Clearing Assessment Report – CPS 818

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Tanami Road Upgrade Stage 1
SLK [REDACTED] Material Areas

Kimberley Region
November 2023
EOS 1890

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Document Control

Report Compilation & Review	Name and Position	Document Revision	Date
Author:	A/Senior Environment Officer	Draft V1	26/10/2023
Reviewer:	Senior Environment Officer	Draft V1	08/11/2023

1 PROPOSAL

1.1 Purpose and Justification

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

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

1.1.1 Main Roads Approach to Road Safety and the Environment

Main Roads is committed to minimising the environmental impacts of all of its activities and manages the State road network to achieve balanced economic, social, safety and environmental benefits for the community. Main Roads recognises that Western Australia's environment is significant from a global perspective and the unique conservation values that are contained within its road reserve. The Main Roads 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 1.5.

1.2 Proposal Scope

Project Name: Tanami Road Upgrade Stage 1 SLK [REDACTED] Material Areas

Project Purpose / Components:
Tanami Road is currently an unsealed road in the Kimberley region connecting Halls Creek and Alice Springs (in the Northern Territory). The government has committed to seal the road as it poses a safety hazard to road users and at times becomes inaccessible for long periods during the wet season. At over 300km in length, this will represent a substantial upgrade over many years. The upgrade of the road between SLK 0 (Halls Creek) and SLK 311 (where the road intersects the Northern Territory border) will be completed in stages over a 10-year timeframe subject to the availability of government funding.

Main Roads commenced Tanami Road construction works in March 2023 and is anticipating sealing up to 20km of road by the end of 2023. To support the construction of Tanami Road, Main Roads commenced investigation and stockpiling of materials in late 2022 and has utilised material in the construction works in 2023. As construction continues with the planned commencement of the SLK 20-40 section in 2024, there is a need to identify suitable naturally occurring gravels and rock by the end of 2023.

This proposal assesses the clearing of up to 80 ha of native vegetation within a 463 ha Development Envelope.

The scope of works under this assessment includes:

- Investigation of material areas and select pit development, requiring the clearing of up to 80 ha of native vegetation.

1.3 Proposal Location

Project Location(s): The project area is located on Tanami Road (Road No. 0020025) between SLK [REDACTED] approximately 26 km south-west of Halls Creek Townsite, within the Shire of Halls Creek with the proposed work areas shown in Figure 1 and **Error! Reference source not found.**.

- Latitude: [REDACTED]
- Longitude: [REDACTED]

An overview of the project is provided in Figure 2.

The Tanami Road is a Local Government Road under the care and control of the Shire of Halls Creek. In response to the Federal and State Governments committing funding to upgrade and seal the Road to the Northern Territory Border, the Shire of Halls Creek has requested Main Roads Western Australia's assistance in delivering the Project.

1.4 Clearing Details

Proposed clearing to be undertaken using CPS 818: Up to 80 ha within a 463 ha Development Envelope.

The Development Envelope sets the boundary of this assessment within which all works will be contained. The layout used for this assessment is indicative but is based on the most conservative estimate of the clearing required (full 80 ha of clearing). Actual on-ground impacts will not exceed the estimated impacts determined in this assessment.

Type of Native Vegetation:
The Biological Survey undertaken by Biota (2023) mapped 12 vegetation units (excluding Disturbed and Cleared) comprising three units on hills (H1, H2 and H4), six units on plains (P3, P5, P7, P8, P10 and P11) and three units in drainage lines (D3, D4 and D5). Of the 12 mapped units, 7 Vegetation units are present within the Development Envelope (as seen in Table 3).

Table 3, Table 4 and Table D5 provide details of the vegetation units, vegetation condition within the proposal areas, and the remaining extents of these associations.

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Figure 1: Project Overview Map

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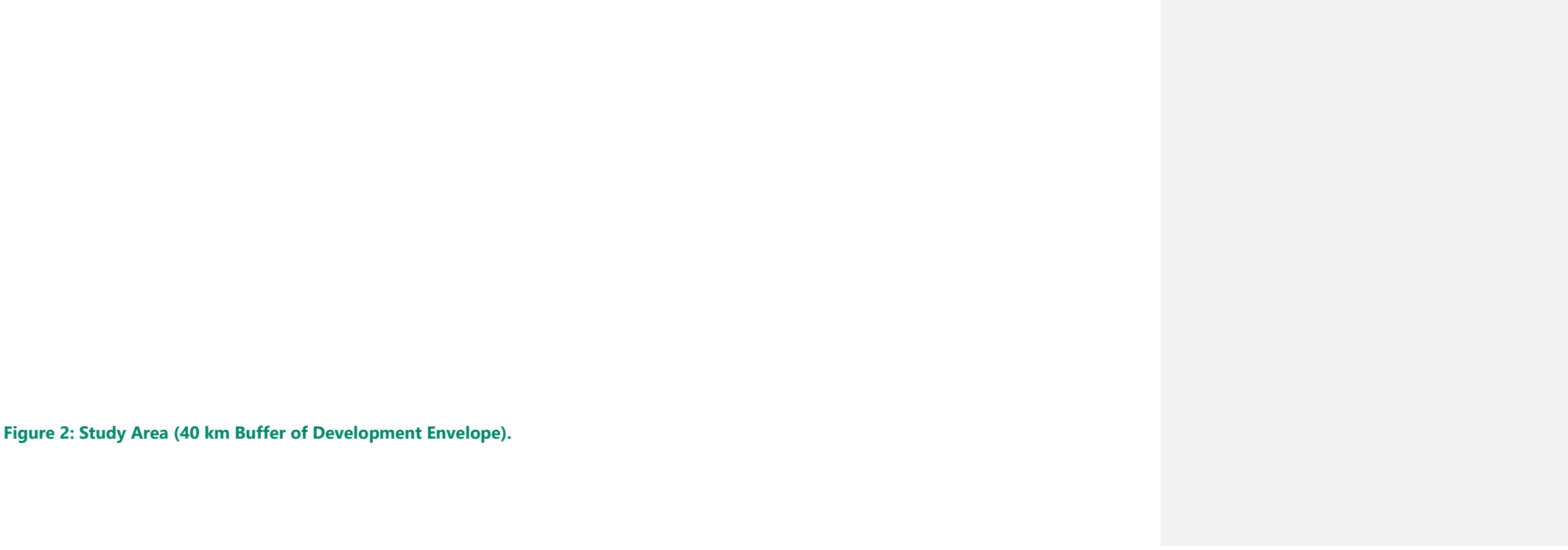


Figure 2: Study Area (40 km Buffer of Development Envelope).

1.5 Alternatives to Native Vegetation Clearing Considered During Proposal Development

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

- Importing construction materials from a third-party supplier. Due to the remote nature of the project and large volume of material required, a third-party source could not be located. Furthermore, the costs to import material is cost prohibitive, economically unfeasible and provides no net environmental benefit, due to the carbon cost of transporting the material over a larger distance.
- Not conducting the clearing is not considered a feasible option as it does not allow for the Tanami Road upgrade works to proceed that are required to address existing safety hazards to road users.
- Main Roads retains frangible vegetation where a clear zone is to be established for road projects. This project, however, only requires clearing for the purpose of material extraction with no clear zone being established. Accordingly, the retention of frangible vegetation does not apply to this proposal.
- 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. The reduction of speed limits to avoid clearing of native vegetation for this proposal is not applicable given speed limits are not a relevant factor to the search and extraction of materials under this scope of works.

