes substantially with the ability of the area to effectively contribute to the recovery of the species.

An assessment of each of these criteria with respect to the proposed development are provided in the table below.

**Assessment of Significant Impact using Criteria for WRP in the southern Swan Coastal Plain region (Commonwealth of Australia 2009)**

Criteria	Assessment of Impact of the Proposed Action on Western Ringtail Possums.
<p>Reduces the ability of the region to support the persistence of the WRP</p>	<p><b>Capel:</b> It has been estimated that about 1.3 ha of WRP habitat will be directly impacted upon as a consequence of the proposed works. Based on available vegetation mapping it is estimated that there is approximately 8,195 ha of native vegetation within 12 km of the subject site, much of which would be WRP habitat (i.e. various vegetation complexes containing woodland dominated vegetation units with a midstorey component – Webb <i>et al.</i> 2016). A significant portion of this vegetation is located within the Tuart Forest National Park (total area 3,030 ha) and the Capel Nature Reserve (94 ha). The loss of 0.02% of WRP habitat in the region will have no measurable impact on its ability to support the persistence of WRPs.</p> <p><b>South Capel:</b> It has been estimated that about 7.1 ha of WRP-habitat is present within the proposed clearing area at South Capel. Based on available vegetation mapping it is estimated that there is approximately 7,920 ha of native vegetation within 12 km of the subject site, much of which would be WRP habitat (i.e. various vegetation complexes containing woodland dominated vegetation units with a midstorey component – Webb <i>et al.</i> 2016). A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve. The loss of 0.08% of WRP habitat in the region will have no measurable impact on its ability to support the persistence of WRPs.</p>
<p>Modifies, destroys, removes or isolates important remnant habitat patches, or decreases the availability or quality of remnant habitat patches.</p>	<p><b>Capel:</b> The Capel site only supports a small number of WRPs (about 10 individuals recorded, three of which were observed within the proposed clearing area) and is largely comprised of planted non-endemic vegetation. It is therefore unlikely to represent “an important remnant habitat patch”. The removal of 1.3 ha of vegetation from within the Capel site will not result in the isolation, or the reduction of availability or quality of other remnant habitat patches.</p> <p><b>South Capel:</b> The South Capel site only supports a small number of WRPs (18 individuals recorded, 10 of which were observed within the proposed clearing area) and is largely comprised of planted or regrowth vegetation. It is therefore unlikely to represent “an important remnant habitat patch”. The removal of 7.1 ha of fragmented vegetation from within the South Capel site will not result in the isolation, or the reduction of availability or quality of other remnant habitat patches.</p>

Criteria	Assessment of Impact of the Proposed Action on Western Ringtail Possums.
Adversely affects connections between important areas.	<p><b>Capel:</b> The removal of 1.3 ha of vegetation will not compromise the areas existing linkage value to important areas. Connectivity to other areas of bushland is already very limited with the patchy, degraded bushland along Gavin's Road providing a tenuous linkage to vegetation within the railway reserve to the east. This linkage will be maintained despite proposed works proceeding.</p> <p><b>South Capel:</b> The removal of 7.1 ha of vegetation will not compromise the areas existing linkage value to other areas of habitat or decrease the availability or quality of remnant habitat patches. The subject site contains vegetation that extends outside of its boundaries and these areas will maintain any existing linkage value the remnant vegetation in the area may have despite proposed works proceeding.</p>
Interferes substantially with the ability of the area to effectively contribute to the recovery of the species	<p><b>Capel:</b> It has been estimated that about 1.3 ha of WRP habitat will be directly impacted upon as a consequence of the proposed works. This vegetation is largely comprised (~0.9 ha) of planted trees and shrubs that been used to revegetate the site after historical site works and appears to only support a small number of WRPs. Based on available information it is considered unlikely that this represents habitat critical for the survival of the species. This conclusion is supported by the fact that WRPs are relatively common in the Bunbury/Capel/Busselton area (&gt;4,000 observations at 100 unique locations in the last 5 years - G. Harewood pers. obs.) and other areas of reserved vegetation, much of which would be WRP habitat, are present in nearby locations (e.g. Tuart Forest National Park is approximately 2.5 km to the west and the Capel Nature Reserve is approximately 3 km to the south west).</p> <p><b>South Capel:</b> It has been estimated that about 7.1 ha of WRP habitat will be directly impacted upon as a consequence of the proposed works. This vegetation appears to be largely comprised of a regrowth of peppermint (3.1 ha) that has regenerated after historical mining operations and appears to only support a small number of WRPs. Based on available information. it is considered unlikely that this represents habitat critical for the survival of the species. This conclusion is supported by the fact that WRPs are relatively common in the Bunbury/Capel area (&gt;4,000 observations at 100 unique locations in the last 5 years - G. Harewood pers. obs.) and other areas of reserved vegetation, much of which would be WRP habitat, is present in nearby locations (e.g. Tuart Forest National Park is approximately 1 km to the west and the Capel Nature Reserve is approximately 1 km to the east).</p>

