

Appendix L

**NRA - Environmental Analysis Report
(EAR)**



Environmental Approval & Compliance Solutions

Haughton Pipeline Stage 2 Project: Environmental Analysis Report

GHD
(on behalf of Townsville City Council)



Document Control Summary

NRA Environmental Consultants

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Report Summary	
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Abstract	Townsville City Council proposes to construct a pipeline from south of the Haughton River to the Burdekin River, and a pump station (near the Burdekin River). This report describes the proposed project, environmental values, potential impacts and mitigation measures.

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Glossary

ADR	Accepted Development Requirement
BD Status	Biodiversity Status of Regional Ecosystems according to the Queensland Department of Environment and Science
BHWSS	Burdekin Haughton Water Supply Scheme
Biosecurity Act	Queensland <i>Biosecurity Act 2014</i>
BSC	Burdekin Shire Council
BVG	Broad Vegetation Group
DIWA	Directory of Important Wetlands in Australia
EAR	Environmental Analysis Report
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
ESCP	Erosion and Sediment Control Plan
Fisheries Act	Queensland <i>Fisheries Act 1994</i>
GBR	Great Barrier Reef
GHD	GHD Pty Ltd
HES	High ecological significance (wetland)
IWSS	Integrated Water Supply Strategy
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
NC Act	Queensland <i>Nature Conservation Act 1992</i>
NRA	NRA Environmental Consultants
RE	Regional Ecosystem
RPMS BDT	Regional Pest Management Strategy Burdekin Dry Tropics
T&NT	Threatened and Near Threatened
TCC	Townsville City Council
TEC	Threatened Ecological Community
VM Act	Queensland <i>Vegetation Management Act 1999</i>
Water Act	Queensland <i>Water Act 2000</i>
WoNS	Weeds of National Significance
WPA	Wetland Protection Area
WWBW	Queensland Waterways for Waterway Barrier Works

1. Introduction

1.1 Background

Townsville City Council (TCC) is progressing plans for the Haughton Pipeline Stage 2 Project (the Project) to accommodate regional growth and increased water demand amid potential prolonged drought conditions. Stage 1 (the Haughton Pipeline Duplication Project) was completed in June 2020. Stage 1.1, to extend the pipeline approximately 4 km south across the Haughton River, is close to completion.

NRA Environmental Consultants (NRA) was commissioned by GHD Pty Ltd (GHD) on behalf of TCC to establish the environmental constraints of the Project through an Environmental Analysis Report (EAR).

The Project will have design, construction and operation phases. The design phase involves surveys along the proposed alignment and development of detailed design plans. The construction phase involves early works to establish access to and along the pipeline alignment, construction of the pipeline (using a 40 m wide corridor along the alignment, narrower corridor at watercourse crossings, and access tracks), and rehabilitation of most disturbed areas. The operation phase will involve maintenance inspections and repair works (where needed) along the pipeline alignment, with access via designated access tracks.

1.2 Report scope

The most disturbance will occur during the construction phase of the project; therefore, the impact assessment and mitigation measures in this EAR have been prepared for the construction phase.

The scope of the EAR is to:

- describe the proposed work
- describe Commonwealth and State legislative obligations
- describe the existing natural environment in the Project area from desk-based and field studies
- discuss potential impacts of proposed work on the environment
- assess the likely impacts
- provide measures to avoid or minimise impacts.

A desk-based assessment and field survey were undertaken to collect data to inform the EAR.

The identification of environmental values in the receiving environment, and advice relating to the potential threats, mitigation measures and regulatory requirements associated with the proposed works provided in this report, are based on Project information provided by GHD from January to July 2021 (and described in **Section 2**).

The design process for Stage 2 is ongoing, and refinements to the existing plans are expected prior to construction. NRA understands that the information provided herein will be reviewed, and supplementary studies (desk-based and/or field) conducted, if material changes are made to the Project design as described in this report.

2. Project Description

2.1 Overview

The Haughton Pipeline began operations in 1988 and forms an important part of Townsville's water supply and water security. Prior to Stage 1, the Haughton Pipeline comprised a pump station at the Upper Haughton that was capable of drawing 130 ML of water per day from the Burdekin Haughton Water Supply Scheme (BHWSS) and transferring it to the Ross River Dam via a 35.6 km pressure and gravity pipeline. Drawdown from the BHWSS was activated when the Ross River Dam water level dropped to 20% capacity.

Projected population growth in the Townsville region and increased demand for water, coupled with climatic modelling that shows a decline in rainfall in the Townsville region, have led to an anticipated greater future reliance on the water supply from the BHWSS.

The following staged works have been undertaken/are proposed by TCC to meet the increasing demand for water.

- Stage 1.
 - In 2019, TCC, through the implementation of TCC's Integrated Water Supply Strategy (IWSS), duplicated the existing Haughton Pipeline to meet increasing demand. The duplicate pipeline is 36.5 km long and is adjacent to the existing pipeline.
- Stage 1.1.
 - Approximately 4 km of pipeline across the Haughton River (south to the beginning of Stage 2) is under construction.
- Stage 2 (this Project).
 - Includes the extension of the existing pipeline from the Stage 1.1 works to a new pump station between the Tom Fenwick pump station and the Clare Weir.

The objective of this Project is to deliver a pump station and a 28.5 km pipeline, capable of transferring 364 ML of water per day from Burdekin River to Ross River Dam.

2.2 Construction

The Project will involve construction of the following.

- A buried pipeline (constructed of mild steel cement lined pipework and/or glass reinforced pipework) 1,800 mm in diameter and approximately 28.5 km long; from south of Haughton River (Stage 1.1 works) to Burdekin River.
- Temporary support facilities including laydown areas for materials and equipment.
- A permanent access road along the length of the pipeline (21.5 m wide).
- A pump station, near to the existing Tom Fenwick Pump Station.
- Power supply works including a substation from the Powerlink 132 kV lines, and an 11kV extension and transformer (as an interim supply)¹.

¹ Development approvals associated with the new substation and power supply works will form part of a separate development application to that of the pump station and water supply pipeline (Queensland Government 2021).

For the purposes of this report it is assumed that construction will involve the following key steps.

- Clearing of vegetation and grading of the pipeline alignment to prepare a construction working area for the pipeline, pump station and substation.
- Separating and stockpiling topsoil and subsoil to protect and preserve for later use.
- Creation of a trench for the pipeline using trenching machines and conventional (open cut trench) methods for the majority of the pipeline length. At major infrastructure crossings (road and rail lines) trenchless construction techniques (*eg* enveloper) will be applied.
- Lowering the pipeline into the trench and backfilling the trench with excavated material and replacing topsoil.
- Cleaning up and restoring the construction site, including the rehabilitation of non-operational areas.

The construction of the Project is expected to commence in mid-2021 and is scheduled to be completed by the end of 2023.

3. Project Area

3.1 Location

The proposed pipeline alignment is approximately 70 km (from its mid-point) south-east of Townsville. The proposed pipeline will be constructed from Burdekin River (near the existing Tom Fenwick Pump Station), in a north-westerly direction for approximately 28.5 km, to the southern-most point of the Stage 1.1 pipeline (south of Haughton River) (**Figure 1**). The proposed alignment traverses agricultural land for most of its length, with some sections following existing irrigation channels (owned by Sunwater) and powerline easements.

The proposed alignment is in the Burdekin Shire Council (BSC) Local Government Area. Townships in the vicinity of the proposed alignment include Upper Haughton and Clare.

3.2 Project area

This EAR was prepared using the proposed alignment provided to NRA on 25 May 2021. The proposed alignment was used as a mid-point for a 200 m wide design corridor (*pers. comm.* Rebecca Peardon, Senior Planner, GHD via email on 20 January 2021) (**Figure 1**); hereafter the Project area.

Preliminary designs are available at this time. Construction works will be limited to a 40 m wide corridor. At watercourses and drainage features the construction corridor will be reduced to a 20 m wide corridor. Most disturbed areas will be rehabilitation and revegetated following construction works. Permanent clearing will be restricted to a 21.5 m wide access road, along the length of the pipeline, for operational and maintenance purposes.

3.3 Tenure

Tenures include a mixture of private properties, State controlled land, and local government owned land.

3.4 Infrastructure and utilities

Two state controlled roads (Ayr Ravenswood Road and Ayr Dalbeg Road) intersect the Project area as well as a small number of BSC controlled minor roads and road reserve areas. The Project area also traverses a rail corridor, Powerlink easements and several Sunwater owned irrigation channels.

3.5 Land use

Land use in the Project area and surrounds is zoned Rural under the Burdekin Shire IPA Planning Scheme (BSC 2011).

The land use in the Project area is mapped by DES (2019a). The majority of the Project area is mapped as 'grazing native vegetation', with smaller areas of 'other minimal use', 'channel/aqueduct', 'irrigated cropping', 'river', 'reservoir/dam' and 'marsh/wetland'. Surrounding land use is mostly 'irrigated cropping' and 'grazing native pasture'. The mapped land uses are consistent with the current land uses of the Project area.

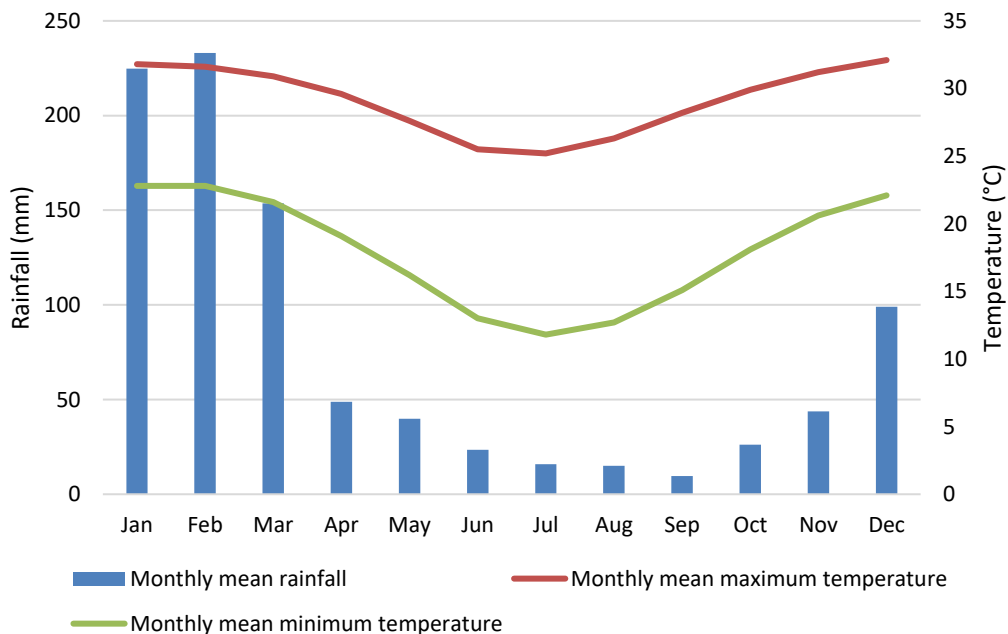
3.6 Protected areas

Protected Areas of Queensland represent: areas protected for the conservation of natural and cultural values; and areas managed for production of forest resources, including timber and quarry material. The Project area does not intersect any Protected Areas.

The closest Protected Area is Bowling Green National Park, which is >13 km from the Project area. Bowling Green Bay National Park is a 58,128 ha National Park that protects a diverse range of habitats including forested landscape of the Mount Elliot range and coastal estuaries between Cape Cleveland and Cape Bowling Green. Horseshoe Lagoon Conservation Park is the next closest Protected area, >20 km north-east of the Project area. This 80 ha park contains freshwater wetland systems.

3.7 Climate

Data collected at the Ayr DPI Research Station (Bureau of Meteorology Station No. 33002), 35 km north-west of the Project area, is shown on **Graph 1** and is likely to be representative of the weather conditions in the Project area (BoM 2021). This area is in the dry tropics, which typically has a distinct wet season with higher temperatures (nominally November to April) and a dry season with lower temperatures (nominally May to October).



Source: BoM (2021).

Graph 1: Mean monthly rainfall and maximum and minimum temperatures (1951–2021) recorded at the Ayr DPI Research Station (33002)

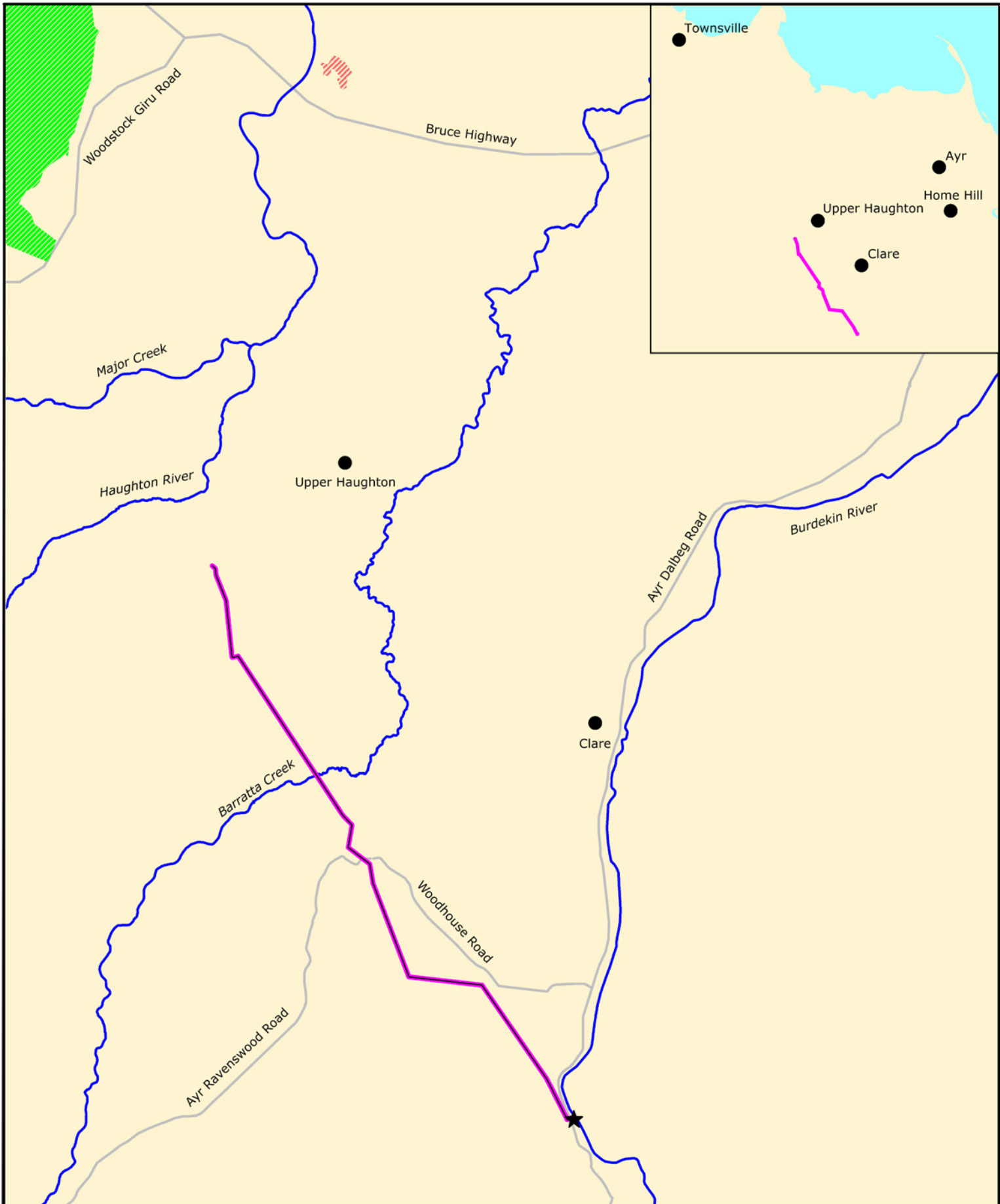
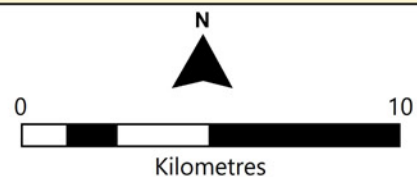


Figure 1: Location of the Haughton Pipeline Stage 2 Project
 Project: Haughton Pipeline Stage 2 Project: Environmental Analysis Report

- Major drainage
- Major road
- Proposed alignment (May 2021)
- 200 m wide design corridor
- Bowling Green Bay National Park
- Horseshoe Lagoon Conservation Park
- Pump station



Source: © State of Queensland (Department of Environment and Science) 2021, © State of Queensland (Department of Resources) 2021, Updated data available at <https://qldspatial.information.qld.gov.au/catalogue/>

NRA Ref: 135037
 Date: August 2021



4. Existing Environment

The construction of the Project has the potential to impact on the existing natural environment. This section of the EAR describes environmental values of the Project area and possible impacts and mitigation measures to avoid or reduce impacts on identified environmental values.

The environmental values considered include:

- soil and topography (**Section 4.1**)
- watercourses and waterways (**Section 4.2**)
- wetlands (**Section 4.3**)
- flora (**Section 4.4**)
- fauna (**Section 4.5**)
- air and noise (**Section 4.6**).

For each of the environmental values, a desk-based assessment and field survey were conducted to describe the existing conditions and identify potential impacts associated with the proposed Project. The field survey was undertaken on 21 April and 25–26 May 2021. Weather conditions during the first mobilisation of the field survey (21 April 2021) were wet following a period of significant rain, and access within the Project area was restricted². Weather conditions during the second mobilisation of the field survey (25–26 May 2021) were fine and dry, permitting unrestricted access to the Project area.

4.1 Soil and topography

4.1.1 Methods

Data from the following sources was used to identify the soils in the Project area.

- Soils of the Lower Burdekin Valley, North Queensland: Redbank Creek to Bob's Creek and south to Bowen River (Thompson *et al.* 1990).
- Soils of the Lower Burdekin River – Barratta Creek-Haughton River Area, North Queensland (Reid & Baker 1984).
- Queensland government detailed surface geology mapping (DoR 2018).

4.1.2 Description of environmental values

The Project area is low-lying and topography is generally flat. Elevation ranges from approximately 25 m to 45 m Australian Height Datum. The majority of the Project area is underlain with alluvium rock, and a small area of granite is present in the centre of the Project area (north of Ayr Ravenswood Road) (DoR 2018).

Soils in the Project area are mapped at a 1:100,000 scale by Thompson *et al.* (1990) and Reid and Baker (1984). The project area contains seven dominant soil types, and 23 different soil profile classes (**Figure 2, Table 1**). The most widespread/common soil type in the Project area is *Sand or loam over sodic clay – Sodosols, Kurosols* (approximately 66%). Descriptions of, and limitations associated with, soil profile classes³, are described in Thompson *et al.* (1990) and presented in **Table 1**. Nine of the soil class profiles within the Project area are described as susceptible to erosion (4Ucf, 2Dda, 2Dbd, 4Dba, 4Dye, 4Dyh, 4Dyk and 6Dyj)).

² The Project area was accessed on-foot from state and BSC controlled roads.

³ Limitations are described in terms of agricultural use; however, most limitations (*eg* erosion risk, flooding potential) are relevant to land disturbance more generally.

Table 1: Dominant soil types and soil class profiles in the Project area

Dominant soil type ^A	Soil profile class ^A	Description ^B	Soil limitations ^C	% of Project area ^D	
Cracking clay soils – Vertosols	2Ugc	Grey brown and grey clays with weakly mottled light clay surface, profile alkaline by 90 cm.	Gilgai, flooding, waterlogging, surface crusting.	4.06	
	2Ugd	Grey clays with bleached light and light medium clay surface, profile strongly alkaline by 90–120 cm.		4.40	
	2Uge	Mottled grey and dark clays with light and light medium clay surface, profile strongly alkaline by 60 cm.		16.23	
	2Ugh	Grey and dark clays with moderately mottled medium to heavy clay surface, profile strongly alkaline by 30 cm.		0.92	
	Total			25.61	
Deep sandy soils – Tenosols, Rudosols	4Ucf	Sands and loams from 30–110 cm deep. Often cobbly and gravelly.	Shallow soils, stone, low water retention, erosion, impermeable upper B horizon.	2.01	
	6Uca	Deep sands with minimal pedological development.	Soil variability, shallow perched, water tables in some areas, low water retention, flooding.	1.41	
	6Ucb	Deep bleached sands.		1.26	
	Total			4.68	
Friable non-cracking clay or clay loam soils – Dermosols, Ferrosols	6Gnd	Neutral yellow brown gradational soils with sandy loam A horizon.	Flooding in some areas, surface crusting.	2.20	
	Total			2.20	
Sand or loam over friable or earthy clay – Chromosols, Kurosols	6Dya	Mottled yellow podzolic soil with 60 to 120 cm sandy loam A horizon. Bleached A2 horizon.	Soil variability, perched water tables in wet season, low water retention.	0.13	
	Total			0.13	
Sand or loam over sodic clay – Sodosols, Kurosols	2Dbf	Brown solodics-solodized solonetz with 12–25 cm sandy loam A horizon, B horizon alkaline by 60 cm.	Flooding in some areas, waterlogging, impermeable upper B horizon, surface crusting.	1.08	
	2Dda	Dark solodics-solodized solonetz with 2.5–12 cm loam to clay loam A horizon, B horizon strongly alkaline by 60 cm.	Soil variability, impermeable upper B horizon, restricted rooting depth, sheet erosion, surface crusting.	7.98	
	2Ddb	Dark solodics-solodized solonetz with 2.5–12 cm loam to clay loam A horizon, B horizon strongly alkaline by 30 cm.		4.54	
	2Dyb	Grey and dark solodics-solodized solonetz with 12–20 cm loam to clay loam A horizon, B horizon strongly alkaline by 60 cm.		12.69	
	4Dbf	Brown solodics-solodized solonetz with 20–25 cm A horizon, B horizon alkaline by 90 cm.	Soil variability, impermeable upper B horizon, restricted rooting depth, sheet erosion, surface crusting, waterlogging.	2.64	
	4Dye	Grey to yellow solodics-solodized solonetz with 35–40 cm A horizon, B horizon alkaline by 90 cm.		3.18	
	4Dyg	Grey to yellow solodics-solodized solonetz with 15–30 cm A horizon, B horizon alkaline by 60 cm.		1.73	
	4Dyh	Grey to dark brown solodics-solodized solonetz with 15 to 30 cm A horizon, B horizon alkaline by 30 cm.		0.24	
	4Dyk	Grey and yellow podzolic soils with 35–100 cm coarse sandy A horizon. Bleached A2 horizon. Overlies decomposed granite.		Slope and erosion, low water retention, soil variability.	1.37
	6Dyb	Mottled yellow soloth with 30–60 cm of sandy loam A horizon. Bleached A2 horizon.	Flooding in some areas, surface crusting.	3.76	
	6Dyf	Yellow solodics-solodized solonetz with 25–50 cm sandy clay loam to clay loam A horizon, B horizon alkaline by 120 cm.	Soil variability, impermeable upper B horizon, surface crusting.	2.08	
	6Dyg	Yellow, grey and brown solodic-solodized solonetz with 10–20 cm sandy clay loam A horizon, B horizon strongly alkaline by 60 cm.	Surface crusting, waterlogging, soil variability, impermeable upper B horizon.	1.91	
	6Dyj	Dark and grey solodics-solodized solonetz with 5–20 cm A horizon, B horizon strongly alkaline by 30 cm.	Flooding and erosion, perched water tables in wet season.	15.39	
	6Gnc	Alkaline yellow structured gradational soils with sink hole micro relief.	Sink hole micro relief in some areas, soil variability, dispersion subsoils.	7.14	
	Total			65.71	
	Eroded land – other	Total			1.62
	Lagoon	Total			0.05

^A As per Thompson *et al.* (1990) and Reid and Baker (1984). Dominant soil types are mapped on **Figure 2**.

^B As per Table 1 in Thompson *et al.* (1990).

^C As per Table 2 in Thompson *et al.* (1990). Limitations are described in terms of agricultural use; however, most limitations (*eg* erosion risk, flooding potential) are relevant to land disturbance more generally.

^D Percentage of total Project area represented by each dominant soil type/soil class profile. Data subject to rounding errors.

4.1.3 Potential impact and mitigation measures

The potential impacts to soils due to the Project are as follows.

- Soil degradation from disturbances (*eg* vegetation clearing, soil stripping) increases the risk of soil erosion.
- Soil erosion may be accelerated by poor or unmanaged drainage of disturbed areas, and large volumes of fast flowing water will erode disturbed soils that are otherwise stable.
- Fine sediment exported from disturbed soils can impact on water quality of nearby water features (*eg* streams and wetlands), particularly those downstream of the disturbance.
- Contamination of soils with waste materials/hazardous chemicals.
- Loss of soil or diminished soil quality due to construction works will have a direct impact on flora and fauna values in the Project area and could hinder the re-establishment of vegetation.

All soils in the Project area that will be disturbed by the proposed activity will require appropriate erosion and sediment control measures, and management of the soils should be commensurate with the risk that each soil type poses. Areas containing soils with higher erosion susceptibility will require additional, or more specialised, treatment to avoid adverse impacts during construction.

The following mitigation measures are provided to reduce potential impacts. Construction contractor(s) should prepare a Project-specific Construction Environmental Management Plan (CEMP) as part of pre-construction activities. Measures to address the following recommendations should be included in the Project CEMP (where applicable).

Recommendation 1: The CEMP should include a Project Clearing Plan (PCP) (or equivalent). The PCP should:

- aim to minimise the total disturbance area/footprint as well as the area of soil exposed through disturbance at any time
- maximise the use of existing cleared areas
- ensure that clearing does not occur beyond approved clearing extents by including a requirement to survey (*eg* as part of pre-clearance works) and clearly mark vegetation clearing extents (*ie* the width of the construction corridor) to be maintained for the duration of construction
- identify and mark large trees with hollows that can be retained (*eg* on the edge of the construction corridor)
- define controls to prevent unauthorised vegetation clearing (*eg* supervision, permissions).

Recommendation 2: A site-specific Erosion and Sediment Control Plan (ESCP) (or equivalent) should be developed and implemented by the construction contractor as part of pre-construction activities. The ESCP should be prepared in accordance with industry standards, be prepared by a suitably qualified practitioner, and take into consideration the erosion risk of each soil type. Elements of the ESCP must be integrated into the construction schedule.

Recommendation 3: Undertake construction in the dry season and ensure that the beds and banks of disturbed watercourses are stabilised prior to the wet season.

- Recommendation 4:** Ensure that appropriate fill is used around the pipeline, so that erosion and subsidence does not become an issue or risk to the asset in the future.
- Recommendation 5:** Salvaged soil should be directly reused for rehabilitation rather than being stockpiled, with reused soil material to be replaced to reflect its original profile position (*ie* subsoil below surface soil material). Where direct reuse of soil material is not possible, soil material is to be conserved and stockpiled, with surface soil stockpiled separately to subsoil. Soil stockpiles must be located and managed to minimise erosion and revegetated if they are to remain for >4 weeks (in the interim apply mulch or appropriate soil binder).
- Recommendation 6:** Store chemicals and products in accordance with relevant Australian Standards to reduce the likelihood of soil contamination.
- Recommendation 7:** Maintain spill kits in areas where hazardous substances are handled, or near machinery with potential for spills, and remediate all hazardous substance spills as soon as practicable.
- Recommendation 8:** Maintain vehicles and machinery according to manufacturer specifications.
- Recommendation 9:** Rehabilitate disturbed land as soon as practicable (excluding the 21.5 m wide permanent access road) and in accordance with a Project-specific Rehabilitation Plan (or equivalent). Suitable native plant species should be used in revegetation work. The species composition should be determined in consultation with a suitably qualified practitioner.

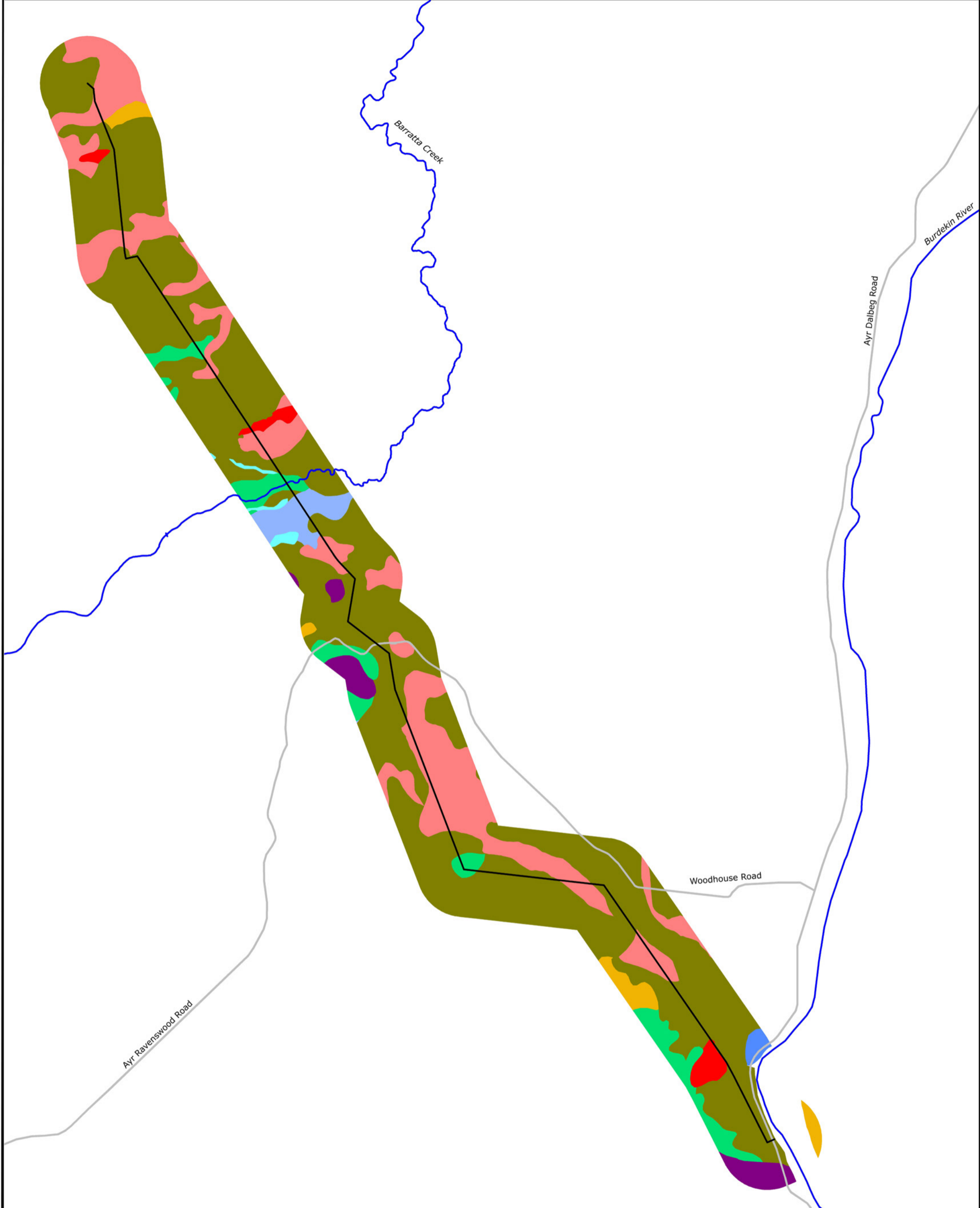
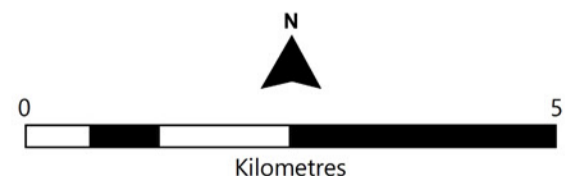


Figure 2: Soil types mapped by the Queensland Government
 Project: Haughton Pipeline Stage 2 Project: Environmental Analysis Report

Proposed alignment (May 2021)
 Major road
 Major drainage

Dominant soil types within 1km of the proposed alignment

- | | |
|--|--|
| <ul style="list-style-type: none"> Cracking clay soils - vertosols Deep sandy soils - tenosols, rudosols Friable non-cracking clay or clay loam soils - dermosols, ferrosols Sand or loam over friable or earthy clay - chromosols, kurosols | <ul style="list-style-type: none"> Sand or loam over sodic clay - Sodosols, kurosols Eroded land - other Lagoon Steep Hill |
|--|--|



Source: Reid and Baker 1984, Thompson et al. 1990, © State of Queensland (Department of Environment and Science) 2021, © State of Queensland (Department of Resources) 2021, Updated data available at <https://qldspatial.information.qld.gov.au/catalogue/>

NRA Ref: 135037
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4.2 Watercourses and waterways

4.2.1 Methods

A desk-based assessment and field survey were conducted to assess the watercourse and waterway values applicable to the Project area. The desk-based assessment included a review of information from the following sources.

- Watercourse Identification Map (DRDMW 2021).
- Vegetation management watercourse/drainage mapping (DoR 2021a).
- Queensland Waterways for Waterway Barrier Works (WWBW) mapping (DAF 2016).
- Queensland Globe aerial imagery (accessed via: <https://qldglobe.information.qld.gov.au/qldglobe/>).

During the field survey, the presence of watercourses and waterways in the Project area was confirmed and observations were made on the presence of water, and bank stability/condition.

4.2.2 Description of environmental values

The environmental values of waterways and watercourses in Queensland are managed through the Queensland *Water Act* 2000 (Water Act), the Queensland *Vegetation Management Act* 1999 (VM Act) and the Queensland *Fisheries Act* 1994 (Fisheries Act).

The Project area is within the Haughton River and Lower Burdekin River sub-basins of the Burdekin Basin.

Watercourses and drainage features are defined in the Water Act. *Watercourses*, *drainage features* and *unmapped features* are shown on the Watercourse Identification Map (DRDMW 2021), presented on **Figure 3**. The unmapped features in the Project area are ephemeral, and drain to Haughton River (to the north), Barratta Creek and the Burdekin River, which are mapped watercourses.

Fifteen watercourses/drainage features are mapped by DoR (2021a) to intersect the Project area; of these, three have a stream order⁴ of five or greater. These include: Scott Creek (5th order), Barratta Creek (5th order) and Burdekin River (9th order). Vegetation associated with watercourses is defined as a Matter of State Environmental Significance (MSES)⁵ (regulated vegetation (defined watercourse)). The majority of the watercourse/drainage features assessed did not meet the definition of a watercourse under the Water Act.

WWBW mapping (DAF 2016) identifies 16 waterways intersecting the Project area, comprising one low, six moderate, three high and six major risk waterways (**Figure 4**).

Watercourses (including drainage features and unmapped features) and waterways intersecting the Project area were assessed at 20 sites during the field survey (**Figure 3**). Results of the field observations of watercourses and waterways in the Project area are in **Table 2**.

⁴ Stream order as defined by Strahler (1957). Smaller numbers are upstream, minor tributaries (closer to the source). Larger numbers are more significant watercourses (farther from the source).

⁵ Prescribed under the Queensland *Environmental Offsets Regulation* 2014.

Table 2: Field observation of watercourses and waterways

Site ID ^A	Latitude ^B	Longitude ^B	Wetland/linear feature	Type	Water present	Channel width (m)	Bank erosion	Riparian vegetation description	WIM category ^C	Stream order ^D	WWBW category ^E
WC1	-19.740959	147.085179	Linear feature	Natural; Ephemeral	Yes (standing)	15	Very little	Regional ecosystem (RE) 11.3.25b verified adjacent to watercourse. Riparian zone 20 m wide both sides of channel.	Unmapped	4	Major
WC2	-19.741489	147.085238	Linear feature	Natural; Ephemeral	No	1	Very little	None	Unmapped	-	-
WC3	-19.750146	147.086159	None present	-	-	-	-	-	Unmapped	1	Moderate
WC4	-19.759277	147.088073	None present	-	-	-	-	-	Unmapped	-	-
WC5	-19.792258	147.110937	Linear feature	Natural; Ephemeral	No	5	Very little	No riparian vegetation. RE 11.3.7/11.3.35 verified adjacent to watercourse. Riparian zone 2 m wide both sides of channel.	Unmapped	1	Moderate
WC6	-19.797460	147.115026	Linear feature	Natural; Ephemeral	Yes (standing)	8	Some (signs of pig and cattle)	<i>Lophostemon grandiflora</i> and <i>Melaleuca leucadendra</i> fringing creek line with <i>Arundinella</i> sp.; 2 m wide both sides of channel.	Unmapped	1	-
WC7	-19.800440	147.116712	Linear feature	Natural; Ephemeral	Yes (flowing)	15	Very little	RE 11.3.25b verified adjacent to watercourse. Riparian zone 20 m both sides of channel.	Unmapped	4	Major
WC8	-19.802840	147.118826	Linear feature	Natural; Ephemeral	No	12	None	RE 11.3.25b verified adjacent to watercourse. Riparian zone 15 m both sides of channel.	Watercourse	5 (Barratta Creek)	Major
WC9	-19.804671	147.120139	Wetland	Natural; Ephemeral	No	-	Some (signs of pig and cattle)	Wetland plants: <i>Monochoria vaginalis</i> , <i>Aeschynomene indica</i> , <i>Marsilea</i> sp., <i>Lophostemon grandiflora</i> nearby.	Unmapped	1	-
WC10	-19.805554	147.120866	Linear feature	Natural; Ephemeral	No	4	None	Riparian vegetation: <i>Pandanus</i> sp., <i>Lophostemon grandiflora</i> .	Unmapped	1	Moderate
WC11	-19.820309	147.132975	Linear feature	Natural; Ephemeral	Yes (standing)	5	None	Riparian vegetation: <i>Lophostemon grandiflora</i> and <i>Melaleuca leucadendra</i> .	Unmapped	1	Moderate
WC12	-19.833521	147.136523	Linear feature	Natural; Ephemeral	No	15	Very little	RE 11.3.25b verified adjacent to watercourse. Riparian zone 15 m both sides of channel.	Unmapped	5 (Scott Creek)	Major
WC13	-19.845476	147.142418	Linear feature	Natural; Ephemeral	Yes (standing)	5	None	Aquatic/riparian vegetation: <i>Nymphaea gigantea</i> , <i>Ludwigia</i> sp., <i>Melaleuca viridiflora</i> .	Unmapped	2	High
WC14	-19.863101	147.149475	Linear feature	Natural; Ephemeral	Yes (standing)	5	Some (signs of cattle)	RE 11.3.7 verified adjacent to watercourse. Aquatic plants (<i>Nymphaea gigantea</i>).	Unmapped	2	Moderate
WC15	-19.888455	147.191896	Wetland	Natural; Ephemeral	Yes (standing)	-	Some (signs of pig and cattle)	Aquatic vegetation: <i>Nymphaea gigantea</i> , <i>Oryza</i> sp., <i>Ludwigia</i> sp., <i>Marsilea</i> sp. Riparian area 5 m both sides of channel.	Unmapped	1	High
WC16	-19.894905	147.196897	Linear feature	Natural; Ephemeral	Yes (standing)	3	Very little (signs of cattle)	Aquatic vegetation: <i>Nymphaea gigantea</i> , <i>Ludwigia</i> sp.	Unmapped	1	Moderate
WC17	-19.909596	147.206310	Linear feature	Natural; Ephemeral	Yes (standing)	10	None	Aquatic vegetation: <i>Typha domingensis</i> , <i>Ludwigia</i> sp. Riparian area 2 m wide both sides of channel.	Unmapped	-	Low
WC18	-19.916060	147.211611	Linear feature	Natural; Ephemeral	No	10	Very little	Riparian vegetation: <i>Lophostemon grandiflora</i> , <i>Corymbia clarksoniana</i> , <i>Pleiogynium timorense</i> . Riparian zone 15 m wide on both sides.	Unmapped	3	High
WC19	-19.922485	147.213573	Wetland	Artificial; Permanent	Yes (standing)	-	None	Aquatic plants: <i>Aeschynomene indica</i> , <i>Nymphoides indica</i> , <i>Persicaria attenuata</i> .	-	-	Major
WC20	-19.926071	147.218796	Linear feature	Natural; Permanent	Yes (flowing)	350	Very little	RE 11.3.25f/11.3.25b verified adjacent to watercourse. Riparian zone 200 m wide both sides of channel.	Watercourse	9 (Burdekin River)	Major

^A Site ID as per **Figure 3**.^B WGS 84 datum.^C Categories mapped on the Watercourse Identification Map (WIM) (administered under the Water Act) (DRDMW 2021) include: watercourse, drainage feature and unmapped. Shown on **Figure 3**.^D Stream orders as mapped on the vegetation management watercourse/drainage mapping (administered under the VM Act) (DoR 2021a).^E Categories mapped on the Waterways for Waterway Barrier Works (WWBW) mapping (administered under the Fisheries Act) (DAF 2016) include: low, moderate, high and major risk waterways. Shown on **Figure 4**.

‘-’ indicates not applicable.

4.2.3 Potential impact and mitigation measures

Watercourses and waterways mapped on the Watercourse Identification Map (DRDMW 2021), vegetation management watercourse/drainage mapping (DoR 2021a) and WWBW mapping (DAF 2016) intersect the Project area. Construction of the Project will involve temporary disturbances to these watercourses and waterways. Potential impacts to the aquatic receiving environment as a result of the Project (before mitigation measures) include the following.

- The transport of sediment laden water into watercourses/waterways due to increased erosion in areas with exposed soils following earthworks and from stockpiles (particularly during rainfall events).
- The release of contaminants (particularly hydrocarbons that are stored in work areas or used in machinery) into watercourses/waterways.
- Reduction in the value of the aquatic receiving environment caused by littering with waste during construction works.
- Reduction in, or alteration of, surface water flow to watercourses/waterways through the modification of drainage.
- Waterway barriers impeding flow and/or migration of fish in mapped *Waterways for Waterway Barrier Works*.

Where possible, the construction activities will be undertaken to meet the accepted development requirements (ADRs) or exemption requirements for works in these areas. All early work activities should avoid watercourses and waterways.

Regulatory approvals or permits for these works may not be required where the Project can meet the requirements in the following documents.

- *Accepted development requirements for operational work that is constructing or raising waterway barrier works* (DAF 2018).
- *Riverine protection permit exemption requirements (WSS/2013/726)* (DNRME 2019).

Measures to manage the potential Project impacts on watercourses and waterways are provided below (where applicable these should be included in the Project CEMP).

- Recommendation 10:** Minimise disturbance to the bed and banks of watercourses/waterways using, where possible, existing disturbed crossings.
- Recommendation 11:** Ensure that pipeline trenching depth across watercourses/waterways is sufficient to avoid exposure of the pipeline as a result of river bed erosion and interference with the low flow of water.
- Recommendation 12:** Maintain buffer zones between soil stockpiles and drainage lines.
- Recommendation 13:** Implement a Project-specific Hazardous Material Storage and Handling Management Plan (or equivalent). This plan will detail how hazardous substances (particularly hydrocarbons used in machinery/vehicle operation) will be handled as per the relevant Australian Standards and away from watercourses/waterways, as required.
- Recommendation 14:** Store waste prior to transport and disposal off-site (including general refuse and hazardous waste) in designated areas away from watercourses/waterways as per the relevant Australian Standards, as required.

Recommendation 15: Obtain relevant development approvals or permits if accepted development and exemption requirements cannot be met, and implement actions to achieve compliance with conditions of the approval/permit.