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

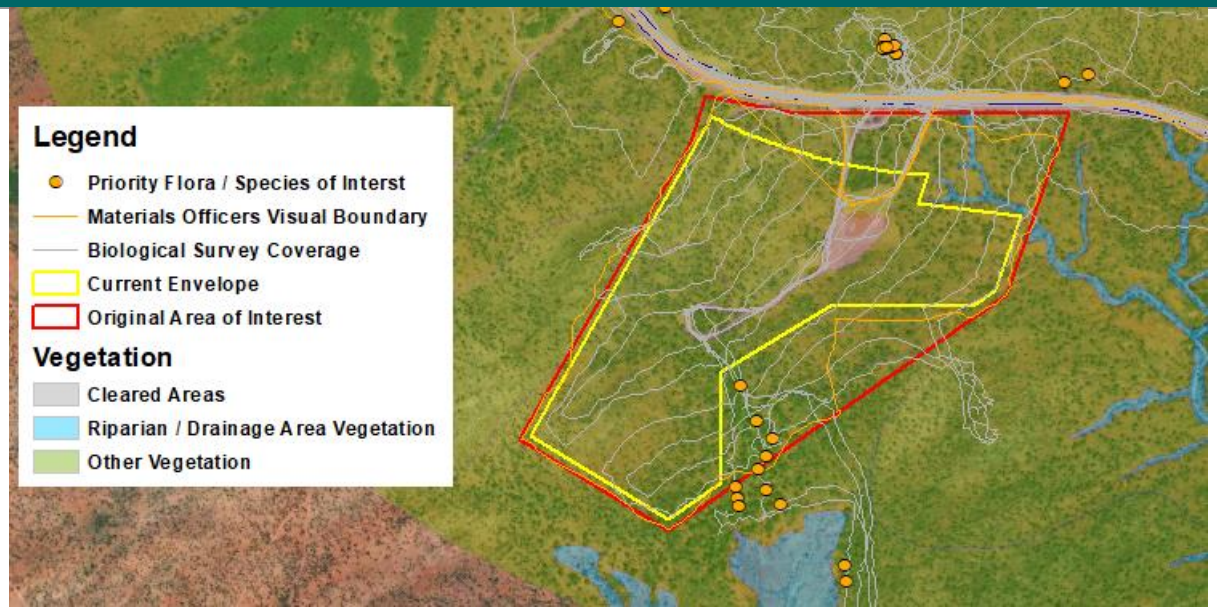
The design and management measures implemented to avoid and minimise the clearing impacts by the project are provided in Table 1. In addition, the following measures have been considered:

- Use of existing access tracks and material pits where possible;
- The Development Envelope was modified to avoid areas of high value vegetation and Significant Flora species;
- Utilising existing Shire of Halls Creek material pits where possible for material supply, however the amount of material required for the upgrade significantly exceeds the amount currently available; and
- Implementation of clearing will be supervised by Main Roads Environment Officers.

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
Preferential use of existing cleared areas for access tracks, construction storage and stockpiling	• There are limited existing cleared areas within the Development Envelope adjacent to the existing Tanami Road, mainly being fence lines, access tracks and existing gravel pits. Material extraction for the majority of these areas is limited as it will require the need for replacement infrastructure and subsequent clearing. However, where existing pits are in place, available material and the existing pit access points have been utilised to access the new material areas that are being developed under this assessment. Refer to Plate 1.
Drainage modification	• The Material Areas have been selected to avoid watercourses, reducing the risk of impeding natural drainage patterns. Refer to Plate 1.
Incentives to Minimise Clearing	• The Development Envelope was refined from original surveyed areas through a visual inspection by Main Roads Materials Officers. • Reductions were made to avoid all populations of Priority Flora and Species of Interest (as seen in Table 7).

Design or Management Measure	Discussion and Justification
	 **Plate 1: Example of Envelope design and refinement process**
Use of a large development envelope with a smaller clearing limit	• Using a Larger Development Envelope for geotechnical investigations allows for the most suitable materials to be clearly identified and mapped, reducing the clearing required for pits which contain sub-standard materials. More clearing is generally required where materials are of poor quality, to allow for the required volumes of material types to be obtained. • This is mainly due to the potential failure and frequent maintenance required by roads where sub-standard materials were used, which leads to more pit expansions over the long term.

1.7 Approved Policies and Planning Instruments

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

In addition to the matters considered in accordance with section 51O of the EP Act, 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 (Government of WA, December 2014)
- Procedure: Native vegetation clearing permits (Government of WA, October 2019)
- 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.

2 SCOPE AND METHODOLOGY ASSESSMENT OF CLEARING

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

To comply with CPS 818, Main Roads must prepare a Clearing Assessment Report (CAR).

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

2.1 Report Terminology and Sources

The following terms are used in this Clearing Report:

- **Development Envelope** – The maximum extent within which the Clearing Area will be located. This envelope is larger than the Clearing Area and the Proposal Area to allow for minor changes to the Proposal footprint as the design process continues, and to account for minor and unexpected changes that may occur during construction, such as working to avoid a large tree or encountering buried boulders or services. This flexibility also allows the site personnel to make modifications to the Proposal to avoid areas that may contain better environmental values. The CAR has assessed all environmental values within the Development Envelope as though all of these values will be impacted, up to the amount specified within the Clearing Area.
- **Clearing Area** – The maximum limit of clearing allowed within the Development Envelope. For this proposal, the Clearing Area is limited to 80 ha.
- **Survey Area** – The area covered by a Biological Survey, which is typically larger than the Development Envelope. This terminology is used broadly to include the Contextual Biological Survey area unless otherwise stated.
- **Study Area** – Area covered by the Desktop Assessment. The Study Area for the Proposal is confined to a local area of a 40km radius.

2.2 Desktop Assessment

A desktop assessment of the Development Envelope was undertaken by viewing internal datasets and other government agency managed databases, and consulting with relevant stakeholders where necessary. Results from searches can be found in Appendix 3.

GIS layer viewing and mapping is done using ArcMap and/or Main Roads corporate mapping system known as iMaps. Referencing of the GIS layers accessed is done under the relevant methodology section of each clearing principle. Government managed databases were searched to locate additional information, which are found under References in Section 8.

2.3 Surveys and Assessments

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

- Tanami Road Upgrades SLK 15-50 Material Pits Biological Survey (Biota Environmental Sciences 2023).

To a lesser extent where regional impacts need to be considered, the assessment also considers the following surveys:

- Tanami Road Upgrade and Great Northern Highway Material Pit Areas: Flora Survey (Biota Environmental Sciences, 2021);
- Tanami Road Upgrade Targeted Flora Survey (360 Environmental, 2021);
- Tanami Road Upgrade SLK 0-60 Biological Survey (Biota Environmental Services, 2020); and
- Main Roads Targeted Survey 2022 (Main Roads, 2022)

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

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

Consultant & Survey Name	Survey Details
Biota Environmental Sciences (2023)	**Survey Area:** Survey Area comprises 4563 ha on Tanami Road specifically for material areas between SLK 15 and 50. **Type:** Detailed flora and vegetation survey, targeted flora survey and basic and targeted fauna survey. **Timing:** May 2023 **Shapefile TRIM Ref:** D23#913196 **Document TRIM Ref:** D23#913187
Biota Environmental Sciences (2020) Tanami Road Upgrade SLK 0-60 Biological Survey	**Survey Area:** Survey area comprised approximately 1650.7 ha and a contextual area of 5951.4 ha (7602.1 ha including survey area) adjacent along Tanami Road (SLK 0 – 60). This started at the Great Northern Highway (GNH) Tanami intersection and continued for 60 km at varying widths between 200m and 500m wide. **Type:** Detailed flora and vegetation survey, targeted flora survey and basic and targeted fauna survey. **Timing:** Fieldwork conducted on from the 23rd of May to 8th June 2020. **Shapefile TRIM Ref:** D21#506928 **Document TRIM Ref:** D21#125420
360 Environmental (2021) Tanami Road Upgrade Targeted Flora Survey	**Survey Area:** Nine polygons (material pit locations) were surveyed along Tanami Road, totalling 58.2 ha in area. **Type:** Targeted Flora survey for the proposed Tanami Road Upgrade (SLK 0 – 60) within nine areas (proposed material pits and construction water dams) on Tanami Road. **Timing:** Fieldwork conducted on 21st – 25th May 2021 **Shapefile TRIM Ref:** D21#1081780 **Document TRIM Ref:** D21#1081407
Biota Environmental Sciences (2021a) Tanami Road Upgrade and Great Northern Highway Material Pit Areas: Flora Survey	**Survey Area:** Survey Area comprises 44.20 ha on Tanami Road and 132.15 ha on GNH. **Type:** Targeted surveys for Priority flora species and other species of interest that were identified as occurring or potentially occurring, during the initial botanical survey in 2020. **Timing:** Fieldwork was conducted on 14th – 25th June 2021 **Shapefile TRIM Ref:** D21#1219428 **Document TRIM Ref:** D21#1020020

Consultant & Survey Name	Survey Details
Main Roads (2022) Tanami Road Upgrade SLK 0-20 Targeted Flora Survey	**Survey Area:** Survey Area comprises 2.74 ha on Tanami Road and 10.21 ha on GNH. **Type:** Targeted surveys for *Goodenia crenata* **Timing:** November 2022 **Shapefile TRIM Ref:** D22#1201338 **Document TRIM Ref:** D22#1201339

3 SURVEY RESULTS

Main Roads commissioned a survey for the project, completed in 2023.

