

# Clearing Assessment Report – CPS 818

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Western Australia.*

GNH Passing Lanes 1185.7-1260.3

February 2023

EOS # 1342

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# Amendments

| Report<br>Compilation &<br>Review | Name and Position          | Document<br>Revision | Date       |
|-----------------------------------|----------------------------|----------------------|------------|
| Author:                           | Environment Officer        | Draft v1             | 17/05/2022 |
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| Author                            | Environment Officer        | Rev1                 | 9/02/2023  |
| Reviewer                          | Environment Contractor     | Rev 1                | 14/02/23   |
|                                   |                            |                      |            |

# 1 PURPOSE

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

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

## 2 SCOPE

### 2.1 Project Scope

**Project Name:** GNH Passing Lanes 1185.7-1260.3

**Project Purpose / Components:**

The project involves the construction of passing lanes along Great Northern Highway (H006) Overtaking Lanes 1, 2, 3, 4 & 6 (Newman to Auski) SLK 1173.1 to 1212.2. With a high percentage of heavy vehicles using Great Northern Highway and several locations with high grade, there is a high likelihood of road users encountering 'slow' vehicles. Constructing passing lanes through this section of road will greatly improve travel wellbeing and reduce the potential for unsafe overtaking manoeuvres.

The objectives of the project are to:

- Enable safe overtaking opportunities in locations where slow vehicles are prevalent;
- Reduce the occurrence of fatal and serious injuries on Great Northern Highway;
- Improve travel time for road users north of Newman.

**The proposed clearing undertaking using CPS 818 is:** 149 hectares within a project area of 164ha.

All overtaking lanes associated with this project will not be constructed within the same calendar year and most likely will be funded in different packages over several years. With the current Pilbara Region limits of clearing under CPS 818 prescribed to a maximum 150 ha, no more than 75ha of clearing per calendar year will be allocated towards these works.

**The proposed temporary clearing undertaking using CPS 818 is:** 0 ha.

**Project Location(s):** The passing lanes are located along Great Northern Highway north of Newman 1185.7-1260.3 SLK in the Shire of East Pilbara as shown in Figure 1.

- GDA94: 761,093.34E 7,427,420.07N m

OTL 1 South Bound SLK 1173.62 – SLK 1177.99

OTL 2 North Bound SLK 1177.36 – SLK 1180.73

OTL 3 South Bound SLK 1190.99 – SLK 1194.37

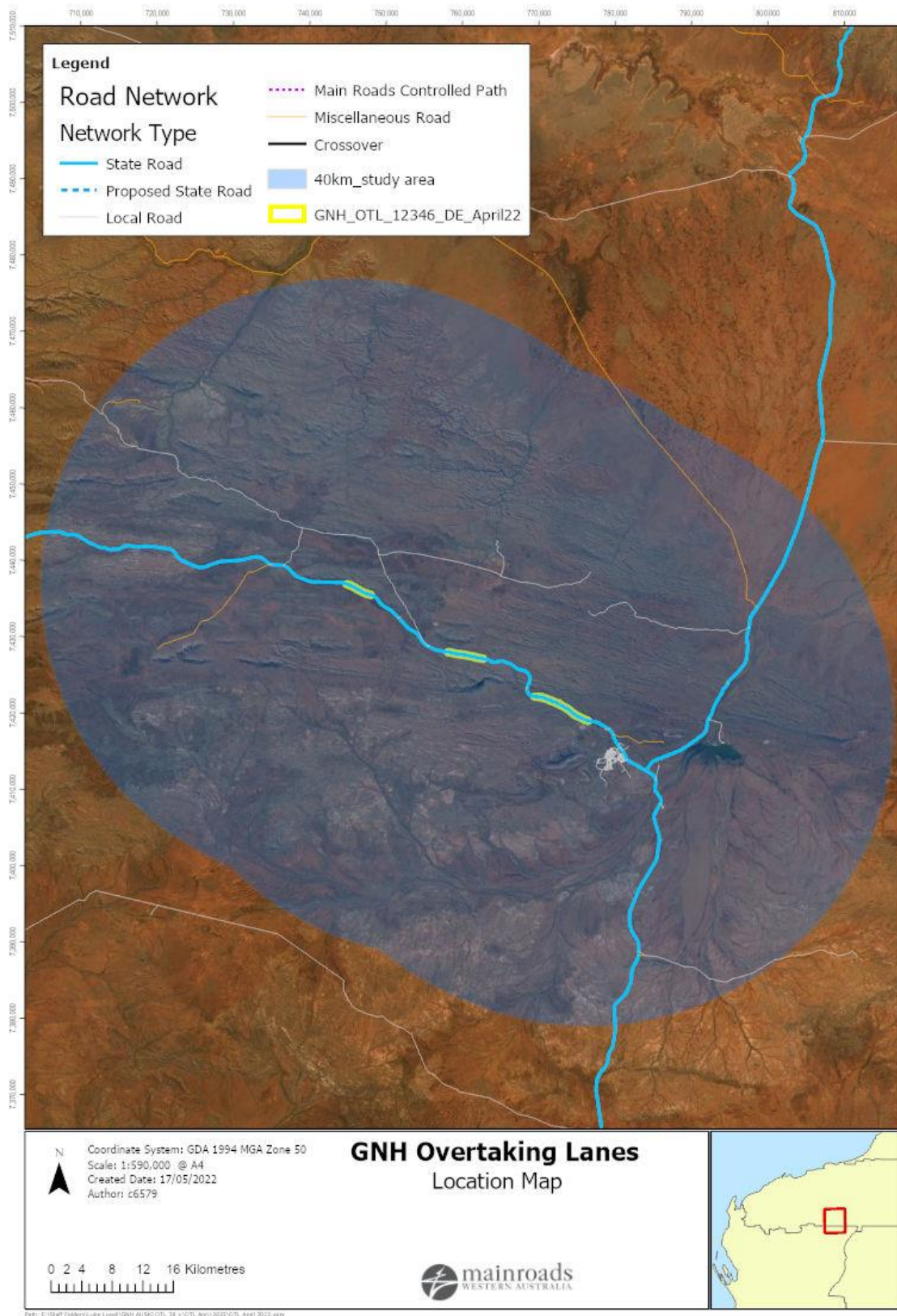
OTL 4 North Bound SLK 1192.50 - SLK 1185.85

OTL 6 South Bound SLK 1208.93 – SLK 1212.30

The location of the proposed works is at Figure 1.

