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Great Eastern Highway Upgrade Project SLK 56.4-67.8 EPBC 2022/9151

Construction Environmental Management Plan

D22#1068744
December 2024

Version Control

Revision	Date	Name	
0	October 2022	GHD	Author
0	October 2022	GHD	Reviewer
0	October 2022	Main Roads	Reviewer / Approver
1	July 2024	Main Roads	Author
2	September 2024	Main Roads	Author
3	December 2024	Main Roads	Author

Executive Summary

Background

Main Roads Western Australia (Main Roads) proposes to upgrade a section of the Great Eastern Highway (GEH) between Straight Line Kilometre (SLK) 56.4 and 67.8 (the GEH Upgrade Project SLK 56.4-67.8, the Proposed Action, EPBC 2022/9151).

On 28 March 2022, a delegate of the Minister for the Environment determined the Proposed Action was a 'Controlled Action' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to be assessed by Preliminary Documentation. The relevant controlling provisions are listed threatened species and communities (sections [s] 18 & 18A).

On the 13 April 2022, the Department of Climate Change, Energy, the Environment and Water (DCCEEW) requested additional information to inform the assessment of the relevant impacts of the Proposed Action. In making the request, DCCEEW considered the Proposed Action may impact Matters of National Environmental Significance (MNES) including:

- Carnaby's Black Cockatoo (*Zanda latirostris* formerly *Calyptorhynchus latirostris*) – Endangered
- Baudin's Black Cockatoo (*Zanda baudinii* listed as *Calyptorhynchus baudinii*) – Endangered
- Forest Red-tailed Black Cockatoo (FRTBC, *Calyptorhynchus banksii naso*) – Vulnerable.

This Construction Environmental Management Plan (CEMP) has been prepared to address DCCEEW's request for further information to support assessment of a controlled action by Preliminary Documentation. The CEMP has been prepared in accordance with the Department's *Environmental Management Plan Guidelines* 'the EMP Guidelines' (DoE, 2014).

Purpose and structure of this Plan

This CEMP has been prepared and is structured in accordance with the EMP Guidelines to support the Commonwealth assessment of EPBC 2022/9151.

This CEMP outlines the actions required to mitigate and manage the impacts from Proposed Action construction activities on MNES, as described in the Proposed Action Preliminary Documentation (Main Roads 2024).

Objectives of this Plan

The overarching objective of this CEMP is to minimise and manage adverse impacts on Black Cockatoos resulting from construction of the Proposed Action. This CEMP aims to achieve the overarching objective through implementation of the following environmental outcomes, to address the potential impacts and risks to MNES:

1. To minimise and manage unauthorised impacts to habitat for Carnaby's Black Cockatoo, Baudin's Black Cockatoo and FRTBC
2. To minimise and manage edge impacts into adjacent areas of habitat for Carnaby's Black Cockatoo, Baudin's Black Cockatoo and FRTBC outside of the Development Envelope (DE)
3. To minimise and manage injury or mortality to Carnaby's Black Cockatoo, Baudin's Black Cockatoo and FRTBC during vegetation clearing and construction.

COVER PAGE AND DECLARATION OF ACCURACY

- **EPBC number**: 2022/9151
- **Project name**: Great Eastern Highway Upgrade Project SLK 56.4-67.8
- **Action management plan title**: Great Eastern Highway Upgrade Project SLK 56.4-67.8 Construction Environmental Management Plan
- **Proponent /approval holder and ACN or ABN**: Main Roads Western Australia, ABN 50860676021
- **Proposed / approved action**: Great Eastern Highway Upgrade Project SLK 56.4-67.8
- **Location of the action**: Great Eastern Highway from Linley Valley Road to Swamp Road, approximately 56 km east of Perth and 25 km west of Northam in WA
- **Date of preparation of the action management plan:** October 2022
- **Person accepting responsibility for the action management plan**: Martine Scheltema, Director Environment and Heritage, Main Roads Western Australia

Declaration of accuracy

I declare that to the best of my knowledge, all the information contained in, or accompanying this document is complete, current and correct. I am duly authorised to sign this declaration on behalf of the proponent/approval holder. I am aware that:

a) giving false or misleading information is a serious offence under section 137. 1 of the *Criminal Code Act 1995* (Cth)
b) section 137.2 of the *Criminal Code Act 1995* (Cth) makes it an offence for a person to produce a document to another person in compliance or purported compliance with a law of the Commonwealth where the person knows that the document is false or misleading;
c) section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading; and
d) section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) (EPBC Regulations) where the person knows the information or document is false or misleading.

Signed: Martine Scheltema
Full name: Martine Scheltema, Director Environment and Heritage
Organisation: Main Roads Western Australia (ABN 50 860 676 021)
Date 15/12/24

Contents

1 PROJECT DESCRIPTION

1.1 Proposed works

Main Roads proposes to upgrade a section of the GEH between SLK 56.4 and 67.8 (the Proposed Action). The Proposed Action is located approximately 56 km east of Perth and 25 km west of Northam in WA. Figure 1 presents the Proposed Action location and DE. The DE comprises an area of approximately 35.15ha and represents the impact footprint within which all development will be contained.

Currently, the GEH is a sealed two-lane rural road and is the main east/west link between Perth, Kalgoorlie and Adelaide. The highway provides a major transport link and forms part of the Perth - Adelaide Corridor and supports social and economic integration between the west and east of Australia. In some cases, the GEH is the sole connection between a large number of remote communities and the Perth metropolitan area. The GEH is a heavy haulage route and is an essential route for the international transport logistics chain for mining, agriculture and other export industries.

The 10.49 km Coates Gully section of the GEH has very poor alignment, which is severely affecting the safety and efficiency of the highway. This route has been identified as the third riskiest road in regional WA for three consecutive RAC surveys (RAC, 2024), owing to the poor road condition. Of particular concern is the inadequate road formation and seal widths, and the narrow or absent shoulders.

The key components of the Proposed Action include:

- Clearing of up to 15.7 ha of suitable habitat for Black Cockatoo species, including 15.6 ha of potential breeding and roosting habitat, and up to 400 suitable diameter at breast height (DBH) trees for Black Cockatoos for the reconstruction and realignment of the existing 9 metre (m) road formation and widening to a 12 m formation
- Additional westbound and eastbound overtaking lanes
- Intersection improvements at Bodeguero Way, Wariin Road, Chedaring Road, Hawke Avenue, Inkpen Road, Coates Road and Oyston Road
- Removal and relocation of all rest areas/parking bays within the DE
- Upgrade to drainage, kerbing, culverts and installation of safety barrier.

1.2 Proposed schedule

The Proposed Action construction works are scheduled to commence in Quarter 4 2024 and will take approximately 6 months. These dates are subject to change depending on a number of factors and will be updated accordingly.

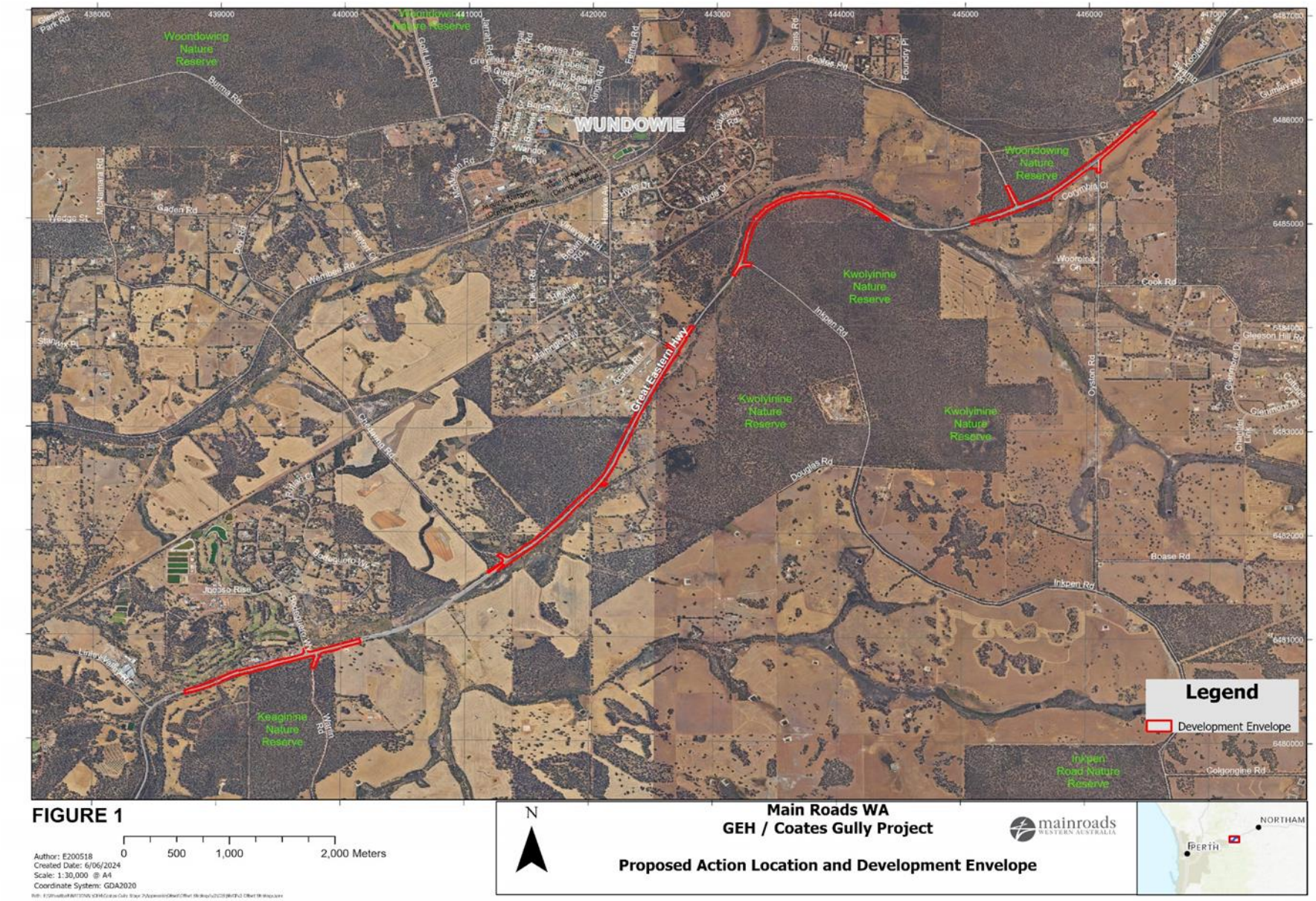

Figure 1 Proposed Action location and Development Envelope

2 POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS

2.1 Threats to Matters of National Environmental Significance

2.1.1 Controlling provisions

The Proposed Action has been determined a Controlled Action under the EPBC Act due to the likelihood of significant impacts on listed threatened species and communities (s18 and s18A of the Act), including:

- Carnaby's Black Cockatoo (*Zanda latirostris* formerly *Calyptorhynchus latirostris*) – Endangered
- Baudin's Black Cockatoo (*Zanda baudinii* listed as *Calyptorhynchus baudinii*) – Endangered
- Forest Red-tailed Black Cockatoo (FRTBC, *Calyptorhynchus banksia naso*) – Vulnerable.

The Preliminary Documentation (Main Roads, 2024) provides details of the environmental values relating to the above MNES. The information is summarised below in Section 2.1.2.

2.1.2 Environmental values

2.1.2.1 Biological surveys

A number of field assessments were undertaken to support and inform the development of the Proposed Action. The surveys relevant to MNES are summarised in Table 1.

Table 1 Studies and surveys relevant to the Proposed Action

Report name	Survey methodology
Great Eastern Highway Coates Gully (Stage 1 and 2) Project: Detailed Flora and Vegetation Report (360 environmental, 2020)	A detailed single season flora and vegetation survey was undertaken over a 59 ha survey area, with field visits from 9 to 11 October 2019. The field survey included an assessment of seven quadrats, five relevés, mapping notes, vegetation condition notes, opportunistic flora collections, observations, and a targeted Priority flora search. The survey area was traversed on foot and opportunistic collections were made to identify significant flora.
Coates Gully Recheck *Phytophthora* dieback occurrence assessment – Version 1.0 (Glevan Consulting, 2021)	The presence of *Phytophthora* dieback was assessed over an 86.5 ha survey area, on Chidlow-York Road. No new *Phytophthora* dieback infestations were identified during the recheck and no changes were made to the boundaries of the two existing infestations and the total infested area remained at 0.93 ha. The only change was the addition of a temporarily uninterpretable (protectable) section where part (2.19 ha) of a previously protectable uninfested area had been burnt.
Great Eastern Highway SLK 55.8-68.5 Fauna and Black Cockatoo Habitat Assessment (Bamford 2015, revised 2021)	A targeted fauna assessment (including a Black Cockatoo habitat assessment) was undertaken over a 229 ha survey area, with field surveys conducted on 5, 6 and 8 of October 2015. The objective of the assessment was to identify key fauna values including critical breeding, foraging and roosting habitat for Black-Cockatoos and the potential for other conservation significant fauna species to occur in the area was also assessed during field investigations. From the initial 2015 study further assessment of potential impacts and recommendations to minimise these impacts was presented as part of the January 2021 review of the report.
H005 Great Eastern Highway Coates Gully	Biologic undertook a desktop assessment, single season detailed flora and vegetation survey, targeted flora, basic terrestrial vertebrate fauna survey

Report name	Survey methodology
(SLK 56.4-67.8) Biological Survey (Biologic, 2021)	and Targeted Black Cockatoo habitat assessment over a 16.1 ha survey area. The detailed and targeted flora and vegetation survey was undertaken on 21 and 23 October, and 20 November 2020. The basic terrestrial vertebrate fauna survey and Black Cockatoo habitat assessment was undertaken on 24 and 30 November 2020.
Black Cockatoo Breeding Hollow Inspection, Coates Gully, Wundowie (Kirkby, 2021)	A detailed inspection of possible Black Cockatoo breeding hollows, based on hollows located during the Biologic (2021) survey, was undertaken on 8 and 9 June 2021. A total of 70 hollows located in 40 trees were assessed.
Black Cockatoo Breeding Hollow Inspection, Coates Gully, Wundowie (T. Kirkby, 2022)	A detailed inspection of possible Black Cockatoo breeding hollows, based on hollows located during the Bamford (2015, revised 2021) survey, was undertaken on 16 August 2022. A total of 22 trees containing hollows were assessed.

2.1.2.2 Locality

The DE follows the existing road corridor of the GEH and the majority of the DE is located in the Shire of Northam, with a small western portion of the DE also within the Shire of Mundaring. The DE traverses two conservation areas including the Kwolyinine and Woondowing Nature Reserves. There is 2.50 ha of native vegetation within the Kwolyinine Nature Reserve and 0.34 ha of native vegetation within the Woondowing Nature Reserve within the DE. The DE also lies adjacent to, but outside, the Keaginine Nature Reserve.

The Proposed Action occurs within the Northern Jarrah Forest, which comprises laterite gravels to the west, transitioning to clayey soils in the east. The Northern Jarrah Forest occupies the northern portion of the Darling Plateau to the east of the Darling Scarp and overlies Archaean granite and metamorphic rocks (Beard, 1990).

No waterways or major drainage lines run through the DE; however, the Wooroloo Brook and Coates Gully are located within the immediate vicinity. Coates Gully is a minor water course which follows the GEH within the vicinity of the eastern portion of the DE. The Wooroloo Brook runs directly to the North of the western portion of the DE. Coates Gully is fed by numerous other water courses surrounding the DE, before flowing into an unnamed major perennial water course then into Wooroloo Brook, eventually discharging into the Swan River.

2.1.2.3 Black Cockatoos

Carnaby's Black Cockatoo, Baudin's Black Cockatoo and FRTBC were identified during the field surveys undertaken within the DE by Bamford in 2015 and Biologic in 2021. These species were observed by direct observation and foraging evidence.

Breeding habitat

360 environmental (2020) and Biologic (2021) identified a total of 15.6 ha of potential Black Cockatoo breeding habitat within the DE. Bamford (2015, revised 2021) and Biologic (2021) identified 400 suitable DBH trees within the DE, based on a suitable DBH (>300 mm or >500 mm) and species known to support breeding (Figure 2). Of the 400 suitable DBH trees within the DE, no hollows have been confirmed to be suitable support Black Cockatoo breeding (T. Kirkby, 2021).

Within 10 m of the DE, there are four potentially suitable hollows to support Black Cockatoo breeding (T. Kirkby, 2021). Main Roads will implement the Proposed Action to avoid any impacts to the four

hollows, root zones and canopies. In addition, Main Roads will undertake a pre-clearance survey for the hollows where adjacent vegetation is proposed to be cleared within the breeding period for Black Cockatoos (i.e. July to December).

Foraging habitat

The surveys (Bamford 2015, revised 2021 & Biologic, 2021) recorded foraging residuals from all three species of Black Cockatoo within the DE (via observations of chewed nuts). The DE comprises 1.4 ha of High Quality, 12.5 ha of Medium Quality and 1.8 ha of Low Quality foraging habitat for Carnaby's Black Cockatoo and 1.4 ha of High Quality, 12.5 ha of Medium Quality and 1.7 ha of Low Quality foraging habitat for Baudin's Black Cockatoo and FRTBC (Biologic, 2021).

Roosting habitat

No evidence of roosting (e.g. clipped leaves and branches or droppings under suitable trees) was recorded within the DE during the Biologic (2021) survey. 360 environmental (2020) and Biologic (2021) identified a total of 16.22 ha of potential Black Cockatoo roosting habitat within the DE.

Bamford (2015, revised 2021), however, identified a white-tailed Black Cockatoo roost approximately 600 metres west of the DE on Mairinger Way in Wundowie.

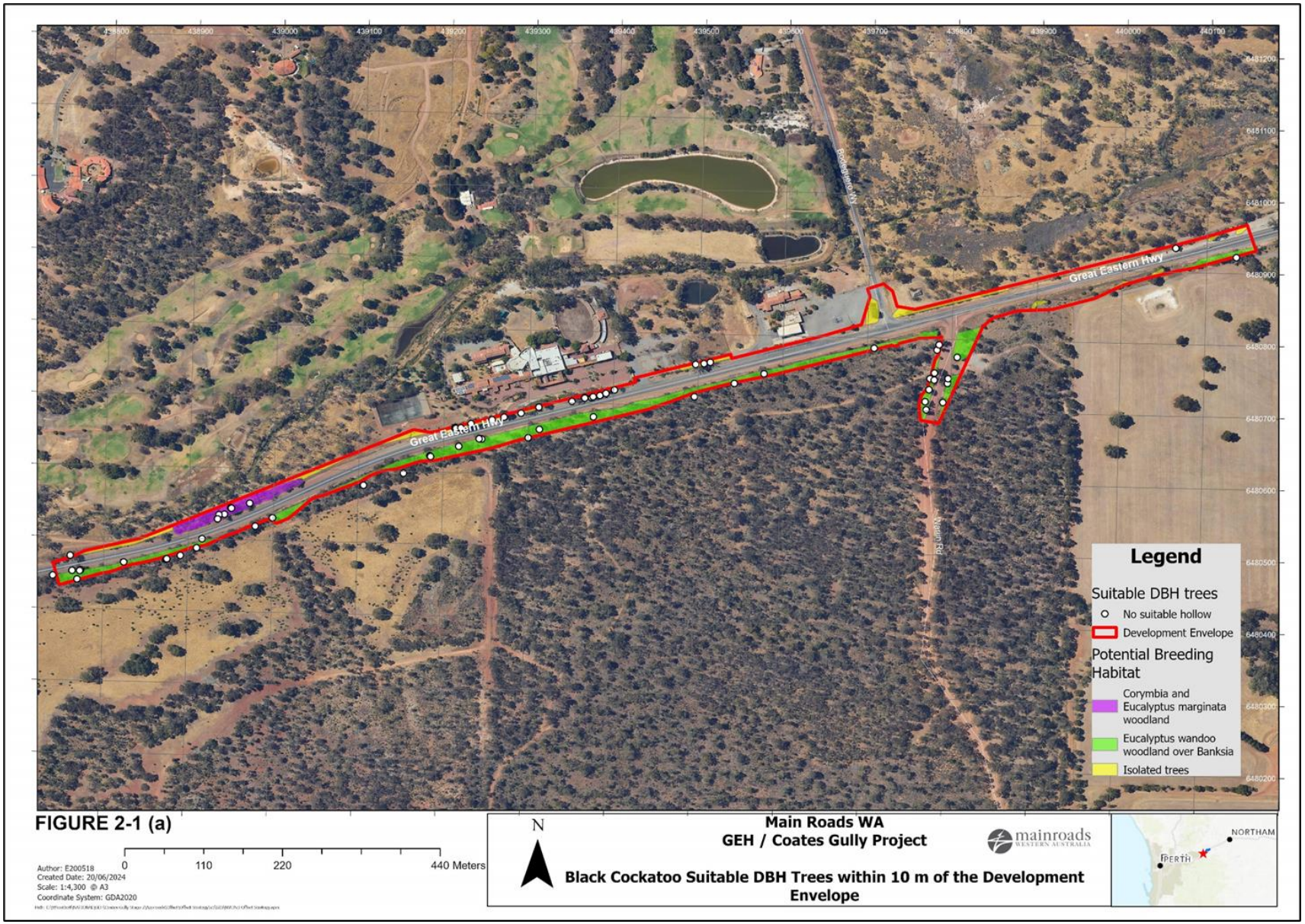

Figure 2-1 (a) Potentially suitable hollows within 10 m of the Development Envelope