A summary of the findings are presented in Sections 3.1 – 3.5.

3.1 Summary of Biological Survey – Biota 2023

The "Tanami Road Upgrade SLK 15-50 Material Pits Biological Survey" was conducted from the 29 May to 10 June 2023, by Biota Environmental Sciences covering a detailed survey area of 1,085.7 ha and a larger contextual mapping area totalling 4,652.7 ha. The spatial scopes for the biological survey comprised a detailed survey area, a contextual area (400 m buffer around the survey area) and the study area (40 km buffer around the survey area). A desktop flora and fauna assessment were undertaken for the study area, followed by a field survey which comprised a detailed and targeted flora and vegetation survey and a basic and targeted fauna survey of the survey area.

Vegetation
A total of 12 vegetation units were identified from the survey area, associated with drainage lines, plains and hills. None of the vegetation units represent listed Threatened Ecological Communities (TECs), or Priority Ecological Communities (PECs). The vegetation unit P10 shared some similarities to the two tussock grassland communities in the study area that are listed as PECs. Vegetation unit P10 is considered to be of local significance due to comprising of tussock grassland dominated by *Eriachne festucacea* and *Dichanthium fecundum*, however, this vegetation is not listed as a PEC. Two vegetation units from drainage line habitats (D3 and D4) were considered to represent Groundwater Dependent Ecosystems and were also considered to be locally significant. A minimal amount of Drainage Lines and no P10 vegetation units are present in the Development Envelope.

Flora
A total of 334 native vascular flora species from 150 genera and 52 families were recorded from the survey area. No Threatened flora were recorded. Eight Priority-listed species (the P1 *Goodenia lunata, Pentalepis trichodesmoides* subsp. *incana* and *Portulaca* sp. finely echinate (D.G. Tulloch 41); P2 *Ipomoea racemigera* and *Kohautia australiensis*; and P3 *Glycine falcata, Goodenia crenata* and *Trachymene dusenii*) and two species of interest (*Cullen* sp. (TAN-TW07) and *Sida* ? sp. (TAN01-17)) were also recorded from the survey area, representing new populations of these species in the locality. A total of 18 weed species were recorded, including one significant weed species **Calotropis procera* (Calotrope) which is a Declared Plant and was found scattered through plains and drainage lines throughout the survey area.

Fauna

A combined total of 113 species of vertebrate fauna were recorded, including 19 mammals, 10 bats, 79 birds, 13 reptiles and two amphibians. Two significant fauna species: the Gouldian Finch (*Chloebia gouldiae*) and Freshwater Crocodile (*Crocodylus johnstoni*) were recorded. Likelihood of occurrence assessments based on the desktop study results and an assessment of habitats undertaken during the field survey indicated that a further five significant vertebrate species are likely to occur in the survey area, while 17 may occur. Many of these are noted to be migratory bird species.

Two taxonomic groups with the potential to include short-range endemic (SRE) species were recorded within the survey area (seven mygalomorph spiders and three araneomorph spiders). Three taxa have not been recorded previously and are therefore currently known only from the survey area. Lack of survey effort in the broader locality makes it impossible to draw strong conclusions as to the extent of distribution of these lineages.

Six fauna habitats were described for the survey area, the most well represented being habitat associated with low rolling stony hills, and the least being cracking clay plains and a man-made dam. It is worth noting the least representative habitats recorded are the least preferable for material areas.

4 VEGETATION DETAILS

4.1 Explanation on Impact Estimates

This CAR includes impact statistics of potential impact based on the Development Envelope, and mapping completed by Biota (2023). Details on how each statistic is calculated is detailed below.

4.1.1 Extents in Survey Area

This represents the surveyed extents in the detailed and contextual mapping area (Biota 2023).

4.1.2 Extent in Development Envelope

This represents the extent of a given matter only within the Development Envelope being assessed.

% Surveyed Area
This statistic shows what proportion of the surveyed area for a given matter is within the Development Envelope.

4.1.3 Estimated Impacts

This represents a more realistic estimate of likely impacts that are distributed across the Development Envelope.

This statistic provides an example of how the distribution of impacts is realistically expected to be.

% Surveyed Area
A realistic estimate on what proportion of the surveyed area of a given matter will be impacted.

4.1.4 Maximum Potential Impact

Because the assessment uses a Development Envelope approach, this represents a hypothetical worst case scenario where the entire clearing cap is used in an area that affects only a single environmental matter. This provides a worst case estimate of impact to provide certainty of acceptable impacts from the Development Envelope approach.

Where the clearing cap is larger than the extent of a matter in the Development Envelope, the full extent of the matter in the Development Envelope is presumed cleared. Where the Clearing Limit is smaller than the extent of a matter in the Development Envelope, the full extent of the Clearing Limit is presumed cleared for that matter.

If *Extent in Development Envelope* >/= 80 ha, assumes the full 80 ha is cleared.

If *Extent in Development Envelope* < 80 ha, assumes full *Extent in Development Envelope* is lost.

This should only be used to estimate the maximum theoretical impact to a single matter resulting from this proposal. The estimate should only be used by itself to estimate acceptable levels of impact.

4.2 Proposal Site Vegetation Description

The Biological Survey undertaken by Biota (2023) mapped 12 vegetation units (excluding Disturbed and Cleared) comprising three units on hills (H1, H2 and H4), six units on plains (P3, P5, P7, P8, P10 and P11) and three units in drainage lines (D3, D4 and D5). Of the 12 mapped units, 7 Vegetation units are present within the Development Envelope (Table 3).

Table 3, Table 4, Table D5 and Table 6 provide details of the vegetation units, vegetation condition within the proposal areas, and the remaining extents of these associations.

Table 3. Surveyed Vegetation Types Representation (Biota, 2023)

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Type	Description (Biota 2021a)	Extent in Survey Area (ha)	Extent in Development Envelope (ha) (% Surveyed Area)	Estimated Impacts (ha) (% Surveyed Area)	Maximum Potential Impact (ha)* (% Surveyed Area)
Hills					
H1	*Eucalyptus brevifolia, Corymbia opaca* scattered low trees to low open woodland over *Triodia intermedia* hummock grassland.	1019.1	75.06 (7.36%)	26.15 (2.57%)	**75.06 (7.37%)**
H2	*Corymbia opaca, Eucalyptus brevifolia* low open woodland over *Triodia wiseana* hummock grassland.	1416.6	302.33 (21.34%)	45.39 (3.20%)	**80.0 (5.65%)**
H4	*Eucalyptus brevifolia* low open woodland over *Triodia* sp. (TAN07-02/34), *T. epactia* open hummock grassland.	157.3	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Plains					
P3	*Corymbia opaca, Bauhinia cunninghamii, Atalaya hemiglauca* scattered low trees to low open woodland over *Dichrostachys spicata, Carissa lanceolata* scattered tall shrubs over *Triodia epactia* very open hummock grassland and/or mixed very open tussock grassland.	213.2	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
P5	*Corymbia opaca, Eucalyptus brevifolia* scattered low trees over *Triodia intermedia* open hummock grassland	624.7	66.25 (10.61%)	8.45 (1.35%)	**66.25 (10.61%)**
P7	*Eucalyptus brevifolia, Bauhinia cunninghamii* scattered low trees to low open woodland over *Dichrostachys spicata, Carissa lanceolata, *Vachellia farnesiana* tall open shrubland over *Triodia intermedia* very open hummock grassland and/or **Cenchrus* spp., *Chrysopogon fallax* open tussock grassland	557.2	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
P8	*Acacia synchronicia, *Vachellia farnesiana, Carissa lanceolata* scattered shrubs to tall open shrubland over *Chrysopogon fallax, Dichanthium*	202.3	0.58 (0.28%)	0.01 (0.01%)	**0.58 (0.28%)**

