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WESTERN AUSTRALIA

Clearing Assessment Report – CPS 818

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Western Australia.*

Thomas Road Duplication (Tonkin Highway
to South Western Highway)

EOS 2907

D24#39034
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1 PROPOSAL

1.1 Purpose and Justification

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

Main Roads proposes to duplicate Thomas Road between Tonkin Highway and South Western Highway (SLK 0.4 to 3.0). The proposal will greatly improve the efficiency of road traffic flow by widening the current extent of the road. This assessment provides an evaluation of the vegetation clearing impacts associated with the project using the ten Clearing Principles, and the strategies used to manage vegetation clearing.

1.1.1 Main Roads Approach to Road Safety and the Environment

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

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

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

Further details on measures to avoid, minimise and reduce are provided in Section 1.6.

1.2 Proposal Scope

Proposal Name: Thomas Road Duplication (Tonkin Highway to South Western Highway)

Proposal purpose / Components: Main Roads is proposing to duplicate of Thomas Road between Tonkin Highway (SLK 3.0) and South Western Highway (SLK 0.4), for improved efficiency of traffic.

The required Clearing Area for these works is shown in Figure 1.

The proposed clearing undertaking using CPS 818 is: Clearing Area will require clearing of 1.76 ha of remnant vegetation

The proposed temporary clearing undertaking using CPS 818 is: Nil

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

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

1.3 Proposal Location

The Clearing Area is located 31 km south-east of the Perth CBD along Thomas Road between Tonkin Highway (SLK 3.0) and South Western Highway (SLK 0.4) within the Shire of Serpentine-Jarrahdale as shown in Figure 1.

Start: -32.20486919, 116.00688476

End: -32.20713802, 115.98035237

1.4 Clearing Details

Proposed Clearing to be undertaken using CPS 818:

The Clearing Area will require clearing of 1.76 ha of remnant vegetation. No temporary clearing will be required for the Proposal.

Areas of Native Vegetation Clearing:

The areas of native vegetation to be cleared (Clearing Area) are shown in Figure 2.

Type of Native Vegetation:

The Clearing Area has 1.76 ha of native vegetation in 'Degraded' condition and mapped in two vegetation units. This includes 0.49 ha of *Corymbia calophylla* tall open woodland and 1.27 ha of Sparse native trees over weeds. All native vegetation within the Clearing Area is representative of the under-represented Guildford complex (5.09 % of pre-European extent remaining) and is vegetation growing in association with a wetland (Multiple-Use Palusplain wetlands).

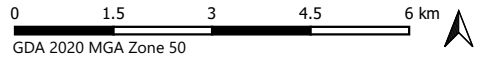
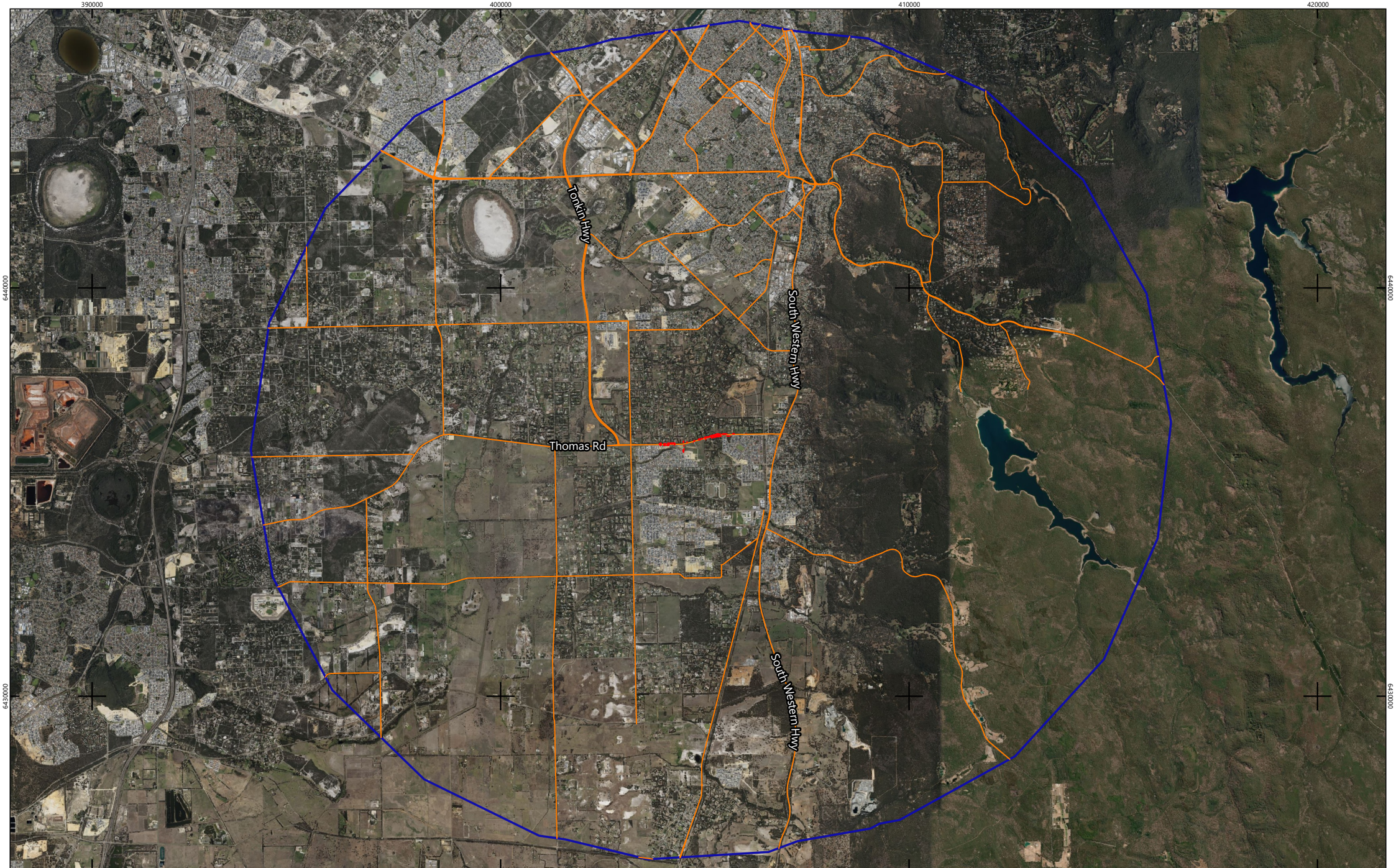


Figure 1 - Study Area

- Legend**
- Clearing Area
 - Study Area
 - Main Roads





0 100 200 300 400 m
 GDA 2020 MGA Zone 50

Figure 2 - Vegetation within Clearing Area

Legend

Clearing Area:

- Corymbia calophylla tall open woodland over mixed weeds
- Sparse native trees over weeds
- Roads

Vegetation Complexes:

- Beernullah Complex
- Forrestfield Complex
- Guildford Complex



1.5 Alternatives to Native Vegetation Clearing Considered During Proposal Development

The Clearing Area represents the maximum extent of disturbance for the proposal. Where possible, vegetation and fauna habitat will be retained during detailed design and construction. The road corridor is constrained by private property and the requirement to tie into Tonkin Highway and Southwestern Highway. In order to duplicate Thomas Road, there are no alternatives to clearing native vegetation.

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

- Realigning Thomas Road. However, this is not possible due to the constraints of adjacent residential and rural properties and the requirement to tie in Thomas Road to the new bridge over the railway and existing intersections at Tonkin Highway and South Western Highway.
- Upgrading other alternative routes that are less vegetated and environmentally constrained, however these are not suitable due to longer travel times, sensitive local receptors (such as residences) or other planning issues.
- Do not upgrade the road, however this will result in increased congestion, a poorer safety outcome and may result in future fatalities or serious injuries.
- Reducing the speed limit to minimise clearing requirements, while still balancing safety (driver fatigue) and freight efficiency. Speed limits are an essential mechanism to ensure the safe and efficient operation of road networks. The application of appropriate speed limits and other traffic management measures is a key mechanism in managing vehicle speeds to achieve desired safety, mobility, traffic management, local amenity, and road user expectations. There are several factors involved in road safety, including road conditions, driver behaviour and overall road design. Except in special situations, reducing speed limits below national standards on state and national roads is not typically supported as it has the potential to contribute to driver frustration, impatience, tiredness and recklessness. The environmental values protected by reducing the speed limit do not justify the impacts on freight efficiencies nor road user safety. Accordingly, the reduction of the speed limits to avoid clearing of native vegetation for this proposal is not proposed.

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

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

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

Design or Management Measure	Discussion and Justification
Alignment to one side of existing road	Existing road alignment for Thomas Road has been retained and a second carriageway constructed to the south. The existing road needs to be upgraded to meet modern road safety requirements for the predicted traffic volumes.
Alternative alignment located within pasture or degraded areas	Main Roads has avoided the clearing of native vegetation for the Thomas Road Duplication as far as practicable. The majority of the road construction works will not impact native vegetation and will be constructed in existing disturbed and cleared areas. Only 1.76 ha of native vegetation will be impacted within a 17.5 ha construction footprint.
Simplification of design to reduce number of lanes and/or complexity of intersections	<p>The median has been reduced to the minimum safe width in order to reduce the clearing area. This has reduced the incursion into the native vegetation on the southern side of Thomas Road.</p> <p>It is not possible to reduce the number of lanes without compromising the objectives of the road construction project – which is to duplicate Thomas Road.</p>
Steepen batter slopes	The road will be just above existing ground surface, in order to prevent flooding and capillary rise from groundwater from impacting the road pavement. Steepening batter slopes will provide minimal if any reduction in the amount of clearing required, however, road shoulders will use a 3:1 slope rather than 6:1 slope.
Installation of barriers	Safety barriers will be installed to ensure that no further clearing impacts are necessary beyond the current Clearing Area. Detailed design will determine the extent and location of barriers required.
Installation of kerbing	Kerbing has been designed where possible, but open drainage structures will be required to manage the flow of road runoff and storage of stormwater.
Use of existing cleared areas for access tracks, construction storage and stockpiling	Much of the road duplication area has been previously cleared and will be used for construction storage and stockpiling. No temporary clearing will be undertaken for the construction works.

1.7 Approved Policies and Planning Instruments

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

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

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

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

Environmental Protection Policies:

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

Other relevant policies and guidance documents:

- Environmental Offsets Policy (Government of Western Australia, 2011)
- A guide to the assessment of applications to clear native vegetation (DER 2014)
- Procedure: Native vegetation clearing permits (DWER 2021)
- Environmental Offsets Guidelines (Government of Western Australia 2014)
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016)
- Technical guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA 2020)
- Approved conservation advice under section 266B of the EPBC Act for threatened flora/fauna/vegetation communities.
- Approved Recovery Plans for threatened species
- EPBC Act Referral Guidelines for Three Threatened Black-Cockatoo Species (DSEWPaC 2012)
- Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan (DPAW 2013)
- Referral guideline for 3 WA Threatened Black-Cockatoo species (DAWE 2022).

2 SCOPE AND METHODOLOGY OF ASSESSMENT OF CLEARING

Clearing of 1.76 ha native vegetation will be undertaken using the Main Roads Statewide Clearing Permit CPS 818.

To comply with CPS 818, Main Roads must prepare a CAR (this document).

The CAR outlines the key activities associated with the Proposal, the existing environment and an assessment of native vegetation clearing. This assessment provides an evaluation of the vegetation clearing impacts associated with the Proposal using the ten Clearing Principles listed under s51 of the *Environmental Protection Act 1986* (EP Act) and strategies used to manage vegetation clearing.

2.1 Report Terminology and Sources

The following terms are used in this CAR:

- **Native Vegetation Clearing Area (Clearing Area)** – The maximum amount of native vegetation to be cleared for the Proposal that will accommodate the designed earthworks and, typically, a nominal buffer to allow for the safe movement of machinery during construction.
- **Proposal Area** – The total footprint of the Proposal including both cleared and uncleared areas. This is based on the current design. It has included a buffer to allow for constructability and the movement of machinery during construction.
- **Desktop Area** – Area covered by the Desktop Assessment. The Desktop Area for the Proposal is confined to a local area of a 10 km radius.
- **Survey Area** – Area covered by the Biological Survey, which is typically larger than the Development Envelope. The survey covered an area of 30.95 ha (ELA 2023).