Criteria	Assessment of Impact of the Proposed Action on Western Ringtail Possums.
Is a Significant Impact Expected?	<p><b>No. Based on available information the proposed action (proposed clearing of vegetation at Capel and South Capel) is not considered as likely to have a significant impact.</b></p> <p><b>This conclusion is supported by the fact that proposed clearing in both areas is largely regrowth or planted vegetation from previous mining or mining related activities, the works footprint in both cases is relatively small and is only being utilised by a small number of WRPs. The removal of the vegetation at Capel and South Capel will also not fragment any linkages to other areas. There are large areas of habitat in adjoining and nearby areas known to also support WRPs. Only a small number of WRPs will be displaced at each site and the species can be expected to persist in adjoining and nearby areas despite the proposal proceeding in its current form.</b></p>

### Significant Impact Guidelines

The document “Matters of National Environmental Significance. Significant Impact Guidelines 1.1, *EPBC Act 1999*.” (Commonwealth of Australia 2013) provides detailed criteria related to what may constitute “significant impact”. An assessment of each of the criteria contained within the significant Impact guidelines document with respect to the proposed development are provided in the table below.

Within the table the term ‘population’ is used. A ‘population’ is defined by DotEE (Commonwealth of Australia 2013) as “an occurrence of the species in a particular area”. Occurrences include but are not limited to:

- a geographically distinct regional population, or collection of local populations, or
- a population, or collection of local populations, that occurs within a particular bioregion

It is difficult to define the boundaries of what represents a distinct population as a whole as the species is present in many areas of remnant vegetation on the southern Swan Coastal Plain however the western ringtail possums observed during the surveys at Capel and south Capel most likely represent small subsets of a population or local population that extends from at least Bunbury to Dunsborough.

**Assessment of Significant Impact using Criteria for Critically Endangered Species (western ringtail possum) (Commonwealth of Australia 2013)**

Criteria	Assessment of Impact of the Proposed Action on Western Ringtail Possums.
Lead to a long-term decrease in the size of a population?	<p><b>Capel:</b> It has been estimated that about 1.3 ha of WRP habitat will be directly impacted upon as a consequence of the proposed works. It is considered unlikely that the removal of the small area of habitat in question would result in an overall decrease in population numbers given the presence of significant areas of habitat in the vicinity known to also be in use by WRPs. Based on available vegetation mapping it is estimated that there is approximately 8,195 ha of native vegetation within 12 km of the subject site, much of which would be WRP habitat (i.e. various vegetation complexes containing woodland dominated vegetation units with a midstorey component – Webb <i>et al.</i> 2016). A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve.</p> <p><b>South Capel:</b> It has been estimated that about 7.1 ha of WRP habitat will be directly impacted upon as a consequence of the proposed works. It is considered unlikely that the removal of the small area of habitat in question would result in an overall decrease in population numbers given the presence of significant areas of habitat in the vicinity known to also be in use by WRPs. Based on available vegetation mapping it is estimated that there is approximately 7,920 ha of native vegetation within 12 km of the subject site, much of which would be WRP habitat (i.e. various vegetation complexes containing woodland dominated vegetation units with a midstorey component – Webb <i>et al.</i> 2016). A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve.</p>
Reduce the area of occupancy of the species?	<p><b>Capel:</b> It has been estimated that about 1.3 ha of WRP habitat will be directly impacted upon as a consequence of the proposed works. Suitable habitat of the species exist in surrounding areas, much with national parks and reserves, and therefore the species overall area of occupancy will not be affected.</p> <p><b>South Capel:</b> It has been estimated that about 7.1 ha of WRP habitat will be directly impacted upon as a consequence of the proposed works. Suitable habitat of the species exists in surrounding areas, much with national parks and reserves, and therefore the species overall area of occupancy will not be affected.</p>

