Attexo

Matters of National Environmental Significance Assessment Report

Tully Battery Energy Storage System

Prepared for: RWE Renewables

Date: 26 November 2025

Document information

Document	Matters of National Environmental Significance Assessment Report
Attexo ref	RWE-002
Date	26 November 2025
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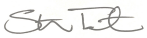
Reviewed by	Chris Beavon, Principal Ecologist

Quality information

Rev	Date	Details	Authorisation	
			Name/position	Signature
A	23-10-2025	First draft for review	Chris Beavon, Principal Ecologist	
B	26-11-2025	Final	Steven Tarte, Principal	
0	01-12-2025	Final for submission	Steven Tarte, Principal	
1	07-01-2026	Minor updates relating to P-ESCP	Steven Tarte, Principal	

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Glossary

Term	Definition
ALA	Atlas of Living Australia
APZ	Asset protection zone
ATSIHS	Aboriginal and Torres Strait Islander Heritage Strategy
Attexo	Attexo Group Pty Ltd
BESS	Battery energy storage system
BLTT TEC	Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland TEC.
CCRC	Cassowary Coast Regional Council
CCRC Planning Scheme	Cassowary Coast Regional Council Planning Scheme 2015
CEMP	Construction Environmental Management Plan
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DC	Direct current
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DIN	Dissolved Inorganic Nitrogen
Disturbance Footprint	Disturbance Footprint is the area that will be directly impacted by the Project. The Disturbance Footprint is approximately 9 ha.
DNRMMRRD	Queensland Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development.
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESCP	Erosion and sediment control plan
GBR	Great Barrier Reef
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GBRNHP	Great Barrier Reef National Heritage Place
GBRWHA	Great Barrier Reef World Heritage Area
GTRE	Ground-truthed regional ecosystem
Guidelines	The Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (DoE, 2013)
HVR	High value regrowth
IECA	International Erosion Control Association
LoO	Likelihood of Occurrence assessment
LTRWT TEC	Lowland Tropical Rainforests of the Wet Tropics TEC
LTSP	Long-term Sustainability Plan

MNES	Matters of National Environmental Significance
MW	Megawatt
NC Act	*Nature Conservation Act 1992*
OEMP	Operational Environmental Management Plan
OH	Overhead
OHTL	Overhead transmission line
OUV	Outstanding Universal Value
PCU	Power conversion units
PESCP	Preliminary Erosion and Sediment Control Plan
Planning Act	*Planning Act 2016* (Qld)
PMST	Protected Matters Search Tool
PQ	Powerlink Queensland
PQ Tully substation	The existing Powerlink Queensland 132 kV Tully substation located within Lot 1 on RP716718.
Project area	Project area identifies the total area that includes the direct and indirect disturbance, as well as any areas of avoidance or retention (for example grassed buffers between areas of disturbance and drainage features or wetlands). The Project area includes areas of permanent works as well as temporary works. The total area of the Project area is 13.3 ha
QLD	Queensland
RE	Regional ecosystems
Reef 2050 WQIP	Reef 2050 Water Quality Improvement Plan
RUSLE	Revised Universal Soil Loss Equation
RWE	RWE Renewables Pty Ltd
SIA	Significant Impact Assessments
Site	The Site identifies the extent of the lot boundaries for Lot 1 on RP716718, Lot 1 on RP735276 and Lot 1 on RP852238. The combined area of all three lots is 31.4 ha.
SPP	State Planning Policy 2017
Survey area	Survey area includes the two lot parcels that comprise the Project area as well as the vegetation that continues from the Project area into PQ parcel Lot 5 on SP140625. The total area of the Survey area is 36.4 ha.
TEC	Threatened Ecological Communities
The Project	The Project (also referred to under the EPBC Act as the 'proposed action') is the Tully BESS, and all associated infrastructure including grid connection assets and ancillary facilities. Throughout this report, the proposed action is referred to as the 'Project'.
Threatened species	Flora and fauna species listed as 'critically endangered', 'endangered', 'vulnerable', 'migratory' under the EPBC Act and/or the NC Act
UG	Underground
VM Act	*Vegetation Management Act 1999 (Qld)*
WoNS	Weeds of National Significance

1. Introduction

1.1 Project background

RWE Renewables Australia Pty Ltd (RWE) are proposing development of the Tully Battery Energy Storage System (BESS) (the Project) across a 31.4-hectare (ha) site. The Project will have a capacity of up to 200 MW / 800 MWh. Grid connection is proposed via the neighbouring Powerlink Queensland (PQ) 132 kV substation (PQ Tully substation) located to the northeast on Lot 1 on RP716718.

The Project seeks to support the growing need for grid-scale energy storage and is sited within the North and Far North Queensland Renewable Energy Hubs, strategically located near the recently upgraded PQ Tully Substation. The Project will improve reliability for the Far North Queensland energy network, allowing the storage of excess energy to discharge back into the grid during peak demand times, power outages or to assist with grid balancing.

The Project includes the proposed BESS and associated infrastructure (e.g. transformer, OHTL, air insulated switchgear, access roads, laydown areas, foundations, hard stand, parking, switch rooms, storage, fences and site office). The BESS and associated infrastructure will comprise a total Disturbance Footprint of approximately 9 ha within the 13.3 ha Project area.

Attexo Group Pty Ltd (Attexo) has been engaged by RWE to assess the existing environmental values and potential impacts associated with the Project's development, with specific reference to Matters of National Environmental Significance (MNES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Project area, Disturbance Footprint, and locality context are shown on in **Figure 1.1.** A description of the Site is provided in **Section 1.2**, while **Section 1.8** provides definitions for terminology used in this report.

1.2 The Site

The Site is located approximately 4 km south-west of the township of Tully in north Queensland, in the CCRC Local Government Area and comprises the allotments detailed in **Table 1.1**. Access to the Project area is via Sandy Creek Road, off Tully Gorge Road.

Table 1.1 Site property details

Lot	Plan	Tenure	Size (ha)	Use
1	RP852238	Freehold	20.6	BESS facility
1	RP735276	Freehold	8.1	OHTL
1	RP716718	Freehold (PQ Tully substation)	2.7	Grid connection
		Total	**31.4**	

The Site has been largely cleared to accommodate the existing rural, rural residential and infrastructure use, with a dwelling on each of Lot 1 on RP735276 and Lot 1 on RP852238, as well as livestock grazing. There is a concentration of vegetation at the State-mapped Great Barrier Reef (GBR) wetland protection area in the east of the Site.

Sandy Creek Road forms the west and northwest border of the Site, joining with Tully Gorge Road on the north border. Land to the south and east of the Site are rural areas used for sugarcane farming, with the PQ Tully substation (Lot 1 on RP716718) and a new 275 kV PQ substation in Lot 5 on SP140625 to the northeast of the Site.

A single first order, unnamed drainage feature traverses the Project area, starting at the west of Lot 1 on RP735276 and running east into the neighbouring PQ parcel (Lot 5 on SP140625). The drainage feature then continues into the north of Lot 1 on RP852238 and runs southeast to join a formed agricultural drainage channel at the eastern boundary of that lot. The drainage feature turns south through a complex network of sugarcane drains that connect to Banyan

Creek to the east and the Tully River to the south. The Tully River flows east to its mouth in Rockingham Bay, just south of Tully Heads, where it discharges, approximately 25 km downstream, into the Coral Sea.

Tully Gorge National Park is located north of the site, on the opposite side of Tully Gorge Road and private property. The National Park encompass large areas of contiguous vegetation, which is anticipated to provide significant habitat for a range of native species.

1.3 Site selection and project design

The selection of an appropriate site for the development of a BESS has been a critical aspect of the Project. Several criteria were taken into consideration during the site selection process to align the Project with best practices in environmental stewardship, grid connectivity, overall feasibility, and the application of the mitigation hierarchy of first avoiding MNES values, then mitigating impacts (where avoidance is not possible), and (last) offsetting any residual significant impacts.

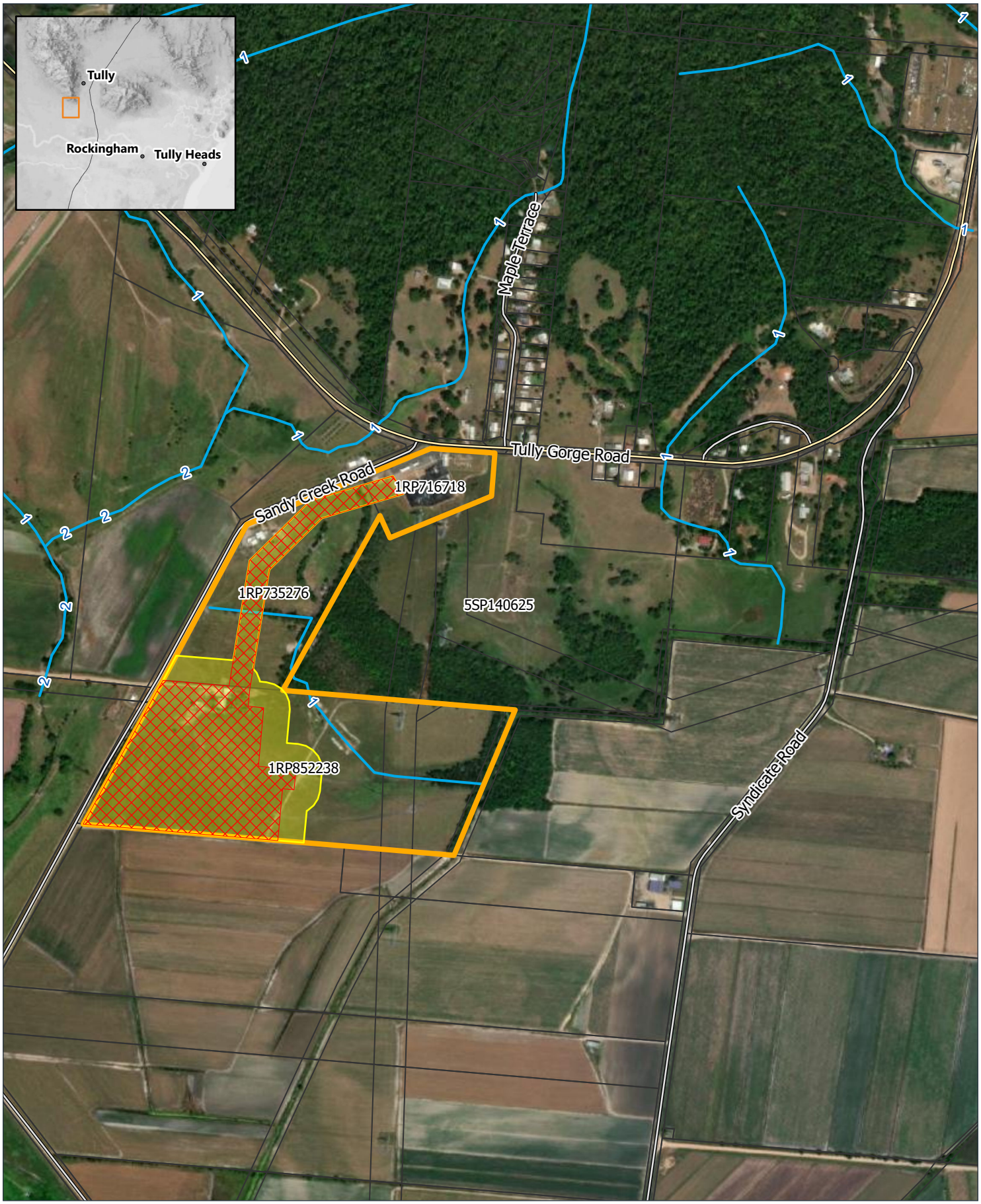
The following site characteristics were considered in determining an appropriate site for the Project:

- Highly modified environments with reduced environmental values. The Site contains historical clearing, cattle grazing and high voltage overhead transmission corridors, and a general lack of native vegetation and habitat values. This represents a Site with limited environmental values compared with other locations in the region that are less disturbed and support larger areas of native vegetation. Locating the Project in cleared areas effectively applies the 'avoid' mitigation hierarchy by first avoiding areas with native vegetation and habitat values.
- Relatively flat topography to simplify the construction process, reduce grading and earthwork requirements, and optimise the overall efficiency of the Project. A flat site reduces the amount of bulk earthworks and soil disturbance which has the potential to increase erosion and generate sediment.
- Proximity to existing grid infrastructure (and with available grid capacity) to reduce the Disturbance Footprint of transmission infrastructure, thereby reducing the need for extensive new transmission lines and the associated impact. This minimises environmental impacts and enhances Project efficiency.
- Existing road access for transportation of Project components.

Since the early design stages of the Project, RWE have employed a strategy to guide the design of the Project's Disturbance Footprint, including:

- Identifying and avoiding impacts to MNES by siting Project infrastructure appropriately and implementing sufficient mitigation measures.
- Avoiding impact to mapped vegetation under the VM Act.
- Applying vegetated or grassed buffers to watercourses and wetlands mapped under the VM Act.
- Minimising ground disturbance to ensure erosion and sedimentation risks are minimal and able to be mitigated effectively.

The above considerations have led to the current Site, Project area, and Disturbance Footprint being selected for the BESS Project.



Project Overview

Figure 1.1

Site
Project area
Disturbance Footprint
VM watercourse
Main Road
Local Road
Cadastral parcels

DWG No: RWE-002-018[B]
DATE: 16/10/2025
DRAWN: KB
REVIEWED NC
SCALE (A4): 1:10,000

N

0 m 200

GDA2020

1.4 Description of the action

1.4.1 Project infrastructure

The Project has been designed to minimise impacts, in keeping with the sustainable nature of the development for supporting renewable energy projects and reducing greenhouse gas emissions. Accordingly, the existing environment; existing land use in the Project area and the surrounding locality; proximity to existing electricity infrastructure; stormwater management; and noise impact have all been considered in the design development.

The primary components of the Project will consist of the following (**Figure 1.2)**:

- Battery units will cover a total area of approximately 2.5 ha. The battery units will be installed directly on the pad or with screw piles, piers or concrete pad formations, this will be determined through detailed design. The BESS will be connected to the adjacent switching station via underground cables. Inverters may be incorporated as part of the battery units or there may be separate Power Conversion Units (PCU) that convert the DC energy from the battery units.
- Stormwater drainage systems will be constructed to allow for safe collection and diversion of rainwater at the BESS facility and will be established prior to the start of the construction and operational phases.
- Access to the facility will be via the existing local road network with upgraded access proposed from Sandy Creek Road.
- Grid connection will be via an OHTL running from the north of the BESS area to substation on the neighbouring PQ parcel (Lot 5 on SP140625). The OHTL will be supported by five (5) single circuit 132 kV concrete poles approximately 27.5m in height.
- The BESS area will be fenced for safety and security purposes.
- An Asset Protection Zone (APZ) will be established and maintained around the battery storage infrastructure to ensure protection from bushfire and to allow access to firefighting personnel in the event of fire (**Figure 1.2**)
- A perimeter road will be provided for operations, maintenance and emergency response.
- Earthworks, including batters and clearing required for access to undertake civil works in the Project area.
- Two (2) bioretention basins (BRB) are proposed within the site to treat run off from the developed site and surrounding post-development catchment using grassed swales which channel flow into each BRB. BRB A will be located along the southern boundary of Subcatchment A and adjacent to the BESS laydown area at the down-slope end of the site. BRB B will be located to the east of Subcatchment B, adjacent to the right corner of battery pad laydown.
- An acoustic wall of 6 m in height has been included with the design; this is located directly on the northern perimeter of the BESS units. Subject to further design enhancements of the BESS units to reduce noise emissions, the acoustic wall may not be required.
- The Project includes provision for lighting for when maintenance works are to be undertaken at night; these will be on 10 m high poles. Additionally, there would be security lighting that is controlled by sensor. All lighting would be designed and operated in accordance with AS 4282:2023 Control of the obtrusive effects of outdoor lighting.
- Lightning arrestors will also be located within the development footprint; these will be up to 20 m in height.

1.4.1.1 Battery Energy Storage System

The battery units will cover an area of approximately 2.5 ha and will include up to 188 battery units, associated infrastructure, inverters, MV transformers, internal access roads, hardstand and security fencing.

The battery units and MV transformers would be installed on concrete footings or screw piles. Each battery unit is anticipated to weigh approximately 39 tonnes and be 8.6 m in length, 2.8 m in height and 2.1 m wide.

The associated transformers/inverters (up to 47 units are estimated, subject to final equipment selection and design) would similarly be trucked to the Project area and arranged onto footings or screw piles via mobile crane.

1.4.1.2 Switching Station

A switching station is proposed comprising a 132/33 kV high-voltage transformer, air insulated switchgear, an auxiliary transformer, two 33 kV switch rooms and potentially harmonic filters. The switch rooms will include the switchgear and a Site office, with trenches and conduits for the cabling entering the building. The building would be manufactured off-site and delivered via truck. The switch rooms and transformers would sit on concrete footings or piles.

1.4.1.3 Grid Connection

The connection to the grid will be via overhead line to connect the BESS to the neighbouring PQ Tully substation. The route is approximately 600 m in length. The OHTL will be supported by five (5) single circuit 132 kV concrete pole approximately 27.5 m in height. The OHTL will travel north through Lot 1 on RP735276 and then east to connect to the neighbouring substation site on Lot 1 on RP716718. It is intended to use the PQ standard 132 kV pole design.

1.4.1.4 Operation and Maintenance Area

A temporary construction and permanent operations and maintenance (O&M) area will be established adjacent to Sandy Creek Road. This would include an operations and maintenance building, yard, parking areas and any required office buildings, water tanks or storage sheds. Repurposing of the existing dwellings on in the Project area as O&M areas for operation is being considered.

The temporary laydown areas for use during construction will be hardstand areas, these hard stand areas will remain in place following construction.

1.4.1.5 Parking and Access

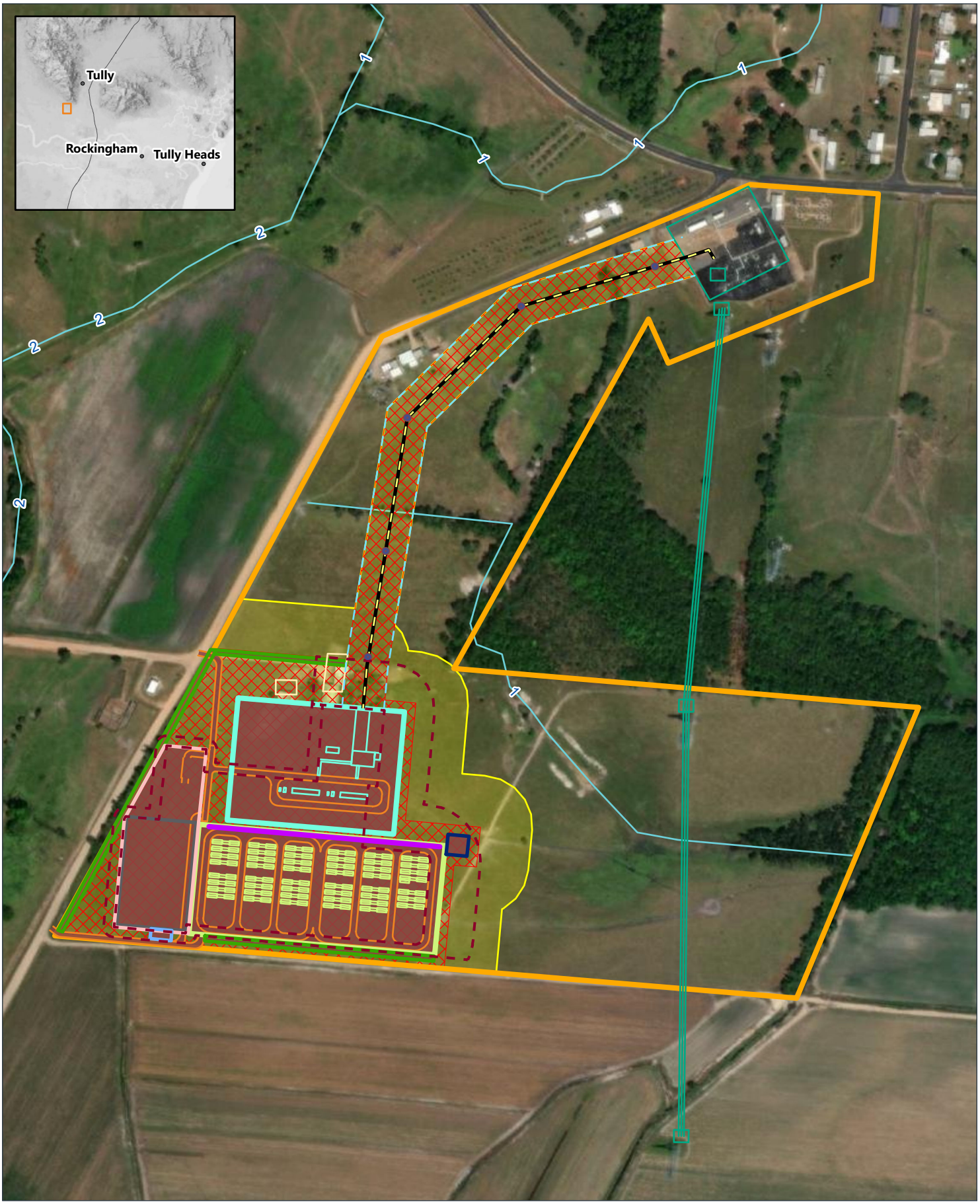
Access to the facility will be via the existing road network, with two upgraded site access points to be constructed from Sandy Creek Road. The proposed access points to the development from the road network are illustrated in **Figure 1.2**. Sufficient parking to meet the needs of the Project will be provided within the Disturbance Footprint.

1.4.1.6 Fencing

Temporary fencing will be erected at in the Project area once the main earthworks have been completed. Final perimeter fencing will be erected around the BESS area, switching station and O&M area for safety and security reasons. The proposed security fencing will be fauna-friendly and free of barbed wire. The Site boundary will retain the existing 3-wire and post fencing.

1.4.1.7 Landscaping buffer

A landscape buffer of 5 m depth is proposed along the frontage of Lot 1 on RP852238. This has been designed and will be planted and maintained in accordance with the Cassowary Coast Regional Council Planning Scheme 2015 (CCRC Planning Scheme) requirements.



Project infrastructure layout

Figure 1.2

DWG No: RWE-002-019[C]
DATE: 26/11/2025
DRAWN: KB
REVIEWED NC
SCALE (A4): 1:5,000

N

0 m 100

GDA2020

- Site
- Project area
- Earthworks extent
- Disturbance Footprint
- Asset Protection Zone
- Tower footings
- Proposed transmission line
- 20m exclusion zone
- Switchroom/ Transformer
- BESS
- Bioretention basin A
- Bioretention basin B
- O & M Area
- Construction laydown area
- Noise wall
- Landscaping area
- Existing 132kV Line
- Existing Dwellings
- Proposed Access Track
- VM watercourse

1.4.2 Project construction

Construction of the BESS is estimated to be undertaken over an 18-month period, subject to final equipment selection, construction methodology and appointment of construction contractors(s). Note that stages may occur in parallel with different activities taking place on different parts of the Project area at the same time. **Table 1.2** provides a summary of the main construction stages.

Table 1.2 Construction stages

Stage		Overview
1	Site preparation	Vegetation clearing The Disturbance Footprint is represented by non-remnant, cleared pasture, dominated by exotic grasses with limited habitat value. The Disturbance Footprint construction preparation methodology has not yet been determined; however, preparation of cleared areas will likely be undertaken through mechanical methods that are suitable for the applicable environmental conditions. The types of machinery will be determined prior to construction by the relevant contractor.
		Existing infrastructure The existing dwellings and sheds in the Project area will be assessed for suitability to be repurposed as O&M areas for Project operation. Where existing structures cannot be repurposed, they will be removed.
		Earthworks Civil works will be required to prepare the Project area for construction of the BESS and ancillary facilities. Excavation and filling will be required to make the Disturbance Footprint level and cater to stormwater management requirements, including BRB. Cut and fill volumes and batter design will be finalised during detailed design.
2	Construction	BESS Bench If relevant, topsoil will be removed and stockpiled within the Disturbance Footprint for use in landscaping and rehabilitation once construction is completed or else disposed of. Where the quality of material is acceptable, excavated material would be used as backfill and compacted during the civil works program. Gravel sheeting will be applied to the BESS bench area.
		Access Roads New internal access roads will be constructed for delivery of equipment and material and ongoing maintenance activities. The access roads would be up to 6 m wide and connect the BESS compound entrance to the Project area frontage at Sandy Creek Road. Any topsoil would be removed for use elsewhere where applicable, and the access roads will be finished with compacted gravel. A bitumen crossover will be constructed in accordance with the appropriate standards between Sandy Creek Road and the Site boundary.
		Battery Units The battery units and MV transformers would be installed on either screw piles, piers or concrete pad formations (to be determined through detailed design phase). Each BESS unit is expected to be 8.6 m in length, 2.8 m in height and 2.1 m wide.

		The battery units would be transported to Project area via heavy vehicles and craned onto their concrete footings for anchoring. The associated transformers would also be trucked to Project area and arranged onto footings via mobile crane.
		Storage and Operation Area Areas will be designated on-site for the storage of materials in open air laydown, for use as required during operations.
		Switchgear Control Room A switchgear control room will be manufactured off-site and delivered to the BESS bench via trucks. The control building would sit on suitable concrete footings with trenches and conduits for the cabling entering the building.
		Perimeter Fencing Fencing will be erected at the perimeter of the BESS area, switching station and O&M area for safety and security reasons.
		Underground cabling Underground cabling within the BESS bench would be installed via open trenching, undertaken in accordance with relevant Australian Standards and marked accordingly. Upon installation of the cable, the trench will be backfilled with excavated material and the surface rehabilitated.
		APZ The APZ will be established and maintained around the BESS infrastructure to a width of 48.1 m along the northern and eastern sides and 10 m along the western and southern sides. The APZ will be cleared of any vegetation and have a mineral earth or grass surface. Where a grass surface is chosen, it must be maintained at a height ≤ 10 cm during the fire danger season.
		Demobilisation Following completion of construction, all construction equipment will be demobilised from the Project area.
3	Rehabilitation	Rehabilitation would occur in stages throughout the construction program. Rehabilitation works comprising compaction and surfacing of the BESS bench area would occur once civil works have been completed. Further rehabilitation of the Project area, including disposal of waste materials (at an appropriately licensed waste facility) would occur once equipment installation and construction has been completed.
4	Operation	The BESS will be in operation 24 hours a day, every day of the year. O&M activities may occasionally extend beyond daylight hours for corrective maintenance activities as required. The Project area will be remotely monitored 24 hours a day.
5	Decommissioning	The Project is intended to operate for a period of 20 years. Following this period a determination will be made whether to: • Extend the life of the existing infrastructure with increased maintenance, refurbishment and/or replacement of certain components; or • Repower the Project area with new infrastructure; or • Decommission the infrastructure and rehabilitate the Project area.

1.4.2.1 Hours of Construction

Most construction work, including trenching and deliveries, will be undertaken during standard construction hours: Monday to Saturday, 6:30am to 6:30pm.

The following construction activities may be undertaken outside of standard construction hours:

- Distribution of materials within the Project area;
- Commissioning and testing activities; and
- Other quiet works including survey work, office work and general mechanical assembly.

The above activities are proposed in consideration of the closest neighbour being approximately 500 m from the proposed Disturbance Footprint and no noise impacts are expected.

Any other construction activities outside of standard construction hours, including deliveries and use of heavy-duty mechanical equipment, would only be undertaken in consultation with CCRC and in consideration of audible noise impact on nearby residents.

Project construction will generate 60 jobs.

1.4.2.2 Construction Traffic

Maximum traffic generation is expected to be 40 light vehicles and 30 heavy vehicles travelling to and from the Project area each day, with an average of 30 light vehicle movements daily and 15 heavy vehicle movements daily.

Given the semi-rural location and size of the Project, it is anticipated that there is sufficient area to provide non-formalised car parking spaces. As such, no formal car parking is proposed for the construction workforce, and a temporary construction parking area will be designated on-site.

The construction workforce is expected to commute using private vehicles as no existing active or public transport networks are accessible within the Project's vicinity.

1.4.2.3 Construction Period

Construction of the Project is anticipated to begin in 2027 and is expected to take approximately 18 months.

1.4.2.4 Construction Environmental Management Plan

A CEMP will be developed and implemented to manage potential environmental impacts from the construction of the Project. The CEMP will address key activities likely to have an environmental impact and implement strategies to protect and manage water quality, waste, flora and fauna, soils (including erosion and sedimentation), air quality, noise and cultural heritage. The CEMP will be finalised during detailed design and will respond to the relevant conditions of the development permit to be obtained under the *Planning Act 2016* (Qld) (Planning Act) (refer to **Section 2.3**).

All contractors involved in the Project will be required to comply with the CEMP.

1.4.3 Project operation and maintenance

1.4.3.1 Hours of Operation

The BESS will be in operation, including remote monitoring, 24 hours a day, every day of the year.

1.4.3.2 Operational Workforce

RWE intends to manage the operations for the life of the project. Primary operation of the Project (i.e. the charge and discharge of energy) will be undertaken from a remote-operations control centre. Physical monitoring and maintenance of the facility will be undertaken via periodic inspections of the equipment at the Site.

Project operation will generate three ongoing jobs.

1.4.3.3 Maintenance Tasks

Planned maintenance activities will likely include:

- Monthly inspections (electrical, civil and environmental);
- Vegetation management (in line with various management plans), including maintenance of APZ required to comply with bushfire management requirements;
- Other activities as defined in the O&M management plans);
- During fire danger period, weekly inspections of the APZ, access road, fire-fighter water supply, signage and building protection systems are required.

Corrective maintenance activities will likely include:

- Testing and replacement of faulty plant components (fuses, etc.); and
- Any other corrective actions within the O&M scope.

1.4.3.4 Waste

Waste from operations will be generated from the O&M building. Waste will be general rubbish including putrescible waste, and recyclable material which will be placed into bins and collected for disposal.

1.4.4 Decommissioning

The Project life is up to 20 years. Following the 20-year period the determination will be made whether to:

- Extend the life of the existing infrastructure with increased maintenance, refurbishment and/or replacement of certain components;
- Repower the Project with new infrastructure; or
- Decommission the infrastructure and rehabilitate the Project area.

Decommissioning will be addressed as part of a Decommissioning Management Plan but would typically consist of removal of all above-ground infrastructure for recycling or disposal and reinstatement of all disturbed land. The land will be returned to its pre-existing condition, or an improved state, to allow for rural use. Decommissioning activities will be planned and implemented to avoid any additional environmental impacts to areas of retained MNES habitat, and thus, will not contribute to a significant impact to MNES.

1.5 Early/investigative works

Early works and site investigation activities have been undertaken to support the design of and development of the Project and inform the final design of infrastructure. Additional geotechnical investigation or other investigative works may be required. However, if required, any additional investigative works (e.g. geotechnical investigations) will be low impact in nature and will be undertaken exclusively in areas which do not support MNES values. Any additional early works therefore have negligible potential to significantly impact MNES.

1.6 Alternatives to taking the action

The only realistic alternatives to taking the action are to not undertake the action, or to undertake the action at a different location. However, supporting more efficient energy generation through the development of energy storage projects on land such as that contained within the Project area (being an area previously cleared and currently and historically being used for small scale cattle grazing) is considered the preferable means of such project development, rather than developing within locations that demonstrate high biodiversity, amenity, and agricultural land values.

The Project seeks to support the growing need for grid-scale energy storage and is strategically located near the recently upgraded PQ Tully substation, a key part of the region's high-voltage transmission network. The Project will develop a grid-forming battery which is an energy storage system that will actively regulate the power grid's voltage and frequency, providing network support and stability increasing the resilience of the grid in the locality.

The Project will improve reliability for the Far North Queensland energy network, allowing the storage of excess energy to discharge back into the grid during peak demand times, power outages or to assist with grid balancing.

BESS developments further bolster the existing energy network through:

- Lower emissions – reducing reliance on fossil fuels, helping to decrease greenhouse gas emissions
- Decentralisation – enabling power to be stored and used closer to where it is needed, reducing the burden on long-distance transmission networks and improving energy reliability, especially within remote areas
- Affordability – improving efficiency and reducing peak load demand to contribute to more stable and affordable energy prices.
- Aligning with targets – the Federal government's energy targets aim have a 62–70% reduction in emissions below 2005 levels by 2035, and net zero emissions by 2050, this project will support achieving these goals.

Impacts associated with not undertaking the action include the following:

- Renewable energy projects, including BESS, are a critical way to reduce impacts associated with climate change. This is a documented threating process to MNES, including the GBR. In this regard, doing nothing to transition to renewable energy could exacerbate climate change impacts.
- The impacts associated with undertaking the action at a different location include the following:
  - The current Site has minimal ecological values within the Project area and proposed Disturbance Footprint. Whereas other sites may have higher ecological values and may involve direct impacts to areas with MNES value or areas where MNES have been confirmed.
  - The current Site is directly adjacent to the PQ Tully substation, allowing for a direct connection to the grid. Other sites may require the development of a transmission line to connect the generation facility to an external connection point which may involve direct impacts to areas with MNES value or areas where MNES have been confirmed.

1.7 Purpose and scope of this report

This report provides information regarding MNES protected under the Commonwealth EPBC Act to inform a Referral under the provisions of the EPBC Act.

This report documents the legislative framework, the assessment methods, the general environmental values of the Project area, identifies the MNES present, and assess the Project's potential impacts to MNES, including Significant Impact Assessments (SIA) for MNES 'Known to occur' or MNES assessed as being 'Likely to occur' in the Project area.

This report includes a suite of measures to avoid, mitigate, and manage the identified direct and indirect impacts anticipated as a result of the Project.

The following MNES are deemed relevant to the Project area, and, as such, are discussed in this report:

- Nationally threatened ecological communities
- Nationally threatened flora species
- Nationally threatened fauna species
- Nationally threatened aquatic species
- Migratory species
- National heritage places
- World heritage properties
- The Great Barrier Reef Marine Park.

The following MNES are not relevant to this report, and are therefore not discussed further:

- Wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed)
- Nuclear actions (including uranium mining).

- Commonwealth marine areas
- Species listed only as 'marine' under the EPBC Act are only protected where they are over Commonwealth waters. As the Project is not over a Commonwealth marine area, MNES listed only as 'marine' under the EPBC Act are not considered in this report.

1.8 Terminology

The following terms are used to describe the Project and proposed development:

- **The Site** is the area defined by the property boundaries for the parcels that contain the Project. This includes Lot 1 on RP735276, Lot 1 on RP852238 and Lot 1 on RP716718. (as depicted in **Figure 1.1**). The total area of the Site is 31.4 ha.
- **Project area** identifies the total area that includes the direct and indirect disturbance, as well as any areas of avoidance or retention (for example grassed buffers between areas of disturbance and drainage features or wetlands). The Project area includes areas of permanent works as well as temporary works. The Project area is located within the Site (as depicted in **Figure 1.1**). The total area of the Project area is 13.3 ha.
- **Disturbance Footprint** is the area of land that will be directly impacted by the Project, and all areas that will be cleared or otherwise physically altered or occupied as a result of the proposed Project. The Disturbance Footprint is located within the Project area (as depicted in **Figure 1.1**). The total area of the Disturbance Footprint is approximately 9 ha.
- **Earthworks Extent** is the area of earthworks and direct disturbance to ground and soil. The Earthworks Extent is located within the Disturbance Footprint. The total area of the Earthworks Extent is 6.3 ha.
- **Project infrastructure** includes the components that form the construction and operation of the Project proposed within the Disturbance Footprint.
- **Survey area** includes Lot 1 on RP735276 and Lot 1 on RP852238, as well as part of Lot 1 on RP716718 and Lot 5 on SP140625 (as identified by the survey area in **Figure 3.1**). The total area of the Survey area is 36.4 ha.

2. Regulatory framework

2.1 *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act is the Australian Government's central piece of environmental legislation that provides a legal framework to protect and manage MNES, many of which are also internationally important. If a proposed development or other action has, will have or is likely to have a significant impact on a protected matter, then it must be referred for assessment under the EPBC Act. Protected matters under the EPBC Act are:

- World heritage properties
- National heritage properties
- Wetlands of international importance (Ramsar Wetlands)
- Nationally threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)
- A water resource, in relation to coal seam gas development and large coal mining development

The act also protects the environment when actions are taken:

- On Commonwealth land or impact upon Commonwealth land
- By an Australian Government agency anywhere in the world
- That impact Commonwealth heritage places overseas.

2.1.1 Significant impact guidelines

Under the EPBC Act, an action will require approval from the Minister if the action has, will have, or is likely to have a significant impact on MNES. The Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (DoE, 2013) (the Guidelines) provide detailed criteria to determine whether or not a referral may be required and if the proposed action may have a significant impact on MNES. Criteria provided in the Guidelines vary according to the threat status of the MNES.

2.2 EPBC Act referral guideline for 14 birds listed as migratory

The Draft referral guideline for 14 birds listed as migratory under the EPBC Act (DoE 2015) provides information to assist proponents in assessing the likelihood of a significant impact on one or more of the bird species listed in the Referral Guideline as migratory under the EPBC Act:

- Barn swallow (*Hirundo rustica*)
- Black-faced monarch (*Monarcha melanopsis*) (no longer listed as 'migratory')
- Black-winged monarch (*Monarcha frater*) (no longer listed as 'migratory')
- Fork-tailed swift (*Apus pacificus*)
- Grey wagtail (*Motacilla cinerea*)
- Oriental cuckoo (*Cuculus saturates*)
- Oriental reed-warbler (*Acrocephalus orientalis*)
- Osprey (*Pandion cristatus*)
- Red-rumped swallow (*Cecropis daurica*)
- Rufous fantail (*Rhipidura rufifrons*) (no longer listed as 'migratory')
- Satin flycatcher (*Myiagra cyanoleuca*) (no longer listed as 'migratory')

- Spectacled monarch (*Symposiachrus trivirgatus*) (no longer listed as 'migratory')
- White-throated needletail (*Hirundapus caudacutus*)
- Yellow wagtail (*Motacilla flava*).

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- Substantially modify, destroy or isolate an area of important habitat for a migratory species.
- Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species.
- Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

The referral guideline describes what is considered to be important habitat for each of these migratory species, as well as the invasive species harmful to each. The referral guideline also defines what constitutes an ecologically significant proportion of each species' population, based on published estimates of area occupied and recorded densities. For actions proposed within the distribution of these species and in important habitats, bird surveys should be undertaken following the appropriate guidance.

Surveys for Oriental reed-warbler, barn or red-rumped swallow, or grey or yellow wagtails are considered not to yield useful results due to the small number of these birds visiting Australia, their non-threatened status, their large global populations and the improbability of a significant proportion of their population being present at a site for changes to that site to have any significance to the conservation status of the species (DoE 2015). However, any records of these species encountered during other surveys should be forwarded to the DCCEEW for inclusion in the Atlas of Living Australia in order to build a greater understanding of their patterns of occurrence.

Species listed only as 'marine' under the EPBC Act are only protected where they are over Commonwealth waters. As the Project is not over a Commonwealth marine area, they are not considered in this report.

2.2.1 EPBC Act environmental offsets policy

Environmental offsets are required to be delivered in accordance with the EPBC Act Environmental Offsets Policy (DSEWPC 2012a). The Environmental Offsets Policy outlines the Australian Government's approach to the use of environmental offsets under the EPBC Act. Offsets are defined as measures that compensate for the residual adverse impacts of an action on the environment. Where appropriate, offsets are considered during the assessment phase of an environmental impact assessment under the EPBC Act. The mitigation hierarchy requires that avoidance, minimisation and mitigation measures are the primary strategies for managing the potential significant impacts of a proposed action. Offsets do not reduce the likely impacts of a proposed action but instead compensate for any significant impact.

Where significant impacts are found to occur to MNES, and environmental offsets are required, an offsets package should be provided. An offsets package is a suite of actions that a proponent undertakes in order to compensate for the significant residual impacts to the identified MNES. It can comprise a combination of direct offsets and other compensatory measures. Offsets should align with conservation priorities for the impacted protected matter and be tailored specifically to the attribute of the protected matter that is impacted, in order to deliver a conservation gain.

To support any offset assessments that may be required for the Project, it is important to evaluate the specific MNES attributes that occur within the proposed Project area (e.g. foraging versus breeding habitat versus traverse areas) and the habitat quality of the mapped habitat areas. This information is required to inform offset calculations.

Significant impacts to MNES, and any offsets that may be required, are addressed through the EPBC Act assessment and approval process.

2.3 *Planning Act 2016*

The Project is currently being assessed for a Development Permit for a Material Change of Use under the Planning Act. The Assessment Manager for the development application is CCRC and is subject to Impact Assessment as the proposed BESS is considered to be an "Undefined Use".

An impact assessable development application is the highest level of assessment for a development in Queensland under the Planning Act. The Project will be assessed by CCRC as the assessment manager against the relevant planning instruments as follows:

- Far North Queensland Regional Plan 2009
- State Planning Policy 2017
- CCRC Planning Scheme.

Specific outcomes of the design of the Project that have been demonstrated in the assessment include:

- Project design avoids direct impacts to the wetland area with the existing hydrology regime and flow to the wetland area being maintained. Water quality impacts will be managed through the site specific stormwater management plan and preliminary erosion and sediment control plan (PESCP).
- Stormwater quality management measures to achieve the water quality objectives and provide an overall net improvement relative to baseline conditions. That is, the development returns a net improvement in the runoff water quality discharging from site.
- Stormwater treatment infrastructure ensures that the wetland protection area will be protected by:
  - Minimising earthworks, using pervious surfaces, and incorporating vegetated swales and bioretention basins to maintain natural flow paths and support infiltration, helping preserve surface and groundwater hydrology.
  - Implementing a water sensitive urban design treatment train designed to meet SPP and Reef 2050 water quality objectives, supported by MUSIC modelling and robust erosion and sediment control measures during construction.
  - Locating all stormwater treatment devices outside mapped wetlands and buffers, ensuring wetlands are not used for detention or treatment
- Specific actions that will be taken to control erosion during Project construction is as follows:
  - Soil amelioration requirements (where required) will be documented within the construction phase erosion and sediment control plan (ESCP) or a dedicated soil management plan.
  - Earthworks will be limited to the Earthworks Extent of 6.3 ha.
  - Bushfire Management Pans

The proponent is committed to ensuring the detailed design of the management and mitigation measures described conceptually will be developed further to ensure the final design provides the intended outcomes. It is anticipated that should development permit under the Planning Act be granted by CCRC, that it would be subject to conditions and specifically where appropriate matters can be management plans these would be required to be submitted to CCRC for approval prior to construction. Such management plans include:

- Stormwater Management Plan
- Construction Environmental Management Plan
- Erosion and Sediment Control Plan
- Bushfire Management Plan
- Emergency Management Plan
- Decommissioning Management Plan.

3. Environmental assessment methods

3.1 General

The assessment of MNES in the Project area and the significance of impact have been completed through a combination of desktop review and field survey effort. The steps in the assessment of MNES in the Project area is summarised as follows:

- Undertaking a desktop review of available literature and database searches for previously recorded, mapped or potentially occurring MNES.
- Developing an initial Likelihood of Occurrence assessment (LoO) for all MNES identified on the database searches to inform the field surveys. This LoO applies to the Survey area and is refined following the ecological field surveys.
- Ecological field surveys in accordance with best practice and species-specific survey guidelines to:
  - Document the condition, extent and value of vegetation communities, habitat types, and other ecological values within the Survey area.
  - Identify TEC, flora, and fauna listed under the EPBC Act to determine their presence, abundance, and extent within the Survey area.
  - Identify habitat resources for potentially occurring threatened flora, fauna, and migratory species.
- Analysis of field-based data in conjunction with aerial imagery to determine the extent of vegetation communities, habitat types, and associated MNES values across the Survey area.
- Updating the LoO following the field surveys to re-assess the likelihood of MNES within the Project area (rather than the Survey area) based on the results of the field surveys (specifically the habitat assessments).
- Undertake a detailed assessment of impacts to the identified MNES.
- Development of a suite of mitigation measures to minimise impacts to the identified MNES.
- Undertaking SIA in accordance with the Guidelines (DoE, 2013) and supplemented with species-specific referral guidelines (where relevant) to confirm the likelihood of significant impacts to each MNES confirmed present during the field surveys (i.e. 'Known to occur') or assessed in the LoO as being 'Likely to occur' within the Project area.

The above desktop assessment and field survey methods are further described in the following sections.

3.2 Desktop Assessment

A desktop review was undertaken of State and Commonwealth databases to assist in determining the previously recorded ecological attributes and ecological attributes predicted to occur within the Survey area. The desktop assessment included a review of the following:

- Atlas of Living Australia/ iNaturalist.
- Commonwealth DCCEEW EPBC Act Protected Matters Search Tool. A 10 km buffer was used to inform the LoO (refer to **Section 3.4** for further details of the LoO).
- Commonwealth DCCEEW National Flying-fox monitoring viewer.
- The Queensland Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development's (DNRMMRRD) Vegetation Management Supporting Map.
- The Queensland DNRMMRRD wetland mapping.
- The Queensland DNRMMRRD essential habitat mapping.
- The Queensland Department of Environment, Tourism, Science and Innovation's (DETSI) Protected Plants Flora Survey Trigger Map.
- The Queensland DETSI Map of Queensland wetland environmental values, to identify wetlands of high ecological significance (HES) and general ecological significance (GES).

- The Queensland Government Statewide biodiversity corridor mapping.
- The Queensland Government's WildNet database. A 10 km buffer was used to inform the LoO (refer to **Section 3.4** for further details of the LoO).
- Queensland Spatial Catalogue (QSpatial):
  - Historical aerial imagery
  - The VM watercourse/drainage feature - 1:100 000 and 1:250 000 mapping layer for watercourses mapped under the VM Act.
  - The Watercourse Identification Map and Watercourse Lines feature layers for watercourses mapped under the Water Act.

A copy of the desktop searches is provided in **Appendix A**. The results of the EPBC Act Protected Matters Search Tool (PMST) and the WildNet Species List using the 10 km search radius are presented in this report and in **Appendix A**.

3.3 Ecological field surveys

Ecological field surveys involved the following:

- Validation of the desktop assessment results.
- Assessment and verification of the floristic structure and composition of the vegetation communities present within the Survey area.
- Assessment of fauna habitat values present and recording threatened fauna sightings.
- Fauna habitat surveys to confirm the presence of fauna habitat features present associated with each broad habitat type.
- Spotlighting surveys for nocturnal fauna.
- Identification of weed species and documentation of disturbance to vegetation.

All surveys were conducted under a valid Animal Ethics license (reference CA 2021/11/1563) and Scientific Purposes Permit (number WA0014242).

3.3.1 Survey guidelines

A range of flora, vegetation, and fauna habitat surveys were adopted for the survey programs to assist with building a species inventory for the Survey area and to identify MNES species and their habitat which may occur within the Project area and Disturbance Footprint. The ecological survey methods were developed to be consistent with the methods outlined in the following survey guidelines:

- Survey Guideline for Australia's threatened mammals (DSEWPC 2011a)
- Survey Guidelines for Australia's threatened birds (DEWHA 2010b)
- Survey Guidelines for Australia's threatened reptiles (DSEWPC 2011b)
- Survey Guidelines for Australia's threatened bats (DEWHA 2010a)
- Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (DoEE 2017)
- Terrestrial Vertebrate Fauna Survey Guidelines for Queensland
- Draft Survey Guidelines for Australia's Threatened Orchids (DoEE 2013)
- Flora Survey Guidelines – Protected Plants (DES 2020a)
- Methodology for survey and mapping of regional ecosystems (RE) and vegetation communities in Queensland (Neldner, et al 2023)
- Conservation Advice, Recovery Plan, or Listing advice for relevant TEC
- A review of koala habitat assessment criteria and methods (Youngentob, Marsh Skewes 2021)
- Referral guideline for 14 birds listed as migratory species under the EPBC Act (DoE 2015)

- Guide to greater glider habitat in Queensland (Eyre, et al 2022)
- Guide to determining terrestrial habitat quality (DES 2020b).

The guide to determining terrestrial habitat quality (DES 2020b) provides guidance of the number of sampling sites relative to the size of each assessment unit (being either an RE or broad habitat type). The number of sampling sites recommended per assessment unit, is replicated below in **Table 3.1**. The fauna habitat assessments sites were distributed in each broad habitat type as per the recommendations in **Table 3.1**.

Table 3.1 Guide to number of sampling sites relative to assessment unit size

Assessment unit size	Suggested number of sampling sites
0–50 ha	At least two
50 – 100 ha	Three
100 – 500 ha	Four
500 – 1,000 ha	Five
More than 1,000 ha	Six

3.3.2 Survey teams and survey timing

The field surveys were conducted on 11, 12, and 13 November 2024. The field surveys were conducted by lead ecologist Justin Armstrong and ecologist Nicholas Callahan. Justin has extensive experience in undertaking ecological survey programs and is suitably qualified to undertake surveys in accordance with State and Commonwealth survey guidelines.

3.3.3 Weather conditions

The weather conditions in the lead up to the field surveys was considered adequate and conducive to vegetation and fauna habitat surveys for the time of year and the target species. The weather data is shown in **Table 3.2**, sourced from the Cowley Beach Defence (station #032194), which is located approximately 35 km northeast of the Project area.

No rain was measured in the 11 days prior to the surveys. The Site experienced a drier than average August in 2024, however a wetter than average start to the year resulted in a fairly typical annual total for 2024. Monthly rainfall totals for September to November 2024 within the typical range for those months. Apart from a hotter than usual January, monthly average temperatures were also within a typical range throughout 2024 leading up to the surveys.

Table 3.2 Weather conditions during the field surveys

Date	Min temp (^{0}C)	Max temp (^{0}C)	Rain (mm)	3pm relative humidity (%)	3pm wind speed (km/h)
11 Nov 2024	23.4	30.8	0	66	6
12 Nov 2024	26.0	31.7	0	64	9
13 Nov 2024	21.0	31.5	0	64	11

3.3.4 Field surveys

Field surveys were undertaken within the Survey area to confirm vegetation communities, assess habitat for threatened flora and fauna species, identify TEC, and make recommendations for further targeted surveys (if appropriate). The field survey effort is shown in **Figure 3.1**.

The field surveys comprised the following:

Flora, Vegetation communities, and TEC

- Flora survey using the meander survey method detailed in the Queensland Flora Survey Guidelines – Protected Plants (DES 2020a) for threatened flora species in areas of suitable habitat. Flora surveys in strict accordance with the Flora Survey Guidelines – Protected Plants (DES, 2020a) were not undertaken as part of the works.
- Assessment of the suitability of the vegetation to provide habitat for threatened flora species listed under the NC Act and/or the EPBC Act.
- Quaternary surveys in accordance with the *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland* (Neldner, et al., 2023) within mapped remnant and high value regrowth (HVR) vegetation to confirm the mapped regional ecosystems and HVR and to characterise the floristic composition and structure of vegetation communities.
- Vegetation categorisation surveys to characterise the vegetation into field validated broad habitat types based on vegetation structure and dominant canopy, sub-canopy, shrub, and ground cover species and habitat values.
- Vegetation community delineation surveys to validate the extent of the on-ground vegetation communities.
- Assessment of the vegetation communities to confirm if the vegetation meets the key diagnostic characteristics and/or condition thresholds of TEC identified in the desktop assessment (or in the field).
- Recording areas with high density restricted invasive plant species listed under the *Biosecurity Act 2014 (Qld)* and Weeds of National Significance (WoNS).

Fauna and Fauna Habitats

- Recording all incidental observations of all fauna species.
- Diurnal bird surveys targeting threatened bird species identified in the desktop assessment.
- Active searches in areas with habitat features which may support threatened fauna species.
- Spotlighting surveys targeting nocturnal species identified in the desktop assessment.
- Deployment of Anabat ultrasonic bat call recording devices targeting bat species identified in the desktop assessment.
- Fauna habitat assessments of the vegetation to confirm the suitability of the vegetation to provide habitat to threatened fauna species identified in the desktop assessment.
- Identifying the presence of breeding habitat/places for threatened fauna (including for colonial breeding species).
- Recording restricted invasive animal species listed under the *Biosecurity Act 2014 (Qld)*.

The field survey effort is detailed in **Table 3.3**.

Field survey effort

Figure 3.1

DWG No: RWE-002-020[C]
DATE: 30/10/2025
DRAWN: KB
REVIEWED NC
SCALE (A4): 1:5,000

Table 3.3 Field survey effort

Survey	Description	Survey effort
Flora, vegetation communities, and TEC		
Opportunistic flora observations	Opportunistic observations of threatened flora species were recorded in conjunction with all survey efforts outlined above and whilst generally traversing through the Project area as part of this survey program.	32 person hours over 3 days
Quaternary surveys	Quaternary surveys were the primary method and were undertaken in accordance with the Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Nelder *et al*. 2023). The following data was collected at each quaternary assessment site: • Vegetative structure including median heights and estimated cover for each stratum. • Floristic composition including native species dominance and sub-dominance within each identified stratum. Quaternary surveys were also used to identify potential areas of TEC based on vegetative structure and floristic composition.	9 Sites
Flora Habitat Assessments	Habitat assessments were undertaken to document the habitat values available for all potentially occurring flora species based on the presence of key habitat requirements and microhabitats. Key habitat features for those MNES species identified in the Likelihood of Occurrence were also recorded at each survey site.	12 Sites
TEC validation and delineation surveys	Quaternary surveys identified no areas of potential TEC in the Survey area, so TEC validation and delineation surveys were not required.	0 Sites
Fauna and fauna habitats		
Fauna Habitat Assessments	Habitat assessments were completed across the Survey area with the aim of identifying key habitat features such as rocky areas, tree hollows or fallen woody debris to support an assessment of threatened fauna species that may occur in the Survey area and Project area and MNES species-specific habitat mapping. The habitat assessments support the analysis of habitat values of MNES, including habitat for threatened birds in terms of ground cover composition and proximity to water to assist in identifying habitat for this species. Habitat assessments recorded the following habitat attributes at each Habitat Assessment survey site: • the presence of fallen logs, leaf litter, rocks • vegetative groundcover • presence of cracking soils • presence rocky overhangs, caves, decorticating bark • foraging resources such as native grasses, preferred food trees for koalas, etc. • available water sources • animal breeding places such as hollow-bearing trees, dens, and nests • presence and abundance of weeds	12 Sites

Survey	Description	Survey effort
	• signs of pest animals • hollow bearing tree surveys.	
Spotlighting surveys	Spotlighting meanders were undertaken throughout two nights of the survey period with a focus on searching the canopy, ground and understory layer within vegetated areas, forest edges and into the surrounding cleared pasture. All fauna species seen were identified and added to an overall species list.	8 person hours over 2 nights
Opportunistic fauna observations	Opportunistic observations of threatened fauna species were recorded in conjunction with all survey efforts outlined above and whilst generally traversing through the Project area as part of this survey program. All fauna species seen were identified and added to an overall species list.	28 person hours over 3 days

3.3.5 Compliance with Commonwealth survey guidelines

MNES specific survey guidelines and/or recommendations have been published by DCCEEW to assist with the identification of MNES with the potential of occurring within a nominated study area. Whilst no ecological field survey is ever completely comprehensive, by undertaking surveys in accordance with the relevant survey guidelines, surveys are considered sufficient for the detection of an MNES. Moreover, surveys undertaken in accordance with the relevant survey guidelines are considered sufficient to inform an assessment of the likelihood of an MNES being present within a study area. Habitat assessments are a recognized approach to firstly categorizing the vegetation to confirm the potential for threatened flora and fauna species to be present.

Table 3.4 provides an assessment of the number of habitat assessments required and the number of habitat assessment sites undertaken for each broad habitat type (refer to **Section 4.7** for a full description of the broad habitat types).

Table 3.5 details the survey effort for MNES and compliance with relevant survey guidelines. It should be noted that, due to the small scale of the Site, the cleared nature of the Project area, current use for cattle grazing, historical use as a sugarcane farm, the field surveys did not make any recommendations for further targeted surveys as the Preliminary surveys were sufficient to understand the ecological values of the Site, particularly as they relate to MNES.

Table 3.4 Guide to number of sampling sites relative to assessment unit size

Broad habitat type	Area (ha)	Suggested number of sampling sites	Number of sampling sites	Justification
Melaleuca quinquenervia open forest	1.47	2	4	Complies with Survey guidelines – Table 3.4
Lophostemon suaveolens/Corymbia intermedia open forest	0.62	2	4	Complies with Survey guidelines – Table 3.4
Cleared areas/pasture, dominated by exotic grasses	25.71	2	4	Complies with Survey guidelines – Table 3.4
Total	**27.8**	**6**	**12**	

Table 3.5 Assessment of adequacy of the survey effort for MNES

MNES	Survey Methods	Survey effort	Survey guidelines	Compliance with Survey Guidelines
Flora and vegetation communities				
Threatened flora species	Opportunistic observations of threatened flora species were recorded in conjunction with all survey efforts outlined above and whilst generally traversing through the Project area as part of this survey program. Surveys for orchids protected under the EPBC Act were included in opportunistic searches.	3 days 32 person hours	Flora Survey Guidelines – Protected Plants (DES 2020a) Australian government's draft Survey Guidelines for Australia's Threatened Orchids (DoEE 2013)	**Yes**. Habitat assessments and meander surveys are sufficient and appropriate to identify threatened flora species and their suitable habitats
	Assessment of the vegetation to confirm if the vegetation provides suitable habitat for threatened flora species.	12 sites		
Vegetation validation	Quaternary surveys to confirm vegetation type and condition.	9 sites	Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland (Neldner, et al 2023).	**Yes**. The number of quaternary assessments meets or exceeds the requirements to map the extent of native vegetation in the Survey area.
TEC validation and delineation surveys	N/A. Quaternary surveys to confirm vegetation community structure and constituent species in order to identify potential TEC.	N/A	N/A	**Yes**. Quaternary surveys are sufficient to determine vegetation community structure and constituent species in order to identify vegetation containing potential TEC. Quaternary Surveys did not identify any vegetation composed of communities that are indicative of potential TEC.
Birds				
	Opportunistic observations during all other surveys	32 person hours	Survey guidelines for Australia's threatened birds (DEWHA 2010b)	**Yes**. Habitat assessments are sufficient and appropriate to identify threatened bird species and assess their suitable habitat.

MNES	Survey Methods	Survey effort	Survey guidelines	Compliance with Survey Guidelines
All threatened birds with the potential to occur	Habitat assessments were completed across the Survey area	12 sites		At least two habitat assessments were undertaken in each broad habitat type, as per the recommendation of the guide to determining terrestrial habitat quality (DES 2020b).
Migratory birds	Opportunistic observations during all other surveys.	32 person hours.	Referral guidelines for 14 birds listed as migratory species under the EPBC Act (DoE 2015) Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebirds species (DoEE 2017).	**Yes**. Habitat assessments are sufficient, and diurnal surveys are appropriate to identify migratory bird species and assess their suitable habitat. At least two habitat assessments were undertaken in each broad habitat type, as per the recommendation of the guide to determining terrestrial habitat quality (DES 2020b). Note: the surveys were undertaken during November, a period of high activity of migratory species during inbound migration (DoEE 2017).
	Habitat assessments were completed across the Survey area with the aim of identifying key habitat features such as suitable wetlands with wet meadows and fringing riparian areas.	12 sites.		

MNES	Survey Methods	Survey effort	Survey guidelines	Compliance with Survey Guidelines
Mammals				
All threatened mammals with potential to occur	Habitat assessments were completed across the Survey area with the aim of identifying key habitat features such as rocky areas, tree hollows or fallen woody debris to support an assessment of threatened fauna species that may occur in the Survey area.	12 Sites.	Survey guidelines for Australia's threatened mammals (DSEWPC 2011a)	**Yes**. Habitat assessments and surveys are sufficient and appropriate to identify threatened fauna species and their suitable habitat. At least two habitat assessments were undertaken in each broad habitat type, as per the recommendation of the guide to determining terrestrial habitat quality (DES 2020b).
	Spotlighting surveys were completed across the Survey area targeting nocturnal mammals	2 nights 8 person hours		
	Opportunistic observations during all other surveys.	32 person hours.		
Herpetofauna				
All threatened reptiles and frogs with potential to occur	Opportunistic observations during all other surveys.	32 person hours.	Survey Guidelines for Australia's threatened reptiles (DSEWPC 2011b) Survey Guidelines for Australia's threatened frogs (DEWHA 2010c)	**Yes**. Habitat assessments and surveys are sufficient and appropriate to identify threatened fauna species and their suitable habitat. At least two habitat assessments were undertaken in each broad habitat type, as per the recommendation of the guide to determining terrestrial habitat quality (DES 2020b)
	Habitat assessments were completed across the Survey area with the aim of identifying key habitat features such as wetlands, rocky areas, tree hollows or fallen woody debris to support an assessment of threatened fauna species that may occur in the Survey area.	12 Sites.		
	Spotlighting surveys were completed across the Survey area targeting reptiles and frogs with potential to occur	2 nights 8 person hours		

3.4 Likelihood of occurrence assessment

A LoO is an assessment of the likelihood that an MNES identified in the desktop assessment will occur within the Survey area (to inform target species during the field survey) and Project area (to inform impact assessment) and is done because the EPBC Act PMST uses bioclimatic modelling to predict suitable habitat for MNES and where MNES may be present, while the WildNet Species List and ALA database provides previous records of presence within a broad search extent. These searches do not necessarily indicate the actual presence of an MNES within the Project area.

The LoO for the Project has been undertaken for all threatened flora and fauna species identified in the EPBC Act Protected Matters Report (PMR), the WildNet Species List, and the ALA search (see **Appendix B**).

The LoO is done in two stages, with the first stage being a desktop assessment (Pre-field work) done in the planning phase to inform the survey effort and assess which MNES should be targeted during the field surveys. At the Pre-field work (planning) stage, the LoO is based entirely on desktop data and used to inform the suite of MNES for which surveys should be conducted. A 10 km buffer area is applied to capture a wide range of species and vegetation communities, and to account for (a potential lack of) survey effort as well as highly mobile species such as birds.

The LoO is then updated following the field surveys and is refined to the Project area (rather than the Survey area) and is based on the results of the field surveys, including the habitat assessments, to re-assess the likelihood of an MNES being present within the Project area based on data derived from the field survey effort. **Table 3.6** details the categories used in the LoO.

Table 3.6: Likelihood of Occurrence categories

Category	Description
Known to occur	Directly and/or indirectly observed during the field surveys undertaken for the Project or Recorded during previous ecological surveys and documented in existing reports/published material.
Likely to occur	Likely to be present despite not being observed during the field surveys, with fauna species being likely to habitually utilise the habitat within the Project area, which is likely to provide breeding, foraging, and/or dispersal opportunities for the species. All MNES assessed as 'Likely to occur' are subjected to further assessment, including impact assessment, and an SIA.
Potential to occur	If present, likely to occur in only low or very low numbers, with fauna species being unlikely to habitually utilise the habitat within the Project area, which is unlikely to provide breeding resources for the species. However, fauna species may occasionally utilise the habitat for dispersal purposes or as low value foraging habitat. Flora species are, if present, likely to only be present as individuals or in very low densities. All MNES assessed as 'Potential to occur' are not subjected to further assessment, including impact assessment and SIA as there is a reduced potential of the MNES being present, and (if present) are likely to be present infrequently and/or in low numbers such that any impact is unlikely to impact the breeding/foraging/dispersal success of flora/fauna or the broader population of the species.
Unlikely to occur	Unlikely to be present within the Project area. Fauna species are unlikely to utilise the habitat within the Project area due to the limited extent and/or unsuitability of habitat and/or the habitat lacks necessary habitat features or microhabitat requirements. All MNES assessed as 'Unlikely to occur' are not subjected to further assessment, including impact assessment and SIA as there is a negligible potential of the MNES being present, and (if present) are likely to be present infrequently and/or in low numbers such

Category	Description
	that any impact is unlikely to impact the breeding/foraging/dispersal success of flora/fauna or the broader population of the species.

Table 3.7 details the criteria used for the Pre-Field Work (Planning Phase) LoO, while **Table 3.8** details the criteria used for the Post-Field Work LoO.

Table 3.7 Pre-field work (Planning Phase) LoO categories criteria

Criteria	TEC	Flora	Fauna
Known to occur	The TEC has been previously recorded in the Survey during previous ecological surveys and documented in existing reports/published material.	The species has been recorded in the Survey area during previous ecological surveys and documented in existing reports/published material.	The species has been recorded in the Survey area during previous ecological surveys and documented in existing reports/published material (i.e. online databases).
Likely to occur	Associated RE are mapped within the Survey area (and meet minimum size thresholds for the associated TEC).	RE or other habitat features (such as land zones or geology) which provide suitable habitat for the species are mapped within the Survey area AND There are post-1980 records of the species (WildNet or ALA) within the 10 km search extent.	RE or other habitat features (such as land zones or geology) which provide suitable habitat for the species are mapped within the Survey area AND There are post-1980 records of the species (WildNet or ALA) within the 10 km search extent.
Possibly occurring	Associated RE are mapped within the 50 km search extent	RE which provide suitable habitat for the species are mapped within the Survey area AND There are post-1980 records of the species (WildNet or ALA) within 10 km of the Survey area.	RE which provide suitable habitat for the species are mapped within the Survey area AND There are post-1980 records of the species (WildNet or ALA) within 10 km of the Survey area. OR The species is migratory or nomadic and may only occur in the Survey area on a seasonal and/or infrequent basis.
Unlikely to occur	Associated RE are not mapped within the 50 km search extent	RE which provide suitable habitat for the species are not mapped within the Survey area AND/OR Species records within the search extent are from before 1980 AND/OR The species has a highly restricted range that occurs within the search radius but outside of the Survey area AND/OR The Survey area is outside the current known range of the species	RE which provide suitable habitat for the species are not mapped within the Survey area AND/OR Species records within the search extent are from before 1980 AND/OR The species has a highly restricted range that occurs within the search extent but outside of the Survey area AND/OR The Survey area is outside the current known range of the species

Table 3.8 Post-field work LoO categories criteria – Project area only

Criteria	TEC	Flora	Fauna
Known to occur	The TEC has been recorded in the Project area	The species has been directly observed in the Project area during the field surveys OR The species has been recorded in the Project area during previous ecological surveys and documented in existing reports/published material.	The species has been directly or indirectly observed in the Project area during the field surveys OR The species has been recorded in the Project area during previous ecological surveys and documented in existing reports/published material.
Likely to occur	Associated RE are mapped within the Project area and the mapped RE meet the minimum size thresholds for the associated TEC	The habitat assessments undertaken for the Project identified that suitable habitat for the species is present within the Project area AND the species records (WildNet or ALA) within the 10 km search extent are from the year 2000 onwards. OR The habitat assessments undertaken for the Project identified that suitable habitat for the species is present within the Project area, despite there being no records of the species.	The habitat assessments undertaken for the Project identified that suitable habitat for the species is present within the Project area AND the species records (WildNet or ALA) within the 10 km search extent are from the year 2000 onwards. OR The habitat assessments undertaken for the Project identified that suitable habitat for the species is present within the Project area, despite there being no records of the species.
Potentially occurring	Associated RE are not mapped within the Project area, but are mapped contiguous to the Project area	The habitat assessments undertaken for the Project identified that suitable habitat for the species is present within the Project area AND the species records (WildNet or ALA) within the 10 km search extent are older than the year 2000. OR The habitat assessments undertaken for the Project identified that marginal/suboptimal habitat for the species is present within the Project area, despite there being no records of the species, but there is potential for the species to still occur	The habitat assessments undertaken for the Project identified that suitable habitat for the species is present within the Project area AND the species records (WildNet or ALA) within the 10 km search extent are older than the year 2000. OR The habitat assessments undertaken for the Project identified that marginal/suboptimal habitat for the species is present within the Project area, despite there being no records of the species, but there is potential for the species to still occur
Unlikely to occur	Associated RE are not mapped within or contiguous to the Project area	Suitable habitat for the species is either: not present within the Project area; and/or limited in quality and/or extent such that the habitat would not support the species; and/or	Suitable habitat for the species is either: not present within the Project area; and/or limited in quality and/or extent such that the habitat would not support the species; and/or

Criteria	TEC	Flora	Fauna
		lacks the necessary habitat features or microhabitat features. AND/OR The Project area is outside the current known distribution for the species. AND/OR The species has a highly restricted distribution that occurs within the 10 km search extent but does not occur in the Project area. AND/OR Comprehensive surveys have been undertaken in all areas of potentially suitable habitat in accordance with State and Commonwealth guidelines and the species was not observed.	lacks the necessary habitat features or microhabitat features. AND/OR The Project area is outside the current known distribution for the species. AND/OR The species has a highly restricted distribution that occurs within the 10 km search extent but does not occur in the Project area. AND/OR Comprehensive surveys have been undertaken in all areas of potentially suitable habitat in accordance with State and Commonwealth guidelines and the species not observed.

