Clearing Assessment Report – CPS 818

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Goldfields Highway Wiluna to Meekatharra Package 2 – West Creek Realignment
Goldfields Highway (H049)
Goldfields – Esperance Region
3332

D24#1072289
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Document Control

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1 PROPOSAL

1.1 Purpose and Justification

Goldfields Highway (H049) is an important link in the Regional Road Network providing access between Kalgoorlie/Boulder in the Eastern Goldfields through to Meekatharra, the southern Gascoyne and Pilbara Regions of Western Australia.

The increase in mining activity along this section of Goldfields Highway has increased traffic volumes especially heavy vehicles carting materials. As a result, the section between Wiluna and Meekatharra requires increasingly frequent maintenance with a corresponding increase in costs.

Poor quality of the current alignment through West Creek has led to increased susceptibility to road closures due to flooding, poor driving conditions, high operating costs and poor reliability. As such Main Roads Western Australian (MRWA) are proposing a realignment of approximately 10 km of road between SLK 626.5 and SLK 636.5 and upgrade to a sealed road standard. The new alignment will be located south of the current road and will result in a reduction in road length and improved overall safety for road users.

The project objectives are:

- Improve road user safety to reduce the frequency and severity of crashes.
- Reduce the risk to safe freight movements and efficiency.
- Improving safety and serviceability of the road by upgrading to a sealed standard.
- Improving road surface and serviceability of the flood crossings.
- Improving road drainage by introducing floodways, culvert, and open drains.
- Reliable and efficient travel on the Goldfields Highway, through the reduction in annual closures and travel time.

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 1.5.

1.2 Proposal Scope

Main Roads proposes to realign approximately 10km of the Goldfields Highway across West Creek between the town sites of Meekatharra and Wiluna. The works will comprise the following components:

- Clearing of native vegetation
- Geotechnical Investigations
- Earthworks for road construction and associated works such as construction and installation of drainage, laydown areas.
- Drainage & Rock Protection
- Culvert installation and Floodway Construction
- Pavements
- Cement Stabilised Pavements
- Tie-ins into existing alignment
- Services Investigation & Potential Relocation of existing Services.
- Upgrade Side Access Roads
- Signs & Line Marking.

1.3 Proposal Location

The Development Envelope is located south of Goldfields Highway between Meekatharra and Wiluna, SLK 625.7 and SLK 637.4, in the Shire of Wiluna, as shown in Figure 1.

The central coordinate of the proposal are:

- Longitude: 120.0373758
- Latitude: -26.5771440

1.4 Clearing Details

Proposed Clearing to be undertaken using CPS 818:
34.354 ha within a 40.424 ha Development Envelope

Areas of Native Vegetation Clearing:
The areas of native vegetation to be cleared are shown in Appendix 2.

Type of Native Vegetation:

The type of native vegetation to be cleared under this Proposal comprise six Vegetation Types (Spectrum, 2023) and shown in Appendix 2, including:

- **CL-1:** *Eucalyptus victrix, Casuarina obesa*, and *Melaleuca xerophila* low woodland, over *Acacia burkittii* tall sparse shrubland, over *Eriachne benthamii* and *Themeda triandra* low sparse grassland.
- **FP-1:** *Eucalyptus victrix* and *Acacia incurvaneura* low woodland over, *Acacia tetragonophylla* and *Senna artemisioides* subsp. *filifolia* mid sparse shrubland, over *Ptilotus obovatus* and *Sida fibulifera* low sparse shrubland.
- **HC-1:** *Acacia pruinocarpa*, *Acacia minyur*a and *Acacia fuscaneura* low open woodland, over *Senna artemisioides* subsp. *xpetiolaris*, *Acacia tetragonophylla*, and *Senna artemisioides* subsp. *helmsii* mid sparse shrubland, over *Eremophila jucunda* low sparse shrubland.
- **P-3:** *Acacia caesaneura* low open woodland, over *Acacia tetragonophylla* tall sparse shrubland, over *Rhagodia drummondii* and *Ptilotus obovatus* low sparse shrubland, over *Eragrostis eriopod*a and *Monachather paradoxus* low sparse tussock grassland.
- **P-4:** *Acacia craspedocarpa* low open woodland, over Acacia burkittii and *Senna artemisioides* subsp. *filifolia* mid sparse shrubland, over *Ptilotus obovatus* and *Sclerolaena deserticola* low sparse shrubland.
- **S-1:** *Acacia minyura*, *Acacia pruinocarpa*, and *Acacia incurvaneura* low open woodland, over *Eremophila jucunda* and *Eremophila latrobei* subsp. *latrobei* mid sparse shrubland, over *Triodia melvillei* low open hummock grassland.

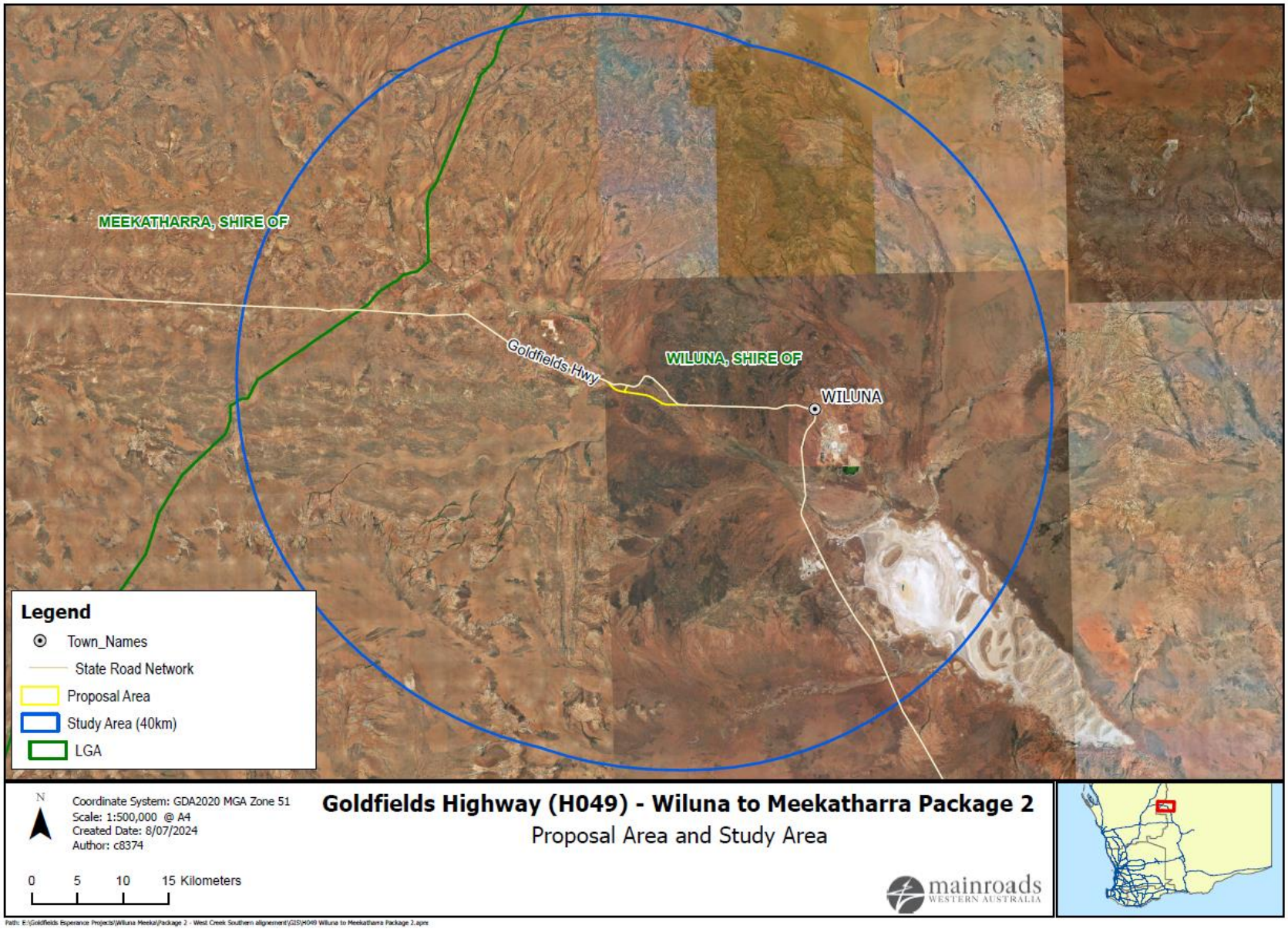

Figure 1. Proposal and Study Area

1.5 Alternatives to Native Vegetation Clearing Considered During Proposal Development

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

- Do not upgrade the road, however this will potentially result in a poorer safety outcome and may result in future fatalities or serious injuries and further degradation of the State road asset.
- Upgrade on existing alignment, however this would still result in a poor alignment with flooding, poor driving conditions and road closures.
- Main Roads retains frangible vegetation where a clear zone is to be established for road projects. For this project, however, clearing will only be required to accommodate the road formation, 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. 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	The proposed realignment currently aims to balance safety by maintaining a suitable curve geometry for a sealed road as well as environmental impacts. An alignment to one side of the existing road would not achieve these outcomes or alleviate the current issues associated with flooding and road closures.
Alternative alignment located within pasture or degraded areas	This option is not a suitable alternative due to the road being located in an area of the State that is not the subject of agricultural farming and with surrounding vegetation in a better than degraded condition. The proposed alignment aims to balance safety by maintain a suitable curve geometry with environmental impacts.
Simplification of design to reduce number of lanes and/or complexity of intersections	Not applicable.
Steepen batter slopes	Not applicable.
Installation of barriers	Not applicable.
Installation of kerbing	Not applicable.
Use of existing cleared areas for access tracks, construction storage and stockpiling	Where practical site offices, material storage areas and vehicle turn arounds have been located within previously disturbed or cleared areas. Access tracks to the work area have been selected based on existing tracks to reduce the clearing of native vegetation.

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:

- **Native Vegetation 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.

- **Development Envelope** – The total footprint of the Proposal including both cleared and uncleared areas. This is based on the current design and usually includes a buffer to allow for constructability and the movement of machinery during construction.

- **Study Area** – Area covered by the Desktop Assessment. The Study Area for the Proposal is confined to a local area of a 40km radius.

- **Survey Area** – Area covered by the Biological Survey, which is typically larger that the Development Envelope.

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.

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 10.

2.3 Surveys and Assessments

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

- Goldfields Highway Detailed and targeted flora and vegetation assessment (Spectrum, 2023).
- Goldfields Highway Vertebrate & Short Range Endemic Terrestrial fauna assessment (Spectrum, 2023).
- Goldfields Highway Pre-Clearance Malleefowl Assessment (Spectrum, 2023).
- Goldfields Highway Vegetation & Fauna Habitat Mapping Extension (Spectrum, 2023).

- Goldfields Highway Package 2 Vegetation & Fauna Habitat Mapping Extension Addendum 2 (Spectrum, 2024)

Biological and targeted surveys conducted for the proposal are outlined in Table 2 and a summary of the findings in these reports are presented in Sections 3.1 to 3.2.

For the purposes of determining impacts, all surveys have been combined and are presented as the "Survey Area".