Type	Description (Biota 2021a)	Extent in Survey Area (ha)	Extent in Development Envelope (ha) (% Surveyed Area)	Estimated Impacts (ha) (% Surveyed Area)	Maximum Potential Impact (ha)* (% Surveyed Area)
	fecundum, *Cenchrus* spp. Open tussock grassland				
P10	*Eriachne festucacea, Dichanthium fecundum* tussock grassland	53.7	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
P11	*Xerochloa laniflora*, *Cenchrus ciliaris* very open tussock grassland	10.9	0.14 (1.28%)	0 (0.0%)	**0.14 (1.28%)**
Drainage Lines					
D3	*Eucalyptus camaldulensis* open woodland	70.2	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
D4	*Eucalyptus camaldulensis, E. limitaris* open woodland	63.1	0.35 (0.56%)	0 (0.0%)	**0.35 (0.56%)**
D5	*Eucalyptus limitaris, Terminalia volucris* low open woodland	164.9	0.05 (0.03%)	0.01 (0.01%)	**0.05 (0.03%)**
Disturbed		62.1	17.20 (27.69%)	2.03 (3.27%)	**17.20** (27.69%)
Cleared		37.3	1.08 (2.89%)	0.09 (0.24%)	**1.08** (2.89%)
TOTAL (excluding "Disturbed" & 'Cleared' areas)				**80 ha**	N/A

* The maximum potential impact has been considered to assess the worst-case impact of clearing on vegetation types across the Development Envelope. It is unlikely that clearing under this scope of works will result in the maximum impact given material locations are spread across a number of areas in the Development Envelope.

Table 4. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 831	**Statewide**	381,764.51	381,594.39	99.96	8.42
	IBRA Bioregion *Ord Victoria Plain*	380,910.53	380,744.09	99.96	8.44
	IBRA Sub-region *Purnululu*	379,001.70	378,835.26	99.96	8.48
	Local Government Authority *Shire of Halls Creek*	381,764.51	381,594.39	99.96	8.42
Veg Assoc No. 851	**Statewide**	111,037.36	110,983.69	99.95	0.05
	IBRA Bioregion *Ord Victoria Plain*	110,998.40	110,944.72	99.95	0.05
	IBRA Sub-region *Purnululu*	110,984.56	110,930.89	99.95	0.05
	Local Government Authority *Shire of Halls Creek*	111,037.36	110,983.69	99.95	0.05

Table D5: Summary of Project Development Area's Mapped Pre-European Vegetation Associations

Commented [JR2]: Done

Pre-European Vegetation Association(s)	Extent in Development Envelope (ha)	% Vegetation Condition in Development Envelope (Biota 2021a)	
Vegetation Association 831 described as Hummock grasslands, sparse tree steppe; snappy gum over hard spinifex *Triodia intermedia* & *T. inutilis* (Government of Western Australia, 2019)	40.98 ha	Good to Very Good 99.99% Cleared 0.01%	
Vegetation Association 851 described as a Hummock grasslands, sparse tree steppe; snappy gum & bloodwood (*E. terminalis*) over hard spinifex, / & *T. intermedia* on basalt and dolerite (Government of Western Australia, 2019)	417.3 ha	Excellent 39.78% Very Good to Excellent 15.57% Very Good 27.33% Good to Very Good 12.76% Good 0.09% Poor 0.02% Completely Degraded 4.19% Cleared 0.25%	"

* Development Envelope (ha) are maximum areas for each vegetation noting that the total clearing will not exceed 80 ha.

Table 6: Surveyed Vegetation Condition Representation within the Survey Area and Development Envelope (Biota, 2021a)

Condition	Description (Trudgen 1988)	Extent in Survey Area (ha)	Extent in Development Envelope (ha) (% of Surveyed Area)	Estimated Impacts (ha) (% Surveyed Area)	Maximum Potential Impact** (ha) (% of Surveyed Area)
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.	1654.4	167.91 (10.15%)	33.43 (2.02%)	**80.0 (4.84%)**
Very Good to Excellent	Intermediate condition	460.9	65.72 (14.26%)	12.62 (2.74%)	**65.72 (14.26%)**
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.	634.8	115.34 (18.17%)	17.06 (2.69%)	**80.0 (12.60%)**
Good to Very Good	Intermediate condition	615.6	94.81 (15.4%)	16.87 (2.74%)	**80.0 (13.0%)**
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as	256.0	0.40 (0.16%)	0.01 (0.004%)	**0.05 (0.02%)**

Condition	Description (Trudgen 1988)	Extent in Survey Area (ha)	Extent in Development Envelope (ha) (% of Surveyed Area)	Estimated Impacts (ha) (% Surveyed Area)	Maximum Potential Impact** (ha) (% of Surveyed Area)
	that caused by low levels of grazing or slightly aggressive weeds.				
Poor to Good	Intermediate condition	21.6	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.	488.3	0.09 (0.02%)	0 (0.0%)	**0.09 (0.02%)**
Degraded to Poor	Intermediate condition	353.1	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Degraded	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.	46.6	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.	84.2	17.68 (21.0%)	2.04 (0.09%)	**17.68 (21.0%)**
Cleared	Areas devoid of native vegetation	37.3	1.08 (2.89%)	**0.09 (0.24%)**	**1.08 (2.89%)**

* The maximum potential impact has been considered to assess the worst-case impact of clearing on vegetation types across the Development Envelope. It is unlikely that clearing under this scope of works will result in the maximum impact given material locations are spread across the Development Envelope.

4.2.1 Priority Flora & Species of Interest

Table 67 presents the total counts and population estimates of Priority Flora and Species of Interest collected from the survey (Biota 2023). The location of materials pits covered under this scope of works has avoided impacts to Priority Flora and Species of Interest with no clearing of individuals proposed.

Table 7: Surveyed Priority Flora and Species of Interest

Taxon	Abundance in Survey Area	Abundance in Development Envelope (% of Surveyed Population)	Estimated Maxiumum Potential Impact* (% of Surveyed Population)
Priority 1			
Goodenia lunata	19,210	0	**0**
Pentalepis trichodesmoides subsp. *Incana*	28	0	**0**
Portulaca ? sp. Finely echinate (D.G.Tulloch 41)	43	0	**0**
Priority 2			
Ipomoea racemigera	150	0	**0**
Kohautia australiensis	2	0	**0**
Priority 3			
Glycine falcata	384	0	**0**
Goodenia crenata	44,186	0	**0**
Trachymene dusenii	5,444	0	**0**
Species of Interest			
Cullen sp. (TAN-TW07)	2,684	0	**0**
Sida sp. (TAN01-17)	69	0	**0**
Triodia sp. (TAN07-02/34)	15,024	0	**0**

* The maximum potential impact has been considered to assess the worst-case impact of clearing on vegetation types across the Development Envelope. It is unlikely that clearing under this scope of works will result in the maximum impact given material locations are spread across the Development Envelope.

4.2.2 Fauna Habitats

Table 78 presents fauna habitats recorded by Biota (2021a) along with the estimated proportions within the Development Envelope and estimated impacted based on the indicative layout.

Table 8: Surveyed Fauna Habitat Representation

Type	Fauna Habitat Description (Biota 2021a)	Extent within Survey Area (ha)	Extent in Development Envelope (ha) (% of Surveyed Area)	Estimated Impact (ha) (% of Surveyed Area)	Maxiumum Potential Impact* (ha) (% of Surveyed Area)
Hills					
LSH	Low rolling stony hills - Dominant habitat of the contextual area, occurring on hills with rocky and stony substrates. Open *Eucalyptus brevifolia* and *Corymbia opaca* woodland over hummock grasslands dominated by *Triodia intermedia* and/or *T. wiseana*.	2446.6	377.53 (15.43%)	71.55 (2.92%)	**80.0 (3.27%)**
RBS	Ridgeline breakaways and scree slopes - Ironstone and granite ridgeline formations supporting overhangs, caves and rocky boulders. Scattered *Eucalyptus brevifolia*	157.3	0 (0.0%)	0 (0.0%)	**0 (0.0%)**