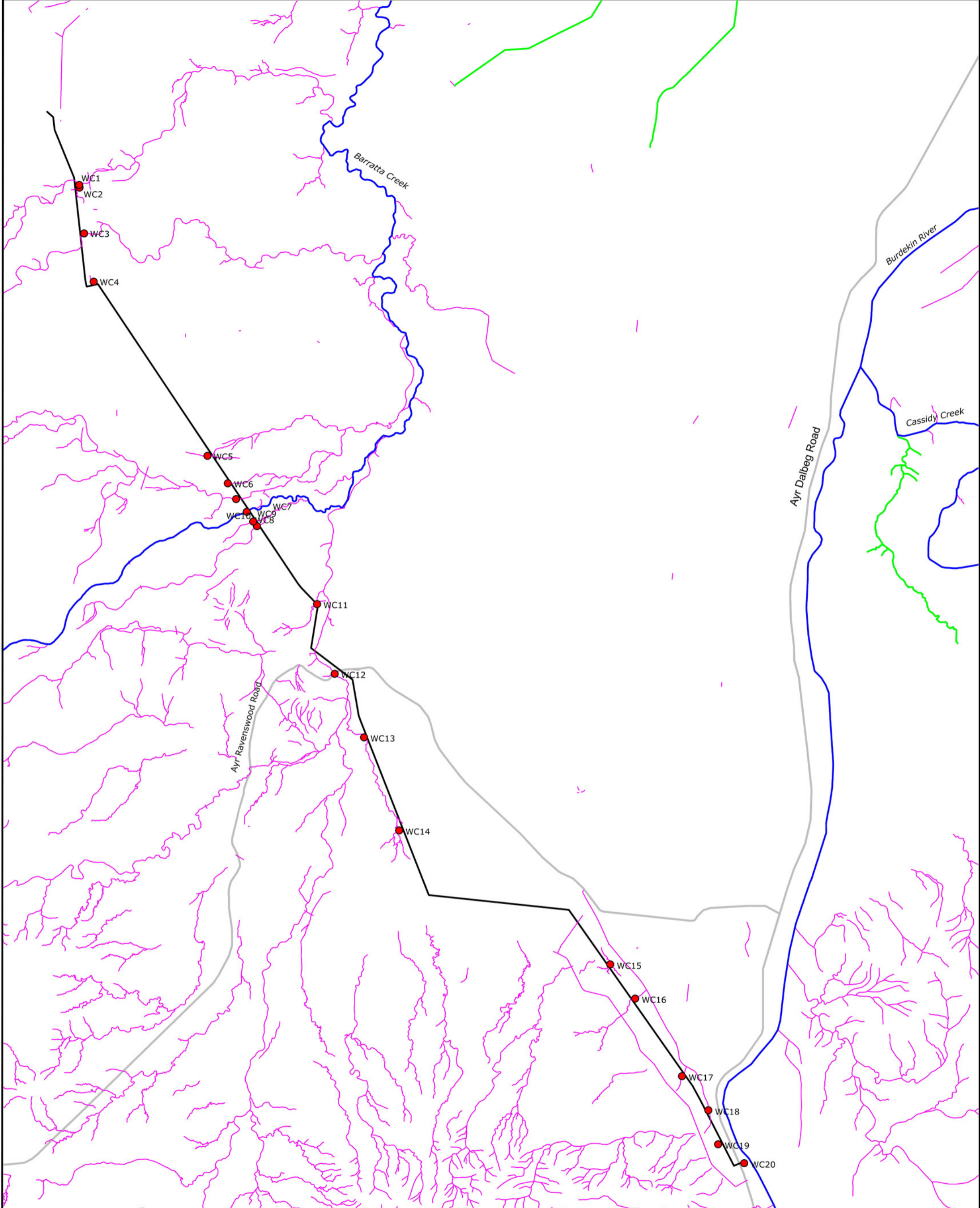






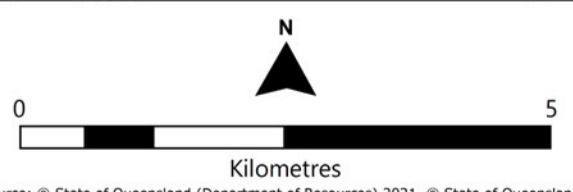


Figure 3: Assessment sites and Watercourse Identification Map
 Project: Haughton Pipeline Stage 2 Project: Environmental Analysis Report

-  Proposed alignment (May 2021)
-  Major road
-  Assessment sites

- Watercourse identification map category
-  Unmapped
 -  Watercourse
 -  Drainage Feature



Source: © State of Queensland (Department of Resources) 2021, © State of Queensland (Department of Regional Development, Manufacturing and Water) 2021. Updated data available at <https://qldspatial.information.qld.gov.au/catalogue/>

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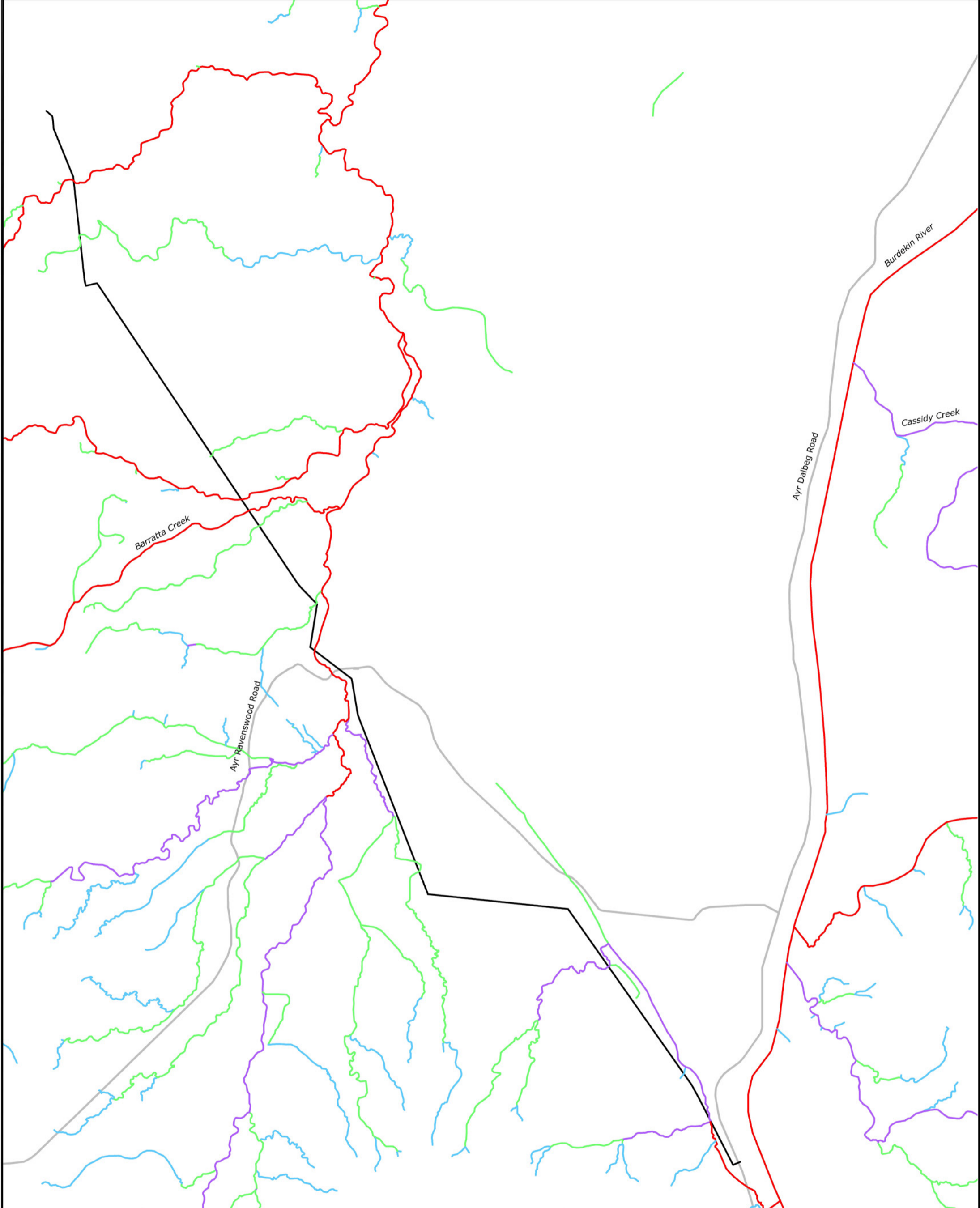
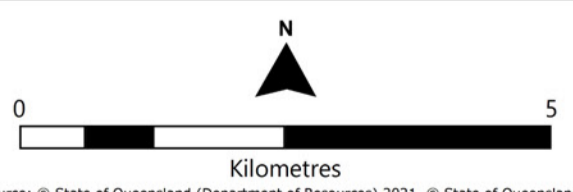


Figure 4: Waterways for waterway barrier works
 Project: Houghton Pipeline Stage 2 Project: Environmental Analysis Report

- Proposed alignment (May 2021)
 - Major road
-
- Waterways for waterway barrier works**
 - Low
 - Moderate
 - High
 - Major



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4.3 Wetlands

4.3.1 Methods

A desk-based assessment and field survey were conducted to assess the wetland values applicable to the Project area. The desk-based assessment included a review of information from the following sources. During the field survey, the locations of wetlands were confirmed.

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (DAWE 2021a). An EPBC Act Protected Matters Report was generated for an area within 20 km of a point central to the Project area (-19.82963, 147.13252) (**Appendix A**).
- Wetland protection area mapping (DES 2020a).
- Wetland data mapping (DES 2019b).
- Queensland Globe aerial imagery (accessed via: <https://qldglobe.information.qld.gov.au/qldglobe/>).
- Directory of Important Wetlands (DAWE 2021b).

4.3.2 Description of environmental values

The environmental values and legislative status of wetlands are assessed at international, national and state scales.

At the international scale, the Convention on Wetlands of International Importance (the Ramsar Convention) is an intergovernmental treaty that promotes national action and international cooperation on the conservation and wise use of wetlands and their resources (DAWE 2021c). At the national scale, the Directory of Important Wetlands in Australia (DIWA) identifies and classifies nationally important wetlands within three broad categories: marine and coastal zone wetlands, inland wetlands, and human made wetlands (DAWE 2021b). Ramsar wetlands are considered Matters of National Environmental Significance (MNES) and are protected under the EPBC Act.

The Queensland Government maps wetlands of high ecological significance (HES) and Wetland Protection Area (WPA) trigger areas (DES 2020a). WPA trigger areas are buffers of up to 500 m in rural areas and 100 m in urban areas that surround HES wetlands within the Great Barrier Reef (GBR) catchment. HES wetlands are MSES and are protected under State legislation.

The Queensland Government (DES 2019b) also maps other wetland values, *ie* marine, estuarine, riverine, lacustrine and palustrine waterbodies, and associated vegetation communities (Queensland Wetland Map, **Appendix B**).

No Ramsar wetlands are present in the Project area or in the immediate receiving environment. Bowling Green Bay Wetland, located (at its closest point) approximately 13 km north-east of the Project area, is a Ramsar wetland and is listed on the DIWA (**Appendix A**, DAWE 2021b).

Two DIWA mapped wetlands are present within, and adjacent to, the Project area (Queensland Wetlands of Importance map, **Appendix B**). The *Haughton Balancing Storage Aggregation - QLD200* is mapped to occur in the north of the Project area. This area was visited during the field survey and standing water was present. This wetland is an artificial wetland (*ie* classified as a human made wetland), which provides water storage for the Haughton Main Channel system. The *Barratta Channels Aggregation - QLD196* is mapped to occur in the centre of the Project area. The mapped area comprises a floodplain with a network of natural channels and drainage depressions extending from its southern extent near the Project area, over 30 km towards the coast. It is classified as both a coastal zone wetland and an inland wetland.

Watercourse assessments undertaken at WC11 and WC12 are within the mapped wetland area (**Figure 3, Table 2**). The DIWA listings for these wetlands are provided in **Appendix C**.

No HES wetlands or WPA trigger areas are mapped to occur within the Project area (DES 2020a). The closest mapped HES is approximately 1.1 km west of the Project area (the WPA trigger area for this wetland is 650 m west of the Project area) (**Figure 5**).

DES (2019b) mapping identified the following wetlands that correspond to the mapped watercourses/waterways discussed in **Section 4.2.2**. DES (2019b) mapping is provided in **Appendix B** (Queensland Wetland Map).

- Four riverine wetlands (*ie* WC1, 7, 8 and 12⁶ in **Table 2**).
- Three lacustrine wetlands (*ie* WC19 and 20 in **Table 2**, and the *Haughton Balancing Storage Aggregation - QLD200* DIWA wetland).

Other non-mapped wetlands were identified during the assessment of mapped watercourses at sites WC9 and 15 (**Figure 3, Table 2**).

4.3.3 Potential impact and mitigation measures

Surface water in the north of the Project area drains into the Haughton River, which flows east into the Bowling Green Bay Ramsar Wetland. Given the distance of the Project area to this wetland (approximately 13 km), and provided the recommendations below are implemented, it is not likely that Project construction will have significant impact on the Ramsar wetland.

Regulatory approvals or permits are required for activities within a WPA trigger area that meet the definition of ‘high impact earthworks’ under the Queensland *Planning Regulation 2017*. No construction activities are planned to occur within a WPA trigger area for this Project.

Project construction may involve temporary disturbance of riverine, lacustrine and DIWA wetlands. The following are potential impacts to wetlands in the Project area.

- Reduction in, or alteration of, surface water flow to wetlands through the modification of drainage.
- The transport of sediment laden water into wetlands due to increased erosion in areas with exposed soils following earthworks and from stockpiles.
- The release of contaminants (particularly hydrocarbons that are stored in work areas or used in machinery) into wetlands.
- Reduction in the value of the aquatic receiving environment caused by littering with waste during construction works.

To manage potential impacts to wetland areas, the following mitigation measures are recommended (where applicable these should be included in the Project CEMP). These recommendations are in addition to those already provided.

Recommendation 16: Excavated material associated with the trenching activities is to be restored, as far as practicable, to its original contours after the pipeline is established.

Recommendation 17: The site-specific ESCP (or equivalent) should incorporate additional protective safeguards for watercourses/waterways mapped as riverine, lacustrine or DIWA wetlands (Queensland Wetland Map, **Appendix B**).

⁶ This riverine wetland is also mapped as the *Barratta Channels Aggregation - QLD196* DIWA wetland.

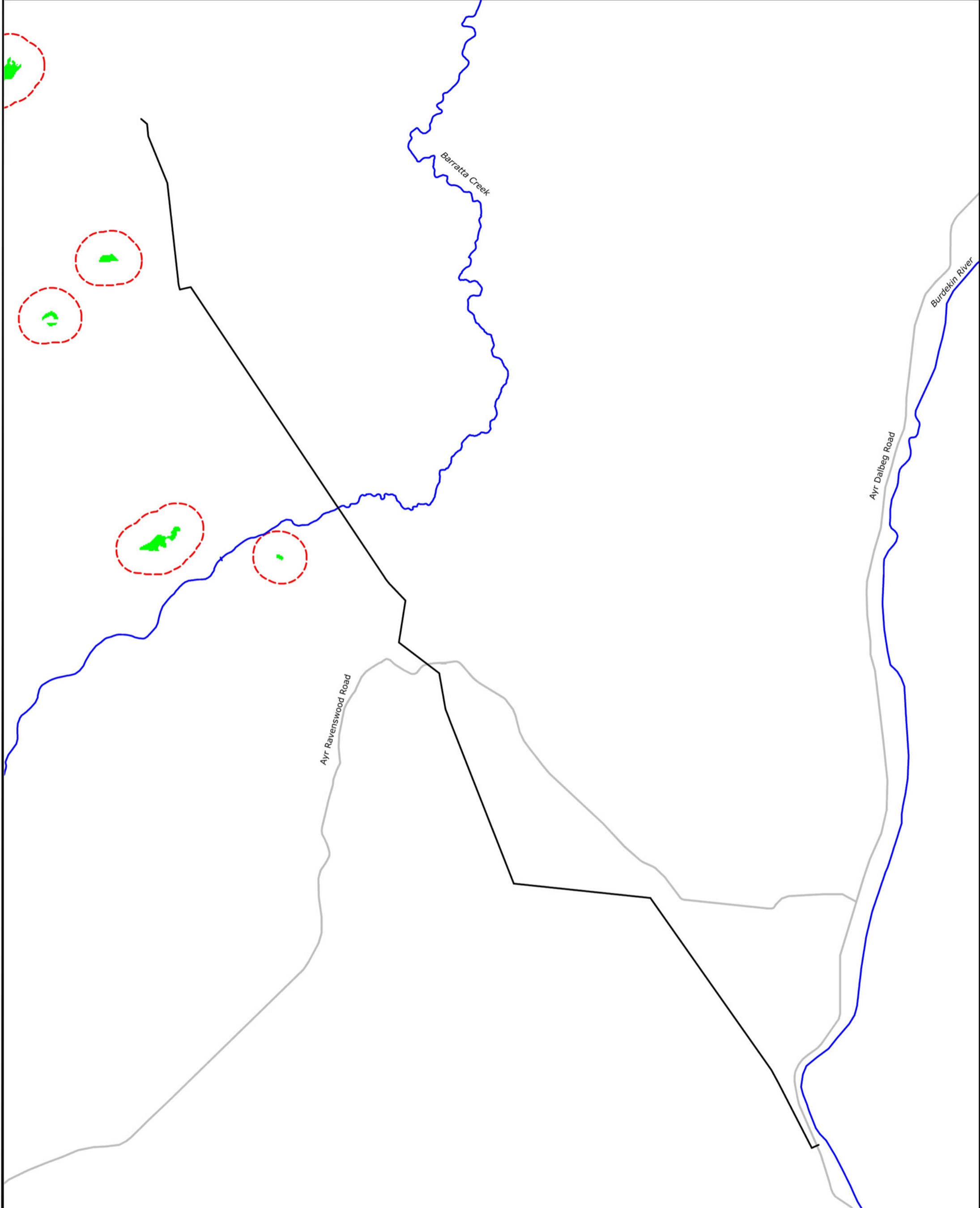





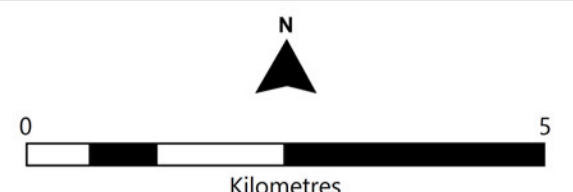


Figure 5: Wetlands of high ecological significance and wetland protection area trigger areas
 Project: Haughton Pipeline Stage 2 Project: Environmental Analysis Report

-  Proposed alignment (May 2021)
-  Major road
-  Major drainage
-  Wetlands of high ecological significance
-  Wetland protection area trigger area



Source: © State of Queensland (Department of Environment and Science) 2020, © State of Queensland (Department of Resources) 2021. Updated data available at <https://qldspatial.information.qld.gov.au/catalogue/>

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4.4 Flora

4.4.1 Methods

A desk-based assessment and field survey were conducted to assess the flora values in the Project area.

The desk-based assessment included a review of information from the following sources.

- Vegetation management Regional Ecosystem (RE) mapping (DoR 2021b).
- Vegetation management regulated vegetation mapping (DoR 2021c).
- Regional Ecosystem description database (DES 2021a).
- Protected Plants Flora Survey Trigger Map (DES 2019c, **Appendix D**).
- MSES environmental reports (DES 2021b, **Appendix E**)
- Results from searches of the following databases.
 - EPBC Act Protected Matters Search Tool (DAWE 2021a). An EPBC Act Protected Matters Report was generated for an area within 20 km of a point central to the Project area (-19.82963 147.13252) (**Appendix A**).
 - Wildlife Online database (DES 2021c). A report was generated for an area within 30 km of a point central to the Project area (-19.8296, 147.1325) (**Appendix F**).
 - Atlas of Living Australia database (ALA 2021). Review of T&NT species records near the Project area.
- Queensland Globe aerial imagery (accessed via: <https://qldglobe.information.qld.gov.au/qldglobe/>).

The following field survey tasks were completed.

- Targeted search for T&NT⁷ flora species and their habitats. The results of the desk-based assessment were used to identify potential species of interest.
- Targeted searches for weed (*ie* not-native flora) species with a focus on species that are listed under national, state, local or regional legislation, policy or guidelines.
- Field verification of Queensland Government RE mapping (DoR 2021b). Field verification of RE mapping in the Project area was undertaken by quaternary vegetation assessments (pursuant with Neldner *et al.* 2020). Thirty-two vegetation assessment sites were assessed across the Project area (**Figure 6**).
- A general flora species inventory was developed for all species encountered (**Appendix G**).

The field survey was undertaken on 21 April and 25–26 May 2021, at the end of the wet season. Flora species were generally visible and readily identifiable.

4.4.2 Description of environmental values

Overview

The Project area is in the Townsville Plains subregion of the Brigalow Belt North bioregion (Sattler & Williams 1999) and broadly contains open eucalypt woodlands, narrow tracts of riparian forests along major watercourses and cleared land. Remnant vegetation cover in the subregion is 69.02% (Accad *et al.* 2021) due to broad-scale clearing for agriculture and

⁷ Threatened (Critically Endangered, Endangered, Vulnerable) or Near Threatened species as listed under the EPBC Act and NC Act.

mining, mostly affecting vegetation on fertile soils. The majority of relatively undisturbed habitats occur on rugged parts of the landscape (DES 2018).

During the field survey, 111 flora species, including 51 native species, were identified; a list of these species is in **Appendix G**.

Vegetation communities

Regional ecosystems

REs are vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil (Sattler & Williams 1999). The REs mapped by the Queensland Government (DoR 2021b) as present in the Project area, and their regulatory status, are described in **Table 3**. The legislation and conservation status of each community is provided with reference to the following, and is current as at 30 June 2021.

- The EPBC Act, which lists Threatened Ecological Communities (TECs) as Vulnerable, Endangered or Critically Endangered. TECs are considered MNES and are protected under the EPBC Act.
- The VM Act, which categorises REs based on the remaining extent of the RE in the bioregion. REs are listed as Endangered, Of Concern or Least Concern.
- The Biodiversity Status (BD Status) of the REs according to the Queensland Department of Environment and Science. The BD Status is based on the extent of the REs in the bioregion, their condition, and the presence of threatening processes. REs are listed as Endangered, Of Concern or No Concern at Present.

According to the Queensland Government RE mapping (DoR 2021b), 11 different REs are mapped in the Project area⁸. These REs, are presented on **Figure 6** and in **Table 3**.

The mixed RE polygons mapped as RE11.3.4/11.3.25/11.3.13/11.3.25b on **Figure 6** (in the centre of the Project area) contain a dominant⁹ Of Concern RE (11.3.4) under the VM Act. These polygons are also identified in the MSES mapping: regulated vegetation (category B – endangered or of concern) (**Appendix E**, DES 2021b).

The Queensland Government RE mapping (DoR 2021b) was verified at 32 assessment sites during the field survey (**Figure 6**) and is reliable for its intended use. Potential opportunities for refinement of the mapping were identified. The potential opportunities for refinement of the RE mapping are discussed below, and the results from the quaternary vegetation assessments are provided in **Appendix H**.

The following opportunities for refinement of the mapping do not alter the legislative status of the vegetation communities.

- Site 38: remnant RE 11.3.7 is mapped by DoR (2021b). NRA field verified this area as remnant RE 11.3.35. The tree layers were dominated by *Eucalyptus platyphylla* (Poplar Gum).
- Site 39: remnant RE 11.3.9 is mapped by DoR (2021b). NRA field verified this area as remnant RE 11.3.35. The tree layers were dominated by Poplar Gum with *Corymbia tessellaris* (Moreton Bay Ash) present.

⁸ Some of the RE polygons in the DoR (2021b) mapping contain more than one RE code (*ie* mixed polygons).

⁹ This RE accounts for 60% of the mixed polygons.

- Site 43: remnant RE 11.3.9 is mapped by DoR (2021b). NRA field verified this area as remnant RE 11.3.7. The tree layers were dominated by Moreton Bay Ash, with Poplar Gum present.
- Site 46: remnant RE 11.3.7/11.3.9 is mapped by DoR (2021b). NRA field verified this area as remnant RE 11.3.35. The tree layers were dominated by Poplar Gum with *Corymbia clarksoniana* (Clarkson's Bloodwood) and Moreton Bay Ash present.
- Site 51: remnant RE 11.3.9 is mapped by DoR (2021b). NRA field verified this area as remnant RE 11.3.7. The tree layers were dominated by *Corymbia dallachiana* (Dallachy's Gum) with Moreton Bay Ash present.
- Site 52: remnant RE 11.3.35/11.3.30 is mapped by DoR (2021b). NRA field verified this area as remnant RE 11.3.7. The tree layers were dominated by *Corymbia* spp. with Poplar Gum present.

The following opportunities for refinement of the mapping may alter the legislative status of the vegetation communities. More detailed vegetation surveys would be required to confirm this, and determine the extent of these areas.

- Site 16 and site 19: remnant RE 11.12.1 is mapped by DoR (2021b). NRA field verified these area as non-remnant vegetation. The tree 1 (T1) layers were low (8–12 m) with *Grevillea striata* (Beefwood), Poplar Gum and *Eremophila mitchellii* (False Sandalwood).
- Site 17: regrowth RE 11.12.1 is mapped by DoR (2021b). NRA field verified this area as non-remnant vegetation. The tree layers and shrub layers were absent. The ground layer was dominated by *Panicum* sp. and weed species.
- Two small areas (one north of the alignment, and one in the centre of the alignment) mapped as remnant vegetation by DoR (2021b) (RE 11.3.7/11.3.9 and RE 11.3.35/11.3.10 respectively). These areas were identified as non-remnant cropping land by a review of the aerial imagery.

Regulated vegetation

Requirements for clearing vegetation in Queensland under the VM Act vary depending on the land tenure and regulated vegetation mapping (DoR 2021c). Regulated vegetation mapping comprises the following categories.

- **Category A:** eg declared areas, environmental offset areas and voluntary declaration areas.
- **Category B:** remnant vegetation areas.
- **Category C:** non-remnant areas of high-value regrowth vegetation.
- **Category R:** non-remnant areas of regrowth vegetation within 50 m of a watercourse or drainage feature in the GBR catchment areas.
- **Category X:** all other non-remnant vegetation areas.

The Project area contains Category B, Category R and Category X vegetation (**Figure 6**, DoR 2021c)¹⁰. The majority of the Project area is mapped as Category B vegetation, with smaller areas of Category X and Category R vegetation (see **Table 3**). Environmental approval requirements for the different categories of vegetation within the Project area are detailed in **Appendix K**.

¹⁰ Category C vegetation (mapped on **Figure 6**) occurs within 1 km of the proposed alignment but not in the Project area.

Areas mapped by DoR (2021c) as Category R vegetation are shown on **Figure 6**. These areas are identified in the MSES mapping: regulated vegetation (category R – GBR riverine) (**Appendix E**, DES 2021b).

Threatened Ecological Communities

TECs are communities that have been assessed and assigned a category related to the status of the threat to the community at a national scale. None of the vegetation communities mapped within the Project area are listed as TECs under the EPBC Act, and no TECs were observed during the field survey.

Table 3: REs mapped by the Queensland Government to occur in the Project area

RE Code ¹	Description ²	Status ³			Structure Category ⁴	Area (ha) and relative proportion of each RE in the Project area ⁵		
		VM Act	BD Status	EPBC Act		Regrowth (Category R)	Remnant (Category B)	Non-remnant (Category X)
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. woodland on alluvial plains	OC	OC	-	Sparse	0.73 (0.13%)	14.03 (2.44%)	-
11.3.7	<i>Corymbia</i> spp. open woodland on alluvial plains	LC	OC	-	Very sparse	-	0.99 (0.17%)	-
11.3.9	<i>Eucalyptus platyphylla</i> , <i>Corymbia</i> spp. woodland on alluvial plains	LC	NC	-	Sparse	-	1.18 (0.21%)	-
11.3.10	<i>Eucalyptus brownii</i> woodland on alluvial plains	LC	NC	-	Sparse	-	7.76 (1.35%)	-
11.3.13	<i>Grevillea striata</i> open woodland on coastal alluvial plains	OC	E	-	Very sparse	0.20 (0.04%)	24.37 (4.24%)	-
11.3.25	<i>Eucalyptus tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	LC	OC	-	Sparse	0.03 (0.01%)	50.46 (8.77%)	-
11.3.25b	<i>Melaleuca leucadendra</i> and/or <i>M. fluviatilis</i> , <i>Nauclea orientalis</i> open forest	LC	OC	-	Sparse	0.31 (0.05%)	127.55 (22.17%)	-
11.3.30	<i>Eucalyptus crebra</i> , <i>Corymbia dallachiana</i> woodland on alluvial plains	LC	NC	-	Sparse	-	2.32 (0.40%)	-
11.3.35	<i>Eucalyptus platyphylla</i> , <i>Corymbia clarksoniana</i> woodland on alluvial plains	LC	NC	-	Sparse	-	14.20 (2.47%)	-
11.3.35a	<i>Corymbia tessellaris</i> , <i>C. clarksoniana</i> and <i>Eucalyptus platyphylla</i> woodland	LC	NC	-	Sparse	0.96 (0.17%)	161.12 (28.01%)	-
11.12.1	<i>Eucalyptus crebra</i> woodland on igneous rocks	LC	NC	-	Sparse	0.18 (0.03%)	114.27 (19.87%)	-
Non-remnant	-	-	-	-	-	-	-	54.55 (9.48%)
Total	-	-	-	-	-	2.42 (0.42%)	518.26 (90.10%)	54.55 (9.48%)

¹ As per DoR (2021b) mapping.² Description from the Regional Ecosystem Description Database (DES 2021a).³ VM Status: Least Concern (LC), Of Concern (OC) or Endangered (E). BD Status: No Concern at Present (NC), Of Concern (OC) or Endangered (E). EPBC Act status (TECs): Vulnerable (V), Endangered (E) or Critically Endangered (CE).
-: not listed.⁴ Structure categories from the Regional Ecosystem Description Database (DES 2021a).⁵ Calculated using a 100 m buffer either side of the proposed alignment (the 200 m wide design corridor) from DoR (2021b) RE mapping. Regulated vegetation categories: Category R, Category B and Category X. Data may be subject to rounding errors.

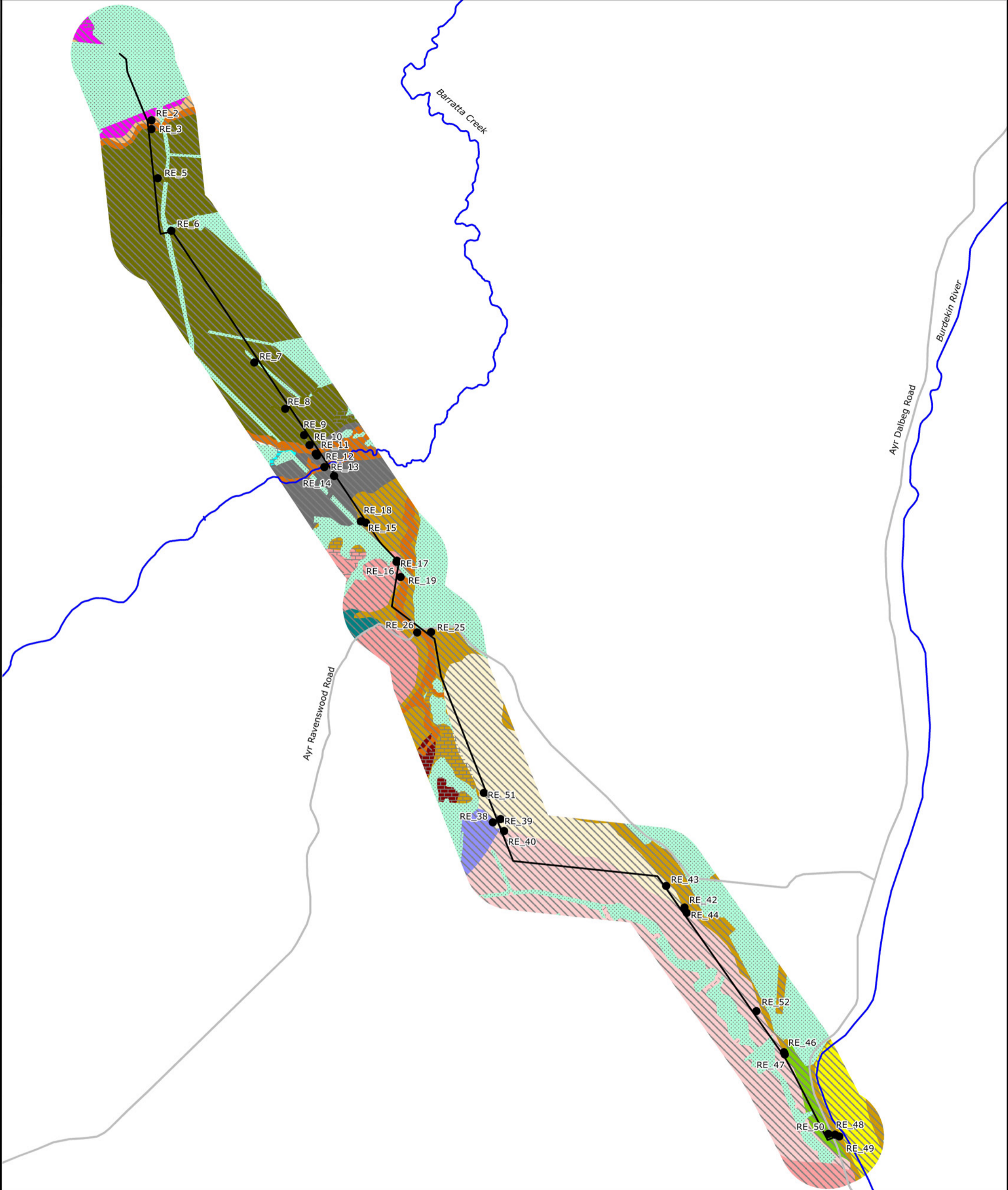


Figure 6: Vegetation assessment sites and Regional Ecosystems mapped by the Queensland Government
 Project: Houghton Pipeline Stage 2 Project: Environmental Analysis Report

<ul style="list-style-type: none"> Proposed alignment (May 2021) Major drainage Major road Vegetation assessment sites 	Regional Ecosystem mapping within 1km of the proposed alignment		<ul style="list-style-type: none"> B C R X 	 0 5 Kilometres	
	11.12.1	11.3.7			Source: © State of Queensland (Department of Resources) 2021. Updated data available at https://qldspatial.information.qld.gov.au/catalogue/ NRA Ref: 135037 Date: August 2021 <small>T:_Temp Mapping 2021\135\WOR\135037\135037_REs_210827</small>
	11.3.25b	11.3.7/11.3.25/11.3.25b			
	11.3.25f/11.3.25b	11.3.7/11.3.35			
	11.3.30/11.3.35	11.3.7/11.3.9			
	11.3.31	11.3.7/11.3.9/11.3.10/11.3.12			
	11.3.35/11.3.30/11.3.7	11.3.9			
	11.3.35a/11.3.10	11.3.9/11.3.12/11.3.7			
	11.3.4	non-remnant			
	11.3.4/11.3.25/11.3.13/11.3.25b				

Threatened and Near Threatened flora species

The Project area did not contain any ‘high risk’ areas on the *Protected Plants Flora Survey Trigger Map* (DES 2019c, **Appendix D**); therefore, the field survey did not need to comply with requirements of the *Flora Survey Guidelines* (DES 2020b).

Database searches identified six T&NT species that may occur in the Project area, or for which suitable habitat exists (DAWE 2021a, DES 2021c, ALA 2021). Information on these species and their likelihood of occurrence are provided in **Appendix I**.

No T&NT flora species were recorded during the field survey. One species has a ‘possible’ likelihood of occurrence: Black Ironbox (*Eucalyptus raveretiana*). This species is considered an MNES (*ie* listed threatened species) and is protected under the EPBC Act. A description of this species, and the suitability of habitats in the Project area to support it, is provided below. No other T&NT flora, or potential habitat for T&NT flora, were identified in the Project area during the field survey.

Black Ironbox

Black Ironbox (Vulnerable, EPBC Act; Least Concern, NC Act) is a large tree that occurs in riparian woodlands on alluvial flats along river banks on sandy and/or alluvial soils (DEWHA 2008). The species occurs in the region. The nearest record of the species is approximately 4 km north-west of the Project area along the Haughton River (NRA 2018). The next closest record is approximately 9 km south of the Project area along the Burdekin River (ALA 2021)¹¹. During the field survey, no Black Ironbox trees were found in the Project area; however, suitable habitat was identified along the Burdekin River including areas within the Project area. It is recommended that pre-clearing surveys in areas of potentially suitable habitat occur to assess the presence of Black Ironbox in the Project area.

Weed species

The desk-based assessment identified 81 weed species (*ie* species introduced to Queensland) as possibly occurring within the Project area. These species include the following weeds of management concern, which are considered to threaten socioeconomic and environmental values.

- Weeds of National Significance (WoNS).
- ‘Prohibited Matter’ or ‘Restricted Matter’ under the Queensland *Biosecurity Act* 2014 (Biosecurity Act).
- High priority species listed under local government biosecurity plans and regional pest management plans (BSC undated, NQ Dry Tropics 2014).

Sixty weed species were recorded during the field survey (**Appendix G**). Seventeen weeds of management concern were recorded (**Table 4**). Weeds of management concern, and their abundance at each vegetation assessment site, are presented in **Appendix J**.

Many weed species were abundant in the Project area. It is expected that the abundance and location of weed species may change between the time that the field survey was undertaken and the commencement of Project construction. It is recommended that a detailed weed survey be undertaken immediately prior to construction to confirm weed locations and the subsequent management for weed control. Ideally, the weed survey should be undertaken at a time when

¹¹ Records for this species near the Project area are not recent (*circa* 1950).

weeds are most likely to be present or have features required for identifying species *ie* soon after the wet season.

Nationally significant weeds

At the national level, the Commonwealth Government maintains a list of WoNS; this list currently comprises 32 species (Weeds Australia 2021). These species are listed based on their invasiveness, potential for spread, and environmental, social and economic impacts. Six WoNS were recorded during the field survey (**Table 4**).

State significant weeds

In Queensland, the Biosecurity Act provides the framework and powers for the management of biosecurity matters, including weed species. Landholders are required to comply with the general biosecurity obligation (GBO), which is defined under the Biosecurity Act as follows.

- Take all reasonable and practical steps to prevent or minimise each biosecurity risk.
- Minimise the likelihood of the risk causing a biosecurity event and limit the consequences of such an event.
- Prevent or minimise the adverse effects the risk could have and refrain from doing anything that might exacerbate the adverse effects.

The Biosecurity Act lists species as Prohibited Matter or Restricted Matter. Prohibited Matter is biosecurity matter that is not found in Queensland, but would have a significant adverse impact on our health, way of life, the economy or the environment if it entered the state. Restricted Matter is biosecurity matter found in Queensland and has a significant impact on human health, social amenity, the economy or the environment. There are seven categories of Restricted Matter, and a species may fall under more than one category.

Eleven Category 3¹² Restricted Matter species were observed during the field survey (**Table 4**).

Locally and regionally significant weeds

Local and regional pest management documents provide a resource for determining the significance of weed species at local scales. The documents relevant to the Project area are the *Regional Pest Management Strategy for the Burdekin Dry Tropics NRM Region 2014 – 2019* (RPMS BDT) (NQDT 2014) and the *Burdekin Shire Council Biosecurity Plan Draft v 2.0 2020-2025* (BSC Biosecurity Plan) (BSC undated).

- **RPMS BDT.** Of the weed species found during the field survey, 15 weed species are listed as ‘Priority species’ (**Table 4**).
- **BSC Biosecurity Plan.** Of the weed species found during the field survey, 10 weed species are listed as ‘Very High’ risk weeds (**Table 4**).

¹² A person who has Category 3 Restricted Matter in the person’s possession or under the person’s control must not distribute or dispose of the Restricted Matter unless the distribution or disposal meets the requirements of the Biosecurity Act.

Table 4: Weeds of management concern observed in the Project area during the field survey and their status

Species	Common name	Status			
		WoNS ¹	Biosecurity Act ²	RPMS BDT ³	BSC Biosecurity Plan ⁴
<i>Argyrea nervosa</i>	Woodrose	-	Category 3	-	-
<i>Cryptostegia grandiflora</i>	Rubber Vine	X	Category 3	Priority	Very High
<i>Grewia asiatica</i>	Grewia	-	-	Priority	-
<i>Hymenachne amplexicaulis</i>	Hymenachne	X	Category 3	Priority	Very High
<i>Jatropha gossypifolia</i>	Bellyache Bush	X	Category 3	Priority	Very High
<i>Lantana camara</i>	Lantana	X	Category 3	Priority	Very High
<i>Leucaena leucocephala</i>	Leucaena	-	-	Priority	Very High
<i>Opuntia stricta</i>	Prickly Pear	X	Category 3	Priority	-
<i>Parkinsonia aculeata</i>	Parkinsonia	X	Category 3	Priority	Very High
<i>Senna obtusifolia</i>	Sicklepod	-	Category 3	Priority	Very High
<i>Sporobolus jacquemontii</i>	American Rat's Tail Grass	-	Category 3	Priority	-
<i>Sporobolus natalensis/pyramidalis</i>	Giant Rat's Tail Grass	-	Category 3	Priority	Very High
<i>Stachytarpheta jamaicensis</i>	Jamaica Snakeweed	-	-	Priority	-
<i>Themeda quadrivalvis</i>	Grader Grass	-	-	-	Very High
<i>Vachellia farnesiana</i>	Mimosa Bush	-	-	Priority	-
<i>Xanthium occidentale</i>	Noogoora Burr	-	-	Priority	-
<i>Ziziphus mauritiana</i>	Chinee Apple	-	Category 3	Priority	Very High

¹ WoNS = Weeds of National Significance; 'X' indicates species listed as WoNS.

² Biosecurity Act = Queensland *Biosecurity Act* 2014 (Restricted Matter categories comprise: Category 1, Category 2, Category 3, Category 4, Category 5, Category 6 and Category 7).

³ RPMS BDT = *Regional Pest Management Strategy 2014 - 2019 for the Burdekin Dry Tropics* (NQDT 2014) (categories comprise: Priority and Alert).

⁴ BSC Biosecurity Plan = *Burdekin Shire Council Biosecurity Plan Draft v 2.0 2020-2025* (BSC undated) (categories comprise: Very High, High and Medium risk).

4.4.3 Potential impact and mitigation measures

Construction activities (as described in **Section 2.2**) associated with the Project pose the following direct and indirect threats to flora values.

- **Direct threats** are vegetation clearing and the loss of habitat for flora species. Direct threats include the following.
 - Clearing of T&NT flora species during construction. The Project area incorporates potential habitat for the T&NT flora species Black Ironbox. Although this species was not found in the Project area during the field survey, additional surveys are recommended to assess its presence in the Project area.
 - Clearing of regulated vegetation during construction works. Category B and Category R regulated vegetation is present in the Project area. Remnant REs in the Project area are classified as Least Concern and Of Concern under the VM Act.
- **Indirect threats** are secondary threats that may occur as a result of the Project. Their impacts may extend beyond the development footprint and may include the following.
 - Habitat alteration and degradation as a result of weed ingress and ground disturbance. The Project area contains several weed species, including species of management concern. The risk of spreading these weed species across the Project area is high given:
 - weed species are present (and, in some areas, abundant) throughout the Project area
 - weeds and weed seeds may be spread easily by the movement of vehicles
 - weed species are quick to establish.
 - Fugitive dust smothering vegetation, reducing plant health in the immediate receiving environment.

At this stage of the Project, detailed designs (*ie* a final clearing area) are not available, so it is not possible to quantify the potential magnitude of impact that may result from the threats. Potential direct threats on flora values are predominantly associated with planned vegetation clearing. Some indirect threats may be short-term and localised (*eg* fugitive dust), whereas others, if not properly managed, may cause severe and/or irreversible impacts at the site, local and regional scales (*eg* biosecurity incursions).

Measures to manage the potential impacts on flora values are provided below (where applicable these should be included in the Project CEMP). These recommendations are in addition to those already provided.

Recommendation 18: Vegetation clearing will be limited to the width of the construction corridor. In defining the location of the construction corridor, the following should occur:

- minimise the area of Category B and Category R vegetation to be cleared for the Project, especially across major watercourses and near large mature trees (if practicable)
- minimise the areas of Of Concern (VM Act status) REs to be cleared for the Project (especially across watercourses)

Recommendation 19: Access roads, parking, laydown, stockpiling areas and camps (if needed) should occur (where possible) in previously cleared areas to avoid the need to clear additional remnant vegetation in the Project area.

Recommendation 20: A flora survey to confirm presence of T&NT flora species Black Ironbox in areas of potentially suitable habitat (*ie* riparian

vegetation along Burdekin River) should be commissioned by the construction contractor as part of pre-construction activities (*ie* the pre-clearance survey).

- Recommendation 21:** Obtain an operational works permit for clearing native vegetation (VM Act) for applicable areas.
- Recommendation 22:** A formal weed survey should be commissioned by the construction contractor as part of pre-construction activities to confirm weed presence along the pipeline alignment and ancillary areas. The survey should occur soon after the wet season and immediately prior to construction.
- Recommendation 23:** A Project Weed and Pest Management Plan (or equivalent) should be developed and implemented. The Plan must include management direction taken from the Biosecurity Act and regional biosecurity plans and pest management plans (NQDT 2014, BSC undated).
- Recommendation 24:** Where clearing activities involve disturbing topsoil from known weed infestation areas, this soil material should be quarantined and not used in rehabilitation. The soil contaminated with weed seeds can be buried to a depth of at least 1 m below ground surface.
- Recommendation 25:** Conserve and stockpile topsoil and seed-bearing vegetation for use in rehabilitation.

4.5 Fauna

4.5.1 Methods

A desk-based assessment and field studies were conducted to assess the fauna values applicable to the Project area. The desk-based assessment included a review of information from the following sources.

- Queensland Government Broad Vegetation Group (BVG) mapping (1:2 M) (DES 2021d).
- Vegetation management essential habitat mapping (DoR 2021d).
- Results from searches of the following databases.
 - EPBC Act Protected Matters Search Tool (DAWE 2021a). An EPBC Act Protected Matters Report was generated for an area within 20 km of a point central to the Project area (-19.82963 147.13252) (**Appendix A**).
 - Wildlife Online database (DES 2021c). A report was generated for an area within 30 km of a point central to the Project area (-19.8296 147.1325) (**Appendix F**).
 - Atlas of Living Australia database (ALA 2021). Review of T&NT species records near the Project area.

The following field survey tasks were completed.

- Searches for, and assessment of, potential habitat for T&NT, Migratory and Special Least Concern fauna species.

- Deployment and collection of full-spectrum acoustic bat detectors to assess the presence of T&NT micro-bat species, including Bare-rumped Sheath-tailed Bat (*Saccolaimus saccolaimus nudicluniatus*)¹³.
- Ascertaining the presence of important fauna breeding and roosting places.
- Compiled a general fauna species inventory for all species encountered.

The field survey was undertaken on 21 April and 25–26 May 2021, at the end of the wet season. Three acoustic bat detectors (**Figure 8**) were deployed on 25 (one detector) and 26 (two detectors) May 2021, and were collected on 4 June 2021. Conditions during the survey were suitable for detecting fauna.

4.5.2 Description of environmental values

Overview

Sixty-six fauna species were identified during the field survey (**Appendix G**).

Fauna habitats

Broad vegetation groups

The following BVGs (1:2M) are mapped by the Queensland Government (DES 2021d) to occur in the Project area. Descriptions are as per Neldner *et al.* (2019).

- *BVG 9: Moist to dry eucalypt open forests to woodlands usually on coastal lowlands and ranges.*
 - Widespread in the Project area, occurs throughout most of the low-lying areas.
- *BVG 13: Dry to moist eucalypt woodlands and open forests, mainly on undulating to hilly terrain of mainly metamorphic and acid igneous rocks.*
 - Localised, occurs in the centre of the Project area on lower hill slopes.
- *BVG 16: Eucalyptus spp. dominated open forest and woodlands drainage lines and alluvial plains.*
 - Occurs in the centre of the Project area on floodplains near drainage lines, and in the south of the Project area in the Burdekin River channel.
- *BVG 18: Dry eucalypt woodlands to open woodlands primarily on sandplains or depositional plains.*
 - Localised, occurs in the south of the Project area, adjacent to riparian vegetation fringing the Burdekin River.
- *BVG 22: Melaleuca spp. on seasonally inundated open forests and woodlands of lowland coastal swamps and fringing drainage lines (palustrine wetlands).*
 - Occurs along drainage channels throughout the centre and north of the Project area.

