Flora and Fauna Assessment Report

Aldington and Abbotts Road Upgrade

Report prepared by Narla Environmental Pty Ltd

for AT&L

March 2024

NARLA
environmental

Report:	Flora and Fauna Assessment Report – Aldington and Abbotts Road Upgrade
Prepared for:	AT&L
Prepared by:	Narla Environmental Pty Ltd
Project no:	ATL1
Date:	March 2024
Version:	Final v2.0

Narla Environmental Pty Ltd

www.narla.com.au

Report Certification

Works for this report were undertaken by:

Staff Name	Position
Chris Moore *BBioCon*	Narla Environmental General Manager/ Senior Ecologist
Jonathan Coy *BEnv*	Narla Environmental Project Manager/ Ecologist
Kayla Spithoven *BSc/BLang*	Narla Environmental Ecologist
Jayden Maloney *BSc MConBio*	Narla Environmental Ecologist

Document Control

Revision	Document Name	Issue Date	Internal Document Review
Draft v1.0	Flora and Fauna Assessment Report – Aldington and Abbotts Road Upgrade	26/04/2023	Jonathan Coy
Final v1.0	Flora and Fauna Assessment Report – Aldington and Abbotts Road Upgrade	9/05/2023	Jonathan Coy
Draft v2.0	Flora and Fauna Assessment Report – Aldington and Abbotts Road Upgrade	04/03/2024	Chris Moore
Final v2.0	Flora and Fauna Assessment Report – Aldington and Abbotts Road Upgrade	06/03/2024	Chris Moore

Table of Contents

1. INTRODUCTION 8
1.1 Project Background 8
1.2 Site Description and Location 8
1.2.1 Topography, Geology and Soil 8
1.2.2 Hydrology 9
1.3 Scope of Assessment 9
1.4 Study Limitations 9
1.5 Relevant Legislation and Policy 12
1.6 Cumberland Plain Conservation Plan 13
1.6.1 Biodiversity Conservation Act 2016 13
1.6.2 Environment Protection and Biodiversity Conservation Act 1999 14
1.7 Biodiversity Assessment Pathway 14
1.8 State Environmental Planning Policy: Industry and Employment 2021 18
1.8.1 Zoning 18
2. METHODOLOGY 19
2.1 Desktop Assessment and Literature Review 19
2.2 Ecological Site Assessment 19
2.2.1 General Survey 19
2.2.2 Weather Conditions 19
2.3 Mapping and Analysis of Vegetation Communities 20
2.4 Impact Assessment 21
3. NATIVE VEGETATION 22
3.1 Vegetation Community 22
3.1.1 Historically Mapped Vegetation Communities 22
3.1.2 Field Validated Vegetation Communities 22
4. THREATENED ENTITIES 35
4.1 Threatened Ecological Communities (TECs) 35
4.1.1 Listing under the BC Act: Cumberland Plain Woodland in the Sydney Basin Bioregion – Critically Endangered Ecological Community (CEEC) 35
4.1.2 Listing under EPBC Act -- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest 35
4.2 Threatened Flora 42
4.3 Threatened Fauna 47

4.3.1 Migratory Fauna Species 48
5. IMPACT SUMMARY 57
5.1 Vegetation Loss 57
5.2 Threatened Ecological Communities 57
5.2.1 Local Occurrence of Cumberland Plain Woodland in the Sydney Basin Bioregion 57
6. RECOMMENDATIONS 59
7. CONCLUSION 61
8. REFERENCES 62
9. APPENDICES 64

Tables

Table 1. Relevant legislation and policy addressed. 12
Table 2. Biodiversity Offset Scheme Entry Thresholds. Bold text indicates the threshold relevant to this assessment. 14
Table 3. Weather conditions recorded at Badgerys Creek AWS (station 067108) preceding and during the survey periods (survey dates in bold). 20
Table 4. Cumberland Shale Plains Woodland (Canopy) identified within the Project Area. 29
Table 5. Cumberland Shale Plains Woodland (Derived Grassland) identified within the Project Area. 31
Table 6. Exotic Vegetation identified within the Project Area. 33
Table 7. Key diagnostics features required to meet the EPBC Listing Status for Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (Threatened Species Scientific Committee 2009). 36
Table 8. Condition classes and thresholds for Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (Threatened Species Scientific Committee 2009). 37
Table 9. Likelihood of occurrence of threatened flora species within the Project Area (V=Vulnerable; E=Endangered; CE=Critically Endangered) 42
Table 10. Fauna habitat values. 47
Table 11. List of potential threatened fauna that may occupy the Project Area at some stage of their lifecycles. Vulnerable = V, Endangered = E, Endangered Population = EP, Critically Endangered = CE. 49
Table 12. Table of measures to be implemented before, during and after construction to avoid and minimise the impacts of the project. 59

Figures

Figure 1. The Location of the Proposed Activity. 10
Figure 2. Watercourses and their associated Riparian Buffers within the Project Area. 11
Figure 3. Cumberland Plain Conservation Plan (Map 1/3). 15
Figure 4. Cumberland Plain Conservation Plan (Map 2/3). 16

Figure 5. Cumberland Plain Conservation Plan (Map 3/3). 17
Figure 6. Historically Mapped Vegetation Communities (1/3) (DPE 2022). 23
Figure 7. Historically Mapped Vegetation Communities (2/3) (DPE 2022). 24
Figure 8. Historically Mapped Vegetation Communities (3/3) (DPE 2022). 25
Figure 9. Narla Field-validated Vegetation Mapping within the Project Area. (1/3). 26
Figure 10. Narla Field-validated Vegetation Mapping within the Project Area (2/3). 27
Figure 11. Narla Field-validated Vegetation Mapping within the Project Area (3/3). 28
Figure 12. Threatened Ecological Communities within the Project Area (BC & EPBC Act) (1/3). 39
Figure 13. Threatened Ecological Communities within the Project Area (BC and EPBC Act) (2/3). 40
Figure 14. Threatened Ecological Communities within the Project Area (BC and EPBC Act) (3/3). 41
Figure 15. Threatened Species Survey effort and Habitat Features identified with the Project Area (1/3). 44
Figure 16. Threatened Species Survey effort and Habitat Features identified with the Project Area (2/3). 45
Figure 17. Threatened Species Survey effort and Habitat Features identified with the Project Area (3/3). 46
Figure 18. Local Occurrence of Cumberland Plain Woodland in the Sydney Basin Bioregion (BC Act). 58

Glossary

Acronym/ Term	Definition
BAM	Biodiversity Assessment Method
BC Act	New South Wales Biodiversity Conservation Act 2016
Biodiversity values	The composition, structure, and function of ecosystems, including threatened species, populations and ecological communities, and their habitats
CEMP	Construction Environmental Management Plan
CPCP	Cumberland Plain Conservation Plan
DA	Development Application
DCP	Mamre Road Precinct Development Control Plan 2021
Development	The use of land, and the subdivision of land, and the carrying out of a work, and the demolition of a building or work, and the erection of a building, and any other act, matter or thing referred to in section 26 that is controlled by an environmental planning instrument but does not include any development of a class or description prescribed by the regulations for the purposes of this definition (EP&A Act 1979).
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment (now known as DPE)
EHG	Environment and Heritage Group
EP&A Act	Environmental Planning & Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
FFA	Flora and Fauna Assessment
ha	Hectares
km	Kilometre
IPA	Inner Protection Area
LGA	Local Government Area
Locality	A 10km x 10km cell centred on the Project Area
m	metres
Native Vegetation	Any of the following types of plants native to New South Wales: (a) trees (including any sapling or shrub), (b) understorey plants, (c) groundcover (being any type of herbaceous vegetation) and (d) plants occurring in a wetland.
OEH	Office of Environment and Heritage (now known as the DPE)
SEPP	State Environmental Planning Policy
SEPP (I&E)	State Environmental Planning Policy (Industry and Employment) 2021
Project Area	The footprint of the proposed activity.
Threatened species, populations, and ecological communities	Species, populations, and ecological communities specified in Schedules 1 and 2 of the BC Act 2016.

1. Introduction

1.1 Project Background

Narla Environmental Pty Ltd (Narla) was commissioned by AT&L to undertake a Flora and Fauna Assessment (FFA) for the proposed activity along Aldington Road and Abbotts Road, Kemps Creek. The proposed activity aims to upgrade Aldington Road and Abbotts Road, and to provide for the development of land within the Mamre Road Precinct (AT&L 2024; **Appendix A**). All areas associated with the proposed activity are hereafter referred to as the 'Project Area' (**Figure 1**), including:

- Widening the road beyond the existing road reserve (either side on Aldington Road);
- Signalised intersections;
- Earthworks including raising and lowering the road;
- Stormwater (new and larger culverts under and adjacent to road);
- Relocation of services (above and underground);
- New services (incl water, power, comms).
- Site sheds, material storage as required for road construction project;
- Temporary works as necessary to facilitate construction;
- Temporary works buffer as necessary to facilitate construction.

Narla have produced this report to assess any potential impacts associated with the proposed activity on terrestrial ecology (biodiversity), particularly threatened species, populations and ecological communities listed under the Biodiversity Conservation Act 2016 (BC Act) and Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The report will also recommend appropriate measures to mitigate any potential impacts in line with all relevant State Environmental Planning Policies (SEPP), including SEPP (Industry and Employment) (I&E) 2021, and state and local government plans, namely the Mamre Road Precinct Development Control Plan (DCP) 2021.

1.2 Site Description and Location

The Project Area is on a slightly hilly terrain and is located within a rural setting, covering an area of approximately 14.81ha within the Penrith Local Government Area (LGA). The Project Area stretches from the northern part of Aldington to Abbotts Road in the south. The Project Area is composed of mainly exotic-dominated grasslands and paddocks, with sporadic intervals of hardstand, exotic vegetation, and minor remnant vegetation. The Project Area is bordered by continuous stretches of rural residences and paddocks.

1.2.1 Topography, Geology and Soil

The Project Area ranges from 41m to 87m above sea level (asl; Google 2023). The Project Area is situated on the 'Luddenham' and 'Blacktown' soil landscapes as described in the Soil Landscapes of the Penrith 1:100,000 sheets (Bannerman and Hazelton 2011).

The Luddenham landscape is characterised by undulating to rolling hills underlain by Wianamatta Group Ashfield Shale and Bringelly Shale formations, with local relief 50-80m and slopes 5-20%. The Ashfield Shale consists of laminite and dark grey shale. Bringelly Shale consists of shale, calcareous claystone, and laminite. Between these two shale members is the Minchinbury Sandstone consisting of fine to medium-grained lithic quartz sandstone. Soils are shallow (<100cm) consisting of dark Podzolic Soils or massive Earthy Clays on crests, moderately deep (70-150cm) Red Podzolic Soils on upper slopes and moderately deep (<150cm) Yellow Podzolic Soils on lower slopes and drainage lines.

The Blacktown soil landscape is characterized by gently undulating rises on Wianamatta Group shales, with local relief to 30 m and slopes usually >5%.The geology consists of Wianamatta Group—Ashfield Shale comprising of laminite and dark grey siltstone, Bringelly Shale which consists of shale with occasional calcareous claystone, laminite and infrequent coal, and Minchinbury Sandstone consisting of fine to medium-grained quartz lithic sandstone. Soils are shallow to moderately deep (>100cm) hard setting mottled texture contrast soils and Brown Podzolic Soils on crests, grading to Yellow Podzolic Soils on lower slopes and drainage lines. The Project Area is not mapped as having any risk of acid sulfate soils.

1.2.2 Hydrology

The Project Area contains two (2) 1st order watercourses and one (1) 2nd order watercourse along with their associated riparian buffer zones (**Figure 2**). Two (2) mapped hydroareas (dams) also overlap with the Project Area. No additional unmapped water features were observed within the Project Area (**Figure 2**).

1.3 Scope of Assessment

The objectives of this FFA were to:

- Establish the likelihood of occurrence of migratory species, threatened species, endangered populations, and threatened ecological communities as listed under the New South Wales BC Act and/or the Commonwealth EPBC Act;
- Assess any potential impacts to species and/or communities listed under the BC Act and EPBC Act;
- Identify and map the distribution of vegetation communities within the Project Area;
- Record the presence and extent of any known or potential fauna habitat features such as nests, dreys, caves, crevices, culverts, pools, soaks, flowering trees, fruiting trees, hollow-bearing trees and provide recommendations for on-going management of these habitat features and any fauna present;
- Record the presence and extent of any priority weeds or weed infestations and provide recommendations for on-going management; and
- Recommend any controls or additional actions to be taken to protect or improve environmental outcomes of the proposed activity.

1.4 Study Limitations

This study was not intended to provide a complete inventory of all flora and fauna species with potential to occur on the Project Area. The timing of the survey may not have coincided with emergence times of some species of flora and fauna, such as seasonally flowering herbs, seasonal migratory fauna, or nocturnal fauna.

To account for those species that could not be identified during the field survey, detailed habitat assessments were combined with desktop research and local ecological knowledge to establish an accurate prediction of the potential for such species to occur on or adjacent to the Project Area.

Figure 1. The Location of the Proposed Activity.

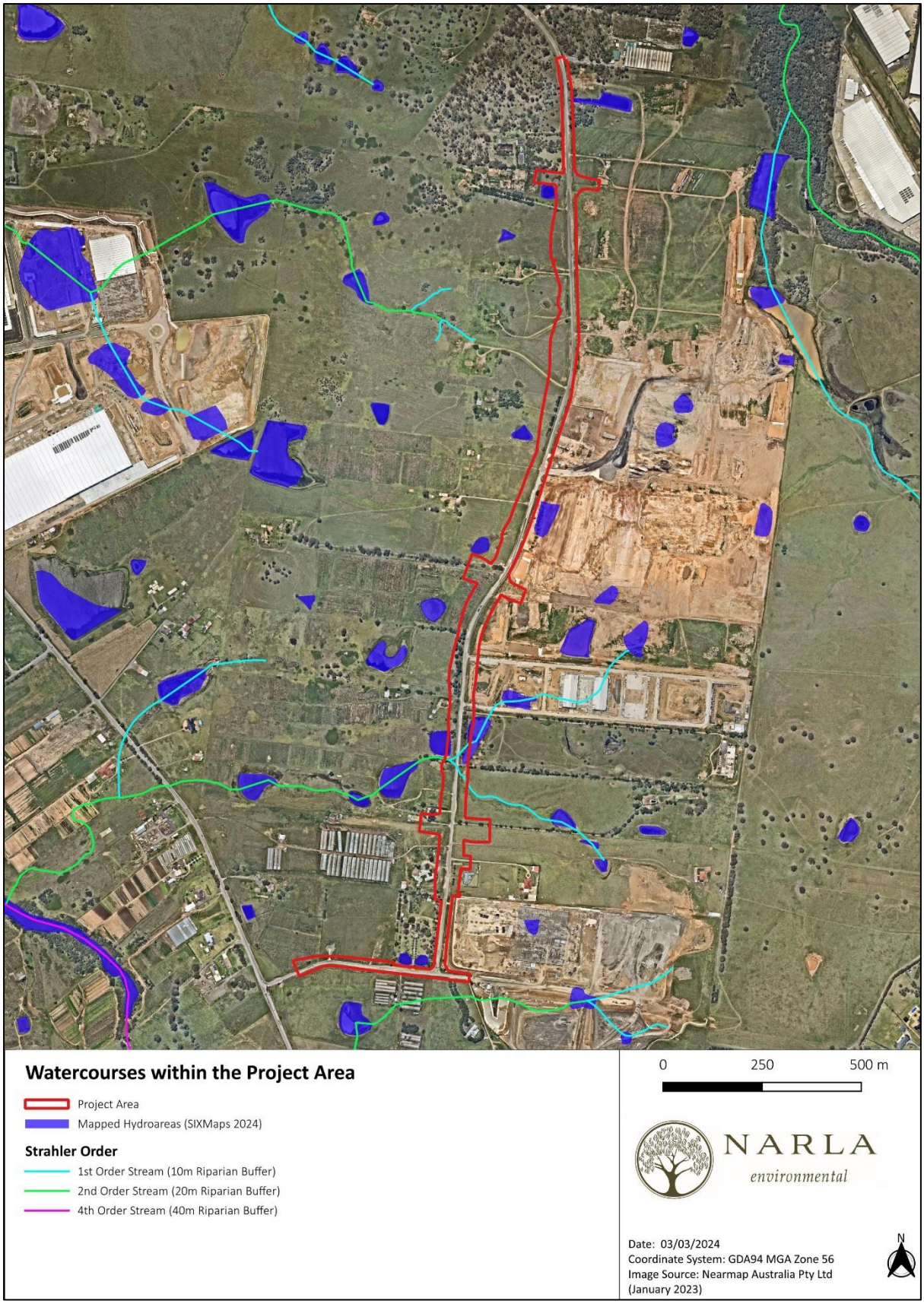


Figure 2. Watercourses and their associated Riparian Buffers within the Project Area.

1.5 Relevant Legislation and Policy

The legislation and policy that are addressed in this report are listed in **Table 1.**

Table 1. Relevant legislation and policy addressed.