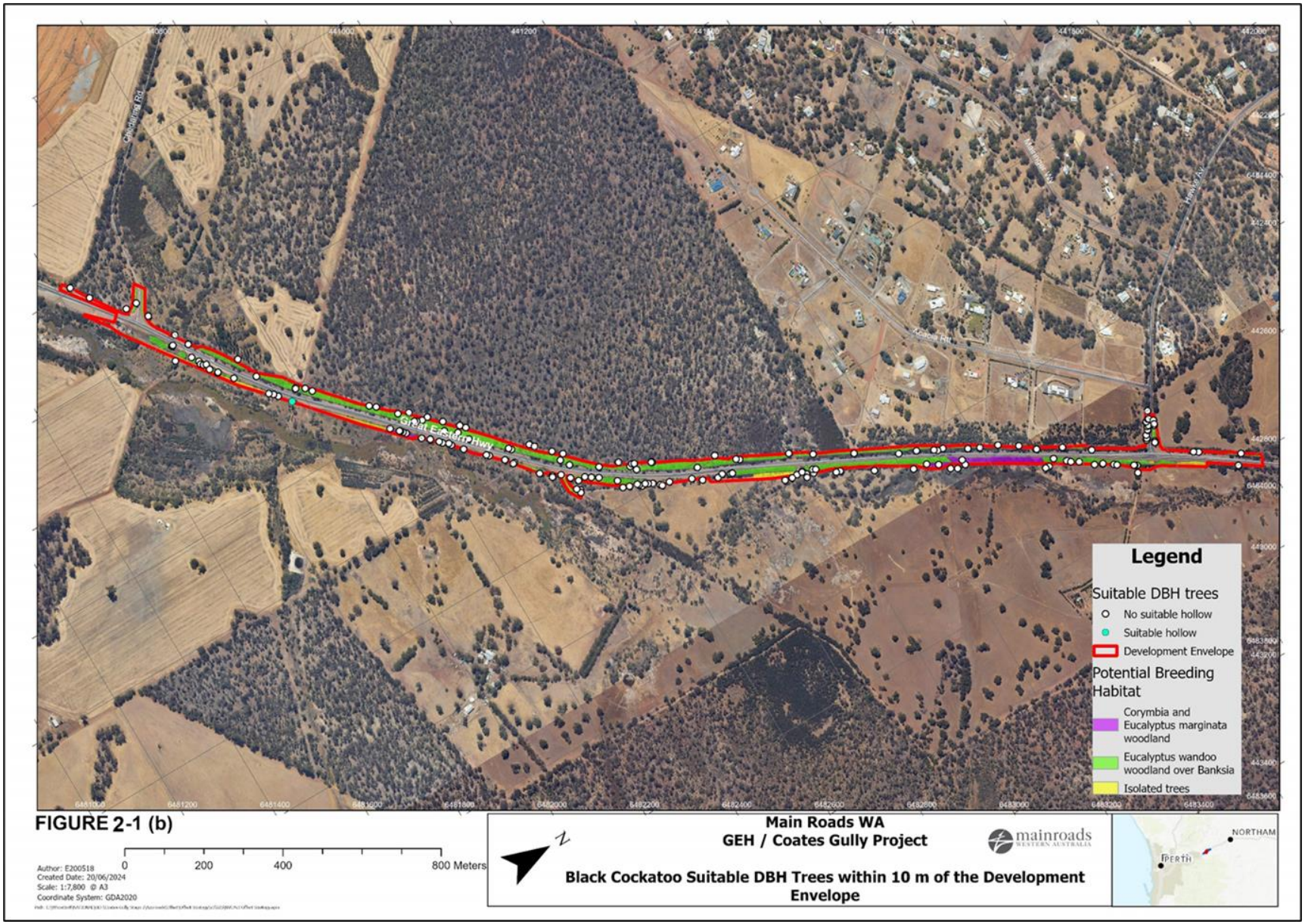

Figure 2-1 (b) Potentially suitable hollows within 10 m of the Development Envelope

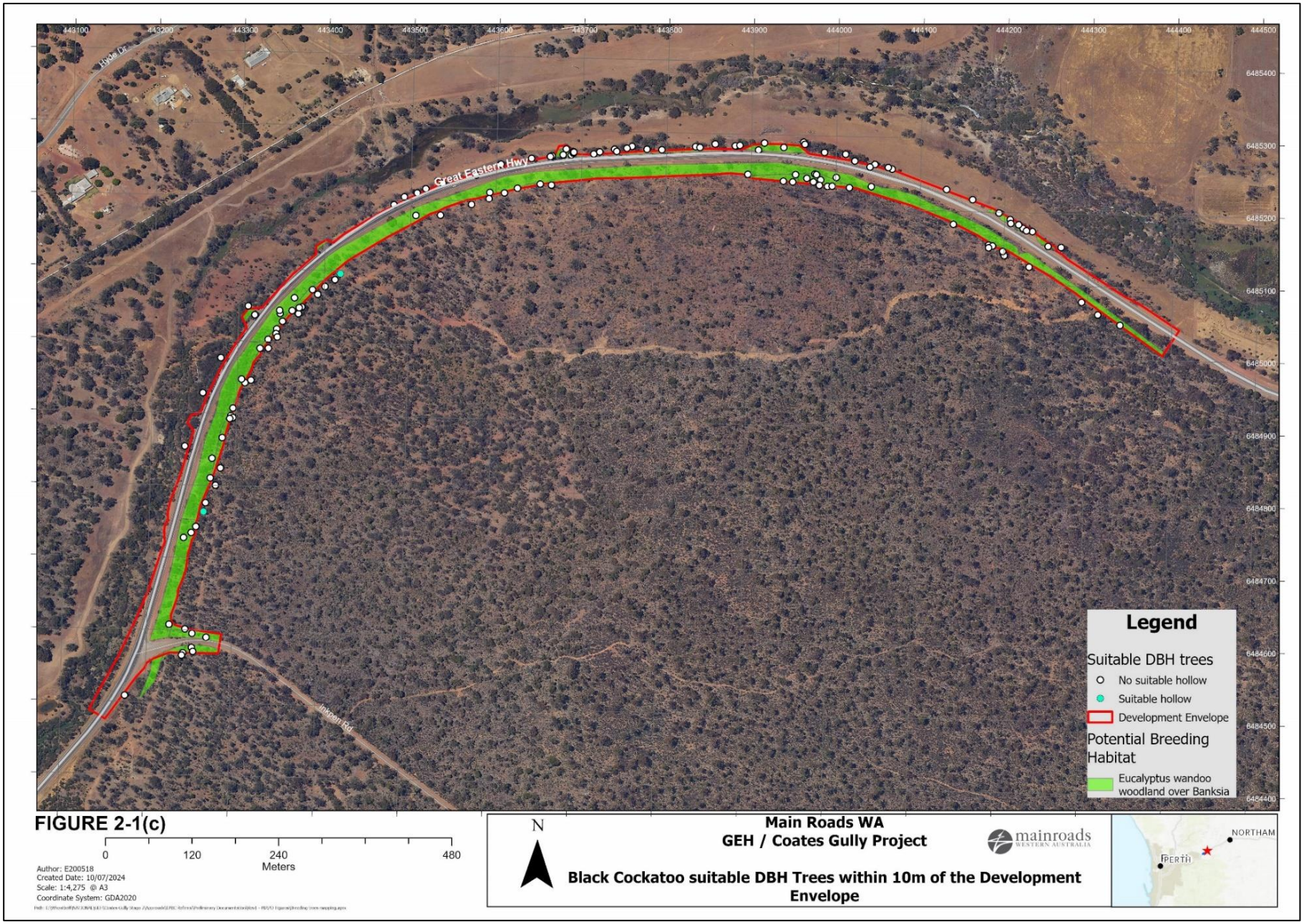

Figure 2-1 (c) Potentially suitable hollows within 10 m of the Development Envelope

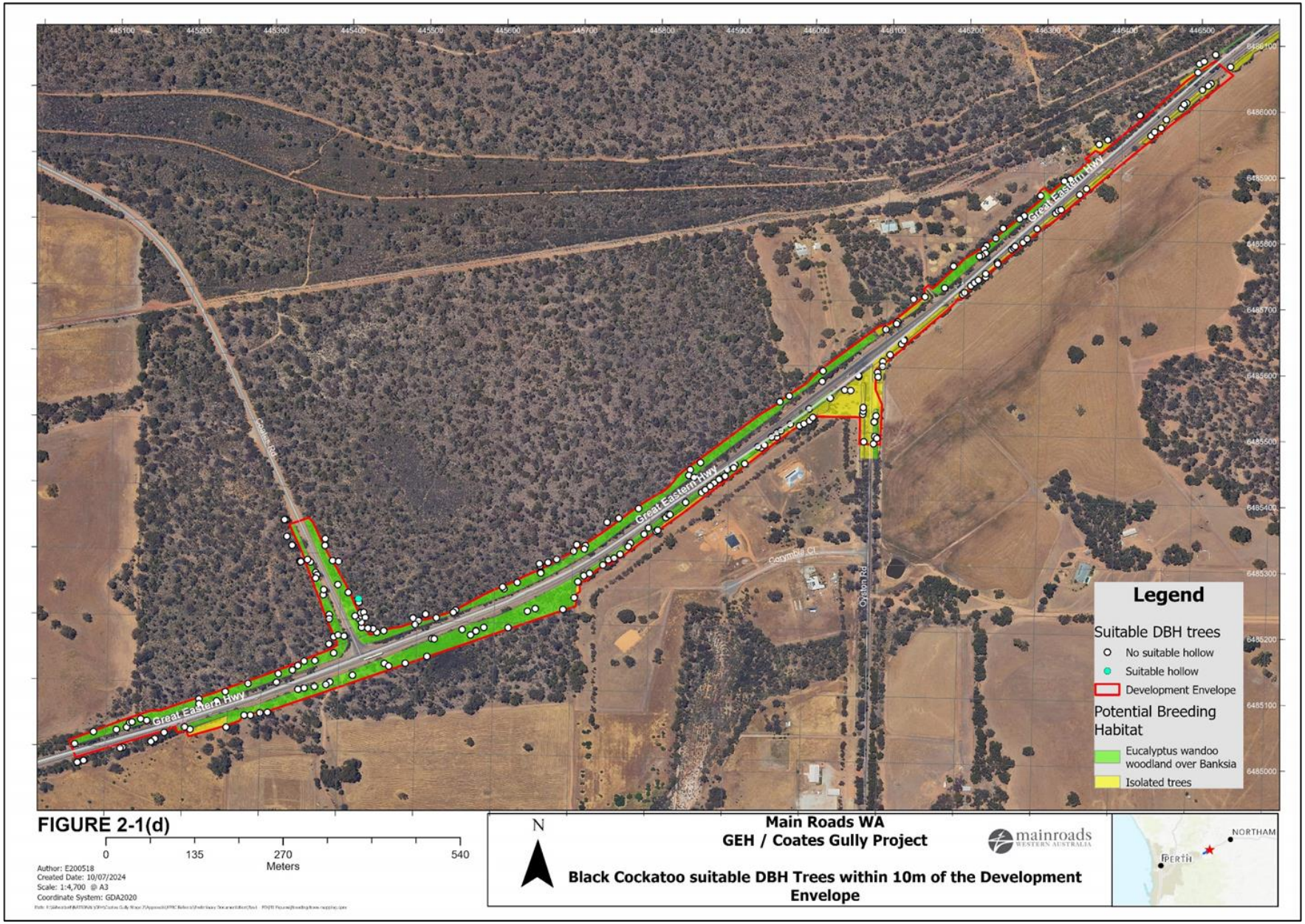

Figure 2-1 (d) Potentially suitable hollows within 10 m of the Development Envelope

2.1.2.4 Weeds

Bamford (2015, revised 2021) and Biologic (2021) together recorded 60 non-native taxa during the surveys, of which 33 were found within the DE. Of the 60 taxa recorded within the wider survey areas, four are listed as Declared Pests, one is recognised as a Weed of National Significance (WoNS), and one is listed as both a Declared Pest and a WoNS:

- *Gomphocarpus fruticosus* (Narrowleaf Cotton Bush) – Declared Pest (located outside of the DE)
- *Moraea flaccida* (One-leaf Cape Tulip) – Declared Pest
- *Zantedeschia aethiopica* (Arum Lily) – Declared Pest
- *Echium plantagineum* (Paterson's Curse) – Declared Pest
- *Genista linifolia* (Flax-leaf Broom) – WoNS
- *Asparagus asparagoides* (Bridal Creeper) – Declared Pest and WoNS.

The Bridal Creeper, Flax-leaf Broom, Paterson's Curse and One-leaf Cape Tulip occur within the DE (Figure 3). These species were found mostly in previously disturbed areas and the existing GEH, within the western portion of the DE.

2.1.2.5 Dieback

Glevan Consulting originally conducted a *Phytophthora* Dieback Occurrence Assessment of 31.88 ha of the 35.15ha DE, with a recheck completed in August 2021 (Glevan, 2021). The original assessment identified two small areas of Dieback infestation (totalling 0.93 ha) approximately 180 m to the west of DE, in the vicinity of Linley Valley Road. A non perennial waterway Wooroloo Brook occurs within the Dieback Infested area and flows to the west away from the DE. No new Dieback infestations were identified during the recheck. The Dieback infested areas are located within the vicinity of Keaginine Reserve (located approximately 600 m to the east of the infested area), see Figure 4. There are a number of non perennial waterways within the vicinity of to the DE, construction works will not occur immediately adjacent to any watercourse and works will be managed to ensure any surface water flows within the DE are directed to the existing constructed road drainage network. Keaginine Reserve contains Black Cockatoo habitat that has the potential to be impacted by Dieback spread, no works are planned to occur within known Dieback Infested areas adjacent to Keaginine Nature Reserve.

Areas of uninfested protectable land (totalling 6.00 ha) were identified along the GEH alignment within the DE. The uninfested protectable land was located within the vicinity of the Keaginine, Kwolyinine and Woondowing Nature Reserves, which comprise Black Cockatoo foraging habitat. A recent fire within the northern portion of the Kwolyinine Nature Reserve caused significant damage to a portion of one of the previously protectable uninfested areas within the DE, resulting in this portion of land being classified as temporarily uninterpretable. It is likely to be at least three years before this area becomes interpretable. A Dieback Survey will be completed the Spring of 2024 to recheck 2021 Dieback mapping, prior to the commencement of construction activities. The 2024 Dieback survey will inform construction works and further prevent potential introduction and spread of Dieback into protectable land during works.