2.2 Desktop Assessment

A desktop assessment of the Clearing Area was undertaken as part of the survey undertaken by ELA (2023).

2.3 Surveys and Assessments

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

- Eco Logical Australia (ELA) (2023). *Thomas Road Duplication Biological Survey*.
- Focused Vision Consulting (2024). *Ballawara Ave – Indigo Parkway roundabout, Byford, Site Inspection – Memo Report*.

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

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

Consultant & Survey Name	Survey Details
<p>ELA (2023) Thomas Road Duplication Biological Survey</p>	<p>Survey Area: The total area surveyed was approximately 30.95 ha, of which, 4.28 ha was native vegetation.</p> <p>Type: Detailed flora and vegetation survey, Basic fauna, and Black-Cockatoo (BC) habitat assessment</p> <p>Timing: The flora, vegetation, and the fauna survey were undertaken in 2020 and updated in 2023.</p> <p>Survey Results Shapefile TRIM Ref: D24#333467</p> <p>Document TRIM Ref: D24#333478</p>
<p>Focused Vision Consulting (2024) Ballawara Ave – Indigo Parkway roundabout, Byford, Site Inspection – Memo Report (Appendix 1)</p>	<p>Survey Area: 0.22 ha within Proposal Area just north of Malarkey Road roundabout that had not been surveyed by ELA (2023) due to changes to the proposal’s design.</p> <p>Type: Extrapolation of flora, vegetation and fauna habitat survey results, with on-site inspection of potential Black-Cockatoo habitat trees. Vegetation unit and condition mapping was extrapolated at a desktop level in reference to aerial imagery, using GIS software, and a site inspection was undertaken to assess Diameter at Breast Height (DBH) trees, record observable native flora and to confirm vegetation units, vegetation condition and fauna habitats.</p> <p>Timing: Site inspection of occurred on 7 March 2024.</p> <p>Survey Results Shapefile TRIM Ref: D24#540563</p> <p>Document TRIM Ref: D24#540554</p>

3 SURVEY RESULTS

In accordance with CPS 818/17 condition 8 (e) (iii), a copy of the relevant sections of the executive summary and report conclusions from the biological survey and/or field assessments are provided in **Appendix 1. Figure 3** shows the extent of the ELA (2023) survey areas compared to the Clearing Area and the area of extrapolation by FVC (2024).

3.1 Summary of Flora and Vegetation Surveys

Eco Logical Australia (2020, 2023)

A Detailed and Targeted flora and vegetation survey was undertaken by Eco Logical Australia (ELA) in 2020. In July 2023, ELA undertook a supplementary field survey to ground-truth and refine mapping boundaries following the modifications to the survey area boundary, and additionally update the vegetation mapping to reflect cleared areas since 2020 survey.

Results from ELA (2023) includes the updated survey area boundaries along with desktop area, totalling to 30.95 ha.

The survey mapped four vegetation communities totalling an area of 7.97 ha across the 30.95 ha survey area, including tracks and cleared areas. Of this, only 4.28 ha was remnant native vegetation (of which 1.76 ha occurs within the Clearing Area). Two native vegetation units were mapped in the ELA (2023) survey: *Corymbia calophylla* tall open woodland, and Sparse native trees over weeds. The vegetation condition ranged from 'Degraded' to 'Completely Degraded'. No significant ecological communities, Threatened Ecological Communities (TEC) or Priority Ecological Community (PEC) were inferred to occur within the survey area.

A total of 49 flora taxa representing 18 families and 47 genera were recorded from 11 quadrats and four relevés. This total comprised of 11 native and 38 introduced species. No Threatened or Priority flora species were identified in the ELA (2023) survey.

Focused Vision Consulting (2024)

A site inspection was undertaken by Focused Vision Consulting (FVC) on 7 March 2024, in order to extrapolate the ELA (2023) results into a small (0.22 ha) area that was not part of ELA's flora, vegetation, and fauna habitat assessment area.

Flora, and vegetation units and condition were evaluated during the survey (FVC 2024) to match ELA's results.

Two native flora species, *Corymbia calophylla* and *Kingia australis*, were recorded during the site inspection. The understorey was found to be dominated by grassy weeds with no other native species observed. No significant flora species were recorded.

Two vegetation classifications (mapped in accordance with ELA (2023) descriptions) were observed in the survey area: Sparse native trees over weeds (0.049 ha) and Cleared (0.177 ha). The vegetation condition within the site inspection area was found to range from 'Completely Degraded' (0.007 ha) to 'Degraded' (0.042 ha) condition. Most of the 0.22 ha inspected has been previously cleared (0.177 ha, 77.8%) and is devoid of remnant vegetation.

3.2 Summary of Fauna Surveys

Eco Logical Australia (2020, 2023)

A basic fauna and targeted Black-Cockatoo habitat assessment was undertaken by ELA in 2020, with a supplementary survey in July 2023 to refine mapping boundaries.

The fauna survey identified three fauna habitats within the survey area; Fauna habitat 1: Marri tall open woodland over mixed weeds, Fauna habitat 2: Sparse native and planted trees over weeds and Fauna habitat 3: Revegetation. The survey area contains minor patches of roadside remnant vegetation, which is interspersed with cleared areas and surrounded by residential housing. Fauna habitat within the survey area is unlikely to provide high quality connectivity for fauna species (ELA 2023).

A total of 16 fauna species were recorded within the survey area (15 birds, one mammal). Three significant fauna species were observed through direct and indirect sightings within the survey area. These are:

- Carnaby's Black-Cockatoo (*Zanda latirostris*) – Endangered under BC and EPBC Act
- Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*) – Vulnerable under BC and EPBC Acts
- Quenda (*Isoodon fusciventer*) – Priority 4 (DBCA listing).

The survey area occurs within the known range of all three Black-Cockatoos species (Carnaby's Black-Cockatoo, Forest Red-tailed Black-Cockatoo and Baudin's Black-Cockatoo (*Zanda baudinii*)). Whilst only two Black-Cockatoo species were recorded in the survey area, Baudin's Black-Cockatoo also has the potential to occur, due to the presence of moderate quality foraging habitat for the species and known records in close proximity (ELA 2023).

One introduced fauna species was directly observed in the survey area – Rainbow Lorikeet (**Trichoglossus moluccanus*).

A total of 2.59 ha (8.4%) within the survey area is considered to provide 'Moderate' quality foraging habitat for all three Black-Cockatoo species, with tall Marri woodland. Other fauna habitats were identified to provide Poor (5.33 ha) or Very Poor (0.05 ha) quality foraging habitat, with scattered *Eucalyptus* spp. occurring in low cover areas. Much of the survey area (22.97 ha) provides no foraging habitat for Black-Cockatoos.

The Black-Cockatoo breeding habitat assessment identified 131 potentially suitable Diameter at Breast Height (DBH) trees within the survey area. All potentially suitable DBH trees were Marri (*Corymbia calophylla*), with no hollows recorded (ELA 2023).

Focused Vision Consulting (2024)

A site inspection was undertaken by FVC on 7 March 2024 in order to extrapolate the ELA (2023) results into a small (0.22 ha) area that was not included in ELA's flora, vegetation, and fauna habitat assessment area. Fauna habitat was evaluated during the survey to match ELA's results.

The DBH for all potential Black-Cockatoo breeding and roosting trees was measured and inspected for potential hollows.

One Marri with a potentially suitable DBH (DBH > 500 mm) was recorded. No suitable hollows for Black-Cockatoo breeding were observed.

The fauna habitat within the site inspection area consisted of 'Fauna habitat 2: Sparse native and planted trees over weeds' in 'Poor' condition, as per the description of fauna habitats in ELA (2023).

3.3 Summary of Dieback Survey (ELA 2023)

A *Phytophthora* Dieback survey was undertaken on 27 August 2020 by Bruno Rikli, who is registered as a qualified Dieback Interpreter with DBCA with over 23 years of experience (ELA 2023). Due to the degraded vegetation condition of the Clearing Area, the entire survey area was classified as 'Excluded' (unprotectable) due to absence of observable factors (indicator species, vegetation) to detect the Dieback pathogen's impact on native vegetation.

No disease expression was observed due to the site being severely altered. Sporadic deaths of *Xanthorrhoea preissii* were observed but they showed no chronology or pattern of deaths that could suggest Dieback was the cause. Dieback resistant species including Marri and *Kingia* spp. were also seen to be dead or in decline. These deaths may be due to a range of other factors.

Two samples were collected from the survey area to check for *Phytophthora* infestation. Laboratory results from the two *X. preissii* samples gave a negative outcome for presence of *Phytophthora* spp. Sampling was limited as there was no recently dead or dying indicator plants. Both samples were from plants that had died a long time ago, which can limit the viability of inoculum to detect the pathogen through laboratory techniques.

4 VEGETATION DETAILS

4.1 Proposal Site Vegetation Description

The Clearing Area has 1.76 ha of native vegetation in Degraded condition (Table 3).

Table 3. Summary of Vegetation Units representing native vegetation (ELA 2023, FVC 2024)

Vegetation Unit(s)	Extent of native vegetation within clearing area	Vegetation condition
<i>Corymbia calophylla</i> tall open woodland over mixed weeds	0.49	Degraded
Sparse native trees over weeds	1.27	Degraded

The Clearing Area is located within the Swan Coastal Plain IBRA region and the Perth subregion (SWA02). The Perth subregion is composed of colluvial and aeolian sands, alluvial river flats and coastal limestone and the vegetation is described by Mitchell *et al.* (2002) as Heath and/or Tuart woodlands on limestone, Banksia, and Jarrah-Banksia woodlands on Quaternary marine dunes of various ages and Marri on colluvial and alluvial. The Perth subregion also comprises a complex series of seasonal wetlands, and areas of relatively high ecosystem/species diversity (Mitchell *et al.* 2002).

There is one Vegetation Association within the Clearing Area – 968, which is described as – Medium woodland: *Eucalyptus marginata*, *Corymbia calophylla*, and *Eucalyptus wandoo*.

Table 4 provides details of the vegetation association within the Clearing Area, and its remaining extent in comparison to its pre-European extent.

Table 4. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre-European Extent (ha)	Current Extent (ha)	% Remaining	% Current Extent in DBCA Managed Land (proportion of pre-European Extent)
Veg Assoc No. 968	Statewide	296,877.84	95,048.82	32.02	18.45
	IBRA Bioregion Swan Coastal Plain	136,188.20	9,017.32	6.62	1.43
	IBRA Sub-region Perth	136,188.20	9,017.32	6.62	1.43
	Local Government Authority Shire of Serpentine-Jarrahdale	24,351.49	1,121.13	4.60	0.57

4.2 Vegetation Complexes and Representation

Vegetation Complexes within the Clearing Area have been defined by Heddle *et al.* (1980) and are based on vegetation in association with landforms and underlying geology. Only one native vegetation complex as described by Heddle *et al.* (1980) occurs within the Clearing Area, as follows:

- **Guildford Complex** – A mixture of open forest to tall open forest of *Corymbia calophylla* - *Eucalyptus wandoo*– *Eucalyptus marginata* and woodland of *Eucalyptus wandoo* (with rare occurrences of *Eucalyptus lane-pooei*). Minor components include *Eucalyptus rudis* - *Melaleuca raphiophylla*.

The remaining extent of the Guildford complex is below the minimum threshold of 10% that is the target for retention in constrained areas (DER 2014). The current remaining extent of this vegetation complex is detailed in Table 5.

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

Heddle/Mattiske Veg Complex	Pre-European Extent (ha)	Current Extent (ha)	% Remaining
Guildford Complex	90,513.13	4,607.91	5.09

5 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

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

Each principle has been assessed in accordance with DWER’s ‘A Guide to the Assessment of Applications to Clear Native Vegetation’ (DER 2014).

The proposed clearing is at variance with one or more of the ten Clearing Principles.

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

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

Assessment

Vegetation:

The Clearing Area comprises of 1.76 ha of native remnant vegetation in Degraded condition (ELA 2023) comprising two vegetation units/communities:

- *Corymbia calophylla* tall open woodland over mixed weeds
- Sparse native trees over weeds: Marri, Allocasuarina, Flooded gum, over *Kunzea glabrescens*, *Melaleuca preissiana*, *Xanthorrhoea preissii* sparse shrubland over weeds.