### 2.2 Assessment Report Scope

The Study, see Figure 1, is confined to a local area of a 40km radius.



**Figure 1. Project Area**

## 2.3 Alternatives to clearing

Clearing is required to develop the overtaking lanes. The only alternative is to not build the overtaking lanes which will continue to place lives at risk.

## 2.4 Measures to Avoid, Minimise, Reduce and Manage Project Clearing Impacts

The design and management measures implemented to avoid and minimise the clearing impacts by the project are provided in Table 1 and listed below.

- Reduce the requirement for road works and culvert upgrades within minor non-perennial watercourses.
- Avoid several Aboriginal Heritage Sites.
- Passing Lane 4 was designed further south of the nearby intersection to improve road safety.
- Cost effective placement of Passing Lanes to avoid works occurring in difficult terrain and complex civil engineering.
- Feasibility of alignment and need to meet Australian Standards.
- Existing material pit being used.
- The clearing area will be demarcated prior to the commencement of project activities and prior to the commencement of native vegetation clearing.
- Further project clearing will be avoided as materials storage areas and construction vehicles/machinery will be located on previously disturbed or cleared areas.
- Vegetation that will be cleared to establish a new maintenance zone will be slashed where possible instead of completely cleared to retain the seed bank along adjacent roadside vegetation.

**Table 1. Measures undertaken to Avoid, Minimise, Reduce and Manage the Project Clearing Impacts**

| <b>Design or Management Measure</b>                                                                                 | <b>Discussion and Justification</b>                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Steepen batter slopes</b>                                                                                        | Due to the traffic volumes, vehicle type and posted speeds these batters cannot be changed significantly.                                                                                         |
| <b>Installation of safety barriers</b>                                                                              | Not applicable                                                                                                                                                                                    |
| <b>Alignment to one side of existing road</b>                                                                       | Due to safety measures and maintaining site lines the overtaking lanes are designed on a predetermined side of the road.                                                                          |
| <b>Alternative alignment to follow existing road (or) to preferentially locate within pasture or degraded areas</b> | Not applicable                                                                                                                                                                                    |
| <b>Installation of kerbing</b>                                                                                      | Kerbing has been considered and implemented in the design where possible.                                                                                                                         |
| <b>Simplification of design to reduce number of lanes and/or complexity of intersections</b>                        | The overtaking lanes cannot be further simplified whilst retaining the necessary safety benefits.                                                                                                 |
| <b>Preferential use of existing cleared areas for access tracks, construction storage and stockpiling</b>           | Further project clearing will be avoided as the site office, materials storage areas, construction vehicles/machinery and access tracks will be located on previously disturbed or cleared areas. |

| Design or Management Measure | Discussion and Justification                                               |
|------------------------------|----------------------------------------------------------------------------|
| Drainage modification        | Culverts will be installed and required to maintain the natural hydrology. |



## 2.5 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 (see Section 1.3), Main Roads has also had regard to the below instruments.

### **Other Legislation of relevance 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)
- Town Planning and Development Act 1928

### **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 (DEC, December 2014)
- Procedure: Native vegetation clearing permits (DWER, October 2019)
- Environmental Offsets Guidelines (Government of Western Australia, August 2014)
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016)
- Technical guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA, 2020)
- Approved conservation advice under section 266B of the EPBC Act for threatened flora/fauna/vegetation communities
- Approved Recovery Plans for threatened species
- EPBC Act Referral guidelines for the three threatened black cockatoo species
- Strategic advice - EPA

### 3 SUMMARY OF SURVEYS

#### 3.1 Summary of Biological Survey

Main Roads Western Australia (Main Roads) is undertaking an upgrade of a section of the Great Northern Highway with the development of five overtaking lanes (1, 2, 3, 4 and 6) between Newman and Auski (the Project). In May 2018, Phoenix Environmental Sciences Pty Ltd (Phoenix) was commissioned by Main Roads to undertake a biological survey for the Project.

The development envelope comprised three sections along the Great Northern Highway totalling 164.82 ha. A desktop review was completed prior to the survey to collate existing biological information within the study area (50 km radius of the development envelope) and inform the field survey.

The field survey was undertaken from the 15-18 June 2018 to verify the findings of the desktop assessment and to complete:

- vegetation type mapping by quadrat and relevé sampling and mapping of vegetation condition boundaries;
- identification and mapping of fauna habitats based on vegetation types and identify which vegetation types are suitable for each significant fauna species recorded or considered likely or to possibly occur;
- recording of fauna species observed, including direct and secondary evidence of significant fauna within the development envelope;
- targeted searches for Threatened and Priority flora and Threatened Ecological Communities or Priority Ecological Communities and populations of Weeds of National Significance (WoNS) or Declared Pests and record their locations.

From the desktop review, 41 significant flora species were identified as occurring in the study area, including one species listed as Threatened under the EPBC Act. No significant flora species were identified to occur within the development envelope.

A total of 145 flora species representing 31 families and 74 genera were recorded during the field survey. The assemblage included 139 native species and six introduced species (weeds), including 114 perennial species, 29 annual or short-lived species and two unknown species. One of the introduced species *Prosopis* sp. is a Declared Pest and a WoNS.

The desktop assessment identified one State-listed Endangered TEC, Ethel Gorge aquifer stygobiont community, and five PECs within the study area.

Twelve vegetation types were defined for the development envelope. Broadly the vegetation recorded represented one hummock grassland, two mallee woodlands, six woodlands and three shrublands.

None of the vegetation types defined for the development envelope represented any TEC or PEC. All vegetation types recorded in the development envelope were considered representative of vegetation covering large areas in regional surveys.

None of the 42 significant flora species identified in the desktop assessment were recorded in the

development envelope. Fifteen significant species were considered to have a moderate (8 species) to high (7 species) probability of occurrence in the development envelope. Approximately 58% of the development envelope was recently burnt (<1 year), mainly in the eastern section, and it is possible that some of these species were present in a juvenile form and subsequently were not readily identifiable during the field survey.