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

Consultant & Survey Name	Survey Details
Spectrum Ecology & Spatial (2023) Goldfields Highway Detailed Flora & Vegetation Assessment	**Survey Area:** Survey area comprised approximately 114.9 ha over three Package areas of Goldfields Highway between the towns of Meekatharra and Wiluna. Package 1 (SLK 644.4 to 646.6; 0.6 ha), Package 2 (SLK 625.80 to 636.50; 99.8 ha), and Package 3 (SLK 653.7 to 665; 14.4 ha). **Type:** Single Season detailed flora and vegetation assessment with desktop flora assessment undertaken in the wider study area to identify likelihood of significant flora and vegetation in the proximity of the Survey Area. The survey identified and mapped the dominant vegetation units, assessed vegetation condition and completed opportunistic searches for conservation significant ecological communities and flora and fauna taxa. **Timing:** Fieldwork conducted from 19 to 28 June 2023. **Survey Results Shapefile TRIM Ref:** D23#924122 **Document TRIM Ref:** D23#924024
Spectrum Ecology & Spatial (2023) Goldfields Highway Vertebrate & Short-Range Endemic Terrestrial Fauna Assessment	**Survey Area:** Survey area comprised approximately 114.9 ha over three Package areas of Goldfields Highway between the towns of Meekatharra and Wiluna. Package 1 (SLK 644.4 to 646.6; 0.6 ha), Package 2 (SLK 625.80 to 636.50; 99.8 ha), and Package 3 (SLK 653.7 to 665; 14.4 ha). **Type:** Basic and targeted terrestrial vertebrate fauna assessment and a Level 1 short-range endemic invertebrate assessment. **Timing:** Fieldwork conducted from 19 to 23 June 2023 **Survey Results Shapefile TRIM Ref:** D23#1233183 **Document TRIM Ref:** D24#90172
Spectrum Ecology & Spatial (2023) Goldfields Highway Pre-Clearance Malleefowl Assessment	**Survey Area:** Survey area comprised approximately 114.9 ha over three Package areas of Goldfields Highway between the towns of Meekatharra and Wiluna. Package 1 (SLK 644.4 to 646.6; 0.6 ha), Package 2 (SLK 625.80 to 636.50; 99.8 ha), and Package 3 (SLK 653.7 to 665; 14.4 ha). **Type:** Targeted Survey for Malleefowl within the survey area. **Timing:** Fieldwork conducted 19 to 23 June 2023 **Document TRIM Ref:** D23#772529

Consultant & Survey Name	Survey Details
Spectrum Ecology & Spatial (2023) Goldfields Highway Vegetation & Fauna Habitat Mapping Extension	**Survey Area:** Mapping extension for an additional 7.5 ha adjacent to the original survey area of Package 2 on Goldfields Highway. **Type:** Extension of vegetation, vegetation condition and fauna habitat mapping conducted by Spectrum in June 2023 **Survey Results Shapefile TRIM Ref:** D23#1234187 **Document TRIM Ref:** D23#1234231
Spectrum Ecology & Spatial (2024) Goldfields Highway Package 2 Vegetation & Fauna Habitat Mapping Extension Addendum 2	**Survey Area:** Mapping extension for an additional 5 ha adjacent to the original survey area of Package 2 on Goldfields Highway. **Type:** Extension of vegetation, vegetation condition and fauna habitat mapping conducted by Spectrum in June 2023 **Survey Results Shapefile TRIM Ref:** D24#685163 **Document TRIM Ref:** D24#685173

3 SURVEY RESULTS

In accordance with CPS 818 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.

3.1 Summary of Flora and Vegetation Surveys

Spectrum Ecology & Spatial (Spectrum) (2023a) undertook a single season flora and vegetation survey. The survey identified and mapped the dominant vegetation units, assessed vegetation condition and completed opportunistic searches for conservation significant ecological communities and flora and fauna taxa.

The survey extent covered a total of 114.9 ha over three package areas of Goldfields Highway between the towns of Meekatharra and Wiluna.

Vegetation

Nine vegetation types were identified and mapped within the Spectrum (2023a) Survey Area, six of which are present within the Development Envelope. These were:

- **CL-1:** *Eucalyptus victrix, Casuarina obesa*, and *Melaleuca xerophila* low woodland, over *Acacia burkittii* tall sparse shrubland, over *Eriachne benthamii* and *Themeda triandra* low sparse grassland.
- **FP-1:** *Eucalyptus victrix* and *Acacia incurvaneura* low woodland over, *Acacia tetragonophylla* and *Senna artemisioides* subsp. *filifolia* mid sparse shrubland, over *Ptilotus obovatus* and *Sida fibulifera* low sparse shrubland.

- **HC-1:** *Acacia pruinocarpa*, *Acacia minyur*a and *Acacia fuscaneura* low open woodland, over *Senna artemisioides* subsp. *xpetiolaris*, *Acacia tetragonophylla*, and *Senna artemisioides* subsp. *helmsii* mid sparse shrubland, over *Eremophila jucunda* low sparse shrubland.
- **P-3:** *Acacia caesaneura* low open woodland, over *Acacia tetragonophylla* tall sparse shrubland, over *Rhagodia drummondii* and *Ptilotus obovatus* low sparse shrubland, over *Eragrostis eriopod*a and *Monachather paradoxus* low sparse tussock grassland.
- **P-4:** *Acacia craspedocarpa* low open woodland, over Acacia burkittii and *Senna artemisioides* subsp. *filifolia* mid sparse shrubland, over *Ptilotus obovatus* and *Sclerolaena deserticola* low sparse shrubland.
- **S-1:** *Acacia minyura*, *Acacia pruinocarpa*, and *Acacia incurvaneura* low open woodland, over *Eremophila jucunda* and *Eremophila latrobei* subsp. *latrobei* mid sparse shrubland, over *Triodia melvillei* low open hummock grassland.

None of the vegetation types recorded by Spectrum (2023a) are representative of communities that correspond to any state (BC Act) or Commonwealth (EPBC Act) listed Threatened Ecological Community (TEC) or any state listed Priority Ecological Community (PEC).

The Condition of the vegetation within the Native Vegetation Clearing Area the subject of this CAR was assessed as Good and Very Good (Spectrum, 2023a), with majority of the vegetation in Very Good condition. Other areas within the Development Envelope are cleared.

Flora

Spectrum (2023a) recorded a total of 187 taxa representing 37 families and 93 genera within the Survey Area. Three introduced species were recorded within the Survey Area, none of which are listed as a Declared Pest or Weed of National Significance (WON). One weed species, *Rumex vesicarius* (Ruby Dock), was located within the Development Envelope.

No Threatened Flora taxa were recorded during the assessment by Spectrum (2023a). One Priority Flora species was recorded within the Survey Area, being *Eremophila congesta* (Priority 1). No other significant flora taxa were recorded within the Survey Area during the field assessment.

A likelihood of occurrence assessment was conducted post-field survey concluded three species are known or likely to occur within the broader 114.9 ha survey area, being:

- *Eremophila congesta*
- *Goodenia modesta*
- *Vittadinia pustulata*

Further assessment of likelihood of occurrence of the above species within the Native Vegetation Clearing Area has been presented Section 5(a) (Principle (a)).

Whilst Priority 1 species *Eremophila congesta* was recorded form one location within the Study area, this is outside of the Development Envelope and will not be impacted by the proposed clearing.

3.2 Summary of Fauna Surveys

Spectrum Ecology & Spatial (Spectrum) (2023b) undertook a Basic and targeted terrestrial vertebrate fauna assessment and a Level 1 short-range endemic invertebrate assessment. A concurrent targeted Malleefowl survey was also undertaken over the same survey area.

The survey extent covered a total of 114.9 ha over three package areas of Goldfields Highway between the towns of Meekatharra and Wiluna.

Six fauna habitat types were recorded by Spectrum (2023b) within the Survey Area, five of which are present within the Development Envelope. These were:

- Drainage Line;
- Open Shrubland on Limestone;
- Rocky Hillslope and Footslope;
- Bluebush Open Shrubland; and
- Mixed Tall Shrubland on Sandy Clay.

A total of 45 vertebrate fauna species were recorded within the Survey Area, which included two native non-volant mammals, four introduced mammals and 39 bird species.

Two species of significance were recorded during a concurrent Malleefowl survey, being one Southern Whiteface (*Aphelocephala leucopsis*, EPBC Act Vulnerable); and secondary evidence in the form of burrows and diggings of the Brush-tailed Mulgara (*Dasycercus blythi*, DBCA P4). Whilst recorded within the Survey Area, neither of these two significant species were recorded within the Development Envelope.

A likelihood of occurrence assessment was conducted post-field survey and concluded six species have a medium or high likelihood of occurrence within the broader 114.9 ha survey area, being:

- *Dasycercus blythi* (Brush-tailed Mulgara)
- *Leipoa ocellata* (Malleefowl)
- *Falco hypoleucos* (Grey Falcon)
- *Aphelocephala leucopsis* (Southern Whiteface)
- *Apus pacificusI* (Pacific Swift)
- *Falco peregrinus* (Peregrine Falcon)

Further assessment of likelihood of occurrence of the above species within the Native Vegetation Clearing Area has been presented Section 5(a) (Principle (b)).

The targeted Malleefowl survey did not identify any evidence or secondary evidence (in the form of Malleefowl mounds) within the survey area. Spectrum (2023b) considers the habitat within the Development Envelope to be marginal for Malleefowl.

4 VEGETATION DETAILS

4.1 Proposal Site Vegetation Description

According to the broad scale mapping undertaken by Beard (Shepherd et al 2001), the Development Envelope is mapped as occurring within the following pre-European vegetation association:

- 11: Medium woodland; coolabah (*Eucalyptus microtheca*)
- 18: Low woodland; mulga (*Acacia aneura*)
- 204: Succulent steppe with open scrub; scattered mulga & *Acacia sclerosperma* over saltbush & bluebush

Table 3 provides details of the Pre-European Vegetation Associations within the Development Envelope and the remaining extent of these associations.

All vegetation associations have greater than 30% of pre-European extent remaining at all levels. All levels have greater than 98% remaining.

Table 3. 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. 11	**Statewide** 11	31,723.47	31,698.27	99.92	-
	IBRA Bioregion Murchison	9,178.32	9,153.12	99.73	-
	IBRA Sub-region Eastern Murchison	8,524.38	8,499.18	99.70	-
	Local Government Authority Shire of Wiluna	7,037.15	7,011.95	99.64	-
Veg Assoc No. 18	**Statewide** 18	19,892,306.46	19,843,148.07	99.75	6.62
	IBRA Bioregion Murchison	12,403,172.30	12,363,252.47	99.68	4.96
	IBRA Sub-region Eastern Murchison	10,269,896.44	10,234,838.22	99.66	5.12
	Local Government Authority Shire of Wiluna	2,039,880.64	2,030,406.99	99.54	3.75
Veg Assoc No. 204	**Statewide** 204	199,475.40	198,735.10	99.63	6.75
	IBRA Bioregion Murchison	185,601.68	184,861.37	99.60	7.26
	IBRA Sub-region Eastern Murchison	75,042.26	74,305.79	99.02	11.47
	Local Government Authority Shire of Wiluna	39,116.94	38,380.47	98.12	-

Six native vegetation types were mapped within the Native Vegetation Clearing Area (Spectrum, 2023a) and area summarised below in Table 4. Vegetation condition ranges from Good to Very Good and is summarised in Table 5, with 84.55% of vegetation in Very Good condition.

S-1 and P-3 were the two most common vegetation associations recorded, comprising 40.76% and 24.42% of the native vegetation respectively.

Table 4 and Table 5 provide details of the vegetation types and their condition within the Development Envelope.

Table 4. Summary of Vegetation Types within Development Envelope

Vegetation Type	Extent within Development Envelope (ha)	Total Extent Mapped (ha) within Survey Area
CL-1 *Eucalyptus victrix, Casuarina obesa*, and *Melaleuca xerophila* low woodland, over *Acacia burkittii* tall sparse shrubland, over *Eriachne benthamii* and *Themeda triandra* low sparse grassland.	0.603	1.269
FP-1 *Eucalyptus victrix* and *Acacia incurvaneura* low woodland over, *Acacia tetragonophylla* and *Senna artemisioides* subsp. *filifolia* mid sparse shrubland, over *Ptilotus obovatus* and *Sida fibulifera* low sparse shrubland.	3.170	7.480
HC-1 *Acacia pruinocarpa*, *Acacia minyur*a and *Acacia fuscaneura* low open woodland, over *Senna artemisioides* subsp. *xpetiolaris*, *Acacia tetragonophylla*, and *Senna artemisioides* subsp. *helmsii* mid sparse shrubland, over *Eremophila jucunda* low sparse shrubland.	1.134	3.314
P-3 *Acacia caesaneura* low open woodland, over *Acacia tetragonophylla* tall sparse shrubland, over *Rhagodia drummondii* and *Ptilotus obovatus* low sparse shrubland, over *Eragrostis eriopod*a and *Monachather paradoxus* low sparse tussock grassland.	9.870	32.415
P-4 *Acacia craspedocarpa* low open woodland, over Acacia burkittii and *Senna artemisioides* subsp. *filifolia* mid sparse shrubland, over *Ptilotus obovatus* and *Sclerolaena deserticola* low sparse shrubland.	3.100	9.823
S-1 *Acacia minyura*, *Acacia pruinocarpa*, and *Acacia incurvaneura* low open woodland, over *Eremophila jucunda* and *Eremophila latrobei* subsp. *latrobei* mid sparse shrubland, over *Triodia melvillei* low open hummock grassland.	16.477	45.971