Neither of the vegetation units/communities present represent PECs, nor are any PECs expected to occur within the Clearing Area.

Flora:

A total of 49 flora species representing 18 families and 47 genera were recorded in seven quadrats and three relevés (ELA 2023) from the survey area. From the 49 flora species, 11 are native, and 38 are introduced.

No State or Federally listed Threatened or Priority flora species were recorded within the Clearing Area (ELA 2023). Of the 25 significant flora species identified from the pre-survey likelihood of occurrence assessment, none were likely to occur within the Clearing Area, due to highly degraded nature of vegetation and lack of suitable habitat.

Fauna and fauna habitat:

The Clearing Area supports 1.76 ha that could provide habitat for native fauna. All such habitat is in poor condition as a result of historical clearing, surrounding infrastructure and high levels of weed invasion. It is not considered likely that this habitat supports a high diversity of native fauna.

As the Clearing Area contains no Threatened and/or Priority flora, contains remnant native vegetation of 1.76 ha in degraded to completely degraded condition, and a limited amount of poor quality foraging habitat for conservation significant fauna species, the proposed Clearing Area is not considered to comprise a high level of biodiversity and is not likely to be at variance to this principle.

Methodology

ELA (2023)

EPA (2016)

DBCA Shapefiles

MRWA shapefiles

NatureMap (2023)

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.

Proposed clearing is at variance to this Principle.

Assessment

The desktop assessment identified known records of 32 significant fauna species occurring within 10 km of the Clearing Area.

The biological survey (ELA 2023) identified three conservation species present within the survey area. These are:

- Carnaby's Cockatoo (*Zanda latirostris*) – EPBC Act and BC Act Endangered
- Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*) – EPBC Act and BC Act Vulnerable
- Quenda (*Isodon fusciventer*) – Priority 4.

Within the Clearing Area, Carnaby's Black-Cockatoo and Quenda were observed directly, while the Forest Red-tailed Black-Cockatoo was recorded from secondary signs, specifically tail feathers, and foraging evidence (ELA 2023).

Black-Cockatoos

The Clearing Area is within the known distribution and range of the Carnaby's Cockatoo and Forest Red-tailed Black-Cockatoo, with foraging evidence for both species present within the Clearing Area. Baudin's Black-Cockatoo (*Zanda baudinii*) was not directly observed in the Clearing Area but is considered to have the potential to occur, as the Clearing Area is within its known range and provides potentially suitable foraging, breeding, and roosting habitat.

Within the Clearing Area, 1.76 ha of potentially suitable foraging habitat for all three Threatened Black-Cockatoo species was recorded (**Figure 4**). The quality of the foraging habitat varied from 'Moderate' (0.44 ha) to 'Poor' (1.32 ha).

There are 37 potentially suitable DBH (Marri) trees within the Clearing Area (ELA 2023, FVC 2024). No suitable hollows for breeding have been confirmed within any of these trees. Another two DBH trees (identified as trees 51 and 104 in **Figure 4**) are outside the Clearing Area but may be impacted by clearing due to their canopy hanging over the Clearing Area and are therefore considered as part of this assessment.

No roosting of Black-Cockatoos was observed during surveys within the Clearing Area (ELA 2023). The Clearing Area does not occur within the buffer of a known Black-Cockatoo roosting site. However, all potential DBH trees within the Clearing Area provide potentially suitable roosting habitat (ELA 2023).

The loss of up to 1.76 ha of Black-Cockatoo foraging habitat, potential breeding habitat and potential roosting habitat is considered to be at variance to this clearing principle.

Other Conservation Significant Species

The Quenda occurs in wet or dry sclerophyll forest through to open woodland and scrubby, dense vegetation on sandy soils but also inhabits urban backyards, parklands and bush fragments. The species was recorded within the fauna surveys that included the Clearing Area (ELA 2023). This species was directly observed within the survey area. Quenda are widespread and is an adaptable species, and the vegetation within the Clearing Area is not considered to be critical to the species.

It is unlikely that the small area of vegetation to be cleared constitutes significant habitat for the species, which is more likely to occur in larger pockets of native vegetation associated with local bushland reserves.

Assessment:

Clearing within the Clearing Area is at variance to this Principle due to:

- Loss of up to 1.76 ha of Black-Cockatoo foraging habitat, potential breeding habitat, and potential roosting habitat.

- Loss of up to 39 potentially suitable DBH trees for Black-Cockatoos. This number includes two DBH trees outside the Clearing Area that may be impacted due to their canopy overhanging the Clearing Area.

Methodology

Aerial Photography

ELA (2023)

FVC (2024)

DBCA Shapefiles

DBCA website

DAWE 2022

EPA (2016)

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

Proposal is not at variance to this Principle.

Assessment

No State or Federally listed Threatened flora species were recorded within the survey area (ELA 2023).

ELA (2023) identified 17 Threatened flora species as possibly occurring within the survey area based on the database searches. A pre-survey likelihood of occurrence assessment identified one Threatened species as having the potential to occur within the survey area:

- *Synaphea* sp. Serpentine (Critically Endangered under the EPBC Act and BC Act).

A post-survey likelihood of occurrence assessment following the flora survey indicated that none of the 17 Threatened flora species were likely to occur. This is due to the lack of suitable habitat within the survey area for any of the Threatened flora species and the highly degraded nature of vegetation within the survey area. The level of search effort within the survey area was considered adequate to have identified any individuals of a Threatened species (ELA 2023).

As no Threatened species are known or likely to occur in the Clearing Area, the proposed clearing is not at variance to this Principle.

Methodology

ELA (2023)

DBCA Shapefiles

Florabase

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Proposed clearing is not at variance to this Principle.

Assessment

No State or Federally listed TEC occurs within the Clearing Area (ELA 2023).

Based on desktop assessment, buffers of two State and Federally listed TECs occur in close proximity to the Clearing Area. Both of these TECs are listed as Endangered under EPBC Act and Critically Endangered under BC Act. These are:

- SCP3a *Corymbia calophylla* – *Kingia australis* woodlands on heavy soils, Swan Coastal Plain
- SCP3c *Corymbia calophylla* – *Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain.

The buffer of the TECs intersects the eastern end of the survey area, but the actual location and extent of both TECs is outside the Survey Area and within the adjacent rail reserve. No vegetation within the Survey Area or the Clearing Area is representative of either TEC.

There are no known TECs within the Clearing Area and therefore, the proposed clearing is not at variance to this Principle.

Methodology

ELA (2023)

DBCA Shapefiles

EPA (2016)

Community specific conservation listing advice and recovery plans

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Proposed clearing is at variance to this Principle.

Assessment

The Clearing Area is located within the Swan Coastal Plain IBRA region and Perth subregion (SWA02). One Beard (1990) vegetation association (968) occurs within the Clearing Area and is described as: Medium woodland; *Eucalyptus marginata*, *Corymbia calophylla*, and *Eucalyptus wandoo*. Within the Swan Coastal Plain IBRA region and the Perth IBRA subregion, this Beard vegetation association is underrepresented, with less than 10% of its pre-European extent remaining.

Vegetation Association (Beard 1990) within the Clearing Area

Pre-European Vegetation Association	Scale	Pre-European Extent (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 968	Statewide	296,877.84	95,048.82	32.02	18.45
	IBRA Bioregion Swan Coastal Plain	136,188.20	9,017.32	6.62	1.43
	IBRA Sub-region Perth	136,188.20	9,017.32	6.62	1.43
	Local Government Authority Shire of Serpentine-Jarrahdale	24,351.49	1,121.13	4.60	0.57

One Heddle *et al.* (1980) complex, the Guildford Complex, occurs within the Clearing Area, and is summarised as: a mixture of open forest to tall open forests of Marri, Wandoo, Jarrah, and woodland of wandoo with rare occurrences of Flooded Gum and paperbark. The Guildford Complex is considered to be under-represented as there is 5.09 % of its pre-European extent remaining.

Vegetation Complex (Heddle *et al* 1980) within the Clearing Area

Heddle/Mattiske Veg Complex	Pre-European Extent (ha)	Current Extent (ha)	% Remaining
Guildford Complex	90,513.13	4,607.91	5.09

The national objectives and targets for biodiversity conservation in Australia have a target to prevent clearance of ecological communities with an extent below 30% of that present pre-1750, below which, species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia 2001). The Clearing Area is within a constrained area, and as such, a retention target of at least 10% applies (DER 2014).

The current extent of Vegetation Association 968 is below the 10% threshold (IBRA Bioregion, IBRA sub-region, and LGA) and therefore, is considered significant as a remnant of native vegetation. In addition to this, the current extent of Guildford complex is below 10% threshold for the Swan Coastal Plain, and therefore representations are considered significant vegetation.

The proposed clearing is at variance to this Principle, as the vegetation within the Clearing Area is in an area that has been extensively cleared.

Methodology

EPA (2016)

ELA (2023)

Vegetation Statistics

- DBCA 2018
- Government of Western Australia (2019)

DBCA Shapefiles

Aerial photography

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

Proposed clearing is at variance to this Principle.

Assessment

According to DBCA's Geomorphic Wetlands of the SCP Dataset (1:25,000 scale mapping), three multiple use wetlands (UFI 15797, 7868, and 15013) are mapped as occurring occur within the Clearing Area (**Figure 5**). However, by definition, these wetlands are degraded to the extent that they are not a priority for conservation and have few remaining important attributes and functions. The small extent of the proposed clearing will not have a significant impact on these already highly modified palusplains. The entire 1.76 ha of native vegetation within the Clearing Area occurs on an area mapped as palusplain wetlands. Therefore, the proposed clearing is at variance to this Principle. However, the proposed clearing is not likely to impact on the greater extent of riparian vegetation in the local area considering it comprises a small area within an extensive palusplain – the Armadale Palusplain covers over 7,200 ha, therefore this does not constitute a significant residual impact.

Methodology

ELA (2023)

DWER and DBCA shapefiles

- Government GIS shapefiles:
 - Geomorphic Wetlands (Accessed March 5, 2024)

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

Proposed clearing is not at variance to this Principle.

Assessment:

The Department of Primary Industries and Regional Development (DPIRD) provides a series of soil degradation risk mapping at sub-system level. The Clearing Area is located within the Pinjarra soil system which is described as: ‘poorly drained coastal plain with variable alluvial and aeolian soils. Vegetation includes Jarrah, Marri, wandoo, paperback, forest, and woodland’.

The table below summarises the soil degradation risk within the Clearing Area:

Aspect	Degradation risk (Pinjarra soil system)
Wind erosion	65%
Waterlogging	45 – 100%
Water Erosion	0%
Salinity	0%
Flood risk	1%

Wind erosion and waterlogging are the two potential soil degradation aspects relevant to the Clearing Area. However, due to the poorly drained and heavy soils associated with the Clearing Area, it is unlikely that wind erosion will be a significant issue. The Clearing Area is located within an extensive Palusplain wetland, which is known to be affected by waterlogging even without clearing. Given the small amount of clearing proposed, it is unlikely that the clearing will cause any increase in waterlogging.

It is unlikely that clearing within the Clearing Area will cause appreciable land degradation given the relatively small amount of clearing and the implementation of appropriate measures to mitigate and manage potential wind driven erosion during construction.

Methodology

GIS shapefiles

Natural Resource Management SLIP Soil Systems (Accessed March 2024)

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Proposed clearing is at variance to this Principle.

Assessment

The Clearing Area will impact on native vegetation within reserve 37332 (also known as Lot 151 on Plan 1367, Byford) which covers 0.4 ha of the Clearing Area. Reserve 37332 is managed by the Shire of Serpentine Jarrahdale under a management order for the dual purpose of 'Public Recreation and Conservation'. Reserve 37332 was an offset condition for the Shire of Serpentine Jarrahdale for CPS 6498/1 (**Figure 6**).

CPS 6498/1 requires the Shire to conserve 5.6 ha of Black Cockatoo habitat in perpetuity within Reserve 37332. Given R 37332 is approximately 7.3ha in size, the Shire's offset won't be impacted by the proposed clearing.

No DBCA managed conservation areas occur within the Clearing Area.