Legislation/ Policy	Relevant Ecological Feature on Site	Triggered	Action Required
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Commonwealth)	Potential suitable habitat was considered present for the EPBC Act listed Vulnerable fauna species, *Litoria aurea* (Green and Golden Bell Frog). The native vegetation within the Project Area did not meet the listing advice for protection under the EPBC Act. No EPBC Act listed fauna or flora species were identified within Project Area: EPBC Act listed threatened species have the potential to occur within the Project Area.	Yes	This FFA, particularly the likelihood tables for threatened fauna and flora species occurring or potentially occurring within the Project Area, as well as severity of potential impacts. An assessment of Significant Impact Criteria was undertaken in accordance with Commonwealth Environment Protection and Biodiversity Conservation Act 1999 to assess potential impacts from the proposed activity on Green and Golden Bell Frog (**Appendix E**).
New South Wales Biodiversity Conservation Act 2016 (BC Act)	One (1) BC Act listed Endangered Ecological Community (EEC) occurs within the Project Area: ▪ Cumberland Plain Woodland in the Sydney Basin Bioregion Potential suitable habitat was considered present for the BC Act listed Endangered fauna species, *Litoria aurea* (Green and Golden Bell Frog) however this habitat was restricted to areas mapped as 'Certified – Urban Capable Land' and therefore no additional assessment under the BC Act is required. No BC Act listed fauna or flora species were identified within the Project Area. BC Act listed threatened species have the potential to occur within the Project Area. Part of the Project Area has been nominated as 'Certified-urban capable land' under the Cumberland Plain Conservation Plan (CPCP). Development in these areas do not require further biodiversity assessment under the BC Act. However, other parts of the Project Area that are mapped as 'Excluded Land' or 'Avoided Land' under the CPCP still require biodiversity approval under the BC Act.	Yes	This FFA, particularly the likelihood tables for threatened fauna and flora species occurring or potentially occurring within the Project Area, as well as severity of potential impacts. A Test of Significance (5-part Test) was undertaken in accordance with the BC Act to assess potential impacts from the proposed activity on the CEEC (**Appendix D**).

Legislation/ Policy	Relevant Ecological Feature on Site	Triggered	Action Required
Biosecurity Act 2015 (Bio Act)	Six (6) Priority Weeds were identified within the Project Area: ▪ *Lantana camara* (Lantana); ▪ *Lycium ferocissimum* (African Boxthorn); ▪ *Olea europaea subsp. cuspidata* (African Olive); ▪ *Opuntia stricta* (Common Prickly Pear); ▪ *Rubus fruticosus species aggregate* (Blackberry); and ▪ *Senecio madagascariensis* (Fireweed).	Yes	All priority weeds must be managed in accordance with the Biosecurity Act
Environmental Planning and Assessment Act 1979 (EP&A Act)	All threatened species, populations and ecological communities and their habitat that occur or are likely to occur on the Subject Property during a part of their lifecycle.	Yes	This FFA and all subsequent recommendations relevant to the planning process under 'Part 4 Development assessment and consent'.
State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Chapter 4 Koala Habitat Protection 2021	Penrith City Council is not listed in Schedule 2 of the SEPP as one of the LGAs to which this chapter applies. Therefore Chapter 4 of the SEPP does not apply to the proposed activity.	No	None.
State Environmental Planning Policy (Resilience and Hazards) 2021 - Chapter 2 Coastal Management	The Project Area does not contain areas mapped as 'Coastal Wetlands,' 'Littoral Rainforest,' or proximity to either, therefore, Chapter 2 of this SEPP does not apply.	No	None
Water Management Act 2000	As the proposed works intersect a mapped water course this Act Applies.	Yes	Controlled Activity approval may be required.

1.6 Cumberland Plain Conservation Plan

1.6.1 Biodiversity Conservation Act 2016

Part of the Project Area has been nominated as 'Certified-urban Capable Land' under the Cumberland Plain Conservation Plan (CPCP). Development in these areas do not require further biodiversity assessment under the BC Act. However, other parts of the Project Area that are mapped as 'Excluded Land' or 'Avoided Land' still require biodiversity assessment under the BC Act (**Figure 3**; **Figure 4**; **Figure 5**). Therefore, all impacts to vegetation located within 'Certified-urban Capable Land' has not been assessed has not been assessed within this report. BC Act Tests of Significant (5-part Tests) have been conducted for areas of Cumberland Plain Woodland (**Appendix D**), which were located with areas mapped under the CPCP as 'Excluded Land'.

1.6.2 Environment Protection and Biodiversity Conservation Act 1999

The Department of Planning and Environment is currently pursuing Commonwealth approval for the CPCP under Part 10 of the EPBC Act. Landholders can submit development applications, seek subdivision or start master planning. However, development that will have a significant impact on matters of national environmental significance (MNES) on certified - urban capable land cannot commence until the Commonwealth CPCP approval is in place.

The Cumberland Plain Woodland located within the Project Area was found to not meet the listing advice for protection under the EPBC Act however, an assessment of significant impact on the EBPC listed Green and Golden Bell Frog has been conducted as part of this proposal (**Appendix E**) and it was determined that no significant impact was likely.

1.7 Biodiversity Assessment Pathway

The requirements of the BC Act 2016 and Biodiversity Conservation Regulation 2017 are mandatory for all development applications assessed pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) submitted in the Penrith City Council LGA.

The Biodiversity Values (BV) Map (DPE 2024a) identifies land with high biodiversity values that are particularly sensitive to impacts from development and clearing. The map forms part of the Biodiversity Offsets Scheme Entry Threshold which is one of the triggers for determining whether the Biodiversity Offset Scheme (BOS) applies to a clearing or development proposal. The Project Area does not contain any areas mapped on the Biodiversity Values (BV) Map.

No minimum lot size is prescribed by the LEP to the Project Area. Therefore, the total size of the smallest lot is utilised to determine the clearing threshold for the project. The smallest lot intersected by the proposed activity was found to be in the less than 1ha category, meaning that to avoid triggering the BOS, the proponent must avoid clearing 0.25ha or more of native vegetation (**Table 2**). As the proposed activity will only impact 0.07ha, of native vegetation not located within areas identified as 'Certified-urban Capable Land', the clearing threshold is not exceeded and the BOS does not apply.

Table 2. Biodiversity Offset Scheme Entry Thresholds. Bold text indicates the threshold relevant to this assessment.

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	**0.25ha or more**
1 ha to less than 40 ha	0.50ha or more
40 ha to less than 1000 ha	1ha or more
1000ha or more	2ha or more

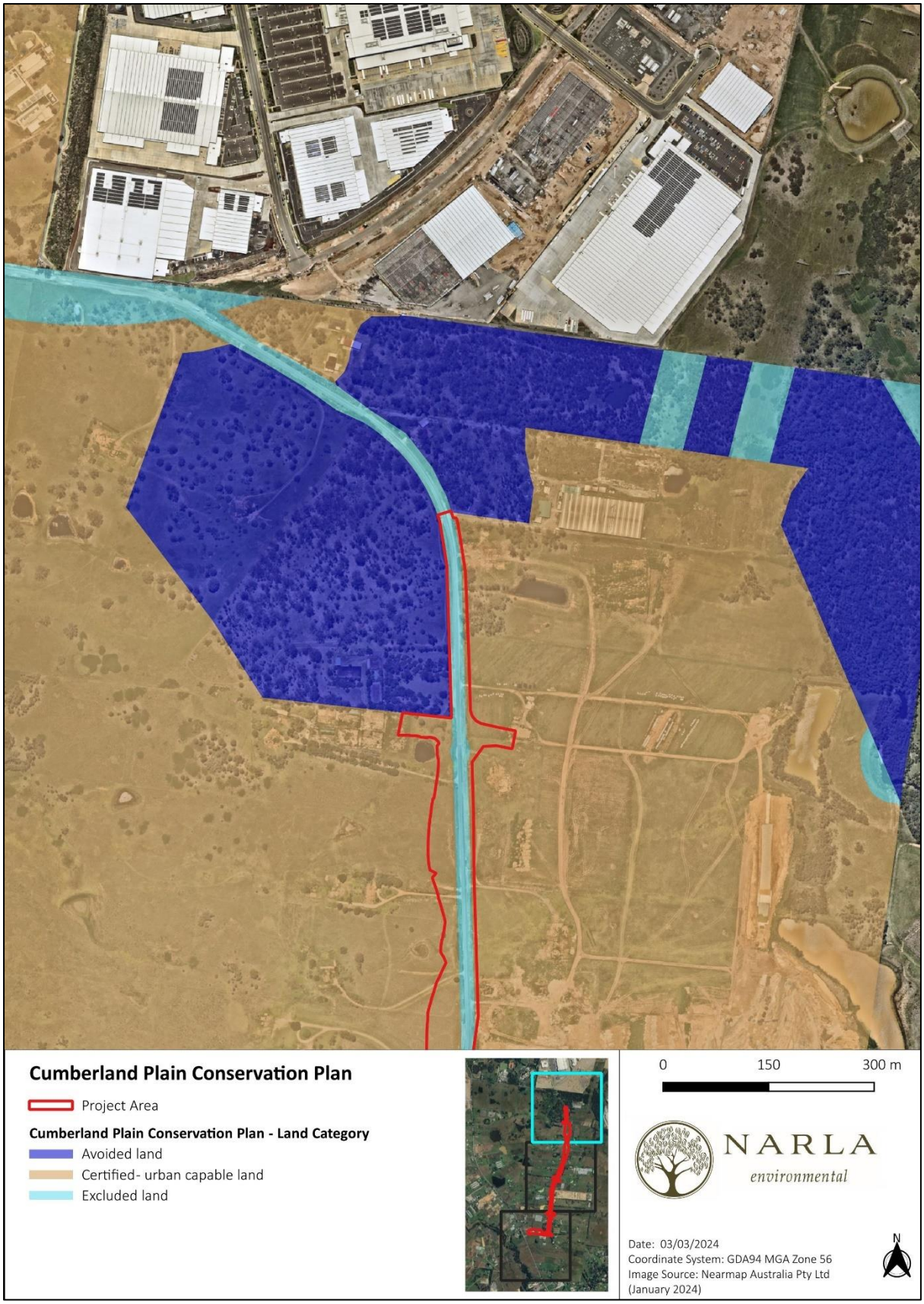


Figure 3. Cumberland Plain Conservation Plan (Map 1/3).

Figure 4. Cumberland Plain Conservation Plan (Map 2/3).

Figure 5. Cumberland Plain Conservation Plan (Map 3/3).

1.8 State Environmental Planning Policy: Industry and Employment 2021

The proposed activity will be undertaken in a manner that meets the requirements of the SEPP (I&E).

1.8.1 Zoning

The Project Area intersects land zoned within the Mamre Road Precinct as 'IN1: General Industrial'. The SEPP requires that the development satisfies the zone objectives, which are:

- Zone IN1: General Industrial
    - To facilitate a wide range of employment-generating development including industrial, manufacturing, warehousing, storage and research uses and ancillary office space;
    - To encourage employment opportunities along motorway corridors, including the M7 and M4;
    - To minimise any adverse effect of industry on other land uses;
    - To facilitate road network links to the M7 and M4 Motorways;
    - To encourage a high standard of development that does not prejudice the sustainability of other enterprises or the environment; and
    - To provide for small-scale local services such as commercial, retail and community facilities (including child care facilities) that service or support the needs of employment-generating uses in the zone.

2. Methodology

2.1 Desktop Assessment and Literature Review

A thorough literature review of local information relevant to the Penrith LGA was undertaken. Searches using NSW Wildlife Atlas (BioNet; DPE 2024b) and the Commonwealth Protected Matters Search Tool (DCCEEW 2024) were conducted to identify all current threatened flora and fauna, as well as migratory fauna records within a 10km x 10km cell centred on the Project Area. These data were used to assist in establishing the presence or likelihood of any ecological values as occurring on or adjacent to the Project Area and helped inform our Ecologist on what to look for during the site assessment.

Soil landscape and geological mapping was examined to gain a deeper understanding of the geology of the Project Area that assists in determining whether any threatened flora or ecological communities may occur (Kovac & Lawrie,1991).

2.2 Ecological Site Assessment

2.2.1 General Survey

A site assessment was undertaken by Narla Ecologists Jayden Maloney and Hannah Martin on the 9th and 10th of February 2023, and the 14th and 15th of March 2023. An additional site assessment was then conducted by Narla Ecologist Chris Moore and Kayla Spithoven on the 1st of March 2024. During the site assessments, the following activities were undertaken:

- Identifying and recording the vegetation communities within the Project Area, with focus on identifying any threatened ecological communities (TECs);
- Recording a detailed list of flora species encountered within the Project Area, with a focus on threatened species, species diagnostic of threatened ecological communities and Priority Weeds;
- Recording opportunistic sightings of any fauna species seen or heard on or within the immediate surrounds of the Project Area;
- Targeted surveys for threatened flora;
- Identifying and recording the locations of notable fauna habitat such as important nesting, roosting or foraging microhabitats;
- Targeting the habitat of any threatened and regionally significant fauna including:
    - Tree hollows (habitat for threatened large forest owls, parrots, and arboreal mammals);
    - Caves and crevices (habitat for threatened reptiles, small mammals, and microbats);
    - Termite mounds (habitat for threatened reptiles);
    - Soaks (habitat for threatened frogs);
    - Wetlands (habitat for threatened fish, frogs, and water birds);
    - Drainage lines (habitat for threatened fish and frogs);
    - Fruiting trees (food for threatened frugivorous birds and mammals);
    - Flowering trees (food for threatened nectarivorous mammals and birds);
    - Trees and shrubs supporting nest structures (habitat for threatened birds and arboreal mammals); and
    - Any other habitat features that may support fauna (particularly threatened) species.
- Assessing the connectivity and quality of the vegetation within the Project Area and surrounding area.

2.2.2 Weather Conditions

Weather conditions recorded at the nearest weather station prior to and during the general flora and fauna survey period are provided in **Table 3** (BOM 2024). This data reveals little to no rainfall and warm conditions leading up

to the survey, which is unlikely to have a significant effect on triggering the emergence/flowering of threatened species that could potentially occur within the Project Area.

Table 3. Weather conditions recorded at Badgerys Creek AWS (station 067108) preceding and during the survey periods (survey dates in bold).

Survey Type	Survey date	Day	Minimum Temp. (°C)	Maximum Temp. (°C)	Rainfall (mm)
Lead up to survey	02-Feb-23	Thu	18.1	34.4	0
	03-Feb-23	Fri	16.8	29.3	0
	04-Feb-23	Sat	13.6	27.8	0
	05-Feb-23	Sun	10.2	31.2	0
	06-Feb-23	Mon	17.3	31.8	0
	07-Feb-23	Tue	19.4	30.6	0
	08-Feb-23	Wed	18.4	28.2	0
Survey Dates	**09-Feb-23**	**Thu**	**18.2**	**24.6**	**0**
	10-Feb-23	**Fri**	**15.0**	**33.3**	**0**
Lead up to survey	7-Mar-23	Tue	18.3	36.2	0
	8-Mar-23	Wed	10.2	33.4	0
	9-Mar-23	Thu	12.5	30.3	0
	10-Mar-23	Fri	12.3	30.6	0
	11-Mar-23	Sat	14.1	35.0	0
	12-Mar-23	Sun	19.7	30.2	0
	13-Mar-23	Mon	17.0	22.7	2.8
Survey Dates	**14-Mar-23**	**Tue**	**16.8**	**24.6**	**6.6**
	15-Mar-23	**Wed**	**16.4**	**31.4**	**8.4**
Lead up to survey	23-Feb-24	Fri	18.5	37.1	0
	24-Feb-24	Sat	18.0	20.6	2.2
	25-Feb-24	Sun	13.9	23.7	0.4
	26-Feb-24	Mon	16.4	30.8	0
	27-Feb-24	Tue	18.9	23.0	0.6
	28-Feb-24	Wed	19.3	30.7	0
	29-Feb-24	Thu	20.3	38.7	0
Survey Date	**01-Mar-24**	**Fri**	**20.7**	**30.5**	**0.4**

2.3 Mapping and Analysis of Vegetation Communities

Narla examined local satellite imagery, geological mapping, soil landscape mapping and topographic mapping, in addition to existing vegetation mapping (DPE 2022) in order to stratify the Project Area and guide the site

assessment survey efforts. The following resources were consulted during the site assessment to assist with the identification of vegetation communities present within the Project Area:

- eSPADE v2.2 (DPE 2023d);
- Soil Landscapes of the Penrith 1:100,000 sheet (Bannerman and Hazelton 2011);
- State Vegetation Type Mapping (DPE 2022).

2.4 Impact Assessment

Locally occurring threatened species (as per DPE 2023b) were assessed for their potential to occur within the Project Area (Table 9; Table 11). It was then determined whether a further impact assessment (test of significance; 5-part test and/or an Assessment of Significant Impact Criteria) was required.

An assessment of Significance (5-part Test) was carried out for the BC Act listed Critically Endangered Ecological Community (CEEC), Cumberland Plain Woodland in the Sydney Basin Bioregion that is not within Certified-urban capable land under CPCP (Appendix D). An Assessment of Significant Impact Criteria was also carried out for the EPBC Act listed vulnerable species *Litoria aurea* (Green and Golden Bell Frog; Appendix E).

3. Native Vegetation

3.1 Vegetation Community

3.1.1 Historically Mapped Vegetation Communities

Based on historical vegetation mapping, three (3) vegetation communities are present within the Project Area (DPE 2022; **Figure 6; Figure 7** and **Figure 8**):

- PCT 3319: Cumberland Shale Plains Woodland;
- PCT 3320: Cumberland Shale Plains Woodland; and
- Non-native Vegetation.

Both PCT 3319 and 3320 conform to the BC listed CEEC, Cumberland Plain Woodland in the Sydney Basin Bioregion, and the EPBC Act listed CEEC, Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest.

3.1.2 Field Validated Vegetation Communities

Field survey conducted by the Narla Ecologists identified three (3) vegetation communities within the Project Area (**Figure 9**):

- Cumberland Shale Plains Woodland (Canopy; **Table 4**);
- Cumberland Shale Plains Woodland (Derived Grassland; **Table 5**); and
- Exotic Vegetation (**Table 6**).

.