Criteria	Assessment of Impact of the Proposed Action on Western Ringtail Possums.
Fragment an existing population into two or more populations?	<p><b>Capel:</b> The removal of 1.3 ha of vegetation will not compromise the areas existing linkage value to other areas of habitat and therefore its removal will not fragment any populations. Connectivity to other areas of bushland is already very limited with the patchy, degraded bushland along Gavin's Road providing a tenuous linkage to vegetation within the railway reserve to the east. This linkage will be maintained despite proposed works proceeding.</p> <p><b>South Capel:</b> The removal of 7.1 ha of vegetation will not compromise the areas existing linkage value to other areas of habitat and therefore its removal will not fragment any populations. The site contains vegetation that extends outside of its boundaries and these areas will maintain any linkage value the remnant vegetation in the area may have.</p>
Adversely affect habitat critical to the survival of a species?	<p><b>Capel:</b> It has been estimated that about 1.3 ha of WRP habitat will be directly impacted upon as a consequence of the proposed works. This vegetation is largely comprised of planted trees and shrubs (~0.9 ha) that been used to revegetate the site after historical site works. Based on available information it is considered unlikely that this represents habitat critical for the survival of the species. This conclusion is supported by the fact that WRPs are relatively common in the Bunbury/Capel area (&gt;4,000 observations at 100 unique locations in the last 5 years - G. Harewood pers. obs.) and other areas of reserved vegetation, much of which would be WRP habitat, is present in nearby locations (e.g. Tuart Forest National Park (3,030 ha) and the Capel Nature Reserve (94 ha)).</p> <p><b>South Capel:</b> It has been estimated that about 7.1 ha of WRP habitat will be directly impacted upon as a consequence of the proposed works. This vegetation appears to be largely comprised of a regrowth of peppermint (3.1 ha) that has regenerated after historical mining operations. Based on available information it is considered unlikely that this represents habitat critical for the survival of the species. This conclusion is supported by the fact that WRPs are relatively common in the Bunbury/Capel area (&gt;4,000 observations at 100 unique locations in the last 5 years - G. Harewood pers. obs.) and other areas of reserved vegetation, much of which would be WRP habitat, is present in nearby locations (e.g. Tuart Forest National Park and the Capel Nature Reserve).</p>

Criteria	Assessment of Impact of the Proposed Action on Western Ringtail Possums.
Disrupt the breeding cycle of at population?	<p><b>Capel:</b> A small number of WRP individuals may be displaced as a consequence of the proposed works and therefore it is possible that the breeding cycle of some individuals may be “disrupted”. However, the number of individuals directly affected is likely to be small (two or three individuals within the proposed clearing area based on the most recent survey).</p> <p><b>South Capel:</b> A small number of WRP individuals may be displaced as a consequence of the proposed works and therefore it is possible that the breeding cycle of some individuals may be “disrupted”. However, the number of individuals directly affected is likely to be small (about 10 individuals within the proposed clearing area based on the most recent survey).</p>
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?	<p><b>Capel:</b> It has been estimated that about 1.3 ha of WRP habitat will be directly impacted upon as a consequence of the proposed works. This vegetation is largely comprised of planted trees and shrubs (~0.9 ha) that been used to revegetate the site after historical site works. Based on available information it is considered very unlikely that the removal of this relatively small area of vegetation will result in an overall decline in WRP numbers. This conclusion is supported by the fact that WRPs are relatively common in the Bunbury/Capel area (&gt;4,000 observations at 100 unique locations in the last 5 years - G. Harewood pers. obs.) and other areas of reserved vegetation, much of which would be WRP habitat, is present in nearby locations (e.g. Tuart Forest National Park and the Capel Nature Reserve).</p> <p><b>South Capel:</b> It has been estimated that about 7.1 ha of WRP habitat will be directly impacted upon as a consequence of the proposed works. The vegetation present appears to be largely comprised of a regrowth of peppermint (3.1 ha) that has regenerated after historical mining operations. Based on available information it is considered very unlikely that the removal of this relatively small area of vegetation will result in an overall decline in WRP numbers. This conclusion is supported by the fact that WRPs are relatively common in the Bunbury/Capel area (&gt;4,000 observations at 100 unique locations in the last 5 years - G. Harewood pers. obs.) and other areas of reserved vegetation, much of which is known to also be occupied by WRPs (e.g. Tuart Forest National Park and the Capel Nature Reserve).</p>

Criteria	Assessment of Impact of the Proposed Action on Western Ringtail Possums.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or endangered species' habitat?	<p><b>Capel:</b> The proposed action is unlikely to result in introduction of any new invasive species known to be harmful to WRPs. The general area is already utilised by feral predators such as foxes and cats.</p> <p><b>South Capel:</b> The proposed action is unlikely to result in introduction of any new invasive species known to be harmful to WRPs. The general area is already utilised by feral predators such as foxes and cats.</p>
Introduce disease that may cause the species to decline?	<p><b>Capel:</b> The proposed action is unlikely to introduce a disease that would impact on western ringtail possums.</p> <p><b>South Capel:</b> The proposed action is unlikely to introduce a disease that would impact on WRPs.</p>
Interfere substantially with the recovery of the species.	<p><b>Capel:</b> The area of potential/existing habitat that will be modified/lost as a consequence of the proposal proceeding is relatively small (~1.3 ha) and this is unlikely to have a substantial impact on the recovery of the species. This conclusion is supported by the presence of approximately 8,195 ha of native vegetation within 12 km of the subject site, much of which would be WRP habitat. A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve.</p> <p><b>South Capel:</b> The area of potential/existing habitat that will be modified/lost as a consequence of the proposal proceeding is relatively small (~7.1 ha) and this is unlikely to have a substantial impact on the recovery of the species. This conclusion is supported by the presence of approximately 7,920 ha of native vegetation within 12 km of the subject site, much of which would be WRP habitat. A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve.</p>