As the Clearing Area is partly within a reserve managed for conservation, the proposed clearing is at variance to this Principle.

Methodology

ELA (2023)

DBCA shapefiles

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

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

Assessment

The Clearing Area of 1.76 ha of native vegetation adjacent to an existing road and other disturbance is unlikely to cause or exacerbate the deterioration of the quality of surface or ground water. Whilst groundwater levels are high within the Clearing Area, the transmissivity of the soil is low due to the heavy soils.

Given the small area of clearing of 1.76 ha of native vegetation, there will be no change to the surface or groundwater hydrology of the Clearing Area.

The proposed duplication will construct drainage structures within the Clearing Area, to ensure that rainfall with a 1% annual exceedance probability (AEP) is managed within the drainage system.

Deterioration in the quality of surface water or underground water is unlikely to occur as a result of native vegetation clearing.

The proposed clearing is not likely to be at variance to this Principle.

Methodology

ELA (2023)

DWER and DBCA shapefiles

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

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

Assessment

Given that the wetland areas within and adjacent to the Clearing Area have been significantly altered due to urban, infrastructure and agricultural development and the proposed clearing is relatively small in relation to the size of the palusplain wetlands, the proposed clearing is unlikely to cause or exacerbate the incidence or intensity of flooding.

The proposed duplication will construct drainage structures within the Clearing Area, to ensure that rainfall with a 1% AEP is managed within the drainage system.

The proposed clearing is not likely to be at variance to this Principle.

Methodology

ELA (2023)

Natural Resource Management SLIP Soil Systems (Accessed March 2024)

GIS Shapefiles

6 VEGETATION MANAGEMENT

Main Roads will avoid clearing native vegetation where possible. Where clearing cannot be avoided, then clearing will be kept to a minimum. A Vegetation Management Plan (VMP) has been developed to manage and minimise vegetation clearing for the Proposal (refer to **Appendix 3**).

7 REHABILITATION, REVEGETATION & OFFSETS

7.1 Revegetation and Rehabilitation

No temporary clearing will be undertaken as part of the Proposal activities.

7.2 Offset Proposal

In accordance with CPS 818/17 condition 11(a), Main Roads is preparing an offset proposal which will be submitted to DWER for approval.

8 STAKEHOLDER CONSULTATION

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

9 COMPLIANCE WITH CPS 818

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

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

Impact of Clearing	Yes/No or NA	Further Action Required
<p>1. The CAR indicates that the clearing is 'At Variance' or 'May be at Variance' with one or more of the Clearing Principles.</p>	<p>Yes</p>	<ol style="list-style-type: none"> 1. Clearing Report to be published on website and submissions sought for 21 days. 2. Submissions invited from relevant parties, including the LGA, the owner or occupier of the land and other stakeholders in accordance with Condition 8 of CPS 818. 3. VMP has been completed, refer to Appendix 3. 4. An offset proposal for approval by DWER will be prepared. 5. Summary of submissions and a statement addressing each of those submissions to be published on website.
<p>2. Clearing is at variance or may be at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality or (j) the incidence of flooding.</p>	<p>No</p>	<p>No further action required.</p>
<p>3. Clearing is at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality and (j) the incidence of flooding.</p>	<p>No</p>	<p>No further action required.</p>
<p>4. The Proposal involves clearing for temporary works (as defined by CPS 818).</p>	<p>No</p>	<p>No further action required.</p>
<p>5a. Proposal is within a Region that:</p> <ul style="list-style-type: none"> • has rainfall greater than 400mm; and, • is South of the 26th parallel; and, • works are necessary in 'Other than dry conditions'; and, • works have potential for uninfested areas to be impacted. 	<p>Yes</p>	<p>A Dieback assessment was conducted in the Clearing Area (ELA 2023). Results show that the Clearing Area has been classified as 'Excluded' (unprotectable) because the site vegetation structure is severely altered. Standard Vehicle and Plant management actions from Principal Environmental Management Requirements (PEMRs) and Hygiene Checklists will be applied. This will be adequate to minimise the risk of spreading dieback and weeds within and outside the Clearing Area (ELA 2023).</p>
<p>5b. Do the proposed works require clearing within or adjacent to DBCA managed lands in non-dry conditions?</p>	<p>No</p>	<p>No further action required.</p>

Impact of Clearing	Yes/No or NA	Further Action Required
<p>6. Main Roads has been notified by DWER or an environmental specialist that the area to be cleared is susceptible to a pathogen other than dieback.</p>	<p>No</p>	<p>No further action required.</p>
<p>7. Weeds are likely to spread to and result in environmental harm to adjacent areas of native vegetation that are in good or better condition.</p>	<p>No</p>	<p>There is no adjacent native vegetation in good or better condition.</p>
<p>8. Did an environmental specialist conduct the survey or field assessment?</p>	<p>Yes</p>	<p>The Environmental Specialist undertaking the biological assessments was suitably qualified and had more than three years' experience.</p>
<p>9. Did an environmental specialist prepare the Assessment Report and any other associated documentation including the VMP, Dieback Management Plan or Offset Proposal?</p>	<p>Yes</p>	<p>The Environmental Specialist preparing the Assessment Report and any other associated documentation including the VMP, Dieback Management Plan or Offset Proposal was suitably qualified and had more than three years' experience.</p>

10 REFERENCES

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11 APPENDICES

Appendix	Title
Appendix 1	CPS 818/17 condition 8 (e) (iii) Biological Surveys and Field Assessment Executive Summary and Report Conclusions
Appendix 2	Figures
Appendix 3	Vegetation Management Plan

Appendix 1: CPS 818/17 condition 8 (e) (iii) Biological Surveys and Field Assessment Executive Summary and Report Conclusions

Thomas Road Duplication Biological Survey (ELA 2023)

Executive Summary

Main Roads Western Australia (Main Roads) is proposing to duplicate Thomas Road between Tonkin Highway (SLK 18.5) and South Western Highway, to improve the safety and efficiency on Thomas Road. The survey area is located approximately 40 kilometres south of Perth, Western Australia, and consists of an approximately 60-metre-wide by 3.5-kilometre-long section of road reserve to the north and south of Thomas Road in Byford, Western Australia.

Eco Logical Australia was engaged by Main Roads in 2020 to undertake a Detailed and Targeted flora and vegetation survey and a Basic fauna survey and Targeted black cockatoo habitat assessment of the survey area in order to identify biological values present. In July 2023, ELA undertook a supplementary field survey to ground-truth and refine mapping boundaries following an amendment to the survey area boundary, and to update vegetation mapping to reflect cleared areas since the 2020 survey. Results presented in the following report, inclusive of the desktop assessment, reflect the updated survey area, totalling approximately 30.95 ha.

A desktop assessment was undertaken, including a review of relevant government database searches within 5 kilometres of the survey area, to assess for the potential presence of conservation listed flora and fauna species and ecological communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the State *Biodiversity Conservation Act 2016* or Priority species by the Department of Biodiversity, Conservation and Attractions.

A single, out of season Detailed and Targeted flora and vegetation survey and a Basic fauna survey and Targeted black cockatoo habitat assessment was undertaken within the survey area on 4 August 2020. The 2020 field survey was undertaken in accordance with the Environmental Protection Authority *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (2016), the Environmental Protection Authority *Technical guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (2020) and the Department of Sustainability, Environment, Water, Populations and Communities *EPBC Act referral guidelines for three threatened black cockatoo species* (2012). An out-of-season supplementary field survey was conducted on 24 July 2023.

A total of 49 flora species (11 native and 38 introduced) representing 18 families and 47 genera were recorded from the eleven quadrats and four relevés established within the survey area and from opportunistic collections. No Threatened (Declared Rare) flora species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* or the State *Biodiversity Conservation Act 2016*, or Priority flora species listed by the Department of Biodiversity, Conservation and Attractions were recorded within the survey area. A post-survey flora likelihood of occurrence assessment was undertaken following the field survey. Following this assessment, all of the 25 significant flora species identified from the desktop assessment as possibly occurring within the survey area were considered as being unlikely to occur within the survey area. This assessment was based on the lack of suitable habitat present within the survey area, the highly degraded nature of vegetation present and from adequate search effort having been undertaken within the survey area. Two introduced (weed) species listed as Declared Pests under the State *Biosecurity and Agriculture Management Act 2007* were recorded within the survey area, namely **Gomphocarpus fruticosus* (Narrow Leaf Cotton Bush) and **Zantedeschia aethiopica* (Arum Lily). Each of these species is categorised as s. 22(2) (c3), required to be managed.

Vegetation communities were described through the establishment of eleven 10 x 10 metre quadrats and four relevés. Four vegetation communities were mapped across the survey area, covering a total area of 7.98 hectares. Of this 4.28ha was remnant native vegetation, 3.64ha was planted and 0.05 was revegetation. Tracks and cleared areas with weeds accounted for the remaining 22.97 hectares. No significant ecological communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the State *Biodiversity Conservation Act 2016* or by the Department of Biodiversity, Conservation and Attractions were inferred to occur within the survey area.

Condition of remnant vegetation in the survey area ranged from Completely Degraded to Degraded, with majority of remnant vegetation within the survey area being recorded in Degraded condition (13.8%; 4.28 hectares). All vegetation has been subject to historical disturbances including weed invasion, historical clearing and minor rubbish dumping.

A total of three fauna habitats were recorded within the survey area; Fauna habitat 1: Marri tall open woodland over mixed weeds, Fauna habitat 2: Sparse native and planted trees over weeds and Fauna habitat 3: Revegetation. The survey area contains minor patches of roadside remnant vegetation, which is interspersed with cleared areas and surrounded by residential housing. Fauna habitat within the survey area is unlikely to provide high quality connectivity for fauna species.

A total of 16 fauna species were recorded within the survey area, comprising 15 birds and one mammal. Of these species, Carnaby's Cockatoo (*Calyptorhynchus latirostris*) is listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the State *Biodiversity Conservation Act 2016*, the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii* subsp. *naso*) is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the State *Biodiversity Conservation Act 2016*, and Quenda (*Isodon fusciventer*) is listed as Priority 4 by the Department of Biodiversity, Conservation and Attractions. These species were observed from direct observation (Carnaby's Cockatoo calls heard and birds observed flying overhead, Quenda directly observed) and from secondary signs (e.g., Forest Red-tailed Black Cockatoo tail feathers and foraging evidence observed within Fauna habitat 1: Marri tall open woodland over mixed weeds and Fauna habitat 2: Sparse native and planted trees over weeds). One introduced fauna species was recorded within the survey area, namely **Trichoglossus moluccanus* (Rainbow Lorikeet), which was directly observed within the survey area.

The Targeted black cockatoo habitat assessment was undertaken in accordance with the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* referral guidelines (Department of Sustainability, Environment, Water, Populations and Communities 2012). The survey area occurs within the known distribution of Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black Cockatoo (Department of Sustainability, Environment, Water, Populations and Communities 2012).

A total of 2.59 hectares (8.4%) within the survey area is considered as providing 'Moderate' quality foraging habitat for all three black cockatoo species, with tall open Marri (*Corymbia calophylla*) woodland providing potentially suitable foraging habitat for all three species of black cockatoo species. A further 5.33 hectares and 0.05 hectares is considered as providing Poor and Very Poor foraging quality, respectively, with Scattered *Eucalyptus* spp. occurring at a low cover within these areas. A total of 22.97 hectares is considered as providing 'Nil' foraging quality for black cockatoo species.

The black cockatoo breeding habitat assessment identified 131 potentially suitable Diameter at Breast Height trees within the survey area, comprising *Corymbia calophylla* (Marri), none of which contained hollows or suitable hollows for breeding. All potentially suitable Diameter at Breast Height trees recorded from the survey area provide potential roosting habitat for three black cockatoo species. An additional 127 potentially suitable roosting trees were recorded, bringing the total to 258 potentially suitable roosting trees recorded within the survey area.

Although not directly observed during the field survey, Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) is also considered as having the potential to occur within the survey area, as the survey area provides moderate quality foraging habitat, and occurs within this species' known foraging range.