No Vegetation	6.070	10.921
TOTAL (ha)	40.424	111.193

Table 5. Summary of Vegetation Condition within Development Envelope

Vegetation Condition (EPA, 2019)	Extent within Development Envelope (ha)	Total Extent Mapped (ha) within Survey Area
Very Good	34.178	98.416
Good	0.176	1.856
N/A (No Vegetation)	6.070	10.921
TOTAL (ha)	40.424	111.193

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 or may be 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

The proposal will result in the clearing of 34.354 ha of native vegetation. Condition of the vegetation proposed to be cleared ranges from Good to Very Good, with majority of the vegetation in Very Good condition. Six vegetation types have been mapped within the Development Envelope (Spectrum, 2023a) all of which are considered typical of the local and wider area:

- **CL-1:** *Eucalyptus victrix, Casuarina obesa*, and *Melaleuca xerophila* low woodland, over *Acacia burkittii* tall sparse shrubland, over *Eriachne benthamii* and *Themeda triandra* low sparse grassland.
- **FP-1:** *Eucalyptus victrix* and *Acacia incurvaneura* low woodland over, *Acacia tetragonophylla* and *Senna artemisioides* subsp. *filifolia* mid sparse shrubland, over *Ptilotus obovatus* and *Sida fibulifera* low sparse shrubland.
- **HC-1:** *Acacia pruinocarpa*, *Acacia minyur*a and *Acacia fuscaneura* low open woodland, over *Senna artemisioides* subsp. *xpetiolaris*, *Acacia tetragonophylla*, and *Senna artemisioides* subsp. *helmsii* mid sparse shrubland, over *Eremophila jucunda* low sparse shrubland.
- **P-3:** *Acacia caesaneura* low open woodland, over *Acacia tetragonophylla* tall sparse shrubland, over *Rhagodia drummondii* and *Ptilotus obovatus* low sparse shrubland, over *Eragrostis eriopod*a and *Monachather paradoxus* low sparse tussock grassland.
- **P-4:** *Acacia craspedocarpa* low open woodland, over Acacia burkittii and *Senna artemisioides* subsp. *filifolia* mid sparse shrubland, over *Ptilotus obovatus* and *Sclerolaena deserticola* low sparse shrubland.
- **S-1:** *Acacia minyura*, *Acacia pruinocarpa*, and *Acacia incurvaneura* low open woodland, over *Eremophila jucunda* and *Eremophila latrobei* subsp. *latrobei* mid sparse shrubland, over *Triodia melvillei* low open hummock grassland.

None of the vegetation types described within the Development Envelope are representative of communities that correspond to any state (BC Act) or Commonwealth (EPBC Act) listed Threatened Ecological Communities (TEC) or Priority Ecological Communities (PEC).

Desktop searches DBCA and WA herbarium databases identified the presence/potential presence of 27 conservation significant flora within the 40km Study Area, being:

- *Beyeria lapidicola* (P1)
- *Calandrinia mirabilis* (P1)
- *Indigofera rotula* (P3)
- *Jacksonia lanicarpa* (P1)

- *Eremophila arachnoides subsp. arachnoides* (P3)
- *Eremophila arguta* (P1)
- *Eremophila congesta* (P1)
- *Eremophila regia* (P1)
- *Euryomyrtus inflata* (P3)
- *Frankenia confuse* (P4)
- *Goodenia lyrate* (P3)
- *Goodenia modesta* (P3)
- *Hemigenia exilis* (P4)
- *Hibiscus sp. Perrinvale Station (J. Warden & E. Ager WB 10581)* (P1)
- *Homalocalyx echinulatus* (P3)
- *Indigofera gilesii* (P3)
- *Maireana prosthecochaeta* (P3)
- *Olearia mucronate* (P3)
- *Prostanthera ferricola* (P3)
- *Ptilotus chrysocomus* (P1)
- *Ptilotus luteolus* (P3)
- *Sida picklesiana* (P3)
- *Stackhousia clementii* (P3)
- *Tecticornia enodis* (P1)
- *Thryptomene sp. Leinster (B.J. Lepschi & L.A. Craven 4362)* (P3)
- *Tribulus adelacanthus* (P3)
- *Vittadinia pustulata* (P3)

No Threatened flora are known to occur within the project Development Envelope or the associated 40km radius Study Area.

The field Survey by Spectrum (2023a) identified 187 vascular flora species with the survey area. The post-survey likelihood of occurrence by Spectrum (2023a) assessed all but three species as having a low likelihood of occurrence within the Development Envelope. The following three species were considered to have a high likelihood of occurrence:

- *Eremophila congesta* (P1)
- *Goodenia modesta* (P3)
- *Vittadinia pustulata* (P3)

Eremophila congesta was identified within the survey area, although it is not present within the Development Envelope and will therefore not be impacted. No other priority species were identified during the field survey.

Goodenia modesta and *Vittadinia pustulata* have flower seasons outside of the timing of the survey by Spectrum (2023a) and as such retain their 'High' likelihood. The single DBCA record for *Vittadinia pustulata* is located 4.2 km from the Development Envelope and the single record (10 plants) of *Goodenia modesta* is located 8.5 km from the Development Envelope. Neither species was noted in historical surveys by GHD (2014) that cover the Development Envelope. Impact to these two species is considered unlikely.

Three introduced species were recorded within the Survey Area, none of which are listed as a Declared Pest or Weed of National Significance (WON). One weed species, *Rumex vesicarius* (Ruby Dock), is located within the Development Envelope.

A search of the DBCA TEC/PEC database within 40km of the Development Envelope (Study Area), identified no TECs and the following seven PECs listed by the Department of Biodiveristy and Conservation and Attractions (DBAC):

- Paroo Calcrete – Paroo Calcrete groundwater assemblage type on Carey palaeodrainage on Paroo Station (Priority 1);
- Millbillillie Bubble Well Calcrete - Millbillillie Bubble Well groundwater calcrete assemblage type on Carey palaeodrainage on Millbillillie Station (Priority 1);
- Wiluna West BIF (Wiluna North 01, Wiluna West Central 01 and Wiluna South 01)- Wiluna West vegetation complexes (banded ironstone formation) (Priority 1);
- Hinkler Well Calcrete - Hinkler Well calcrete groundwater assemblage type on Carey palaeodrainage on Lake Way Station (Priority 1);
- Lake Violet Calcrete - Lake Violet south and Lake Violet calcrete groundwater assemblage types on Carey palaeodrainage on Millbillillie Station (Priority 1);

- Uramurdah Calcrete - Uramurdah Lake calcrete groundwater assemblage type on Carey palaeodrainage on Millbillillie Station (Priority 1); and
- Wiluna BF Calcrete - Wiluna BF calcrete groundwater assemblage type on Carey palaeodrainage on Millbillillie Station (Priority 1).

The Development Envelope intersects the Millbillillie Bubble Well Calcrete PEC.

All PECs are related to Calcrete Groundwater assemblages of subterranean invertebrates and will not be impacted by the clearing of vegetation at surface.

The Development Envelope comprises of five mapped fauna habitats:
- Drainage Line;
- Open Shrubland on Limestone;
- Rocky Hillslope and Footslope;
- Bluebush Open Shrubland; and
- Mixed Tall Shrubland on Sandy Clay.

All habitats are common within the vicinity of the Development Envelope and within the wider region.

A total of 45 vertebrate fauna species were recorded within the Survey Area, which included two native non-volant mammals, four introduced mammals and 39 bird species.

Two species of significance were recorded during a concurrent Malleefowl survey, being one Southern Whiteface (*Aphelocephala leucopsis*, EPBC Act Vulnerable); and secondary evidence in the form of burrows and diggings of the Brush-tailed Mulgara (*Dasycercus blythi*, DBCA P4). Whilst recorded within the Survey Area, neither of these two significant species were recorded within the Development Envelope.

The targeted Malleefowl survey did not identify any evidence or secondary evidence (in the form of Malleefowl mounds) within the survey area. Spectrum (2023b) considers the habitat within the Development Envelope to be marginal for Malleefowl.

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

Methodology

- Biological Survey (Spectrum, 2023a)
- DCCEEW Protected Matters Search Tool Report
- Department of Natural Resources and Environment (2002)
- Government GIS Shapefiles:
  - DBCA Threatened and Priority Ecological Community database search (Accessed 13/08/2024)
  - DBCA Threatened and Priority flora database search (Accessed 13/08/2024)
  - WA Herbarium (Accessed 13/08/2024)
- Statewide Vegetation Statistics (Government of Western Australia 2018)

(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.

Assessment

A basic fauna assessment was conducted by Spectrum (2023b) which included the Development Envelope. Five habitat types were mapped within the Development Envelope, being:

- Bluebush Open Shrubland
- Drainage Line
- Mixed Tall Shrubland on Sandy Clay
- Open Shrubland on Limestone
- Rocky Hillslope & Footslope

These habitat types are well represented in the immediate vicinity of the Development Envelope and in the broader Murchison region.

A desktop search of DBCA data identified the following 20 fauna species of significance known to occur within a 40 km study area:

- *Actitis hypoleucos* (Common sandpiper)
- *Apus pacificus* (Fork-tailed swift)
- *Calidris acuminata* (Sharp-tailed sandpiper)
- *Calidris alba* (Sanderling)
- *Calidris melanotos* (Pectoral Sandpiper)
- *Calidris ruficollis* (Red-necked Stint)
- *Calidris subminuta* (Long-toed Stint)
- *Charadrius veredus* (Oriental Plover)
- *Dasycercus blythi* (Brush-tailed Mulgara)
- *Falco hypoleucos* (Grey Falon)
- *Falco peregrinus* (Peregrine Falcon)
- *Gelochelidon nilotica* (Gull-billed Tern)
- *Glareola maldivarum* (Oriental Pratincole)
- *Leipoa ocellata* (Malleefowl)
- *Macrotis lagotis* (Bilby)
- *Plegadis falcinellus* (Glossy Ibis)
- *Pluvialis fulva* (Pacific Golden Plover)
- *Sminthopsis longicaudata* (Long-tailed Dunnart)
- *Tringa glareola* (Wood Sandpiper)
- *Tringa nebularia* (Common Greenshank)

No sightings or secondary evidence of conservation significant species were made within the Development Envelope during the biological survey.

The following species were rated by Spectrum as having a medium or high likelihood of occurrence and are further described below:

- Brush-tailed Mulgara; *Dasycercus blythi* (Priority 4 listing by DBCA) – This species prefers sandy, loamy and sometimes stony/ gibber plains vegetated with spinifex and/ or tussock grasses (Spectrum, 2023). Suitable habitat is available within the Development Envelop in the form of Mixed Tall Shrublands on Sandy Clay, however no evidence or secondary evidence of the species was identified within the field survey.

- Mallefowl; *Leipoa ocellata* (listed as Vulnerable under the EPBC and BC Act) – Suitable habitat is present within the Development Envelope in the form of Mixed Tall Shrubland on Sandy Clay. Targeted searches for Mallefowl undertaken during the survey (Spectrum, 2023d) did not result in any sightings or secondary evidence of this species within the Development Envelope. Spectrum (2023b) concluded that whilst the Mallefowl may use the area for foraging and dispersal it is unlikely to be used for nesting. With the linear nature of the project and the abundance of similar habitat locally and regionally the impacts on the Malleefowl will not be significant.

- Grey Falcon; *Falco hypoleucos* (listed as Vulnerable under the EPBC and BC Act) -This species occurs sparsely in a wide variety of arid and semi-arid zones across an area of over 5 million square kilometres

(Spectrum, 2023b). Whilst the species may potentially occur within the area it would primarily be as an infrequent vagrant. No suitable nesting habitat was recorded, and no sightings or evidence of the species was recorded during the field survey.

- Southern Whiteface; *Aphelocephala leucopsis* (listed as Vulnerable under the EPBC Act) – This species inhabits arid open woodlands with a shrubby or grassy understory; as well as grass plains (DCCEEW, 2024). One Southern Whiteface individual was observed during the biological survey (Spectrum, 2023b), however this individual was 120 km west of the Development Envelope.

- Pacific Swift; *Apus pacificus* (listed as Migratory under the EPBC and BC Acts) - The Pacific Swift has a wide distribution across all states and territories of Australia and is almost exclusively aerial. Given the wide distribution and that no individuals were sighted during the field survey the removal of vegetation in a linear corridor is unlikely to have a significant impact on this species.