Type	Fauna Habitat Description (Biota 2021a)	Extent within Survey Area (ha)	Extent in Development Envelope (ha) (% of Surveyed Area)	Estimated Impact (ha) (% of Surveyed Area)	Maxiumum Potential Impact* (ha) (% of Surveyed Area)
	trees over mixed open hummock grasslands often dominated by *Triodia intermedia*.				
Plains					
CCP	Cracking clay plains - Heavy clay and stony substrates on basalt, supporting *Eriachne festucacea* and *Dichanthium fecundum* open tussock grasslands.	14.8	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
LOD	Low open degraded plain - *Corymbia opaca, Eucalyptus brevifolia* scattered low trees over heavily degraded open hummock grassland and/or tussock grassland.	523	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
OGP	Open shrubland/woodland on tussock grass plains - *Corymbia opaca, Bauhinia cunninghamii, Atalaya hemiglauca* scattered low trees to low open woodland over *Dichrostachys spicata, Carissa lanceolata* scattered tall shrubs over *Triodia epactia* very open	360.2	0.58 (0.16%)	0.01 (0.0%)	**0.58 (0.16%)**
OSP	Open shrubland/woodland on spinifex plains - Open *Eucalyptus brevifolia, Corymbia opaca* low open woodland over *Triodia intermedia* spinifex hummock grasslands, over stony substrate on broad undulating plains; occasionally supporting termite mounds.	753.1	66.25 (8.80%)	8.45 (1.12%)	**66.25 (8.80%)**
Riverine					
MDL	Major drainage lines and associated tributaries - Open *Eucalyptus camaldulensis* and *Terminalia platyphylla* woodland near ephemeral drainage lines.	298.2	0.40 (0.13%)	0.02 (0.01%)	**0.40 (0.13%)**
MMD	Man-made dam surrounded by introduced *Eucalyptus* sp.	3.5	0 (0.0%)	0 (0.0%)	**0 (0.0%)**
Cleared and Disturbed			18.27 (19.07%)	2.12 (2.21%)	**18.27 (19.07%)**

* The maximum potential impact has been considered to assess the worst-case impact of clearing on vegetation types across the Development Envelope. It is unlikely that clearing under this scope of works will result in the maximum impact given material locations are spread across the Development Envelope.

5 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

In assessing whether the Proposal's 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 the former Department of Environment Regulation (now Department of Water and Environmental Regulation (DWER) '*A Guide to the Assessment of Applications to Clear Native Vegetation*' (Department of Environment Regulation, 2014) and other relevant clearing permit application decision reports prepared by DWER.

The proposed clearing is at variance to Principle F only and not at, or not likely to be at variance with the remaining 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.
The following metrics are considered to be indicators of high biological diversity (as described in DER 2014): 1. Biodiversity hotspots 2. Flora and Fauna species diversity 3. Priority and other Significant Flora 4. Priority Fauna 5. Ecological Community Diversity 6. Significant Ecological Communities 7. Vegetation Condition An assessment of the Development Envelope against the above metrics has been undertaken to ascertain the level of biological diversity. **Biodiversity Hotspots** The proposed clearing is not located in a Biodiversity Hotspot (DER 2014). **Species Diversity** A total of 334 species of vascular flora and 113 species of vertebrate fauna were recorded in the survey area during biological surveys (Biota 2023). The proposed Development Envelope has excised all Priority, Threatened, and Species of Interest identified from these surveys. Biota (2021a) notes that these surveys represent a large proportion of species recorded from the surrounding IBRA subregions, but also notes that this is likely due to a number of factors including: • The linear nature of the survey area, running perpendicular to local landforms (i.e. a range of habitats are intersected); • The length of the corridor crossing a broad geographic range; and • Very high rainfall received prior to the survey resulting in optimal collecting conditions. Species diversity within the areas proposed to be cleared is likely to be overall lower than that of surrounding areas due to the following: • Nearly all areas of clearing are in close proximity to an existing major road and existing gravel pits that are subject to disturbance and edge effects (as noted in weed data collected by [Biota 2021a]); • Previous surveys identified there are areas of higher biological diversity in the surrounding areas, notably in the vicinity of Duncan Road (Biota 2021c);

- The proposed clearing areas have been designed to avoid targeting areas containing conservation significant species and therefore, impacting less diverse areas.

Furthermore, the current extent of pre-European vegetation associations within the Development Envelope retains above 99% at all scales (State IBRA Bioregion, IBRA Subregion, LGA). Species diversity is expected to be higher in areas beyond the Development Envelope that have not been subject to disturbance or indirect impacts from adjacent ground disturbance and clearing activities.

Priority and other Significant Flora

No known records of Threatened flora taxa were identified from the project study area, and no Threatened flora were recorded during the biological survey by Biota (2021a), the subsequent follow up targeted flora survey by 360 Environmental (2022), or the broader survey area Biota (2021b).

Six priority flora taxa and two species of interest were recorded during biological surveys (Biota 2023; Table 8) however the Development Envelope has been selected to avoid all priority flora and species of interest. This avoids any direct impact to priority and significant flora.

No other Priority Flora species were considered as likely to or may occur given the surrounding area has been sampled numerous times in recent years (Biota 2021a; Biota 2021b; 360 Environmental 2021; Biota 2023).

Priority Fauna

Two species of conservation significance were detected during Biota's survey, the Gouldian Finch (Priority 4), and the Freshwater Crocodile.

Biota Notes that the Gouldian Finch may use the open woodland with larger eucalypts over spinifex for foraging and potentially breeding (LSH and OSP habitats). Assuming all 80 ha of clearing occurs in these two habitats, the maximum impact is 2.5% of their mapped extents. The distribution maps from the ALA and DCCEEW note that this area of the Tanami Road is on the southern edge of their known distribution and is not considered to be core habitat (ALA 2023; DCCEEW 2023). Therefore, it is likely that there will be no discernible impacts to the species from the proposed clearing.

Impacts to the Freshwater Crocodile are also expected to be negligible; the maximum loss of habitat from the proposed clearing is at most 0.4 ha, less than 0.13% of the habitat available in the Surveyed Area.

A likelihood of occurrence assessment of all significant species identified in the desktop assessment was undertaken by Biota (2021a) based on availability of suitable habitat and previous known records in the study area. The assessment indicated that 8 significant species were considered likely to occur and 17 species may occur within the survey area. Despite these species being specifically targeted during the fauna component of the survey, none were recorded.

The Development Envelope is within the mapped distribution and may contain suitable foraging habitat but no breeding habitat for the following species:

- Fork-tailed Swift (MI)
- Grey Falcon (VU);
- Peregrine Falcon (OS);
- Oriental Pratincole (MI);
- Gull-billed Tern (MI).

Further details on the fauna species that are assessed as likely or may occur within the Development Envelope are provided in Principle (b). All species listed above have broad distributions across inland or northern Australia, making large areas in the East Kimberley potential foraging habitat (See Principle B; DoE 2018).

The marine and migratory birds identified in the desktop assessment are mostly non-breeding migrants to Australia and breed in the northern hemisphere. These species have a wide range of occurrence across Australia and the extent of suitable habitat within the project envelope is very limited.

Ecological Community Diversity

Of the 12 ecological communities (vegetation units) recorded during biological surveys, the proposed clearing will impact 7 communities (Table 3). The Tanami Road is a linear infrastructure corridor running approximately north to south, perpendicular to the landforms in the area and therefore intersects numerous vegetation units. As stated above, the impacts to vegetation units will occur primarily in areas adjacent to existing pits or the existing Tanami Road.

In addition, all the vegetation units within the proposed clearing area are well represented in the survey area. The vegetation unit with the highest level of potential impact is P5, with a maximum of 10.48% of the total surveyed area to potentially be impacted. This estimate assumes the full extent of this vegetation type within the Development Envelope is cleared. The actual impacts are likely to be lower.

Significant Ecological Communities

No Environmentally Sensitive Areas (ESAs) and Threatened Ecological Communities (TECs) were identified in the 40km radius desktop database searches nor recorded during the field survey by Biota (2023).

The desktop assessment identified four Priority Ecological Communities (PECs) from the project Study Area:

- **P1 - Vegetation Association 872** as defined by John Beard's vegetation mapping for the Kimberley (Beard 1979): Described as **"**Hummock grasslands, sparse tree steppe; snappy gum over hard spinifex *Triodia wiseana* and *T. intermedia* on basalt and dolerite" (DBCA 2020).
- **P3 - Vegetation Association 850** as defined by John Beard's vegetation mapping for the Kimberley (Beard 1979): Described as "Grasslands, tall bunch grass savanna, mitchell & blue grass" (DBCA, 2021)
- **P3 - Vegetation Association 834** as defined by John Beard's vegetation mapping for the Kimberley (Beard 1979): Described as "Grasslands, tall bunch grass savanna, mitchell & blue grass" (DBCA, 2021)
- **P3 - Gordon land system:** Described as "Low hilly to undulating limestone country on inland and coastal erosional plains" (DBCA 2021).