A Phytophthora dieback assessment, conducted in accordance with the requirements of Main Roads Statewide Purpose Clearing Permit, CPS818/14, was completed within the survey area on 27 August 2020 by Bruno Rikli from Bark Environmental, a DBCA registered dieback interpreter, former Forester and former Biosecurity Officer for Department of Agriculture and Food Western Australia. The survey was undertaken with consideration of any naturally vegetated areas of influence up to 150 metres outside of the survey area and involved the collection of up to 2 plant/soil samples for laboratory testing, as required.

Due to the degraded condition of vegetation and the absence of available observable factors to detect the Dieback pathogen's impact, the entire survey area was classified as Excluded (unprotectable). There was no disease expression to report, due to site vegetation structure being severely altered. Sporadic deaths of the widely scattered susceptible indicator plant *Xanthorrhoea preissii* were observed, however they showed no chronology or pattern of deaths within the landscape that could suggest *Phytophthora spp.* as the cause. Two samples were collected from within the survey area, with the sampling strategy being to detect any possible *Phytophthora spp.* in the survey by targeting known susceptible plants and to sample areas where *Phytophthora spp.* commonly occurs e.g., alongside roads and drainage lines. Both sampled plants, both of which returned a negative sample.

5. Discussion

5.1 Flora and vegetation

A total of 49 flora species (11 native and 38 introduced) representing 18 families and 47 genera were recorded from the eleven quadrats and four relevés established within the survey area and from opportunistic collections. No Threatened flora species listed under the EPBC Act and BC Act or Priority flora species listed by DBCA were recorded within the survey area. Of the 25 significant flora species identified from the desktop assessment as possibly occurring within the survey area, all are considered as unlikely to occur within the survey area. This is due to the lack of suitable habitat within the survey area, highly degraded nature of vegetation present and from adequate search effort having been undertaken within the survey area.

A total of 38 introduced (weed) species were recorded within the survey area, representing 77.6% of flora species within the survey area. High numbers of introduced flora within the survey area are likely due to the highly degraded nature of vegetation present within the survey area. Of these species, **Gomphocarpus fruticosus* (Narrow Leaf Cotton Bush) and **Zantedeschia aethiopica* (Arum Lily) are listed as Declared Pests the BAM Act, categorised as s22(2) (exempt). **Gomphocarpus fruticosus* is a perennial herb or shrub to 1.5 m high with white flowers. It readily spreads by windblown seed, through water or by soil movement (DBCA and WAH 2020). **Gomphocarpus fruticosus* was recorded from nine locations within the survey area totalling 40 individuals. **Zantedeschia aethiopica* is a rhizomatous perennial herb to 1 m high with white flowers. It grows in loam and sand near swamps and, rarely, upland. This species primarily disperses through water but also by birds, foxes, stock or soil (DBCA and WAH 2020). **Zantedeschia aethiopica* was recorded from two locations within the survey area totalling eight individuals.

Vegetation within the survey area has been subject to significant levels of degradation over time as a result of historical clearing, surrounding infrastructure (i.e., Thomas Road) and frequent access. Four vegetation communities were recorded within the survey area; Vegetation community 1: *Corymbia calophylla* tall open woodland over mixed weeds, Vegetation community 2: Sparse native trees over weeds, Vegetation community 3: Sparse planted trees over weeds and Vegetation community 4: Revegetation. Vegetation communities comprised a sparse native vegetation structure at one or two strata, however, were highly modified by factors including sustained weed invasion and clearing. Native vegetation accounted for 13.8% (4.28ha) of the survey area, with planted vegetation 11.8% (3.64ha), revegetation 0.2% (0.05ha) and tracks and other cleared areas with weeds accounting for the remaining 74.2% (22.97 ha). Floristic community type analysis was unable to be undertaken for vegetation present within the survey area due to the nature and condition of vegetation present, being highly disturbed and no longer supporting what would be considered 'intact' vegetation.

None of the vegetation communities recorded within the survey area represent any known Threatened or Priority ecological community listed under the EPBC Act, BC Act or by DBCA. Of the four significant ecological communities identified from the desktop assessment as having the potential to occur within the survey area, all are considered as not occurring within the survey area. This assessment is based on the lack of native structure and highly degraded nature of vegetation within the survey area, and due to the lack of dominant indicator species present for these communities (e.g., no *Banksia* spp., *Kingia australis* or *Eucalyptus marginata* recorded within the survey area).

Majority of the survey area (90.9%) intersects with the Pinjarra land system, a poorly drained coastal plain characterised by variable alluvial and aeolian soils and variable vegetation including Jarrah, marri, wandoo, paperbark sheoaks and *Eucalyptus rudis*. Within the survey area, characteristics of this land system are represented in Vegetation community 1, Vegetation community 2 and Vegetation community 3, with the presence of *Corymbia calophylla* and *Eucalyptus rudis*. This land system is extensive across the Swan Coastal Plain, with the survey area representing less than 0.01% of its total extent in WA.

Two vegetation associations occur within the survey area; Pinjarra 968 and Pinjarra 3. Vegetation within the survey area aligns with Beard's vegetation association mapping, as presented in Section 2.5 above. These vegetation communities broadly comprise aspects of Beard's 968 and 3 vegetation associations with the presence of Marri (*Corymbia calophylla*) in the overstorey. Pre-European vegetation communities mapped within the survey area have less than 7% (968) and 17% (3) of their extent remaining within WA (Government of Western Australia 2019), with the survey area representing less than less than 0.5% of each association's total extent in WA.

Condition of remnant vegetation in the survey area ranged from Completely Degraded to Degraded, with all remnant vegetation within the survey area was recorded as being in Degraded condition (13.8%; 4.28 ha). All vegetation has been subject to historical disturbances including weed invasion, historical clearing and minor rubbish dumping.

5.2 Fauna

A total of three fauna habitats were recorded within the survey area; Fauna habitat 1: Marri tall open woodland over mixed weeds, Fauna habitat 2: Sparse native and planted trees over weeds and Fauna habitat 3: Revegetation. These fauna habitats cover a total of 25.8% (7.98 ha) of the survey area, with cleared areas and roads/ tracks accounting for the remaining 74.2% (22.97 ha). The most commonly occurring fauna habitat was Fauna habitat 2: Sparse native and planted trees over weeds, covering a total of 17.2% of the survey area (5.33 ha). The survey area contains minor patches of roadside remnant vegetation, which is interspersed with cleared areas and surrounded by residential housing. Fauna habitat within the survey area is unlikely to provide high quality connectivity for fauna species. Fauna habitats are consistent with those mapped by AECOM (2020), who recorded 'Scattered trees', 'Eucalypt woodland' and 'Grassland with occasional tree' within their survey area (AECOM 2020).

A total of 16 fauna species were recorded as occurring within the survey area, comprising 15 bird species and one mammal. Of these species, Carnaby's Cockatoo (*Calyptorhynchus latirostris*) is listed as EN under the EPBC Act and BC Act, the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii* subsp. *naso*) is listed as VU under the EPBC Act and BC Act, and the Quenda (*Isoodon fusciventer*) is listed as P4 by DBCA. Carnaby's Cockatoo was observed directly within the survey area, with both calls heard and birds observed flying overhead. Quenda was also observed directly within the survey area from one location within Fauna habitat 1 (m 405366E; m 6436363N). Forest Red-tailed Black Cockatoo was observed from secondary signs, specifically tail feathers and foraging evidence observed within Fauna habitat 1: Marri tall open woodland over mixed weeds and Fauna habitat 2: Sparse native and planted trees over weeds.

Carnaby's Cockatoo (*Calyptorhynchus latirostris*) is a large (53 to 58 centimetres [cm] in length) mostly black cockatoo with white cheek patches, large white panels on the tail and a strong curved bill

(Department of Parks and Wildlife [DPaW] 2003). This species is known from 24,470 records over a range of approximately 1,150 km from north of Geraldton in the north, along the coast and inland to Esperance in the south (DBCA 2007-2020). Carnaby's Cockatoo nests in the hollows of live or dead eucalypts, primarily in the smooth barked Salmon Gum (*Eucalyptus salmonophloia*) and Wandoo (*E. wandoo*; DPaW 2003). Large-scale removal of native vegetation and increased widespread availability of introduced food species has resulted in a significant shift in the dietary composition for Carnaby's Cockatoo, with a traditional diet of mostly native seeds expanding to seeds from introduced plants including canola and pine (DPaW 2003). Within the survey area, foraging evidence of this species was observed within Fauna habitat 1: Marri tall open woodland over mixed weeds and Fauna habitat 2: Sparse native trees over weeds in the form of chewed Marri nuts.

The Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii* subsp. *naso*) is a large (55 to 60 cm in length), glossy black cockatoo with a pair of black central tail feathers, a crest, robust beak and bright red, orange or yellow barring in the tail (Department of the Environment, Water, Heritage and the Arts [DEWHA] 2009). This species is known from 2,419 records over a range of approximately 450 km from near Northam in the north, along the coast and inland to east of Albany in the south (DBCA 2007-2020). The Forest Red-tailed Black Cockatoo inhabits the dense *Eucalyptus marginata* (Jarrah), *E. diversicolor* (Karri) and *Corymbia calophylla* (Marri) forests, breeding in large hollow-bearing trees. Their foraging requirements consist of Jarrah and Marri woodlands and forest, and edges of karri forests including Wandoo and Blackbutt (*E. patens*). Within the survey area, foraging evidence of this species was observed within Fauna habitat 1: Marri tall open woodland over mixed weeds and Fauna habitat 2: Sparse native trees over weeds in the form of chewed Marri nuts and from a tail feather.

The Quenda (*Isoodon fusciventer*; listed as P4 by DBCA) is a medium-sized ground dwelling marsupial with coarse dark greyish brown fur above and creamy white below, a tapered, dark brown tail and short, rounded ears (Threatened Species Recovery Hub 2021). Though this species is widespread, occurring along an arc in on the Swan Coastal Plain from Geraldton to Esperance in WA, population numbers are in decline due to habitat loss via land clearing, altered fire regimes, predation from feral species and competition for resources (Bryant 2019). The species known to inhabit urban backyards and parklands, bush fragments and conservation reserves (Bryant 2019), with records of this species are occurring in remnant bushland ~350 m east of the survey area. This species prefers areas of scrubby vegetation (often swampy areas) with a dense cover of up to 1 m in height, often foraging in adjacent forest and woodland areas. Within the survey area, one individual of this species was recorded from one location within Fauna habitat 1 (m 405366E; m 6436363N).

Of the remaining 29 species identified as possibly occurring within the survey area from the desktop assessment, three are considered as having the potential to occur within the survey area., namely Baudin's Cockatoo, Common Death Adder and Dell's Skink.

Baudin's Cockatoo (*Calyptorhynchus baudinii*; listed as EN under the EPBC Act and BC Act) is considered as having the potential to occur within the survey area due to close proximity of recent records and presence of potentially suitable habitat. This is discussed further in Section 5.2.1 below.

Common Death Adder (*Acanthophis antarcticus*; listed as P3 by DBCA) is considered as having the potential to occur within the survey area due to close proximity of recent records (records within 5 km of the survey area) and presence of potentially suitable habitat. This species inhabits forests,

woodlands, grasslands and heaths, aspects of which are broadly represented in Fauna habitat 1 and Fauna habitat 3 within the survey area (i.e., woodland; totalling 2.65 ha).

Dell's Skink (*Ctenotus delli*; listed as P4 by DBCA) is considered as having the potential to occur within the survey area due to close proximity of recent records (records occurring 1 km north of the survey area) and presence of potentially suitable habitat. This species is commonly found within Jarrah and Marri woodlands with an understorey of shrubs over a laterite, sand or clay substrate. Aspects of this habitat are represented in Fauna habitat 1 (i.e., Marri woodland; totalling 2.6 ha).

One introduced fauna species was recorded within the survey area, namely **Trichoglossus moluccanus* (Rainbow Lorikeet), which was directly observed within the survey area.

5.2.1 Black cockatoo habitat assessment

The Targeted black cockatoo habitat assessment was undertaken in accordance with the EPBC Act referral guidelines (SEWPaC 2012). The survey area occurs within the known distribution of Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black Cockatoo (SEWPaC 2012).