3.5 Impact assessment

The potential direct and indirect impacts the Project is anticipated to have on the identified ecological values and MNES are discussed in **Section 9** and **Section 11.5**. Where impact areas (ha) are presented in this report, the impact areas have been calculated using the Disturbance Footprint rather than the Survey area or Project area as these areas are used to assess broader ecological attributes and incorporate areas which are not impacted by the Project. Therefore, there may be ecological attributes (e.g. threatened fauna species habitat/flora species/individuals) present in the broader Survey area or Project area which are not present in the Disturbance Footprint and therefore not impacted by the Project and not included in the impact area calculations.

When calculating the extent of impacts to MNES habitat, the MNES (species specific) habitat mapping developed as a result of the field surveys has been used rather than desktop sourced mapping (e.g. the RE mapping, or essential habitat mapping). The desktop sourced mapping layers are not used as these mapping layers are not field verified and therefore do not necessarily reflect the extent of on-ground vegetation communities and do not accurately reflect the value of the vegetation to flora and fauna species (e.g. the density of hollows or other microhabitat features required). The MNES species-specific suitable habitat mapping has been developed based on the outcomes of the field surveys and is therefore a more valid representation of suitable habitat.

3.6 Significant impact assessment

The SIA have been completed for MNES 'Known to occur', or those assessed as 'Likely to occur' or 'Potential to occur' in the LoO. The SIA have been undertaken in accordance with the Significant Impact Criteria of the MNES in the Guidelines (DoE, 2013) (or species-specific referral guidelines, where available). MNES assessed as being 'Unlikely to occur' have not been subject to SIA as they have been assessed as having a reduced likelihood of occurring within the Project area and therefore direct or indirect impacts are unlikely.

The significant impact assessment includes an assessment of the nature and magnitude, as well as likely consequences of the potential impacts. Based on the SIA, a significant impact is classified as either:

- **Likely** – direct and/or indirect impacts are anticipated to occur to the MNES and the unmitigated scale and/or severity of the impacts are likely to pose short and/or long-term risks to the survival and/or integrity of the MNES.
- **Possible** – direct and/or indirect impacts may occur to the MNES and there is uncertainty as to the unmitigated scale and/or severity of the impact in regard to the short or long-term survival and/or integrity of the MNES.
- **Unlikely** – direct and/or indirect impacts are either unlikely to occur to the MNES and/or the impacts are such that the scale and/or severity are unlikely to pose short or long-term risks to the survival and/or integrity of the MNES.

3.7 Limitations

The content of this report, including the assessment of the Project's impacts, is based on information available at the time the report was prepared. Information has been obtained from third party sources and, while every care has been taken to ensure the accuracy of this data, Attexo makes no statements regarding the reliability or completeness of this data, or any assumptions made based on third party data.

The field surveys undertaken for the Project have not included targeted surveys. Based on the field surveys, areas of suitable habitat sufficient to host populations of threatened species were not identified within the Project area. These initial assessments included a range of appropriate surveys to identify suitable habitat and assess vegetation communities. Given the general absence of suitable habitat identified in the Project area for threatened species, further targeted surveys are not warranted. This approach is both efficient and ensures that any potential impacts are responsibly assessed.

There is inherent variability in vegetation communities and species distributions and inherent limitations in all field surveys. The inherent limitations in undertaking field surveys have been mitigated by applying a field survey program

consistent with State and Commonwealth survey guidelines to assess individual threatened species and habitats (including breeding, foraging, and dispersal) that may be suitable for threatened flora and fauna species. However, there remains a low risk that threatened species may not have been identified, particularly small and/or cryptic species and/or migratory species. Regardless of these limitations, the field surveys have been progressed consistent with State and Commonwealth survey guidelines by suitably qualified professionals with relevant experience and are therefore considered sufficient to identify environmental and ecological attributes to inform the significant impact assessments.

4. General environmental values

4.1 Catchment, waterways and wetlands

4.1.1 Catchment

The Project area falls in the Tully River sub-basin of the Tully drainage basin within the Wet Tropics Great Barrier Reef Catchment Region.

4.1.2 Watercourses

A single first order drainage feature traverses the Project area, starting at the west of Lot 1 on RP735276 and running east into the neighbouring PQ parcel (Lot 5 on SP140625). The drainage feature then continues into the north of Lot 1 on RP852238 and runs southeast to join a formed agricultural drainage channel at the eastern boundary of that lot.

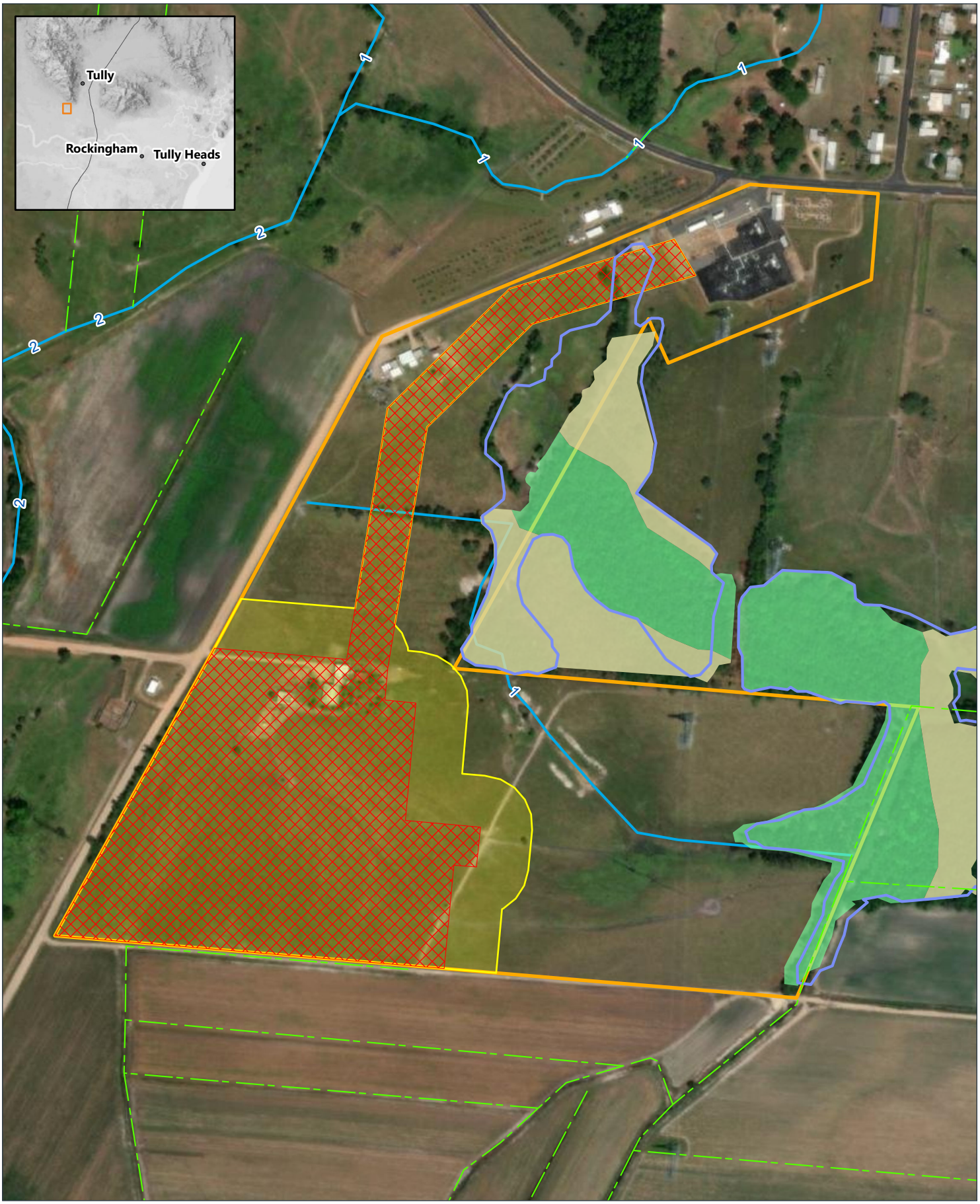
The waterways mapped under the Queensland VM Act (and their stream order) which traverse through the Site are shown on **Figure 4.1**.

4.1.3 Wetlands

There are no nationally or internationally important wetlands within the Project area. A high ecological significance wetland (with associated GBR wetland protection trigger areas) is mapped within the Survey Area on the matters of state environmental significance (MSES) high ecological significance (HES) wetlands GIS dataset (DES 2021), and both CRCC Planning Scheme Environmental Significance Overlay and the Waterway Corridors and Wetlands Overlay. This MSES high ecological significance wetland is mapped along the eastern boundaries of Lot 1 on RP735276 and Lot 1 on RP852238 of the, continuing into the neighbouring properties.

Figure 4.1 shows the mapped extent of the wetlands associated with the Site.

Figure 4.2 details the drainage flows from within the site through the downstream watercourses and the Tully River, into the Coral Sea.



Watercourses and wetlands within the Site

Figure 4.1

DWG No: RWE-002-021[B]
DATE: 16/10/2025
DRAWN: KB
REVIEWED NC
SCALE (A4): 1:5,000

N

0 m 100

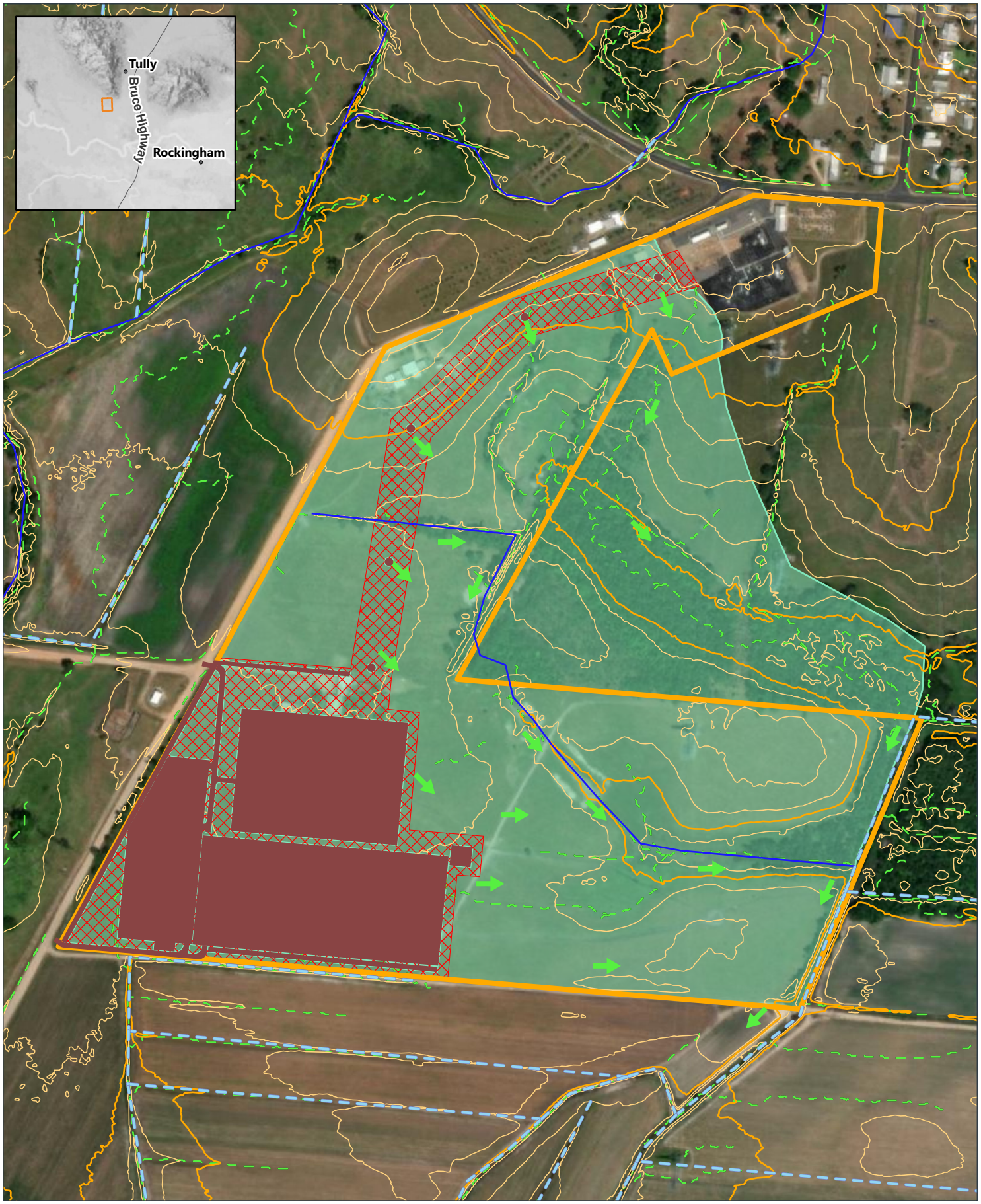
GDA2020

Site
Project area
Disturbance Footprint

Wetland areas
Contains wetlands [1 to 50%]
Palustrine wetlands [hydrologically natural]

Wetlands of high ecological significance

Sugarcane drains
VM watercourse



Detailed drainage map

Figure 4.2

DWG No: RWE-002-027 [B]
DATE: 27/10/2025
DRAWN: XB
REVIEWED NC
SCALE (A4): 1:5,000

N

0 Metres 100

GDA2020

Contour - 1m
Index Contour
Intermediate Contour
Site
Disturbance Footprint
Stream Flow
Sugarcane drains
Vegetation Management (VM)
Watercourse
Earthworks Extent
Vegetative Buffer

4.2 Topography

The Project area is located south of the Tully Gorge National Park, located 4 km south of Mount Tyson. Elevation within the Project area ranges from 18 m Australian height datum (AHD) in the northwest in association with a crest of 19 m AHD to the north of Sandy Creek Road, to a low of 9 m AHD in the east of the site associated with wetlands.

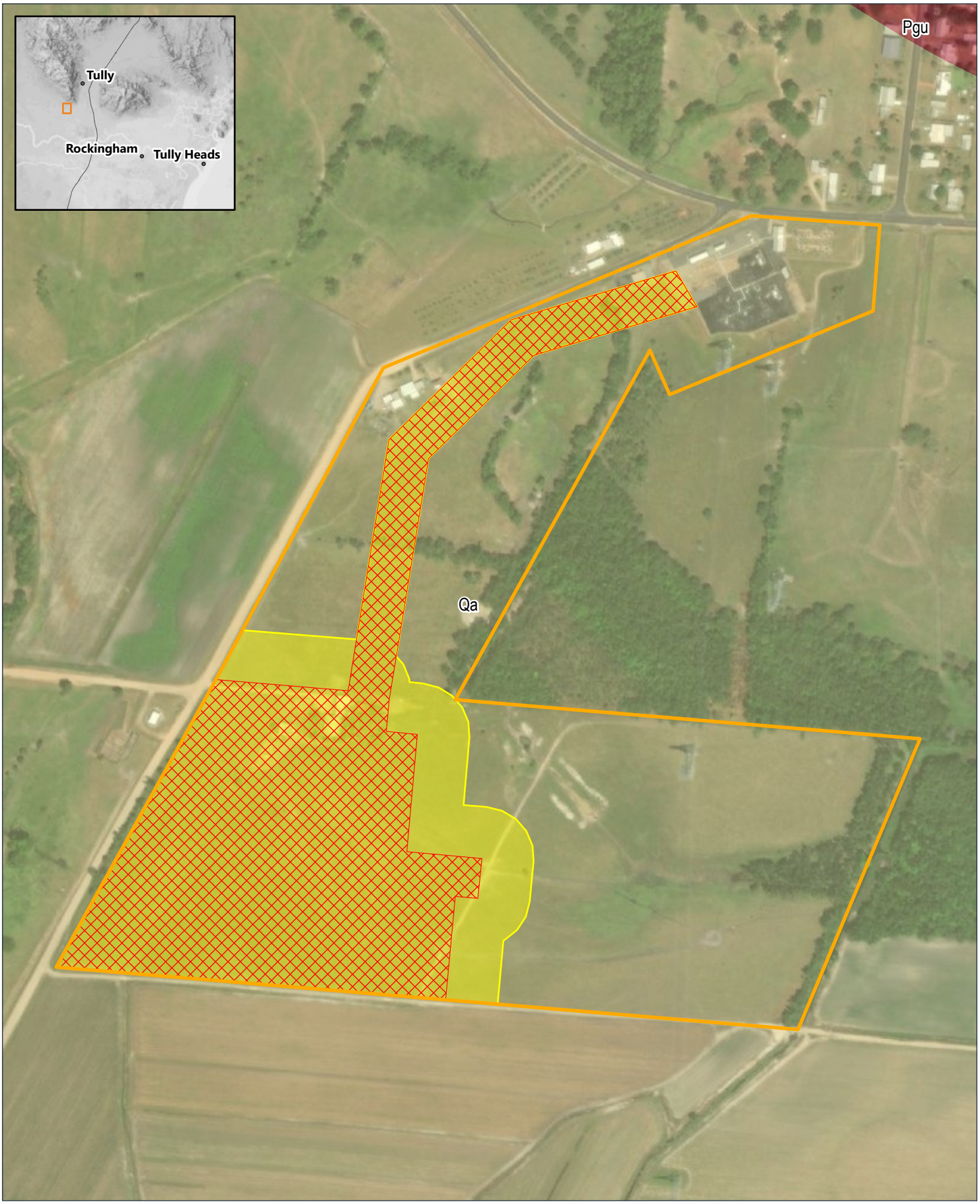
Topography across the Project area can be divided into three areas:

- The northern half of Lot 1 on RP735276 slopes to the southeast from 18 m AHD to 10 m AHD at approximately 3–5%.
- The eastern half of Lot 1 on RP852238 is bisected into two north-south rises at 12 m AHD by a drainage feature flowing to the southeast to the low of the wetlands at 9 m AHD.
- The southern half of Lot 1 on RP735276 and western half of Lot 1 on RP852238, including the Disturbance Footprint, is located on land around 12 m AHD which predominantly slopes away from the north at 0.5–1.5%.

By design, the Earthworks Extent avoids areas of the greatest slope, with minimal disturbance near these areas required only for some OHTL footings.

4.3 Geology

The Project area is located entirely on the Qa-QLD surface geological unit, consisting of quaternary alluvium of clay, silt, sand and gravel; flood-plain alluvium (DNRMMRRD 2025). The detailed surface geology for the Project area is depicted in **Figure 4.3**.



Detailed Surface Geology within the Site

Figure 4.3

DWG No: RWE-002-022[B]
DATE: 16/10/2025
DRAWN: KB
REVIEWED NC
SCALE (A4): 1:5,000

N

0 m 100

GDA2020

Site
Project area
Disturbance Footprint

Detailed Surface Geology
Qa-QLD (Qa)
Tully Granite Complex (Pgu)

4.4 Soils

4.4.1 Soil mapping within the Site

Soils within the Project Area have been mapped in the 1:50,000 *Soils of the Cardwell-Tully Area, North Queensland* by Cannon *et al.* (1992). The Cannon *et al.* (1992) mapping identifies two mapped soil units (Hewitt and MSC [Miscellaneous soils]) over the Site as shown in **Figure 4.4** and detailed in **Table 4.1**. The Disturbance Footprint is located mostly within the area mapped as comprising Hewitt soils, with the northern half of the OHTL passing through the area mapped as comprising MSC.

The Hewitt soil series forms a continuum, becoming progressively more poorly drained with distance from higher, better drained levees. Overall, the Hewitt soil unit is mapped as containing poorly drained soils formed on alluvium. MSC is a miscellaneous map unit that has not been assessed in detail, located to the north of the Disturbance Footprint.

Table 4.1 Soils (Cannon et al, 1992) mapped within the Site

Soil	Landform	Major distinguishing features	Australian Soil Classification
Hewitt	Floodplain and swamps	Sapric loamy A horizon, grey whole coloured or mottled, silty clay B horizons	Hydrosols
MSC	-	Miscellaneous type of mapping unit, used to identify areas not typically assessed in detail.	Podosols

The Hewitt soil series is described as having variable topsoil depths, from 9–80 cm thick, consisting of black to dark grey, sapric to fibric loams to clay loams. The terms sapric and fibric refer to peat materials, where fibric is undecomposed or weakly decomposed organic materials whilst sapric is strongly to completely decomposed organic material. Hewitt subsoils comprise brown to grey, clay loam to medium clays with mottling due to their commonly waterlogged status.

No soil sodicity was identified in the recorded analytical data, however soil pH is consistently acidic (<5.0) throughout the profile, with high presence of hydrogen and aluminium cations.

Due to the lack of information on the MSC soil, relevant to the proposed grid connection route north of the Disturbance Footprint, it has been conservatively assumed that sodic, dispersive soils could potentially be disturbed by the Project.

Figure 4.4 The 1:50,000 *Soils of the Cardwell-Tully Area, North Queensland*

4.4.2 Risk of soil loss

The risk of soil loss and erosion associated with the soils on site was undertaken and presented in the PESCP (Attexo 2025) (**Appendix D**). A complete assessment of erosion risk involves consideration of a range of factors contributing to erosion at a site. The PESCP (Attexo 2025) presents three different methods of assessing erosion risk that are complementary and when used in an integrated manner provide a more complete understanding of erosion risk, these methods include:

- Average monthly rainfall analysis – a simple assessment useful for understanding temporal erosion risk
- Soil loss estimation – useful for considering erosion risk factors additional to average monthly rainfall (e.g. soils, slope, rainfall erosivity and land management practices)
- General observations pertaining to erosion risk associated with high intensity rainfall events and climate change are also presented. When determining the monthly erosion risk for the proposed construction the highest monthly risk rating will be used to determine the erosion control requirements.

The assessment from the PESCP has been summarised and presented in the following sections.

4.4.2.1 Rainfall based erosion risk assessment

Rainfall data from the Tully Sugar Mill weather station (Bureau of Meteorology (BoM) station #032042) has been used to inform the ESCP. This weather station is located approximately 3 km northeast of the Site and has been selected as it provides the most reliable account of rainfall data in proximity to the Site. The dataset extends from 1925 to present (100 years) (BoM 2025).

The monthly erosion risk for the Site has been determined based on mean monthly rainfall depth in accordance with IECA 2025 (Table 4.4.2) in **Table 4.2.** Monthly erosion risk rangess from high to extreme, with the latter corresponding to the highest rainfall months of December to May. Erosion risk ratings are used to determine the erosion control standard for the Project.

Table 4.2 Monthly erosion risk based on mean monthly rainfall depth

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean rainfall (mm)[1]	607	732	751	527	332	198	156	128	114	106	166	277	4099
Erosion Risk rating	E	E	E	E	E	H	H	H	H	H	H	E	-

Key: E = extreme, H = high

4.4.2.2 Soil loss estimation

To assess the risk of soil loss as a proxy for determining the potential of the soils to generate erosion and the sedimentation of waterways during construction and operation, the Revised Universal Soil Loss Equation (RUSLE) has been used. RUSLE is designed to predict long term, average, and annual soil loss under sheet and rill flow conditions on short slopes (<300 m) in conjunction with mean annual rainfall. RUSLE does not account for soil erosion resulting from concentrated flow conditions (e.g. gully erosion). Further, RUSLE does not account for the seasonal variability captured in **Table 4.2**.

The RUSLE is calculated as follows

A = R x K x LS x C x P

Where:

- A = annual soil loss due to erosion in t/ha/yr
- R = rainfall erosivity factor
- K = soil erodibility factor
- LS = topographic factor derived from slope length and slope gradient slope / length factor
- C = cover and management factor (a conservative default factor of 1 is applied for construction sites where groundcover type and application rates cannot be predicted)
- P = erosion control practice factor (a conservative default factor of 1.3 is applied for construction sites where erosion control practices cannot be reliably predicted).

An erosion hazard map derived using the DETSI (DETSI 2020) RUSLE data series to calculate estimated annual soil loss (based on a 90 m Digital Elevation Model), is provided in the PESCP. Spatial analysis of annual soil loss estimates shows the soil loss across the Site is predominantly <150 t/ha/y (Very Low), including across the southern half of the Disturbance Footprint. The majority of the remaining Site and Disturbance Footprint is 225-500 t/ha/y (Moderate), with an isolated area of 500-1,500 t/ha/y (High) to the northwest of the Disturbance Footprint.

[1] Data from BoM for the Tully Sugar Mill (station #032042) accessed online 11.12.2025 at: https://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=136&p_display_type=dailyDataFile&p_startYear=&p_c=&p_stn_num=032042

4.4.2.3 RUSLE – significance of slope

The influence of slope on erosion potential is further demonstrated in **Table 4.3**, which shows the differences in RUSLE soil loss under construction conditions for various relevant slope scenarios with all other factors being equal.

RULSE soil loss estimates have been calculated to demonstrate the relationship between soil loss and slope using the following inputs:

- Rainfall erosivity (R-values) have been utilised for Tully as per IECA (2025) Table E1.
- LS factors for nominal 80 m slope length from IECA (2025) Table E3.
- A conservative soil K factor of 0.04 (sapric loamy topsoils 0.04, over silty clay 0.025)
- Default C and P values of 1 and 1.3 respectively.

Table 4.3: Application of RUSLE to existing Project slopes

RUSLE factor	Percentage Slope				
	1%	**2%**	**3%**	**4%**	**5%**
R[2]	22,970	22,970	22,970	22,970	22,970
K[3]	0.04	0.04	0.04	0.04	0.04
LS[4]	0.19	0.41	0.65	0.91	1.19
C	1	1	1	1	1
P	1.3	1.3	1.3	1.3	1.3
A (t/ha/yr)	230	490	776	1,087	1,418

4.4.2.4 RUSLE – monthly rainfall erosivity

Seasonal variability can be captured by the RUSLE by adopting monthly as opposed to annual rainfall erosivity factors. Monthly R-factor values and erosion risk ratings for Tully as per IECA (2025) Table E1 and Table 4.4.4 respectively are shown in **Table 4.4**.

Monthly soil loss rates have been calculated to demonstrate the relationship between soil loss and rainfall erosivity using the following inputs:

- A conservative soil K factor of 0.04 (sapric loamy topsoils 0.04, over silty clay 0.025)
- LS of 0.65 based on an 80 m slope of 3% from IECA (2025) Table E3
- Default C and P values of 1 and 1.3 respectively.

Table 4.4 Monthly erosion risk based on calculated rainfall erosivity factors

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
R-factor	4119	5224	4959	2770	1104	460	443	296	312	475	835	1973
Erosion risk	E	E	E	E	H	H	H	H	H	H	H	E
Monthly soil loss (t/ha/mth)	139	177	168	94	37	16	15	10	11	16	28	67

[2] Calculated annual rainfall erosivity using rainfall data for the Cardwell Marine PDE BoM weather station data for 2005-2025 via a daily timestep model using the methodology described in Ellis (2018).
[3] Conservative K-factor of 0.04 applied given unknown soils (MSC) within the Site (Table 3.1)
[4] Factor for 80m length, X% slope as shown in IECA 2008 Table E3.

4.4.2.5 General observations on High Intensity rainfall and Climate Change

The higher risk ratings derived applying monthly rainfall erosivity values (**Table 4.4**) as compared to mean monthly rainfall depth (**Table 4.2**) using the same rainfall data set demonstrates the influence of rainfall intensity on soil loss rates. High intensity rainfall events are part of the climatic regime of the Site, particularly during the peak wet season (December to March inclusive) which is associated with cyclonic or tropical low-pressure systems.

Thus, Project construction phase ESCPs must consider the likelihood of intense rainfall occurring, so that the Disturbance Footprint is adequately prepared for these events.

Future climate change scenarios likely to affect soil erosion are related to the amount and intensity of rainfall (i.e. rainfall erosivity) received, and its seasonal distribution. Rainfall seasonality being a consideration in that it can affect antecedent soil moisture conditions, which is a significant factor in the generation of surface water runoff.

Climate change projections acknowledge significant uncertainty in the magnitude of projected changes in rainfall. Overall, less frequent but more intense tropical cyclones are expected, with a slight decline in the amount of rainfall received and overall number of heavy precipitation days (DEC 2024). Department of Energy and Climate (DEC) 2024 climate change projections do not speak to rainfall seasonality.

Given the positive linear relationship between rainfall depth / intensity and soil erosion, the data provided by DEC for Far North Queensland (DEC 2024) suggests an overall reduction in soil erosion resulting from climate change. However, vegetative groundcover is also a significant factor in erosion, with soil loss increasing with decreasing amounts of groundcover (inverse relationship). Reduced rainfall, depending on its seasonality, may result in an overall reduction in vegetative groundcover, which would likely offset any net soil loss reduction that may be expected considering rainfall in isolation.

Further, a reduction in vegetative groundcover would leave soils particularly vulnerable to higher intensity rainfall events. Should it be realised, distinct increases in soil loss associated with severe weather events has the potential to place substantial additional pressure on receiving aquatic ecosystems.

Further detail on soil loss estimation and the general observations on high intensity rainfall and climate change is provided in the PESCP (Attexo 2025) (**Appendix D**).

4.5 Historical vegetation clearing

A review of historical aerial imagery (via QImagery) has been undertaken to assess the changes in vegetation within the Project area and surrounding landscape over time to assist in understanding:

- The disturbance history of the Site
- Historical vegetation patterns and habitat values
- Changes to the extent of those habitat values which may impact the continued use of the Project area by fauna species and the presence of threatened flora species.

The Site is indicated by the orange outline in **Plate 4.1, Plate 4.2, Plate 4.3, Plate 4.4, Plate 4.5** and **Plate 4.6**.

The historical imagery indicates that much of the Site (and much of the area surrounding of the Site) maintained vegetation cover up until sometime between 1964 and 1974, however the initial transmission line corridor through the Site was cleared earlier than this. By 1974 heavy vegetation clearing had been completed in the surrounding areas, with significant cropping already established and clearing had commenced within the Site. Most of the remainder of the Site had been heavily disturbed, if not completely cleared, by 1977. By 1992 a small area of cropping appears in the south-west of the Site, with the remaining cleared areas representative of improved pasture for grazing.

The wetland areas in the Survey area appear to have been much less vegetated with more pronounced wetland values in the earlier imagery from the 50s, 60s and 70s (see **Plate 4.1, Plate 4.2, Plate 4.3**). Following the widespread conversion of the surrounding landscape to sugarcane farms, the wetland areas appear to have changed, with vegetation coverage increasing up to the present-day forested state. This may have been due to significant changes to regional surface and groundwater conditions following the introduction of sugarcane farming to the area.

Based on the review of historical aerial imagery, fauna habitat values within the Project area have been severely limited since at least 1974 when most of the Site was cleared and all regrowth in the Site actively managed/cleared. The remaining vegetation in the area has also been isolated since for the same time period due to landscape scale clearing for agricultural use.

Plate 4.1 Historical aerial imagery - June 1951

Plate 4.2 Historical aerial imagery - January 1964

Plate 4.3 Historical aerial imagery - January 1974

Plate 4.4 Historical aerial imagery - January 1977

Plate 4.5 Historical aerial imagery - July 1992

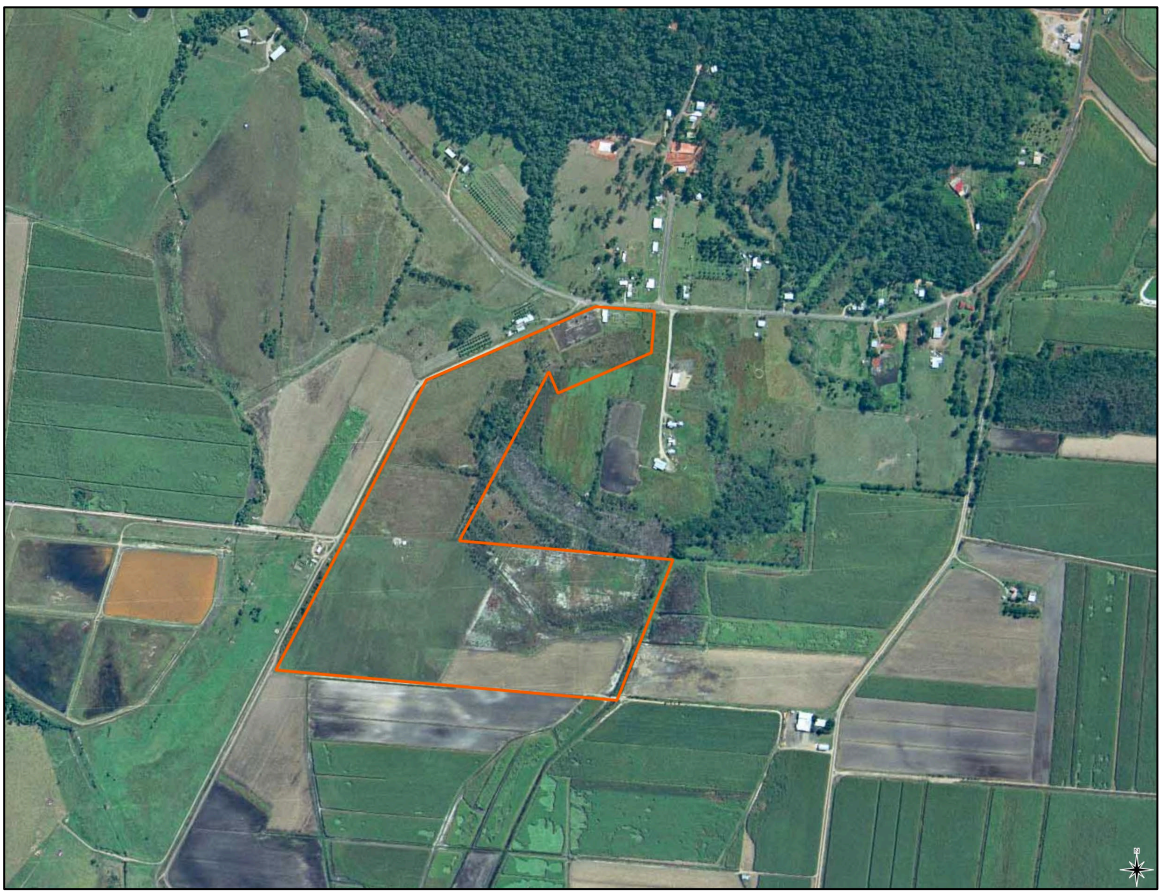


Plate 4.6 Historical aerial imagery - August 2000

4.6 Queensland regional ecosystems and high value regrowth under the *Vegetation Management Act 1999*

A total of six unique RE and HVR vegetation communities are mapped within the Survey area, shown within **Figure 4.5**. **Table 4.5** identifies all the mapped RE and HVR within the Survey area and provides their status under the VM Act, and the short description.

Table 4.5 State mapped RE and HVR with the Survey area

Regional Ecosystem	RE/HVR	VM Act Status	Description
7.3.5a	HVR	Least Concern	*Melaleuca quinquenervia* open forest, woodland and shrubland. Lowlands of the very wet and wet rainfall zone, on poorly drained peaty humic grey soils where the water table is near or above the ground for most of the year. Palustrine. (BVG1M: 22a).
7.3.7a	HVR	Endangered	*Eucalyptus pellita* and *Corymbia intermedia* open forest and woodland. Poorly drained alluvium, including seasonal swamps. Contains Palustrine. (BVG1M: 9e).

Regional Ecosystem	RE/HVR	VM Act Status	Description
7.3.7b	HVR	Endangered	*Eucalyptus pellita* and *Corymbia intermedia* open forest and woodland, with a very well-developed vine forest understorey. Poorly drained alluvium, including seasonal swamps. Contains Palustrine. (BVG1M: 9e).
7.3.8c	HVR	Endangered	*Melaleuca viridiflora*, and *Lophostemon suaveolens* open forest to woodland. Poorly drained soils of coastal lowlands. Contains Palustrine. (BVG1M: 21a).
7.3.8d	HVR	Endangered	*Melaleuca viridiflora*, *Lophostemon suaveolens* and *Allocasuarina littoralis* open shrubland. Poorly drained soils of coastal lowlands. Contains Palustrine. (BVG1M: 21a).
7.3.20a	HVR	Of Concern	*Eucalyptus pellita*, *Corymbia intermedia*, *C. tessellaris*, open forest often with *Acacia celsa*, *A. cincinnata*, *A. mangium* and *A. flavescens*. Includes small areas dominated by *A. crassicarpa*. Alluvial fans of the very wet and wet rainfall zones, of the lowlands and foothills. Not a Wetland. (BVG1M: 9d).

All mapped RE and HVR within the Survey area were assessed via Quaternary surveys. A total of two RE were confirmed present within the Survey area, which are identified in **Table 4.6**. The distribution of the ground-truthed RE (GTRE) within the Survey area is shown in **Figure 4.5**.

Table 4.6 GTRE with the Survey area

RE Label	RE/HVR	VM Act Status	Short description	Area (ha)
7.3.5	RE, HVR	Least Concern	*Melaleuca quinquenervia* and/or *Melaleuca cajuputi* subsp. *platyphylla* closed forest to shrubland on poorly drained alluvial plains	5.3
7.3.7a	HVR	Endangered	*Eucalyptus pellita* and *Corymbia intermedia* open forest and woodland. Poorly drained alluvium, including seasonal swamps. Contains Palustrine. (BVG1M: 9e).	2.2

State mapped RE and HVR within the Site

Figure 4.5

DWG No: RWE-002-023[B]
DATE: 16/10/2025
DRAWN: KB
REVIEWED NC
SCALE (A4): 1:5,000

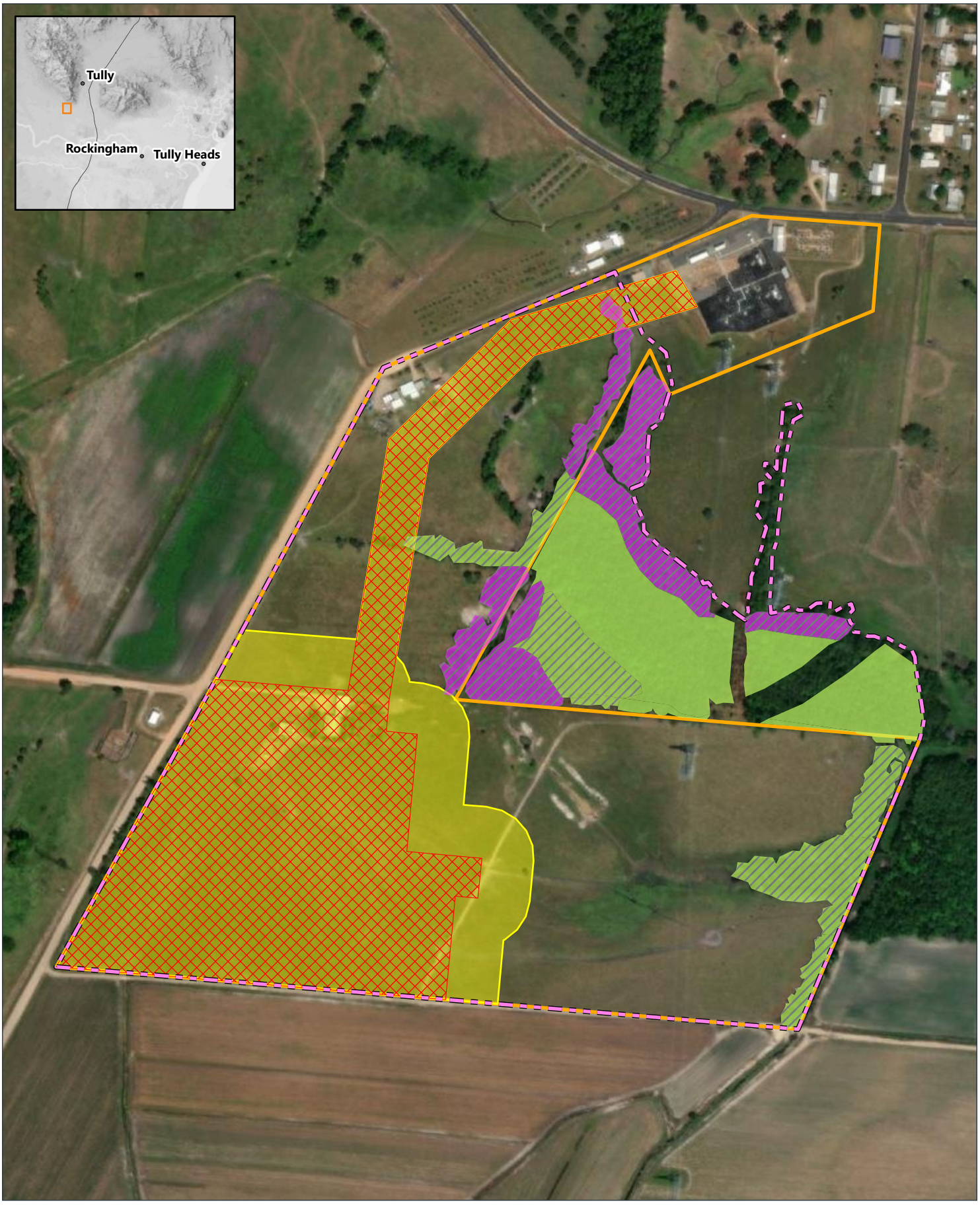
N

0 m 100

GDA2020

Site
Project area
Disturbance Footprint

Category C or R area containing endangered
Category C or R area containing of concern
Category C or R area that is of least concern



GTRE within the Survey area

Figure 4.6

Site
Project area
Disturbance Footprint
Survey area

Ground-truthed RE
Regrowth Endangered RE
Regrowth Least Concern RE
Remnant Least Concern RE

DWG No: RWE-002-024[A]
DATE: 16/10/2025
DRAWN: KB
REVIEWED NC
SCALE (A4): 1:5,000

N
0 m 100
GDA2020

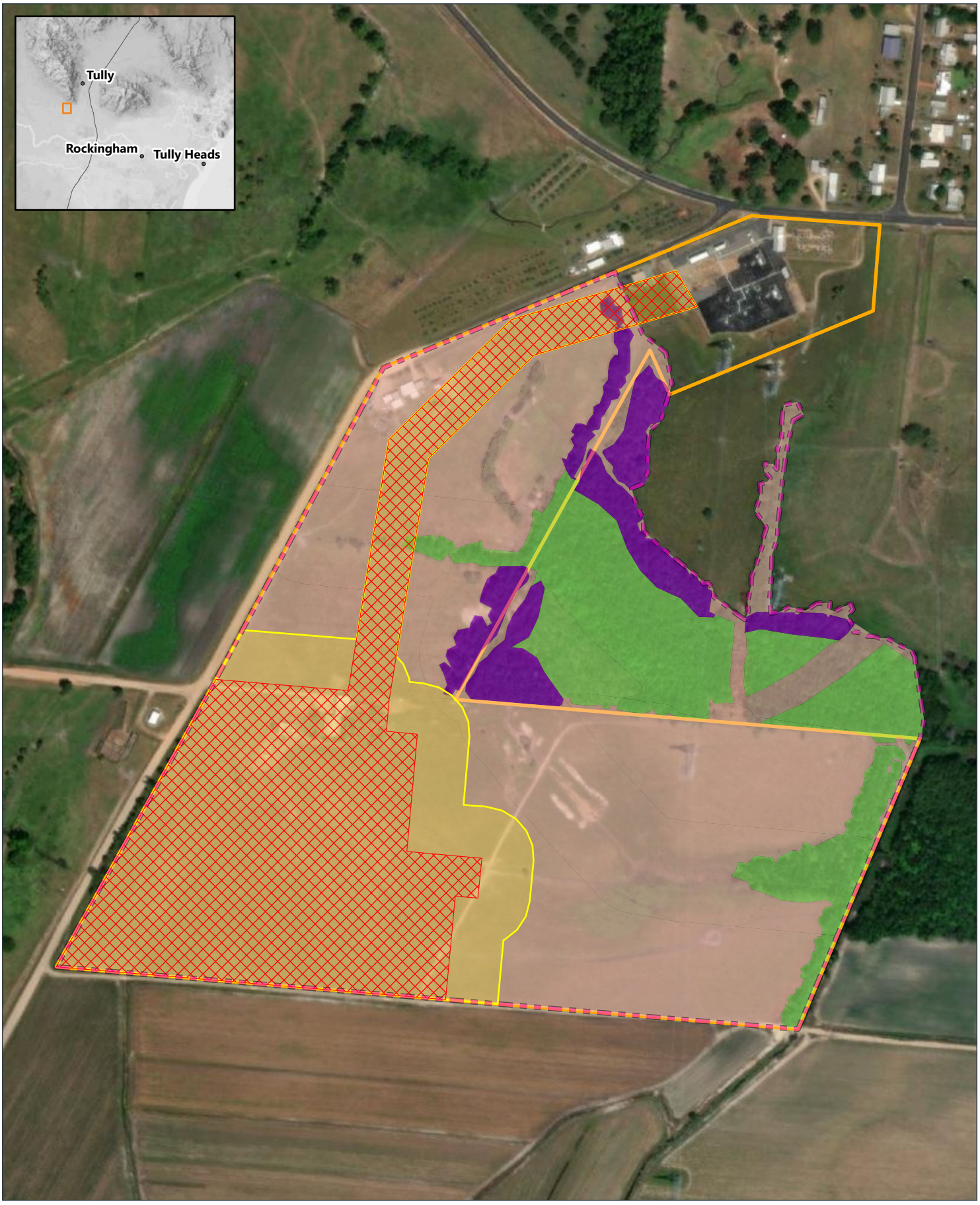
4.7 Broad Habitat types

Field survey confirmed that the vast majority of the Project area is represented by non-remnant, cleared pasture, dominated by exotic grasses. With some small areas of regrowth vegetation along the eastern boundaries of each of the Lots within the Site. There is a cleared fence line with a multistrand barbed wire fence running along the eastern boundary of Lot 1 on RP735276 and a formed sugarcane drain just beyond the eastern boundary of Lot 1 on RP852238. These features separate the vegetated habitats within the Site from the surrounding areas of habitat in the broader Survey area and beyond.

The vegetation within the Survey area has been categorised into broad habitat types based on the dominant canopy species, vegetation structure, and associated habitat attributes. The broad habitat types with their corresponding RE and their extent within the Project area are listed in **Table 4.7**. Examples of the broad habitat types are provided in **Plate 4.7**, **Plate 4.8** and **Plate 4.9**.

Table 4.7 Broad habitat types and their corresponding RE within the Project area

Broad Habitat Type	Corresponding RE	Area within the Site (ha)	Area within the Project area (ha)
Melaleuca quinquenervia open forest	7.3.5	1.47	0.01
Lophostemon suaveolens/Corymbia intermedia open forest	7.3.7a	0.62	0.04
Cleared areas/pasture, dominated by exotic grasses	Non-remnant areas	30.33	13.3



Broad habitat types mapping within the Survey area

Figure 4.7

DWG No: RWE-002-025[B]
DATE: 16/10/2025
DRAWN: KB
REVIEWED NC
SCALE (A4): 1:5,000

N

0 m 100

GDA2020

Site
Project area
Disturbance Footprint
Survey area

Broad Habitat Type

Melaleuca quinquenervia open forest

Lophostemon suaveolens/ Corymbia intermedia open forest

Cleared areas/ pasture

4.7.1 Melaleuca quinquenervia open forest

The main occurrence of *Melaleuca quinquenervia* open forest within the Site was near the eastern boundary of Lot 1 on RP852238. This habitat type included a canopy dominated by *Melaleuca quinquenervia* (swamp paperbark) to an average height of 12 m with some limited *Melaleuca viridiflora* (broad-leaved tea tree). Canopy cover was approximately 30%. *Nauclea orientalis* (Leichhardt tree) was also present.

The shrub layer was sparse to absent with the occasional smaller canopy species. The ground cover was dominated by *Rhynchospora corymbosa* (matamat), *Hymenachne amplexicaulis* (Hymenachne) and *Isachne globosa* (swamp millet) but also included occasional *Stenochlaena palustris* (climbing swamp fern).

This habitat type also occurred within the Site along the drainage line running east west and at the centre of Lot 1 on RP735276 and eastern boundary of that parcel. In these areas the habitat type included a denser canopy cover (approximately 60%), some additional species in a sub-canopy including *Lophostemon suaveolens* (swamp mahogany), *Dillenia alata* (reed beech), *Melicope* sp., *Polyscias australiana* (ivory basswood) and *Acacia mangium* (black wattle), and a shrub layer of *Carallia brachiata* (freshwater mangrove) and *P. australiana*. The groundcover layer included more fern species such as *Blechnum cartilagineum* (gristle fern).

The habitat type continued east from here to the broader Survey area into Lot 5 on SP140625, through the mapped wetland area to the northeastern most corner of the Lot 1 on RP852238 boundary line. The habitat type is interrupted by the cleared transmission line easements running north-south and northeast-southwest through the centre of Lot 5 on SP140625, but the vegetation continues beyond these corridors to the east with increasing in canopy height (15 m) and density in the shrub layer driven by more *Stenochlaena palustris* in this layer. The areas in Lot 5 on SP140625 included a very thick ground layer of leaflitter (up to 200 mm) along with *Blechnum cartilagineum*, *Stenochlaena palustris*, *Isachne globosa* and *Lygodium microphyllum* (snake fern).

A small patch of this broad habitat type in the southwest of Lot 5 on SP140625 represents a less advanced area of regrowth. The patch contains lesser canopy cover (20%), fewer sub-canopy species and *Allocasuarina littoralis* as co-dominant in the canopy to an average height of 13 m.

Throughout the Survey area this habitat shows heavy signs of disturbance driven by cattle use in the southeast of the Site and numerous vegetation edges formed by the cleared paddocks and powerline corridors allowing grasses and weedy herbs to infiltrate throughout. A large *Hymenachne amplexicaulis* infestation at the southeast boundary of the site also represents a reduction in habitat quality with its propensity to form dense stands that reduce plant diversity and available habitat for native animals.

Tree diameters were small in all areas, with all trees well under 30 cm diameter at breast height (DBH). The average tree size in this habitat type was between 8 and 15 cm DBH.

Plate 4.7 provides examples of this broad habitat type throughout the Survey area.

Near eastern boundary of Lot 1 on RP852238

Near eastern boundary of Lot 1 on RP852238

Centre east of Lot 1 on RP735276

Denser example from southern end of neighbouring Lot 5 on SP140625

Plate 4.7 *Melaleuca quinquenervia* open forest

4.7.2 Lophostemon suaveolens / Corymbia intermedia open forest

This habitat type occurs within the Site in a small patch near the southeastern boundary of Lot 1 on RP735276. Here the habitat type included a canopy to 17 m of *Lophostemon suaveolens*, *Acacia mangium*, *Corymbia intermedia* (pink bloodwood) and *Allocasuarina littoralis* with canopy cover up to 60%. The shrub layer included *Polyscias australiana*, *Rhodomyrtus trineura* (rusty ironwood) and *Cryptocarya* sp. The Ground layer included some *Rhynchospora corymbosa* but was predominantly *Axonopus fissifolius* and *Urochloa humidicola* as is widespread in the adjacent, cleared pasture. This patch is interrupted by the cleared fence line at the Lot 1 on RP735276 eastern boundary but continues a short way into Lot 5 on SP140625.

A very narrow strip of this habitat type also occurs near the north eastern boundary of Lot 1 on RP735276. Here, the canopy was lower (15 m) and included a single *Eucalyptus pellita* (large-fruited red mahogany) amongst *Acacia disparrima* (southern salwood) and *Allocasuarina littoralis*. The shrub layer contained *Dillenia alata*, *Rhodomyrtus trineura*, *Carallia brachiata*, *Melaleuca quinquenervia*, *Polyscias australiana*, *Melastoma affine* and *Syzygium* sp. The ground layer matched the patch to the south with predominantly pasture grasses from the surrounding cleared areas with *Rhynchospora corymbosa* and the weedy herb Spermacoce remota (woodland false buttonweed).

In the broader Survey area, there are some areas of this habitat type on the northern extent of the vegetated area in Lot 5 on SP140625. In these areas, the canopy layer averaged 18 m with *Acacia mangium*, *Commersonia bartramia*

(brown kurrajong) *Lophostemon suaveolens*, *Melicope* sp. and *Schefflera actinophylla* (umbrella tree) and a canopy cover up to 80-90%. A dense sub canopy layer included *Polyscias australiana*, *Cryptocarya* sp., *Dillenia alata*, *Carallia brachiata*, *Archontophoenix alexandrae* (Alexandra palm), *Calamus australis (lawyer cane)* and *Pandanus* sp. The ground layer was mostly leaf litter (up to 25-30 mm thick) and included *Oplismenus imbecillis*, *Spermacoce remota* and native sedge, with *Urochloa humidicola* (Tully grass), *Axonopus fissifolius* (carpet grass) and *Mimosa pudica* (sensitive weed) towards the cleared edges. Other exotic species present near the cleared edges include *Passiflora edulis* (passionfruit vine), *Cyperus rotundus* (nutgrass), *Cyperus aromaticus*, *Paspalum conjugatum* (buffalo grass) and *Ageratum conyzoides* (billy goat weed).

Throughout the Survey area this habitat shows heavy signs of disturbance from the numerous vegetation edges formed by the cleared paddocks and powerline corridors allowing grasses and weedy herbs to infiltrate the edges of the habitat type and throughout the narrower patches.

Tree diameters were small in all areas, with all trees well under 30 cm diameter at breast height (DBH). The average tree size in this habitat type was between 8 and 15 cm DBH.

Plate 4.8 provides examples of this broad habitat type throughout the Survey area.

North eastern boundary of Lot 1 on RP735276

South eastern boundary of Lot 1 on RP735276

South eastern boundary of Lot 1 on RP735276

Example from eastern edge of neighbouring Lot 5 on SP140625

Plate 4.8 *Lophostemon suaveolens/Corymbia intermedia* open forest

4.7.3 Cleared areas / pasture, dominated by exotic grasses

This broad habitat type is widespread within the Survey area and was observed to support high density exotic grasses and herbs including *Urochloa humidicola, Axonopus fissifolius*, *Paspalum conjugatum*, *Mimosa pudica*, *Cyperus rotundus, Cyperus aromaticus*, *Ageratum houstonianum* and *Ageratum conyzoides*. This broad habitat type has been highly disturbed due to a history of intensive agricultural practices, including sugarcane farming and cattle grazing. As a result, exotic flora species dominate the vegetation.

Plate 4.9 provides examples of this broad habitat type throughout the Survey area.

Northern part of Lot 1 on RP735276

Eastern part of Lot 1 on RP852238

Eastern part of Lot 1 on RP852238

Northern end of Disturbance Footprint (southern end of the OHTL)

Plate 4.9 Cleared areas/pasture, dominated by exotic grasses

4.8 Pest flora and fauna

Weed species listed as Restricted Matters under the *Biosecurity Act 2014* or WoNS that were identified within the Survey area are listed in **Table 4.8**. No pest fauna species were identified within the Survey area during the field survey.

Table 4.8 Restricted Matters under the *Biosecurity Act 2014* identified in the Site

Scientific name	Common Name	Biosecurity Act Status	WoNS
Hymenachne amplexicaulis	Hymenachne	Restricted Category 3	Yes

5. Nationally threatened ecological communities

5.1 Desktop assessment results

5.1.1 EPBC Act Protected Matters Search Tool

The EPBC Act PMR identified the following TECs have the potential to occur within a 10 km radius of the Site (refer to **Appendix A**):

- Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland (BLTT TEC)
- Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (LRCVT TEC)
- Lowland tropical rainforest of the Wet Tropics (LTRWT TEC)

Table 5.1 presents the three TEC identified in the desktop assessment and their associated RE.

Table 5.1 TEC identified in the desktop assessment

Community Name	EPBC Act Status	Associated Regional Ecosystems
Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland	Endangered	7.3.8a, 7.3.8b, 7.3.8c, 7.3.8d, 7.5.4g, 8.3.2, 8.5.2a, 8.5.2c and 8.5.6
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	3.2.1a; 3.2.1b; 3.2.12; 3.2.13; 3.2.28; 3.2.29; 3.2.31; 3.2.11; 3.12.20; 7.2.1a-i; 7.2.2a-h; 7.2.5a; 7.2.6b; 7.11.3b; 7.12.11d; 8.2.2 and 12.2.2
Lowland tropical rainforest of the Wet Tropics	Endangered	3.3.1, 3.3.4, 3.3.5, 3.3.6, 3.8.2, 7.3.3, 7.3.4, 7.3.10, 7.3.17, 7.3.20, 7.3.23, 7.3.25, 7.3.38, 7.3.49, 7.3.50, 7.8.1, 7.8.2, 7.8.11, 7.8.12, 7.8.14, 7.11.1, 7.11.2, 7.11.3, 7.11.7, 7.11.23, 7.11.24, 7.11.25, 7.11.30, 7.12.1, 7.12.2, 7.12.7, 7.12.11, 7.12.39, and 7.12.40.

5.2 Field survey results

Field surveys identified that all vegetation within the Survey area (including the mapped remnant and regrowth RE, and non-remnant areas) did not contain vegetation communities with the potential to conform to the identified TECs. Associated REs for the BLTT TEC, LRCVT TEC and LTRWT TEC were confirmed absent from the Survey area. As a result, the BLTT TEC, LRCVT TEC and LTRWT TEC are not present within the Survey area.

6. Nationally threatened flora species

6.1 Desktop assessment results

6.1.1 EPBC Act Protected Matters Search Tool

A total of 16 EPBC Act listed threatened flora species were identified within a 10km radius of the Site during the desktop searches. Following the desktop likelihood of occurrence assessment, 9 threatened flora species were identified as potentially occurring or likely to occur within the Survey area. These species, including EPBC Act status are listed below in **Table 6.1**.

Table 6.1 Threatened flora species identified on the EPBC Act PMR

Common Name	Scientific Name	EPBC Status
-	*Canarium acutifolium*	Vulnerable
-	*Carronia pedicellata*	Endangered
-	*Chingia australis*	Endangered
-	*Diplazium cordifolium*	Vulnerable
-	*Eleocharis retroflexa*	Vulnerable
-	*Leichhardtia araujacea*	Critically endangered
Ant Plant	*Myrmecodia beccarii*	Vulnerable
Lesser Swamp-orchid	*Phaius australis*	Endangered
-	*Phaius pictus*	Vulnerable
Rat's Tail Tassel-fern	*Phlegmariurus filiformis*	Endangered
Rock Tassel-fern, Water Tassel-fern	*Phlegmariurus squarrosus*	Critically endangered
Square Tassel Fern	*Phlegmariurus tetrastichoides*	Vulnerable
-	*Plesioneuron tuberculatum*	Endangered
Middle Filmy Fern	*Polyphlebium endlicherianum*	Endangered
-	*Polyscias bellendenkerensis*	Vulnerable
Velvet Jewel Orchid	*Zeuxine polygonoides*	Vulnerable

6.1.2 The Queensland WildNet Species List

The WildNet Species List identified three threatened flora species protected under the EPBC Act within a 10 km radius from the Site (refer to **Appendix A**). *Eleocharis retroflexa* and *Canarium acutifolium*, which are both listed as 'vulnerable' under the EPBC Act and NC Act and *Carronia pedicellata* which is listed Endangered under the EPBC Act and NC Act.

6.1.3 Atlas of Living Australia

The Atlas of Living Australia holds records no additional threatened flora species protected under the EPBC Act within a 10 km radius from the Survey area, other than those included in the WildNet Species.

6.1.4 Protected Plant Flora Survey Trigger Mapping

The Queensland Protected Plant Flora Survey Trigger Mapping identifies that there are no "high-risk" areas mapped within the Survey area.

6.2 Field survey results

6.2.1 Threatened flora species

Despite comprehensive field surveys within the Project area (refer to **Figure 3.1** for the survey effort), which included targeted surveys in all areas of suitable habitat, no threatened flora species protected under the EPBC Act were identified.

Given the historical clearing within the Project area and the on-going use of the Project area for cattle farming, there is limited potential for threatened flora species or their suitable habitat to be present within the Project area.

A complete list of flora species observed during the field surveys is provided in **Appendix C**.

6.3 Likelihood of occurrence – threatened flora

A LoO has been undertaken (provided in **Appendix B**) as per the methods described in **Section 3.4** to assess the likelihood of all threatened flora species identified in the EPBC Act PMR, WildNet Species List, and ALA to be present within the Project area (and therefore potentially impacted by the Project).

Due to the historical and on-going clearing within the Project area, all threatened flora species were assessed as **'Unlikely to occur'**. This is supported by the field surveys undertaken within the Project area, which did not identify any threatened flora species, or suitable habitat for threatened flora species within the Project area.

7. Nationally threatened fauna species

7.1 Desktop assessment results

7.1.1 EPBC Act Protected Matters Search Tool

A total of 31 EPBC Act listed threatened fauna species were identified within a 10 km radius of the Site during the desktop searches. Following the desktop likelihood of occurrence assessment, 8 threatened fauna species were identified as potentially occurring or likely to occur. This included 2 bird species, 4 mammals, 1 amphibian, 1 fish. These species, including EPBC Act status are listed below in **Table 7.1.**

Table 7.1 Threatened fauna species potentially occurring or likely to occur identified on the EPBC Act PMR

Common Name	Scientific Name	EPBC Status
Bird		
Southern Cassowary	*Casuarius casuarius* (southern population)	Endangered
White-throated needletail	*Hirundapus caudacutus*	Vulnerable, Migratory, Marine
Mammal		
Greater Glider (northern)	*Petauroides minor*	Vulnerable
Mahogany Glider	*Petaurus gracilis*	Endangered
Koala (combined populations of Qld, NSW and the ACT)	*Phascolarctos cinereus*	Endangered
Spectacled flying-fox	*Pteropus conspicillatus*	Endangered
Amphibian		
Australian Lace-lid	*Litoria dayi*	Vulnerable
Fish		
Cairns Rainbowfish	*Cairnsichthys rhombosomoides*	Endangered

7.1.2 Queensland WildNet Species List

The WildNet Species List holds records of five threatened fauna species protected under the EPBC Act within a 10 km radius from the Survey area (refer to **Appendix A**). The records include:

- Australian lacelid (*Litoria dayi*) – Vulnerable under the EPBC Act
- Red goshawk (*Erythrotriorchis radiatus*) – Endangered under the EPBC Act
- Southern cassowary (*Casuarius casuarius*) – Endangered under the EPBC Act
- Latham's snipe (*Gallinago hardwickii*) – Vulnerable under the EPBC Act
- Mahogany glider (*Petaurus gracilis*) - Endangered under the EPBC Act

7.1.3 Atlas of Living Australia

The Atlas of Living Australia holds records of 1 threatened fauna species protected under the EPBC Act within a 10 km radius from the Survey area. Spectacled flying-fox (*Pteropus conspicillatus*) is listed as Endangered under the EPBC Act.

7.1.4 Commonwealth National Flying-fox monitoring viewer

The National flying-fox interactive monitoring viewer identifies that there are no roost camps within the Survey area or in close proximity to the Survey area. The nearest camp is Over 20 km away to the north of the Project area at El Arish.

7.2 Field survey results

7.2.1 General

A total of 31 fauna species were observed during the field surveys, comprised of the following:

- 20 bird species
- two frog species
- five invertebrate species
- three mammal species
- one reptile species.

A complete list of fauna species observed during the field surveys is provided in **Appendix C**.

Following three days of survey effort across the Survey area in all broad habitat types, no threatened fauna species were observed during the field surveys. Due to the historical clearing within the Project area and the historical and current land-use as cattle grazing, no suitable habitat for threatened fauna specifies within the Project area was identified.

7.2.2 Fauna habitat assessments

A total of 9 fauna habitat assessments were undertaken, across each broad habitat type. The fauna habitat assessments identified the following in regard to fauna habitat within the Survey area:

- The Project area comprises heavily grazed pasture dominated by exotic grasses and herbs which provides negligible habitat value for threatened fauna species.
- Two broad habitat types dominated by native vegetation were observed within the Survey area, which provide a range of habitat values for native fauna species. These are predominantly located outside of the Project area.
- Two farm dams were observed on Lot on RP852238. These were assessed as providing permanent surface water but limited to negligible habitat for threatened aquatic and wetland species, including migratory birds such as grey plover and common sandpiper as the constructed farm dams do not provide the represent unsuitable habitat and lack microhabitat features required by both species.
- Vegetated areas surrounding the Project area including *Lophostemon suaveolens/Corymbia intermedia* open forest and *Melaleuca quinquenervia* open forest are present outside the Project area and continue into the neighbouring PQ parcel. These areas are likely to provide habitat for native fauna species, however are still highly disturbed by cattle use, transmission line corridors and have no connectivity to surrounding vegetation due to Tully Gorge Road and heavy sugarcane farming in the wider landscape.

Given the isolated habitat in the broader Survey area and the expanse of much higher quality habitat outside the Project area (with large tracts of remnant vegetation in the Wet Tropics World Heritage area to the north and further to the east of the Project area), threatened fauna species are unlikely to utilise the cleared pasture within the Project area.

7.3 Likelihood of Occurrence – terrestrial fauna

A LoO has been undertaken in **Appendix B** as per the methods described in **Section 3.4** for all fauna species predicted to occur on the EPBC Act PMR and previously recorded on WildNet and/or ALA.

The LoO was initially undertaken at a desktop level for the entire Survey area to inform the field surveys and then updated to be specific to the Project area only, following the field surveys, based on the habitat assessment and survey outcomes. The results are based on the field surveys and are relevant to the Project area only. The results identified that, whilst there were initially some species assessed at the desktop level as 'Likely to occur' in the Survey area, no threatened fauna species were assessed as being 'Known to occur' or 'Likely to occur' within the Project area.

The outcomes of the LoO is consistent with the fauna habitat assessments and the surveys undertaken which identified that there are limited habitat values present within the Project area for threatened fauna species, and is consistent with the disturbance history of the Project area (refer to **Section 4.5**).

As all threatened fauna species were assessed as having a reduced potential to occur (being assessed as either **'Potential to occur'** or being **'Unlikely to occur'**) within the Project area, threatened fauna species are anticipated to either not be present, not utilise the vegetation within the Project area, or utilise the Project area infrequently, or to be present in only low numbers/densities or as vagrants. As such, all threatened fauna species are not discussed further in this report (as with species listed only as 'marine' under the EPBC Act). Given the outcomes of the field survey and LoO, all threatened fauna species have not been subject to an SIA as they are considered to either not be present or be present infrequently or in low numbers such that any impact would likely not be significant.

7.4 Habitat connectivity

The landscape surrounding the Project area is dominated by sugarcane farming and heavily dissected by sugarcane drains and transmission line corridors, which fragment the vegetation with cleared area. There is significant vegetation to the north of Tully Gorge Road and further to the east of the Project area, on the opposite side of the Bruce Highway, associated with the World Heritage Area. This vegetation is anticipated to provide significant and important fauna movement opportunities and has no apparent corridors through the Project area for habitat connectivity.

Within the Project area, there is limited value for dispersing fauna as the Project area has been cleared of woody vegetation, and Lot 1 on RP852238 is an active cattle-grazing farm dominated by exotic species. This vegetation (or lack thereof) within the Project area exposes fauna to predators, heat stress, and lacks foraging and resting resources required by dispersing fauna species.

The vegetation approximately 2.5 km to the east of the Project area along Banyan Creek (close to the Bruce Highway), is the nearest Statewide Biodiversity Corridor and is anticipated to provide suitable dispersal habitat for fauna species traversing the landscape in a north-south direction between the Wet Tropics WHA and the vegetation associated with the Tully River further to the South. However, any fauna species entering into the vegetation in the northwest of the Survey area will be impacted by the Tully Gorge Road, the residential area on Maple Terrace and Tully Gorge Road and the two Substations and associated transmission lines in the PQ parcels. Roads and highways are a recognised threat for several MNES fauna species, including the southern cassowary. In this regard, there is a reduced potential for threatened fauna species to disperse into the Site from the north.

8. Migratory Species

8.1 Desktop assessment results

8.1.1 EPBC Act Protected Matters Search Tool

The EPBC Act PMR identifies 19 migratory fauna species as having the potential to occur within a 10 km buffer from the Survey area. Following desktop likelihood of occurrence assessment 5 migratory species were identified as potentially occurring in the Project area including 4 bird species and 1 reptile. Of the 4 migratory birds, 2 are also listed as threatened species. All potentially occurring migratory species identified along with EPBC Act Statuses are summarised below in **Table 8.1**.

Table 8.1 Migratory fauna species recorded on the EPBC Act PMR

Common Name	Scientific Name	EPBC Status
Bird		
Common Sandpiper	*Actitis hypoleucos*	Migratory
Oriental Cuckoo	*Cuculus optatus*	Migratory
White-throated Needletail	*Hirundapus caudacutus*	Migratory, Vulnerable
Osprey	*Pandion haliaetus*	Migratory
Reptile		
Salt-water Crocodile	*Crocodylus porosus*	Migratory

8.1.2 Queensland WildNet Species List

The WildNet Species List identifies one bird species, Latham's snipe (*Gallinago hardwickii*), listed as 'migratory' under the EBPC Act previously recorded within a 10 km radius from the Site (refer to **Appendix A**).