- Peregrine Falcon; *Falco peregrinus* (listed as Other Specially Protected Fauna under the EPBC and BC Acts) – This is a widespread but uncommon species that occurs in a variety of habitats including open woodlands, grasslands with trees, lakes, timbered watercourses and urban areas (Spectrum, 2023b). No suitable nesting habitat was recorded, and no sightings or evidence of the species was recorded during the survey by Spectrum (2023b).

Whilst the Development Envelope may provide some habitat value for fauna, including conservation significant species, all habitat types are well represented locally and regionally. The clearing of 34.354 ha of native vegetation, in a narrow linear corridor, does not represent significant habitat for fauna indigenous to Western Australia and will not impact on the maintenance of significant fauna.

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

Methodology

- Biological Survey (2023b)
- DCCEEW Protected Matters Search Tool Report
- Government GIS Shapefiles:
  - DBCA Threatened and Priority fauna database search (Accessed 01/07/2024)
- Species specific conservation listing advice and recovery plans

(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

A search of DBCA databases did not identify any known records of Threatened flora species within a 40 km study area. Biological Survey by Spectrum (2023a) did not identify any Threatened Species within the Development Envelope.

Based on the biological survey findings that no Threatened flora are present within the Development Envelope, the proposed clearing does not include, or is necessary to support the continued existence of Threatened flora.

The proposed clearing is not at variance to this Principle.

Methodology

- Biological Survey (Spectrum, 2023a)
- Government GIS shapefiles:
  - DBCA Threatened flora database search (Accessed 01/07/2024)

(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

A search of the DBCA Threatened Ecological Community (TEC) database did not identify any state listed TEC's within the Development Envelope. Likewise, a search of the DCCEEW Protected Matters Search Tool did not identify any federally listed TEC's within the Development Envelope.

None of the vegetation types described within the Development Envelope are representative of communities that correspond to any state (BC Act) or Commonwealth (EPBC Act) listed Threatened Ecological Community (TEC).

The proposed clearing is not at variance to this Principle.

Methodology

- Biological Survey (Spectrum, 2023a)
- DCCEEW Protected Matters Search Tool Report
- Government GIS shapefiles:
  - DBCA Threatened Ecological Community database search (Accessed 02/07/2024)

(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.

Assessment

The proposal is located within the Murchison Interim Biogeographic Regionalisation of Australia (IBRA) region and Easter Murchison sub-region.

According to the broad scale mapping undertaken by Beard (Shepherd et al 2001), the Development Envelope is mapped as occurring within the following pre-European vegetation association:

- 11: Medium woodland; coolabah (*Eucalyptus microtheca*)
- 18: Low woodland; mulga (*Acacia aneura*)
- 204: Succulent steppe with open scrub; scattered mulga & *Acacia sclerosperma* over saltbush & bluebush

The National Objectives and Targets for Biodiversity Conservation recognise that the retention of 30% or more of the pre-clearing extent of each ecological community is necessary if Australia's biological diversity is to be protected (Commonwealth of Australia 2001) except in constrained areas (Perth & Peel) where 10% representation should be maintained.

The Development Envelope is not located within a "constrained area", with all three vegetation associations having greater than 30% of pre-European vegetation extent remaining at all levels, as summarised in the Table below.

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. 11	**Statewide** 11	31,723.47	31,698.27	99.92	-
	IBRA Bioregion Murchison	9,178.32	9,153.12	99.73	-
	IBRA Sub-region Eastern Murchison	8,524.38	8,499.18	99.70	-
	Local Government Authority Shire of Wiluna	7,037.15	7,011.95	99.64	-
Veg Assoc No. 18	**Statewide** 18	19,892,306.46	19,843,148.07	99.75	6.62
	IBRA Bioregion Murchison	12,403,172.30	12,363,252.47	99.68	4.96
	IBRA Sub-region Eastern Murchison	10,269,896.44	10,234,838.22	99.66	5.12
	Local Government Authority Shire of Wiluna	2,039,880.64	2,030,406.99	99.54	3.75
Veg Assoc No. 204	**Statewide** 204	199,475.40	198,735.10	99.63	6.75
	IBRA Bioregion Murchison	185,601.68	184,861.37	99.60	7.26
	IBRA Sub-region Eastern Murchison	75,042.26	74,305.79	99.02	11.47

	Local Government Authority Shire of Wiluna	39,116.94	38,380.47	98.12	-

The vegetation within the Development Envelope is well represented locally and regionally and the proposed clearing occurs in an area that has not been extensively cleared at a local and regional scale and therefore, is not considered significant as a remnant of native vegetation.

The proposed clearing is not at variance to this Principle.

Methodology

- Aerial photography
- Government GIS shapefiles:
  - Pre-European vegetation (Accessed 01/07/2024)
  - IBRA Regions (Accessed 20 November 2023)
  - IBRA Sub-regions (Accessed 20 November 2023)
- Statewide Vegetation Statistics (Government of Western Australia 2019)

(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

The native vegetation proposed to be cleared is not within, and does not intersect:

- an Internationally Important Wetland (i.e. RAMSAR)
- a Nationally Important Wetland; or
- a surface water area that is proclaimed under the RIWI Act

The Development Envelope intersects several minor non-perennial drainage lines and one minor non-perennial watercourse, West Creek. West Creek flows in a southeast direction into Lake Way (located 25 km southeast of the Development Envelope).

Vegetation at West Creek was mapped as:

- CL-1: *Eucalyptus victrix*, *Casuarina obesa,* and *Melaleuca xerophila* low woodland, over *Acacia burkittii* tall sparse shrubland, over *Eriachne benthamii* and *Themeda triandra* low sparse grassland.

A total of 0.603 ha of this vegetation type is proposed to be cleared across West Creek.

This vegetation type associated with West Creek extends beyond the area surveyed by Spectrum (2023a) in both a north and south direction along the watercourse. Spectrum (2023a) concluded that CL-1 is a riparian community associated with Beard Vegetation Association (BVA)11, however given the extent of its related BVA-11 and the extent of this watercourse system on the aerial imagery, CL-1 is not considered locally or regionally significant.

The proposed clearing is at variance to this Principle.

Methodology

- Biological Survey (Spectrum, 2023)
- Government GIS shapefiles:
  - Geomorphic Wetlands (Accessed 02/07/2024)
  - Ramsar Wetlands (Accessed 02/07/2024)
  - Important Wetlands (Accessed 02/07/2024)
  - Watercourses (Accessed 02/07/2024)
  - RIWI Act Surface Water Areas (Accessed 02/07/2024)

(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 CSIRO ASRIS Acid Sulphate Soils Shapefiles indicated an extremely low risk of acid sulphate soils within the Development Envelope and surrounds. The proposed works are not anticipated to have an impact on soil acidity.

DPIRD mapping indicates that the Development Envelope presents the following land degradation risk:

Risk Percentage	Information
1%	Very poor to poor drainage potential
1%	Very high to extreme water erosion hazard
1%	High to extreme wind erosion hazard
1%	Moderate salinity hazard
0%	Has pHCa <4.5 surface acidity
1%	Moderate to very high waterlogging Risk
1%	Moderate to high flood hazard

Wind erosion and dust will be managed via the Construction Environmental Management Plan during clearing of native vegetation.

Proposed works are intended to only alter drainage and surface water flows locally. Surface flows will be directed to existing flood ways and are not anticipated to lead to increased erosion or degradation as a consequence of the works.

The clearing of native vegetation, in a narrow linear corridor will not lead to appreciable land degradation.

The proposed clearing is not at variance to this Principle.

Methodology

- Biological Survey (Spectrum, 2023a)
- Government GIS Shapefiles:
  - Acid Sulphate Soil Risk Map (Accessed 02/07/2024)
  - Soil landscape land quality – Water Erosion Risk (Accessed 02/07/2024)
  - Soil landscape land quality – Wind Erosion Risk (Accessed 02/07/2024)
  - Soil landscape land quality – Salinity Risk (Accessed 02/07/2024)
  - Soil landscape land quality – Surface Acidity (Accessed 02/07/2024)
  - Soil landscape land quality – Waterlogging Risk (Accessed 02/07/2024)
  - Soil landscape land quality – Flood Risk (Accessed 02/07/2024)

(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 not at variance to this Principle.

Assessment

A desktop assessment did not identify any listed or proposed Nature Reserves or Conservation Areas (including Bush Forever Sites, Important Wetlands or DBCA Managed Lands) within 40km of the Development Envelope.

A search Landgate Reserves (LGATE-227) database identified the Peak Hill Stock Route (reserve 1661) which runs north/south across the project area. The road reserve has been excised from this reserve and as such there will be no impact to the Peak Hill Stock Route reserve.

The proposed clearing of native vegetation will not have an impact on the environmental value or any conservation areas.

The proposed clearing is not at variance to this Principle.

Methodology

- Government GIS Shapefiles:
  - DBCA Legislated Lands and Waters & Lands of Interest (Accessed 02/07/2024)
  - Bush Forever Area (DPLH-019)
  - Ramsar Wetlands (Accessed 02/07/2024)
  - Important Wetlands (Accessed 02/07/2024)
  - Landgate (LGATE-227) Reserves (02/07/2024)

(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 Development Envelope is not located within a Surface Water Areas as proclaimed under the RIWI Act, nor is it located within a Public Drinking Water Source Area or within any of the controlled catchment areas under the *Country Areas Water Supply Act 1947* (CAWS Act). There are no RAMSAR or Nationally Important Wetlands within the Development Envelope.

The Development Envelope is located within the Proclaimed East Murchison Groundwater Area under the *Rights in Water Irrigation Act 1914* (RIWI Act).

There is no associated perennial surface water however several minor non-perennial drainage lines and one minor non-perennial watercourse, West Creek, intersect the Development Envelope. West Creek flows in a southeast direction into Lake Way (located 25 km southeast of the Development Envelope).

A review of the ArcGIS shapefiles (ASRIS 2022) indicates the Development Envelope is mapped as having an Extremely Low Probability of Occurrence of encountering ASS.

The Development Envelope is mapped as having a low salinity risk (i.e. <1% of map unit has a moderate salinity risk). In addition, the Development Envelope has a low risk of surface acidity (i.e. <0% of map unit has pHCa <4.5).

Clearing of vegetation has the potential to impact surface water quality through sedimentation, when the flow occurs along these drainage lines, however, given that the flow is intermittent, it is unlikely that the proposed clearing will cause deterioration in the quality of surface or groundwater.

With low rainfall and ephemeral surface drainage, there are no permanent bodies of surface water within the Development Envelope and as such clearing will not result in sedimentation, erosion or turbidity of watercourses or wetlands.

Clearing of native vegetation in a narrow linear corridor is not likely to result in any alteration of groundwater salinity, pH of water tables or existing water regimes.

Based on the above the proposed clearing is not likely to cause deterioration in the quality or surface or groundwater.

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

Methodology

- Biological Survey (Spectrum, 2023a)
- Government GIS Shapefiles:
  - RIWI Act, Surface Water Areas and Irrigation Districts (Accessed 02/07/2024)
  - CAWSA Part 2A Clearing Control Catchments (Accessed 02/07/2024)
  - RIWI Act, Groundwater Areas (Accessed 02/07/2024)
  - Soil landscape land quality - Salinity Risk (Accessed 02/07/2024)
  - Acid Sulphate Soil risk mapping (Accessed 02/07/2024)
  - Public Drinking Water Source Areas (02/07/2024)

(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 at variance to this Principle.

Assessment

The Meekatharra-Wiluna area experiences low rainfall and ephemeral surface drainage. The Development Envelope receives an average annual rainfall of 261 mm per year (Wiluna), with very high evaporation rates. Majority of rainfall occurs between the months of December to April (BoM, 2024).

The Development Envelope intersects two soil landscape map units:

- 293Cu: Cunya system - Calcrete platforms, intervening drainage floors and channels and minor alluvial plains, supporting acacia shrublands, occasional casuarina woodlands and minor halophytic shrublands.
- 293Gl: Glengarry system - Sandstone plateaux, summits and hillslopes supporting mainly dense mulga and other acacia shrublands, spinifex, and numerous low shrubs.

The Development Envelope is mapped as having a low risk of waterlogging (1% of map unit has a moderate to very high waterlogging risk).

The proposed clearing is a narrow and linear corridor with no intersection or proximity to perennial watercourses or wetlands. With a low risk of waterlogging and flooding in the area, the proposed clearing is unlikely to cause or exacerbate the incidence or intensity of flooding.