Two areas identified as 'areas requiring investigation as feeding habitat' in the Swan Coastal Plain for Carnaby's Cockatoo occur within the survey area. It is likely that Marri (*Corymbia calophylla*) within the survey area may provide an important local food source for all three black cockatoo species, each of which utilise Marri as a food source (SEWPaC 2012; Groom 2011; Lee *et al.* 2013; Johnstone *et al.* 2011). Suitable foraging habitat was also identified adjacent to the survey area by AECOM (2020), who recorded a total of 34.4 ha of foraging habitat for Carnaby's Cockatoo, consisting of similar vegetation to that recorded in the current survey area, namely eucalypt woodlands and scattered mature eucalypts. Within the survey area, a total of 2.59 ha (8.4%) of tall open Marri (*Corymbia calophylla*) woodland is considered as providing 'Moderate' foraging quality for three black cockatoo species. A further 5.33 hectares and 0.05 hectares is considered as providing Poor and Very Poor foraging quality, respectively, with Scattered *Eucalyptus* spp. occurring at a low cover within these areas. A total of 22.97 hectares is considered as providing 'Nil' foraging quality for black cockatoo species.

The black cockatoo breeding habitat assessment identified 131 potentially suitable DBH trees within the survey area, comprising *Corymbia calophylla* (Marri), of which none contained hollows or suitable hollows for breeding. All potentially suitable DBH trees recorded from the survey area provide potential suitable roosting habitat for three black cockatoo species, and an additional 127 potentially suitable roosting trees were recorded, bringing the total to 258 potentially suitable roosting trees recorded within the survey area. Several confirmed breeding sites were identified as occurring within the desktop study area, including three with buffers that intersect the survey area, located approximately 700 m north, 300 m south and 1.2 km south of the survey area. In addition, the survey area is surrounded by connected habitat to assist in black cockatoo dispersal, while a number of non-perennial wetlands occur within the 5 km desktop study area, as described in Section 2.7 above (DWER 2021).

5.3 Dieback assessment

This Dieback assessment has mapped the entire study area as the "Excluded" occurrence category, as site vegetation structure is severely altered and Phytophthora occurrence assessment is not possible. The small vegetated areas were also Excluded considering the total environmental context. If Phytophthora Dieback was present within this site, with the current native vegetation paucity and overall absence of susceptible plant species, it would not be observable or cause a significant impact.

The remnant stand of Marri (*Corymbia calophylla*) trees was also Excluded because its understorey is no longer intact and it is in Degraded condition. In addition, it has open access for off-road vehicles and recent evidence of this was observed along the sand/mud tracks surrounds it. Given the entire survey area has been classed as “Excluded” and it does not adjoin any current Phytophthora susceptible native vegetation, it can be considered as “Unprotectable” from Dieback. It also has ongoing potential to have pathogens introduced as it has open roads and roadside drainage vectors.

Recommendations are provided in the Phytophthora Dieback Assessment report below (**Appendix L**).

5. DISCUSSION AND RECOMMENDATIONS

This Dieback assessment has mapped the entire study area of 27.55 ha as the “Excluded” occurrence category because site vegetation structure is severely altered and *Phytophthora* occurrence assessment is not possible. The small vegetated areas were also Excluded considering the total environmental context. If *Phytophthora* Dieback was present within this site, with the current native vegetation paucity and overall absence of susceptible plant species, it would not be observable or cause a significant impact. The remnant stand of Marri trees was also Excluded because its understorey is no longer intact and it is Degraded. In addition, it has open-access for off-road vehicles and recent evidence of this was observed along the sand/mud tracks surrounds it.

Given the entire assessment study area has been classed as “Excluded” and it does not adjoin any current *Phytophthora* susceptible native vegetation, it can be considered as “Unprotectable” from Dieback. It also has ongoing potential to have pathogens introduced as it has open roads and roadside drainage vectors.

Recommendations

Overall: Applying basic precautionary Dieback Hygiene Management in this road project area will be adequate to minimise the risk of spreading any undetected pathogens (and weeds) to within and outside of the project area into any vulnerable vegetation.

1. The activity can proceed using the following basic dieback management measures in contractual documentation and site inductions (this will compliment weed management).
2. Green Card training is recommended for all proponents and contractors for all projects involving native vegetation clearing and earthworks.
3. Advise the workforce that they are working in an area where *Phytophthora* disease status is unknown, so the aim is to avoid spreading BRM/weed material outside of the project site to within any external vulnerable vegetation areas. To achieve this will require a Clean-on-Entry and Exit point to be established on a hard-stand surface where operators can inspect and clean-down their machinery, vehicles, tools and footwear free from soil, mud and organic material.
4. Schedule works in dry soil conditions to minimise clean-down effort.
5. Any seedlings for revegetation should be sourced from a NIASA Accredited nursery to ensure they contain sterile soil medium that is *Phytophthora spp.* and weed free.
6. If the remnant block of Marri is to be retained for conservation, access controls and/or fencing is recommended; as well as any opportunities to involve the local community/Friends of group.
7. Monitor and record conformance with the projects Dieback Management requirements and any requirements under CPS 818.

MAP VALIDITY – FIGURE 1

Note: The *Phytophthora* occurrence map (Figure 1) has a validity period because *Phytophthoras* have the ability to spread autonomously and through vectors such as people, machinery, vehicles and animals. Therefore, assessment areas should be rechecked by a Registered Dieback Interpreter in the field before operations proceed if the map is more than 1 year old (September 2021). A full re-interpretation will be required after three years (September 2023) to inform hygiene management decisions when planning disturbance activities.

Ballawara Ave – Indigo Parkway Roundabout, Byford, Site Inspection Report (FVC 2024)

MEMORANDA

Date	7 March 2024	Title	Ballawara Ave – Indigo Parkway Roundabout, Byford, Site Inspection Report
Ref.	MRWA22013_ExtrapArea_MEM_Rev0	Distribution	Bree Atkinson Environment Officer Main Roads Western Australia
Authors	Aishwarya Gujarathi Graduate Ecologist	Reviewed/ Authorised	John Braid Principal Environmental Consultant

1. BACKGROUND AND SCOPE OF WORK

Main Roads Western Australia (Main Roads) is proposing to duplicate Thomas Road between Tonkin Highway (SLK 3.0) and South Western highway (SLK 0.4). The works include a connection from Thomas Road to the Marlarkey Road/ Ballawara Avenue/ Indigo Parkway Roundabout.

Eco Logical (ELA 2023) conducted a detailed flora and vegetation survey in 2020, followed by a supplementary assessment in 2023, on Thomas Road between Tonkin Highway and South Western Highway. The survey area included most of the Thomas Road connection to Marlarkey Road, however a 0.22 ha portion of the current proposal design falls outside of the ELA (2023) survey boundary (**Figure 1**). The unsurveyed area was surveyed by Focused Vision Consulting Pty Ltd (FVC) on 7 March 2024.

The scope of the site inspection was to inspect and verify the following, to enable extrapolation of ELA (2023) results and mapping:

- native flora
- vegetation units/communities
- vegetation condition
- fauna habitats
- Black-Cockatoo habitat trees for:
 - nesting
 - roosting.

2. METHODS

FVC conducted a site inspection of the area shown in **Figure 1** on 7 March 2024. The purpose of the survey was to ground truth aerial imagery in order to extrapolate the ELA (2023) survey data for vegetation units and condition and fauna habitat. The Diameter at Breast Height (DBH) for all potential Black-Cockatoo breeding and roosting trees was measured and inspected for potential hollows.

The site was easily accessible by vehicle from Ballawara Ave – Indigo Parkway roundabout. The site inspection was conducted by Senior Ecologist, Lisa Chappell, assisted by Technician, Will Bauer-Simpson, who accessed the site on foot.

Flora and vegetation, and fauna habitat observations, and opportunistic data collection were carried out continuously within and throughout the area of the site inspection. All observable native flora were recorded and the suite of flora and vegetation structure and condition was documented, to enable alignment with ELA (2023) vegetation units, vegetation condition and fauna habitat mapping.

Potentially suitable DBH trees were assessed by examining each tree within the survey area and determining whether each tree of suitable DBH contained hollows, had evidence nesting, or had the potential to be a future nesting tree (with a diameter at breast height of 500 mm or greater, or 300 mm or greater for Salmon Gum and Wandoo). Stands of trees were also assessed as potentially suitable for Black-Cockatoo roosting.

Vegetation units and condition, and fauna habitats were then extrapolated to be compatible with the ELA (2023) survey results.

Field data were collected using electronic tablet devices with customised data forms and mobile spatial mapping capability, within the software program, Mappt™ (Takor Group 2021), and track logs of all personnel were captured.

3. RESULTS

Two native flora species, *Corymbia calophylla* and *Kingia australis*, were recorded during the site inspection. The understorey was dominated by grassy weeds with no native species observed. No significant flora species were recorded.

Two vegetation unit classifications (characterised in accordance with ELA (2023) descriptions) were observed and mapped in the survey area: 'Sparse native trees over weeds' (0.049 ha) and 'Cleared' (0.177 ha).

The vegetation condition within the site inspection area ranged from 'Completely Degraded' (0.007 ha) to 'Degraded' (0.042 ha) (**Figure 2**). Most of the area in the site inspection has been previously cleared (0.177 ha, 77.8%) and is devoid of remnant vegetation.

The fauna habitat within the site inspection area was found to align with ELA (2023) 'Fauna habitat 2: Sparse native and planted trees over weeds' (0.049 ha) in 'Poor' condition or 'Cleared' (0.177 ha) (**Figure 3**).

One Marri (*Corymbia calophylla*) with a suitable DBH (DBH > 500 mm) was recorded. No suitable hollows for Black-Cockatoo breeding were observed (**Figure 3**).

The tall trees in the inspection area, within ELA (2023) 'Fauna habitat 2: Sparse native and planted trees over weeds' (0.049 ha) are considered to potentially provide suitable habitat for Black-Cockatoo roosting.

4. CONCLUSION

The site inspection of a 0.22 ha area within the proposed Thomas Road Duplication proposal area that had not been previously surveyed, found that the site was largely degraded and had been impacted by recent urban development. One Marri with a DBH >500 mm was identified within the site inspection area. No hollows were observed. A total of 0.049 ha of native vegetation was confirmed to occur, in 'Completely Degraded – Degraded' to 'Degraded' condition.

Results from this memo will be included in the Thomas Road Duplication Clearing Assessment Report and Environmental Impact Assessment reports.

5. REFERENCES

Eco Logical (2023) Thomas Road Duplication Biological Survey. Report prepared by ELA for Main Roads WA.

Takor Group (2021) Mappt. <https://mappt.com.au/>.