8.1.3 Atlas of Living Australia

The ALA database identified one migratory bird species listed under the BONN, CAMBA, and/or JAMBA and one migratory reptile species within a 10 km radius from the Site. **Table 8.2** details the migratory species recorded on the ALA database.

Table 8.2 Migratory fauna species recorded on ALA database

Common Name	Scientific Name	EPBC Status
Bird		
Common Sandpiper	*Actitis hypoleucos*	Migratory
Reptile		
Salt-water Crocodile	*Crocodylus porosus*	Migratory

8.2 Field survey results

Field surveys were conducted within the Survey area in accordance with Commonwealth and State survey guidelines (refer **Section 3.3**), focusing on areas of higher quality habitat.

No migratory species protected under the EPBC Act were recorded. Given the history of clearing, ongoing cattle grazing within the Project area, the potential of the Project area to support migratory species is limited. Although, ephemeral wetland areas and farm dams within the Site may provide habitat for migratory species in suitable conditions. These wetland areas are small ephemeral systems. When these wetlands are flooded and provide habitat for wetland birds, the availability of similar habitats throughout the local landscape will be extensive. Wetland areas will not be directly impacted by the Project area. As a result, the Project area was assessed as providing negligible habitat values for threatened migratory species previously recorded within 10 km of the Site.

8.3 Likelihood of Occurrence – migratory species

A LoO has been undertaken in **Appendix B** as per the methods described in **Section 3.4** for all migratory species predicted to occur on the EPBC Act PMR and previously recorded on WildNet and/or ALA within 10 km of the Survey area.

The LoO was initially undertaken at a desktop level to inform the field surveys and then updated following the field surveys based on the detailed habitat assessment and survey outcomes. The results (which are based on the field surveys) identified that there are no migratory species assessed as 'Known to occur' or 'Likely to occur' within the Project area due to there being only negligible habitat values for migratory species.

The outcome of the LoO is consistent with the fauna habitat assessments which identified that there were limited fauna habitat values present within the Project area. This is also consistent with the disturbance history of the Project area (refer to **Section 4.5**). As such, all migratory species are anticipated to either not utilise the habitat within the Project area, or utilise the Project area infrequently, or to be present in only low numbers/densities or as vagrants. As such, all migratory species were assessed as **'Unlikely to Occur'** and are not discussed further in this report (as with species listed only as 'marine' under the EPBC Act). Accordingly, migratory species have not been subject to a significant impact assessment as they are considered to either not be present or be present infrequently or in low numbers such that any impact would likely not be significant.

9. Impact assessment

9.1 General

The following sections provide an overview of the potential impacts to the ecological values identified within the Project area as a result of the Project. This section relates to impacts to ecological values and threatened species, while **Section 11.5** address potential impacts to the GBR.

The avoidance and mitigation measures developed for the Project have been presented in **Section 10**, which primarily addresses mitigation measures as they relate to threatened species. However, the avoidance and mitigation measures are also relevant to the GBR.

The ecological values within the Disturbance Footprint are well understood, as the area has been surveyed in accordance with both State and Commonwealth ecological survey guidelines. The potential impacts of the Project are also well understood as the works comprise conventional BESS construction, operational, maintenance, decommissioning and rehabilitation works. In this regard, the potential impacts of the Project are anticipated to be adequately mitigated by applying the mitigation hierarchy of firstly avoiding ecological values, and (where complete avoidance is not possible) minimising impacts.

As no TEC, threatened flora, or threatened fauna species were assessed as 'Known to occur' or 'Likely to occur' within the Project area (and therefore are all unlikely to be impacted by the Project), species specific mitigation measures have not been developed. Rather, the mitigation measures developed for the Project (**Section 10**) comprise a range of measures to minimise impacts to all vegetation communities, flora and fauna species commensurate with the level of anticipated impact (to threatened species).

9.2 Impacts to nationally threatened ecological communities

As no TEC were identified within the Survey area, and none were assessed as being 'Likely to occur" within the Project area, the Project is anticipated to avoid all impacts (including indirect impacts) to nationally threatened ecological communities.

9.3 Impacts to nationally threatened flora species

As no threatened flora species were observed within the Survey area, and none were assessed as being 'Likely to occur' within the Project area, the Project is anticipated to avoid all impacts (including indirect impacts) to nationally threatened flora species.

9.4 Impacts to nationally threatened fauna species

- No threatened fauna species were directly or indirectly observed within the Survey area, and the Project area was assessed as providing negligible habitat values for threatened fauna species.
- No threatened fauna species were assessed as 'Likely to occur' within the Project area due to the general lack of fauna habitat values associated with the nature of land use (cattle grazing and former sugarcane farming).

In this regard, the Project is anticipated to avoid any direct or indirect impacts to nationally threatened fauna species.

9.5 Impacts to all migratory bird species

- No migratory birds were directly or indirectly observed within the Survey area, and the Project area was assessed as providing negligible habitat values for migratory birds.
- No migratory birds were assessed as 'Likely to occur' within the Project area due to the general lack of habitat values.

In this regard, the Project is anticipated to avoid any direct or indirect impacts to nationally migratory birds.

9.6 Direct impacts to wildlife

During construction of the BESS, fauna have the potential to be killed or injured by vehicle strike or through collisions with vehicles. While there are unlikely to be threatened fauna species within the Project area, vehicle speed will be limited to 20 km/hr within the Project area. Given the reduced speed of vehicles within the Project area and the low number of vehicles on site at any one time (coupled with the low potential of threatened fauna species within the Project area), this threat is likely to be low.

As no threatened species are anticipated to be present within the Disturbance Footprint, the Project is unlikely to result in direct impacts to any threatened fauna species.

9.7 Habitat clearance

The Project is anticipated to result in limited direct impacts (0.05 ha within the Project area) to broad habitat types as detailed in **Table 9.1**. Earthworks and clearing in broad habitat types containing native vegetation will be avoided. The proposed OHTL crosses native vegetation at two locations, on Lot 1 on RP735276, and may require minor trimming of vegetation (no clearing of vegetation is required) to maintain PQ's required safety clearance between vegetation and OHTLs.

Ground disturbance within the cleared areas / pasture broad habitat type will be restricted to only those areas required (battery units, switching station, temporary construction area, O&M area, perimeter road, batters required for civil works, acoustic wall (if required), foundation for OHTL towers, etc.) and is not required for other areas such as the APZ and under the OHTL corridor.

Table 9.1 Impacts to broad habitat types anticipated as a result of the Project

Broad Habitat Type	Corresponding RE	Area within the Site (ha)	Area within the Project area (ha)	Area within the Disturbance Footprint (ha)	Area within the Earthworks Extent (ha)
Melaleuca quinquenervia open forest	7.3.5	1.47	0.01	0.01	0
Lophostemon suaveolens / Corymbia intermedia open forest	7.3.7a	0.62	0.04	0.04	0
Cleared areas / pasture, dominated by exotic grasses	Non-remnant areas	30.1	13.3	10.62	6.3

The trimming of upper tree branches in these areas of *Melaleuca quinquenervia* open forest and *Lophostemon suaveolens / Corymbia intermedia* open forest is unlikely to reduce habitat availability or the area of occupancy for any threatened fauna species, as any habitat values associated with these narrow patches of regrowth will be retained, with only a change to tree heights below the OHTL anticipated as a result of the Project. **Plate 9.1** and **Plate 9.2** indicate the anticipated vegetation crossing points (Red outline) on Lot 1 on RP735275.

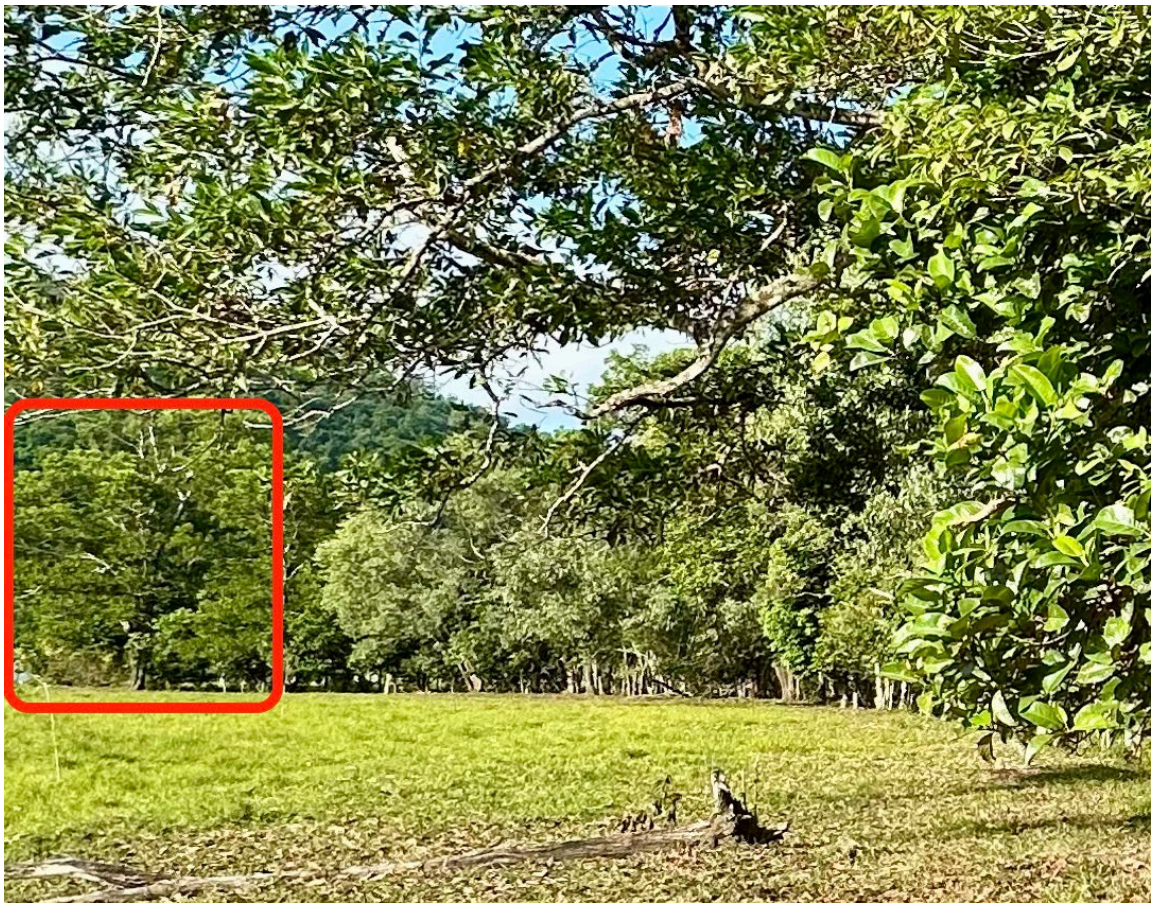


Plate 9.1 Anticipated OHTL vegetation crossing - north of Lot 1 on RP735275

Plate 9.2 Anticipated OHTL vegetation crossing - centre of Lot 1 on RP735275

9.8 Fauna movement and habitat fragmentation

Fauna dispersal opportunities have been considered at a Site and landscape scale for both existing opportunities and post-construction/operational opportunities.

Existing fauna dispersal opportunities within the Site are limited but likely associated with vegetated corridors, rather than cleared areas which expose fauna species to predation risk, heat stress, and where there are no/limited sheltering and foraging resources. Suitable dispersal opportunities include the vegetation along the drainage line in the centre of Lot 1 on RP735275, the vegetation along the eastern boundary of that same parcel and the vegetation in the east of Lot 1 on RP852238. These dispersal opportunities do not link to other areas of fauna habitat but may allow fauna to venture out of the more significant vegetation in Lot 5 on SP140625.

Fauna dispersal opportunities within the Project area are limited to the two OHTL vegetation crossings, as fauna species are most likely to remain in the vegetated areas along the site boundary with the potential to temporarily venture into the narrow, treed areas. The Project does not involve creating any barriers to movement in these areas with only an OHTL crossing and potential tree trimming proposed for the two narrow areas of vegetation crossed on Lot 1 on RP735276. This is not anticipated to restrict access to or dispersal through these areas. Nor will the Project disturb any of the vegetated areas along the boundaries of the Site, which will be maintained and available for use by fauna species that may utilise the Site.

The Site is currently bounded by a multistrand barbed wire fence. Changes to the existing fencing at the boundary of the Site is not anticipated, meaning the connectivity restriction at the boundary will remain unchanged. No new barriers to movement are to be created in areas of vegetation or mapped watercourses in the Project area or neighbouring PQ parcel. Therefore, connectivity to/from and within those areas is not anticipated to be altered.

The relatively small area and extent of fencing as part of the construction and operation of the Project is unlikely to represent significant barriers to movement or impact to fauna species in the area. The total linear fenced extent is expected to be approximately 1650 m, representing a total north-south barrier expected to be approximately 250 m from the southernmost to the to the northernmost point of the fenced area. With a permeable corridor of approximately 500 m remaining in the Site to the north of the fenced area of the Project infrastructure. The fenced area of the Project infrastructure will be positioned only in areas of cleared pasture that do not present high value dispersal opportunity due to their lack of vegetation cover.

As the Project will maintain the fauna dispersal opportunities and will not create a barrier to fauna movement, the Project is anticipated not to impact fauna movement opportunities nor to fragment existing habitat.

9.9 Indirect impacts

Indirect impacts are secondary impacts to vegetation, habitat, and individual species that are not the direct result of an action but occur after – or as a result of – the direct impacts. The following sections discuss the indirect impacts which may arise from the construction, operation, and decommissioning of the Project.

9.9.1 Habitat degradation via edge effects

Habitat within the Project area has the potential to succumb to habitat degradation via edge effects and an increase in the abundance and proliferation weeds which may then cause alterations to micro-habitats. However, the exotic species currently present in high densities in the majority of Project area have already extended into the bordering vegetation at pasture/forest edges and edges of the existing cleared transmission line corridors running through the vegetation in the south of Lot 5 on SP140625.

Cleared, grassed areas to the north and east of the Disturbance Footprint provide separation between the Disturbance Footprint and the native vegetation within the Project area. These areas will be retained in their present state, which reduces the potential for new edge effects to infiltrate into the native vegetation communities. In this regard, the threat posed by increased weeds and changes to micro-habitat conditions via edge effects is considered **minimal**.

9.9.2 Erosion and sedimentation

Erosion is caused by the exposure of soil to wind and water. Removal of native vegetation, the creation of roads, earthworks, and removal of topsoil can all lead to erosion. Erosion reduces habitat quality for flora and fauna, changes surfaces water flow and reduces water quality when the soil washes into waterways leading to sedimentation (IECA 2008).

Sedimentation in waterways reduces habitat quality for aquatic fauna and flora, changes the chemistry of the water and affects water temperatures (Radke, et al 2004). Erosion and sedimentation can arise from acts of nature. For example, extreme flood events can result in extreme erosion and sedimentation, the impacts of which are unpredictable (Hancock 2009).

A first order drainage feature runs west to east within the Site across roughly the centre of Lot 1 on RP735276 turning south to follow the eastern boundary of that parcel and then crossing Lot 1 on RP852238 northwest to southeast before joining a sugarcane drain running south along the eastern boundary of that parcel (see **Figure 4.1**).

Elevation across the Site ranges from approximately 9 m above mean sea level (AMSL) at the southeastern most boundary and in the neighbouring PQ parcel (Lot 5 on SP140625) to approximately 18 m AMSL at the northeastern most boundary of the Site. The proposed BESS infrastructure is sited in an area of mid-elevation, at approximately 12-13 m AMSL and remains approximately 78 m from the State and local government mapped wetland areas on the neighbouring PQ parcel and approximately 95 m from the single, mapped water feature within the Site. Overland flow drainage is generally in an easterly direction towards the formed sugarcane drain along the southeastern boundary. From here, water flows generally south through a network of sugarcane drains to meet Banyan Creek and the Tully River in the south, where drainage continues easterly to the Coral Sea.

Vegetated/grassed buffers to waterways will be maintained and will not be cleared by the Project. This is anticipated to reduce the extent to which sediment enters waterways, as vegetated buffers slow the flow of water allowing suspended sediments to settle before entering waterways.

The Project has the potential to increase erosion via the establishment of access tracks and earthworks required for underground cabling and hard stand areas.

A summary of environmental values potentially impacted by erosion and / or sediment transport are identified in **Table 9.2**, along with the identified potential threats and impacts to these values. Detailed descriptions of the environmental values identified for the Project, where not described herein, are provided within the PESCP (Attexo 2025) (**Appendix D**).

Table 9.2 Environmental Values and Threats Analysis

Environmental Value	Potential threats and impacts
Local surface waters including extensive network of sugarcane drains, Banyan Creek and the Tully River which flows into the Coral Sea.	Threat: • Sediment transport to natural surface waters. – Sediment transport opportunities from the Earthworks Extent would run overland through a minimum 50 m of grassy areas, then 820 m through the unnamed drainage line to the southeastern boundary of the site. Flow continues through 3.4 km of sugarcane drains to Banyan Creek and then 4 km to the Tully River, alternatively, a 5 km route through sugarcane drains flows directly into the Tully River. The Tully River flows 7.5 km to the GBRWHA boundary or 20.9 km to the Coral Sea and the Great Barrier Reef Marine Park (GBRMP) boundary. Potential impacts: • Increased opportunity for transport of pollutants via soil particles resulting in reduced water quality. – Subsequent impacts e.g. eutrophication, toxicity, changes to water chemistry etc.

Environmental Value	Potential threats and impacts
	• Death of / harm to aquatic organisms (flora and fauna) associated with: – Reduced overall water quality. – Reduced light penetration through water column impacting visibility for fauna and plant photosynthesis. – Smothering of plants and animals by sediment causing suffocation. • Sediment deposits within watercourses introducing barriers to fauna movement or altered flow paths. • Recreational impacts associated with loss of visual amenity and fishing opportunity.
GBRWHA	<u>Threats:</u> • Sediment discharged from the Project area is transported to the GBRWHA. – Sediment transport opportunities from the Earthworks Extent would run overland through a minimum 50 m of grassy areas, then 820 m through the unnamed drainage line to the southeastern boundary of the site. Flow continues through 3.4 km of sugarcane drains to Banyan Creek and then 4 km to the Tully River, alternatively, a 5 km route through sugarcane drains flows directly into the Tully River. The Tully River flows 7.5 km to the boundary of the GBRWHA. <u>Potential impacts:</u> • Minor potential for the smothering of small amounts of coral resulting in inhibited coral recruitment, reduced growth rates and increased susceptibility to disease. • Reduced light availability impacting photosynthesis by seagrass ecosystems and beneficial reef algae. • Minor increase in sediment deposits on seabed with a minor potential for creating conditions unsuitable for coral larvae and disrupting filter feeding organisms. • Smothering of fish, damaging gills and potentially causing death. • Increased transport of land-based nutrients and pollutants to the reef via soil particles and subsequent eutrophication and toxicity impacts. • Reduced resilience of the reef and reef dependent organisms to withstand or recover from other pressures e.g. coral bleaching events.
Surrounding agricultural land-use.	<u>Threat:</u> • Soil erosion. <u>Potential impacts:</u> • Physical impacts associated with significant gully, tunnel and channel erosion such as loss of access to portions of land. • Undermining of access tracks and other built infrastructure.

The soils present within the Project area are predominantly Hewitt (Hydrosols) (i.e. sapric or fibric loamy or silty clay) with a loamy sand to loam fine sandy topsoil. There are also some miscellaneous type soils (MSC soil series) mapped in association with the OHTL route in the North of Lot 1 on RP735276. Due to the lack of information on the MSC soil, it has been conservatively assumed (for the purposes of soil loss and erosion risk assessment, and for ESC planning) that sodic, dispersive soils could potentially be disturbed by the Project.

Based on soil loss estimates using a Rainfall Based Erosion Risk Assessment and RUSLE (refer to **Section 4.4.2**) the Project area has an IECA erosion risk rating varying from High in the Dry season (May – November) to Extreme during the wetter months (December - April) (Attexo 2025).

The battery units are proposed to be installed on screw piles, piers or concrete pad formations. The battery unit foundations, along with site access tracks, perimeter road, the switching rooms and underground cables, the O&M area, and the footings for the OHTL are anticipated to be the source of topsoil and ground disturbance associated with the Project. The total topsoil/ground disturbance is depicted in **Figure 1.2** and anticipated to be approximately 6.3 ha.

Much of the existing Project area is vegetated with pasture grass and other grasses, providing natural grass filtering to water running through the Site. These factors, along with limited total ground disturbance, a relatively flat Project area and relatively short times for sites to be stabilised due to minimal earthworks provides low inputs to much of the soil loss estimation calculations. However, the very high rainfall of the region has a significant effect on the results during the wetter months. Thus, Project construction ESCPs must consider the likelihood of intense rainfall occurring, so that the Disturbance Footprint is adequately prepared for these events.

9.9.3 Noise and lighting

Noise can impact the behaviours of fauna in vegetation retained in the Project area. Animals may avoid parts of their home ranges, change their movement patterns or cease some activities (such a breeding) due to disturbance from noise (Shannon *et al.* 2016). Impacts from noise are generally temporary and restricted to the construction phase of the Project. However, there may be a minor increase in noise during the operational phase of the Project; the impact of which is anticipated to be negligible in accordance with the Queensland *Environment Protection (Noise) Policy 2019*.

Artificial nighttime lighting may impact a species' ability to hide from predators or search for prey (Outen 2002). This may lead some animals to avoid parts of their home range or change their movement pattens (Outen 2002).

To address this, artificial nighttime lighting will only be used for security purposes and will be restricted to the BESS and substation areas and at the entry point of the Project area. These areas are away from retained fauna habitat and artificial nighttime lighting is therefore unlikely to impact fauna and fauna habitat.

All nighttime lighting will be designed in generally consistent with mitigation measures identified in the National Light Pollution Guidelines for Wildlife to minimise the potential for light impacts.

9.9.4 Dust

Dust is created when soil is disturbed or exposed to the air. Increased dust is expected during vegetation clearing, soil stripping, and vehicle and machinery movements. Dust can be deposited on retained vegetation adjacent to the works areas, and impair photosynthesis and plant functions (Williams & Yates 2018). Dust can also injure individual fauna species through inhalation, reduce visibility, reduce water quality, and alter the soil properties impacting flora growth (Queensland Government 2020).

The Project has the potential to generate dust during the construction, with limited potential during the operational phase. Dust impacts are generally temporary and restricted to dry periods during the construction phase of the Project. There may be slight ongoing dust generation during the operational phase of the Project via vehicle movement around the Project area. However, this will be minimal given the low volume of anticipated traffic movement. The risk of dust being generated on soils with loamy sand topsoils is very limited as only areas of the Project with heavier loam soils present a risk of dust (if they are found to occur).

Dust will be controlled in accordance with the CEMP during construction that will be developed prior to construction activities commencing and is further discussed in **Section 10**.

Dust generated during the Project's operational phase is likely to be minimal and unlikely to impact retained fauna habitat within the Project area.

9.9.5 Weeds and pests

Pre-construction, construction, and operational activities have the potential to introduce new weeds and/or spread existing infestations. Weeds compete with native vegetation, reduce the availability of native forage species, create an environmental and agricultural nuisance, and smother habitat for fauna (Queensland Herbarium 2019).

Weeds can be spread due to inappropriate weed hygiene procedures via staff, light vehicles, machinery, equipment, and fill entering the Site. Disturbed soil allows for weeds to germinate and colonise areas (Queensland Herbarium 2019). Weeds can become established and/or proliferate in vegetation communities via the creation of new edges (edge effects).

Inappropriate management or disposal of waste could potentially increase introduced predators within the Project area by increasing access and scavenging opportunities. Introduced predators are a key threat to several MNES fauna species. Weed and pest management may inadvertently impact on native species through secondary poisoning or poisoning of pollinator species.

As weeds and pest species are already present throughout the Project area and within the edges of vegetation communities, there is considered to be minimal risk of the Project introducing new weeds or further facilitating the spread of weeds through the Project area. Weed and pest mitigation measures are further discussed in **Section 10**.

9.9.6 Bushfire

Parts of the Project Site are mapped within a Bushfire Prone Area (High potential bushfire intensity and potential impact buffer) in both the CCRC Planning Scheme and SPP mapping.

Accordingly, a Bushfire Hazard Assessment and Management Plan (BHAMP) has been prepared by Meridian Urban and is provided as **Appendix F**. The BHAMP includes assessment against the CCRC Planning Scheme and SPP Natural hazards, risk and resilience (bushfire) State interest, and has regard to relevant guidance material including the Bushfire Resilient Communities Technical Reference Guide (prepared Queensland Fire and Emergency Services).

Bushfire mitigation measures are further discussed in **Section 10.**

9.10 Operations and maintenance

During operation of the BESS, fauna have the potential to be killed or injured by vehicle strike or through collisions with vehicles. However, there are unlikely to be threatened fauna species within the Project area. Regardless, vehicle speed will be limited to 20 km/hr within the Project area. Given the reduced speed of vehicles within the Project area and the low number of vehicles on site at any one time (coupled with the low potential of threatened fauna species within the Project area), this threat is likely to be low.

Upon completion of construction, the disturbed area (Earthworks Extent) will be completely stabilised by compacted hardstand, aggregate groundcover and landscaping with a stormwater drainage system to manage runoff. The Project is to be developed in accordance with the Stormwater Management Plan that has been prepared for the Project by Water Technology (2025) (see **Appendix E**).

Management of the Site will minimise erosion and improve water quality through best practice land management including:

- Grass cover will be maintained, and RWE intend to continue livestock grazing to manage fuel loads or other appropriate fuel load management strategies. RWE's operations team will manage the areas to maintain cover >90% throughout the year.
- The Project will fence the wetlands to exclude livestock if grazing is used to manage fuel loads to improve water quality.
- Areas of erosion near the two dams on Lot 1 on RP852238 will be stabilised and cover re-established to prevent continued erosion.

Even during flood events there is unlikely to be significant erosion within the Project area during the operational phase of the BESS compared to current land use. Velocities during flood events (1% Annual Exceedance Probability

AEP) from the Flood Hazard Assessment study (WaterTech 2025) found that water velocities are generally low, remaining below 0.5 m/s. Based on a grass cover during the operational phase of the BESS there is unlikely to be any erosion. Established grass, even on easily erodible soils, being able to withstand velocities of 1.0 – 1.5 m/s (see Table A24 (IECA 2008)). The allowable flow velocities for bare soils (e.g. cultivated land for sugarcane or overgrazed pasture) can only withstand velocities up to 0.5 m/s for sandy loam and highly erodible soils (see Table A23 (IECA 2008)).

9.11 Decommissioning

The potential impacts associated with the decommissioning phase of the Project include the following:

- Potential increase in erosion and sediment whilst removing BESS and supporting infrastructure which all involve topsoil disturbance.
- Machinery and equipment used during the decommissioning has the potential to generate dust and noise, which can impact individual flora species, fauna species, and reduce habitat quality.
- Fauna species have the potential to be directly impacted via vehicle collisions and impacted by the increase in activities on site.

The decommissioning impacts are anticipated to similar to construction related impacted and, with standard and appropriate mitigation measures (refer **Section 10.3.4**), all decommissioning activities are unlikely to directly impact vegetation communities, waterways, or fauna species.

10. Proposed avoidance and mitigation measures

10.1 General

This section details how the mitigation hierarchy of avoidance, minimise, then mitigate has been applied to the Project in the context of the potential impacts described in **Section 9**.

10.2 Avoidance

Starting with the site selection and early design, and continuing through Project development, RWE have committed to avoiding environmental impacts. This included the following strategies:

- Site selection to avoid native vegetation clearing, to minimise earthworks requirements and to minimise transmission distances
- Undertaking field surveys to determine the presence of MNES habitat, TEC and wetland/watercourse values in the Project area and in vegetation on neighbouring PQ parcels
- Avoiding impact to areas of threatened fauna and flora habitat
- Avoiding impact to waterways
- Avoiding impact to wetlands
- Minimising impact to native vegetation
- Avoiding direct and indirect impact to MNES to the greatest extent practicable.

The early identification and avoidance of MNES values was a key principle applied to the Project design, with the Project avoiding habitat for MNES species and TECs. By selecting a Project area and Disturbance Footprint already cleared of native vegetation with negligible habitat values and which was currently being used for cattle grazing, the Project has effectively avoided direct environmental impacts. By implementing an "avoidance first" approach, the Project can proceed without the need to disturb large areas of native vegetation or species' habitat.

Project design also considered the topography to select a Project area and Disturbance Footprint that would minimise the need for earthworks and the risk of destabilised soils. Keeping the Disturbance Footprint within an area of <1.5% gradient removes a great deal of risk associated with erosion and sedimentation. The Project will also minimise initial earthworks and major land disturbing activities during the high-risk wet season months (December to March), in which rainfall erosivity has been rated as extreme in the PESCP (Attexo 2025) (See **Appendix D**).

The current Disturbance Footprint is the result of several iterations of the Project design which have aimed to minimise ecological and technical constraints based on the results of the desktop and field survey results.

By design, the Disturbance Footprint avoids ground disturbance and clearing in the drainage feature and mapped wetland values. However, the proposed OHTL intersects these areas at two narrow crossings (30-40 m span). These crossings will be full span and overhead, not requiring earthworks or vegetation clearing in the areas, however, there may be some minor trimming of the vegetation being crossed to ensure safe clearance to the high voltage transmission wires is maintained.

The Disturbance Footprint has been located to avoid areas which contain broad habitat types dominated by native vegetation, and which were identified as potentially providing suitable habitat for MNES. The Disturbance Footprint has been located in existing cleared areas / pasture broad habitat type (with the exception of two narrow vegetation crossings by the OHTL), which has in the past been used for cropping agriculture and is currently being used for cattle grazing. The Project design process has completely avoided any clearing of native vegetation and has limited direct impacts to potential trimming of vegetation in two very narrow corridors of heavily disturbed regrowth, to maintain safety clearances between vegetation and the overhead transmission lines. Overhead transmission was also chosen over underground to avoid greater ground disturbing activities and the need to clear vegetation of the two very narrow corridors.

The cleared areas / pasture broad habitat type is considered to provide negligible habitat values for MNES. The placement of the Disturbance Footprint primarily in this broad habitat type is therefore consistent with firstly 'avoiding' MNES values.

As site selection has avoided impacts to migratory birds, the Project is consistent with Australia's obligations under the Biodiversity Convention, the Convention on Conservation of Nature in the South Pacific (Apia Convention), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

10.3 Proposed mitigation

The following management plans have been or will be developed to address the identified risks for the Project and to document Project specific mitigation measures:

- Construction Environmental Management Plan (CEMP)
- Preliminary Erosion and Sediment Control Plan (PESCP) (**Appendix D**)
- Stormwater Management Pan (SMP) (**Appendix E**)
- Bushfire Hazard Assessment and Management Plan (**Appendix F**)

The implementation and management of the mitigation measures for MNES, as well as state and local matters, will be achieved via the above management plans. The mitigation measures included in the management plans are standard measures routinely and successfully applied across infrastructure projects in Queensland and Australia. These measures are therefore anticipated to be effective at mitigating the risk to MNES.

Sections 10.3.1-10.3.5 provide an overview of the mitigation measures described in the management plans, with each management plan providing further detail.

10.3.1 Construction environmental management plan

A Project specific CEMP will be developed, which includes the following mitigation measures:

Habitat degradation

- Spill management and response measures will be developed and documented in the CEMP to prevent contaminants entering and affecting surrounding environments.
- All chemicals, fuels, and other hazardous substances will be stored and handled properly to prevent spills from entering waterways and contaminating adjacent habitat.
- Noise mitigation will be achieved via employing noise-reducing equipment, limiting work hours, and regularly maintaining machinery and construction vehicles to minimise disturbances to wildlife.
- There will be no nighttime construction activities.
- If required, all nighttime lighting will be designed in accordance with mitigation measures identified in the National Light Pollution Guidelines for Wildlife to minimise the potential for light impacts
- Weed control programs will be developed and implemented to minimise the spread of invasive plant species (including WoNS), including cleaning equipment and vehicles before entering or leaving the Disturbance Footprint.
- Pest management will be achieved by minimising the potential for attracting pest species (e.g. rats, feral cats) that could harm native wildlife by managing waste and implementing pest control protocols.
- New and / or exacerbated infestations of restricted invasive plants identified within the Project area are to be logged as a hazard within the construction contractor(s) incident database and appropriate corrective action taken to treat / remove the infestation.
- Washdown of construction vehicles and machinery must be undertaken at dedicated washdown facilities.
- Temporary infrastructure (including lay down areas, stockpiles, etc.) and access tracks are to be located wholly within the Disturbance Footprint and clearing of vegetation outside of the Disturbance Footprint is strictly prohibited.

Waste management

- Adopting measures to reduce waste generation, recycle materials when possible, and ensure proper disposal of waste to prevent contamination of natural habitats.
- Regularly cleaning the Project area of construction debris and litter to avoid negative impacts on wildlife and surrounding habitats.

Pest and invasive species control

- Implementing measures to prevent construction activities from attracting invasive species (e.g. rodents, feral cats) that could harm native fauna.
- Ensuring that machinery and equipment are cleaned before entering the Project area to minimise the introduction of invasive plant species that may degrade fauna habitat.
- Ensuring that only clean fill which is weed free is imported into the Site.

Monitoring and reporting

- Conducting ongoing visual monitoring during construction as per the CEMP to ensure that mitigation measures are effective.
- Establish and implementing procedures to report and respond to environmental incidents (e.g., spills, fauna deaths) and take corrective actions swiftly.
- Following on from environmental incidents, implement continual improvement measures if applicable.

Training and awareness programs

- Providing training to all construction personnel on environmental protection measures, habitat sensitivity, and proper practices to minimise impacts
- Providing training for all construction personnel on the importance of fauna protection, including how to identify and avoid disturbing local wildlife species
- Educating workers on the proper procedures for dealing with injured or distressed wildlife, including how to contact local wildlife rescue organizations

Vegetation avoidance

- The primary mitigation measure for vegetation and fauna management is avoiding any clearing of native vegetation.
- Trimming of tree foliage will be kept to the minimum required for safe installation and safe operational clearance from the OHTL only in those areas where the OHTL crosses vegetation, however the CEMP will prohibit works that require the clearing of native vegetation.

Pre-construction Fauna Surveys

- Conducting thorough surveys before any construction begins to identify the presence of fauna and active/potential breeding places.
- Employing licensed Fauna Spotter/Catchers to identify, capture, and relocate fauna found within the Disturbance Footprint before clearing or earthworks begin, under a low-risk Species Management Program (SMP) (administered under the NC Act).

Fauna Handling

- Specific procedures for the safe capture, handling, and relocation of fauna from the Disturbance Footprint to suitable alternative retained habitats outside the Disturbance Footprint
- For species with particular habitat needs, ensuring that appropriate habitat is identified for their relocation (e.g. relocating arboreal species to areas with adequate tree cover)

Habitat Protection and Restoration

- Retaining habitat features such as hollow bearing logs, or large rocks and/relocate these to nearby retained habitats.

Exclusion zones and fencing

- Installing temporary fauna exclusion fencing around active construction areas which are adjacent to fauna habitats to prevent wildlife from entering hazardous areas

Construction timing to minimise impact

- Planning and carrying out large earthworks during the low rainfall months (as far as practical) to minimise potential erosion and sedimentation
- Scheduling and carrying out ground disturbance work during daylight hours only to minimise disturbance to nocturnal fauna

Fauna Management, Monitoring and reporting

- Imposition of vehicular speed limits (20 km/hr) within work areas for safety and to reduce risk of fauna collision.
- Daily inspections of any open excavations to remove trapped fauna.
- Trenches will be backfilled as soon as possible to minimise the chance of fauna becoming trapped. Trench sections left open overnight will be inspected early in the morning and any trapped fauna removed. The use of ramps or ladders to facilitate trapped fauna escape is recommended (dependent on the size of trench needed).
- Maintaining regular monitoring to assess the presence of fauna, check the effectiveness of exclusion measures, and adjust practices as needed
- Establishing protocols for reporting and responding to fauna-related incidents, such as injury or death, with corrective actions taken to prevent recurrence

10.3.2 Erosion and sediment control plan

The PESCP (**Appendix D**) developed for the Project identifies the principles, standards and strategies to be applied for erosion, drainage and sediment control throughout the Project construction phase. The erosion and sediment control standard for the Project is the best practice erosion and sediment control (BPESC) standard developed by the IECA for the Australasian region (IECA 2008). It recognises that effective erosion and sediment control requires an iterative process of plan-implement-monitor-update. A hierarchical ESC management framework has therefore been adopted for Project construction, consisting of the PESCP developed by RWE, which is to be implemented via iterative construction ESCPs to be developed and maintained by the Principal Construction Contractor. Specific controls are to be defined by construction ESCPs in accordance with the requirements established by the PESCP.

An integrated approach involves the establishment of firm ESC standards and expectations during the Project planning phase, whilst providing flexibility for specific 'on-ground' management measures to be determined by those undertaking the work, so that construction sequencing can occur to minimise risk, and physical controls are compatible with construction methods. Examples of the application of this approach include (but are not limited to):

- Sequencing of works so that overall simultaneous soil exposure is minimised, works with higher erosion potential occur outside of higher rainfall months, and works are scheduled in a way that favours progressive rehabilitation.
- Planning the cut and fill program so that early installation of physical controls is planned, topsoils are effectively managed, the double handling of soils is minimised, and ESCs are adjusted as the site changes with time.
- The planning of resources so that materials, equipment and work crews are available when required for timely ESC and progressive rehabilitation.
- The adoption of controls which are compatible with resources available and familiar to construction crews.

Mitigation of ESC risks involves the development and implementation of ESC measures for erosion control, drainage control and sediment control. The PESCP outlines the standards and approaches as well as providing examples of these control measures which will be adopted by construction ESCPs.

The Project's flood assessment as part of the Storm Water Management Plan (WaterTech 2025) identified there is a low risk for erosion and sediment generation in the Disturbance Footprint to generate sediment due to a water flow velocities being generally low (<0.5 ms^{-1}).

For sediment control, sediment traps will be utilised across the Disturbance Footprint to treat stormwater run-off to capture entrained sediment prior to stormwater discharge from this area of disturbance. The following actions will be taken to ensure that sediment controls are designed, installed and maintained to the IECA 2008 international best practice standard:

- From the commencement of ground disturbing activities through to the achievement of stabilisation criteria within a particular site drainage sub-catchment - all dirty stormwater run-off from within the Development footprint must be directed to a sediment trap for treatment prior to release from site.
- Sediment traps must remain in place until 80% groundcover has been achieved within the upstream drainage sub-catchment draining to that trap.
- All sediment traps must be selected, positioned and sized by an accredited ESC practitioner[5] and signed off as having met the IECA 2008 BPESC Standard and the requirements of this ESCP.
- All sediment basins must be designed by an RPEQ and signed off as having met the IECA 2008 BPESC Standard by an accredited ESC practitioner.[5]
- Where installed, sediment basins must be inspected by a suitably qualified and accredited ESC practitioner[5] or RPEQ and signed off as having been installed in accordance with design.
  - Inspections must occur following of completion of sediment basin construction.
  - Where slight deviations are observed that nevertheless meet the requirements of IECA 2008 BPESC Standard and this ESCP, the construction ESCP must be updated to show the basin as constructed.
  - Installed sediment basins that fail to meet the requirements of IECA 2008 BPESC Standard and this ESCP must be modified to meet these criteria following of identification.
- Stabilised site exits must be established to prevent the tracking of soils offsite by vehicles in accordance with IECA 2008.

ESC monitoring and maintenance programs will be documented within construction ESCPs in accordance with IECA 2008 and the PESCP. This will include the development of inspection check sheets and other aids to facilitate thorough checks of controls in place and discharge points. Inspections will be undertaken by a suitably experienced ESC practitioner.

The efficacy of sediment traps will be reviewed where monitoring indicates that those in place are failing to achieve water quality objectives Upon completion of construction, the BESS area (Disturbance Footprint) will be completely stabilised by compacted hardstand, aggregate groundcover and landscaping with a stormwater drainage system to manage runoff. A stormwater management plan has been prepared for the Project by Water Technology (2025). Management of the Site will minimise erosion and improve water quality through best practice land management including:

- Maintaining grass cover to >90% throughout the year
- Continuing livestock grazing to manage fuel loads
- Fencing the wetlands and buffer areas to exclude livestock and improve water quality
- Areas of erosion near the dams on Lot 1 on RP852238 will be stabilised and cover re-established to prevent continued erosion

[5] Accreditation must be through a recognised certification body which upholds ethical standards e.g. Envirocert International Inc., Soil Science Australia or equivalent.

10.3.3 Bushfire Hazard Assessment and Management Plan

The Bushfire Hazard Assessment and Management Plan (BHAMP) has been prepared by Meridian Urban and is provided as **Appendix F**.

A number of mitigation measures have been identified for implementation on Site to reduce the likelihood and severity of bushfire hazard, including:

- Establishing and maintaining an APZ of 48.1 m along the northern and eastern boundaries, and 10 m along the western and southern boundaries of the BESS
- Provision of a minimum 40,000 L static water supply dedicated to bushfire fighting purposes (or as directed by the Queensland Fire Department)
- Provision of direct access from the BESS facility to Sandy Creek Road
- Storage of all hazardous materials and chemicals away from hazardous vegetation
- Implementation of appropriate procedures during construction and operation of the Project

The proposed Disturbance footprint takes into consideration the existing vegetation and fauna habitat values within the Site, while accommodating appropriate bushfire APZ.

Additionally, an indicative species list has been developed for the landscaping treatments (Landscape Plan, Cusp Landscape Architecture + Urban Design, 2025) and includes species identified within Planning Scheme Policy C6.4 Landscaping and the Bushfire Resilient Building Guidance for Queensland Homes (2020).

10.3.4 Operational stage

A range of mitigation measures will be implemented during the operational phase of the Project to monitor and minimise any ongoing impacts to fauna species and the surrounding environment, which include the following:

Vegetation and Groundcover Management

- Maintaining native vegetation and encourage the growth of native grasses and low-lying vegetation under and around stabilised hard surface areas to minimise soil erosion and reduce dust.
- Preferencing the use of low-impact methods, such as periodic mowing, to manage vegetation height and maintain groundcover; minimise the use of herbicides; and prevent the use of heavy machinery that could disturb the soil and wildlife and negatively impact water quality.
- Implementing regular monitoring and control of invasive plant species to prevent their spread, ensuring that herbicide use is minimised and targeted.

Erosion and Sediment Control

- Maintaining grassed or vegetated buffers to all the unnamed drainage line and wetland areas on the site to minimise the potential for sediment laden water to reach the waterways.

Stormwater and Water Management

- Designing and maintaining stormwater management systems to ensure that runoff is controlled, preventing water pollution or erosion.
- Ensuring any chemicals and hazardous materials are stored above defined flood levels to prevent contamination of nearby watercourses in the event of flooding.

Wildlife and Habitat Protection

- Maintaining fencing around the wetland areas and the farm dams on Lot 1 on RP852238 to ensure that cattle are excluded from areas of highest erosion and water quality contamination risk.

Noise and Vibration Management

- Regularly servicing and maintaining operational equipment, such as inverters and transformers, to ensure that noise levels remain within acceptable limits and minimise any potential disturbance to wildlife.

Minimising Chemical Use

- Using environmentally friendly cleaning products and avoid using harmful chemicals that could contaminate nearby soil or water.
- Using integrated pest management strategies for pest control to minimise chemical pesticide use.

Waste Management

- Ensuring that any waste generated during maintenance activities, such as replacement equipment, is recycled, reuse or disposed of in an environmentally responsible manner and in accordance with the *Environmental Protection Act 1994* (EP Act) and *Waste Reduction and Recycling Act 2011*.
- Maintaining a Waste Management Plan that addresses the proper disposal of operational waste, such as packaging materials or worn-out components, to avoid littering, contamination, storage of incompatible wastes, and minimise environmental impacts.

Emergency Response Plan

The Project will develop an emergency response plan in consultation the Queensland Fire Department and other key stakeholders. Initial engagement has occurred in Q3 2025 with the Queensland Fire Department. Early project planning has also included a range of measures in the BHAMP that will also be incorporated into the emergency response plan, as described in **Section 10.3.3**.

10.3.5 Decommissioning

During the decommissioning phase of the Project, the focus will be on minimising environmental impacts as infrastructure is dismantled, and the Project area is restored to the pre-disturbance condition or another agreed land use. The mitigation measures aim to ensure that decommissioning activities are conducted in a way that protects the local environment, minimises pollution, and promotes the safe disposal or recycling of materials.

Mitigation to be employed during the decommissioning phase of the Project will be included in a Decommissioning Plan (or similar) which will include the following (as a minimum):

Site Assessment and Planning

- Outlining all the steps for dismantling the infrastructure, removing equipment, restoring the land, and mitigating any environmental impacts. The plan will include a timeline for completing each step.

Soil and Vegetation Protection

- Implementing measures to minimise soil disturbance during the removal of infrastructure, such as using low-impact machinery, staying on designated access roads, and avoiding unnecessary soil compaction.
- Implementing and maintaining appropriate erosion controls, drainage controls and sediment controls as identified in the PESCP. These should be implemented before any ground disturbing works commence (where practicable).
- Installing sediment control measures, such as silt fences, sediment traps and grassed filter strips around disturbed areas to minimise soil erosion and sediment runoff into adjacent waterways.
- Incorporating any lessons learned during the construction phase of the Project.

Waste Management and Resource Recovery

- Ensuring that as much of the Project's infrastructure as possible is recycled or reused.

- Safely managing and disposing of hazardous materials, such as chemicals, batteries, or electronics, following EP Act regulatory requirements for storage, transport and disposal to avoid environmental contamination.
- Prioritising waste minimisation and resource recovery by separating materials for reuse and recycling and limiting the amount of waste sent to landfills by recycling and reusing materials where possible.

Removal of BESS and Equipment

- Following established protocols for safely removing batteries, inverters, and other electrical components to prevent damage to the environment, including containment of any hazardous substances (e.g. materials, oils, or chemicals).

Water Management

- Maintaining stormwater management systems during decommissioning to control runoff and minimise erosion, especially after infrastructure is removed and disturbed areas within the Project area are being revegetated.
- Implementing measures to minimise water pollution from any potential spills or leaks during the removal of electrical infrastructure, ensuring that chemicals, oils, or other hazardous materials are contained and disposed of safely.
- Ensuring any chemicals and hazardous materials are stored above defined flood levels to prevent contamination of nearby watercourses in the event of flooding.

Dust and Noise Control

- Using water sprays or other dust suppression techniques during the decommissioning process, especially when removing or breaking down concrete footings or disturbed soils, to minimise dust generation and protect local air quality and reduce impacts to adjacent vegetation.
- Limiting noisy activities to daytime hours and use noise-dampening techniques to reduce the impact on nearby wildlife during decommissioning.
- Where dust has accumulated on adjacent vegetation, spraying the vegetation with clean water to remove dust which could impact vegetation health.

Wildlife Protection

- Conducting surveys to identify any wildlife that may have taken up residence in or around the BESS infrastructure during its operation.
- Where necessary, relocating any fauna to nearby suitable habitats.

Revegetation and Land Rehabilitation

- Implementing a revegetation program to return the Project area to the pre-disturbance state (or as otherwise agreed to by the landholder, the proponent, and/or regulatory authorities).

Community Engagement

- Engaging with local communities and stakeholders to provide updates on the decommissioning process, addressing concerns related to noise, dust, traffic, or environmental impacts.
- Communicating plans for post-decommissioning land use.

10.3.6 Fencing

The Project has avoided creating barriers to fauna movement or fragmenting habitat. Fauna movement corridors are present in the east of the Site and will be maintained.

The Project area has been concentrated within the already cleared interior portions of the Site, avoiding the small patches of vegetation along the eastern boundaries. These vegetated edges remain intact, providing the limited

dispersal opportunities for native fauna movement. The retention of these corridors preserves the existing movement opportunities for terrestrial species. The proposed security fencing, fauna-friendly and free of barbed wire, around the perimeter of the BESS Infrastructure area is unlikely to impede fauna movement, as the fenced area primarily comprises previously cleared pastureland with negligible habitat value for MNES fauna species. Field assessments confirmed that the Project area does not support key habitat features or resources likely to attract or sustain threatened fauna. The vegetation and habitat corridors of ecological value are located outside the fenced area and will remain accessible to native wildlife. As such, the installation of security fencing is expected not to disrupt fauna dispersal across the broader landscape or result in habitat fragmentation for species of conservation concern.

11. The Great Barrier Reef

11.1 Introduction

The GBR holds a range of significant values, and these are afforded protection under three of the nine prescribed MNES identified in the EPBC Act, including:

- The environment in the GBRMP (sections 24B and 24C)
- The world heritage values of a declared World Heritage property (sections 12and 15A)
- The national heritage values of a National Heritage place (sections 15B and 15C).

Approval under the EPBC Act is required for any action that may impact the GBR with respect to the above controlling provisions.

As outlined in **Section 1**, the proposed action comprises the construction, operation, and decommissioning of a BESS approximately 4 km south-west of Tully, Queensland. The Site is located approximately 17 km from the coast (25 km hydrologically), adjacent to the Coral Sea, and the boundary of the GBRMP. The GBR World Heritage Area (GBRWHA) and GBR National Heritage Place (GBRNHP) include the lower section of the Tully River, with the boundary for the GBRWHA and GBRNHP being approximately 8.5 km from the Site (12.5 km from the Site hydrologically). The Site is within the Tully Catchment of the Wet Tropics Great Barrier Reef Catchment Region, which ultimately drains into the GBRMP, GBRWHA, and GBRNHP.

The purpose of this chapter is to detail the relevant legislation, GBR values, assess the potential impacts and outline the mitigation measures to be implemented to demonstrate the proposed action is anticipated not to have a significant impact on GBRMP, GBRWHA and/or GBRNHA. As such, the chapter:

- begins with an overview of the relevant legislation and policies that have been introduced to afford protection to the GBRMP, GBRWHA, and GBRNHA.
- provides an overview of the GBR and its values, including its world and national heritage status, key environmental attributes, and current pressures.
- provides an overview of the existing environmental conditions in the Project area, downstream waterways, and proximate to the discharge location into the GBRMP, GBRWHA, and GBRNHP.
- details the potential impacts and associated risks with respect to the proposed development on the GBR, before detailing the avoidance, mitigation and management measures proposed to counter these potential impacts and the subsequent residual risk to the GBRMP, GBRWHA, and GBRNHP.
- concludes with an assessment of the Project against the Guidelines (DoE, 2013), and a discussion on how the Project is aligned with the Reef 2050 reduction targets.

11.2 Relevant legislation and policies

Key elements of the framework established to protect the integrity of the GBRMP, GBRWHA, and GBRWHA include the EPBC Act, and the Reef 2050 Long-term Sustainability Plan (LTSP) which includes the Reef 2050 Water Quality Improvement Plan (Reef 2050 WQIP).

11.2.1 EPBC Act

As described in **Section 11.1**, this report has been prepared to assess the potential impacts of the proposed action to MNES, including the GBRMP, GBRWHA, and GBRNHP, and the associated measures proposed to avoid and mitigate any potential impacts as part of the EPBC Act referral process. As such, after the potential risks associated with the Project, and the relevant avoidance, mitigation and management measures have been outlined, and this chapter provides an assessment of the proposed action against the Significant Impact Assessment Guidelines for the GBRMP, GBRWHA, and GBRNHP.

11.2.2 Reef 2050 LTSP

The Reef 2050 LTSP is the Australian and Queensland Government's overarching framework on how the GBR will be protected and managed to 2050. The Reef 2050 LTSP is a flexible framework that is reviewed every five years, and it includes five priority areas for action, being:

- Limit the impacts of climate change
- Reduce the impacts from land-based activities
- Reduce the impacts from water-based activities
- Influence the reduction of international sources of impacts
- Protect, rehabilitate, and restore.

To guide action in these five priority areas, the Reef 2050 LTSP includes a range of programs and initiatives, including the Reef 2050 Water Quality Improvement Plan (WQIP).

11.2.2.1 Reef 2050 WQIP

The Reef 2050 WQIP sits within the Reef 2050 LTSP framework and identifies how the water quality outcomes under the broader framework will be delivered. The WQIP states that global warming caused by greenhouse gases, and the climate change it drives, is the most serious and pervasive threat to the Reef. Increasing carbon dioxide emissions are causing Reef waters to acidify, reducing the ability of corals and other reef-building organisms to grow carbonate shell material and increases the risk of them dissolving. The long-term outlook for the Reef is critically dependent on limiting global temperature rise to the maximum extent possible, as quickly as possible.

In addition to climate change impacts, the Reef LTSP has identified several priority pollutants from land-based activities that are a threat to the GBR. End-of-catchment targets have been set for all catchments and most sub-catchments draining into the GBR. The end of catchment water quality targets set by the Reef 2050 WQIP for the Tully Catchment of the Wet Tropics Region are outlined in **Table 11.1**. The target for pesticides is the same for all catchments and regions and is based on the concentrations required to protect at least 99 % of aquatic species at the river mouth.

Table 11.1 Tully Catchment of the Wet Tropics Region Reef 2050 Water Quality Targets

WQ Parameter	Load Reduction in Kilotonnes	Reduction Target
DIN	190	50%
Fine Sediment	17	20%
Particulate Phosphorus	23	20%
Particulate Nitrogen	68	20%

11.2.3 Development Permit

As discussed in **Section 2**, the development permit for the project is currently under assessment. As such there are no permit conditions yet known that apply to the GBR values, however it is likely that development approval will be conditional on adequate and best practice management of stormwater and erosion and sediment control.

11.3 The GBR values, conditions, and threats

11.3.1 GBR World Heritage Area values

The GBR was inscribed as a World Heritage Area (WHA; GBRWHA) in 1981. The GBRWHA is slightly larger than the GBRMP at approximately 348,000 km^2 and includes:

- North-South Range: The GBRWHA stretches beyond the northern boundary of the GBRMP, extending into the Torres Strait to just north of Fraser Island.
- East-West Range: It extends from the low-water mark on the Queensland coast to beyond the outer edge of the continental shelf (up to 60-250 kilometres offshore), encompassing both shallow and deep marine areas.
- Land and Marine Components: The GBRWHA includes islands, cays, and parts of the mainland coast, incorporating a range of ecosystems such as coral reefs, mangroves, seagrass meadows, and estuaries - some of these areas fall outside the GBRMP boundary.

To be inscribed as a WHA, a property must be assessed as having Outstanding Universal Value (OUV). OUV is one of the central ideas unpinning the World Heritage Convention. To be considered of OUV, a property needs to:

- Meet one or more of ten criteria
- Meet the conditions of integrity
- If a cultural property, meet the conditions of authenticity, and
- Have an adequate system of protection and management to safeguard its future.

The GBRWHA is considered a natural property of OUV as it satisfies the above requirements, including four of the listed criteria (vii, viii, ix, and x), and the conditions of integrity. A summary of how the GBRWHA meets the requirements (UNESCO, 2024) is as follows:

- **Criteria vii:** to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

  The GBRWHA is considered to be of superlative natural beauty, above and below the water. The property is considered to provide some of the most spectacular scenery on earth. Above the water, the mosaic patterns of reefs, islands, and coral cays produce seascapes comprised of diverse shapes, sizes, and colours. Below the water, there is also an abundance of different species.

  The annual coral spawning, migrating whales, nesting turtles, and significant spawning aggregations of many fish species are also considered to be of superlative natural beauty.

- **Criteria viii:** to be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features.

  The GBRWHA is considered to be a globally outstanding example of an ecosystem that has evolved over millennia. The area has been exposed and flooded by at least four glacial and interglacial cycles, and over the past 15,000 years reefs have grown on the continental shelf. Today, the GBR forms the world's largest coral reef ecosystem.

- **Criteria ix**: to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals.

  The unique diversity of species within the GBR reflects the maturity of an ecosystem that has evolved over millennia, including evidence for the evolution of hard corals and other fauna.

- **Criteria x:** to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

  The enormous size and diversity of the GBR means it is one of the richest and most complex natural ecosystem on earth, and consequently, one of the most significant for biodiversity conservation.

- **Integrity:** Integrity is a measure of the wholeness and intactness of the natural and/or cultural heritage and its attributes. Examining the conditions of integrity, therefore requires assessing the extent to which the property:

  a. includes all elements necessary to express its outstanding universal value:

  – is of adequate size to ensure the complete representation of the features and processes which convey the property's significance

- suffers from adverse effects of development and/or neglect.

The GBRWHA is considered to meet the conditions of integrity principally due to its unparalleled size and current good state of conservation across the property. While there are several natural pressures stressing parts of the GBRWHA, the property is currently considered to be largely intact.

Due to the inscription of the GBRWHA as a property of OUV, Australia has protection and management responsibilities under the World Heritage Convention. Assessment of impacts to the GBRWHA through the EPBC Act process is one of the ways the Commonwealth protects the values of the GBRWHA.

11.3.2 GBR National Heritage Place values

The GBR was added to Australia's National Heritage List in 2007. The extent of the GBRNHP is very similar to the GBRWHA, however as it is focused on preserving the national significance of the Reef, there are certain islands and coastal lands that are not included in the boundary as they have more international significance.

For a property to be classified as National Heritage the Australian Heritage Council must assess whether a nominated place is considered to have heritage value by considering if it meets one or more of nine National Heritage List criteria. The Australian Heritage Council must also apply a 'significance threshold' to judge the level of significance of the property. The GBR has been assessed to meet five of the criteria, including criteria a, b, c, d, and e. A summary of how the GBR meets each of these criteria is provided below:

- **Criteria a**: the place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history.

  The National Heritage Council states the GBR meets this National Heritage criterion, as the World Heritage Committee determined it meets the World Heritage criteria vii, viii, ix, and x.

- **Criteria b**: the place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history.

  The National Heritage Council states the GBR meets this National Heritage criterion, as the World Heritage Committee determined it meets the World Heritage criterion x.

- **Criteria c**: the place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history.

  The National Heritage Council states the GBR meets this National Heritage criterion, as the World Heritage Committee determined it meets the World Heritage criteria viii, ix, and x.

- **Criteria d**: the place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of:
  - a class of Australia's natural or cultural places; or
  - a class of Australia's natural or cultural environments.

  The National Heritage Council states the GBR meets this National Heritage criterion, as the World Heritage Committee determined it meets the World Heritage criteria viii, ix, and x.

- **Criteria e**: the place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group

  The National Heritage Council states the GBR meets this National Heritage criterion, as the World Heritage Committee determined it meets the World Heritage criterion vii.

The GBR is also recognised to be of cultural importance, containing many middens and other archaeological study areas of Aboriginal or Torres Strait Islander origin.

11.3.3 Cultural heritage values of the GBR National Heritage Place

The Aboriginal and Torres Strait Islander Heritage Strategy (ATSIHS) for the GBRMP is the Great Barrier Reef Marine Park Authority's (GBRMPA) long-term strategy to strengthen the protection of Aboriginal and Torres Straight Island Reef heritage.

The ATSIHS states the Traditional Owners view Indigenous heritage as 'everything in sea country' (GBRMPA 2019). The GBRMPA applies the broad definition of Indigenous heritage to mean the tangible and intangible expressions of Traditional Owners' relationships with country, people, beliefs, knowledge, law, language, symbols, ways of living, sea, land and objects: all of which arise from Indigenous spirituality, including heritage places and / or values.

Notwithstanding the overall cultural value that the GBRMP represents for Traditional Owners, certain elements of the reef are known to represent particularly significant values for Indigenous groups. For instance, certain species within the GBR, such as whales and dolphins, hold totemic value for some Traditional Owner groups. The GBR also comprises traditional burial and sacred sites, some of which are underwater due to rising sea levels.

11.3.4 GBR Marine Park values

The GBRMP was established in 1975, and is a protected marine area managed by the GBRMPA. The extent of the GBRMP is approximately 344,400 km^2, with the boundary extending from the low water mark along the Queensland coast to 200 nautical miles (nm) offshore, encompassing coastal waters, lagoons, and the outer reef. The GBRMP extends from just south of the Torres Strait in the north, to just north of the mouth of Baffle Creek in the south.

The GBRMP supports a vast diversity of environmental values. The key environmental value associated with the GBR is the extensive network of coral reefs it supports, which comprise of over 2,900 individual reefs that support a vast array of marine life. The park is also home to seagrass meadows, which serve as crucial feeding grounds for dugongs and green sea turtles, and mangrove forests, which provide both essential nursery habitats for fish and coastal protection. The open ocean and deepwater ecosystems within the Reef sustain migratory species such as humpback whales, manta rays, and various shark species. The overall Reef environment supports a range of species and habitats, however there is significant heterogeneity in the distribution of these attributes throughout the GBRMP.

The spatial variability of the environmental attributes in the GBRMP is driven by factors such as latitude, depth, water clarity, and proximity to the coast. Coral reefs are generally most diverse and extensive in the northern and central sections of the GBR, where warmer waters and stable conditions support high coral cover and biodiversity. In contrast, reefs in the southern GBR experience greater seasonal variability and bleaching events. Seagrass meadows tend to be more prominent in coastal and shallow waters, particularly in areas such as Hervey Bay, Halifax Bay, and the Torres Strait, where they support dugong and turtle populations. Mangrove forests are concentrated in estuarine and intertidal zones along the GBR coastline, with extensive stands in regions like Cape York Peninsula and the Whitsundays, where they provide coastal protection and nursery habitats. Deepwater and open ocean ecosystems exhibit significant variability due to differences in temperature, currents, and nutrient availability, influencing the distribution of pelagic species such as sharks, whales, and large migratory fish.

11.3.5 Condition and threats to the GBR

The overall condition of the GBR environment is in decline. While the most recent report released by the Reef Authority on 23 August 2024 (Australian Government, 2024), stated that the current general condition of the GBR is showing signs of improvement, it noted that the outlook of the reef is one of declining health. The report acknowledged that some habitats and species have shown signs of improvement over the past five years, particularly hard coral cover, but stated that the "overall outlook of the GBR remains one of future deterioration due largely to climate change".

In addition to climate change, the Reef Plan identified the other biggest threats to the GBR. These include land run off due to nutrient, pesticide, and sediment contamination, coastal development, illegal poaching, and the crown-of-thorns starfish. A summary of how each of the key threats is putting pressure on the GBR is provided in **Table 11.2**.

Table 11.2 Key Threats to the GBR

Threat	Sub-threat	Description
Climate Change	-	Climate change, including increasing water temperature, is one of the main causes of coral bleaching. Scientists know that sea surface temperatures of the GBR have increased by 0.8 degrees Celsius since the late 19th century. Additionally, ocean acidification, linked to climate change is caused by the oceans absorbing atmospheric CO_2, and it is adversely impacting the species within the GBR.
Land Run Off	Nutrients	Nutrients are the natural chemical elements and compounds that plants and animals need to grow. While nutrients are an important part of the ecology of ecosystems, excessive nutrient loading into the GBR is considered a threatening process. Excessive amounts of nutrients, notably nitrogen and phosphorus, can increase algae abundance and algal blooms, which reduce coral diversity. Monitoring and scientific modelling have identified applied fertilisers are the primary source of nutrients entering the GBR (Queensland Government, 2023).
	Sediment	Sediments are natural materials made up of particles of rock, minerals, organic matter and soil that have been broken down by weathering and erosion. Studies have shown that the majority of unwanted fine sediments are washed into the sea from grazing activities or streambank erosion (Scientific Consensus Statement Team, 2022).
	Pesticides	Pesticides are designed to kill pests including weeds and insects. When these chemicals enter the marine environment, marine species are also impacted.
Other Threats	Coastal developments	Coastal developments threaten the Reef by disrupting the sea floor and contributing direct and indirect impacts to the GBR.
	Illegal fishing	Illegal fishing threatens the GBR as the fishing practices directly impact the reef, and unsustainable catches impact the abundance and diversity of marine species.
	Crown-of-thorns starfish	Crown-of-thorns starfish, while native to the GBR, are a key threat to the Reef when they are found in large numbers because they destroy corals. Excessive nutrients contribute to increasing Crown-of-thorns starfish numbers and compound the issue.

11.4 Existing environment – characteristics and condition

11.4.1 Project area

11.4.1.1 Project location and water features

The Site is on lowlands (9-19 m AMSL) to the south of Mount Tyson approximately 17 km from the coastline. The Site is located approximately 17 km from the boundary of the GBRMP, and approximately 8.5 km from the boundary of the GBRWHA and GBRNHP (refer to **Figure 11.1**).

As stated in **Section 4.1.2**, there is one unnamed drainage feature within Project area and Site. The drainage feature joins a formed sugarcane drain just outside of the eastern border of Lot 1 on RP852238 turning south through a complex network of sugarcane drains that connect to Banyan Creek to the east and the Tully River to the south. The Tully River flows east to its mouth in Rockingham Bay, just south of Tully Heads, where it drains into the Coral Sea.

The GBRMP boundary occurs at the coastline (25 km away from the Site, hydrologically), the GBRWHA and GBRNHP boundaries occur within the lower waters of the Tully River (12.5 km away from the Site, hydrologically [see **Figure 4.2**]).

The Site is relatively flat, with ranging from 0.5-5% across the Site with the majority of the Project area being < 1.5% slope. There are no landscape features associated with erosion known to occur such as gully, tunnel or stream bank erosion within the Project area. There is however erosion evident within the Site near the two dams on Lot 1 on RP852238, likely a result of cattle access to these areas.

The waterways within the Site are ephemeral which temporarily hold water during and immediately after rain events. Following rain events, the drainage line holds water in disconnected and shallow pools. Due to the ephemeral nature of the drainage line, the small, shallow, and disconnected pools, and impacted water quality, the drainage feature was assessed as negligible aquatic habitat values, particularly for MNES.

Figure 11.1 presents a detailed map of watercourses within and downstream of the Site and the extent of the GBRWHA and GBRMP. Figure 4.2 presents the drainage flows from the Earthworks Extent, through the site and downstream through to the GBRWHA and GBRMP.

11.4.1.2 Project soil types and erosion risk

As described in **Section 4.4**, mapping identifies two soil units comprising the Site: Hewitt (Hydrosols) and MSC (Podosols). These soils have different characteristics which influences their erosivity. Hewitt soils are typically poor drainage with a common waterlogged status but no particularly high erosive potential. The MSC soil unit is a miscellaneous type of mapping unit that may contain sodic, dispersive soils with an erosion risk. The majority of the Project area is within the Hewitt soil unit, with only the northern section of the OHTL within the MSC unit. The area within the MSC unit represents minimal soil and ground disturbance including only the footings for three of the five transmission line poles. While it is unconfirmed, the Project has conservatively assumed that MSC soils contain sodic, dispersive soils.

The PESCP (Attexo 2025) developed for the Project has assessed the erosion risk of the Site based on the soils present and mean annual rainfall in accordance with the IECA guidelines (2008). The results of the assessment indicate that the most significant erosion risk to the site is present between December and March, where mean monthly rainfalls are highest (Attexo 2025).

The hazard level associated with the erosion risk on site is a function of additional considerations, including the topography, land cover and management, and erosion control practice factors. The flood modelling indicated a generally very low overland flow velocity within the Site (<0.5 ms^{-1}) (WaterTech 2025) and the PESCP (Attexo 2025) has assessed the hazard levels across the Site, concluding the erosion hazard (based on the RULSE) across the Site is very low to medium through the dryer months of the year (June to September), higher in April, May, October and November and Extreme from December to March. Indicating that the primary driver of erosion risk is the extremely high rainfall of the region during the wetter months, rather than inherent risk in the soil types or physical site characteristics.

11.4.1.3 Existing land use

As discussed in **Section 4.5**, the historical and current land use of the Site includes improved pasture for cattle grazing (current) and previous sugarcane cropping. The historical imagery indicates that clearing of the Site had commenced by 1974 with the remainder of the Site heavily disturbed, if not completely cleared, by 1977. By 1992 a small area of cropping appears in the south-west of the Site, with the remaining cleared areas representative of improved pasture for grazing. Sugarcane cropping is the predominant agricultural land use within the locality and is one of the highest value cropping land uses for the region. The current day use of the Site continues to be cattle grazing.

11.4.2 Downstream waterways

Downstream waterways include a network of sugarcane drains (formed, artificial canals), offering two drainage routes from the Site to the Tully River. The southeastern route flows for 3.4 km through the sugarcane drains into Banyan Creek to the southeast of the Site, then for 4 km through Banyan Creek into the Tully River. The southern drainage route flows through 5 km of sugarcane drains directly into the Tully River to the south of the Site. Flows then continue along the Tully River for 7.5 km before reaching the GBRWHA/GBRNHP boundary and an additional 13.4 km before reaching the Coral Sea and the boundary of the GBRMP.