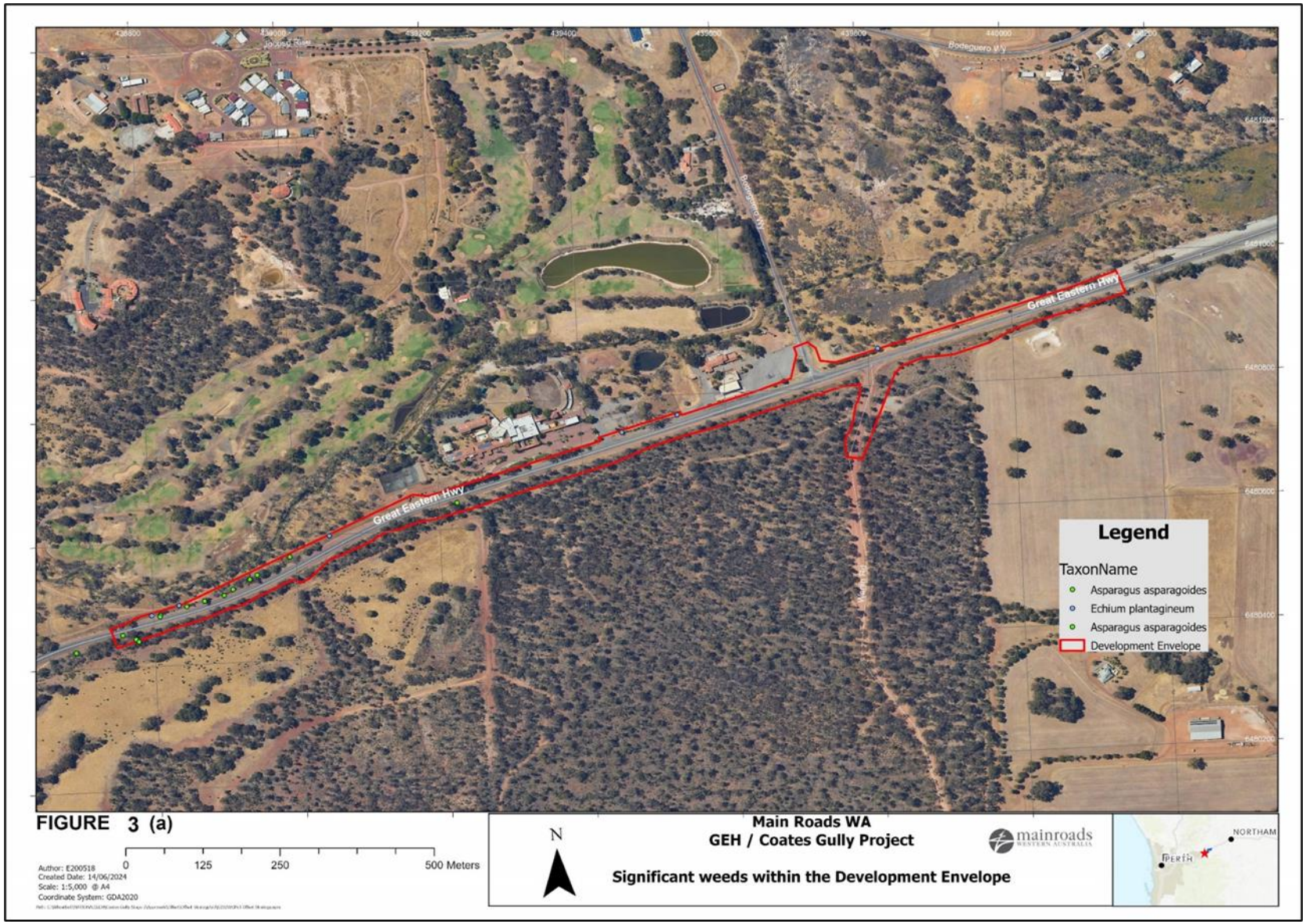

Figure 3 (a) Significant weeds

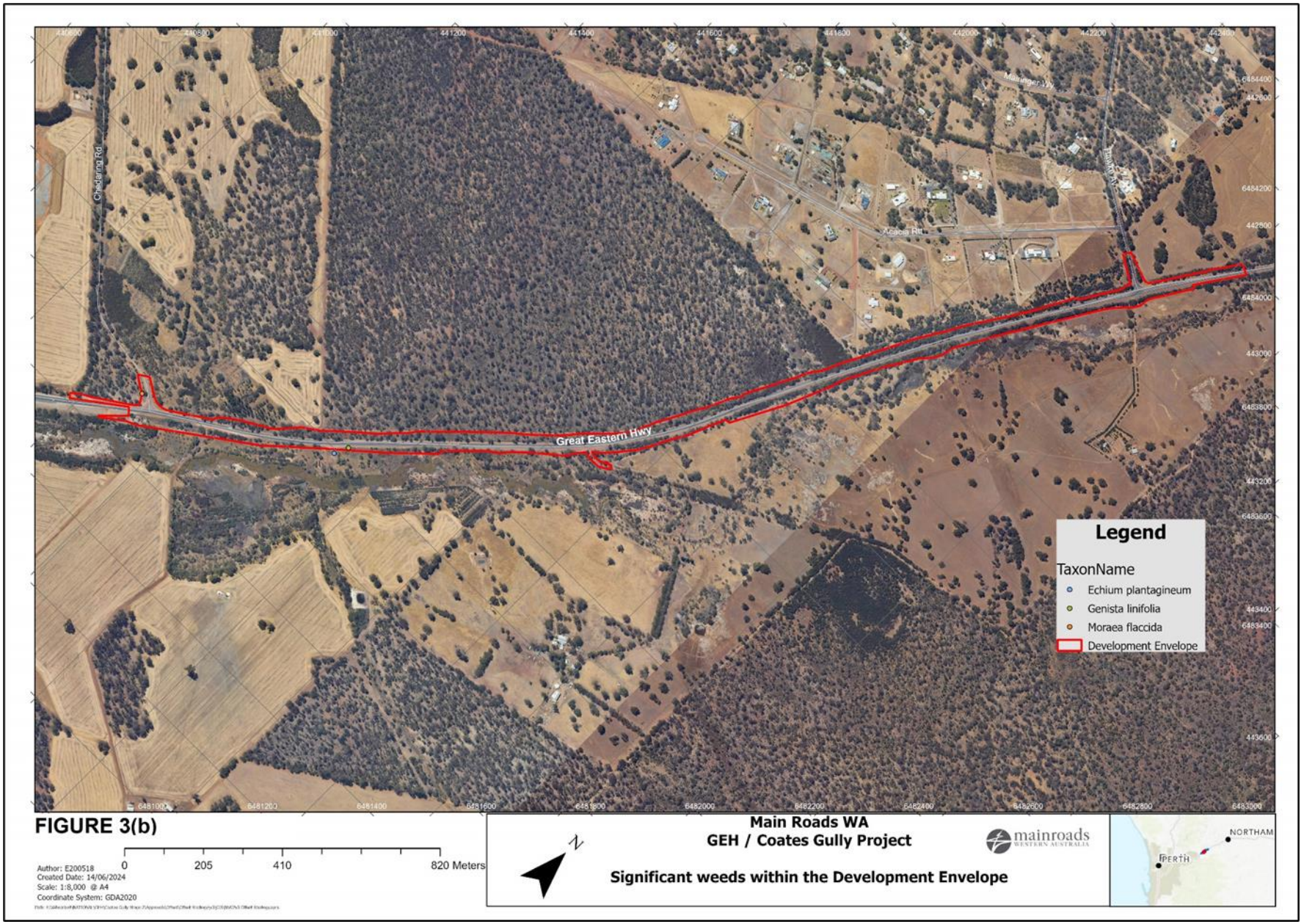

Figure 3 (b) Significant weeds

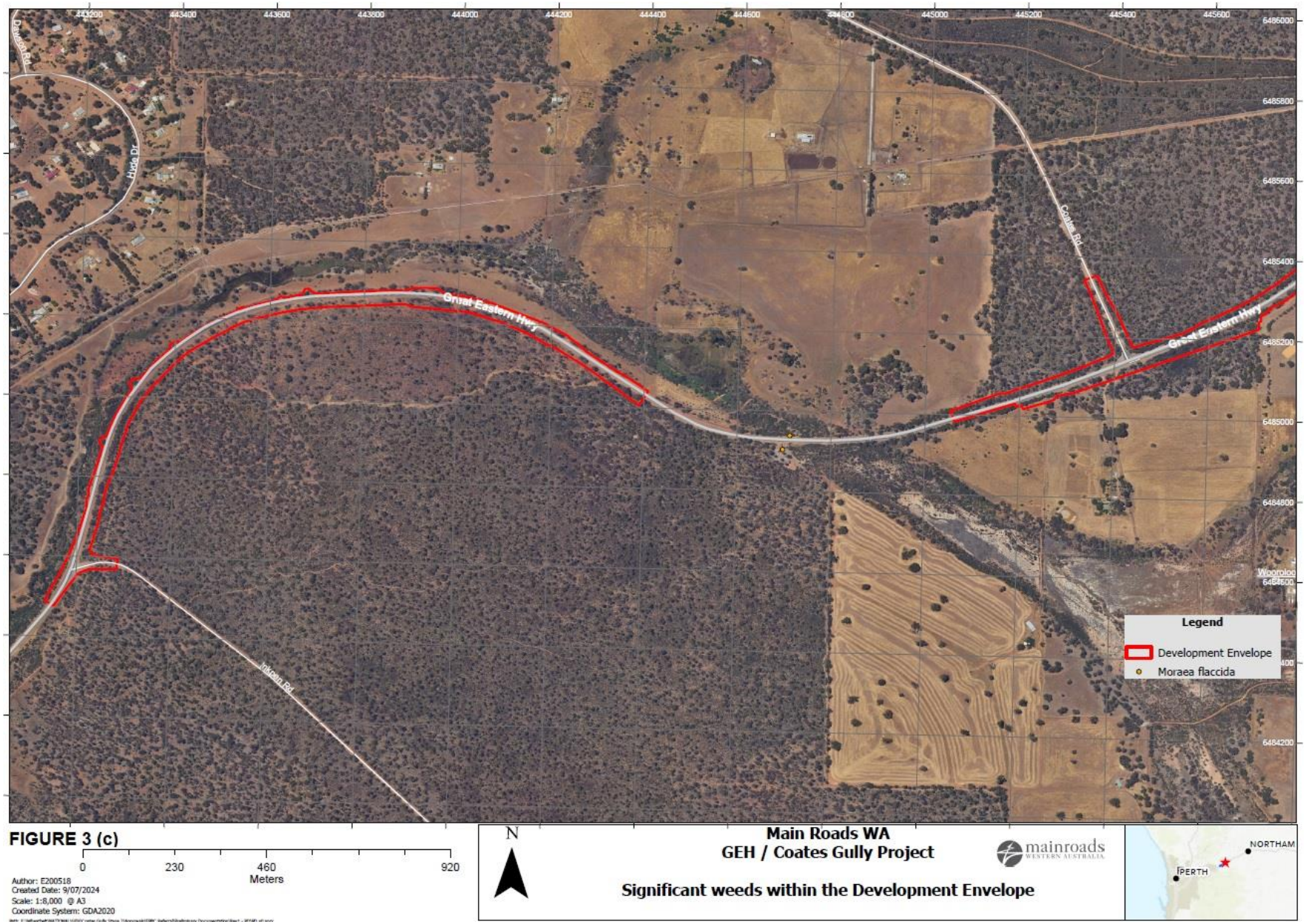

Figure 3 (c) Significant weeds

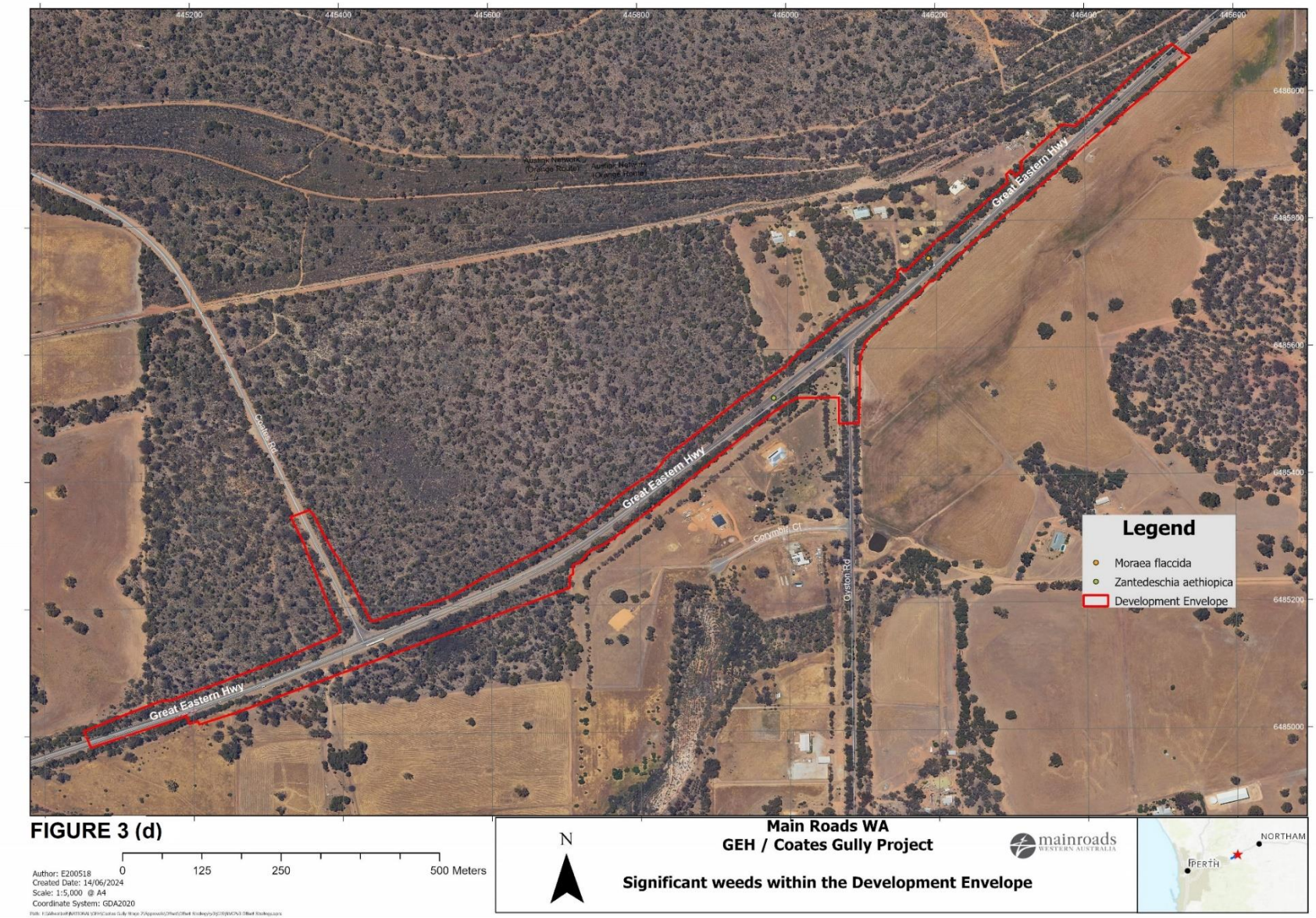

Figure 3 (d) Significant weeds

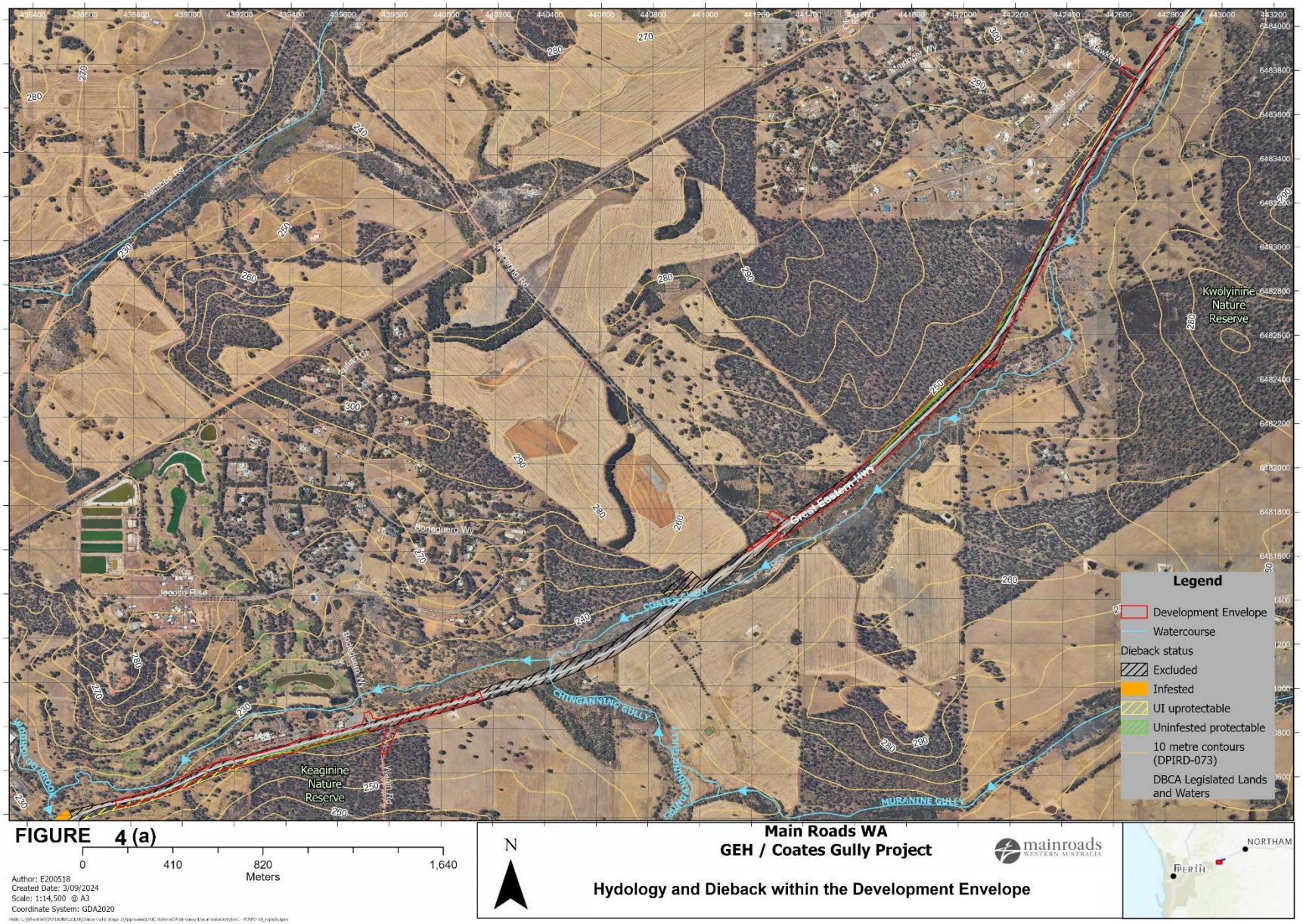

Figure 4 (a) Hydrology and Dieback

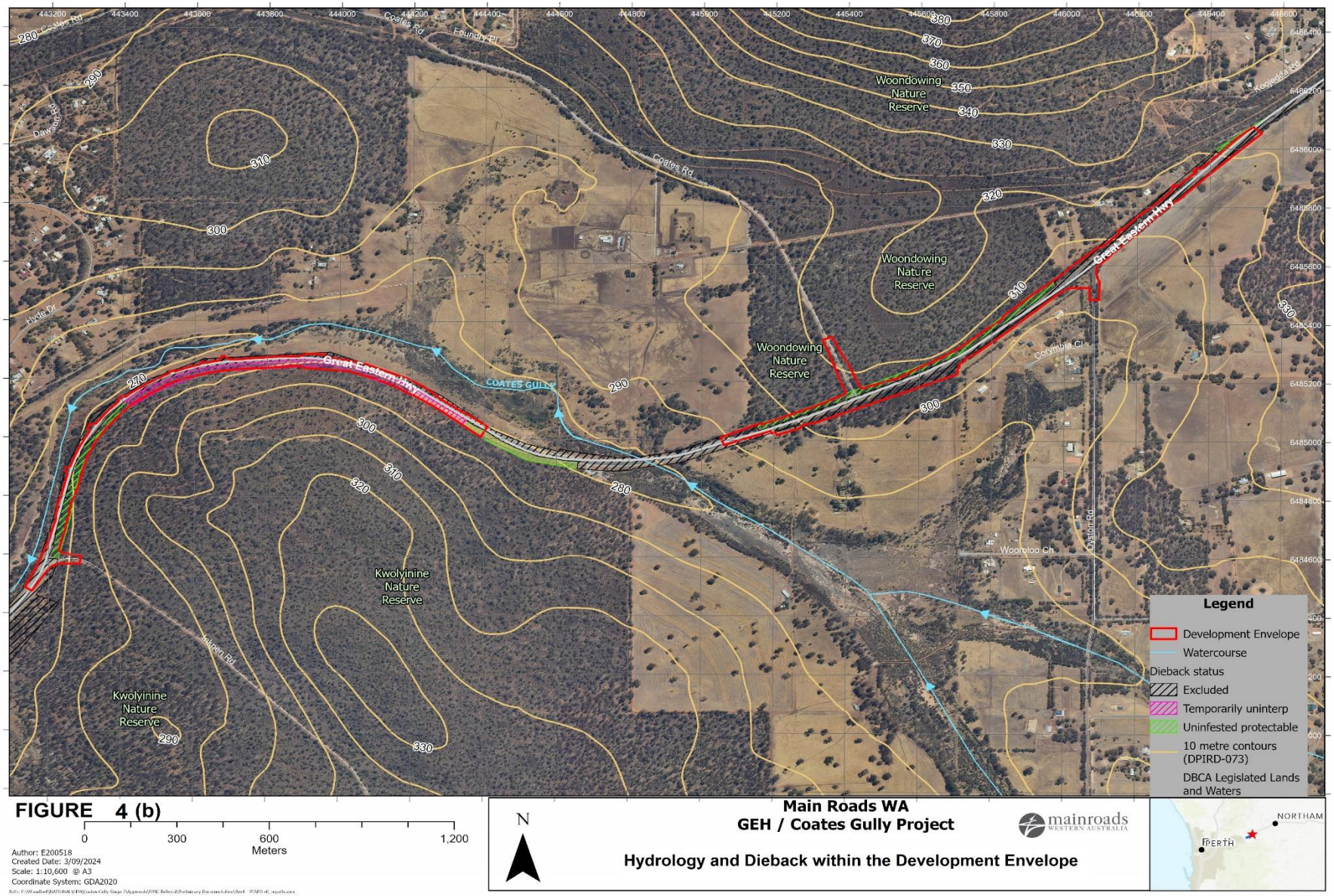

Figure 4 (b) Hydrology and Dieback

2.2 Potential impacts

This section provides a summary of potential impacts to MNES from the Proposed Action construction activities, based on the detailed assessment of impacts presented in the Preliminary Documentation (Main Roads, 2024).

2.2.1 Direct impacts

The Proposed Action is expected to result in the following direct impacts to habitat for Carnaby's Black Cockatoo, Baudin's Black Cockatoo and FRTBC within the DE:

- Clearing of up to 1.4 ha of High Quality, 12.5 ha of Medium Quality and 1.8 ha of Low Quality foraging habitat for Carnaby's Black Cockatoo
- Clearing of up to 1.4 ha of High Quality, 12.5 ha of Medium Quality and 1.7 ha of Low Quality foraging habitat for Baudin's Black Cockatoo and FRTBC
- Clearing of up to 15.6 ha of potential breeding and roosting habitat for Black Cockatoos
- Clearing of up to 400 suitable DBH trees for Black Cockatoos.

The Proposed Action construction activities have the potential to result in direct impacts (injury or mortality) to Carnaby's Black Cockatoo, Baudin's Black Cockatoo and FRTBC individuals present during clearing activities and via bird strike with construction vehicles.

The Proposed Action is not expected to result in impacts to known nesting hollows of Carnaby's Black Cockatoo and FRTBC. The Proposed Action is not expected to result in impacts to Baudin's Black Cockatoo breeding habitat. However, the DE represents potential breeding habitat for Black Cockatoos, given the presence of suitable DBH trees (mostly Wandoo and Marri) and foraging habitat.

Two unverified Black Cockatoo breeding records within the vicinity of the DE, in the Wundowie Reserve (5 km north) were identified during initial desktop assessment of the Proposed Action (Biologic, 2021). Records of FRTBC breeding located within approximately 9 km of the DE. The closest verified breeding record for Baudin's Black Cockatoo is 50 km south of the DE within the Wungong catchment area (T. Kirkby, pers. comm.).

No known roosting sites for Black Cockatoos will be impacted by the Proposed Action. Although roosting was not recorded within the DE during the survey (Bamford 2015, revised 2021 & Biologic, 2021), there is potential for Carnaby's Black Cockatoo, Baudin's Black Cockatoo and FRTBC to roost within the DE during the construction phase in one or more of the large trees present in the *Eucalyptus* woodland and Isolated trees habitat. Roosting may potentially occur throughout the year.

There are limited opportunities for rehabilitation within the DE as the Proposed Action constitutes minimal realignment and all contractor ancillary activities will be restricted to existing cleared areas (i.e. farmers paddocks).

2.2.2 Indirect impacts

The Proposed Action has the potential to cause indirect impacts to Black Cockatoo habitat that lies within and adjacent to the DE. Potential indirect impacts can be caused by:

- Indirect impacts to potentially suitable hollows within the vicinity of the DE
- Spread and/or introduction of weeds
- Introduction and/or spread of pathogens, such as Dieback (*Phytophthora cinnamomi*)
- Vehicle strike
- Erosion, Sedimentation
- Spills of hazardous materials and wastes
- Fire.

The introduction and/or spread of dieback and/or weeds would result in long term impacts, whereas indirect impacts to potentially suitable hollows within the vicinity of the DE, erosion and sedimentation, hydrocarbon/waste spills and fire would result in short term impacts. The DE lies adjacent to good condition native vegetation and Black Cockatoo habitat within the Keaginine, Kwolyinine and Woondowing Nature Reserves.