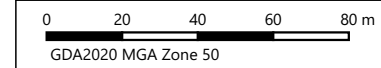
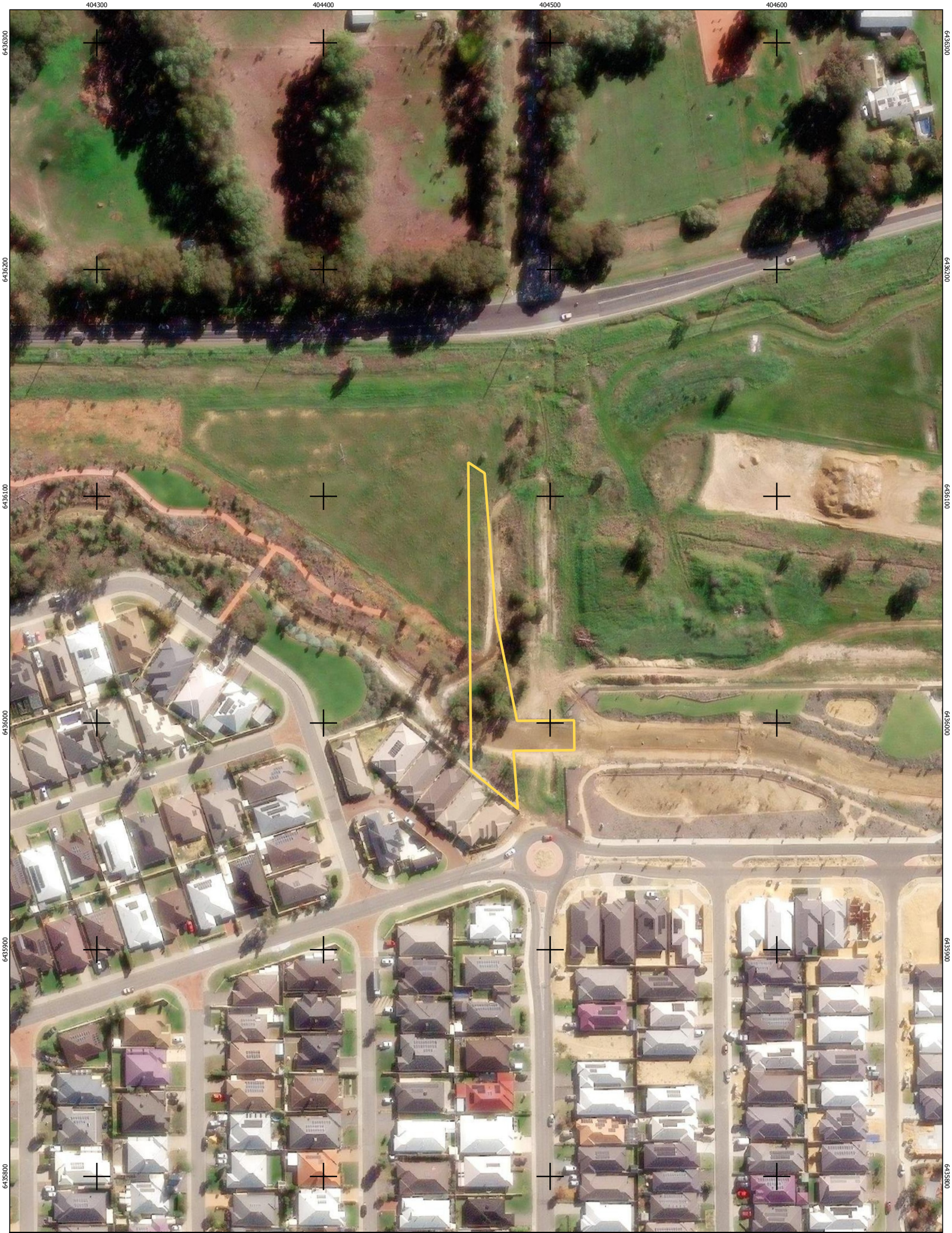
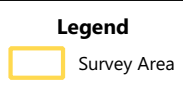


Figure 1 - Survey Area



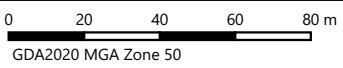
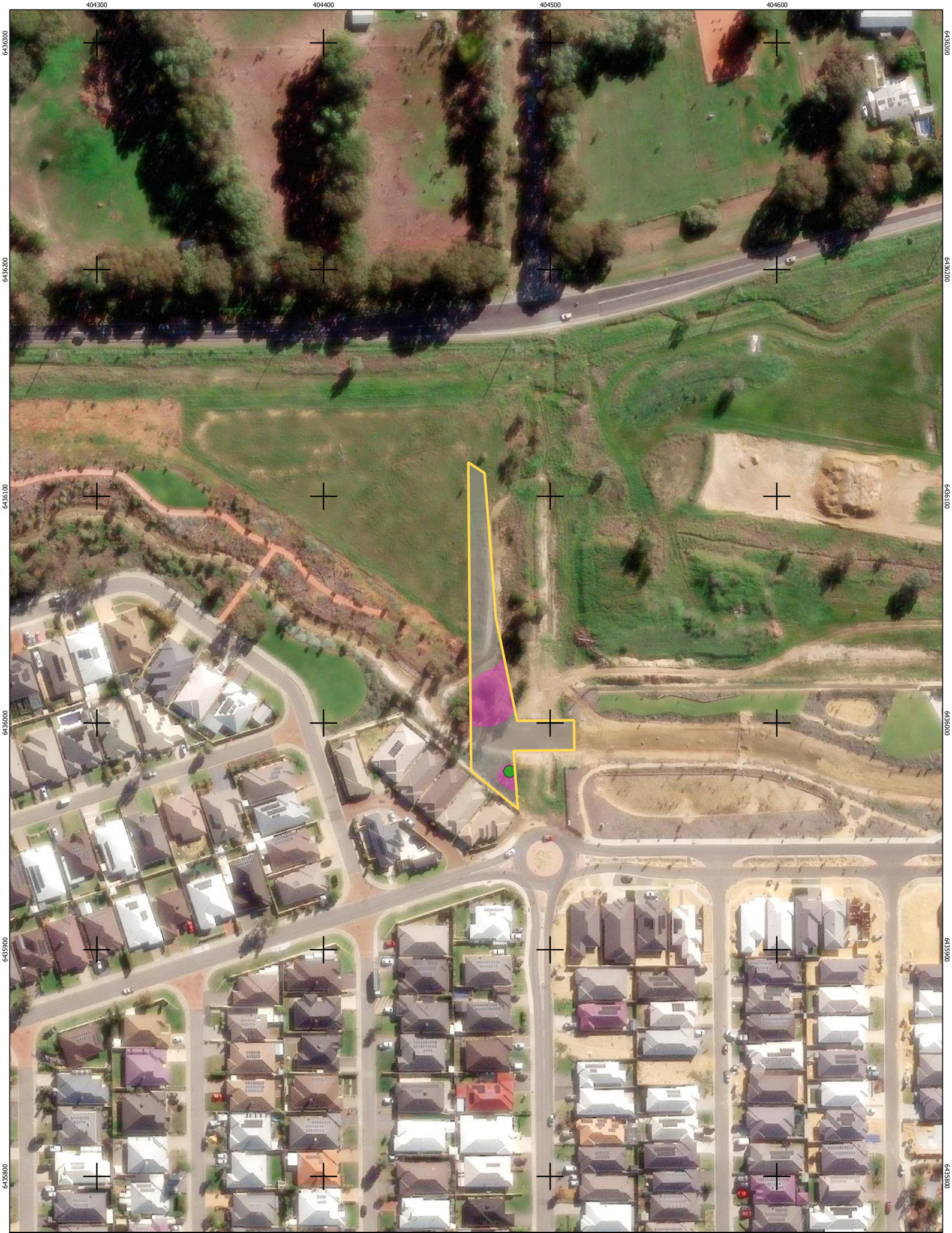


Figure 2 - Vegetation Units and Condition

Legend

- Survey Area
- Cleared
- Completely Degraded (Sparse native trees over weeds)
- Degraded (Sparse native trees over weeds)





0 20 40 60 80 m
 GDA2020 MGA Zone 50



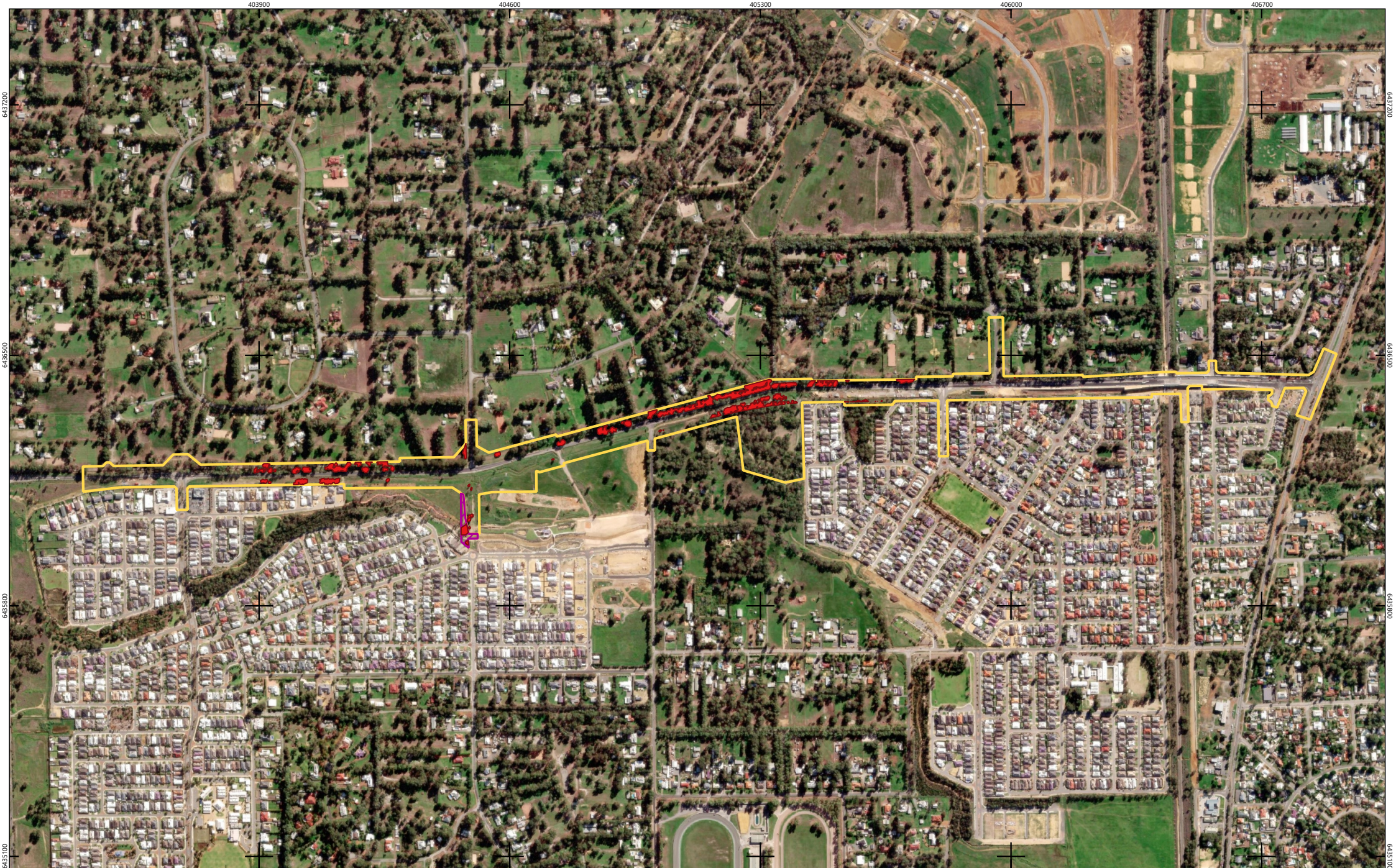
Legend

- Survey Area
- Cleared
- Potential DBH Tree
- Fauna habitat 2: Sparse native and planted trees over weeds/ Poor condition

Figure 3 - Fauna Habitat



Appendix 2: Figures



0 150 300 450 600 m
GDA 2020 MGA Zone 50

Figure 3 - Extent of biological surveys/assessments

- Legend**
- Clearing Area
 - FVC Survey Area
 - Ecological Survey (2023)