None of the vegetation communities recorded during the Biological Survey carried out by Biota, (2023) represents TECs or PECs. One Tussock Grassland vegetation unit recorded during the field survey has been described to share some similarities with P3 PECs - Vegetation Associations 850 and 834:

- **P10 -** *Eriachne festucacea, Dichanthium fecundum* tussock grassland.

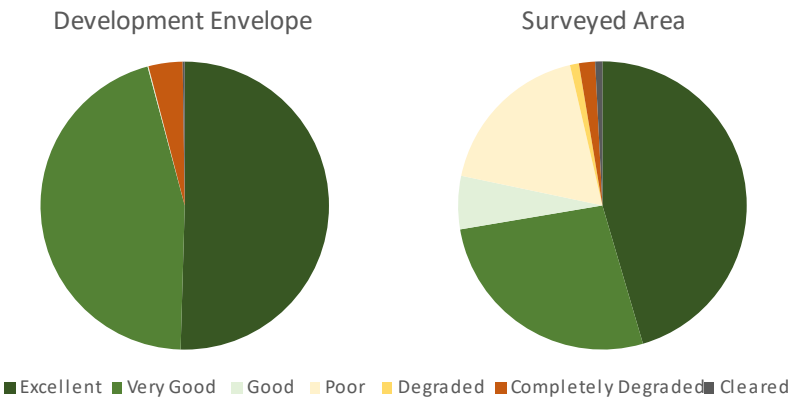
The vegetation unit P10 comprises tussock grassland dominated by *Eriachne festucacea* (Plains Wandarrie Grass) and *Dichanthium fecundum* (Bluegrass) which are associated with PECs found in the biological study area, and as such were identified to be of local significance (Biota 2023). However, the survey area does not intersect any mapped areas of these PECS and vegetation unit P10 is not a PEC. No vegetation comprised of P10 is proposed to be cleared as none exists within the Development Envelope (Table 4).

Fauna Habitat Diversity

Biota (2021a) identified nine fauna habitats during the biological survey, of which only three will require any clearing (Table 8). The amount of clearing required is highest for the OSP (open shrubland plains) habitat, with a maximum potential clearing total of 65.47 ha, or 8.69% of the extent mapped by Biota (2023). All of the fauna habitats to be impacted are well represented outside of the Development Envelope and have been recorded from the surrounding areas (Biota 2021a). The proposed clearing is therefore considered unlikely to have a significant impact on local fauna habitat diversity.

Vegetation Condition

The charts below show the proportions of vegetation conditions that are in the Development Envelope, in comparison with that of the local area (survey area) as recorded by Biota (2023).



**intermediate vegetation conditions assigned to the better condition to reduce number of categories for comparison purposes.*

Evidently, the estimated impact area contains a proportionately higher amount of vegetation in 'Good' or better condition. This is caused by a number of factors:

1. The only existing cleared areas in this section of road are for the existing Tanami Road, fence lines, access tracks and existing gravel pits. Materials cannot be extracted from these areas without the need for replacement infrastructure clearing (existing Shire pits are likely to be exhausted or not contain enough material for the project).
2. This section of the Tanami Road has minimal pastoral impacts, reducing the availability of pits in areas with poorer vegetation condition.
3. The landscapes that produce good road building materials (e.g. rocks and gravel) are often hilly and stony and therefore relatively unfavourable to the primary source of land degradation in the region, grazing.

Despite a proportionately high level of 'Good' or better condition vegetation (448.18 ha), the total amount of clearing required is still a very small subset of the surveyed area in comparable condition (3,621.6 ha). The Proposal will only clear up to 80 ha in the Development Envelope, however, even if the entire DE was cleared, this would remove only 2.21% of comparable quality vegetation from the survey area (Biota 2023) (Table 6). The proposed clearing of 80 ha within the DE is not considered to constitute a significant impact on the vegetation at a local or regional level given there is a significant amount of good or better vegetation remaining outside of the DE.

Summary

The proposed clearing is considered not likely to be at variance to this Principle for the following reasons:

- Conservation Significant Flora: will not be impacted as a result of project activities due to the absence of species in the Development Envelope.
- Conservation Significant Fauna: Two conservation significant species were found both of which are unlikely to be impacted due to the low levels of habitat loss (a maximum of 2.5% for the Gouldian Finch and a negligible 0.13% for the Freshwater Crocodile).
- Priority Ecological Communities: No TECs or PECs will be impacted as a result of project activities.
- Vegetation and Fauna Habitat Communities: A maximum of 10.61% and 8.80% of surveyed extents may be cleared for a single Vegetation community (P5) and fauna habitat (OSP) respectively.

Regional mapping indicates that these vegetation types and habitats extend significantly beyond the survey area (Biota 2021a).

- Vegetation Condition: Although a proportionately higher amount of vegetation in 'Good' or better condition requires clearing, the worst case estimate for clearing is a loss of 2.21% of the surveyed extent of vegetation in that condition.

Based on the above, the project is not likely to be at variance to this Principle.

Methodology

ALA 2023
360 Environmental, (2022)
Biota, (2023)
Biota, (2021a)
Biota, (2021b)
Biota (2021c)
DBCA, (2021)
DBCA shapefiles
DER 2014
EPBC Act Protected Matters Search Report 26/10/2023
Florabase WA Government of WA (2019)
Main Roads GIS Shapefiles
MWH 2014

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

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

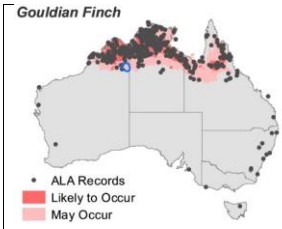
Only 4 fauna habitat types out of 8 recorded by Biota (2021a) will be impacted by the proposed clearing: LSH, OSP, OGP and MDL (Table 8).

As evident from Table 8, the mapped fauna habitats are widespread throughout the larger survey area and the Development Envelope represents only a small fraction of current extent of each of these habitats. The maximum potential clearing of the OSP habitat (Open shrubland/woodland on spinifex plains) is up to 65.47 ha, or 8.69% of the mapped extent in the survey area (Biota 2023). All of the fauna habitats to be impacted are well represented outside of the Development Envelope and Surveyed Area (Biota 2023; 2021a). It is highly unlikely that all clearing will be limited to this single habitat type, so the actual impact is expected to be significantly lower.

Two species of significance were recorded during surveys, the Gouldian Finch (P4) and Australian Freshwater Crocodile (Other Specially Protected [OS]).

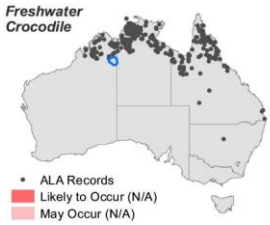
Gouldian Finch (P4)

Biota Notes that the Gouldian Finch may use the open woodland with larger eucalypts over spinifex for foraging and potentially breeding (LSH and OSP habitats). Assuming all 80 ha of clearing occurs in these habitats, the maximum impact is up to 2.5% of their surveyed habitat extents. It is likely that the species was opportunistically detected due to the nearby presence of a construction water dam currently being used for the Tanami Road Upgrade Project; two individuals were opportunistically recorded at the dam by the author in June 2023. The distribution maps from the ALA and DCCEEW note that this area of the Tanami Road is on the southern edge of their known distribution with infrequent records, indicating that the area surrounding the Project is not likely to be considered core habitat (ALA 2023; DCCEEW 2023).
Therefore, it is likely that there will be no discernible impacts to the species from the proposed clearing.