Seven broad fauna habitats were defined for the development envelope (three within the western and central sections and four within the eastern section), all of which are well represented broadly in the study area. One conservation significant fauna species was recorded, *Pseudomys chapmani* Western Pebble mound Mouse (P4), with two active mounds recorded (one in the development envelope and the other in the study area) and suitable habitat (woodland on stony hillslope and shrubland on stony hillslope) noted throughout the western and central sections. Considering habitats in the development envelope, current known distributions, proximity of previous records and species' habitat preferences, 15 additional conservation significant fauna species have the potential to occur.

While these 15 species include several Threatened species, there is no critical habitat present within the development envelope, e.g. denning/shelter habitat or caves for species such as Northern Quoll, Ghost Bat or Pilbara leaf-nosed bat. All three of these species and others may however traverse or use the habitats (e.g. for foraging) within the development envelope and surrounds on occasion. The Western Pebble-mound Mouse is likely one of the few, less mobile, resident species within the development envelope, particularly in the western and central sections.

## 4 VEGETATION DETAILS

### 4.1.1 Project Site Vegetation Description

As per the results of the Phoenix environmental biological survey conducted in 2018 a total 12 vegetation types were defined for the development envelope comprising of one hummock grassland, two mallee woodlands, six woodlands and three shrublands. The most prominent vegetation types in the development envelope were the low *Eucalyptus* and/or *Corymbia* woodlands/mallee woodlands which accounted for 62.82% of vegetation. The hummock grassland was the next most widespread vegetation type accounting for 18.70% of vegetation in the development envelope with the remaining 18.47% vegetated by the three shrubland communities.

Except for one woodland, ChAsppCc, which was recorded in two sections of the development envelope and accounted for almost one quarter (23.62%) of vegetation overall, all remaining vegetation types were confined to a single section of the development envelope.

Tables 2 and 3 provide details of the Pre-European Vegetation Associations with the project area and the remaining extents of these associations.

**Table 2. Summary of Project Area's Mapped Pre-European Vegetation Associations**

| Pre-European Vegetation Association(s)                                                                                                                           | Clearing Description                                                                                                            | Vegetation Condition              | Comments                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------|
| Beard Vegetation Association 82 described as Hummock grasslands, low tree steppe; snappy gum over <i>Triodia wiseana</i> (Government of Western Australia, 2017) | Up to 149 hectares within a project area of 164 ha hectares for Passing Lanes on Great Northern Highway, Shire of East Pilbara. | Good to degraded (Keighery, 1994) | The vegetation condition was determined via the field survey |
| Beard Vegetation Association 18 described as Low woodland; mulga ( <i>Acacia aneura</i> ) (Government of Western Australia, 2017)                                | Up to 149 hectares within a project area of 164 ha hectares for Passing Lanes on Great Northern Highway, Shire of East Pilbara. | Good to degraded (Keighery, 1994) | The vegetation condition was determined via the field survey |

**Table 3. Pre-European Vegetation Representation**

| Pre-European Vegetation Association | Scale                                                      | Pre-European (ha) | Current Extent (ha) | % Remaining | % Remaining in DBCA reserves |
|-------------------------------------|------------------------------------------------------------|-------------------|---------------------|-------------|------------------------------|
| <b>Veg Assoc No. 82</b>             | <b>Statewide</b>                                           | 2,565,901.28      | 2,553,206.19        | 99.51       | 11.51                        |
|                                     | <b>IBRA Bioregion</b>                                      | 2,563,583.23      | 2,550,888.14        | 99.50       | 11.52                        |
|                                     | <b>IBRA Sub-region</b><br>PIL 3 Hammersley                 | 2,177,573.90      | 2,165,224.21        | 99.43       | 13.49                        |
|                                     | <b>Local Government Authority</b><br>Shire of East Pilbara | 927,709.76        | 919,072.17          | 99.07       | 0.5                          |
| <b>Veg Assoc No. 18</b>             | <b>Statewide</b>                                           | 19,892,306.46     | 19,843,148.07       | 99.75       | 6.62                         |
|                                     | <b>IBRA Bio region</b>                                     | 676,556.72        | 671,843.35          | 99.3        | 25.17                        |
|                                     | <b>IBRA Sub-region</b><br>PIL 3 Hammersley                 | 581,246.08        | 576,541.70          | 99.19       | 29.30                        |
|                                     | <b>Local Government Authority</b>                          | 359,372.12        | 355,446.47          | 98.91       | 1.47                         |

## 5 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

In assessing whether the project's proposed clearing is likely to have a significant impact on the environment, the project was assessed against the ten Clearing Principles (Environmental Protection Act 1986, Schedule 5).

Each principle has been assessed in accordance with DWER's 'A Guide to the Assessment of Applications to Clear Native Vegetation' and other relevant CPS Decision Reports prepared by DWER.

The proposed clearing is **not likely** to be at variance with the 10 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**

This project involves the removal of up to 149 hectares of native vegetation. The development envelope is in good to degraded condition due to the works occurring within and directly adjacent to the maintenance zone of Great Northern Highway. The area is mapped as Beard Vegetation Association 18 described as Low woodland; mulga (*Acacia aneura*), Beard Vegetation Association 82 described as hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* and Beard Vegetation Association 175 Short bunch grassland - savanna/grass plain.