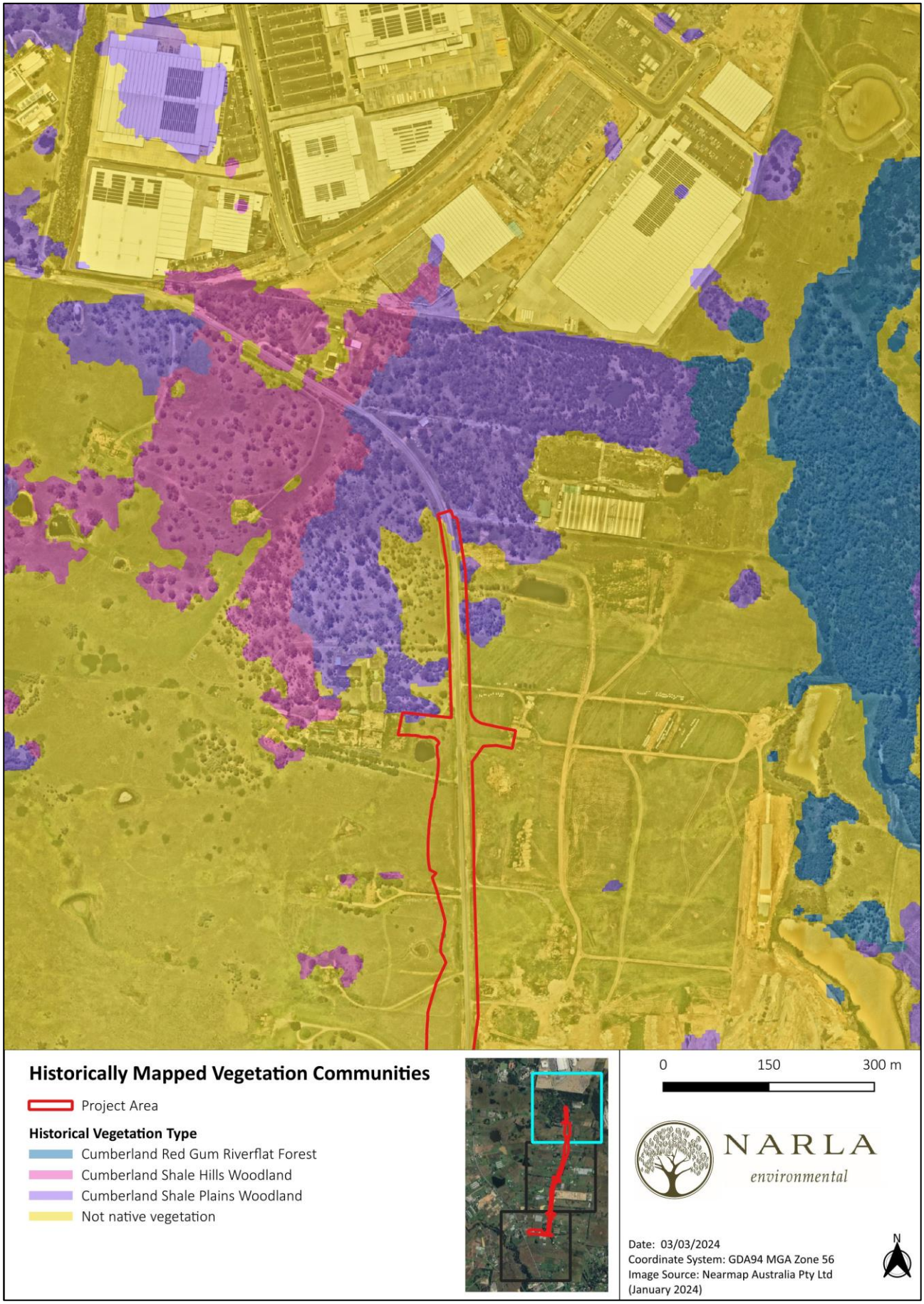


Figure 6. Historically Mapped Vegetation Communities (1/3) (DPE 2022).

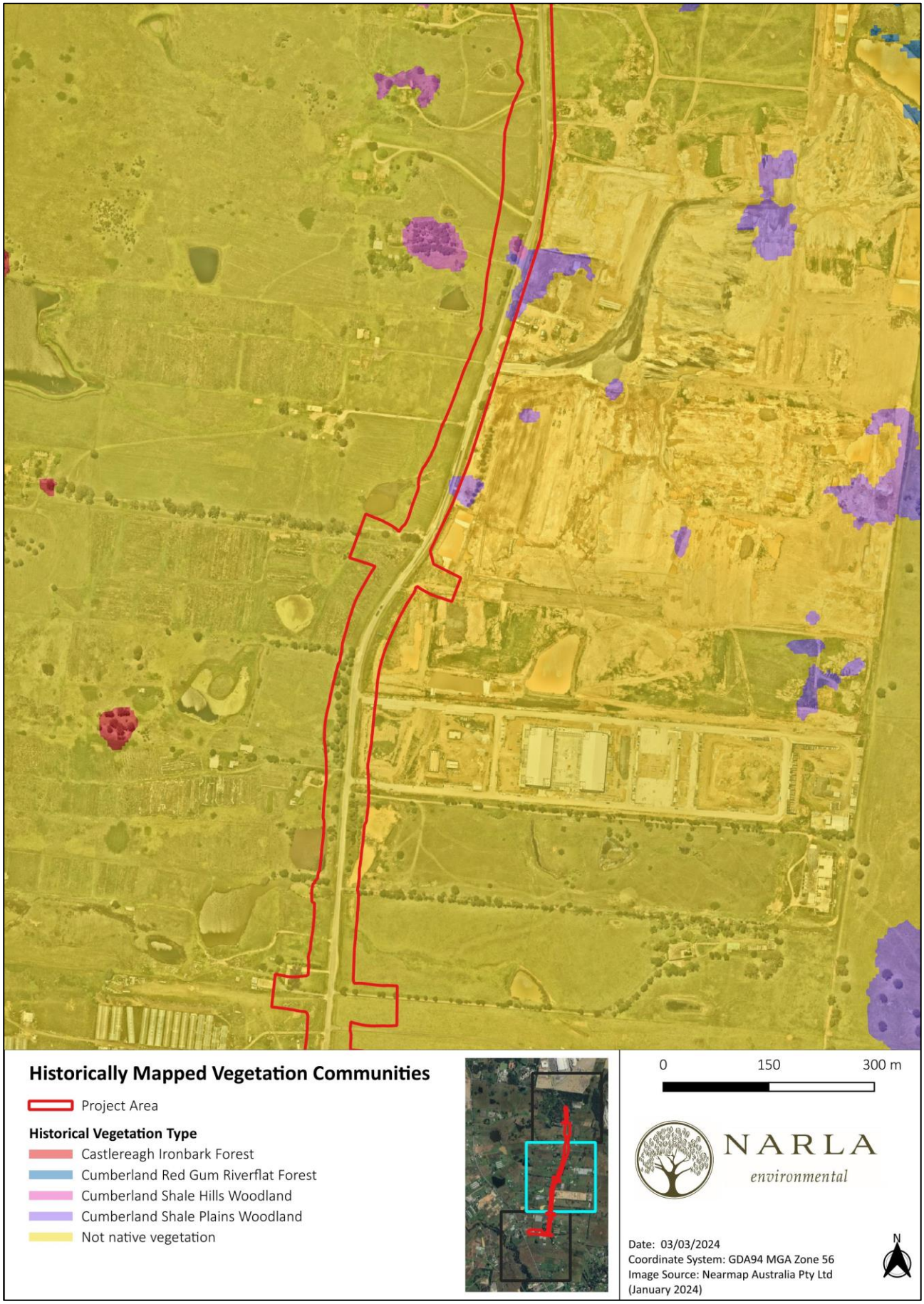


Figure 7. Historically Mapped Vegetation Communities (2/3) (DPE 2022).

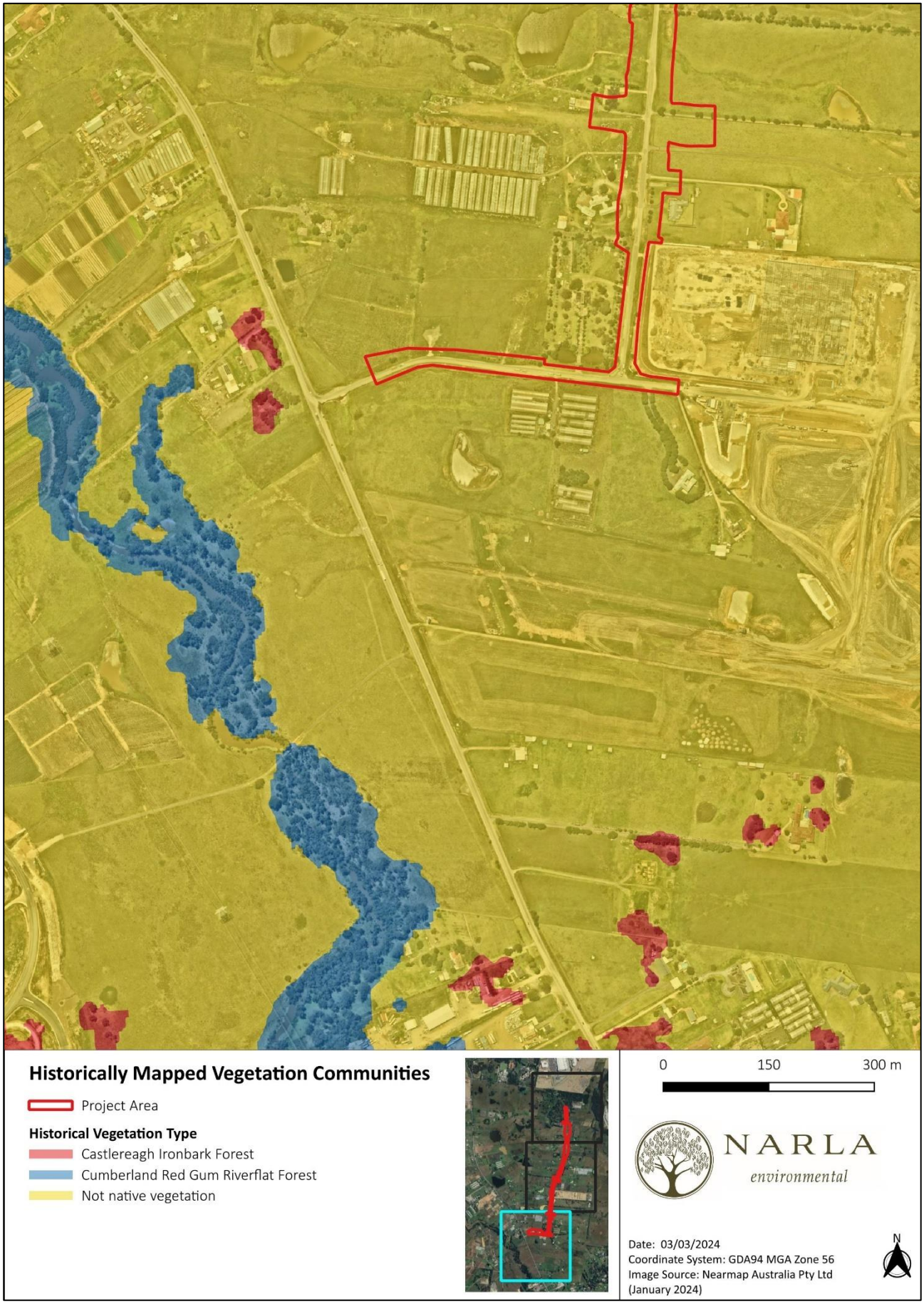


Figure 8. Historically Mapped Vegetation Communities (3/3) (DPE 2022).

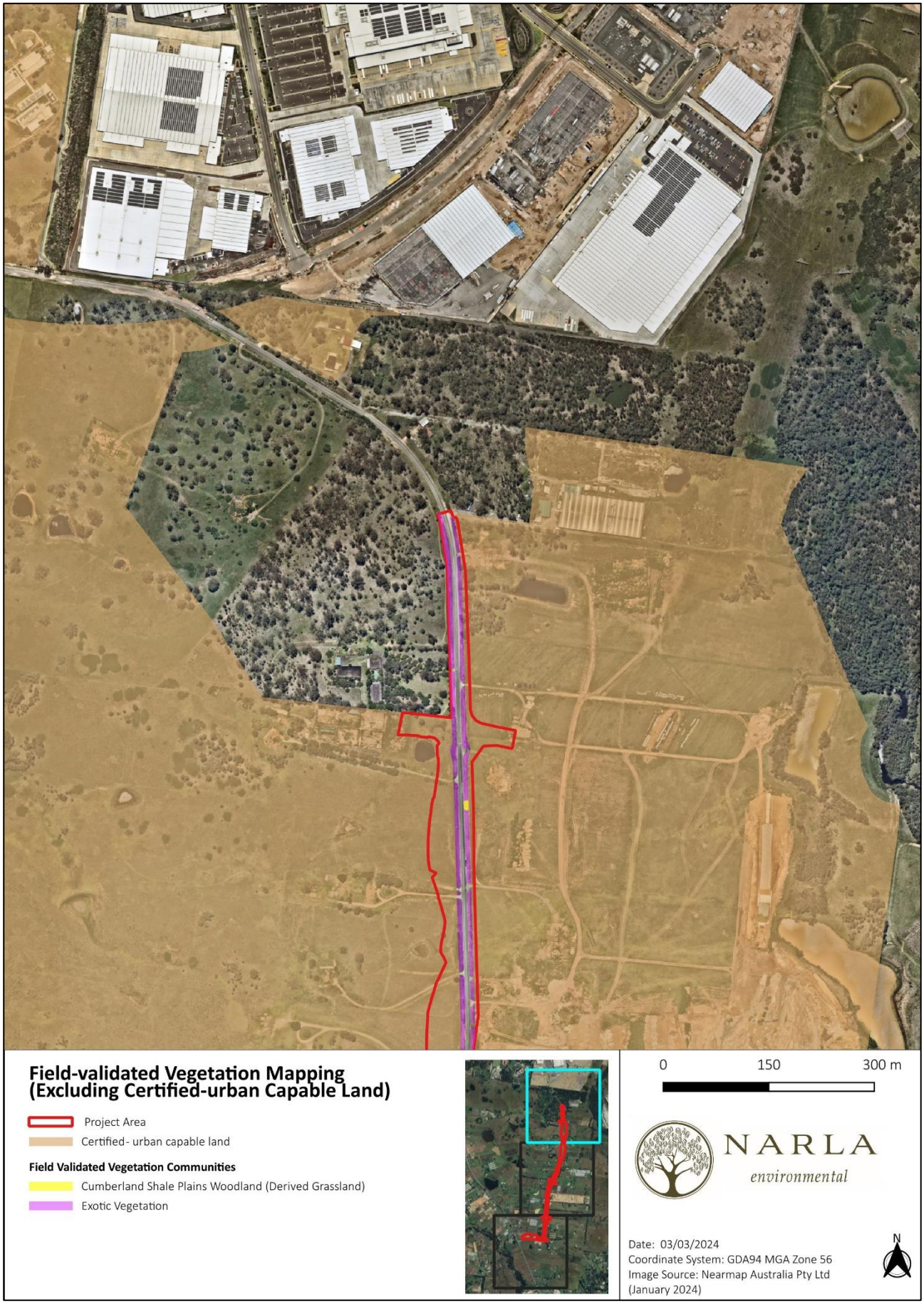


Figure 9. Narla Field-validated Vegetation Mapping within the Project Area. (1/3).

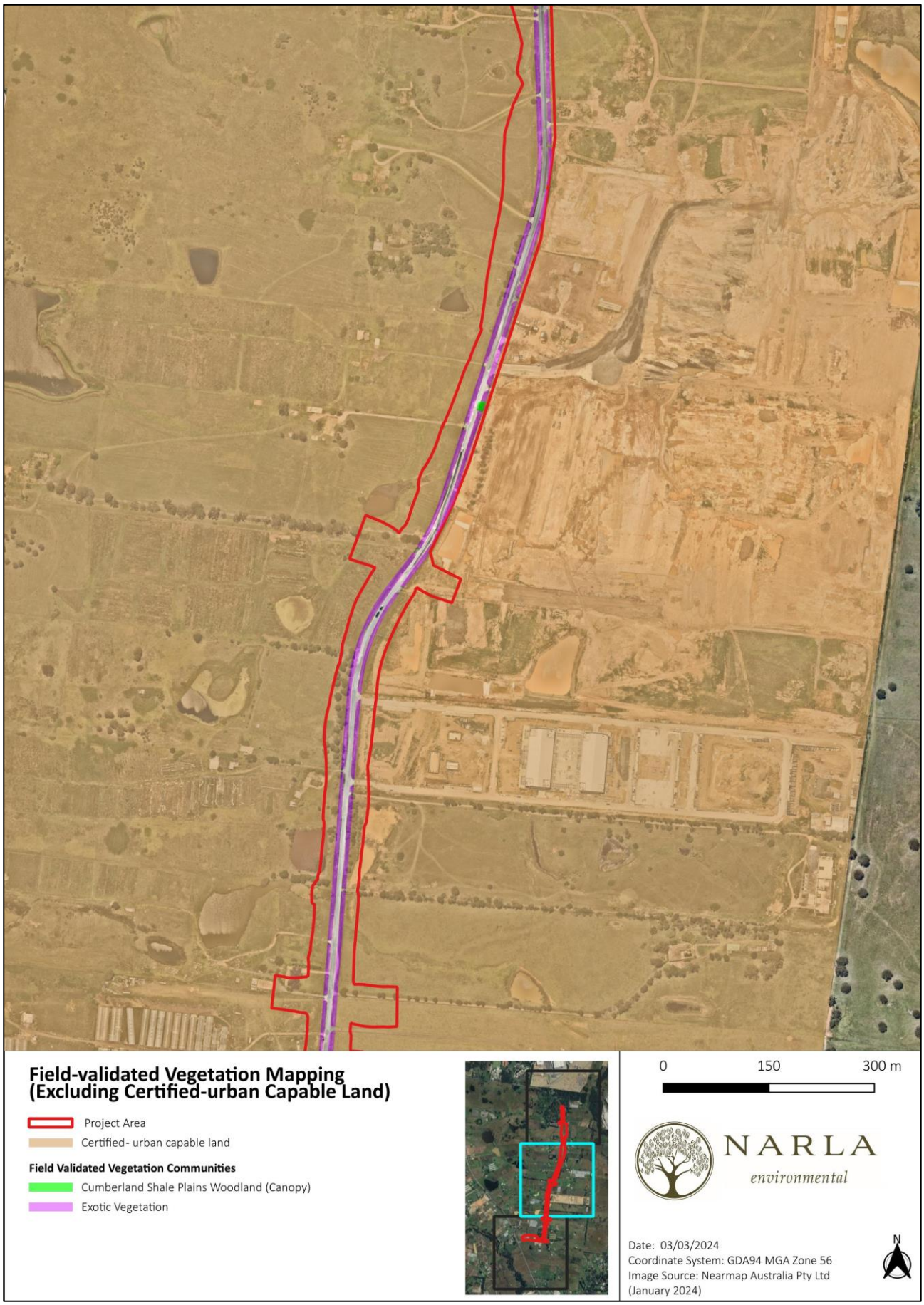


Figure 10. Narla Field-validated Vegetation Mapping within the Project Area (2/3).