Like the unnamed drainage feature and wetland areas in the Site, the network of sugarcane drains is ephemeral, fed by overland flow from rainfall events. However, the sugarcane drains are also fed by agricultural activities, such as watering of the surrounding farms. The ephemeral and heavily disturbed nature of the sugarcane drains would limit habitat availability and quality in these drainage features.

Banyan Creek and the Tully River are permanent water features with narrow riparian vegetation lining much of their banks that likely provide suitable habitat for flora and fauna and corridors for movement through the heavily modified landscape for many aquatic and terrestrial species.

Bronzewing Creek
Banyan Creek
Silky Oak Creek
Tully River
Weiss Creek
Boongarri Creek
Murray River
Lagoon Creek
Bedford Creek

Watercourses and the Great Barrier Reef

Figure 11.1

DWG No: RWE-002-026[C]
DATE: 17/10/2025
DRAWN: KB
REVIEWED NC
SCALE (A4): 1:60,000

N

0 km 1

GDA2020

- Site
- Project area
- Disturbance Footprint
- Great Barrier Reef Marine Park
- Great Barrier Reef World Heritage Area
- Sugarcane drains
- Major Watercourse
- Minor Water Course

Tully
Rockingham
Tully Heads

11.4.3 Tully River and the GBR

11.4.3.1 Local Environmental attributes

The mouth of the Tully River is at Tully Heads, opening into the Rockingham Bay along a 35 km stretch of open beaches running from Kennedy Bay in the north to Cardwell and the start of the Hinchenbrook Channel in the south. The river mouth sits between two other large river mouths: the Hull River, 4 km to the north, and the Murray River, 6 km to the south.

Nearby islands to the Tully River mouth include The Family Islands (10-15 km east/northeast) (including Dunk Island) and Goold Island (20 km southeast). Reefs associated with these islands are the closest mapped reefs to the Tully River mouth and are composed of well-developed, island-fringing reef flats, classified as "turbid water reefs" (Browne, Smithers Perry 2012).

"Turbid water reefs" are coral reef ecosystems that thrive in low-light, high-sediment environments. Unlike clear-water reefs, these reefs, including the fringing reefs of the islands nearest to the Tully River mouth, have adapted to survive in conditions where suspended sediments limit light penetration (Browne, Smithers Perry 2012 Larcombe, Costen Woolfe 2001). These reefs have a higher tolerance to sedimentation. Some species of coral in these reefs have the ability to actively shed sediments by secreting a mucus to trap particulates, then utilising wave and tidal forces along with ciliary movements to shed the sediment laden mucus (Browne, Smithers Perry 2012).

The Hinchinbrook Island National Park is located approximately 15 km south of the mouth of the Tully River. The park includes the Hinchinbrook Channel, a vast, sheltered waterway separating the mainland from Hinchinbrook Island. This area features some of the richest and most varied mangrove forests in Australia, providing essential ecological services such as shoreline stabilisation and nutrient cycling. The channel system is crucial for a variety of marine life, including threatened species.

The broader Rockingham Bay environment also comprises habitat features that support various marine species. Dugong (*Dugong dugon*) are known to utilise the region (particularly north from Mission beach), and the estuarine and mangrove habitats around the Tully River mouth are also known refuge habitat for saltwater crocodile (*Crocodylus porosus*). The deep channels and calm waters near Hinchinbrook Island provide a migration corridor for some cetaceans, but the area is not formally zoned as a Whale Protection Area (WPA). The nearest WPA is located approximately 370 km south-east in the Whitsunday region (390 km southeast of the Project area).

11.4.3.2 Heritage values

Besides the specific world and national heritage values supported by the GBR, there are certain sites, such as shipwrecks, that may also hold special heritage value. With respect to shipwreck sites, there are no well-documented shipwrecks immediately adjacent to the discharge location area, with the nearest, most significant shipwreck being the Mermaid HMCS, which sank in 1829. This is located approximately 100 km to the North of the Tully River on Flora Reef, 33 km off the coast from Babinda. The nearest, most significant historical aircraft wreck being the Royal Australian Air Force Catalina approximately 90 km away from the Tully River, 20 km off the coast from Babinda.

11.4.4 Local threats to the GBR

As stated in the Scientific Consensus Statement (SCS) on the GBR (2022), there are different risk levels associated with each catchment that drains into the Reef, relative to the predominant land uses and management practices. In its assessment of the Wet Tropics region, the SCS identified the region as a high risk to the GBR due to water quality risks. Key management issues are DIN and pesticides, attributed to the intensive sugarcane cropping in parts of the region.

Historical land use of the proposed Project area was sugarcane farming (based on historical photography approximately 1980-2004) and, more recently, cattle grazing. The surrounding areas have historically been, and are currently, heavily cropped with sugarcane. Such land use practices in the area may have contributed to the high-risk water quality issues for the catchment.

11.5 Potential impacts

As the Project is not located within the boundaries of the GBR, the Project will not have any direct impacts to the GBRMP, GBRWHA or GBRNHP. However, activities outside the GBR have the potential to indirectly impact the GBR, GBRMP, GBRWHA or GBRNHP. Potential indirect impacts from the Project are associated with potential water quality impacts from increased sediment loads and chemical pollution.

A description of the potential impact pathways associated with these indirect impacts, and an assessment of each potential impact is provided in the following sections.

11.5.1 Potential impact pathways

Potential impact pathways refer to the mechanisms or processes through which a development may impact the environment. The key potential impact pathways considered in this section that are relevant to the Project with respect to the GBR include the following:

- Erosion and sediment – i.e. land disturbance activities may increase sediment transport into nearby waterways, which flow into the GBR.
- Nutrient/pesticide mobilisation – i.e. land disturbance activities may cause soil erosion, mobilising nutrients and/or pesticides into nearby waterways, which flow into the GBR.
- Chemical pollution – i.e. the use of chemicals on site may result in spills that could enter waterways flowing to the GBR.

11.5.2 Potential impacts

The potential impacts to the GBR that may occur as a result of the proposed action in each phase of the development are presented in **Table 11.3**.

Table 11.3 Potential Impacts and Risk Rating

Potential Impact	Stage	Description
Water quality and sedimentation	Con.	During earthworks, sediments may be transported into the unnamed drainage line or wetland areas on the Site. However, due to the small area (6.3 ha) of ground disturbance required, and the incorporation of erosion and sediment controls, the retention of wetland/watercourse vegetation and grassed buffers, and the retention of ground cover vegetation over the majority of the Project area, the resulting potential impact on the GBR is likely to be inconsequential and is unlikely to lead to sedimentation impacts including reduced light availability for coral reefs and seagrass beds, particularly as the reefs closest to the Tully River mouth (e.g. the reefs associated with Dunk Island, Gould Island, Brooke Island and Coombe Island) are 'turbid water reefs' (Browne, Smithers Perry 2012) adapted to turbid waters with a higher tolerance to sedimentation. With consideration of the soil loss modelling (refer to **Section 4.4.2**) for the construction period, ground disturbance activities will be avoided during the months of "Extreme" erosion risk lowering the potential impacts to water quality. Particularly since the modelled water velocities are low, which limits the potential for sediment to be transported by overland flow into the unnamed drainage feature and wetland areas at the Site.
	Ops.	During operations, the activities anticipated to occur on Site are expected not to contribute to erosion or sedimentation. Once operational, for the 20-year lifespan of the Project, onsite activities will be limited to maintaining and operating the BESS infrastructure, which will not expose or disturb soils. The soil loss modelling for the operations period, anticipates minimal erosion risk and an improvement to water quality through maintaining grass cover, exclusion of livestock from wetlands and stabilisation and groundcover improvement in existing areas of erosion near the farm dams on Lot 1 on RP852238 (Attexo 2025). In the event the Project does not proceed, the Project area will likely remain in use for cattle grazing, and the impacts associated with cattle access to wetland areas and erosion concerns at the farm dams will continue unmitigated.
	Decom.	At the end of the Project's operational life, decommissioning activities will include the removal of Project components. These activities are expected to comprise only minimal ground-disturbing activities, limited to the removal of near-surface level cabling, switch-rooms, fencing and battery foundations. There is anticipated to be no land clearing or grading required during this phase, which would reduce the amount of bare ground/soil that is exposed to potential wind and rain erosion. Ground cover vegetation will be reinstated over all areas disturbed.
Erosion causing the mobilisation of nutrients and pesticides migrating into the GBR	Con.	The construction phases of the Project will not require fertilizer or pesticide application, which effectively nullifies the risk of significant quantities of nutrient/pesticide/fertiliser pollution running off into the unnamed drainage feature or wetland areas on Site, and then into Tully River which could impact the GBR. There is therefore considered a negligible risk of nutrients and pesticides migrating into the GBR. In addition, the nutrient loads associated with contaminated run-off from cattle manure will also be reduced due to the proposed action involving the exclusion of cattle from wetland areas. There is low potential for legacy contaminants, including phosphorus* and pesticides that have been bound to soils and/or colloidal minerals, to migrate offsite.

Potential Impact	Stage	Description
	Ops.	The operational phases of the Project will not require fertilizer or large amounts of pesticide application, which effectively nullifies the risk of significant quantities of nutrient/pesticide/fertiliser pollution running off into the unnamed drainage feature or wetland areas on Site, and then into the Tully River which could impact the GBR. With consideration of the soil loss modelling (refer to **Section 4.4.2**) for the operations period, ground disturbance activities will not be required during this Project phase removing significant risk of erosion. The modelled water velocities are low for the Project areas, which limits the potential for erosion and mobilisation of nutrients and pesticides being transported into the unnamed drainage feature and wetland areas at the Site.
	Decom.	The decommissioning phases of the Project will not require fertilizer or pesticide application, which effectively nullifies the risk of significant quantities of nutrient/pesticide/fertiliser pollution running off into the unnamed drainage feature or wetland areas on Site, and then into the Tully River which could impact the GBR. At the end of the Project's operational life, decommissioning activities will include the removal of Project components. These activities are expected to comprise only minimal ground-disturbing activities, limited to the removal of near-surface level cabling, switch-rooms, fencing and battery foundations. There is anticipated to be no land clearing or grading required during this phase, which would reduce the amount of bare ground/soil that is exposed to potential wind and rain erosion. Ground cover vegetation will be reinstated over all areas disturbed. As such, there is a low risk of activities during decommissioning resulting in erosion causing the mobilisation of nutrients and pesticides migrating into the GBR.
Chemical spill on site migrating into the GBR	All	During the construction, operation, and decommissioning phases of the proposed BESS, only minor quantities of fuels, lubricants, and hydraulic fluids will be handled, used, and stored on within the Project area. If spilled, there is a low-to-negligible potential for these chemicals to travel over grassed areas and enter the unnamed drainage feature or wetland areas on Site, and then into the Tully River and the GBR, resulting in health impacts to fish populations and corals. The potential for the Project to result in chemical pollution impacting the GBR is low as there will not be sufficient quantities of pollutants stored on Site to impact the GBR and all chemicals will be stored away from waterways or drainage channels, and any spills are required to be treated immediately.
Cumulative impacts	All	As the Project is unlikely to contribute significantly to GBR impacts, the Project is unlikely to contribute to cumulative impacts in the region.

Note: con. = construction; ops. = operations; decom. = decommissioning.; All = construction, operations, and decommissioning.; * it has been assumed that nitrogen will have been removed through the nitrogen cycle.

11.6 Avoidance, mitigation, and management measures

RWE have carefully considered the potential impacts of the Project, and applied the mitigation hierarchy to avoid, mitigate, and manage the risks. An assessment of the residual risk associated with each potential impact, after the avoidance, mitigation and management measures has been undertaken. Risk ratings were derived applying the likelihood, consequence, and rating matrices provided by the DCCEEW *Environmental Management Plan Guidelines 2024*, which have been replicated as **Table 11.4**, **Table 11.5**, and **Table 11.6**.

To provide a robust impact and risk assessment, the potential impacts of the Project together with the respective avoidance, mitigation and management measures that have been identified, and the subsequent residual risk rating assessment has been detailed in **Table 11.7**.

Table 11.4 Qualitative Risk Analysis Matrix

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

Table 11.5 Definition of Likelihood

Level of Likelihood	How likely is it that this event/issue will occur after control strategies have been put in place?
Highly Likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

Table 11.6 Definitions of Consequence

Levels of Consequence	Definitions
Minor	Minor incident of environmental damage that can be reversed
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts
High	Substantial instances of environmental damage that could be reversed with intensive efforts
Major	Major loss of environmental amenity and real danger of continuing
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage

Table 11.7 Project avoidance, mitigation, and management measures, and residual risk rating

Project Avoidance, mitigation and management measures				Residual Risk Rating			
Potential Impact	**Stage**	**Avoidance**	**Mitigation and Management**	**Likelihood**	**Consequence**	**Residual Risk**	**Justification**
Increased erosion causing sediment to migrate into the GBR	Construction	Due to the low velocities of overland flow (WaterTech 2025), the limited earthworks area, the low slope of the Project area, separation of waterways from the Project area via grassed buffers, and the activities that will occur during construction, the Site is expected to have a low risk of contributing to sedimentation impacts downstream. RWE has avoided the need for a significant amount of land disturbance activities that may contribute to erosion through: • Site selection – the relatively flat site has avoided the need for extensive cut and fill, which will avoid exposing a larger area of bare ground to potential wind and rain erosion. The cleared Project area requires no vegetation clearing for construction, reducing the need to remove vegetated buffers and expose more soil and bare ground. • Construction methodology - RWE intends to utilise an OHTL to connect the battery to the substation rather than trenching underground cabling. This method avoids exposing large areas of bare ground that may contribute to erosion. Fencing will be improved and maintained to avoid the impact of cattle trampling which causes erosion, including in areas proximate to the on-site farm dam and wetland areas. Buffer zones to waterways have been applied to avoid the disturbance of stream bank areas that may result in erosion.	Dust and erosion from stockpiling activities will be managed to avoid escape into waterways which can impact on water quality and aquatic habitats. Earthworks will be staged to minimise erosion risk. Project vehicles and machinery, material laydowns, and stockpiling will remain within the Disturbance Footprint. Topsoil will be stockpiled and protected separately for rehabilitation works. Where relevant, separate subsoils layers and topsoils layers will be replaced in their natural configuration to assist revegetation. ESC measures will be installed prior to disturbance and maintained for the duration of the construction phase to minimise sediment from entering waterways. Soils will be stabilised by using techniques such as mulching, temporary seeding, or erosion control blankets to stabilise exposed soil and minimise erosion. The exposure of bare ground will be minimised by phasing construction activities and undertaking progressive rehabilitation activities. Stabilised entry/exit points to the Site and Project area will be established and traffic movement on the site will be limited to dedicated roads to prevent sediment tracking. Prior to the commencement of construction, the contractor will be required to prepare a site-specific erosion and sediment control plan in accordance with IECA guidelines (2008) and the PESCP (**Appendix D**), which will include detailed information on where erosion and sediment control devices and measures will be installed to manage surface water flow on site. Suitable devices may include silt fences and sediment basins. Further details on the standard and requirements of the ESCP protocols to be adopted on the site are outlined in the PESCP (**Appendix D**).	Unlikely	Minor	Low	The risk of this potential impact has been determined as "low" as: • The overland flow velocities are minimal (WaterTech 2025), which means there is a low potential for sediment laden water to reach the drainage feature or wetland areas on the Site. • There is only a small area (6.3 ha) proposed for earthworks. • The Project area has a low slope which limits the risk of erosion and therefore the potential for sediment to be transported to the unnamed drainage feature or any wetland areas. • The wetland areas and unnamed drainage feature on site are separated from the Disturbance Footprint by grassed buffers allowing settlement of suspended sediment and/or infiltration of overland flow. • Should erosion and sedimentation occur, it is anticipated that any impacts would be minor, temporary in nature and therefore negligible • The range of mitigation and management measures to be implemented are consistent with best practice and considered sufficient to address the risks.
	Operation	Due to the nature of the proposed land use and the activities that will occur on Site during operations, the Site is expected to have a low operational risk of contributing to sedimentation impacts downstream. To ensure this outcome, a permanent 90% groundcover will be maintained throughout the operational life of the Project. Additionally, cattle will be excluded from areas in which erosion is evident or high risk (including the farm dam on Lot 1 on RP852238 and the wetland areas) as cattle activity in such areas is a known driver of erosion and sedimentation, especially when cattle are left to graze proximate to waterways.	Only the established stabilised entry/exit points and access tracks will be used by vehicles to prevent sediment tracking during operations. Grass cover will be maintained, and RWE intend to continue livestock grazing to manage fuel loads or other appropriate fuel load management strategies. RWE's operations team will manage the areas to maintain cover >90% throughout the year. Where bare ground is identified, the causes will be assessed and action taken to re-establish cover and/or protect the area from erosion.	Rare	Minor	Low	The risk of this potential impact has been determined as "low" as: • The overland flow velocities are minimal (WaterTech 2025), which means there is a low potential for sediment laden water to reach the drainage feature or wetland areas on the Site. • There is only a small area (6.3 ha) proposed for earthworks. • The Project area has a low slope which limits the risk of erosion and therefore the potential for sediment to be transported to the unnamed drainage feature or any wetland areas. • The wetland areas and unnamed drainage feature on site are separated from the Disturbance Footprint by grassed buffers allowing settlement of suspended sediment and/or infiltration of overland flow. • Should erosion and sedimentation occur, it is anticipated that any impacts would be minor, temporary in nature and therefore negligible

Project Avoidance, mitigation and management measures				Residual Risk Rating			
Potential Impact	**Stage**	**Avoidance**	**Mitigation and Management**	**Likelihood**	**Consequence**	**Residual Risk**	**Justification**
							• The range of mitigation and management measures to be implemented are consistent with best practice and considered sufficient to address the risks.
	Decommission	Due to the nature of the activities that will occur during decommissioning, the Site is expected to have a low risk of contributing to sedimentation impacts downstream.	A Decommissioning Plan (or similar) will be developed for the Project which will include an ESCP – refer to **Section 10.3.2**. Project vehicles and machinery, and material laydowns will remain within the Disturbance Footprint. Topsoil will be stockpiled and protected separately for rehabilitation works. ESC devices will be installed pre-decommissioning and maintained for the duration of the decommissioning phase to minimise sediment from entering waterways and wetland areas. Soils will be stabilised by using techniques such as mulching, temporary seeding, or erosion control blankets to stabilise exposed soil and minimise erosion. Bare ground exposure will be limited, by phasing decommissioning activities and undertaking progressive rehabilitation activities. Established entry/exit points and traffic movements on the Site will be limited to the designated areas to prevent sediment tracking	Unlikely	Minor	Low	The risk of this potential impact has been determined as "low" as: • The event could occur; however, it is considered unlikely as decommissioning activities will not comprise of significant earthworks, requiring the removal of significant ground cover which may expose dispersive soils to wind and rainfall. • Should the event occur, it is anticipated that any impacts would be temporary in nature as the amount of potential sediment loss would be minor. • The overland flow velocities are minimal (WaterTech 2025), which means there is a low potential for sediment laden water to reach the drainage feature or wetland areas on the Site. • There is only a small area (6.3 ha) proposed for earthworks. • The Project area has a low slope which limits the risk of erosion and therefore the potential for sediment to be transported to the unnamed drainage feature or any wetland areas. • The wetland areas and unnamed drainage feature on site are separated from the Disturbance Footprint by grassed buffers allowing settlement of suspended sediment and/or infiltration of overland flow. • Should erosion and sedimentation occur, it is anticipated that any impacts would be minor, temporary in nature and therefore negligible • The range of mitigation and management measures to be implemented are consistent with best practice and considered sufficient to address the risks.
Mobilisation of nutrients/pesticides migrating into the GBR	Construction	**Avoidance of the application of nutrient and pesticides** The broadscale application of nutrients or pesticides is not proposed and will not be undertaken as part of the Project. However, there may be small and localized amounts of slow-release fertilisers (if required) to re-establish ground cover and small amounts of pesticides to control weeds. Stock will remain on the Site however the exclusion of cattle from the farm dam on Lot 2 on RP852238 and the wetland areas will reduce contamination of the drainage feature, wetland areas and onwards into the Tully River by reducing erosion and manure as a source of nutrients in those areas of ephemeral flow. If any weeds are identified on the site, RWE will preference the use of manual control methods to ensure pesticide use is minimised on the Site. **Avoidance of disturbing legacy nutrient and pesticides**	**Avoidance of disturbing legacy nutrient and pesticides** Bulk earthworks will be minimised during extreme rainfall erosivity periods (i.e. December to March) when soil loss and erosion risks are highest. Soils will be stabilised by using techniques such as mulching, temporary seeding, or erosion control blankets to stabilise exposed soil and minimise erosion. The exposure of bare ground will be minimised by phasing construction activities and undertaking progressive rehabilitation activities. Further details on the standard and requirements of the ESCP protocols to be adopted on the site are outlined in the PESCP (**Appendix D**).	Unlikely	Minor	Low	The risk of this potential impact has been determined as "low" as: • Should the event occur, it is anticipated that any impacts could be reversed as the amount of potential sediment loss, thus mobilised nutrient/pesticide would be minor. • The overland flow velocities are minimal (WaterTech 2025), which means there is a low potential for sediment laden water to reach the drainage feature or wetland areas on the Site. • There is only a small area (6.3 ha) proposed for earthworks. • The Project area has a low slope which limits the risk of erosion and therefore the potential for sediment to be transported to the unnamed drainage feature or any wetland areas.

Project Avoidance, mitigation and management measures				Residual Risk Rating			
Potential Impact	**Stage**	**Avoidance**	**Mitigation and Management**	**Likelihood**	**Consequence**	**Residual Risk**	**Justification**
		RWE has avoided the need for a significant amount of land disturbance activities that may contribute to the disturbance and release of legacy chemicals via: • Site selection – the relatively flat site has avoided the need for extensive cut and fill. • Construction methodology - RWE intends to avoid surface stripping earthworks through its construction methodology by opting to install an OHTL for grid connection rather than underground cabling. This method avoids trenching areas of bare ground that may contribute to erosion and soil loss at the Site.					• The wetland areas and unnamed drainage feature on site are separated from the Disturbance Footprint by grassed buffers allowing settlement of suspended sediment and/or infiltration of overland flow. • Should erosion and sedimentation occur, it is anticipated that any impacts would be minor, temporary in nature and therefore negligible • The range of mitigation and management measures to be implemented are consistent with best practice and considered sufficient to address the risks.
	Operation	**Avoidance of the application of nutrients and pesticides** The application of nutrients or pesticides during operation will be limited to minor amounts of slow-release fertilisers to help establish ground-cover, if required. RWE will keep the Site will exclude cattle from the areas of erosion at dams on Lot 1 on RP852238 and wetland areas on Site to reduce a source of nutrients (manure) and erosion associated with the current land use. RWE will stabilise existing areas of erosion near the dams on Lot 1 on RP852238 and re-establish ground cover in those areas to eliminate a source of soil loss and potential nutrients. If any weeds are identified on the Site, RWE will preference the use of manual methods to minimise the use of pesticides. **Avoidance of disturbing legacy nutrient and pesticides** Significant land disturbance activities are not proposed or required as part of operations.	**Avoidance of disturbing legacy nutrient and pesticides** Maintenance of the groundcover will be undertaken as necessary to ensure there is no bare ground. Where bare ground is identified, the soils will be immediately stabilised using techniques such as mulching, temporary seeding, or erosion control blankets to stabilise exposed soil and minimise erosion.	Rare	Minor	Low	The risk of this potential impact has been determined as "low" as: • Due to the limited amount of ground disturbing activities, the likelihood of erosion impacting the GBR is considered unlikely. • Should the event occur, it is anticipated that any impacts could be reversed as the amount of potential sediment loss, and thus mobilised nutrients/pesticides would be minor.
	Decommission	**Avoidance of the application of nutrients and pesticides** No nutrients or pesticides, with the exception of minor amounts of slow-release fertilisers to help establish ground-cover, if required, will be applied to the site during the decommissioning phase of the Project. If any weeds are identified on the Site, RWE will preference the use of manual methods to minimise the use of pesticides. **Avoidance of disturbing legacy nutrient and pesticides** Significant land disturbance activities are not proposed or required as part of decommissioning.	**Avoidance of disturbing legacy nutrient and pesticides** Where bare ground is exposed, the soils will be immediately stabilised using techniques such as mulching, temporary seeding, or erosion control blankets to stabilise exposed soil and minimise erosion.	Unlikely	Minor	Low	The risk of this potential impact has been determined as "low" as: • The event could occur; however, it is considered unlikely as decommissioning activities will not comprise of significant earthworks, requiring the removal of significant ground cover which may expose dispersive soils to wind and rainfall. • Should the event occur, it is anticipated that any impacts could be reversed as the amount of potential soil loss, thus mobilised nutrients/pesticides would be minor.
Chemical spill on site migrating into the GBR	All	RWE will avoid storing more than minor volumes of chemicals on site during construction, operations, and decommissioning. All chemicals or fuels will be stored away from the unnamed drainage line and wetland areas on Site. No handling of chemicals or refuelling of equipment will occur during inclement weather, including periods of rainfall or high winds.	Fuels and chemicals will be stored in bunded areas to prevent leaks. Storage will be in accordance with Australian Standards and Queensland Legislative requirements. All chemicals or fuels will be stored away from waterways and drainage lines. Any refuelling of equipment will be undertaken on hardstand areas. Hardstand areas suitable for refuelling of equipment will be at least 50 m from waterways on the Site. Fully stocked spill skills will be kept on-site and staff will be trained in emergency responses to spills.	Unlikely	Minor	Low	The risk of this potential impact has been determined as "low" as: • The event could occur; however, it is considered unlikely as the storage, use, and handling of all chemicals will be in accordance with best practice, staff will be trained in the use of the spill kit, which will be kept on site and remain fully stocked. • Should the event occur, it is anticipated that any impacts could be reversed as the amount of potential chemical spills would be minimal (due to minor quantities being kept within the Project area, and a spill kit being on site with staff trained in its use), thus any

Project Avoidance, mitigation and management measures				Residual Risk Rating			
Potential Impact	Stage	Avoidance	Mitigation and Management	Likelihood	Consequence	Residual Risk	Justification
			The CEMP for the Project will provide further details on the standards associated with hazardous chemical use, handling, and storage to be maintained on the site during construction. Prior to operations commencing, an operational environmental management plan will be prepared and implemented, with information on how chemicals will be stored, handled, and used in accordance with best practice and all relevant legislation.				potential spills would be minor in nature, and able to be remediated.

11.7 Alignment with Reef 2050 and SIA

11.7.1 Reef 2050 WQIP

As outlined in **Section 11.2.2** to align with the Reef 2050 WQIP, a Project should demonstrate how it:

- Is managing the primary pollutants of concern, including fine sediment and particulate nutrients, DIN, and pesticides; and
- Aligns with the Reef 2050 WQIP land and catchment management priorities.

The Project's contribution to and consistency with respect to these matters is presented in **Table 11.8** and **Table 11.9**.

Table 11.8 Management for primary pollutants of concern and how the Project contributes to the reef water quality targets

Primary pollutant of concern	Finding / Justification
Fine sediment and particulate nutrients	**Consistent with Reef 2050 WQIP** • Project ESC will meet or exceed best practice standards (IECA 2008). • Vegetation clearing will be avoided and ground disturbance during construction will be minimised. • The Project will establish and maintain high levels of groundcover consistent with IECA 2008 as described in Table 4.2 of the PESCP. • Ground disturbance outside of hardstand areas will be stabilised with vegetative (or other, e.g. rock) groundcover of a minimum >80% cover upon completion of construction. • The Project will not use fertilisers unless identified as required for revegetation. • Upon completion of construction, the Site will be maintained as grass and RWE intend to continue livestock grazing to manage fuel loads or other appropriate fuel load management strategies. RWE's operations team will manage the areas to maintain cover >90% throughout the year. • The Project will fence the wetlands to exclude livestock if grazing is used to manage fuel loads to improve water quality. • Areas of erosion near the dams on Lot 1 on RP852238 will be stabilised and cover re-established to prevent continued erosion.
Pesticides	**Consistent with Reef 2050 WQIP** • Pesticide use for the Project will be minimised by: – The adoption of preventative weed control methods e.g. vehicle and equipment hygiene. – Progressive revegetation of disturbed areas to prevent proliferation of pioneer weed species requiring chemical treatment. – Prioritisation of mechanical and manual weed control methods over herbicide application. – Regular monitoring and early response to weeds identified. – Targeted use of pesticides to minimise spray drift and prevent overuse in accordance with the Project EMP.

Land management targets identified by the Reef 2050 WQIP aim to increase the overall area of land managed using best management practices for water quality outcomes. An overview of the land management practices to be adopted by the Project to align with Reef 2050 WQIP land management targets is provided in **Table 11.9**.

Table 11.9 Project response to Reef 2050 WQIP land and catchment targets

Management Target	Determination / Justification
90% of agricultural land in priority areas managed using best management practice for water quality outcomes	**Consistent with Reef 2050 WQIP** • Grazing within the Site will continue, however exclusion of cattle access to erosion risk areas such as wetlands and farm dams will be enacted, with ESCs implemented in accordance with the IECA 2008 best practice management standard. • Upon completion of construction, the Site will be managed by RWE and cover will be maintained to prevent erosion. • The Project will fence the wetlands to exclude livestock if grazing is used to manage fuel loads to improve water quality. • Areas of erosion near the dams on Lot 1 on RP852238 will be stabilised and ground cover re-established to prevent continued erosion.
90% of grazing lands with greater than 70% groundcover in the late dry season	**Consistent with Reef 2050 WQIP** • A minimum of 80% groundcover will be established across Project area upon completion of construction. • IECA 2008 clearing ahead and land stabilisation timeframes will be abided during construction. • Upon completion of construction, the Site will be maintained as grass and RWE intend to continue livestock grazing to manage fuel loads or other appropriate fuel load management strategies. RWE's operations team will manage the areas to maintain cover >90% throughout the year.
Increase riparian vegetation	**Consistent with Reef 2050 WQIP** • The overhead transmission line may require some trimming of vegetation on the northern boundary of the Site; however this trimming will be minimised as much as possible and clearing will be avoided. • The Project is committed to establishing buffers around wetlands and this is likely to result in an increase in riparian vegetation.
No loss of natural wetlands	**Consistent with Reef 2050 WQIP** • The Project will not result in the loss of any natural wetlands and will establish wetland protection buffers to prevent any potential impacts.
Improved management of urban, industrial and public land uses.	**Not applicable** • The Site does not intersect urban, industrial or public land uses.

As demonstrated in **Table 11.8** and **Table 11.9**, the Project is consistent with the intent of the Reef 2050 WQIP. **Table 11.8** and **Table 11.9** describe the Project's contribution to the primary pollutant load reductions set for the Tully Catchment of the Wet Tropics Great Barrier Reef Catchment based on the nature of the land use, and the avoidance, mitigation and management measures to be implemented. In addition, these actions are also aligned with the land and catchment management measures outlined in the Reef 2050 WQIP.

Land management targets in the Reef 2050 WQIP are based on increasing the area of land managed using best management practices for water quality outcomes. The Project's stormwater and erosion and sediment control measures will have a positive impact on the water quality. Exclusion of cattle from the wetland areas on the Site will also contribute to improvements in water quality and a reduction in erosion and sedimentation.

While an increase in estimated soil loss risk during the project construction phase is predicted, the RUSLE does not account for sediment capture and retention via the implementation of best practice ESCs to which the Project is

committed. Nor does it consider the filtration capacity of grass buffers present both within and immediately adjacent to the Project area.

Additionally, the RUSLE is known over-predict sediment loss due to surface / hillslope erosion (the dominant erosion process occurring at the site) . Measurements undertaken in the savannah grazing lands of Cape York found sediment yields to be overpredicted by 2-4 times applying the RUSLE method (McCloskey, et al 2021).

The Project is consistent with Reef 2050 WQIP, which seeks to improve the quality of water flowing from catchments adjacent to the GBR.

11.7.2 Significant impact assessment

To assess whether the proposed action is likely to have a significant impact on the GBRMP, an assessment has been undertaken in **Table 11.10** against the Guidelines (DoE, 2013) for the GBRMP.

To assess whether the proposed action is likely to have a significant impact on the GBRWHA and GBRNHP, an assessment has been prepared against the Guidelines (DoE, 2013) for a WHA and NHP. The assessment of the Project against these MNES has been presented in **Table 11.11** and **Table 11.12**.

Table 11.10 Significant Impact Assessment of the GBRMP

An action is likely to have a significant impact on the environment of the Great Barrier Reef Marine Park if there is a real chance or possibility that the action will:	**Project response**
Modify, destroy, fragment, isolate or disturb an important, substantial, sensitive or vulnerable area of habitat or ecosystem component such that an adverse impact on marine ecosystem health, functioning or integrity in the Great Barrier Reef Marine Park results	**Unlikely** As demonstrated in **Section 11.5** and **Section 11.6**, there is a low residual risk of the Project adversely impacting water quality (sedimentation, pesticide/fertilizer, and chemical contamination) during construction, operations, and decommissioning. With no worsening of water quality discharged from the Site and the discharge route from the Site to the GBRMP being over 25 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River, it is considered unlikely that the proposed action would modify, destroy, fragment, isolate or disturb an important, substantial, sensitive or vulnerable area of habitat or ecosystem component such that an adverse impact on marine ecosystem health, functioning or integrity in the Great Barrier Reef Marine Park results.
Have a substantial adverse effect on a population of a species or cetacean including its life cycle (for example, breeding, feeding, migration behaviour, life expectancy) and spatial distribution	**Unlikely** As demonstrated in **Section 11.5** and **Section 11.6**, there is a low residual risk of the project adversely impacting the GBR via worsening water quality (sedimentation, pesticide/fertiliser, and chemical contamination) during construction, operations, and decommissioning. With no worsening of water quality discharged from the Site and the discharge route from the Site to the GBRMP being over 25 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River, it is highly unlikely that the proposed action would have a substantial adverse impact on a population of a species or cetacean including on its life cycle (for example, breeding, feeding, migration behaviour, life expectancy) or spatial distribution.
Result in a substantial change in air quality or water quality (including temperature) which may adversely impact on biodiversity, ecological health or integrity or social amenity or human health	**Unlikely** As demonstrated in **Section 11.5** and **Section 11.6**, there is a low residual risk of the Project adversely impacting water or air quality (dust, sedimentation, pesticide/fertiliser, and chemical contamination) during construction, operations, and decommissioning. With no worsening of water quality discharged from the Site and the discharge route from the Site to the GBRMP being over 25 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River (over 15 km away in a straight line), it is considered highly unlikely that the proposed action will result in a substantial change in air

An action is likely to have a significant impact on the environment of the Great Barrier Reef Marine Park if there is a real chance or possibility that the action will:	Project response
	quality or water quality (including temperature) which may adversely impact on biodiversity, ecological health or integrity or social amenity or human health.
Result in a known or potential pest species being introduced or becoming established in the Great Barrier Reef Marine Park	**Unlikely** As the Project is not located within the GBRMP, nor will any activities occur in the waterways that flow to the GBRMP (the GBRMP is over 25 km away downstream through a network of sugarcane drains and the Tully River), it is highly unlikely that the Project will result in any known or potential pest species being introduced or becoming established in the GBRMP.
Result in persistent organic chemicals, heavy metals, or other potentially harmful chemicals accumulating in the marine environment such that biodiversity, ecological integrity, or social amenity or human health may be adversely affected, or	**Unlikely** It is anticipated that the proposed action will have no change to the risk of persistent organic chemicals, and fertilisers entering the marine environment by changing the land use from grazing to the BESS While there is a low likelihood of legacy chemicals within the Project area being disturbed, and/or chemical spills being released into waterways leading to the GBR, it is considered highly unlikely that if this occurred it would adversely impact biodiversity, ecological integrity, or social amenity or human health as outlined in **Section 11.5** and **Section 11.6** and summarised below: • Soil disturbance will be limited spatially and temporarily – only minimal land disturbance is required during the construction phase of the project • Only minor amounts of chemicals will be stored on site, and procedures to reduce the likelihood and ensure spills are immediately contained will be implemented. • Cattle grazing will continue within the Site, however fencing and grass cover condition and percentage will be monitored and maintained as part of the Project, providing lower risk of cattle induced erosion and contamination of surface water. • ESC devices will be located and installed in accordance with best-practice IECA guidelines to limit contaminants running off site. • The discharge route from the Site to the GBRMP is 25 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River.
Have a substantial adverse impact on heritage values of the Great Barrier Reef Marine Park, including damage or destruction of an historic shipwreck.	**Unlikely** As described in **Section 11.4.3.2** there are no specific heritage values, including historic shipwrecks in proximity to the discharge location. The nearest historic shipwreck to the discharge location is located approximately 100 km to the North of the Tully River on Flora Reef, 33 km off the coast from Babinda. The nearest historical aircraft wreck is a Royal Australian Air Force Catalina approximately 90 km away from the Tully River, 20 km off the coast from Babinda.

Table 11.11 Significant Impact Assessment – Great Barrier Reef World Heritage Area

Criteria	Assessment
Criterion (vii): Will the proposed action of itself, or in combination with other relevant impacts, result in loss or	**Unlikely** As demonstrated in **Section 11.5** and **Section 11.6**, there is a low residual risk of the Project potentially impacting the GBRWHA via worsening water quality

Criteria	Assessment
degradation of areas that are essential for maintaining the beauty of the property?	(sedimentation, pesticide/fertilizer, and chemical contamination) during construction, operations, and decommissioning. With no worsening of water quality discharged from the Site and the discharge route from the Site to the GBRWHA being over 12.5 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River, it is considered highly unlikely that the proposed action would result in loss or degradation of areas that are essential for maintaining the beauty of the GBRWHA.
Criterion (viii): Will the proposed action of itself, or in combination with other relevant impacts, impact on the key interrelated and interdependent elements in their natural relationships?	**Unlikely** As demonstrated in **Section 11.5** and **Section 11.6**, there is a low residual risk of the Project potentially impacting the GBRWHA via worsening water quality (sedimentation, pesticide/fertilizer, and chemical contamination) during construction, operations, and decommissioning. With no worsening of water quality discharged from the Site and the discharge route from the Site to the GBRWHA being over 12.5 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River, it is considered highly unlikely that the proposed action would result in impacts to the key interrelated and interdependent elements in their natural relationships and result in an adverse impact to the GBRWHA.
Criterion (ix): Will the proposed action of itself, or in combination with other relevant impacts, result in the loss of necessary elements that are essential for the long-term conservation of the area's ecosystems and biodiversity?	**Unlikely** As demonstrated in **Section 11.5** and **Section 11.6**, there is a low residual risk of the Project potentially impacting the GBRWHA via worsening water quality (sedimentation, pesticide/fertilizer, and chemical contamination) during construction, operations, and decommissioning. With no worsening of water quality discharged from the Site and the discharge route from the Site to the GBRWHA being over 12.5 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River, it is considered highly unlikely that the proposed action would result in the loss of necessary elements that are essential for the long-term conservation of the area's ecosystems and biodiversity.
Criterion (x): Will the proposed action of itself, or in combination with other relevant impacts, result in the loss or degradation of habitats required for maintaining the diverse fauna and flora of the region?	**Unlikely** As demonstrated in **Section 11.5** and **Section 11.6**, there is a low residual risk of the Project potentially impacting the GBRWHA via worsening water quality (sedimentation, pesticide/fertilizer, and chemical contamination) during construction, operations, and decommissioning. With no worsening of water quality discharged from the Site and the discharge route from the Site to the GBRWHA being over 12.5 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River, it is considered highly unlikely that the proposed action would result in the loss or degradation of habitats required for maintaining the diverse fauna and flora of the region.

Table 11.12 Significant Impact Assessment – World Heritage Area/National Heritage Place

Criteria	Assessment
Will the action modify or inhibit ecological processes in a National Heritage place?	**Unlikely** As demonstrated in **Section 11.5** and **Section 11.6,** there is a low residual risk of the project potentially impacting the GBRNHA via worsening water quality (sedimentation, pesticide/fertilizer, and chemical contamination) during construction, operations, and decommissioning. With no worsening of water quality discharged from the Site and the discharge route from the Site to the GBRNHP being over 12.5 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River, it is considered highly unlikely that the proposed action would result in the modification or inhabitation of ecological processes in the GBRNHP. There are no other NHPs in proximity to the Site, or ultimate discharge

Criteria	Assessment
	location of the downstream waterways associated with the Site. As such, it is considered highly unlikely that the action will modify or inhibit ecological processes in a National Heritage place.
Will the action reduce the diversity or modify the composition of plant and animal species in all or part of a World Heritage Property?	**Unlikely** As demonstrated in **Section 11.5** and **Section 11.6,** there is a low residual risk of the Project potentially impacting the GBRWHA via worsening water quality (sedimentation, pesticide/fertilizer, and chemical contamination) during construction, operations, and decommissioning. With no worsening of water quality discharged from the Site and the discharge route from the Site to the GBRWHA being over 12.5 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River, it is considered highly unlikely that the proposed action would result in a reduction of the diversity, or modification of the composition of plant and animal species in the GBRWHA. There are no other WHAs in proximity to the Project, or ultimate discharge location of the downstream waterways associated with the Project. PAs such, it is considered highly unlikely that the action will reduce the diversity or modify the composition of plant and animal species in all or part of a World Heritage Property.
Will the action fragment, isolate or substantially damage habitat important for the conservation of biological diversity in a World Heritage property?	**Unlikely** As demonstrated in **Section 11.5** and **Section 11.6,** there is a low residual risk of the Project potentially impacting the GBRWHA via worsening water quality (sedimentation, pesticide/fertilizer, and chemical contamination) during construction, operations, and decommissioning. With no worsening of water quality discharged from the Site and the discharge route from the Site to the GBRWHA being over 12.5 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River, it is considered highly unlikely that the proposed action would result in the fragmentation, isolation, or substantive damage to habitat for the conservation of biological diversity in the GBRWHA. There are no other WHAs in proximity to the Project, or ultimate discharge location of the downstream waterways associated with the Site. As such, it is considered highly unlikely that the action would result in the fragmentation, isolation, or substantive damage to habitat for the conservation of biological diversity in all or part of a World Heritage Property.
Will the action cause a long-term reduction in rare, endemic or unique plant or animal populations or species in a World Heritage property?	**Unlikely** As demonstrated in **Section 11.5** and **Section 11.6,** there is a low residual risk of the Project potentially impacting the GBRWHA via worsening water quality (sedimentation, pesticide/fertilizer, and chemical contamination) during construction, operations, and decommissioning. While the broader Tully River and catchment are known to contain unique ecosystems, flora and fauna, particularly within the Wet Tropics World Heritage Area, these areas and habitats occur only upstream of the Site. As they are upstream via the Tully River and through the catchment and the Project requires no entry to these areas, there are no vectors for impact to these areas. With no worsening of water quality discharged from the Site and the discharge route from the Site to the GBRWHA being over 12.5 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River, it is considered extremely unlikely that any impact would cause a long-term reduction in rare, endemic, or unique plant or animal populations or species in the GBRWHA. As there are no other WHAs in proximity to the Site, it is considered highly unlikely that the action would cause a long-term reduction in rare, endemic, or unique plant or animal populations or species in a World Heritage Property.
Will the action fragment, isolate or substantially damage habitat for rare, endemic or unique animal populations or species in a World Heritage property?	**Unlikely** As demonstrated in **Section 11.5** and **Section 11.6,** there is a low residual risk of the project potentially impacting the GBRWHA via worsening water quality (sedimentation, pesticide/fertilizer, and chemical contamination) during construction, operations, and decommissioning. While the broader Tully River and catchment are known to contain unique ecosystems, flora and fauna, particularly within the Wet Tropics World Heritage Area, these areas and habitats occur

Criteria	Assessment
	only upstream of the Site. As they are upstream via the Tully River and through the catchment and the Project requires no entry to these areas, there are no vectors for impact to these areas. With no worsening of water quality discharged from the Site and the discharge route from the Site to the GBRWHA being over 12.5 km downstream via a network of sugarcane drains through active sugarcane farms and the Tully River, it considered extremely unlikely that any impact would fragment, isolate, or substantively damage habitat for rare, endemic, or unique plant or animal populations or species in the GBRWHA. As there are no other WHAs in proximity to the Site, it is considered highly unlikely that the action would fragment, isolate, or substantively damage habitat for rare, endemic, or unique plant or animal populations or species in a World Heritage Property.

11.7.3 Assessment summary

As described in **Section 11.7.1** and **Section 11.7.2,** the proposed action is:

- Aligned to the Reef 2050 WQIP; and
- Unlikely to result in a significant impact to the GBRMP, GBRWHA, and/or GBRNHP.

This determination was reached based on:

- The proposed action is located outside of the GBRMP, GBRWHA, and GBRNHP and will not have any direct impacts on the GBRMP, GBRWHA, and GBRNHP.
  - The downstream distance from the Project area to the GBRMP is over 25 km and the straight-line distance is over 15 km
  - The downstream distance from the Project area to the GBRWHA and GBRNHP is over 12.5 km and the straight-line distance is over 8.5 km
- The indirect impacts to the GBRMP, GBRWHA, and GBRNHP associated with the proposed action contributing to worsening water quality via sedimentation, nutrient and pesticide pollution have been assessed as having a low residual risk rating, based on the biophysical conditions of the Site and surrounding landscape, the nature of the proposed action, and the avoidance, mitigation and management actions to be implemented.
- Initial earthworks and major land disturbing activities will be minimised during extreme rainfall erosivity periods (i.e. December to March). Where major land disturbing works are required during extreme rainfall erosivity periods, a commensurate level of erosion and sediment control must be adopted. The implementation of best practice ESC measures, as described in the PESCP (**Appendix D**), will effectively mitigate erosion and sedimentation risks.

The proposed action has the potential to reduce pressures on the GBR, as the Project would improve stormwater management on the Site and add restrictions to cattle accessing wetland and farm dam areas providing potential water quality improvements. Finally, the BESS is positively contributing to increased power grid efficiency and Australia's commitment to reduce its greenhouse gas emissions, which is the leading cause of climate change, and the key threat to the long-term health of the GBR.

12. Environmental objectives and performance indicators

Environmental objectives for the Project have been established to align with the MNES identified during this assessment and have been designed specifically targeting the protection of the Great Barrier Reef. The objectives are supported by a set of performance indicators, which serve as measurable benchmarks to evaluate whether the objectives are being achieved.

Table 12.1 details the environmental objectives and their corresponding performance indicators developed for the GBR.

In instances where the performance indicators suggest that the environmental objectives are not being met, adaptive management strategies will be implemented. These strategies will be regularly assessed to ensure their effectiveness in mitigating identified issues. Ongoing management efforts will be detailed within the relevant management plans, particularly the CEMP and PESCP. Should monitoring outcomes indicate that environmental targets have not been, or may not be, achieved, these adaptive management strategies will be refined and activated as necessary to maintain compliance with environmental objectives and improved outcomes.

This approach ensures that the Project remains responsive to ecological variances, thereby upholding the integrity of the MNES throughout the Project's lifecycle.

Table 12.1 Environmental objectives and performance indicators – GBR

Environmental Objective	Performance Indicator
Minimise sediment runoff and erosion from construction activities.	Sediment and erosion control measures (e.g. silt fences, sediment basins) installed and maintained in compliance with both the PESCP and the construction contractor's ESCP.
Timing of earthworks	Initial earthworks and major land disturbing activities will be minimised during extreme rainfall erosivity periods (i.e. December to April).
Prevent contamination of surface and groundwater from construction and operation activities.	No contamination of soils, surface water groundwater as a result of any spills or leaks.
	Proper containment and disposal of hazardous substances, including documented inspections and compliance audits.
Maintain vegetative cover and rehabilitate disturbed areas to prevent soil loss and nutrient export.	The best practice land clearing and rehabilitation requirements identified for erosion risk rankings specified in IECA 2008, Table 4.4.7 pg. 4.16 will be applied during Project construction. IECA best practice land clearing and rehabilitation requirements for the risk values attributed to the Project are described in the PESCP.
Ensure stormwater management prevents pollutants from entering sensitive receiving environments.	Implementation of a site-specific stormwater management plan with functional treatment systems (e.g. vegetated swales, retention ponds).
Limit impacts of dust generation on water quality.	Dust suppression measures (e.g. watering, stabilisation) implemented during dry and windy conditions during the construction and decommissioning phases of the Project.
Comply with conditions of approval.	Compliance with all conditions of approval. Where a non-compliance or potential non-compliance is identified, undertake investigations and corrective actions in accordance with approval conditions or regulatory requirements.
	Comply with regulator notification requirements.
	No repeat of non-compliances.

13. Offset assessment

Under the EPBC Act, environmental offsets are required when a proposed action is likely to have a significant impact on an MNES. Offsets are considered part of the broader environmental impact assessment process under the EPBC Act, and they are intended to compensate for the residual adverse impacts that cannot be avoided or mitigated.

Offsets are considered only after all reasonable measures have been taken to avoid or mitigate the environmental impact. Offsets are often imposed as part of the conditions attached to the approval of a project under the EPBC Act, which specify the type of offset required and the monitoring and reporting arrangements.

If a Project has a significant residual impact on MNES, the proponent must provide offsets to counterbalance the impact. Offsets can take the form of habitat restoration, land acquisition for conservation, or funding conservation activities related to the impacted species or ecological community. Offsets are considered a last resort after all efforts to avoid or mitigate impacts have been exhausted. If an action can be redesigned or altered to completely avoid impacts on MNES, or if mitigation measures are sufficient to reduce the impacts to a non-significant level, offsets are not required. As such, under the EPBC Act, offsets are only required if a proposed action is likely to have a significant impact on MNES. If the action is assessed and determined not to have a significant impact on MNES, offsets are not required.

The Project has been designed to avoid all direct impact to potential MNES habitat identified within the Project area.

The field surveys did not identify any TEC, threatened flora or threatened fauna species, and the Project area is largely devoid of any suitable habitat for threatened species. As such, offsets for TEC, threatened flora, or threatened fauna species are not proposed.

The Project has been assessed as being unlikely to directly or indirectly impact the values of the GBR, with the suite of mitigation measures developed further minimising any potential indirect/downstream impacts to water quality. As a result, offsets for impacts to the GBR are not proposed.

14. Ecological sustainable development

Section 3A of the EPBC Act sets out the principles of ecologically sustainable development that apply where MNES may be impacted by a proposal:

- Principle 1: Decision-making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations.
- Principle 2: If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- Principle 3: The principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
- Principle 4: The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.
- Principle 5: Improved valuation, pricing and incentive mechanisms should be promoted.

The Project has been developed with these principles in mind. In particular, the precautionary principle is utilised in the implementation of proven and achievable mitigation measures, and consideration of these measures in assessing the potential for significant residual impacts.

The Project design has been refined in response to ecological field data in order to avoid, minimise and mitigate potential adverse impacts. In particular, the re-design of the project has avoided areas of higher ecological constraint, and the Project is situated in previously areas.

With consideration of the extensive assessment included within this report, it is concluded that the Project represents a sound land use planning outcome for the Site and embodies the principles of ESD.

In summary, the Project design adopts leading practice in the industry and avoids most potential environmental impacts, and where unavoidable (or residual) impacts occur they will be effectively managed to meet the applicable regulatory standards. The Project is therefore recommended to be approved on its planning and environmental merit.

15. Conclusion

RWE is proposing the Tully BESS Project located approximately 4 km south-west of the township of Tully in north Queensland. The Project will have a capacity of up to 200 MW / 800 MWh. Grid connection is proposed via the neighbouring PQ Tully substation.

Comprehensive desktop assessments and a field survey were undertaken to identify and confirm the ecological values within the Site, Project area, and Disturbance Footprint. The field surveys identified that the Project area holds only negligible values for threatened flora and fauna species. Due to the historical land-use of the Site and surrounding landscape, which has been cleared of vegetation, as well as the on-going impacts associated with the current land use of cattle grazing, the Project area was assessed as providing unsuitable habitat for MNES fauna and flora species.

The Likelihood of Occurrence Assessment considered the field survey results, the desktop review of published literature, conservation advice, online databases and spatial information. The Likelihood of Occurrence Assessment identified that MNES were assessed as having a reduced likelihood of being present in the Project areas, having been assessed as either the 'Potential to occur' or 'Unlikely to occur'.

The Project has followed the mitigation hierarchy of firstly avoiding then mitigating impacts. The Project has had several design iterations which have considered the ecological values and avoided areas identified as MNES habitat. The Disturbance Footprint has been designed to preferentially locate Project infrastructure in already cleared areas and avoid MNES.

The Project has incorporated a wide range of mitigation measures to ensure that water quality is maintained, and there are no significant impacts to the values of the GBR. A range of Project specific management plans have been prepared and will be developed to minimise and manage impacts to vegetation and fauna habitat and water quality. The implementation of the management plans are considered sufficient to prevent and/or minimise potential impacts.

The Project has been assessed against the Guidelines (DoE, 2013) to assess the likelihood of the Project resulting in a significant impact to the GBRMP, GBRWHA and/or GBRNHP, which are the only MNES considered relevant to the Site. The assessment identified the Project is unlikely to result in a significant impact. As a result of this assessment, offsetting is not proposed.

This MNES report demonstrates that the Project can be constructed, operated, and decommissioned in a manner that is consistent with the principles of the EPBC Act and should therefore be deemed 'not a controlled action' if the Project is undertaken in accordance with documentation provided with this report.

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Attexo

Appendix A

Desktop Searches

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. Please see the caveat for interpretation of information provided here.

Report created: 25-Nov-2025

Summary

Matters of National Environment 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:	2
National Heritage Places:	3
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	47
Listed Migratory Species:	19

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 https://www.dcceew.gov.au/parks-heritage/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 Lands:	None
Commonwealth Heritage Places:	1
Listed Marine Species:	27
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	9
Regional Forest Agreements:	None
Nationally Important Wetlands:	2
EPBC Act Referrals:	5
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

World Heritage Properties [Resource Information]

Name	State	Legal Status	Buffer Status
Great Barrier Reef	QLD	Declared property	In buffer area only
Wet Tropics of Queensland	QLD	Declared property	In buffer area only

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Indigenous			
Wet Tropics World Heritage Area (Indigenous Values)	QLD	Within listed place	In buffer area only
Natural			
Great Barrier Reef	QLD	Listed place	In buffer area only
Wet Tropics of Queensland	QLD	Listed place	In buffer area only

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.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Broad leaf tea-tree (Melaleuca viridiflora) woodlands in high rainfall coastal north Queensland	Endangered	Community likely to occur within area	In buffer area only
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area	In buffer area only
Lowland tropical rainforest of the Wet Tropics	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Casuarius casuarius listed as Casuarius casuarius johnsonii Southern Cassowary [1096]	Endangered	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area	In buffer area only
Tyto novaehollandiae kimberli			
Masked Owl (northern) [26048]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FISH			
Cairnsichthys rhombosomoides			
Cairns Rainbowfish, Northern Soft-spined Sunfish [86541]	Endangered	Species or species habitat may occur within area	In buffer area only
Stiphodon semoni			
Opal Cling Goby [83909]	Critically Endangered	Species or species habitat may occur within area	In feature area
FROG			
Litoria dayi			
Australian Lace-lid, Lace-eyed Tree Frog, Day's Big-eyed Treefrog [86707]	Vulnerable	Species or species habitat known to occur within area	In feature area
Litoria nyakalensis			
Mountain Mist Frog, Nyakala Frog [1820]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
MAMMAL			
Dasyurus hallucatus			
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	In feature area
Dasyurus maculatus gracilis			
Spotted-tailed Quoll (North Queensland), Yarri [64475]	Endangered	Species or species habitat likely to occur within area	In feature area
Hipposideros semoni			
Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat [180]	Vulnerable	Species or species habitat may occur within area	In feature area
Macroderma gigas			
Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Mesembriomys gouldii rattoides](#)			
Black-footed Tree-rat (north Queensland), Shaggy Rabbit-rat [87620]	Vulnerable	Species or species habitat may occur within area	In feature area
[Petauroides minor](#)			
Greater Glider (northern), Greater Glider (north-eastern Queensland) [92008]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Petaurus gracilis](#)			
Mahogany Glider [26775]	Endangered	Species or species habitat known to occur within area	In feature 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]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Pteropus conspicillatus](#)			
Spectacled Flying-fox [185]	Endangered	Roosting known to occur within area	In feature area
[Rhinolophus robertsi](#)			
Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat [87639]	Vulnerable	Species or species habitat may occur within area	In feature area
[Saccolaimus saccolaimus nudicluniatus](#)			
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat [66889]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Xeromys myoides](#)			
Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
PLANT			
[Canarium acutifolium](#)			
[23956]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Carronia pedicellata](#)			
[24178]	Endangered	Species or species habitat likely to occur within area	In feature area
[Chingia australis](#)			
[24603]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diplazium cordifolium [15585]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eleocharis retroflexa a sedge [23672]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Leichhardtia araujacea [91900]	Critically Endangered	Species or species habitat may occur within area	In feature area
Myrmecodia beccarii Ant Plant [11852]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area	In buffer area only
Phaius pictus [22564]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phlegmariurus filiformis Rat's Tail Tassel-fern [86551]	Endangered	Species or species habitat may occur within area	In feature area
Phlegmariurus squarrosus Rock Tassel-fern, Water Tassel-fern [86556]	Critically Endangered	Species or species habitat may occur within area	In feature area
Phlegmariurus tetrastichoides Square Tassel Fern [86555]	Vulnerable	Species or species habitat may occur within area	In feature area
Plesioneuron tuberculatum [24604]	Endangered	Species or species habitat may occur within area	In feature area
Polyphlebium endlicherianum Middle Filmy Fern [87494]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Polyscias bellendenkerensis [7237]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Zeuxine polygonoides Velvet Jewel Orchid [46794]	Vulnerable	Species or species habitat may occur within area	In buffer area only
SHARK			
Pristis pristis Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat may occur within area	In buffer area only

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Marine Species			
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Pristis pristis Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Endangered	Species or species habitat may occur within area	In buffer area only
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hirundo rustica Barn Swallow [662]		Species or species habitat likely to occur within area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat likely to occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat likely to occur within area	In buffer area only
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Heritage Places			[Resource Information]
Name	State	Status	Buffer Status
Natural			
Tully Training Area	QLD	Listed place	In buffer area only

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anseranas semipalmata			
Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Vulnerable	Species or species habitat may occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
[Chalcites osculans as Chrysococcyx osculans](#) Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
[Hirundo rustica](#) Barn Swallow [662]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat likely to occur within area	In buffer area only
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Reptile			
Crocodylus porosus			
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Alcock	Forest Reserve	QLD	In buffer area only
Ant Plant West	Nature Refuge	QLD	In buffer area only
Djilgarin	Conservation Park	QLD	In buffer area only
Gulngay	National Park	QLD	In buffer area only
Hull River	National Park	QLD	In buffer area only
Jalum	Conservation Park	QLD	In buffer area only
Mount Mackay	National Park	QLD	In buffer area only
Murray Upper Wetlands	Nature Refuge	QLD	In buffer area only
Tully Gorge	National Park	QLD	In buffer area only

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Edmund Kennedy Wetlands	QLD	In buffer area only
Tully River - Murray River Floodplains	QLD	In feature area

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
275/132kVTransmission Line Replacement Project	2010/5346	Controlled Action	Post-Approval	In feature area
High Voltage Electricity Transmission Line	2001/232	Controlled Action	Post-Approval	In feature area
Not controlled action				
Mission Beach sewerage scheme	2002/827	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				
Bruce Highway Upgrade	2006/2967	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Waste Transfer Station (Minor)	2001/284	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and 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

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

Where little information is available for a 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 detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

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
-Ocean Biogeographic Information System
-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.

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resources.QLD.GOV.AU

Vegetation management report

For Lot: 1 Plan: RP852238
9/5/2024

Queensland Government

This publication has been compiled by Operations Support, Department of Resources.

Recent changes

Updated mapping

Updated vegetation mapping was released on 22 November 2023 and includes the most recent Queensland Herbarium scientific updates to the Regulated Vegetation Management Map, regional ecosystems, essential habitat, wetland and high-value regrowth mapping.

The Department of Environment, Science and Innovation have also updated their koala protection mapping to align with the Queensland Herbarium scientific updates.

The latest version (v10) of the Protected Plants Flora Survey Trigger Map (trigger map) was released on 6 September 2023.

Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:
Property details - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s) and catchment(s);

Vegetation management framework - an explanation of the application of the framework and contact details for the Department of Resources who administer the framework;

Vegetation management framework details for the specified Lot on Plan including:

- the vegetation management categories on the property;
- the vegetation management regional ecosystems on the property;
- vegetation management watercourses or drainage features on the property;
- vegetation management wetlands on the property;
- vegetation management essential habitat on the property;
- whether any area management plans are associated with the property;
- whether the property is coastal or non-coastal; and
- whether the property is mapped as Agricultural Land Class A or B;

Protected plant framework - an explanation of the application of the framework and contact details for the Department of Environment, Science and Innovation who administer the framework, including:

- high risk areas on the protected plant flora survey trigger map for the property;

Koala protection framework - an explanation of the application of the framework and contact details for the Department of Environment, Science and Innovation who administer the framework; and

Koala protection framework details for the specified Lot on Plan including:

- the koala district the property is located in;
- koala priority areas on the property;
- core and locally refined koala habitat areas on the property;
- whether the lot is located in an identified koala broad-hectare area; and
- koala habitat regional ecosystems on the property for core koala habitat areas.

This information will assist you to determine your options for managing vegetation under:
- the vegetation management framework, which may include:

- exempt clearing work;
- accepted development vegetation clearing code;
- an area management plan;
- a development approval;

- the protected plant framework, which may include:

- the need to undertake a flora survey;
- exempt clearing;
- a protected plant clearing permit;

- the koala protection framework, which may include:

- exempted development;
- a development approval;
- the need to undertake clearing sequentially and in the presence of a koala spotter.

Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 8 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.

Table of Contents

1. Property details

1.1 Tenure and title area

All of the lot, plan, tenure and title area information associated with property Lot: 1 Plan: RP852238 are listed in Table 1.

Table 1: Lot, plan, tenure and title area information for the property

Lot	Plan	Tenure	Property title area (sq metres)
1	RP852238	Freehold	206,000
N	RP730844	Easement	19,910
D	SP233167	Easement	17,920
E	SP338637	Easement	999

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

Does the property Lot: 1 Plan: RP852238 have a freehold tenure and is in the Wet Tropics of Queensland World Heritage Area?

No, this property is not located in the Wet Tropics of Queensland World Heritage Area.

1.2 Property location

Table 2 provides a summary of the locations for property Lot: 1 Plan: RP852238, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Cassowary Coast Regional	Tully	Wet Tropics	Tully

2. Vegetation management framework (administered by the Department of Resources)

The *Vegetation Management Act 1999* (VMA), the Vegetation Management Regulation 2012, the *Planning Act 2016* and the Planning Regulation 2017, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem identified in the Vegetation Management Regional Ecosystem Description Database (VM REDD) as having a grassland structure; and
- a mangrove.

2.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify the Department of Resources or obtain an approval under the vegetation management framework. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 4.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval under the vegetation management framework. For all other land tenures, contact the Department of Resources before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at

https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/exemptions/.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Exempt clearing work may require approval under other Commonwealth, State or Local Government laws, or local government planning schemes. Contact the Department of Resources prior to clearing in any of these areas.

2.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at

https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/codes/

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify the Department of Resources before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at
https://vegetation-apps.dnrm.qld.gov.au

2.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing under the vegetation management framework. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

On 8 March 2020, AMPs ended for fodder harvesting, managing thickened vegetation and managing encroachment. New notifications cannot be made for these AMPs. You will need to consider options for fodder harvesting, managing thickened vegetation or encroachment under a relevant accepted development vegetation clearing code or apply for a development approval.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an Area Management Plan applies to your property for which you can make a new notification, it will be listed in Section 3.6 of this report. Before clearing under one of these AMPs, you must first notify the Department of Resources and then follow the conditions and requirements listed in the AMP.

https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/area-management-plans

2.4 Development approvals

If under the vegetation management framework your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval. Information on how to apply for a development approval is available at

https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/development

2.5. Contact information for the Department of Resources

For further information on the vegetation management framework:

Phone 135VEG (135 834)

Email vegetation@resources.qld.gov.au

Visit https://www.resources.qld.gov.au/?contact=vegetation to submit an online enquiry.

3. Vegetation management framework for Lot: 1 Plan: RP852238

3.1 Vegetation categories

The vegetation categories on your property are shown on the regulated vegetation management map in section 4.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

Table 3: Vegetation categories for subject property

Vegetation category	Area (ha)
Category C	0.01
Category R	4.15
Category X	16.44

Table 4: Description of vegetation categories

Category	Colour on Map	Description	Requirements / options under the vegetation management framework
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact the Department of Resources to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing on freehold land, indigenous land and leasehold land for agriculture and grazing purposes is considered exempt clearing work under the vegetation management framework. Contact the Department of Resources to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

Property Map of Assessable Vegetation (PMAV)

There is no Property Map of Assessable Vegetation (PMAV) present on this property.

3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 4.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at
https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/

Table 5: Regional ecosystems present on subject property

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
7.3.5	Least concern	C	0.01	Melaleuca quinquenervia and/or Melaleuca cajuputi subsp. platyphylla closed forest to shrubland on poorly drained alluvial plains	Dense
7.3.5	Least concern	R	2.20	Melaleuca quinquenervia and/or Melaleuca cajuputi subsp. platyphylla closed forest to shrubland on poorly drained alluvial plains	Dense
7.3.8	Least concern	C	less than 0.01	Melaleuca viridiflora +/- Eucalyptus spp. +/- Lophostemon suaveolens open forest to open woodland on poorly drained alluvial plains	Mid-dense
7.3.8	Least concern	R	1.95	Melaleuca viridiflora +/- Eucalyptus spp. +/- Lophostemon suaveolens open forest to open woodland on poorly drained alluvial plains	Mid-dense
non-rem	None	X	16.44	None	None

Please note:
1. All area and area derived figures included in this table 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.
2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work;
- accepted development vegetation clearing codes;
- performance outcomes in State Code 16 of the State Development Assessment Provisions (SDAP).

3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 4.2.

3.4 Wetlands

Vegetation management wetlands are present on this property and are shown on the vegetation management supporting map in section 4.2 of this report.

3.5 Essential habitat

Under the VMA, essential habitat for protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA) as critically endangered, endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected

under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 4.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map -

1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or
2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

Category A and/or Category B and/or Category C

Table 6: Essential habitat in Category A and/or Category B and/or Category C
No records

3.6 Area Management Plan(s)

Nil

3.7 Coastal or non-coastal

For the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP), this property is regarded as*

Coastal

*See also Map 4.3

3.8 Agricultural Land Class A or B

The following can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code:

Does this lot contain land that is mapped as Agricultural Land Class A or B in the State Planning Interactive Mapping System?
Class A (with urban areas masked as per SPP): 20.61 ha

No Class B

Note - This confirms Agricultural Land Classes as per the State Planning Interactive Mapping System only. This response does not include Agricultural Land Classes identified under local government planning schemes. For further information, check the Planning Scheme for your local government area.

See Map 4.4 to identify the location and extent of Class A and/or Class B Agricultural land on Lot: 1 Plan: RP852238.