Criteria	Assessment of Impact of the Proposed Action on Western Ringtail Possums.
Is a Significant Impact Expected?	<p data-bbox="528 253 1390 405"><b>No. Based on available information the proposed action (proposed clearing of vegetation at Capel and South Capel) is not considered likely to have a significant impact on western ringtail possums or their habitat.</b></p> <p data-bbox="528 450 1390 875"><b>This conclusion is supported by the fact that proposed clearing in both areas is largely regrowth or planted vegetation from previous mining and related activities, the footprint in both cases is relatively small and is only being utilised by a small number of WRPs. Also, the removal of the vegetation at Capel and South Capel will not fragment any linkages to other areas. There are large areas of habitat in adjoining and nearby areas known to also support WRPs. Only a small number of WRPs will be displaced at each site and the species can be expected to persist in adjoining and nearby areas despite the proposal proceeding in its current form.</b></p> <p data-bbox="528 920 1390 1223"><b>The animals present at both sites are not near the limit of the species range, and the small numbers of individuals present are also unlikely to represent key source populations. Given the small number of individuals likely to be present at each location they are also unlikely to be necessary for maintaining genetic diversity in the species. The individuals encountered during proposed site works are to be relocated nearby and their genetic contribution will therefore be maintained and not lost.</b></p>

## Black Cockatoos

At the Capel Dry Plant site, it has been estimated that about 0.23 hectares of quality black cockatoo habitat foraging habitat is present (i.e. woodland areas containing marri). Twenty two potential breeding habitat trees were also identified within the clearing area, none of which contain hollows of any size. No roosting activity was noted (Harewood 2018a).

At the South Capel site, it has been estimated that about 0.70 hectares of quality black cockatoo habitat foraging habitat is present (i.e. woodland areas containing marri, jarrah and/or *banksia*). Twenty nine potential breeding habitat trees will be cleared by the proposal, none of which contains large hollows. No roosting activity was noted (Harewood 2018b).

## Referral Guidelines

The document titled “EPBC Act referral guidelines for three threatened black cockatoo species: Carnaby’s cockatoo (endangered) *Calyptorhynchus latirostris*, Baudin’s cockatoo (vulnerable) *Calyptorhynchus baudinii*, Forest red-tailed black cockatoo (vulnerable)

*Calyptorhynchus banksii naso*. summarises what scale of actions would be considered likely to have a “significant impact” on black cockatoos, these being:

Actions that have a high risk of significant impacts

1. Clearing of any known nesting tree.
2. Clearing or degradation of any part of a vegetation community known to contain breeding habitat.
3. Clearing of more than 1 ha of quality foraging habitat.
4. Clearing or degradation (including pruning the top canopy) of a known night roosting site.
5. Creating a gap of greater than 4 km between patches of black cockatoo habitat (breeding, foraging or roosting).

Actions that have an uncertain risk of significant impacts

6. Degradation (such as through altered hydrology or fire regimes) of more than 1 ha of foraging habitat. Significance will depend on the level and extent of degradation and the quality of the habitat.
7. Clearing or disturbance in areas surrounding black cockatoo habitat that has the potential to degrade habitat through introduction of invasive species, edge effects, hydrological changes, increased human visitation or fire.
8. Actions that do not directly affect the listed species but that have the potential for indirect impacts such as increasing competitors for nest hollows.
9. Actions with the potential to introduce known plant diseases such as *Phytophthora* spp. to an area where the pathogen was not previously known.

Actions that have a low risk of significant impacts

- Actions that do not affect black cockatoo habitat or individuals.
- Actions whose impacts occur outside the modelled distribution of the three black cockatoos.

An assessment of each of these criteria with respect to the proposed development are provided in the table below.