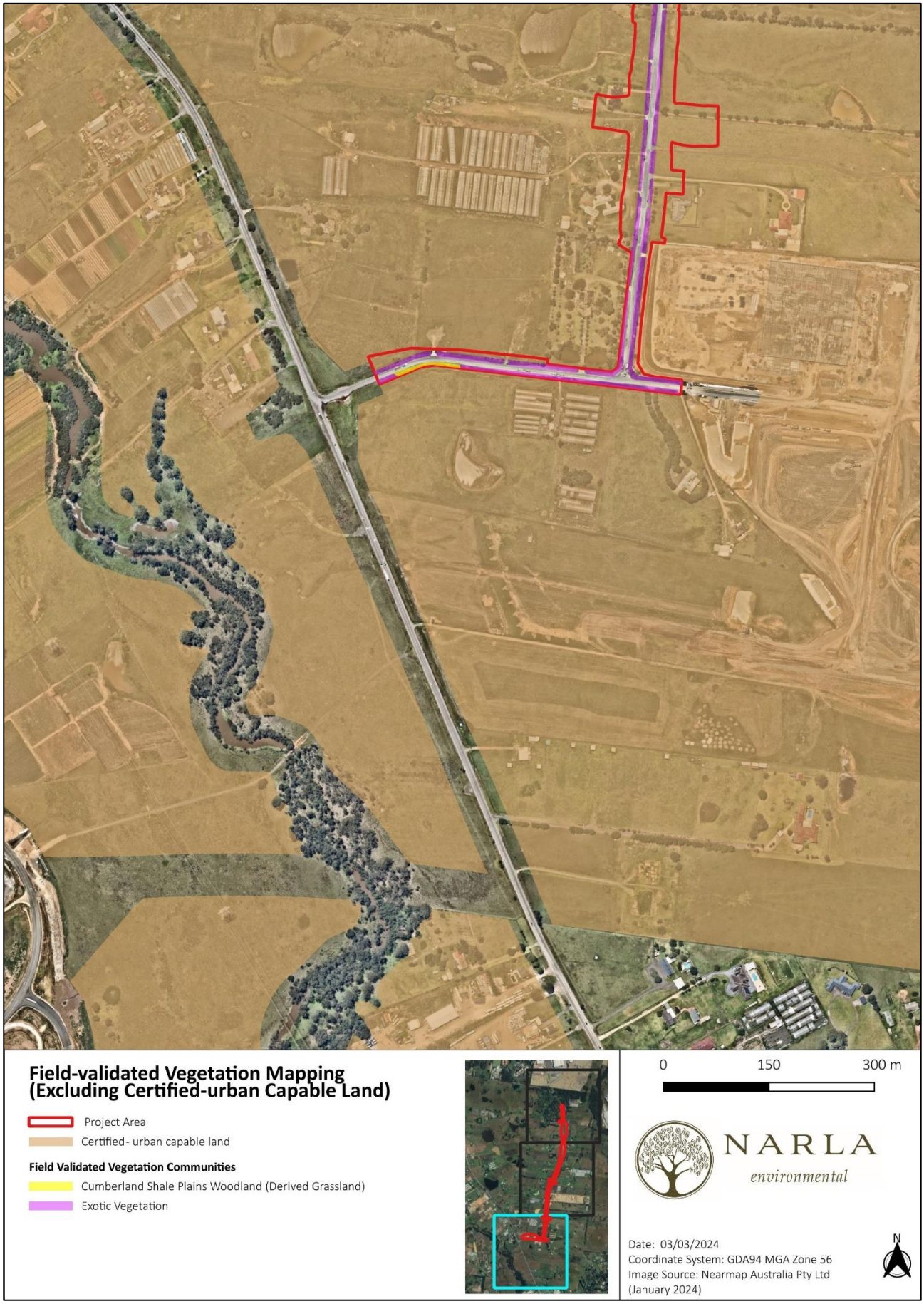


Figure 11. Narla Field-validated Vegetation Mapping within the Project Area (3/3).

Table 4. Cumberland Shale Plains Woodland (Canopy) identified within the Project Area.

Cumberland Shale Plains Woodland (Canopy)	
	
Extent within the Project Area (approx.; excluding areas mapped as Certified-urban Capable Land)	0.01ha

Cumberland Shale Plains Woodland (Canopy)	
Description (DPE 2022)	
A tall to very tall sclerophyll woodland to open forest with a mid-stratum of soft-leaved shrubs and small trees with a grassy ground cover that is extensive on rises and upper slopes of hills south from Cecil Hills, in the south-western part of the Cumberland Plain to the west of Sydney. It is most extensive in Campbelltown, Camden and Wollondilly local government areas. The canopy commonly includes *Eucalyptus moluccana* and *Eucalyptus tereticornis*, with a sparse shrub to small tree layer which very frequently includes *Bursaria spinosa* and at least one species of Acacia, of which *Acacia implexa* is most frequent. The presence of *Acacia implexa* helps distinguish this PCT from PCT 3320, which has a similar assemblage and structure. The mid-dense ground layer typically includes forbs, grasses and twiners. *Dichondra repens* is almost always present and *Microlaena stipoides, Desmodium varians, Brunoniella australis* and *Aristida ramosa* are very frequent. This PCT typically occurs in a warm, moist climate between 90-300 metres asl. It has been heavily cleared and now occurs in small remnants with varying levels of disturbance within a rural landscape. The canopy in these remnants often comprises immature cohorts of trees that have regenerated after thinning or clearing.	
Description of the Vegetation in the Project Area.	
This vegetation zone within the Project Area consisted of islated native trees including *Eucalyptus tereticornis* and *Eucalyptus molucanna* above a historically cleared and disturbed ground layer dominated by exotic species such as *Paspalum dilatatum, Chloris gayana* and *Cenchrus clandestinus*.	
Justification of Vegetation Assignment	The determination of this community was based on the geographical region, landscape attributes including soil landscapes and elevation, and the presence of diagnostic species.
BC Act 2016 Status	This vegetation within the Project Area conforms to the BC Act listed Cumberland Plain Woodland in the Sydney Basin Bioregion Critically Endangered Ecological Community (CEEC) (see **section 4.1.1**).
EPBC Act 1999 Status	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest is associated with this vegetation type. This vegetation within the Project Area however, failed to meet the condition thresholds for the community and therefore **DOES NOT** conform to the CEEC listed under the EPBC Act (see **section 4.1.2**).
References	Department of Planning and Environment (DPE) (2022) State Vegetation Type Mapping

Table 5. Cumberland Shale Plains Woodland (Derived Grassland) identified within the Project Area.

Cumberland Shale Plains Woodland (Derived Grassland)	
	
Extent within the Project Area (approx.; excluding areas mapped as Certified-urban Capable Land)	0.06ha
Description (DPE 2022)	
A tall to very tall sclerophyll woodland to open forest with a mid-stratum of soft-leaved shrubs and small trees with a grassy ground cover that is extensive on rises and upper slopes of hills south from Cecil Hills, in the south-western part of the Cumberland Plain to the west of Sydney. It is most extensive in Campbelltown, Camden and Wollondilly local government areas. The canopy commonly includes *Eucalyptus moluccana* and *Eucalyptus tereticornis*, with a sparse shrub to small tree layer which very frequently includes *Bursaria spinosa* and at least one species of Acacia, of which *Acacia implexa* is most frequent. The presence of *Acacia implexa* helps distinguish this PCT from PCT 3320, which has a similar assemblage and structure. The mid-dense ground layer typically includes forbs, grasses and twiners. *Dichondra repens* is almost always present and *Microlaena stipoides, Desmodium varians, Brunoniella australis* and *Aristida ramosa* are very frequent. This PCT typically occurs in a warm, moist climate between 90-300 metres asl. It has been heavily cleared and now occurs in small remnants with varying levels of disturbance within a rural landscape. The canopy in these remnants often comprises immature cohorts of trees that have regenerated after thinning or clearing.	
Description of the Vegetation in the Project Area	
This zone is comes in the form of a dervied native grassland comprised of a mix of native and exotic groundcover species. The canopy and shrub layers were absent. Native species within this zone varied from sporadic to	

Cumberland Shale Plains Woodland (Derived Grassland)	
dominant with species including *Themeda triandra* and *Imperata cylindrica*. Exotic species were also present at high densities consisting of *Eragrostis curvula* and *Cenchrus clandestinus*.	
Justification of Vegetation Assignment	The determination of this community was based on the geographical region, landscape attributes including soil landscapes and elevation, and the presence of diagnostic species.
BC Act 2016 Status	This vegetation within the Project Area conforms to the BC Act listed Cumberland Plain Woodland in the Sydney Basin Bioregion Critically Endangered Ecological Community (CEEC) (see section 4.1.1).
EPBC Act 1999 Status	Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest is associated with this vegetation type. This vegetation within the Project Area however, failed to meet the condition thresholds for the community and therefore DOES NOT conform to the CEEC listed under the EPBC Act (see section 4.1.2).
References	Department of Planning and Environment (DPE) (2022) State Vegetation Type Mapping

Table 6. Exotic Vegetation identified within the Project Area.

Exotic Vegetation	
	
Extent within the Project Area (approx.; excluding areas mapped as Certified-urban Capable Land)	3.13ha
Description of the Vegetation in the Project Area	
This zone contains primarily exotic vegetation. This exotic vegetation came in form of primarily an exotic-dominated grassland, as well as sporadic occurences of exotic-dominated gardens and plantings. The exotic dominated grassland had a completely absent canopy layer. The shrub layer was sparse however included the Priority Weeds, *Rubus fruticosus species aggregata, Olea europaea subsp. cuspidata* and *Lycium ferocissimum*. The groundlayer was almost entirely comprised of exotic species. The Priority Weeds sighted in the groundlayer included, *Senecio madagascariensis* and *Opuntia spp.* Environmental weeds in the groundlayer included *Paspalum diltatum, Rumex obtusifolia, Conyza bonariensis, Cenchrus clandestinus, Chloris guyana, Bromus catharticus, Verbena bonariensis, Avena barbata, Sida rhombifolia, Solanum nigrim, Bouteloua dactyloides, Trifolium repens, Araujia sericifera, Modiola caroliniana, Cirsium vulgare, Setaria parviflora,*	

Exotic Vegetation	
Hypochaeris radicata and *Centaurium erythraea.* The exotic plantings were mainly comprised of canopy and shrub species. *Pinus radiata* was the dominant canopy species. Other canopy species included *Schinus molle, Heptapleurum actinophyllum, Diospyros kaki, Phoenix canariensis* and *Toona sinensis*. Exotic shrub species included *Abelia grandiflora, Murraya paniculata* and *Nerium oleander*. Exotic groundcovers were sparse, however included *Hedera helix, Tradescantia fluminensis, Agapanthus africanus, Pelargonium zonale* and *Strelitzia spp.*	
Justification of Vegetation Assignment	The vegetation within this area consisted of exotic vegetation with minimal native species. As the vegetation could not be classified as a native community it has been classified as Exotic Vegetation.
BC Act 2016 Status	N/A
EPBC Act 1999 Status	N/A

4. Threatened Entities

4.1 Threatened Ecological Communities (TECs)

4.1.1 Listing under the BC Act: Cumberland Plain Woodland in the Sydney Basin Bioregion – Critically Endangered Ecological Community (CEEC)

The vegetation mapped within the Project Area as Cumberland Shale Plains Woodland conforms to the BC Act listed CEEC, Cumberland Plain Woodland in the Sydney Basin Bioregion as it contains species indicative of this CEEC and occurs within the associated geology and landscape position.

Cumberland Plain Woodland is the name given to the ecological community in the Sydney Basin bioregion associated with clay soils derived from Wianamatta Group geology, or more rarely alluvial substrates, on the Cumberland Plain, a rainshadow area to the west of Sydney's Central Business District. The community typically occurs on flat to undulating or hilly terrain up to about 350 m elevation but may also occur on locally steep sites and at slightly higher elevations. Cumberland Plain Woodland typically comprises an open tree canopy, a near-continuous groundcover dominated by grasses and herbs, sometimes with layers of shrubs and/or small trees. Shrubs may sometimes occur in locally dense stands. Less disturbed stands of the community may have a woodland or forest structure. Small trees or saplings may dominate the community in relatively high densities after partial or total clearing, and the groundcover may be relatively sparse, especially where densities of trees or shrubs are high. The community also includes 'derived' native grasslands which result from removal of the woody strata from the woodlands and forests (NSW Scientific Committee 2011).

Native species listed within the final determination (NSW Scientific Committee 2011) that occur within the Project Area include:

- *Corymbia maculata;*
- *Eucalyptus moluccana;*
- *Eucalyptus tereticornis; and*
- *Themeda triandra*

Approximately 0.07ha of land mapped as Cumberland Plain Woodland is located in land identified as "Excluded Land" or "Avoided Land" under the CPCP. This vegetation will be subject to further assessment under the BC Act (Appendix D).

4.1.2 Listing under EPBC Act -- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest

In order to be protected as a matter of national environmental significance areas of the ecological community must meet both:

- The key diagnostic characteristics (Table 7); and
- At least the minimum condition thresholds (Section 5.2.1).

The vegetation mapped within the Project Area as Cumberland Shale Plains Woodland (both Canopy and Derived Grassland conditions) does not meet the Key Diagnostic Features for the community (Table 7), nor does it meet the key condition thresholds required to meet the EPBC Act listing status (Table 8). Therefore, areas mapped as Cumberland Shale Plains Woodland (Canopy and Derived Grassland conditions) within the Project Area do not conform to the EPBC Act listed Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (Threatened Species Scientific Committee 2009) and no further assessment under the EPBC Act is required for this vegetation in the Project Area.

Table 7. Key diagnostics features required to meet the EPBC Listing Status for Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (Threatened Species Scientific Committee 2009).

Thresholds	Status in the Project Area	
	Cumberland Shale Plains Woodland (Canopy)	Cumberland Shale Plains Woodland (Derived Grassland)
Distribution is limited to the Sydney Basin Bioregion with most occurrences in the Cumberland Sub-region. This covers a geographic area commonly known as the Cumberland Plain, a rainshadow coastal valley in western Sydney.	Yes	Yes
Most occurrences are on clay soils derived from Wianamatta Group geology, with limited to rare occurrences on soils derived from Tertiary Alluvium, Holocene Alluvium, the Mittagong Formation, Aeolian Deposits and Hawkesbury Sandstone.	Yes	Yes
Upper tree layer species must be present with these features: ▪ The minimum projected foliage cover of canopy trees is 10% or more; and ▪ The tree canopy is typically dominated by *Eucalyptus moluccana* (Grey Box), *E. tereticornis* (Forest Red Gum) and/or *E. fibrosa* (Red Ironbark). Other canopy species may occur in association with the typical dominants and may be locally dominant at some sites.	Yes	No
A sparse lower tree layer may be present, typically with young eucalypts of upper tree canopy species and species of Acacia, Exocarpos and Melaleuca.	Yes	No
The understorey typically is dominated by the ground layer and shows these features: ▪ The ground layer typically comprises a variety of perennial native graminoids and forbs; ▪ Native graminoid species that are often present include: the grasses *Aristida ramosa* (Purple Wiregrass), *A. vagans* (Threeawn Speargrass), *Cymbopogon refractus* (Barbed Wire Grass), *Dichelachne micrantha* (Plumegrass), *Echinopogon caespitosus var. caespitosus* (Tufted Hedgehog Grass), *Eragrostis leptostachya* (Paddock Lovegrass), *Microlaena stipoides subsp. stipoides* (Weeping Grass), *Paspalidium distans* and *Themeda triandra* (Kangaroo Grass), and other graminoids *Carex inversa* (Knob Sedge), *Cyperus gracilis* (Slender Sedge), *Lomandra filiformis subsp. filiformis* (Wattle Mat-rush) and *L. multiflora subsp. multiflora* (Many flowered Mat-rush); ▪ Native forb and other herb species present include: *Asperula conferta* (Common Woodruff), *Brunoniella australis* (Blue Trumpet), *Cheilanthes sieberi* (Poison Rock-Fern), *Desmodium varians* (Slender Tick-trefoil), *Dianella longifolia* (Blue Flax-Lily), *Dichondra repens* (Kidney Weed), *Glycine spp., Hardenbergia violacea* (Native Sarsparilla), *Opercularia diphylla* (Stinkweed), *Oxalis perennans, Pratia purpurascens* (Whiteroot) and *Wahlenbergia gracilis* (Australian Bluebell); and ▪ A shrub layer may be present, to variable extent, and is often dominated by *Bursaria spinosa* (Blackthorn) while other species include: *Daviesia ulicifolia* (Gorse	No	Yes

Thresholds	Status in the Project Area	
	Cumberland Shale Plains Woodland (Canopy)	Cumberland Shale Plains Woodland (Derived Grassland)
Bitter Pea), *Dillwynia sieberi*, *Dodonaea viscosa subsp. cuneata* (Wedge-leaf Hop-bush), *Indigofera australis* (Native Indigo) and *Lissanthe strigosa* (Peach Heath).		