Habitat features

Notable habitat features in the Project area include:

- variable light conditions, including areas of full sun, dappled shade and deep shade
- dense ground cover comprising living plants, leaf litter and coarse woody debris (including fallen trees)
- complex vegetation structure including dense canopy and shrub layers in riparian areas
- an abundance of hollow-bearing trees

¹³ The survey achieved the minimum survey effort recommended in the Australian Government survey guidelines for threatened bats (*ie* 16 detector nights) (DEWHA 2010).

- ephemeral and permanent sources of surface water (watercourses and wetlands)
- a diversity and abundance of flowering plants
- a variety of land surface conditions and soil types
- presence of mistletoes.

Condition

The condition of fauna habitats in the Project area was varied. The influence of cattle grazing and fire was evident; in some areas these actions have had negative impacts on habitats. Some degree of weed ingress was present throughout the Project area. Weeds were dominant in the ground layers and shrub layers at most sites assessed. Tree layers were dominated by native species.

Essential habitat

Essential habitat for the following species is mapped by the Queensland Government (DoR 2021d) in or near the Project area and shown on **Figure 7**. Essential habitat is an MSES (**Appendix E**).

- Estuarine Crocodile (*Crocodylus porosus*): areas within the Project area (in the centre), and upstream of Project area (along Burdekin River).
- Koala (*Phascolarctos cinereus*): an area-south west of the Project area.
- Bare-rumped Sheathtail Bat: areas the north-west of the Project area.

The likelihood of occurrence assessment for these species is provided in **Appendix I**. Essential habitat mapping is created using sighting records held by the Queensland Government and does not accurately portray the extent of potentially suitable habitat for these species.

Estuarine Crocodile and Bare-rumped Sheathtail Bat are discussed in more detail below. Koala is not considered likely to occur in or near the Project area. The essential habitat mapping is based on a single, old (1987) sighting, and no recent records of Koala are present in the vicinity of the Project area (ALA 2021). Koala is present on Magnetic Island, though no permanent populations are known to occur in the Townsville mainland.

Important breeding and roosting places

Hollows occur in the mature Eucalypt/Corymbia species, in the larger *Melaleuca* spp. (eg *M. leucadendra* and *M. fluviatilis*) and in dead trees in the Project area. The hollows vary in size and structure according to:

- the age and size of the tree
- the tree species
- historical influences such as fires, storms and insect activity.

Some of these hollows may provide a breeding or roosting place for a variety of fauna, including T&NT species such as the Bare-rumped Sheathtail Bat and Southern Black-throated Finch (*Poephila cincta cincta*).

No large or significant bird nests or other obvious breeding places were observed during the field survey.

Threatened and Near Threatened fauna species

Database searches identified 21 T&NT fauna species that may occur in the Project area, or for which suitable habitat exists (DAWE 2021a, DES 2021c, ALA 2021). Information on these species and their likelihood of occurrence are provided in **Appendix I**.

One T&NT fauna species was possibly recorded during the field survey, but it could not be confirmed (this species has a probable likelihood of occurrence):

- Bare-rumped Sheathtail Bat: Vulnerable, EPBC Act; Endangered, NC Act.

No other T&NT fauna species were recorded during the field survey; however, the following species have the potential to occur. Further survey work over different seasons and employing different survey techniques would be required to confirm the presence/absence and distribution of these species in the Project area.

- Probable likelihood of occurrence: three species.
 - Southern Black-throated Finch: Endangered, EPBC Act and NC Act.
 - Squatter Pigeon (southern subspecies) (*Geophaps scripta scripta*): Vulnerable, EPBC Act and NC Act.
 - White-throated Needletail (*Hirundapus caudacutus*): Vulnerable and Migratory, EPBC Act; Vulnerable, NC Act.
- Possible likelihood of occurrence: one species.
 - Estuarine Crocodile: Migratory, EPBC Act; Vulnerable, NC Act.

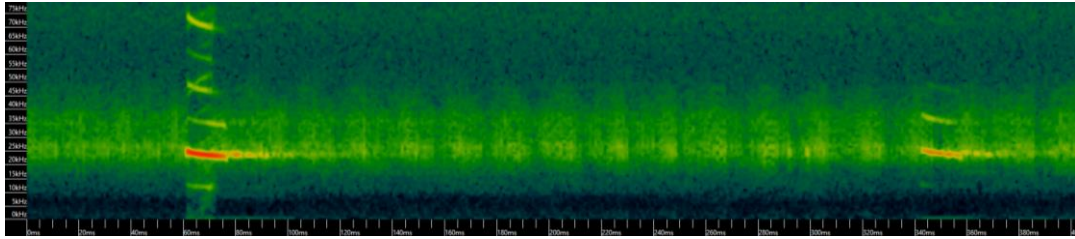
A description of each species, and the suitability of habitats in the Project area to support the species, is provided below. These species are considered MNES (*ie* listed threatened or migratory species) and are protected under the EPBC Act.

Bare-rumped Sheathtail Bat

The Bare-rumped Sheathtail Bat is a poorly known species. In north-east Queensland it is primarily found in near-coastal areas. It is insectivorous and preferentially forages above the tree canopy in eucalypt forests and woodlands (Woinarski *et al.* 2014). However, it has been recorded foraging above a variety of habitat types, along forest edges and large clearings, and over modified habitats including agricultural areas (Churchill 2008, Lumsden 2017). Bare-rumped Sheathtail Bats have been recorded roosting during the day in tree hollows, with large diameter, deep chambered, hollows being preferred (Compton & Johnson 1983, Murphy 2002, Churchill 2008, Milne & Pavay 2011, Reside *et al.* 2015). Only a few roost sites have been documented for this species in Australia, with the species recorded roosting in Poplar Gum, Darwin Stringybark (*Eucalyptus tetradonta*), Weeping Tea-tree (*Melaleuca leucadendra*) and Moreton Bay Ash. Roosts may be used regularly, but individuals may use multiple roosts, and numbers at a roost site may vary temporally (Woinarski *et al.* 2014).

The Bare-rumped Sheathtail Bat is likely to occur above all habitats in the Project area, and some hollow-bearing trees may contain roosting bats or suitable roosting habitat. Areas likely to contain suitable roosting habitat within and outside of the Project area are shown on **Figure 8**. Several sheathtail bat (*Saccolaimus* sp.) calls were recorded at acoustic bat detectors in the south and centre of the Project area (**Figure 8**). These calls could represent either the Bare-rumped Sheathtail Bat or the Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*)¹⁴ (**Graph 2**). The locations where calls were recorded contain suitable foraging and roosting habitat for the species.

¹⁴ Least Concern conservation status under the NC Act.



Graph 2: Sonagram showing detection of *Saccolaimus* sp. from an Anabat audio recording in the south of the Project area

Southern Black-throated Finch

Southern Black-throated Finch is restricted to Queensland, with subpopulations in the central and northern Desert Uplands, southern Einasleigh Uplands, southern Wet Tropics and northern Brigalow Belt bioregions (Buosi *et al.* in press). Townsville supports one of the largest subpopulations of Southern Black-throated Finch. This species inhabits open woodlands, woodlands and open forests (usually dominated by *Eucalyptus* sp. or *Melaleuca* sp.) where there is access to seeding grasses and water (Mula-Laguna *et al.* 2019, Buosi *et al.* in press). They appear to feed preferentially on fallen seeds of grasses, sedges and legumes, including both native and introduced species, in grassy areas where the ground layer is not dense (Zann 1976, Mitchell 1996, NRA 2005, 2007, 2011, Rechetelo *et al.* 2016, Mula-Laguna *et al.* 2019, Buosi *et al.* in press). Southern Black-throated Finches nest in the branches and small hollows of trees and shrubs, favouring Poplar Gum and Broad-leaf Tea-tree (*Melaleuca viridiflora*) in the Townsville region.

Populations of this species are known to occur near the Project area. An area along the Haughton River (directly adjacent to the north of the Project area) is mapped as an ‘important area’ for this species in DEWHA (2009). Some areas of remnant vegetation within the Project area were consistent with habitats that Southern Black-throated Finches are known to occur in. Other areas within the Project area were in poor condition, with frequent signs of heavy grazing and/or a high abundance of weeds that form a dense ground cover and are unfavourable to Southern Black-throated Finches (eg Shrubby Stylo (*Stylosanthes scabra*) and Joyweed (*Alternanthera ficoidea*). Areas likely to contain suitable habitat within and outside of the Project area are shown on **Figure 9**¹⁵.

Squatter Pigeon

In north Queensland, Squatter Pigeon (southern subspecies) is known to occur south of the Burdekin-Lynd divide (in the southern region of the Cape York Peninsula), and from the east coast to Hughenden. Nesting and primary food resources for Squatter Pigeon generally occur in open-forest to woodland communities with patchy (*ie* approximately 33% ground cover) tussock-grassy understories growing on well-draining gravelly, sandy or loamy soils within 1 km of a permanent waterbody (Squatter Pigeon Workshop 2011). The majority of the Project area, including areas mapped as non-remnant vegetation, constitutes potentially suitable foraging and nesting habitat. Resident and transient populations of Squatter Pigeon (small flocks) may occur in and near to the Project area—in woodlands, open woodlands and non-remnant vegetation, and favouring the more sparsely grassed areas (due to natural conditions or disturbance) near water.

¹⁵ Suitable habitat was categorised using RE mapping (DoR 2021b) and refined based on aerial imagery and the results of the field survey. Additional survey work would be required to further refine this mapping.

White-throated Needletail

The White-throated Needletail breeds in north-eastern Asia, migrating when non-breeding to spend the spring and summer months in Australia (Menkhorst *et al.* 2019). The species spends most its time in flight, foraging on insects above a variety of habitat types. In the region, flocks often pass before a storm at the start of the wet season but are otherwise scarce. The species feeds above any habitat, and no areas of core habitat are identifiable in the Project area. The Project area is unlikely to support breeding populations or habitat. Its presence is likely to be sporadic and temporary.

Estuarine Crocodile

Estuarine Crocodile occurs in salt, brackish and fresh water bodies across northern and eastern Queensland. Its primary food sources are crustaceans, insects and mammals (DAWE 2021d). Populations extend inland along major waterways. Individuals may, on rare occasions, range along the Burdekin River in the vicinity of the Project area.

Migratory and Special Least Concern fauna species

Database searches identified 22 Migratory and/or Special Least Concern fauna species that may occur in the Project area, or for which suitable habitat exists (DAWE 2021a, DES 2021c, ALA 2021). Information on these species and their likelihood of occurrence are in **Appendix I**.

No Migratory or Special Least Concern fauna species were recorded during the field survey; however, the following species have the potential to occur. Further survey work over different seasons and employing different survey techniques would be required to confirm the presence/absence and distribution of these species in the Project area.

- Probable likelihood of occurrence: two species.
 - Fork-tailed Swift (*Apus pacificus*): Migratory, EPBC Act; Special Least Concern, NC Act.
 - White-throated Needletail (discussed above).
- Possible likelihood of occurrence: seven species.
 - Eastern Osprey (*Pandion cristatus* (*Pandion haliaetus*)): Migratory, EPBC Act; Special Least Concern, NC Act.
 - Black-faced Monarch (*Monarcha melanopsis*): Migratory, EPBC Act; Special Least Concern, NC Act.
 - Spectacled Monarch (*Symposiachrus trivirgatus trivirgatus*): Migratory, EPBC Act; Special Least Concern, NC Act.
 - Rufous Fantail (*Rhipidura rufifrons*): Migratory, EPBC Act; Special Least Concern, NC Act.
 - Oriental Cuckoo (*Cuculus optatus*): Migratory, EPBC Act; Special Least Concern, NC Act.
 - Short-beaked Echidna (*Tachyglossus aculeatus*): Special Least Concern, NC Act.
 - Estuarine Crocodile (discussed above).

A description of each species, and the suitability of habitats in the Project area to support the species, is provided below. These species (other than Short-beaked Echidna) are considered MNES (*ie* listed threatened or migratory species) and are protected under the EPBC Act.

Fork-tailed Swift

Fork-tailed Swift is a non-breeding visitor to Australia (Higgins 1999). Flocks may pass through the region at any time during the wet season. The species feeds above any habitat, and

no areas of core habitat are identifiable in the Project area. Its presence is likely to be sporadic and temporary.

Eastern Osprey

Eastern Osprey is common in coastal areas of north Queensland. It favours littoral habitats, river mouths and terrestrial wetlands, occasionally occurring farther inland along major rivers. It may range along the Burdekin River in/near to the Project area.

Black-faced Monarch

Black-faced Monarch is a passage migrant (March/April and September/October) through lowlands of the region (mainly in rainforest ecosystems). It is likely to be an infrequent visitor to the Project area, favouring riparian forests and nearby woodland habitat.

Spectacled Monarch

Spectacled Monarch is generally a winter migrant to the region, preferring dense vegetation types (eg vine forests and dense woodland) (Wieneke 1989). It is likely to be an infrequent visitor to the Project area, favouring larger riparian forests and nearby woodland habitat.

Rufous Fantail

Rufous fantail is a summer migrant to the region, often occurring in tropical rainforests. It can also be found in vine thickets (especially along creeks). Within the Project area, preferred habitat occurs along the larger riparian forests and nearby woodlands.

Oriental Cuckoo

Oriental Cuckoo is primarily a summer migrant, occurring in dense vegetation such as rainforest margins, vine thickets and mangroves. It is likely to be an infrequent visitor to the Project area, favouring riparian forests and nearby woodland habitat.

Short-beaked Echidna

This species is Australia's most widespread native mammal, occurring in almost all habitats, eg various open woodland types, savannah, semi-arid and arid areas, and rainforest. Short-beaked Echidnas shelter and/or forage among rocks, hollow logs, within shrubs and tussocks of grass, and burrow into the soil (Nicol & Anderson 2007, Aplin *et al.* 2016). All areas of remnant vegetation in the Project area are suitable for this species.

Pest fauna

The desk-based assessment identified 22 pest fauna species (*ie* species introduced to Queensland) as possibly occurring within the Project area. These include the following species considered to threaten socioeconomic and environmental values.

- 'Prohibited Matter' or 'Restricted Matter' under the Biosecurity Act.
- High priority species listed under local government biosecurity plans and regional pest management plans (BSC undated, NQDT 2014).

Two pest fauna species were recorded during the field survey.

- Feral Pig (*Sus scrofa*).
 - Evidence of pig activity was widely observed in wetland/riparian areas, which provide ideal habitat for this species.
- European Rabbit (*Oryctolagus cuniculus*).
 - Signs were observed in the centre of the Project area in open woodland habitat.

Feral Pig and European Rabbit are Categories 3, 4, 5 and 6 Restricted Matter under the Biosecurity Act¹⁶, and priority species in the RPMS BDT (NQDT 2014). Additionally, Feral Pigs are Very High risk species in the BSC Biosecurity Plan (BSC undated).

¹⁶ These categories are defined as follows.

- Category 3: A person who has Category 3 Restricted Matter in the person's possession or under the person's control must not distribute or dispose of the Restricted Matter unless the distribution or disposal meets the requirements of the Act.
- Category 4: A person must not move, or cause or allow to be moved, Category 4 Restricted Matter, unless the moving is for the purposes of its identification by, or at the request of, a relevant entity as defined by the Act.
- Category 5: A person must not keep in the person's possession or under the person's control Category 5 Restricted Matter, unless the keeping is for the purposes of its identification by, or at the request of, a relevant entity as defined by the Act.
- Category 6: A person must not give food to a Category 6 Restricted Matter unless the feeding is carried out in preparation for, or in the course of, lawfully baiting, trapping or shooting the Category 6 Restricted Matter.

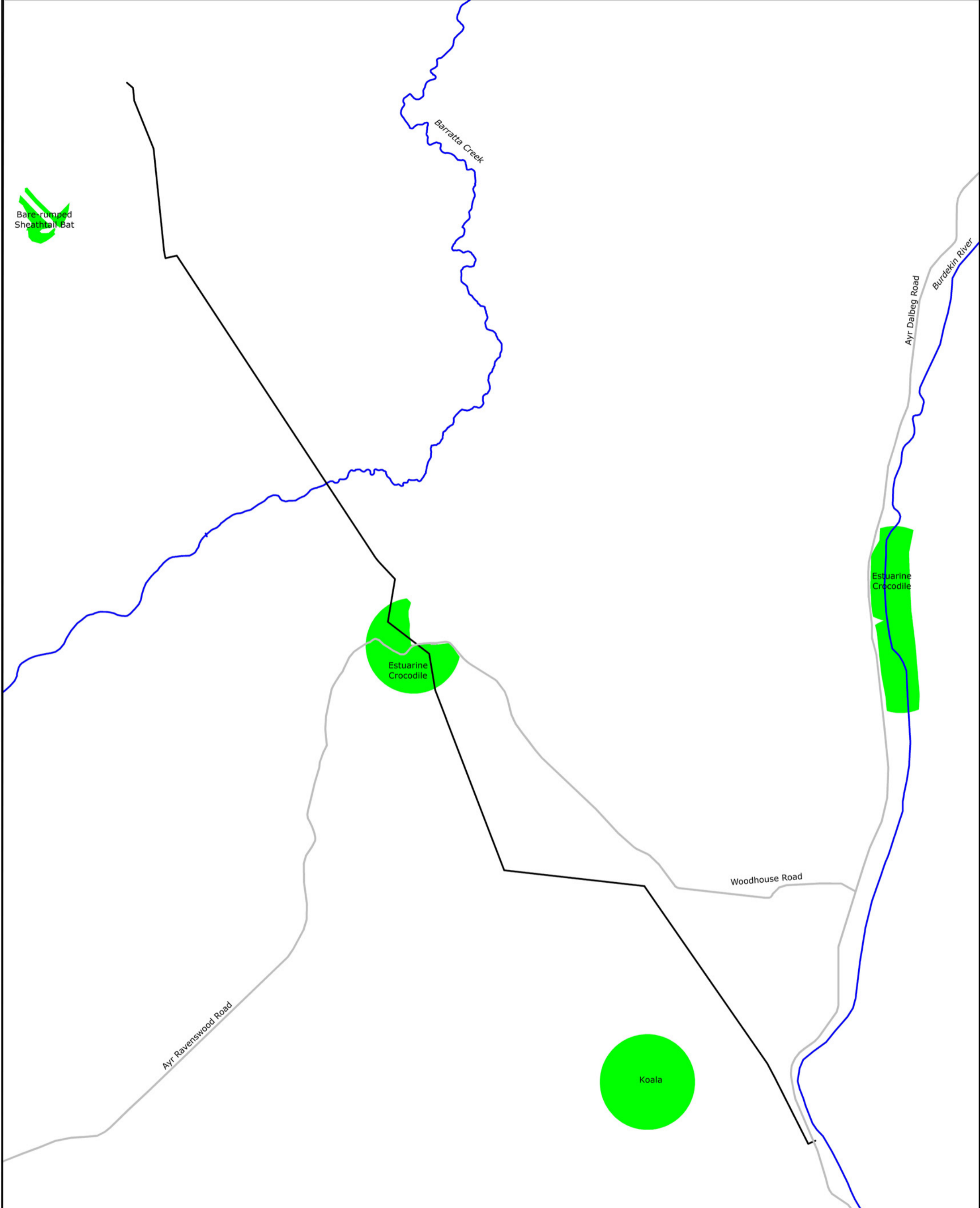
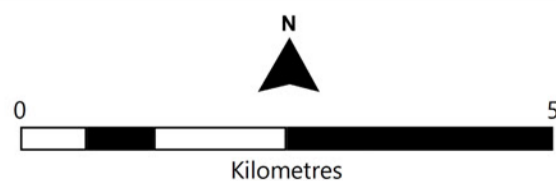


Figure 7: Essential habitat map
 Project: Haughton Pipeline Stage 2 Project: Environmental Analysis Report

-  Proposed alignment (May 2021)
-  Major road
-  Major drainage
-  Essential Habitat



Source: © State of Queensland (Department of Resources) 2021, Updated data available at <https://qidsatial.information.qld.gov.au/catalogue/>

NRA Ref: 135037
 Date: August 2021



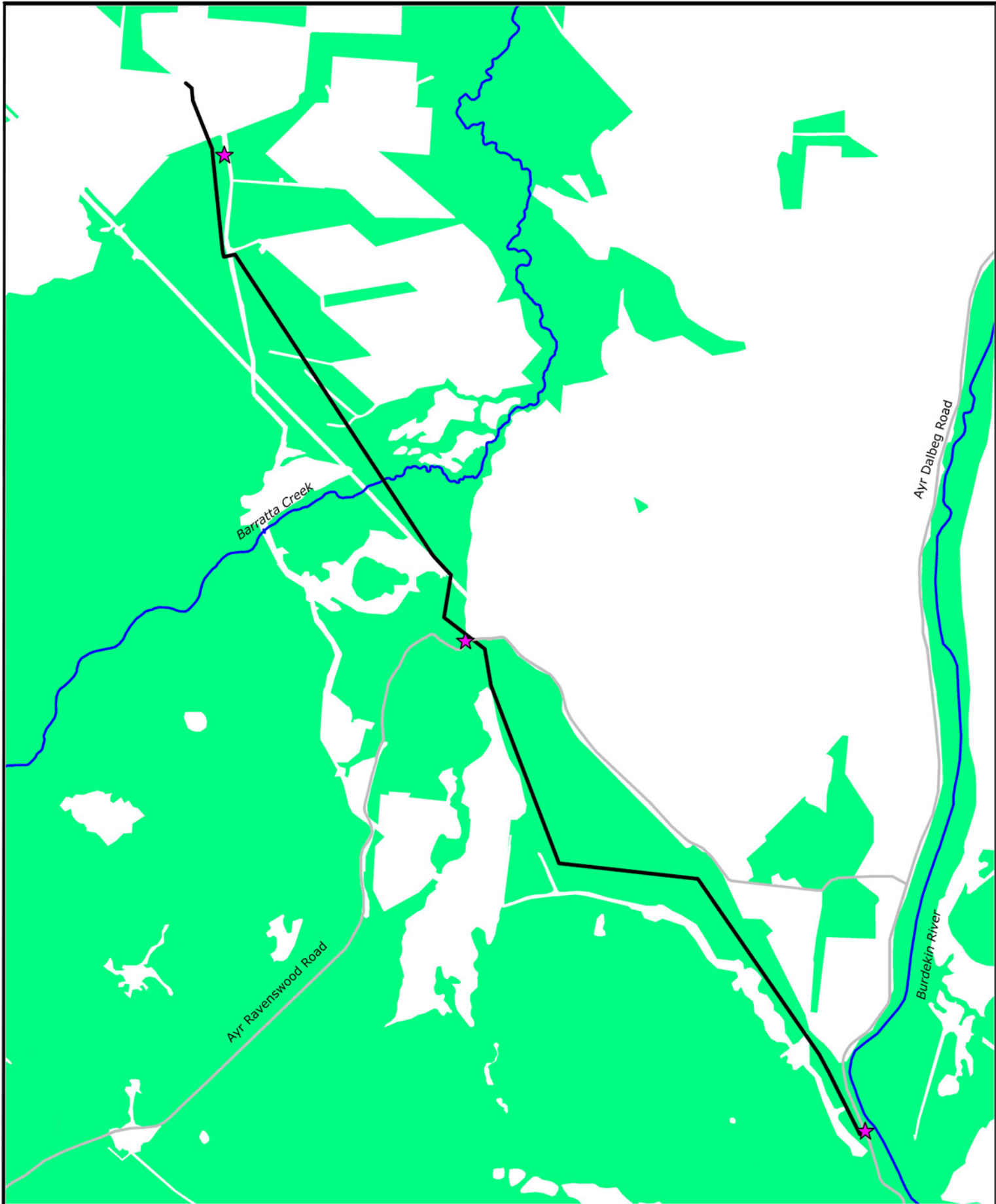
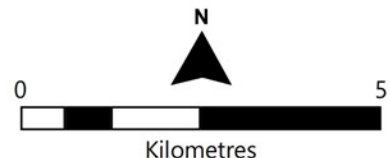


Figure 8: Potential roosting habitat for the Bare-rumped Sheathtail Bat
 Project: Haughton Pipeline Stage 2 Project: Environmental Analysis Report

- Proposed alignment (May 2021)
- Major roads
- Major drainage
- Potential roosting habitat for Bare-rumped Sheathtail Bat
- Detector location



Source: © State of Queensland (Department of Resources) 2021,
 Updated data available at <https://qldspatial.information.qld.gov.au/catalogue/>

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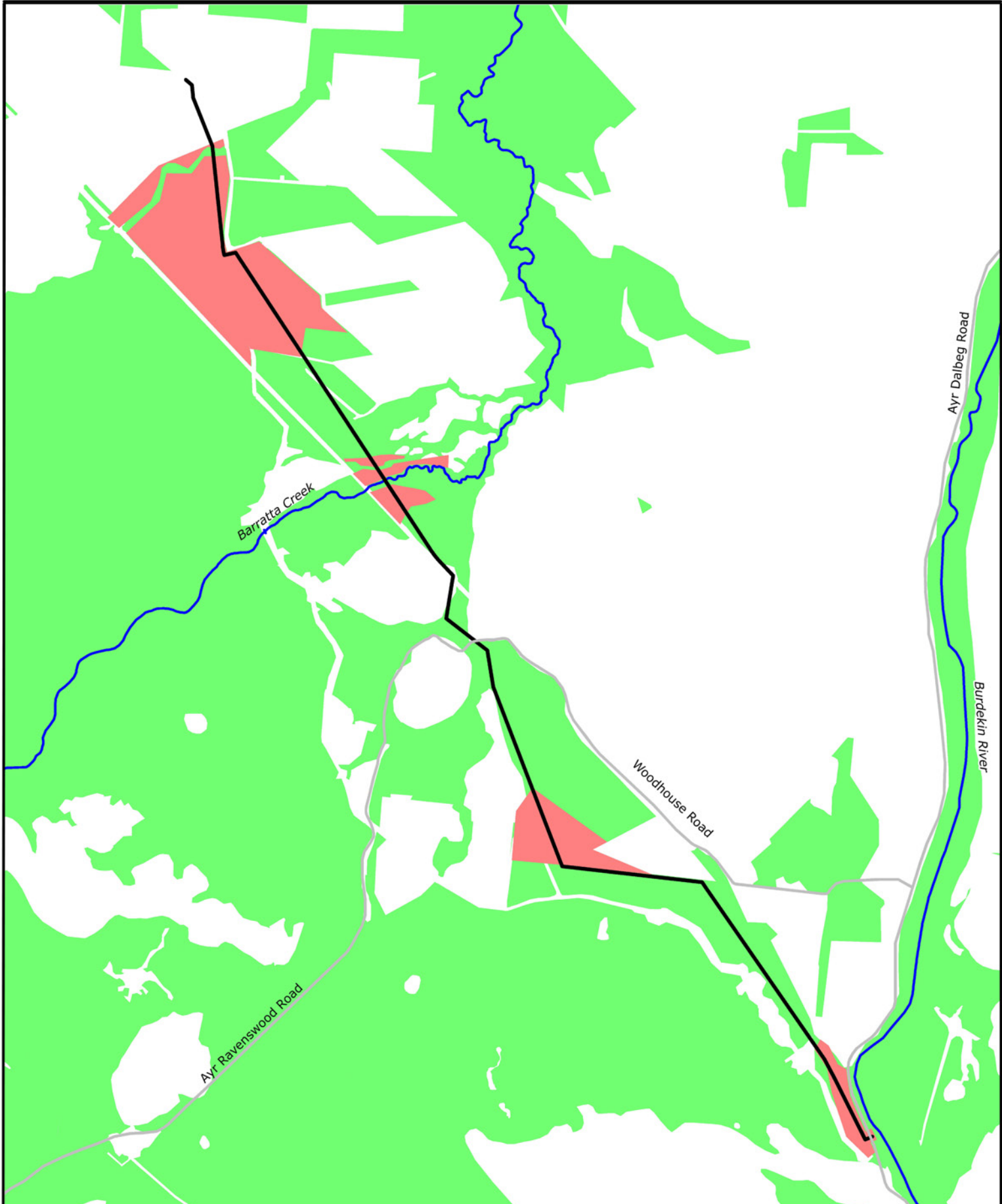





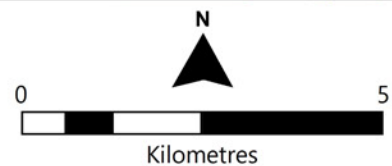


Figure 9 : Potential habitat for the Black-throated Finch
 Project: Haughton Pipeline Stage 2 Project: Environmental Analysis Report

-  Proposed alignment (May 2021)
 -  Major drainage
 -  Major Roads
- Potential habitat for Black-throated Finch
-  Higher suitability
 -  Lower suitability



Source: © State of Queensland (Department of Resources) 2021,
 Updated data available at <https://qldspatial.information.qld.gov.au/catalogue/>

NRA Ref: 135037
 Date: August 2021



4.5.3 Potential impact and mitigation measures

Construction activities (as described in **Section 2.2**) associated with the Project pose the following direct and indirect threats to fauna and associated habitat.

- **Direct threats** are the loss of habitat (and subsequent displacement of wildlife), and direct mortality during clearing and excavation works. With respect to habitat loss, it is the loss of core, limiting, or critical habitat that poses the greatest direct threat.
- **Indirect threats** are secondary threats that may occur as a result of the Project. Their impacts may extend beyond the development footprint and may include the following.
 - Habitat alteration and degradation as a result of weed ingress and ground disturbance.
 - Introduction of pest fauna (or pathogens) that prey on, exclude or compete with native fauna.
 - Increased levels of habitat fragmentation, *ie* changed fauna behaviours in response to human presence and/or habitat loss.
 - Sedimentation and contamination of waterways resulting in reduced water quality and/or reduced dry season water levels.

The fauna species (and populations) that are most vulnerable to the direct and indirect threats (and resulting impacts) are those that:

- are permanent, frequent or regular inhabitants of the site
- are sensitive to the threats posed by the action¹⁷
- have core, limiting or critical habitat within the receiving environment of impact.

At this stage in the Project, detailed designs (*ie* a final clearing area) are not available, so it is not possible to quantify the potential magnitude of impact that may result from the threats. Potential direct threats on fauna values are predominantly associated with planned vegetation clearing and habitat loss. Some indirect threats may be short-term and localised (*eg* disturbance), whereas others, if not properly managed, may cause severe and/or irreversible impacts at the site, local and regional scales (*eg* biosecurity incursions).

With respect to the T&NT, Migratory and Special Least Concern fauna described in **Section 4.5.2**, the following species are unlikely to be significantly impacted by the proposed works as no areas of core habitat are identifiable in the Project area, and they are likely to have a sporadic and temporary presence.

- White-throated Needletail.
- Estuarine Crocodile.
- Fork-tailed Swift.
- Eastern Osprey.
- Oriental Cuckoo.

The species most likely to be impacted by the proposed works, and the nature of those impacts, are discussed below.

Bare-rumped Sheathtail Bat

Within the Project area, Bare-rumped Sheathtail Bat is likely to forage above all habitats (including disturbed areas). It may roost in any tall hollow-bearing trees, with large diameter,

¹⁷ Due to biology (including life history), behaviour and/or population size.

deep chambered, hollows preferred. Habitats where *Melaleucas* (syn. Paperbarks/Tea-trees) and Eucalypts (*Eucalyptus* and *Corymbia* spp.) are dominant components of the vegetation community are considered potential roosting habitat for this species, and are shown on **Figure 8**.

Habitat loss and degradation are the main project-related threats to this species. Habitat loss can be reduced by maximising the use of existing disturbed areas and by minimising clearing extents in areas where mature vegetation occurs (especially near large mature trees). If this is achieved, the resulting impacts are unlikely to be significant, as habitats of similar type and quality are common in the immediate and local landscape.

It is difficult to establish the presence of roosting bats. To reduce the potential for inadvertent impacts on roosting individuals, large hollow-bearing trees should be retained where possible. Where clearing of these trees is necessary, a spotter-catcher should be present during clearing to provide guidance if a roost is disturbed or an injured bat is found. The introduction or proliferation of weeds, especially those that increase the risk and intensity of fires (eg Grader Grass), poses a threat to the suitability and condition of potential habitats for the Bare-rumped Sheath-tail Bat. This risk can be managed via a Project Weed and Pest Management Plan (or equivalent).

In the absence of mitigation, only a small proportion of core/roosting habitat for this species is likely to be negatively impacted. This scale of impact is negligible, as habitats of similar type and quality are abundant in the immediate and local landscape. To ensure project-related threats are controlled and minimised, the implementation of the above mitigation measures is recommended. If this occurs, significant impacts on the Bare-rumped Sheath-tail Bat are not anticipated.

Southern Black-throated Finch

Some areas of remnant vegetation within the Project area were consistent with habitats that Southern Black-throated Finches are known to occur in. Potential roosting and/or foraging habitat for this species is shown on **Figure 9**. An area along the Haughton River (near the north of the Project area) is mapped as an 'important area' for this species in DEWHA (2009). Targeted surveys of the Project area for Southern Black-throated Finches may be required to meet regulatory (*ie* policy) requirements¹⁸.

The proposed works may result in the loss of potential foraging and nesting habitat for Southern Black-throated Finch. The long-term loss of foraging habitat is likely to be negligible if disturbance footprints are minimised and disturbed areas are properly rehabilitated (with suitable grass species) post-construction.

The clearing of potential nesting trees (eg Poplar Gum and Broad-leaf Tea-tree) in areas of suitable habitat (particularly higher suitability habitat) (**Figure 9**) has the potential to result in the loss of nesting resources. This impact can be reduced by maximising the use of existing disturbed areas and by minimising clearing extents in areas where mature vegetation occurs. If this is achieved, the resulting impacts are unlikely to be significant as habitats of similar type and quality are abundant in the immediate and local landscape.

In areas of suitable habitat (particularly higher suitability habitat), where potential nesting trees are present (**Figure 9**), vegetation clearing has the potential to kill or injure nesting Southern Black-throated Finches. The direct threat to nesting birds can be avoided by undertaking pre-

¹⁸ This should be confirmed in consultation with the regulator.

clearance surveys and, if nesting birds are found, ceasing work around the nest until the occupants vacate the area¹⁹. The risk of impacting breeding birds can be further reduced by timing clearing activities to avoid the core breeding season (seasonally dependent though nominally February to June).

Southern Black-throated Finches are reliant on seasonal and permanent water sources, including natural and man-made features. Erosion and sedimentation during construction of the pipeline has the potential to reduce the availability of surface water. This risk can be minimised by implementing a site-specific ESCP prepared by a suitably qualified practitioner.

The proposed works have the potential to introduce or proliferate non-native plant species, including species that are detrimental to habitats preferred by Southern Black-throated Finches. Bulky exotic grasses such as Grader Grass are significant threats to the conservation of the Southern Black-throated Finches (Mula-Laguna *et al.* 2019, Buosi *et al.* in press). The introduction of invasive ants (*ie* Tramp Ants), which prey on nesting birds, is also a threat. These threats can be minimised and controlled via a Project Weed and Pest Management Plan (or equivalent).

In summary, the proposed works have the potential to impact on foraging habitat, nesting habitat and water sources that may be used by Southern Black-throated Finches. The project-related threats can be avoided or minimised by implementing the recommendations provided above. If this occurs, significant impacts on the Southern Black-throated Finch are not anticipated.

Squatter Pigeon

The majority of the Project area, including many areas mapped as non-remnant vegetation, constitutes potentially suitable foraging and nesting habitat for Squatter Pigeon. Potential impacts on Squatter Pigeon habitat will be short-term, and negligible, if disturbance footprints are minimised, disturbed areas are rehabilitated, and the risk of weed and pest species²⁰ introduction and spread is managed via a Project Weed and Pest Management Plan (or equivalent). Direct threats to nesting Squatter Pigeons can be avoided by conducting pre-clearance surveys prior to vegetation clearing and, if nesting birds are found, ceasing work around the nest until the occupants vacate the area²¹. Further, impacts on water sources can be minimised by implementing a site-specific ESCP prepared by a suitably qualified practitioner.

Squatter Pigeons may benefit (even in the absence of mitigation) from the long-term modification to habitats that result from the proposed construction of the Project. However, the loss or degradation of habitat due to erosion and sedimentation, weed ingress and pest species introduction/spread should be managed as per the recommendations described above. If this occurs, significant impacts on Squatter Pigeons are not anticipated.

Black-faced Monarch, Spectacled Monarch and Rufous Fantail

These bird species have similar preferred habitats (riparian areas and immediately adjacent woodland), occurrences in the region (more likely to be present in the Project area during the cooler months) and ecologies. None of these species is likely to breed in the Project area. The impact of habitat loss for these species as a result of the Project is negligible, as habitats of

¹⁹ If the nesting birds are breeding, work around the nest should cease until breeding and fledging are complete.

²⁰ Tramp ants are a particular threat to ground nesting birds.

²¹ If the nesting birds are breeding, work around the nest should cease until breeding and fledging are complete.

similar type and quality are abundant in the immediate and local landscape. To ensure project-related threats are controlled and minimised, it is recommended that the Project design maximises the use of existing disturbed areas and minimises clearing extents in riparian areas (*ie* the areas of suitable habitat). If this occurs, significant impacts to these species are not anticipated.

Short-beaked Echidna

All areas of remnant vegetation in the Project area are considered suitable habitat for Short-beaked Echidna. The impact of habitat loss for this species as a result of the Project is negligible as habitats of similar type and quality are abundant in the immediate and local landscape. Vegetation clearing has the potential to kill or injure Short-beaked Echidna that may occur in the Project area. A pre-clearing survey prior to vegetation clearing, and a spotter-catcher present during vegetation clearing and trench excavation, is recommended.

Measures to manage the potential impacts on fauna values are summarised below (where applicable these should be included in the Project CEMP). These recommendations are in addition to those already provided.

- Recommendation 26:** When possible (*eg* on the edge of the construction corridor), large trees with hollows should not be removed as these trees provide nesting and roosting sites for birds and mammals. A buffer, at least equivalent to the diameter of the canopy, should be maintained to reduce the risk of root damage during clearing of surrounding vegetation (*eg* use flagging tape to mark locations of large trees and buffer boundaries).
- Recommendation 27:** A project-specific Species Management Plan (or equivalent) should be developed and implemented as part of pre-construction activities. Measures outlined in the plan should include the following.
- A pre-clearance survey to determine the presence of fauna and fauna breeding places by appropriately trained persons prior to disturbance.
 - Contingency plans (*ie* a spotter-catcher present during works) should be in place should wildlife be encountered injured during construction.
- Recommendation 28:** A Project Weed and Pest Management Plan (or equivalent) should be developed and implemented. The plan should address weed and pest (*eg* invasive ants) prevention/hygiene, control and monitoring.
- Recommendation 29:** Avoid operating machinery, vehicles and equipment in long grass, particularly during the dry season, to minimise potential for igniting bush fires.
- Recommendation 30:** Maintain fire response equipment on-site and train site staff in their use and response procedures; ensuring sufficient water is available for use in firefighting.
- Recommendation 31:** Following construction, rehabilitate areas mapped as ‘higher suitability’ on **Figure 9** with grass species suitable for Southern Black-throated Finch (this can include native and non-native species).

4.6 Air and noise

4.6.1 Methods

A desk-based assessment was conducted to determine the air and noise values in the Project area. The desk-based assessment included a review of Queensland Globe aerial imagery (accessed via <https://qldglobe.information.qld.gov.au/qldglobe/>) to identify potential sources of air and noise pollution and sensitive receptors.

4.6.2 Description of environmental values

The area within and surrounding the Project area is generally rural land use and contains natural ecosystems, agricultural land, residential dwellings and government/privately owned infrastructure (*eg* roads, irrigation channels). The closest residential dwelling is 150 m from the Project area on Lot 71 SP289517 (Rapisrada property).

The environmental values for air include qualities of the air environment that are conducive to protecting the health and biodiversity of ecosystems; human health and wellbeing; protecting the aesthetics of the environment; and protecting agricultural use of the environment. The environmental values for noise include the qualities of the acoustic environment that are conducive to protecting the health and biodiversity of ecosystems; human health and wellbeing; and protecting the amenity of the community.

Existing air quality pollutants in the Project area are likely to be primarily particulate emissions (*ie* dust) and fumes (*eg* from vehicle and machinery exhaust) commensurate with rural land use activities. Potential sources of particulate emissions from the surrounding environment comprise natural wind erosion (which may be exacerbated by disturbance from grazing activities), vehicles on unsealed roads, and smoke. Vehicles and machinery are the primary source of fumes.

The main noise and vibration producing source in the Project area is traffic along the state-controlled roads (*ie* Ayr Ravenswood Road and Ayr Dalbeg Road). Other minor roads and rail lines and agricultural machinery within/near to the Project area are a source of noise and vibration.

4.6.3 Potential impact and mitigation measures

The primary sources of air pollutants from the Project are particulate emissions (*eg* dust from earthworks and vehicle movements) and fumes (*eg* from vehicle use). Excessive dust from the Project has the potential to be a nuisance at the nearby sensitive receptors, or impact on the health of the by inhibiting physiological processes such as photosynthesis and transpiration.

The primary source of noise and vibration for the Project are expected to be from vehicle and machinery use during construction. Sensitive receptors likely to be impacted by noise and vibrations from the Project include residential properties and nearby fauna habitats.

Measures to manage the potential Project impacts on air and noise are provided below (where applicable these should be included in the Project CEMP). These recommendations are in addition to those already provided.

Recommendation 32: Dust suppression to be implemented during the construction phase of the Project, to reduce mobilisation of particulates during dry and/or windy conditions.

- Recommendation 33:** Keep soil stockpile heights low (<2 m) and revegetate if they are to remain for >4 weeks (in the interim apply mulch, or appropriate soil binder to avoid wind erosion).
- Recommendation 34:** Rehabilitate disturbed areas as soon as practicable to restore ground cover and minimise wind erosion.
- Recommendation 35:** Maintain vehicles and machinery according to manufacturer specifications to minimise exhaust emissions and noise volume.
- Recommendation 36:** Fit and maintain appropriate noise control devices (*eg* mufflers) on vehicles and machinery used on-site.
- Recommendation 37:** Undertake works during approved operating hours, and notify landholders of works that have the potential to cause a nuisance (*eg* excavation works, compaction activities, drilling).

5. State and Commonwealth Legislation

Commonwealth and State legislation specifies the manner in which activities can be carried out and the permit requirements for particular activities. Environmental legislation potentially relevant to the development of the Project is provided in **Appendix K**. This is informed by written pre-lodgement advice from the State provided on 7 January 2021 (Queensland Government 2021)²².

The opinions expressed in this section and **Appendix K** are based on the technical and practical experience of expert environmental practitioners. They are not presented as legal advice. Nor do they represent decisions from the regulatory agencies charged with the administration of the relevant acts. Any legislation or code of practice referenced in this section is understood to be current at the time of writing. The information provided is restricted to environmental legislation and approvals.

²²Following a pre-lodgement meeting held with relevant Queensland Government regulators on 23 December 2020.

6. Conclusion

The Project has the potential to impact on the following:

- water environmental values including:
 - watercourses (under the Water Act)
 - low, medium and high risk waterways (WWBW)
 - wetlands that are:
 - DIWA wetlands
 - riverine and lacustrine wetlands
- soils with varying degrees of susceptibility to erosion
- flora environmental values including:
 - vegetation communities that are:
 - REs with a Least Concern or Of Concern VM Act Status
 - REs with a BD status of No Concern at Present, Of Concern and Endangered
 - regulated vegetation (Categories B, R and X)
 - one T&NT flora species
- fauna environmental values including:
 - fauna habitat values (*eg* breeding and roosting places, essential habitat)
 - five T&NT fauna species
 - nine Migratory and/or Special Least Concern fauna species.
- air and noise environmental values.

Potential impacts to these environmental values can be prevented or reduced by implementing the recommendations and mitigation measures outlined in **Section 4**. Provided these measures are implemented, significant impacts to environmental values are not anticipated.

Supplementary studies (*ie* desk-based and/or field) and review of this EAR will be required if material changes are made to the Project design as described in this report.