2.2.2.1 Potential long-term indirect impacts

Dieback assessment found two small areas of Dieback infestation (totalling 0.93 ha) approximately 180 m to the west of DE, in the vicinity of Linley Valley Road (Glevan, 2021). Although the DE is devoid of Dieback infestation, there is the potential for construction activities to spread *Phytophthora* from the existing infestations within the vicinity of the DE. In addition, Dieback could be introduced to the DE through imported soil/plant materials/surface water or on construction plant or vehicles.

The DE and adjacent contains areas of infestation with Declared Pests:

- *Gomphocarpus fruticosus* (Narrowleaf Cotton Bush) – Declared Pest
- *Moraea flaccida* (One-leaf Cape Tulip) – Declared Pest
- *Zantedeschia aethiopica* (Arum Lily) – Declared Pest
- *Echium plantagineum* (Paterson's Curse) – Declared Pest
- *Genista linifolia* (Flax-leaf Broom) – WoNS
- *Asparagus asparagoides* (Bridal Creeper) – Declared Pest and WoNS.

Construction activities have potential to spread existing weed infestations as well as introduce weeds with imported soil/plant materials/surface water or on construction plant or vehicles. Weeds spread or introduced within the DE will require management during operations and may spread into adjacent land.

2.2.2.2 Potential short-term indirect impacts

Proposed Action construction works will not require the removal of the four trees identified with potentially suitable hollows that are located within 10 m of construction works, however, construction activities may affect breeding pairs utilising the potentially suitable hollow(s), should the delivery of the Proposed Action coincide with the Black Cockatoo breeding season. Potentially suitable hollow/s identified to contain active breeding BC species are likely to be exposed to increased noise from construction works and potentially be affected by dust and lighting towers should works occur outside of daylight hours.

Construction activities have potential to cause uncontrolled surface runoff from compacted and paved areas resulting in erosion and sediment discharge, as well as accidental spills of hazardous materials or wastes. These discharges could result in localised impact to vegetation condition within and adjacent to the DE.

Construction activities have potential to result in fires through hot works, operation of vehicles with spark ignition engines, and inappropriate disposal of cigarettes. Fire spread from the DE into surrounding areas may potentially affect large areas of the Keaginine, Kwolyinine and Woondowing Nature Reserves.

Construction activities will result in increased amount of heavy machinery within the DE which has the potential to result in an increased number of fauna strikes to BC species known to foraging in adjacent bushland vegetation.

2.3 Risk assessment

A risk assessment has been undertaken of the potential impacts identified for the Proposed Action construction activities, in accordance with the EMP Guidelines. The risk assessment adopts likelihood and consequence criteria and a risk matrix, presented in Table 2, Table 3 and Table 4.

Table 5 presents the risk assessment results, incorporating management objectives and measures to generate a residual risk outcome for each identified risk. Management measures, references and documents (*procedures, processes, work practices and forms)* referred to in Table 5 are listed in Section 6, Controlling Documents.

Section 3 provides implementation details for the management objectives and measures.

Table 2 Likelihood criteria

Likelihood	Criteria
Highly likely	Is expected to occur during the construction/operation period
Likely	Will probably occur during the construction/operation period
Possible	Might occur during the construction/operation period
Unlikely	Could occur during construction/operation but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

Table 3 Consequence criteria

Likelihood	Criteria
Minor	Minor environmental impact that can be reversed
Moderate	Isolated but substantial environmental impact that could be reversed with intensive efforts
High	Substantial environmental impact that could be reversed with intensive efforts
Major	Major loss of environmental value and real danger of continuing
Critical	Severe widespread loss of environmental value and irrecoverable environmental damage

Table 4 Risk ranking matrix

Likelihood	Consequence				
	Minor	Moderate	High	Major	Critical
Highly likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

Table 5 Risk assessment of Proposed Action construction activities to Matters of National Environmental Significance

Management objective / desired outcome	Risk	Cause	Unmoderated Risk			Management measures (refer to Table 8)	Residual risk		
			Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
To avoid impacts to Black Cockatoo habitat beyond that approved	Loss of habitat for Carnaby's Black Cockatoo, Baudin's Black Cockatoo and FRTBC	• Clearing more than 1.4 ha High Quality foraging habitat, 12.5 ha of Medium Quality foraging habitat and 1.8 ha of Low-Quality foraging habitat for Carnaby's Black Cockatoo • Clearing more than 1.4 ha High Quality foraging habitat, 12.5 ha of Medium Quality foraging habitat and 1.7 ha of Low-Quality foraging habitat for Baudin's Black Cockatoo and FRTBC • Clearing of more than 400 suitable DBH trees for Black Cockatoos • Clearing of Black Cockatoo habitat outside of the approved area	Likely	High	High	• All currently identified Black Cockatoo DBH trees within DE that are not required to be cleared will be marked with white flagging tape and identified as no-go areas, demarcated on relevant drawings and provided to the Construction Contractor Representative – Doc #; 201928-0001-2 and 201928-0007. • Vegetation to be retained within the DE will be clearly marked with white flagging tape- Doc #; 201928-0001-2 • All clearing areas will surveyed, demarcated and identified with pink flagging tape and approved by the Main Roads Superintendent prior to clearing commencing – Doc #; 201928-0001-2 • A pre-clearance inspection will be undertaken prior to commencement of clearing to ensure flagging of DBH trees, no-go zones, vegetation retention and vegetation clearing limits is correct and aligns with drawings showing no-go areas– Doc #; 201928-0001-2 and 201928-0007 • Induction of construction personnel on the presence and value of vegetation and Black Cockatoo habitat adjacent to the DE, and vegetation and Black Cockatoo habitat to be retained within the DE • Daily inspection of flagging, clearing areas and retention areas during clearing stage - Doc # 201928-0001-2 and D19#787510 • Ancillary services required for construction such as laydown areas, stockpile areas and vehicle turn around, will be located in areas cleared for permanent works or areas that do not contain Black Cockatoo habitat (i.e. farmers paddocks)	Unlikely	High	Medium
To avoid edge impacts into adjacent areas of habitat outside the DE	Degradation in condition of foraging and potential breeding habitat for Black Cockatoos	• Construction plant, equipment, soil, surface water movement introducing or spreading weeds and/or dieback to uninfested vegetation • Unauthorised site access introducing or spreading weeds and/or dieback to uninfested vegetation	Possible	High	Medium	• Declared Plants within the construction site boundary will be treated prior to clearing according to their Control Codes and advice from Department of Primary Industries and Regional Development (DPIRD), with the aim of eradication where possible but as a minimum prevent off site movement -refer to Appendix 1 • Prior to clearing, control of WoNS and environmental weeds within the construction site boundary will be treated according to the weed control management outlined by Weeds Australia (http://weeds.ala.org.au/) with the aim of controlling off-site movement - refer to Appendix 1 • Topsoil containing Declared Plants or WoNS (plus a 5 m buffer) will be removed and stockpiled separately to clean topsoil at designated stockpile area or disposed to waste facility – Doc # 201928-0002-1 • Areas of infested stockpiled topsoil to be clearly marked as no use areas - – Doc # 201928-0007 • Infested topsoil to be buried at a depth of at least 300 mm or disposed off-site at a landfill • All heavy plant and machinery will be inspected by the contractor and a vehicle hygiene inspection checklist completed prior to entry at the work site and be confirmed to be clean and free of vegetation and soil material – Doc # D18#847320 • Dieback infested areas to be survey and demarcated within the DE prior to commencing works, Clean on Entry points established and site induction to	Rare	High	Low

Management objective / desired outcome	Risk	Cause	Unmoderated Risk			Management measures (refer to Table 8)	Residual risk		
			Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
						clearly communicate hygiene works requirements. – Doc # D18#847320, D23#179551 • Topsoil from infected or potentially infected Phytophthora dieback areas shall be segregated and not used in non-infected areas • Dieback protectable areas will be identified and established within the DE and adjacent land to guide dieback hygiene practises including Clean on Entry and/or Exit (CoE) procedures that will be implemented on site, and entry and exit records kept for the CoE points. – Doc # D18#847320, D23#179551 • Dieback survey to be undertaken within 12months of commencing work for the DE and surrounding area prior to commencing and ongoing 6 monthly in locations identified as protectable or un-infested. • No uncontrolled discharge of surface water outside of DE, surface drainage within DE directed to existing constructed road drainage network.			
		• Reduced habitat quality/condition due to construction dust emissions	Possible	Moderate	Medium	• Water carts and/or surface stabilisation measures (e.g. hydro mulch) will be used to minimise dust generated from cleared areas/ bare unsealed surfaces • Local weather conditions are to be monitored daily to identify high risk conditions (dry with high/gusty winds), water-cart on standby during high risk weather. • Dust generating activities will be suspended at the direction of the Construction Contractors Environmental Representative and will not recommence without approval of Contractors Environmental Representative • No construction to occur within 10m of an identified active BC breeding hollow within breeding BC season • Vehicle speeds will be limited to between 40-60km/hr on site for safety purposes and this will consequently reduce dust generated.	Unlikely	Moderate	Low
		• Surface water runoff and spills from temporary construction areas causing erosion, sedimentation or contamination	Possible	Moderate	Medium	• Temporary erosion and sediment controls will be maintained within the DE during construction to prevent stormwater runoff from construction areas from eroding or causing sediment deposition in adjacent native vegetation. • No uncontrolled discharge of surface water outside of DE, surface drainage within DE directed to existing constructed road drainage network. • Waste and hazardous materials management measures will be implemented during construction to prevent contaminant discharges to adjacent native vegetation. • No storage of waste or hazardous materials within 50 m of Black Cockatoo habitat or water bodies.	Unlikely	Moderate	Low
		• Surface water runoff from road surface causing sedimentation or pollution	Possible	Moderate	Medium	• Surface runoff within the DE will drain into roadside drains constructed within the DE. The roadside drains will be designed to capture and infiltrate runoff from a 1 in 100 year Average Recurrence Interval (ARI) rainfall event, to prevent stormwater runoff into adjacent areas of native vegetation. • Local weather forecasts to be monitored daily, additional temporary measures (such as diversion channels/ sand bagging) to be installed to divert surface water flows away from sensitive receivers to constructed road drainage lines if significant rainfall event is forecast.	Rare	Moderate	Low
		• Damage to vegetation from accidental fires caused by construction activities	Possible	High	Medium	• All hot work will be undertaken in accordance with Contractor's hot work procedure. This will be reviewed and approved by the Main Roads Superintendent prior to work commencing • All vehicles, plant and equipment to be fitted with fire extinguishers and restricted to designated cleared areas unless involved in clearing operations • No smoking permitted onsite unless within designated smoking areas	Rare	High	Low

Management objective / desired outcome	Risk	Cause	Unmoderated Risk			Management measures (refer to Table 8)	Residual risk		
			Likelihood	Consequence	Risk rating		Likelihood	Consequence	Risk rating
						• No burning of any material authorised onsite • Fire danger ratings and Shire vehicle movement bans to be observed and the requirements of these implemented			
		• Landscaping introducing or spreading weeds and/or dieback to uninfested vegetation	Possible	Moderate	Medium	• Topsoil within the DE will be harvested, stockpiled and reused in accordance with Main Roads Environmental Guideline Topsoil Management- Doc#201928-0002-1 • Landscaping within the road reserve will use local native species in accordance with Main Roads Specification 304 (Revegetation and Landscaping) and Main Roads Environmental Guideline Revegetation Planning and Techniques. Doc # D19#12558 and D19#12560 • Dieback hygiene measures to be implemented during construction, including clean on entry – Doc # D18#847320, D23#179551 • All fill material required during construction is to be sourced from approved and certified sources only, free from weed and dieback	Unlikely	Moderate	Low
To avoid injury or mortality to Black Cockatoos, during vegetation clearing and construction	Fauna mortality during construction	• Vehicle collision with birds during construction	Unlikely	High	Medium	• Induction of construction personnel on reducing the risk of fauna injury and the procedure in the event of fauna injury or death – Doc # D17#681312, Appendix 2 • A designated fauna spotter will be present during all clearing activities. The person will hold a permit to handle and move significant fauna under Section 40 of the Biodiversity Conservation Act 2016, have suitable equipment to administer emergency care to injured and or displaced fauna, and have access to a care facility that can used to rehabilitate injured fauna • Speed limits between 40-60km p/hr will be applied throughout the construction site for safety purposes which will consequently reduce the risk of fauna strikes during construction • Where active BC breeding trees are located within 10 m of construction works, works will be postponed until breeding event is complete • Local wildlife rescue organisations and/or carers will be contacted in the event of fauna injury' • Revegetation designs shall not include foraging or breeding plant species within 10 m of the road alignment- Doc # D19#12558 and D19#12560	Rare	High	Low
		• Clearing of active breeding trees	Unlikely	High	Medium	• Within 7 days prior to commencing clearing, the four trees identified within 10m of the DE will be inspected by a suitably qualified person to confirm that potentially suitable hollows are not currently being used by Black Cockatoos within the breeding period for Black Cockatoos (i.e. July to December). Unoccupied hollows identified during this survey will be blocked to deter Black Cockatoo use during construction. • Within 7 days prior to clearing events, any tree and vegetation within 10 m of any tree identified as being potentially used by Black Cockatoos for nesting must not be cleared until a suitably experienced person has verified that the tree is not in use • A designated fauna spotter will be present during all clearing activities. The person will hold a permit to handle and move significant fauna under Section 40 of the Biodiversity Conservation Act 2016, have suitable equipment to administer emergency care to injured and or displaced fauna, and have access to a care facility that can used to rehabilitate injured fauna	Rare	High	Low

3 ENVIRONMENTAL MANAGEMENT MEASURES

SMART performance standards have been developed for this CEMP to address the requirements of both the EPA (Environmental Management Plans EPA (2024)) and DCCEEW (DoE (2014) *Action Management Plan Criteria)*. Relevant terminology from both formats is included where relevant. SMART performance standards are intended to relate to measurable (numerical) values, which can be applied to a Proposed Action (rather than qualitatively measured management / monitoring actions), and can include measurements such as 'performance indicators', 'corrective actions' and 'completion criteria'. Terms used in the SMART performance standards in this plan are defined in Table 6.

Table 6 Smart performance standard term definitions

Term	Definition
Performance target / Outcome	Proposed Action-specific measurable target defined to assess whether the management actions are effective in achieving the environmental objective
Performance indicator	The aspect of monitoring that provides a quantifiable parameter to measure performance over time to assess whether the target/outcome will be achieved/has been maintained.
Trigger / Early warning indicator	Values specified for the performance indicator that provide for early warning of potential impacts or plan not meeting plan objective/s (reach of which is determined through monitoring)
Contingency / corrective action	Actions to be undertaken should a trigger value be reached or exceeded
Completion criteria	Proposed Action-specific indicators designed to demonstrate the environmental objective is being or has been met (criteria for success)

In relation to listed threatened fauna, Main Roads has prepared SMART performance standards directly related to the measurable impacts of the Proposed Action on each taxon. The proposed SMART performance standards for the Proposed Action are identified in Table 7.

These SMART performance standards are aligned to the management actions and performance targets, monitoring actions and corrective actions identified in Table 8.

The 'trigger criteria' and 'completion criteria' are considered to be achievable; with the risk potential of not achieving the proposed SMART performance standards captured by the risk assessment presented Section 2.3 and Table 5.

As the proposed SMART performance standards for 'trigger criteria' and 'completion criteria' relate to physical measures that can be readily controlled through standard construction management processes[1], the proposed SMART performance standards have a low level of uncertainty, with additional margins for safety not required.

[1] Measures that have been applied successfully to other large scale projects that are considered appropriate in minimising the environmental impacts. These measures ensure that clearing is implemented properly, that erosion does not occur, and that spills are minimised and managed appropriately.

Table 7 SMART performance standards for Black Cockatoo

Environmental objective: Minimise the impacts to Black Cockatoos during construction of the Proposed Action				
Performance target / outcome	**Trigger / early warning indicator**	**Performance indicator**	**Corrective actions**	**Completion criteria**
To minimise and manage impacts to Black Cockatoo habitat beyond that approved	• Clearing of Black Cockatoo habitat and / or suitable DBH trees at 90% of approved limit	Amount of Black Cockatoo foraging and potential breeding habitat cleared	• Review clearing program progress against design to confirm clearing of Black Cockatoo habitat will not exceed the approved limit	• Not more than 400 suitable DBH trees cleared • No potentially suitable hollow (suitable and worn entrance) cleared • Not more than 15.7 ha of Carnaby's Black Cockatoo foraging habitat cleared • Not more than 15.6 ha of Baudin's Black Cockatoo and FRTBC foraging habitat cleared • Not more than 15.6 ha of Black Cockatoo breeding and roosting habitat cleared
To minimise and manage edge impacts into adjacent areas of habitat outside the DE	• Occurrence of a Declared Plant or WoNS within the DE or immediately adjacent during construction • Occurrence of dieback within the DE or immediately adjacent during construction	Number of Declared Plants, WoNS or dieback occurrence within the DE or immediately adjacent	• Application of weed eradication techniques for the weed species (refer to Appendix 1) • Review CoE process Doc # D23#179551 , D17#859669 • Survey for Dieback infestation within protectable / un-infested land bi-annually • Hygiene management procedures and site induction reviewed for suitability if non-conformance is identified	• No new Declared Plants, WoNS or *Phytophthora* dieback in land within or adjoining the DE as a result of the Proposed Action
To minimise and manage injury or mortality to Black Cockatoos during vegetation clearing and construction	• Trees located within 10m of the DE with hollows used by or suitable for use by Carnaby's Black Cockatoo or FRTBC not inspected by a suitably experienced person within 7 days prior to clearing • Black Cockatoo sighting within a tree hollow -/+ 10 m from construction area • Injured Black Cockatoo individual(s) within DE with injury suspected to be a consequence of construction activity • Live individual(s) identified within a hollow of a felled tree (despite preclearing fauna survey of hollows)	Number of Black Cockatoos injured or killed	• Clearing in the direct vicinity will cease immediately if trigger is met • Immediate inspection of injured Black Cockatoo (if required) • Contractor to provide evidence that a suitably experienced person is engaged to conduct surveys prior to subsequent clearing events • Contractor to provide evidence that surveys are scheduled within 7 days prior to subsequent clearing events • Clearing will not recommence until no go areas have been reviewed and confirmed to be in place correctly, and Main Roads Superintendent provides approval to recommence • Local wildlife rescue organisations and/or carers will be contacted to advise of an appropriate destination to transfer injured cockatoo(s) • Clearing will not recommence until Black Cockatoo has been relocated and checks have been completed to ensure no additional Black Cockatoo individuals are present, and the fauna spotter / catcher provides approval to recommence	• No Black Cockatoo mortalities as a consequence of construction activities

The SMART performance standards do not require detailed statistical analysis to determine if the 'trigger criteria' and 'completion criteria' have been met, nor require statistical power to detect change (for example, seasonal or climatic variability) at control or reference sites (for comparative purposes).

3.1 Implementation

Table 8 provides detail of the management measures to be put in place to achieve the outcomes identified in the risk assessment, including performance targets/completion criteria, implementation timing, monitoring, reporting and corrective action.

Management controls, references and documents (*procedures, processes, work practices and forms)* referred to in Table 8 are listed in Section 6.