Table 8. Condition classes and thresholds for Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (Threatened Species Scientific Committee 2009).

Category and Rationale	Thresholds	Thresholds Present within the Project Area
A. Core thresholds that apply under most circumstances: patches with an understorey dominated by natives and a minimum size that is functional and consistent within mapping unit size applied in NSW.	Minimum patch size is >0.5ha. AND >50% of the perennial understorey vegetation cover is made up of native species.	No. The patch size is <0.5ha and <50% of the perennial understorey vegetation cover is made up of native species.
OR		
B. Larger patches which are inherently variable due to their rarity.	The patch size is >5ha; AND >30% of the perennial understorey vegetation cover is made up of native species.	No. The patch size is <5ha and <30% of the perennial understorey vegetation cover is made up of native species.
OR		
C. Patches with connectivity to large native vegetation remnants in the landscape.	The path size is >0.5ha; AND ≥30% of the perennial understorey vegetation cover is made up of native species; AND The patch is contiguous with a native vegetation remnant (any native vegetation where cover in each layer present is dominated by native species) that is ≥5ha in area.	No. The patch size is <0.5ha and <30% of the perennial understorey vegetation cover is made up of native species and the patch is not contiguous with another native vegetation remnant that is ≥5ha.
OR		
D. Patches that have large mature trees or trees with hollows (habitat) that are very scarce on the Cumberland Plain.	The patch size is >0.5ha in size; AND ≥30% of the perennial understorey vegetation cover is made up of native species; AND The patch has at least one tree with hollows per hectare or at least one large tree (≥80 cm dbh) per hectare from the upper tree	No. The patch size is <0.5ha and <30% of the perennial understorey vegetation cover is made up of native species and the patch does not have at least one tree with hollows per hectare or at least one large tree >80cm dbh per hectare.

Category and Rationale	Thresholds	Thresholds Present within the Project Area
	layer species outlined in the Description and Appendix A.	
Cumberland Shale Plains Woodland (both Canopy and Derived Grassland Conditions) within the Project Area **DOES NOT** meet the minimum condition thresholds for Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest; therefore, it is **NOT** considered to be part of the CEEC under the EPBC listing.		

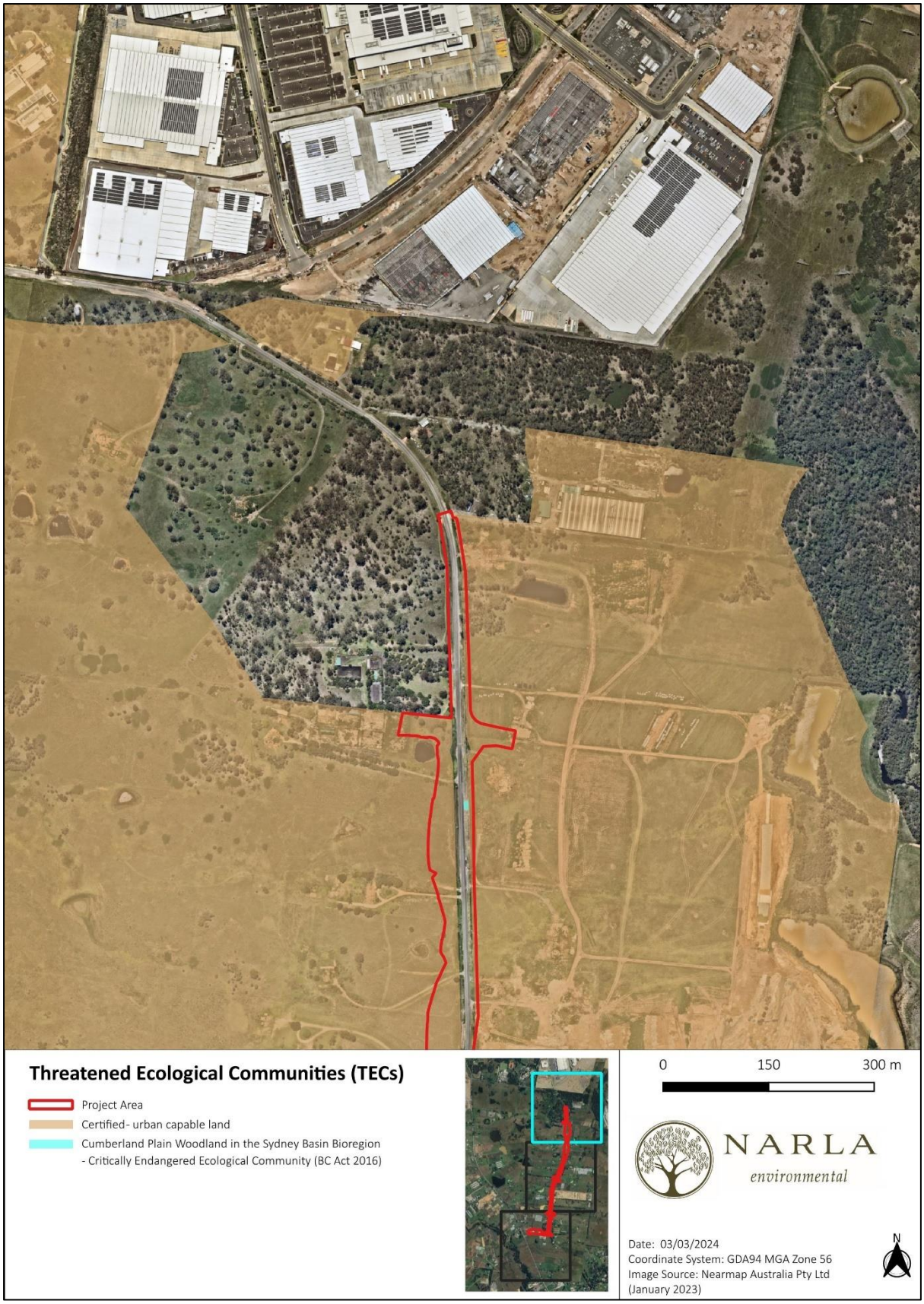


Figure 12. Threatened Ecological Communities within the Project Area (BC & EPBC Act) (1/3).

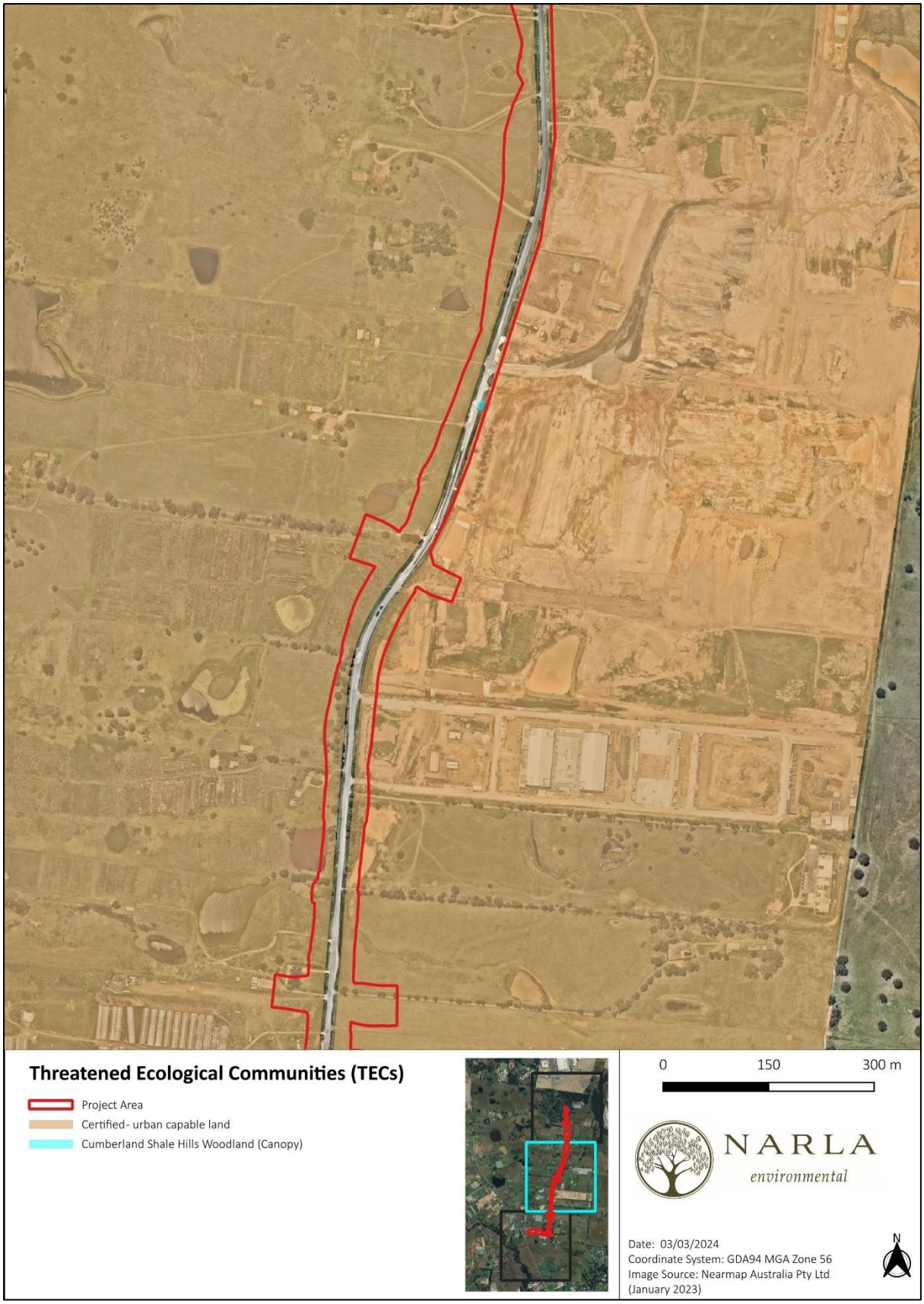


Figure 13. Threatened Ecological Communities within the Project Area (BC and EPBC Act) (2/3).

Figure 14. Threatened Ecological Communities within the Project Area (BC and EPBC Act) (3/3).

4.2 Threatened Flora

Desktop analysis revealed several threatened flora species as occurring within a 10km x 10km cell centred on the Project Area. These species were assessed for their potential to occur within the Project Area (**Table 9**). The survey effort for this assessment is presented in **Figure 15**.

Table 9. Likelihood of occurrence of threatened flora species within the Project Area (V=Vulnerable; E=Endangered; CE=Critically Endangered)

Species	BC Act	EPBC Act	Likelihood of occurrence within the Project Area	Further Impact Assessment Required?
Acacia pubescens (Downy Wattle)	V	V	Absent. Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Potential habitat is present within the Project Area. A targeted survey was undertaken during the approved DPE survey period (all year round), and no individuals were identified.	No
Dillwynia tenuifolia	V	-	Low. In western Sydney, may be locally abundant particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland. Potential habitat is present, however due to the degraded nature of the Project Area, it is unlikely for this species to occur. Although a targeted survey was undertaken outside the approved DPE survey period (August-October), no *Dillwynia spp.* individuals were identified.	No
Grevillea juniperina subsp. *juniperina* (Juniper-leaved Grevillea)	V	-	Absent. Grows on reddish clay to sandy soils derived from Wianamatta Shale and Tertiary alluvium (often with shale influence), typically containing lateritic gravels. Recorded from Cumberland Plain Woodland, Castlereagh Ironbark Woodland, Castlereagh Scribbly Gum Woodland and Shale/Gravel Transition Forest. Potential habitat is present within the Project Area. A targeted survey was undertaken during the approved DPE survey period (all year round), and no individuals were identified.	No
Grevillea parviflora subsp. parviflora (Small-flower Grevillea)	V	V	Low. Grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. Sydney region occurrences are usually on Tertiary sands and alluvium, and soils derived from the Mittagong Formation. Soil landscapes include Lucas Heights or Berkshire Park. Potential habitat is present, however due to the degraded nature of the Project Area, it is unlikely for this species to occur.	No
Isotoma fluviatilis subsp. fluviatilis	-	Ex	Low. This species is thought to be extinct. Known to grow in damp places, on the Cumberland Plain, including freshwater wetland, grassland/alluvial woodland and an alluvial woodland/shale plains woodland (Cumberland Plain Woodland) ecotone. Potential habitat is present, however due to the degraded nature of the Project Area, it is unlikely for this species to occur. Although a	No

Species	BC Act	EPBC Act	Likelihood of occurrence within the Project Area	Further Impact Assessment Required?
			targeted survey was undertaken outside the approved DPE survey period (September-November), no *Isotoma spp*. individuals were identified.	
Marsdenia viridiflora subsp. viridiflora (Native Pear)	E	-	Absent. This species grows in vine thickets and open shale woodland. Potential habitat is present within the Project Area. A targeted survey was undertaken during the approved DPE survey period (November-February), and no individuals were identified.	No
Persoonia nutans (Nodding Geebung)	E	E	Absent. Northern populations are confined to aeolian and alluvial sediments and occur in a range of sclerophyll forest and woodland vegetation communities, with the majority of individuals occurring within Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland and some in Cooks River / Castlereagh Ironbark Forests. Southern populations also occupy tertiary alluvium, but extend onto shale sandstone transition communities and into Cooks River / Castlereagh Ironbark Forest. Potential habitat is not present within the Project Area. However, a targeted survey was undertaken during the approved DPE survey period (all year round), and no individuals were identified.	No
Pultenaea pedunculata (Matted Bush-pea)	E	-	Low. In the Liverpool - Fairfield area, the majority of occurrences are in lower-lying areas and often close to creek lines. Soils are moderately to poorly drained. Potential habitat is present, however due to the degraded nature of the Project Area, it is unlikely for this species to occur. Although a targeted survey was undertaken outside the approved DPE survey period (September-November), no *Pultenaea spp.* individuals were identified.	No
Pimelea spicata (Spiked Rice-flower)	E	E	Absent. This species is found on well-structured clay soils. On the Cumberland Plain sites, it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. Potential habitat is present within the Project Area. A targeted survey was undertaken during the approved DPE survey period (all year round), and no individuals were identified.	No

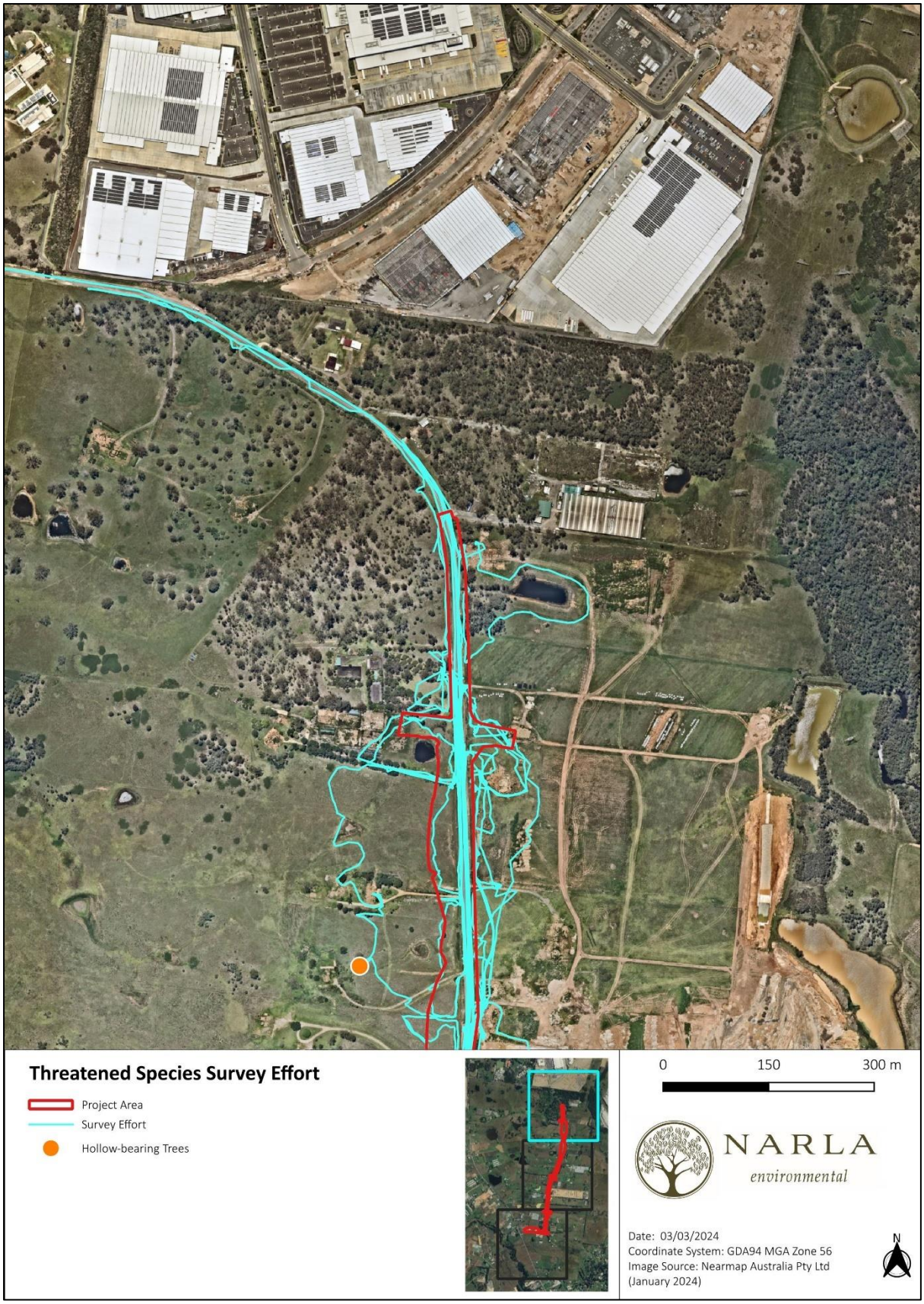


Figure 15. Threatened Species Survey effort and Habitat Features identified with the Project Area (1/3).