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Appendix A:
EPBC Act Protected Matters
Search Report



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 01/07/21 08:23:24

[Summary](#)

[Details](#)

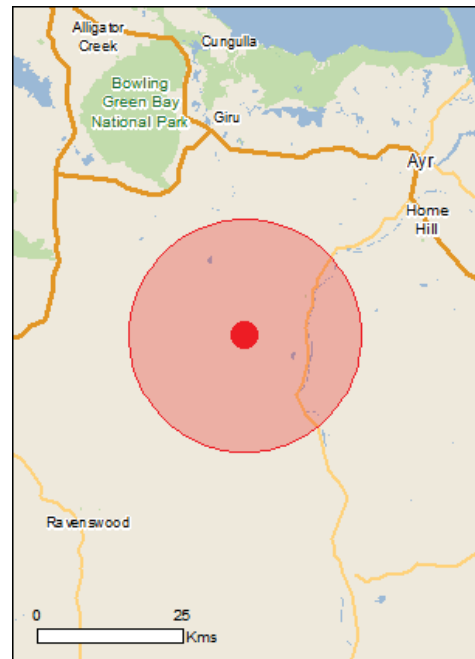
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

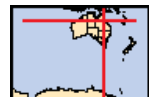
[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)

Buffer: 20.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	24
Listed Migratory Species:	18

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	22
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	32
Nationally Important Wetlands:	2
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Bowling green bay	10 - 20km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community may occur within area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
------	--------	------------------

Birds

Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Turnix olivii Buff-breasted Button-quail [59293]	Endangered	Species or species habitat may occur within area
Tyto novaehollandiae kimberli Masked Owl (northern) [26048]	Vulnerable	Species or species

Name	Status	Type of Presence habitat likely to occur within area
Mammals		
Dasyurus hallucatus		
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
Hipposideros semoni		
Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Vulnerable	Species or species habitat may occur within area
Macroderma gigas		
Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat likely to occur within area
Saccolaimus saccolaimus nudicluniatu		
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus raveretiana		
Black Ironbox [16344]	Vulnerable	Species or species habitat likely to occur within area
Marsdenia brevifolia		
[64585]	Vulnerable	Species or species habitat may occur within area
Omphalea celata		
[64586]	Vulnerable	Species or species habitat likely to occur within area
Tephrosia leveillei		
[16946]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Denisonia maculata		
Ornamental Snake [1193]	Vulnerable	Species or species habitat may occur within area
Egernia rugosa		
Yakka Skink [1420]	Vulnerable	Species or species habitat likely to occur within area
Lerista vittata		
Mount Cooper Striped Skink, Mount Cooper Striped Lerista [1308]	Vulnerable	Species or species habitat may occur within area
Sharks		
Pristis pristis		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat likely to occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Marine Species		

Name	Threatened	Type of Presence
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur

Name	Threatened	Type of Presence
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area
Reptiles		
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

Extra Information

Invasive Species [[Resource Information](#)]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species

Name	Status	Type of Presence
<i>Sturnus vulgaris</i> Common Starling [389]		habitat likely to occur within area Species or species habitat likely to occur within area
Frogs		
<i>Rhinella marina</i> Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
<i>Bos taurus</i> Domestic Cattle [16]		Species or species habitat likely to occur within area
<i>Canis lupus familiaris</i> Domestic Dog [82654]		Species or species habitat likely to occur within area
<i>Capra hircus</i> Goat [2]		Species or species habitat likely to occur within area
<i>Equus caballus</i> Horse [5]		Species or species habitat likely to occur within area
<i>Felis catus</i> Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
<i>Lepus capensis</i> Brown Hare [127]		Species or species habitat likely to occur within area
<i>Mus musculus</i> House Mouse [120]		Species or species habitat likely to occur within area
<i>Oryctolagus cuniculus</i> Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
<i>Rattus rattus</i> Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
<i>Sus scrofa</i> Pig [6]		Species or species habitat likely to occur within area
<i>Vulpes vulpes</i> Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
<i>Acacia nilotica</i> subsp. <i>indica</i> Prickly Acacia [6196]		Species or species habitat may occur within area
<i>Cabomba caroliniana</i> Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
<i>Cryptostegia grandiflora</i> Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

Reptiles

Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat may occur within area
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Nationally Important Wetlands

[Resource Information]

Name	State
Barrattas Channels Aggregation	QLD
Haughton Balancing Storage Aggregation	QLD

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-19.82963 147.13252

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
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- [-Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

Appendix B:
Queensland Government Wetland
Mapping

WetlandMaps Report



For selected area of interest

Current as at 07/07/2021

Environmental Reports - General Information

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the Area of Interest (AOI) (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no matters of interest have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Important Note to User

Information presented in this report is based upon the mapping of water bodies and wetland regional ecosystems across Queensland. The Queensland wetland mapping was produced using existing information including water body mapping derived from Landsat satellite imagery, regional ecosystem mapping, topographic data, and a springs database. The result is a consistent wetland map for the whole of Queensland.

Ancillary data, such as higher resolution imagery (for example SPOT and aerial photographs), other vegetation and wetland mapping, geology, soil and land system mapping was also used in attributing and assessing the derived Queensland Wetlands Program wetland mapping products.

The wetland mapping was done in accordance with a detailed peer reviewed methodology which included quality assurance measures for all steps in the process. For more detailed information on how the Queensland Wetlands Program wetland mapping was produced, please see the [Wetland Mapping and Classification Methodology](#).

Disclaimer

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Summary Information

The following table provides an overview of the area of interest.

Table 1. Area of interest details

Size (ha)	167.42
Local Government(s)	Burdekin Shire
Bioregion(s)	Brigalow Belt
Subregion(s)	Townsville Plains
Catchment(s)	Burdekin, Haughton
Drainage sub-basin	Lower Burdekin River, Barratta Creek

NRM Regions

The following NRM region(s) are in the area of interest:

NQ Dry Tropics

Water Resource Plan Boundaries

The following Water Resource Plan(s) are in the area of interest:

Burdekin Basin

Learn more about how Wetlands are mapped in Queensland:

Queensland Wetlands Mapping Definitions

Wetlands are areas of permanent or periodic/intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed 6 metres. To be a wetland the area must have one or more of the following attributes:

- at least periodically the land supports plants or animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle, or
- the substratum is predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layers, or
- the substratum is not soil and is saturated with water, or covered by water at some time.

Examples under this definition **include**:

- those areas shown as a river, stream, creek, swamp, lake, marsh, waterhole, wetland, billabong, pool or spring on the latest Sunmap 1:25,000, 1:50,000, 1:100,000 or 1:250,000 topographic map
- areas defined as wetlands on local or regional maps prepared with the aim of mapping wetlands
- wetland regional ecosystems (REs) as defined by the Queensland Herbarium (Environmental Protection Agency 2005a)
- areas containing recognised hydrophytes as provided by the Queensland Herbarium
- saturated parts of the riparian zone
- artificial wetlands such as farm dams
- water bodies not connected to rivers or flowing water such as billabongs and rock pools.

Examples under this definition **exclude**:

- areas that may be covered by water but are not wetlands according to the definition
- floodplains that are intermittently covered by flowing water but do not meet the hydrophytes and soil criteria
- riparian zone above the saturation level.

Wetland Systems

Riverine wetlands are all wetlands and deepwater habitats within a channel. The channels are naturally or artificially created, periodically or continuously contain moving water, or connecting two bodies of standing water.

Palustrine wetlands are primarily vegetated non-channel environments of less than 8 hectares. They include billabongs, swamps, bogs, springs, soaks etc, and have more than 30% emergent vegetation.

Lacustrine wetlands are large, open, water-dominated systems (for example, lakes) larger than 8ha. This definition also applies to modified systems (for example, dams), which are similar to lacustrine systems (for example, deep, standing or slow-moving waters).

Marine wetlands include the area of ocean from the coastline or estuary, extending to the jurisdictional limits of Queensland waters (3 nautical mile limit). This definition differs from that in Ramsar, as it includes waters deeper than 6m below the lowest astronomical tide.

Estuarine wetlands are those with oceanic water sometimes diluted with freshwater run-off from the land.

Subterranean wetlands are wetlands occurring below the surface of the ground and that are fed by groundwater i.e. caves and aquifers. These wetlands provide water to groundwater dependent ecosystems.

Methodology and Wetland Classification: <https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/wetland-background/>

Links and support

Other sites that deliver wetland related information include:

WetlandSummary tool: <https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/>

Queensland Spatial Catalogue: <http://qldspatial.information.qld.gov.au/catalogue/custom/index.page>

Queensland Globe: <https://qldglobe.information.qld.gov.au/>

Environmental reports online: <https://environment.ehp.qld.gov.au/report-request/environment/>

Wetland on-line education modules: <https://wetlandinfo.des.qld.gov.au/wetlands/resources/training/>

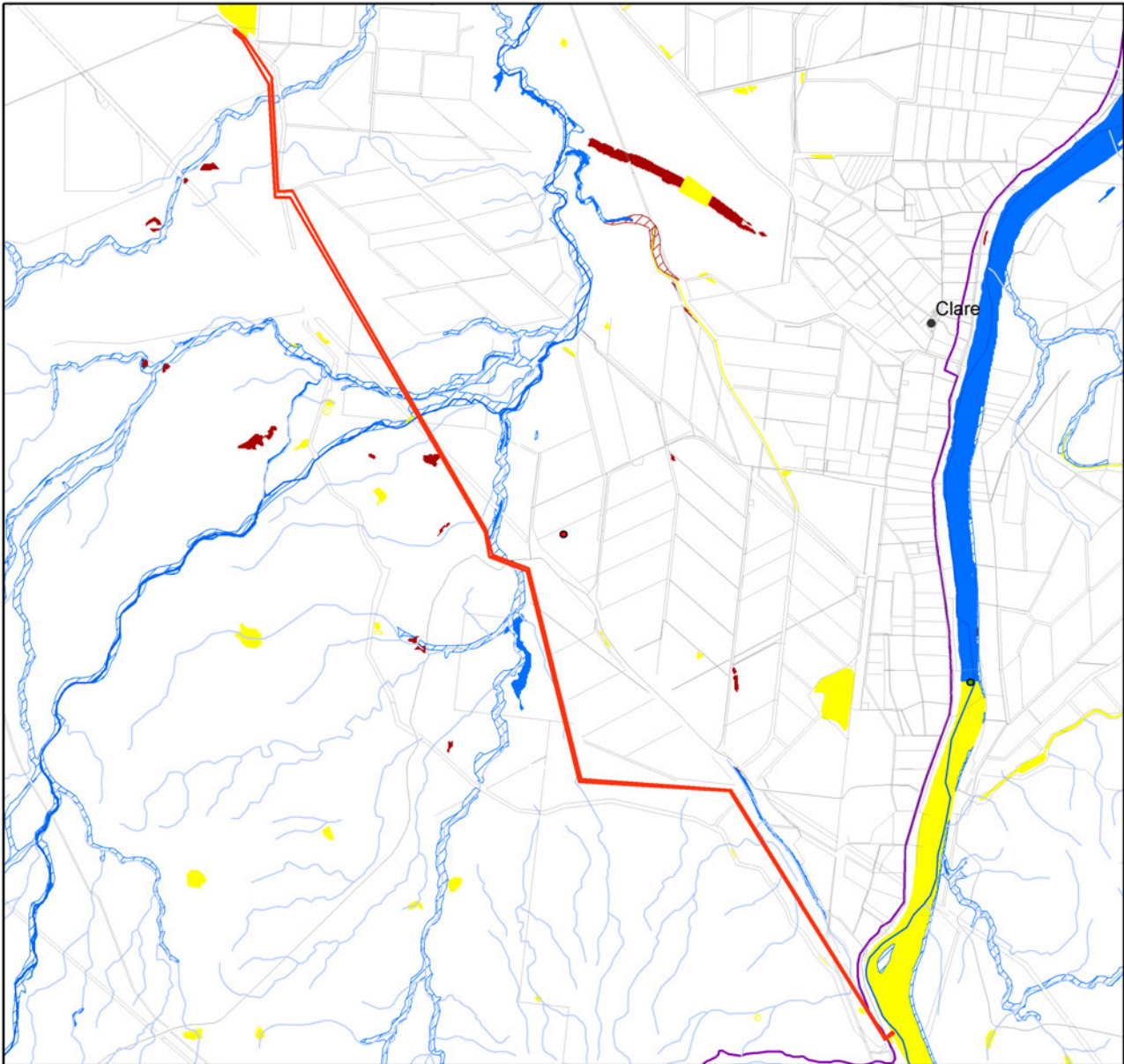
Regional Ecosystem Mapping information: :

<https://www.qld.gov.au/environment/plants-animals/plants/herbarium/mapping-ecosystems>

Aquatic Conservation Assessments: : <https://wetlandinfo.des.qld.gov.au/wetlands/assessment/assessment-methods/aca/>

Groundwater Dependant Ecosystems information:

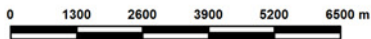
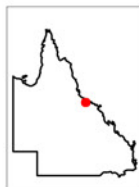
<https://wetlandinfo.des.qld.gov.au/wetlands/ecology/aquatic-ecosystems-natural/groundwater-dependent/>



Legend

- point
- polygon
- ▲ Springs
- Dams and weirs
- Towns
- Highways
- Roads
- Cadastral boundaries
- Sub-basin
- Wetland Mapping**
- Wetland System - Water Bodies**
- Marine Waterbodies
- Estuarine Waterbodies
- Riverine Waterbodies
- Lacustrine Waterbodies
- Palustrine Waterbodies
- Wetland System - Regional Ecosystems**
- Marine RE
- Estuarine RE
- Riverine RE
- Lacustrine RE
- Palustrine RE
- RE 51_80% wetland (mosaic units)
- Riverine System Drainage Lines**
- Major
- Minor

Queensland Wetland Map

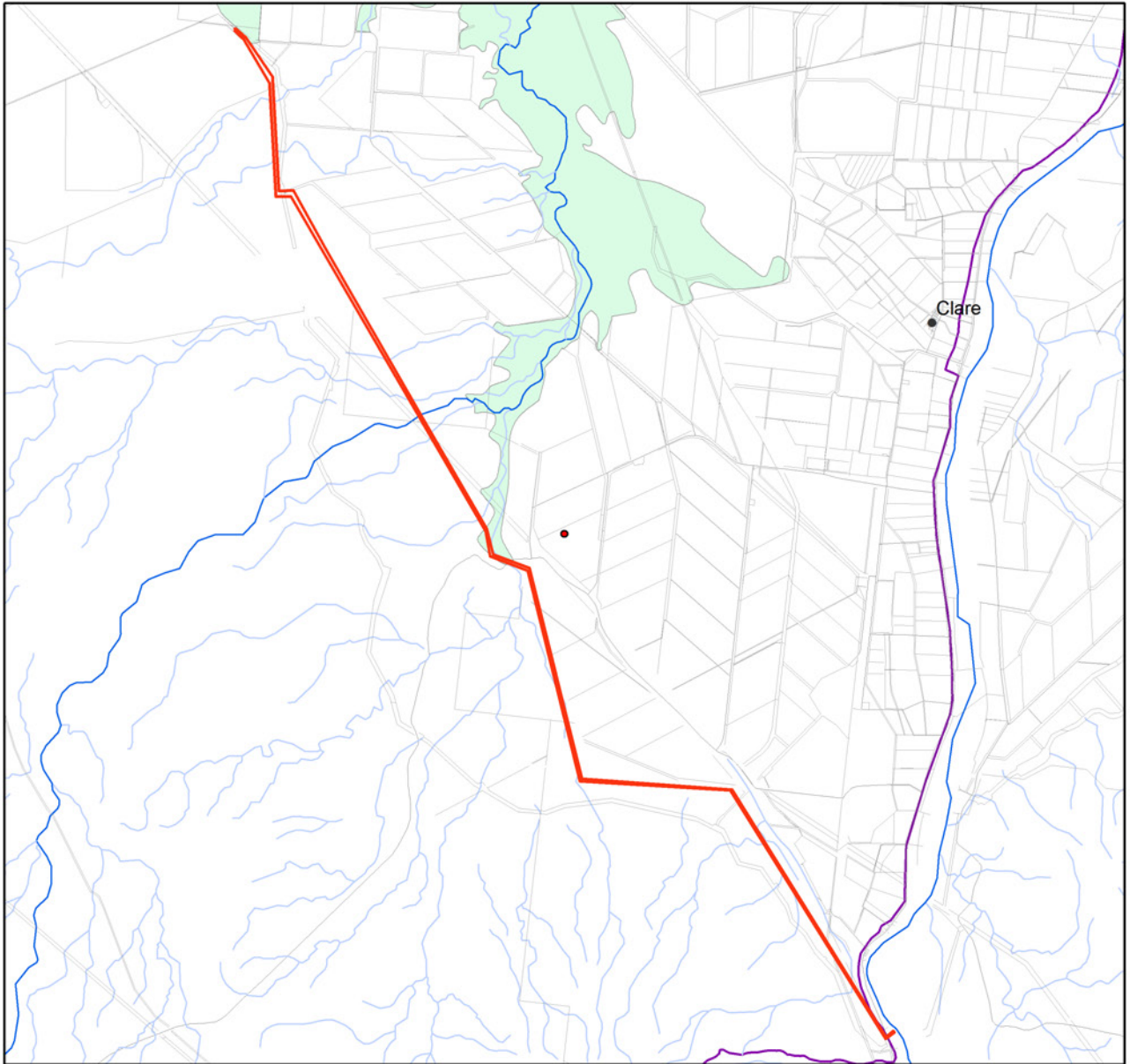


Horizontal Datum: Geographic Datum of Australia 1994 (GDA94)

This map was produced by the Queensland Wetlands Program, Department of Environment and Science, July 2021.

For further information contact: wetlands@des.qld.gov.au

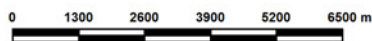
© The State of Queensland, 2021



Legend

- point
- polygon
- Towns
- Cadastral boundaries
- Highways
- Roads
- Sub-basin
- Directory of Important Wetlands
- Ramsar Wetlands
- Riverine System Drainage Lines**
- Major
- Minor

Queensland Wetlands of Importance Map

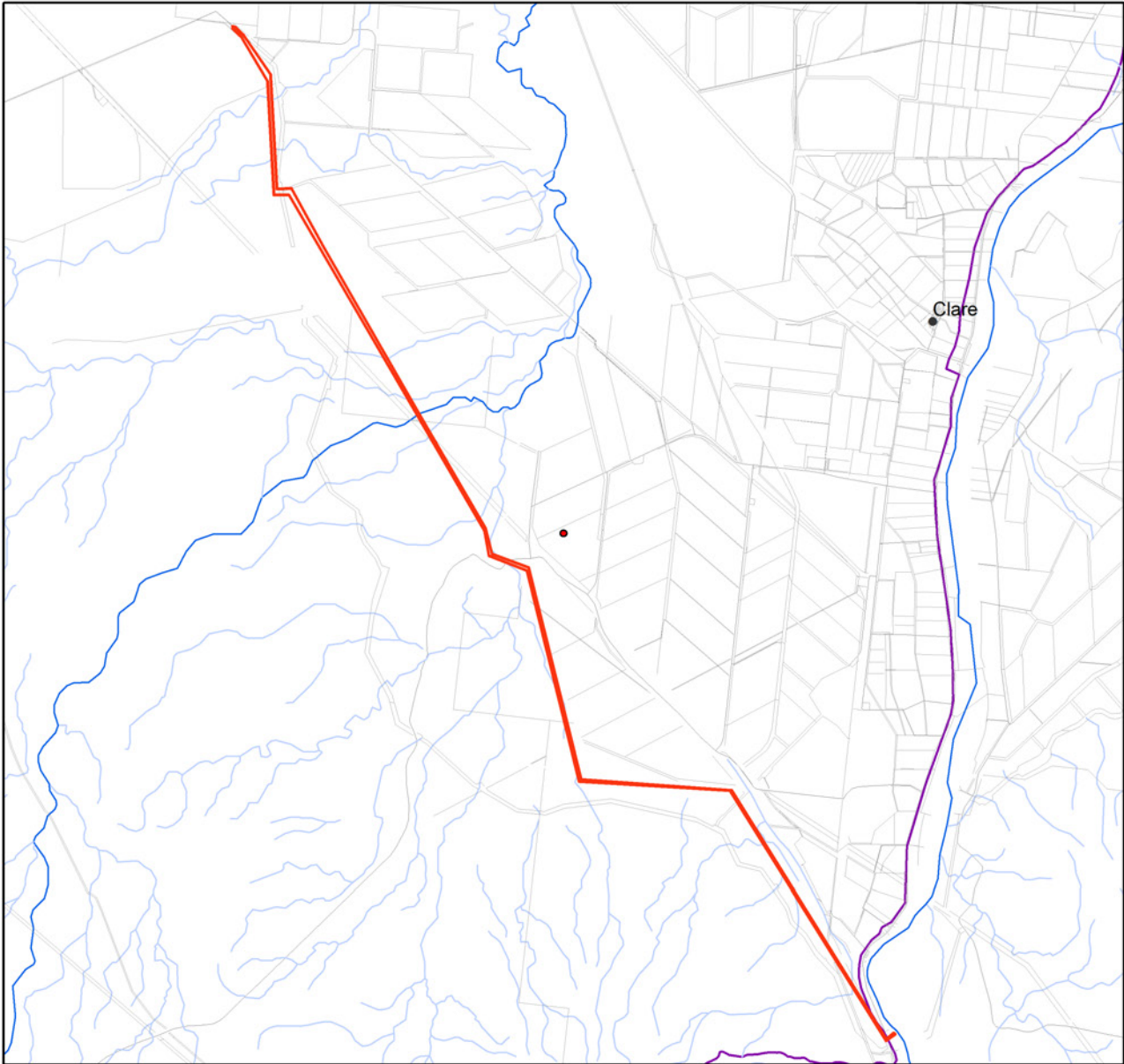


Horizontal Datum: Geographic Datum of Australia 1994 (GDA94)

This map was produced by the Queensland Wetlands Program, Department of Environment and Science, July 2021.

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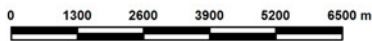
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Legend

- point
- polygon
- Towns
- Cadastral boundaries
- Highways
- Roads
- Sub-basin
- Riverine System Drainage Lines**
- Major
- Minor
- Protected Areas**
- National Park
- National Park (Scientific)
- National Park (CYPAL)
- Conservation Park
- Resources Reserve
- Forest Reserve
- State Forest
- Timber Reserve
- Marine Parks**
- General Use Zone
- Habitat Protection Zone
- Estuarine Conservation Zone
- Conservation Park Zone
- Buffer Zone
- Scientific Research Zone
- Marine National Park Zone
- Preservation Zone

Queensland Protected Area Map



Horizontal Datum: Geographic Datum of Australia 1994 (GDA94)

This map was produced by the Queensland Wetlands Program, Department of Environment and Science, July 2021.

For further information contact: wetlands@des.qld.gov.au

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Wetland habitat types in the AOI. Total area: 8.2ha

Wetland Class	Habitat type	Area (ha)
Riverine	Riverine	8.08
Lacustrine	Artificial/ highly modified wetlands (dams, ring tanks, irrigation channel)	0.12

Queensland wetland habitat typology: Major wetland habitat types for wetland conceptual models and wetland management profiles

Wetland name	Conceptual model	Wetland profile
Mangrove Wetlands	Not developed	Mangrove Wetlands
Saltmarsh Wetlands	Not developed	Saltmarsh Wetlands
Coastal and subcoastal saline swamps of all substrates, water regimes, topographic types and vegetation communities	Coastal and subcoastal saline swamps	Coastal grass-sedge wetlands
Coastal and subcoastal non-floodplain tree swamps (Melaleuca and Eucalypt) of all substrates and water regimes	Coastal and subcoastal non-floodplain tree swamps - melaleuca and eucalypt	Coastal and subcoastal tree swamps
Coastal and subcoastal non-floodplain wet heath swamps of all substrates and water regimes	Coastal and subcoastal non-floodplain wet heath swamps	Coastal and subcoastal wet heath swamps
Coastal and subcoastal non-floodplain grass, sedge and herb swamps of all substrates and water regimes	Coastal and subcoastal non-floodplain grass, sedge and herb swamps	Coastal grass-sedge wetlands
Coastal and subcoastal spring swamps of all substrates, water types, water regimes and vegetation communities	Coastal and subcoastal spring swamps	Great Artesian Basin spring wetlands
Coastal and subcoastal floodplain tree swamps - melaleuca and eucalypt of all substrates and water regimes	Coastal and subcoastal floodplain tree swamps - melaleuca and eucalypt	Coastal and subcoastal tree swamps
Coastal and subcoastal floodplain wet heath swamps of all substrates and water regimes	Coastal and subcoastal floodplain wet heath swamps	Coastal and subcoastal wet heath swamps
Coastal and subcoastal floodplain, grass, sedge herb swamps of all substrates and water regimes	Coastal and subcoastal floodplain grass, sedge, herb swamps	Coastal grass-sedge wetlands
Coastal and subcoastal tree swamps - palm of all substrates, topographic types and water regimes	Coastal and subcoastal floodplain tree swamps - palm	Coastal Palm Swamps
Coastal and subcoastal Floodplain Lakes of all substrates, water types and water regimes	Coastal and subcoastal Floodplain Lakes	Coastal and subcoastal floodplain lakes and non-floodplain soil lakes
Coastal and subcoastal non-floodplain rock lakes of all water types and water regimes	Coastal and subcoastal non-floodplain rock lakes	Coastal and subcoastal non-floodplain rock lakes
Coastal and subcoastal non-floodplain sand lakes (window) of all water types and water regimes	Coastal and subcoastal non-floodplain sand lakes - window	Coastal non-floodplain sand lakes
Coastal and subcoastal non-floodplain sand lakes (perched) of all water types and water regimes	Coastal and subcoastal non-floodplain sand lakes - perched	Coastal non-floodplain sand lakes
Coastal and subcoastal non-floodplain soil lakes of all water types and water regimes	Coastal and subcoastal non-floodplain soil lakes	Coastal and subcoastal floodplain lakes and non-floodplain soil lakes
Arid and semi-arid saline swamps of all substrates, water regimes, topographic types and vegetation communities	Arid and semi-arid saline swamps	Semi-arid swamps

Wetland name	Conceptual model	Wetland profile
Arid and semi-arid fresh tree swamps of all substrates, and water regimes and topographic types	Arid and semi-arid tree swamps	Arid swamps Semi-Arid swamps
Arid and semi-arid lignum swamps of all substrates, and water regimes and topographic types	Arid and semi-arid lignum swamps	Arid swamps Semi-Arid swamps
Arid and semi-arid grass, sedge, herb swamps of all substrates, water regimes and topographic types	Arid and semi-arid grass, sedge, herb swamps	Arid swamps Semi-Arid swamps
Arid and semi-arid fresh non-floodplain tree swamps of all substrates and water regimes	Arid and semi-arid non-floodplain tree swamps	Arid swamps Semi-Arid swamps
Arid and semi-arid fresh non-floodplain lignum swamps of all substrates and water regimes	Arid and semi-arid non-floodplain lignum swamps	Arid swamps Semi-Arid swamps
Arid and semi-arid fresh non-floodplain grass, sedge, herb swamps of all substrates and water regimes	Arid and semi-arid non-floodplain grass, sedge, herb swamps	Arid swamps Semi-Arid swamps
Arid and semi-arid, non-floodplain swamps - springs of all substrates, water regimes and vegetation communities	Arid and semi-arid spring swamps	Great Artesian Basin spring wetlands
Arid and semi-arid, saline lakes of all substrates, topographic types and water regimes	Arid and semi-arid saline lakes	Arid and semi-arid lakes
Arid and semi-arid, floodplain lakes of all, substrates and water regimes	Arid and semi-arid floodplain lakes	Arid and semi-arid lakes
Arid and semi-arid, non-floodplain Lakes of all substrates and water regimes	Arid and semi-arid non-floodplain lakes	Arid and semi-arid lakes
Arid/ semi-arid, non-floodplain (clay pans) lakes of all substrates and water regimes	Arid and semi-arid fresh non-floodplain lakes (clay pans)	Arid and semi-arid lakes
Arid and semi-arid, Permanent Lakes permanently inundated lakes of all substrates, water types, topographic types and vegetation communities	Arid and semi-arid permanent lakes	Arid and semi-arid lakes

Appendix C:
Directory of Important Wetlands
Australia Listings

Directory of Important Wetlands Australia: Listings

Haughton Balancing Storage Aggregation – QLD200

Level of importance:	National - Directory
Location:	On the floodplain between the Burdekin and Haughton rivers, with a central point at about 19 degrees 43' 19" S, 147 degrees 04' 38" E. It is 38 km south-west of Ayr.
Biogeographic region:	Brigalow Belt North
Shire:	Burdekin
Area:	213 ha
Elevation:	25m AHD
Other listed wetlands in same aggregation:	None
Wetland type:	C1
Criteria for inclusion:	3

Site description:

Physical features:

This storage is part of the Haughton Main Channel system, a water distribution system that carries water from the Burdekin River to the Haughton. The channel is one of three main distribution systems that comprise the Burdekin Irrigation Scheme. It is a shallow impoundment that is often almost entirely occupied by aquatic plants. It is locally and probably regionally important for waterbirds. These are very easily observed from the retaining wall of the storage. The retaining wall on the eastern side of the storage is constructed of broken rock and earth. Landform is an alluvial plain. Geology/soils: Cainozoic alluvial deposits. Cracking clays which are strongly alkaline by 60cm (Reid and Baker 1984)

Hydrological features:

The Haughton Main Channel has a flow capacity of about 7.6 cubic metres per second, and the balancing storage is intended to provide a reservoir that will maintain this flow (QWRC 1980). During a brief visit to the storage on 9 December 1999 the water in it was observed to be very turbid, and coffee coloured with a bluish tinge. The maximum depth is unknown but it is unlikely to be much greater than 2 m. The site is located in the Barrattas subcatchment of the Burdekin. The Barrattas are a complex system of intertwining stream channels and drainage depressions on the floodplain between the Burdekin and Haughton rivers. They play an important role in distributing floodwaters from these rivers and are used as a drain for irrigation tail waters.

Ecological features:

Artificially flooded palustrine wetland dominated by persistent emergents (*Typha* spp). Artificially flooded lacustrine littoral wetland dominated by rooted vascular aquatic bed. Artificially flooded lacustrine littoral wetland dominated by floating leaved aquatic bed. Artificially flooded lacustrine littoral wetland dominated by algal aquatic bed. These were observed on 9 December 1999. The emergent wetland is most likely quite stable in position and composition, the other types probably vary in position, composition and relative abundance.

Significance:

The site supports rich and extensive beds of aquatic plants which provide food and breeding sites for a wide range of water birds. Because water levels are maintained in the storage, the site has potential to be an important drought refuge for water birds. The long retaining wall, which has a road on it, provides a convenient viewing platform for bird watching, whilst minimising disturbance to the birds. This convenience and the site's proximity to Townsville give it potential to be a popular bird watching site, although access is currently restricted.

Notable flora:

Nymphoides indica, *Myriophyllum verrucosum*, floating algal mats, *Azolla pinnata*, *Hydrilla verticillata*, *Potamogeton crispus*, *Typha* spp and *Blyxa aubertii*.

Notable fauna:

During a brief visit on 9/12/1999 at least 200 black swans (*Cygnus atratus*), many magpie geese (*Anseranas semipalmata*), intermediate egrets (*Ardea intermedia*), comb-crested jacana (*Irediparra gallinacea*), darters (*Anhinga melanogaster*), yellow billed spoonbills (*Platalea flavipes*), royal spoonbills (*Platalea regia*), Caspian terns (*Sterna caspia*) and little black cormorants (*Phalacrocorax sulcirostris*), a few great egrets (*Ardea alba*) and a white-bellied sea-eagle (*Haliaeetus leucogaster*) (EPBC Migratory) were observed. Also recorded on the storage are black-necked stork (*Ephippiorhynchus asiaticus*) (Sr), the crimson finch (*Neochmia phaeton iredalei*) (Sv), black chinned honeyeater (*Melthreptus gularis*) (Sr), and fork tailed swift (*Apus pacificus*) (EPBC Migratory). Other species are grey teal (*Anas gracilis*), Pacific black duck (*Anas superciliosa*), white-necked heron (*Ardea pacifica*), Australian wood duck (*Chenonetta jubata*), wandering whistling-duck (*Dendrocygna arcuata*), plumed whistling-duck (*Dendrocygna eytoni*), little egret (*Egretta garzetta*), white-faced heron (*Egretta novaehollandiae*), black-fronted dotterel (*Elsayornis melanops*), buff-banded rail (*Gallirallus philippensis*), brolga (*Grus rubicunda*), nankeen night heron (*Nycticorax caledonicus*), great cormorant (*Phalacrocorax carbo*), little pied cormorant (*Phalacrocorax melanoleucos*), little black cormorant (*Phalacrocorax sulcirostris*), purple swamphen (*Porphyrio porphyrio*), Australasian grebe (*Tachybaptus novaehollandiae*), Australian white ibis (*Threskiornis molucca*), straw-necked ibis (*Threskiornis spinicollis*), forest kingfisher (*Todiramphus macleayii*), sacred kingfisher (*Todiramphus sanctus*) and red-backed kingfisher (*Todiramphus pyrrhopygia*). Glass shrimp, mussels and snails were observed to be common amongst the aquatic beds. The spectacled hare wallaby (*Largochestes conspicillatus*) has been observed adjacent to the retaining wall.

Other Fauna:

Social and Cultural values:

Water birds are very easily observed from the retaining wall of the storage. Access is currently restricted. If it were to be made more open it is likely that this site would acquire considerable renown as a bird watching site.

Land tenure:

On site: Water reserve. Surrounding areas: State land, freehold, and leasehold

Current land use:

This site is part of or adjacent to a modified water body currently managed for the primary purpose of water supply infrastructure and that also serves as a wetland. Notwithstanding that this is a modified or constructed wetland, the site does have biodiversity values that are consistent with the criteria for listing an important wetland on the DIWA. As the site is being operated as water supply infrastructure from time to time the management entity will need to undertake management actions and practices to maintain or enhance the supply of water to users. While such actions may not be undertaken for the primary purpose of protection of the environmental values, such activities need not be inconsistent with listing of the site on the DIWA. Similarly, listing on the DIWA does not preclude a possible future upgrade or other development of the current infrastructure. Any future modification or development of the water supply infrastructure should be assessed on merit as part of the requisite environmental assessment and approval process. On site: Balancing storage for irrigation waters. Surrounding areas: Horticulture (sugar cane), extensive grazing.

Disturbance or threat:

Current: The storage has been invaded by the aggressive aquatic grass *Hymenachne amplexicaulis*.

Potential: None apparent.

Conservation measures taken:

Apparently successful control of *Hymenachne*. An integrated catchment management plan is being developed for the Haughton, which recognises the wetland values and aims at constructive upstream management to preserve these values.

Management authority and jurisdiction:

SunWater.

References:

Blackman, JG *et al.* (2002); Queensland Water Resources Commission (1980); Reid, RE & Baker, DE (1984). See Queensland Reference List

Compiler & date:

Perry, TW, 2001. Edited Deacon, G, and Miller, GJ, 2004.

Drainage:

AWRC Division: North-East Coast
 AWRC Region: BURDEKIN
 AWRC Basin: HAUGHTON RIVER
 Catchment: Haughton River
 Sub-catchment:

Barratta Channels Aggregation – QLD196

Level of importance:	National - Directory
Location:	The Barrattas are a distributary system on the floodplain between the Haughton and Burdekin rivers. The site extends from the Bruce Highway 30 km south south-west to Woodhouse Mountain, and ranges in width from 1 to 5 km. The centre of the site is at 19 degrees 41' 32" S, 147 degrees 09' 30" E, about 29 km west south-west of Ayr.
Biogeographic region:	Brigalow Belt North
Shire:	Burdekin
Area:	7 118 ha.
Elevation:	8-30m AHD
Other listed wetlands in same aggregation:	Immediately upstream of the Jerona Aggregation (QLD201) which is part of the Burdekin-Townsville Coastal Aggregation (QLD005).
Wetland type:	B2, B4, B14, B10, A9
Criteria for inclusion:	1, 2, 3, 5,

Site description:**Physical features:**

A complex of distributary channels and drainage depressions, which appear to have been superimposed on a former delta of the Burdekin. Landform pattern is a flood plain with the landform elements of backplain, bank, bar, drainage depression, levee, plain, stream bed, stream channel, and swamp. Quaternary alluvium. Alkaline duplex or cracking grey clay with varying degrees of gilgai. These soils are poorly drained and the subsoil of the duplexes tends to be strongly sodic.

Hydrological features:

The source of Barratta Creek is in the Leichhardt Range, near Blue Mountain. For the early part of its course it is an ordinary small stream flowing from the coastal ranges onto the coastal plain. In the latter part of its course (i.e. to the north of Woodhouse Mountain) it spreads out and becomes a functioning part of the Burdekin-Haughton floodplain. During large floods of the Burdekin, floodwaters overtop the left bank levee in the vicinity of Clare and flow into the Barrattas system. It has been estimated that this will happen when discharge reaches 28,000 cubic metres per second. This discharge has been exceeded at least five times between 1919 and 1999. Large floods in the Haughton also occasionally spill over into the Barrattas, but less commonly than for the Burdekin. Flood peaks in the Burdekin

and Haughton rarely coincide. It appears that the Haughton was once a tributary of the Burdekin, joining it somewhere west of Clare. Barratta Creek then probably joined the Haughton or the Burdekin somewhere near there. At this time the coastline was probably about 5 km north of the northern end of the site (about 11 km south of the present coast line) and the area now occupied by it and the Jerona Aggregation would have constituted the focal part of the Burdekin-Haughton delta. Superficial sediments laid down by the Barrattas have since obscured this. It is probable that occasional very large Burdekin/Haughton floods, larger than any recorded, have played a significant role in scouring out channels and creating deep waterholes and other flood plain features on the site. A gauging station has operated on the main channel, at Northcote near the centre of the site since 1974. Up until 1986 the channel rarely carried flowing water for more than four months during the wet season. Since late 1987 flow has been continuous. In 1986 the Burdekin Falls Dam was completed and shortly thereafter irrigation of the flood plain between the Burdekin and the Haughton was expanded. Other stations have been located on the Barrattas since 1992 mainly to gauge the effects of irrigation tail waters on the system. Water quality results from these indicate that irrigation tail water entering the system has higher levels of nitrogen, phosphorous and organochlorides than waters naturally entering the system.

Ecological features:

Intermittent riverine, streambed, unconsolidated shore and aquatic bed. Palustrine, emergents, aquatic bed, and unconsolidated shore.

Significance:

The site provides a very good representative example of a flood distributary system on a large tropical flood plain. It provides valuable insights into the development of floodplains. The site represents some of the best remaining habitat on the lower Burdekin. It has been estimated that the majority of small mammals remaining on the lower Burdekin floodplain are reliant on riparian vegetation associated with the Barrattas. It is possible that the site provides critical habitat for the bare rumped sheath-tail bat *Saccolaimus saccolaimus nudicluniatus* (Nce, Sr), listed as critically endangered in the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999. One of very few records of this bat comes from Jerona, immediately to the north. More recent echolocation call data suggest it is still in the area. It is restricted to coastal woodland and appears to be dependent on hollows in old *Eucalyptus platyphylla* trees for roosting and breeding. This site and the adjacent Jerona probably represent the only suitable remaining habitat for it on the floodplain.

Notable flora:

The woodland surrounding the channels is generally dominated by *Eucalyptus platyphylla* with *Corymbia tessellaris* and *Corymbia dallachiana* prominent. The main grasses are *Heteropogon contortus*, *Themeda australis* and *Allotheropsis semialata*. *Ophiuros exaltatus* and *Dichanthium annulatum* become prominent, sometimes dominant in damper, less well drained areas. Riparian strips along channels and surrounding waterholes are broadly similar to the above. They tend to be denser, more diverse and *Melaleuca fluviatilis*, swamp tea-tree (*Melaleuca dealbata*) and weeping cabbage palm (*Livistona decipiens*) are commonly prominent or dominant. Some patches of riparian vegetation are so dense and diverse that they have a rainforest feel about them. The area upstream of the main bridge on the Clare-Giru road is a good example. Other species recorded in riparian strips on the site are listed below: *Leichhardt tree (Nauclea orientalis)*, creek sandpaper fig (*Ficus coronata*), *Eustrephus latifolius*, *Lomandra longifolia*, broad-leaved tea-tree (*Melaleuca leucadendra*), *Ficus opposita*, red kamala (*Mallotus philippensis*), *Lysiphellum* sp, *Gymnanthera oblonga*, *Lophostemon grandiflorus*, *Pandanus cookii*, cockatoo apple (*Planchonia careya*), *Milletia pinnata*, *Cupaniopsis anacardioides*, *Castanospora alphanthii*, *Antidesma parvifolium*, *Rostellularia adscendens*, doolan (*Acacia salicina*), *Wedelia spilanthis*, *Cyperus concinnus*, *Pterocaulon redolens*, *Phyllanthus virgatus*, *Grewia retusifolia*, and *Rhynchosia minima*.

Since irrigation in the area began, water in the system has remained permanently turbid. The effect that this has had on aquatic plants is uncertain. Beds of aquatic plants in the system tend to be scattered, sparse and dominated by emergents; this is probably a response to perennial turbidity. Species recorded in the channels and waterholes are listed below: *Pseudoraphis spinescens*, *Ludwigia peploides*, *Nymphaea violacea*, shiny nardoo (*Marsilea mutica*), *Hydrilla verticillata*, *Ceratophyllum demersum*, *Chara* sp, *Lemna minor*, *Azolla filiculoides*, *Myriophyllum verrucosum*, *Typha domingensis*, *Potamogeton crispus*, *Persicaria decipiens*, *Nymphaea gigantaea*, swamp rice grass (*Leersia hexandra*) and *Cyperus involucratus*.

Notable fauna:

grey teal (*Anas gracilis*), Pacific black duck (*Anas superciliosa*), plumed whistling duck (*Dendrocygna eytoni*), spectacled hare wallaby (*Largochestes conspicillatus*), and squirrel glider (*Petaurus norfolkensis*). Fish recorded in Barratta Creek are as follows: eastern rainbowfish (*Melanotaenia splendida*), bony bream (*Nematolosa erebi*), glass perchlet (*Ambassis agassizi*), fly specked hardyhead (*Craterocephalus stercusmuscarum*), barramundi (*Lates calcarifer*), tarpon (*Megalops cyprinoides*), northern mouth almighty (*Glossamia aprion*), empire gudgeon (*Hypseleotris compressa*), northern trout gudgeon (*Morgunda morgurda adpersa*), tandan (*Neosilurus species*),

salmon catfish (*Arius graeffei*), long finned eel (*Anguilla reinhardtii*), spangled perch (*Leiopotherapon unicolour*), milkfish (*Chanos chanos*), and banded grunter (*Amniatabia percooides*).

Other Fauna:

Social and Cultural values:
None known.

Land tenure:

On site: The majority of the site is water reserve or State land. There is some leasehold in the south. Surrounding areas: Mainly freehold, with substantial areas of national park to the west and north.

Current land use:

On site: The site was excluded from development during a recent expansion of the Burdekin River Irrigation Area. Some is lightly grazed; the rest is not used. Surrounding areas: Mainly horticulture (sugar cane and to a much lesser extent, mangoes) with some extensive grazing.

Disturbance or threat:

Current: The Burdekin River Irrigation Area (BRIA) is irrigated by an open-ended system. That is, water goes in at one end and a lesser amount comes out at the other. This flow is necessary to make the system work. The water that comes out at the other end is referred to as tail water and it is causing environmental problems on the Lower Burdekin. Most of the tail water from the BRIA flows into the Barrattas system. The whole system was once seasonal but tail waters are now tending to maintain flows throughout the year. Flow in West Barratta Creek remains intermittent. Between 1989 and 1991 rainfall increased 47% but the discharge of the Barrattas increased by 323%. Tail water has higher levels of nitrogen, phosphorus and organochlorides than waters naturally entering the system. The water from the Burdekin dam is permanently turbid, having high levels of fine-grained colloidal sediments that are held in suspension. Because the water holes and distributary channels of the Barrattas system are now used as irrigation infrastructure, turbid dam water has been mixed with clearer floodplain water, resulting in environmental changes. Excessive nutrients can lead to destructive algal blooms and excessive growth of weedy species, particularly the introduced pasture grasses *Brachiaria mutica* and *Hymenachne amplexicaulis* and the native *Typha* species. No significant algal blooms have yet been detected (this is probably more due to high turbidity than nutrient levels); *Hymenachne*, however, appears to be spreading through the system. There are concerns that nutrient concentrations will increase as production increases and the nutrient adsorption capacity of recently cultivated soils is exceeded. *Bothriochloa pertusa* has also been recorded on site, it has the potential to displace native species but it is more of a dryland weed. *Gambusia*, which has the potential to eliminate native fish species, has been recorded in Barratta Creek.

Potential: Continuing neglect is probably the greatest future threat to the site. It has been excluded from cane expansion but it is a narrow strip almost surrounded by land devoted to intensive agriculture. It is unlikely that the site will retain its natural values without some monitoring and management. It must be recognised that these wetland systems, when utilised as drainage outlets, require careful management to continue to function in a beneficial manner. The site represents one of the best remaining examples of a restricted type of coastal woodland and may be crucial habitat for a species listed as critically endangered in federal legislation. It is possible that salts in the sodic subsoils of the duplex soils on the site may be mobilised as a result of changes in the water regime. Elevation of saline groundwater tables to the surface is also possible.

Conservation measures taken:

The Barrattas floodplain has been inscribed on the Register of the National Estate (2002) for its natural values. The site has been excluded from cane expansion in recognition of these values; however there must be improved monitoring and management of the site to ensure that these values are maintained. An integrated catchment management plan is being developed for the adjacent Haughton catchment, which recognises the wetland values and aims at constructive upstream management to preserve these values.

Management authority and jurisdiction:

Department of Natural Resources and Mines, Burdekin River Irrigation Area, Environmental Protection Agency.