Table 8 Management measures for Black Cockatoos

Management objective / desired outcome	Timing	Management measures	Performance target / outcome	Completion criteria	Monitoring / reporting activity	Trigger / early warning indicator	Corrective action	Corrective action responsibility
To minimise and manage unauthorised impacts to Black Cockatoo habitat	Contract award and prior to commencement of clearing	Induction of construction personnel on the presence and value of vegetation and Black Cockatoo habitat adjacent to the DE, and vegetation and Black Cockatoo habitat to be retained within the DE	• All construction personnel inducted prior to clearing activities Doc # D17#681312	• Clearing limit to be surveyed and demarcated prior to commencing clearing activities • Not more than 400 suitable DBH trees cleared • No potentially suitable hollow within 10m of DE (suitable and worn entrance) cleared • Black Cockatoo foraging habitat cleared • Not more than 15.6 ha of Baudin's Black Cockatoo and FRTBC foraging habitat cleared • Not more than 15.6 ha of Black Cockatoo breeding and roosting habitat cleared	• Induction records reviewed prior to commencement of clearing Doc # D17#681312	• Any construction personnel not inducted prior to the commencement of clearing activities	• Undertake induction prior to recommencing work Doc# D17#681312	• Construction Contractor Environmental Management Representative • Main Roads Superintendent
		All currently identified Black Cockatoo suitable DBH trees within DE that are not required to be cleared will be marked with white flagging tape and identified as no-go areas, demarcated on relevant drawings and provided to the Construction Contractor Representative - Doc # 201928-0001-2	• All environmental no-go areas clearly marked with white flagging tape on site and inspected prior to clearing hold points being released. Doc # 201928-0001-2 • Drawings showing environmental no-go areas provided to the Construction Contractor Representative		• Record of provision of drawings showing environmental no-go areas • Environmental Management Representative inspection prior to clearing to confirm no-go areas are appropriately flagged / fenced, and that clearing remains within limits - Doc # 201928-0001-2 • Incident reporting (EQSafe) – see Form Appendix 2, Doc # D12#153561 • Weekly site inspections • Weekly site inspection by Construction Contractor	• No-go areas not flagged, or incorrectly flagged, on site prior to clearing • Drawings showing no-go areas not provided to the Construction Contractor Representative prior to clearing	• Clearing in the direct vicinity will cease immediately if trigger is met. Clearing will not recommence until no-go areas have been reviewed and confirmed to be in place correctly, and Main Roads Superintendent provides approval to recommence • Flagging within the DE will be corrected prior to clearing • Incorrectly cleared areas will be rehabilitated within 6 months of completion of clearing for revegetation with Black Cockatoo foraging habitat species	
		Vegetation to be retained within the DE will be clearly marked with white flagging tape Doc # 201928-0001-2	• All vegetation to be retained within the DE will be marked with white flagging tape Doc # 201928-0001-2			• Vegetation to be retained within the DE not flagged or incorrectly flagged, prior to commencement of clearing		
		All clearing areas will be marked with pink flagging tape and approved by the Main Roads Superintendent prior to clearing commencing Doc # 201928-0001-2	• All areas to be cleared within the DE will be marked with pink flagging tape Doc # 201928-0001-2			• Areas to be cleared within the DE not flagged, or incorrectly flagged prior to commencement of clearing		

Management objective / desired outcome	Timing	Management measures	Performance target / outcome	Completion criteria	Monitoring / reporting activity	Trigger / early warning indicator	Corrective action	Corrective action responsibility
		A pre-clearance inspection will be undertaken prior to commencement of clearing to ensure flagging for no-go zones, vegetation retention and vegetation clearing is correct and aligns with drawings showing no-go areas Doc # 201928-0001-2	• All vegetation to be cleared and vegetation to be retained within the DE is correctly flagged and aligns with drawings showing no-go areas Doc # 201928-0001-2		• Pre-clearance inspection report	• Areas within the DE not correctly flagged during pre-clearance survey		
	During construction	Daily inspection of clearing areas and retention areas during clearing stage	• Clearing and retention areas inspected daily, clearing area appropriately flagged Doc # 201928-0001-2		• Inspection reports	• Daily inspection not undertaken; no site flagging identified	• Cease clearing and undertake inspection.-Re-survey, demarcate and flag clearing limits. Clearing will not recommence until inspection complete.	
		Ancillary services required for construction such as laydown areas, stockpile areas and vehicle turn around, will be located in areas cleared for permanent works or areas that do not contain Black Cockatoo habitat (i.e. farmers paddocks) Clearing will be avoided for any temporary construction activities	• Areas for ancillary services / temporary construction activities located in cleared areas or areas that do not contain Black Cockatoo habitat • No clearing of Black Cockatoo habitat for ancillary services / temporary construction activities		• Construction site plan (and photos showing all ancillary areas not located on land containing Black Cockatoo habitat) reviewed by Main Roads Superintendent prior to release of clearing hold point. • Monthly site inspections Doc # D18#685148	• Areas for ancillary services / temporary construction activities planned to be located within areas that contain Black Cockatoo habitat	• Main Roads Superintendent is required to provide approval for clearing of native vegetation for construction laydown etc., approval must only be given if there are no other practicable options • Incorrectly cleared areas will be rehabilitated within 6 months of completion of clearing for revegetation with Black Cockatoo foraging habitat species	• Main Roads Superintendent
To minimise and manage edge impacts into adjacent areas of Black Cockatoo habitat outside the Development Envelope	Prior to and during construction	Declared Plants within the DE will be treated prior to clearing according to their Control Codes and advice from Department of Primary Industries and Regional Development (DPIRD), with the aim of eradication where possible but as a	• Number of new occurrence or spread of Declared Plants within the DE or in immediately adjacent areas during construction activities	No new Declared Plants, WoNS or *Phytophthora* dieback in land within or adjoining the DE as a result of the Proposed Action	• Weekly site inspections • Annual revegetation Representative monitoring	• Occurrence of a Declared Plant or WoNS within the DE or immediately adjacent during construction	• Re-Application of weed eradication techniques for the weed species (refer to Appendix 1) • Review and update CoE process – Doc # D17#859669, D23#179551	• Construction Contractor Representative • Construction Environmental Management Representative

Management objective / desired outcome	Timing	Management measures	Performance target / outcome	Completion criteria	Monitoring / reporting activity	Trigger / early warning indicator	Corrective action	Corrective action responsibility
		minimum prevent off site movement – Appendix 1						
		Prior to clearing, control of WoNS and environmental weeds within the construction site boundary will be treated according to the weed control management outlined by Weeds Australia (http://weeds.ala.org.au/) with the aim of controlling off-site movement (refer to Appendix 1)	• No new occurrence or spread of WoNS or environmental weeds through construction activities				• Application of weed eradication techniques for the weed species (refer to Appendix 1) until completion criteria of weed cover at less than 30% is met • Review CoE process – Doc # D17#859669, D23#179551	
	During construction	• Topsoil containing Declared Plants or WoNS (plus a 5 m buffer), based on baseline flora and vegetation survey mapping, removed and stockpiled separately to clean topsoil – Doc # 201928-0002-1 • Areas of infested (weeds) stockpiled topsoil to be clearly marked as no use areas - Doc # 201928-0007 • Infested topsoil to be buried at a depth of at least 300 mm or disposed off-site at a landfill	• Topsoil containing Declared Pests or WoNS shall not be reused in landscaping, revegetation or respread within DE		• Records of topsoil segregation and burial or disposal at licensed waste facilities provided within Construction Contractor's monthly report.	• Topsoil containing Declared Pests and WoNS planned to be used in landscaping or revegetation activities	• Topsoil removed from landscaping/revegetation areas and replaced with clean topsoil. Infested topsoil buried at depth or disposed at a licensed waste facility	

Management objective / desired outcome	Timing	Management measures	Performance target / outcome	Completion criteria	Monitoring / reporting activity	Trigger / early warning indicator	Corrective action	Corrective action responsibility
	Prior to and during construction	• All heavy plant and machinery will be inspected by the contractor prior to entry at the work site and be confirmed to be clean and free of vegetation and soil material. Doc # D17#859669, D23#179551	• All heavy plant and machinery will be verified clean on arrival at site- Doc # D17#859669 • No entry of heavy plant and machinery into the DE without prior inspection. - Doc # D23#179551		• Records verifying plant and machinery arriving on site is clean - Doc # D17#859669	• Heavy plant and machinery not inspected prior to entry of work site during construction activities	• Refresher training will be conducted - Doc # D17#859669, D23#179551, D17#681312	
	During construction	Topsoil from infected or potentially infected *Phytophthora* dieback areas shall be segregated and not used in non-infected areas - Doc # 201928-0002-1 Clean on Entry hygiene form completed prior to construction activities commencing - Doc # D17#859669	• No reuse of topsoil containing infected or potentially infected *Phytophthora* dieback - Doc # 201928-0002-1 • All topsoil from infested and potentially infected dieback areas disposed of at a licensed facility • Dieback Protectable land does not become infested		• Records of topsoil segregation - Doc # 201928-0002-1 • Hygiene forms complete - Doc # D17#859669, D23#179551 • Clean on Entry / dieback infested/ dieback protectable signage onsite- Doc # 201928-0007 • Dieback survey of protectable areas to be completed bi-annually for upto 3 years.	• Topsoil from infected or potentially infected Phytophthora dieback not segregated or planned to be used in non-infected areas during construction activities • No signage for dieback protected areas / clean on entry onsite • Site induction material does not cover site hygiene requirements • No hygiene inspection form completed	• Topsoil sampled for Phytophthora at sampling density according to WA guidelines • If topsoil found to contain *Phytophthora*, the topsoil will be removed and temporarily placed on an infected area and disposed of at a licensed waste facility • If infected topsoil is used in non-infected areas, phosphite will be applied to dieback susceptible species within 30 m of placed topsoil that tested positive for *Phytophthora*, in accordance with DBCA guidance • Any protectable area with unauthorised activities to be surveyed for dieback infestation	
	During Construction	Dieback infested and protectable areas will be identified and established within the DE and adjacent land to guide dieback hygiene practises including CoE procedures that will be implemented on site,	• No breach of CoE protocols • No unauthorised entry to site • Clear signage onsite to demarcate COE / dieback infested /		• Entry and/or exit hygiene records for CoE points - Doc # D17#859669, D23#179551 • Monthly site inspections	• Hygiene checklist forms not available onsite • No COE sign-posted onsite • No dieback signage onsite to identify	• Refresher training / site induction to be re-completed • Site induction to be reviewed • Hygiene management forms and site requirements reviewed for	

Management objective / desired outcome	Timing	Management measures	Performance target / outcome	Completion criteria	Monitoring / reporting activity	Trigger / early warning indicator	Corrective action	Corrective action responsibility
		and entry and exit records kept for the CoE points - Doc # 201928-0002-1, D17#859669, D23#179551	protectable areas - Doc # 201928-0002-1		• Clear signage onsite to indefinity soil/land dieback status - Doc # 201928-0002-1	boundaries or soil stockpile status	suitability Doc # D17#859669, D23#179551	
	During construction	• Water carts and/or surface stabilization measures (e.g. hydro mulch) will be used to minimise dust generated from cleared areas • Dust generating activities will be suspended at the direction of the Construction Contractors Environmental Representative if deemed too dusty and will not recommence without approval	• No hazardous dust plumes generated by construction activities • No dust complaints from community or other stakeholders	Dust does not pose a visual hazard and safety issue to workforce or traveling public	• Visual dust observations by all project personnel • Daily site inspection of site • Daily monitoring of local weather forecast • Monthly site inspections	• Visual dust observed during construction activities • Dry windy/gusty local weather conditions present / forecast	• Increased application rate/frequency for dust suppression methods (e.g. water carts, additives added to water) will be implemented effective immediately of trigger being realised • Suspend dust generating activities at the direction of the Construction Contractor	• Construction Contractor • Environmental Management Representative
		• Vehicle speeds will be limited to between 40-60km/hr on site for safety purposes and this will consequently reduce dust generated	• No incidents of speeding within the construction site boundary		• Visual monitoring by all construction personnel Incident reporting (EQSafe) Appendix 2, Doc # D12#153561		• Refresher training will be conducted within 1 week • Instances of speeding are identified, and offenders will be asked to immediately reduce speed • Repeat offenders (i.e. Caught speeding more than 2 times) will undergo further refresher training	
	During hot works such as welding	• All hot work will be undertaken in accordance with Contractor's hot work procedure. This will be reviewed and approved by the Main Roads Superintendent prior to work commencing	• No fires started as a result of hot works	No changes to baseline quality / condition (function and value) of Black Cockatoo habitat as a result of fires adjacent to the DE, as a result of the Proposed Action	• Monthly site inspections to confirm required controls are in place • Incident reports related to fires Appendix 2, Doc # D12#153561	• Hot work not undertaken in accordance with Contractor's hot work procedure	• Incident investigation shall be initiated within 1 day and a report completed within 1 week • Fire impacted areas will be recorded in a plan of DE • Refresher training will be conducted within 1 week Doc # D17#681312	• Construction Contractor • Environmental Management Representative

Management objective / desired outcome	Timing	Management measures	Performance target / outcome	Completion criteria	Monitoring / reporting activity	Trigger / early warning indicator	Corrective action	Corrective action responsibility
	During construction	• All vehicles, plant and equipment to be fitted with fire extinguishers and restricted to designated cleared areas unless involved in clearing operations	• No fires started as a result of construction vehicles or equipment			• Vehicles, plant and equipment not fitted with fire extinguishers prior to construction activities		
		• Fire danger ratings and Shire vehicle movement bans to be observed and the requirements of these implemented	• No fires started as a result of construction vehicles or equipment			• Fire danger ratings and Shire vehicle movement bans not observed during construction activities		
		• Temporary erosion and sediment controls will be maintained within the DE during construction to prevent stormwater runoff from construction areas from eroding or causing sediment deposition in adjacent native vegetation • Surface runoff within the DE will drain into roadside drains constructed within the DE. The roadside drains will be designed to capture and infiltrate runoff from a 1 in 100 year Average Recurrence Interval (ARI) rainfall event, to prevent stormwater runoff into adjacent areas of native vegetation	• No evidence of erosion and/or sedimentation from construction activities within no-go areas or retained Black Cockatoo habitat.	No evidence of erosion and/or sedimentation within or adjoining the DE as a result of the Proposed Action	• Daily site inspection • Incident reporting (EQSafe) – Appendix 2, Doc # D12#153561 • Monitor local weather forecasts for indication of future rainfall events	• Scouring or erosion observed at temporary drainage structures • Scouring or erosion of adjacent vegetated areas occurring as a result of construction activities	• Review drainage to identify whether there are any failure points, and repair/address any failure points identified within 1 week	• Construction Contractor • Environmental Management Representative
		• Waste and hazardous materials management	• No evidence of waste and hazardous	No evidence of waste and/or hazardous materials within or		• No waste or hazardous materials	• Review waste and/or hazardous materials management measures	

Management objective / desired outcome	Timing	Management measures	Performance target / outcome	Completion criteria	Monitoring / reporting activity	Trigger / early warning indicator	Corrective action	Corrective action responsibility
		measures will be implemented during construction to prevent contaminant discharges to adjacent native vegetation • No storage of waste and/or hazardous materials within 50 m of Black Cockatoo habitat	materials discharge within or adjacent to the DE	adjoining the DE as a result of the Proposed Action		management measures detailed prior to construction • Waste or hazardous materials within adjacent vegetated areas occurring as a result of construction activities • Waste / material storage areas not appropriately designed to contain stored waste/ materials	within 2 weeks of identified discharge	
	Prior to and during construction and landscaping	• Topsoil within the DE will be harvested, stockpiled and reused in accordance with Main Roads Environmental Guideline Topsoil Management - Doc # 201928-0002-1, 201928-0007	• Topsoil is managed in accordance with Main Roads Guideline - Doc # 201928-0002-1, 201928-0007	No harvesting, stockpiled and reused topsoil that is not in accordance with Main Roads Guideline - Doc # 201928-0002-1, 201928-0007	• Monthly site inspections	• Topsoil within the DE harvested, stockpiled and reused not in accordance with Main Roads Environmental Guideline Topsoil Management during construction activities	• Topsoil management amended to ensure compliance with Main Roads Guideline - Doc # 201928-0002-1, 201928-0007	• Construction Contractor • Environmental Management Representative
	Prior to and during landscaping	• Landscaping within the road reserve will use local native species in accordance with Main Roads Specification 304 (Revegetation and Landscaping) and Main Roads Environmental Guideline Revegetation Planning and Techniques Doc # D18#755580, D19#12558, D19#12560	• Landscaping is compliant with Main Roads Specification 304 and Guideline	No landscaping without compliance with Main Roads Specification 304 and Guideline Only local, native species used in landscaping	• Review of landscaping areas and species list • Inspection of landscaping areas	• Landscaping within the road reserve does not use local native species • Landscaping within the road reserve is not in accordance with Main Roads Specification 304 (Revegetation and Landscaping) and Main Roads Environmental Guideline Revegetation Planning and Techniques	• Landscaping design and species list amended to ensure compliance • Landscaping works are replanted to comply with approved designs and species list	• Construction Contractor • Environmental Management Representative • Main Roads Superintendent

Management objective / desired outcome	Timing	Management measures	Performance target / outcome	Completion criteria	Monitoring / reporting activity	Trigger / early warning indicator	Corrective action	Corrective action responsibility
		• No landscaping with BC foraging species within 10m of road alignment						
To minimise and manage injury or mortality to Black Cockatoos during vegetation clearing and construction	Prior to construction	• Induction of construction personnel on the presence and value of vegetation and Black Cockatoo habitat adjacent to the DE, and vegetation and Black Cockatoo habitat to be retained within the DE	• All construction personnel inducted prior to clearing activities Doc # D17#681312	All construction personnel inducted prior to clearing activities Doc # D17#681312	• Induction records Doc # D17#681312	• Any construction personnel not inducted prior to the commencement of clearing activities	• Undertake induction within 48hrs	• Construction Contractor • Environmental Management Representative
	During construction	• A designated fauna spotter will be present during all clearing activities. The person will hold a permit to handle and move significant fauna under Section 40 of the *Biodiversity Conservation Act 2016*, have suitable equipment to administer emergency care to injured and or displaced fauna, and have access to a care facility that can used to rehabilitate injured fauna	• No death of Black Cockatoos due to direct interaction with equipment and machinery	Presence of a designated fauna spotter during all clearing activities	• Fauna spotting program • Daily observation reports to be filed by Fauna Spotter • Incident reporting (EQSafe) – Appendix 2, Doc # D12#153561	• Injured Black Cockatoo individual within DE with injury suspected to be a consequence of construction activity • Live individual identified within hollow of a felled tree (despite preclearing fauna survey of hollows)	• Clearing in the direct vicinity will cease immediately if trigger is met • Immediate inspection of injured Black Cockatoo • A list of local wildlife rescue organisations and carers will be maintained on site. This will allow efficient identification of an appropriate destination to which to transfer injured cockatoo • Clearing will not recommence until Black Cockatoo has been relocated and checks have been completed to ensure no additional Black Cockatoo individuals are present, and the fauna spotter / catcher provides approval to recommence	• Fauna spotter / catcher
		• Where trees that are known to be Black Cockatoo habitat are retained but are located within 10 m of the edge of the	• Risk assessment undertaken if Black Cockatoo habitat is retained within 10 m of	No Black Cockatoo mortalities as a consequence of construction activities	• Risk assessment	• Wildlife hazard signage not implemented where required • Injured Black Cockatoo individual	• Install wildlife hazard signage if required	• Construction Contractor • Environmental Management Representative

Management objective / desired outcome	Timing	Management measures	Performance target / outcome	Completion criteria	Monitoring / reporting activity	Trigger / early warning indicator	Corrective action	Corrective action responsibility
		road seal the risk of fauna strike will be assessed to determine if wildlife hazard signage is required	the edge of the road seal • Installation of wildlife hazard signage, if required from the risk assessment	Wildlife hazard signage if required		within DE with injury suspected to be a consequence of construction activity		
		• Speed limits between 40-60km p/hr will be applied throughout the construction site for safety purposes which will consequently reduce the risk of fauna strikes during construction	• No incidents of speeding within the construction site boundary	No Black Cockatoo mortalities as a consequence of construction activities	• Visual monitoring by all construction personnel • Incident reporting (EQSafe) – Appendix 2, Doc # D12#153561	• Injured Black Cockatoo individual within DE with injury suspected to be a consequence of construction activity	• Refresher training will be conducted within 1 week • Instances of speeding are identified and offenders will be asked to immediately reduce speed • Repeat offenders (i.e. Caught speeding more than 2 times) will undergo further refresher training	
		• A list of local wildlife rescue organisations and carers will be maintained on site to contact in the event of fauna injury	• A list of local wildlife rescue organisations and carers is on site at all times	All injured and ill Black Cockatoos are taken to an experienced wildlife veterinarian or approved wildlife rehabilitation facility	• Monthly inspection Doc #D18#685148 • Incident reporting (EQSafe) – Appendix 2, Doc # D12#153561	• List of local wildlife rescue organisations and carers is not onsite prior to commencement of construction activities	• A list of local wildlife rescue organizations and carers is obtained by site immediately • Refresher training will be conducted within 1 week	
	Prior to commencement of revegetation	• Revegetation designs shall not include foraging or breeding plant species within 10 m of the road	• Revegetation designs exclude foraging or breeding plant species within 10 m of the road	No revegetation with Black Cockatoo foraging or breeding plant species within 10 m of the road	• Record of revegetation drawings showing species mix • Revegetation Monitoring Report – Doc # D18#847320	• Revegetation designs include Black Cockatoo foraging or breeding plant species within 10 m of the road	• Design drawings amended to exclude revegetation with foraging or breeding plant species within 10 m of the road • Foraging or breeding plant species removed from within 10 m of the road and replaced with non-habitat species	• Construction Contractor • Environmental Management Representative • Main Roads Superintendent
	Within 7 days prior to clearing events	Within 7 days prior to clearing: • The four trees with potentially suitable hollows within 10 m of the DE will be subject to a pre-clearance survey where adjacent	• Survey of trees with hollows potentially suitable for use by Black Cockatoo undertaken within 7 days	No clearing of trees with active hollows No clearing within 10 m of an identified active hollow No Black Cockatoo mortalities as a	• Surveys undertaken by suitably experienced person to confirm potentially suitable hollow within 10 of DE is no longer being used by Black Cockatoo	• Trees with hollows potentially suitable for use by Carnaby's Black Cockatoo or FRTBC not inspected by a suitably experienced person	• Clearing in the direct vicinity will cease immediately if trigger is met • Immediate inspection of felled tree (e.g. with hollow currently in use) to determine survivability of Black Cockatoo (if present)	• Construction Contractor • Environmental Management Representative

Management objective / desired outcome	Timing	Management measures	Performance target / outcome	Completion criteria	Monitoring / reporting activity	Trigger / early warning indicator	Corrective action	Corrective action responsibility
		vegetation is proposed to be cleared within the breeding period for Black Cockatoos (i.e. July to December). Unoccupied hollows identified during this survey will be blocked to deter Black Cockatoo use during construction • Within 7 days prior to clearing events, any tree and vegetation within 10 m of any tree identified as being used by Black Cockatoos for nesting must not be cleared until a suitably experienced person has verified that the tree is not in use	prior to clearing events • No clearing of trees used by Black Cockatoo • All trees currently being used by Black Cockatoos are marked with white flagging as no-go areas with flagging with a 10 m exclusion zone • All hollows being utilised by the species are detected during tree pre-works inspection survey • No Black Cockatoo mortality or injury during clearing Doc # D12#153561	consequence of construction activity	• Maintain a register of nesting trees	within 7 days prior to clearing • Injured Black Cockatoo individual within DE with injury suspected to be a consequence of construction activity • Live individual identified within hollow of a felled tree (despite preclearing fauna survey of hollows) • Incident reporting (EQSafe) Appendix 2, Doc # D12#153561	• Contractor to provide evidence that a suitably experienced person is engaged to conduct surveys prior to subsequent clearing events • Contractor to provide evidence that surveys are scheduled within 7 days prior to subsequent clearing events • Unanticipated clearing event delays will be risk assessed against survey findings • A list of local wildlife rescue organisations and carers will be maintained on site. This will allow efficient identification of an appropriate destination to which to transfer injured cockatoo	

3.2 Monitoring program

A number of activities will be undertaken to monitor and report on the implementation of management measures and achievement of completion criteria. Monitoring activities are mapped to each management measure in Table 9. Table 9 describes the monitoring in detail and includes relevant monitoring guidelines or methods and responsible people.