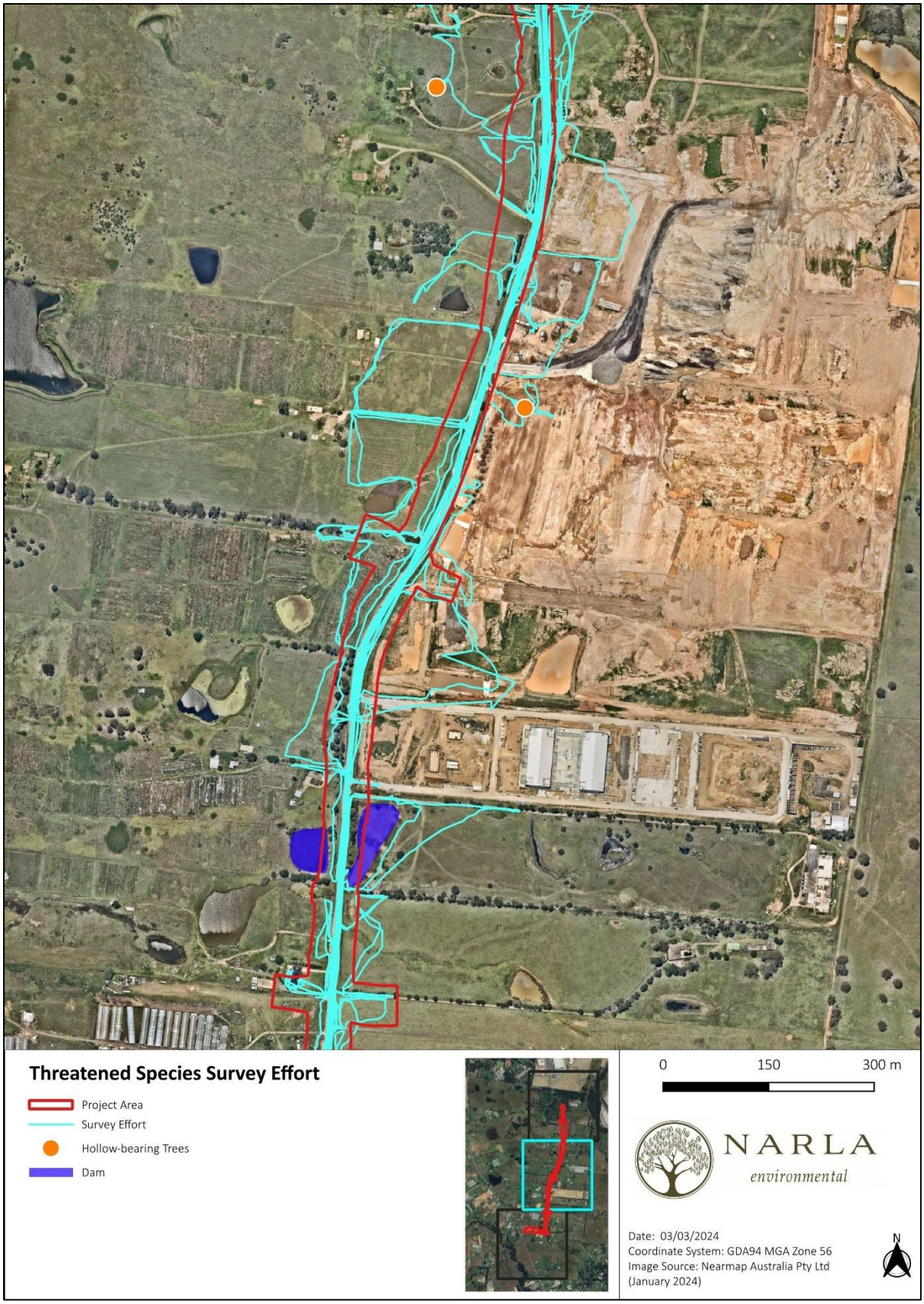


Figure 16. Threatened Species Survey effort and Habitat Features identified with the Project Area (2/3).

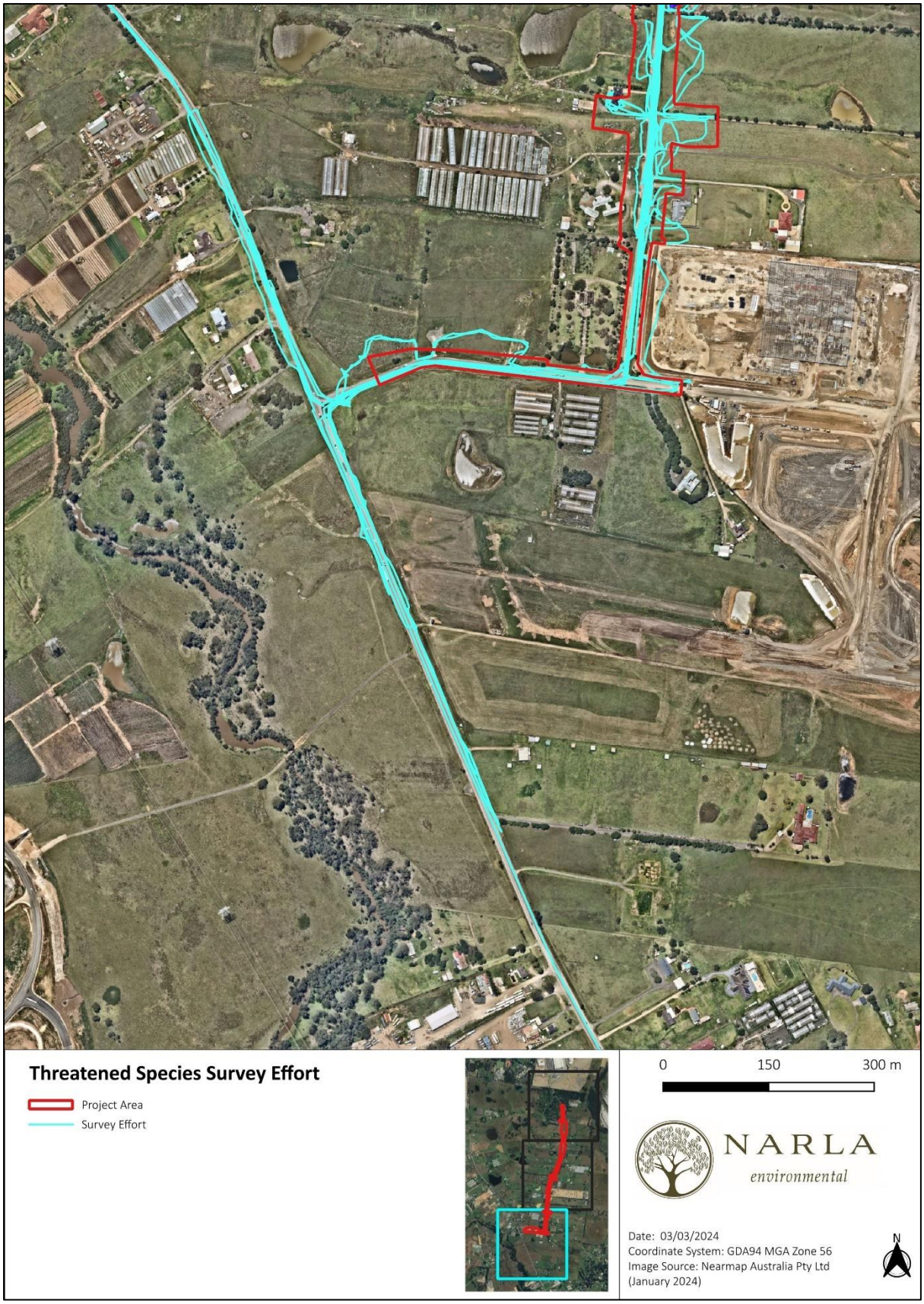


Figure 17. Threatened Species Survey effort and Habitat Features identified with the Project Area (3/3).

4.3 Threatened Fauna

Several habitat features were present within the Project Area (**Table 10**). Desktop analysis revealed that several threatened fauna species have the potential to utilise such habitat within the Project Area during part of their lifecycles (**Table 11**). No threatened fauna species were observed within the Project Area by the Narla Ecologists during their site assessment in February and March 2023 or March 2024.

It is unlikely that the proposed works will have a significant impact such that a local viable population or occurrence of any of the threatened fauna species will be placed at risk of extinction (**Table 11**). Therefore, no BDAR or EPBC Act Referral to Commonwealth is required for the proposed activity. Any areas of fauna habitat nominated as 'Certified-urban capable land' under the Cumberland Plain Conservation Plan (CPCP) require no further assessment under the BC Act.

Table 10. Fauna habitat values.

Habitat component	Site values
Coarse woody debris	Absent.
Rock outcrops and bush rock	Absent.
Caves, crevices, and overhangs	Absent.
Culverts, bridges, mine shafts, or abandoned structures	Absent.
Nectar/lerp-bearing Trees	Present. The Project Area and surrounds contained sporadic *Eucalypt spp*. and *Corymbia spp.*. Such trees and shrubs may provide intermittent nectar and/or lerp sources for a suite of species.
Nectar-bearing shrubs	Absent.
Koala Feed Trees	Present.
Large stick nests	Absent.
Sap and gum sources	Present. Eucalypts were present within the Project Area.
She-oak fruit	Present. Allocasuarina individuals were present within the Project Area.
Seed-bearing trees and shrubs	Present. Eucalypts were present within the Project Area.
Soft-fruit-bearing trees	Absent.
Dense shrubbery and leaf litter	Absent.
Tree hollows	Absent. Although, two (2) medium hollows were recorded in close vicinity to the Project Area, however these trees will not be impacted by the proposed activity.
Decorticating bark	Absent.
Wetlands, soaks, and streams	Absent.
Open water bodies	Present. Two (2) dams overlapped with the Project Area. however are entirely located within land mapped as 'Certified-urban Capable Land' .
Estuarine, beach, mudflats, and rocky foreshores	Absent.

4.3.1 Migratory Fauna Species

Desktop analysis revealed following EPBC Act listed migratory terrestrial fauna species were considered to have the potential to utilise habitat within the Project Area (e.g., foraging or passage) during part of their lifecycles:

- *Cuculus optatus* (Oriental Cuckoo);
- *Hirundapus caudacutus* (White-throated Needletail);
- *Hydroprogne caspia* (Caspian Tern);
- *Monarcha melanopsis (*Black-faced Monarch);
- *Motacilla flava* (Yellow Wagtail);
- *Myiagra cyanoleuca* (Satin Flycatcher); and
- *Rhipidura rufifrons* (Rufous Fantail).

The proposed activity will have negligible impacts to potential foraging and breeding habitat for these species given their migratory nature. In the unlikely event that these species forage within the Project Area, the proposed removal of vegetation will have minimal impacts to foraging habitat given the large areas of better suited habitat in the surrounding area and in their migratory range. As such, the proposed activity will have no significant impact on these species; therefore, a Referral to Commonwealth pursuant to the EPBC Act is not required.

Table 11. List of potential threatened fauna that may occupy the Project Area at some stage of their lifecycles. Vulnerable = V, Endangered = E, Endangered Population = EP, Critically Endangered = CE.

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Project Area	Breeding Habitat Present Within the Project Area	Anticipated Impact	Further Impact Assessment Required?
Anthochaera phrygia (Regent Honeyeater)	E	CE	Low	A generalist forager, although it feeds on the nectar from a small number of eucalypts that produce high volumes of nectar. Eucalyptus feed trees have been identified within the Project Area.	This species breeds in temperate woodlands and riparian gallery forests in only three known locations: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra Barraba region. The Project Area is not mapped on the Regent Honeyeater Important Areas Map (DPE 2024b).	Minimal impact to foraging habitat given the mobility of the species and degraded state of the Project Area. No impact to breeding habitat.	No
Artamus cyanopterus cyanopterus (Dusky Woodswallow)	V	-	Low	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and groundcover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Primarily eats invertebrates, insects, which are captured whilst hovering or sallying above the canopy or over water. Also occasionally take nectar, fruit, and seed. Potential foraging	Nest sites vary, but occur in shrubs or low trees, living or dead, horizontal, or upright forks in branches, spouts, hollow stumps, or logs, behind loose bark or in a hollow in the top of a wooden fence post. Nest sites may be exposed or well concealed by foliage. No nests were present within the Project Area.	Minimal impact to foraging habitat given the mobility of the species and the degraded state of the Project Area. No impact to breeding habitat.	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Project Area	Breeding Habitat Present Within the Project Area	Anticipated Impact	Further Impact Assessment Required?
				habitat is present within the Project Area.			
Daphoenositta chrysoptera (Varied Sittella)	V	-	Low	Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. Potential foraging habitat was present within the Project Area.	Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years. No nests were present within the Project Area.	Minimal impact to potential foraging habitat given mobility of the species and the degraded state of the Project Area. No anticipated net loss of breeding habitat.	No
Falsistrellus tasmaniensis (Eastern False Pipistrelle)	V	-	Low	Hunts beetles, moths, weevils, and other flying insects above or just below the tree canopy. Potential foraging habitat was present within the Project Area.	Roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. No potential breeding habitat was present within the Project Area.	Minimal impact to potential foraging habitat given mobility of the species and the degraded state of the Project Area. No anticipated net loss of breeding habitat.	No.
Glossopsitta pusilla (Little Lorikeet)	V	-	Low	This species forages primarily in the canopy of open Eucalypt forests and woodlands. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Potential foraging habitat is present within the Project Area.	Nests in proximity to feeding areas, if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and high above the ground (2–15 m). No hollows were identified within the Project Area.	Minimal impact to potential foraging habitat given mobility of the species and the degraded state of the Project Area. No anticipated net loss of breeding habitat.	No.
Haliaeetus leucogaster (White-bellied Sea-Eagle)	V	-	Low	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea.	Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to	Negligible, no anticipated net loss of foraging or breeding habitat.	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Project Area	Breeding Habitat Present Within the Project Area	Anticipated Impact	Further Impact Assessment Required?
				Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries, and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs, and saltmarsh. No such habitat was identified within the Project Area as not large waterbodies were present.	foraging habitat. Nests are large structures built from sticks and lined with leaves or grass. No nests were identified within the Project Area.		
Hieraaetus morphnoides (Little Eagle)	V	-	Low	Occupies open eucalypt forest, woodland, or open woodland. She-oak or Acacia woodlands and riparian woodlands of interior NSW are also used. Preys on birds, reptiles, and mammals, occasionally adding large insects and carrion. Potential prey items may occur within the Project Area.	Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. No nests were identified within the Project Area.	Negligible, no anticipated net loss of foraging or breeding habitat.	No
Ixobrychus flavicollis (Black Bittern)	V	-	Low	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves. Potential foraging habitat is present within the Project Area.	Like other bitterns, but unlike most herons, nesting is solitary. Nests, built in spring are located on a branch overhanging water and consist of a bed of sticks and reeds on a base of larger sticks. Between three and five eggs are laid and both parents incubate and rear the young. No nests or potential habitat were present within the Project Area.	Minimal impact to potential foraging habitat given mobility of the species and the degraded state of the Project Area. No anticipated net loss of breeding habitat.	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Project Area	Breeding Habitat Present Within the Project Area	Anticipated Impact	Further Impact Assessment Required?
Lathamus discolor (Swift Parrot)	E	CE	Low	On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Potential foraging habitat present within the Project Area with the presence of *Eucalyptus* species. However, Project Area is not mapped on the Swift Parrot Important Areas Map (DPE 2022c).	N/A. Breeds in Tasmania.	Minimal impact to potential foraging habitat given the mobility of the species and the degraded nature of the Project Area. No anticipated net loss of breeding habitat.	No
Litoria aurea (Green and Golden Bell Frog)	E	V	Low	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha spp.*) or spikerushes (*Eleocharis spp.*). Potential foraging habitat is present within the Project Area.	Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Males call while floating in water and females produce a raft of eggs that initially float before settling to the bottom, often amongst vegetation. Potential breeding habitat is present in the form of two (2) dams.	Minimal impact to potential foraging and breeding habitat given the degraded nature of the Project Area and dams.	Yes. An EPBC Act test of significance was undertaken for this species (**Appendix E**). As the dams were located in Certified – urban capable land, no assessment is required under the BC Act.
Lophoictinia isura (Square-tailed Kite)	V	-	Low	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Potential	Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs. No nests were identified within the Project Area.	Minimal impact to potential foraging habitat given the mobility of the species and the degraded nature of the Project	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Project Area	Breeding Habitat Present Within the Project Area	Anticipated Impact	Further Impact Assessment Required?
				foraging habitat is present within the Project Area.		Area. No anticipated net loss of breeding habitat.	
*Meridolum corneovirens (*Cumberland Plain Land Snail*)*	E	-	Low	This species primarily inhabits Cumberland Plain Woodland west of Sydney. It lives under litter of bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish. Potential foraging habitat is present within the Project Area.	Little is known of its biology, including breeding biology. It is known to be hermaphroditic, laying clutches of 20-25 small, round, white eggs in moist, dark areas (such as under logs). Potential breeding habitat is present within the Project Area.	Minimal impact to potential foraging and breeding habitat given the degraded nature of the Project Area. A targeted search of the species was undertaken and no individuals were observed.	No
Micronomus norfolkensis (Eastern Coastal Free-tailed Bat)	V	-	Low	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range, feeding on insects. Potential foraging habitat is present within the Project Area.	Roost in tree hollows but will also roost under bark or in manufactured structures. No potential breeding habitat is present within the Project Area.	Minimal impact to potential foraging habitat given the mobility of the species and the degraded nature of the Project Area. No anticipated net loss of breeding habitat.	No
Miniopterus australis (Little Bent-winged Bat)	V	-	Low	Found in moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests, and banksia scrub. Generally found in well-timbered areas. at night forage for small insects beneath the canopy of densely vegetated habitats. Potential foraging habitat is present within the Project Area.	This species only breeds in caves. No such habitat was present within the Project Area.	Minimal impact to potential foraging habitat given the mobility of the species and the degraded nature of the Project Area. No anticipated net loss of breeding habitat.	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Project Area	Breeding Habitat Present Within the Project Area	Anticipated Impact	Further Impact Assessment Required?
Miniopterus orianae oceanensis (Large Bent-winged Bat)	V	-	Low	Hunt in forested areas, catching moths and other flying insects above the tree tops. Potential foraging habitat present within the Project Area.	This species only breeds in caves. No such habitat was present within the Project Area.	Minimal impact to potential foraging habitat given the mobility of the species and the degraded nature of the Project Area. No anticipated net loss of breeding habitat.	No
Myotis macropus (Southern Myotis)	V	-	Low	This species forages over streams and pools catching insects and small fish by raking their feet across the water surface. Potential foraging habitat present within the Project Area.	Roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. No such habitat is present within the Project Area.	Minimal impact to potential foraging habitat given the mobility of the species and the degraded nature of the Project Area. No anticipated net loss of breeding habitat.	No
Ninox strenua (Powerful Owl)	V	-	Low	Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. As most prey species require hollows and a shrub layer, these are important habitat components for the owl. Potential prey items may occur within the Project Area.	Powerful Owls nest in large tree hollows (at least 0.5m deep), in large eucalypts (diameter at breast height of 80-240cm) that are at least 150 years old. No hollows were present within the Project Area.	Minimal impact to potential foraging habitat given the mobility of the species and the degraded nature of the Project Area. No anticipated net loss of breeding habitat.	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Project Area	Breeding Habitat Present Within the Project Area	Anticipated Impact	Further Impact Assessment Required?
Pteropus poliocephalus (Grey-headed Flying-fox)	V	V	Low	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, and swamps as well as urban gardens and cultivated fruit crops. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Potential foraging tree species present within the Project Area.	No breeding camps were found within or surrounding the Project Area.	Minimal impact to potential foraging habitat given the mobility of the species and the degraded nature of the Project Area. No anticipated net loss of breeding habitat.	No
Rostratula australis (Australian Painted Snipe)	E	E	Low	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Potential foraging habitat is present within the Project Area.	The nest consists of a scrape in the ground, lined with grasses and leaves. No nests were sighted within the Project Area.	Minimal impact to potential foraging habitat given the mobility of the species and the degraded nature of the Project Area. No anticipated net loss of breeding habitat.	No
Saccolaimus flaviventris (Yellow-bellied Sheathtail-bat)	V	-	Low	When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees. Potential foraging habitat present within the Project Area.	This species requires tree hollows for breeding/roosting. No potential breeding habitat is present within Project Area.	Minimal impact to potential foraging habitat given the mobility of the species and the degraded nature of the Project Area. No anticipated net loss of breeding habitat.	No