References:

Australian Centre for Tropical Freshwater Research. (1994); Australian Government (2004); Australian Heritage Commission. (2001); Blackman, J.G. et al. (2002); Congdon, R.A. & Lukacs, G.P. (1995); Congdon, R.A. & Lukacs G.P. (1996); Fleming, P.M. (1980); Hopley, D. (1970); Kinhill Cameron McNamara. (1996); Lavery, H.J. & Johnson, P.M. (1974). See Queensland Reference List

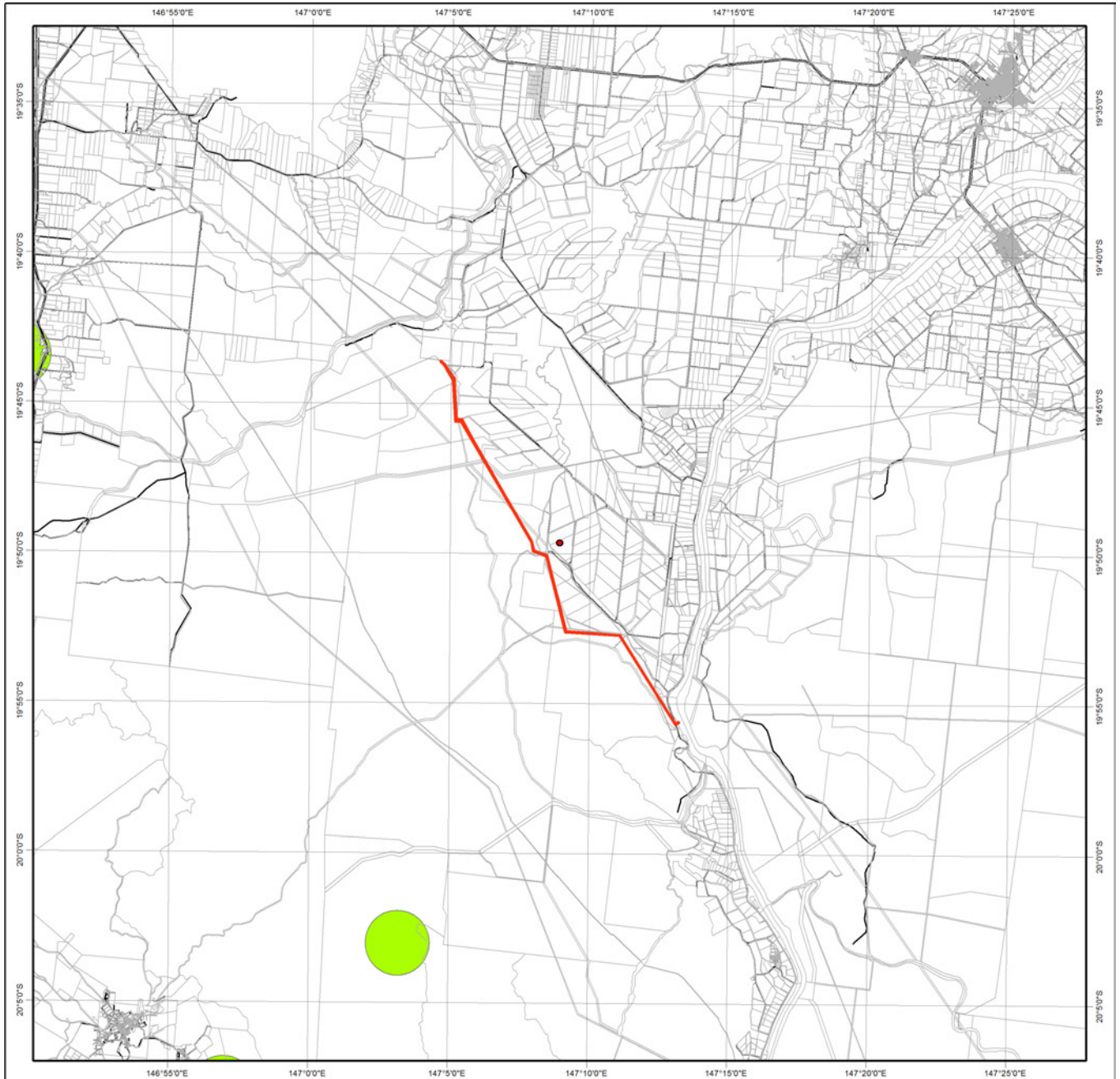
Compiler & date:

Perry, T. W., 2001. Edited Deacon, G., and Miller, G.J., 2004.

Drainage:

AWRC Division: North-East Coast
AWRC Region: BURDEKIN
AWRC Basin: HAUGHTON RIVER
Catchment: Barratta Creek
Sub-catchment:

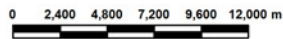
Appendix D:
Protected Plants Trigger Map



Protected Plants Flora Survey Trigger Map

Legend

- point
- polygon
- High risk area
- Other land parcel boundaries
- Freeways / motorways / highways
- Secondary roads / streets



This product is projected into:
GDA 1994 Queensland Albers

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

Land parcel boundaries are provided as locational aid only.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@des.qld.gov.au

Disclaimer:
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Protected plants flora survey trigger map

The protected plants flora survey trigger map identifies 'high risk areas' where endangered, vulnerable or near threatened plants are known to exist or are likely to exist. Under the *Nature Conservation Act 1992* (the Act) it is an offence to clear protected plants that are 'in the wild' unless you are authorised or the clearing is exempt, for more information see [section 89](#) of the Act.

Please see the Department of Environment and Science webpage on the [clearing of protected plants](#) for information on what exemptions may apply in your circumstances, whether you may need to undertake a flora survey, and whether you may need a protected plants clearing permit.

Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

Species information

Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the [Queensland Spatial Catalogue](#), the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the [clearing of protected plants](#) for more information.

Appendix E:
Matters of State Environmental
Significance Environmental Report



Queensland Government

Department of Environment and Science

Environmental Reports

Matters of State Environmental Significance

For the selected area of interest

Environmental Reports - General Information

The Environmental Reports portal provides for the assessment of selected matters of interest relevant to a user specified location, or area of interest (AOI). All area and derivative figures are relevant to the extent of matters of interest contained within the AOI unless otherwise stated. Please note, if a user selects an AOI via the "central coordinates" option, the resulting assessment area encompasses an area extending for a 2km radius from the point of interest.

All area and area derived figures included in this report have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

Figures in tables may be affected by rounding.

The matters of interest reported on in this document are based upon available state mapped datasets. Where the report indicates that a matter of interest is not present within the AOI (e.g. where area related calculations are equal to zero, or no values are listed), this may be due either to the fact that state mapping has not been undertaken for the AOI, that state mapping is incomplete for the AOI, or that no values have been identified within the site.

The information presented in this report should be considered as a guide only and field survey may be required to validate values on the ground.

Please direct queries about these reports to: Planning.Support@des.qld.gov.au

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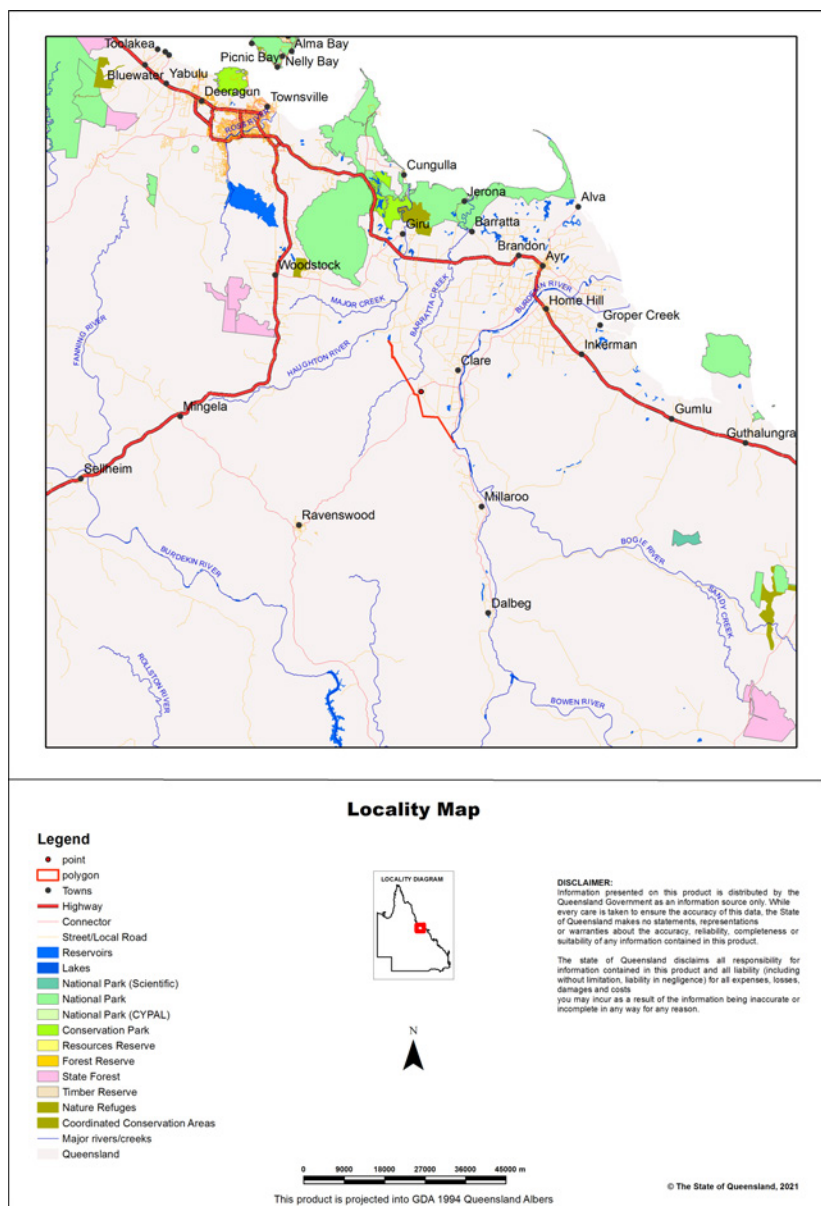
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Assessment Area Details

The following table provides an overview of the area of interest (AOI) with respect to selected topographic and environmental values.

Table 1: Summary table, details for AOI

Size (ha)	167.42
Local Government(s)	Burdekin Shire
Bioregion(s)	Brigalow Belt
Subregion(s)	Townsville Plains
Catchment(s)	Burdekin, Houghton



Matters of State Environmental Significance (MSES)

MSES Categories

Queensland's State Planning Policy (SPP) includes a biodiversity State interest that states:

'The sustainable, long-term conservation of biodiversity is supported. Significant impacts on matters of national or state environmental significance are avoided, or where this cannot be reasonably achieved; impacts are minimised and residual impacts offset.'

The MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The SPP defines matters of state environmental significance as:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992* ;
- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004* ;
- Areas within declared fish habitat areas that are management A areas or management B areas under the Fisheries Regulation 2008;
- Threatened wildlife under the *Nature Conservation Act 1992* and special least concern animals under the Nature Conservation (Wildlife) Regulation 2006;
- Regulated vegetation under the *Vegetation Management Act 1999* that is:
 - Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
 - Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
 - Category R areas on the regulated vegetation management map;
 - Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse and drainage feature map;
 - Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;
- Strategic Environmental Areas under the *Regional Planning Interests Act 2014* ;
- Wetlands in a wetland protection area of wetlands of high ecological significance shown on the Map of Queensland Wetland Environmental Values under the Environment Protection Regulation 2019;
- Wetlands and watercourses in high ecological value waters defined in the Environmental Protection (Water) Policy 2009, schedule 2;
- Legally secured offset areas.

MSES Values Present

The MSES values that are present in the area of interest are summarised in the table below:

Table 2: Summary of MSES present within the AOI

1a Protected Areas- estates	0.0 ha	0.0 %
1b Protected Areas- nature refuges	0.0 ha	0.0 %
1c Protected Areas- special wildlife reserves	0.0 ha	0.0 %
2 State Marine Parks- highly protected zones	0.0 ha	0.0 %
3 Fish habitat areas (A and B areas)	0.0 ha	0.0 %
4 Strategic Environmental Areas (SEA)	0.0 ha	0.0 %
5 High Ecological Significance wetlands on the map of Referable Wetlands	0.0 ha	0.0 %
6a High Ecological Value (HEV) wetlands	0.0 ha	0.0 %
6b High Ecological Value (HEV) waterways **	0.0 km	Not applicable
7a Threatened (endangered or vulnerable) wildlife	13.55 ha	8.1%
7b Special least concern animals	0.0 ha	0.0 %
7c i Koala habitat area - core (SEQ)	0.0 ha	0.0 %
7c ii Koala habitat area - locally refined (SEQ)	0.0 ha	0.0 %
8a Regulated Vegetation - Endangered/Of concern in Category B (remnant)	5.51 ha	3.3%
8b Regulated Vegetation - Endangered/Of concern in Category C (regrowth)	0.0 ha	0.0 %
8c Regulated Vegetation - Category R (GBR riverine regrowth)	1.04 ha	0.6%
8d Regulated Vegetation - Essential habitat	13.55 ha	8.1%
8e Regulated Vegetation - intersecting a watercourse **	1.5 km	Not applicable
8f Regulated Vegetation - within 100m of a Vegetation Management Wetland	1.15 ha	0.7%
9a Legally secured offset areas- offset register areas	0.0 ha	0.0 %
9b Legally secured offset areas- vegetation offsets through a Property Map of Assessable Vegetation	0.0 ha	0.0 %

Additional Information with Respect to MSES Values Present

MSES - State Conservation Areas

1a. Protected Areas - estates

(no results)

1b. Protected Areas - nature refuges

(no results)

1c. Protected Areas - special wildlife reserves

(no results)

2. State Marine Parks - highly protected zones

(no results)

3. Fish habitat areas (A and B areas)

(no results)

Refer to **Map 1 - MSES - State Conservation Areas** for an overview of the relevant MSES.

MSES - Wetlands and Waterways

4. Strategic Environmental Areas (SEA)

(no results)

5. High Ecological Significance wetlands on the Map of Queensland Wetland Environmental Values

(no results)

6a. Wetlands in High Ecological Value (HEV) waters

(no results)

6b. Waterways in High Ecological Value (HEV) waters

(no results)

Refer to **Map 2 - MSES - Wetlands and Waterways** for an overview of the relevant MSES.

MSES - Species

7a. Threatened (endangered or vulnerable) wildlife

Values are present

7b. Special least concern animals

Not applicable

7c i. Koala habitat area - core (SEQ)

Not applicable

7c ii. Koala habitat area - locally refined (SEQ)

Not applicable

Threatened (endangered or vulnerable) wildlife habitat suitability models

Species	Common name	NCA status	Presence
<i>Boronia keysii</i>		V	None
<i>Calyptorhynchus lathamii</i>	Glossy black cockatoo	V	None
<i>Casuarus casuaris johnsonii</i>	Sthn population cassowary	E	None
<i>Crinia tinnula</i>	Wallum froglet	V	None
<i>Denisonia maculata</i>	Ornamental snake	V	None
<i>Litoria freycineti</i>	Wallum rocketfrog	V	None
<i>Litoria olongburensis</i>	Wallum sedgefrog	V	None
<i>Melaleuca irbyana</i>		E	None
<i>Petaurus gracilis</i>	Mahogany Glider	E	None
<i>Petrogale persephone</i>	Proserpine rock-wallaby	E	None
<i>Phascolarctos cinereus</i>	Koala - outside SEQ*	V	None
<i>Pezoporus wallicus wallicus</i>	Eastern ground parrot	V	None
<i>Taudactylus pleione</i>	Kroombit tinkerfrog	E	None
<i>Xeromys myoides</i>	Water Mouse	V	None

*For koala model, this includes areas outside SEQ. Check 7c SEQ koala habitat for presence/absence.

Threatened (endangered or vulnerable) wildlife species records

Scientific name	Common name	NCA status	EPBC status	Migratory status
<i>Crocodylus porosus</i>	estuarine crocodile	V		M-B/E

Special least concern animal species records

(no results)

*Nature Conservation Act 1992 (NCA) Status- Endangered (E), Vulnerable (V) or Special Least Concern Animal (SL).
Environment Protection and Biodiversity Conservation Act 1999 (EPBC) status: Critically Endangered (CE) Endangered (E), Vulnerable (V)

Migratory status (M) - China and Australia Migratory Bird Agreement (C), Japan and Australia Migratory Bird Agreement (J), Republic of Korea and Australia Migratory Bird Agreement (R), Bonn Migratory Convention (B), Eastern Flyway (E)

To request a species list for an area, or search for a species profile, access Wildlife Online at:

<https://www.qld.gov.au/environment/plants-animals/species-list/>

Refer to **Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals** and **Map 3b - MSES - Species - Koala habitat area (SEQ)** for an overview of the relevant MSES.

MSES - Regulated Vegetation

For further information relating to regional ecosystems in general, go to:

<https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/>

For a more detailed description of a particular regional ecosystem, access the regional ecosystem search page at:

<https://environment.ehp.qld.gov.au/regional-ecosystems/>

8a. Regulated Vegetation - Endangered/Of concern in Category B (remnant)

Regional ecosystem	Vegetation management polygon	Vegetation management status
11.3.4/11.3.25/11.3.13/11.3.25b	O-dom	rem_oc

8b. Regulated Vegetation - Endangered/Of concern in Category C (regrowth)

Not applicable

8c. Regulated Vegetation - Category R (GBR riverine regrowth)

Regulated vegetation map category	Map number	RVM rule
R	8358	4

8d. Regulated Vegetation - Essential habitat

Values are present

8e. Regulated Vegetation - intersecting a watercourse**

A vegetation management watercourse is mapped as present

8f. Regulated Vegetation - within 100m of a Vegetation Management wetland

Regulated vegetation map category	Map number	RVM rule
B	8358	2

Refer to **Map 4 - MSES - Regulated Vegetation** for an overview of the relevant MSES.

MSES - Offsets

9a. Legally secured offset areas - offset register areas

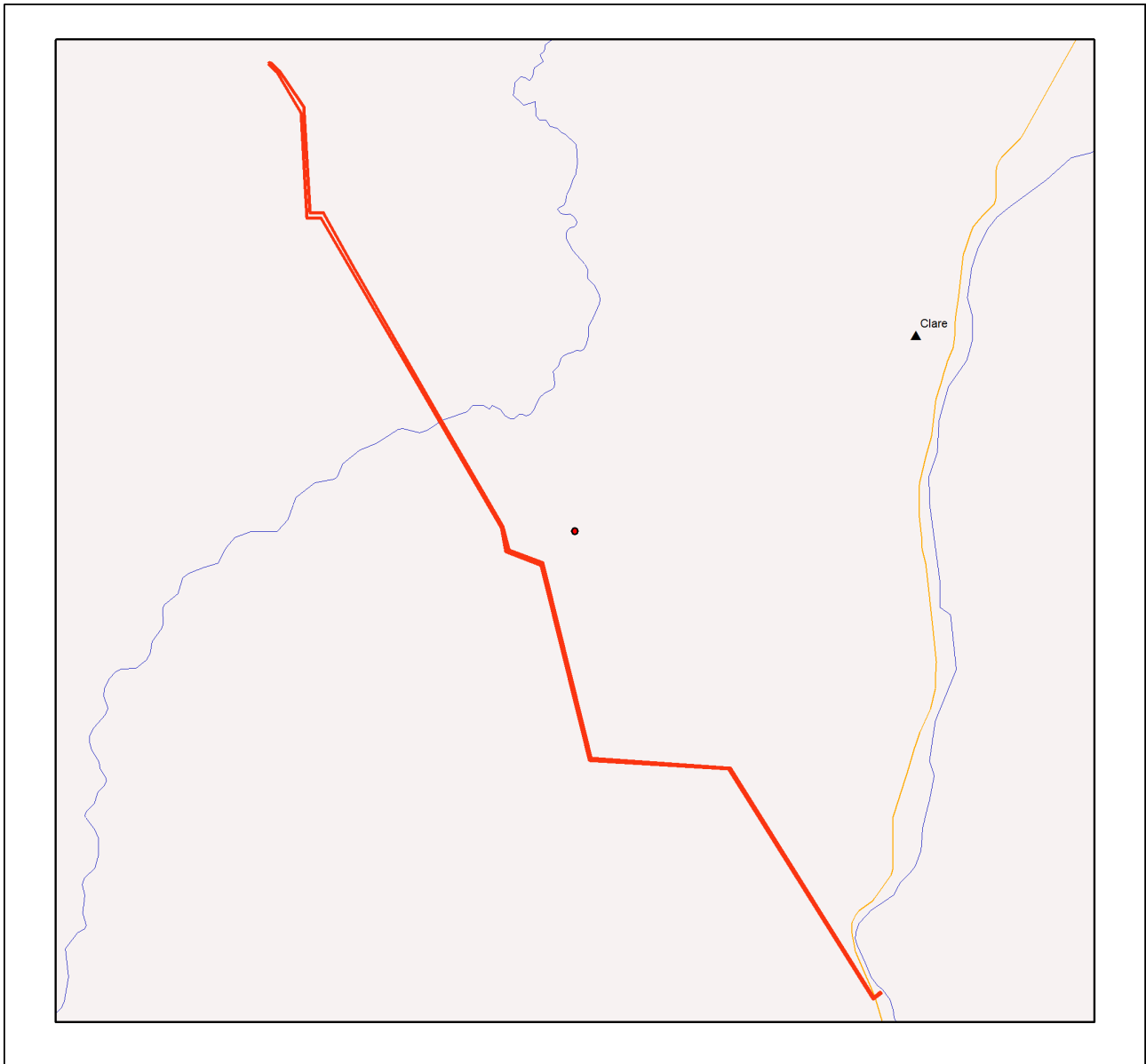
(no results)

9b. Legally secured offset areas - vegetation offsets through a Property Map of Assessable Vegetation

(no results)

Refer to **Map 5 - MSES - Offset Areas** for an overview of the relevant MSES.

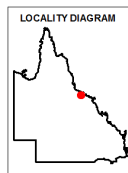
Map 1 - MSES - State Conservation Areas



MSES - State Conservation Areas

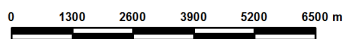
Area of Interest

- point
- ▭ polygon
- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Protected area (estates, nature refuges, special wildlife reserves)
- Declared fish habitat area (A and B areas)
- Marine park (highly protected)



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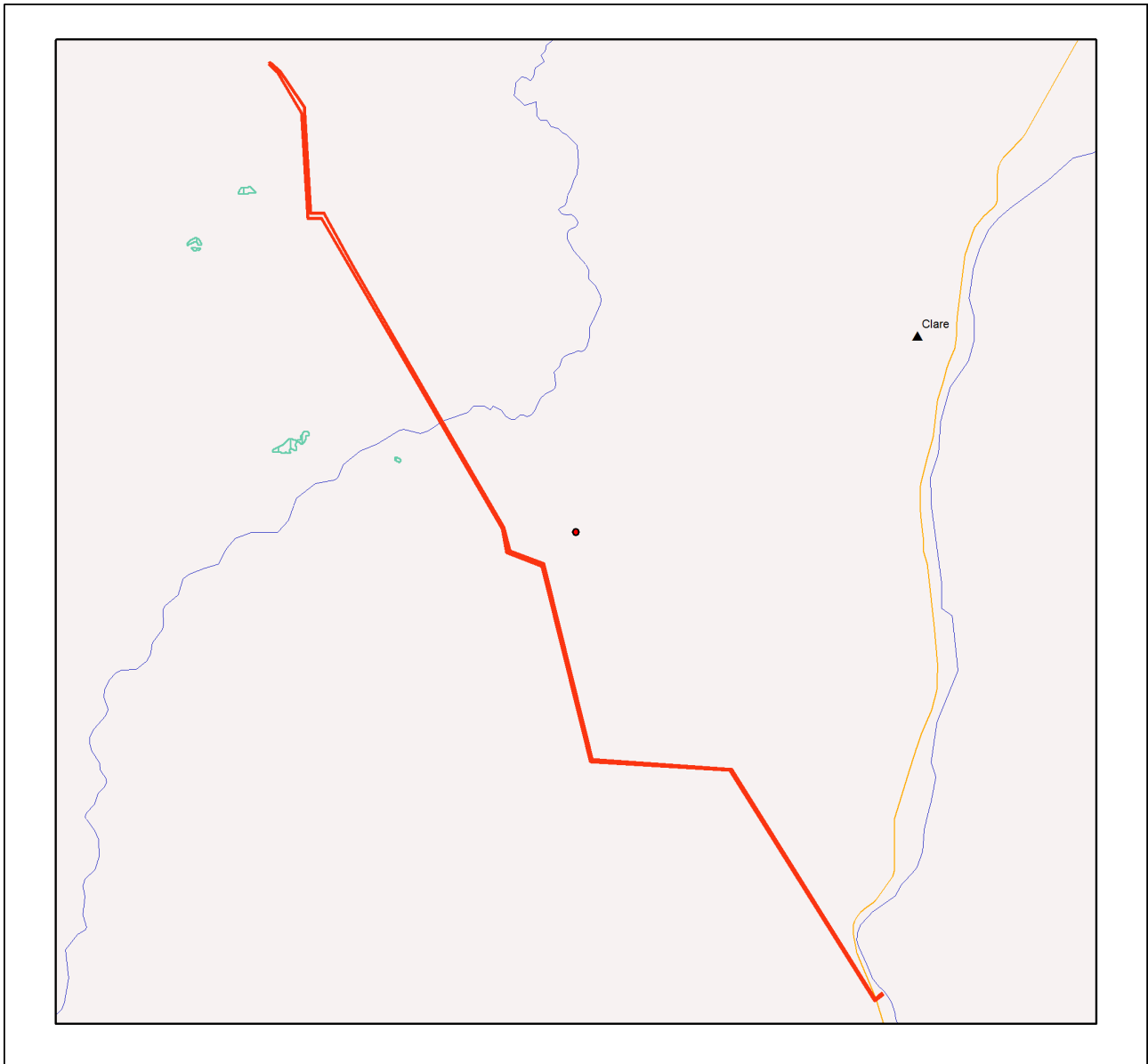
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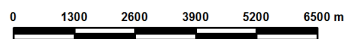
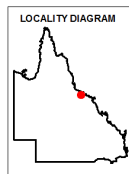
Map 2 - MSES - Wetlands and Waterways



MSES - Wetlands and Waterways

Area of Interest

- point
- ▭ polygon
- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Declared high ecological value waters (watercourse)
- ▭ Strategic environmental area (designated precinct)
- ▭ Declared high ecological value waters (wetland)
- ▭ High ecological significance wetlands



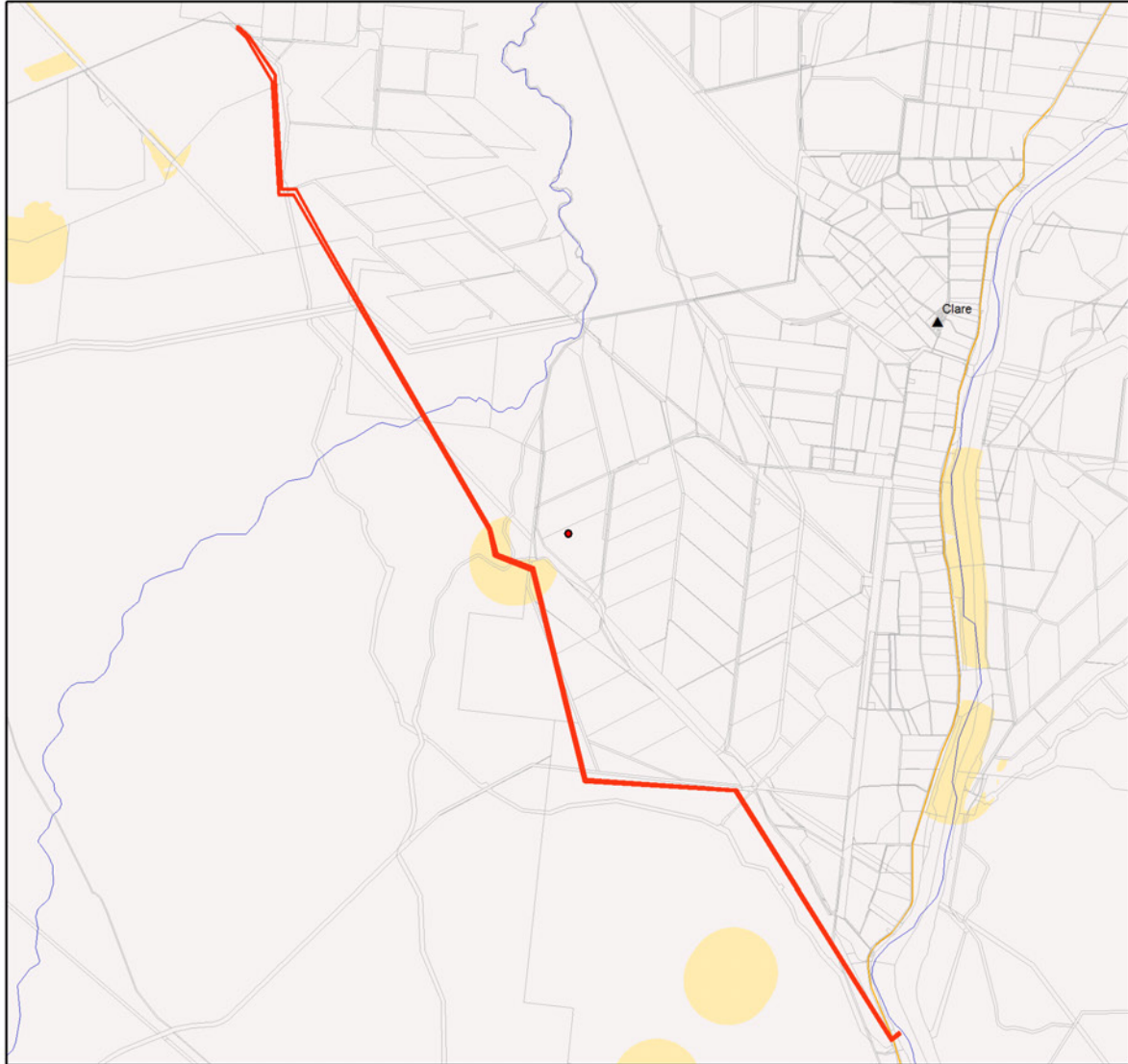
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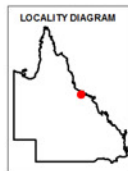
Map 3a - MSES - Species - Threatened (endangered or vulnerable) wildlife and special least concern animals



MSES - Species Threatened (endangered or vulnerable) wildlife and special least concern animals

Area of Interest

- point
- ▭ polygon
- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- ▭ Wildlife habitat (special least concern)
- ▭ Wildlife habitat (endangered or vulnerable)



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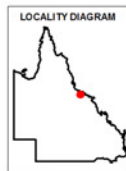
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Map 3b - MSES - Species - Koala habitat area (SEQ)



MSES - Species Koala habitat area (SEQ)

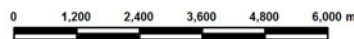
- Area of Interest**
- point
 - ▭ polygon
 - ▲ Towns
 - Freeways/Highways
 - Secondary roads
 - Major rivers/creeks
 - Koala habitat area (core)
 - Koala habitat area (locally refined)



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The represented layers for SEQ 'koala habitat area-core' and 'koala habitat area- locally refined' in MSES are sourced directly from the regulatory mapping under the Nature Conservation (Koala) Conservation Plan 2017. Whilst every effort is made to ensure the information remains current, there may be delays between updating versions. Please refer to the original mapping for the most recent version. See <https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping>

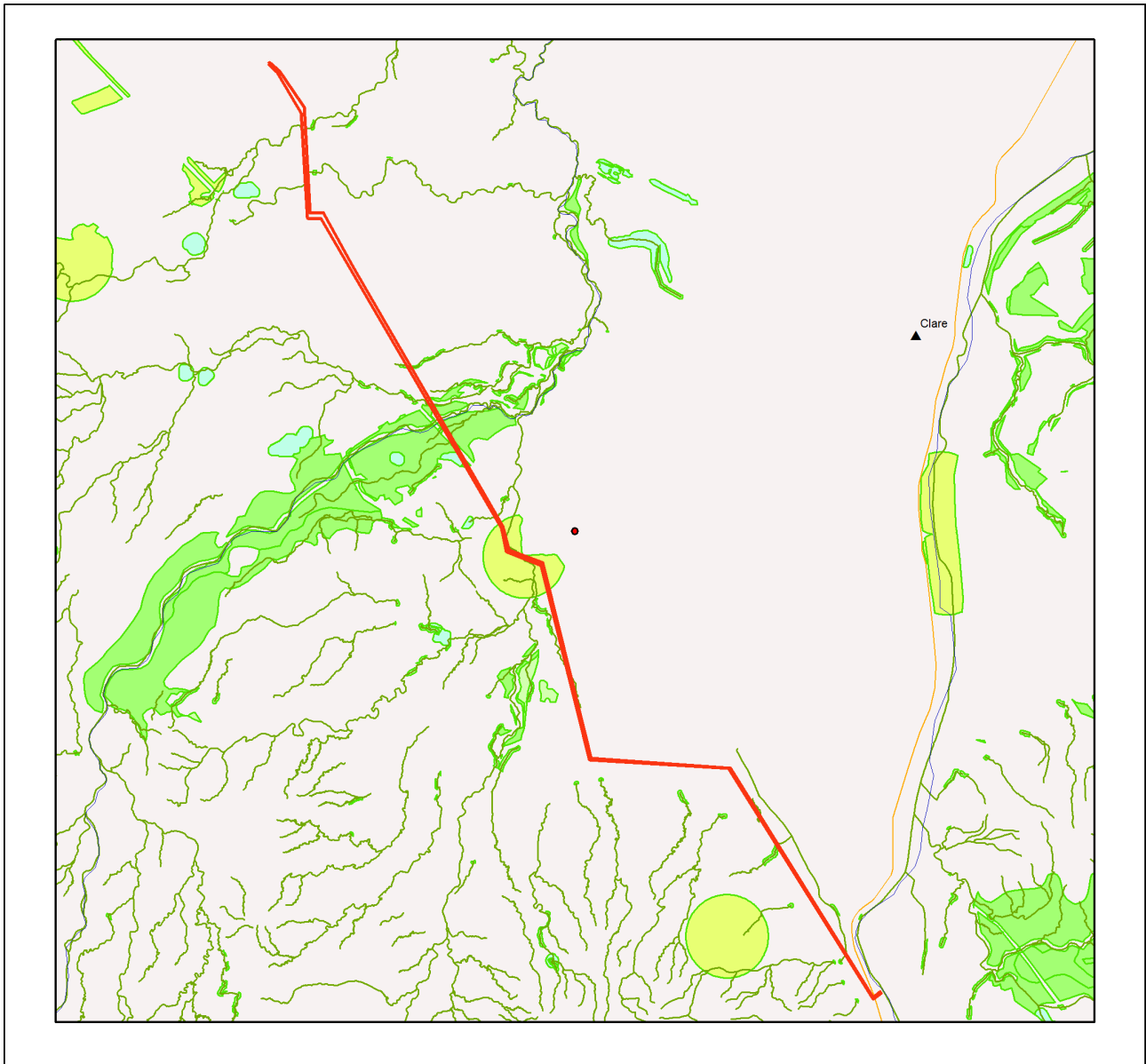
The koala habitat mapping within South East Queensland uses regional ecosystem linework compiled at a scale varying from 1:25,000 to 1:100,000. Linework should be used as a guide only. The positional accuracy of regional ecosystem data mapped at a scale of 1:100,000 is +/- 100 metres.



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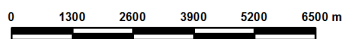
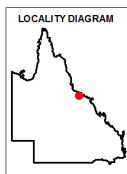
Map 4 - MSES - Regulated Vegetation



MSES - Regulated Vegetation

Area of Interest

- point
- polygon
- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Regulated vegetation (intersecting a watercourse)
- Regulated vegetation (100m from wetland)
- Regulated vegetation (category B - endangered or of concern)
- Regulated vegetation (category C - endangered or of concern)
- Regulated vegetation (category R - GBR riverine)
- Regulated vegetation (essential habitat)



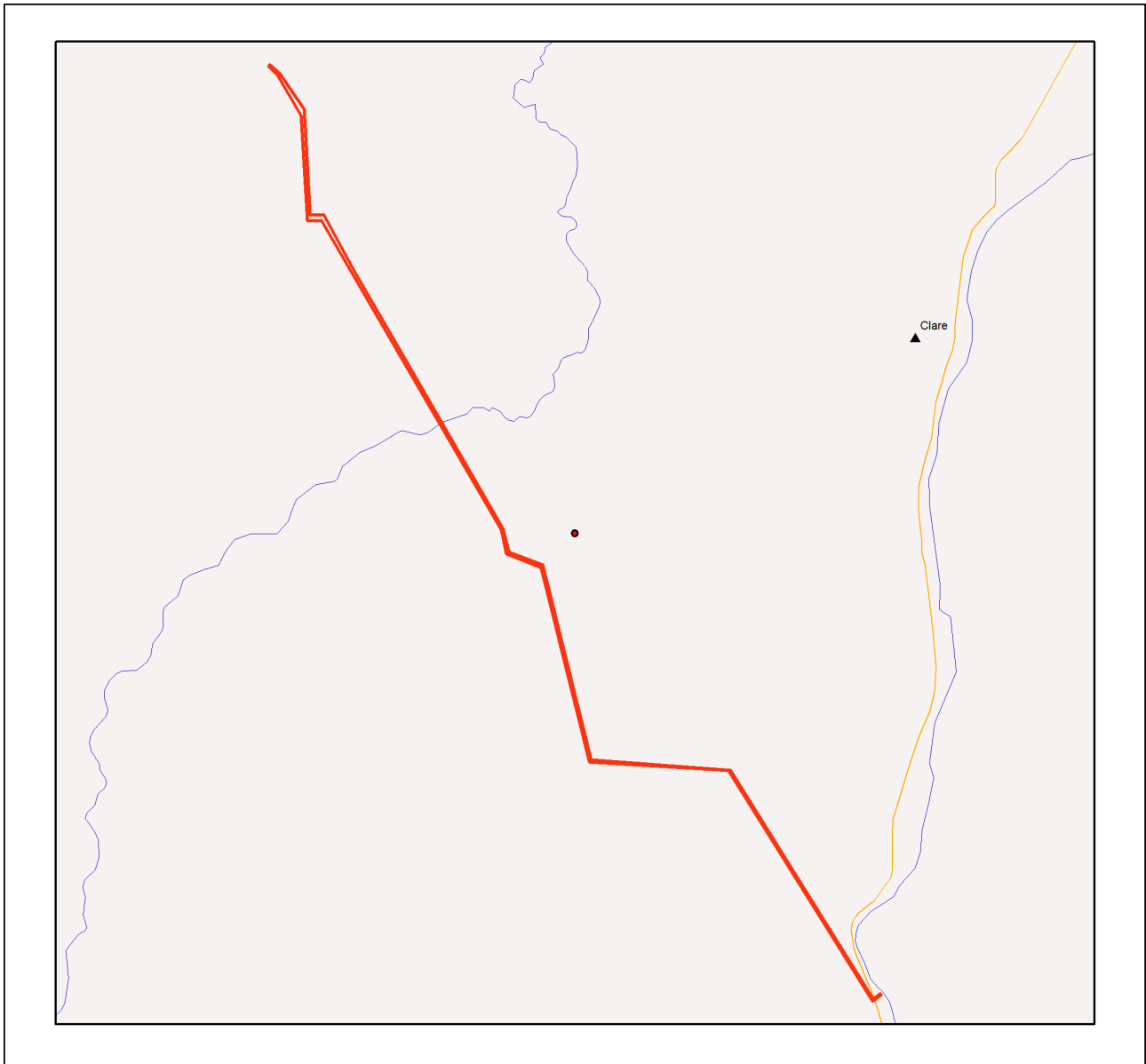
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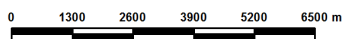
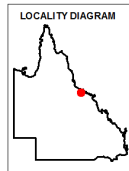
Map 5 - MSES - Offset Areas



MSES - Offsets

Area of Interest

- point
- polygon
- ▲ Towns
- Freeways/Highways
- Secondary roads
- Major rivers/creeks
- Legally secured offset area (offset register)
- Legally secured offset area (vegetation offsets)



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Appendices

Appendix 1 - Matters of State Environmental Significance (MSES) methodology

MSES mapping is a regional-scale representation of the definition for MSES under the State Planning Policy (SPP). The compiled MSES mapping product is a guide to assist planning and development assessment decision-making. Its primary purpose is to support implementation of the SPP biodiversity policy. While it supports the SPP, the mapping does not replace the regulatory mapping or environmental values specifically called up under other laws or regulations. Similarly, the SPP biodiversity policy does not override or replace specific requirements of other Acts or regulations.

The Queensland Government's "Method for mapping - matters of state environmental significance for use in land use planning and development assessment" can be downloaded from:

<http://www.ehp.qld.gov.au/land/natural-resource/method-mapping-mses.html> .

Appendix 2 - Source Data

The datasets listed below are available on request from:

<http://qldspatial.information.qld.gov.au/catalogue/custom/index.page>

- Matters of State environmental significance

Note: MSES mapping is not based on new or unique data. The primary mapping product draws data from a number of underlying environment databases and geo-referenced information sources. MSES mapping is a versioned product that is updated generally on a twice-yearly basis to incorporate the changes to underlying data sources. Several components of MSES mapping made for the current version may differ from the current underlying data sources. To ensure accuracy, or proper representation of MSES values, it is strongly recommended that users refer to the underlying data sources and review the current definition of MSES in the State Planning Policy, before applying the MSES mapping.

Individual MSES layers can be attributed to the following source data available at QSpatial:

MSES layers	current QSpatial data (http://qspatial.information.qld.gov.au)
Protected Areas-Estates, Nature Refuges, Special Wildlife Reserves	- Protected areas of Queensland - Nature Refuges - Queensland - Special Wildlife Reserves- Queensland
Marine Park-Highly Protected Zones	Moreton Bay marine park zoning 2008
Fish Habitat Areas	Queensland fish habitat areas
Strategic Environmental Areas-designated	Regional Planning Interests Act - Strategic Environmental Areas
HES wetlands	Map of Queensland Wetland Environmental Values
Wetlands in HEV waters	HEV waters: - EPP Water intent for waters Source Wetlands: - Queensland Wetland Mapping (Current version 5) Source Watercourses: - Vegetation management watercourse and drainage feature map (1:100000 and 1:250000)
Wildlife habitat (threatened and special least concern)	-WildNet database species records - habitat suitability models (various) - SEQ koala habitat areas under the Koala Conservation Plan 2019
VMA regulated regional ecosystems	Vegetation management regional ecosystem and remnant map
VMA Essential Habitat	Vegetation management - essential habitat map
VMA Wetlands	Vegetation management wetlands map
Legally secured offsets	Vegetation Management Act property maps of assessable vegetation. For offset register data-contact DES
Regulated Vegetation Map	Vegetation management - regulated vegetation management map

Appendix 3 - Acronyms and Abbreviations

AOI	- Area of Interest
DES	- Department of Environment and Science
EP Act	- <i>Environmental Protection Act 1994</i>
EPP	- Environmental Protection Policy
GDA94	- Geocentric Datum of Australia 1994
GEM	- General Environmental Matters
GIS	- Geographic Information System
MSES	- Matters of State Environmental Significance
NCA	- <i>Nature Conservation Act 1992</i>
RE	- Regional Ecosystem
SPP	- State Planning Policy
VMA	- <i>Vegetation Management Act 1999</i>

Appendix F:
Wildlife Online Database Search



Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point

Species: All

Type: All

Status: All

Records: All

Date: All

Latitude: -19.8296

Longitude: 147.1325

Distance: 30

Email: rhiannon@natres.com.au

Date submitted: Thursday 01 Jul 2021 08:45:23

Date extracted: Thursday 01 Jul 2021 08:50:07

The number of records retrieved = 677

Disclaimer

As the DSITIA is still in a process of collating and vetting data, it is possible the information given is not complete. The information provided should only be used for the project for which it was requested and it should be appropriately acknowledged as being derived from Wildlife Online when it is used.

The State of Queensland does not invite reliance upon, nor accept responsibility for this information. Persons should satisfy themselves through independent means as to the accuracy and completeness of this information.