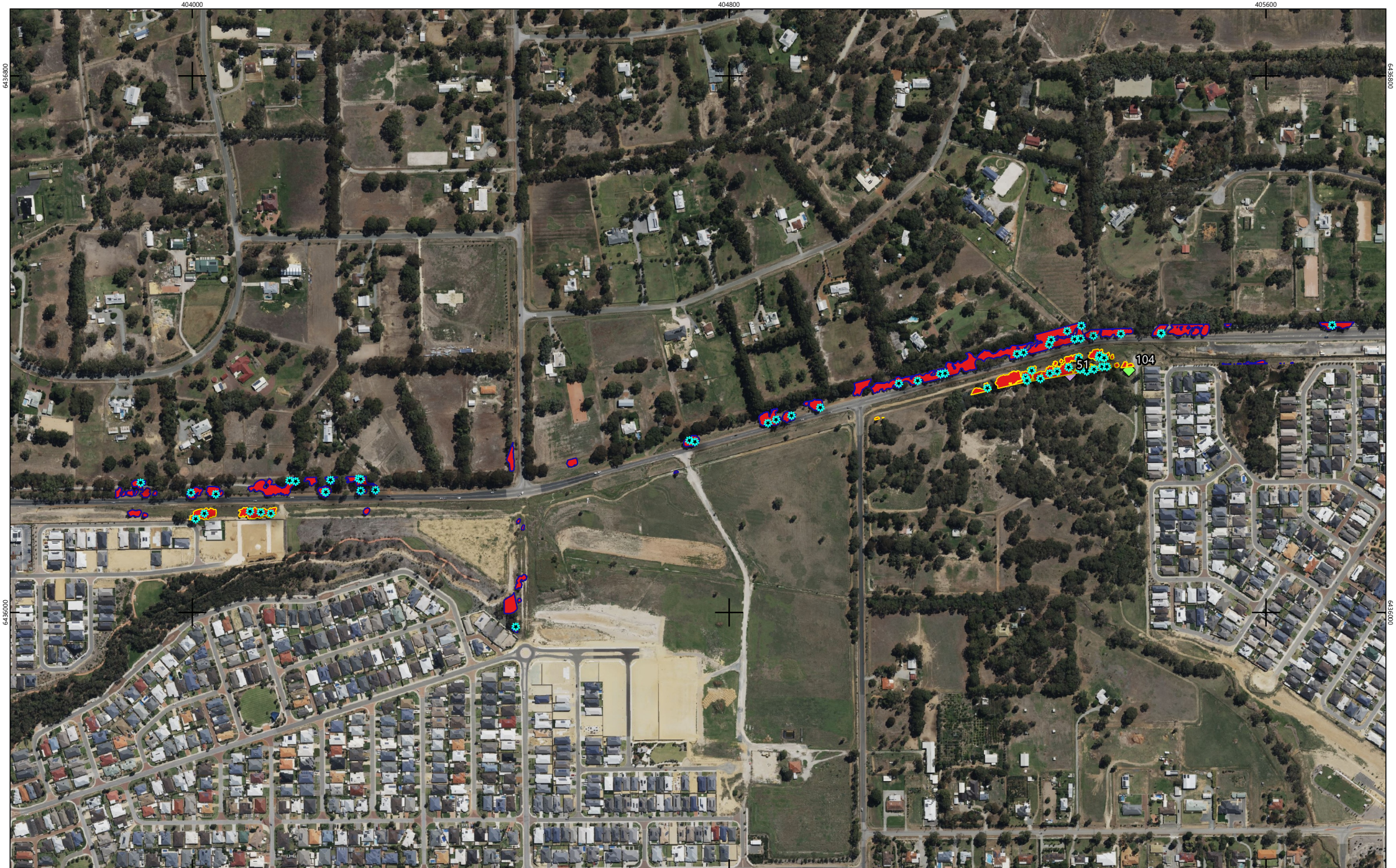
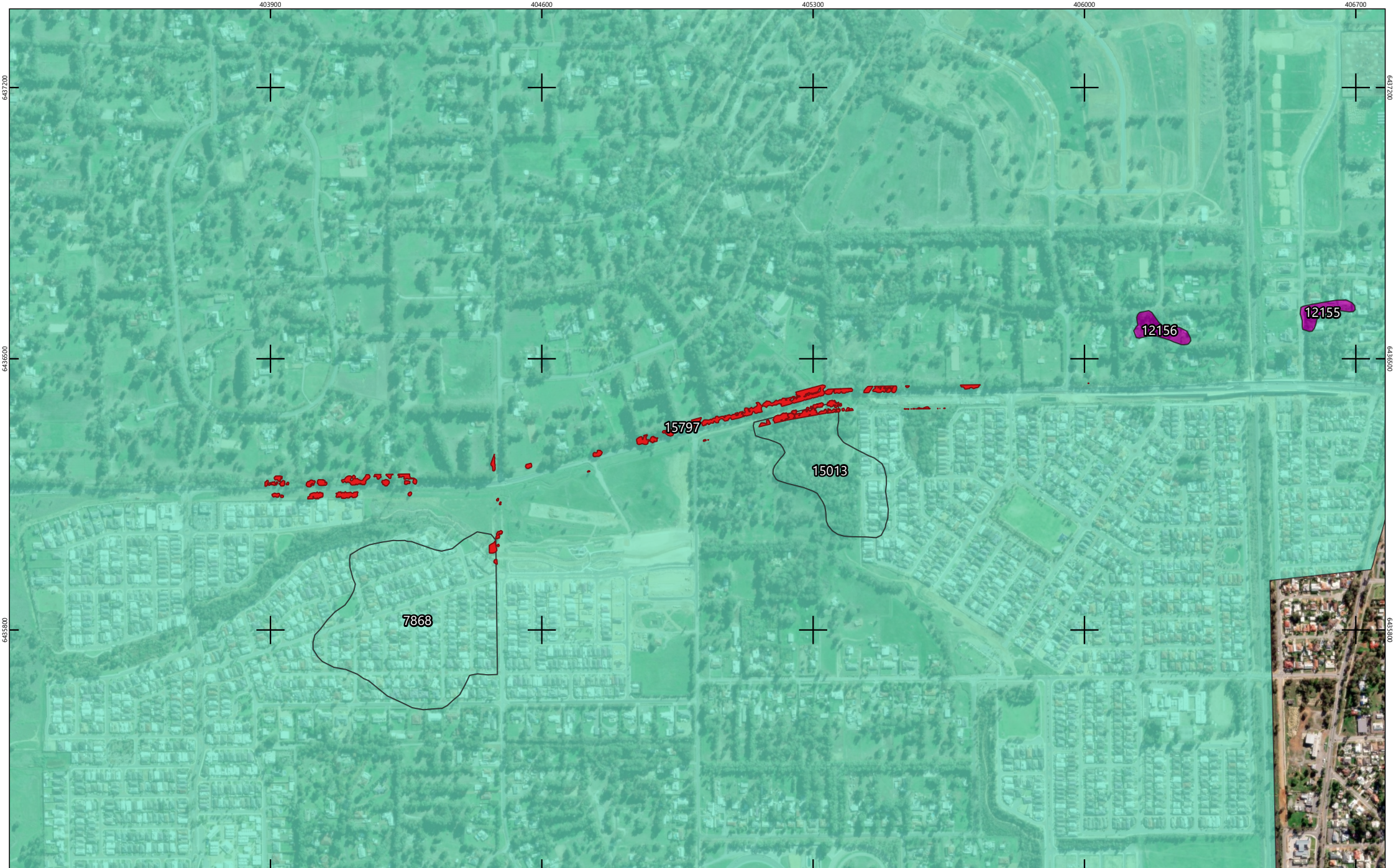


Figure 4 - Black - Cockatoo Habitat

- Clearing Area
- ★ Fauna Habitat Trees
- ◆ Potentially Impacted Trees: 51
- ◆ Potentially Impacted Trees: 104

- Legend**
- Fauna habitat 1: Marri tall open woodland over mixed weeds
 - Fauna habitat 2: Sparse native and planted trees over weeds



0 150 300 450 600 m
 GDA 2020 MGA Zone 50

Legend

■ Clearing Area

Wetlands Category:

- Multiple Use
- Resource Enhancement

Figure 5 - Geomorphic Wetlands



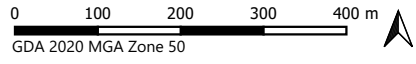




Figure 6 - Reserve 37332 (Lot 151 on Plan 1367, Byford)

Legend

-  Clearing Area
-  Lot 151



Appendix 3: Vegetation Management Plan

THOMAS ROAD DUPLICATION (TONKIN HIGHWAY TO SOUTH WESTERN HIGHWAY)

Purpose and Scope

This Vegetation Management Plan (VMP) has been prepared by Main Roads for the purpose of managing native vegetation clearing impacts associated with the Thomas Road Duplication.

Main Roads Western Australia (Main Roads) proposes to duplicate Thomas Road between Tonkin Highway and South Western Highway.

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

Actions, and their relevant timeframes, from this VMP will be documented within the relevant Tender Documentation (Specifications), such as:

- Specification 204 Environmental Management
- Specification 301 Vegetation Clearing and Demolition
- Specification 303 Materials and Water
- Specification 304 Revegetation
- Specification 304 Rehabilitation of Disturbed Areas.

Once the Contract has been awarded, the Superintendent's Contract Management Team (or equivalent roles) are to ensure that the requirements are implemented by the Contractor.

Avoiding, Mitigating and Managing the Impacts of Clearing

A number of measures were undertaken to during the development and design of the proposal to reduce its impact the environment.

For further information on the alternatives that were considered during the proposal development, please go to Section 1.5 of the Clearing Assessment Report for the proposal.

For further information on the measures undertaken to avoid, minimise, reduce and manage the proposal's clearing impacts, please go to Section 1.6 of the Clearing Assessment Report for the proposal.

VMP Actions

General vegetation management actions to be undertaken is shown in Appendix 4.1: General Vegetation Management Actions for Clearing.

Appendix 3.1: General vegetation management actions for clearing

Management Action	Responsibility	Timing
The Contractor must ensure plant, machinery and equipment, is cleaned down prior to arrival to the site.	Superintendent	During construction
Vehicle hygiene inspection checklists will be utilised to manage potential weed/dieback spread on earth-moving machinery.	Superintendent	During construction
No known dieback infested soil, mulch, fill or other material will be permitted into the works area.	Superintendent	During construction
All Clearing must be undertaken in such a way to allow fauna to move out of the Clearing area.	Superintendent	During construction
The Limits of Vegetation Clearing will be demarcated on site prior to the commencement of clearing to prevent entry into areas of native vegetation.	Superintendent	During construction
Natural drainage pathways will not be obstructed from stockpile gravel, crushed rock and excavated material.	Superintendent	During construction
All recently cleared, exposed and loose surface areas shall be protected from wind, water and soil erosion.	Superintendent	During construction
The Contractor will ensure that clearing of native vegetation is only undertaken in dry conditions, unless otherwise approved and / or directed by the Superintendent.	Superintendent	During construction
All Special Environmental Areas will be pegged in accordance with Main Roads' Drawing 201928-0001-1 Construction Peg Colour Code (https://www.mainroads.wa.gov.au/globalassets/technical-commercial/technical-library/standard-contract-drawings/vegetation/construction-environmental-management/201928-0001-construction-peg-colour-code-drawing.pdf?v=49bd3b).	Superintendent	During construction
The Contractor must develop and detail a Site induction training program as part of the CEMP that includes as a minimum, the significant environmental impacts, actual or potential, of work activities associated with the Contract	Superintendent	During construction

The following specific actions shall also be implemented and will be the responsibility of the Superintendent to ensure they are completed prior to clearing commencing, unless otherwise specified:

- Engage an environmental specialist (zoology) to identify the areas to demarcate for all significant fauna habitat to be avoided within the development envelope.
- Engage an environmental specialist (fauna) to undertake a preclearance check of conservation significant fauna residences.

The above actions will be documented within Specifications 204 and 301.

Main Roads' preclearing **Hold Point** applies to all projects that require vegetation clearing, as documented within Specification 301 (301.12 PRE-CLEARING PROCESS). Accordingly, all Hold Point actions must be signed off prior to clearing commencing. This Hold Point comprises the following actions:

1. Prior to the commencement of any clearing operations, the Contractor must certify for the Superintendent's verification and approval that the following activities have been completed in accordance with the relevant specification:
 - a) The pegging of limits of vegetation clearing has been undertaken.
 - b) The pegged vegetation clearing area does not exceed the Limits of Vegetation Clearing.
 - c) Mature trees have been conserved as far as practicable.
 - d) The pegging of special environmental areas has been undertaken.
 - f) All pre-clearing weed control has been undertaken.
 - g) All pre-clearing fauna operational controls have been undertaken.
 - h) All pre-clearing dieback operational controls have been undertaken.
 - i) Suitable and unsuitable topsoil zones have been identified.
 - j) Vegetation and topsoil stockpile locations have been identified.
 - o) All clearing machinery is compliant with controls.

Monitoring and Maintenance Program

The Superintendent's Contract Management Team shall monitor the implementation of management actions that are a **Hold Point**. **Hold Point** actions must be signed off by the Superintendent's Representative to confirm it has occurred and recorded within the Superintendent's Contract Management Plan.

Non-Compliance

Non-compliance with management actions will trigger corrective actions, preventative actions and/or an incident investigation. Non-compliances will be recorded with Main Roads incident management system and reviewed by Main Roads Manager Environment.

The need for reporting non-compliances with VMP management actions to DWER will be determined as part of an incident investigation.

Revegetation

Revegetation will be undertaken in accordance with Condition 9 of CPS 818. Relevant requirements from Condition 9 have been incorporated into Project Revegetation Plan Template. The elements to be implemented by the Contractor will be incorporated into the relevant Specification 304.