Species	BC Act	EPBC Act	Likelihood of Occurrence	Foraging Habitat Present Within the Project Area	Breeding Habitat Present Within the Project Area	Anticipated Impact	Further Impact Assessment Required?
Scoteanax rueppellii (Greater Broad-nosed Bat)	V	-	Low	Forages after sunset, flying slowly and directly along creek and river corridors. Potential foraging is present within the Project Area.	This species requires tree hollows for breeding/roosting. No potential breeding habitat is present within the Project Area.	Minimal impact to potential foraging habitat given the mobility of the species and the degraded nature of the Project Area. No anticipated net loss of breeding habitat.	No
Stagonopleura guttata (Diamond Firetail)	V	-	Low	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Potential foraging habitat is present within the Project Area.	Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting. No nests were identified within the Project Area.	Minimal impact to potential foraging habitat given the mobility of the species and the degraded nature of the Project Area. No anticipated net loss of breeding habitat.	No
Stictonetta naevosa (Freckled Duck)	V	-	Low	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Potential foraging habitat is present within the Project Area.	Nests are usually located in dense vegetation at or near water level. Potential breeding habitat is present within the Project Area.	Minimal impact to potential foraging and breeding habitat given the mobility of the species and the degraded nature of the Project Area.	No. As the dam is located in Certified – urban capable land, no further assessment is required under the BC Act.

5. Impact Summary

5.1 Vegetation Loss

The following vegetation (located outside of Certified-urban Capable Land) within the Project Area will be impacted by the proposed activity:

- 0.01ha of Cumberland Shale Plains Woodland (Canopy);
    - conforms to the BC Act listed Cumberland Plain Woodland in the Sydney Basin Bioregion (CEEC).
- 0.06ha of Cumberland Shale Plains Woodland (Derived Grassland):
    - conforms to the BC Act listed Cumberland Plain Woodland in the Sydney Basin Bioregion (CEEC); and
- 3.13ha of Exotic Vegetation.

5.2 Threatened Ecological Communities

5.2.1 Local Occurrence of Cumberland Plain Woodland in the Sydney Basin Bioregion

Local occurrence is defined as the ecological community that occurs within the study area (OEH 2018). However, the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated (OEH 2018).

State Vegetation Type Mapping (DPE 2022) and aerial vegetation mapping identified areas of Cumberland Plain Woodland in the Sydney Basin Bioregion (Cumberland Shale Plains Woodland). These areas, in addition to the Narla field-validated vegetation mapped within the Project Area, form part of the local occurrence of this CEEC within the locality (**Figure 18**). No areas of Cumberland Shale Plains Woodland mapped as occurring within 'Certified Land' was included in local occurrence calculations.

It was calculated that the local occurrence of Cumberland Plain Woodland (located outside of Certified Land) for the Project Area was approximately 86.20ha. The removal of 0.07ha of non-certified Cumberland Plain Woodland (Canopy and Derived Grassland) within the Project Area constitutes approximately 0.08% of the local occurrence of this CEEC (BC Act).

A Test of Significance (5-part test) in accordance with Section 7.3 of the BC Act, and an EPBC Assessment of Significant Impact, were conducted to assess potential impacts from the proposed activity on Cumberland Plain Woodland (**Appendix D**).

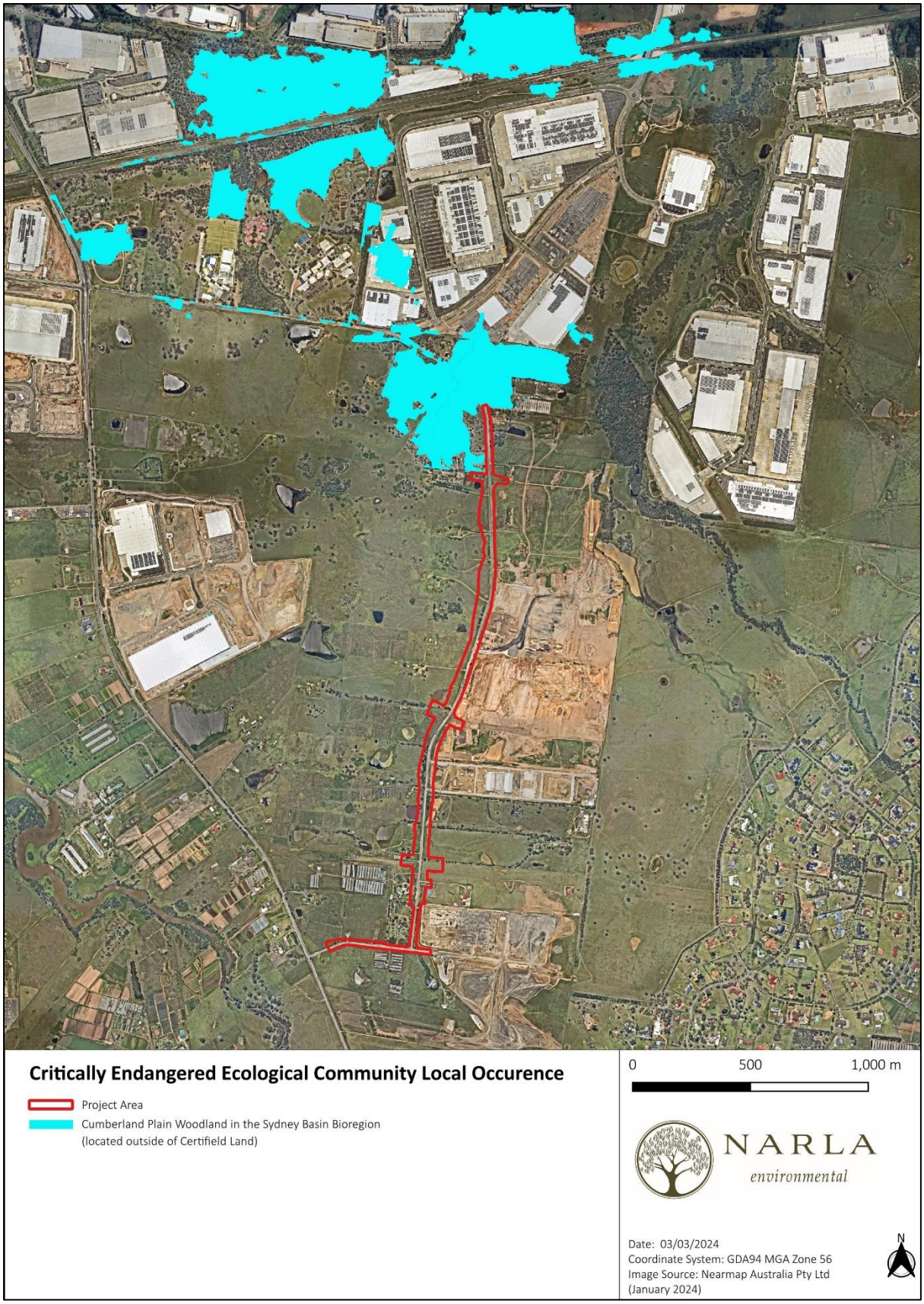


Figure 18. Local Occurrence of Cumberland Plain Woodland in the Sydney Basin Bioregion (BC Act).

6. Recommendations

This section of the report details recommended efforts to avoid and minimise impact on biodiversity values associated with the proposed activity. Measures to be implemented before, during and post construction to avoid and minimise the impacts of the project are detailed in **Table 12**.

Table 12. Table of measures to be implemented before, during and after construction to avoid and minimise the impacts of the project.

Action	Outcome	Timing	Responsibility
Project Location, Design and Planning	Due to the nature of the proposed activity, all vegetation within the Project Area will be impacted. Owing to the need to facilitate road upgrades for the changing needs of the locality no alternate locations were possible for the proposed works.	Pre-construction phase	Proponent
Assigning a Project Ecologist	Prior to the implementation of the activity, the proponent should commission the services of a qualified and experienced Ecologist with a minimum tertiary degree in Science, Conservation, Biology, Ecology, Natural Resource Management, Environmental Science or Environmental Management. The Ecologist must be licensed with a current Department of Primary Industries Animal Research Authority permit and New South Wales Scientific License issued under the BC Act. The Ecologist will be commissioned to: ▪ Undertake any required targeted searches for threatened flora prior to vegetation clearing; ▪ Undertake an extensive pre-clearing survey which includes targeted searches for threatened fauna threatened flora and Priority Weeds, and delineating habitat-bearing trees and shrubs; ▪ Undertake an additional targeted surveys for the threatened Cumberland Land Snail; ▪ Undertake an extensive pre-clearing survey which includes targeted searches for threatened fauna (including potential *Litoria aurea* [Green and Golden Bell Frog] within dams prior to removal); ▪ Supervise the clearing/modification of any aquatic habitat including creeks or dams in order to capture, treat and/or relocate any displaced fauna.	Pre-construction phase	Proponent
Tree Protections	Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970) outlines that a Tree Protection Zone (TPZ) is the principal means of protecting trees on construction sites. It is an area isolated from construction disturbance so that the tree remains viable. Ideally, works should be avoided within the TPZ. A Minor Encroachment is less than 10% of the TPZ and is outside the structural root zone (SRZ). A Minor Encroachment is considered acceptable by AS-4970 when it is compensated for elsewhere and contiguous within the TPZ. A Major Encroachment is greater than 10% of the TPZ or inside the SRZ. Major Encroachments require root investigations undertaken by non-destructive methods or the use of tree sensitive construction methods.	Pre-construction phase	Proponent Arborist

Action	Outcome	Timing	Responsibility
	Tree protection fencing is to be installed around all trees proposed for retention in the immediate vicinity of the proposed works.		
Erection of temporary fencing	Temporary barriers (e.g., flagging tape) should be erected around retained native vegetation that may incur indirect impacts on biodiversity values due to the construction works.	Pre-construction phase	Proponent Construction Contractor
Erosion and Sedimentation	Appropriate erosion and sediment control must be erected and always maintained during construction to avoid the potential of incurring indirect impacts on biodiversity values. An Erosion and Sediment Control Plan should be developed to the Soils and Construction Managing Urban Stormwater Standards (Landcom 2004).	Construction phase	Proponent Construction Contractor
Vegetation Replacement	Any roadside revegetation/landscape works should utilise tree species representative of the Cumberland Plain Woodland community to ensure habitat for this community continues in the locality.	Post-construction phase	Proponent
Weed Removal	The following six (6) Priority Weeds were identified within the Project Area: ▪ *Lantana camara* (Lantana); ▪ *Lycium ferocissimum* (African Boxthorn); ▪ *Olea europaea subsp. cuspidata* (African Olive); ▪ *Opuntia stricta* (Common Prickly Pear); ▪ *Rubus fruticosus species aggregata* (Blackberry); and ▪ *Senecio madagascariensis* (Fireweed). All priority weeds should be removed in accordance with the Biosecurity Act 2015 and NSW WeedWise (DPI 2023). Environmental weeds should be managed with best practice techniques to improve the condition of the native vegetation within the Project Area.	Post-construction phase	Proponent
Storage and stockpiling (soil and materials)	Allocate all storage, stockpile, and laydown sites away from any native vegetation that is planned to be retained. Avoid importing any soil from outside the site as this can introduce weeds and pathogens to the site to avoid the potential of incurring indirect impacts on biodiversity values.	Construction phase	Construction Contractors

7. Conclusion

This assessment indicates that the relevant provisions of the Environmental Planning and Assessment Act 1979, Biodiversity Conservation Act 2016, Environment Protection and Biodiversity Assessment Act 1999, the State Environmental Planning Policy (Industry and Employment) 2021, and the Mamre Road Precinct Development Control Plan 2021 have been satisfied.

Part of the Project Area has been nominated as 'Certified-urban capable land' under the Cumberland Plain Conservation Plan (CPCP). Development in these areas do not require further biodiversity assessment under the BC Act. However, other parts of the Project Area that are mapped as 'Excluded Land' or 'Avoided Land' still require biodiversity assessment under the BC Act and are the focus of this report.

The Department of Planning and Environment is currently pursuing Commonwealth approval for the CPCP under Part 10 of the EPBC Act. Landholders can submit development applications, seek subdivision or start master planning. However, development that will have a significant impact on matters of national environmental significance (MNES) on certified - urban capable land cannot commence until the Commonwealth CPCP approval is in place.

In summary, the following vegetation communities (located outside of Certified-urban Capable Land) within the Project Area will be impacted by the proposed activity:

- 0.01ha of Cumberland Shale Plains Woodland (Canopy);
    - conforms to the BC Act listed Cumberland Plain Woodland in the Sydney Basin Bioregion (CEEC).
- 0.06ha of Cumberland Shale Plains Woodland (Derived Grassland):
    - conforms to the BC Act listed Cumberland Plain Woodland in the Sydney Basin Bioregion (CEEC); and
- 3.13ha of Exotic Vegetation.

A BC Act Test of Significance (5-part Test) and an EPBC Assessment of Significant Impact was conducted for all threatened entities considered to have the potential to be impacted by the proposed activity. It was then concluded that the proposed activity will not have a significant impact on any threatened entities.

8. References

AT & L (2024) FFA Assessment Scope: Abbotts Road and Aldington Road

Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970)

Bannerman S.M. and Hazelton P.A. (2011) Soil Landscapes of the Penrith 1:100,000 Sheet report, digital reprint, Office of Environment and Heritage, Sydney

Bureau of Meteorology (BOM) (2024) Badgerys Creek AWS, NSW (station 067108) February and March 2023 Daily Weather Observations http://www.bom.gov.au/climate/dwo/202107/html/IDCJDW2062.202107.shtml

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2024) Protected Matters Search Tool, http://www.environment.gov.au/epbc/pmst/

Department of the Environment (2014) Approved Conservation Advice for Litoria aurea (Green and Golden Bell Frog) http://www.environment.gov.au/biodiversity/threatened/species/pubs/1870-conservation-advice.pdf.

Department of the Environment, Water, Heritage and the Arts (2009). Approved Conservation Advice for Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community.