No statements, representations or warranties are made about the accuracy or completeness of this information. The State of Queensland disclaims all responsibility for this information and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufo	<i>Rhinella marina</i>	cane toad	Y			12
animals	amphibians	Hylidae	<i>Litoria bicolor</i>	northern sedgefrog		C		1
animals	amphibians	Hylidae	<i>Litoria inermis</i>	bumpy rocketfrog		C		2
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		2
animals	amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog		C		2
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		1
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		4
animals	amphibians	Limnodynastidae	<i>Limnodynastes convexiusculus</i>	marbled frog		C		1
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		17
animals	birds	Acanthizidae	<i>Smicromis brevirostris</i>	weebill		C		12
animals	birds	Acanthizidae	<i>Gerygone palpebrosa</i>	fairy gerygone		C		3
animals	birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza		C		8
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		7
animals	birds	Accipitridae	<i>Lophoictinia isura</i>	square-tailed kite		C		3
animals	birds	Accipitridae	<i>Pandion cristatus</i>	eastern osprey		SL		1
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		7
animals	birds	Accipitridae	<i>Circus assimilis</i>	spotted harrier		C		6
animals	birds	Accipitridae	<i>Haliastur indus</i>	brahmyny kite		C		3
animals	birds	Accipitridae	<i>Milvus migrans</i>	black kite		C		64
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		11
animals	birds	Accipitridae	<i>Haliastur sphenurus</i>	whistling kite		C		47
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		19
animals	birds	Accipitridae	<i>Accipiter novaehollandiae</i>	grey goshawk		C		1
animals	birds	Accipitridae	<i>Circus approximans</i>	swamp harrier		C		6
animals	birds	Acrocephalidae	<i>Acrocephalus australis</i>	Australian reed-warbler		C		7
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar		C		1
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		4
animals	birds	Alcedinidae	<i>Ceyx pusillus</i>	little kingfisher		C		1
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose		C		12
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		19
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck		C		18
animals	birds	Anatidae	<i>Dendrocygna eytoni</i>	plumed whistling-duck		C		17/3
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		6
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal		C		9
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		39
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead		C		18
animals	birds	Anatidae	<i>Nettapus pulchellus</i>	green pygmy-goose		C		11
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		46
animals	birds	Anseranatidae	<i>Anseranas semipalmata</i>	maggpie goose		C		44
animals	birds	Apodidae	<i>Aerodramus terraereginae</i>	Australian swiftlet		C		2
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		V	V	1
animals	birds	Apodidae	<i>Apus pacificus</i>	fork-tailed swift		SL		2
animals	birds	Ardeidae	<i>Bubulcus ibis</i>	cattle egret		C		10
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		15
animals	birds	Ardeidae	<i>Egretta picata</i>	pieb heron		C		1
animals	birds	Ardeidae	<i>Ardea sumatrana</i>	great-billed heron		C		2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		25
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		28
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron		C		8
animals	birds	Ardeidae	<i>Ixobrychus flavicollis</i>	black bittern		C		4
animals	birds	Ardeidae	<i>Egretta garzetta</i>	little egret		C		10
animals	birds	Ardeidae	<i>Ixobrychus dubius</i>	Australian little bittern		C		1
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		37
animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		2
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		50
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		5
animals	birds	Artamidae	<i>Strepera graculina</i>	pieb currawong		C		13
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	pieb butcherbird		C		44
animals	birds	Artamidae	<i>Artamus personatus</i>	masked woodswallow		C		1
animals	birds	Artamidae	<i>Artamus cinereus</i>	black-faced woodswallow		C		15
animals	birds	Artamidae	<i>Artamus minor</i>	little woodswallow		C		1
animals	birds	Artamidae	<i>Gymnorhina tibicen</i>	Australian magpie		C		58
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew		C		7
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		31
animals	birds	Cacatuidae	<i>Nymphicus hollandicus</i>	cockatiel		C		3
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		4
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo		C		49
animals	birds	Campephagidae	<i>Coracina tenuirostris</i>	cidcabird		C		2
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		71
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		6
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		27
animals	birds	Campephagidae	<i>Coracina maxima</i>	ground cuckoo-shrike		C		1
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		49
animals	birds	Caprimulgidae	<i>Caprimulgus macrurus</i>	large-tailed nightjar		C		1
animals	birds	Casuariidae	<i>Dromaius novaehollandiae</i>	emu		C		1
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		36
animals	birds	Charadriidae	<i>Elseya melanops</i>	black-fronted dotterel		C		5
animals	birds	Charadriidae	<i>Charadrius ruficapillus</i>	red-capped plover		C		1
animals	birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork		C		14
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		11
animals	birds	Cisticolidae	<i>Cisticola juncidis laveryi</i>	zitting cisticola		C		2
animals	birds	Columbidae	<i>Geophaps scripta scripta</i>	squatter pigeon (southern subspecies)		V	V	2
animals	birds	Columbidae	<i>Lopholaimus antarcticus</i>	topknot pigeon		C		4
animals	birds	Columbidae	<i>Streptopelia chinensis</i>	spotted dove	Y			2
animals	birds	Columbidae	<i>Macropygia amboinensis</i>	brown cuckoo-dove		C		2
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		23
animals	birds	Columbidae	<i>Columba livia</i>	rock dove	Y			5
animals	birds	Columbidae	<i>Ducula bicolor</i>	pieb imperial-pigeon		C		2
animals	birds	Columbidae	<i>Geopelia cuneata</i>	diamond dove		C		8
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		88
animals	birds	Columbidae	<i>Geophaps scripta</i>	squatter pigeon		C		11
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		40

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		1
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		21
animals	birds	Corcoracidae	<i>Struthidea cinerea</i>	apostlebird		C		17
animals	birds	Corcoracidae	<i>Corcorax melanorhamphos</i>	white-winged chough		C		5
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		30
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		29
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		14
animals	birds	Cuculidae	<i>Chalcites minutillus russatus</i>	Gould's bronze-cuckoo		C		4
animals	birds	Cuculidae	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo		C		11
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		2
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo		C		20
animals	birds	Cuculidae	<i>Chalcites minutillus</i>	little bronze-cuckoo		C		11
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel		C		12
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo		C		34/1
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		45
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		6
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		45
animals	birds	Estrildidae	<i>Lonchura punctulata</i>	nutmeg mannikin	Y			9
animals	birds	Estrildidae	<i>Neochmia modesta</i>	plum-headed finch		C		12
animals	birds	Estrildidae	<i>Neochmia phaeton</i>	crimson finch		C		10
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin		C		341
animals	birds	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch		C		13
animals	birds	Estrildidae	<i>Taeniopygia guttata</i>	zebra finch		C		7
animals	birds	Estrildidae	<i>Poephila cincta cincta</i>	black-throated finch (white-rumped subspecies)		E	E	15
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		63
animals	birds	Eurostopodidae	<i>Eurostopodus argus</i>	spotted nightjar		C		1
animals	birds	Falconidae	<i>Falco berigora</i>	brown falcon		C		14
animals	birds	Falconidae	<i>Falco longipennis</i>	Australian hobby		C		7
animals	birds	Falconidae	<i>Falco subniger</i>	black falcon		C		1
animals	birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon		C		5
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		11
animals	birds	Gruidae	<i>Antigone rubicunda</i>	brolga		C		13
animals	birds	Halcyonidae	<i>Dacelo leachii</i>	blue-winged kookaburra		C		60
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		32
animals	birds	Halcyonidae	<i>Todiramphus macleayi</i>	forest kingfisher		C		60
animals	birds	Halcyonidae	<i>Todiramphus pyrrhopygius</i>	red-backed kingfisher		C		3
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		34
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		22
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		14
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		23
animals	birds	Jacanidae	<i>Irediparra gallinacea</i>	comb-crested jacana		C		27
animals	birds	Laridae	<i>Gelochelidon nilotica</i>	gull-billed tern		SL		2
animals	birds	Laridae	<i>Hydroprogne caspia</i>	Caspian tern		SL		5
animals	birds	Laridae	<i>Chlidonias hybrida</i>	whiskered tern		C		2
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		76

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Megaluridae	<i>Cincloramphus mathewsi</i>	rufous songlark		C		21
animals	birds	Megaluridae	<i>Megalurus timoriensis</i>	tawny grassbird		C		22
animals	birds	Megapodiidae	<i>Alectura lathamii</i>	Australian brush-turkey		C		6
animals	birds	Meliphagidae	<i>Meliphaga notata</i>	yellow-spotted honeyeater		C		3
animals	birds	Meliphagidae	<i>Myzomela obscura</i>	dusky honeyeater		C		5
animals	birds	Meliphagidae	<i>Stomiopera flava</i>	yellow honeyeater		C		92
animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		5
animals	birds	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater		C		1
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		53/1
animals	birds	Meliphagidae	<i>Manorina flavigula</i>	yellow-throated miner		C		25
animals	birds	Meliphagidae	<i>Epthianura tricolor</i>	crimson chat		C		1
animals	birds	Meliphagidae	<i>Gavicalis virescens</i>	singing honeyeater		C		1
animals	birds	Meliphagidae	<i>Philemon buceroides</i>	helmeted friarbird		C		7
animals	birds	Meliphagidae	<i>Stomiopera unicolor</i>	white-gaped honeyeater		C		6
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		48
animals	birds	Meliphagidae	<i>Melithreptus gularis</i>	black-chinned honeyeater		C		10
animals	birds	Meliphagidae	<i>Ramsayornis modestus</i>	brown-backed honeyeater		C		21
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		23
animals	birds	Meliphagidae	<i>Ramsayornis fasciatus</i>	bar-breasted honeyeater		C		3
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		5
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		5
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		60
animals	birds	Meliphagidae	<i>Conopophila rufogularis</i>	rufous-throated honeyeater		C		14
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		55
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		66
animals	birds	Monarchidae	<i>Symposiachrus trivirgatus</i>	spectacled monarch		SL		3
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		12
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		64
animals	birds	Monarchidae	<i>Myiagra cyanoleuca</i>	satin flycatcher		SL		1
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		81
animals	birds	Monarchidae	<i>Monarcha melanopsis</i>	black-faced monarch		SL		3
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		5
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		18
animals	birds	Nectariniidae	<i>Cinnyris jugularis</i>	olive-backed sunbird		C		32
animals	birds	Oriolidae	<i>Sphecotheres vieillotii</i>	Australasian figbird		C		25
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		24
animals	birds	Otididae	<i>Ardeotis australis</i>	Australian bustard		C		9
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		89
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		1
animals	birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush		C		12
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		50
animals	birds	Passeridae	<i>Passer domesticus</i>	house sparrow	Y			6
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		18
animals	birds	Petroicidae	<i>Poecilodryas superciliosa</i>	white-browed robin		C		1
animals	birds	Petroicidae	<i>Microeca flavigaster</i>	lemon-bellied flycatcher		C		49
animals	birds	Petroicidae	<i>Microeca fascinans</i>	jacky winter		C		10

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Petroicidae	<i>Petroica goodenovii</i>	red-capped robin		C		2
animals	birds	Petroicidae	<i>Melanodryas cucullata</i>	hooded robin		C		1
animals	birds	Phalacrocoracidae	<i>Phalacrocorax carbo</i>	great cormorant		C		13
animals	birds	Phalacrocoracidae	<i>Phalacrocorax varius</i>	piebald cormorant		C		4
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		36
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		32
animals	birds	Phasianidae	<i>Coturnix ypsilophora</i>	brown quail		C		12
animals	birds	Pittidae	<i>Pitta versicolor</i>	noisy pitta		C		1
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		5
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		20
animals	birds	Podicipedidae	<i>Podiceps cristatus</i>	great crested grebe		C		8
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		7
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		25
animals	birds	Psittacidae	<i>Aprosmictus erythropterus</i>	red-winged parrot		C		26
animals	birds	Psittacidae	<i>Trichoglossus moluccanus</i>	rainbow lorikeet		C		44
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		58
animals	birds	Psittacidae	<i>Melopsittacus undulatus</i>	budgerigar		C		2
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus maculatus</i>	spotted bowerbird		C		1
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus nuchalis</i>	great bowerbird		C		29
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		5
animals	birds	Rallidae	<i>Porphyrio melanotus</i>	purple swamphen		C		2
animals	birds	Rallidae	<i>Amaurornis moluccana</i>	pale-vented bush-hen		C		7
animals	birds	Rallidae	<i>Gallirallus philippensis</i>	buff-banded rail		C		6
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		5
animals	birds	Rallidae	<i>Porzana pusilla</i>	Baillon's crane		C		1
animals	birds	Rallidae	<i>Porzana fluminea</i>	Australian spotted crane		C		1
animals	birds	Rallidae	<i>Porzana tabuensis</i>	spotless crane		C		1
animals	birds	Rallidae	<i>Amaurornis cinerea</i>	white-browed crane		C		3
animals	birds	Recurvirostridae	<i>Recurvirostra novaehollandiae</i>	red-necked avocet		C		1
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		4
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		76
animals	birds	Rhipiduridae	<i>Rhipidura rufiventris</i>	northern fantail		C		1
animals	birds	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail		SL		2
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		71
animals	birds	Scolopacidae	<i>Gallinago hardwickii</i>	Latham's snipe		SL		1
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		1
animals	birds	Strigidae	<i>Ninox rufa queenslandica</i>	rufous owl (southern subspecies)		C		1
animals	birds	Strigidae	<i>Ninox connivens</i>	barking owl		C		8
animals	birds	Sturnidae	<i>Aplonis metallica</i>	metallic starling		C		1
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		35
animals	birds	Threskiornithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		40
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill		C		18
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill		C		18
animals	birds	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis		SL		5
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silveryeye		C		2
animals	birds	Turnicidae	<i>Turnix varius</i>	painted button-quail		C		1

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animals	birds	Turnicidae	<i>Turnix pyrrhоторax</i>	red-chested button-quail		C		2
animals	birds	Turnicidae	<i>Turnix maculosus</i>	red-backed button-quail		C		4
animals	birds	Tytonidae	<i>Tyto delicatula</i>	eastern barn owl		C		2
animals	mammals	Cervidae	<i>Axis axis</i>	chital	Y			1
animals	mammals	Dasyuridae	<i>Dasyurus hallucatus</i>	northern quoll		C	E	3
animals	mammals	Leporidae	<i>Lepus europaeus</i>	European brown hare	Y			1
animals	mammals	Macropodidae	<i>Notamacropus agilis</i>	agile wallaby		C		2
animals	mammals	Macropodidae	<i>Petrogale assimilis</i>	allied rock-wallaby		C		5/5
animals	mammals	Macropodidae	<i>Osphranter robustus</i>	common wallaroo		C		1
animals	mammals	Macropodidae	<i>Petrogale inornata</i>	unadorned rock-wallaby		C		3/3
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		3
animals	mammals	Miniopteridae	<i>Miniopterus schreibersii oceanensis</i>	eastern bent-wing bat		C		1
animals	mammals	Miniopteridae	<i>Miniopterus australis</i>	little bent-wing bat		C		1
animals	mammals	Peramelidae	<i>Isoodon macrourus</i>	northern brown bandicoot		C		2/2
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	1
animals	mammals	Pteropodidae	<i>Pteropus alecto</i>	black flying-fox		C		2/1
animals	mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox		C		1
animals	mammals	Suidae	<i>Sus scrofa</i>	pig	Y			6
animals	mammals	Vespertilionidae	<i>Myotis macropus</i>	large-footed myotis		C		1
animals	ray-finned fishes	Ambassidae	<i>Ambassis species</i>	northwest glassfish				2
animals	ray-finned fishes	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish				1
animals	ray-finned fishes	Ambassidae	<i>Ambassis agrammus</i>	sailfin glassfish				11
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				40
animals	ray-finned fishes	Apogonidae	<i>Glossamia aprion</i>	mouth almighty				45
animals	ray-finned fishes	Ariidae	<i>Neoarius graeffei</i>	blue catfish				7
animals	ray-finned fishes	Atherinidae	<i>Craterocephalus stercusmuscarum</i>	flyspecked hardyhead				400
animals	ray-finned fishes	Belonidae	<i>Strongylura krefftii</i>	freshwater longtom				47
animals	ray-finned fishes	Centropomidae	<i>Lates calcarifer</i>	barramundi				188
animals	ray-finned fishes	Cichlidae	<i>Oreochromis mossambica</i>	Mozambique mouthbrooder	Y			4
animals	ray-finned fishes	Clupeidae	<i>Nematalosa erebi</i>	bony bream				518
animals	ray-finned fishes	Eleotridae	<i>Oxyeleotris lineolata</i>	sleepy cod				218
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris compressa</i>	empire gudgeon				67
animals	ray-finned fishes	Gobiidae	<i>Awaous acritosus</i>	roman-nose goby				1
animals	ray-finned fishes	Hemiramphidae	<i>Arrhamphus sclerolepis</i>	snubnose garfish				7
animals	ray-finned fishes	Megalopidae	<i>Megalops cyprinoides</i>	oxeye herring				36
animals	ray-finned fishes	Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	eastern rainbowfish				84
animals	ray-finned fishes	Mugilidae	<i>Mugil cephalus</i>	sea mullet				1
animals	ray-finned fishes	Osteoglossidae	<i>Scleropages jardinii</i>	northern saratoga				1
animals	ray-finned fishes	Plotosidae	<i>Neosilurus ater</i>	black catfish				35
animals	ray-finned fishes	Plotosidae	<i>Neosilurus hyrtlii</i>	Hyrtl's catfish				1
animals	ray-finned fishes	Poeciliidae	<i>Gambusia holbrooki</i>	mosquitofish	Y			1
animals	ray-finned fishes	Scatophagidae	<i>Scatophagus argus</i>	spotted scat				2
animals	ray-finned fishes	Terapontidae	<i>Scortum parviceps</i>	smallhead grunter				3
animals	ray-finned fishes	Terapontidae	<i>Leiopotherapon unicolor</i>	spangled perch				6
animals	ray-finned fishes	Terapontidae	<i>Hephaestus fuliginosus</i>	sooty grunter				22
animals	ray-finned fishes	Terapontidae	<i>Amniataba percoides</i>	barred grunter				36

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animals	ray-finned fishes	Toxotidae	<i>Toxotes chatareus</i>	sevenspot archerfish				20
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead		C		2/1
animals	reptiles	Boidae	<i>Antaresia maculosa</i>	spotted python		C		1/1
animals	reptiles	Carphodactylidae	<i>Nephrurus asper</i>	spiny knob-tailed gecko		C		1
animals	reptiles	Chelidae	<i>Emydura macquarii krefftii</i>	Krefft's river turtle		C		1
animals	reptiles	Chelidae	<i>Elseya irwini</i>	Irwin's turtle		C		1
animals	reptiles	Chelidae	<i>Chelodina canni</i>	Cann's longneck turtle		C		1
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake		C		1
animals	reptiles	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake		C		2
animals	reptiles	Elapidae	<i>Vermicella annulata</i>	bandy-bandy		C		1/1
animals	reptiles	Elapidae	<i>Antaioserpens albiceps</i>	north-eastern plain-nosed burrowing snake		C		1/1
animals	reptiles	Elapidae	<i>Furina diadema</i>	red-naped snake		C		1
animals	reptiles	Elapidae	<i>Demansia torquata</i>	collared whipsnake		C		1
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella		C		1/1
animals	reptiles	Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's gecko		C		3
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		2/2
animals	reptiles	Pygopodidae	<i>Delma tinctoria</i>	excitable delma		C		1/1
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		1
animals	reptiles	Scincidae	<i>Morethia taeniopleura</i>	fire-tailed skink		C		1
animals	reptiles	Scincidae	<i>Pygmaeascincus timlowi</i>	dwarf litter-skink		C		1
animals	reptiles	Scincidae	<i>Glaphyromorphus punctulatus</i>	fine-spotted mulch-skink		C		4/4
animals	reptiles	Scincidae	<i>Lampropholis delicata</i>	dark-flecked garden sunskink		C		3/3
animals	reptiles	Scincidae	<i>Carlia rubigo</i>	orange-flanked rainbow skink		C		2
animals	reptiles	Scincidae	<i>Carlia jarnoldae</i>	lined rainbow-skink		C		1
animals	reptiles	Scincidae	<i>Carlia schmeltzii</i>	robust rainbow-skink		C		1
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		1
animals	reptiles	Scincidae	<i>Cryptoblepharus sp.</i>			C		1
animals	reptiles	Typhlopidae	<i>Anilius affinis</i>	small-headed blind snake		C		1
animals	reptiles	Varanidae	<i>Varanus storri</i>	Storr's monitor		C		2
plants	land plants	Acanthaceae	<i>Ruellia tuberosa</i>		Y			1/1
plants	land plants	Acanthaceae	<i>Nelsonia campestris</i>			C		1/1
plants	land plants	Acanthaceae	<i>Thunbergia fragrans</i>		Y			4/4
plants	land plants	Acanthaceae	<i>Thunbergia grandiflora</i>	sky flower	Y			1/1
plants	land plants	Acanthaceae	<i>Hygrophila angustifolia</i>			C		1/1
plants	land plants	Acanthaceae	<i>Asystasia gangetica subsp. gangetica</i>		Y			1/1
plants	land plants	Acanthaceae	<i>Hypoestes floribunda var. floribunda</i>			C		1/1
plants	land plants	Acanthaceae	<i>Rostellularia adscendens subsp. adscendens</i>			C		1/1
plants	land plants	Alismataceae	<i>Caldesia oligococca</i>			C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera nodiflora</i>	joyweed		C		1/1
plants	land plants	Amaranthaceae	<i>Alternanthera nana</i>	hairy joyweed		C		1/1
plants	land plants	Amaranthaceae	<i>Guilleminea densa</i>	small matweed	Y			1/1
plants	land plants	Amaranthaceae	<i>Alternanthera ficoidea</i>		Y			2/2
plants	land plants	Amaranthaceae	<i>Amaranthus spinosus</i>	needle burr	Y			2/2
plants	land plants	Amaranthaceae	<i>Deeringia amaranthoides</i>	redberry		C		3/3
plants	land plants	Amaranthaceae	<i>Alternanthera angustifolia</i>			C		1/1

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plants	land plants	Amaranthaceae	<i>Alternanthera denticulata</i> var. <i>micrantha</i>			C		4/4
plants	land plants	Anacardiaceae	<i>Pleiogynium timorense</i>	Burdekin plum		C		1/1
plants	land plants	Apocynaceae	<i>Wrightia saligna</i>			C		1/1
plants	land plants	Apocynaceae	<i>Alyxia spicata</i>			C		1/1
plants	land plants	Apocynaceae	<i>Catharanthus roseus</i>	pink periwinkle	Y			1/1
plants	land plants	Apocynaceae	<i>Parsonsia lanceolata</i>	northern silkpod		C		1/1
plants	land plants	Apocynaceae	<i>Vincetoxicum erectum</i>			C		5/5
plants	land plants	Apocynaceae	<i>Cryptostegia grandiflora</i>	rubber vine	Y			8/2
plants	land plants	Araceae	<i>Lemna aquinoctialis</i>	common duckweed		C		1/1
plants	land plants	Asteraceae	<i>Xerochrysum bracteatum</i>	golden everlasting daisy		C		1/1
plants	land plants	Asteraceae	<i>Coronidium lanuginosum</i>			C		1/1
plants	land plants	Asteraceae	<i>Cyanthillium cinereum</i>			C		1/1
plants	land plants	Asteraceae	<i>Xanthium occidentale</i>		Y			1/1
plants	land plants	Asteraceae	<i>Synedrella nodiflora</i>		Y			1/1
plants	land plants	Asteraceae	<i>Sphaeranthus indicus</i>			C		1/1
plants	land plants	Asteraceae	<i>Centipeda borealis</i>			C		2/2
plants	land plants	Asteraceae	<i>Peripleura scabra</i>			C		2/2
plants	land plants	Asteraceae	<i>Eclipta prostrata</i>	white eclipta	Y			3/3
plants	land plants	Asteraceae	<i>Campactra barbata</i>			C		1/1
plants	land plants	Asteraceae	<i>Blumea saxatilis</i>			C		1/1
plants	land plants	Asteraceae	<i>Xerochrysum bracteatum</i> subsp. (Mount Elliot A.R.Bean 3593)			C		1/1
plants	land plants	Asteraceae	<i>Pterocaulon serrulatum</i> var. <i>serrulatum</i>			C		2/2
plants	land plants	Asteraceae	<i>Acmella grandiflora</i> var. <i>brachyglossa</i>			C		1/1
plants	land plants	Asteraceae	<i>Gynura drymophila</i> var. <i>drymophila</i>			C		1/1
plants	land plants	Asteraceae	<i>Pseudognaphalium luteoalbum</i>	Jersey cudweed		C		1/1
plants	land plants	Asteraceae	<i>Acanthospermum hispidum</i>	star burr	Y			1/1
plants	land plants	Asteraceae	<i>Parthenium hysterophorus</i>	parthenium weed	Y			1/1
plants	land plants	Asteraceae	<i>Chrysocephalum apiculatum</i>	yellow buttons		C		2/2
plants	land plants	Bignoniaceae	<i>Pandorea pandorana</i>	wonga vine		C		1/1
plants	land plants	Bignoniaceae	<i>Dolichandrone alternifolia</i>			C		1/1
plants	land plants	Bombacaceae	<i>Lagunaria queenslandica</i>			C		2/2
plants	land plants	Boraginaceae	<i>Cordia dichotoma</i>			C		1/1
plants	land plants	Boraginaceae	<i>Ehretia grahamii</i>			C		1/1
plants	land plants	Boraginaceae	<i>Heliotropium ovalifolium</i>			C		2/2
plants	land plants	Boraginaceae	<i>Ehretia membranifolia</i>	weeping koda		C		1/1
plants	land plants	Byttneriaceae	<i>Hannafordia shanesii</i>			C		1/1
plants	land plants	Byttneriaceae	<i>Melochia corchorifolia</i>			C		1/1
plants	land plants	Caesalpiniaceae	<i>Parkinsonia aculeata</i>	parkinsonia	Y			2/2
plants	land plants	Caesalpiniaceae	<i>Senna gaudichaudii</i>			C		1/1
plants	land plants	Caesalpiniaceae	<i>Lysiphyllum hookeri</i>	Queensland ebony		C		1/1
plants	land plants	Caesalpiniaceae	<i>Chamaecrista absus</i> var. <i>absus</i>			C		2/2
plants	land plants	Campanulaceae	<i>Wahlenbergia caryophylloides</i>			C		1/1
plants	land plants	Campanulaceae	<i>Lobelia quadrangularis</i>			C		1/1
plants	land plants	Capparaceae	<i>Capparis canescens</i>			C		1/1
plants	land plants	Caryophyllaceae	<i>Polycarpaea spirostylis</i> subsp. <i>spirostylis</i>			C		1/1

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plants	land plants	Casuarinaceae	<i>Casuarina cunninghamiana</i> subsp. <i>cunninghamiana</i>			C		1/1
plants	land plants	Celastraceae	<i>Denhamia oleaster</i>			C		1/1
plants	land plants	Celastraceae	<i>Elaeodendron melanocarpum</i>			C		1/1
plants	land plants	Celastraceae	<i>Denhamia cunninghamii</i>			C		2/2
plants	land plants	Chenopodiaceae	<i>Chenopodium album</i>	fat-hen	Y			2/2
plants	land plants	Chenopodiaceae	<i>Dysphania glomulifera</i> subsp. <i>glomulifera</i>			C		1/1
plants	land plants	Cleomaceae	<i>Tarenaya aculeata</i>		Y			1/1
plants	land plants	Cleomaceae	<i>Arivela viscosa</i>			C		1/1
plants	land plants	Clusiaceae	<i>Hypericum gramineum</i>			C		1/1
plants	land plants	Cochlospermaceae	<i>Cochlospermum gillivraei</i>			C		2/2
plants	land plants	Combretaceae	<i>Terminalia sericocarpa</i>	damson		C		1/1
plants	land plants	Convolvulaceae	<i>Distimake quinquefolius</i>		Y			2/2
plants	land plants	Convolvulaceae	<i>Xenostegia tridentata</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Evolvulus nummularius</i>		Y			1/1
plants	land plants	Convolvulaceae	<i>Operculina turpethum</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea abrupta</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea eriocarpa</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea aquatica</i>			C		2/2
plants	land plants	Convolvulaceae	<i>Argyreia nervosa</i>		Y			2/2
plants	land plants	Convolvulaceae	<i>Jacquemontia paniculata</i>			C		1/1
plants	land plants	Convolvulaceae	<i>Ipomoea funicularis</i>			C		1/1
plants	land plants	Cornaceae	<i>Alangium polyosmoides</i> subsp. <i>tomentosum</i>			C		1/1
plants	land plants	Cucurbitaceae	<i>Luffa aegyptiaca</i>			C		1/1
plants	land plants	Cucurbitaceae	<i>Diplocyclos palmatus</i> subsp. <i>affinis</i>			C		1/1
plants	land plants	Cucurbitaceae	<i>Cucumis anguria</i> var. <i>anguria</i>	West Indian gherkin	Y			1/1
plants	land plants	Cyperaceae	<i>Scleria sphacelata</i>			C		2/2
plants	land plants	Cyperaceae	<i>Cyperus perangustus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus platystylis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Eleocharis geniculata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis dichotoma</i>	common fringe-rush		C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis bisumbellata</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis sieberiana</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus procerus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus bulbosus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus distans</i>			C		1/1
plants	land plants	Cyperaceae	<i>Gahnia aspera</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus iria</i>			C		1/1
plants	land plants	Cyperaceae	<i>Fimbristylis littoralis</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus nervulosus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Schoenus falcatus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus concinnus</i>			C		1/1
plants	land plants	Cyperaceae	<i>Cyperus scariosus</i>			C		1/1
plants	land plants	Droseraceae	<i>Drosera finlaysoniana</i>			C		1/1
plants	land plants	Ebenaceae	<i>Diospyros laurina</i>			C		1/1
plants	land plants	Ebenaceae	<i>Diospyros humilis</i>	small-leaved ebony		C		1/1
plants	land plants	Ebenaceae	<i>Diospyros geminata</i>	scaly ebony		C		1/1

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plants	land plants	Euphorbiaceae	<i>Acalypha eremorum</i>	soft acalypha		C		2/2
plants	land plants	Euphorbiaceae	<i>Croton arnhemicus</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Mallotus philippensis</i>	red kamala		C		2/2
plants	land plants	Euphorbiaceae	<i>Jatropha gossypifolia</i>	bellyache bush	Y			2/2
plants	land plants	Euphorbiaceae	<i>Claoxylon tenerifolium subsp. tenerifolium</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Ricinus communis</i>	castor oil bush	Y			5/1
plants	land plants	Euphorbiaceae	<i>Euphorbia bifida</i>			C		1/1
plants	land plants	Euphorbiaceae	<i>Croton</i>					1/1
plants	land plants	Euphorbiaceae	<i>Croton phebalioides</i>	narrow-leaved croton		C		1/1
plants	land plants	Fabaceae	<i>Glycine</i>				C	1/1
plants	land plants	Fabaceae	<i>Vigna sp. (Greta Creek R.J.Lawn+ AQ532201)</i>				C	3/3
plants	land plants	Fabaceae	<i>Tephrosia</i>					1/1
plants	land plants	Fabaceae	<i>Hovea longipes</i>	brush hovea			C	1/1
plants	land plants	Fabaceae	<i>Mucuna gigantea</i>	burny bean			C	1/1
plants	land plants	Fabaceae	<i>Centrosema molle</i>		Y			1/1
plants	land plants	Fabaceae	<i>Cullen badocanum</i>				C	3/3
plants	land plants	Fabaceae	<i>Canavalia papuana</i>	wild jack bean			C	1/1
plants	land plants	Fabaceae	<i>Flemingia lineata</i>				C	1/1
plants	land plants	Fabaceae	<i>Millettia pinnata</i>				C	1/1
plants	land plants	Fabaceae	<i>Indigofera tryonii</i>				C	1/1
plants	land plants	Fabaceae	<i>Aeschynomene indica</i>	budda pea			C	1/1
plants	land plants	Fabaceae	<i>Aeschynomene villosa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria goreensis</i>	gambia pea	Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria verrucosa</i>				C	1/1
plants	land plants	Fabaceae	<i>Desmodium scorpiurus</i>		Y			1/1
plants	land plants	Fabaceae	<i>Indigofera linifolia</i>				C	1/1
plants	land plants	Fabaceae	<i>Indigofera pratensis</i>				C	1/1
plants	land plants	Fabaceae	<i>Uraria lagopodioides</i>				C	1/1
plants	land plants	Fabaceae	<i>Alysicarpus vaginalis</i>		Y			1/1
plants	land plants	Fabaceae	<i>Indigofera leucotricha</i>				C	1/1
plants	land plants	Fabaceae	<i>Tephrosia macrostachya</i>				C	1/1
plants	land plants	Fabaceae	<i>Alysicarpus ovalifolius</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria laburnifolia</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria quinquefolia</i>				C	1/1
plants	land plants	Fabaceae	<i>Macroptilium lathyroides</i>		Y			1/1
plants	land plants	Fabaceae	<i>Alysicarpus bupleurifolius</i>	sweet alys	Y			1/1
plants	land plants	Fabaceae	<i>Vigna radiata var. sublobata</i>				C	1/1
plants	land plants	Fabaceae	<i>Crotalaria retusa var. retusa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria montana var. exserta</i>				C	1/1
plants	land plants	Fabaceae	<i>Crotalaria pallida var. obovata</i>		Y			3/3
plants	land plants	Fabaceae	<i>Galactia tenuiflora var. lucida</i>				C	2/2
plants	land plants	Fabaceae	<i>Tephrosia filipes subsp. filipes</i>				C	1/1
plants	land plants	Fabaceae	<i>Zornia muriculata subsp. angustata</i>				C	3/3
plants	land plants	Fabaceae	<i>Abrus precatorius subsp. precatorius</i>				C	1/1
plants	land plants	Fabaceae	<i>Tephrosia brachyodon var. longifolia</i>				C	2/2
plants	land plants	Fabaceae	<i>Crotalaria aridicola subsp. aridicola</i>				C	1/1

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plants	land plants	Fabaceae	<i>Zornia muelleriana</i> subsp. <i>muelleriana</i>			C		1/1
plants	land plants	Fabaceae	<i>Aeschynomene americana</i> var. <i>glandulosa</i>		Y			1/1
plants	land plants	Fabaceae	<i>Crotalaria medicaginea</i> var. <i>medicaginea</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria mitchellii</i> subsp. <i>mitchellii</i>			C		1/1
plants	land plants	Fabaceae	<i>Crotalaria sessiliflora</i> var. <i>anthylloides</i>			C		1/1
plants	land plants	Fabaceae	<i>Vigna</i> sp. (Station Creek R.J.Lawn CQ3284)			C		2/2
plants	land plants	Fabaceae	<i>Galactia</i>					1/1
plants	land plants	Goodeniaceae	<i>Goodenia rosulata</i>				C	1/1
plants	land plants	Goodeniaceae	<i>Goodenia pilosa</i>				C	1/1
plants	land plants	Haloragaceae	<i>Gonocarpus acanthocarpus</i>				C	1/1
plants	land plants	Haloragaceae	<i>Myriophyllum verrucosum</i>	water milfoil			C	1/1
plants	land plants	Helicteraceae	<i>Helicteres semiglabra</i>				C	1/1
plants	land plants	Hemerocallidaceae	<i>Dianella caerulea</i>				C	2/2
plants	land plants	Hydrocharitaceae	<i>Ottelia ovalifolia</i> subsp. <i>ovalifolia</i>				C	1/1
plants	land plants	Hydrocharitaceae	<i>Hydrilla verticillata</i>	hydrilla			C	1/1
plants	land plants	Hydrocharitaceae	<i>Ottelia alismoides</i>				C	1/1
plants	land plants	Hydrocharitaceae	<i>Hydrocharis dubia</i>	frogbit	Y			2/2
plants	land plants	Lamiaceae	<i>Clerodendrum floribundum</i>				C	5/5
plants	land plants	Lamiaceae	<i>Mesosphaerum suaveolens</i>		Y			1/1
plants	land plants	Lamiaceae	<i>Coleus scutellarioides</i>				C	1/1
plants	land plants	Lamiaceae	<i>Basilicum polystachyon</i>				C	2/2
plants	land plants	Lamiaceae	<i>Pityrodia salviifolia</i>	pityrodia			C	1/1
plants	land plants	Lamiaceae	<i>Leucas lavandulifolia</i>		Y			1/1
plants	land plants	Lamiaceae	<i>Ocimum americanum</i>		Y			2/2
plants	land plants	Lamiaceae	<i>Teucrium modestum</i>				C	2/2
plants	land plants	Lamiaceae	<i>Premna dallachyana</i>				C	1/1
plants	land plants	Lamiaceae	<i>Leucas decemdentata</i>				C	1/1
plants	land plants	Lamiaceae	<i>Premna serratifolia</i>				C	1/1
plants	land plants	Lamiaceae	<i>Coleus graveolens</i>				C	1/1
plants	land plants	Lauraceae	<i>Litsea glutinosa</i>				C	2/2
plants	land plants	Lauraceae	<i>Cryptocarya triplinervis</i> var. <i>triplinervis</i>				C	2/2
plants	land plants	Laxmanniaceae	<i>Lomandra longifolia</i>				C	1/1
plants	land plants	Lentibulariaceae	<i>Utricularia aurea</i>	golden bladderwort			C	1/1
plants	land plants	Lentibulariaceae	<i>Utricularia stellaris</i>				C	1/1
plants	land plants	Loranthaceae	<i>Lysiana subfalcata</i>				C	1/1
plants	land plants	Lythraceae	<i>Ammannia multiflora</i>	jerry-jerry			C	1/1
plants	land plants	Malvaceae	<i>Abutilon auritum</i>	Chinese lantern			C	1/1
plants	land plants	Malvaceae	<i>Urena lobata</i>	urena weed	Y			1/1
plants	land plants	Malvaceae	<i>Sida acuta</i>	spinyhead sida	Y			1/1
plants	land plants	Malvaceae	<i>Sida hackettiana</i>				C	1/1
plants	land plants	Malvaceae	<i>Abutilon guineense</i>		Y			1/1
plants	land plants	Malvaceae	<i>Hibiscus panduriformis</i>				C	2/2
plants	land plants	Malvaceae	<i>Abutilon micropetalum</i>				C	1/1
plants	land plants	Malvaceae	<i>Hibiscus krichauffianus</i>				C	1/1
plants	land plants	Malvaceae	<i>Hibiscus vitifolius</i>				C	1/1
plants	land plants	Marsileaceae	<i>Marsilea mutica</i>	shiny nardoo			C	1/1

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plants	land plants	Martyniaceae	<i>Martynia annua</i>	small-fruited devil's claw	Y			2/2
plants	land plants	Menispermaceae	<i>Pachygone ovata</i>			C		1/1
plants	land plants	Mimosaceae	<i>Leucaena leucocephala subsp. leucocephala</i>		Y			1/1
plants	land plants	Mimosaceae	<i>Neptunia gracilis forma gracilis</i>			C		1/1
plants	land plants	Mimosaceae	<i>Desmanthus leptophyllus</i>		Y			1/1
plants	land plants	Mimosaceae	<i>Leucaena leucocephala</i>		Y			5
plants	land plants	Mimosaceae	<i>Vachellia farnesiana</i>		Y			1/1
plants	land plants	Mimosaceae	<i>Neptunia monosperma</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia leptostachya</i>	Townsville wattle		C		1/1
plants	land plants	Mimosaceae	<i>Acacia jackesiana</i>			C		1/1
plants	land plants	Mimosaceae	<i>Acacia tephрина</i>			C		2/2
plants	land plants	Mimosaceae	<i>Acacia hemsleyi</i>			C		1/1
plants	land plants	Mimosaceae	<i>Senegalia</i>					1/1
plants	land plants	Mimosaceae	<i>Neptunia major</i>			C		3/3
plants	land plants	Molluginaceae	<i>Glinus oppositifolius</i>			C		1/1
plants	land plants	Molluginaceae	<i>Glinus lotoides</i>	hairy carpet weed		C		1/1
plants	land plants	Molluginaceae	<i>Mollugo verticillata</i>		Y			2/2
plants	land plants	Moraceae	<i>Ficus rubiginosa forma rubiginosa</i>			C		1/1
plants	land plants	Myrsinaceae	<i>Lysimachia ovalis</i>			C		2/2
plants	land plants	Myrtaceae	<i>Eucalyptus shirleyi</i>			C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca bracteata</i>			C		3/3
plants	land plants	Myrtaceae	<i>Melaleuca viminalis</i>			C		1/1
plants	land plants	Myrtaceae	<i>Corymbia clarksoniana</i>			C		2/2
plants	land plants	Myrtaceae	<i>Corymbia lamprophylla</i>			C		1/1
plants	land plants	Myrtaceae	<i>Corymbia leichhardtii</i>	rustyjacket		C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus persistens</i>			C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca leucadendra</i>	broad-leaved tea-tree		C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus platyphylla</i>	poplar gum		C		2/2
plants	land plants	Myrtaceae	<i>Eucalyptus raveretiana</i>	black ironbox		C	V	1/1
plants	land plants	Myrtaceae	<i>Eucalyptus xanthoclada</i>	yellow-branched ironbark		C		2/2
plants	land plants	Myrtaceae	<i>Leptospermum anfractum</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus drepanophylla</i>			C		1/1
plants	land plants	Myrtaceae	<i>Rhodomyrtus trineura subsp. trineura</i>			C		1/1
plants	land plants	Myrtaceae	<i>Eucalyptus brownii</i>	Reid River box		C		1/1
plants	land plants	Myrtaceae	<i>Melaleuca nervosa</i>			C		4/4
plants	land plants	Myrtaceae	<i>Gossia bidwillii</i>			C		4/4
plants	land plants	Myrtaceae	<i>Syzygium cumini</i>		Y			1/1
plants	land plants	Myrtaceae	<i>Lophostemon grandiflorus subsp. riparius</i>			C		5/5
plants	land plants	Myrtaceae	<i>Corymbia dallachiana</i>			C		2/2
plants	land plants	Najadaceae	<i>Najas tenuifolia</i>	water nymph		C		1/1
plants	land plants	Nelumbonaceae	<i>Nelumbo nucifera</i>	pink waterlily		C		2/2
plants	land plants	Nyctaginaceae	<i>Pisonia aculeata</i>	thorny pisonia		C		2/2
plants	land plants	Orchidaceae	<i>Cymbidium canaliculatum</i>			C		1/1
plants	land plants	Papaveraceae	<i>Argemone ochroleuca subsp. ochroleuca</i>	Mexican poppy	Y			1/1
plants	land plants	Passifloraceae	<i>Passiflora suberosa subsp. litoralis</i>		Y			1/1
plants	land plants	Passifloraceae	<i>Passiflora foetida</i>		Y			1/1

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plants	land plants	Phrymaceae	<i>Glossostigma diandrum</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus reticulatus</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Poranthera microphylla</i>	small poranthera		C		1/1
plants	land plants	Phyllanthaceae	<i>Bridelia leichhardtii</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Antidesma parvifolium</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Breynia oblongifolia</i>			C		2/2
plants	land plants	Phyllanthaceae	<i>Phyllanthus carpentariae</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Flueggea virosa subsp. melanthesoides</i>			C		3/3
plants	land plants	Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>			C		1/1
plants	land plants	Phyllanthaceae	<i>Phyllanthus minutiflorus</i>			C		1/1
plants	land plants	Picrodendraceae	<i>Petalostigma banksii</i>			C		1/1
plants	land plants	Picrodendraceae	<i>Dissiliaria indistincta</i>			C		1/1
plants	land plants	Pittosporaceae	<i>Bursaria incana</i>			C		1/1
plants	land plants	Plantaginaceae	<i>Scoparia dulcis</i>	scoparia	Y			2/2
plants	land plants	Plantaginaceae	<i>Mecardonia procumbens</i>		Y			1/1
plants	land plants	Plantaginaceae	<i>Bacopa floribunda</i>			C		2/2
plants	land plants	Poaceae	<i>Chionachne cyathopoda</i>	river grass		C		2/2
plants	land plants	Poaceae	<i>Dichanthium annulatum</i>	sheda grass	Y			1/1
plants	land plants	Poaceae	<i>Elytrophorus spicatus</i>			C		1/1
plants	land plants	Poaceae	<i>Eragrostis parviflora</i>	weeping lovegrass		C		1/1
plants	land plants	Poaceae	<i>Heteropogon triticeus</i>	giant speargrass		C		1/1
plants	land plants	Poaceae	<i>Panicum trachyrhachis</i>			C		1/1
plants	land plants	Poaceae	<i>Alloteropsis semialata</i>	cockatoo grass		C		1/1
plants	land plants	Poaceae	<i>Chionachne hubbardiana</i>			C		1/1
plants	land plants	Poaceae	<i>Echinochloa turneriana</i>	channel millet		C		1/1
plants	land plants	Poaceae	<i>Enneapogon lindleyanus</i>			C		1/1
plants	land plants	Poaceae	<i>Urochloa subquadripara</i>		Y			1/1
plants	land plants	Poaceae	<i>Dactyloctenium radulans</i>	button grass		C		1/1
plants	land plants	Poaceae	<i>Echinochloa frumentacea</i>	Siberian millet	Y			1/1
plants	land plants	Poaceae	<i>Sporobolus actinocladus</i>	katoora grass		C		1/1
plants	land plants	Poaceae	<i>Sporobolus jacquemontii</i>		Y			2/2
plants	land plants	Poaceae	<i>Sporobolus australasicus</i>			C		1/1
plants	land plants	Poaceae	<i>Eriochloa pseudoacrotricha</i>			C		1/1
plants	land plants	Poaceae	<i>Rottboellia cochinchinensis</i>		Y			2/2
plants	land plants	Poaceae	<i>Dinebra panicea var. brachiata</i>		Y			1/1
plants	land plants	Poaceae	<i>Sorghum nitidum forma aristatum</i>			C		1/1
plants	land plants	Poaceae	<i>Hymenachne amplexicaulis 'Olive'</i>		Y			3
plants	land plants	Poaceae	<i>Aristida holathera var. holathera</i>			C		1/1
plants	land plants	Poaceae	<i>Bothriochloa bladhii subsp. bladhii</i>			C		2/2
plants	land plants	Poaceae	<i>Bothriochloa decipiens var. decipiens</i>			C		2/2
plants	land plants	Poaceae	<i>Panicum decompositum var. decompositum</i>			C		1/1
plants	land plants	Poaceae	<i>Dichanthium sericeum subsp. polystachyum</i>			C		1/1
plants	land plants	Poaceae	<i>Bothriochloa decipiens var. cloncurrrensensis</i>			C		1/1
plants	land plants	Poaceae	<i>Oryza sativa</i>		Y			1/1
plants	land plants	Poaceae	<i>Eulalia aurea</i>	silky browntop		C		1/1
plants	land plants	Poaceae	<i>Dinebra neesii</i>			C		2/2

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plants	land plants	Poaceae	<i>Melinis repens</i>	red natal grass	Y			1/1
plants	land plants	Poaceae	<i>Chloris inflata</i>	purpletop chloris	Y			1/1
plants	land plants	Poaceae	<i>Setaria surgens</i>				C	1/1
plants	land plants	Poaceae	<i>Sorghum bicolor</i>	forage sorghum	Y			5/5
plants	land plants	Poaceae	<i>Sorghum x almu</i>		Y			2/2
plants	land plants	Poaceae	<i>Dinebra ligulata</i>				C	1/1
plants	land plants	Poaceae	<i>Eriochloa crebra</i>	spring grass			C	1/1
plants	land plants	Poaceae	<i>Leersia hexandra</i>	swamp rice grass			C	1/1
plants	land plants	Poaceae	<i>Themeda triandra</i>	kangaroo grass			C	1/1
plants	land plants	Poaceae	<i>Chloris pectinata</i>	comb chloris			C	1/1
plants	land plants	Poaceae	<i>Panicum laevinode</i>	pepper grass			C	1/1
plants	land plants	Poaceae	<i>Sorghum halepense</i>	Johnson grass	Y			2/2
plants	land plants	Poaceae	<i>Sporobolus caroli</i>	fairy grass			C	1/1
plants	land plants	Poaceae	<i>Arundinella setosa</i>				C	1/1
plants	land plants	Poaceae	<i>Cenchrus purpureus</i>		Y			1/1
plants	land plants	Poaceae	<i>Oryza meridionalis</i>				C	1/1
plants	land plants	Poaceae	<i>Panicum trichoides</i>				C	1/1
plants	land plants	Poaceae	<i>Eragrostis elongata</i>				C	1/1
plants	land plants	Poaceae	<i>Oryza australiensis</i>				C	1/1
plants	land plants	Poaceae	<i>Oxychloris scariosa</i>	winged chloris			C	1/1
plants	land plants	Poaceae	<i>Cenchrus caliculatus</i>	hillside burrgrass			C	1/1
plants	land plants	Poaceae	<i>Dichanthium fecundum</i>	curly bluegrass			C	3/3
plants	land plants	Poaceae	<i>Sorghum arundinaceum</i>	Rhodesian Sudan grass	Y			1/1
plants	land plants	Poaceae	<i>Themeda quadrivalvis</i>	grader grass	Y			5/1
plants	land plants	Poaceae	<i>Vacoparis laxiflorum</i>				C	1/1
plants	land plants	Poaceae	<i>Alloteropsis cimicina</i>				C	1/1
plants	land plants	Polygonaceae	<i>Persicaria barbata</i>				C	1/1
plants	land plants	Polygonaceae	<i>Polygonum plebeium</i>	small knotweed			C	2/2
plants	land plants	Polygonaceae	<i>Persicaria lapathifolia</i>	pale knotweed			C	2/2
plants	land plants	Polygonaceae	<i>Persicaria decipiens</i>	slender knotweed			C	1/1
plants	land plants	Pontederiaceae	<i>Monochoria australasica</i>				C	1/1
plants	land plants	Pontederiaceae	<i>Monochoria cyanea</i>				C	1/1
plants	land plants	Proteaceae	<i>Grevillea parallela</i>				C	1/1
plants	land plants	Proteaceae	<i>Grevillea glauca</i>	bushy's clothes peg			C	1/1
plants	land plants	Proteaceae	<i>Grevillea striata</i>	beefwood			C	1/1
plants	land plants	Pteridaceae	<i>Ceratopteris thalictroides</i>				C	1/1
plants	land plants	Pteridaceae	<i>Cheilanthes nudiuscula</i>				C	1/1
plants	land plants	Pteridaceae	<i>Cheilanthes pumilio</i>				C	1/1
plants	land plants	Pteridaceae	<i>Cheilanthes brownii</i>				C	2/2
plants	land plants	Pteridaceae	<i>Adiantum atroviride</i>				C	1/1
plants	land plants	Pteridaceae	<i>Cheilanthes sieberi subsp. sieberi</i>				C	1/1
plants	land plants	Putranjivaceae	<i>Drypetes deplanchei</i>	grey boxwood			C	1/1
plants	land plants	Rhamnaceae	<i>Alphitonia excelsa</i>	soap tree			C	1/1
plants	land plants	Rhamnaceae	<i>Ventilago viminalis</i>	supplejack			C	1/1
plants	land plants	Rhamnaceae	<i>Ziziphus mauritiana</i>	Indian jujube	Y			2/1
plants	land plants	Rubiaceae	<i>Nauclea orientalis</i>	Leichhardt tree			C	1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Rubiaceae	<i>Dentella repens</i>	dentella		C		1/1
plants	land plants	Rubiaceae	<i>Spermacoce sp. (Lorim Point A.Morton AM1237)</i>			C		1/1
plants	land plants	Rubiaceae	<i>Larsenaikia ochreatea</i>			C		1/1
plants	land plants	Rubiaceae	<i>Scleromitron galioides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Timonius timon var. timon</i>			C		4/4
plants	land plants	Rubiaceae	<i>Psychotria daphnoides var. daphnoides</i>			C		1/1
plants	land plants	Rubiaceae	<i>Pavetta australiensis var. australiensis</i>			C		1/1
plants	land plants	Rutaceae	<i>Acronychia laevis</i>	glossy acronychia		C		1/1
plants	land plants	Salviniaceae	<i>Salvinia molesta</i>	salvinia	Y			1/1
plants	land plants	Salviniaceae	<i>Azolla rubra</i>			C		1/1
plants	land plants	Salviniaceae	<i>Azolla pinnata</i>	ferny azolla		C		1/1
plants	land plants	Santalaceae	<i>Exocarpos latifolius</i>			C		1/1
plants	land plants	Sapindaceae	<i>Harpullia hillii</i>			C		2/2
plants	land plants	Sapindaceae	<i>Atalaya multiflora</i>	broad-leaved whitewood		C		1/1
plants	land plants	Sapindaceae	<i>Cupaniopsis anacardioides</i>	tuckeroo		C		2/2
plants	land plants	Sapindaceae	<i>Alectryon connatus</i>	grey birds-eye		C		1/1
plants	land plants	Sapindaceae	<i>Arytera divaricata</i>	coogera		C		1/1
plants	land plants	Sapindaceae	<i>Cardiospermum halicacabum var. halicacabum</i>		Y			1/1
plants	land plants	Sapotaceae	<i>Amorphospermum antilogum</i>			C		1/1
plants	land plants	Sapotaceae	<i>Planchonella cotinifolia var. pubescens</i>			C		1/1
plants	land plants	Scrophulariaceae	<i>Myoporum acuminatum</i>	coastal boobialla		C		1/1
plants	land plants	Solanaceae	<i>Datura inoxia</i>		Y			1/1
plants	land plants	Solanaceae	<i>Solanum torvum</i>	devil's fig	Y			1/1
plants	land plants	Solanaceae	<i>Solanum sporadotrichum</i>				NT	1/1
plants	land plants	Solanaceae	<i>Nicotiana glauca</i>	tree tobacco	Y			1/1
plants	land plants	Solanaceae	<i>Solanum ellipticum</i>	potato bush		C		2/2
plants	land plants	Sparrmanniaceae	<i>Grewia graniticola</i>			C		1/1
plants	land plants	Sparrmanniaceae	<i>Grewia australis</i>			C		1/1
plants	land plants	Sparrmanniaceae	<i>Grewia savannicola</i>			C		1/1
plants	land plants	Sparrmanniaceae	<i>Corchorus olitorius</i>	jute		C		1/1
plants	land plants	Stackhousiaceae	<i>Stackhousia intermedia</i>			C		1/1
plants	land plants	Sterculiaceae	<i>Brachychiton</i>					1/1
plants	land plants	Stylidiaceae	<i>Stylidium rotundifolium</i>			C		1/1
plants	land plants	Thymelaeaceae	<i>Pimelea sericostachya</i>			C		1/1
plants	land plants	Turneraceae	<i>Turnera ulmifolia</i>		Y			3/3
plants	land plants	Vitaceae	<i>Cissus cardiophylla</i>			C		1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ().