**Assessment of Significant Impact using Criteria for Black Cockatoos  
(Commonwealth of Australia 2012)**

Criteria	Assessment of Impact of the Proposal Action on Black Cockatoos
<b>Actions that have a high risk of significant impacts</b>	
Clearing of any known nesting tree.	<p><b>Capel:</b> The proposed clearing at Capel will not impact on any known nesting tree.</p> <p><b>South Capel:</b> The proposed clearing at South Capel will not impact on any known nesting tree.</p>
Clearing or degradation of any part of a vegetation community known to contain breeding habitat.	<p><b>Capel:</b> The Capel site clearing footprint contains 22 habitat trees (i.e. trees with a DBH <math>\geq</math>50cm) but none contain hollows of any size. There is approximately 8,195 ha of native vegetation within 12 km of the subject site much of which would also contain habitat trees. The removal of these 22 trees will have no measurable impact on black cockatoos.</p> <p><b>South Capel:</b> The South Capel site clearing footprint contains 29 habitat trees (i.e. trees with a DBH <math>\geq</math>50cm). The probability that this or any of the other identified potential breeding trees would ever be used by cockatoos for breeding can be considered to be very low. There is approximately 7,920 ha of native vegetation within 12 km of the subject site much of which would also contain habitat trees. The removal of these 29 trees will have no measurable impact on black cockatoos.</p>
Clearing of more than 1 ha of quality foraging habitat.	<p><b>Capel:</b> The Capel site clearing footprint contains about 0.23 ha of quality black cockatoo foraging habitat (i.e. woodlands containing marri).</p> <p><b>South Capel:</b> The South Capel site clearing footprint contains about 0.70 ha of quality foraging habitat (i.e. woodlands containing marri, jarrah and/or <i>banksia</i>).</p>
Clearing or degradation (including pruning the top canopy) of a known night roosting site.	<p><b>Capel:</b> The proposed clearing at Capel will not impact on any known roosting tree.</p> <p><b>South Capel:</b> The proposed clearing at South Capel will not impact on any known roosting tree.</p>
Creating a gap of greater than 4 km between patches of black cockatoo habitat (breeding, foraging or roosting)	<p><b>Capel:</b> The proposed clearing at Capel will not create a gap of greater than 4 km between patches of black cockatoo habitat.</p> <p><b>South Capel:</b> The proposed clearing at South Capel will not create a gap of greater than 4 km between patches of black cockatoo habitat.</p>

Criteria	Assessment of Impact of the Proposal Action on Black Cockatoos
<b>Actions that have and uncertain risk of significant impacts</b>	
<p>Degradation (such as through altered hydrology or fire regimes) of more than 1 ha of foraging habitat. Significance will depend on the level and extent of degradation and the quality of the habitat.</p>	<p><b>Capel:</b> The proposed clearing at Capel will not result in the degradation of any adjoining or nearby areas of black cockatoo foraging habitat with activities being strictly confined to the proposed works footprint.</p> <p><b>South Capel:</b> The proposed clearing at South Capel will not result in the degradation of any adjoining or nearby areas of black cockatoo foraging habitat with activities being strictly confined to the works footprint. Existing hydrological characteristics will be maintained.</p>
<p>Clearing or disturbance in areas surrounding black cockatoo habitat that has the potential to degrade habitat through introduction of invasive species, edge effects, hydrological changes, increased human visitation or fire.</p>	<p><b>Capel:</b> The proposed clearing at Capel will not result in the clearing or disturbance of any adjoining or nearby areas of black cockatoo foraging habitat with activities being strictly confined to the works footprint.</p> <p><b>South Capel:</b> The proposed clearing at South Capel will not result in the clearing or disturbance of any adjoining or nearby areas of black cockatoo foraging habitat with activities being strictly confined to the works footprint.</p>
<p>Actions that do not directly affect the listed species but that have the potential for indirect impacts such as increasing competitors for nest hollows.</p>	<p><b>Capel:</b> The proposed clearing at Capel will not result in any indirect impacts on black cockatoos or their habitat with impact being strictly confined to the works footprint.</p> <p><b>South Capel:</b> The proposed clearing at South Capel will not result in any indirect impacts on black cockatoos or their habitat with impact being strictly confined to the works footprint.</p>
<p>Actions with the potential to introduce known plant diseases such as <i>Phytophthora</i> spp. to an area where the pathogen was not previously known.</p>	<p><b>Capel:</b> The proposed clearing at Capel has little or no potential to spread plant diseases into black cockatoo habitat areas where they are currently not present.</p> <p><b>South Capel:</b> The proposed clearing at South Capel has little or no potential to spread plant diseases into black cockatoo habitat areas where they are currently not present.</p>