The biological survey conducted by Phoenix in 2018 identified 12 vegetation types comprising of one hummock grassland, two mallee woodlands, six woodlands and three shrublands. The most prominent vegetation types in the development envelope were the low *Eucalyptus* and/or *Corymbia* woodlands/mallee woodlands which accounted for 62.82% of vegetation. The hummock grassland was the next most widespread vegetation type accounting for 18.70% of vegetation in the development envelope with the remaining 18.47% vegetated by the three shrubland communities. (Phoenix,2019)

Except for one woodland, ChAsppCc, which was recorded in two sections of the development envelope and accounted for almost one quarter (23.62%) of vegetation overall, all remaining vegetation types were confined to a single section of the development envelope. All these vegetation types are locally abundant and widespread throughout the Pilbara.(Phoenix,2019)

A total of 33 conservation significant species of potential relevance to the development envelope were identified in the desktop assessment, including ten listed as Threatened, Conservation Dependent or Specially Protected under the EPBC Act and/or WC Act. Eight species are listed as Priority by the DBCA and 16 species are listed as Migratory under the EPBC Act and/or WC Act. (Phoenix,2019)

While these 15 species include several Threatened species, there is no critical habitat present within the development envelope, e.g. denning/shelter habitat or caves for species such as Northern Quoll, Ghost Bat or Pilbara leaf-nosed bat. All three of these species and others may however traverse or use the habitats (e.g. for foraging) within the development envelope and surrounds on occasion. The Western Pebble-mound Mouse (P4) is likely one of the few, less mobile, resident species within the development envelope, particularly in the western and central sections. (Phoenix,2019)

As the project is adjacent to highly active and noisy lineal infrastructure, it may be likely that Western Pebble mouse individuals will inhabit, forage and utilise the adjacent vegetation in better condition and therefore it is unlikely there will be any significant direct or indirect impacts

to threatened fauna and priority fauna species. Management measure will be put in place to ensure no active mounds will be cleared as part of the project.

Desktop assessment confirmed records of 41 significant flora species were identified within the 40km study area. This included one species listed as Threatened (Vulnerable) under the EPBC Act, *Pityrodia augustensis*. In total there were five Priority 1, eight Priority 2, 21 Priority 3 and seven Priority 4 flora. Likelihood of occurrence was assessed for the significant flora identified in the desktop assessment. Based on habitats present in the development envelope, flowering period, disturbance within the development envelope and/or proximity of closest record to development envelope, a high likelihood of occurrence was assessed for six species listed below. (Phoenix,2019)

*Xerochrysum boreale* (P3) suitable habitat, records located within 5 km with large areas recently burnt and it is possible that the species was present but in a juvenile state and not easily detectable, however this species has a common habitat throughout the Pilbara, predominantly stony plains. It would not be expected the roadside vegetation would be significant to this species. (Phoenix,2019)

*Rhagodia* sp. Hamersley (M. Trudgen 17794) (P3), suitable habitat, records located within 5 km with large areas recently burnt and it is possible that the species was present but in a juvenile state and not easily detectable. This species is quite prolific throughout the local area and therefore it is unlikely that the clearing of roadside vegetation would have a detrimental effect on the local population. (Phoenix,2019)

*Oxalis* sp. Pilbara (M.E. Trudgen 12725) (P2), suitable habitat, records located within 10 km of the development envelope with large areas recently burnt and it is possible that the species was present however this species has a large range throughout the Pilbara stretching down to the midwest making it unlikely that the project would have significant impacts on the greater population. (Phoenix,2019)

*Ipomoea racemigera* (P2), suitable habitat, records located within 10 km of the development envelope with large areas recently burnt and it is possible that the species was present but in a juvenile state and not easily detectable. However, *Ipomoea racemigera* are known to occur on flats with brown silty loam soil and fringing vegetation on the southside of river creeklines. This habitat is locally abundant in better condition than what is available in the project area. (Phoenix,2019)

*Aristida jerichoensis* var. *subspinulifera* (P3), suitable habitat, records located within 5 km of development envelope with large areas recently burnt and it is possible that the species was present but in a juvenile state and not easily detectable. As per the *Ipomea* this species has an even larger distribution area stretching into the Midwest and throughout the Pilbara, with abundant preferred habitat locally (clayey plains). It is unlikely the proposed clearing would be critical habitat for this species. (Phoenix,2019)

*Aristida lazardis* (P2), suitable habitat, records located within 5 km of development envelope with large areas recently burnt and it is possible that the species was present but in a juvenile state and not easily detectable. This species prefers flood plains and drainage zones which has very limited habitat within the project development envelope hence would unlikely have a significant impact on this species if it was to occur.

No priority flora was found within the development envelope as per the biological survey carried out by Phoenix in 2018. As there are no restricted habitats within the development envelope and all vegetation types were locally abundant in equal or greater condition, it would not be expected that the proposed clearing would have a significant impact on the local abundance of these species if they were to occur within the development envelope.

Project activities are considered unlikely to significantly impact an area of high biodiversity as project activities are limited to largely degraded road side vegetation and vegetation is broadly widespread. Therefore, this project is not likely to be at variance to this Clearing Principle.

#### **Methodology**

Phoenix (2019)

Keighery (1994)

Government of Western Australia (2018)

Aerial photography

### **(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**

Desktop studies identified a total of 33 conservation significant species within the 40km study area, including ten listed as Threatened, Conservation Dependent or Specially Protected under the EPBC Act and/or WC. Eight species are listed as Priority by the DBCA and 16 species are listed as Migratory under the EPBC Act and/or WC Act;

All of these species are highly mobile avian species that may occur within the study area in a fly over nature for foraging and/or migratory activities. Taking into account the 146 hectare linear strip of vegetation clearing in the degraded road reserve, the locally and regionally highly vegetated landscape in comparably better condition, and the highly mobile nature of the species, project activities are not likely to impact any migratory species.

Priority and vulnerable species within the 40km study areas for the combined development envelope are listed below.

- Ghost Bat
- Northern Quoll
- Olive Python
- Western Pebble-mound Mouse
- Rock Wallaby
- Long-tailed Dunnart
- Blind Snake
- Spotted Ctenotus
- Unpatterned Robust Slider
- Striated Grasswren
- Night Parrot
- Princess Parrot
- Pilbara Leaf-nosed Bat

The Striated Grasswren and Princess Parrot are both avian and it is unlikely that the habitat being disturbed will be critical for these species as they are highly mobile. The Night Parrot is also avian however less mobile and is reported to favour areas of dense 'old-growth' Spinifex (*Triodia* spp.) greater than 15 years old and unburnt, for roosting and nesting, especially hummocks that are ring-forming which were not recorded within the development envelope.

Two vulnerable listed bats have records with the 40km study area including the Ghost Bat and the Pilbara Leaf-nosed Bat, both of these species roost in warm caves and forage in drainage lines. Caves do not occur in the development envelope and no physical sign of the species was found within the limited riparian vegetation within the development envelope, hence impacts would not likely be significant to critical habit.