Freshwater Crocodile (Specially Protected)

The Freshwater Crocodile occurs primarily in freshwater areas upstream of the tidal influence, occasionally entering brackish tidal areas (Webb et. al. 1987; Swanson 2019). This species was recorded in the Survey Area, but outside the Development Envelope. Suitable habitat does exist in the Development Envelope, comprising the Major Drainage Line and associated tributaries (MDL) habitat type, and Biota postulates that the species could occur wherever there is suitable habitat. The extent of the MDL habitat type within the Development Envelope is mapped by Biota (2023) to be 0.40 ha or 0.13% of the surveyed habitat extent. Even if all of this habitat were to be cleared, the maximum loss in habitat for this species is at most 0.13%



A likelihood of occurrence assessment of all significant species identified in the desktop assessment was undertaken by Biota (2021a) based on availability of suitable habitat and previous known records in the study area. These species were also targeted in the field survey. The assessment indicated that 5 significant species were considered likely to occur and 17 species may occur within the survey area:

Other Species Likely to Occur

Apus pacificus	Fork-tailed Swift (MI)
Falco hypoleucos	Grey Falcon (VU)
Falco peregrinus	Peregrine Falcon (OS)
Glareola maldivarum	Oriental Pratincole (MI)
Gelochelidon nilotica	Gull-billed Tern (MI)

Other Species that May Occur

Actitis hypoleucos	Common Sandpiper (MI)
Calidris acuminata	Sharp-tailed Sandpiper (MI)
Calidris subminuta	Long-toed Stint (MI)
Calidris ruficollis	Red-necked Stint (MI)
Charadrius veredus	Oriental Plover (MI)
Chlidonias leucopterus	White-winged Tern (MI)
Erythrotriorchis radiatus	Red Goshawk (MI)
Gallinago megala	Swinhoe's Snipe (MI)
Macroderma gigas	Ghost Bat (VU)
Numenius minutus	Little Curlew (MI)
Plegadis falcinellus	Glossy Ibis (MI)
Rostratula australis	Australian Painted Snipe (EN)
Tringa stagnatilis	Marsh Sandpiper (MI)
Tringa glareola	Wood Sandpiper (MI)

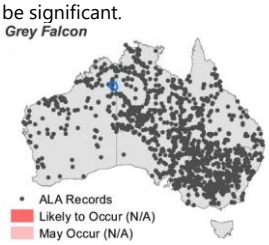
Tringa nebularia	Common Greenshank (MI)
Vespadelus douglasorum	Yellow-lipped Cave Bat (P2)

Species that were determined as 'Likely to Occur' are predominantly migratory birds with the exception of the Grey and Peregrine Falcons. Impacts to Migratory species are considered unlikely because:

1. The species have broad distributions, occurring over most of Northern Australia (DCCEEW 2023); or
2. Species often have broad habitat preferences or favour wetlands and watercourses, which are minimally represented within the Development Envelope.

Potential impacts to the Grey and Peregrine Falcon are discussed below.

Grey Falcon (VU) There is one record in the Atlas of Living Australia (ALA) database within the Desktop Assessment Area, the collection details of which are unreliable (ALA 2023). Grey Falcon nests usually in the tallest trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*) (DAWE, 2021b). No Grey Falcon were detected during the biological survey. They are likely to utilise all of the fauna habitats within the Development Envelope for foraging, particularly Major Drainage Lines and Associated Tributaries. However, only a small portion of this habitat type (0.40 ha out of 298.2 ha in the survey area, or 0.13%) is proposed to be cleared while a major portion of suitable habitat types are outside the project clearing. As such, impact to the species habitat as a result of this clearing is unlikely to be significant.



(DoEE 2018)

Peregrine Falcon (OS) – There are multiple records of this species in the Desktop Assessment Area from the ALA Database (location unreliable; ALA 2023). This species inhabits a wide range of habitats including forest, woodlands, wetlands and open country and nest in cliff faces, tree hollows and along rivers. They were not recorded during the survey and suitable cliffs for breeding do not occur but most habitats within the Development Envelope are likely to be used for foraging. The clearing of 80 ha of potential habitat within a surveyed area of 4,653 ha of potential habitat is not considered a significant level of impact (1.7%).

(DoEE 2018)

The marine and migratory birds that are assessed as likely or may occur in the area are non-breeding migrants to Australia and breed in the northern hemisphere. Shorebirds forage primarily on muddy margins and shallow waters of wetlands and other inundated habitats, with some exhibiting preferences for saline or freshwater habitats. They may use freshwater habitats regularly and may use the margins of wetlands and other inundated habitats within the survey area on occasion. However, these species have a wide range of occurrence across Australia and the extent of suitable habitat within the Development Envelope is very limited (DAWE 2022).

Summary
The proposed clearing does not comprise the whole or a part of or is not considered necessary for the maintenance of a significant habitat for indigenous fauna because:

- The amount of clearing proposed is small in relation to habitat available within the local and regional area, with all habitats to be cleared well represented in adjacent areas.
- Two conservation significant species were detected during the surveys, though the assessment shows that the amount of habitat affected, is at most 2.5% of available habitat within the surveyed area.
- All species that were determined as likely to occur based on the likelihood of occurrence assessments are not restricted to the Project area.
- None of the habitats to be cleared were isolated and/or represented core habitat for conservation significant species.

Therefore, given the above, the project is not likely to be at variance to this Principle.

Methodology
Atlas of Living Australia, (2021; 2023)
Australian Museum, (2021)
Biota, (2023)
DAWE, (2021b)
DBCA shapefiles
DCCEEW 2023
DoEE (2018)
EPBC Act Protected Matters Search Report 26/10/2023
Main Roads GIS Shapefiles
Species Profile and Threats Database (Accessed 19/08/2021)

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

Proposal is not at variance to this Principle.

The Desktop Database Searches (Main Roads ArcGIS files and PMST report) identified no known records of rare flora listed under the Biodiversity Conservation Act 2016 from the project 40km radius desktop search.

The Biological Survey undertaken by Biota, (2023) and other surveys in the locality did not record any rare flora taxa (Biota 2021a; 2021b; 360 Environmental 2021; Main Roads Western Australia 2022).

As such, the project clearing is not at variance to this Principle.

Methodology
Biota, (2023)
Biota, (2021a)
Biota, (2021b)
360 Environmental, (2022)
DBCA shapefiles
EPBC Act Protected Matters Search Report 26/10/2023

(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.
The Desktop database searches (PMST report and DBCA Shapefiles) show no known records of State listed Threatened Ecological Communities (TECs) from within the project 40 km radius desktop search. Vegetation communities recorded during the Biological Survey carried out by Biota, 2021 are not representative of TECs. As such, the proposed clearing is not at variance to this Principle.
Methodology Biota, (2023) DBCA shapefiles EPBC Act Protected Matters Search Report 26/10/2023

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

Proposed clearing is not at variance to this Principle.
As evident from Table 34 and Table 45, the current extent of pre-European remnant vegetation is more than 30% "National Threshold Level" at all scales (State IBRA Bioregion, IBRA Subregion, LGA). All of the vegetation associations have greater than 99% of their pre-European extent remaining intact. As such, the project is not located in an area of regionally significant remnant vegetation. Given that the vegetation associations are widespread throughout the area and are well-represented locally and regionally, impacts due to project clearing are not likely to be significant. Based on the above, the project is not at variance to this Principle.
Methodology EPA (2016) Government of Western Australia (2019) ARCGIS Shapefiles - Pre-European Vegetation

(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.
The Development Envelope is situated on the boundary of, and in some areas, intersects the Fitzroy, Upper Ord and Sturt Creek Catchments (DWER 2018a) The Development Envelope includes 0.35 ha of vegetation mapped as D4 and 0.05 ha mapped as D5 associated with minor drainage lines and moderately sized creeks (Biota 2023). Neither watercourse is present in DWER dataset, but is identified in Geoscience Australia datasets as a minor, non-perennial watercourse (Crossman and Li 2015). Works crossing this drainage zone will consist of a single access track with a narrower footprint that must be crossed to access a proposed material source and the upgrade of an existing crossing.

Because the D4 and D5 vegetation type is considered to be growing in associated with a watercourse, the clearing is at variance to this Principle.

Methodology
Biota, (2023)
Crossman and Li, (2015)
DWER, (2018a)
DWER, (2018b)
Main Roads Statewide Clearing Permit CPS 8181/16

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

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

The project is in an area prone to severe rainfall events, which could contribute to land degradation via flooding and heavy runoff. The 80 ha of clearing is likely to be distributed over 18 discrete sites, limiting the size of cleared areas and reducing the likelihood of land degradation, noting that several of the material pit locations are based around areas of existing pits.