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*. The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).

This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.

Appendix G:
Flora and Fauna Species List

Table 1: Flora and fauna species observed during the field survey

Family	Scientific name	Common name	Status		
			Introduced ¹	NC Act ²	EPBC Act ²
Fauna					
Birds					
Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle	-	LC	-
Accipitridae	<i>Haliastur sphenurus</i>	Whistling Kite	-	LC	-
Accipitridae	<i>Milvus migrans</i>	Black Kite	-	LC	-
Artamidae	<i>Artamus cinereus</i>	Black-faced Woodswallow	-	LC	-
Artamidae	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	-	LC	-
Artamidae	<i>Cracticus nigrogularis</i>	Pied Butcherbird	-	LC	-
Artamidae	<i>Gymnorhina tibicen</i>	Australian Magpie	-	LC	-
Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	-	LC	-
Cacatuidae	<i>Calyptorhynchus banksii</i>	Red-tailed Black-cockatoo	-	LC	-
Campephagidae	<i>Coracina papuensis</i>	White-bellied Cuckoo-shrike	-	LC	-
Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	-	LC	-
Cisticolidae	<i>Cisticola exilis</i>	Golden-headed Cisticola	-	LC	-
Columbidae	<i>Geopelia humeralis</i>	Bar-shouldered Dove	-	LC	-
Columbidae	<i>Geopelia striata</i>	Peaceful Dove	-	LC	-
Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon	-	LC	-
Corvidae	<i>Corvus coronoides</i>	Australian Raven	-	LC	-
Cuculidae	<i>Centropus phasianinus</i>	Pheasant Coucal	-	LC	-
Dicruridae	<i>Dicrurus bracteatus</i>	Spangled Drongo	-	LC	-
Estrildidae	<i>Lonchura castaneothorax</i>	Chestnut-breasted Mannikin	-	LC	-
Estrildidae	<i>Neochmia phaeton</i>	Crimson Finch	-	LC	-
Estrildidae	<i>Taeniopygia bichenovii</i>	Double-barred Finch	-	LC	-
Falconidae	<i>Falco peregrinus</i>	Peregrine Falcon	-	LC	-
Halcyonidae	<i>Dacelo leachii</i>	Blue-winged Kookaburra	-	LC	-
Halcyonidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	-	LC	-
Maluridae	<i>Malurus melanocephalus</i>	Red-backed Fairy-wren	-	LC	-
Megapodiidae	<i>Alectura lathami</i>	Australian Brush-turkey	-	LC	-
Meliphagidae	<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	-	LC	-
Meliphagidae	<i>Manorina melanocephala</i>	Noisy Miner	-	LC	-
Meliphagidae	<i>Melithreptus albogularis</i>	White-throated Honeyeater	-	LC	-
Meliphagidae	<i>Stomiopera flava</i>	Yellow Honeyeater	-	LC	-
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater	-	LC	-
Monarchidae	<i>Grallina cyanoleuca</i>	Magpie-lark	-	LC	-
Monarchidae	<i>Myiagra rubecula</i>	Leaden Flycatcher	-	LC	-
Nectariniidae	<i>Cinnyris jugularis</i>	Olive-backed Sunbird	-	LC	-
Nectariniidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird	-	LC	-
Oriolidae	<i>Oriolus sagittatus</i>	Olive-backed Oriole	-	LC	-
Oriolidae	<i>Sphecotheres vieilloti</i>	Australasian Figbird	-	LC	-
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler	-	LC	-
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush	-	LC	-
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote	-	LC	-
Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian Pelican	-	LC	-
Phasianidae	<i>Coturnix ypsilophora</i>	Brown Quail	-	LC	-
Psittacidae	<i>Aprosmictus erythropterus</i>	Red-winged Parrot	-	LC	-
Psittacidae	<i>Platycercus adscitus</i>	Pale-headed Rosella	-	LC	-
Psittacidae	<i>Trichoglossus chlorolepidotus</i>	Scaly-breasted Lorikeet	-	LC	-
Psittacidae	<i>Trichoglossus haematodus moluccanus</i>	Rainbow Lorikeet	-	LC	-
Rhipiduridae	<i>Rhipidura albiscapa</i>	Grey Fantail	-	LC	-
Rhipiduridae	<i>Rhipidura leucophrys</i>	Willie Wagtail	-	LC	-
Threskiornithidae	<i>Platalea regia</i>	Royal Spoonbill	-	LC	-
Mammals					
Emballonuridae	<i>Saccolaimus saccolaimus nudicluniatus</i>	Bare-rumped Sheathtail Bat ³	-	E	V
Emballonuridae	<i>Saccolaimus</i> sp.	Sheathtail Bat	-	LC	-
Leporidae	<i>Oryctolagus cuniculus</i>	European Rabbit	Y	-	-
Macropodidae	<i>Notamacropus agilis</i>	Agile Wallaby	-	LC	-
Miniopteridae	<i>Miniopterus australis</i>	Little Bent-wing Bat	-	LC	-
Miniopteridae	<i>Miniopterus schreibersii oceanensis</i>	Eastern Bent-wing Bat	-	LC	-
Molossidae	<i>Chaerephon jobensis</i>	Northern Freetail Bat	-	LC	-
Molossidae	<i>Mormopterus lumsdenae</i>	Northern Free-tailed Bat	-	LC	-
Molossidae	<i>Mormopterus ridei</i>	Eastern Free-tailed Bat	-	LC	-
Rhinolophidae	<i>Rhinolophus megaphyllus</i>	Eastern Horseshoe-bat	-	LC	-
Suidae	<i>Sus scrofa</i>	Feral Pig	Y	-	-
Vespertilionidae	<i>Chalinolobus morio</i>	Chocolate Wattled Bat	-	LC	-
Vespertilionidae	<i>Chalinolobus nigrogriseus</i>	Hoary Wattled Bat	-	LC	-
Vespertilionidae	<i>Myotis macropus</i>	Large-footed Myotis	-	LC	-
Vespertilionidae	<i>Scotorepens</i> sp.	Broad-nosed Bat	-	LC	-
Vespertilionidae	<i>Vespadelus troughtoni</i>	Eastern Cave Bat	-	LC	-
Reptiles					
Boidae	<i>Aspidites melanocephalus</i>	Black-headed Python	-	LC	-
Flora					
Amaranthaceae	<i>Alternanthera ficoidea</i>	Joyweed	Y	-	-
Amaranthaceae	<i>Gomphrena celosioides</i>	Gomphrena Weed	Y	-	-
Anacardiaceae	<i>Pleiogynium timorense</i>	Burdekin Plum	-	LC	-
Apocynaceae	<i>Cryptostegia grandiflora</i>	Rubber Vine	Y	-	-
Asteraceae	<i>Ageratum conyzoides</i>	Billygoat Weed	Y	-	-
Asteraceae	<i>Emilia sonchifolia</i> var. <i>sonchifolia</i>	Emilia	Y	-	-
Asteraceae	<i>Tridax procumbens</i>	Tridax Daisy	Y	-	-
Asteraceae	<i>Xanthium occidentale</i>	Noogoora Burr	Y	-	-
Cactaceae	<i>Opuntia stricta</i>	Prickly Pear	Y	-	-
Caesalpinaceae	<i>Lysiphyllum hookeri</i>	Queensland Ebony	-	LC	-
Caesalpinaceae	<i>Parkinsonia aculeata</i>	Parkinsonia	Y	-	-
Caesalpinaceae	<i>Senna obtusifolia</i>	Sicklepod	Y	-	-
Caesalpinaceae	<i>Senna occidentalis</i>	Coffee Senna	Y	-	-
Casuarinaceae	<i>Casuarina cunninghamiana</i>	River Oak	-	LC	-

Family	Scientific name	Common name	Status		
			Introduced ¹	NC Act ²	EPBC Act ²
Convolvulaceae	<i>Argyreia nervosa</i>	Woodrose	Y	-	-
Convolvulaceae	<i>Ipomoea</i> sp.	Morning Glory	-	LC	-
Convolvulaceae	<i>Ipomoea triloba</i>	Littlebell	Y	-	-
Convolvulaceae	<i>Xenostegia tridentata</i>	-	-	LC	-
Cucurbitaceae	<i>Cucumis anguria</i> var. <i>anguria</i>	West Indian Gherkin	Y	-	-
Euphorbiaceae	<i>Euphorbia heterophylla</i>	Milkweed	Y	-	-
Euphorbiaceae	<i>Euphorbia hirta</i>	Asthma-plant	Y	-	-
Euphorbiaceae	<i>Jatropha gossypifolia</i>	Bellyache Bush	Y	-	-
Euphorbiaceae	<i>Ricinus communis</i>	Castor Oil Bush	Y	-	-
Fabaceae	<i>Aeschynomene americana</i> var. <i>americana</i>	American Jointvetch	Y	-	-
Fabaceae	<i>Aeschynomene indica</i>	Budda Pea	-	LC	-
Fabaceae	<i>Alysicarpus</i> sp.	-	Y	-	-
Fabaceae	<i>Clitoria ternatea</i>	Butterfly Pea	Y	-	-
Fabaceae	<i>Crotalaria goreensis</i>	Gambia Pea	Y	-	-
Fabaceae	<i>Crotalaria pallida</i>	Streaked Rattlepod	Y	-	-
Fabaceae	<i>Macroptilium atropurpureum</i>	Siratro	Y	-	-
Fabaceae	<i>Macroptilium lathyroides</i>	Phasey Bean	Y	-	-
Fabaceae	<i>Millettia pinnata</i>	Pongamia	-	LC	-
Fabaceae	<i>Stylosanthes hamata</i>	Caribbean Stylo	Y	-	-
Fabaceae	<i>Stylosanthes humilis</i>	Townsville Stylo	Y	-	-
Fabaceae	<i>Stylosanthes scabra</i>	Shrubby Stylo	Y	-	-
Lamiaceae	<i>Mesosphaerum suaveolens</i>	Hyptis	Y	-	-
Lamiaceae	<i>Ocimum americanum</i>	Basil	Y	-	-
Laxmanniaceae	<i>Lomandra</i> sp.	-	-	LC	-
Lecythidaceae	<i>Planchonia careya</i>	Cockatoo Apple	-	LC	-
Malvaceae	<i>Sida acuta</i>	Spinyhead Sida	Y	-	-
Malvaceae	<i>Sida cordifolia</i>	Flannel Weed	Y	-	-
Malvaceae	<i>Urena lobata</i>	Urena Weed	Y	-	-
Marsileaceae	<i>Marsilea</i> sp.	Nardoo	-	LC	-
Meliaceae	<i>Azadirachta indica</i>	Neem	Y	-	-
Menyanthaceae	<i>Nymphoides indica</i>	Water Snowflake	-	LC	-
Mimosaceae	<i>Albizia procera</i>	-	-	LC	-
Mimosaceae	<i>Leucaena leucocephala</i>	Leucaena	Y	-	-
Mimosaceae	<i>Vachellia farnesiana</i>	Mimosa Bush	Y	-	-
Moraceae	<i>Ficus opposita</i>	Sandpaper Fig	-	LC	-
Myrtaceae	<i>Corymbia clarksoniana</i>	Clarkson's Bloodwood	-	LC	-
Myrtaceae	<i>Corymbia dallachiana</i>	Dallachy's Gum	-	LC	-
Myrtaceae	<i>Corymbia tessellaris</i>	Moreton Bay Ash	-	LC	-
Myrtaceae	<i>Eucalyptus platyphylla</i>	Poplar Gum	-	LC	-
Myrtaceae	<i>Eucalyptus tereticornis</i>	Forest Red Gum	-	LC	-
Myrtaceae	<i>Lophostemon grandiflorus</i>	Northern Swamp Mahogany	-	LC	-
Myrtaceae	<i>Lophostemon suaveolens</i>	Swamp Box	-	LC	-
Myrtaceae	<i>Melaleuca fluviatilis</i>	-	-	LC	-
Myrtaceae	<i>Melaleuca leucadendra</i>	Weeping Tea-tree	-	LC	-
Myrtaceae	<i>Melaleuca nervosa</i>	-	-	LC	-
Myrtaceae	<i>Melaleuca viridiflora</i>	Broad-leaved Tea-tree	-	LC	-
Nymphaeaceae	<i>Nymphaea gigantea</i>	Blue Water Lily	-	LC	-
Onagraceae	<i>Ludwigia</i> sp.	-	-	LC	-
Pandanaceae	<i>Pandanus</i> sp.	Screw Pine	-	LC	-
Papaveraceae	<i>Argemone mexicana</i>	Mexican Poppy	Y	-	-
Passifloraceae	<i>Passiflora foetida</i>	Stinking Passionfruit	Y	-	-
Phyllanthaceae	<i>Flueggea virosa</i>	White Currant	-	LC	-
Phyllanthaceae	<i>Phyllanthus virgatus</i>	-	-	LC	-
Pittosporaceae	<i>Bursaria incana</i>	Prickly Pine	-	LC	-
Poaceae	<i>Alloteropsis cimicina</i>	-	-	LC	-
Poaceae	<i>Aristida</i> sp.	-	-	LC	-
Poaceae	<i>Arundinella</i> sp.	Reedgrass	-	LC	-
Poaceae	<i>Bothriochloa pertusa</i>	Indian Bluegrass	Y	-	-
Poaceae	<i>Cenchrus ciliaris</i>	Buffel Grass	Y	-	-
Poaceae	<i>Chloris gayana</i>	Rhodes Grass	Y	-	-
Poaceae	<i>Chloris inflata</i>	Purpletop Chloris	Y	-	-
Poaceae	<i>Dichanthium sericeum</i>	Silky Blue-grass	-	LC	-
Poaceae	<i>Digitaria</i> sp.	-	-	LC	-
Poaceae	<i>Echinochloa colona</i>	Awnless Barnyard Grass	Y	-	-
Poaceae	<i>Enteropogon ramosus</i>	Twirly Windmill Grass	-	LC	-
Poaceae	<i>Eragrostis</i> sp.	-	-	LC	-
Poaceae	<i>Eriachne</i> sp.	-	-	LC	-
Poaceae	<i>Heteropogon contortus</i>	Black Speargrass	-	LC	-
Poaceae	<i>Hymenachne amplexicaulis</i>	Hymenachne	Y	-	-
Poaceae	<i>Iseilema vaginiflorum</i>	Red Flinders Grass	-	LC	-
Poaceae	<i>Leersia hexandra</i>	Swamp Rice Grass	-	LC	-
Poaceae	<i>Megathyrsus maximus</i>	Guinea Grass	Y	-	-
Poaceae	<i>Melinis repens</i>	Red Natal Grass	Y	-	-
Poaceae	<i>Oryza</i> sp.	-	-	LC	-
Poaceae	<i>Panicum</i> sp.	-	-	LC	-
Poaceae	<i>Sporobolus jacquemontii</i>	American Rat's Tail Grass	Y	-	-
Poaceae	<i>Sporobolus natalensis/pyramidalis</i>	Giant Rat's Tail Grass	Y	-	-
Poaceae	<i>Themeda quadrivalvis</i>	Grader Grass	Y	-	-
Poaceae	<i>Urochloa mosambicensis</i>	Sabi Grass	Y	-	-
Poaceae	<i>Urochloa mutica</i>	Para Grass	Y	-	-
Polygonaceae	<i>Persicaria attenuata</i>	Water Pepper	-	LC	-
Pontederiaceae	<i>Monochoria vaginalis</i>	Bog Hyacinth	-	LC	-
Proteaceae	<i>Grevillea striata</i>	Beefwood	-	LC	-
Rhamnaceae	<i>Alphitonia excelsa</i>	Soap Tree	-	LC	-
Rhamnaceae	<i>Ziziphus mauritiana</i>	Chinee Apple	Y	-	-
Rubiaceae	<i>Mitracarpus hirtus</i>	White Eye	Y	-	-
Rubiaceae	<i>Richardia brasiliensis</i>	White Eye	Y	-	-

Family	Scientific name	Common name	Status		
			Introduced ¹	NC Act ²	EPBC Act ²
Sapindaceae	<i>Atalaya hemiglauca</i>	Whitewood	-	LC	-
Scrophulariaceae	<i>Eremophila mitchellii</i>	False Sandalwood	-	LC	-
Scrophulariaceae	<i>Myoporum acuminatum</i>	Coastal Boobialla	-	LC	-
Solanaceae	<i>Physalis angulata</i>	Wild Gooseberry	Y	-	-
Solanaceae	<i>Solanum torvum</i>	Devil's Fig	Y	-	-
Sparrmanniaceae	<i>Grewia asiatica</i>	Grewia	Y	-	-
Sparrmanniaceae	<i>Triumfetta rhomboidea</i>	Chinese Burr	Y	-	-
Typhaceae	<i>Typha domingensis</i>	Cumbungi	-	LC	-
Verbenaceae	<i>Lantana camara</i>	Lantana	Y	-	-
Verbenaceae	<i>Stachytarpheta jamaicensis</i>	Jamaica Snakeweed	Y	-	-

¹ Introduced: 'Y' (non-native), '-' (native species).

² Status under Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Queensland *Nature Conservation Act 1992* (NC Act). EX (Extinct), CE (Critically Endangered), E (Endangered), V (Vulnerable), NT (Near Threatened), SL (Special Least Concern), Least Concern (LC) and M (Migratory).

³ This species was possibly recorded during the field survey, but it could not be confirmed.

Appendix H:
Vegetation Assessment Proformas

Project number/name: 135037.

Project location: HPS 2.

Site name: RE-2 (from a distance - poor access) Date: 25/5/21 Observers: DW

Latitude: -19.738569 Longitude: 147.086697 Datum: WGS84 Photos: North: - South: - East: - West: 89

VEGETATION
 RE (as mapped): 11.3.7 / 11.3.25 / 11.3.25b RE (observed): 11.3.7
 General vegetation description: Cor top, Cor dal & Cor cla open woodland.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	16-18	Cor top, Cor dal, Cor cla	
T2	S	8-12	T1 sep.	
S1	S	1.5-4	2:2 Mau*, Coy gra*, Gre str	
G	D	0-1	Chil inf*, Sty sc*, Sp. jac*, Sty ham*, Art. Ec*, Art. con.	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: -

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Colour:
 Notes: Not ascertained - likely clay/brown.

DISTURBANCE [Severity/Extent[^]] Notes (info source, fire scar height, time since event)

Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	2W	Adjacent
Non-native plant cover	3W	
Grazing	2W	
Feral diggings	1L	Pig activity
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	0	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	-	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance [^] - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine} {Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing} {Natural/Modified} {Pugging/Heavy Grazing/Light Grazing} {Clear/Turbid/Surface Film Oil/Surface Film Organic}
Large (>10cm) tree hollows	1	
Small (<10cm) tree hollows	3	
Fallen logs (>10cm diam.)	2	
Course litter (>2cm diam.)	3	
Fine litter (<2cm diam.)	3	
Decorticating bark	1	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	
Large Boulders (>2m)	0	
Exfoliating rock	2	Ratio grass/forb (%): 60/40
Active flowering (T & S)	0	Ground cover (%): Bare Ground : Rock : Litter : Live 0 : 0 : 5 : 95
Other	-	CWD (50m transect): -

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS2

Site name: R6-3	Date: 25/5/12	Observers: RW
Latitude: -19.740970	Longitude: 117.084890	Datum: WGS84
Photos:	North: 44/48	South: 95/99
	East: 96/100	West: 97/101

VEGETATION
 RE (as mapped): 11.3.256 RE (observed): 11.3.256.

General vegetation description: Mel low & Lop gra riparian vegetation (young creeks).

Layer^	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	M	15-20	Mel low, Lop gra, Cas cum	Mil pin, Fox fr, Cor oak
T2	S	4-8	T1 spp, Lys hoo, Pan sp	
S1	S	2-4	Lon can, Lys hoo, Fir spp, Cry gra, Yan pur	
G		0.1-5	Mog moss, Yan pur, Ait fic, Lom sp.	

LANDFORM
 Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil)
 Depth: {Deep/Shallow/Skeletal} Texture: Sandy. Colour: Tan.

DISTURBANCE | Severity/Extent^ | Notes (info source, fire scar height, time since event)

Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	1W	
Grazing	1W	
Feral diggings	1L	
Erosion	1W	Crack bones
Storm	0	
Human litter/waste	0	
Infrastructure	0	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance^ - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	3	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	5	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	4	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	3	Notes: WC-11, US-90, DS-91. Dry channel dominated with Ait fic.
Fine litter (<2cm diam.)	4	
Decorticating bark	5	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 2/80
Active flowering (T & S)	0	Ground cover (%): Bare Ground : Rock : Litter : Live 30 : 0 : 10 : 40
Other	0	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS 2

Site name: 06-5 Date: 25/5/21 Observers: R.W.

Latitude: -19.749988 Longitude: 147.086119 Datum: WSG 84 Photos: North: 83 South: 84 East: 85 West: 86

VEGETATION RE (as mapped): 11.3.7/11.3.35 RE (observed): 11.3.35

General vegetation description: Cor tes dominated woodland with fuc pla and cor spp. open

Table with columns: Layer^, Cover*, Height Range, Dominant species*, [Layer: E, T1, T2, T3, S1, S2, G]. Rows include T1, T2, S, G with species like Cor tes, fuc pla, Cor cla, Cor dal, etc.

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay Colour: Brown

DISTURBANCE table with columns: Disturbance, Severity/Extent^, Notes. Rows include Fire, Logging/clearing, Non-native plant cover, Grazing, Feral diggings, Erosion, Storm, Human litter/waste, Infrastructure, Artificial noise/light, Other.

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE table with columns: Feature, Abundance^ - Notes, Waterbody, Caves, Ratio grass/forb (%), Ground cover (%), CWD (50m transect).

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS 2.

Site name: RE-6 Date: 25/5/21 Observers: RW.

Latitude: -19.759525 Longitude: 147.088570 Datum: WSG 84. Photos: North: 73 South: 74 East: 75 West: 76

VEGETATION RE (as mapped): 11.37/11.3.35 RE (observed): 11.37.

General vegetation description: Cor dal dominated open woodland. Euc plu in the distance to S.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	14-18	Cor dal,	
T2	S	4-10	Cor dal, Cere STR	
S	S	1.5-3	2.2 Mau*, Cere STR	
G	D	0-1	Sry sca*, Hat con, Cui inf* (2)	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay. Colour: Dark brown

DISTURBANCE	Severity/Extent [^]	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	3W	
Grazing	2W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	0/L	{building/road/tracks/fence} irrigated channel nearby.
Artificial noise/light	—	{noise/light}
Other		

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance [^] - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Large (>10cm) tree hollows	2	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Small (<10cm) tree hollows	3	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Fallen logs (>10cm diam.)	3	Notes: NA.
Course litter (>2cm diam.)	3	
Fine litter (<2cm diam.)	4	
Decorticating bark	1	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA
Large Boulders (>2m)	0	
Exfoliating rock	—	Ratio grass/forb (%): 20/80
Active flowering (T & S)	—	Ground cover (%): Bare Ground : Rock : Litter : Live 5 : 0 : 10 : 85
Other	—	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS 2

Site name: RE-7 Date: 25/5/21 Observers: RW

Latitude: -19.783822 Longitude: 147.104937 Datum: WSG 84 Photos: North: 69 South: 70 East: 71 West: 72

VEGETATION RE: 11.3.7/11.3.35 RE (observed): 11.3.35

General vegetation description: Euc pla & Cor tos open woodland. To the SE, a mix of Cor spp., to the NE just Euc pla (11.3.35).

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	16-20	Euc pla, Cor tos	
T2	S	6-10	T1 spp, Cor str	
S	S	1.5-3	Ziz. Mann*, Cor str	
G	D	0-1.5	Chc inf*, Pan sp., Dry sca*, Sty ham*, Ziz Mann*	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle:

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay Colour: Dark brown

DISTURBANCE Severity/Extent[^] Notes (info source, fire scar height, time since event)

Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	2W	on fire
Non-native plant cover	2W	G & S layers
Grazing	1W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	nil	{building/road/tracks/fence}
Artificial noise/light	1	{noise/light}
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance [^] - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	3	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	4	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	3	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	4	Notes: NA -
Fine litter (<2cm diam.)	5	
Decorticating bark	2	
Cryptogam	0	
Soil cracks	6	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA -
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 80/20
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 15 : 0 : 5 : 80
Other	1	CWD (50m transect):

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS 2

Site name: RE-8 Date: 25/1/21 Observers: RW.

Latitude: -19.792343 Longitude: 147.110978 Datum: WGS84 Photos: North: 65 South: 66 East: 61 West: 68

VEGETATION RE (as mapped): 11.37/11.3.35 (regrowth) RE (observed): 11.3.7/11.3.35

General vegetation description: Euc pla and Cor tes open woodland. Suitable for BTF.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	18-22	Euc Dia, Cor tes	
T2	S	6-14	T1 spp, Cor str	
S1	S	1.5-4	Ziz maud*, Vac fav*	
G	D	0-1.5	Herb can, Bot Pet*, Sty sca, Cur inf*, Uro Mos*, Ent ram, All cinn, APT SP.	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Sandy Colour: Tan

DISTURBANCE | Severity/Extent[^] | Notes (info source, fire scar height, time since event)

Fire	3	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	1W	
Grazing	1W	
Feral diggings	0	
Erosion	1L	CLERE
Storm	0	
Human litter/waste	0	
Infrastructure	0	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	—	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance [^] - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine} {Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing} {Natural/Modified} {Pugging/Heavy Grazing/Light Grazing} {Clear/Turbid/Surface Film Oil/Surface Film Organic} — NO water
Large (>10cm) tree hollows	2	
Small (<10cm) tree hollows	4	
Fallen logs (>10cm diam.)	4	
Course litter (>2cm diam.)	5	
Fine litter (<2cm diam.)	5	
Decorticating bark	1	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	
Boulders (61cm-2m)	0	
Large Boulders (>2m)	0	
Exfoliating rock	0	
Active flowering (T & S)	—	
Other	—	

Notes: WC-31. US-63 → 5m channel. 0-64 → 2m rip veg. No riparian veg. Ziz maud*.

Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}

Ratio grass/forb (%): 25/75

Ground cover (%): Bare Ground : Rock : Litter : Live 15 : 10 : 5 : 80

CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes: wpt 5 - rabbit droppings.

Project number/name: 135037

Project location: HPS2

Site name: RE-9 Date: 25/5/21 Observers: RW.

Latitude: -14.797163 Longitude: 147.114655 Datum: WSG 84 Photos: North: 57 South: 58 East: 59 West: 60

VEGETATION RE (as mapped): 11.3.7/11.3.35 RE (observed): 11.3.35

General vegetation description: Euc pla dominated open woodland with Cor tes.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	14-18	Euc pla, Cor tes	
T2	S	5-12	T1 spp, Gre str	
S1	S	1.5-2.5	Ziz man*, Vac for*, T1 x 2 spp.	
G	D	0-1.5	Het con, Sty sca*, lsc veg, Alt fic*	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: clay. Colour: Dark brown

DISTURBANCE	Severity/Extent [^]	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	2 W	Ziz man & Stylo.
Grazing	1 W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	0	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance [^] - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Large (>10cm) tree hollows	3	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Small (<10cm) tree hollows	5	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Fallen logs (>10cm diam.)	3	Notes:
Course litter (>2cm diam.)	4	
Fine litter (<2cm diam.)	5	
Decortivating bark	1	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	MA.
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 70/30
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 15 : 0 : 10 : 75.
Other	1	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135031

Project location: HPS2

Site name: RE-10 Date: 25/5/21 Observers: EW

Latitude: -19.798992 Longitude: 147.115700 Datum: WGS84 Photos: North: 53 South: 54
East: 55 West: 56

VEGETATIONRE (as mapped): 11.3.4/11.3.25/11.3.13/11.3.25b RE (observed): 11.3.4General vegetation description: Euc pla dominated woodland with Cor tes.Same as RE-12. → more grass → Pan sp & Aru sp.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
<u>T1</u>	<u>S</u>	<u>16-20</u>	<u>Euc pla, Cor tes</u>	
<u>T2</u>	<u>V</u>	<u>6-12</u>	<u>T1 spp, Lop gra, Alb pro, Pla tes</u>	
<u>S</u>	<u>S-M</u>	<u>1.5-2</u>	<u>Lit. Mas, Gg gra*</u>	
<u>G</u>	<u>D</u>	<u>0-1.5</u>	<u>All fic, Mas sha, Asc sp, Cliter, Ocime, Ure lob, Ure Mas, Pan sp, Aru sp</u>	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle:

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay Colour: Grey/Brown
Notes:

DISTURBANCE | Severity/Extent[^] | Notes (info source, fire scar height, time since event)

Fire	<u>0</u>	<u>{scorched trunk/some crown death/much crown death}</u>
Logging / clearing	<u>0</u>	
Non-native plant cover	<u>3W</u>	
Grazing	<u>3W</u>	
Feral diggings	<u>0</u>	
Erosion	<u>0</u>	
Storm	<u>0</u>	
Human litter/waste	<u>0</u>	
Infrastructure	<u>1L</u>	<u>{building/road/tracks/fence}</u>
Artificial noise/light	<u>0</u>	<u>{noise/light}</u>
Other	<u>—</u>	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance [^] - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	<u>6</u>	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	<u>5</u>	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	<u>3</u>	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	<u>5</u>	Notes: <u> </u>
Fine litter (<2cm diam.)	<u>5</u>	
Decorticating bark	<u>2</u>	
Cryptogam	<u>0</u>	
Soil cracks	<u>0</u>	
Stones (20-60cm)	<u>0</u>	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	<u>0</u>	
Large Boulders (>2m)	<u>0</u>	
Exfoliating rock	<u>0</u>	Ratio grass/forb (%): <u>40/60</u>
Active flowering (T & S)	<u>—</u>	Ground cover (%): Bare Ground : Rock : Litter : Live <u>10 : 0 : 5 : 85</u>
Other	<u>—</u>	CWD (50m transect): <u> </u>

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS 2

Sit name: RE-11 Date: 25/5/21 Observers: EW
 Latitude: -19 900587 Longitude: 117 116912 Datum: WSG84 Photos: North: - South: -
 East: 51 West: 52

VEGETATION RE (as mapped): 11.3.256 RE (observed): 11.3.256

General vegetation description: Mel lau & Lop gra fringing a watercourse.

Layer [^]	Cover [*]	Height Range	Dominant species [*]	[Layer: E, T1, T2, T3, S1, S2, G]
T1	M	18-22	Mel lau, Mel lau, Lop gra, Cor tes,	
T2	S	6-12	Ti spp, Fic spp, Bur inc,	
S	S	2-3	Van pan*, Lon cam*	
G	D	0-1.5	Meg Max, Aiu sp, Spo jac*, Age con*, Lud sp.	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Sandy Colour: Tan
 Notes: —

DISTURBANCE	Severity/Extent [^]	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	1W	
Grazing	1W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	0	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	—	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Rivering/Palustrine/Lacustrine}
Feature	Abundance [^] - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Large (>10cm) tree hollows	3	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Small (<10cm) tree hollows	4	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Fallen logs (>10cm diam.)	4	Notes:
Course litter (>2cm diam.)	6	
Fine litter (<2cm diam.)	6	
Decorticating bark	6	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	1	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 90/10
Active flowering (T & S)	—	Ground cover (%): Bare Ground : Rock : Litter : Live 30 : 0 : 15 : 55
Other	—	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Project number/name: 135037

Project location: HPS2

Site name: RE-12 Date: 25/5/21 Observers: RW

Latitude: -19.800920 Longitude: 147.117152 Datum: WGS84 Photos: North: 47 South: 48 East: 49 West: 50

VEGETATION RE (as mapped): 11.3 4/11 3.25/11 313/11.3 256 RE (observed): 11.3 4.

General vegetation description: Euc pla dominated with Car tas. S and G layers dominated by non-native spp.

Layer^	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	16-20	Euc pla, Car tas	
T2	V	6-12	T1 spp., Lop gra, Alb pla, Plc tim	
S1	S-M	1.5-2	Ziz mau*, Cry gra*	
G	D	0-1.5	Alt fig*, Mes sula*, Asc sp*, Cliter, Oxi ana*, Ure lob*, Uca mas*	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay Colour: Gray/brown

DISTURBANCE	Severity/Extent^	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	3W	
Grazing	3W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1L	{building/road/tracks/fence}, Shed
Artificial noise/light	0	{noise/light}
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance^ - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Large (>10cm) tree hollows	4	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Small (<10cm) tree hollows	5	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Fallen logs (>10cm diam.)	3	Notes:
Course litter (>2cm diam.)	5	NA
Fine litter (<2cm diam.)	5	
Decorticating bark	2	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA
Large Boulders (>2m)	0	
Exfoliating rock	1	Ratio grass/forb (%): 5/95
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 15 : 0 : 5 : 80
Other	1	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: APS2

Site name: RE-13 Date: 25/5/21 Observers: [initials]

Latitude: -19.803036 Longitude: 147.118589 Datum: WSG84 Photos: North: 46 South: 48 East: 44 West: 43

VEGETATION RE (as mapped): 11.3.256 RE (observed): 11.3.256

General vegetation description: Mel low & Lop gra riparian vegetation fringing watercourse

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	M	18-22	Mel low, Lop gra, Mel tree, Cor tree	
T2	S	6-12	T1 spp., GC spp., Bor inc	
S	S	2-3	Yon Fern*, Lam Fern*	
G	D	0-1.5	Meg moss, Arn sp., Spo jac*, Age cor*, Lid sp.	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Sandy Colour: Tan

DISTURBANCE	Severity/Extent [^]	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	LW	
Grazing	LW	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	0	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance [^] - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Large (>10cm) tree hollows	3	{Natural/Modified} {Pugging/Heavy Grazing/light Grazing}
Small (<10cm) tree hollows	4	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Fallen logs (>10cm diam.)	4	Notes:
Course litter (>2cm diam.)	6	
Fine litter (<2cm diam.)	6	
Decortivating bark	6	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	1	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 90/10
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 30 : 0 : 15 : 55
Other	1	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HRS2

Site name: RE-14 Date: 25/5/21 Observers: RW

Latitude: -19.804657 Longitude: 147.110518 Datum: WSG84 Photos: North: 39 South: 46 East: 41 West: 42

VEGETATION RE (as mapped): 11.3.4/11.3.75/11.3.13/11.3.25b RE (observed): 11.3.4

General vegetation description: Cor tes dominated woodland with Cor cla, G and S layers dominated by non-native spp.

Layer^	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	16-20	Cor tes, Cor cla, Euc pla, Lop gra (0)	
T2	V	6-12	T1 spp, Alp etc, Ple tim	
S1	M	2-4	Ziz Mas*, Myo acu (0)	
G			Her con, Alf sic*, Mac lat*, Myo swa*, Oci ame*, Cro gar*, Sid acu's	

LANDFORM Situation*: B Pattern*: U Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay Colour: D brown

DISTURBANCE [Severity/Extent^] Notes (info source, fire scar height, time since event)

Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	2W	
Grazing	1W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	0	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance^ - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	1	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	3	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	3	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	5	Notes: NA.
Fine litter (<2cm diam.)	5	
Decorticating bark	5	
Cryptogam	5	
Soil cracks	5	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA.
Large Boulders (>2m)	0	
Exfoliating rock	1	Ratio grass/forb (%): 40/60
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 20 : 0 : 10 : 70
Other	1	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS2

Site name: RE-15 Date: 25/5/21 Observers: DW.

Latitude: -19.81371 Longitude: 147.12677 Datum: WGS84 Photos: North: 27 South: 26 East: 29 West: 30

VEGETATION RE (as mapped): 11.3.7 / 11.3.9 RE (observed): 11.3.9.

General vegetation description: Euc pla open woodlnd with cur tes

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	14-18	Euc pla, Cur tes	
T2	V	8-12	T1 spp.	
S1	M	2-3	Ziz max*, Par acu*	
G	D	0-1	Hat con, Dic scr, Pan sp., Alt cr*, Sty ham*	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay Colour: Dark brown

DISTURBANCE | Severity/Extent[^] | Notes (info source, fire scar height, time since event)

Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	1W	
Grazing	1W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	0	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance [^] - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	3	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	4	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	1	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	4	Notes:
Fine litter (<2cm diam.)	5	NA
Decorticating bark	1	
Cryptogam	6	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 90/10
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 15 : 0 : 10 : 75
Other	1	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS2.

Site name: RE-16. Date: 25/5/21 Observers: RW.

Latitude: -19.820243 Longitude: 147.132766 Datum: WGS84 Photos: North: 17 South: 18 East: 19 West: 20

VEGETATION RE (as mapped): 11.12.1 RE (observed): Non-rem

General vegetation description: Gre str, Euc pla and Ere mit mixed open woodland. Non-remnant.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	8-12	Gre str, Euc pla, Ere mit	
S1	S	2-4	Ere mit, 22. Man*, Cry gra*	
G	D	0-1	Hel con, Pan sp., Cliter*, All fir*, Sty sca*, Sty ham*, Chime*	

LANDFORM Situation*: B Pattern*: L Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay - Colour: Dark brown

DISTURBANCE	Severity/Extent [^]	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	3W	
Non-native plant cover	1W	
Grazing	1W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1L	{building/road/(racks/fence)}
Artificial noise/light	1L	{noise/light}
Other	—	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance [^] - Notes	
Large (>10cm) tree hollows		{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	0	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	2	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	1	Notes: —
Fine litter (<2cm diam.)	4	
Decortivating bark	4	
Cryptogam	1	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	
Large Boulders (>2m)	0	
Exfoliating rock	—	Ratio grass/forb (%): 65/35
Active flowering (T & S)	—	Ground cover (%): Bare Ground : Rock : Litter : Live
Other	—	10 : 0 : 5 : 85
		CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS2

Site name: RE-17 (Rapisrade) Date: 25/5/21 Observers: EW

Latitude: -19.820441 Longitude: 147.932702 Datum: WGS84 Photos: North: 11 South: 12 East: 13 West: 14

VEGETATION RE (as mapped): 11.12.1 (Regrowth) RE (observed): Non-rom

General vegetation description: Non-remnant vegetation along an ephemeral creek. No shrub or tree layer. Weedy ground layer.

Layer ^A	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
G	D	0-1.5	Pan sp., Alt fr*, Yan pan*, Cry gra*, Cliter*, Bot pet, Dig sp (?), Ent rom	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay Colour: Dark brown

DISTURBANCE	Severity/Extent ^A	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	3W	in the region
Non-native plant cover	3W	
Grazing	2W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1L	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance ^A - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Large (>10cm) tree hollows	0	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Small (<10cm) tree hollows	0	{Clear/Turbid/Surface Film Oil/Surface Film Organic} - NA
Fallen logs (>10cm diam.)	0	Notes: WC-10.
Course litter (>2cm diam.)	4	Creek line
Fine litter (<2cm diam.)	4	→ Hym amp* US-15 @ 4/1
Decorticating bark	0	→ Ziz man* DS-16
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	
Large Boulders (>2m)	0	
Exfoliating rock	1	Ratio grass/forb (%): 50/50
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live
Other	1	10 : 0 : 5 : 85
		CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS 2

Site name: RE-18 Date: 25/5/21 Observers: RW

Latitude: -19.813006 Longitude: 147.125703 Datum: WSG84 Photos: North: 23 South: 24 East: 25 West: 26

VEGETATION RE (as mapped): 1137/1134 RE (observed): 1137

General vegetation description: Cor dal dominated open woodland with evidence of clearing

Layer [^]	Cover [*]	Height Range	Dominant species [*]	[Layer: E, T1, T2, T3, S1, S2, G]
T1	V	12-14	Cor dal	
T2	V	6-8	Cor dal	
S1	S-M	2-4	Ziz Max [*]	
G	D	0-1	Her cor, Chl inf [*] , Alf Sic [*] , Sty hum ⁺	

LANDFORM Situation^{*}: B Pattern^{*}: LP Slope position^{*}: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Colour: Notes:

DISTURBANCE | Severity/Extent[^] | Notes (info source, fire scar height, time since event)

Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	2W	Clear cut to the SE side. Scorched trees remaining.
Non-native plant cover	2W	G & S layers.
Grazing	1W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1L	{building/road/tracks/fence} Power line
Artificial noise/light	1W	{noise/light} Road in distance
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance [^] - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	1	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	2	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	1 Dead trees	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	4	Notes: NA
Fine litter (<2cm diam.)	4	
Decorticating bark	1	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA.
Large Boulders (>2m)	0	
Exfoliating rock	—	Ratio grass/forb (%): 75/25
Active flowering (T & S)	—	Ground cover (%): Bare Ground : Rock : Litter : Live
Other	—	5 : 0 : 5 : 90
		CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: 4452

Site name: RE-19 Date: 25/5/21 Observers: RW, PB

Latitude: -19.823223 Longitude: 147.133281 Datum: WGS84 Photos: North: 7 South: 8 East: 9 West: 10

VEGETATION RE (as mapped): 11.12.1 RE (observed): Non-rem.