4. Vegetation management framework maps

Vegetation management maps included in this report may also be requested individually at:
https://www.resources.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form

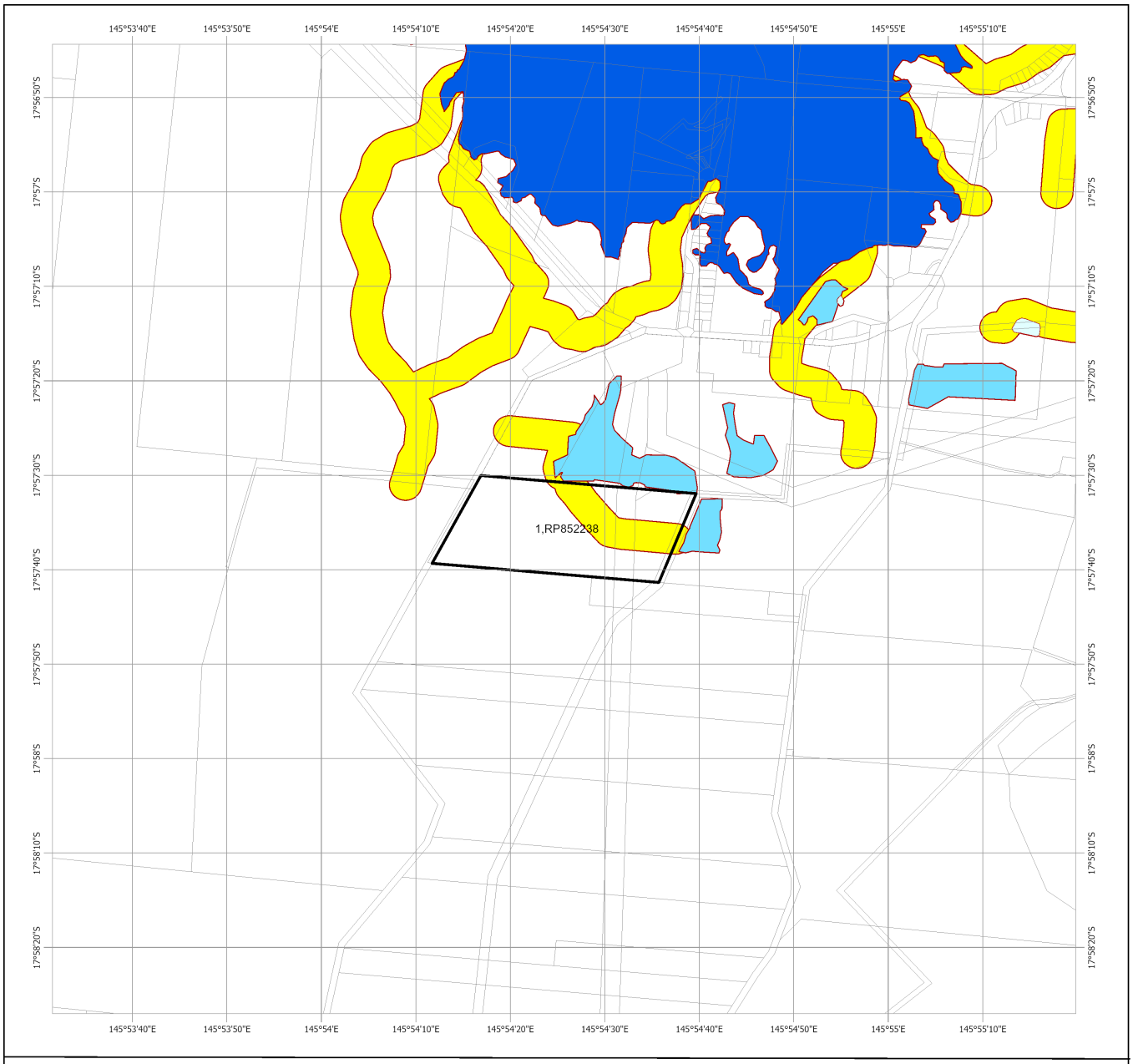
Regulated vegetation management map
The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new property maps of assessable vegetation (PMAV).

Vegetation management supporting map
The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

Coastal/non-coastal map
The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP).

Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture
The Agricultural Land Class map confirms the location and extent of land mapped as Agricultural Land Classes A or B as identified on the State Planning Interactive Mapping System. Please note that this map does not include areas identified as Agricultural Land Class A or B in local government planning schemes. This map can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code.

4.1 Regulated vegetation management map



Regulated Vegetation Management Map

Category A area (Vegetation offsets/compliance notices/VDecs)
Category B area (Remnant vegetation)
Category C area (High-value regrowth vegetation)
Category R area (Reef regrowth watercourse vegetation)
Category X area (Exempt clearing work on Freehold, Indigenous and Leasehold land)
Water
Other land parcel boundaries
Selected Lot and Plan

LOCALITY DIAGRAM

N

0 180 360 540 720 900 m

This product is displayed in:
GDA2020

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Resources makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

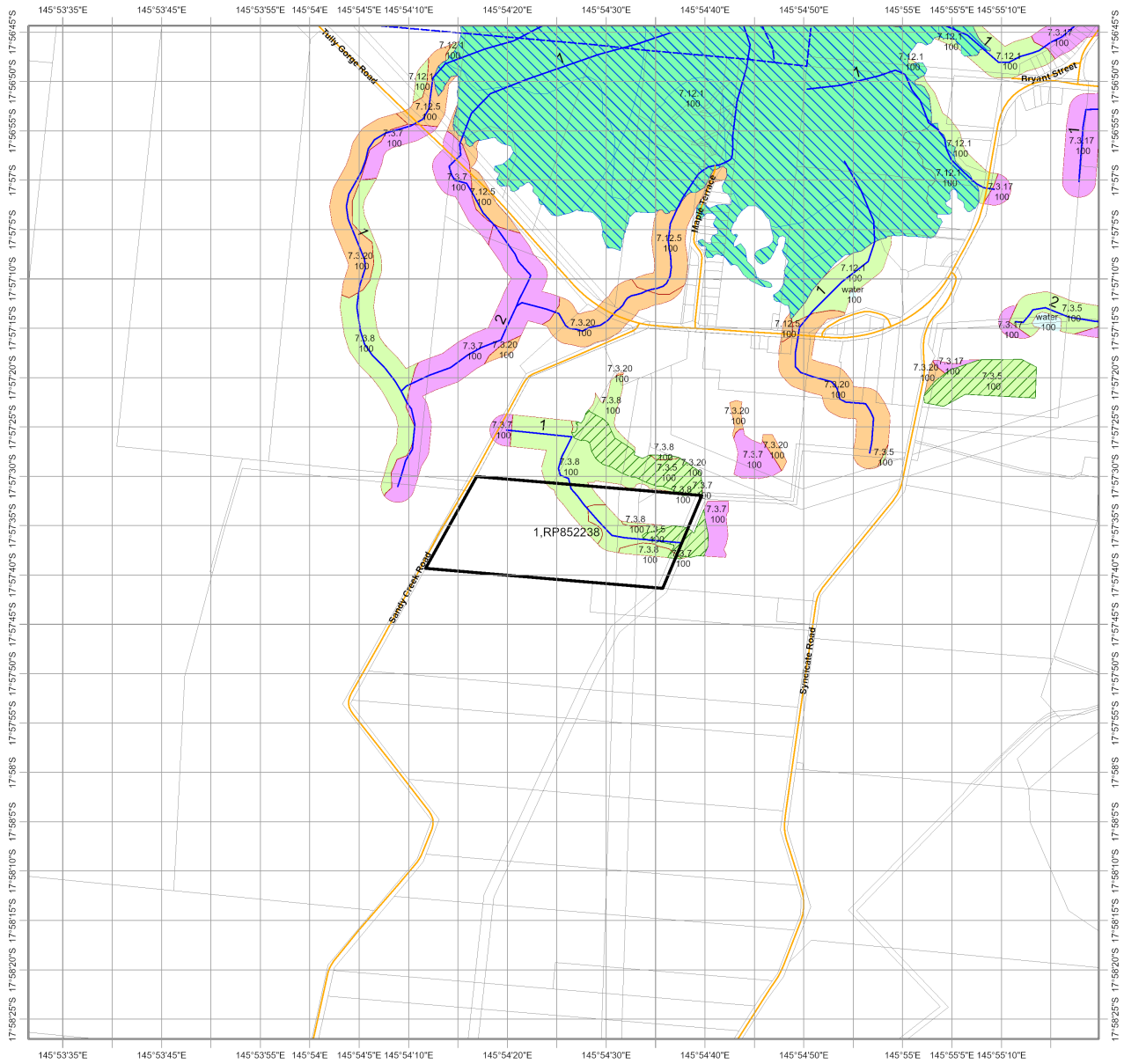
Additional information required for the assessment of vegetation values is provided in the accompanying "Vegetation Management Supporting map". For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the regulated vegetation management map is available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Land parcel boundaries are provided as locational aid only.

This map is updated on a monthly basis to ensure new PMAVs are included as they are approved.

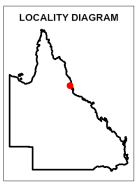
4.2 Vegetation management supporting map



Vegetation Management Supporting Map

- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map (Stream order shown as black number against stream where available)
- Highway
- Connector
- Street/Local Road
- National Parks, State Forest and other reserves
- Other land parcel boundaries
- Selected Lot and Plan

LOCALITY DIAGRAM



N

0 130 260 390 520 650 m

This product is displayed in: GDA2020

Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

Disclaimer:
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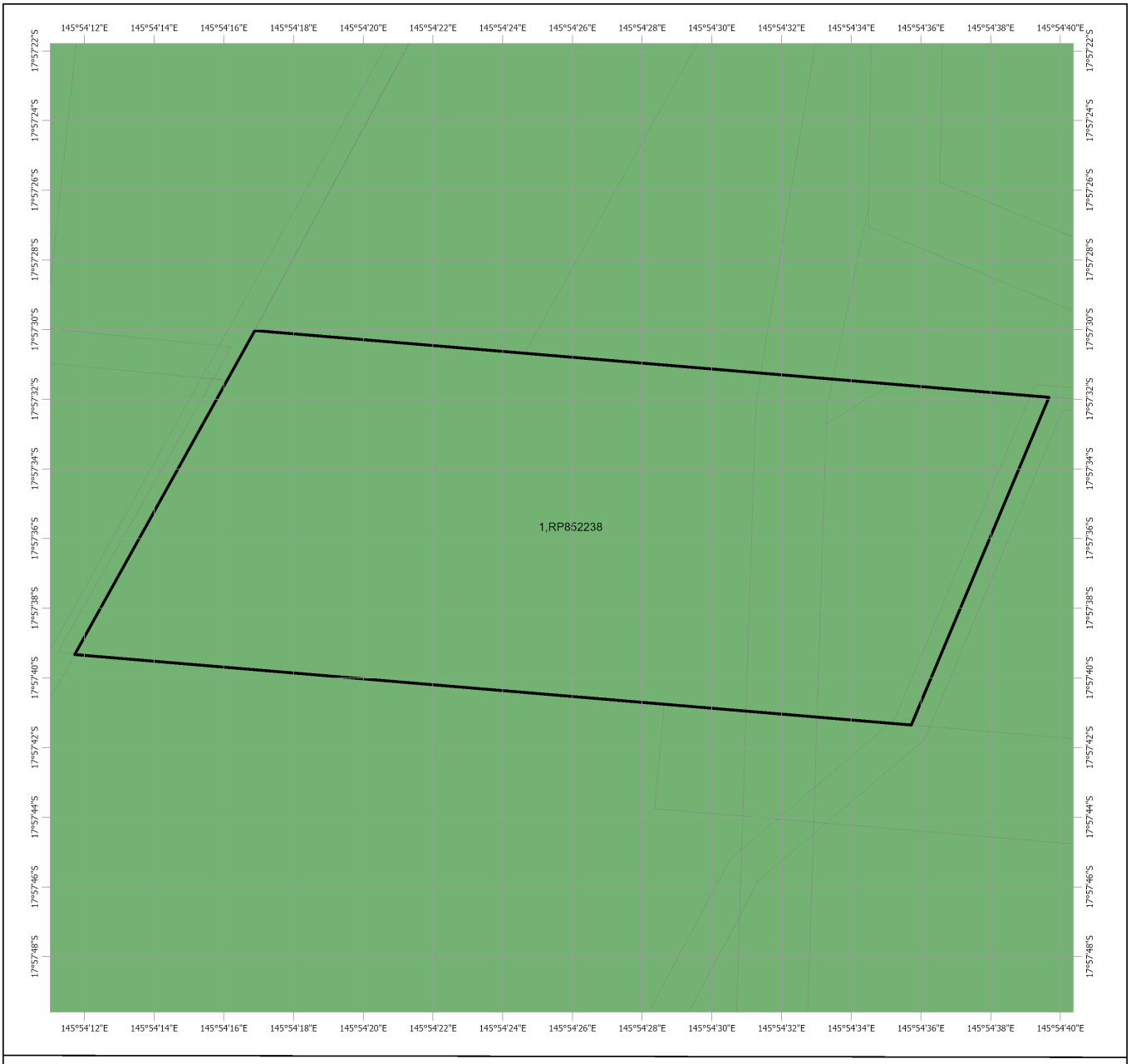
Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Land parcel boundaries are provided as locational aid only.

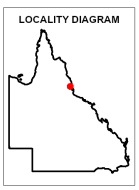
4.3 Coastal/non-coastal map



Coastal/Non Coastal Map

Coastal
Non Coastal
Other land parcel boundaries
Selected Lot and Plan

LOCALITY DIAGRAM



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Land parcel boundaries shown are provided as a locational aid only.

N

0 50 100 150 200 250 m

This product is displayed in:
GDA2020

4.4 Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture

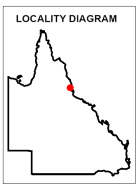
Agricultural Land Class A or B
as per State Planning Policy: State Interest for Agriculture

- Towns
- Rivers and creeks
- Freeways / motorways; Highways
- Secondary roads; Streets

Agricultural land class A or B

- A
- B
- Not class A or B
- Selected Lot and Plan

LOCALITY DIAGRAM



N

0 50 100 150 200 250 m

This product is displayed in GDA2020

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5. Protected plants framework (administered by the Department of Environment, Science and Innovation (DESI))

In Queensland, all plants that are native to Australia are protected plants under the *Nature Conservation Act 1992* (NCA). The NCA regulates the clearing of protected plants 'in the wild' (see Operational policy: When a protected plant in Queensland is considered to be 'in the wild') that are listed as critically endangered, endangered, vulnerable or near threatened under the Act.

Please note that the protected plant clearing framework applies irrespective of the classification of the vegetation under the *Vegetation Management Act 1999* and any approval or exemptions given under another Act, for example, the *Vegetation Management Act 1999* or *Planning Regulation 2017*.

5.1 Clearing in high risk areas on the flora survey trigger map

The flora survey trigger map identifies high-risk areas for threatened and near threatened plants. These are areas where threatened or near threatened plants are known to exist or are likely to exist based on the habitat present. The flora survey trigger map for this property is provided in section 5.5.

If you are proposing to clear an area shown as high risk on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken by a suitably qualified person in accordance with the Flora survey guidelines. The main objective of a flora survey is to locate any threatened or near threatened plants that may be present in the clearing impact area.

If the flora survey identifies that threatened or near threatened plants are not present within the clearing impact area or clearing within 100m of EVNT plants can be avoided, the clearing activity is exempt from a permit. An exempt clearing notification form must be submitted to the Department of Environment, Science and Innovation, with a copy of the flora survey report, at least one week prior to clearing.

If the flora survey identifies that threatened or near threatened plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the clearing permit application form.

5.2 Clearing outside high risk areas on the flora survey trigger map

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that threatened or near threatened plantsare present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

5.3 Exemptions

Many activities are 'exempt' under the protected plant clearing framework, which means that clearing of native plants that are in the wild can be undertaken for these activities with no need for a flora survey or a protected plant clearing permit. The Information sheet - General exemptions for the take of protected plants provides some of these exemptions.

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) under the *Vegetation Management Act 1999* (i.e. listed in Schedule 21 of the Planning Regulations 2017) while some are different.

5.4 Contact information for DESI

For further information on the protected plants framework:
Phone 1300 130 372 (and select option four)
Email palm@des.qld.gov.au
Visit https://www.qld.gov.au/environment/plants-animals/plants/protected-plants

5.5 Protected plants flora survey trigger map

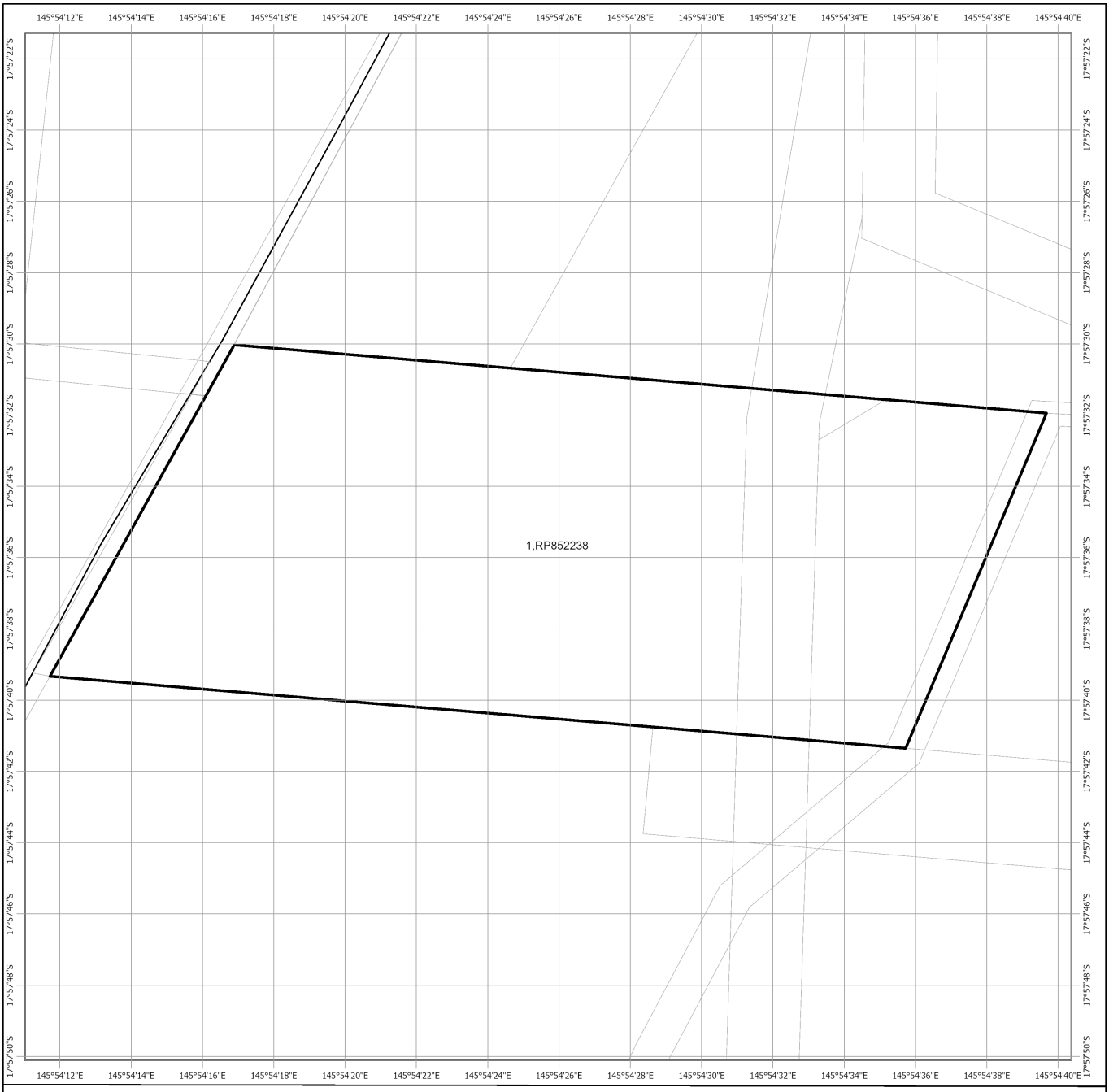
This map included may also be requested individually at: https://apps.des.qld.gov.au/map-request/flora-survey-trigger/.

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, Science and Innovation 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, Science and Innovation webpage on the clearing of protected plants for more information.



Protected Plants Flora Survey Trigger Map

High risk area
Other land parcel boundaries
Freeways / motorways / highways
Secondary roads / streets
Selected Lot and Plan

LOCALITY DIAGRAM

N

0 34 68 102 136 170 m

This product is displayed in:
GDA2020

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, Science and Innovation at palm@des.qld.gov.au

Disclaimer: While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

6. Koala protection framework (administered by the Department of Environment, Science and Innovation (DESI))

The koala (*Phascolarctos cinereus*) is listed in Queensland as endangered by the Queensland Government under *Nature Conservation Act 1992* and by the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Queensland Government's koala protection framework is comprised of the *Nature Conservation Act 1992*, the Nature Conservation (Animals) Regulation 2020, the Nature Conservation (Koala) Conservation Plan 2017, the *Planning Act 2016* and the Planning Regulation 2017.

6.1 Koala mapping

6.1.1 Koala districts

The parts of Queensland where koalas are known to occur has been divided into three koala districts - koala district A, koala district B and koala district C. Each koala district is made up of areas with comparable koala populations (e.g. density, extent and significance of threatening processes affecting the population) which require similar management regimes.

Section 7.1 identifies which koala district your property is located in.

6.1.2 Koala habitat areas

Koala habitat areas are areas of vegetation that have been determined to contain koala habitat that is essential for the conservation of a viable koala population in the wild based on the combination of habitat suitability and biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water). In order to protect this important koala habitat, clearing controls have been introduced into the Planning Regulation 2017 for development in koala habitat areas.

Please note that koala habitat areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

There are two different categories of koala habitat area (core koala habitat area and locally refined koala habitat), which have been determined using two different methodologies. These methodologies are described in the document Spatial modelling in South East Queensland.

Section 7.2 shows any koala habitat area that exists on your property.

Under the Nature Conservation (Koala) Conservation Plan 2017, an owner of land (or a person acting on the owner's behalf with written consent) can request to make, amend or revoke a koala habitat area determination if they believe, on reasonable grounds, that the existing determination for all or part of their property is incorrect.

More information on requests to make, amend or revoke a koala habitat area determination can be found in the document Guideline - Requests to make, amend or revoke a koala habitat area determination.

The koala habitat area map will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

Changes to the koala habitat area map which occur between annual updates because of a request to make, amend or revoke a koala habitat area determination can be viewed on the register of approved requests to make, amend or revoke a koala habitat area available at: https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/koalamaps. The register includes the lot on plan for the change, the date the decision was made and the map issued to the landholder that shows areas determined to be koala habitat areas.

6.1.3 Koala priority areas

Koala priority areas are large, connected areas that have been determined to have the highest likelihood of achieving conservation outcomes for koalas based on the combination of habitat suitability, biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water) and a koala conservation cost benefit analysis.

Conservation efforts will be prioritised in these areas to ensure the conservation of viable koala populations in the wild including a focus on management (e.g. habitat protection, habitat restoration and threat mitigation) and monitoring. This includes a prohibition on clearing in koala habitat areas that are in koala priority areas under the Planning Regulation 2017 (subject to some exemptions).

Please note that koala priority areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

Section 7.2 identifies if your property is in a koala priority area.

6.1.4 Identified koala broad-hectare areas

There are seven identified koala broad-hectare areas in SEQ. These are areas of koala habitat that are located in areas committed to meet development targets in the SEQ Regional Plan to accommodate SEQ's growing population including bring-forward Greenfield sites under the Queensland Housing Affordability Strategy and declared master planned areas under the repealed *Sustainable Planning Act 2009* and the repealed *Integrated Planning Act 1997*.

Specific assessment benchmarks apply to development applications for development proposed in identified koala broad-hectare areas to ensure koala conservation measures are incorporated into the proposed development.

Section 7.2 identifies if your property is in an identified koala broad-hectare area.

6.2 Koala habitat planning controls

On 7 February 2020, the Queensland Government introduced new planning controls to the Planning Regulation 2017 to strengthen the protection of koala habitat in South East Queensland (i.e. koala district A).

More information on these planning controls can be found here:
https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy.

As a high-level summary, the koala habitat planning controls make:

- development that involves interfering with koala habitat (defined below) in an area that is both a koala priority area and a koala habitat area, prohibited development (i.e. development for which a development application cannot be made);
- development that involves interfering with koala habitat (defined below) in an area that is a koala habitat area but is not a koala priority area, assessable development (i.e. development for which development approval is required); and
- development that is for extractive industries where the development involves interfering with koala habitat (defined below) in an area that is both a koala habitat area and a key resource area, assessable development (i.e. development for which development approval is required).

Interfering with koala habitat means:

1. Removing, cutting down, ringbarking, pushing over, poisoning or destroying in anyway, including by burning, flooding or draining native vegetation in a koala habitat area; but
2. Does not include destroying standing vegetation stock or lopping a tree.

However, these planning controls do not apply if the development is exempted development as defined in Schedule 24 of the Planning Regulation 2017. More information on exempted development can be found here:
https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy.

There are also assessment benchmarks that apply to development applications for:

- building works, operational works, material change of use or reconfiguration of a lot where:

  - the local government planning scheme makes the development assessable;
  - the premises includes an area that is both a koala priority area and a koala habitat area; and
  - the development does not involve interfering with koala habitat (defined above); and

- development in identified koala broad-hectare areas.

The Guideline - Assessment Benchmarks in relation to Koala Habitat in South East Queensland assessment benchmarks outlines these assessment benchmarks, the intent of these assessment benchmarks and advice on how proposed development may meet these assessment benchmarks.

6.3 Koala Conservation Plan clearing requirements

Section 10 and 11 of the Nature Conservation (Koala) Conservation Plan 2017 prescribes requirements that must be met when clearing koala habitat in koala district A and koala district B.

These clearing requirements are independent to the koala habitat planning controls introduced into the Planning Regulation 2017, which means they must be complied with irrespective of any approvals or exemptions offered under other legislation.

Unlike the clearing controls prescribed in the Planning Regulation 2017 that are to protect koala habitat, the clearing requirements prescribed in the Nature Conservation (Koala) Conservation Plan 2017 are in place to prevent the injury or death of koalas when koala habitat is being cleared.

6.4 Contact information for DESI

For further information on the koala protection framework:
Phone 13 QGOV (13 74 68)
Email koala.assessment@des.qld.gov.au
Visit https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

7. Koala protection framework details for Lot: 1 Plan: RP852238

7.1 Koala districts

Koala District C

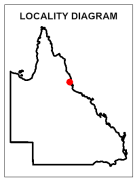
7.2 Koala priority area, koala habitat area and identified koala broad-hectare map

Koala priority area, koala habitat area and identified koala broad-hectare area map

- Koala habitat area (core)
- Koala habitat area (locally refined)
- Koala priority area
- Identified koala broad-hectare area
- Cadastral Boundaries
- Towns
- Major rivers/creeks
- Highway
- Connector
- Street/Local Road
- Queensland
- Selected Lot and Plan

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.

LOCALITY DIAGRAM



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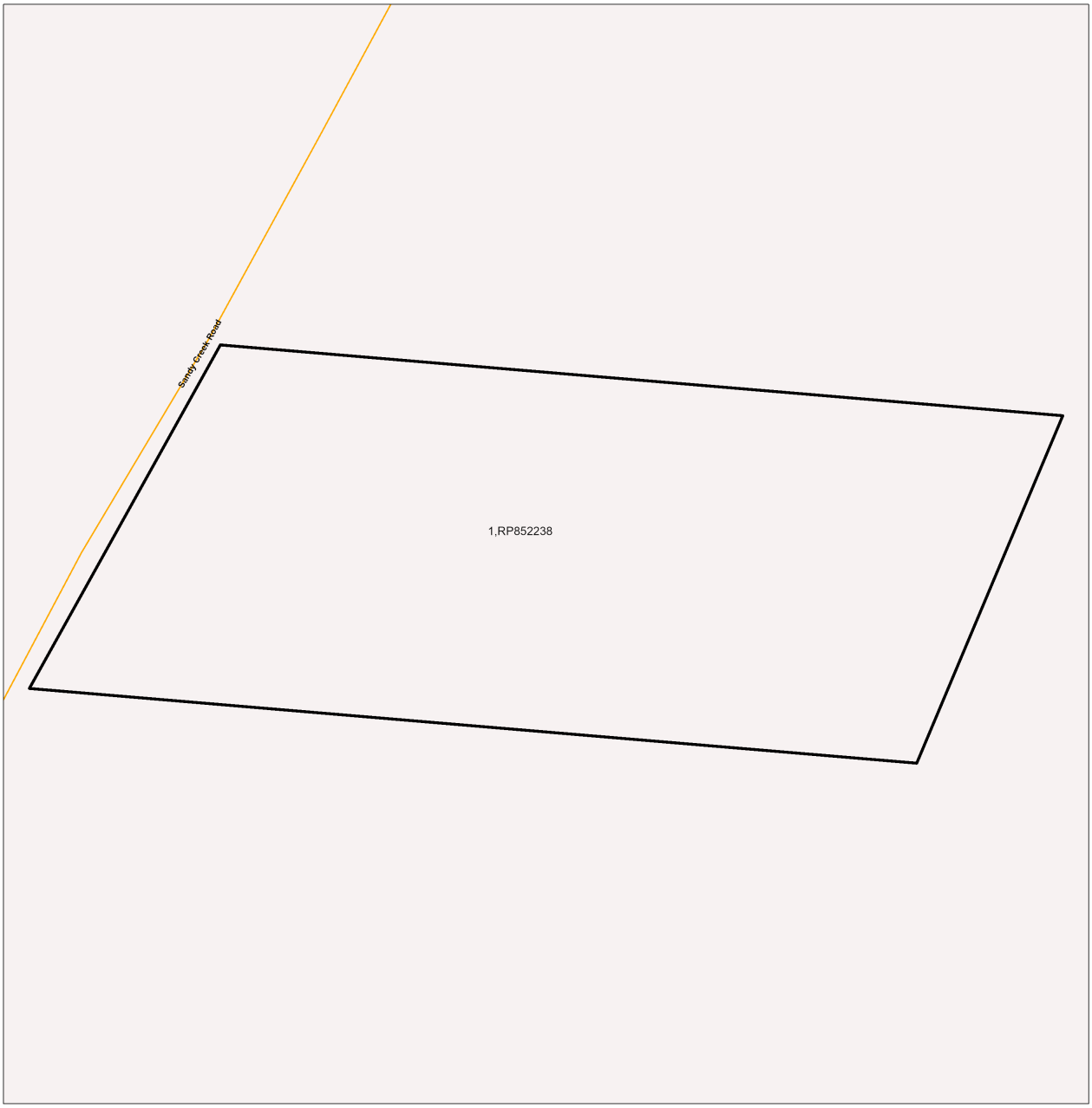
The koala conservation plan maps will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

In order to ensure that the most recent map for an area of interest can be accessed, prior to the annual update, a register of changes made to koala habitat areas as a result of the map amendment process will be available at: https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/. The register will include lot on plan for the change, the date the decision was made and the map issued to the landholder which shows areas determined to be koala habitat areas.

7.3 Koala habitat regional ecosystems for core koala habitat areas



Koala habitat regional ecosystems for core koala habitat areas

Koala habitat area (core)
Towns
Highway
Connector
Street/Local Road
Major rivers/creeks
Queensland
Selected Lot and Plan

LOCALITY DIAGRAM

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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.

This product is displayed in GDA2020

8. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
• Interference with overland flow • Earthworks, significant disturbance	*Water Act 2000* *Soil Conservation Act 1986*	Department of Regional Development, Manufacturing and Water (Queensland Government) Department of Resources (Queensland Government)	Ph: 13 QGOV (13 74 68) www.rdmw.qld.gov.au/ www.resources.qld.gov.au
• Indigenous Cultural Heritage	*Aboriginal Cultural Heritage Act 2003* *Torres Strait Islander Cultural Heritage Act 2003*	Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships	Ph: 13 QGOV (13 74 68) www.datsip.qld.gov.au
• Mining and environmentally relevant activities • Infrastructure development (coastal) • Heritage issues	*Environmental Protection Act 1994* *Coastal Protection and Management Act 1995* *Queensland Heritage Act 1992*	Department of Environment, Science and Innovation (Queensland Government)	Ph: 13 QGOV (13 74 68) www.des.qld.gov.au
• Protected plants and protected areas	*Nature Conservation Act 1992*	Department of Environment, Science and Innovation (Queensland Government)	Ph: 1300 130 372 (option 4) palm@des.qld.gov.au www.des.qld.gov.au
• Koala mapping and regulations	*Nature Conservation Act 1992*	Department of Environment, Science and Innovation (Queensland Government)	Ph: 13 QGOV (13 74 68) Koala.assessment@des.qld.gov.au
• Interference with fish passage in a watercourse, mangroves • Forestry activities on State land tenures	*Fisheries Act 1994* *Forestry Act 1959*	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
• Matters of National Environmental Significance including listed threatened species and ecological communities	*Environment Protection and Biodiversity Conservation Act 1999*	Department of Agriculture, Water and the Environment (Australian Government)	Ph: 1800 803 772 www.environment.gov.au
• Development and planning processes	*Planning Act 2016* *State Development and Public Works Organisation Act 1971*	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dsdmip.qld.gov.au
• Local government requirements	*Local Government Act 2009* *Planning Act 2016*	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office
• Harvesting timber in the Wet Tropics of Qld World Heritage area	*Wet Tropics World Heritage Protection and Management Act 1993*	Wet Tropics Management Authority	Ph: (07) 4241 0500 https://www.wettropics.gov.au/

resources.QLD.GOV.AU

Vegetation management report

For Lot: 1 Plan: RP735276
9/5/2024

Queensland Government

This publication has been compiled by Operations Support, Department of Resources.

Recent changes

Updated mapping

Updated vegetation mapping was released on 22 November 2023 and includes the most recent Queensland Herbarium scientific updates to the Regulated Vegetation Management Map, regional ecosystems, essential habitat, wetland and high-value regrowth mapping.

The Department of Environment, Science and Innovation have also updated their koala protection mapping to align with the Queensland Herbarium scientific updates.

The latest version (v10) of the Protected Plants Flora Survey Trigger Map (trigger map) was released on 6 September 2023.

Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:
Property details - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s) and catchment(s);

Vegetation management framework - an explanation of the application of the framework and contact details for the Department of Resources who administer the framework;

Vegetation management framework details for the specified Lot on Plan including:

- the vegetation management categories on the property;
- the vegetation management regional ecosystems on the property;
- vegetation management watercourses or drainage features on the property;
- vegetation management wetlands on the property;
- vegetation management essential habitat on the property;
- whether any area management plans are associated with the property;
- whether the property is coastal or non-coastal; and
- whether the property is mapped as Agricultural Land Class A or B;

Protected plant framework - an explanation of the application of the framework and contact details for the Department of Environment, Science and Innovation who administer the framework, including:

- high risk areas on the protected plant flora survey trigger map for the property;

Koala protection framework - an explanation of the application of the framework and contact details for the Department of Environment, Science and Innovation who administer the framework; and

Koala protection framework details for the specified Lot on Plan including:

- the koala district the property is located in;
- koala priority areas on the property;
- core and locally refined koala habitat areas on the property;
- whether the lot is located in an identified koala broad-hectare area; and
- koala habitat regional ecosystems on the property for core koala habitat areas.

This information will assist you to determine your options for managing vegetation under:
- the vegetation management framework, which may include:

- exempt clearing work;
- accepted development vegetation clearing code;
- an area management plan;
- a development approval;

- the protected plant framework, which may include:

- the need to undertake a flora survey;
- exempt clearing;
- a protected plant clearing permit;

- the koala protection framework, which may include:

- exempted development;
- a development approval;
- the need to undertake clearing sequentially and in the presence of a koala spotter.

Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 8 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.

Table of Contents

1. Property details

1.1 Tenure and title area

All of the lot, plan, tenure and title area information associated with property Lot: 1 Plan: RP735276 are listed in Table 1.

Table 1: Lot, plan, tenure and title area information for the property

Lot	Plan	Tenure	Property title area (sq metres)
1	RP735276	Freehold	80,940

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

Does the property Lot: 1 Plan: RP735276 have a freehold tenure and is in the Wet Tropics of Queensland World Heritage Area?

No, this property is not located in the Wet Tropics of Queensland World Heritage Area.

1.2 Property location

Table 2 provides a summary of the locations for property Lot: 1 Plan: RP735276, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)	Catchment(s)	Bioregion(s)	Subregion(s)
Cassowary Coast Regional	Tully	Wet Tropics	Tully

2. Vegetation management framework (administered by the Department of Resources)

The *Vegetation Management Act 1999* (VMA), the Vegetation Management Regulation 2012, the *Planning Act 2016* and the Planning Regulation 2017, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem identified in the Vegetation Management Regional Ecosystem Description Database (VM REDD) as having a grassland structure; and
- a mangrove.

2.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify the Department of Resources or obtain an approval under the vegetation management framework. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 4.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval under the vegetation management framework. For all other land tenures, contact the Department of Resources before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at

https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/exemptions/.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Exempt clearing work may require approval under other Commonwealth, State or Local Government laws, or local government planning schemes. Contact the Department of Resources prior to clearing in any of these areas.

2.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at

https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/codes/

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify the Department of Resources before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at
https://vegetation-apps.dnrm.qld.gov.au

2.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing under the vegetation management framework. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

On 8 March 2020, AMPs ended for fodder harvesting, managing thickened vegetation and managing encroachment. New notifications cannot be made for these AMPs. You will need to consider options for fodder harvesting, managing thickened vegetation or encroachment under a relevant accepted development vegetation clearing code or apply for a development approval.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an Area Management Plan applies to your property for which you can make a new notification, it will be listed in Section 3.6 of this report. Before clearing under one of these AMPs, you must first notify the Department of Resources and then follow the conditions and requirements listed in the AMP.

https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/area-management-plans

2.4 Development approvals

If under the vegetation management framework your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval. Information on how to apply for a development approval is available at

https://www.qld.gov.au/environment/land/management/vegetation/clearing-approvals/development

2.5. Contact information for the Department of Resources

For further information on the vegetation management framework:

Phone 135VEG (135 834)

Email vegetation@resources.qld.gov.au

Visit https://www.resources.qld.gov.au/?contact=vegetation to submit an online enquiry.

3. Vegetation management framework for Lot: 1 Plan: RP735276

3.1 Vegetation categories

The vegetation categories on your property are shown on the regulated vegetation management map in section 4.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

Table 3: Vegetation categories for subject property

Vegetation category	Area (ha)
Category C	0.47
Category R	2.47
Category X	6.02

Table 4: Description of vegetation categories

Category	Colour on Map	Description	Requirements / options under the vegetation management framework
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact the Department of Resources to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing on freehold land, indigenous land and leasehold land for agriculture and grazing purposes is considered exempt clearing work under the vegetation management framework. Contact the Department of Resources to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

Property Map of Assessable Vegetation (PMAV)

There is no Property Map of Assessable Vegetation (PMAV) present on this property.

3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 4.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at
https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/

Table 5: Regional ecosystems present on subject property

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
7.3.5	Least concern	C	0.14	Melaleuca quinquenervia and/or Melaleuca cajuputi subsp. platyphylla closed forest to shrubland on poorly drained alluvial plains	Dense
7.3.5	Least concern	R	0.07	Melaleuca quinquenervia and/or Melaleuca cajuputi subsp. platyphylla closed forest to shrubland on poorly drained alluvial plains	Dense
7.3.7	Endangered	R	0.27	Eucalyptus pellita and Corymbia intermedia open forest to woodland (or vine forest with emergent E. pellita and C. intermedia) on poorly drained alluvial plains	Mid-dense
7.3.8	Least concern	C	0.33	Melaleuca viridiflora +/- Eucalyptus spp. +/- Lophostemon suaveolens open forest to open woodland on poorly drained alluvial plains	Mid-dense
7.3.8	Least concern	R	2.13	Melaleuca viridiflora +/- Eucalyptus spp. +/- Lophostemon suaveolens open forest to open woodland on poorly drained alluvial plains	Mid-dense
non-rem	None	X	6.02	None	None

Please note:
1. All area and area derived figures included in this table 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.
2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work;
- accepted development vegetation clearing codes;
- performance outcomes in State Code 16 of the State Development Assessment Provisions (SDAP).

3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 4.2.

3.4 Wetlands

Vegetation management wetlands are present on this property and are shown on the vegetation management supporting map in section 4.2 of this report.

3.5 Essential habitat

Under the VMA, essential habitat for protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA) as critically endangered, endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 4.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map -

1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or
2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

Category A and/or Category B and/or Category C

Table 6: Essential habitat in Category A and/or Category B and/or Category C

No records

3.6 Area Management Plan(s)

Nil

3.7 Coastal or non-coastal

For the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP), this property is regarded as*

Coastal

*See also Map 4.3

3.8 Agricultural Land Class A or B

The following can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code:

Does this lot contain land that is mapped as Agricultural Land Class A or B in the State Planning Interactive Mapping System?

Class A (with urban areas masked as per SPP): 8.96 ha

No Class B

Note - This confirms Agricultural Land Classes as per the State Planning Interactive Mapping System only. This response does not include Agricultural Land Classes identified under local government planning schemes. For further information, check the Planning Scheme for your local government area.

See Map 4.4 to identify the location and extent of Class A and/or Class B Agricultural land on Lot: 1 Plan: RP735276.

4. Vegetation management framework maps

Vegetation management maps included in this report may also be requested individually at:
https://www.resources.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form

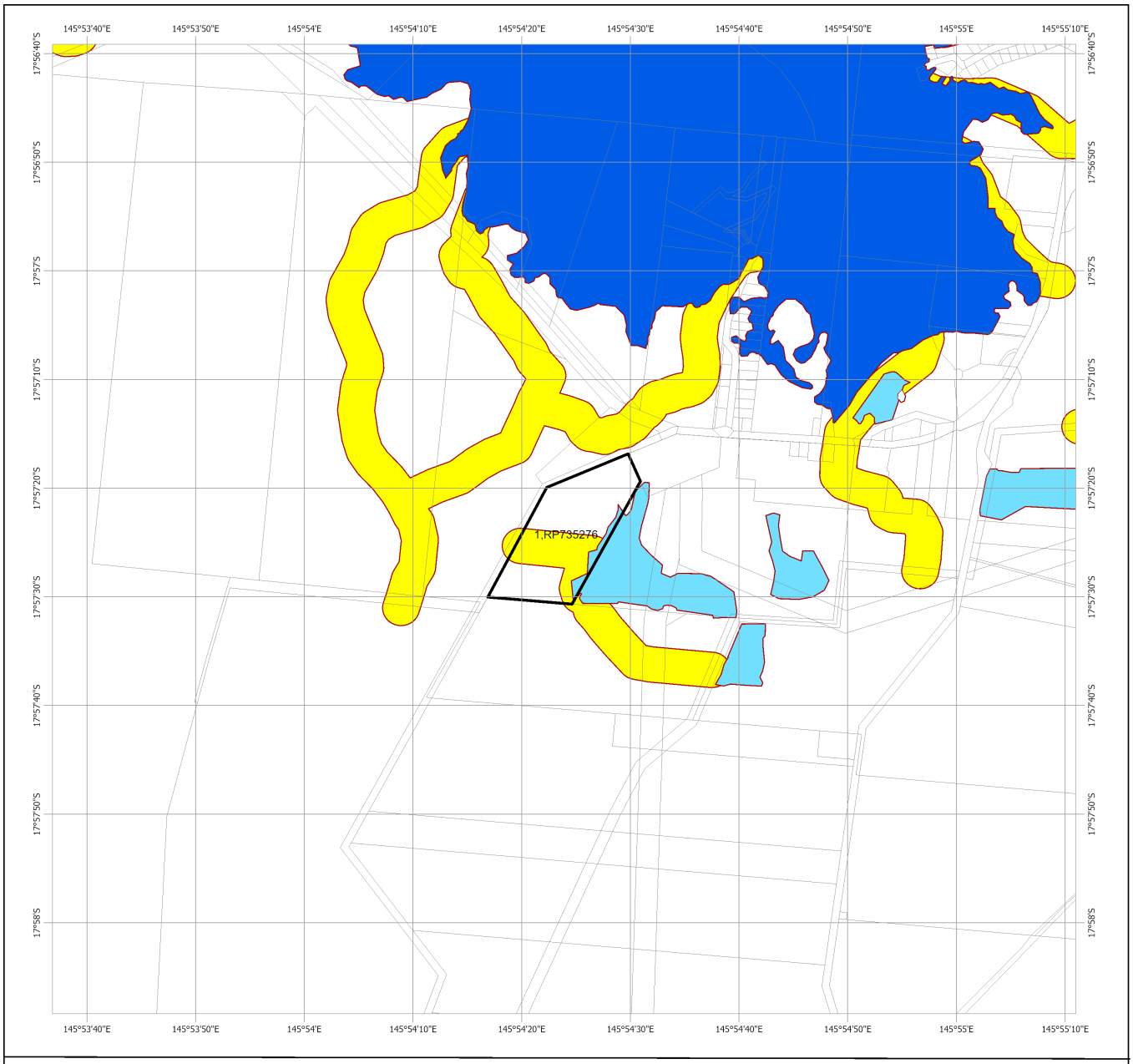
Regulated vegetation management map
The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new property maps of assessable vegetation (PMAV).

Vegetation management supporting map
The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

Coastal/non-coastal map
The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and State Code 16 of the State Development Assessment Provisions (SDAP).

Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture
The Agricultural Land Class map confirms the location and extent of land mapped as Agricultural Land Classes A or B as identified on the State Planning Interactive Mapping System. Please note that this map does not include areas identified as Agricultural Land Class A or B in local government planning schemes. This map can be used to identify Agricultural Land Class A or B areas under the "Managing regulated regrowth vegetation" accepted development vegetation clearing code.

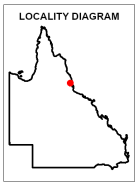
4.1 Regulated vegetation management map



Regulated Vegetation Management Map

- Category A area (Vegetation offsets/compliance notices/VDecs)
- Category B area (Remnant vegetation)
- Category C area (High-value regrowth vegetation)
- Category R area (Reef regrowth watercourse vegetation)
- Category X area (Exempt clearing work on Freehold, Indigenous and Leasehold land)
- Water
- Other land parcel boundaries
- Selected Lot and Plan

LOCALITY DIAGRAM



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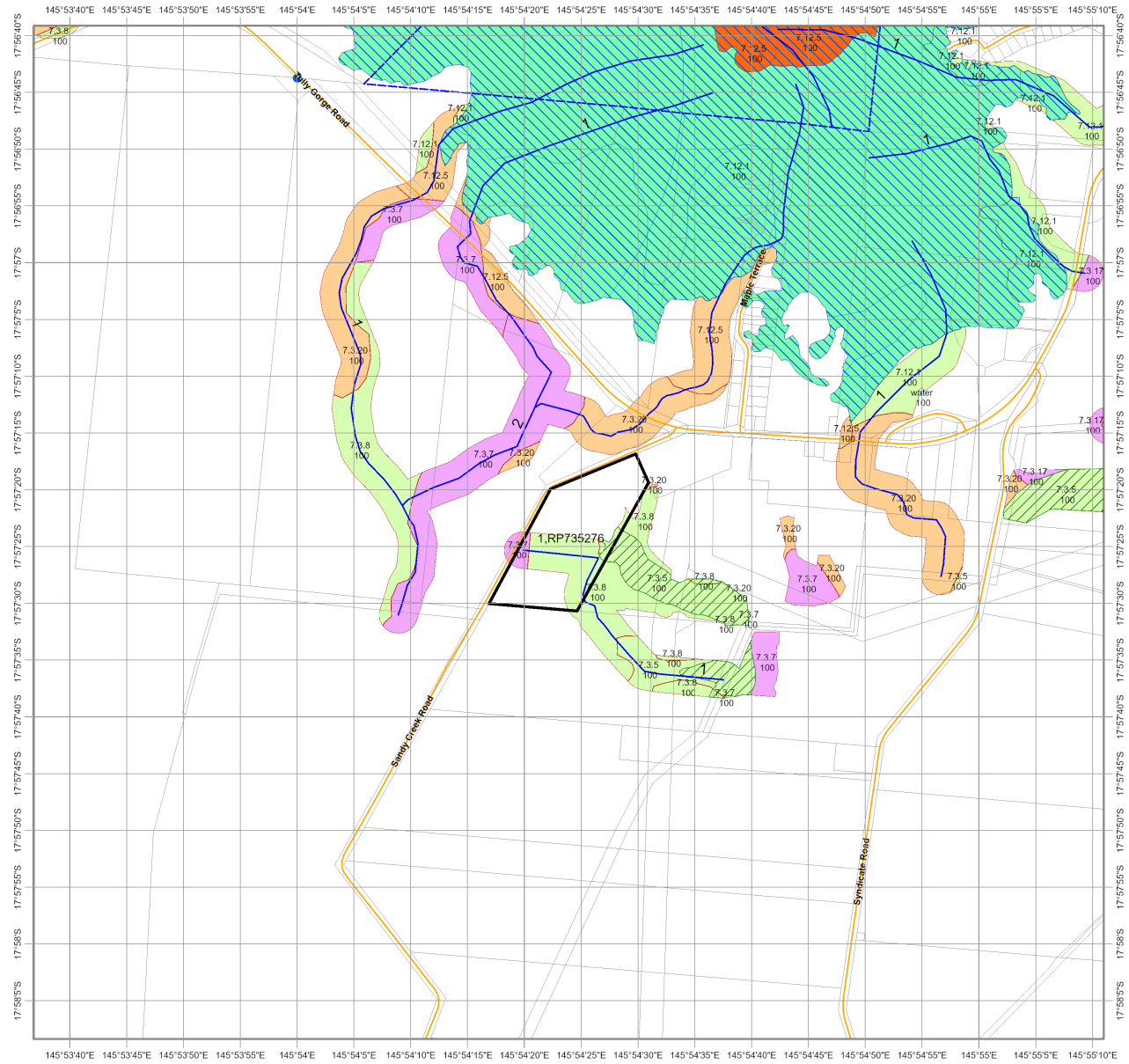
Additional information required for the assessment of vegetation values is provided in the accompanying "Vegetation Management Supporting map". For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the regulated vegetation management map is available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Land parcel boundaries are provided as locational aid only.

This map is updated on a monthly basis to ensure new PMAVs are included as they are approved.

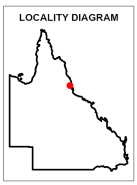
4.2 Vegetation management supporting map



Vegetation Management Supporting Map

- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C or R area containing endangered regional ecosystems
- Category C or R area containing of concern regional ecosystems
- Category C or R area that is a least concern regional ecosystem
- Category X area
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map (Stream order shown as black number against stream where available)
- Highway
- Connector
- Street/Local Road
- National Parks, State Forest and other reserves
- Other land parcel boundaries
- Selected Lot and Plan

LOCALITY DIAGRAM



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Labels for Essential Habitat are centred on the area of enquiry.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

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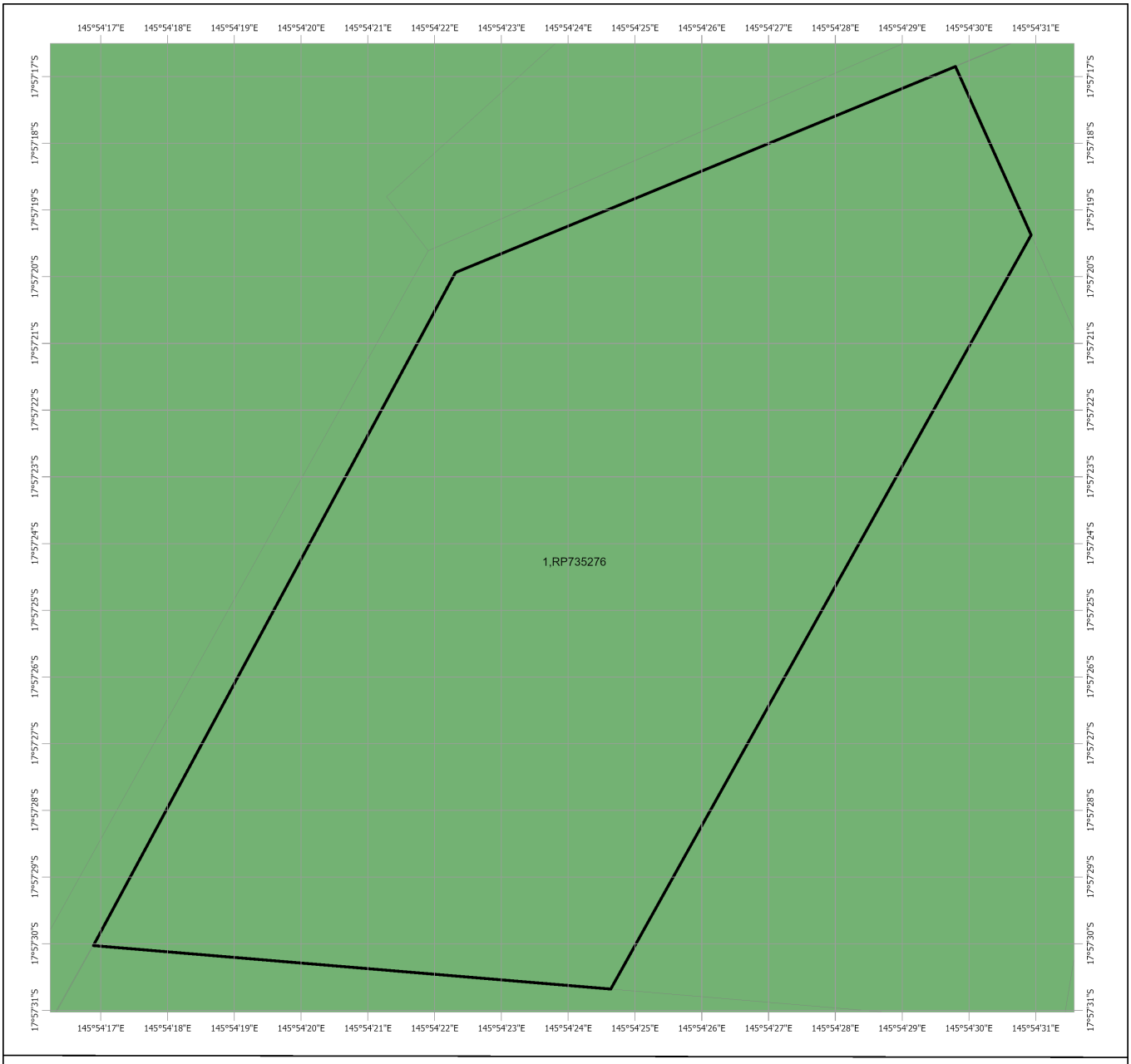
Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.resources.qld.gov.au or contact the Department of Resources.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

Land parcel boundaries are provided as locational aid only.

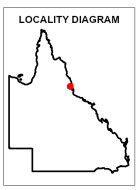
4.3 Coastal/non-coastal map



Coastal/Non Coastal Map

Coastal
Non Coastal
Other land parcel boundaries
Selected Lot and Plan

LOCALITY DIAGRAM



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Land parcel boundaries shown are provided as a locational aid only.

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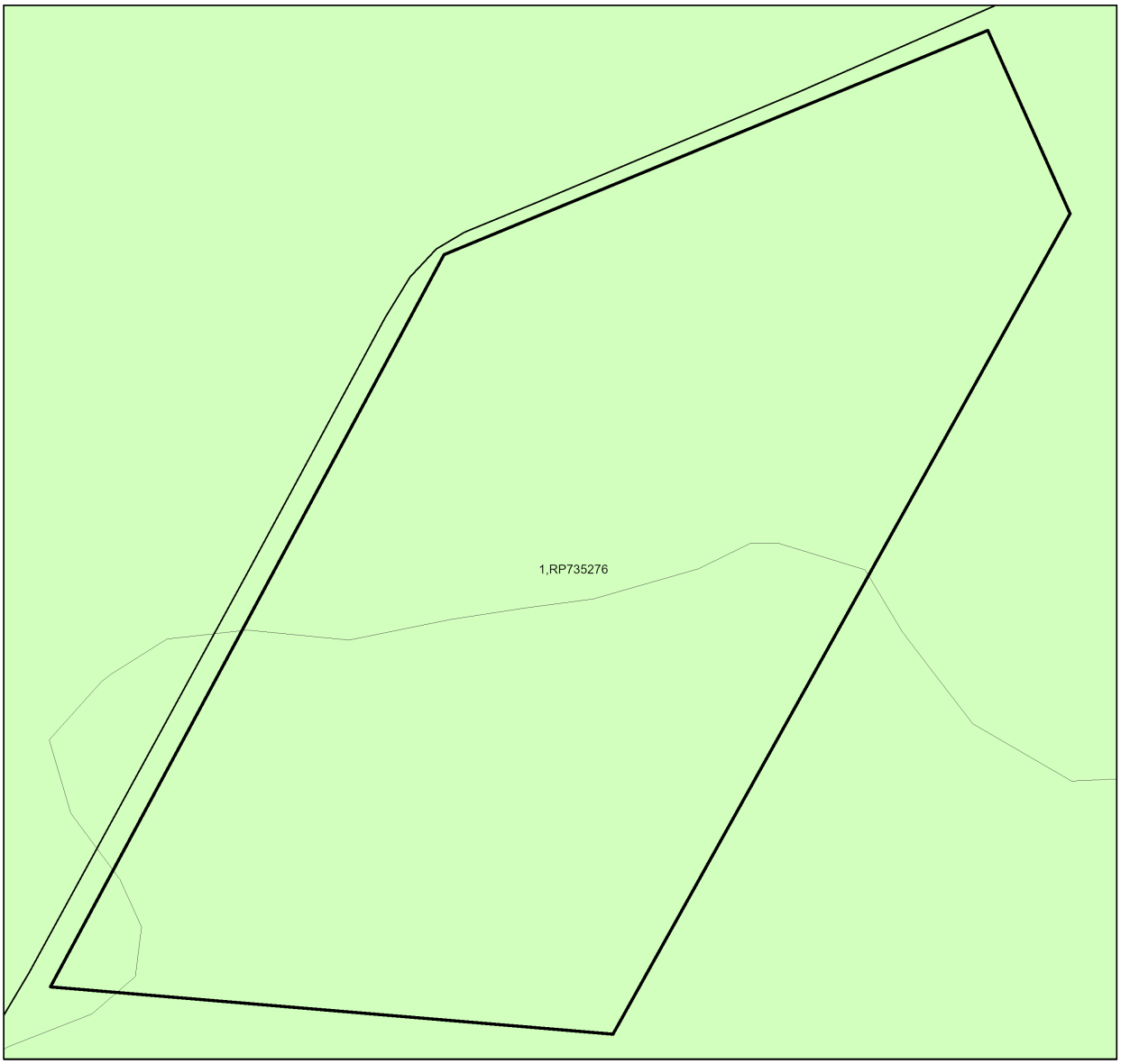
GDA2020

4.4 Agricultural Land Class A or B as per State Planning Policy: State Interest for Agriculture



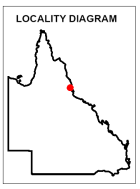
Agricultural Land Class A or B
as per State Planning Policy: State Interest for Agriculture

- Towns
- Rivers and creeks
- Freeways / motorways; Highways
- Secondary roads; Streets

Agricultural land class A or B

- A
- B
- Not class A or B
- Selected Lot and Plan

LOCALITY DIAGRAM



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5. Protected plants framework (administered by the Department of Environment, Science and Innovation (DESI))

In Queensland, all plants that are native to Australia are protected plants under the *Nature Conservation Act 1992* (NCA). The NCA regulates the clearing of protected plants 'in the wild' (see Operational policy: When a protected plant in Queensland is considered to be 'in the wild') that are listed as critically endangered, endangered, vulnerable or near threatened under the Act.

Please note that the protected plant clearing framework applies irrespective of the classification of the vegetation under the *Vegetation Management Act 1999* and any approval or exemptions given under another Act, for example, the *Vegetation Management Act 1999* or *Planning Regulation 2017*.

5.1 Clearing in high risk areas on the flora survey trigger map

The flora survey trigger map identifies high-risk areas for threatened and near threatened plants. These are areas where threatened or near threatened plants are known to exist or are likely to exist based on the habitat present. The flora survey trigger map for this property is provided in section 5.5.

If you are proposing to clear an area shown as high risk on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken by a suitably qualified person in accordance with the Flora survey guidelines. The main objective of a flora survey is to locate any threatened or near threatened plants that may be present in the clearing impact area.

If the flora survey identifies that threatened or near threatened plants are not present within the clearing impact area or clearing within 100m of EVNT plants can be avoided, the clearing activity is exempt from a permit. An exempt clearing notification form must be submitted to the Department of Environment, Science and Innovation, with a copy of the flora survey report, at least one week prior to clearing.

If the flora survey identifies that threatened or near threatened plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the clearing permit application form.

5.2 Clearing outside high risk areas on the flora survey trigger map

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that threatened or near threatened plantsare present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

5.3 Exemptions

Many activities are 'exempt' under the protected plant clearing framework, which means that clearing of native plants that are in the wild can be undertaken for these activities with no need for a flora survey or a protected plant clearing permit. The Information sheet - General exemptions for the take of protected plants provides some of these exemptions.

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) under the *Vegetation Management Act 1999* (i.e. listed in Schedule 21 of the Planning Regulations 2017) while some are different.

5.4 Contact information for DESI

For further information on the protected plants framework:
Phone 1300 130 372 (and select option four)
Email palm@des.qld.gov.au
Visit https://www.qld.gov.au/environment/plants-animals/plants/protected-plants

5.5 Protected plants flora survey trigger map

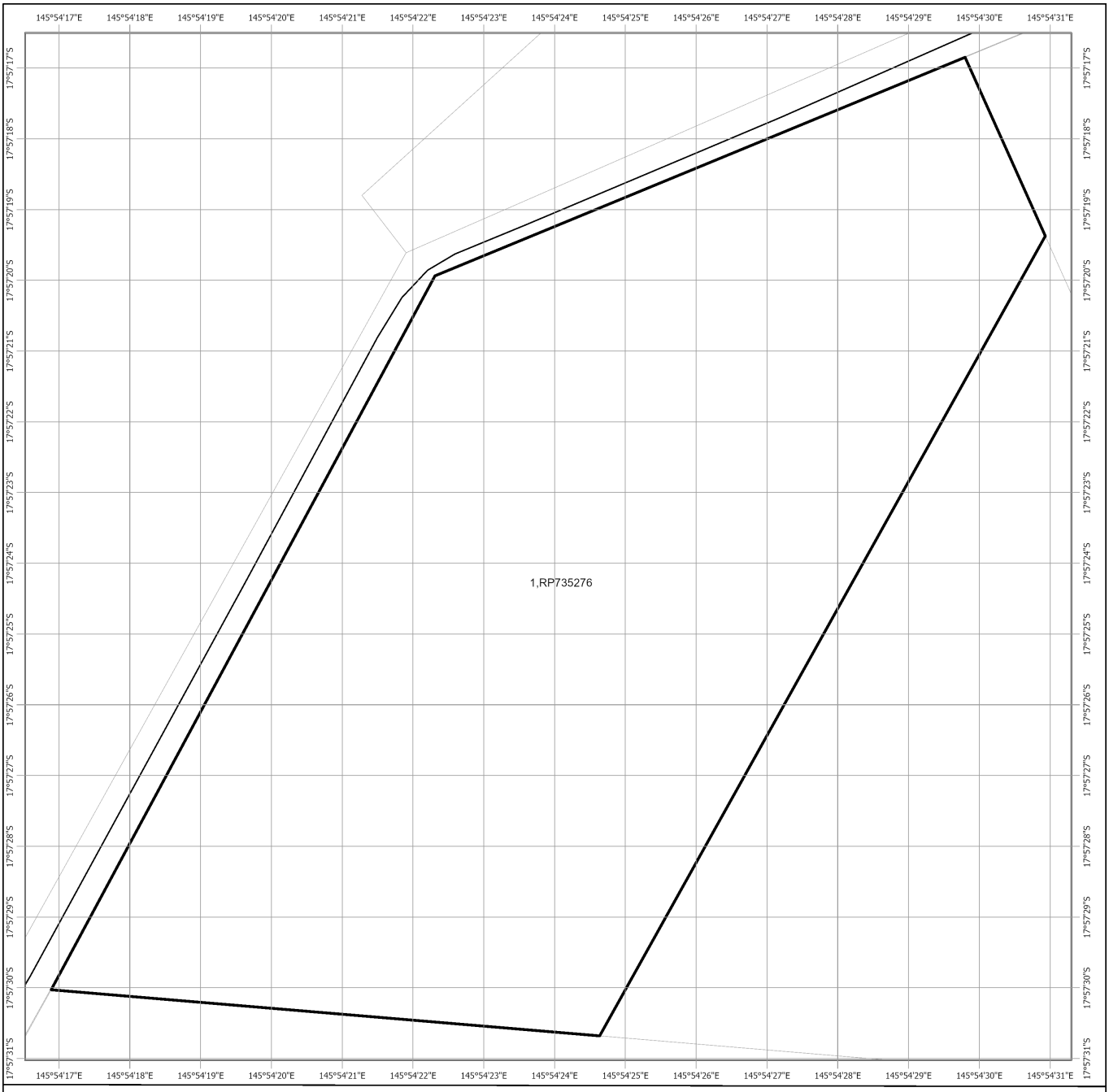
This map included may also be requested individually at: https://apps.des.qld.gov.au/map-request/flora-survey-trigger/.

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, Science and Innovation 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, Science and Innovation webpage on the clearing of protected plants for more information.



Protected Plants Flora Survey Trigger Map

High risk area
Other land parcel boundaries
Freeways / motorways / highways
Secondary roads / streets
Selected Lot and Plan

LOCALITY DIAGRAM

N

0 17 34 51 68 85 m

This product is displayed in:
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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, Science and Innovation at palm@des.qld.gov.au

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6. Koala protection framework (administered by the Department of Environment, Science and Innovation (DESI))

The koala (*Phascolarctos cinereus*) is listed in Queensland as endangered by the Queensland Government under *Nature Conservation Act 1992* and by the Australian Government under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Queensland Government's koala protection framework is comprised of the *Nature Conservation Act 1992*, the Nature Conservation (Animals) Regulation 2020, the Nature Conservation (Koala) Conservation Plan 2017, the *Planning Act 2016* and the Planning Regulation 2017.

6.1 Koala mapping

6.1.1 Koala districts

The parts of Queensland where koalas are known to occur has been divided into three koala districts - koala district A, koala district B and koala district C. Each koala district is made up of areas with comparable koala populations (e.g. density, extent and significance of threatening processes affecting the population) which require similar management regimes.

Section 7.1 identifies which koala district your property is located in.

6.1.2 Koala habitat areas

Koala habitat areas are areas of vegetation that have been determined to contain koala habitat that is essential for the conservation of a viable koala population in the wild based on the combination of habitat suitability and biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water). In order to protect this important koala habitat, clearing controls have been introduced into the Planning Regulation 2017 for development in koala habitat areas.

Please note that koala habitat areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

There are two different categories of koala habitat area (core koala habitat area and locally refined koala habitat), which have been determined using two different methodologies. These methodologies are described in the document Spatial modelling in South East Queensland.

Section 7.2 shows any koala habitat area that exists on your property.

Under the Nature Conservation (Koala) Conservation Plan 2017, an owner of land (or a person acting on the owner's behalf with written consent) can request to make, amend or revoke a koala habitat area determination if they believe, on reasonable grounds, that the existing determination for all or part of their property is incorrect.

More information on requests to make, amend or revoke a koala habitat area determination can be found in the document Guideline - Requests to make, amend or revoke a koala habitat area determination.

The koala habitat area map will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

Changes to the koala habitat area map which occur between annual updates because of a request to make, amend or revoke a koala habitat area determination can be viewed on the register of approved requests to make, amend or revoke a koala habitat area available at: https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/koalamaps. The register includes the lot on plan for the change, the date the decision was made and the map issued to the landholder that shows areas determined to be koala habitat areas.

6.1.3 Koala priority areas

Koala priority areas are large, connected areas that have been determined to have the highest likelihood of achieving conservation outcomes for koalas based on the combination of habitat suitability, biophysical variables with known relationships to koala habitat (e.g. landcover, soil, terrain, climate and ground water) and a koala conservation cost benefit analysis.

Conservation efforts will be prioritised in these areas to ensure the conservation of viable koala populations in the wild including a focus on management (e.g. habitat protection, habitat restoration and threat mitigation) and monitoring. This includes a prohibition on clearing in koala habitat areas that are in koala priority areas under the Planning Regulation 2017 (subject to some exemptions).

Please note that koala priority areas only exist in koala district A which is the South East Queensland "Shaping SEQ" Regional Plan area. These areas include the local government areas of Brisbane, Gold Coast, Logan, Lockyer Valley, Ipswich, Moreton Bay, Noosa, Redland, Scenic Rim, Somerset, Sunshine Coast and Toowoomba (urban extent).

Section 7.2 identifies if your property is in a koala priority area.

6.1.4 Identified koala broad-hectare areas

There are seven identified koala broad-hectare areas in SEQ. These are areas of koala habitat that are located in areas committed to meet development targets in the SEQ Regional Plan to accommodate SEQ's growing population including bring-forward Greenfield sites under the Queensland Housing Affordability Strategy and declared master planned areas under the repealed *Sustainable Planning Act 2009* and the repealed *Integrated Planning Act 1997*.

Specific assessment benchmarks apply to development applications for development proposed in identified koala broad-hectare areas to ensure koala conservation measures are incorporated into the proposed development.

Section 7.2 identifies if your property is in an identified koala broad-hectare area.

6.2 Koala habitat planning controls

On 7 February 2020, the Queensland Government introduced new planning controls to the Planning Regulation 2017 to strengthen the protection of koala habitat in South East Queensland (i.e. koala district A).

More information on these planning controls can be found here:
https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy.

As a high-level summary, the koala habitat planning controls make:

- development that involves interfering with koala habitat (defined below) in an area that is both a koala priority area and a koala habitat area, prohibited development (i.e. development for which a development application cannot be made);
- development that involves interfering with koala habitat (defined below) in an area that is a koala habitat area but is not a koala priority area, assessable development (i.e. development for which development approval is required); and
- development that is for extractive industries where the development involves interfering with koala habitat (defined below) in an area that is both a koala habitat area and a key resource area, assessable development (i.e. development for which development approval is required).