Table 9 Monitoring schedule

Monitoring activity	Parameter measures	Items addressed	Applicable method / guideline	Responsibility
• Pre-clearing surveys of potentially suitable hollows within 10 of DE for use by Black Cockatoos	Presence of hollow/s being used by Black Cockatoos	• Confirm DBH trees with potentially suitable breeding hollows located within 10m of work area do not have active breeding BCs • Confirm DBH trees with potentially suitable breeding hollows within 10m of works area are not being utilised before construction commences • Maintain a register of confirmed active and non-active DBH breeding hollows located within 10m of construction area • Record the location of any active breeding hollow or potentially suitable breeding hollows and marked as no-go areas	• Suitably experienced person with experience in BC breeding hollow identification to visually inspect all potential breeding trees within 10m of construction area and record spatial co-ordinates for any DBH trees identified as active breeding hollows that are being utilised, or are capable of being utilised, by Black Cockatoos • Monitoring will be conducted in line with best practice and monitoring methods used will be consistent advice contained within the Black Cockatoo Recovery Plan (DPaW, 2013) • Note: no-go areas are areas of vegetation that are not approved to be cleared, these include trees with confirmed or potentially suitable breeding hollows that are being used by Black Cockatoos, conservation significant flora and all areas outside of the approval boundary. These areas are identified on the engineering drawings issued for construction	• Suitably experienced person • Construction Contractor • Environmental Management Representative
• Weekly site inspection	Compliance with CEMP requirements	• Confirm all vegetation to be retained is clearly marked with flagging on site - Doc # 201928-0001-2 • Confirm environmental no-go areas are clearly marked on site - Doc # 201928-0001-2 • Confirm that clearing outside of approved area or in excess of approved limits has not or will not occur - Doc # 201928-0001-2 • Confirm areas required for temporary construction activities, such as laydown, are only located on previously cleared areas • Confirm all plant and machinery are verified clean on arrival at site – Doc # D23#179551, D17#859669 • Confirm no new occurrences of declared/WoNS flora are located within or adjacent to the construction site boundary • Confirm no breach of CoE procedures • Confirm soil from known or potential dieback infested areas has only been reused in infested areas or disposed off-site at a licensed waste facility • Confirm list of wildlife rescue organization contact details is on site • Confirm no visual dust plumes/hazards • Confirm hot works procedures are in place and correctly implemented • Confirm no erosion or scouring in DE or within vegetation that is to be retained in no-go areas or outside the approval boundary • Confirm topsoil is harvested, stockpiled, sign-posted and reused in accordance with Main Roads Environmental Guideline Topsoil Management – Doc # 201928-0002-1 • Confirm landscaping within the road reserve is compliant with approved landscaping designs and species mix – Doc # D19#12558, D19#12560 • Confirm weed control measures have been effective and if follow-up treatment is required to eliminate the weeds – Appendix 1 • Confirm weed control measures have been implemented as per this CEMP and in line with Weeds Australia Guidance (http://weeds.ala.org.au/WoNS/) – Appendix 1	• Visual inspection to confirm that management measures in the CEMP are being implemented correctly • Contractors Monthly Performance Report • Main Roads Surveillance Officer daily inspection journal	• Construction Contractor • Environmental Management Representative • Main Roads Environmental Representative

3.3 Managing uncertainty

This CEMP has been developed based on varying data and information sources. These sources have informed the risk assessments and management measures contained within the CEMP and therefore, any limitations or uncertainties with this data or information may impact the accuracy of this CEMP. **Error! Not a valid bookmark self-reference.** contains measures for managing uncertainty so that the CEMP continues to be based on the most up to date and relevant information and data.

Table 10 Managing uncertainty

Data	Limitations / uncertainty	Risk presented by limitations / uncertainty	Risk management measures
Road alignment design	High level of certainty of maximum impact within the DE	Low risk	N/A
Detailed Flora and Vegetation Report (360 environmental 2020)	Detailed Flora and Vegetation survey reported nil to low limitations in desktop or field components	Low risk	N/A
Recheck *Phytophthora* dieback occurrence assessment (Glevan Consulting, 2021)	Observable symptoms of *Phytophthora* must be present in vegetation during the assessment period	Unrecorded / unexpressed *Phytophthora* infestations may be present	Dieback hygiene management adopted as a precautionary measure, Dieback survey within 12months of commencing works, 3 monthly surveys to determine spread of Dieback
Fauna and Black Cockatoo Habitat Assessment (Bamford 2015, revised 2021)	Fauna and Black Cockatoo Habitat Assessment reported nil to low limitations or uncertainties within the report	Low risk	N/A
Biological Survey (Biologic, 2021)	Biological survey reported nil to low limitations in the majority of the desktop or field components. The availability of data and information was assessed as a partial limitation as limited survey work has been undertaken in the vicinity of the survey area	Low risk	N/A
Black Cockatoo Breeding Hollow Inspection (Kirkby, 2021 & Kirkby, 2022)	Black Cockatoo Breeding Hollow Inspection reported nil to low limitations or uncertainties within the report. All potentially suitable hollows within 10 m of the DE were confirmed to not be active	Medium risk	Inspection of four trees containing potential breeding hollows to determine BC activity to be conducted at least 7 days prior to

Data	Limitations / uncertainty	Risk presented by limitations / uncertainty	Risk management measures
	nesting BC breeding trees. Four potential suitable hollows exist within 10 m of construction area.		construction commencement.

4 CEMP IMPLEMENTATION AND REVIEW

4.1 Roles and responsibilities

All project personnel, including sub-contractors/sub-consultants, are responsible for complying with applicable Commonwealth and state legislation, local government requirements and the conditions of all licences, permits and approvals. Specific responsibilities in relation to the CEMP are outlined in Table 11.

Table 11 Construction Environment Management Plan roles and responsibilities

Role	CEMP responsibilities
Main Roads Project Manager	• Reviewing and approving the CEMP • Assisting with implementation of the CEMP • Providing the necessary resources to ensure the CEMP is properly implemented • Ensuring all personnel are inducted into the project's environmental requirements prior to commencement of works on-site • Ensuring suppliers are made aware of the environmental objectives pertaining to them through conditions of contract • Taking strategic actions to continuously improve the CEMP • Participating in incident investigations • Management, implementation, monitoring and compliance of the CEMP and any approval conditions, including construction supervision and performance of all staff, contractors and subcontractors • Reviewing CEMP performance and implementation of correction actions, or stop work procedures, in the event of breaches of CEMP conditions, that may lead to serious impacts on local communities, or affect the reputation of the project • Representing the project at community meetings
Main Roads Superintendent	• Confirming all environmental requirements are implemented as outlined in the CEMP as required to avoid and minimise actual or potential environmental harm on-site • Assisting the Contractor Environmental Management Representative to develop and maintain the various registers and checklists • Supporting the Environmental Management Representative to plan and implement environmental requirements • Reporting activity that has resulted, or has the potential to result, in an environmental incident immediately to the Environmental Management Representative • Participating in incident investigations

Role	CEMP responsibilities
	• Monitoring construction activities to ensure that identified and appropriate control measures are effective and in compliance with the CEMP • Managing CEMP performance and implementation of correction actions, or stop work procedures, in the event of breaches of CEMP conditions, that may lead to serious impacts on local communities, or affect the reputation of the project • Ensuring that all construction personnel and subcontractors are informed of the intent of the CEMP and are made aware of the required measures for environmental a compliance and performance • Ensuring effective communication and dissemination of the content and requirements of the CEMP to contractors and subcontractors • During construction, maintain traffic safety along access roads, with special emphasis on high trafficked areas
Main Roads Environmental Representative	• The overall management and review control of the CEMP • Review monitoring programs required under this CEMP • Managing procedures and practices for receiving and responding to complaints and inquiries in relation to the environmental performance • Assist in managing any activity that has resulted in, or has the potential to result in an environmental incident immediately to the Project Manager, Construction Manager and other relevant personnel • Considering and advising on matters specified in the conditions of licences and approvals relating to the environmental performance and impacts of the Proposed Action • Requiring reasonable steps to be taken to avoid or minimise unintended or adverse environmental impacts, and failing the effectiveness of such steps, to direct that relevant actions be ceased immediately should an adverse impact on the environment is likely to occur • Reviewing environmental competence of all staff to ensure adequate delivery of environmental training to all site personnel involved with construction. • Acting as main point of contact between the regulatory authorities and the Proposed Action on environmental issues • Providing advice and liaison with the construction teams to ensure that environmental risks are identified, and appropriate controls are developed and included within method statements • Assisting in the development and delivery of environmental training for site personnel and subcontractors • Environmental auditing of subcontractors and suppliers
Construction Contractor Representative	• Implementation of the CEMP on-site for construction related activities • Providing the necessary resources to ensure the CEMP is properly implemented • Making sure all personnel are inducted into the Proposed Action's environmental requirements prior to commencement of works on-site • Participating in reporting and incident investigations • Developing monitoring programs required under this CEMP • Management, implementation, monitoring and compliance of the CEMP and any approval conditions

Role	CEMP responsibilities
	• Daily, weekly and monthly inspection of the entire worksite against this CEMP for the duration of construction works
Construction Contractor Environmental Management Representative	• Developing and maintaining various procedures, registers and checklists required during clearing for construction • Coordinating and managing all the environmental activities during the construction phase • Being the primary contact point in relation to the environmental performance of the construction phase • Managing procedures and practices for receiving and responding to complaints and inquiries in relation to the environmental performance • Reporting any activity that has resulted in, or has the potential to result in an environmental incident immediately to the Main Roads Superintendent and other relevant personnel • Requiring reasonable steps to be taken to avoid or minimise unintended or adverse environmental impacts, and failing the effectiveness of such steps, to direct that relevant actions be ceased immediately should an adverse impact on the environment is likely to occur • Identify environmental competence requirements for all staff and ensure delivery and efficiency of environmental training to all site personnel involved with construction works, prior to personnel commencing works onsite • Assistance in the development and delivery of environmental training for site personnel and subcontractors • Participating in reporting and incident investigations • Assist in daily, weekly and monthly inspection of the worksite against this CEMP for the duration of construction works • Management of the construction contractor's environmental monitoring, inspection and audit program in so far as it relates to construction activities
Fauna spotter / catcher	• Being onsite during all pre-clearing activities to inspect and monitor clearing areas for the presence of Black Cockatoo individuals • Having sufficient authority to guide all clearing activities • Manage and handle all fauna tasks onsite • Implement fauna contingency measures (where required) • Prepare report following the completion of vegetation clearing • Participating in reporting of incidents

4.2 Inspections, audits and reporting

4.2.1 Contractor inspections and audits

The Construction Contractor will undertake monthly inspection of the entire worksite against this CEMP for the duration of construction works. Where any High or Severe risks are identified, inspections in the areas to which these apply will be undertaken on a weekly basis or daily where relevant.

An audit of this CEMP will be undertaken by the Construction Contractor within five weeks of the commencement of work and every three months thereafter.

Main Roads will conduct environment and heritage audits of the construction contract area on a three-monthly basis during the construction phase.

4.2.2 Incident reporting

Environmental incident categories and reporting timeframes are outlined in the Main Roads EQSafe Environmental Incident Reporting, Investigation and Management Procedure, Doc # D12#153561. This procedure provides a process for the reporting, investigation and management of environment or heritage incidents.

Where an environmental incident occurs, the following will be actioned:

- Immediate remedial action: where safe to do so the observer of an incident should undertake any immediate actions to stop, control or contain the incident to prevent further damage
- Determine the environmental incident category (i.e. minor, significant or major): environmental incidents are to be categorised as per the Main Roads Environmental Incident Reporting, Investigation and Management Procedure
- Notifications: Notification requirements for environmental incidents are outlined on the Main Roads Environmental Incident Reporting, Investigation and Management Procedure, Doc # D12#153561
- Assessment and investigation into the environmental incident, including cause, environmental impact and mitigation/remediation
- Incident report: EQSafe is Main Roads electronic system for the recording and management of all incidents. Where EQSafe cannot be accessed the Main Roads Corporate Environmental Incident Report Form (see Appendix 2) will be used to record environmental incidents associated with the Project
- Corrective and preventative actions – the Construction Contractor will track the progress of agreed corrective and preventative actions
- All environmental incidents are to be reported to the Main Roads Superintendent and filed by the Construction Contractor.

Corrective actions may also arise from audits, inspections, and management reviews. Correction actions are to be reviewed and endorsed by Main Roads Superintendent before the action is implemented. Audits will follow to confirm satisfactory completion.

All environmental incidents that result in an off-site impact to the Keaginine, Kwolyinine and Woondowing Nature Reserves will be reported by Main Roads Environment Representative to Department of Biodiversity, Conservation and Attractions.

4.3 Environmental training

An environment induction will be developed by the Construction Contractor and reviewed by Main Roads Environmental Representative with all visitors, all site personnel, contractors and sub consultants completing the induction prior to commencing work on the Project Site. This induction details the responsibilities of all project personnel, contractors and sub consultants under this CEMP

and outlines environment requirements that personnel need to be aware of when undertaking work activities in accordance with this CEMP.

All personnel will be required to sign an attendance form on completion of the induction, Doc # D17#681312. Attendance at these inductions is recorded in the Training Register developed and maintained by the Construction Contractor for the duration of Project.

Daily pre-start meetings will be conducted to inform Project personnel, including visitors and sub-consultants, of specific environmental issues related to the day's work. Additionally, toolbox meetings will be undertaken with all personnel to provide environmental awareness training, disseminate relevant outcomes of environmental inspections and audits, including improvements or achievements.

Specialist training will be provided to relevant personnel and will include spill prevention, control and containment/clean up, erosion and sediment control, and environmental emergency response.

Main Roads will maintain documented records as verification that personnel have received the appropriate training and are competent to fulfil their roles.

4.4 Review

4.4.1 Risk Review

The risk assessment will be reviewed annually to confirm it remains relevant and captures all risks to MNES. Review triggers are:

- Changes to Project/CEMP scope
- Following significant environmental incidents
- Where corrective actions or contingency management measures are implemented
- When new information regarding MNES becomes available.

4.4.2 CEMP review

Throughout the life of the EPBC Act approval the CEMP will be reviewed and updated as required. The review will include an evaluation of the effectiveness of the plan and incorporate new data or information pertinent to the management of Black Cockatoos.

Review triggers are as follows:

- Annually on the anniversary of the approval of the CEMP
- Following significant incidents
- Anticipated changes to scope and new risks
- Following community or stakeholder complaints
- Identification of non-compliance with environmental approval conditions
- Monitoring results, inspections or audits indicate performance targets or completion criteria may not be achieved or maintained
- Monitoring results, inspections or audits indicate completion criteria have been achieved.

The CEMP will be updated by the Main Roads Environmental Representative or suitably qualified delegate and approved by the Main Roads Project Director.

Changes to the CEMP will be communicated to all Project personnel, contractors and sub consultants via the regular pre-start and toolbox meetings. Main Roads will inform DCCEEW of any changes to the CEMP.

5 DATA MANAGEMENT

Records will be kept to demonstrate compliance with this CEMP. These records include, but are not limited to:

- Risk assessments
- Audit results and reports, including the timing, location and spatial delineation of clearing, and periodic reconciliation against approved disturbance limits
- Black Cockatoo potential breeding hollow pre-clearing inspections
- Monthly, weekly and daily inspection results
- Environmental incident reports
- Monitoring data, results and reports
- Landscaping design and species mix approved for use
- Topsoil harvesting, storage and reuse from known/potential dieback infected areas
- Records of landscaping activities including dates, location and area of landscaping, species mixes used and quantities
- Induction records
- Pre-start and Toolbox meeting minutes
- Correspondence in relation to the requirements of this CEMP between Main Roads, Construction Contractors and/or regulators.

The Main Roads Site Superintendent and the Construction Contractor Representative are responsible for establishing and maintaining electronic and hardcopy filing systems for the above information. Once construction is completed, all documents that were kept on site during construction will be transferred to Main Roads head office as part of site demobilisation.

6 CONTROLLING DOCUMENTS

Management documents relevant to actions, procedures noted in the CEMP are included in Table 12 below and indicative documents included the Appendix. Additional control documents not listed below that are referred to within the CEMP are to be developed by the Construction Contractor and provided to Main Roads Superintendent for approval prior to commencement of construction activities.

Table 12 Controlling documents

Document Number	Description
201928-0001-2	Construction Peg Colour Code Drawing
201928-0007	Construction Environmental Management Signs
201928-0002-1	Main Roads Environmental Guideline Topsoil Management Guideline Drawing
D12#153561	Main Roads Environmental Incident Reporting, Investigation and Management Procedure
D17#681312	Training Attendance Sheet
D17#859669	Hygiene Inspection Checklist / Clean on Entry Hygiene Form
D18#685148	Monthly Reporting Form
D18#755580	Specification 304 Landscaping & Revegetation
D18#847320	Revegetation Site Assessment Checklist
D19#12558	Specification 304 Revegetation
D19#12560	Specification 304 Rehabilitation of Disturbed Areas
D19#787510	Clearing Site Inspection Checklist
D23#179551	Hygiene Inspection Register

7 REFERENCES

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8 APPENDICES

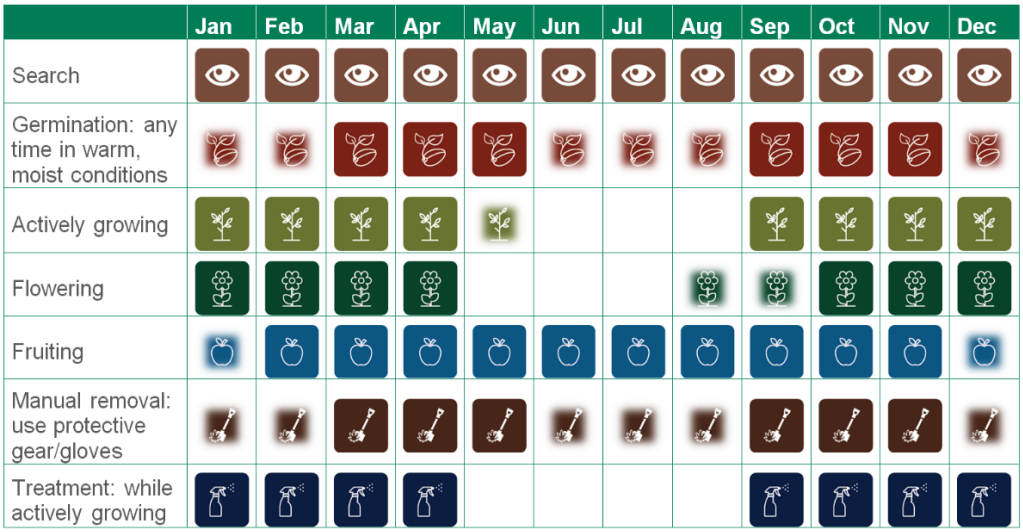
Appendix	Title
Appendix 1	Summary of weed controls for Declared Pests and WoNS
Appendix 2	Main Roads Environment Incident Reporting Form
Appendix 3	Construction Peg Colour Code
Appendix 4	Indicative Construction Environmental Management Signs
Appendix 5	Topsoil Management Guideline
Appendix 6	Indicative Training Attendance / Site Induction Register
Appendix 7	Indicative Hygiene Inspection Checklist / Clean on Entry Hygiene Form
Appendix 8	Indicative Hygiene Inspection Register

Appendix 1: Summary of weed controls for Declared Pests and WoNS

- *Gomphocarpus fruticosus* (Narrowleaf Cotton Bush) – Declared Pest
- *Moraea flaccida* (One-leaf Cape Tulip) – Declared Pest
- *Zantedeschia aethiopica* (Arum Lily) – Declared Pest
- *Echium plantagineum* (Paterson's Curse) – Declared Pest
- *Genista linifolia* (Flax-leaf Broom) – WoNS
- *Asparagus asparagoides* (Bridal Creeper) – Declared Pest and WoNS.