General vegetation description: Cre str, Euc pla and Ere mit non-remnant open woodland.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	8-12	Cre str, Euc pla, Ere mit	
S1	S	2-4	Ere mit, Zi2 Mau*, Cry gra*	
G	D	0-1	Hel con, Pan sp, Clitac*, All Ek*, Sty sea*, Sty ham*, Cal ml*	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay Colour: Dark brown

DISTURBANCE | Severity/Extent[^] | Notes (info source, fire scar height, time since event)

Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	3W	
Non-native plant cover	1W	
Grazing	1W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1L	{building/road/tracks/fence}
Artificial noise/light	1L	{noise/light}
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance [^] - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	0	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	2	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	1	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	4	Notes: NA
Fine litter (<2cm diam.)	4	
Decorticating bark	1	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA
Large Boulders (>2m)	0	
Exfoliating rock	—	Ratio grass/forb (%): 65/35
Active flowering (T & S)	—	Ground cover (%): Bare Ground : Rock : Litter : Live 10 : 0 : 5 : 85
Other	—	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: Rapitxada - HP Stg 2

Site name: RE_25 Date: 21-4-21 Observers: P. Buosi R. Williams

Latitude: -19.83325 Longitude: 147.139417 Datum: WSG84 Photos: North: 064608 South: 005 East: 610 West: 0611

VEGETATION RE (as mapped): 11.3.7 / 11.3.9 RE (observed): Mostly 11.3.9 but 11.3.7 present (subdom)

General vegetation description: Euc woodland (mostly E. platyphylla) w G. striata common ast2 over grassy ground layer

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	12-15m	Euc pla, Euc dal	
T2	S	4-8m	T1 spp., G. striata, Ata hem	
S1	S w D patches	1.3-2.2m	Ziz mau*, Cry gra	
G	D	1.2-1.6m	Het con, meg max*, Chl gay*, Chl inf*, Alt fic*, Sty ham*, Iseilema vaginiflorum	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: _____

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay Colour: brown

DISTURBANCE	Severity/Extent [^]	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	2L	
Non-native plant cover	2W	
Grazing	1W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1	{building/road/tracks/fence}
Artificial noise/light	1	{noise/light} Road (light traffic)
Other		

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance [^] - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing} Nil
Large (>10cm) tree hollows	1	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Small (<10cm) tree hollows	4	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Fallen logs (>10cm diam.)	2	Notes: stream nearby
Course litter (>2cm diam.)	2	
Fine litter (<2cm diam.)	5	
Decorticating bark	0	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	Nil
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 80/20
Active flowering (T&S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 0 : 0 : 5 : 95
Other	1	CWD (50m transect): _____

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: LPSZ

Site name: RE-26 Date: 21/4/21 Observers: RW, PB

Latitude: -19.833417 Longitude: 147.136705 Datum: WSG84 Photos: North: 613 South: 612 East: 614 West: 615

VEGETATION RE (as mapped): 11.3.256 RE (observed): 11.3.253

General vegetation description: Melaleuca leucadendra, Cortes riparian veg (fringing drainage line). Ephemeral drainage line.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	D	15-20m	Melaleuca Cortes, Lop sua	
T2	S	8-12m	Alp exc, Pla cof, Gre str,	
S1	V	1-2m	Ziz max*, Cry gra*	
E	D	0-1m	Meg max*, Xan bun*, Alt fig, Bot per, Spe nat*	

LANDFORM Situation*: Pattern*: Slope position*: Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Sand Colour: Sandy (tan)

DISTURBANCE	Severity/Extent [^]	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	2W	
Grazing	1L	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1L	{building/road/tracks/fence} bridge, culvert
Artificial noise/light	1L	{noise/light} road
Other	—	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance [^] - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Large (>10cm) tree hollows	2	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Small (<10cm) tree hollows	3	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Fallen logs (>10cm diam.)	3	Notes:
Course litter (>2cm diam.)	5	
Fine litter (<2cm diam.)	5	
Decorticating bark	4	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	1 on causeway	None
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 40/60
Active flowering (T & S)	—	Ground cover (%): Bare Ground : Rock : Litter : Live 20 : 5 : 15 : 60
Other		CWD (50m transect): NA

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135034

Project location: HPS2

Site name: RE 38 Date: 21-4-21 Observers: P. Bussi R. Williams


Latitude: -1.868216 Longitude: 147.151464 Datum: WSG84 Photos: North: 616 South: 617 East: 618 West: 619

VEGETATION RE (as mapped): RE 11.3.7 RE (observed): 11.3.35

General vegetation description: Poplar Gum woodland w very sparse lower tree layers + shrub layer dominated by Chinese Apple. Degraded ground layer (grasses sparse)

Layer^	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	SP	12-16m	Euc pla	
T2	V	4-8m	Euc pla	
S1	M	1.5-2m	Ziz mau*, Cry gra*	
G	D	<1.4m	Sty sca*, Het can, Bot per*, Panicum sp., Chi inf*	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: _____

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: clay Colour: 

DISTURBANCE [Severity/Extent^] Notes (info source, fire scar height, time since event)

Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	1L	
Non-native plant cover	2W	
Grazing	1W	ground layer indicates extensive historical grazing
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1	{building/road/tracks/fence}
Artificial noise/light	1	{noise/light} road
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance^ - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	2	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	5	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing} Nil
Fallen logs (>10cm diam.)	3	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	4	Notes:
Fine litter (<2cm diam.)	4	
Decorticating bark	0	
Cryptogam	4	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	Nil
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 30/70
Active flowering (T & S)	—	Ground cover (%): Bare Ground : Rock : Litter : Live 5 : 0 : 10 : 85
Other	—	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPSZ

Site name: RE-39 Date: 2/14/23 Observers: RW, FB

Latitude: -19.867627 Longitude: 147.152982 Datum: WGS84 Photos: North: 626 South: 621 East: 627 West: 623

VEGETATION RE (as mapped): 11-39 RE (observed): 11-335

General vegetation description: Euc pla open woodland on flat alluvium. High cover of weeds in shrubs & ground layer - little native recruitment.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	12-16 m	Euc pla, Cor tes	
T2	V	8-12 m	Euc pla, Cor tes	
S1	M	1-2.5 m	2/3 mu, Crog gra*	
G	D	0-1 m	sgy sea, Chigay*, Hot con, Alt fic*, The qua*, Sgy hom*	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay Colour: Brown

DISTURBANCE	Severity/Extent [^]	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	1L	powerline corridor / roads
Non-native plant cover	3W	
Grazing	2W	current pressure low - plants indicate an excess of grazing historically
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1L	{building/road/tracks/fence}
Artificial noise/light	1L	{noise/light} road
Other	—	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance [^] - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Large (>10cm) tree hollows	3	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Small (<10cm) tree hollows	4	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Fallen logs (>10cm diam.)	3	Notes: None
Course litter (>2cm diam.)	4	
Fine litter (<2cm diam.)	5	
Decorticating bark	1	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	None
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 20/80
Active flowering (T & S)	—	Ground cover (%): Bare Ground : Rock : Litter : Live 5 : 0 : 1 : 94
Other	—	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: 4052

Site name: PE-40 Date: 21/11/21 Observers: RW, PB.

Latitude: -19.469824 Longitude: 147.153655 Datum: WGS84 Photos: North: 630 South: 631 East: 632 West: 633

VEGETATION RE (as mapped): 11.3.30/11.3.35/11.3.7 RE (observed): 11.3.7

General vegetation description: Cor tas Mixed open woodland on alluvial plain. Weeds present in shrub layer.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	15-16m	Cor tas, Corcla Eucal, Eucpa	
T2	S	6-10m	T1 species, Gr STR	
S1	S	1-2.5m	Ziz max, Oyg gra	(S with M patinoj)
G	D	0-1m	Stry hum, Stry set, Wet can, Grasp, Chl inf*	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay/loam Colour: Brown

DISTURBANCE | Severity/Extent[^] | Notes (info source, fire scar height, time since event)

Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	1W	
Non-native plant cover	3W	
Grazing	1W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1L	{building/road/tracks/fence}
Artificial noise/light	1L	{noise/light} road
Other	1	

{Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)}

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance [^] - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	1	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	3/4	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	3	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	4	Notes: NA
Fine litter (<2cm diam.)	4	
Decorticating bark	1	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	1W	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 30/70
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 4 : 0 : 1 : 95
Other	1	CWD (50m transect): —

{Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)}

Site sketch/notes:

Project number/name: 135037

Project location: HPS2

Site name: RE-42	Date: 26/5/21	Observers: RW
Latitude: -19.8833871	Longitude: 147.1888441	Datum: WSG84
Photos:	North: —	South: —
	East: —	West: 129
VEGETATION		
RE (as mapped): 11.3.7/11.3.9	RE (observed): 11.3.7	
General vegetation description: Cor spp. mixed open woodland with Lys hood.		

Layer^	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	15-19	Cor tas, Cor dal, Cor cla, Euc Pla	
T2	S	6-12	T1 spp., Pla cor, Lys hood	
S	S-M	1.5-3	Ziz Max ^o , Pas fax ^o	
G	D	0-1.5	Sty han ^o , Uro mai ^o , Chi inf ^o , Art fil ^o , Mes siks ^o , Lys con,	

LANDFORM	Situation*: B	Pattern*: LP	Slope position*: E	Slope angle: —
SOIL (topsoil)	Depth: {Deep/Shallow/Skeletal}	Texture: Clay/Loam	Colour: Brown	
Notes:				

DISTURBANCE	Severity/Extent^	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	1W	
Non-native plant cover	3W	
Grazing	2W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1L	{building/road/cracks/fence}
Artificial noise/light	0	{noise/light}
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance^ - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Large (>10cm) tree hollows	3	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Small (<10cm) tree hollows	4	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Fallen logs (>10cm diam.)	4	Notes: NA
Course litter (>2cm diam.)	5	
Fine litter (<2cm diam.)	5	
Decorticating bark	2	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA
Large Boulders (>2m)	0	
Exfoliating rock	1	Ratio grass/forb (%): 50/50
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 5 : 0 : 5 : 90
Other	1	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: | 35037

Project location: HPS2.

Site name: RE-43 Date: 26/5/21 Observers: AW.

Latitude: -19.879920 Longitude: 147.185274 Datum: WSG84 Photos: North: 130 South: 131 East: 132 West: 133

VEGETATION RE (as mapped): 11.3.9 RE (observed): 11.3.7

General vegetation description: Cor tes dominated open woodland with Euc Pla.

Layer^	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	14-18	Cor tes, Euc Pla	
T2	S	4-10	T1 spp	
S1	S-M	1-5-3	2/2 M...*, Par acv*, C...*	
G	D	0-1.5	lec. h...	

LANDFORM Situation*: Pattern*: Slope position*: Slope angle:

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Colour: Brown

DISTURBANCE | Severity/Extent^| Notes (info source, fire scar height, time since event)

Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	2W	
Non-native plant cover	1W	
Grazing	2W	cow prints
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	0	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance^ - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	3.2	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	3	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	1	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	1	Notes:
Fine litter (<2cm diam.)	1	
Decorticating bark	1	NA
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 90/10
Active flowering (T & S)	0	Ground cover (%): Bare Ground : Rock : Litter : Live 10 : 0 : 0 : 90
Other	0	CWD (50m transect):

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS 2.

Site name: RE-44 Date: 26/5/21 Observers: RW.

Latitude: -11.864859 Longitude: 147.189276 Datum: WSG84 Photos: North: 125 South: 126 East: 127 West: 128

VEGETATION RE (as mapped): 11.3 35/11.3 30/11.3 7 RE (observed): 11.3 7

General vegetation description: Cor sp mixed open woodland with Lys hoo.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	15-19	Cor ted, Cor dal, Cor cla, Euc pla	
T2	S	6-12	Ti spp, Pla cor, Lys hoo	
S1	S-M	1.5-3	Ziz max ⁺ , Pas for ⁺	
G	D	0-1.5	Sty ham ⁺ , Uro Max ⁺ , Cul inf ⁺ , Ait Lic ⁺ , Mes SW ⁺ , Aet can	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay/loam Colour: Brown
Notes: —

DISTURBANCE	Severity/Extent [^]	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	1W	
Non-native plant cover	3W	
Grazing	2W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1L	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	—	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance [^] - Notes	
Large (>10cm) tree hollows	3	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	4	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	4	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	5	Notes: NA.
Fine litter (<2cm diam.)	5	
Decorticating bark	2	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 50/50
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live
Other	1	5 : 0 : 5 : 90
		CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS2

Site name: RE-46 Date: 26/5/21 Observers: LW.

Latitude: -19.910487 Longitude: 147.208226 Datum: WGS84 Photos: North: — South: — East: — West: —

VEGETATION RE (as mapped): 11.3.7 / 11.3.9. RE (observed): 11.3.35

General vegetation description: Euc pla dominated woodland.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	14-18	Euc Pla / Cor cla, Cor tes	
T2	S	6-12	Tl spp. 1 Pla cor	
S1	S (D. peduncul)	1.5-3	Ziz. Mon*, Gse asi*, Pal fce*, Arg. res*	
E	O	0-1.5	Alf fic*, Pal fce*, Sty hem*, Hut con	

LANDFORM Situation*: B Pattern*: L Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay / loam Colour: Dark brown

DISTURBANCE	Severity/Extent [^]	Notes (info source, fire scar height, time since event)
Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	3W	
Grazing	2W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	—	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance [^] - Notes	
Large (>10cm) tree hollows	3	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	4	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	3	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	4	Notes: —
Fine litter (<2cm diam.)	5	
Decorticating bark	3	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 20/80
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 8 : 0 : 5 : 90
Other	—	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS2

Site name: RE-47	Date: 26/5/21	Observers: RW
Latitude: -19.910861	Longitude: 147.208403	Datum: WGS84
Photos:	North: 110	South: 111
	East: 112	West: 113

VEGETATION
 RE (as mapped): 11.3.30 / 11.3.35
 RE (observed): 11.3.35

General vegetation description:
eye pla dom woodland

Layer ^A	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	14-18	Cooc pla, Cor Cla, Cor tes	
T2	S	6-12	Ti spp, Pla cor	
S1	S (D patches)	1.5-3	Ziz Mou*, Gre asi*, Pas fo*, Arg Ner*	
E	D	0-1.5	Ait Lic*, Pas fo*, Styham*, Det cen	

LANDFORM
 Situation*: **B** Pattern*: **LP** Slope position*: **F** Slope angle: **—**

SOIL (topsoil)
 Depth: {Deep/Shallow/Skeletal} Texture: *Clay/loam* Colour: *Dark brown*
 Notes: *—*

DISTURBANCE | Severity/Extent^A | Notes (info source, fire scar height, time since event)

Fire	6	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	3W	
Grazing	2W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1	{building/road/tracks/fence}
Artificial noise/light	—	{noise/light}
Other	—	

{Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)}

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance ^A - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	3	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	5	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	3	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	4	Notes: <i>NA</i>
Fine litter (<2cm diam.)	5	
Decorticating bark	3	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	<i>NA</i>
Large Boulders (>2m)	0	
Exfoliating rock	—	Ratio grass/forb (%): 20/80
Active flowering (T & S)	—	Ground cover (%): Bare Ground : Rock : Litter : Live <i>5 : 6 : 5 : 90</i>
Other	—	CWD (50m transect): —

{Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)}

Site sketch/notes:

Project number/name: 135037

Project location: 4FS2

Site name: RC-48 Date: 21/4/21 Observers: RW, PB

Latitude: -19.925596 Longitude: 147.218162 Datum: WGS84 Photos: North: 632 South: 635 East: 636 West: 637

VEGETATION RE (as mapped): 1137/1139 RE (observed): 1139

General vegetation description: Eucpla & Cor cla dominated open woodland

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	12-18m	Cor cla, Euc pla, Cor tes	
T2	S	6-10m	Pla car, Gte cor, TL species, Ziz max*	
S1	M	2-4m	TL species, Fic opp	
G	D	0-1.5m	Meg max* Hat con, Hyp Surt, Tri thot	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Sandy loam Colour: tan/brown

DISTURBANCE	Severity/Extent [^]	Notes (info source, fire scar height, time since event)
Fire	1W	{scorched trunk/some crown death/much crown death} old fire scars
Logging / clearing	0	
Non-native plant cover	3W	
Grazing	0	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1L	{building/road/tracks/fence}
Artificial noise/light	1L	{noise/light} road
Other	1	

(Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@))

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance [^] - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Large (>10cm) tree hollows	3	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Small (<10cm) tree hollows	5	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Fallen logs (>10cm diam.)	1	Notes: NA
Course litter (>2cm diam.)	5	
Fine litter (<2cm diam.)	5	
Decortivating bark	1	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 70/30
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live
Other	1	8 : 0 : 2 : 90
		CWD (50m transect): —

(Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance))

Site sketch/notes:

Project number/name: 135037

Project location: HPS2

Site name: RC-49 (2nd G-1st) Date: 2/4/21 Observers: RW, PA

Latitude: -19.92607 Longitude: 147.21874 Datum: WSG84 Photos: North: 632 South: 637 East: 640 West: 641

VEGETATION RE (as mapped): 11325b/11325f RE (observed): 11325b/11325f

General vegetation description: Euc ter dominated riparian vegetation on river banks. Sandy river bed. Mel vim in middle of channel.

Layer^	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	15-20m	Euc ter	
T2	M	8-10m	Plb hlm, Mil pin, Euc ter, Arg nat*	
S1	S	2-4m	Euc asi*, P/c app, Ric cent, Jat gosh*	
G	D	0-1.5m	Mq max*, Tri rho*, P/c faen	

LANDFORM Situation*: B Pattern*: LP Slope position*: F Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Sand Colour: Sandy/ten

DISTURBANCE	Severity/Extent^	Notes (info source, fire scar height, time since event)
Fire	@	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	2W	ground cover
Grazing	0	
Feral diggings	0	
Erosion	1L	
Storm	0	
Human litter/waste	0	
Infrastructure	1	{building/road/tracks/fence}
Artificial noise/light	1	{noise/light} road
Other		

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance^ - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Large (>10cm) tree hollows	1	{(Natural)/Modified} {Pugging/Heavy Grazing/Light Grazing}
Small (<10cm) tree hollows	3	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Fallen logs (>10cm diam.)	1	Notes: Burdekin river - As per WC-20/WE-13 Assessment.
Course litter (>2cm diam.)	5	
Fine litter (<2cm diam.)	6	
Decorticating bark	1	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	2	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	2	NA.
Large Boulders (>2m)	2	
Exfoliating rock	1	Ratio grass/forb (%): 70/30
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 5 : 0 : 5 : 90
Other	1	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS2

Site name: RE-50 Date: 21/11/21 Observers: PB, RWD

Latitude: -19.925463 Longitude: 147.216903 Datum: WSG84 Photos: North: 643 South: 644 East: 645 West: 646

VEGETATION RE (as mapped): 11330 / 11335 RE (observed): 113.35

General vegetation description: Ecocla dominated open woodland with Cortes, Corcla.

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	5	15-20m	Ecocla, Cortes, Corcla	
T2	3	6-10m	Pla Cor, TI species, Cic opp, Cere 45c*, My exc, Retic	
S1	5	2-4m	Cere 45c* Plu vir, Ziz mac*	
G	0	0-1.5m	Mag Max*, Tri the*, Het con, Gregor*	

LANDFORM Situation*: 3 Pattern*: LP Slope position*: F Slope angle: 7

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Sandy loam Colour: tan/brown

DISTURBANCE	Severity/Extent [^]	Notes (info source, fire scar height, time since event)
Fire	1L	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	3W	Ground layer
Grazing	1W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1	{building/road/tracks/fence}
Artificial noise/light	1	{noise/light} road
Other	—	—

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE		Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Feature	Abundance [^] - Notes	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Large (>10cm) tree hollows	2	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Small (<10cm) tree hollows	4	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Fallen logs (>10cm diam.)	1	Notes: NA
Course litter (>2cm diam.)	5	
Fine litter (<2cm diam.)	6	
Decorticating bark	1	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA
Large Boulders (>2m)	0	
Exfoliating rock	1	Ratio grass/forb (%): 70/30
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 10 : 0 : 5 : 85
Other	1	CWD (50m transect): —

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: 1482

Site name: RE-51 Date: 21/4/21 Observers: RW, PB

Latitude: -19.862814 Longitude: 147.149899 Datum: WSG84 Photos: North: 626 South: 627 East: 628 West: 627

VEGETATION RE (as mapped): 1139 RE (observed): 11.3.7

General vegetation description: Euc dal dominated open woodland on alluvial plains

Layer^	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	10-15m	Euc dal, Cor tree	
T2	V	6-8m	Euc shr, Euc dal	
S1	D	1-2.5m	Zit Mau*, Cry qua*	
G	D	0-0.75	Sty sca*, Sty huma*, Hot con, Ufo nos*, Spo jagi*, Thegum*	

LANDFORM Situation*: B Pattern*: LP Slope position*: C Slope angle: —

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay Colour: Brown

DISTURBANCE [Severity/Extent^] Notes (info source, fire scar height, time since event)

Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	0	
Non-native plant cover	3W	
Grazing	1W	
Feral diggings	0	
Erosion	0	
Storm	1W	dead trees
Human litter/waste	0	
Infrastructure	0	{building/road/tracks/fence}
Artificial noise/light	1	{noise/light} Plane
Other	—	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance^ - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	0	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	3	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	1	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	3	Notes: NA
Fine litter (<2cm diam.)	4	
Decorticating bark	1	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA
Large Boulders (>2m)	0	
Exfoliating rock	0	Ratio grass/forb (%): 20/80
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 4 : 0 : 1 : 95
Other	—	CWD (50m transect): NA

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Project number/name: 135037

Project location: HPS2

Site name: RE_52 / RE 52 Date: 26/5/21 Observers: RW

Latitude: -14.902911 Longitude: 147.20850 Datum: WSG84 Photos: North: 117 South: 118 East: 119 West: 120

VEGETATION RE (as mapped): 11.3.95/11.3.30 RE (observed): 11.3.7

General vegetation description: Cor sp mixed open woodland

Layer [^]	Cover*	Height Range	Dominant species*	[Layer: E, T1, T2, T3, S1, S2, G]
T1	S	15-14	Cor tes, Cor dal, Cor CIA, Euc pla.	
T2	S	6-12	T1 spp., Pla cor	
S1	S-M	1.5-3	Ziz max*, Pas for*	
G	D	0-1.5	Sty ham*, Uro max*, Crot inf*, Ait Lic*, Mes sun*, Lat con	

LANDFORM Situation*: Pattern*: Slope position*: Slope angle:

SOIL (topsoil) Depth: {Deep/Shallow/Skeletal} Texture: Clay/loam Colour: Brown

DISTURBANCE | Severity/Extent[^] | Notes (info source, fire scar height, time since event)

Fire	0	{scorched trunk/some crown death/much crown death}
Logging / clearing	1W	T1 and T2 layer largely cleared to the W. Borders less nor than
Non-native plant cover	3W	
Grazing	2W	
Feral diggings	0	
Erosion	0	
Storm	0	
Human litter/waste	0	
Infrastructure	1L	{building/road/tracks/fence}
Artificial noise/light	0	{noise/light}
Other	1	

[Severity: (0 nil) - 3 (severe); Extent: Localised (L) / Widespread (W); Info. Source: Direct obs. (#) / Anecdotal (@) / Combination (#@)]

HABITAT CHARACTERISTICS - ABUNDANCE

Feature	Abundance [^] - Notes	Waterbody: {Marine/Estuarine/Riverine/Palustrine/Lacustrine}
Large (>10cm) tree hollows	3	{Dry/Filling/Receding/Unknown or Neutral} {Still/Flowing}
Small (<10cm) tree hollows	4	{Natural/Modified} {Pugging/Heavy Grazing/Light Grazing}
Fallen logs (>10cm diam.)	4	{Clear/Turbid/Surface Film Oil/Surface Film Organic}
Course litter (>2cm diam.)	5	Notes: NA
Fine litter (<2cm diam.)	5	
Decorticating bark	2	
Cryptogam	0	
Soil cracks	0	
Stones (20-60cm)	0	Caves: {Deep/Shallow/Overhang/Crevices/Boulder Piles}
Boulders (61cm-2m)	0	NA
Large Boulders (>2m)	0	
Exfoliating rock	1	Ratio grass/forb (%): 50/50
Active flowering (T & S)	1	Ground cover (%): Bare Ground : Rock : Litter : Live 5 : 0 : 5 : 90
Other	1	CWD (50m transect):

[Abundance: Nil(0), 1(Rare), 2(Rare/Occasional), 3(Occasional), 4(Occasional/Common), 5(Common), 6(Common/Abundance), 7(Abundance)]

Site sketch/notes:

Appendix I:
Likelihood of Occurrence
Assessment

Table 1: Threatened, Near Threatened, Migratory and Special Least Concern species likelihood of occurrence

Family	Scientific name	Common name	Status ¹		Database ²		LoC ³
			NC Act	EPBC Act	WO	PMST	
Fauna							
Birds							
Accipitridae	<i>Erythrotriorchis radiatus</i>	Red Goshawk	E	V	-	x	Unlikely
Accipitridae	<i>Pandion cristatus (Pandion haliaetus)</i>	Eastern Osprey	SL	M	x	x	Possible
Apodidae	<i>Apus pacificus</i>	Fork-tailed Swift	SL	M	x	x	Probable
Apodidae	<i>Hirundapus caudacutus</i>	White-throated Needletail	V	V,M	x	x	Probable
Columbidae	<i>Geophaps scripta scripta</i>	Squatter Pigeon (southern subspecies)	V	V	x	-	Probable
Cuculidae	<i>Cuculus optatus</i>	Oriental Cuckoo	SL	M	-	x	Possible
Estrildidae	<i>Neochmia ruficauda ruficauda</i>	Star Finch	E	E	-	x	Unlikely
Estrildidae	<i>Poephila cincta cincta</i>	Black-throated Finch (southern subspecies)	E	E	x	x	Probable
Falconidae	<i>Falco hypoleucos</i>	Grey Falcon	V	V	-	x	Unlikely
Laridae	<i>Gelochelidon nilotica</i>	Gull-billed Tern	SL	M	x	-	Unlikely
Laridae	<i>Hydroprogne caspia</i>	Caspian Tern	SL	M	x	-	Unlikely
Monarchidae	<i>Monarcha melanopsis</i>	Black-faced Monarch	SL	M	x	x	Possible
Monarchidae	<i>Myiagra cyanoleuca</i>	Satin Flycatcher	SL	M	x	x	Unlikely
Monarchidae	<i>Symposiachrus trivirgatus trivirgatus</i>	Spectacled Monarch	SL	M	x	x	Possible
Motacillidae	<i>Motacilla flava</i>	Yellow Wagtail	SL	M	-	x	Unlikely
Oceanitidae	<i>Fregetta grallaria grallaria</i>	White-bellied Storm-petrel	LC	V	-	x	Unlikely
Rhipiduridae	<i>Rhipidura rufifrons</i>	Rufous Fantail	SL	M	x	x	Possible
Scolopacidae	<i>Actitis hypoleucos</i>	Common Sandpiper	SL	M	-	x	Unlikely
Scolopacidae	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	SL	M	-	x	Unlikely
Scolopacidae	<i>Calidris ferruginea</i>	Curlew Sandpiper	CE	CE,M	-	x	Unlikely
Scolopacidae	<i>Calidris melanotos</i>	Pectoral Sandpiper	SL	M	-	x	Unlikely
Scolopacidae	<i>Gallinago hardwickii</i>	Latham's Snipe	SL	M	x	x	Unlikely
Scolopacidae	<i>Numenius madagascariensis</i>	Eastern Curlew	E	CE,M	-	x	Unlikely
Scolopacidae	<i>Tringa nebularia</i>	Common Greenshank	SL	M	-	x	Unlikely
Threskiornithidae	<i>Plegadis falcinellus</i>	Glossy Ibis	SL	M	x	-	Unlikely
Turnicidae	<i>Turnix olivii</i>	Buff-breasted Button-quail	E	E	-	x	Unlikely
Tytonidae	<i>Tyto novaehollandiae kimberli</i>	Masked Owl (northern)	V	V	-	x	Unlikely
Fishes							
Pristidae	<i>Pristis pristis</i>	Freshwater Sawfish	-	V,M	-	x	Unlikely
Mammals							
Dasyuridae	<i>Dasyurus hallucatus</i>	Northern Quoll	LC	E	-	x	Unlikely
Emballonuridae	<i>Saccolaimus saccolaimus nudicluniatus</i>	Bare-rumped Sheath-tail Bat	E	V	-	x	Probable ⁴
Hipposideridae	<i>Hipposideros semoni</i>	Semon's Leaf-nosed Bat	E	V	-	x	Unlikely
Megadermatidae	<i>Macroderma gigas</i>	Ghost Bat	E	V	-	x	Unlikely
Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	V	V	x	x	Unlikely
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	SL	-	-	-	Possible*
Reptiles							
Crocodylidae	<i>Crocodylus porosus</i>	Estuarine Crocodile	V	M	-	x	Possible
Elapidae	<i>Denisonia maculata</i>	Ornamental Snake	V	V	-	x	Unlikely
Scincidae	<i>Egernia rugosa</i>	Yakka Skink	V	V	-	x	Unlikely
Scincidae	<i>Lerista vittata</i>	Mount Cooper Striped Skink	V	V	-	x	Unlikely
Flora							
Apocynaceae	<i>Marsdenia brevifolia</i>	-	V	V	-	x	Unlikely
Euphorbiaceae	<i>Omphalea celata</i>	-	V	V	-	x	Unlikely
Fabaceae	<i>Tephrosia leveillei (syn Tephrosia flagellaris)</i>	-	LC	V	-	x	Unlikely
Myrtaceae	<i>Eucalyptus raveretiana</i>	Black Ironbox	LC	V	x	x	Possible
Poaceae	<i>Dichanthium setosum</i>	Bluegrass	LC	V	-	x	Unlikely
Solanaceae	<i>Solanum sporadotrichum</i>	-	NT	-	x	-	Unlikely

¹ Status under Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Queensland *Nature Conservation Act 1992*. EX (Extinct), CE (Critically Endangered), E (Endangered), V (Vulnerable), NT (Near Threatened), SL (Special Least Concern), Least Concern (LC) and M (Migratory).

² Database records included a Wildlife Online search (with a 30 km search area from a point central to the Project area), an EPBC Act Protected Matters Report (with a 20 km search area from a point central to the Project area), and the Atlas of Living Australia (a review of species records near the Project area).

³ Likelihood of occurrence (LoC) categories comprise: 'Probable', 'Possible' and 'Unlikely'. Based on consideration of species records and distributions and the habitats in the Project area.

⁴ This species was possibly recorded during the field survey, but it could not be confirmed.

x Denotes a species record was present.

- Not applicable/no data recorded.

* This species was not recorded in database search results but has been added based on expert opinion.

Appendix J:
Abundance of Weeds of
Management Concern

Abundance of weeds of management concern at the vegetation assessment sites

Site ID ^A	Weed species abundance ^B													
	<i>Ziziphus mauritiana</i> (Chinee Apple)	<i>Cryptostegia grandiflora</i> (Rubber Vine)	<i>Parkinsonia aculeate</i> (Parkinsonia)	<i>Xanthium occidentale</i> (Noogoora Burr)	<i>Sporobolus natalensis/pyramidalis</i> (Giant Rat's Tail Grass)	<i>Sporobolus jacquemontii</i> (American Rat's Tail Grass)	<i>Themeda quadrivalvis</i> (Grader Grass)	<i>Stachytarpheta jamaicensis</i> (Jamaica Snakeweed)	<i>Grewia asiatica</i> (Grewia)	<i>Jatropha gossypifolia</i> (Bellyache Bush)	<i>Argyrea nervosa</i> (Woodrose)	<i>Lantana camara</i> (Lantana)	<i>Vachellia farnesiana</i> (Mimosa Bush)	<i>Hymenachne amplexicaulis</i> (Hymenachne)
RE 2	O	O	-	-	-	R	-	-	-	-	-	-	-	-
RE 3	O	-	-	O	-	-	-	-	-	-	R	-	-	-
RE 5	F	F	-	-	-	O	-	-	-	-	-	-	-	-
RE 6	O	R	-	-	-	-	-	-	-	-	-	R	-	-
RE 7	F	-	-	-	-	-	-	-	-	-	-	-	-	-
RE 8	O	R	-	-	-	-	-	-	-	R	-	R	-	-
RE 9	O	R	-	R	-	R	-	-	-	-	-	R	-	-
RE 10	O	R	-	-	-	-	-	-	-	-	-	-	-	-
RE 11	R	R	-	R	-	R	-	-	-	-	-	-	-	-
RE 12	O	R	-	-	-	-	-	-	-	-	-	-	-	-
RE 13	-	R	-	O	-	R	-	-	-	-	R	-	-	-
RE 14	A	R	-	-	-	-	-	-	-	R	-	-	-	-
RE 15	F	R	O	-	-	-	-	-	-	-	-	-	-	-
RE 16	O	R	-	-	-	-	-	-	-	-	-	-	-	-
RE 17	R	R	-	F	-	-	-	-	-	-	-	-	-	A
RE 18	F	-	-	-	-	-	-	-	-	-	-	-	-	-
RE 19	O	R	-	-	-	-	-	-	-	-	-	-	-	-
RE 25	A	R	R	-	-	-	-	-	-	-	-	-	-	-
RE 26	O	R	-	A	R	-	-	-	-	-	-	-	-	-
RE 38	A	R	-	-	-	-	-	R	-	-	-	-	-	-
RE 39	A	O	-	-	-	-	R	-	-	-	-	-	-	-
RE 40	F	F	-	-	-	-	-	-	-	-	-	-	-	-
RE 42	F	-	-	-	-	-	-	-	-	R	-	-	-	-
RE 43	F	R	O	-	-	-	-	-	-	-	-	R	-	-
RE 44	F	-	-	-	-	-	-	-	-	R	-	-	-	-
RE 46	F	-	-	-	-	-	-	O	-	F	-	-	-	-
RE 47	F	-	-	-	-	-	-	O	-	F	-	-	-	-
RE 48	O	-	-	-	-	-	-	O	-	-	-	-	-	-
RE 49	-	-	-	-	-	-	-	-	O	O	-	-	-	-
RE 50	O	-	-	-	-	-	-	O	-	-	-	-	-	-
RE 51	A	O	-	-	-	R	R	-	-	-	-	-	-	-
RE 52	F	-	-	-	-	-	-	-	-	R	-	-	-	-

^A As per **Figure 6** and **Appendix H**.

^B Abundance: categories comprise Dominant (D) (>75% crown cover), Abundant (A) (50–75% crown cover), Frequent (F) (25–50% crown cover), Occasional (O) (5–25% crown cover) or Rare (R) (<5% crown cover).

Appendix K: Potentially Relevant
State and Commonwealth
Legislation

Potentially relevant Commonwealth and State environmental legislation and approvals

Legislation	Type of approval	Potential triggers for approval	Comments
Commonwealth			
<i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>	EPBC Act referral	<p>A project requires Referral under the EPBC Act if it is likely to have a significant impact on a Matter of National Environmental Significance (MNES). For the Project area, the following MNES occur in the broader receiving environment:</p> <ul style="list-style-type: none"> • Listed threatened ecological communities • listed threatened species • listed migratory species • wetlands of international importance. 	EPBC Act-listed threatened species, or their habitat, have the potential to occur in the Project area. Once a final clearing footprint is available, the significance of impacts as a result of the Project with respect to the EPBC Act should be assessed and documented in a self-assessment report. The self-assessment report should inform decisions about the need for EPBC Act approval.
Queensland			
<i>Biosecurity Act 2014</i>	NA	NA	<p>The field surveys identified the following weeds listed as Category 3 weeds under the <i>Biosecurity Act 2014</i> in the Project area:</p> <ul style="list-style-type: none"> • Woodrose (<i>Argyrea nervosa</i>) • Rubber Vine (<i>Cryptostegia grandiflora</i>) • Hymenachne (<i>Hymenachne amplexicaulis</i>) • Bellyache Bush (<i>Jatropha gossypifolia</i>) • Lantana (<i>Lantana camara</i>) • Prickly Pear (<i>Opuntia stricta</i>) • Parkinsonia (<i>Parkinsonia aculeata</i>) • Sicklepod (<i>Senna obtusifolia</i>) • American Rat's Tail Grass (<i>Sporobolus jacquemontii</i>) • Giant Rat's Tail Grass (<i>Sporobolus natalensis/pyramidalis</i>) • Chinese Apple (<i>Ziziphus mauritania</i>) <p>Category 3 weeds are invasive plants and must not be released into the environment. During the construction of the pipeline¹, weeds may be cleared. The abundance and location of weed species has the potential to change annually; therefore, at the time of construction weeds may differ to what was observed during the field surveys. It is recommended that a detailed weed survey be undertaken immediately prior to construction to confirm the extents of weeds and to inform management. The survey needs to be undertaken on areas proposed to be disturbed during construction.</p>
<i>Planning Act 2016 (Planning Act) Planning Regulation 2017</i>	Development Application - General	<p>Activities associated with the development of the Project are defined as 'Operational Works' under the Planning Act and will trigger approvals if accepted development requirements (ADRs) cannot be met. Activities potentially requiring approval are detailed below.</p> <p>Clearing native vegetation (<i>Vegetation Management Act 1999 (VM Act)</i>).</p>	<p>Some elements of development cannot meet exemptions or accepted development requirements (as detailed below); therefore, a development application is required.</p>
		<p>Constructing or raising waterway barrier works (<i>Fisheries Act 1994</i>).</p>	<p>Vegetation clearing within the road reserve (<i>ie</i> land dedicated as a road under the Queensland <i>Land Act 1994</i>) is exempt from vegetation clearing approvals where the clearing occurs for Category R or Category X vegetation. Clearing of Category X vegetation on freehold land is also exempt.</p> <p>Clearing for ancillary works (<i>eg</i> access tracks, laydown area) in Category B or Category R vegetation may comply with ADRs. This should be confirmed once the location/extent of ancillary works has been identified.</p> <p>For clearing that is not exempt and that does not meet ADR, a development approval is needed. This is a two-stage process. The first stage requires that the clearing be determined a <i>relevant purpose</i> for infrastructure activities under section 22A of the VM Act. An application for <i>relevant purpose</i> determination was submitted by GHD on 3 December 2020. The second stage is the clearing application, which cannot be applied for until the first stage is completed. The development application must address and meet the requirements of State Development Assessment Provisions <i>State Code 16: Native vegetation clearing</i>.</p> <p>The proposed alignment crosses several waterways that trigger consideration of waterway barrier works. During construction, waterway barriers will be installed on identified waterways. Waterway barriers include vehicle crossings (<i>eg</i> bed level crossings, causeways, culvert crossings and some bridges), partial bunds, silt curtains, abutment works and temporary structures.</p> <p>Works associated with the Project may be considered temporary structures, and comply with the ADRs if the construction or raising of temporary waterway barriers is within the period specified in Section 7 of DAF's '<i>Accepted development requirements for operational work that is constructing or raising waterway barrier works</i>'. If any proposed temporary waterway barrier works cannot meet the ADRs, they must be covered under a development approval.</p> <p>Permanent works associated with construction of the pipeline and pump station will not be considered waterway barrier works (and will not require development approval), if the following can be achieved:</p> <ul style="list-style-type: none"> • the placement of the permanent infrastructure does not raise the natural bed level of each waterway • the placement of the permanent infrastructure does not reduce the cross-sectional area of each waterway • post construction, each waterway is reinstated to pre-existing conditions, using natural substrate of similar composition on the waterway bed with no changes in elevation, banks are re-profiled to pre-existing conditions and stabilised with suitable riparian vegetation.

Legislation	Type of approval	Potential triggers for approval	Comments
		Undertaking high impact earthworks within a Wetland Protection Area (Planning Act)	Further information regarding pipeline installation and final design plans are required to determine whether the proposed works constitute waterway barrier works. No construction activities will be taking place within a Wetland Protection Area trigger area; therefore, an application for undertaking high impact earthworks within a Wetland Protection Area is not required.
<i>Nature Conservation Act 1992</i> (NC Act) and subordinate legislation	Species Management Program (SMP) (low risk and high risk)	An SMP is required for activities that tamper with breeding places of all native species.	Hollow-bearing trees occur in mature Eucalypt and large Melaleuca species in the Project area. Tree hollows vary in size and may provide a breeding or roosting place for a variety of fauna, including listed T&NT species such as: <ul style="list-style-type: none"> • Bare-rumped Sheathtail Bat (<i>Saccolaimus saccolaimus nudicluniatus</i>) • Black-throated Finch (<i>Poephila cincta cincta</i>). A low risk SMP may be completed for Least Concern species; however, a high risk SMP is required for T&NT, Special Least Concern and colonial breeding species.
<i>Environmental Offsets Act 2014</i>	Environmental offset	Environmental offsets are applicable if the project has a <i>significant residual impact</i> (SRI) on a <i>prescribed environmental matter</i> (eg Matters of National Environmental Significance, Matters of Local Environmental Significance and Matters of State Environmental Significance). Potentially applicable <i>prescribed environmental matters</i> for the Project include: <ul style="list-style-type: none"> • clearing of regulated vegetation that is remnant vegetation within the defined distance of a watercourse identified on the vegetation management watercourses map and essential habitat as identified on the essential habitat map • impacting on connectivity of remnant vegetation and Regional Ecosystems through clearing activities • impacts on habitat for Endangered, Vulnerable or Special Least Concern species (NC Act) • limiting the passage of fish within a waterway. 	Environmental offsets may be required as a condition of approval where proposed activities are likely to result in an SRI. Final clearing footprints are required to assess if development will have an SRI on <i>prescribed environmental matters</i> .
<i>Water Act 2000</i> (Water Act)	Riverine Protection Permit (RPP)	Excavate and replace material within a watercourse (as defined by the Water Act).	Local government is considered an Approved Entity and is exempt from requiring an RPP. For this exemption to apply, conditions outlined in the ' <i>Riverine Protection Permit Exemption Requirements (WSS/2013/726)</i> ' (DNRME 2019) must be adhered to. Should the minimum requirements not be achieved, an RPP will be applicable.
	Water entitlement (water licence)	Temporarily 'taking' (impounding or diverting) water whilst trenching within watercourses.	Local government is considered a Constructing Authority and is exempt from requiring a water licence for the 'taking' of water. 'Taking' water includes extracting water for construction purposes (from surface water or sub-artesian groundwater) and diverting water to conduct trenching activities. For this exemption to apply, conditions outlined in the ' <i>Exemption requirements for constructing authorities for the take of water without a water entitlement (OSW/2020/5467)</i> ' (DRDMW 2021) must be complied with. Should the exemption requirements not be achievable, a water licence will be required. If there is a shortage of water available, the Queensland Department of Regional Development, Manufacturing and Water (DRDMW) may impose, by notice, conditions or restrictions relating to the 'take' of water, including limitations on the times when water may be taken, purposes water is taken for, and the volume of water to be taken.
<i>Environmental Protection Act 1994</i> (EP Act) and subordinate legislation <i>Environmental Protection Regulation 2019</i> (EP Regulation)	Notification	General Environmental Duty (due diligence) Duty to Notify Environmentally Relevant Activity (ERA)	The EP Act outlines that a person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm (the General Environmental Duty). Further, individuals have a 'Duty to Notify' their employers if they become aware of environmental harm or if there is a threat of creating environmental harm by their or someone else's activities. To manage the risk for environmental harm, an Environmental Management Plan (Construction) should be prepared and implemented. Carrying out an ERA will require an environmental authority (EA) under the EP Act. An ERA is an activity that will or may release contaminants with the potential to cause environmental harm. Whilst the construction and operation of the pipeline is not an ERA, ancillary activities associated with the construction may be an ERA.
	Environmental authority (site-specific) for undertaking prescribed ERA 16 – Extractive and Screening Activities	If the minimum thresholds (identified in Schedule 2 of the EP Regulation) are exceeded, an EA is required.	As per the pre-lodgement advice (Queensland Government 2021), this ERA may be triggered depending on the quantities of material removed at any point in time. Extraction of material for construction purposes will be an ERA if thresholds are exceeded.

¹ The Project = Haughton Pipeline Stage 2 Project.

² T&NT = Threatened (Critically Endangered, Endangered, Vulnerable) and Near Threatened species.

References:

DNRME 2019, *Riverine protection permit exemption requirements*, WSS/2013/726 Version 2.01, Queensland Department of Natural Resources, Mines and Energy, 13 November 2019.

DRDMW, 2021, *OSW/2020/5467 Exemption requirements for constructing authorities for the take of water without a water entitlement*, Version 4.01, Queensland Department of Regional Development, Manufacturing and Water, Brisbane.

Queensland Government 2021, *2012-20139 SPL: 12537606 - Haughton Pipeline Duplication Stage 2: Pre-lodgement meeting record*, Queensland Government State Assessment and Referral Agency, 7 January 2021.



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