Management of minor short-term environmental risks will be addressed with:

- the clearing of native vegetation restricted to occurring in dry conditions;
- the clearing will be carried out in a staged manner over several years;
- the material pits constructed to be free draining; and
- the implementation of the Main Roads Standard environment management plan which includes:
  - construction activities undertaken in summer to reduce the potential for soil erosion and drainage line siltation;
  - exposed soil working surfaces will be minimised;
  - material such as gravel, crushed rock and excavated material will be stockpiled away from drainage paths and covered to prevent erosion; and
  - processes and procedures will be developed to prevent erosion and sedimentation in the works area and methods of soil stabilisation and sediment control will be implemented where required.

Furthermore, works occur within a region where close to 100% of pre-European levels of native vegetation remain and within an area mapped as cq(p4) - Extremely Low Probability of Occurrence of ASS.

As clearing works will be completed in dry periods and no excavation below the groundwater table will occur, impacts to groundwater and interruption of natural surface water flows is not expected. As such the risk of the project causing appreciable land degradation is minimal.

The majority of clearing is expected to take place within the Dockrell Land System, comprising 91% of the Development Envelope, while the remaining 9% is situated in the O'Donnell Land System (Schoknecht and Payne 2011). The Dockrell System is considered to have a very low susceptibility to erosion, according to rangeland surveys carried out by the then Department of Agriculture and Food WA (Shocknecht and Payne 2011).

The O'Donnell System is on the whole, considered to have a moderate susceptibility erosion, owing to the occurrence of extensive areas of cracking clay plains, drainage systems, and interfluves with loamy, sandy soils over clays. Schoknecht and Payne estimate that around 76% of the Land System area is comprised of these 'Land Units' (2011). However, the proposed clearing occurs in a less extensive Land Unit characterised

by hills and ridges where outcrops with limited areas of shallow gravelly skeletal soils occur, the target soil type for road building materials. These soil types are less susceptible to erosion and as such, the proposed clearing is not expected to cause appreciable land degradation.

As such, the project is not likely to be at variance to this Principle.

Methodology
CSIRO, (2014)
Main Roads ArcGIS Shapefiles
Schoknecht and Payne, (2011)

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

Proposed clearing is not at variance to this Principle.

The Ord River Regeneration Reserve, an area of DBCA-managed Conservation Estate established to revegetate a degraded portion of the Ord River catchment and reduce downstream siltation, is the closest conservation area, and is located more than 11km from the Development Envelope. The Regeneration Reserve will not be impacted by the proposed activities. Given the distance to the nearest conservation area, the removal of 80ha of vegetation across 18 discrete sites, in a region where close to 100% of pre-European levels of native vegetation remains, the clearing will not impact any buffers, ecological linkages or outliers to a conservation area, and subsequently not impact the environmental values of nearby conservation areas.

Therefore, the project is not at variance to this Principle.

Methodology
DBCA shapefiles - Legislated Lands and Waters (DBCA 2022)

(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.

The Development Envelope intersects the Fitzroy River and Tributaries, Ord River and Tributaries/ Ord Irrigation District Surface water areas and Groundwater Area and Canning-Kimberley Groundwater Area both of which are Proclaimed Areas under the RIWI Act. The amount of clearing required is a very small proportion of the total catchment size for the Ord and Fitzroy Rivers and the Project is therefore unlikely to significantly impact surface water quality. The Halls Creek Water Reserve, a Public Drinking Water Source Area is located 13 km North-east of the project and is unlikely to be impacted.

Drainage lines associated with the proposal consist of D4 and D5, associated with moderately sized and minor sized drainage lines according to Biota (2023), however are both considered to be Minor Non-Perennial Watercourses in Geoscience Australia Datasets (Crossman and Li 2015). Vegetation Type D4 is considered a potential Groundwater Dependent Ecosystem (GDE; Biota 2023). The clearing within Vegetation type D4 is to allow for improvements to an existing track and is therefore, not expected to cause any substantiative damage to surrounding native vegetation.

Clearing of native vegetation will not intersect any large surface water bodies. Two drainage lines are mapped to intersect the Development Envelope at two locations (Crossman and Li 2015). These drainage lines eventually feed into Sturt Creek and Mary River. Clearing within these watercourses is expected to be less than 0.40 ha, and only for a new access track and improvements to an existing access track.

Furthermore, the Main Roads Standard Environment Management Plan also contains appropriate provisions to manage possible contamination risk from spill incidents due to fuel leakage during on-ground works. Operational controls will include: No storage of hazardous materials, fuels or oils within 50 m of any watercourse or wetland; All hazardous materials fuels or oils storage areas will be bunded; Spill kits will be in place at all storage areas; and Induction programs to make all personnel aware of the appropriate response to spills.

The clearing of 80 ha across 18 separate locations within a wider 463 ha Development Envelope further reduces the likelihood of the deterioration in the quality of surface water.

Clearing of native vegetation for the material areas will not involve excavation below the water table.

Based on the above, the project is not likely to be at variance to this Principle.

Methodology
ARCGIS shapefiles- Watercourse
Crossman and Li, (2015)
DWER, (2018b)

(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.

The subregional climate is described as dry winter and hot semi-arid summer with an average annual rainfall of 438 mm (Ruby Plains (Site ID- 2026) (BoM, 2022)). Extreme weather events are a significant component of the Kimberley climate. Tropical cyclones and tropical storms can bring heavy and sustained rainfall, particularly in the months leading up to and during the wet season. It is common for a large proportion of the region's rainfall to be recorded in one single event, leading to extensive flooding of rivers, creeks and roadways.

The climatic conditions are the main factor influencing flooding in the region. The proposed clearing of 80 ha of clearing distributed across 18 isolated sites (pit areas) will be undertaken during dry conditions. It is expected that water may collect within pit areas over the wet season, but will be diverted to natural drainage channels to maintain local hydrological flow.

Given the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology
BoM, (2022)
Main Roads ArcGIS Shapefiles

6 REHABILITATION, REVEGETATION & OFFSETS

6.1 Revegetation and Rehabilitation

No temporary clearing will be undertaken as part of the Proposal activities as Material areas are expected to service the upgrade works over several years and will be used for ongoing maintenance.

6.2 Offset Proposal

No offset proposal is required as the proposed clearing will not result in significant residual impacts to native vegetation within the region.

7 COMPLIANCE WITH CPS 818

Table 9 summarises what further pre-clearing impact assessment is required in accordance with CPS 818.

Table 9. Summary of Additional Management Actions Required by CPS 818

Impact of Clearing	Yes/No or NA	Further Action Required
1. The CAR indicates that the clearing is 'At Variance' or 'May be at Variance' with one or more of the Clearing Principles.	**Yes**	No further action required. *The Proposed Clearing is at variance only to Principle f, where a maximum of 0.4 ha of vegetation growing in association with a minor non-perennial watercourse may be cleared.*
2. Clearing is at variance or may be at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality **or** (j) the incidence of flooding.	**No**	No further action required.
3. Clearing is at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality **and** (j) the incidence of flooding.	**No**	No further action required.
4. The Proposal involves clearing for temporary works (as defined by CPS 818).	**No**	No further action required.
5a. Proposal is within a Region that: • 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.	**No**	No further action required.
5b. Do the proposed works require clearing within or adjacent to DBCA managed lands in non-dry conditions?	**No**	No further action required.
6. Main Roads has been notified by DWER or an environmental specialist that the area to be cleared is susceptible to a pathogen other than dieback.	**No**	No further action required.

Impact of Clearing	Yes/No or NA	Further Action Required
7. Weeds are likely to spread to and result in environmental harm to adjacent areas of native vegetation that are in good or better condition.	**No**	No further action required. The proposal includes implementation of a Main Roads standard environment management plan which will have appropriate provisions to prevent the spread of weeds to adjacent areas of native vegetation.
8. Did an environmental specialist conduct the survey or field assessment?	**Yes**	The Environmental Specialist undertaking the biological assessments was suitably qualified and had more than three years' experience.
9. Did an environmental specialist prepare the Assessment Report and any other associated documentation including the VMP, Dieback Management Plan or Offset Proposal?	**Yes**	The Environmental Specialist preparing the Assessment Report and any other associated documentation including the VMP, Dieback Management Plan or Offset Proposal was suitably qualified and had more than 10 years' experience.

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