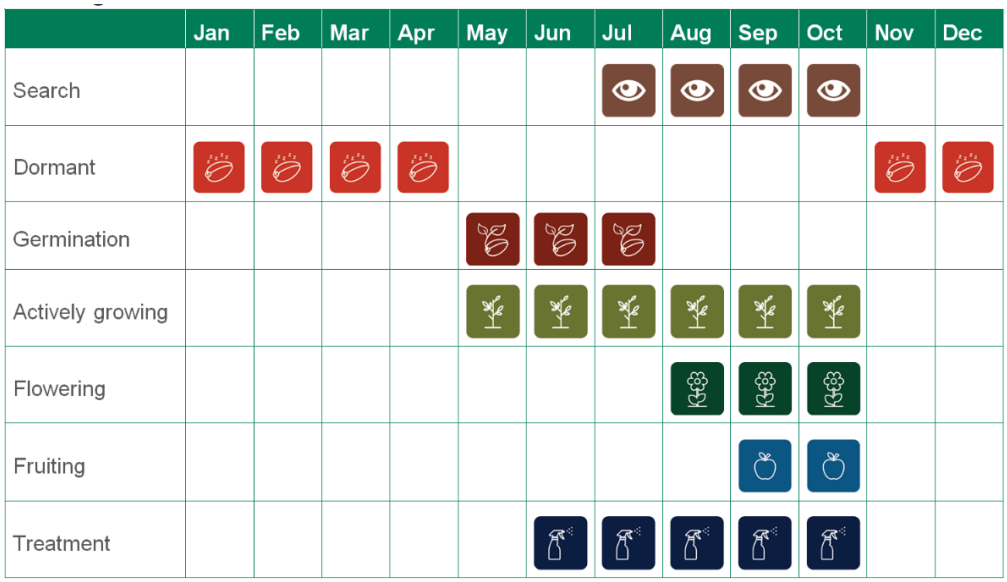
Weed Control Summary Sheet

Narrow leaf cotton bush

Species	*Gomphocarpus fruticosus*
Status	Declared Pest
Objective	Aim to eradicate where possible, as a minimum prevent off-site movement
Management Summary	Refer to https://www.agric.wa.gov.au/declared-plants/narrow-leaf-cotton-bush-declared-pest for management details 
Control Methods Recommended herbicides (Department of Primary Industries and Regional Development)	**Chemical control** Recommended herbicides Active growing, July to December • Glyphosate • Triclopyr
Further Information	For other methods of control refer to declared plant control handbook (DPIRD (2024) available at: https://www.agric.wa.gov.au/herbicides/declared-plant-control-handbook

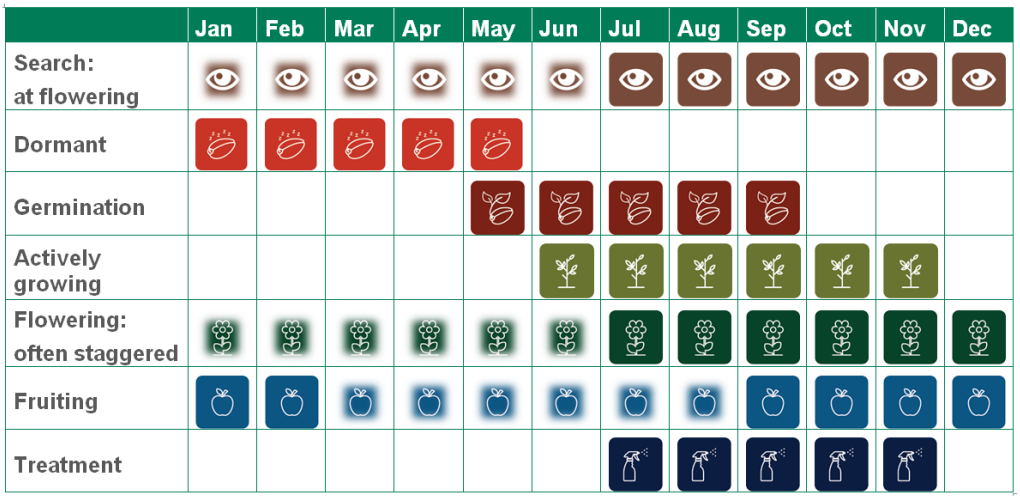
Weed Control Summary Sheet

One-leaf Cape Tulip

Species	*Moraea flaccida*
Status	Declared Pest
Objective	Aim to eradicate where possible, as a minimum prevent off-site movement
Management Summary	Refer to https://www.agric.wa.gov.au/declared-plants/one-leaf-cape-tulip-declared-pest for management details 
Control Methods Recommended herbicides (Department of Primary Industries and Regional Development)	Recommended herbicides (One-leaf) August-September, (two-leaf) July-end August • 2,4-D LV ester (cereals and pasture) • 2,4-D amine (cereals and pasture) • 2,4-DB (cereals and pasture) • Paraquat (blanket wiper) Full emergence to early August • 2,2-DPA
Further Information	For other methods of control refer to declared plant control handbook DPIRD (2024) available at: https://www.agric.wa.gov.au/herbicides/declared-plant-control-handbook

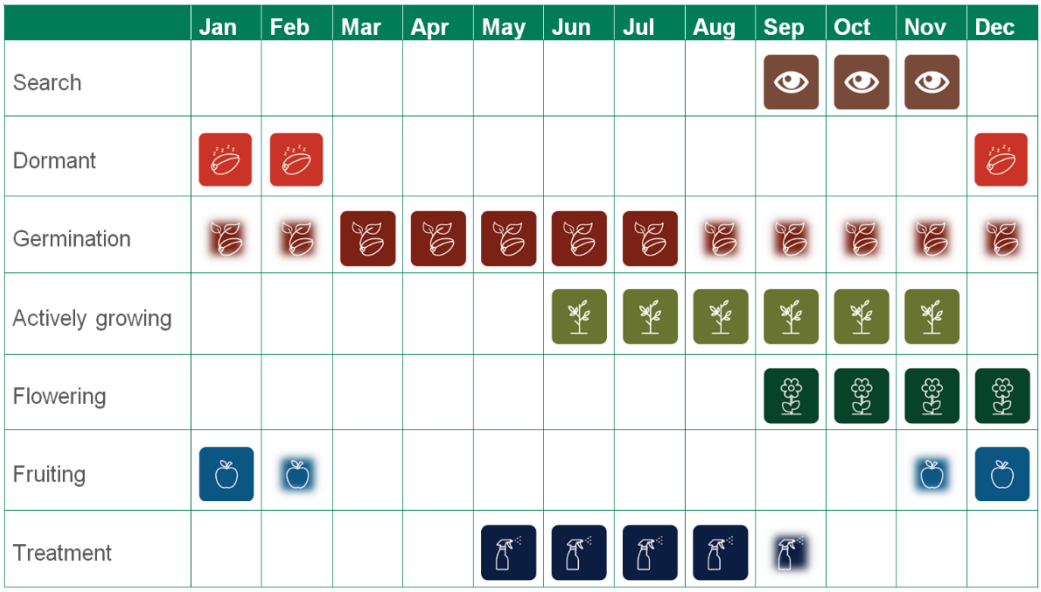
Weed Control Summary Sheet

Arum Lily

Species	*Zantedeschia aethiopica*
Status	Declared Pest
Objective	Aim to eradicate where possible, as a minimum prevent off-site movement
Management Summary	Refer to https://www.agric.wa.gov.au/declared-plants/arum-lily-declared-pest for management details 
Control Methods Recommended herbicides (Department of Primary Industries and Regional Development)	Recommended herbicides June to October • Chlorsulfuron • Metsulfuron • 2,4-D amine • Paraquat
Further Information	For other methods of control refer to declared plant control handbook DPIRD (2024) available at: https://www.agric.wa.gov.au/herbicides/declared-plant-control-handbook

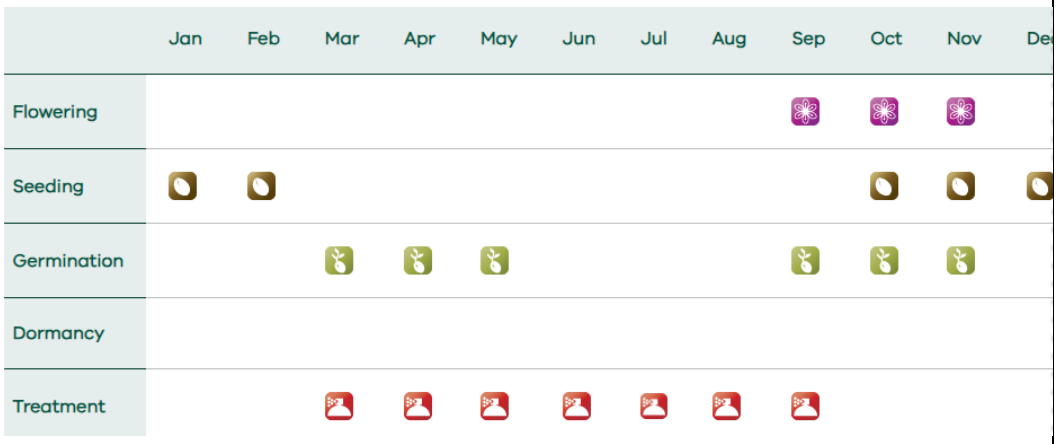
Weed Control Summary Sheet

Paterson's Curse

Species	*Echium plantagineum*
Status	Declared Pest
Objective	Aim to eradicate where possible, as a minimum prevent off-site movement
Management Summary	Refer to https://www.agric.wa.gov.au/declared-plants/paterson%E2%80%99s-curse-declared-pest for management details 
Control Methods Recommended herbicides (Department of Primary Industries and Regional Development)	Recommended herbicides In cereals • Chlorsulfuron; Metsulfuron methyl; Triasulfuron; Tigrex; Broadstrike; Jaguar; Bromoxynil + MCPA In pasture, up to four leaf stage • Jaguar®; Tigrex®; Broadstrike®; Bromoxynil + MCPA At early flowering, seed set control • Chlorsulfuron; Metsulfuron methyl; Triasulfuron; Glyphosate + 2,4-D LV ester
Further Information	For other methods of control refer to declared plant control handbook DPIRD (2024) available at: https://www.agric.wa.gov.au/herbicides/declared-plant-control-handbook

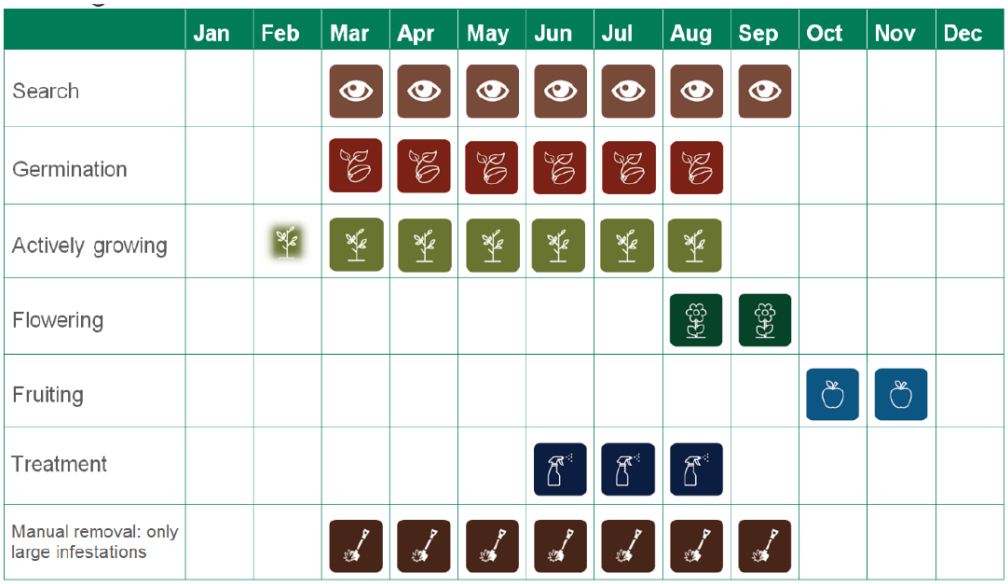
Weed Control Summary Sheet

Flax-leaf Broom

Species	*Genista linifolia*
Status	Weed of National Significance
Objective	Aim to eradicate where possible, as a minimum prevent off-site movement
Management Summary	Refer to https://weeds.org.au/weeds-profiles/?botanical=Genista%20linifolia&region=wa for management details 
Control Methods Recommended herbicides (Department of Primary Industries and Regional Development)	• Hand pull or dig out small seedlings ensuring removal of all roots • For mature plants cut and paint with 50% glyphosate or foliar spray with 1% glyphosate, repeat treatment • Alternatively 250 ml Access® in 15 L of diesel to basal 50 cm of stem (basal bark) • Monitor site for recruitment from seedbank
Further Information	For other methods of control for the Flax-leaf Broom, refer to the Weed Management Guide (Weeds Australia, 2024) available online https://weeds.org.au/.

Weed Control Summary Sheet

Bridal Creeper

Species	*Asparagus asparagoides*
Status	Declared Pest Weed of National Significance
Objective	Aim to eradicate where possible, as a minimum prevent off-site movement
Management Summary	Refer to Aim to eradicate where possible, as a minimum prevent off-site movement for management details 
Control Methods Recommended herbicides (Department of Primary Industries and Regional Development)	Recommended herbicides • Metsulfuron • Glyphosate
Further Information	For other methods of control for the Bridal Creeper, refer to the Weed Management Guide (Weeds Australia, 2024) available online https://weeds.org.au/.

Appendix 2: Main Roads Environment Incident Reporting Form

Environmental and Heritage Incident Reporting Form

This Form is to be completed for **environmental and heritage** incidents when an electronic incident reporting system is unavailable. All fields in the form must be completed. The completed Form must be emailed to: **environmentincidents@mainroads.wa.gov.au**

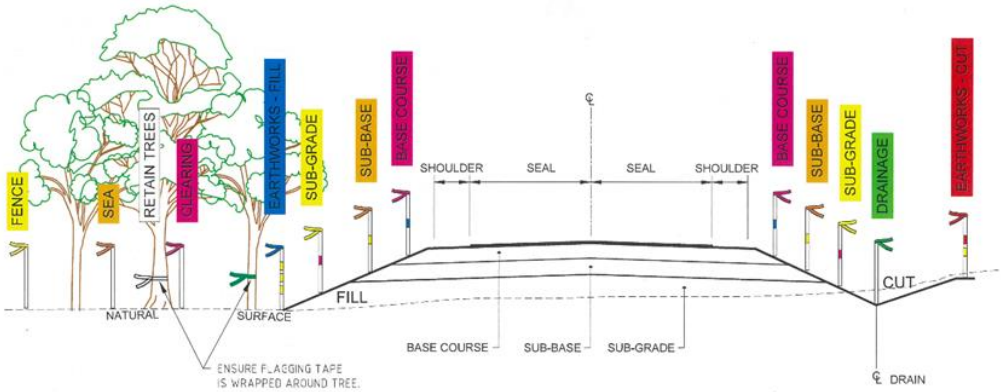
Name and contact details of person reporting the Incident	*Name*	*Phone and Email*			
Organisation Responsible for Managing the Incident	*Insert the Name of the Contractor Organisation, Main Roads or Third Party*				
Name of Main Roads person the Incident was reported to	*Name*	*Phone and Email*			
Main Roads Workgroup (*where the Incident Occurred*)	*This is Main Roads Region. If it has occurred under a Main Roads Contract, also enter the Contract Number. Enter N/A of not known.*				
Location of Incident:	☐ Don Aitken Centre ☐ Heavy Vehicle Services ☐ Materials Engineering Branch ☐ Traffic Operations Centre ☐ Network Operations Centre ☐ Construction Site ☐ Temporary Traffic Management ☐ Journey On Road ☐ Depot ☐ Regional Office ☐ Laboratory ☐ Material Pit ☐ Road Reserve ☐ Offsite or Private Property ☐ Other ☐ N/A				
Name of Main Roads Project Manager:		**Road Name:**			
Project Name:		**Road Number:**			
Contractor:		**Structure Name:**			
EOS No.:		**Structure Number:**			
Date of Incident:		**SLK From:**			
Date and Time Reported:		**SLK To:**			
Environmental Incident (Event Sub Type)	☐ Asbestos containing material intercepted (Natural or man-made) ☐ Contamination intercepted (inherited with site and not Asbestos) ☐ Erosion and sedimentation ☐ Emission of dust / degradation of air quality ☐ Emission of noise / light / vibration ☐ Fire ☐ Impact to Aboriginal heritage site ☐ Impact to Historic heritage site ☐ Impact to Ground or surface water ☐ Impact to Fauna ☐ Impact to Native Title	☐ Impact to Threatened Plants or Ecological Communities ☐ Introduction or spread of weeds, pests, disease ☐ Non-compliance with approval conditions (no environmental impact) ☐ Spill of hydraulic oil ☐ Spill of polluting substance other than hydraulic oil ☐ Spill of grain or canola ☐ Spill of primer or seal in runoff after rainfall ☐ Unauthorised vegetation clearing ☐ Unauthorised waste disposal ☐ Other			
Description of Event: (Insert Short description):	*Insert a title for the incident (i.e.: Duncan Rd SLK 78.33 - Trailer Hydraulic Line Leak.)* **Insert a short description of the incident**				
Describe the Event in detail: attach pictures/maps etc. if you have them:	*Insert step by step description of the incident (including the immediate actions that were undertaken). Please also note the existing controls located at the site.* Outline the environmental approvals and assessment process of the works (if applicable). Outline the contractual governance that the works were delivered under (if applicable). If the incident was a spill indicate approximate volume and advise if the spill was cleaned up. If the incident was clearing of native vegetation advise of the area. **Describe the Event in detail: attach associated documents/pictures/maps and/or provide document TRIM numbers if you have them**				
See Table 1 – Consequence Description					
Actual Consequence	☐ **Insignificant**	☐ **Minor**	☐ **Moderate**	☐ **Major**	☐ **Catastrophic**
See Table 2 and Table 3 for further guidance					
Potential Likelihood	☐ **Almost Certain**	☐ **Likely**	☐ **Possible**	☐ **Unlikely**	☐ **Rare**

Table 1: Qualitative Measures of Consequence					
Level	Rank	Reputation & Trust (Political, Stakeholders and Community)	Business Operations	Environmental	Legal & Compliance
1	INSIGNIFICANT	• Isolated local community or individual's issue-based concerns. • Low profile media attention.	• Some insignificant delays to business activities. • Up to 5% variation in KPI or objective.	• Minimal impact to isolated area. • Simple or no treatment required. • No lasting effect on ecological communities, animal and plant populations it contains, and environmental and heritage values of the area. *i.e.: Contained oil spill in non-sensitive environment.*	• Guidance required for legal/ compliance issues managed through routine procedures. • Legal action unlikely.
2	MINOR	• Local community impacts and concerns. • Occasional once off negative media attention. • Trust issues raised.	• Minor delays to business activities. • 5% to 10% variation in KPI or objective.	• Contained impact. • Rectified with standard treatment. • Short-term residual effect on local ecological communities, animal and plant populations it contains, and environmental and heritage values of the area. *i.e.: Contained oil spills in sensitive environment; Unauthorised clearing (< 10ha) of area with low environmental values.*	• Complex legal/ non-compliance issue to be addressed. • Legal action and /or public liability claim possible.
3	MODERATE	• Sectional community impacts and concerns publicly expressed. • Increased negative media attention. • Loss of confidence and trust by community and stakeholders in Agency processes and capability. • Ministerial concern.	• Some moderate delays to business activities. • 10% - 25% variation in KPI or objective. • One or more projects is significantly impaired.	• Uncontained impact • Rectified in short-medium term. • Medium-term residual effect on local ecological communities, animal and plant populations it contains, and environmental and heritage values of the area. *i.e.: Uncontained spills causing minor pollution; Unauthorised clearing of any sized area of native vegetation that does not contain other significant environmental values; Unauthorised and limited impact to an Aboriginal Heritage or Historic Heritage site; Non-conformance to EMS process, legislation or permit/approval/licence.*	• Non-compliance/s with regulation and/ or probity infringements, which may result in some processes repeated. • Legal action probable.
4	MAJOR	• Considerable and prolonged community impact and dissatisfaction publicly expressed. • Consistent negative media attention. • Criticism and loss of confidence/ trust by community and stakeholders in Agency processes and capability. • Ministerial intervention	• Major delays to activities. • 25% to 50% variation in KPI or objective. • One or more critical programs or projects cannot be delivered.	• Substantial hazardous impact. • Rectified in long-term. • Substantial residual effect on local ecological communities, animal and plant populations it contains, and environmental and heritage values of the area. *i.e.: Unauthorised clearing of native vegetation that has a significant impact to significant environmental values; Major pollution of waterways at local scale; Major unauthorised damage to one or more Aboriginal Heritage or Historic Heritage sites; Major non-compliance with legislation.*	• Major non-compliance with regulation which may result in termination of a process or imposed penalties. • Legal action taken against agency and/ or major public liability claim or potential class action.
5	CATASTROPHIC	• Significant adverse community impacts and condemnation. • Extreme negative media attention. • Consistent ongoing community loss of confidence and trust in Agency capabilities and intentions. • Government intervention.	• Activities ceased. • More than 50% variation in KPI or objective. • Multiple critical programs or projects cannot be delivered.	• Severe uncontained hazardous impact • Requires long-term treatment and monitoring • Severe residual effect on local ecological communities, animal and plant it contains, and environmental and heritage values of the area. *i.e.: Unauthorised clearing of any sized area containing significant environmental value/s where the impacts were understood and the impacts were deliberate; Extensive pollution of waterways at regional scale, Extensive unauthorised damage to one or more Aboriginal Heritage sites; Major non-compliance with legislation.*	• Major non-compliance with legislation and/ or regulation which may result in criminal charges and/ or loss of required accreditation. • Significant legal consequences/ class action against Agency.