Interfering with koala habitat means:

1. Removing, cutting down, ringbarking, pushing over, poisoning or destroying in anyway, including by burning, flooding or draining native vegetation in a koala habitat area; but
2. Does not include destroying standing vegetation stock or lopping a tree.

However, these planning controls do not apply if the development is exempted development as defined in Schedule 24 of the Planning Regulation 2017. More information on exempted development can be found here:
https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/legislation-policy.

There are also assessment benchmarks that apply to development applications for:

- building works, operational works, material change of use or reconfiguration of a lot where:

  - the local government planning scheme makes the development assessable;
  - the premises includes an area that is both a koala priority area and a koala habitat area; and
  - the development does not involve interfering with koala habitat (defined above); and

- development in identified koala broad-hectare areas.

The Guideline - Assessment Benchmarks in relation to Koala Habitat in South East Queensland assessment benchmarks outlines these assessment benchmarks, the intent of these assessment benchmarks and advice on how proposed development may meet these assessment benchmarks.

6.3 Koala Conservation Plan clearing requirements

Section 10 and 11 of the Nature Conservation (Koala) Conservation Plan 2017 prescribes requirements that must be met when clearing koala habitat in koala district A and koala district B.

These clearing requirements are independent to the koala habitat planning controls introduced into the Planning Regulation 2017, which means they must be complied with irrespective of any approvals or exemptions offered under other legislation.

Unlike the clearing controls prescribed in the Planning Regulation 2017 that are to protect koala habitat, the clearing requirements prescribed in the Nature Conservation (Koala) Conservation Plan 2017 are in place to prevent the injury or death of koalas when koala habitat is being cleared.

6.4 Contact information for DESI

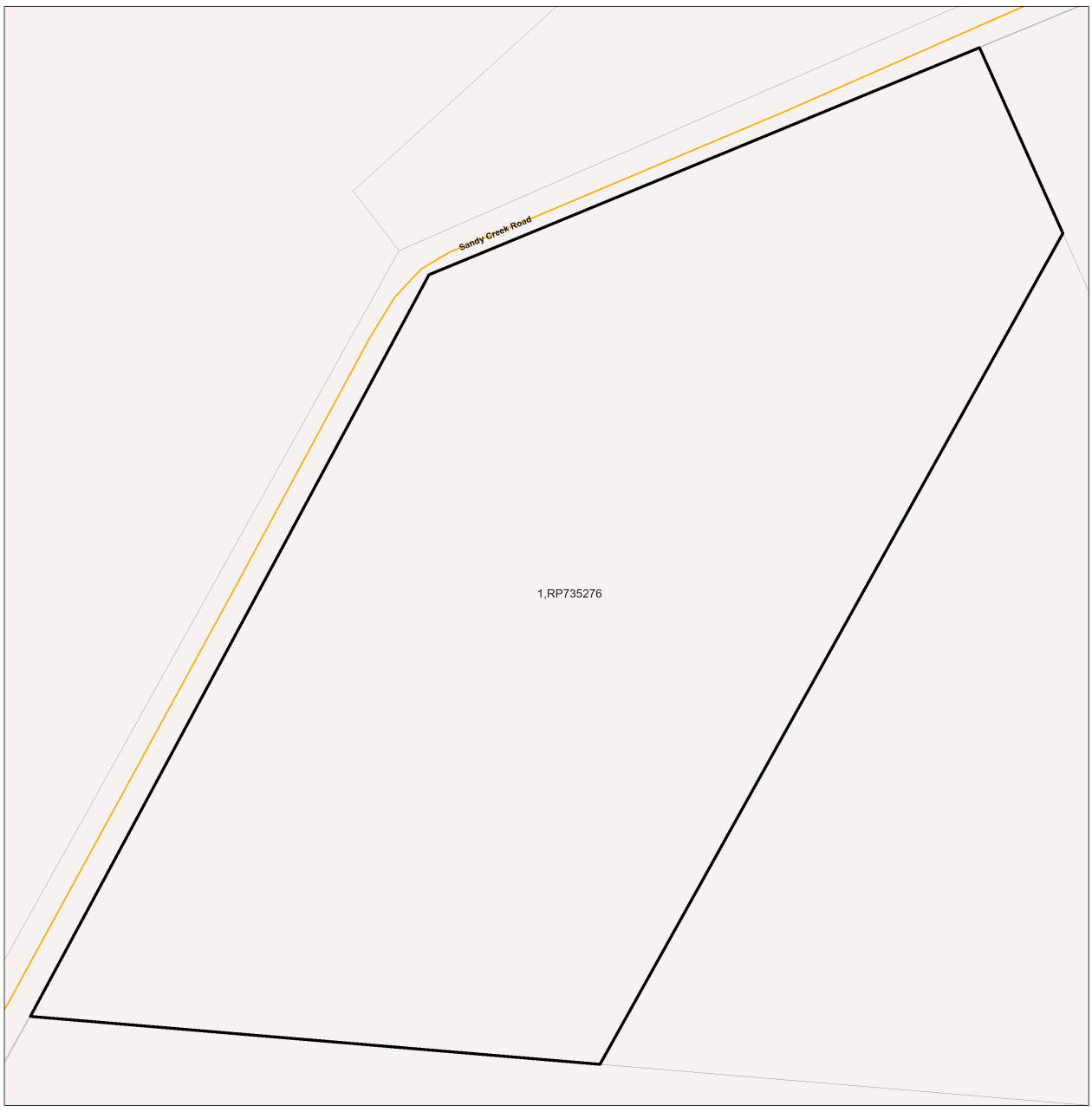
For further information on the koala protection framework:
Phone 13 QGOV (13 74 68)
Email koala.assessment@des.qld.gov.au
Visit https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping

7. Koala protection framework details for Lot: 1 Plan: RP735276

7.1 Koala districts

Koala District C

7.2 Koala priority area, koala habitat area and identified koala broad-hectare map

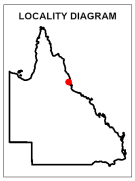


Koala priority area, koala habitat area and identified koala broad-hectare area map

- Koala habitat area (core)
- Koala habitat area (locally refined)
- Koala priority area
- Identified koala broad-hectare area
- Cadastral Boundaries
- Towns
- Major rivers/creeks
- Highway
- Connector
- Street/Local Road
- Queensland
- Selected Lot and Plan

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.

LOCALITY DIAGRAM



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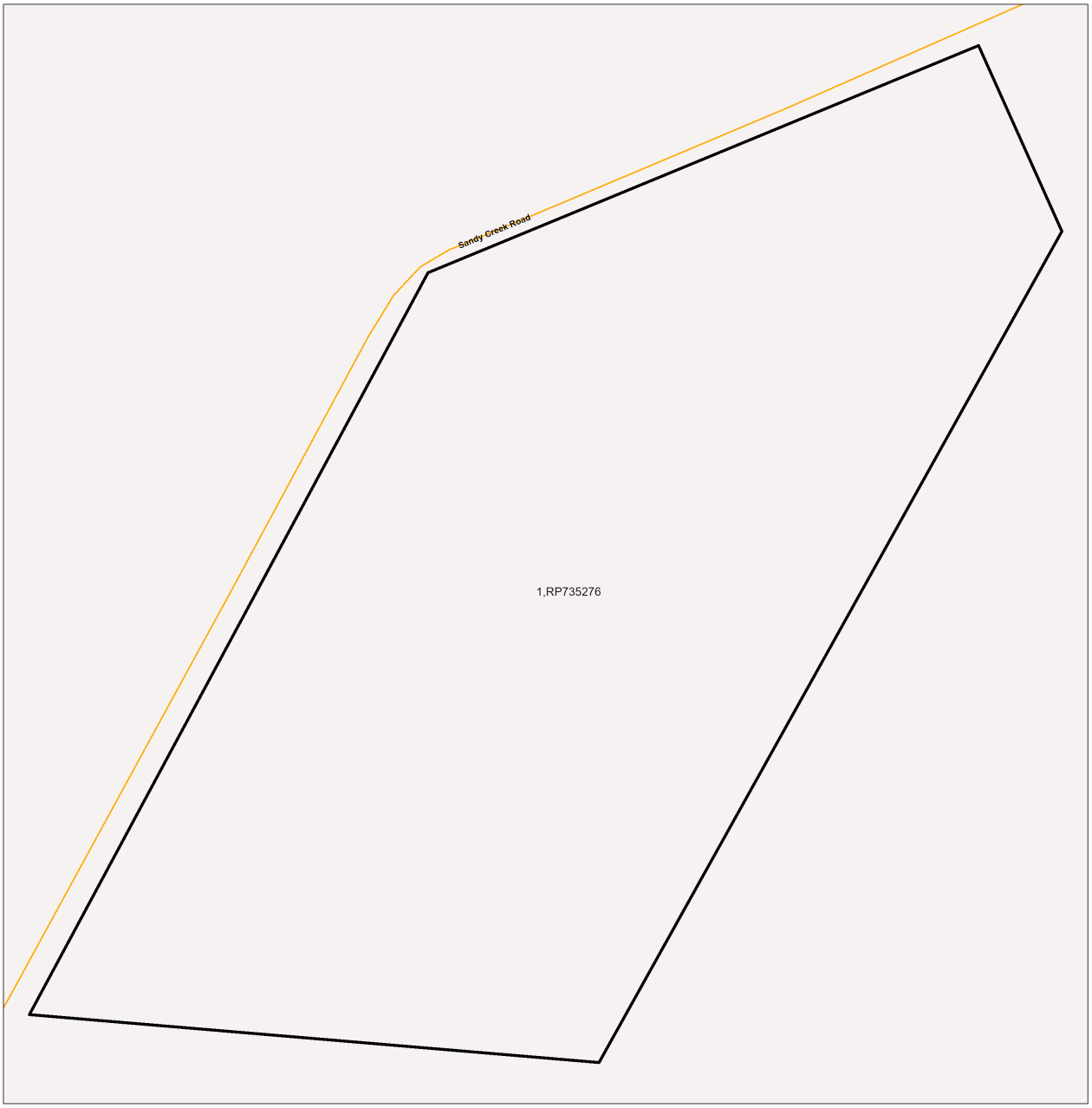
The koala conservation plan maps will be updated at least annually to include any koala habitat areas that have been made, amended or revoked.

In order to ensure that the most recent map for an area of interest can be accessed, prior to the annual update, a register of changes made to koala habitat areas as a result of the map amendment process will be available at: https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/mapping/. The register will include lot on plan for the change, the date the decision was made and the map issued to the landholder which shows areas determined to be koala habitat areas.

7.3 Koala habitat regional ecosystems for core koala habitat areas



Koala habitat regional ecosystems for core koala habitat areas

Koala habitat area (core)
Towns
Highway
Connector
Street/Local Road
Major rivers/creeks
Queensland
Selected Lot and Plan

LOCALITY DIAGRAM

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0 24 48 72 96 120 m

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Due to varying sources of data, spatial locations may not coincide when overlaid.

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.

8. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
• Interference with overland flow • Earthworks, significant disturbance	*Water Act 2000* *Soil Conservation Act 1986*	Department of Regional Development, Manufacturing and Water (Queensland Government) Department of Resources (Queensland Government)	Ph: 13 QGOV (13 74 68) www.rdmw.qld.gov.au/ www.resources.qld.gov.au
• Indigenous Cultural Heritage	*Aboriginal Cultural Heritage Act 2003* *Torres Strait Islander Cultural Heritage Act 2003*	Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships	Ph: 13 QGOV (13 74 68) www.datsip.qld.gov.au
• Mining and environmentally relevant activities • Infrastructure development (coastal) • Heritage issues	*Environmental Protection Act 1994* *Coastal Protection and Management Act 1995* *Queensland Heritage Act 1992*	Department of Environment, Science and Innovation (Queensland Government)	Ph: 13 QGOV (13 74 68) www.des.qld.gov.au
• Protected plants and protected areas	*Nature Conservation Act 1992*	Department of Environment, Science and Innovation (Queensland Government)	Ph: 1300 130 372 (option 4) palm@des.qld.gov.au www.des.qld.gov.au
• Koala mapping and regulations	*Nature Conservation Act 1992*	Department of Environment, Science and Innovation (Queensland Government)	Ph: 13 QGOV (13 74 68) Koala.assessment@des.qld.gov.au
• Interference with fish passage in a watercourse, mangroves • Forestry activities on State land tenures	*Fisheries Act 1994* *Forestry Act 1959*	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
• Matters of National Environmental Significance including listed threatened species and ecological communities	*Environment Protection and Biodiversity Conservation Act 1999*	Department of Agriculture, Water and the Environment (Australian Government)	Ph: 1800 803 772 www.environment.gov.au
• Development and planning processes	*Planning Act 2016* *State Development and Public Works Organisation Act 1971*	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dsdmip.qld.gov.au
• Local government requirements	*Local Government Act 2009* *Planning Act 2016*	Department of State Development, Infrastructure, Local Government and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office
• Harvesting timber in the Wet Tropics of Qld World Heritage area	*Wet Tropics World Heritage Protection and Management Act 1993*	Wet Tropics Management Authority	Ph: (07) 4241 0500 https://www.wettropics.gov.au/

Attexo

Appendix B

Likelihood of Occurrence Assessment

Table 16.1: Likelihood of Occurrence Assessment – TEC

Threatened Ecological Community	EPBC Status	TEC Description	Source	Pre-Field Work (Desktop only) Likelihood of Occurrence - Study area	Post Field Work (Project area) Likelihood of Occurrence
Broad leaf tea-tree (*Melaleuca viridiflora*) woodlands in high rainfall coastal north Queensland	Endangered	This ecological community is restricted to the Wet Tropics and Central Mackay Coast bioregions where it occurs in high rainfall floodplain areas. While most occurrences are found within 20 km of the east coast, some patches of the community lie further inland. It occurs on poorly drained floodplains with a land form that is sloping to flat, and it occurs on landzones 3 (Quaternary alluvial systems) and 5 (plains and plateaus on Tertiary land surfaces). Soils are duplex with an impeded layer several centimetres below the surface which causes surface water to be present during the wet season. Inundation can persist for up to a few months (TSSC 2012a). It is typically a woodland (but can have a forest structure in some areas) where *M. viridiflora* is dominant in the canopy and a diversity of grasses, sedges and forbs occupy the ground layer (DSEWPC 2012b). The structure and floristics of this community vary in response to different soil types, extent of inundation in the wet season and successional responses to fire and grazing (DSEWPC 2012b). This TEC is associated with the following Queensland Regional Ecosystems (REs): 7.3.8a, 7.3.8b, 7.3.8c, 7.3.8d, 7.5.4g, 8.3.2, 8.5.2a, 8.5.2c and 8.5.6 (TSSC 2012).	PMST	**Likely to Occur.** Constituent Regional Ecosystems (RE 7.3.8c-d) are mapped within the Project area and the neighbouring Powerlink property.	**Unlikely to Occur**. Targeted surveys identified the vegetation within the Project area does not meet any of the key diagnostic characteristics of the TEC.
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	The ecological community represents a complex of rainforest and coastal vine thickets, including some that are deciduous, on the east coast of Australia. Typically, the ecological community occurs within two kilometres of the coast or adjacent to a large salt water body, such as an estuary and, thus, is influenced by the sea. Within Australia, littoral rainforest occurs along the coast from far eastern Victoria up the east coast through NSW and QLD and across the NT and WA. In QLD, the REs that equate wholly to the ecological community are: 3.2.1a; 3.2.1b; 3.2.12; 3.2.13; 3.2.28; 3.2.29; 3.2.31; 3.2.11; 3.12.20; 7.2.1a-i; 7.2.2a-h; 7.2.5a; 7.2.6b; 7.11.3b; 7.12.11d; 8.2.2 and 12.2.2.	PMST	**Unlikely to Occur.** No associated Regional Ecosystems are mapped within the Project area.	**Unlikely to Occur**. Targeted surveys identified the vegetation within the Project area does not meet any of the key diagnostic characteristics of the TEC.
Lowland tropical rainforest of the Wet Tropics	Endangered	The ecological community described in this Conservation Advice includes the plants, animals and other organisms typically associated with a type of lowland tropical rainforest that is found in the Wet Tropics region of north Queensland. It is usually a structurally complex, evergreen tall forest with a relatively high species diversity (compared with other Australian rainforests), and a predominance of large-leaved tree species (mesophyll, leaf blade length of 12.5 – 25 cm) and notophylls (<12.5 cm). Vines and lianas, and epiphytes, are relatively common, and in an Australian rainforest context, so are herbaceous ground layer plant species. The ecological community also includes lowland	PMST	**Likely to Occur.** Constituent Regional Ecosystems (RE 7.12.1) are mapped within the Project area, and the neighbouring Powerlink property and surrounds (REs 7.3.17, 7.3.20).	**Unlikely to Occur**. Targeted surveys identified the vegetation within the Project area does not meet any of the key diagnostic

Threatened Ecological Community	EPBC Status	TEC Description	Source	Pre-Field Work (Desktop only) Likelihood of Occurrence - Study area	Post Field Work (Project area) Likelihood of Occurrence
		structurally simple mesophyll vine forests such as those with a prominent layer of *Archontophoenix alexandrae* (Alexandra Palm, sometimes known as Feather Palm) and/or *Licuala ramsayi var. ramsayi* (Fan Palm), typically occurring on poorly drained alluvial plains. Distinctive faunal components include tree kangaroos, cassowaries, riflebirds, tree frogs, butterflies, velvet worms, and a range of endemic canopy arthropods (DAWE 2021). Queensland REs associated with this TEC include: 3.3.1, 3.3.4, 3.3.5, 3.3.6, 3.8.2, 7.3.3, 7.3.4, 7.3.10, 7.3.17, 7.3.20, 7.3.23, 7.3.25, 7.3.38, 7.3.49, 7.3.50, 7.8.1, 7.8.2, 7.8.11, 7.8.12, 7.8.14, 7.11.1, 7.11.2, 7.11.3, 7.11.7, 7.11.23, 7.11.24, 7.11.25, 7.11.30, 7.12.1, 7.12.2, 7.12.7, 7.12.11, 7.12.39, and 7.12.40.			characteristics of the TEC.

Table 16.2: Likelihood of Occurrence Assessment – Species

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
Bird Species							
Common Sandpiper	*Actitis hypoleucos*	Mi, Ma	SL	Shallow, pebbly, muddy or sandy edges of rivers and streams, coastal to far inland; dams, lakes, sewage ponds; margins of tidal rivers; waterways in mangroves or saltmarsh; mudflats; rocky or sandy beaches; causeways, riverside lawns, drains and street gutters (Pizzey & Knight 1999).	PMST, WildNet	**Potential to Occur**. The species is migratory or nomadic and may only occur in the Project area on a seasonal and/or infrequent basis. AND Broadly suitable habitat is mapped in the Project area and a recent record exists within 50 km (9 km NW 2011).	**Unlikely to Occur**. There are post-1980 records of the species (ALA, 9.37 km away, 2011) within 10 km of the Project area HOWEVER Field survey confirmed that preferred habitat for this species does not exist within the Project area.
Fork-tailed Swift	*Apus pacificus*	Mi, Ma	SL	Almost exclusively aerial species, flying from less than 1 m to at least 300 m above the ground. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur	PMST	**Unlikely to Occur**. While broadly suitable habitat for this species is mapped in the Survey	**Unlikely to Occur**. There are no post-1980 records of the species

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh (SPRAT 2010).		area, there are no records within 50 km.	within 10 km of the Project area AND Field survey confirmed that preferred habitat for this nomadic, migratory and primarily aerial species is not present in the Project area.
Sharp-tailed Sandpiper	*Calidris acuminata*	V, Mi, Ma	V	The sharp-tailed sandpiper breeds in northern Siberia but migrates south to winter in Australia and New Zealand. In the non-breeding season, they can be found in tidal mudflats, saltmarshes, mangroves; shallow fresh, brackish or saline inland wetlands; floodwaters, irrigated pastures and crops; sewage ponds and saltfields (Pizzey & Knight 1999).	PMST	**Unlikely to Occur**. There are no post-1980 records of the species within 50 km of the Project area.	**Unlikely to Occur**. There are no post-1980 records of the species within 10 km of the Project area. AND Field survey confirmed that preferred habitat for this species does not exist within the Project area.
Red Knot, Knot	*Calidris canutus*	V, Mi, Ma	V	Marine species. During the non-breeding season in Australasia, the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts and sometimes on sandy beaches or shallow pools on exposed rock platforms. They are occasionally seen on terrestrial saline wetlands near the coast and on sewage ponds and salt works (Higgins & Davies 1996).	PMST	**Unlikely to Occur**. There are no post-1980 records of the species within 10 km of the Project area.	**Unlikely to Occur**. There are no post-1980 records of the species within 10 km of the Project area. AND Field survey confirmed that preferred habitat for this species does not exist within the Project area.
Curlew Sandpiper	*Calidris ferruginea*	CE, Mi, Ma	CR	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms (Pizzey & Knight 1999). They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They	PMST	**Unlikely to Occur**. There are no post-1980 records of the species within 10 km of the Project area.	**Unlikely to Occur**. There are no post-1980 records of the species within 10 km of the Project area. AND

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				generally roost on bare dry shingle, shell or sand beaches, sandpits and islets in or around coastal or near-coastal lagoons and other wetlands (SPRAT 2015).			Field survey confirmed that preferred habitat for this species does not exist within the Project area.
Pectoral Sandpiper	*Calidris melanotos*	Mi, Ma	SL	This species if found in shallow fresh waters, often with low grass and other herbage; swamp margins, flooded pastures, sewage ponds; occasionally tidal areas and saltmarshes (Pizzey & Knight 1999).	PMST	**Unlikely to Occur**. There are no post-1980 records of the species within 10 km of the Project area.	**Unlikely to Occur**. There are no post-1980 records of the species within 10 km of the Project area. AND Field survey confirmed that preferred habitat for this species does not exist within the Project area.
Southern Cassowary	*Casuarius casuarius*	E	E	Although occurring primarily in rainforest and associated vegetation mosaics, the cassowary also uses woodland, swamp and disturbed habitats as intermittent food sources and as connecting habitat between more suitable sites. It requires a high diversity of fruiting trees to provide a year-round supply of fleshy fruits. While some habitats may be important only briefly in the annual cycle of food production, they may be crucial to the survival of cassowaries whose home range encompasses them. At times of food stress in the rainforest, such as after cyclones, food resources in non-rainforest habitats may be more important (QGEPA 2007).	PMST, WildNet	**Likely to Occur**. Broadly suitable rainforest habitat is mapped in the Survey area and a recent, nearby exists (ALA, 0.43 km, 2022).	**Unlikely to Occur**. There are post-1980 records of the species (ALA, 0.43 km away, 2022) within 10 km of the Project area HOWEVER While some species of suitable feed trees were recorded in the neighbouring vegetation and the broader Survey area, field survey confirmed that suitable habitat for this species is not present in the Project area.
Greater Sand Plover, Large Sand Plover	*Charadrius leschenaultii*	V, Mi, Ma	V	In Australia, the Greater Sand Plover occurs in coastal areas in all states, through the greatest numbers occur in northern Australia, especially the north-west. This species breeds in central Asia. In the nonbreeding ground in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons, inshore reefs, rock platforms, small rocky islands or sandy	PMST, WildNet	**Unlikely to Occur**. There are no post-1980 records of the species within 10 km of the Project area.	**Unlikely to Occur**. There are no post-1980 records of the species within 10 km of the Project area. HOWEVER Field survey confirmed that

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				cays on coral reefs. They are also occasionally recorded on near-coastal saltworks and salt lakes, including marginal saltmarsh, and on brackish swamps. They seldom occur at shallow freshwater wetlands (SPRAT 2023).			suitable habitat for the species is not present within the Project area.AND Field survey confirmed that suitable habitat for the species is not present within the Project area.
Oriental Cuckoo, Horsfield's Cuckoo	*Cuculus optatus*	Mi	SL	Within Australia, this species uses a range of vegetated habitats such as monsoon rainforests, wet sclerophyll forest, open woodlands and appears quite often along edges of forests, or ecotones between forest types (DoE 2015; Menkhorst *et al.* 2017). This cuckoo species feeds arboreal, foraging for invertebrates on loose bark on the trunks and branches of trees, and among the foliage, including in mistletoes. It will forage from the ground but requires shrubs or trees from which it sallies and returns to consume prey items. Caterpillars have been noted as a preferred food source. Oriental Cuckoos tend to forage individually and have only been recorded foraging in pairs when infestations of caterpillars occur (DoE 2015).	PMST, WildNet	**Potential to Occur**. Broadly suitable rainforest and eucalypt woodland habitat is mapped in the Project area and a recent record exists within 50 km (ALA, 20.55 km, 2012).	**Unlikely to Occur**. While there is broadly suitable eucalypt woodland in the broader Survey area, field survey confirmed that in the Project area, broad suitable habitat is very limited and preferred foraging habitat for this species is not present. AND There are no post-1980 records of the species within 10 km of the Project area.
Red Goshawk	*Erythrotriorchis radiatus*	E	E	The Red Goshawk is endemic to Australia where it is very sparsely dispersed across approximately 15% of coastal and sub-coastal Australia from western Kimberly to north-eastern NSW, and occasionally on continental islands. It has probably always occurred in central Australia, where three widely spaced, recent confirmed sightings corroborate earlier, previously doubted records, however no breeding has been recorded in central Australia. This species occurs in coastal and sub-coastal areas in wooded and forested lands of tropical and warm-temperate Australia. Riverine forests are also used frequently. Such habitats typically support high bird numbers and biodiversity, especially medium to large species which the red goshawk requires for prey (SPRAT 2023).	PMST	**Unlikely to Occur**. Although there is a record within 50 km, suitable habitat is not mapped within the Survey area.	**Unlikely to Occur**. Field survey confirmed suitable habitat for the species is not present in the Project area AND There are no post-1980 records of the species within 10 km of the Project area.
Grey Falcon	*Falco hypoleucos*	V	V	They Grey Falcon's habitat includes lightly treed inland plains; gibber deserts, sand ridges, pastoral lands, timbered watercourses; seldom in driest deserts.	PMST	**Unlikely to Occur**. There are no records within 50 km and suitable habitat is not	**Unlikely to Occur**. Field survey confirmed suitable habitat for the species is not present in the

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				Resident or nomadic visitor to inland parts of all mainland states (Pizzey & Knight 1999).		mapped within the Survey area.	Project area AND There are no post-1980 records of the species within 10 km of the Project area.
Latham's Snipe, Japanese Snipe	*Gallinago hardwickii*	V, Mi, Ma	V	Latham's Snipe is a non-breeding visitor to south-eastern Australia, and is a passage migrant through northern Australia. This species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern SA. It occurs in permanent and ephemeral wetlands up to 2000m ASL, where they usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). They can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity (SPRAT, 2023).	PMST	**Unlikely to Occur**. There are no records within 50 km and suitable habitat is not mapped within the Survey area.	**Unlikely to Occur**. Field survey confirmed suitable habitat for the species is not present in the Project area. The small constructed farm dams do not have fringing riparian vegetation or a shallow wet meadow. AND There are no post-1980 records of the species within 10 km of the Project area.
White-throated Needletail	*Hirundapus caudacutus*	V, Mi, Ma	V	The White-throated Needletail is a non-breeding migrant to Australia, and, when present, is widespread in eastern and south-eastern Australia. It has been recorded in all coastal regions of Qld, extending inland to the western slopes of the GDR and occasionally onto adjacent plains. In Australia, the species was thought to be almost exclusively aerial, foraging from <1 m to >2,000 m above the ground, but recent evidence suggests that roosting in the canopy of woodlands is a common behaviour (see Tarburton 2021; Vanderduys *et al.* 2024). The species has been recorded foraging over various habitats, including open forests, rainforest, heathlands, grasslands and farmlands, partly cleared pasture, plantations or remnant vegetation at the edge of paddocks (TSSC 2019).	PMST, WildNet	**Potential to Occur**. Broadly suitable habitat for this species is mapped in the Survey area and there is a record within 50 km (ALA, 18.02 km, 2006).	**Potential to Occur**. This species is migratory and nomadic and may only occur in the airspace over the Project area on a seasonal and/or infrequent basis. AND There are no post-1980 records of the species within 10 km of the Project area.
Barn Swallow	*Hirundo rustica*	Mi, Ma	SL	The Barn Swallow usually occurs in northern Australia, on Cocos-Keeling Island, Christmas Island, Ashmore Reef, and patchily along the north coast of the mainland from the Pilbara region, Western Australia, to Fraser Island in Queensland. The species has been recorded irregularly further south in Western Australia, in areas such as Derby and Carnarvon, and in South	PMST	**Unlikely to Occur**. While broadly suitable habitat for this species is mapped in the Survey	**Unlikely to Occur**. Filed survey confirmed that limited suitable habitat occurs within the Project area

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				Australia near Koolunga, Roxby Downs, Nantawarra and south of Innamincka. Vagrants have also been recorded as far south as Sydney. In Australia, the Barn Swallow is recorded in open country in coastal lowlands, often near water, towns and cities. Birds are often sighted perched on overhead wires, and also in or over freshwater wetlands, paperbark Melaleuca woodland, mesophyll shrub thickets and tussock grassland (DoE 2024)		area, there are no records within 50 km.	HOWEVER There are no post-1980 records of the species within 10 km of the Project area.
Bar-tailed Godwit	*Limosa lapponica*	Mi, Ma	SL	The temperate or tropical winter habitats are usually located around intertidal areas along muddy coastlines, estuaries, lagoons, sewage ponds, brackish or saline inland lakes, flooded pastures and airfields (Pizzey & Knight 1999).	PMST	**Unlikely to Occur**. There are no records within 50 km and suitable habitat is not mapped within the Survey area.	**Unlikely to Occur**. Field survey confirmed suitable habitat for the species is not present in the Project area AND There are no post-1980 records of the species within 10 km of the Project area.
Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	*Limosa lapponica baueri*	E	E	The bar-tailed godwit (both subspecies combined) have been recorded in the coastal areas of all Australian states. It is widespread in the Torres Strait and along the eastern and south-east coasts of QLD, NSW and VIC. These species migrate southwards for the boreal winter. *L. l. menzbieri* has a more westerly migration than *L. l. baueri*. They are usually located around intertidal areas along muddy coastlines, estuaries, lagoons, sewage ponds, brackish or saline inland lakes, flooded pastures and airfields (Pizzey & Knight 1999; Threatened Species Scientific Committee)	PMST, WildNet	**Unlikely to Occur.** There are no records within 50 km and suitable habitat is not mapped within the Survey area.	**Unlikely to Occur**. Field survey confirmed suitable habitat for the species is not present in the Project area AND There are no post-1980 records of the species within 10 km of the Project area.
Grey Wagtail	*Motacilla cinerea*	Mi, Ma	SL	The grey wagtail is a scarce but regular visitor to northern Australia (Menkhorst *et al.* 2019). The species inhabits fast-flowing mountain streams and rivers with riffles and exposed rocks or shoals (also waterfalls), often in forested areas. The species is also found in lowland watercourses and canals, where there are artificial waterfall and weirs etc. (Tyler 2020).	PMST	**Unlikely to Occur**. While there is a record within 50 km, suitable habitat is not mapped within the Survey area.	**Unlikely to Occur**. Field survey confirmed suitable habitat for the species is not present in the Project area AND There are no post-1980 records of the species within 10 km of the Project area.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
Yellow Wagtail	*Motacilla flava*	Mi, Ma	SL	This species move south from their breeding distribution in North America to northern Australia during their northern Summer. In northern Australia, wintering yellow wagtail visitors have been recorded in open areas of short grass with clumps of pandanus and small eucalyptus, and observed feeding near sewage ponds. Elsewhere, in open areas with water, along banks of semipermanent streams, in areas adjacent to sugarcane (*Saccarum officinarum*) fields that are used as roosts; as well as in sparse grasslands, acacia steppe, and drying swamps; usually in association with wild and domestic grazing mammals (Badyaev 2020).	PMST	**Unlikely to Occur**. While broadly suitable habitat for this species is mapped in the Survey area, there are no records within 50 km.	**Unlikely to Occur**. Field survey confirmed suitable habitat for the species is not present in the Project area AND There are no post-1980 records of the species within 10 km of the Project area.
Eastern Curlew, Far Eastern Curlew	*Numenius madagascariensis*	CE, Mi, Ma	CR	Inhabits estuaries, tidal mudflats, sandspits, saltmarshes, mangroves; occasionally fresh or brackish lakes; bare grasslands near water (Pizzey & Knight 1999). The Eastern Curlew breeds in northeast Asia and is a common summer migrant to Australian coastlines, although about 25% of the population remains all year round (Finn *et al.*, 2001; Finn *et al.* 2007; Geering *et al.* 2007).	PMST	**Unlikely to Occur.** There are no records within 50 km and suitable habitat is not mapped within the Survey area.	**Unlikely to Occur**. Field survey confirmed suitable habitat for the species is not present in the Project area AND There are no post-1980 records of the species within 10 km of the Project area.
Osprey	*Pandion haliaetus*	Mi, Ma	SL	The Osprey is thinly distributed around the coast of Australia where they forage for fish in fresh, brackish, or saline waters of rivers, lakes, estuaries and inshore coastal waters (Schodde & Tidemann 1993; NPWS 2000). Nests are usually located near a suitable area of foraging habitat and are a bulky structure made from piled sticks, often positioned in a tall dead tree or artificial structures such as telecommunication towers or poles (Schodde & Tidemann 1993; NPWS 2000). Breeding pairs defend breeding territory against other Ospreys, and active nests are usually more than 1 km apart (NPWS 2005).	PMST	**Potential to Occur**. Broadly suitable habitat for this species is mapped in the Survey area and there is a record within 50 km (ALA, 16.17 km, 2021).	**Potential to Occur**. Field survey did not record any suitable habitat for this species within the Project area nor the broader Survey area. No open water exists in the Survey area, with only ephemeral drainage, likely to be shallow, overland flow in even in the wettest events. The density of vegetation in mapped wetland areas within the broader Survey area would prohibit the use by Osprey, even if there was an event providing suitable clear,

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
							open water in these areas. AND There are no post-1980 records of the species within 10 km of the Project area.
Australian Painted Snipe	*Rostratula australis*	E, Ma	E	The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with rank emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum Muehlenbeckia or canegrass or sometimes tea-tree (Melaleuca). The Australian Painted Snipe sometimes utilises areas that are lined with trees, or that have some scattered fallen or washed-up timber (DoE 2025). Australian Painted Snipe breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands, provided that these islands are a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover. The Australian Painted Snipe has also been recorded nesting in and near swamps, canegrass swamps, flooded areas including samphire, grazing land, among cumbungi, sedges, grasses, salt water couch (Paspalum), saltbush (Halosarcia) and grass, also in ground cover of water-buttons and grasses, at the base of tussocks and under low saltbush. One nest has been found in the centre of a cow-pat in a clump of long grass. The Australian Painted Snipe loafs on the ground under clumps of lignum, tea-tree and similar dense bushes (Marchant & Higgins 1993). This species has been recorded foraging under clumps of tea-trees, but most records are from daytime roost sites and the foraging habitat requirements of this species are not well understood and may be quite specific. This species requires suitable wetland areas even in drought conditions. The species can move to suitable habitat if necessary (DoE 2025).	PMST	**Unlikely to Occur**. Suitable habitat is not mapped within the Survey area and no records exist within 50 km.	**Unlikely to Occur**. While there is some potential for habitat within the broader Survey area, field surveys did not record suitable habitat within the Project area. Farm dams were of inappropriate configuration to provide habitat for this species with no shallow margins or "wet meadow" regions. AND There are no post-1980 records of the species within 10 km of the Project area.
Common Greenshank, Greenshank	*Tringa nebularia*	E, Mi, Ma	E	The Common Greenshank does not breed in Australia. However, the species occurs in all types of wetlands and has the widest distribution of any shorebird in Australia. In QLD, the species is widespread in the Gulf country and eastern Gulf of Carpentaria, and has been recorded in most coastal regions.	PMST	**Unlikely to Occur**. Suitable habitat is not mapped within the Survey area and no	**Unlikely to Occur**. Field survey confirmed that preferred habitat for this species does not occur within the Project area

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. The edges of the wetlands used are generally of mud or clay, occasionally of sand, and may be bare or with emergent or fringing vegetation, including short sedges and saltmarsh, mangroves, thickets of rushes, and dead or live trees. It was once recorded with Black-winged Stilts (*Himantopus himantopus*) in pasture but are generally not found in dry grassland. The species is known to forage at edges of wetlands, in soft mud on mudflats, in channels, or in shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as sedges or saltmarsh. It will occasionally feed on exposed seagrass beds (DoE 2025).		records exist within 50 km.	AND There are no post-1980 records of the species within 10 km of the Project area.
Masked Owl (northern)	*Tyto novaehollandiae kimberli*	V	V	The distribution of the Masked Owl (northern) is very poorly known, and three subpopulations have been suggested: Kimberley, NT and Cape York, QLD. In northern Australia, the Masked Owl has been recorded from riparian forest, rainforest, open forest, Melaleuca swamps and the edges of mangroves, as well as along the margins of sugarcane fields (DoE 2024)	PMST, WildNet	**Unlikely to Occur**. While broadly suitable habitat is mapped within the Powerlink properties neighbouring the Project area. No records have been recorded within 50 km.	**Unlikely to Occur**. Field surveys recorded broadly suitable habitat in the Survey area, no suitable habitat was present in the Project area HOWEVER This is of very limited extent and quality and unlikely to support the species AND There are no post-1980 records of the species within 10 km of the Project area.
Mammal Species							

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu]	*Dasyurus hallucatus*	E	C	The northern quoll occurs across much of northern Australia, from south-eastern QLD to the south-west Kimberley, WA, with a disjunct population in the Pilbara. In the NT it is restricted to the Top End. The species occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforest, sandy lowlands and beaches, shrubland, grasslands and desert. The habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Rocky habitats are usually of high relief, often rugged and dissected but can also include fields or caves in low lying areas such as in WA. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes. Dens are made in rock crevices, tree holes or occasionally termite mounds. Northern Quolls sometimes occur around human dwellings and campgrounds. Northern Quolls appear to be most abundant in habitats within 150 km of the coast. Surveys throughout QLD have suggested Northern Quolls are more likely to be present in high relief areas that have shallower soils, greater cover of boulders, less fire impact and were closer to permanent water (DoE 2025).	PMST	**Unlikely to Occur**. While there is a record within 50 km, suitable rocky habitat is unlikely to occur within the Survey area.	**Unlikely to Occur**. Field survey confirmed no suitable habitat (e.g. rocky outcrops) for the species is present within the Project area AND There are no post-1980 records of the species within 10 km of the Project area.
Spotted-tailed Quoll (North Queensland), Yarri	*Dasyurus maculatus gracilis*	E	E	The Spotted-tailed Quoll occurs along the east coast of Australia from south east QLD to SA and TAS. The Spotted-tailed Quoll has been recorded in a wide range of habitat types including dry and moist sclerophyll forests and woodlands, rainforest, coastal heathland, and riparian forest. This species has been occasionally sighted in treeless areas, rocky outcrops and grazing lands. The Spotted-tailed Quoll shelters and dens in small caves, fallen logs with large hollows and tree hollows and may utilise numerous dens within its home range which has been estimated to be between 800 ha to 20 km^2. The Spotted-tailed Quoll is partly arboreal and feeds upon a variety of prey species including birds, rodents, lizards, small wallabies, and even insects. The Spotted-tailed Quoll is also known to scavenge and feed upon carrion, road kills including wild dogs, and litter (DoE 2024). The subspecies is mostly confined to the relatively cool, wet and climatically equable upland closed-forests (mostly above 900 m altitude) that occur in the upper catchments of rivers draining east and west of the Eastern Escarpment in the Wet Tropics bioregion of north-eastern QLD. Research has also suggested that the species occurs in lower altitude notophyll, mesophyll and wet sclerophyll forests in lesser numbers. Vegetation types typical of this habitat are simple and complex notophyll vine forest, simple microphyll vine-	PMST	**Unlikely to Occur**. While there is a record within 50 km, suitable rocky habitat is unlikely to occur within the Survey area.	**Unlikely to Occur**. Field survey confirmed suitable habitat does not occur in the Project area AND The Project area is outside of the most common altitudinal range for the species and does not provide any denning habitat for the species, AND There are no post-1980 records of the species within 10 km of the Project area.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				fern forest and simple microphyll vine-fern thicket. The subspecies utilises dens for resting and for raising young. Dens have been found in tree hollows, logs, rock crevasses and even among building materials. Maternal dens often have long entrances (DoE 2025).			
Semon's Leaf-nosed Bat, Greater Wart-nosed Horseshoe-bat	*Hipposideros semoni*	V	E	Semon's Leaf-nosed Bat is found in tropical rainforest, monsoon forest, wet sclerophyll forest and open savannah woodland. This species does not have an obligatory requirement for cave roosts. Daytime roost sites include tree hollows, deserted buildings in rainforest, road culverts and shallow caves amongst granite boulders or in fissures. They appear to prefer rainforest and are more likely to be tree-dwelling than cave-dwelling. It is often observed in "atypical places that are visited by humans" and there are examples of bats being observed in unoccupied houses (in an oven, clothes closet and on a picture rail) and the door handle of a car. The microclimate of such roosts is similar to that of ambient. The species is associated with the "Mabi forest (Complex notophyll vine forest 5b)", a Threatened Ecological Community listed under the EPBC Act 1999 (DoE 2024).	PMST	**Unlikely to Occur**. While some broadly suitable rainforest habitat for this species is mapped in the Survey area, there are no records within 50 km.	**Unlikely to Occur**. Field survey confirmed no suitable habitat for the species is present within the Project area AND There are no post-1980 records of the species within 10 km of the Project area.
Ghost Bat	*Macroderma gigas*	V	E	Ghost bats occur in a wide range of habitats from rainforest, monsoon and vine scrub, to open woodlands in arid areas. These habitats are used for foraging, while roost habitat is more specific. Favoured roosting sites of the ghost bat are undisturbed caves or mineshafts which have several openings. Ghost bats occur in tropical regions in QLD, and along the ventral and northern coast, from Rockhampton north to Cape York (DEHP 2017).	PMST	**Unlikely to Occur**. While some broadly suitable rainforest habitat for this species is mapped in the Survey area, there are no records within 50 km.	**Unlikely to Occur**. Field survey confirmed no suitable habitat for the species is present within the Project area AND There are no post-1980 records of the species within 10 km of the Project area.
Black-footed Tree-rat (north Queensland), Shaggy Rabbit-rat	*Mesembriomys gouldii rattoides*	V	C	In north QLD, this species mostly occurs in eucalypt forests and woodlands, especially where hollows are relatively plentiful. There is also a record of denning in a hollow in a large rainforest tree near rainforest-eucalypt forest boundary at Iron Range (TSSC 2015). It has been recorded mostly from eucalypt forests and woodlands (but not rainforests) around Mareeba, but there are records sparsely across Cape York Peninsula, including recent records from Mungkan Kandju National Park and the Australian Wildlife Conservancy's Piccaninny Plains and Brooklyn wildlife sanctuaries (TSSC 2015).	PMST	**Unlikely to Occur**. While some broadly suitable eucalypt forest/woodland habitat for this species is mapped in the Survey area, there are no records within 50 km.	**Unlikely to Occur**. Field survey confirmed no suitable habitat for the species is present within the Project area AND There are no post-1980 records of the species within 10 km of the Project area.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
Greater Glider (northern), Greater Glider (north-eastern Queensland)	*Petauroides minor*	V	V	The greater glider (northern) is an arboreal nocturnal marsupial, predominantly solitary and largely restricted to eucalypt forests and woodlands of north-eastern Australia. It is typically found in highest abundance on high elevation, wetter sites in open woodland to open forests, containing relatively old trees and abundant hollows. It is likely that only a proportion of forest in potential habitat areas is suitable for the species, as the structural attributes of the forest overstorey and forage quality it relies on vary considerably across the landscape (DCCEEW 2022).	PMST	**Potential to Occur**. Broadly suitable habitat is mapped in the Survey area and a post 1980 record exists within 50 km (ALA, 40 km, 2017).	**Unlikely to Occur**. Following field survey, the Project area does not contain suitable habitat for this species. Vegetation in the broader Survey area is of insufficient age/size for this species due to historical clearing. Furthermore, the young vegetation that is present, is considered not open enough to be suitable for this gliding species. AND There are no post-1980 records of the species within 10 km of the Project area.
Mahogany Glider	*Petaurus gracilis*	E	E	The mahogany glider is only found in a narrow 122 km long strip of the southern Wet Tropics of north Queensland. It soars through the open forests and woodlands, using a membrane that extends from its wrist to its ankle, and can travel up to 60 m in one glide. The glider prefers open forests as the habitat allows for uninterrupted gliding paths between trees. The species was first recorded in the 1880s but disappeared until it was rediscovered and formally named almost 100 years later, in 1989 (DoE 2024). Mahogany gliders are nocturnal, gliding at night between feed trees and sometimes foraging as low as one metre off the ground on grass tree Xanthorrhoea johnsonii flower spikes. Although principally nectivorous, the mahogany glider relies on many food sources such as nectar, pollen, mistletoe, insects, wattle exudates and honeydew (DAWE 2021). As the second largest Petaurid glider, the mahogany glider requires a more open forest structure for efficient gliding than the sympatric sugar glider. Petaurus gracilis averages approximately 29 m per glide and launches from an average height of 19.75 m (DAWE 2021). Two types of vegetation present formidable ecological barriers for the western and southern boundaries of the species' distribution. They are upland rainforest, typically the dominant vegetation community along the	PMST, WildNet	**Potential to Occur**. Broadly suitable habitat is mapped in the Survey area and a recent record exists within 50 km (ALA, 9 k, 2007).	**Unlikely to Occur**. There are post-1980 records of the species (ALA, 9 km away, 2007) within 10 km of the Project area. HOWEVER Following field survey Area, Potential habitat is absent from the Project area and vegetation in the broader Survey area is unlikely to be suitable for mahogany glider. Vegetation is quite young, making it unsuitable for denning. Additionally, the forest structure is more closed than is generally preferred by this species. *Xanthorrhoea johnsonii* (a secondary food source for

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				escarpment of the Paluma, Seaview and Cardwell Ranges, and the drier Einasleigh woodlands to the south of Saltwater Creek (DAWE 2021).			the species) was not observed during survey and connectivity to suitable habitat in the broader landscape is lacking with connectivity to the north interrupted by Tully Gorge Road, the west by Sandy Creek Road and cleared agricultural land, and the south and east by cleared agricultural land and farm tracks.
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	*Phascolarctos cinereus*	E	E	The Koala is endemic to Australia. The biological species range extends from north-eastern QLD to the south-east corner of SA. Koalas naturally inhabit a range of temperate, subtropical and tropical forests, woodland and semi-arid community's dominated by Eucalyptus species. Their habitat can broadly be defined as any forest or woodland containing species that are a known Koala food tree, or shrubland with emergent food trees (DoE 2025).	PMST	**Potential to Occur**. Broadly suitable habitat is mapped in the Survey area and a post 1980 record occurs within 50 km (ALA, ~37 km, 2019).	**Unlikely to Occur**. Field survey confirmed two species of Ancillary Habitat Trees including *Melaleuca quinquenervia* and some *Corymbia intermedia* in the Survey area, however these were absent from the Project area. Additionally, there was an absence of Locally Important Koala Trees throughout the Survey area. Nearby mapped vegetation (outside of the Survey area) consists mainly of vine forest and rain forest REs, unlikely to support koala. AND There are no post-1980 records of the species within 10 km of the Project area.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
Spectacled Flying-fox	*Pteropus conspicillatus*	E	E	The spectacled flying-fox is associated mainly with rainforests, with most colonial camps occurring in or near (within several kilometres) of rainforests. However, it forages widely away from such camps across a broad range of vegetation types including mangroves, eucalypt forests, Melaleuca forests, gardens and orchards. Individuals may disperse widely from camps to feed and may move frequently between camps. Individuals are known to fly up to 50 km in a single night to feed, and longer-distance movements are predicted (TSSC 2019). Diet includes fruits of many tree species, pollen, nectar and leaves. Telemetry data suggest that much of the foraging is undertaken in open forests (on mass flowering events) rather than on the dispersed fruit and flower resources in rainforests (TSSC 2019).	PMST, WildNet	**Potential to Occur**. Broadly suitable habitat is mapped in the Survey area and a recent post 1980 occurs within 50 km (ALA, 7 km, 2023).	**Unlikely to Occur**. There is one post-1980 record within 10 km of the Project area (ALA, 7 km away, 2023) HOWEVER While low quality, suitable foraging habitat in the form of regrowth Melaleuca vegetation was recorded within the broader Survey Area, there was no suitabel habitat recorded within the Project area.
Large-eared Horseshoe Bat, Greater Large-eared Horseshoe Bat	*Rhinolophus robertsi*	V	V	The greater large-eared horseshoe bat is a poorly-known and generally uncommon species, which probably occurs in low densities even within core habitats. It occurs in rainforests, riparian forests, eucalypt open forests and woodlands. It has a slow fluttery flight, and its diet mostly comprises moths and beetles, but also includes grasshoppers, crickets and lacewings. At night it forages mainly in open forest and wattle-dominated ridges in rainforest. In open forest and woodland, it prefers to forage amongst the thicker vegetation in gullies and along creeks, though they have been observed at the edge of grassy clearings in rainforest and road edges. It usually flies within the lower half of the canopy between one and eight metres, using gaps such as tracks within rainforest, but has also been observed regularly at canopy height (around 25 m). While the species has been observed on occasions foraging in rainforest clearings and around a light near a patch of rainforest, it is thought to prefer to remain within canopy, and the loss of native vegetation remnants and understorey would likely limit their local distribution.	PMST	**Unlikely to Occur**. Mapped vegetation in the adjacent property includes some potentially suitable vine forest RE and some less ideal Melaleuca forest, however there are no records of the species within 50 km of the Survey area.	**Unlikely to Occur**. While there was Melaleuca forest present in the broader Survey area, field surveys did not record any rainforest or vine forest within the Survey area, nor any suitable habitat within the Project area. The species was not recorded either visually nor via ultrasonic recording. AND There are no post-1980 records of the species within 10 km of the Project area.
Bare-rumped Sheath-tailed Bat, Bare-rumped Sheathtail Bat	*Saccolaimus saccolaimus nudicluniatus*	V	E	In Australia, the bare-rumped sheathtail bat has been recorded mostly in eucalypt forests and woodlands, generally in near-coastal areas. In QLD, it is known to be associated with coastal lowland rainforests, and more open forests dominated by Eucalyptus or Corymbia species interspersed with coastal lowland rainforest. The small number of roosts recorded in Australia have all been found in deep	PMST	**Unlikely to Occur**. While broadly suitable habitat is mapped within the Project area, no records of the species have been	**Unlikely to Occur**. Field surveys did not record suitable hollow bearing trees in the Project area nor the broader Survey area. The species was not

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				tree hollows of the following species: poplar gum (*Eucalyptus platyphylla*), Darwin woollybutt (*E. miniata*), Darwin stringybark (*E. tetrodonta*) and weeping paperbark (*Melaleuca leucadendra syn. leucodendron*). Hollows in these tree species have also been used as breeding roosts (TSSC 2016).		recorded within 50 km (ALA, 2024). Suitable tree species for roosts are not likely to occur in the Survey area.	recorded either visually nor via ultrasonic recording. AND There are no post-1980 records of the species within 10 km of the Project area.
Water Mouse, False Water Rat, Yirrkoo	*Xeromys myoides*	V	V	The water mouse occurs in three regions of coastal Australia: NT, central-south QLD, and south-eastern QLD. Although they have been documented in three distinct regions, they all require similar habitat including mangroves and the associated saltmarsh, clay pans, heathlands, and freshwater wetlands. The main habitat difference at each location is the littoral, supralittoral and terrestrial vegetation which differs in structure and composition (DoE 2024). The water mouse may nest or forage in the following Queensland Regional Ecosystems: 8.1.1, 11.1.1, 11.1.2, 11.1.4, 12.1.1, 12.1.2, 12.1.3, 12.2.5, 12.2.7, 12.2.11, 12.2.12 and 12.2.14.	PMST	**Unlikely to Occur**. Suitable habitat is not mapped in the Survey area, nor are there any records within 50 km.	**Unlikely to Occur**. Field survey did not record any observations of the species nor any habitat within the Project area nor the broader Survey area AND There are no post-1980 records of the species within 10 km of the Project area.
Reptile Species							
Salt-water Crocodile, Estuarine Crocodile	*Crocodylus porosus*	Mi, Ma	V	Studies from Arnhem Land (NT) indicated that the Salt-water Crocodile mostly occurs in tidal rivers, coastal floodplains and channels, billabongs and swamps up to 150 km inland from the coast. It has been noted that evaporation in isolated channels may lead to salinity levels that are twice that of seawater. The Salt-water Crocodile usually inhabits the lower (estuarine) reaches of rivers, while the upper reaches are inhabited by *Crocodylus johnstoni* (Fresh-water Crocodile); although, areas of overlap occur in some rivers. In QLD, the species is usually restricted to coastal waterways and floodplain wetlands. Populations may also be found hundreds of kilometres upstream, such as in the Fitzroy River and the waterways of the southern Gulf of Carpentaria (DoE 2025). Preferred nesting habitat of the Salt-water Crocodile includes elevated, isolated freshwater swamps that do not experience the influence of tidal movements. Floating rafts of vegetation also provide important nesting habitat. In the Northern Territory, most nest sites are found on the north-west banks of rivers and are usually exposed to the midday sun, but shaded in the early morning and late evening (DoE 2025).	PMST, WildNet	**Potential to Occur**. Potentially suitable habitat is mapped within the Survey area and a post 1980 record exists within 50 km (ALA, 9.62 km, 2010)	**Unlikely to Occur**. There are post-1980 records of the species (ALA, 9.62 km, 2010) within 10 km of the Project area. AND The Project area does not support estuarine suitable habitat for the species.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
Amphibian Species							
Australian Lace-lid, Lace-eyed Tree Frog, Day's Big-eyed Treefrog	*Litoria dayi*	V	V	*Litoria dayi* is a rainforest species, endemic to the Wet Tropics Bioregion, QLD. It is associated with rainforests and rainforest margins. In montane areas, the species prefers fast-flowing rocky streams although they also frequent slower watercourses where ample vegetation exists along the margins. At low elevations, the lace-eyed tree frog favours rock soaks, narrow ephemeral streams and rock outcrops in larger watercourses. It may also be found on rocks, boulders and vegetation in or adjacent to streams (DoE 2024).	PMST, WildNet	**Potential to Occur**. Broadly suitable habitat is mapped in the Survey area and there are post 1980 records within 50 km (ALA, 8.37 km, 2018).	**Unlikely to Occur**. There are post-1980 records of the species (ALA, 8.37 km, 2018) within 10 km of the Project area. HOWEVER Field survey recorded an absence of rainforest within the Project area and broader Survey Area, as well as an absence of stream and rock habitat suitable for this species.
Mountain Mist Frog, Nyakala Frog	*Litoria nyakalensis*	CE	CR	The Mountain Mistfrog is a rainforest specialist, endemic to the Wet Tropics Bioregion. It is found in upland rainforest and wet sclerophyll forest along fast-flowing streams where there is white water from riffles and cascades. It is usually found perched on rocks or overhanging vegetation adjacent to the water. The tadpoles are restricted to fast-flowing waters where they cling to rocks in riffles and torrents and in highly oxygenated pools below waterfalls. Tadpoles also burrow into loose sand under rocks which may help them withstand the violent floods that often occur in rainforest streams (DoE 2024).	PMST	**Unlikely to Occur.** Suitable fast flowing water habitat for this species is unlikely to be present in the Survey area. HOWEVER There are post 1980 records within 50 km (ALA, 29.4 km, 1984).	**Unlikely to Occur.** Field survey recorded an absence of rainforest/wet sclerophyll forest within the Project area and broader Survey area, as well as an absence of fast flowing stream and rock habitat suitable for this species. AND There are no post-1980 records of the species within 10 km of the Project area.
Fish and Shark Species							
Cairns Rainbowfish, Northern Soft-spined Sunfish	*Cairnsichthys rhombosomoides*	E	E	The habitat of the Cairns rainbowfish consists of small, permanent streams, with a granite boulder, sand, or alluvium dominated substrate, located at the base of mountain ranges or hills in high rainfall areas. The species is most common in the portion of streams situated between the base of steep mountain ranges and deeper, slower flowing, downstream	PMST	**Potential to Occur.** Broadly suitable habitat is mapped within the Survey area and a post 1980 record exists	**Unlikely to Occur.** The field survey confirmed no suitable flowing, clear-water habitat in the Project area. Streams within the Survey area did not contain

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				sections. Such downstream sections often coincide with the regular presence of large predatory species such as Lutjanus argentimaculatus (mangrove jack) and interspecific competition from Melanotaenia splendida (eastern rainbowfish). The Cairns rainbowfish prefers shaded sections with moderate to swift flow rates and abundant cover in the form of woody debris, undercut banks, and instream vegetation such as tree roots. The species is typically found in flowing, clear-water habitats, with the loss of permanent stream flow considered to negatively affect subpopulations, leading to possible extirpation at fragmented sites. However, stream flow is not essential for short-term survival of the species, with individuals found in non-flowing anabranch habitats. Water quality values recorded across this habitat include temperatures between 15–29°C, pH values between 4.5–8.4, low water conductivity (< 65 µScm-1), and moderate to high dissolved oxygen (> 4.9 mgL-1) (DCCEEW 2023).		within 50 km (ALA, 16 km, 2019).	permanent water and at most are reduced to scarce, very small pools during drier periods. AND There are no post-1980 records of the species within 10 km of the Project area.
Largetooth Sawfish, Freshwater Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish	*Pristis pristis*	E	E	Freshwater Sawfish can be found in large rivers across northern Australia. As juveniles, they inhabit freshwater rivers and estuaries before moving to coastal marine and estuarine environments in adulthood (DCCEEW 2025).	PMST	**Unlikely to Occur.** Suitable large river habitat for this species is unlikely to be present in the Survey area and no post 1980 records exist within 50 km.	**Unlikely to Occur.** No large river habitat for this species is present in the Survey area AND There are no post-1980 records of the species within 10 km of the Project area.
Opal Cling Goby	*Stiphodon semoni*	CE	-	In Australia, adult Opal Cling Gobies are found in pristine rainforest streams that have significant flow and direct access to marine habitats.	PMST	**Unlikely to Occur.** Habitat for this species is unlikely to be present in the Survey Area and no post 1980 records exist within 50 km.	**Unlikely to Occur.** Field survey confirmed no rainforest nor pristine streams nor streams with any water flow within the Project area AND There are no post-1980 records of the species within 10 km of the Project area.

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
Plant Species							
-	*Canarium acutifolium*	V	V	*Canarium acutifolium* occurs in north-east Australia and Malaysia. In Australia, it occurs between Mossman and Tully in Queensland. Collections have been made in mesophyll vine forest along rivers and creeks at altitudes of 5 to 200 m (DEWHA 2008). Almost confined to creek and river banks in lowland rain forest (CSIRO 2020).	PMST	**Potential to Occur.** There is broadly suitable habitat mapped within the Survey area and a post 1980 record exists within 50 km (ALA, 5.8 km, 2008).	**Unlikely to Occur.** There are post-1980 records of the species (ALA, 5.8 km, 2008) within 10 km of the Project area HOWEVER Field survey confirmed no rainforest habitat with creek or river banks suitable for this species within the Project area.
-	*Carronia pedicellata*	E	E	*Carronia pedicellata* is endemic to north-east Queensland. It was initially known only from three small remnant rainforest patches on freehold land in the Babinda area. The species is now known to be more widespread from Bellenden Ker to Mission Beach with disjunct populations in the Noah and Cooper Creek catchments near Cape Tribulation. Carronia pedicellata grows in complex mesophyll or notophyll vine forest of deep soils derived from basalt, granite or metamorphic substrates at altitudes from near sea level to 520 m (DEWHA 2008). Grows in well developed lowland rain forest (CSIRO 2020). The distribution of this species overlaps with the "Mabi Forest (Complex Notophyll Vine Forest 5b)" EPBC Act-listed threatened ecological community (DEWHA 2008).	PMST	**Potential to Occur.** There is broadly suitable habitat mapped within the Survey area and a post 1980 record exists within 50 km (ALA, 31.4 km, 2007).	**Unlikely to Occur.** Field survey confirmed no vine forest or rainforest habitat suitable for this species within the Project area AND There are no post-1980 records of the species within 10 km of the Project area.
-	*Chingia australis*	E	E	Habitat for this species is broadly defined as terrestrial on disturbed banks in lower montane mesic vine forest (CSIRO 2020). *C. australis* occurs in rainforest on steep creek banks and ridge slopes. It is an early successional gap specialist, reliant upon exposure of mineral soil (lacking organic matter). It may be somewhat shade-intolerant, often inhabiting naturally well-lit sites such as swampy ground in lowland forest or creek banks. Presence in such locations may be attributed to its high moisture requirements. Like all ferns, *C. australis* has a two-phase lifecycle involving a stage that is entirely dependent on the presence of water. Some populations are riparian (growing in or very close to water courses), all are dependent on surrounding rainforest habitat and the moist microclimate it provides. Populations are ephemeral	PMST	**Unlikely to Occur.** While a post 1980 record exists within 50 km (ALA, 28.42 km, 2002), no suitable rainforest or montain vine forest on steep creek banks and ridge slopes is mapped in the Survey area.	**Unlikely to Occur.** Field survey confirmed no suitable rainforest or montain vine forest on steep creek banks and ridge slopes occurs in the Project area. AND There are no post-1980 records of the species

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				(short-lived), responding to the kind of disturbance processes that typically remove topsoil, such as landslips, flood scouring, tree-falls and road cuttings (Herbert 2006).			within 10 km of the Project area.
-	*Diplazium cordifolium*	V	V	Habitat for this species is broadly defined as terrestrial in high rainfall complex mesophyll vine forest at low altitude (CSIRO 2020). *Diplazium cordifolium* is known from north-east Queensland. This species is found around Cairns, Herberton, and Wooroonooran, and mostly occurs on private land. The species is found in rainforest, along creek banks. It is usually found below 80-100 m altitude, although one population in Palmerston valley grows at 475 m altitude (DEWHA 2008).	PMST	**Potential to Occur.** There is broadly suitable habitat mapped within the Survey area and a post 1980 record exists within 50 km (ALA, 45.16 km, 1993).	**Unlikely to Occur.** Field survey confirmed no suitable rainforest habitat occurs in the Project area AND There are no post-1980 records of the species within 10 km of the Project area.
a sedge	*Eleocharis retroflexa*	V	V	*Eleocharis retroflexa* is known from Queensland and the Northern Territory. In Queensland it is known from the Eubenangee Swamp, north of Garradunga and Blackfellows Creek near Cairns. In the Northern Territory it is known from two swamps on the Wingate Mountains plateau and sandstone plateau in Nitmiluk National Park. It grows in shallow water on the margins of seasonal swamps (DEWHA 2008). This species has been reported growing on plateaus, in shallow water on the margins of seasonal swamps on laterite, or clay loam substrates. One collection is from a sandy drainage depression. Associated species included *Melaleuca viridiflora, Eucalyptus phoenicea, Corymbia oocarpa, Capillipedium parviflorum, Sorghum plumosum, Heteropogon triticeus* and sedges, mostly common, widespread species (DEPWS 2021).	PMST	**Potential to Occur.** There is broadly suitable habitat mapped within the Survey area and a post 1980 record exists within 50 km (ALA, 4 km, 1992).	**Unlikely to Occur.** There are post-1980 records of the species (ALA, 4 km, 1992) within 10 km of the Project area HOWEVER Though there is some broadly suitable habitat in the neighbouring PQ property, field survey confirmed no suitable habitat occurs within the Project area
-	*Leichhardtia araujacea*	CE	CR	*Leichhardtia araujacea* is endemic to northeast QLD where it has been recorded from Binirr National Park (CYPAL) south to the Stone River, west of Ingham. A 2019 record of the species was the first collection of *Leichhardtia araujacea* since 1893, and until the recent record, the species was thought to be extinct. The 2019 observation is from a *Blepharocarya involucrigera* gallery forest; these are invariably associated with permanent water, albeit often by tapping underground springs or aquifers. Blepharocarya dominated communities are widespread; however, they are often linear in distribution following water courses or otherwise just around a water source. *Leichhardtia araujacea* belongs to a group of species (*L. glandulifera, L. racemosa, L.*	PMST	**Unlikely to Occur**. While there is potential for broadly suitable Gallery rainforest in the Survey area, the only record of this species in the last 125 years is from north of Cooktown (over 300 km North of the Survey area).	**Unlikely to Occur**. Field surveys confirmed there is no suitable rainforest or permanent water in the Project area, nor was *Blepharocarya involucrigera* recorded in the vegetation in the Project area or

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				paludicola) that are patchily distributed in Australia, often in spring fed rainforest systems from northern NSW through eastern QLD and across into the NT (Forster 2019).			neighbouring PQ properties. AND There are no post-1980 records of the species within 10 km of the Project area.
Ant Plant	*Myrmecodia beccarii*	V	V	*Myrmecodia beccarii* is known from the coastal woodlands between Cooktown and Ingham in QLD (DEWHA 2008). Paperbark swamps, mangroves and rainforest of North QLD provide the host trees for epiphytic ant-plants. However, *Myrmecodia beccarii* does not occur in rainforest; it is found in lowland woodland dominated by paperbarks, usually broad-leafed tea tree (*Melaleuca viridiflora*, an endangered ecological community under the EPBC Act) and mangroves (Cape York NRM 2021). This species is known from 10 locations. This species occurs within the Wet Tropics and Cape York (Queensland) Natural Resource Management Regions (DEWHA 2008).	PMST, WildNet	**Potential to Occur**. Suitable habitat for the species is mapped in the Survey area and a recent record is "location generalised" to within 50 km (ALA, 11.71 km, 2022) of the Survey area.	**Unlikely to Occur**. While there are some areas with potentially suitable (though quite young) host trees (*Melaleuca viridiflora, M. quinquenervia, Lophostemon suaveolens*) at the eastern edge of the Project area and in the broader Survey area, field survey confirmed mangrove and *Melalueca viridiflora* dominant communities do not occur in the Project area or on the Site. AND There are no post-1980 records of the species within 10 km of the Project area. AND Surveys within the Project area have been undertaken and did not identify the species.
Lesser Swamp-orchid	*Phaius australis*	E	E	*Phaius australis* grows in areas where soils are almost always damp but not flooded for lengthy periods. Sands are generally the underlying soil type, and they are usually found in coastal habitats in between swamps and forests or in suitable areas further inland. This includes swampy sclerophyll forest	PMST	**Potential to Occur**. Broadly suitable habitat is mapped within the Survey area and a	**Unlikely to Occur**. While there are some areas with potentially suitable Melaleuca woodland and

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				dominated by melaleucas, swampy forest that often have sclerophyll emergents, or fringing open forest and melaleuca swamp forest associated with rainforest species. This species has also been recorded in wallum sedgeland, rainforest and closed forest where they often grow in deep shade but can also occur in full sun (Bostock, Species profile—Phaius australis, 2009a).		recent record exists within 50 km (ALA, 26.58 km, 2012).	forest (though none dominated by *M. viridiflora*) in the broader Survey area, field survey confirmed suitable habitat does not occur in the Project area. AND There are no post-1980 records of the species within 10 km of the Project area. AND Surveys within the Project area have been undertaken and did not identify the species.
-	*Phaius pictus*	V	V	*Phaius pictus* occurs in north east Queensland, sporadically from the McIlwraith Range, Bloomfield River to Kirrama Range (DEWHA 2008). The species occurs in humid rainforests and is considered highly localised (ANBG 2024), restricted to rainforests from 0–600 m altitude, and usually occurs in sheltered humid sites close to streams and seepage among forest litter on boulders (DEWHA 2008).	PMST	**Unlikely to Occur.** While there is a historical record within 50 km (ALA, 36.43 km, 2003), suitable habitat close to streams and seepage on boulders is unlikely to be present in the Survey area.	**Unlikely to Occur**. Field surveys confirmed there is no suitable rainforest habitat in the Project area, nor are there suitable streams or seepage on boulders. AND There are no post-1980 records of the species within 10 km of the Project area. AND Surveys within the Project area have been undertaken and did not identify the species.
Rat's Tail Tassel-fern	*Phlegmariurus filiformis*	E	CR	*Phlegmariurus filiformis* occurs in rainforest on basalt soils, at altitudes up to 1200m above sea level. It has been recorded growing on slopes along creeks (Bostock 2009). In Australia the species is restricted to mountaintops in the	PMST	**Unlikely to Occur.** While there is a historical record within	**Unlikely to Occur.** Field survey confirmed that suitable mountaintop

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				Wet Tropics, north east Queensland. Sparsely distributed on mountaintops in the Pacific and Australia.		50 km (ALA, 28.07 km, 2002) of the Survey area, there is no mountaintop rainforest habitat.	rainforest habitat does not occur in the Project area. AND There are no post-1980 records of the species within 10 km of the Project area. AND Surveys within the Project area have been undertaken and did not identify the species.
Rock Tassel-fern, Water Tassel-fern	*Phlegmariurus squarrosus*	CE	CR	*Phlegmariurus squarrosus* occurs on rocks, particularly around waterfalls, or on tree trunks in lowland swamps and low to mid-altitude rainforest (DoE 2014).	PMST	**Unlikely to Occur.** While broadly suitable habitat is mapped in the Survey area, no recent or historical records exist within 50 km.	**Unlikely to Occur.** Field survey confirmed no suitable habitat in the Project area, through there is some broadly suitable lowland swampy habitat in the neighbouring PQ property. AND There are no post-1980 records of the species within 10 km of the Project area. AND Surveys within the Project area have been undertaken and did not identify the species.
Square Tassel Fern	*Phlegmariurus tetrastichoides*	V	V	The Square Tassel-fern is endemic to north-east QLD and occurs from Mount Finnigan south to the Clarke Range, west of Mackay. It is most prevalent on the Evelyn, Atherton and Mount Carbine Tablelands but extends to lower altitudes along the North Johnstone River and Mossman Gorge. The Square Tassel-fern occurs in upland notophyll vineforest. It is an epiphyte on rainforest trees, occurring in north-eastern QLD, from the Daintree, south	PMST	**Potential to Occur.** Broadly suitable habitat is mapped within the Survey area and there is an historical record	**Unlikely to Occur**. Field survey confirmed no suitable rainforest or vine forest habitat in the Project area. AND

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				to Hinchinbrook Island, and west of Mackay, from sea level to 1,100 m altitude (DoE 2025).		within 50 km (ALA, 32.84 km, 2003).	There are no post-1980 records of the species within 10 km of the Project area. AND Surveys within the Project area have been undertaken and did not identify the species.
-	*Plesioneuron tuberculatum*	E	E	*Plesioneuron tuberculatum* occurs in the wet tropics of north east Queensland in the Johnstone and Russell River valleys on creek banks in high rainfall lowland vine forest (ATH 2022) and rainforest (DEWHA 2008).	PMST	**Unlikely to Occur.** While there is broadly suitable habitat mapped within the Survey area, there are no records within 50 km.	**Unlikely to Occur.** Field survey confirmed no suitable vine forest or rainforest occurs in the Project area. AND There are no post-1980 records of the species within 10 km of the Project area. AND Surveys within the Project area have been undertaken and did not identify the species.
Middle Filmy Fern	*Polyphlebium endlicherianum*	E	V	The middle filmy fern grows on damp rocks and tree trunks, in tropical rainforest, often near streams or beside waterfalls. Sites are moist and shaded. In Queensland, herbarium collections have been made on a rock wall in a very dark situation; on a damp rock in a dried stream bed; and in closed forest on granite sands (DoE 2024).	PMST	**Potential to Occur.** There is an historical record within 50 km of the Survey area (ALA, 42.16 km, 2003), and broadly suitable habitat is mapped in the Survey area.	**Unlikely to Occur.** Field survey confirmed no suitable rainforest, stream or waterfall habitat in the Project area. AND There are no post-1980 records of the species within 10 km of the Project area. AND

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
							Surveys within the Project area have been undertaken and did not identify the species.
-	*Polyscias bellendenkerensis*	V	V	Endemic to north east Queensland, *Polyscias bellendenkerensis* known only from collections made on the Bellenden Ker Range, Mt Bartle Frere, the headwaters of Douglas Creek on the Daintree River catchment and the Mt Pieter Botte area at elevations of 750 m or more. Grows only in mountain rain forest (CSIRO 2020; DEWHA 2008).	PMST	**Unlikely to Occur.** There are no records within 50 km of the Survey area and the Survey area is outside of the altitudinal range of the species.	**Unlikely to Occur.** Field survey confirmed that suitable rainforest habitat and altitudinal range is not present in the Project area. AND There are no post-1980 records of the species within 10 km of the Project area. AND Surveys within the Project area have been undertaken and did not identify the species.
Velvet Jewel Orchid	*Zeuxine polygonoides*	V	V	The Velvet Jewel Orchid is confined to north-east QLD where it occurs from near Kuranda to the Cardwell Range, Cardwell. There are also locations reported as far north as the Daintree River and south to the Paluma Range. *Zeuxine polygonoides* (*Rhomboda polygonoides* under the NC Act Qld) grows in moist shady sites in rainforests (mesophyll vine forests and simple notophyll vine forests) in leaf litter on the ground or on large boulders adjacent to streams. Altitudinal range is 450–820 m above sea level. The Velvet Jewel Orchid is found mostly from moist, cloudy or very wet rainfall zones on metamorphic substrates, granite or rhyolite. The species can be found in humus on flat topped rocks in association with *Anoectochilus*	PMST	**Potential to Occur.** There is a record within 50 km of the Survey area (ALA, 28.89 km, 2003), and broadly suitable habitat is mapped in the Survey area.	**Unlikely to Occur**. Field survey confirmed that suitable rainforest habitat is not present in the Project area. AND The Project area is outside of the altitudinal range for this species AND There are no post-1980

Common Name	Scientific Name	EPBC Status	NC Status	Habitat Description	Source	Pre-Field Work (Desktop only) Study area Likelihood of Occurrence	Post Field Work (Project area) Likelihood of Occurrence
				yatesiae, Goodyera viridiflora and *Liparis simmondsii*. The Velvet Jewel Orchid is found in the following Regional Ecosystems: • 7.11.1a: mesophyll vine forest in very high rainfall lowlands and foothills on metamorphics • 7.12.16a: simple notophyll vine forest (often with Bull Kauri (Agathis microstachya)) in cloudy wet to moist uplands on granite and rhyolite.			records of the species within 10 km of the Project area. AND Surveys within the Project area have been undertaken and did not identify the species.