The Northern Quoll prefers to den in rocky escarpments and forage in a range of adjoining habitats. The nearest suitable denning habit is 38km north west of the development envelope. Coupled with no physical signs of Quolls found within the development envelope and the project location being adjacent to busy infrastructure, it is unlikely the proposed clearing will have a detrimental impact on critical habitat.

The Rock Wallaby and Long-tailed Dunnart mainly occupy rocky habitats such as gorges, which are not found within the development envelope.

Little is known of the Blind Snake's ecology and habitat preferences of this species, however limited records indicate that it is often associated with moist ridges and gullies which are not found within the development envelope.

As per the Blind Snake very little habitat information is known for Spotted *Ctenotus*. The known records are not within close proximity to the development envelope so it is unlikely that the linear strip of roadside vegetation would be significant to the maintenance of this species.

The Unpatterned Robust Slider has a large distribution area in the arid central interior of WA in Acacia shrublands and woodlands, with widespread common habitat and large distribution. Combined with the closest known record being over 38km from the project, it is unlikely the project will have a detrimental effect on this species.

The habitat proposed to be disturbed would not be recognised as critical for any priority fauna as all habitat is well represented throughout the local region and in better condition than that located within the disturbance area.

The Pilbara Olive Python preferred habitat is rocky areas in association with watercourses and pools. Limited riparian vegetation occurs within the project area, with abundant habitat locally available in greater condition than that of the development envelope. It is unlikely this habitat is significant for the Pilbara Olive Python.

Evidence of the presence of a single conservation significant species, the Western Pebble-mound Mouse (P4), was recorded in the development envelope. The mound recorded indicates the species is active in the development envelope. Management measures will be applied to ensure no active mounds are cleared as part of the project.

The study area has more than 98% vegetation remaining and is highly represented on a regional context. The vegetation in the project area is in similar or worse condition than the surrounding local vegetation. Given that the surrounding area is highly vegetated and a linear strip of vegetation is to be removed for the project, it is unlikely that the ecological functioning of the project area will be impacted or that this project area would represent significant habitat for any fauna species. The clearing will occur next to the existing road formation and within the maintenance zone, which is in good to degraded condition (Keighery, 1994). It is unlikely that this removal will interfere with any linkages or create fragmentation in the landscape.

The buffer for the Ethel Gorge aquifer stygofauna TEC community is located approximately 3.4 km east of the development envelope. The project is not penetrating the groundwater or dewatering so it is unlikely there will be any impacts on the TEC and associated habitat.

As clearing associated with the project is not removing significant habitat for any of the species identified as known to occur or likely to occur within the study area it is unlikely project activities will clear the whole or a part of, or vegetation that is necessary for the maintenance of significant habitat. Therefore, this project is not likely to be at variance to this Clearing Principle.

#### **Methodology**

DBCA Shapefile  
Keighery (1994)



Phoenix (2019)

**(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.****Proposal is not at variance to this Principle**

There are no known records of Threatened flora within the application area (GIS Database).

The vegetation associations within the application area are common and widespread within the region (GIS Database), and the vegetation proposed to be cleared is unlikely to be necessary for the continued existence of any species of Threatened (rare) flora.

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

**Methodology**

DBCA shapefiles

Phoenix (2019)

**(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 likely to be at variance to this Principle**

There is one TEC/ESA “Ethel Gorge aquifer stygofauna community” within 5 km of the Development Envelope. This TEC is an endangered groundwater stygofauna community that has associated linkages to surface water. Project works are unlikely to alter quality of water within drainage routes or groundwater.

Groundwater flows from south to north aligned with the Fortescue River valley. The project area (Overtaking Lane 1 and 2) is situated within 5 km of the Ethel Gorge aquifer stygofauna community.

The development envelope is situated approximately 5km north of the TEC and does not involve any dewatering or ground water penetration so it would be unlikely any runoff will affect the aquifer, however a surface water management plan / PERMA will be implemented to mitigate these impacts.

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

**Methodology**

DBCA shapefiles

Halse (2014)

Phoenix (2019)

**(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**

| Pre-European Vegetation Association | Scale                                                      | Pre-European (ha) | Current Extent (ha) | % Remaining | % Remaining in DBCA reserves |
|-------------------------------------|------------------------------------------------------------|-------------------|---------------------|-------------|------------------------------|
| <b>Veg Assoc No. 82</b>             | <b>Statewide</b>                                           | 2,565,901.28      | 2,553,206.19        | 99.51       | 11.51                        |
|                                     | <b>IBRA Bioregion</b>                                      | 2,563,583.23      | 2,550,888.14        | 99.50       | 11.52                        |
|                                     | <b>IBRA Sub-region</b><br>PIL 3 Hammersley                 | 2,177,573.90      | 2,165,224.21        | 99.43       | 13.49                        |
|                                     | <b>Local Government Authority</b><br>Shire of East Pilbara | 927,709.76        | 919,072.17          | 99.07       | 0.5                          |
| <b>Veg Assoc No. 18</b>             | <b>Statewide</b>                                           | 19,892,306.46     | 19,843,148.07       | 99.75       | 6.62                         |
|                                     | <b>IBRA Bio region</b>                                     | 676,556.72        | 671,843.35          | 99.3        | 25.17                        |
|                                     | <b>IBRA Sub-region</b><br>PIL 3 Hammersley                 | 581,246.08        | 576,541.70          | 99.19       | 29.30                        |
|                                     | <b>Local Government Authority</b><br>Shire of East Pilbara | 359,372.12        | 355,446.47          | 98.91       | 1.47                         |
| <b>Veg Assoc No. 175</b>            | <b>Statewide</b>                                           | 526,957.95        | 524,640.18          | 99.56       | 7.64                         |
|                                     | <b>IBRA Bio region</b>                                     | 507,860.16        | 507,466.80          | 99.92       | 7.93                         |
|                                     | <b>IBRA Sub-region</b><br>PIL 3 Hammersley                 | 93,039.76         | 92,751.05           | 99.69       | 7.75                         |
|                                     | <b>Local Government Authority</b><br>Shire of East Pilbara | 127,486.40        | 127,461.47          | 99.98       | NA                           |

Beard (1979) mapping shows that the project area consists of Beard Vegetation Associations 18 and 82 . The pre-European extent remaining within all of the spatial categories stated in the above table is greater than 99%. The Vegetation Association within the project area is considered to be of least concern in all of the spatial categories.