Department of Planning and Environment (DPE) (2020) Surveying Threatened Plants and Their Habitats

Department of Planning, Industry and Environment (DPE) (2024a) Biodiversity Values Map and Threshold Tool

Department of Planning and Environment (DPE) (2024b) BioNet. The website of the Atlas of NSW Wildlife http://www.bionet.nsw.gov.au/

Department of Planning and Environment (DPE) (2024c) BioNet Vegetation Classification. https://www.environment.nsw.gov.au/research/Visclassification.htm

Department of Planning and Environment (DPE) (2024d) eSPADE v2.2 https://www.environment.nsw.gov.au/eSpade2Webapp#

Department of Primary Industries (DPI) (2024) NSW WeedWise: Priority weeds for the Greater Sydney https://weeds.dpi.nsw.gov.au/WeedBiosecurities?AreaId=140

Penrith Council (2021) Mamre Road Precinct Development Control Plan

Landcom (2004) Managing Urban Stormwater: Soils and Construction 'The Blue Book', Volume 1, Fourth Edition, New South Wales Government, ISBN 0-9752030-3-7

NSW Government (2017) NSW Legislation: Biodiversity Conservation act 2016 No 63, Schedule 4: Key Threatening Processes https://www.legislation.nsw.gov.au/acts/2016-63.pdf

NSW Government Spatial Services (NSW SixMaps) (2024) NSW Government Land & Property Information Spatial Information Exchange map viewer, https://six.nsw.gov.au/

NSW Legislation (2024) State Environmental Planning Policy (Industry and Employment) 2021

NSW Legislation (2024) State Environmental Planning Policy (Koala Habitat Protection) 2021

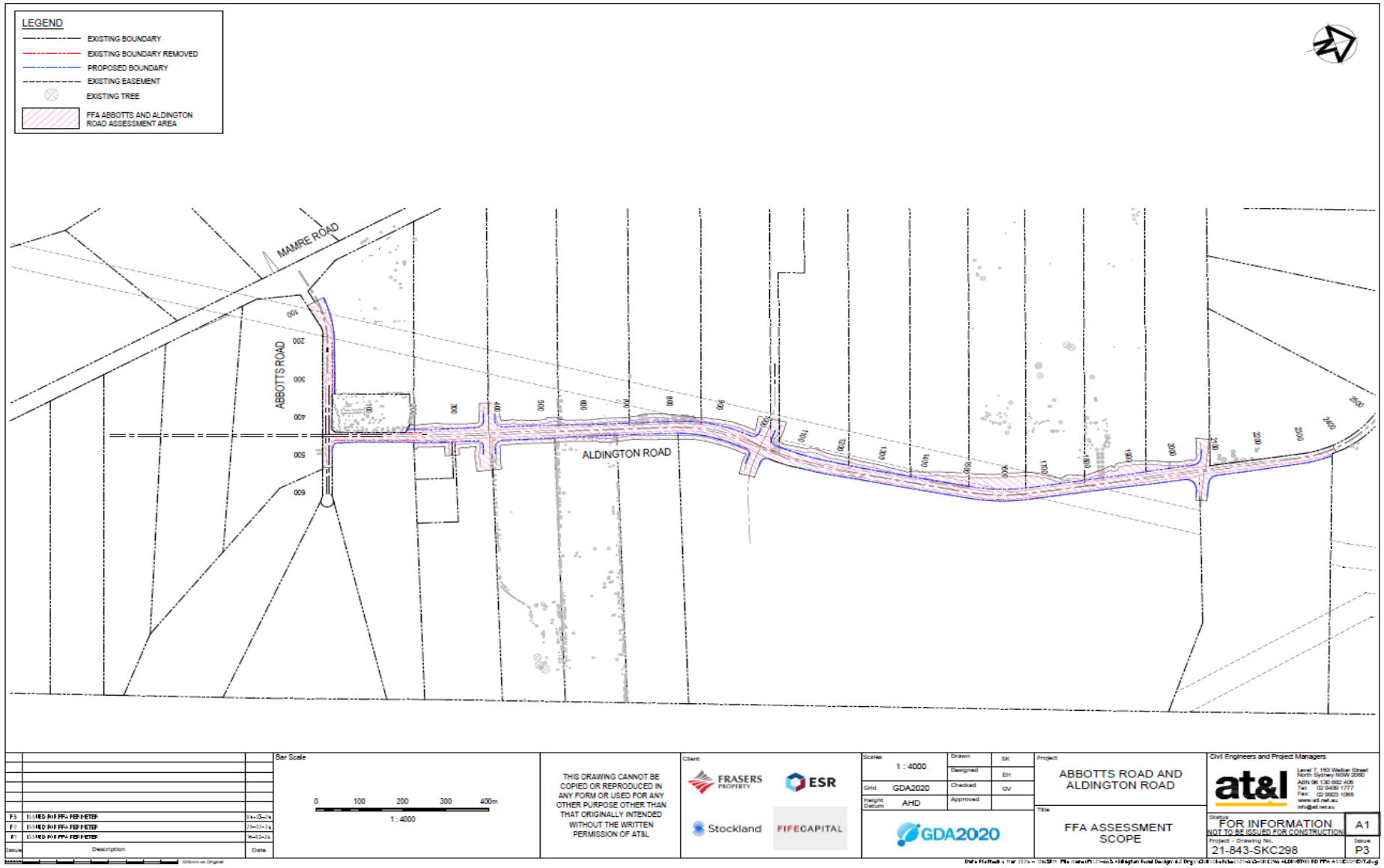
NSW Scientific Committee (2009) Cumberland Plain Woodland in the Sydney Basin Bioregion - critically endangered ecological community listing - https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2008-2010/cumberland-plain-woodland-critically-endangered-ecological-community-listing

PlantNET (2024) The NSW Plant Information Network System, Royal Botanic Gardens and Domain Trust, Sydney. http://plantnet.rbgsyd.nsw.gov.au

9. Appendices

Appendix A. Site Plans FFA Assessment Scope Aldington Road and Abbots Road (AT & L 2024).
Appendix B. Flora species identified within the Project Area and surrounding area during the 2023 and 2024 site assessments.
Appendix C. Fauna species identified within and surrounding the Project Area during the 2023 and 2024 site assessments.
Appendix D. BC Act Assessment of Significance (5-part Test) for Cumberland Plain Woodland in the Sydney Basin Bioregion.
Appendix E. EPBC Act Assessment of Significant Impact Criteria for Litoria aurea (Green and Golden Bell Frog).

Appendix A. Site Plans FFA Assessment Scope Aldington Road and Abbots Road (AT & L 2024).



Appendix B. Flora species identified within the Project Area and surrounding area during the 2023 and 2024 site assessments.

Species	Canopy	Mid layer	Ground layer
*Abelia grandiflora**		X	
Acacia decurrens		X	
Acacia implexa		X	
*Acer spp.**	X		
*Agapanthus africanus**			X
Allocasuarina littoralis	X		
*Araujia sericifera**			X
*Avena barbata**			X
*Bidens pilosa**			X
*Bouteloua dactyloides**	x		X
*Brassica spp.**			X
*Bromus catharticus**			X
Bursaria spinosa subsp. *spinosa*		X	
Callistemon viminalis		X	
*Cenchrus clandestinus**			X
*Centaurium erythraea**			X
Centella asiatica			X
*Ceratonia siliqua**	X		
*Chloris gayana**			X
*Cirsium vulgare**			X
Commelina cyanea			X
*Conyza bonariensis**			X
Corymbia gummifera	X		
Corymbia maculata	X		
Cupaniopsis anacardioides	X		
*Cupressus glauca**	X		
Cynodon dactylon	x		X
*Cyperus eragrostis**			X
Dichondra repens			X
*Dietes grandiflora**			X
*Diospyros kaki**	X		
*Ehrharta erecta**			X
Einadia hastata		X	
Eragrostis brownii			X
*Eragrostis curvula**			X
Eucalyptus cinerea	X		
Eucalyptus crebra	X		
Eucalyptus microcorys	X		
Eucalyptus moluccana	X		
Eucalyptus tereticornis	X		
*Fumaria spp.**			X
Glycine clandestina			X
Glycine tabacina			X
Grevillea robusta	X		

Species	Canopy	Mid layer	Ground layer
Hardenbergia violacea			X
*Hedera helix**			X
*Hypochaeris radicata**			X
Lachnagrostis filiformis			X
*Lantana camara***		X	
*Lepidium bonariense**			X
*Ligustrum lucidum**		X	
*Ligustrum sinense**		X	
*Lycium ferocissimum***		X	
*Malva neglecta**		X	
*Megathyrsus maximus**			X
Melaleuca armillaris		X	
Melaleuca decora	X		
Melaleuca linariifolia	X		
Melaleuca styphelioides	X		
Microlaena stipoides var. stipoides			X
*Murraya paniculata**		X	
*Olea europaea subsp. cuspidata***		X	
Oplismenus aemulus			X
*Opuntia spp.***			X
Oxalis perennans			X
*Pandorea jasminoides**			X
*Paspalum dilatatum**			X
*Pelargonium zonale**			X
Persicaria decipiens			X
*Phoenix canariensis **	X		
*Pinus radiata**	X		
*Plantago lanceolata**			X
*Ricinus communis**		X	
*Rubus fruticosus species aggregata***		X	
*Rumex obtusifolia**			X
Schefflera actinophylla	X		
*Schinus molle**	X		
*Senecio madagascariensis***		x	X
*Setaria parviflora**			X
*Sida rhombifolia**			X
*Solanum linnaeanum**			X
*Solanum mauritianum**		X	
*Solanum nigrum**			X
*Sonchus oleraceus**		x	X
*Sporobolus africanus**		x	X
*Strelitzia spp.**		x	X
Syncarpia glomulifera	X		
*Taraxacum officinale**			X
Themeda triandra			X
*Toona sinensis**	X		

Species	Canopy	Mid layer	Ground layer
*Tradescantia fluminensis**			X
Tricoryne elatior			X
*Trifolium repens**			X
Typha orientalis			X
*Verbena bonariensis**			X
Wahlenbergia gracilis			X
Wahlenbergia stricta			X

**Represents exotic species; ***represents priority weeds*

Appendix C. Fauna species identified within and surrounding the Project Area during the 2023 and 2024 site assessments.

Class	Scientific Name	Common Name	Status
Amphibia	*Crinia signifera*	Common Eastern Froglet	Protected
	Limnodynastes peronii	Striped Marsh Frog	
	Litoria fallax	Eastern Dwarf Tree Frog	
Aves	*Acridotheres tristis*	Indian Myna	Introduced
	Columba livia	Rock Dove	
	Acanthiza pusilla	Brown Thornbill	Protected
	Ardea cinerea	Grey Heron	
	Bubulcus ibis	Cattle Egret	
	Cacatua sanguinea	Little Corella	
	Chenonetta jubata	Australian Wood Duck	
	Corvus coronoides	Australian Raven	
	Grallina cyanoleuca	Magpie Lark	
	Gymnorhina tibicen	Magpie	
	Hirundo neoxena	Welcome Swallow	
	Malurus cyaneus	Superb Fairywren	
	Manorina melanocephala	Noisy Miner	
	Neochmia temporalis	Red-browed Finch	
	Ocyphaps lophotes	Crested Pigeon	
	Phalacrocorax varius	Australian Pied Cormorant	
	Porphyrio melanotus	Australian Swamphen	
	Rhipidura leucophrys	Willie Wagtail	
	Vanellus miles	Masked Lapwing	
	Zanda funerea	Yellow-tailed Black Cockatoo	
	Zosterops lateralis	Silvereye	

Appendix D. BC Act Assessment of Significance (5-part Test) for Cumberland Plain Woodland in the Sydney Basin Bioregion.

Biodiversity Conservation Act 2016 – Test of Significance (5-part Test) for Cumberland Plain Woodland in the Sydney Basin Bioregion (CPW)		
BC Act Status: Critically Endangered Ecological Community		
Background to Test	This Test of Significance (5-part Test) is required to assess impacts to Cumberland Plain Woodland in the Sydney Basin Bioregion that is being impacted by the proposed activity. However, as Part of the Project Area has been nominated as 'Certified-urban capable land' under the CPCP, only areas that are mapped as 'Excluded Land' or 'Avoided Land' are required to be assessed. Therefore, only 0.07ha of Cumberland Plain Woodland (CPW) will be assessed within this 5-part Test	
(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,	Not applicable.	
(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:	(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	The proposed activity is not likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction. In total, 0.08% of the local occurrence of CPW. The removal of minimal low-moderate condition CPW is unlikely to have an adverse effect on the extent community such that its local occurrence is placed at risk of extinction.
	(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,	The proposed activity is not likely to modify the composition of CPW substantially and adversely such that its local occurrence is likely to be placed at risk of extinction. It is not expected that composition of species will be substantially or adversely modified by the proposed activity. The removal of 0.07ha of CPW is approximately 0.08% of its local occurrence.
(c) in relation to the habitat of a threatened species or ecological community:	(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and	In total, approximately 0.07ha of CPW is expected to be impacted by the proposed activity.
	(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and	The area proposed to be impacted consists of a small area of roadside vegetation that has already been fragmented from areas of surrounding habitat.

Biodiversity Conservation Act 2016 – Test of Significance (5-part Test) for Cumberland Plain Woodland in the Sydney Basin Bioregion (CPW)		
BC Act Status: Critically Endangered Ecological Community		
	(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,	All areas which support viable patches of CPW are important. However, the vegetation within the Project Area is highly modified due to historic clearing and edge effects. In total 0.07ha of modified vegetation will be removed. As such, it is not anticipated the removal of this vegetation will impact on the long-term survival of this community within the locality.
(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),	The proposed activity is not likely to have an adverse effect on any declared area of outstanding biodiversity value, directly or indirectly.	
(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	The following Key Threatening Processes (KTPs) listed under Schedule 4 of the BC Act are relevant to the protection of potential habitat in the scope of the proposed activity within the Project Area for this CEEC: ▪ Clearing of native vegetation. The proposed activity will see a temporary increase in the impact on clearing of native vegetation.	
References NSW Government (2017) NSW Legislation: Biodiversity Conservation act 2016 No 63, Schedule 4: Key Threatening Processes https://www.legislation.nsw.gov.au/acts/2016-63.pdf NSW Scientific Committee (2011) Cumberland Plain Woodland in the Sydney Basin Bioregion - Critically endangered ecological community listing		

Appendix E. EPBC Act Assessment of Significant Impact Criteria for *Litoria aurea* (Green and Golden Bell Frog).

Commonwealth Environment Protection and Biodiversity Conservation Act 1999 Assessment of Significant Impact Criteria for *Litoria aurea* (Green and Golden Bell Frog)	
EPBC Act Status: Vulnerable	
Significant impact criteria An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
▪ Lead to a long-term decrease in the size of an important population;	The proposed activity is will not lead to a long-term decrease in the size of an important population. Site assessments were conducted over the course of two (2) years within the known calling time for this species and no individuals were located. The proposed activity involves the upgrading of Aldington and Abbotts Road within the Project Area, with two (2) dams to be impacted. These dams may provide breeding habitat for the Green and Golden Bell Frog. The dams are in low condition, surrounded by degraded vegetation. As such, the potential disturbance to this species is likely to be temporary and localised, with better condition dams and watercourses being untouched in the surrounding locality.
▪ Reduce the area of an occupancy of an important population	The proposed activity will not reduce the area of occupancy of an important population of species. Site assessments were conducted over the course of two (2) years within the known calling time for this species and no individuals were located. Although the proposed activity may see a temporary reduction in potential habitat for the Green and Golden Bell Frog, the dams themselves are in low condition, and are surrounded by degraded vegetation, thus providing less than optimal habitat for this species.
▪ Fragment an existing important population into two or more populations;	The proposed activity will not fragment an existing important population into two or more populations. Site assessments were conducted over the course of two (2) years within the known calling time for this species and no individuals were located.
▪ Adversely affect habitat critical to the survival of a species;	The proposed activity will not adversely affect habitat critical to the survival of this species as the proposed works require the impacts to two (2) low condition dams, which are surrounded by degraded vegetation, thus providing sup-optimal potential habitat for the Green and Gold Bell Frog.
▪ Disrupt the breeding cycle of an important population;	The proposed activity will not disrupt the breeding cycle of an important population. Site assessments were conducted over the course of two (2) years within the known calling time for this species and no individuals were located. Extensive potential breeding habitat in the form of higher condition dams and watercourses (Kemps Creek) will continue to exist post-construction, in the surrounding area.
▪ Modify, destroy, remove, isolate or decrease the availability or	The proposed activity will not modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the

Commonwealth Environment Protection and Biodiversity Conservation Act 1999 Assessment of Significant Impact Criteria for *Litoria aurea* (Green and Golden Bell Frog)	
EPBC Act Status: Vulnerable	
Significant impact criteria An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
quality of habitat to the extent that the species is likely to decline;	species is likely to decline. Although the proposed activity will result in the removal of two (2) low condition dams, this impact will not have a significant impact on the availability of habitat for the Green and Gold Bell Frog and will not lead to a decline in the species.
▪ Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;	Priority and environmental weeds were a significant issue within the Project Area and will be cleared and managed appropriately. No invasive species will be introduced into the Project Area as a result of construction works, thus there will not be further threats to potential Green and Gold Bell Frog habitat.
▪ Introduce disease that may cause the species to decline; or	The proposed landscaping may involve the importation of soil, compost or mulch which may be a potential source of chytrid fungus (a cause of amphibian chytrid fungus disease). If materials are to be imported for landscaping processes, they will be sterilised according to industry standards prior to importation to site.
▪ Interfere with the recovery of the species.	The proposed activity will not interfere with the recovery of the species. While potential sub-optimal breeding and foraging habitat, in the form of two (2)) low condition dams, will be impacted by construction works, it is considered highly unlikely that the removal of this potential habitat will interfere with the recovery of the species. Potential impacts are to be mitigated through the measures outlined in this report including the requirement for a qualified Ecologist to be present on-site during clearing of this potential habitat to supervise works and provide assistance to any individuals of this species directly impacted.
References Department of the Environment (2014) Approved Conservation Advice for Litoria aurea (Green and Golden Bell Frog) http://www.environment.gov.au/biodiversity/threatened/species/pubs/1870-conservation-advice.pdf.	

NARLA

environmental

Eastern Sydney Office
4/10 Bridge Street
Pymble
NSW 2073
Ph: 02 9986 1295

Western Sydney Office
7 Twentyfifth Avenue
West Hoxton
NSW 2171

Hunter Valley Office
10/103 Glenwood Drive
Thornton
NSW 2322

www.narla.com.au