Criteria	Assessment of Impact of the Proposal Action on Black Cockatoos
<b>Actions that have a low risk of significant impacts</b>	
Actions that do not affect black cockatoo habitat or individuals.	<p><b>Capel:</b> The proposed clearing at Capel will affect small areas of black cockatoo habitat but the risk of significant impact is still anticipated to be low.</p> <p><b>South Capel:</b> The proposed clearing at South Capel will affect small areas of black cockatoo habitat but the risk of significant impact is still anticipated to be low.</p>
Actions whose impacts occur outside the modelled distribution of the three black cockatoos	<p><b>Capel:</b> The proposed clearing at Capel is within the modelled distribution of all three black cockatoo species but as only a small area of habitat will be impacted on the risk of significant impact is still anticipated to be of a low.</p> <p><b>South Capel:</b> The proposed clearing at South Capel is within the modelled distribution of all three black cockatoo species but as only a small area of habitat will be impacted on the risk of significant impact is still anticipated to be of a low.</p>
<b>Risk of Significant Impact?</b>	<p><b>No. Using these criteria and based on available information, the proposed action is considered likely to have a low risk of significant impact. Only one high risk impact criterion is compromised (i.e. loss of some habitat trees) and therefore this conclusion is justified when considering the small areas involved, poor quality of much of the habitat, lack of current breeding activity and the presence of thousands of hectares of better quality habitat in nearby areas, much located within reserves and national parks.</b></p>

### Significant Impact Guidelines

As with WRPs, the document “Matters of National Environmental Significance. Significant Impact Guidelines 1.1, *EPBC Act 1999*.” (Commonwealth of Australia 2013) provides more detailed criteria related to what actually constitutes “significant impact”. An assessment of each of the criteria contained within the significant Impact guidelines document with respect black cockatoos and the proposed development are provided in the table below.

The criteria in the significant impact guidelines refer to ‘populations’ and ‘important populations’. It should be noted that these terms have not been defined for black cockatoos, due to the mobile and widely-distributed nature of these species, and the variation in flock compositions (for example, between breeding and non-breeding seasons). The DotEE therefore recommend that for black cockatoos, it is more appropriate to consider significance in terms of impacts on habitat rather than a resident population (Commonwealth of Australia 2012).

For this reason, the assessment provide below addresses criteria with respect to possible habitat loss and not direct impacts on individual birds or populations of birds, though some criteria may be considered irrelevant for assessing impact on black cockatoos given their non-sedentary habits.

**Assessment of Significant Impact using Criteria for Vulnerable/Endangered Species (Carnaby’s, Baudin’s and the forest red-tailed black-cockatoo) (Commonwealth of Australia 2013)**

Criteria	Assessment of Impact of Construction of the Proposed Development on Black Cockatoos
<p>Lead to a long-term decrease in the size of an important population/population of a species?</p>	<p><b>Capel:</b> The area of potential/existing habitat that may be lost as a consequence of the proposal proceeding is relatively small (22 habitat trees and a small area (~0.23 ha – woodlands containing marri) of foraging habitat. The removal of the vegetation is unlikely to impact on a significant number of cockatoos or result in long term decrease in population numbers.</p> <p>The clearing area contains no trees with hollows possibly suitable for breeding. The probability that any of these “potential breeding trees” (DBH <math>\geq</math>50cm) would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low.</p> <p>The foraging habitat present within the proposed clearing area (marri open woodland) has a limited extent (~0.23 ha) and is only likely to provide sufficient food to support a very small number of cockatoos per year.</p> <p>There is approximately 8,195 ha of native vegetation (and 445 ha of pine plantations) within 12 km the subject site. A significant portion of this vegetation is located within the Tuart Forest National Park (total area 3,030 ha) and the Capel Nature Reserve (94 ha). A high percentage of the remanent vegetation in the general vicinity is likely to represent potential cockatoo habitat and it can be expected that black cockatoos will continue to utilise these areas despite any development at the subject site.</p> <p><b>South Capel:</b> The area of potential/existing habitat that may be lost as a consequence of the proposal proceeding is relatively small (up to 29 habitat trees and a small area (~0.70 ha – areas of woodland containing marri, jarrah and/or banksia) of foraging habitat. The removal of this vegetation is unlikely to impact on a significant number of cockatoos or result in long term decrease in population numbers.</p> <p>The proposal will not clear trees with hollows possibly suitable for breeding. The probability that any of these “potential breeding trees” (DBH &gt;50cm) would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low.</p> <p>The foraging habitat present within the proposed clearing area (primarily</p>