There are no areas that are considered remnant vegetation within the study area or the wider regional landscape.

Considering the extent of Vegetation Associations in conjunction with the amount of the broader Pilbara regional context, it is unlikely that the proposal will result in habitat fragmentation and therefore project activities are not at variance to this Clearing Principle

**Methodology**

Keighery (1994)  
Government of Western Australia (2017).  
Phoenix (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.**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Proposed clearing is not at variance to this Principle</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>There are no permanent watercourses or wetlands to be cleared under this application (GIS Database). A minor seasonal creek line passes through the development envelope (GIS Database). Creek lines in the region are dry for most of the year, only flowing briefly immediately following significant rainfall.</p> <p>All riparian vegetation within the Development envelope will be cleared under a Beds and Banks approval.</p> <p>Based on the above, the proposed clearing is not at variance to this Clearing Principle.</p> |
| <p><b>Methodology</b></p> <p>DWER and DBCA shapefiles</p> <p>Phoenix (2019)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Proposed clearing is not likely to be at variance to this Principle</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>The development envelope is characterised primarily by two different soil types, shallow, stony earthy loams and shallow, stony hard alkaline red soils. Due to the coarse stony nature of these soils, they will have moderate infiltration rates. The project area is across slightly undulating plains in a large hilly and rocky landscape. Mean annual rainfall at Newman is 310.2 mm per annum which falls on average over 30 days.</p> <p>There will be no dewatering or excavation below the water table so it is unlikely that acid sulfate soils will be an issue in the area. Furthermore, database searches indicate the soil in the project area has an extremely low risk of Acid Sulphate Soils (ASRIS, 2085). The clearing of vegetation is not considered likely to significantly alter the hydrological balance and cause a change in the salinity in the project area.</p> <p>The proposed clearing of up to 146 hectares of native vegetation within a boundary of approximately 459 hectares, for the purpose of Overtaking Lanes is unlikely to cause appreciable land degradation.</p> <p>Based on the above, the proposed clearing is not likely to be at variance to this Clearing Principle.</p> |
| <p>BOM (2022)</p> <p>GIS Database</p> <ul style="list-style-type: none"> <li>- Landsystem Rangelands</li> <li>- Soils, Statewide</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**(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.**

|                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Proposed clearing is not likely to be at variance to this Principle</b>                                                                                                        |
| <p>There are no Department of Biodiversity, Conservation and Attractions (DBCA) managed lands or other Conservation areas in the study area. The nearest DBCA managed land is</p> |

approximately 33 km to the west of the study area (Karijini National Park). Due to the distance from the National Park it is highly unlikely there will be any direct or indirect impacts to this conservation area.

The project area occurs in an area where the vegetation is relatively degraded from historic road construction, cattle grazing and vehicle tracks. This vegetation is also found in the local and regional area in similar or better condition. The project area occurs in a region where there is limited habitat fragmentation and good ecological linkages. Clearing of a linear section of roadside vegetation is not likely to fragment any ecological linkages.

It is therefore considered native vegetation clearing associated with the proposed project is not likely to be at variance to this Clearing Principle.

#### **Methodology**

DBCA shapefiles  
Phoenix (2019)

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

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

The Development Envelope is located in proclaimed Pilbara Surface Water Area. However, the works include reinstatement and redesign of drainage improving the current road hydrological system.

Groundwater flows from south to north aligned with the Fortescue River valley. The project area (Overtaking Lane 1 and 2) is situated 3.5km from the Ethel Gorge aquifer stygofauna community. The Stygofauna Community is likely to be concentrated in the shallow alluvial aquifer. A total of 78 species of stygofauna have been recorded from the area including Copepods, Ostracods, Oligochaetes and Amphipods. The reasons for the concentration of stygofauna in Ethel Gorge are unknown although the occurrence of extensive vegetation may be related to the nutrient cycle for the stygofauna. However, Halse (2014) suggests water quality maybe not be a great influence on stygofauna where the salinity (Total Dissolved Solids - TDS) is 10,000 mg/L or less.

As the works are not penetrating the groundwater or dewatering, it is not expected works will cause any impact on aquifers hosting stygofauna.

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

#### **Methodology**

DBCA shapefiles  
Halse (2014)  
Phoenix (2019)

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

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

#### **Comment**

The project area is in a low rainfall area. Average annual rainfall data from the nearest weather station in Newman is 310.2 mm per annum (BOM, 2022).

There are no permanent water courses or waterbodies within the application area (GIS Database). Seasonal drainage lines are common in the region and temporary localised flooding

may occur briefly following heavy rainfall events. However, the proposed clearing is unlikely to increase the incidence or intensity of natural flooding events.

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

**Methodology**

BOM (2022)

Phoenix (2019)

## 6 ADDITIONAL ACTIONS REQUIRED

Table 5 summarises what further pre-clearing impact assessment and vegetation management 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<br>(choose and update correct statement)                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------|
| <p><b>1.</b> The CAR indicates that the clearing is 'At Variance' or 'May be at Variance' with one or more of the Clearing Principles.</p> <p>Where the clearing is at variance or may be at variance to Clearing Principle (f) and no other Clearing Principle, and the area of the proposed clearing is less than 0.5 hectares in size and the Clearing Principle (f) impacts only relate to:</p> <ul style="list-style-type: none"> <li>(i) a minor non-perennial watercourse(s);</li> <li>(ii) a wetland(s) classed as a multiple use management category wetland(s); and/or</li> <li>(iii) a wetland that is not a defined wetland;</li> </ul> <p>the preparation of an Assessment Report, as required by condition 6(e), is not required.</p> | <b>N</b>     | No further action required.                                                                                     |
| <p><b>2.</b> Clearing is at variance or may be at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality or (j) the incidence of flooding.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>N</b>     | No further action required.                                                                                     |
| <p><b>3.</b> The project involves clearing for temporary works (as defined by CPS 818).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>N</b>     | No further action required.                                                                                     |
| <p><b>4 a.</b> Project is within Region that:</p> <ul style="list-style-type: none"> <li>- Has rainfall greater than 400mm and</li> <li>- Is South of the 26<sup>th</sup> parallel and</li> <li>- Works are in 'Other than dry conditions' and</li> <li>- Works have potential for <b>uninfested</b> areas to be impacted</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                | <b>N</b>     | Proceed with standard Vehicle and Plant management actions from PEMR's and Vehicle and Plant Hygiene Checklists |