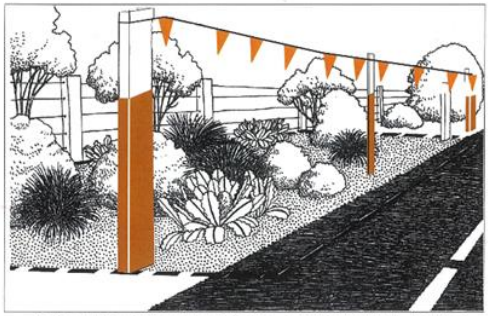
Table 2: Potential Likelihood Ratings		
Rating	**Description**	**Frequency**
Rare	The event may occur only in exceptional circumstances	Less than once every 50 years
Unlikely	The event could occur at some time	Once every 10-50 years
Possible	The event might occur at some time	Once every 1-10 years
Likely	**The event will probably occur in most circumstances**	**More than once per year**
Almost certain	The event is expected to occur in most circumstances	More than once per month

Table 3: Potential Risk Rating					
	Consequence				
Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	**Low 7**	**High 10**	**High 15**	**Very High 20**	**Very High 25**
Likely	**Low 4**	**Medium 8**	**High 12**	**Very High 16**	**Very High 20**
Possible	**Low 3**	**Low 6**	**Medium 9**	**High 12**	**High 15**
Unlikely	**Low 2**	**Low 4**	**Low 6**	**Medium 8**	**High 10**
Rare	**Low 1**	**Low 2**	**Low 3**	**Low 4**	**Low 5**

Appendix 3: Construction Peg Colour Code Drawing



DETAIL (1) NTS — PEG COLOUR CROSS SECTION



ROPE FLAGGING FOR SPECIAL ENVIRONMENT AREAS.

DETAIL (2) NTS

TAPES ON PEGS

There are two types of tapes on survey pegs. Flappers and Wraps.

Flappers are the long tapes that blow in the breeze. They are usually at the top of the pegs. They are used to show you what type of peg it is as per below.

YELLOW (outside earthworks)	Fence
ORANGE (outside earthworks)	SEA - Special Environment Area
PINK (in bush)	Clearing peg
PINK (on trees)	Remove tree
WHITE (on tree)	Retain tree
WHITE (on tree) and PINK (on tree limb)	Retain tree Remove limb
GREEN (on tree)	Reuse Vegetation
RED	Earthworks CUT peg
BLUE	Earthworks FILL peg
GREEN	Drainage peg
YELLOW	Sub-grade peg
ORANGE	Sub-base peg
PINK (on pavement)	Basecourse peg

Wraps are the short tied tapes on the pegs and they are used to show the required level to trim to or to reference the level that is needed to be achieved. The different colours are explained below.

BLUE	Finished level of basecourse
YELLOW	Finished level of sub base
PINK	Sub-grade level (can be on earthworks and on sub-grade pegs)
RED	500mm CUT of FILL depending on whether the Flapper is Red or Blue
YELLOW	1 metre CUT or FILL depending on whether the Flapper is Red or Blue

Example 1 - The earthworks peg which has a Red Flapper with a Red & Yellow Wrap means 1.5m CUT and it refers to the next point in from the top of batter, i.e. the drain.

Example 2 - The earthworks peg which has a Blue Flapper with 3 Yellow Wraps means 3m FILL and it refers to the next point in from the toe of batter, i.e. the sub-grade hinge point.

No.	DESCRIPTION	APPROVED & DATE
1.	NOTES ADDED & PROTECTED AREA ROPE FLAGGING DIAGRAM INCLUDED	
2.	ADDED GREEN FLAGGING ON TREE AND AMENDED TABLE TO SHOW NEW FLAGGING DESCRIPTION	

AMENDMENTS

NOTES

1. SETOUT TO FOLLOW THE CONSTRUCTION SURVEYING GUIDELINE ID12P43455SI ON MAIN ROADS' WEB SITE.
2. FOR CLEARING LINE (PINK) ENSURE SUFFICIENT STAKES/PEGS TO MAINTAIN LINE-OF-SIGHT VISIBILITY, MAXIMUM 40M INTERVAL. INCLUDE STAKES/PEGS AT SIGNIFICANT VERTICES/CHANGES OF DIRECTION.
3. FOR SPECIAL ENVIRONMENT AREAS (SEA - ORANGE) ROPE FLAGGING AS PER DETAIL 2 TO BE INSTALLED ALONG THE LENGTH OF THE SPECIAL ENVIRONMENT AREA.

mainroads WESTERN AUSTRALIA
PLANNING AND TECHNICAL SERVICES DIRECTORATE
ENVIRONMENT BRANCH
Waterloo Crescent
Telephone (08) 9323 4111
East Perth 6004

DESIGNED	B. GRINTER	FEB 2013
DRAWN	A. SZELIGA	FEB 2013
VERIFIED	N. ROWE	01.05.2021
APPROVED	M. SCHELTEMA	01.05.2021
FILE NUMBER	12/3221	MS 15/5/23

STANDARD DRAWING

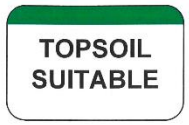
CONSTRUCTION PEG COLOUR CODE

MRWA DRAWING NUMBER 201928-0001-2

SCALE N.T.S.

A3

Appendix 4: Indicative Construction Environmental Management Signs



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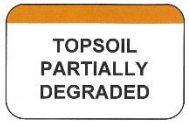
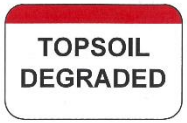


SIGN TYPE B



SIGN TYPE A

SIGN TYPE A

SIGN TYPE A

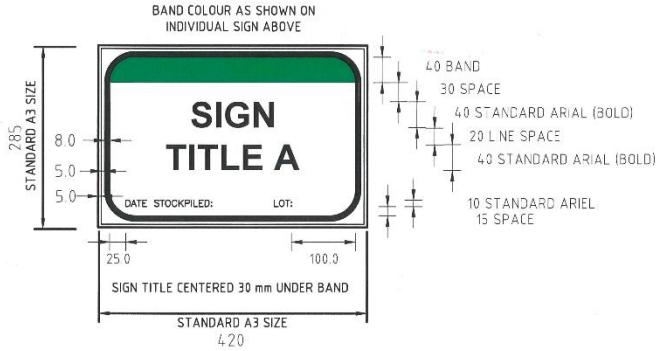
SIGN TYPE B

SIGN TYPE A

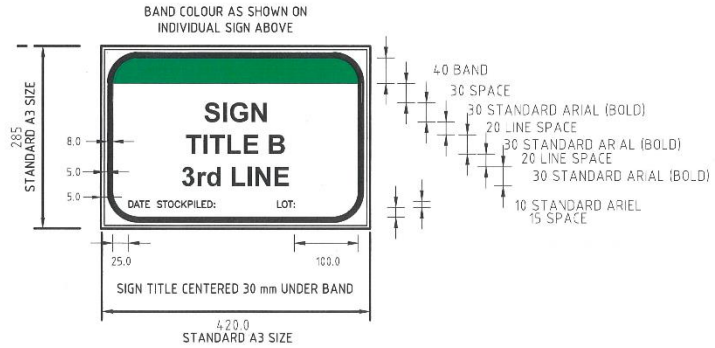
SIGN TYPE A

SIGN TYPE B

SIGN TYPE A



SIGN TYPE B



AMENDMENTS

No.	DESCRIPTION	APPROVED & DATE

NOTES

1. DIMENSIONS
   MEASUREMENTS IN MILLIMETRES
   SIZE 450(W) x 285(H) – STANDARD A3
   CORNER RADIUS = 40
   BORDER = 8
2. COLOURS:
   BLACK LEGEND AND BORDER
   ON WHITE BACKGROUND
   BAND AS PER INDIVIDUAL SIGN
3. MATERIALS:
   SIGN MATERIALS, MANUFACTURE
   AND INSTALLATION TO BE IN
   ACCORDANCE WITH MRWA
   SPECIFICATION 601
4. TEXT FONTS SHALL BE AS PER SHOWN
   ON DRAWING

mainroads WESTERN AUSTRALIA
PLANNING AND TECHNICAL SERVICES DIRECTORATE
ENVIRONMENT BRANCH
Waterloo Crescent EAST PERTH 6004
Telephone 138 138

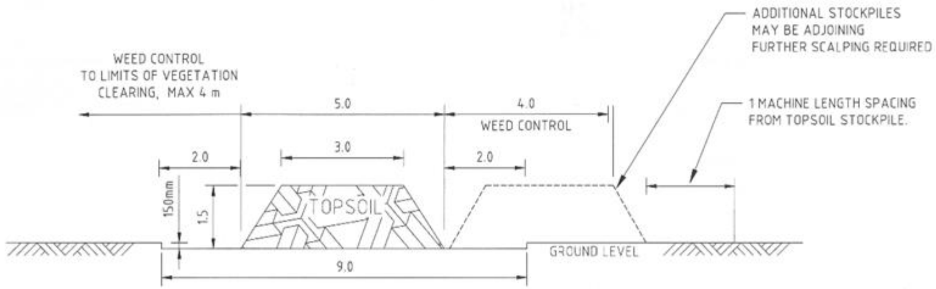
DRAWN	T. OVINGTON
DESIGNED	A. SUTHERLAND
CHECKED	
APPROVED	Martin Sleet 15/5/23
FILE NO	

A3

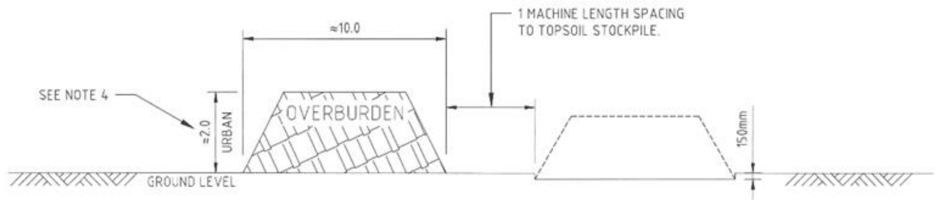
GENERAL SERIES
CONSTRUCTION – ENVIRONMENTAL MANAGEMENT SIGNS

MRWA DRAWING NUMBER: 201928-0007
AMENDMENT

Appendix 5: Topsoil Management Guideline



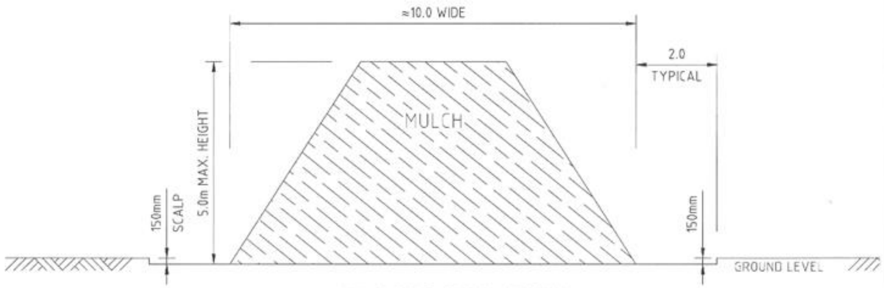
ELEVATION: STOCKPILING OF SITE TOPSOIL
SCALE 1:100



OVERBURDEN CROSS SECTION
SCALE 1:100

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
2. MULCH PILES WITH 5 METRE HEIGHT ARE FOR TEMPORARY STORAGE (I.E. DURING MULCHING PROCESS), LOWER HEIGHT REQUIRED FOR LONG TERM STORAGE. DEPARTMENT OF FIRE & EMERGENCY SERVICES (DFES) RECOMMEND THAT MULCH PILES HAVE A MAXIMUM ALLOWABLE LENGTH OF 50 METRES AND WITH A BUFFER ZONE AROUND THEM, TO BE FREE OF VEGETATION FOR SAFETY REASONS IN THE EVENT OF FIRE.
3. DO NOT MIX FRESH 'GREEN MULCH' IN AN EXISTING OLDER, DRY MULCH PILE - CREATE A SEPARATE STOCKPILE FOR THE NEW MULCH.
4. TOPSOIL NOT USED FOR REVEGETATION PURPOSES I.E. NO NATIVE SEED BANK IN THE SOIL, CAN BE STOCKPILED AS FOR OVERBURDEN.
5. OVERBURDEN HEIGHTS ARE APPROXIMATE, CONSIDERATION OF STOCKPILES IN URBAN AREAS IS FOR SAFETY AND AESTHETICS WHEREAS IN RURAL AREAS CONSIDERATION OF HEIGHT IS PRIMARILY AROUND SAFETY.
6. BEST PRACTICE IS TO STRIP TOPSOIL WHEN THE MATERIAL IS DRY.
7. REFER TO DRAWING 201928-0003 and 201928-0004 FOR ADDITIONAL INFORMATION ON OPENING MATERIAL PITS.
8. STOCKPILES TO BE SIGNED IN ACCORDANCE WITH 201928-0007 - CONSTRUCTION ENVIRONMENTAL MANAGEMENT SIGNS.



MULCH PILE CROSS SECTION
SCALE 1:100

No.	DESCRIPTION	APPROVED & DATE
1	ORDER OF STOCKPILES CHANGED, NEW NOTES ADDED/AMENDED	

AMENDMENTS

CROSS SECTIONS
STOCKPILING IN PITS OR AT LAYDOWNS

mainroads WESTERN AUSTRALIA
PLANNING AND TECHNICAL SERVICES DIRECTORATE
ENVIRONMENT BRANCH
Waterloo Crescent EAST PERTH 6004
Telephone 138 138

DRAWN	A. BERRY
DESIGNED	N. ROWE
VERIFIED	
APPROVED	
FILE NO.	

GUIDELINE DRAWING
TYPICAL REVEGETATION DETAILS
STOCKPILING IN PITS OR AT LAYDOWNS
TOPSOIL, OVERBURDEN & MULCH

MRWA DRAWING NUMBER: 201928-0002-1
AMENDMENT

SCALE 1:100 A3

Martie Scllt 24.5.23

Appendix 6: Indicative Training Attendance / Site Induction Register

Site Induction / Training Register

Name	Signature	Date
1.		
2.		
3.		
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Appendix 7: Indicative Hygiene Inspection Checklist / Clean on Entry Hygiene Form

mainroads WESTERN AUSTRALIA

JUNE 2024

Hygiene Checklist

Vehicles, machinery, trailers, equipment and plant can transport invasive species like *Phytophthora cinnamomi*, pests and weeds into remnant vegetation. This checklist ensures that all vehicles and plant do not arrive or leave Main Roads sites with contaminating material.

Table 1: Project Details

Project Name:			
Region Name:			
Project Number:		**Task Code:**	
Contractor Name:		**Contract Number:**	

Table 2: Vehicle / Machinery / Trailer / Equipment / Plant Details

Date:		**ENTRY or EXIT from site**	*Circle one*
Location of Inspection:			
Owner / Operator:			
Type / Make/ Model:			
Registration Number:			
Odometer / Hour Meter Reading:			

Table 3: Hygiene Checklist

Check the following sections of the Vehicle / Machinery / Trailer / Equipment / Plant, to ensure it is clean and free of vegetative (including weeds and seeds) and soil material.

Item	Type (front, rear, sides)	Not Applicable	Not Clean	Clean
Scrub bar		☐	☐	☐
Air filter		☐	☐	☐
Fenders		☐	☐	☐
Radiator area		☐	☐	☐
Belly plates /underside		☐	☐	☐
Bucket, blade and forks, backhoe attachment , scraper		☐	☐	☐
Rippers		☐	☐	☐
Suspension		☐	☐	☐
Spare wheels		☐	☐	☐
Wheels and tracks, skids		☐	☐	☐
Drill bits		☐	☐	☐
Mud flaps		☐	☐	☐
Flat sections	*Esp. horizontal*	☐	☐	☐
Cupped sections		☐	☐	☐
Chassis areas	*H or C sections*	☐	☐	☐
Hinged points	*Esp. articulated areas e.g. truck, crane, excavator arm*	☐	☐	☐

Item	Type (front, rear, sides)	Not Applicable	Not Clean	Clean
Leaks	*Motor, transmission, hoses, hydraulics to be stuck down, reservoirs*	☐	☐	☐
Spill kits		☐	☐	☐
Fire suppression gear		☐	☐	☐
Trailers		☐	☐	☐
Cargo space		☐	☐	☐
Inside Cabin		☐	☐	☐
Under the Bonnet / Engine Bay		☐	☐	☐
Lights, Bumpers and Accessories e.g. toolboxes, spare tyres.		☐	☐	☐
Hydraulics and any attachments e.g. arms/booms, tynes and rippers, support frames, hydraulic hoses etc.		☐	☐	☐
OTHER COMMENTS ON HYGIENE OF VEHICLE / MACHINERY / TRAILER / EQUIPMENT / PLANT				

INSPECTION SIGN OFF

I declare that the Vehicle / Machinery / Trailer / Equipment / Plant listed above has been thoroughly inspected by myself, and is free of all vegetative and soil material.

Name:			
Company Name:	*(If relevant)*	**Position:**	
Signature:		**Date**	

I concur (different from the person who "declared") that the Vehicle / Machinery / Trailer / Equipment / Plant meets the required hygiene standards and is therefore suitable for entry to/or exit from this site.

Name:			
Company Name:	*(If relevant)*	**Position:**	
Signature:		**Date:**	

OR

This Vehicle / Machinery / Trailer / Equipment / Plant does not meet the required hygiene standards, and is therefore not suitable for entry to or exit from this site until the following areas are further cleaned.

Name:			
Company Name:	*If relevant*	**Position:**	
Signature:		**Date:**	

PHOTOS OF CLEAN VEHICLE/MACHINERY/EQUIPMENT

<Insert photos if required>

Appendix 8: Indicative Hygiene Inspection Register

MAY 2024
D23#179551 (Rev 1)

HYGIENE INSPECTION REGISTER

All vehicles entering a Clean on Entry Point on a Main Roads Construction Site must complete the below vehicle registration to ensure that the vehicle is clean of any material to limit the spread of dieback.

PROJECT DETAILS

Project Name:			
Region Name:			
Contractor Name:		**Contract Number:**	

VEHICLE REGISTRATION & DETAILS

Date:	Time:	Vehicle Registration:	Name:	Organisation:	Hygiene Inspection Checklist