The proposed clearing is not at variance to this Principle.

Methodology

- Biological Survey (Spectrum, 2023a)
- BoM Website (Accessed 02/07/2024)
- Government GIS Shapefiles:
  - Soil Mapping (Accessed 02/07/2024)
  - Soil landscape land quality - Waterlogging Risk (Accessed 02/07/2024)
  - Soil landscape land quality - Flood Risk (Accessed 02/07/2024)

6 VEGETATION MANAGEMENT

Main Roads will avoid clearing native vegetation where possible. Where clearing cannot be avoided then this clearing is kept to a minimum. A Vegetation Management Plan (VMP) has been developed to manage and minimise vegetation clearing for the Proposal (refer to Appendix 4).

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

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

8 STAKEHOLDER CONSULTATION

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

9 COMPLIANCE WITH CPS 818

Table 5 summarises what further pre-clearing impact assessment is required in accordance with CPS 818.

Table 5. 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**	**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.** Summary of submissions and a statement addressing each of those submissions to be published on website.
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**	Standard Vehicle and Plant management actions from Annexure 204B (TABLE 204B.9.1), Hygiene Checklists and Vehicle, Plant and Machinery Hygiene Register Template will be applied.
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.
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 three years' experience.

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Spectrum Ecology & Spatial (2023d) *Goldfields Highway Pre-clearance Malleefowl Assessment.* Unpublished report for Main Roads Western Australia.

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11 APPENDICES

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

Goldfields Highway Detailed Flora and Vegetation Assessment (Spectrum, 2023)

Executive Summary

Spectrum Ecology & Spatial was engaged by Main Roads Western Australia to undertake a single season detailed flora and vegetation assessment along sections of the Goldfields Highway between Meekatharra and Wiluna in the Murchison IBRA region of Western Australia. Package 1 (SLK 644.4 to 646.6; 0.6 ha), Package 2 (SLK 625.80 to 636.50; 99.8 ha), and Package 3 (SLK 653.7 to 665; 14.4 ha) made up the Survey Area (114.9ha). The project objective was to undertake a desktop flora assessment and a single season detailed flora and vegetation survey to describe flora and vegetation values across the Survey Area in order to inform future environmental approvals in the area.

A desktop flora assessment was undertaken in the wider Study Area (Survey Area with a buffer of 30 km) to identify the likelihood of significant flora and vegetation in the proximity of the Survey Area. No Threatened flora species were identified in the Study Area during the desktop assessment. A total of 22 Priority Flora were recorded within the Study Area, eight of which were considered to have a 'High' likelihood of occurrence and 12 a 'Medium' likelihood of occurrence within the Survey Area. No Priority Flora had previously been recorded within the Survey Area.

The one phase detailed flora and vegetation survey was undertaken over 10 days from 19th to the 28th of June 2023 following a period of higher than usual median rainfall for the region. During the survey a total of 17 quadrats, six relevés, and 75.6 km of targeted traverses were sampled.

A total of 187 taxa from 37 families and 94 genera were recorded in the Survey Area. Of the 187, three were introduced species, all of which are classified as permitted s11 weeds under the *Biosecurity and Agriculture Management Act 2007* (BAM Act). The most species rich family was Poaceae with 25 species, followed by Fabaceae with 24 species. The most species rich genera was *Eremophila*, with 19 species, followed by *Acacia*, with 12 species.

No Threatened flora were recorded within the Survey Area. One Priority Flora species, and six range extensions were recorded in the Survey Area.

- Priority 1: *Eremophila congesta*
- Range extensions: *Brachyscome pusilla*, *Enneapogon avenaceus*, *Eremophila fraseri* subsp. *parva*, *Goodenia lamprosperma*, *Goodenia nuda*, and *Panicum laevinode*.

The Priority taxon, *Eremophila congesta* (P1) was assigned a high regional significance. There are 26 previous recordings of *Eremophila congesta* (P1) between 3 km and 29 km from the Survey Area. The species is only known to occur on lateritic outcrops in greenstone hills and stony quartzite slopes within the Eastern Murchison IBRA subregion, thus it is believed to be regionally restricted.

Two Priority 3 species, *Goodenia modesta* and *Vittadinia pustulata* were assessed as 'High' likelihood of occurrence in the post survey analysis. They were not recorded in the Survey Area, however, these species are both annual taxa with flowering periods outside of the timing of the survey, so they may not have been present at this time.

A total of nine Vegetation Types were identified in the Survey Area, including eight derived from the floristic analysis and one additional structural group from both quadrat and relevé data. Two Vegetation Types were identified from the statistical analysis of Package 1 and 3 and six Vegetation Types, and one structural group were identified in Package 2. The dominant Vegetation Types for each area were;

Package 1

P-1: *Acacia incurvaneura*, *Acacia pruinocarpa*, and +/-*Acacia fuscaneura* low open woodland, over *Eremophila spectabilis* subsp. *brevis*, *Eremophila forrestii*, and *Ptilotus obovatus* mid shrubland on flat sandy clay plains.

Package 2

S-1: *Acacia minyura*, *Acacia pruinocarpa*, and *Acacia incurvaneura* low open woodland, over *Eremophila jucunda* and *Eremophila latrobei* subsp. *latrobei* mid sparse shrubland, over *Triodia melvillei* low open hummock grassland and *Eragrostis eriopoda* low sparse tussock grassland on moderate slopes with orange-brown clay or sandy clay soils with abundant ironstone coarse gravel.

P-3: *Acacia caesaneura* low open woodland over *Acacia tetragonophylla* tall spare shrubland over *Rhagodia drummondii* and *Ptilotus obovatus* low sparse shrubland, over *Eragrostis eriopoda* and *Monachather paradoxus* low sparse tussock grassland on flat plains of orange-brown sandy clay.

Package 3

P-1: *Acacia incurvaneura*, *Acacia pruinocarpa*, and +/-*Acacia fuscaneura* low open woodland, over *Eremophila spectabilis* subsp. *brevis*, *Eremophila forrestii*, and *Ptilotus obovatus* mid shrubland on flat sandy clay plains.

P-2: *Eremophila malacoides*, *Maireana pyramidata*, and *Scaevola spinescens* low sparse shrubland, over *Dissocarpus paradoxus*, *Sclerolaena glabra*, and *Sclerolaena lanicuspis* low sparse chenopod shrubland on flat plains of sandy clay with ironstone gravel.

The Priority taxa *Eremophila congesta* (Priority 1) was recorded in the Vegetation Type S-1 within Package 2 of the Survey Area. A Vegetation Type acting as a refuge for a priority species can be considered significant. However, this species is not considered restricted to this Vegetation Type or the Survey Area as it has been recorded in several locations in the local area. Therefore, the Vegetation Type S-1 is not considered significant. None of the Vegetation Types recorded resembled any known Threatened or Priority Ecological Communities. Based on the definitions of significant vegetation listed in section 2.4.4 (Environmental Protection Authority, 2016a) none of the Vegetation Types were considered significant.

The vegetation condition of the majority of the Survey Area was mapped as 'Very Good' (79.3%) away from cleared tracks and roads, with some signs of low levels of grazing within areas of undisturbed native vegetation, and included most of the flat plains, as well as the drainage channel and hill crest. The majority of Package 1 was in 'Good' condition with some areas in 'Poor' condition, 'Degraded', or 'Cleared' where clearing has occurred. Package 2 was mostly 'Very Good', and the remainder considered 'Good' or 'Cleared'. Package 3 was split between 'Good' and 'Very Good' with the remaining 'Cleared' where roads and tracks intersect the area.

Report Conclusions

Flora

No Threatened flora were recorded or considered likely to occur within the Survey Area. One Priority Flora was recorded:

- Priority 1: *Eremophila congesta* – one individual was recorded within the VT S-1 in Package 2 of the Survey Area. Another 12 individuals were recorded at three locations outside the Package 2 Survey Area.

This taxon was assigned a high regional significance and low local significance:

- *Eremophila congesta* (P1) has a high regional significance. This taxon is locally common but has a limited distribution within the Murchison and is only known to occur in a small area in the Eastern Murchison IBRA subregion, generally in areas of laterite outcrops in greenstone hills and stony quartzite slopes (Western Australian Herbarium, 2023).

There were six range extensions recorded within the Survey Area for the taxa, *Brachyscome pusilla*, *Enneapogon avenaceus*, *Eremophila fraseri* subsp. *parva*, *Goodenia lamprosperma*, *Goodenia nuda*, and *Panicum laevinode*.

Species not recorded during the survey that were assessed as 'High' likelihood of occurrence post survey included Priority 3 species, *Goodenia modesta* and *Vittadinia pustulata*. These species are both annual taxa with flowering periods outside of the timing of the survey, so retain their 'High' likelihood.

Vegetation

A total of nine VTs were recorded in the Survey Area, two from Packages 1 and 3 (P-1, P-2), and seven from Package 2 (P-3, P-4, P-5, S-1, HC-1, FP-1, and CL-1).

Based on the definitions of significant vegetation listed in section 2.4.4 (EPA, 2016a) VT S-1 is considered significant as it acts as a role as refuge (providing habitat) for the Priority 1 flora species, *Eremophila congesta* found exclusively on greenstone hills and stony quartzite slopes in the Glengarry Land System. However, this species is not considered restricted to this VT or the Survey Area as it has been recorded in several locations in the local area and can be found further northeast within the Eastern Murchison IBRA region. Therefore, VT S-1 is not considered significant. There was 1.3 ha of riparian vegetation in the Package 2 Survey Area, mapped as CL-1 VT. This VT comprised *Eucalyptus victrix*, *Casuarina obesa* and *Melaleuca xerophila*, which may be considered facultative phreatophytes. Given that this VT was associated with a creek line that was considered to represent a minor drainage system, and the extent of this system on the aerial imagery, it was deemed not to be locally or regionally significant.

Vegetation condition varied within VTs based on previous disturbances and proximity to the road verge. The majority of the Survey Area was mapped in 'Very Good' condition (79.3%). Weeds weren't common, with only three invasive species recorded in the survey.

Goldfields Highway Vertebrate & short Range Endemic Terrestrial Fauna Assessment (Spectrum, 2023)

Executive Summary

Main Roads Western Australia (Main Roads) is proposing to upgrade sections of the Goldfields Highway, H049, (SLK 624.85 to 785.95) between Wiluna and Meekatharra, in the Murchison region of Western Australia (WA). Main Roads commissioned Spectrum Ecology and Spatial (Spectrum) to undertake a basic and targeted terrestrial vertebrate fauna assessment, and a Level 1 short-range endemic (SRE) invertebrate fauna assessment for the following packages:

- Package 1 (SLK 644.4 to 646.6) – approximately 0.6 hectares (ha);
- Package 2 (SLK 625.80 to 636.50) – approximately 99.8 (ha); and
- Package 3 (SLK 653.7 to 665) – approximately 14.4 (ha).

The objective of the fauna assessment was to undertake a desktop review, a basic, and targeted vertebrate and SRE invertebrate fauna survey to describe the fauna and fauna habitat values across the Survey Area in order to inform environmental approvals.

The literature review and database searches identified a total of 41 mammals (including ten introduced), 182 bird, 80 reptile, and seven amphibian species that have previously been recorded in the Study Area (Survey Area with 30 km buffer applied). Of the species identified in the desktop assessment, 33 species were of conservation significance (five mammals, 25 birds, two reptiles and one invertebrate) that have previously been recorded from the Study Area.

To provide regional context for the assessment of the SRE invertebrate fauna values within the Survey Area, a desktop review was conducted of Western Australian Museum invertebrate database records and previous SRE surveys in the Study Area.

The database search and literature review identified 22 Mygalomorph (trapdoor) spiders, 10 scorpions, eight pseudoscorpions, two isopods (slaters), one millipede, and one mollusc (snail) that have previously been recorded from within approximately 50 km of the Survey Area.

A total of six fauna habitat types were recorded during the assessment, none of which are restricted to the Survey Area, these were:

- Mulga Woodland;
- Drainage Line;
- Open Shrubland on Limestone;
- Rocky Hillslope and Footslope;
- Bluebush Open Shrubland; and
- Mixed Tall Shrubland on Sandy Clay.

A total of 45 vertebrate fauna species were recorded during the field event: two species of native non-volant mammal, four introduced mammals and 39 bird species. Two species of significance were recorded during a concurrent Malleefowl survey between:

- One Southern Whiteface (*Aphelocephala leucopsis*, EPBC Act Vulnerable); and
- Brush-tailed Mulgara (*Dasycercus blythi*, DBCA P4) - secondary evidence (burrows and diggings).