Criteria	Assessment of Impact of Construction of the Proposed Development on Black Cockatoos
	<p>marri open woodland) has a limited extent (~0.70 ha) and is only likely to provide sufficient food to support a very small number of cockatoos per year.</p> <p>There is approximately 7,920 ha of native vegetation (and ~500 ha of pine plantations) within 12 km the subject site. A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve. A high percentage of the remanent vegetation in the general vicinity is likely to represent potential cockatoo habitat and it can be expected that black cockatoos will continue to utilise these areas despite any development at the subject site.</p>
<p>Reduce the area of occupancy of an important population/population of the species?</p>	<p><b>Capel:</b> The area of occupancy of black cockatoos will not change as a consequence of the development proceeding. While potential/existing habitat will require clearing it is very small (0.003% of the potential habitat (including pines) within 12 km of the site) and black cockatoos will persist in the area despite development proceeding.</p> <p><b>South Capel:</b> The area of occupancy of black cockatoos will not change as a consequence of the development proceeding. While potential/existing habitat will require clearing it is very small (0.008% of the potential habitat (including pines) within 12 km of the site) and black cockatoos will persist in the area despite development proceeding.</p>
<p>Fragment an existing important population/population into two or more populations?</p>	<p><b>Capel:</b> The proposed clearing covers a very small area and will not create a barrier to black cockatoo movement in the area and/or fragment populations.</p> <p><b>South Capel:</b> The proposed clearing of cockatoo habitat covers a very small area and will not create a barrier to black cockatoo movement in the area and/or fragment populations.</p>
<p>Adversely affect habitat critical to the survival of a species?</p>	<p><b>Capel:</b> The area of potential/existing habitat that may be lost as a consequence of the proposal proceeding is relatively small (22 habitat trees and a small area (~0.23 ha – woodlands containing marri) of foraging habitat). The removal of the vegetation is unlikely to impact on a significant number of cockatoos or result in long term decrease in population numbers.</p> <p>The clearing area contains no trees with hollows possibly suitable for breeding. The probability that any of these “potential breeding trees” (DBH ≥50cm) would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low.</p> <p>The foraging habitat present within the proposed clearing area (marri open woodland) has a limited extent (~0.23 ha) and is only likely to provide</p>

Criteria	Assessment of Impact of Construction of the Proposed Development on Black Cockatoos
	<p>sufficient food to support a very small number of cockatoos per year.</p> <p>There is approximately 8,195 ha of native vegetation (and 445 ha of pine plantations) within 12 km the subject site. A significant portion of this vegetation is located within the Tuart Forest National Park (total area 3,030 ha) and the Capel Nature Reserve (94 ha). A high percentage of the remanent vegetation in the general vicinity is likely to represent potential cockatoo habitat and it can be expected that black cockatoos will continue to utilise these areas despite any development at the subject site.</p> <p><b>South Capel:</b> The area of potential/existing habitat that may be lost as a consequence of the proposal proceeding is relatively small (28 habitat trees and ~0.70 ha of foraging habitat). The vegetation onsite is unlikely to represent “habitat critical” to the survival of black cockatoos.</p> <p>The proposal will not clear trees with hollows possibly suitable for breeding. The probability that any of these “potential breeding trees” (DBH &gt;50cm) would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low.</p> <p>The foraging habitat present within the proposed clearing area (woodlands containing marri, jarrah and/ banksia) has a limited extent (~0.70 ha) and is only likely to provide sufficient food to support a very small number of cockatoos per year.</p> <p>There is approximately 7,920 ha of native vegetation (and ~500 ha of pine plantations) within 12 km the subject site. A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve. A high percentage of the remanent vegetation in the general vicinity is likely to represent potential cockatoo habitat and it can be expected that black cockatoos will continue to utilise these areas despite any development at the subject site.</p>
Disrupt the breeding cycle of an important population/population?	<p><b>Capel:</b> The clearing area contains no trees with hollows possibly suitable for breeding. The probability that any of these “potential breeding trees” (DBH &gt;50cm) would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low.</p> <p>There is approximately 8,195 ha of native vegetation (and 445 ha of pine plantations) within 12 km the subject site. A significant portion of this vegetation is located within the Tuart Forest National Park (total area 3,030 ha) and the Capel Nature Reserve (94 ha). A high percentage of the remanent vegetation in the general vicinity is likely to represent potential cockatoo habitat and it can be expected that black cockatoos will continue to utilise these areas despite any development at the subject site. It is therefore considered unlikely that the proposed development would disrupt</p>