| Impact of Clearing                                                                                                                                                                                                                                                | Yes/No or NA | <i>Further Action Required</i><br><i>(choose and update correct statement)</i> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------------------|
| <b>4b.</b> Does the proposed works require clearing within or adjacent to DBCA estate in non-dry conditions?                                                                                                                                                      | <b>N</b>     | No further action required.                                                    |
| <b>5.</b> 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                                                                                                         | <b>N</b>     | No further action required.                                                    |
| <b>6.</b> The vegetation within the area to be cleared and/or the surrounding vegetation in a good or better condition and weeds likely to spread to and result in environmental harm to adjacent areas of native vegetation that are in good or better condition | <b>N</b>     | No further action required.                                                    |

## 7 STAKEHOLDER CONSULTATION

Main Roads will undertake stakeholder consultation in accordance with CPS 818/15 Condition 8.

## 8 REFERENCES

Beeston, G.R., Hopkins, A.J.M. and Shepherd, D.P. (2002). Land-use and vegetation in Western Australia. Department of Agriculture, Western Australia, Resource Management Technical Report 250.

Bureau of Meteorology Australia. Climate Averages for Australian Sites – Newman – Available online from <http://www.bom.gov.au/climate/data/index.shtml> Accessed 17/05/2022.

Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.

Government of Western Australia. (2018). 2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of December 2018. WA Department of Environment and Conservation, Perth, <https://www2.landgate.wa.gov.au/web/guest/downloader>

Halse, S.A., Scanlon MD, Cocking, JS, Barron, HJ, Richardson, JB and Eberhard, SM, 2014, "Pilbara Stygofauna: deep groundwater of an arid landscape contains globally significant radiation of biodiversity", Records of the West Australian Museum, Supplement 78, pp443-483.

Keighery, B. J. 1994. Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Phoenix Environmental Sciences, 2019, Biological Survey for Great Northern Highway Overtaking Lanes 1, 2, 3, 4 & 6 (Newman to Auski) Prepared for Main Roads Western Australia

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# Principal Environmental Management Requirements (PEMR's)

**Table 1: Clearing PEMR****STANDARD MANAGEMENT ACTIONS**

| <b>STANDARD MANAGEMENT REQUIREMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PRE WORKS</b> <ol style="list-style-type: none"><li>1. The Contractor must prepare, implement and maintain processes to ensure that the movement of all vehicles, plant and machinery does not occur outside of the Limits of Vegetation Clearing. This must include all turnaround areas.</li><li>2. The Contractor must minimise vegetation clearing and the area of disturbance on ground by utilising existing cleared area where possible.</li></ol> |
| <b>DURING WORKS</b> <ol style="list-style-type: none"><li>1. The Contractor must report any damage to vegetation beyond the Limits of Vegetation Clearing as an Environment Incident.</li><li>2. The Contractor must ensure Movements are confined to the Limits of Vegetation Clearing during the works.</li><li>3. The Contractor must undertake the clearing in accordance with the Fauna PEMR.</li></ol>                                                 |
| <b>POST WORKS</b> <ol style="list-style-type: none"><li>1. NIL</li></ol>                                                                                                                                                                                                                                                                                                                                                                                     |

**Table 3: Erosion and Sedimentation**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>PRE WORKS</b></p> <p>1. The Contractor must develop, implement and maintain processes and procedures to ensure that:</p> <ul style="list-style-type: none"> <li>• The Contractor is responsive to and addresses incidents of erosion and sedimentation within and adjacent to the work areas.</li> <li>• Prevent water and wind soil erosion within and adjacent to the works areas.</li> <li>• Prevent the sedimentation and siltation of watercourses located within and adjacent to the works area.</li> <li>• Ensure that sedimentation and siltation of drainage lines due to the removal of riparian vegetation is avoided, minimised and mitigated.</li> <li>• Ensure that loose surfaces and recently cleared areas are protected from wind and soil erosion.</li> <li>• Minimise exposed soil working surfaces or protect them from stormwater erosion.</li> <li>• Ensure material such as gravel, crushed rock and excavated material is stockpiled away from drainage paths and covered to prevent erosion.</li> <li>• Ensure that water quality monitoring is undertaken when turbidity and sedimentation is an issue.</li> </ul> |
| <p><b>DURING WORKS</b></p> <p>1. Implement, monitor and adhere to the sedimentation and erosion processes developed to address the requirements in the pre-works.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>POST WORKS</b></p> <p>1. If required, the Contractor must continue to monitor water quality until the turbidity/sedimentation dissipates.</p> <p>2. The Contractor must ensure that disturbed areas are stabilised as soon as is practicable after construction activities are completed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**Table 4: Fauna****PRE WORKS**

1. The Contractor must ensure that fauna management requirements are communicated to the crew undertaking the clearing works during the induction and pre-start meeting.
2. Where active nests, burrows or dens are identified, works must not proceed until the Contractor obtains the Superintendents approval of the management of active nests, burrows or dens adheres to the Superintendents advice.

**DURING WORKS**

1. The Contractor must undertake the clearing in the following manner to allow fauna to move out of the clearing area;
  - i. Prior to the clearing activities commencing, use machinery to tap large trees with habitat hollows to encourage any animals evacuate.
  - ii. Undertake the clearing in one direction and towards areas of native vegetation to allow the animals to escape to adjacent habitat.
2. The Contractor must ensure that all onsite personnel undertake visual monitoring and are vigilant to the presence of fauna. Any sightings of fauna, including injury or fatality, must be reported as an Environmental Incident.
3. The Contractor must ensure that;
  - i. No pets, traps or firearms are brought into the project area.
  - ii. Fauna are not fed.
  - iii. Fauna are not intentionally harmed or killed.
  - iv. Fauna that venture into the work area are encouraged to leave in a manner that does not harm the animal or operator (loud noise, slowly approaching in a vehicle etc.).
4. The Contractor must ensure that in the event that sick, injured or orphaned native wildlife are located on the project site, the WILDCARE Helpline ((08) 9474 9055) will be contacted for assistance. The Contractor must maintain records of any animal taken to a wildlife carer.
5. No active mounds of the resident Western Pebble Mouse are to be cleared.