A total of 10 specimens belonging to five taxa were collected from Package 2: two pseudoscorpions, one isopod, one soil centipede (Geophilomorph) and one snail.

Three taxa were determined to represent a potential SRE: one pseudoscorpion (*Indolpium* sp. 'PSE19'), one isopod (*Buddelundia* sp. 'GH01'), and one soil centipede – Geophilomorph (*Sepedonophilus* sp. 'GH01').

Following the survey, the significant vertebrate fauna which could potentially occur within the Survey Area were reviewed. A total of six species (one mammal and five birds) have a Medium to High likelihood of occurrence in the Survey Area based on habitat preferences, survey results and regional records. An additional 26 species have a Low to Very Low likelihood to occur at the Survey Area (four mammals, 20 birds, one reptile and one invertebrate).

Report Conclusions

Fauna Habitats

Six fauna habitats were recorded from the Survey Area, and included:

- Mulga Woodland;
- Drainage Line;
- Open Shrubland on Limestone;
- Rocky Hillslope and Footslope;
- Bluebush Open Shrubland; and
- Mixed Tall Shrubland on Sandy Clay.

None of these habitat types were restricted to the Survey Area and were well represented elsewhere in the region. All of these habitats may contain microhabitats that host species from SRE target groups.

Vertebrate Fauna

A total of 45 vertebrate fauna species were recorded during the survey, including two species of native nonvolant mammal, four introduced mammals and 39 bird species. Package 1 and 3 both recorded 14 species, while Package 2 recorded 22.

An additional six species of significant vertebrate fauna were not recorded but are considered to have a Medium to High likelihood of occurrence in the Survey Area. It is noted that the habitats considered potentially suitable for these species were well represented elsewhere in the region and none of the species are likely to be restricted to the Survey Area.

SRE Fauna

A total of 10 specimens belonging to five taxa were collected from Package 2. Three taxa were determined to represent a potential SRE: one pseudoscorpion (*Indolpium* sp. 'PSE19'), one isopod (*Buddelundia* sp. 'GH01'), and one soil centipede – Geophilomorph (*Sepedonophilus* sp. 'GH01').

The two habitats that the potential SREs were located in (Drainage Line and Rocky Hillslope & Footslope), are widespread in the region, the taxa are therefore likely to occur outside the Survey Area. The habitats contained microhabitats typical of SRE invertebrates, such as patches of leaf litter, and the underside of logs.

Goldfields Highway Vegetation & Fauna Habitat Mapping Extension (Spectrum, 2023)

Executive Summary – no exec summary was provided within the report.

Report Conclusions

Vegetation Types

Seven Vegetation Types were identified from the Updated Survey Area, with Slope VT (S-1) covering the greatest area (42.8%), followed by flat plain VT (P-3; 30.1%). Hill Crest VT (HC-1), flat plain VTs (P-4 & P-5), floodplain VT (FP-1) and creekline VT (CL-1) were also recorded (1.2% - 9.1%). None were analogous with significant vegetation.

Vegetation Condition

The vegetation condition of the Updated Survey Area was mapped as 82.9% 'Very Good' which is described as undisturbed native vegetation with some scattered weeds and low levels of grazing. The remaining area was mapped at 14.8% 'Cleared', and 2.3% 'Good.'

Fauna Habitat Types & Fauna Species

Five fauna habitats were recorded from the Updated Survey Area, and included:

- Mixed Tall Shrubland on Sandy Clay;
- Rocky Hillslope and Footslopes;
- Open Shrubland on Calcrete;
- Drainage Line; and
- Bluebush Open Shrubland.

None of these habitat types were restricted to the Survey Area and are well represented elsewhere in the region. All these habitats may contain microhabitats that host species from SRE target groups.

Mixed Tall Shrubland on Sandy Clay habitat is suitable for Southern Whiteface, Bilby, Malleefowl and Brush-tailed Mulgara. Rocky Hills and Footslopes and Drainage Lines are suitable foraging habitat for Grey Falcon and Peregrine Falcon. The Northern Shield-backed Trapdoor Spider may occur in the Rocky Hillslope & Footslope habitat.

Goldfields Highway Package 2 Vegetation & Fauna Habitat Mapping Extension Addendum 2 (Spectrum, 2024)

Executive Summary – no exec summary was provided within the report.

Report Conclusions

Vegetation Types & Significant Flora

Six Vegetation Types were identified from the Updated Survey Area, with Slope VT (S-1) covering the greatest area (40.1%), followed by flat plain VT (P-3; 24.9%). Hill Crest VT (HC-1), flat plain VT (P-4), floodplain VT (FP-1) and creekline VT (CL-1) were also recorded (1.5% - 7.7%). None were analogous with significant vegetation. One Priority Flora species, *Eremophila congesta* (Priority 1) has been recorded within the Updated Survey Area. Twenty-three species were assessed as Low likelihood to occur, and eight species were assessed as Very Low likelihood to occur.

Vegetation Condition

The vegetation condition of the Updated Survey Area was mapped as 84.1% 'Very Good' which is described as undisturbed native vegetation with some scattered weeds and low levels of grazing. The remaining area was mapped at 15.5% 'Cleared', and 0.4% 'Good.'

Fauna Habitat Types & Fauna Species

Five fauna habitats were recorded from the Updated Survey Area, and included:

- Mixed Tall Shrubland on Sandy Clay;
- Rocky Hillslope and Footslopes;
- Open Shrubland on Calcrete;
- Drainage Line; and
- Bluebush Open Shrubland.

None of these habitat types were restricted to the Updated Survey Area and are well represented elsewhere in the region. All these habitats may contain microhabitats that host species from SRE target groups.

Six species of significant vertebrate fauna are considered to have a Medium to High likelihood of occurrence in the Survey Area. Mixed Tall Shrubland on Sandy Clay habitat is suitable for Southern Whiteface, Malleefowl and Brush-tailed Mulgara. Rocky Hills and Footslopes and Drainage Lines are suitable foraging habitat for Grey Falcon and Peregrine Falcon. The Pacific Swift may fly over the entirety of the Updated Survey Area but is unlikely to use the habitats present.

Goldfields Highway Pre-Clearance Malleefowl Assessment (Spectrum, 2023)

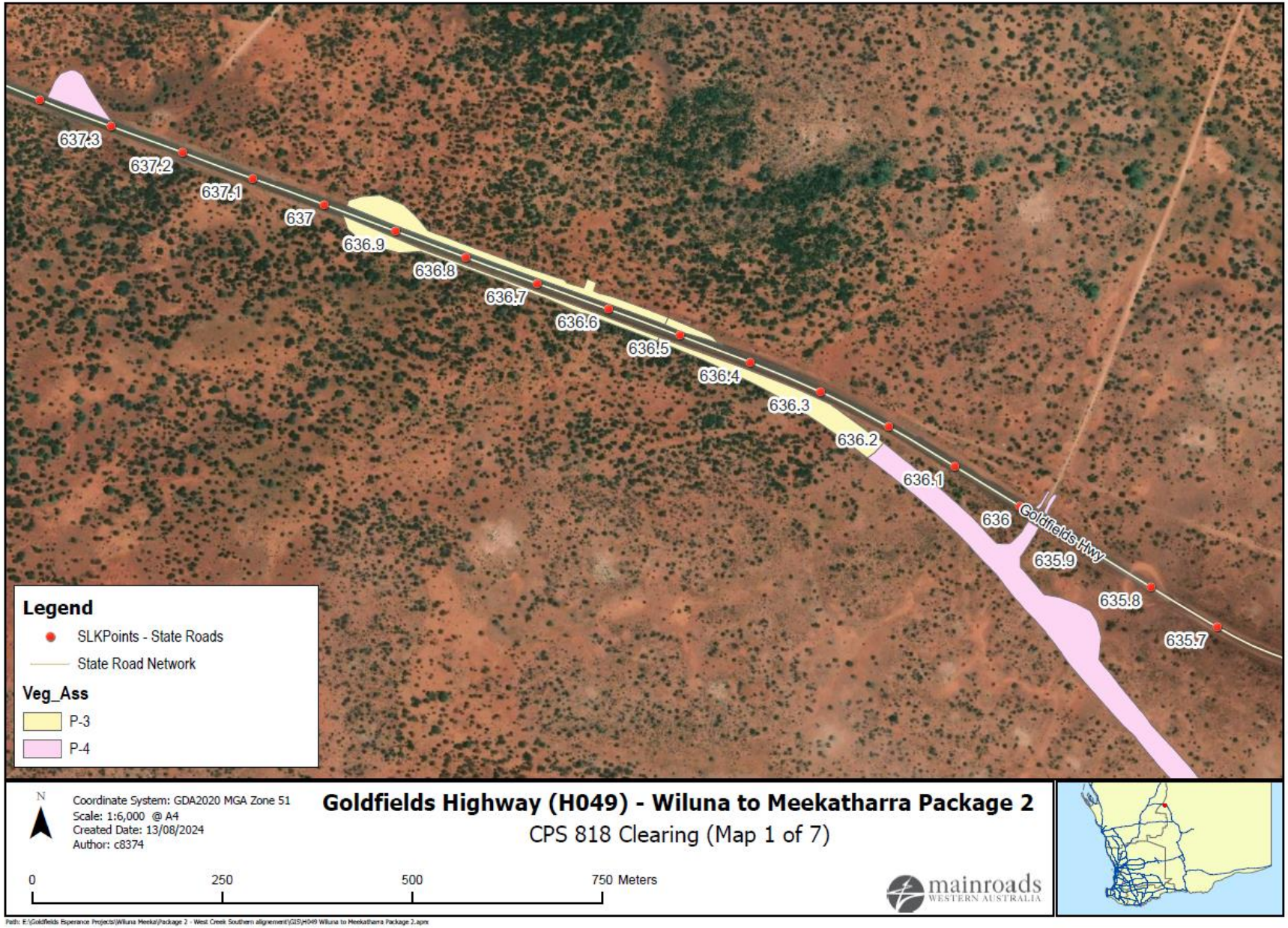
Executive Summary – no exec summary was provided within the report.

Report Conclusions (Survey Results)

The Malleefowl is classified as Vulnerable under the EPBC Act & BC Act. The Malleefowl is a large, ground dwelling bird species that is restricted to the mainland of Australia where it inhabits semi-arid and arid habitats. In its range, the density of the Malleefowl population is generally greater in areas of higher rainfall and where shrub diversity is greatest (Benshemesh, 2007; Malleefowl Recovery Team, 2018). The Malleefowl is a generalist feeder with a diet consisting of seeds, fruits, flowers, fungi, invertebrates, herbs and legumes, depending on location and season (Benshemesh, 2007). The species mates for life and each pair builds large mounds (3-5 m in diameter) which are used as nests for the incubation of eggs. Egg laying typically begins in September when one egg is laid every 5-7 days (total of about 15-25 eggs) until the end of summer. The incubation period is approximately 60 days depending on the temperature of the nest. The eggs are incubated by heat generated by the decomposition of leaf litter and plant material, as well as the heat from the sunlight later in the season (summer). Whilst the male predominantly attends the eggs and maintains the temperature for incubation, the female spends most of her time feeding for egg production and only rarely visits the nest (Benshemesh, 2007). Once common and widespread across semi-arid southern Australia, Malleefowl have declined severely in the last century, with a 50% decrease in area of occupancy and highly fragmented distribution (Benshemesh, 2007). Malleefowl occupy habitats consisting of mallee thickets, mulga or other dense litter-forming shrublands as well as dry forest dominated by other Eucalyptus and Acacia species (Benshemesh, 2007; Johnstone & Storr, 1998). They prefer sandy substrate with leaf litter to build their nesting mounds, so the highest breeding density appears to be located in vegetation that is at least 40 years post-fire and they rarely breed in vegetation that has been burnt within the last 15 years (Benshemesh, 1990, 1992; Woinarski, 1989).

No Malleefowl or secondary evidence was recorded during the survey. The habitat present at Package 4 and 2 were considered marginal for the Malleefowl. Package 3b contained some suitable habitat, with Package 3a being considered marginal. In particular the proximity to the Highway and associated disturbance (high level of dust and noise) limited the suitability of the area to the Malleefowl.