Criteria	Assessment of Impact of Construction of the Proposed Development on Black Cockatoos
	<p>the breeding cycle of an important population or population of black cockatoos.</p> <p><b>South Capel:</b> The proposal will not clear trees with hollows possibly suitable for breeding. The probability that any of these “potential breeding trees” (DBH &gt;50cm) would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low.</p> <p>There is approximately 7,920 ha of native vegetation (and ~500 ha of pine plantations) within 12 km the subject site. A significant portion of this vegetation is located within the Tuart Forest National Park and the Capel Nature Reserve. A high percentage of the remanent vegetation in the general vicinity is likely to represent potential cockatoo habitat and it can be expected that black cockatoos will continue to utilise these areas despite any development at the subject site. It is therefore considered unlikely that the proposed development would disrupt the breeding cycle of an important population or population of black cockatoos.</p>
<p>Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline?</p>	<p><b>Capel:</b> The area of potential/existing habitat that may be lost as a consequence of the proposal proceeding is relatively small (22 habitat trees and a small area (~0.23 ha – woodlands containing marri) of foraging habitat). The removal of the vegetation is unlikely to impact on a significant number of cockatoos or result in long term decrease in population numbers.</p> <p>The clearing area contains no trees with hollows possibly suitable for breeding. The probability that any of these “potential breeding trees” (DBH &gt;50cm) would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low.</p> <p>The foraging habitat present within the proposed clearing area (marri open woodland) has a limited extent (~0.23 ha) and is only likely to provide sufficient food to support a very small number of cockatoos per year.</p> <p>There is approximately 8,195 ha of native vegetation (and 445 ha of pine plantations) within 12 km the subject site. A significant portion of this vegetation is located within the Tuart Forest National Park (total area 3,030 ha) and the Capel Nature Reserve (94 ha). A high percentage of the remanent vegetation in the general vicinity is likely to represent potential cockatoo habitat and it can be expected that black cockatoos will continue to utilise these areas despite any development at the subject site.</p> <p><b>South Capel:</b> The area of potential/existing habitat that may be lost as a consequence of the proposal proceeding is relatively small (up to 29 habitat trees and ~0.70 ha of foraging habitat). The loss of this vegetation</p>

Criteria	Assessment of Impact of Construction of the Proposed Development on Black Cockatoos
	<p>is unlikely to impact on a significant number of cockatoos or result in long term decrease in population numbers.</p> <p>The proposal will not clear trees with hollows considered suitable for breeding. The probability that any of these “potential breeding trees” (DBH &gt;50cm) would ever develop hollows of a suitable size that would then be used by cockatoos for breeding can be considered to be very low.</p> <p>The foraging habitat present within the proposed clearing area (primarily marri open woodland) has a limited extent (~0.70 ha) and is only likely to provide sufficient food to support a very small number of cockatoos per year.</p> <p>There is approximately 7,920 ha of native vegetation (and ~500 ha of pine plantations) within 12 km the subject site. A significant portion of this vegetation is located within the Tuart Forest National Park (total area 3,030 ha) and the Capel Nature Reserve (94 ha). A high percentage of the remanent vegetation in the general vicinity is likely to represent potential cockatoo habitat and it can be expected that black cockatoos will continue to utilise these areas despite any development at the subject site.</p>
Result in invasive species that are harmful to a vulnerable/endangered species becoming established in the vulnerable/endangered species' habitat?	<p><b>Capel:</b> The future development of the site is unlikely to result in introduction of any new harmful invasive species. The area is already utilised by foxes, cats and corellas.</p> <p><b>South Capel:</b> The future development of the site is unlikely to result in introduction of any new harmful invasive species. The area is already utilised by foxes, cats and corellas.</p>
Introduce disease that may cause the species to decline?	<p><b>Capel/South Capel:</b> The proposed action is unlikely to introduce a disease that would impact on black cockatoos.</p>

Criteria	Assessment of Impact of Construction of the Proposed Development on Black Cockatoos
Interfere substantially with the recovery of the species.	<p><b>Capel:</b> The population growth of the black-cockatoos is primarily limited by factors associated with breeding, and consequently priority areas for the recovery of the species are currently focused on known breeding sites (Cale 2003).</p> <p>The clearing area does not represent a known breeding site and it contains no trees with hollows possibly suitable for breeding. It is therefore unlikely that development of the site will interfere substantially with the recovery of any of the black cockatoo species.</p> <p><b>South Capel:</b> The population growth of the black-cockatoos is primarily limited by factors associated with breeding, and consequently priority areas for the recovery of the species are currently focused on known breeding sites (Cale 2003).</p> <p>The clearing area does not represent a known breeding site and the proposal will not clear any trees with hollows considered suitable for breeding. It is therefore unlikely that development of the site will interfere substantially with the recovery of any of the black cockatoo species.</p>
<b>Is a Significant Impact Expected?</b>	<p><b>No. Based on available information the proposed action (proposed clearing of vegetation at Capel and South Capel) is not considered likely to have a significant impact on black cockatoos.</b></p> <p><b>This conclusion is justified when considering the small areas involved, poor quality of much of the habitat, lack of current breeding activity and the presence of thousands of hectares of better quality habitat in nearby areas, much within reserves and national parks.</b></p>

## Conclusion

The assessment using published DotEE criteria suggests that “significant impact” to WRPs and black cockatoos (or their habitat) is not likely. This conclusion is primarily based on the fact that only relatively small areas of habitat will be impacted upon compared to the presence of a large expanse of similar and/or better quality habitat in nearby areas.



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