**POST WORKS**

1. The Contractor must provide any records of fauna impact to the Superintendent.

**Table 5: Machinery and Vehicle Management**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>PRE WORKS</b></p> <ol style="list-style-type: none"> <li>1. The Contractor must ensure that all areas associated with the storage, parking, servicing, wash down and refuelling of all vehicles, plant and machinery is located within the Limits of Clearing and approved by the Superintendent.</li> <li>2. The Contractor must ensure that all vehicles, machinery and plant are clean on entry (i.e. free of all soil and vegetation material) and comply with the requirements of 204.B.32.</li> <li>3. The Contractor must ensure that vehicle servicing and refuelling will be undertaken at designated areas approved by the Superintendent.</li> <li>4. The Contractor must ensure that all staff suitably qualified and competent to undertake works, especially refuelling activities.</li> </ol> |
| <p><b>DURING WORKS</b></p> <ol style="list-style-type: none"> <li>1. The Contractor must maintain records of checking all vehicles, machinery and plant are clean on entry.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>POST WORKS</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Table 6: Mulch and Topsoil Management**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>PRE WORKS</b></p> <ol style="list-style-type: none"> <li>1. The Contractor must ensure that the movement of soil and vegetation is only undertaken in dry conditions unless otherwise approved and / or directed by the Superintendent.</li> <li>2. The Contractor must ensure that poor quality topsoil and mulched vegetation does not contaminate the good quality topsoil and vegetation.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>DURING WORKS</b></p> <ol style="list-style-type: none"> <li>1. The Contractor must ensure that all machinery used in the removal of weed-infested topsoil must be cleaned down before and between operations to prevent the introduction and spread of weeds.</li> <li>2. The Contractor must ensure the movement of large equipment over topsoil materials is avoided to minimise compaction.</li> <li>3. The Contractor must ensure that Dieback and weed infected topsoil and mulch vegetation must be handled separately to minimise the risk of spreading dieback and weed species across the site and stockpiles.</li> <li>4. The Contractor must ensure that stockpiling operations must occur in a manner to ensure that the properties of the topsoil are not degraded and the topsoil made unsuitable for use in revegetation.</li> </ol> |
| <p><b>POST WORKS</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**Table 7: Pegging and Flagging**

|                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>PRE WORKS</b></p> <ol style="list-style-type: none"> <li>1. Pegging must be done in accordance with the requirements detailed in Specification 301.</li> <li>2. The Contractor must clearly communicate, either at the pre-start meeting or equivalent, to the crew undertaking the clearing works, through clear maps and other additional means, what the Pegging represents.</li> </ol>                                |
| <p><b>DURING WORKS</b></p> <ol style="list-style-type: none"> <li>1. The Contractor must peg the Limits of Clearing by PINK flagging tape.</li> <li>2. The Contractor peg/demarcate vegetation proposed to be retained is demarcated by WHITE flagging tape.</li> <li>3. The Contractor must ensure that the vegetation demarcated with PINK and WHITE flagging tape is consistent with the approved clearing areas.</li> </ol> |
| <p><b>POST WORKS</b></p> <ol style="list-style-type: none"> <li>1. The Contractor remove and dispose of appropriately any demarcation, pegging or flagging once project works are completed.</li> </ol>                                                                                                                                                                                                                         |

**Table 8: Water Drainage**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>PRE WORKS</b></p> <ol style="list-style-type: none"> <li>1. Use pollution control and containment strategies for project activities in Public Drinking Water Source Areas (PDWSAs) / Underground Water Pollution Control Areas (UWPCAs) and liaise with the DWER where necessary.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p><b>DURING WORKS</b></p> <ol style="list-style-type: none"> <li>1. Existing natural drainage paths and channels along the road or the vicinity of the project area will not be unnecessarily blocked or restricted.</li> <li>2. Temporary drainage systems may be installed to carry surface water away from the areas where excavation and foundation construction work is taking place or from any other area where the accumulation of water could cause delay or damage to the work.</li> <li>3. Maintain these drainage systems in proper working order at all times.</li> <li>4. Runoff from disturbed areas must be managed to minimise adverse impacts on surrounding vegetation, watercourses and properties.</li> <li>5. Booms and silt fences must be used when working over or adjacent to areas of surface water in order to protect the quality of surface water from construction impacts.</li> </ol> |
| <p><b>POST WORKS</b></p> <ol style="list-style-type: none"> <li>1. Water quality monitoring to be undertaken (if turbidity/ sedimentation is an issue).</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

2. Prior to backfilling the completed pipe work certify that the entire system is flushed clean and tested.
3. Disturbed areas will be stabilised soon after construction activities are completed.
4. Culvert and drainage structures will be free of all grass, weeds, silt and debris.

## Table 9: Weed Management

### PRE WORKS

1. The Contractor must remove or kill any weeds growing in the project area that are likely to spread and result in environmental harm to adjacent areas of native vegetation that are in good or better condition.
2. The Contractor must develop, implement and maintain procedures to identify and control declared and invasive weed species within the Contract areas, to the satisfaction of the Superintendent.
3. The Contractor must prepare a weed control program, for nominated weed species for control and disposal, to the satisfaction of the Superintendent.
4. The Contractor must undertake weed management in Stockpiles as directed by the Superintendent.

### DURING WORKS

1. The Contractor must implement the weed control procedures and management plan and record and manage records of its implementation.
2. The Contractor must treat nominated weed infestations as many times as necessary to control and eradicate the weed species in accordance with the approved weed control program.
3. The contractor must ensure that no known weed, pest or diseased affected soil, mulch, fill or other material is brought into the Site.

### POST WORKS

1. The relevant [Vegetation Maintenance Record Sheets](https://www.mainroads.wa.gov.au/BuildingRoads/Contracting/Pages/ReportingForms.aspx) available at: <https://www.mainroads.wa.gov.au/BuildingRoads/Contracting/Pages/ReportingForms.aspx> must be completed and sent to the Superintendent.