* CR: Critically endangered, E: Endangered, V: Vulnerable, NT: Near threatened, Mi: Migratory, Ma: Marine

Appendix C

Flora and Fauna Species Lists

Table C 1 presents the flora species list of observations during the field survey. **Table C 2** presents the fauna species list of observations during the field survey.

Table C 1 Flora Species List

Scientific Name	Common Name	Endemicity
Acacia disparrima	brush ironbark wattle	Native
Acacia mangium	big leaved acacia	Native
Ageratum houstonianum	blue billygoat weed	Exotic
Allocasuarina littoralis	black sheoak	Native
Alstonia muelleriana		Native
Archontophoenix alexandrae	Alexandra palm	Native
Axonopus fissifolius	carpet grass	Exotic
Blechnum cartilagineum	gristle fern	Native
Calamus australis	wait-a-while, hairy mary, lawyer cane	Native
Carallia brachiata	carallia	Native
Commersonia bertramia	brown kurrajong	Native
Corymbia intermedia	pink bloodwood	Native
Cryptocarya cocosoides	coconut laurel	Native
Cryptocarya sp.		Native
Cupaniopsis foveolata	narrow-leaved tuckeroo	Native
Cyperus aromaticus	aromatic kyllinga	Exotic
Cyperus haspan	sharp edge sedge	Native
Cyperus rotundus	nutgrass	Exotic
Dillenia alata	red beech	Native
Endiandra hypotephra	blue walnut, northern rose walnut	Native
Eriocaulon scariosum	pipewort	Native
Eriocaulon willdenovianum	eriocaulon	Native
Eucalyptus pellita	large-fruited red mahogany	Native
Heptapleurum actinophyllum	umbrella tree	Native
Hymenachne amplexicaulis	hymenachne	Exotic
Hypolytrum nemorum		Native
Hypserpa decumbens	hairy hypserpa	Native
Hypserpa laurina	laurel-leaf hypserpa	Native
Isachne confusa		Native
Isachne globosa	swamp millet	Native
Jasminum kajewskii	native jasmin	Native
Lobelia quadrangularis	sawtooth lobelia	Native
Lophostemon suaveolens	swamp box	Native

Scientific Name	Common Name	Endemicity
Lygodium microphyllum	snake fern	Native
Macaranga involucrata	brown macaranga	Native
Melaleuca quinquenervia	swamp paperbark	Native
Melaleuca viridiflora	broad leaved tea tree	Native
Melastoma malabathricum subsp. malabathricum	black-mouth bush	Native
Melicope sp.		Native
Mimosa pudica	sensitive weed	Exotic
Nauclea orientalis	Leichhardt tree	Native
Oplismenus imbecilis		Native
Pandanus sp.		Native
Parsonsia sp.		Native
Paspalum conjugatum	sourgrass	Exotic
Passiflora edulis	purple passionfruit	Exotic
Polyscias australiana	ivory basswood	Native
Ptychosperma elegans	elegant palm	Native
Rhodomyrtus trineura subsp. trineura	ironwood	Native
Rhynchospora corymbosa	matamat	Native
Schoenoplectiella mucronata	bog bulrush	Native
Schoenus calostachyus	bogrush	Native
Scleria ciliaris		Native
Spermacoce remota	woodland false buttonweed	Exotic
Stenochlaena palustris	climbing swamp fern	Native
Syzygium sp.		Native
Urochloa dictyoneura	creeping false paspalum	Exotic

Table C 2 Fauna Species List

Classification	Scientific Name	Common Name	Endemicity
Amphibian	*Litoria nasuta*	striped rocketfrog	Native
Amphibian	*Litoria rubella*	red tree frog	Native
Bird	*Accipiter cirrocephalus*	collared sparrowhawk	Native
Bird	*Ailuroedus maculosus*	spotted catbird	Native
Bird	*Ardea intermedia*	intermediate egret	Native
Bird	*Bubulcus ibis*	cattle egret	Native
Bird	*Centropus phasianinus*	pheasant coucal	Native
Bird	*Cinnyris jugularis*	olive-backed sunbird	Native

Classification	Scientific Name	Common Name	Endemicity
Bird	*Geopelia humeralis*	bar-shouldered dove	Native
Bird	*Geopelia placida*	peaceful dove	Native
Bird	*Gerigone magnirostris*	large-billed gerygone	Native
Bird	*Hirundo neoxena*	welcome swallow	Native
Bird	*Meliphaga lewinii*	Lewin's honeyeater	Native
Bird	*Merops ornatus*	rainbow bee-eater	Native
Bird	*Oriolus flavocinctus*	green oriole	Native
Bird	*Parvipsitta pusilla*	little lorikeet	Native
Bird	*Philemon corniculatus*	noisy friarbird	Native
Bird	*Podargus strigoides*	tawny frogmouth	Native
Bird	*Rhipidura leucophrys*	willie wagtail	Native
Bird	*Sphecotheres vieilloti*	Australasian figbird	Native
Bird	*Todiramphus macleayii*	forest kingfisher	Native
Bird	*Vanellus miles*	masked lapwing	Native
Invertebrate	*Cosmophasis micarioides*	north queensland jumping spider	Native
Invertebrate	*Dysphania numana*	four o'clock moth	Native
Invertebrate	*Hypolycaena phorbas*	black-spotted flash	Native
Invertebrate	*Opodiphthera eucalypti*	emperor gum moth caterpillar	Native
Invertebrate	*Papilio ulysses joesa*	Ulysses butterfly	Native
Mammal	*Isoodon macrourus*	northern brown bandicoot	Native
Mammal	*Notamacropus agilis*	agile wallaby	Native
Mammal	*Pteropus alecto*	black flying-fox	Native
Mammal	*Bos taurus*	cattle	Introduced
Reptile	*Saproscincus basiliscus*	basilisk shadeskink	Native

Appendix D

Preliminary Erosion and Sediment Control Plan

Preliminary Erosion and Sediment Control Plan

Tully Battery Energy Storage System (BESS) Project

Prepared for: RWE Renewables Australia Pty Ltd

Date: 18/12/2025

Document information

Document	Preliminary Erosion and Sediment Control Plan
Attexo ref	RWE-002
Date	18 December 2025
Prepared by	Harry Savage (CPSS)
Reviewed by	Shahn Nestor (CPESC, 8336) and Justin Claridge

Quality information

Rev	Date	Details	Authorisation	
			Name/position	Signature
0	10/09/2025	Final	Shahn Nestor, Principal Environmental Consultant	
1	18/12/2025	Final	Shahn Nestor, Principal Environmental Consultant	

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1. Introduction

1.1 Background

RWE Renewables Australia Pty Ltd (RWE) are seeking to develop the proposed Tully Battery Energy Storage System (BESS) (the Project) across a 27 hectare (ha) site (the Site), consisting of two freehold parcels, Lot 1 on RP735276 and Lot 1 on RP852238. The Site is located approximately 4 km south-west of the township of Tully in far north Queensland within the Cassowary Coast Regional Council (CCRC) Local Government Area (LGA).

The Project will have a capacity of up to 200 MW / 800 MWh and is proposed to take electricity from the grid in periods of low demand, and feed back into the grid at periods of high demand. Grid connection is proposed via the neighbouring Powerlink 132 kV Tully substation, located to the northeast on Lot 1 on RP716718.

Attexo Group Pty Ltd (Attexo) has been engaged by RWE to prepare this Preliminary Erosion and Sediment Control Plan (PESCP) for the Project.

1.2 Purpose and Objectives

This PESCP has been developed to support the development application for a Material Change of Use (MCU) under the Planning Act and CCRC Planning Scheme. The water management outcome identified by the CCRC Planning Scheme for healthy waters is as follows:

- Development avoids creating additional run-off into waterways and wetlands that causes pollution, erosion, channel widening and sedimentation.

This P-ESCP is intended to demonstrate that potential erosion and sedimentation impacts associated with Project establishment can be effectively managed. Further, this P-ESCP establishes the baseline standard for soil ESC applicable to Project construction works.

The overall objective of this PESCP, and all ESC for the Project, is as follows:

- *To take all reasonable and practicable measures to minimise short and long-term soil erosion and adverse effects of sediment transport* (International Erosion Control Association ([IECA] 2025, p2.1).

1.3 Scope

The best practice erosion and sediment control (BPESC) standard developed by the IECA for the Australasian region (IECA, 2025) recognises that effective erosion and sediment control requires an iterative process of plan-implement-monitor-update. A hierarchical ESC management framework has been adopted for Project construction, consisting of this PESCP developed by RWE, which is to be implemented via iterative construction ESCPs developed and maintained by the Principal Construction Contractor.

A thorough justification for this approach is provided in **Section 4.1** of this PESCP.

This PESCP applies to all Project construction activities and includes:

- A description of the Project Site and construction works required for Project establishment.
- A description of the site environmental conditions relevant to ESC planning.
- An assessment of the Project erosion risk.
- Identification of site constraints, values and potential threats.
- A description of the erosion, drainage and sediment controls to be implemented for the Project.
- Definition of the ESC monitoring and maintenance activities that will be undertaken during Project construction.
- Identification of potential ESC failures and corrective actions to be taken should these be realised.

1.4 Legislation and Standards

A summary of the legislation and standards relevant to ESC that apply to the Project is provided in **Table 1.1**. Further information pertaining to water quality objectives and targets established for the Project catchment area is provided in **Section 3.8** of this PESCP.

Table 1.1: ESC legislation and standards

Standard	Application	Administrator
The Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018	Now an online platform, the guidelines establish a broad set of physical and chemical water quality standards stressing the need to develop locally relevant guidelines. Provides a basis for which local standards can be developed and a guideline which can be used in the absence of the former.	Australian and New Zealand Governments (ANZG)
Environmental Protection Act 1994 (EP Act)	Environmental protection, establishes a General Environmental Duty (GED) and specifically addresses the release of water contaminants (S440ZG).	QLD Department of Environment, Technology, Science and Innovation (DETSI)
Environmental Protection Regulation 2019	Prescribes various matters pertaining to the EP Act, e.g. water contaminants (Schedule 10) including sediment.	DETSI
Environmental Protection (Water and Wetland Biodiversity) Policy 2019	Intended to achieve the object of the EP Act in relation to waters and wetlands. Identifies environmental values and management goals for waters, states water quality guidelines and objectives and provides a framework for decision making and monitoring and reporting on the condition of waters.	DETSI
Tully River, Murray River and Hinchinbrook Island Basins Environmental Values and Water Quality Objectives	Made under the *Environmental Protection (Water and Wetland Biodiversity) Policy 2019*. Identifies water quality objectives for surface and groundwaters of the Tully River, Murray River and Hinchinbrook Island Basins and adjacent coastal waters.	DETSI
The Planning Act 2016, subsidiary legislation, State Codes	Establishes the regulatory processes for wind farm Project approvals and criteria (including those relating to water quality impacts) against which Projects are assessed.	Department of State Development, Infrastructure and Planning (DSDIP)
Cassowary Coast Regional Council Planning Scheme 2015 (Version 4)	Planning schemes identify strategic and specific outcomes relating to water quality protection applicable to developments which are assessable under the Planning scheme.	Cassowary Coast Regional Council
IECA Australasia Best Practice Erosion and Sediment Control Guidelines 2025	Erosion and sediment control standard applicable to the development.	IECA Australasia
Reef 2050 Water Quality Improvement Plan (WQIP)	Identifies management and monitoring requirements for land-based pollution to improve the quality of water discharged from GBR catchments to the Reef. Establishes Water quality targets for each catchment that drains to the GBR.	Queensland and Australian Governments (partnership)

2. Project Description

2.1 Site Overview

The Project includes a proposed BESS with a capacity up to 200 MW / 800 MWh and associated infrastructure (e.g. transformer, OHTL, air insulated switchgear, access roads, laydown areas, foundations, hard stand, parking, switch rooms and storage). The BESS and associated infrastructure will comprise a total development footprint of approximately 9 ha within the 28.7 ha Project Site.

A summary of the terms used to describe the Project is provided in **Table 2.1**. A map showing the Site and Development Footprint is provided in **Figure 2.1**.

Table 2.1: Project descriptions

Area	Definition	Size (hectares, ha)
Project Site	Encompasses the entirety of the two land parcels (Lot 1 on RP735276 and Lot 1 on RP852238) intersected by the Project.	28.694
Grid Connection	Refers to the proposed OHTL that crosses the Project Site and ties-in to the existing Powerlink Tully substation within Lot 1 on RP716718.	
Development Footprint	Comprises the maximum area to be disturbed by the Project for the construction of the BESS. There is expected to be only limited earthworks for the Overhead Transmission Line (OHTL) connecting the BESS to the substation northeast of the Site.	9

2.2 Built Form and Concept Design

The Project has been designed to minimise impacts, in keeping with the sustainable nature of the development for supporting renewable energy projects and reducing greenhouse gas emissions. Accordingly, the existing environment; existing land use at the Site and the surrounding locality; proximity to existing electricity infrastructure; stormwater management; and noise impact have all been considered in the design development.

The primary components of the Project will consist of the following:

- Battery units will cover a total area of approximately 2.5 ha. The foundations on which the proposed battery units will likely be installed on screw piles, piers or concrete pad formations. The BESS will be connected to the adjacent switch rooms via underground cables. Inverters may be incorporated as part of the battery units or there may be separate Power Conversion Units (PCU) that convert the DC energy from the battery units.
- Stormwater drainage systems will be constructed to allow for safe collection and diversion of rainwater at the BESS facility and will be established for both construction and operational phases.
- Access to the facility will be via the existing local road network with upgraded access proposed from Sandy Creek Road.
- Grid connection will be via an overhead transmission line running from the north of the BESS area to substation on the adjoining lot.
- The BESS area will be fenced for safety and security purposes.
- An Asset Protection Zone (APZ) will be established and maintained around the battery storage infrastructure to ensure protection from bushfire and to allow access to firefighting personnel in the event of fire.
- A perimeter road will be provided for operations, maintenance and emergency response.
- Earthworks, including batters and clearing required for access to undertake civil works.

- An acoustic wall of 6 m in height has been included with the design, this is located directly on the northern perimeter of the BESS units. Subject to further design enhancements of the BESS units to reduce noise emissions, the acoustic wall may not be required.

2.2.1 Battery Energy Storage System

The battery units will cover an area of approximately 2.5 ha and will include up to 188 battery units, associated infrastructure, inverters, MV transformers, internal access roads, hardstand and security fencing.

The battery units and MV transformers would be installed on concrete footings or screw piles. Each battery unit is anticipated to weigh approximately 39 tonnes and be 8.6 m in length, 2.8 m in height and 2.1 m wide. Most battery units are approximately in the form of a 12.2 m shipping container.

The associated transformers/inverters (up to 47 units are estimated, subject to final equipment selection and design) would similarly be trucked to Site and arranged onto footings or screw piles via mobile crane.

2.2.2 Switching Station

A switching station is proposed comprising a 132/33 kV high-voltage transformer, air insulated switchgear, an auxiliary transformer, two 33 kV switch rooms and potentially harmonic filters. The switch rooms will include the switchgear and a Site office, with trenches and conduits for the cabling entering the building. The building would be manufactured off-site and delivered via truck. The switch rooms and transformers would sit on concrete footings or piles.

2.2.3 Grid Connection

The connection to the grid will be via overhead line to connect the BESS to the neighbouring 132 kV Tully Substation. The route will travel north through Lot 1 on RP735276 and connect to the neighbouring substation site on Lot 1 on RP716718.

2.2.4 Operation and Maintenance Area

A temporary construction and permanent operations and maintenance (O&M) area will be established adjacent to Sandy Creek Road. This would include an operations and maintenance building, yard, parking areas and any required office buildings, water tanks or storage sheds. Repurposing of the existing dwellings on Site as O&M areas for operation is being considered.

2.2.5 Parking and Access

Access to the facility will be via the existing road network, with two upgraded site access points to be constructed from Sandy Creek Road. The proposed access points to the development from the road network are illustrated on the Project concept design. Sufficient parking to meet the needs of the development will be provided at the Project Site.

2.2.6 Fencing

Temporary fencing will be erected at the Site once the main earthworks have been completed. Final perimeter fencing will be erected around the BESS area, switching station and O&M area for safety and security reasons.

2.2.7 Landscaping buffer

A landscape buffer of 5 m depth is proposed along the frontage of Lot 1 on RP852238. This has been designed and will be planted in accordance with the CCRC Planning Scheme requirements.

Project Area

Development Footprint

Proposed Transmission Line Corridor

Proposed transmission line

20m exclusion zone

Watercourse

Lot Parcel

Main Road

Local Road

TULLY BESS P-ESCP
Project Layout

Figure 2.2

N

0 m 100

Attexo

REVIEWED: HS **DRAWN:** KB **SCALE** 1:3,500 **DATE:** 19/09/2025 **DWG No:** RWE-002_003[C]

2.3 Construction Works

Construction of the BESS is estimated to be undertaken over an 18-month period, subject to final equipment selection, construction methodology and appointment of construction contractors(s). A summary of the main construction stages is provided in **Table 2.2.** Construction stages may occur in parallel with different activities taking place on different parts of the Site at the same time.

Table 2.2: Construction stages

Stage		Overview
1	Site preparation	Vegetation clearing Prior to construction works commencing, vegetation within the development footprint would be removed. The clearing methodology has not yet been determined, however, clearing will likely be undertaken through mechanical methods that are suitable for the applicable environmental conditions. The types of machinery will be determined prior to construction by the relevant contractor.
		Existing infrastructure The existing dwellings and sheds on Site will be assessed for suitability to be repurposed as O&M areas for Project operation. Where existing structures cannot be repurposed, they will be removed.
		Earthworks Civil works will be required to prepare the Project Site for construction of the BESS and ancillary facilities. Excavation and filling will be required to make the Site level and cater to stormwater management requirements. Cut and fill volumes and batter design will be finalised during detailed design.
2	Construction	BESS Bench If relevant, topsoil will be removed and stockpiled on Site for use in landscaping and rehabilitation once construction is completed or else disposed of. Where the quality of material is acceptable, excavated material would be used as backfill and compacted during the civil works program. Gravel sheeting will be applied to the BESS bench area.
		Access Roads New internal access roads will be constructed for delivery of equipment and material and ongoing maintenance activities. The access roads would be up to 6 m wide and connect the BESS compound entrance to the Site frontage at Sandy Creek Road. Any topsoil would be removed for use elsewhere where applicable, and the access roads will be finished with compacted gravel. A bitumen crossover will be constructed in accordance with the appropriate standards between Sandy Creek Road and the property boundary.
		Battery Units The battery units and MV transformers would be installed on concrete footings or screw piles. Each BESS unit is expected to be 8.6 m in length, 2.8 m in height and 2.1 m wide. The battery units would be transported to Site via heavy vehicles and craned onto their concrete footings for anchoring. The associated transformers would also be trucked to Site and arranged onto footings via mobile crane.
		Storage and Operation Area

		Areas will be designated on-site for the storage of materials in open air laydown, for use as required during operations.
		Switchgear Control Room A switchgear control room will be manufactured off-site and delivered to the BESS bench via trucks. The control building would sit on suitable concrete footings with trenches and conduits for the cabling entering the building.
		Perimeter Fencing Fencing will be erected at the perimeter of the BESS area, switching station and O&M area for safety and security reasons.
		Underground cabling Underground cabling within the BESS bench would be installed via open trenching, undertaken in accordance with relevant Australian Standards and marked accordingly. Upon installation of the cable, the trench will be backfilled with excavated material and the surface rehabilitated.
		APZ The APZ will be established and maintained around the site to a width of 48.1 m along the northern and eastern sides and 10 m along the western and southern sides. The APZ will be cleared of any vegetation and have a mineral earth or grass surface. Where a grass surface is chosen, it must be maintained at a height ≤ 10 cm during the fire danger season.
		Demobilisation Following completion of construction, all construction equipment will be demobilised from the Site.
3	Rehabilitation	Rehabilitation would occur in stages throughout the construction program. Rehabilitation works comprising compaction and surfacing of the BESS bench area would occur once civil works have been completed. Further rehabilitation of the Site, including disposal of waste materials (at an appropriately licensed waste facility) would occur once equipment installation and construction has been completed.
4	Operation	The BESS will be in operation 24 hours a day, every day of the year. O&M activities may occasionally extend beyond daylight hours for corrective maintenance activities as required. The Site will be remotely monitored 24 hours a day.
5	Decommissioning	The Project is intended to operate for a period of 20 years. Following this period a determination will be made whether to: Extend the life of the existing infrastructure with increased maintenance, refurbishment and/or replacement of certain components; or Repower the Site with new infrastructure; or Decommission the infrastructure and rehabilitate the Site.

2.3.1 Hours of Construction

Most construction work, including trenching and deliveries, will be undertaken during standard construction hours: Monday to Saturday, 6:30am to 6:30pm.

The following construction activities may be undertaken outside of standard construction hours:

- Distribution of materials within the Site;
- Commissioning and testing activities; and

- Other quiet works including survey work, office work and general mechanical assembly.

2.3.2 Construction Traffic

Maximum traffic generation is expected to be 40 light vehicles and 30 heavy vehicles travelling to and from the Site each day, with an average of 30 light vehicle movements daily and 15 heavy vehicle movements daily.

Given the remote location and size of the Project, it is anticipated that there is sufficient area for informal car parking spaces. As such, no formal car parking is proposed for the construction workforce and a temporary construction parking area will be designated on-site.

The construction workforce is expected to commute to site using private vehicles as no existing active or public transport networks are accessible within the Project's vicinity.

2.3.3 Construction Period

Construction of the Project is anticipated to begin in 2027 and is expected to extend for approximately 18 months.

3. Site Environmental Context

3.1 Climate

The climate of the Site is tropical and characterised by hot humid summers and summer dominant rainfall (BoM, 2025).

The dominant climate factor influencing soil erosion is rainfall. Further discussion of site rainfall is provided in **Section 3.9** in the context of an erosion risk assessment for the Site. A discussion of future climate change scenarios and how these may affect soil erosion is provided in **Section 3.9.4**.

3.2 Land Use

The Site consists of two lots (Lot 1 on RP735276 and Lot 1 on RP852238) that are both zoned as Rural under the CCRC planning scheme and currently used for livestock grazing.

Both lots are currently used as rural residential properties and are largely undeveloped. Lot 1 on RP852238 contains the Powerlink OHTL and infrastructure designation. The existing Powerlink 132 kV substation and 275 kV substation are located on adjacent lots to the north-east of the Site. Land to the south and east of the Site comprise rural areas used for sugar cane farming.

3.3 Soils

Soils within the Site have been mapped in the 1:50,000 *Soils of the Cardwell-Tully Area, North Queensland* by Cannon *et al*. (1992). The Cannon *et al.* (1992) mapping identifies two mapped soil units (Hewitt and MSC) over the Site as shown in **Figure 3.1** and detailed in **Table 3.1**. The Development Footprint is located entirely within the area mapped as comprising Hewitt soils.

The Hewitt soil series forms a continuum, becoming progressively more poorly drained with distance from higher, better drained levees. Overall, the Hewitt soil unit is mapped as containing poorly drained soils formed on alluvium. MSC is a miscellaneous map unit that has not been assessed in detail, located in the north of the Site.

Table 3.1: Soils (Cannon et al, 1992) mapped within the Site

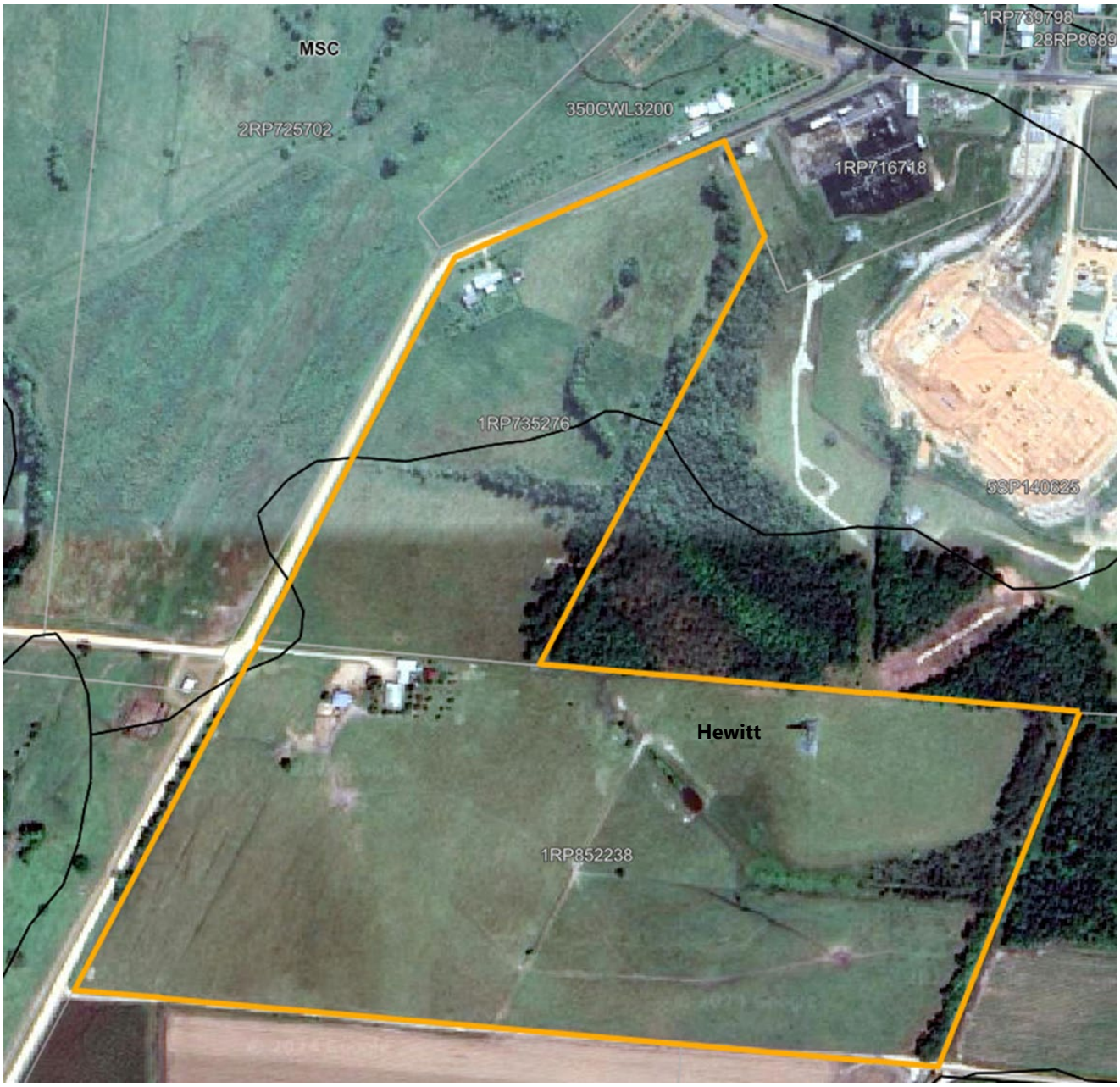
Soil	Landform	Major distinguishing features	Australian Soil Classification
Hewitt	Floodplain and swamps	Sapric loamy A horizon, grey whole coloured or mottled, silty clay B horizons	Hydrosols
MSC	-	Miscellaneous type of mapping unit, used to identify areas not typically assessed in detail.	Podosols

The Hewitt soil series is described as having variable topsoil depths, from 9–80 cm thick, consisting of black to dark grey, sapric to fibric loams to clay loams. The terms sapric and fibric refer to peat materials, where fibric is undecomposed or weakly decomposed organic materials whilst sapric is strongly to completely decomposed organic material. Hewitt subsoils comprise brown to grey, clay loam to medium clays with mottling due to their commonly waterlogged status.

No soil sodicity was identified in the recorded analytical data, however soil pH is consistently acidic (<5.0) throughout the profile, with high presence of hydrogen and aluminium cations.

Due to the lack of information on the MSC soil, relevant to the proposed grid connection route north of the development footprint, it has been conservatively assumed that sodic, dispersive soils could potentially be disturbed by the Project.

Figure 3.1: The 1:50,000 *Soils of the Cardwell-Tully Area, North Queensland*



3.4 Geology

The Site is located entirely on the Qa-QLD surface geological unit, consisting of quaternary alluvium of clay, silt, sand and gravel; flood-plain alluvium (DNRMMRRD, 2025).

3.5 Topography

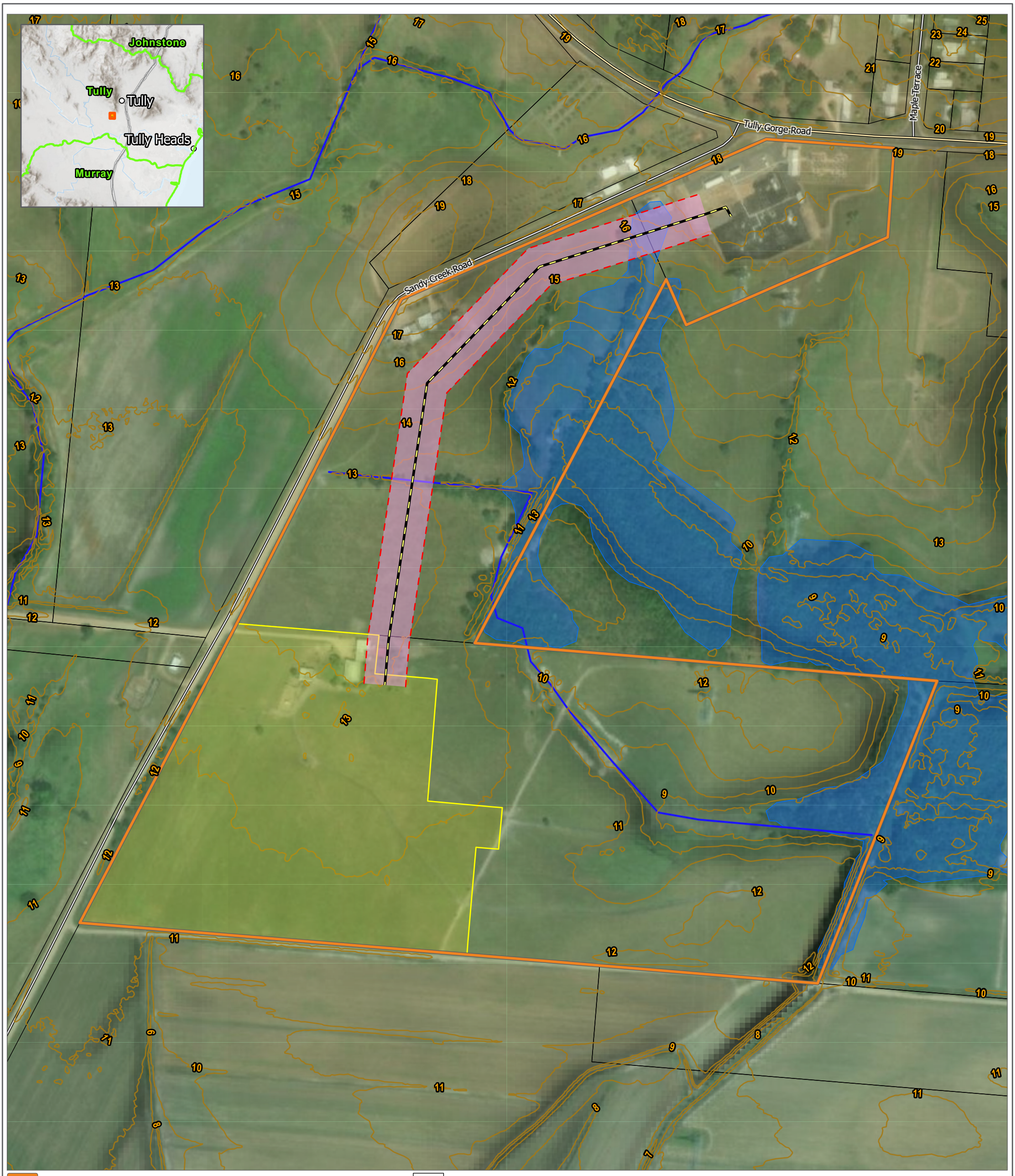
The Site is located south of the Tully Gorge National Park, located 4 km south of Mount Tyson. Elevation within the Site ranges from 18 m Australian height datum (AHD) in the northwest in association with a crest of 19 mAHD to the north of Sandy Creek Road, to a low of 9 mAHD in the east of the site associated with wetlands.

Topography across the site can be divided into three areas:

- The northern half of lot 1RP735276 slopes to the southeast from 18 mAHD to 10 mAHD at approximately 3–5%.
- The eastern half of lot 1RP852238 is bisected into two north-south rises at 12 mAHD by a drainage feature flowing to the southeast to the low of the wetlands at 9 mAHD.
- The southern half of lot 1RP735276 and western half of lot 1RP852238, including the development footprint, is located on land around 12 mAHD which predominantly slopes away from the north at 0.5–1.5%.

A detailed representation of site terrain using slope data from a 5 m digital elevation model from Lidar data[1] is provided in **Figure 3.2.**

[1] Digital Elevation Model (DEM) 5 Metre Grid of Australia derived from LiDAR (Commonwealth of Australia (Geoscience Australia) 2015)



Project Area
Development Footprint
Proposed Transmission Line Corridor
Proposed transmission line
20m exclusion zone
Contours (1m)
Watercourse
Main Road
Local Road
Lot Parcel
Drainage basins
MSES high ecological significance wetlands

TULLY BESS P-ESCP
Site topography and hydrology

Figure 3.2

N
0 m 100

Attexo

REVIEWED: HS **DRAWN:** KB **SCALE** 1:3,500 **DATE:** 30/06/2025 **DWG No:** RWE-002_004[B]

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3.6 Vegetation

The Site is predominantly cleared, with some remnant vegetation occurring in association with drainage features and wetlands.

Field surveys were conducted by Attexo (2025) to assess vegetation within the Site to produce a ground-truthed RE (GTRE) map to validate the mapped vegetation. The vast majority of the Site is represented by non-remnant, cleared pasture, dominated by exotic grasses. There are small areas of regrowth vegetation along the eastern boundaries of each of the Lots within the Site, with none identified within the development footprint (Attexo, 2025).

The Development Footprint is not within any mapped regulated vegetation in the Queensland Regulated Vegetation mapping nor was there any native vegetation ground-truthed within the Development Footprint (Attexo, 2025).

3.7 Protected Areas

No protected areas are present in the Development Footprint or are expected to be disturbed by the Project.

Protected areas in proximity to the Site include:

- Wet Tropics World Heritage Area: located approximately 2 km to the north and approximately 5 km to the east.
- The Great Barrier Reef World Heritage area: reaches up the Tully River to approximately 8.5 km southeast of the Site
- Great Barrier Reef Marine Park (GBRMP): approximately 17 km to the east of the Project, at the coastline.
- Tully Gorge National Park: approximately 1 km north of the Site.
- Gulngay National Park: approximately 13.5 km east-southeast of the Site downstream along the Tully River.

3.8 Hydrology and Drainage

The Site is located within the Tully River basin. Site drainage is generally in a easterly direction. The Site is intersected by three minor watercourses (stream order 1); two ephemeral waterways in the north of the site and one intermittent watercourse which runs west-east across the northern section of the Site, into the neighbouring Powerlink Queensland property and then re-entering the Site in the southwest.

There are no watercourses defined by the *Water Act 2000* (Water Act) present within the Site. An unnamed tributary of the Tully River (Sandy Creek) in the form of a constructed drain is located adjacent to the Site southeast boundary, flowing to the Tully River approximately 4 km to the south-southeast. A number of man-made farm dams occur throughout the Site associated with drainage features.

A map showing the Project location with respect catchment boundaries and local waterways is provided in **Figure 3.2**.

3.8.1 Wetlands

There are no nationally or internationally important wetlands within the Site. A wetland of high ecological significance (with associated Great Barrier Reef wetland protection trigger areas) is mapped within the Site on the Matters of state environmental significance (MSES) high ecological significance wetlands (DES, 2021), and both CRCC Planning Scheme Environmental Significance Overlay and the Waterway Corridors and Wetlands Overlay. This MSES high ecological significance wetland is mapped along the northeastern and southeastern boundary of the Site (totalling 2.3 ha within the Site), continuing into the neighbouring properties.

MSES wetland values (regulated vegetation defined watercourse) are also associated with a stream order 1 drainage feature mapped as running west-east across the northern section of the Site, into the neighbouring property and then re-entering the Site in the southwest. This water feature is listed as “unmapped” under the Water Act.

By design all parts of the Development Footprint avoid these mapped wetland values.

3.8.2 Great Barrier Reef

The Project is situated within the Tully River Catchment of the Great Barrier Reef Catchment Area (GBRCA), within the Wet Tropics resource management region. Overland flows from the Tully River Catchment discharge to the Great Barrier Reef (GBR) approximately 17 km east-southeast of the Project at Tully Heads.

Discharges of land-based pollution to the GBR are managed via the Reef 2050 WQIP in a joint initiative by the Australian and Queensland Governments. Primary pollutants of concern to the GBR from mainland sources are identified as nutrients (nitrogen and phosphorus), fine sediments and pesticides which are largely attributed to agricultural sources. Water quality targets set by the Reef 2050 WQIP for the Wet Tropics Region and Tully River catchment are outlined in **Table 3.2**, with shading indicating the management priority attributed to parameters for the Tully River Catchment.

Table 3.2: Reef 2050 WQIP end of catchment anthropogenic 2025 water quality targets

Area	Dissolved Inorganic Nitrogen		Fine Sediment		Particulate Phosphorus		Particulate Nitrogen		Pesticides
	tonnes	reduction	kilotonnes	reduction	tonnes	reduction	tonnes	reduction	target
Wet Tropics Region	1700[2]	60%	240	25%	360	30%	850	25%	To protect at least 99% of aquatic species at the end-of-catchment.
Tully River Catchment[3]	190	50%	17	20%	23	20%	68	20%	

Sediment and nutrient discharges from GBR catchments are monitored and modelled as part of the Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (Paddock to Reef Program), which provides a framework for evaluating and reporting progress towards the Reef 2050 WQIP water quality targets.

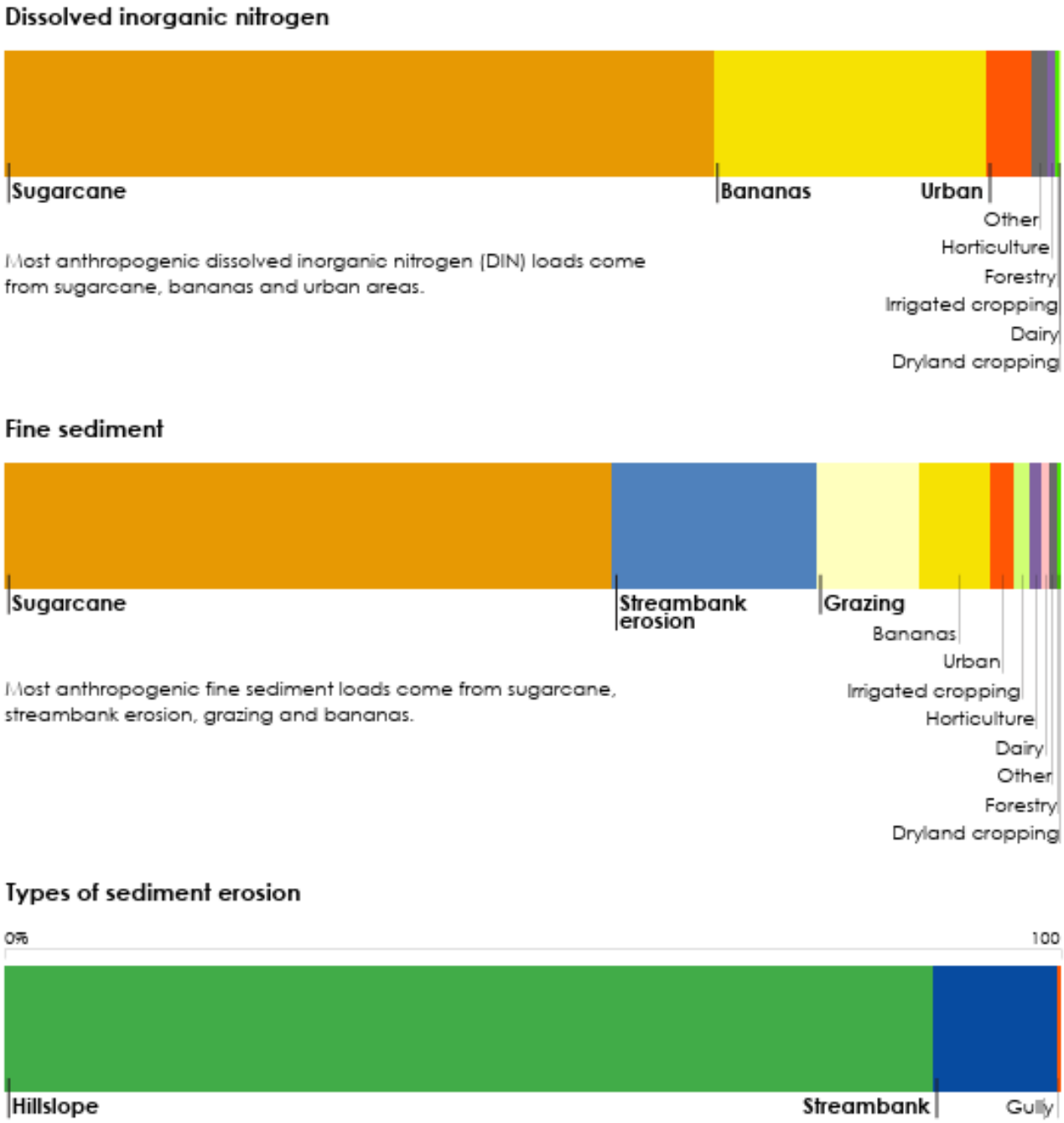
3.8.2.1 Modelled water quality pollutants

The source of sediment entering the GBR lagoon can be described based on land use, and from a physical source such as gullies, hillslopes or alluvium. Modelled water quality pollutant loads for the Tully River catchment, based on land use, are shown in **Figure 3.3** (DETSI, 2024).

It is noted that the Tully catchment contributes high loads of anthropogenic dissolved inorganic nitrogen and smaller loads of fine sediment. Most anthropogenic dissolved inorganic nitrogen (DIN) loads come from sugarcane, bananas and urban areas. Fine sediment in the catchment is predominantly derived from sugarcane, streambank erosion and grazing. The main land usage in the catchment is nature conservation (73%), followed by sugarcane (11%) and grazing (5%) (DETSI, 2024).

[2] MCL = Maintain Current Level
[3] Values represent end of catchment targets, colour highlighting of target denotes management priorities of low for green, moderate for yellow and high for orange.

Figure 3.3: Reef 2050 WQIP modelled water quality pollutant loads



3.8.2.2 Land Management Focus

Land and catchment management and adoption of minimum standards of agricultural practice is a key component of achieving the water quality targets in the Reef 2050 WQIP. The Paddock to Reef program evaluates management practice adoption and effectiveness, catchment condition, pollutant runoff and marine condition. The program has developed regional specific management practice frameworks (water quality risk frameworks) where practices are ranked from those that have the lowest water quality risk to those that have the highest risk. The 'Grazing Water Quality Risk Framework 2017-2022' in conjunction with an understanding and characteristics of the land has been used to identify land management practices for the project that minimise water quality risks.

An overview of the land management practices to be adopted by the Project to align with the Reef 2050 WQIP for high management priority pollutants (**Table 3.2**) is provided in **Table 3.3**.

Table 3.3: Project action for consistency with Reef 2050 WQIP – primary pollutants of concern

Primary pollutant of concern	Finding / Justification
Fine sediment and particulate nutrients	**Consistent with Reef 2050 WQIP** • Project ESC will meet or exceed best practice standards (IECA 2025). • Vegetation clearing and ground disturbance during construction will be minimised. • The Project will establish and maintain high levels of groundcover consistent with IECA 2025 as described in **Table 4.2** of this PESCP. • Ground disturbance outside of hardstand areas will be stabilised with vegetative (or other, e.g. rock) groundcover of a minimum >80% cover upon completion of construction. • The Project will not use fertilisers unless identified as required for revegetation. • Upon completion of construction, the Site will be maintained as grass and RWE intend to continue livestock grazing to manage fuel loads or other appropriate fuel load management strategies. RWE's operations team will manage the areas to maintain cover >90% throughout the year. • The Project will fence the wetlands to exclude livestock if grazing is used to manage fuel loads to improve water quality. • Areas of erosion near the dams on Lot 1 on RP852238 will be stabilised and cover re-established to prevent continued erosion.
Pesticides	**Consistent with Reef 2050 WQIP** • Pesticide use for the Project will be minimised by: – The adoption of preventative weed control methods e.g. vehicle and equipment hygiene. – Progressive revegetation of disturbed areas to prevent proliferation of pioneer weed species requiring chemical treatment. – Prioritisation of mechanical and manual weed control methods over herbicide application. – Regular monitoring and early response to weeds identified. – Targeted use of pesticides to minimise spray drift and prevent overuse in accordance with the Project EMP.

Land management targets identified by the Reef 2050 WQIP aim to increase the overall area of land managed using best management practices for water quality outcomes. An overview of the land management practices to be adopted by the Project to align with Reef 2050 WQIP land management targets is provided in **Table 3.4**.

Table 3.4: Project consistency with Reef 2050 WQIP – land management targets

Management Target	Determination / Justification
90% of agricultural land in priority areas managed using best management practice for water quality outcomes	**Consistent with Reef 2050 WQIP** • Grazing within the Project Development Footprint will cease, with ESCs implemented in accordance with the IECA 2025 best practice management standard. • Upon completion of construction, the Site will be managed by RWE and cover will be maintained to prevent erosion. • The Project will fence the wetlands to exclude livestock if grazing is used to manage fuel loads to improve water quality.

Management Target	Determination / Justification
	• Areas of erosion near the dams on Lot 1 on RP852238 will be stabilised and ground cover re-established to prevent continued erosion.
90% of grazing lands with greater than 70% groundcover in the late dry season	**Consistent with Reef 2050 WQIP** • A minimum of 80% groundcover will be established across Project Development footprint upon completion of construction. • IECA 2025 clearing ahead and land stabilisation timeframes (**Table 4.2**) will be abided during construction. • Upon completion of construction, the Site will be maintained as grass and RWE intend to continue livestock grazing to manage fuel loads or other appropriate fuel load management strategies. RWE's operations team will manage the areas to maintain cover >90% throughout the year.
Increase riparian vegetation	**Consistent with Reef 2050 WQIP** • The overhead transmission line may require some clearing of vegetation on the northern boundary of the Site, however this clearing will be minimised as much as possible. • The Project is committed to establishing buffers around wetlands and this is likely to result in an increase in riparian vegetation.
No loss of natural wetlands	**Consistent with Reef 2050 WQIP** • The Project will not result in the loss of any natural wetlands and will establish wetland protection buffers to prevent any potential impacts.
Improved management of urban, industrial and public land uses.	**Not applicable** • The Site does not intersect urban, industrial or public land uses.

3.8.3 Environmental Protection (Water and Wetland Biodiversity) Policy 2009

The Environmental Protection (Water and Wetland Biodiversity) Policy 2009 (EPP [Water and Wetland Biodiversity]) is intended to achieve the object of the EP Act in relation to waters and wetlands, protecting the water environment whilst allowing for ecologically sustainable development.

Under the EPP (Water and Wetland Biodiversity), environmental values (EVs) and water quality objectives (WQOs) are determined for Queensland waters, defining the use of the water and objectives for physical, chemical and biological water characteristics.

The Project is located within the Tully River basins of the broader Tully River, Murray River and Hinchinbrook Island Basins of the Wet Tropics Basins (**Figure 3.2**). Thus, WQOs for the Site are provided by the *Tully River, Murray River and Hinchinbrook Island Basins Environmental Values and Water Quality Objectives basins 113, 114, 115 and adjacent coastal waters* (Department of Environment and Science [now DETSI], 2020), made under the EPP (Water and Wetland Biodiversity).

WQOs established for the Tully River basin waters to protect aquatic ecosystem environmental value[4] under baseflow conditions are shown in **Table 3.5**. The management intent / level of protection for these waters is defined as moderately disturbed (MD)[5].

Note: WQOs are not individual point source emission objectives but the receiving water WQOs.

[4] The aquatic ecosystem EV is a default applying to all Queensland waters, and therefore the WQOs for aquatic ecosystems form the minimum WQOs for all waters. Where no human use EVs are identified, the WQOs identified for aquatic ecosystem protection remain applicable.
[5] As identified on the WQ1131 – Tully River basin, Environmental Protection (Water) Policy 2009 Wet Tropics Map series, accessed online 11.06.2025 at: https://environment.desi.qld.gov.au/management/water/policy/wet-tropics

Table 3.5: EPP (Water and Wetland Biodiversity) aquatic ecosystem WQOs for MD Tully River basin waters

Sub-basin	Amm N (µg/L)	Oxid N (µg/L)	Total N (µg/L)	FRP (µg/L)	Total P (µg/L)	Chl-a (µg/L)	DO (% sat)	Turb (NTU)	SS (mg/L)	pH
Tully River	<20	<140	<340	<8	<25	<1.5	85-120	<15	<8	6.0-8.0

3.9 Erosion Risk Assessment

A complete assessment of erosion risk involves consideration of a range of factors contributing to erosion at a site. This section presents three different methods of assessing erosion risk that are complementary and when used in an integrated manner provide a more complete understanding of erosion risk, these methods include:

- Average monthly rainfall analysis – a simple assessment useful for understanding temporal erosion risk (**Section 3.9.1**).
- Soil loss estimation – useful for considering erosion risk factors additional to average monthly rainfall (e.g. soils, slope, rainfall erosivity and land management practices) (**Section 3.9.2**).

General observations pertaining to erosion risk associated with high intensity rainfall events and climate change are also provided in **Section 3.9.3** and **Section 3.9.4** respectively. When determining the monthly erosion risk for the proposed construction the highest monthly risk rating will be used to determine the erosion control requirements as outlined in **Section 4.4**.

3.9.1 Rainfall Based Erosion Risk Assessment

Rainfall data from the Tully Sugar Mill weather station (Bureau of Meteorology (BoM) station #032042) has been used to inform this ESCP. This weather station is located approximately 3 km northeast of the Site and has been selected as it provides the most reliable account of rainfall data in proximity to the Site. The dataset extends from 1925 to present (100 years) (BoM, 2025a).

The monthly erosion risk for the Site has been determined based on mean monthly rainfall depth in accordance with IECA 2025 (Table 4.4.2) in **Table 3.6**. Monthly erosion risk range from high to extreme, with the latter corresponding to the highest rainfall months of December to May. Erosion risk ratings are used to determine the erosion control standard for the Project discussed in **Section 4.4.1** of this PESCP.

Table 3.6: Monthly erosion risk based on mean monthly rainfall depth

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean rainfall (mm)[6]	607	732	751	527	332	198	156	128	114	106	166	277	4099
Erosion Risk rating	E	E	E	E	E	H	H	H	H	H	H	E	-

Key: E = extreme, H = high

3.9.2 Soil Loss Estimation

Annual soil loss estimation applying the Revised Universal Soil Loss Equation (RUSLE) can be used to provide a general indication of spatial variability of erosion hazard via the incorporation of variable soil and slope factors across a site. However, the RUSLE is designed to predict long term, average, annual soil loss under sheet and rill flow conditions

[6] Data from BoM for the Tully Sugar Mill (station #032042) accessed online 11.12.2025 at: https://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=136&p_display_type=dailyDataFile&p_startYear=&p_c=&p_stn_num=032042

on short slopes (<300 m) and is limited in that it does not account for soil erosion resulting from concentrated flow conditions (e.g. gully erosion). Further, the RUSLE does not account for the seasonal variability captured by **Table 3.6**.

The RUSLE is applied by IECA 2025 to determine the sediment control standard for smaller sub-catchment areas as described in **Section 4.6.1** of this PESCP.

The RUSLE is calculated as follows:

A = R x K x LS x C x P

Where:

- A = annual soil loss due to erosion in (t/ha/yr)
- R = rainfall erosivity factor
- K = soil erodibility factor
- LS = topographic factor derived from slope length and slope gradient slope / length factor
- C = cover and management factor (a conservative default factor of 1 is applied for construction sites where groundcover type and application rates cannot be predicted)
- P = erosion control practice factor (a conservative default factor of 1.3 is applied for construction sites where erosion control practices cannot be reliably predicted)

3.9.2.1 DETSI RUSLE series mapping

An erosion hazard map derived using the DETSI (DETSI, 2016) RUSLE data series to calculate estimated annual soil loss (based on a 90 m DEM), is provided in **Figure 3.4**. Spatial analysis of annual soil loss estimates shows the soil loss across the Site is predominantly <150 t/ha/y, including across the southern half of the development footprint. The majority of the remaining Site and development footprint is 225-500 t/ha/y, with an isolated area of 500-1,500 t/ha/y to the northwest of the development footprint.

3.9.2.2 RUSLE – estimated annual soil loss

The influence of slope on erosion potential is further demonstrated in **Table 3.7**, which shows the differences in RUSLE soil loss under construction conditions for various relevant slope scenarios with all other factors being equal.

RULSE soil loss estimates have been calculated to demonstrate the relationship between soil loss and slope using the following inputs:

- Rainfall erosivity (R-values) have been utilised for Tully as per IECA (2025) Table E1.
- LS factors for nominal 80 m slope length from IECA (2025) Table E3.
- A conservative soil K factor of 0.04 (sapric loamy topsoils 0.04, over silty clay 0.025) (**Table 3.1**).
- Default C and P values of 1 and 1.3 respectively.

Table 3.7: Application of RUSLE to existing Project slopes

RUSLE factor	Percentage Slope				
	1%	**2%**	**3%**	**4%**	**5%**
R	22,970	22,970	22,970	22,970	22,970
K	0.04	0.04	0.04	0.04	0.04
LS	0.19	0.41	0.65	0.91	1.19
C	1	1	1	1	1
P	1.3	1.3	1.3	1.3	1.3
A (t/ha/yr)	230	490	776	1,087	1,418

3.9.2.3 RUSLE – monthly rainfall erosivity and estimated soil loss

Seasonal variability can be captured by the RUSLE by adopting monthly as opposed to annual rainfall erosivity factors. Monthly R-factor values and erosion risk ratings for Tully as per IECA (2025) Table E1 and Table 4.4.4 respectively are shown in **Table 3.8**.

Monthly soil loss rates have been calculated to demonstrate the relationship between soil loss and rainfall erosivity using the following inputs:

- A conservative soil K factor of 0.04 (sapric loamy topsoils 0.04, over silty clay 0.025) (**Table 3.1**).
- LS of 0.65 based on an 80 m slope of 3% from IECA (2025) Table E3.
- Default C and P values of 1 and 1.3 respectively.

Table 3.8: Tully monthly rainfall erosivity factors and erosion risk based on IECA (2025)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
R-factor	4119	5224	4959	2770	1104	460	443	296	312	475	835	1973
Erosion risk	E	E	E	E	H	H	H	H	H	H	H	E
Monthly soil loss (t/ha/m)	139	177	168	94	37	16	15	10	11	16	28	67

3.9.2.4 Soil loss during BESS operation

Upon completion of construction, the BESS area (Project Footprint) will be completely stabilised by compacted hardstand, aggregate groundcover and landscaping with a stormwater drainage system to manage runoff. A stormwater management plan has been prepared for the Project by Water Technology (2025).

Management of the Site will minimise erosion and improve water quality through best practice land management including:

- Grass cover will be maintained and RWE intend to continue livestock grazing to manage fuel loads or other appropriate fuel load management strategies. RWE's operations team will manage the areas to maintain cover >90% throughout the year.
- The Project will fence the wetlands to exclude livestock if grazing is used to manage fuel loads to improve water quality.
- Areas of erosion near the dams on Lot 1 on RP852238 will be stabilised and cover re-established to prevent continued erosion.

Project Area
Development Footprint
Proposed Transmission Line Corridor
Proposed transmission line
20m exclusion zone

Annual soil loss - construction (t/ha/yr):
0 - 150 (Very Low risk)
150 - 225 (Low risk)
225 - 500 (Moderate risk)
500 - 1,500 (High risk)
>1,500 (Extreme risk)

Watercourse
Main Road
Local Road
Lot Parcel

TULLY BESS P-ESCP
RUSLE erosion hazard map

Figure 3.4

N
0 m 100

Attexo

REVIEWED: HS **DRAWN:** KB **SCALE** 1:3,500 **DATE:** 19/09/2025 **DWG No:** RWE-002_005[C]

3.9.3 High Intensity Rainfall and Erosion

Monthly and annual rainfall erosivity factors (R-factors) have been calculated for the Project applying a daily timestep model of rainfall data for the Tully Sugar Mill BoM weather station data from 2005-2025 using the methodology described in Ellis (2018). This corresponds to the last 20 years and is considered to be representative of current climatic conditions.

R-factors calculated using the daily timestep model are higher compared to R-factors for Tully as per IECA (2025) Table E1, although the monthly erosion risk ratings based on R-factor are consistent (Table 3.9). The higher risk ratings derived applying calculated monthly rainfall erosivity values as compared to IECA-derived values demonstrates the influence of rainfall intensity on soil loss rates.

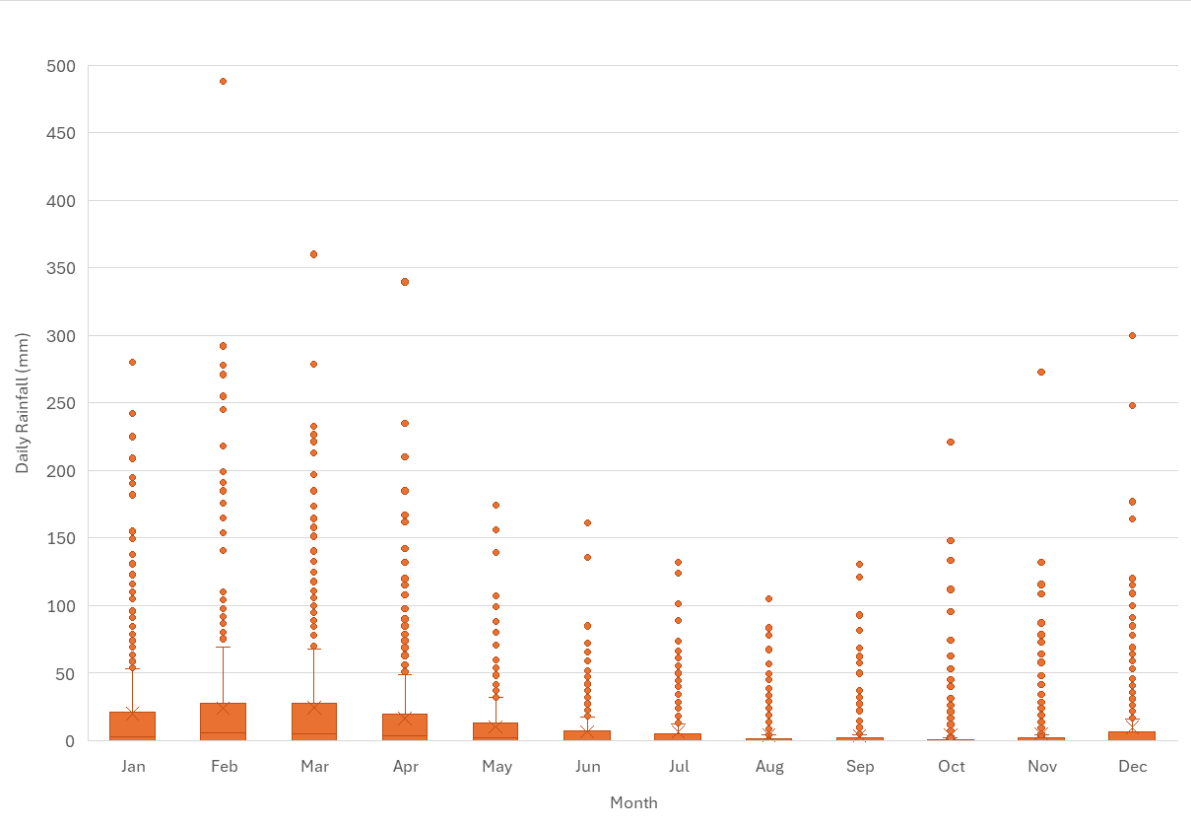
Table 3.9: Monthly erosion risk based on calculated rainfall erosivity factors

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
IECA R-factor	4119	5224	4959	2770	1104	460	443	296	312	475	835	1973
Calculated R-factor	5725	6468	6452	3014	1289	596	641	343	383	694	906	2435
Erosion risk	E	E	E	E	H	H	H	H	H	H	H	E

High intensity rainfall events are part of the climatic regime of the Site, particularly during the peak wet season (December to April inclusive) which is associated with cyclonic or tropical low-pressure systems. Project Construction ESCPs must consider the likelihood of intense rainfall occurring, so that the Development footprint is adequately prepared for these events.

In the absence of fine scale project specific rainfall intensity data, high daily rainfall totals are indicative of high intensity rainfall events. Daily rainfall data from 2005-2025 for the BoM Tully Sugar Mill (station #032042) weather station is presented in **Figure 3.5** as a box plot. The daily outlier events for each month are individually plotted above the outer range of the box plot.

Figure 3.5: Tully Sugar Mill (station #032042) mean daily rainfall outlier events (2005–2025)



3.9.4 Climate Change and Soil Erosion

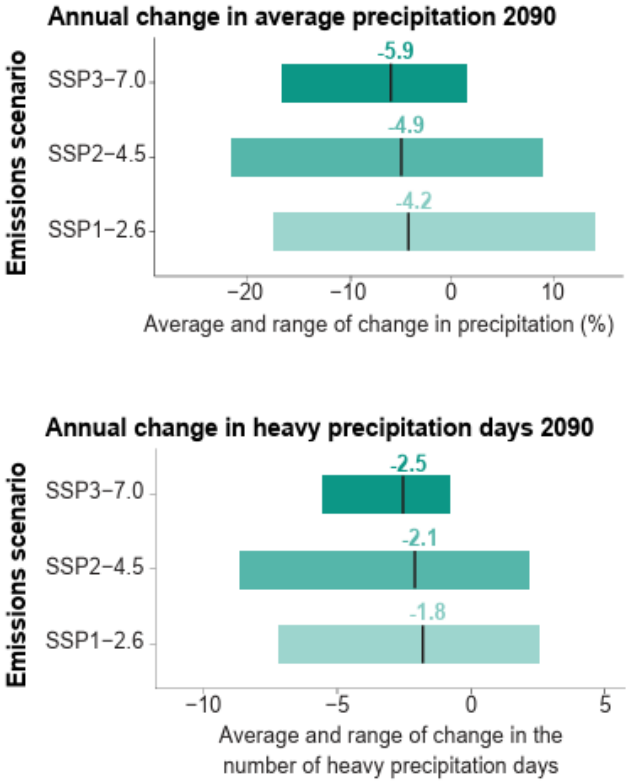
Future climate change scenarios likely to affect soil erosion are related to the amount and intensity of rainfall (i.e. rainfall erosivity) received, and its seasonal distribution. Rainfall seasonality being a consideration in that it can affect antecedent soil moisture conditions, which is a significant factor in the generation of surface water runoff.