Appendix 2: Native Vegetation Clearing Area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Author: c8374
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CPS 818 Clearing (Map 1 of 7)
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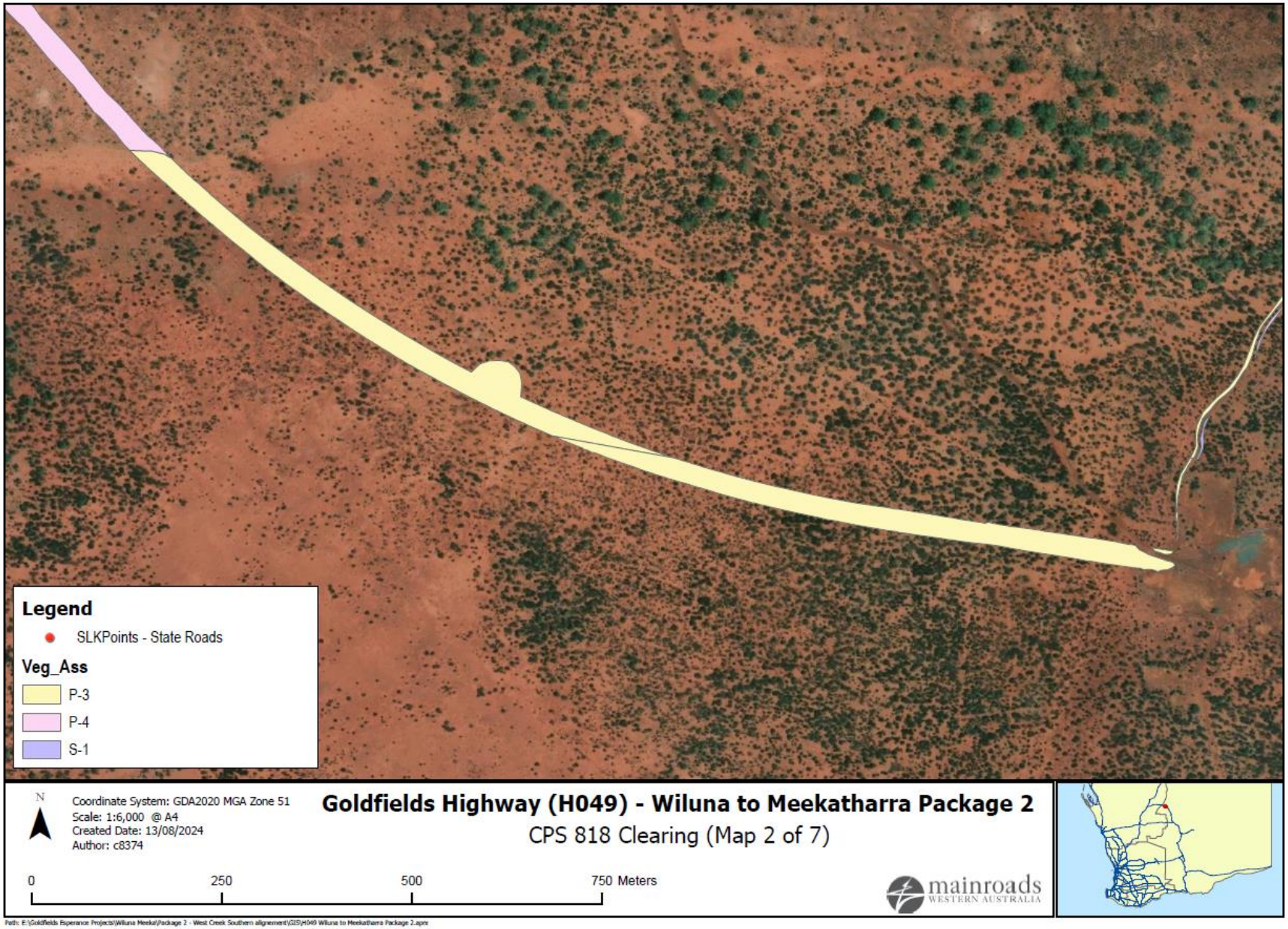
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Author: c8374
Goldfields Highway (H049) - Wiluna to Meekatharra Package 2
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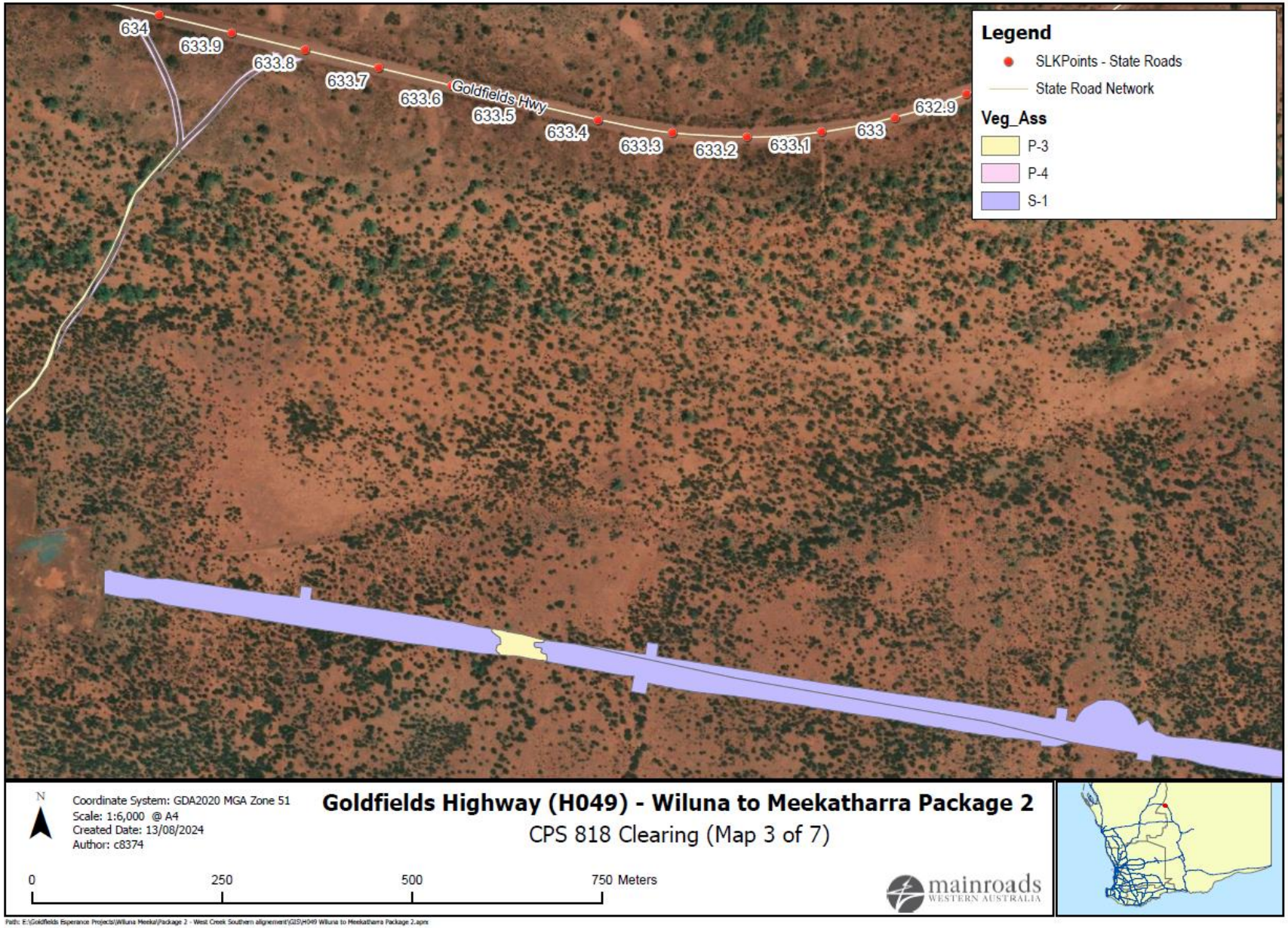
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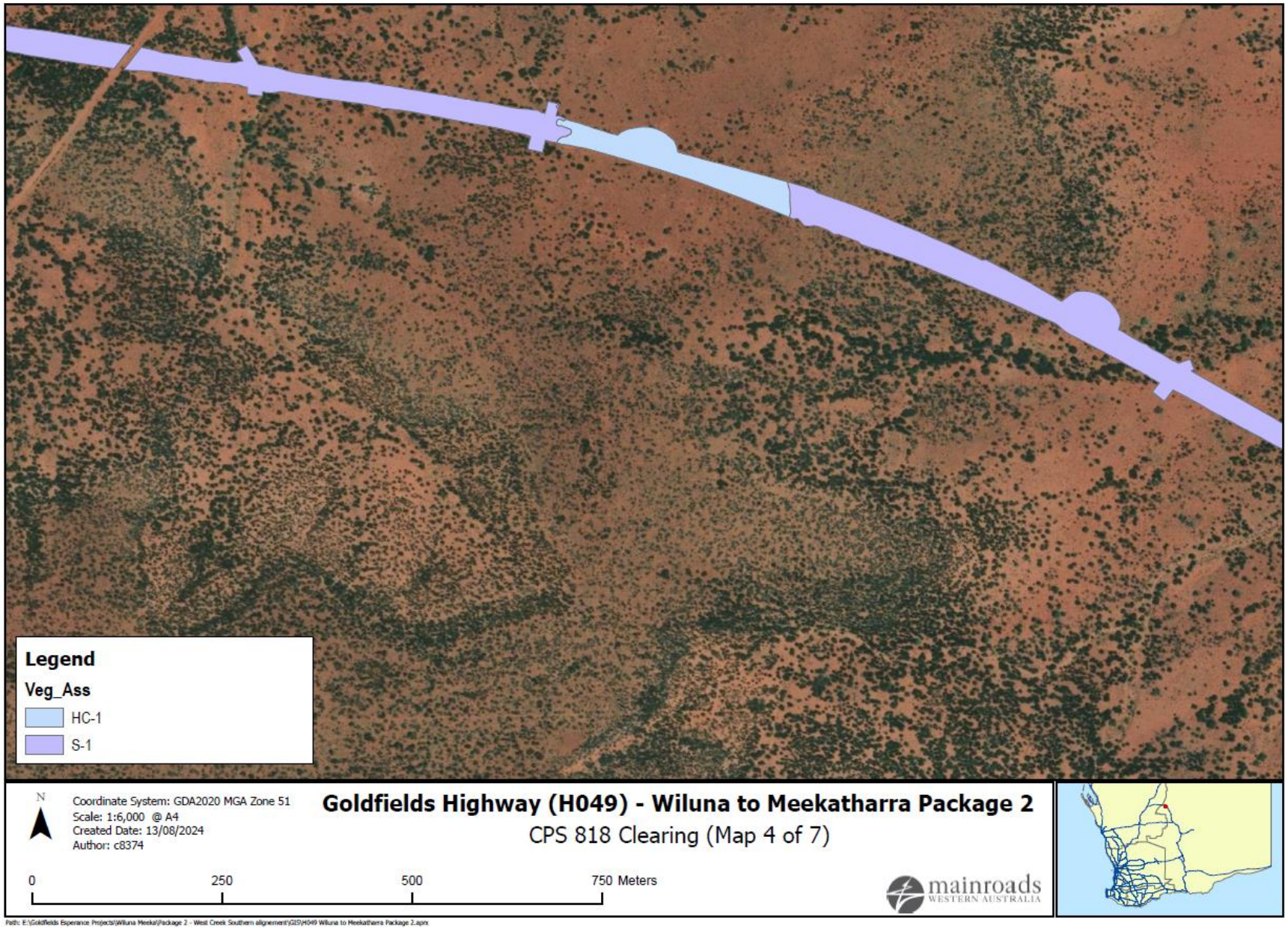
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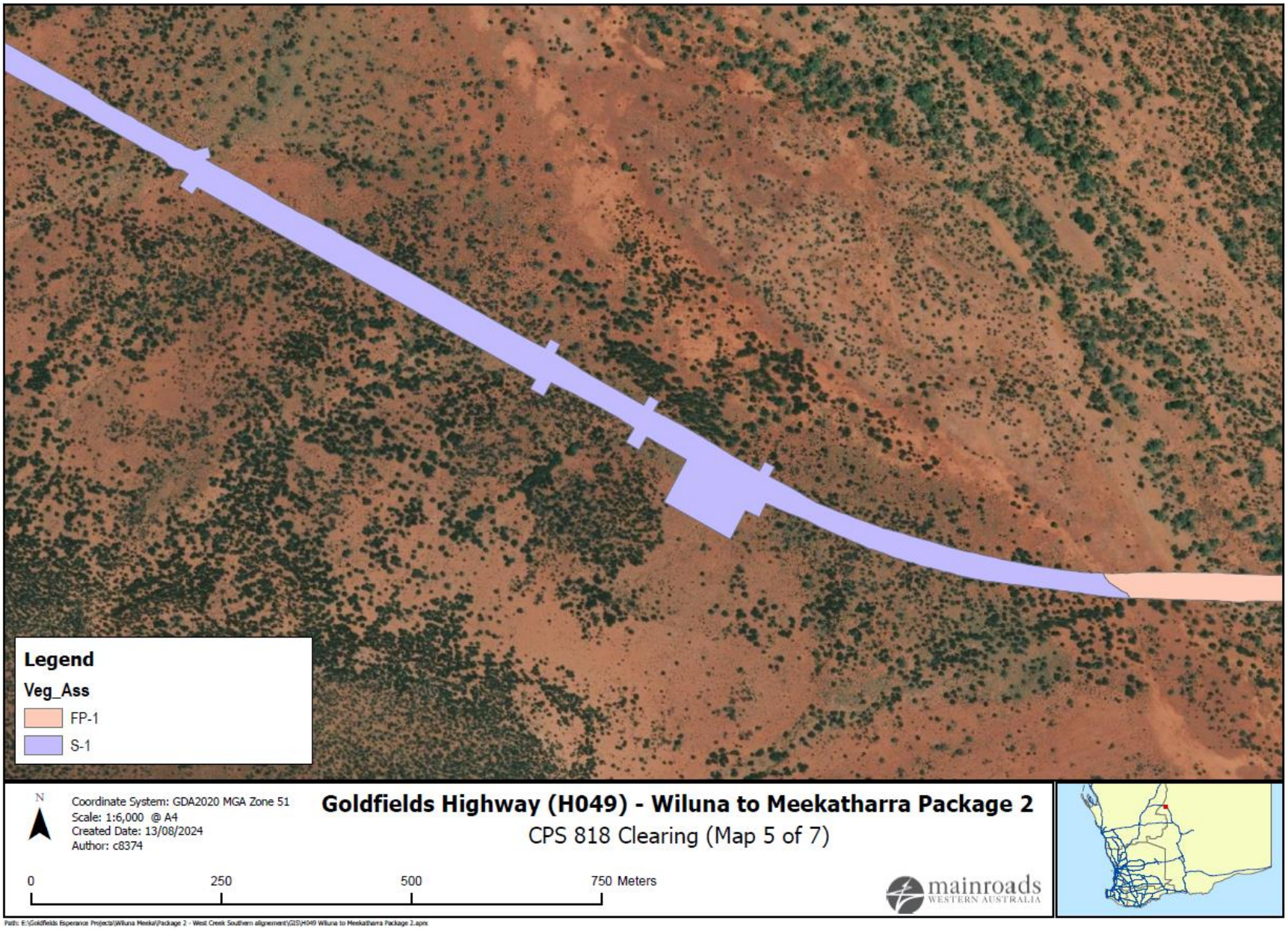
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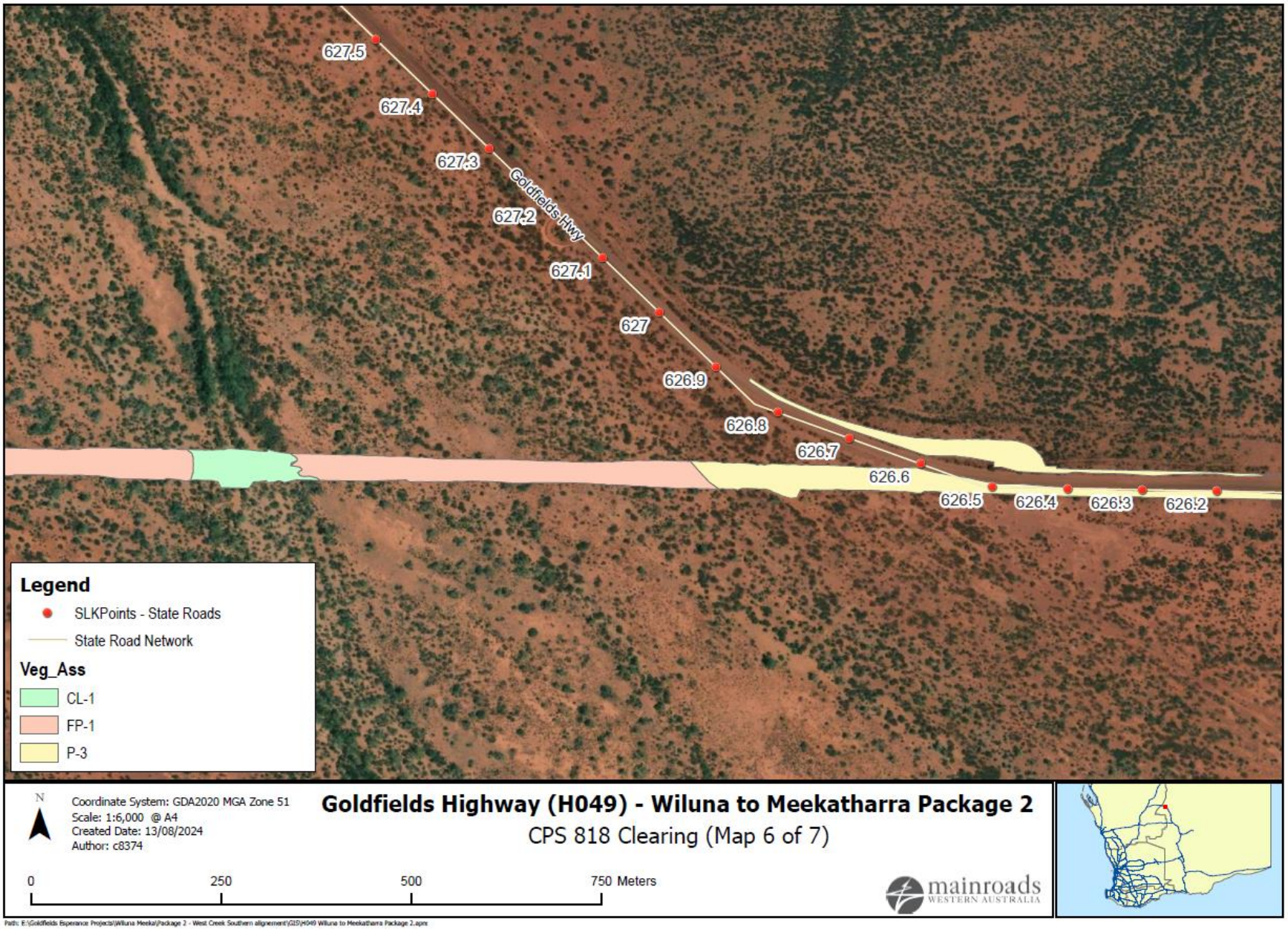
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Goldfields Highway (H049) - Wiluna to Meekatharra Package 2
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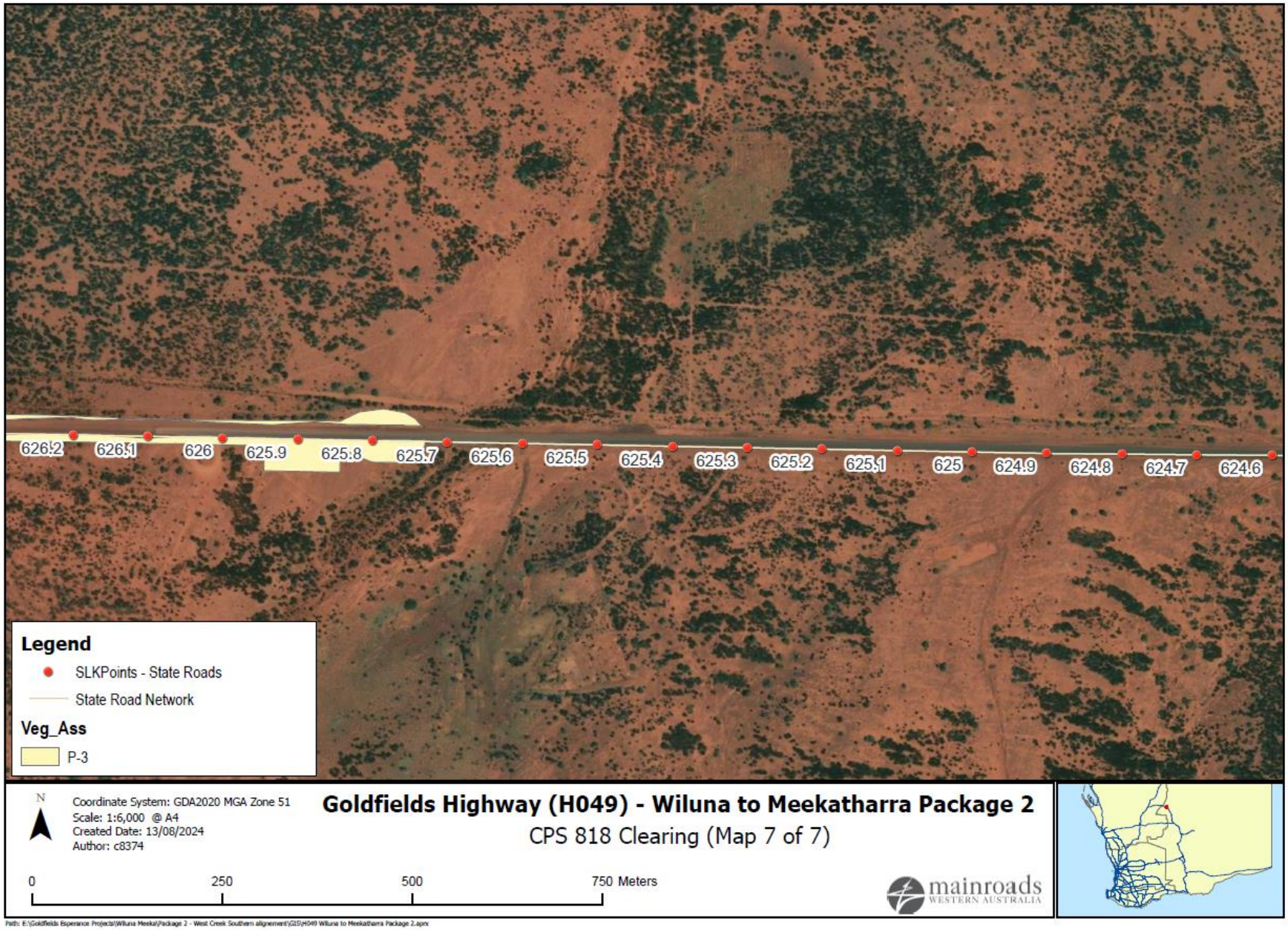
WESTERN AUSTRALIA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624.9
624.8
624.7
624.6
Legend
SLKPoints - State Roads
State Road Network
Veg_Ass
P-3
N
Coordinate System: GDA2020 MGA Zone 51
Scale: 1:6,000 @ A4
Created Date: 13/08/2024
Author: c8374
Goldfields Highway (H049) - Wiluna to Meekatharra Package 2
CPS 818 Clearing (Map 7 of 7)
0
250
500
750 Meters
mainroads
WESTERN AUSTRALIA

Appendix 3: Vegetation Management Plan

GOLDFIELDS HIGHWAY WILUNA TO MEEKATHARRA PACKAGE 2 – WEST CREEK REALIGNMENT

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 Goldfields Highway Wiluna to Meekatharra Package 2 West Creek Realignment.

Main Roads Western Australian (MRWA) are proposing a realignment of approximately 10 km of road between SLK 626.5 and SLK 636.5 and upgrade to a sealed road standard. The new alignment will be located south of the current road and will result in a reduction in road length and improved overall safety for road users.

The project objectives are:

- Improve road user safety to reduce the frequency and severity of crashes.
- Reduce the risk to safe freight movements and efficiency.
- Improving safety and serviceability of the road by upgrading to a sealed standard.
- Improving road surface and serviceability of the flood crossings.
- Improving road drainage by introducing floodways, culvert, and open drains.
- Reliable and efficient travel on the Goldfields Highway, through the reduction in annual closures and travel time.

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
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 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.