Queensland Treasury provides climate projection data for various 'Shared Socioeconomic Pathways' (SSPs) as follows:

- SSP1-2.6: Low emissions future with sustainable development.
- SSP2-4.5: Medium emissions future with socioeconomic trends similar to historical patterns.
- SSP3-7.0: High emissions future driven by strong regional rivalry.

Graphs showing modelled annual changes in average precipitation and heavy precipitation days for the Far North Region are provided in **Figure 3.6**, with the black vertical line on each bar being the multi-model average value and shaded bars showing the range of projected changes applying 15 climate models. Changes shown in the graphs are relative to a 1981–2010 baseline.

Figure 3.6: Graphs showing modelled annual changes in annual precipitation and the number of heavy precipitation days relative to a 1981-2020 baseline (DEC, 2024)



Climate change projections acknowledge significant uncertainty in the magnitude of projected changes in rainfall. Overall, less frequent but more intense tropical cyclones are expected, with a slight decline in the amount of rainfall received and overall number of heavy precipitation days (Department of Energy and Climate [DEC][7], 2024). DEC 2024 climate change projections do not speak to rainfall seasonality.

Given the positive linear relationship between rainfall depth / intensity and soil erosion, the data shown in **Figure 3.6** would suggest an overall reduction in soil erosion resulting from climate change. However, vegetative groundcover is also a significant factor in erosion, with soil loss increasing with decreasing amounts of groundcover (inverse relationship). Reduced rainfall, depending on its seasonality, may result in an overall reduction in vegetative groundcover[8], which would likely offset any net soil loss reduction that may be expected considering rainfall in isolation.

Further, a reduction in vegetative groundcover would leave soils particularly vulnerable to higher intensity rainfall events. Should it be realised, distinct increases in soil loss associated with severe weather events has the potential to place substantial additional pressure on receiving aquatic ecosystems.

Thus, the Project management response for the purposes of minimising increased soil loss and sedimentation impacts due to climate change will involve:

- Maintaining the Development footprint on a day-to-day basis in accordance with best practice standards as described by this plan.
- An increased focus on being prepared for high intensity rainfall events (**Section 4.8**).

[7] now Queensland Treasury.
[8] Absent intervention such as irrigation or a switch to more drought tolerant species.

3.10 Site Constraints

Site constraints have been identified with reference to the IECA Best Practice Erosion and Sediment Control Manuals (Section 3.4) and are discussed in Table 3.10.

Table 3.10: Site constraints

Constraint	Limitation	Description	Management
Soils	Hydrosols (Hewitt)	• Mapped as present within the development footprint. • Indicates presence of commonly inundated, poorly drained soils. • The presence of fibric and sapric topsoils indicates high organic matter content of 'peat' materials. • Acidic soil pH throughout. • Soil properties present challenges for vehicle access, load bearing and revegetation.	• Undertake soil sampling to confirm soil types, characteristics and extent of sodic soils within Development footprint. • Treatment of soil limitations (i.e. sodic or acid soils) to be addressed by the construction ESCP. • Avoid earthworks during wet conditions in areas where high clay content or sodic soils are present.
	Unknown soils (MSC)	• Mapped as present for the OHTL. • Limited information on soil characteristics and limitations, such as sodic, dispersive soils. To be confirmed on-site.	• Treatment of soil limitations (i.e. sodic or acid soils) to be addressed by the construction ESCP. • Top dress dispersive soils with a layer of non-dispersive soil prior to installing scour protection (including vegetation). • Undertake soil amelioration and careful plant selection for revegetation. • Avoid direct revegetation into dispersive soils.
Climate	Rainfall	• The Site is located in an area with consistently high to extreme rainfall erosion risk as per IECA (2025).	• Schedule clearing and ground disturbing works to lower rainfall erosivity months (May-Nov) as far as reasonably practicable.
Sensitive receptors	GBR	• Site is located within the GBR catchment and is subject to the *Reef 2020 WQIP*.	• IECA best practice standard for erosion and sediment control is to be applied to the Project. • Discharge water quality objectives established for the Project are to consider sensitive receptors present. • Sensitive receptors are to be considered by Construction ESCPs. • Buffers will be established around wetlands.
	High ecological significance wetlands	• Within and abutting the eastern portion of the Project boundary.	
	Gulngay National Park	• Located approximately 13.5 km east-southeast of the Site downstream along the Tully River	

3.11 Environmental Values and Threats Analysis

A summary of environmental values potentially impacted by erosion and / or sediment transport are identified in **Table 3.10**, along with the identified potential threats and impacts to these values. Detailed descriptions of the environmental values identified for the Project, where not described herein, are provided in the Ecological Assessment Report for the Tully BESS (Attexo, 2025).

Table 3.11: Environmental values and threats analysis

Environmental value	Potential threats and impacts
Local surface waters including multiple wetlands and higher order ephemeral streams.	Threat: • Sediment transport to natural surface waters. Potential impacts: • Increased opportunity for transport of pollutants via soil particles resulting in reduced water quality. – Subsequent impacts e.g. eutrophication, toxicity, changes to water chemistry etc. • Death of / harm to aquatic organisms (flora and fauna) associated with: – Reduced overall water quality. – Reduced light penetration through water column impacting visibility for fauna and plant photosynthesis. – Smothering of plants and animals by sediment causing suffocation. • Sediment deposits within watercourses introducing barriers to fauna movement or altered flow paths. • Recreational impacts associated with loss of visual amenity and fishing opportunity.
GBR	Threats: • Sediment discharged from the Site is transported to the GBR. Potential impacts: • Smothering of coral resulting in inhibited coral recruitment, reduced growth rates and increased susceptibility to disease. • Reduced light availability impacting photosynthesis by seagrass ecosystems and beneficial reef algae. • Sediment deposits on seabed creating conditions unsuitable for coral larvae and disrupting filter feeding organisms • Smothering of fish, damaging gills and potentially causing death. • Increased transport of land-based nutrients and pollutants to the reef via soil particles and subsequent eutrophication and toxicity impacts. • Reduced resilience of the reef and reef dependent organisms to withstand or recover from other pressures e.g. coral bleaching events.
Surrounding agricultural land-use.	Threat: • Soil erosion. • Sediment deposition. Potential impacts: • Physical impacts associated with significant gully, tunnel and channel erosion such as loss of access to portions of land. • Undermining of access tracks and other built infrastructure.

4. Erosion, Drainage and Sediment Control Practices

The sections to follow identify the principles, standards and strategies to be applied for erosion, drainage and sediment control throughout the Project construction phase. Specific controls are to be defined by construction ESCPs in accordance with the requirements established by this plan.

4.1 ESC Integration and Iterative Management

IECA 2025 recognises that effective ESC requires thorough integration with the construction work program and an iterative process of plan-implement-monitor-update of control measures.

An integrated approach involves the establishment of firm ESC standards and expectations during the Project planning phase, whilst providing flexibility for specific 'on-ground' management measures to be determined by those undertaking the work, so that construction sequencing can occur to minimise risk, and physical controls are compatible with construction methods. Examples of the application of this approach include (but are not limited to):

- Sequencing of works so that overall simultaneous soil exposure is minimised, works with higher erosion potential occur outside of higher rainfall months, and works are scheduled in a way that favours progressive rehabilitation.
- Planning the cut and fill program so that early installation of physical controls is planned, topsoils are effectively managed, the double handling of soils is minimised, and ESCs are adjusted as the site changes with time.
- The planning of resources so that materials, equipment and work crews are available when required for timely ESC and progressive rehabilitation.
- The adoption of controls which are compatible with resources available and familiar to construction crews.

The iterative approach to ESC adopted by IECA 2025 involves:

- Planning: Robust ESCPs developed by suitably qualified and experienced professionals identify the type and location of specific control measures which are selected and designed in accordance with prescribed standards to suit localised site environmental conditions (e.g. soils, rainfall, sensitive receptors etc.).
- Implementation: Experienced ESC practitioners work with the Project delivery team (e.g. managers, foremen, work crews and machine operators) to install / implement the control measures identified by ESCPs. Implementation includes the installation of controls prior to disturbance and maintenance of controls as required, especially prior to and following rainfall events.
- Monitoring: Implemented controls are monitored throughout construction to assess their effectiveness and identify improvements required to ensure ESC objectives are met.
- Update: ESCPs are updated, and on-ground controls adjusted where required to achieve ESC objectives.

The Project will be delivered by RWE in partnership with Construction Contractors. Construction Contractors will coordinate all aspects of Project construction in line with the environmental criteria developed for the Project (including this PESCP). This PESCP establishes clear expectations for ESC against which the Contractors will be held to account, whilst providing flexibility for the design and placement of physical controls by those doing the work. RWE is committed to a maintaining a rigorous environmental assurance program for the Project, which includes the establishment of contractual levers which provide recourse should the standards established by this PESCP not be upheld.

4.2 ESC Guiding Principles

IECA 2025 identifies 10 key principles for effective ESC. A discussion as to how these principles have, or will be, applied by the Project is provided in **Table 4.1**.

Table 4.1: ESC principles

Principle	Project Response
1. Appropriately integrate the development into the site.	• Site constraints including soil, water, vegetation and topography will be considered during Project design. • Access routes and hardstand areas will be positioned to minimise cut and fill for land reshaping and surface modifications. • Trenching and linear disturbance perpendicular to topographical contours will be minimised.
2. Integrate erosion and sediment control issues into site and construction planning.	• Project infrastructure and temporary construction areas will be sited to minimise reprofiling requirements. • Project design to ensure suitable space and locations are available in the construction footprint for required ESC measures. • The timing of clearing and ground disturbing activities will be prioritised to occur outside of the extreme rainfall erosivity erosion risk months of December to April. • ESC standards to be applied during construction are established during the Project planning phase and included within construction tender packs and procurement contracts (i.e. this PESCP).
3. Develop effective and flexible ESCPs based on anticipated soil, weather and construction conditions.	• Construction ESCPs will be developed in accordance with IECA 2025 and implemented by those with control over construction works (supported by a suitably qualified and experienced ESC practitioner). • Soil sampling will be undertaken, and soil characteristics considered as part of the development of Construction ESCPs. • Weather monitoring and wet weather preparedness will be addressed by Construction ESCPs. • ESCs will be regularly monitored and modified as required to achieve water quality objectives.
4. Minimise the extent and duration of soil disturbance.	• Project design will prioritise the co-location of infrastructure to reduce overall land disturbance. • The construction sequence will be managed so that so that simultaneous soil exposure is minimised, and progressive rehabilitation can be undertaken.
5. Control water movement through the site.	• Drainage will be managed to divert all dirty water[9] to an appropriate sediment trap prior to discharge from site. • Drainage design standards will be applied in line with those identified by the Project stormwater management plan and IECA 2025 section 4.3.
6. Minimise soil erosion.	• Construction ESCPs will prioritise erosion prevention by maintaining groundcover and effective drainage controls. • Land clearing, rehabilitation and interim stabilisation will be undertaken in line with IECA 2025 Table 4.4.7.
7. Promptly stabilise disturbed areas.	• Progressive rehabilitation will be considered during work sequencing and undertaken throughout the construction phase. • Land clearing, rehabilitation and interim stabilisation will be undertaken in line with IECA 2025 Table 4.4.7.

[9] As defined by IECA 2025 and in Appendix A.

Principle	Project Response
8. Maximise sediment retention on the site.	• Sediment control techniques will be applied based on the standards defined by IECA 2025 for estimated soil loss or monthly erosivity. • Sediment traps will be designed and positioned by suitably qualified and experienced ESC practitioners.
9. Maintain all ESC measures in proper working order at all times.	• Installed erosion, sediment and drainage controls will be monitored at least weekly and prior to anticipated runoff producing rainfall. • Controls found to be in disrepair will be restored as a priority and as a minimum prior to anticipated runoff producing rainfall.
10. Monitor the site and adjust ESC practices to maintain the required performance standard.	• Installed erosion, sediment and drainage controls will be monitored for effectiveness during and after rainfall events (pending safe access). • Controls identified as not meeting performance criteria will be improved or alternatives sought.

4.3 Project Planning and Design

Project planning and design is a key component of effective management for the minimisation of erosion and sedimentation impacts. Project planning and design will proceed in line with the following principles to minimise erosion risk in the first instance:

1. Design, situate and co-locate infrastructure to make best use of existing topography to aid drainage and minimise disturbance and erosion.
2. Ensure sufficient data is available (e.g. soil characteristics, rainfall and contour data etc.) to inform suitable ESC measures, in particular the avoidance and / or treatment of dispersive soils and soils prone to dust generation.
3. Consider local constraints (soils, topography and hydrology etc.) when determining the location of ESC measures and stockpiles.
4. Calculate soil loss from all disturbed areas to determine temporary and permanent sediment basin sizing and locations.
5. Develop staged ESCPs to be effective during all construction phases.
6. Ensure timing allows for the installation of ESC measures prior to ground disturbance in accordance with the installation sequence specified by construction ESCPs.
7. Ameliorate dispersive soils, particularly in cable trenches and on fill embankments, where there is a high risk of tunnel erosion.
8. Position infrastructure to minimise watercourse crossings and instream works.
9. Initial earthworks and major land disturbing activities will be minimised during extreme rainfall erosivity risk periods (i.e. December to April). Where major land disturbing works are required during extreme rainfall erosivity periods, a commensurate level of erosion and sediment control must be adopted.

4.4 Erosion Control

This section defines the standards and approach that will be applied during Project construction and provides examples of the types of erosion control measures which will be adopted by construction ESCPs. A summary of the specific actions that will be taken to control erosion during Project construction is as follows:

- **Soil amelioration requirements (where required) will be documented** within the construction ESCP or a dedicated soil management plan.
- **Earthworks will be limited to a maximum total area of 9 ha for the BESS facility with limited earthworks expected for the OHTL** .
  - The earthworks extent will be visibly delineated while earthworks are underway.

- The earthworks extent will be delineated by spatial data guiding earthworks activities.
- The earthworks extent will be communicated with Project personnel via inductions and reinforced during toolbox talks and pre-start meetings.

- **The land clearing and stabilisation timeframes specified in Table 4.2 will be abided** and accounted for within the construction schedule (or equivalent auditable evidence of compliance maintained).
- **Final permanent site stabilisation will be required to achieve a minimum permanent groundcover[10] percentage of 80%** to coincide with the 'extreme' erosion risk groundcover criteria (**Table 4.2**).
- **Final permanent site stabilisation criteria will be signed off as being met** by an accredited ESC and / or rehabilitation practitioner[11] prior to relinquishment of site by the construction contractor.

4.4.1 Erosion Control Standard

The monthly erosion risk values for the site range between high and extreme (**Table 3.6**), corresponding to the highest rainfall erosivity months of December to April. The construction schedule for the Project has not yet been determined; thus, it must be assumed that construction may take place at any time of the year, and all risk ratings must be considered.

Erosion control relies heavily on the maintenance and reestablishment of groundcover. The best practice land clearing and rehabilitation requirements identified for erosion risk rankings specified in IECA 2025, Table 4.4.7 pg. 4.16 will be applied during Project construction. IECA best practice land clearing and rehabilitation requirements for the risk values attributed to the Project in **Table 3.6** and **Table 3.8** are reproduced in **Table 4.2**.

Final permanent site stabilisation will be required to achieve a minimum groundcover percentage of 80% to coincide with the 'Extreme' erosion risk groundcover criteria as described in **Table 4.2**.

Table 4.2: Best practice land clearing and rehabilitation requirements for Project erosion risk.

Erosion Risk[12]	Best Practice Requirement
All cases	• All reasonable and practicable steps will be taken to apply best practice erosion control measures to completed earthworks, or otherwise stabilise such works, prior to anticipated rainfall – including existing unstable, undisturbed, soil surfaces under management or control of the building / construction works.
High	• Land clearing limited to a maximum 4 weeks of work[13]. • Disturbed soil surfaces stabilised with a minimum 75% groundcover[14] within 10 days of completion of works within any area of a work site. • Staged construction and stabilisation of earth batters (steeper than 6H:1V) in maximum 3 m vertical increments wherever reasonable and practicable. • The use of turf to form grassed surfaces given appropriate consideration. • Soil stockpiles and unfinished earthworks are suitably stabilised if disturbance is expected to be suspended for a period exceeding 10 days.
Extreme	• Land clearing limited to maximum 2 weeks of work[13]. • Disturbed soil surfaces stabilised with minimum 80%[14] cover within 5 days of completion of works within any area of a work site. • All planned garden beds protected with a minimum 75 mm layer of organic *Mulching*, heavy *Erosion Control Blanket*, *Rock Mulching*, or the equivalent.

[10] For vegetative groundcover, this must comprise perennial species – annual cover crops are not considered as permanent stabilisation.
[11] Accreditation must be through a registered certification body which upholds ethical standards e.g. Envirocert International Inc., Soil Science Australia, the Environmental Institute of Australia and New Zealand or equivalent.
[12] Erosion risk based on the average monthly rainfall and rainfall erosivity shown in Table 3.6 and Table 3.8 of this plan, with best practice requirements as seen in IECA 2025, Table 4.4.7, pg. 4.16.
[13] Refers to the amount of time ahead of the associated works.
[14] May be reduced if the natural cover present is less that the nominated value.

Erosion Risk [12]	Best Practice Requirement
	• Staged construction and stabilisation of earth batters (steeper than 6H:1V) in maximum 2 m vertical increments wherever reasonable and practicable. • High priority given to the use of turf to form grassed surfaces. • Soil stockpiles and unfinished earthworks are suitably stabilised if disturbance is expected to be suspended for a period exceeding 5 days.

4.4.2 Erosion Control Strategy

Erosion controls must be prioritised to minimise the area of soils exposed and therefore susceptible to sedimentation in the first instance. Strategies that will be used to prevent unnecessary disturbance, and minimise the length of time soils are left unprotected by groundcover include:

1. Staging of works so that:
    a. Vegetation clearing and grubbing occurs as close as practicable prior to commencement of civil works within that area.
    b. The overall area of soils exposed at any one time is minimised.
    c. The stockpiling and double handling of soils is minimised.
    d. Ground disturbance activities, particularly in high-risk areas, occur within lower rainfall periods.
    e. Progressive site rehabilitation can take place throughout the construction period.
2. The establishment and demarcation of no-go zones, within which access or work is not permitted.
2. Minimising trafficking disturbance by limiting vehicle activity to formed access tracks, with off-track access being restricted to essential vehicles only.
3. Protection of groundcover in temporary disturbance areas via their inclusion within the above no-go zones until works are to commence and then re-incorporating them back into the no-go zone as soon as work is complete, and the area is stabilised.
4. Remediation of temporary disturbance areas within the timeframes specified for best practice land clearing and rehabilitation in **Table 4.2**.
5. Utilisation of temporary groundcovers such as hydraulically applied soil binders, roll on blankets, mulch, gravel or other, to protect exposed soils not ready to be permanently stabilised.
6. Amelioration of soils in-situ prior to excavation, to minimise mixing requirements.
7. The establishment of groundcovers such as rock or gravel over site office, parking and laydown areas.

Dust control will be undertaken via the application of water or an appropriate soil binder where conditions require.

4.4.3 Erosion Control Methods

Erosion control methods recognised as best practice by IECA 2025 are described in **Table 4.3.** Due to the potential presence of dispersive soils (**Section 3.3**), erosion control methods must be applied to minimise soil exposure.

Table 4.3: Erosion control methods

Technique	Application	Advantages	Limitations
Compost blanket	• Used during the revegetation of steep slopes either incorporating grasses or other plants. • Particularly useful when the slope is too steep for the placement of topsoil, or when sufficient topsoil is absent from the slope.	• Long term[15] • Control of wind, raindrop and sheet erosion. • Establishment of sustainable vegetation cover. • Appropriate where topsoil is limited in quality or quantity. • Utility on steeper slopes (up to 1:1).	• Generally unsuitable for concentrated flows. • Requires 100% surface coverage. • Requires significant areas for cost viability.
Mulching	• Control of raindrop impact erosion on flat and mild slopes. May be placed on steeper slopes with appropriate anchoring. • Control water loss and assist seed gemination on newly seeded soil. • Suppression of weed growth on non-grassed areas.	• Short (light) to long (heavy) term. • Practical erosion control prior to vegetation establishment. • Useful raindrop erosion protection. • Can reduce plant watering requirements.	• Requires 100% surface coverage. • Generally unsuitable for concentrated flows. • Can be limited in bushland areas due to introduced seeds. • Should not be placed directly on dispersive soils. • Displaced mulch can become a stormwater pollutant.
Soil binder	• Dust control. • Stabilisation of unsealed surfaces and roads. • Good alternative to mulches where earthworks will resume.	• Once dry, relatively instant protection. • Provides temporary stabilisation during construction.	• Short term (<6 months). • Product and type variability. • Need for trial and error on-site. • Generally unsuitable for concentrated flows. • Surface must remain intact.
Gravelling	• Protection of non-vegetated soils from raindrop impact erosion. • Stabilisation of site office area, car parks and access roads.	• Short term to permanent. • Low cost, trafficable surface. • Reduces mud generation in wet periods.	• Requires 100% surface coverage. • Low shear stress due to small rock size. • Should not be directly placed on dispersive soils.

[15] Based on the successful establishment of vegetation.

Technique	Application	Advantages	Limitations
Revegetation	• Temporary and permanent stabilisation of soil. • Stabilisation of long-term stockpiles	• Short term to permanent [16]. • Best sustainable long-term solution to erosion. • Generally self-regenerating and self-maintaining. • Aesthetic and public amenity value.	• Requires suitable advice on soils and planting considerations. • Usually not suitable in heavy traffic areas or steep slopes (2:1). • Species selection conflicts. • Maintenance and watering costs. • Can take years for suitable development.
Rock mulching	• Stabilisation of long term, non-vegetated banks and minor drainage channels.	• Permanent. • Low cost, trafficable surface.	• Requires 100% surface coverage. • May require weed control blanket for long-term weed control. • Should not be directly placed on dispersive soils.

[16] Usually requires incorporation of light mulching for suitable short term erosion control.

4.5 Drainage Control

Temporary drainage controls will be required during construction to prevent the ingress of clean water and control dirty surface water flows within the site.

A key component of drainage control is ensuring that channels and berms installed to direct surface water flow are designed and constructed to prevent scour so that they do not become sediment sources themselves. Drainage channels, particularly when formed in dispersive soils, are especially prone to scour. Dispersive soils are not mapped, however there are high clay content subsoils present within the Site; hence the following measures will be taken to mitigate scour of drainage devices:

- The flow velocity of temporary drainage channels will be calculated applying Manning's Equation (or alternative method if determined to be appropriate by a Registered Professional Engineer of Queensland (RPEQ) specialising in hydraulics as part of construction ESCP design, prior to the commencement of works within that area (allowing for staged construction).
- Temporary drainage channels will be designed at a gradient that limits the maximum flow velocity to a value not exceeding that of the surface material; OR
  - Flow velocities will be reduced through the placement of check dams (where the channel does not comprise dispersive soils); or
  - The scour resistance of the drain will be increased using a channel liner selected to suit the calculated flow velocity in accordance with IECA 2025 A5.6.
- Check dams will not be placed directly over dispersive soils; these drains must be lined.
- V-drains will not be used where drain surfaces comprise dispersive soils, these drains will be either u-shaped or trapezoidal.
- Diversion bunds will not comprise an exposed dispersive soil surface.
- Construction ESCPs must be signed off by a suitably qualified and accredited ESC practitioner[17] as having met the requirements of IECA 2025 and this ESCP.
- Drainage controls must be inspected by a suitably qualified and accredited ESC practitioner[17] or Registered Professional Engineer of Queensland (RPEQ) and signed off as having been installed in accordance with design.
  - Inspections will occur following drainage controls being installed within that section of the site.
  - Where on ground deviations are observed that nevertheless meet the requirements of IECA 2025 and this ESCP, the construction ESCP will be updated to reflect implemented controls.
  - Installed drainage controls that fail to meet the requirements of IECA 2025 and this ESCP will be modified to meet these criteria following identification.

4.5.1 Drainage Control Standard

Where not otherwise specified in RPEQ approved stormwater management plans, temporary drainage controls used for ESC purposes will be designed as per Table 4.3.1 of IECA 2025 recommendations for temporary drainage structures in Queensland:

- Design life <12 months: 1 in 2-year event.
- Design life 12-24 months: 1 in 5-year event.
- Design life >24 months: 1 in 10-year event.

Whilst the entire construction period is expected to extend for up to 18 months, works will be staged, meaning standards for lesser design timeframes may be able to be applied.

A stormwater management plan has been prepared for the Project by Water Technology (2025).

[17] Accreditation must be through a recognised certification body which upholds ethical standards e.g. Envirocert International Inc., Soil Science Australia or equivalent.

4.5.2 Drainage Control Strategy

The following strategies / principles will be applied during the design and establishment of temporary drainage controls for construction ESC:

1. Prevent mixing of clean and dirty water where practicable.
2. Divert clean water away from work areas wherever practicable, where this cannot be achieved, control clean water flows through the site to avoid contamination (by sediment).
3. Divide unstable slopes using catch drains or flow diversion banks, at the intervals recommended by IECA 2025 Table 4.3.2 for slope length and steepness considering groundcover percentage.
4. Ensure that installed drainage features are suitable for the slope, appropriately sized and sufficiently lined to prevent scour.
5. Allow water to shed from unsealed access tracks at regular intervals.
6. Utilise appropriate outlet structures at discharge points to prevent downstream scour.
7. Avoid structures that pond water at locations prone to tunnel erosion.
8. Avoid concentration of flow and maintain sheet flow conditions where practicable.

4.5.3 Drainage Control Methods

Drainage controls, whether permanent or temporary, will be designed and constructed to limit flow velocity to a value not exceeding the maximum allowable velocity for the given surface material in accordance with IECA 2025. Controls can influence slope gradient and length, channel roughness, flow depth, velocity and discharge to minimise erosion and manage sediment.

A summary of drainage control techniques recognised by IECA 2025 and their application is provided in **Table 4.4** with examples of specifications as per IECA (2025) contained in **Appendix B**. The adoption and placement of these techniques will be determined by construction ESCPs.

Table 4.4: Drainage control techniques

Technique	Typical use	Advantages	Limitations / Disadvantages
Check dams	• Control flow velocity in unlined, low-gradient drains to prevent scour. • Provide some sediment capture and can function secondarily as sediment control devices.	• Various types of check dams are available for different conditions: – Fibre rolls, triangular and sandbag check dams where drains are less than 500 mm deep. – Rock check dams where drains exceed 500 mm deep. – Compost-filled bags where velocity and filtration or adsorption is needed. • Generally quick and inexpensive to install. • Low maintenance (if properly installed).	• Effectiveness is governed by height and spacing of the check dam, subject to the slope of the drain. • Typical maximum applicable channel gradient of 10% (1:10). • If not installed correctly, can cause flow to leave the drain. • Should not be placed on dispersive soils.
Catch drains	• Small open channels formed at intervals down a slope or adjacent to disturbance to: – Control flow lengths in low-gradient sheet-flow slopes to minimise rill erosion. – Direct runoff around soil disturbance or unstable slopes. – Collect 'dirty' water and direct it to sediment traps. – Collect and divert up-slope water around stockpiles and soil disturbance.	• Generally quick and inexpensive to establish or re-establish. • Standard designs are available for various site conditions. • Can avoid need for channel lining if constructed at appropriate gradients.	• Effectiveness is governed by spacing of drains down the slope, maximum catchment area, lining material and channel gradient. • Design must be based on local hydrologic and soil conditions, especially where soils are dispersive. • Deep V-shaped drains will scour and should be avoided. • Must discharge to a stabilised outlet. • Can be an impediment to vehicle and machinery movement around site.

Technique	Typical use	Advantages	Limitations / Disadvantages
Flow diversion banks	• Raised earth embankments placed along or near ground level on low gradient slopes, to: – Direct sheet runoff from slopes and transport across slopes to a stable outlet. – Direct water to the inlet of a chute or slope drain. – Collect and divert up-slope water around stockpiles and soil disturbance.	• Generally quick and inexpensive to establish or re-establish. • Favoured over catch drains where subsoils are dispersive to avoid exposing subsoils.	• Effectiveness is governed by flow capacity and scour resistance. • Can cause sediment problems and flow concentrations if overtopped by storms. • Must discharge to a stabilised outlet. • Can be an impediment to vehicle and machinery movement around site.
Diversion channels	• Formally designed, excavated channels on low gradient slopes which: – Collect and transport runoff around or through a site. – Collect 'dirty' sediment downslope and direct it to a sediment trap. – Temporarily divert an existing drainage channel during construction activities.	• Low maintenance requirements (if designed and installed correctly). • In larger catchments, diversion of 'clean' water around disturbances can result in large cost savings. • Hydraulic capacity can be significant increased when formed with a downslope flow diversion bank.	• Sized for a specific flow rate which is limited based on catchment, topography, soils and hydrology. • Critical parameters of surface lining, hydraulic capacity and discharge point stability. • Can be an impediment to vehicle and machinery movement around site. • Can be a source of sediment if capacity is exceeded by rainfall.
Chutes	• Steep, open channel running down slopes used to convey flows down gradients usually steeper than 10%. • Used to transport concentrated flow down steep slopes, commonly used on constructed slopes e.g. batters.	• Temporary chutes can be inexpensive and quick to construct. • Typically have a flow capacity much greater than slope drains.	• Critical design considerations of flow entry, allowable velocity and dissipation at the base. • Local topography must allow safe collection and passage of water into the chute. • Some linings have short surface life. • Significant damage can occur if chutes are overtopped.

Technique	Typical use	Advantages	Limitations / Disadvantages
Slope drains	• Temporary water transmission pipe (flexible, solid wall or lay-flat) anchored to the side of a slope, with a stabilised inlet and outlet. • Commonly used to: – Transport minor concentrated flow down embankments greater than 3 m high. – Divert 'clean' water around a site. – Convey water down a newly formed embankment prior to installation of permanent drainage.	• Economical for low flows and high, irregular drops. • Relatively easy to relocate and re-use. • Effective for temporary diversion of water through bushland or areas where disturbance is to be minimised.	• Critical design consideration is the hydraulic capacity of the inlet. • Local topography must allow safe collection and passage of water into the inlet. • Usually only economical for low flows, chutes are preferred for high flows. • Commercially available pipes usually limited to ~300-75 mm diameter. • Inlet can be impeded by sediment and debris. • Prone to wash-out in severe storms.
Outlet structures	• Used at the discharge point of chutes and slope drains to dissipate flow energy and control scour. • Wide range of controls designed to minimise the risk of soil erosion at outlets and undermining of pipes/headwalls. • Options include rock pads, rock mattress aprons and various impact-type dissipaters.	• Quick to install. • Rock can often be retained as a permanent erosion control measure.	• Critical design considerations are mean rock size and length of protection. • If not correctly installed (length, width, depth or rock or recession and direction of flow) erosion can commonly occur around the edge of the rock pads. • Generally ineffective in controlling high-velocity outlet 'jetting'.
Level spreaders (outlet structure)	• Level, grassed side-flow weirs constructed along the contour to convert minor concentrated flow to sheet flow prior to release. • Can be used as an outlet for catch drains and flow diversion banks.	• Inexpensive to construct and maintain.	• Flow must be released as sheet flow over a stable, well-grassed surface to maintain suitable flow conditions downslope. • Critical design considerations are the length and level construction of the outlet sill, which can be difficult to construct with precision. • Can limit machinery movement on site, which must be excluded from the area of the level spreader. • Not suitable for highly erosive or dispersive soils, or where vegetation cover is poor.

4.6 Sediment Control

Sediment traps will be utilised across the Development Footprint to treat stormwater run-off to capture entrained sediment prior to stormwater discharge from this area of disturbance. The following actions must be taken to ensure that sediment controls are designed, installed and maintained to the IECA 2025 international best practice standard:

- From the commencement of ground disturbing activities through to the achievement of stabilisation criteria within a particular site drainage sub-catchment - all dirty stormwater run-off from within the Development footprint must be directed to a sediment trap for treatment prior to release from site.
- Sediment traps must remain in place until 80% groundcover has been achieved within the upstream drainage sub-catchment draining to that trap.
- All sediment traps must be selected, positioned and sized by an accredited ESC practitioner[18] and signed off as having met the IECA 2025 BPESC Standard and the requirements of this ESCP.
- All sediment basins must be designed by an RPEQ and signed off as having met the IECA 2025 BPESC Standard by an accredited ESC practitioner.[18]
- Where installed, sediment basins must be inspected by a suitably qualified and accredited ESC practitioner[18] or RPEQ and signed off as having been installed in accordance with design.
  - Inspections must occur following of completion of sediment basin construction.
  - Where slight deviations are observed that nevertheless meet the requirements of IECA 2025 BPESC Standard and this ESCP, the construction ESCP must be updated to show the basin as constructed.
  - Installed sediment basins that fail to meet the requirements of IECA 2025 BPESC Standard and this ESCP must be modified to meet these criteria following of identification.
- Stabilised site exits must be established to prevent the tracking of soils offsite by vehicles in accordance with IECA 2025.
- The efficacy of sediment traps will be reviewed where monitoring indicates that those in place are failing to achieve WQOs (**Section 5.3**)

4.6.1 Sediment Control Standard

Sediment controls are grouped by their ability to trap a specified grain size as shown in **Table 4.5**. Sediment traps which are not considered sufficiently effective to be classed as Type 1, 2 or 3 are referred to as supplementary controls. Despite their reduced effectiveness, supplementary controls are considered a useful component of best practice sediment control when employed in tandem with Type 1, 2 and 3 controls.

Table 4.5: Classification of sediment traps based on soil particle size (as seen in IECA 2025, Table 4.5.5 page 4.26)

Classification	Minimum Particle Size	Typical Trapped Particles
Type 1	<0.045 mm	Clay, silt & sand
Type 2	0.045-0.14 mm	Silt & sand[19]
Type 3	>0.14 mm	Sand
Supplementary	>0.42 mm	Coarse sand

The sediment control standard to be applied across the various sub-catchment areas within the Project Development footprint will be determined by construction ESCPs based on calculated soil loss rates once sufficient information is available to meaningfully apply the RUSLE (i.e. applying civil design for the determination of sub-catchments and soil

[18] Accreditation must be through a recognised certification body which upholds ethical standards e.g. Envirocert International Inc., Soil Science Australia or equivalent.
[19] Silt particles technically have a grain size of 0.002 to 0.02 mm, which means that only Type 1 sediment traps are likely to capture silt-sized particles. However, for general discussion, it can be assumed that Type 2 systems capture a significant proportion of silt-sized particles.

data for locally derived soil erodibility [K] factors). The sediment control standard will be determined in accordance with **Table 4.6**.

Table 4.6: Sediment control standards (default) based on soil loss rate (as seen in IECA 2025, Table B1, page B.6)

Catchment Area (m^2)[20]	Soil Loss (t/ha/yr)[21]		
	Type 1[22]	**Type 2**	**Type 3**
250	N/A	N/A	Default[23]
1000	N/A	N/A	All cases
25000	N/A	>75	75
>2500	>150	150	75
>10,000	>60	N/A	60

Based on the size of the Project footprint, the soil loss estimates identified in **Section 3.9.2** and site soil characteristics (**Section 3.2**), it is expected that Type 1 sediment controls (i.e. sediment basins) will be required.

4.6.2 Sediment Control Strategy

The following strategies will be applied for sediment control during Project construction:

1. Sediment traps will be designed and positioned by a suitably qualified person.
2. Sediment laden runoff from construction areas will be directed to an appropriate sediment control device in accordance with the required treatment standard.
3. Sediment will be trapped as close to its source as practicable.
4. Stabilised site exits will be established to prevent the tracking of soils offsite by vehicles.
5. All sediment control measures will be designed, installed, operated and maintained in accordance with IECA, 2025.
6. All material removed from sediment traps during maintenance will be disposed of in a manner that does not cause ongoing soil erosion or environmental harm.

4.6.3 Sediment Control Methods

A summary of the Type 1 and Type 2 sediment control methods recognised by IECA 2025 is provided in **Table 4.7** with examples of specifications as per IECA (2025) contained in **Appendix B**. In addition to Type 1 and 2 controls, the Type 3 and supplementary controls described in **Table 4.8** will also be implemented as directed by construction ESCPs.

[20] *Area is defined by the catchment area draining to a given site discharge. Sub-dividing a given drainage catchment shall NOT reduce its 'effective area' if runoff from these areas ultimately discharges from the site at the same general location. The 'area' does not include any 'clean' water catchment that bypasses the sediment trap. The catchment area shall be defined by the 'worst case' scenario, i.e. the largest effective area that exists at any instance during the soil disturbance* (IECA 2025, Table B1, page B.6).
[21] *Soil loss defines the maximum allowable soil loss rate (based on RUSLE analysis) from a given catchment area. A slope length of 80m should be adopted within RUSLE analysis unless permanent drainage or landscape features reduce its length* (IECA 2025, Table B1, page B.6).
[22] *Exceptions to the use of sediment basins shall apply in circumstances where it can be demonstrated that the construction and / or operation of a sediment basin is not practical, such as where the available workspace does not provide sufficient land area. In these instances, the focus must be erosion control using techniques to achieve an equivalent outcome* (IECA 2025, Table B1, page B.6).
[23] *Refer to the relevant regulatory authority for assessment procedures. The default standard is a Type 3 sediment trap.*

Table 4.7: Type 1 and Type 2 sediment control techniques

Type 1	Typical Use / Features	Type 2	Typical Use / Features
Sheet flow treatment techniques			
Buffer zone – capable of infiltrating 100% of stormwater runoff or process water.[24]	• Most suited to sandy soils • Generally, only suitable for rural and rural-residential building/construction sites. • Can provide some turbidity control whilst the zone remains unsaturated.	Buffer zone – capable of infiltrating the majority of flows from design storms.	• Most suited to sandy soils. • Generally, only suitable for rural and rural-residential building/construction sites. • Can provide some turbidity control whilst the zone remains unsaturated.
Concentrated flow treatment techniques			
Type A sediment basin[25]	• Considered the most effective traps for clayey soils. • Pond size is governed by both minimum volume and minimum surface area. • Operation relies on the installation of an automatic chemical dosing system. • A floating decant system collects water from the top of the water column during the storm events. • In most circumstances, the settling pond is required to be de-watered to the nominated static level prior to a rain event that is likely to produce run-off. • Temporary basins are typically sized for the 1 year ARI, 24 hour storm event.	Block & aggregate drop inlet protection	• Small to medium catchment areas. • Filter cloth can be added between aggregate and blocks to improve removal of fine sediments. • Depth of upstream ponding is controlled by the height of the blocks.
		Excavated sediment trap with Type 2 outlet	• Most suited to sandy soils. • Efficiency can be significantly compromised by inflow jetting. • Can present a safety risk to workers and public. • Often used a coarse sediment trap upslope of type 2 sediment trap. • Useful where not safe/desirable to pond water above ground level.
		Filter sock	• Suitable for all soil types.

[24] Buffer zone must be able to infiltrate all inflow into the ground such that there is no surface discharge from the buffer zone.
[25] Classification based on being sized in accordance with best practice standards per IECA 2025, otherwise the technique attracts a lower classification.

Type 1	Typical Use / Features	Type 2	Typical Use / Features
Type B sediment basin[25]	• Pond size is primarily governed by a minimum required surface area. • These basins are typically larger in volume and surface area than Type A basins. • Operation relies on the installation of an automatic chemical dosing system. • Ideally, the settling pond should be dewatered prior to a run-off producing rainfall event; however, during dry conditions water may be retained for use. • Temporary basins are typically sized for a discharge of 0.5 times the peak 1 in 1 year ARI critical duration storm.	Filter tube dam	• Minor concentrated flows. • Generally better than U-shaped sediment trap for low flows. • Can be integrated into Type 2 and 3 traps to improve minor flow efficiency.
		Mesh & aggregate drop inlet protection	• Small to medium catchment areas. • Depth of upstream ponding is controlled by the height of the aggregate filter.
Type C sediment basin[25]	• Type C basins are limited to works within non-dispersive, low clayey, sandy soils and are not expected to be applicable for the MREH Project.	Rock & aggregate drop inlet protection	• Best used in coarse-grained (low clay) soil areas. • Large construction sites such as dual-carriageway located in medians trip. • Locations where space is not critical.
Type D sediment basin[25]	• Pond size is governed by a minimum required volume. • Operation of the basin normally relies on chemical dosing, using either an automatic or manual chemical dosing system. • The settling pond is required to be dewatered to the bottom of the settling zone prior to a rain event that is likely to produce runoff.	Rock filter dam	• Used where there is sufficient room for relatively large rock embankment. • Filter cloth incorporation is preferred for removal of fine sediment but can cause maintenance issues. • Aggregate filter can be used in sandy soils, normally on longer term traps with regular de-silting.
		Sediment trench	• Used in long, narrow spaces. • Used at the base of fill batters with limited space between toe and site boundary.

Type 1	Typical Use / Features	Type 2	Typical Use / Features
	• Temporary basins are typically sized for the 80%ile, 5-day rainfall depth, depending on catchment conditions and risk.	Sediment weir	• Used where space is limited (i.e. insufficient for use of rock filter dam). • Where the trap may be subject to regularly over-topping flows. • Used as an outlet structure on minor Type 2 sediment basins.

Table 4.8: Type 3 and supplementary sediment controls

Application	Control (type)	
Sheet flow conditions	• Buffer zone (3) • Filter fence (3) • Modular Sediment Trap (3) • Sediment Fence (3)	• Grass filter strips (supplementary) • Fibre rolls (supplementary) • Stiff grass barriers (supplementary)
Concentrated flow conditions	• Modular/U-shaped/Coarse Sediment Trap (3) • Excavated drop inlet protection (3) • Excavated sediment trap with type 3 outlet (3) • Fabric drop inlet protection (3)	• Fabric wrap filed inlet sediment trap (3) • Check dam sediment traps (supplementary) • Kerb inlet sediment traps (supplementary) • Straw bale barriers (supplementary)
Dewatering sediment control techniques	• Compost berm (3) • Filter fence (3) • Grass filter bed (3) • Hydrocyclone (3)	• Portable sediment tank (3) • Sediment fence (3) • Grass filter beds (supplementary)
Construction exists	• Rock pads (supplementary) • Vibration grids (supplementary)	• Wash bays (supplementary)

4.7 Soil Stockpile Management

Soil stockpiles will be managed as follows:

- Topsoils are to be handled and stockpiled separately from subsoils for use in site rehabilitation (though this can be at the same location).
- Avoid any reduction in soil quantity or quality with regard to soil characteristics to maintain soil resources for rehabilitation.
- Stockpiles must be:
  - Located within the sediment control envelope.
  - Located away from areas subjected to concentrated overland flow.
  - Isolated from sensitive receiving environmental receptors such as waterways.
- Upslope overland flows must be directed around stockpiles where the upslope catchment exceeds 1,500 m^2 and the average monthly rainfall exceeds 45 mm.
- Stormwater runoff originating from stockpiles must be directed to a suitable sediment trap.
- Soil stockpiles must be covered where the displacement of stockpiled materials has the potential to cause environmental harm, including mulch, vegetative cover, soil binders or impervious blankets when:
  - Long term (>28 days) stockpiling of dispersive soils;
  - Long term (>5/10 days) during high-risk months (**Table 3.8)**; or
  - Stockpiling clayey soils when turbidity control is required.

4.8 Rainfall / Storm Preparedness

Weather monitoring and wet weather preparedness must be addressed by construction ESCPs. Weather monitoring must be undertaken on a daily basis during construction. The amount of rainfall required to generate surface water run-off at the site (i.e. the minimum run-off producing rainfall event) is to be determined onsite through monitoring

and established as a trigger for site preparation and additional rainfall related monitoring. In the interim, if a single rainfall event in excess of 25 mm is forecast, the following is to be undertaken:

- A thorough inspection of all ESC control measures within 24 hours of the event.
- Maintenance and rectification of ESC controls to ensure that they are in proper working order prior to the rainfall occurring.

Sufficient ESC materials and equipment must be maintained available onsite to ensure that ESCs are able to be maintained as fully functional, this includes spare materials should they be required at short notice to ensure the Project Development footprint is adequately prepared for high intensity rainfall.

If high intensity rainfall is predicted, priority must be given to ensuring the Project Development footprint is adequately prepared, this includes diverting all resources necessary, including personnel, machinery and equipment, to works required for site stabilisation and ESC maintenance.

4.9 Dewatering

Dewatering is not expected to be required for the purposes of extracting groundwater from excavations. Dewatering required for other purposes, such as for the dewatering of soil stockpiles, removal of trapped stormwater run-off from the Site (e.g. within trenches and excavations), or the maintenance of sediment traps (e.g. sediment basin dewatering) will be undertaken in accordance with procedures specified within construction ESCPs.

Dewatering processes for the maintenance of sediment basins will be designed to achieve:

- 90 percentile TSS concentration not exceeding 50 mg/L
- Water pH between 6.5-8.5.

Note that these criteria are intended for treated water from dewatering activities and not all discharges of stormwater run-off from site.

4.10 Dust Management

Specific measures for the management of dust during construction must be addressed by construction ESCPs and / or CEMPs developed by construction contractors and will include:

- Dust suppression techniques such as the use of water carts, soil binders and / or soil ameliorants.
- Minimisation of high dust generating activities during particularly dry and windy conditions.
- The implementation of speed limits on unsealed access tracks.
- The positioning and / or protection of soil stockpiles to minimise wind exposure.
- Covering of loads with the potential to generate dust whilst in transit.

5. ESC Monitoring, Maintenance and Reporting

5.1 ESC Inspections

ESC monitoring and maintenance programs will be documented within construction ESCPs in accordance with IECA 2025 and this PESCP. This will include the development of inspection check sheets and other aids to facilitate thorough checks of controls in place and discharge points. Inspections will be undertaken by a suitably experienced ESC practitioner.

The minimum ESC monitoring requirements for the Project are summarised in **Table 5.1**.

Table 5.1: Minimum ESC monitoring requirements[26]

Frequency	Inspection Requirement
Regular Inspections	
Weekly site inspections	• Checks of all drainage, erosion and sediment control measures. • Occurrence of excessive sediment deposition (whether on or off-site). • Checks of all site discharge points (e.g. for scour or sediment deposition). • Occurrences of construction materials, litter or sediment placed, deposited, washed or blown from the site, including deposition by vehicular movements. • Litter and waste receptors.
Monthly inspections	• Surface coverage of finished surfaces (both area and percentage cover). • Health of recently established vegetation. • Proposed staging of future land clearing, earthworks and site / soil stabilisation.
Rainfall Related Inspections	
Prior to anticipated runoff-producing rainfall (within 24 hours of rainfall occurring)	• Checks of all drainage, erosion and sediment control measures. • Checks of all temporary flow diversion and drainage works.
Daily site inspections during runoff producing rainfall	• Checks of all drainage, erosion and sediment control measures. • Occurrence of excessive sediment deposition (whether on or off-site). • Checks of all site discharge points (e.g. for scour or sediment deposition).
Following run-off producing rainfall (within 18 hours)	• Treatment and dewatering requirements for sediment basins. • Sediment deposition within sediment basins and the need for its removal. • All drainage, erosion and sediment controls. • Occurrences of excessive sediment deposition (whether on or offsite). • Occurrences of construction materials, litter or sediment placed, deposited, washed, or blown from the sites, including deposition by vehicle movements. • Occurrences of excessive erosion, sedimentation or mud generation around the site office, car park and / or material storage areas.

[26] As per IECA, 2025 section 7.4

5.2 ESC Maintenance

ESC measures must be maintained until the site is stabilised and they are no longer required as follows:

- As a minimum, ESCs are to be maintained so that they are in proper working order prior to forecast rainfall events.
- To the extent practicable, controls are to be maintained in proper working order to provide protection for unanticipated rainfall events.
- Sediment traps are to be cleaned out and maintained in line with the operational standard for that device.
- As required to mitigate potential safety risks.

The adequacy of controls is to be reviewed considering water quality outcomes and ESCPs updated as required to achieve ESCP objectives.

5.3 Water Quality Outcomes / Objectives

The Project is committed to achieving no net worsening of the quality of downstream water receptors.

The default standard offered by IECA, 2025 of the 90th percentile suspended solids not exceeding 50 mg/L will be adopted as the water quality objective for discharges of treated water from sediment basins.

5.4 ESC Failures, Corrective Actions and Reporting

If a site inspection or environmental monitoring identifies a failure of the adopted drainage, erosion and sediment control measures, or that environmental outcomes have not, or will not be, achieved, an evaluation will be undertaken to determine the cause and appropriate corrective actions. Corrective actions are most effective when developed on a case-by-case basis so that they are targeted to address the causes identified as leading to a specific event.

Notwithstanding, corrective actions and reporting requirements have been identified for potential ESC failures in **Table 5.2**. The nominated corrective actions will be implemented in conjunction with those identified as part of the post event evaluation process. Where a conflict occurs, corrective actions identified as part of an event specific investigation process will prevail.

ESC related incidents will be logged, responded to, and reported on in line with processes described by construction ESCPs and Construction Environmental Management Plans (CEMPs).

Table 5.2: ESC non-conformances / failures and corrective actions

Description	Examples	Corrective Action	Reporting Requirement
The construction ESCP has largely been implemented, however minor deviations, coverage gas or maintenance requirements are identified. Rectification can be achieved within 48 hrs and prior to forecast run-off producing rainfall.	A break in perimeter bunding is identified providing opportunity for the release of dirty water without prior treatment.	Mobilise the materials, equipment and personnel required to rectify the identified gap / maintenance requirement within 48hrs, or prior to forecast rainfall, whichever is sooner.	Nil
	Rock check dams are incorrectly installed or of insufficient frequency.		
	A Type 2 sediment trap is identified as being full and requiring maintenance.		
Material deviations from this PESCP and / or construction ESCPs are identified.	Land-clearing and / or stabilisation criteria (**Table 4.2**) have not been met: 1. Vegetation clearing has extended beyond clearing ahead timeframes. 2. Stabilisation timeframes have not been met.	1. Vegetation clearing is to cease until construction works are within clearing ahead timeframes. An interim ESCP is to be developed and implemented for the additional cleared area and identified interim stabilisation measures applied e.g. the spreading of woodchip mulch or application of soil binder to exposed soils, installation of perimeter bunding to prevent stormwater run-on to the area and direct run-off from areas of exposed soils to a sediment trap. 2. Immediate measures are to be taken to stabilise the area – temporary groundcover must be achieved.	Finding and details of corrective action taken to be included in routine monthly report
	Perimeter controls (e.g. bunding and sediment traps) have not been installed and ground disturbing works have commenced.	Works are to cease until ESCs have been installed in accordance with the construction ESCP. ESCs must be installed within 48 hrs or prior to forecast rainfall, whichever is sooner.	
	Drainage channels are not shaped, sized and / or lined in accordance with the relevant construction ESCP.	Priority will be given to allocation of resources (machinery etc.) necessary to reform / line the drain - accordance with the construction ESCP will be achieved. An interim temporary drain liner (e.g. roll on fabric) must be installed where rainfall is forecast.	

Description	Examples	Corrective Action	Reporting Requirement
The construction ESCP has been implemented however monitoring indicates that ESCP objectives are not being met.	Sediment deposits are identified outside of the Project Development footprint which are attributable to the Project.	Sediment deposits are to be recovered; where this cannot occur due to access limitations or excessive disturbance, the deposit is to be stabilised in-situ. A suitably qualified and accredited ESC practitioner[27] is to review controls and amend the ESCP to increase sediment capture at that location.	Finding to be included in routine monthly report
	Water quality monitoring results do not align with construction ESCP water quality objectives.	A suitably qualified and accredited ESC practitioner[27] is to inspect the site within 10 business days of the finding, identify sediment sources and: • make recommendations for immediate corrective actions to stabilise sediment sources; and • review and amend the ESCP to improve erosion prevention and increase sediment capture. An assessment of environmental harm is to be completed and reporting undertaken commensurate to the outcome in accordance with the EP Act.	Finding to be reported to RWE within 2 business days of becoming aware of the failure.
Failure to implement nominated corrective actions.	Monthly reporting indicates that corrective actions identified to address failures / non-conformances have not been implemented, for example: Water quality monitoring results do not align with ESCP objectives, the 10-business day timeframe has been exceeded however a qualified and accredited ESC practitioner[27] has not inspected the site.	RWE to escalate matter and take action in accordance with Project governance processes	Regulatory reporting in accordance with EP Act and / or approval conditions.

[27] Accreditation must be through a recognised certification body which upholds ethical standards e.g. Envirocert International Inc., Soil Science Australia or equivalent.

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Appendix A

Definitions

Table A.1: Definitions

Term / Acronym	Definition
AHD	Australian Height Datum
ANZG	Australian and New Zealand Governments
RWE	RWE Corporation Pty Ltd
Attexo	Attexo Group Pty Ltd
BESS	Battery Energy Storage System
BGL	Below Ground Level
BoM	Bureau of Meteorology
BPESC	Best Practice Erosion and Sediment Control
CEC	Cation Exchange Capacity
CEMP	Construction Environmental Management Plan
Cth	Commonwealth
DAF	QLD Department of Agriculture and Fisheries
DCCEEW	Cth. Department of Climate Change, Energy, the Environment and Water
DEC	QLD Department of Energy and Climate (now Queensland Treasury)
DETSI	QLD Department of Environment, Tourism, Science and Innovation
DSDIP	Department of State Development, Infrastructure and Planning
ECEC	Effective Cation Exchange Capacity
EP Act	QLD Environmental Protection Act 1994
EPBC Act	Cth. Environment Protection and Biodiversity Conservation Act 1999
EPP (Water and Wetland Biodiversity)	Environmental Protection (Water and Wetland Biodiversity) Policy 2009
ESC	Erosion and Sediment Control
ESCP	Erosion and Sediment Control Plan
EV	Environmental Values
GBR	Great Barrier Reef
GBRCA	Great Barrier Reef Catchment Area
GBRMP	Great Barrier Reef Marine Park
GBRNHP	Great Barrier Reef National Heritage Property
GBRWHA	Great Barrier Reef World Heritage Area
GED	General Environmental Duty
IECA	International Erosion Control Association
IECA 2025	IECA Best Practice Erosion and Sediment Control Guidelines
GBR	Great Barrier Reef
GBRCA	Great Barrier Reef Catchment Area

Term / Acronym	Definition
km	kilometres
MD	Moderately Disturbed
Met	Meteorological
MV	Medium Voltage
MW	Megawatt
OHTL	Overhead Transmission Powerline
The Project	The Tully BESS Project
PSA	Particle Size Analysis
QLD	Queensland
RWQ	Reef Water Quality
RPEQ	Registered Professional Engineer of Queensland
RUSLE	Revised Universal Soil Loss Equation
SCL	Strategic Cropping Land
PESCP	Sediment and Erosion Management Plan
SPP	State Planning Policy
SSP	Shared Socioeconomic Pathway
TSS	Total Suspended Solids
WQIP	Water Quality Improvement Plan
WQO	Water Quality Objective

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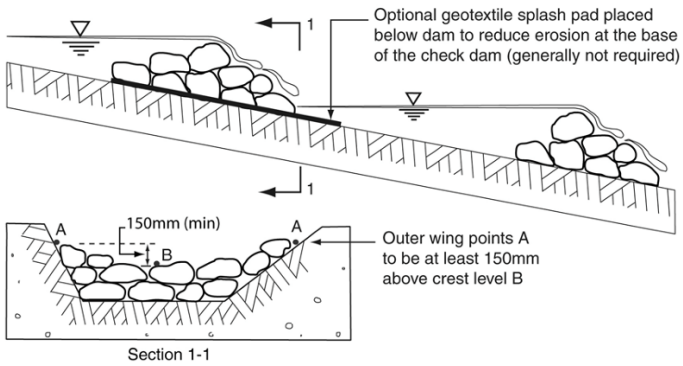
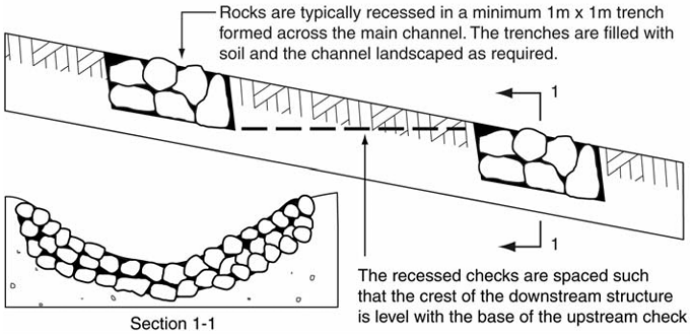
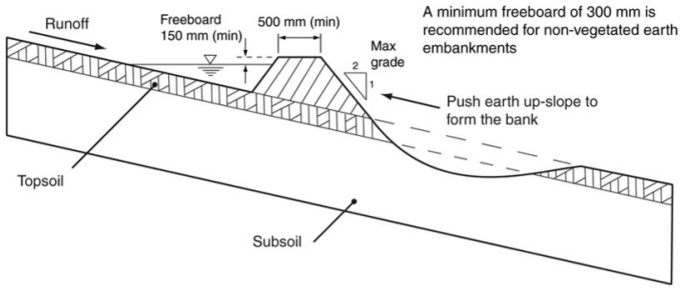
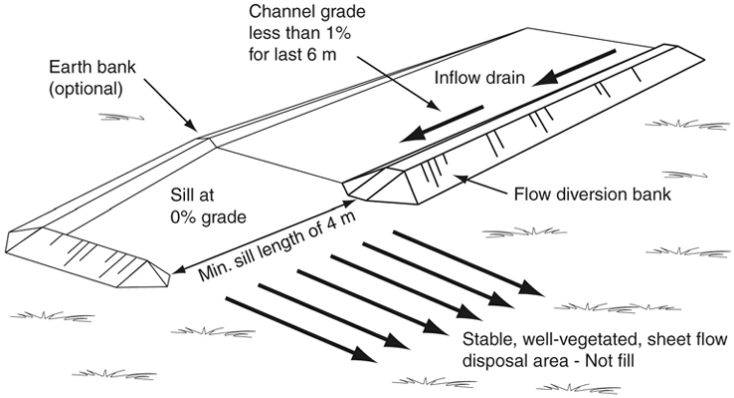
Appendix B

ESC Specifications

B-1 Drainage Controls

Table B.1: Drainage Control Specifications

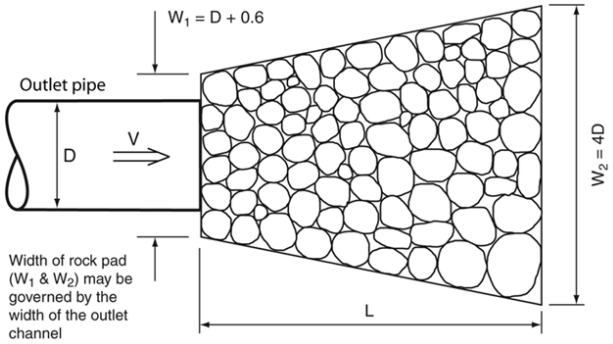
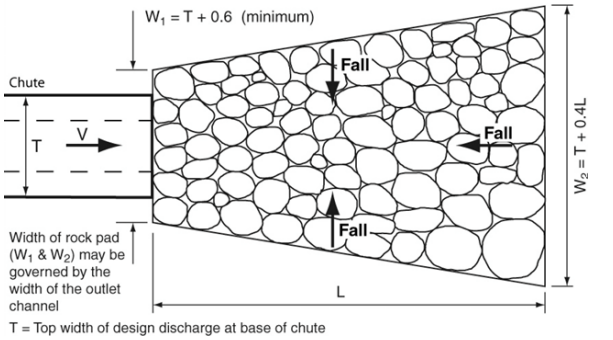
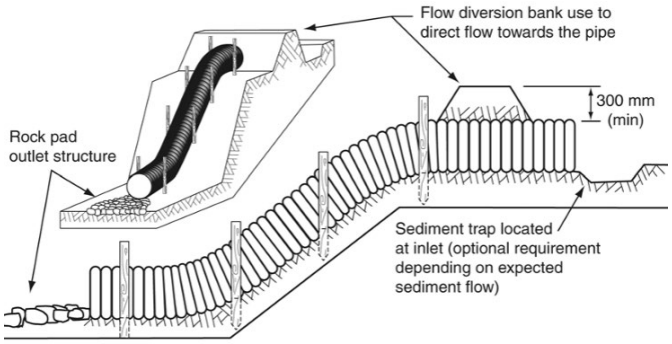
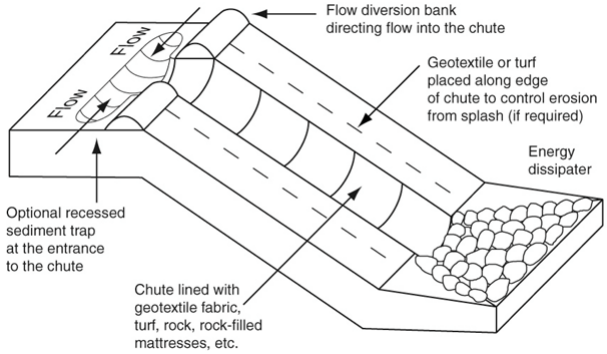
Control	Example drawing
Rock check dams[28]	
Recessed rock check dams[29]	
Flow diversion bank – 'back-push bank'[30]	
Level spreader[31]	

[28] As seen in: Catchments and Creeks Pty Ltd (2010) *Check Dams: Drainage control technique*, Figure 1 (pg. 3) accessed 24/02/2025 at: https://www.austieca.com.au//documents/item/314

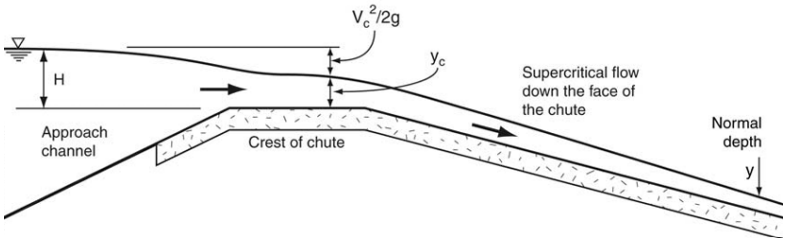
[29] As seen in: Catchments and Creeks Pty Ltd (2020) *Check Dams: Drainage control technique*, Figure 4 (pg. 7) accessed 24/02/2025 at: https://www.austieca.com.au//documents/item/314

[30] As seen in: Catchments and Creeks Pty Ltd (2010) *Flow Diversion Banks Part 1: General Drainage Control Technique*, Figure 1 (pg. 3) accessed 24/02/2025 at: https://www.austieca.com.au//documents/item/301

[31] As seen in: Catchments and Creeks Pty Ltd (2010) *Level Spreaders: Drainage Control Technique*, Figure 2 (pg. 3) accessed 24/02/2025 at: https://www.austieca.com.au//documents/item/312

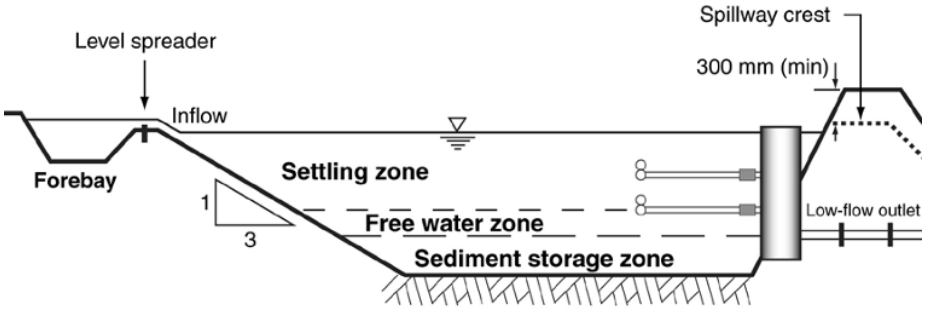
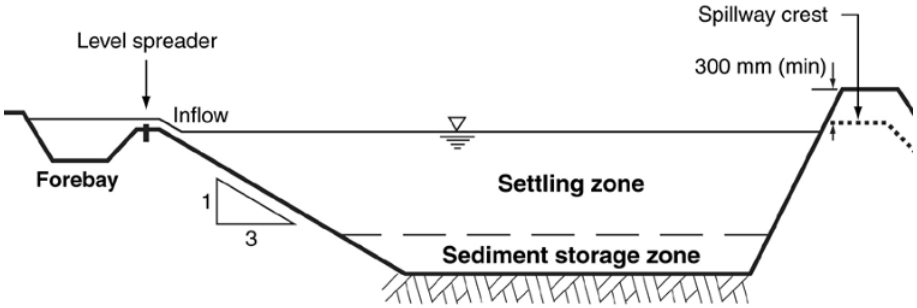
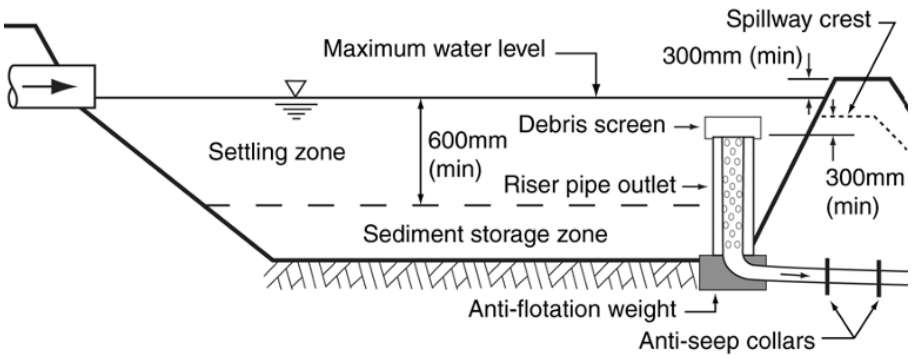
Control	Example drawing
Outlet structure – single pipe rock outlet[32]	
Outlet structure – recessed rock outlet for chute[33]	
Slope drain – PVC pipe[34]	
Chute[35]	

[32] As seen in: Catchments and Creeks Pty Ltd (2010) *Outlet Structures: Drainage Control Technique*, Figure 1 (pg. 3) accessed 24/02/2025 at: https://www.austieca.com.au//documents/item/313
[33] As seen in: Catchments and Creeks Pty Ltd (2010) *Outlet Structures: Drainage Control Technique*, Figure 2 (pg. 4) accessed 24/02/2025 at: https://www.austieca.com.au//documents/item/313
[34] As seen in: Catchments and Creeks Pty Ltd (2010) *Slope Drains: Drainage Control Technique*, Figure 1 (pg. 4) accessed 24/02/2025 at: https://www.austieca.com.au//documents/item/317
[35] As seen in: Catchments and Creeks Pty Ltd (2010) *Chutes Part 1: General Information*: Drainage Control Technique, Figure 8 (pg. 8) accessed 24/02/2025 at: https://www.austieca.com.au//documents/item/296

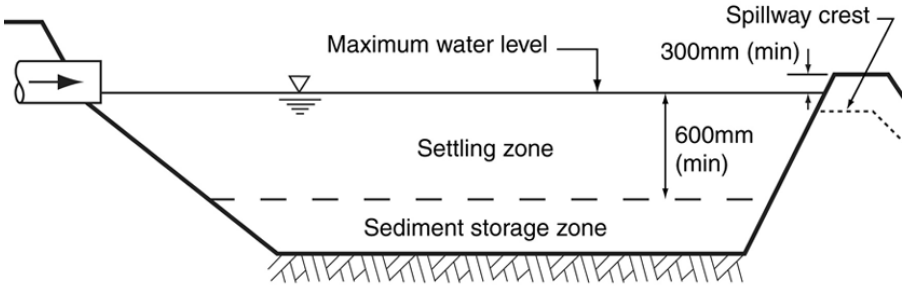
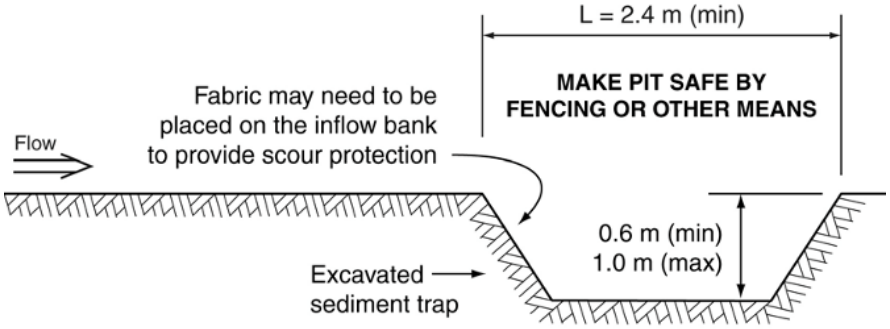
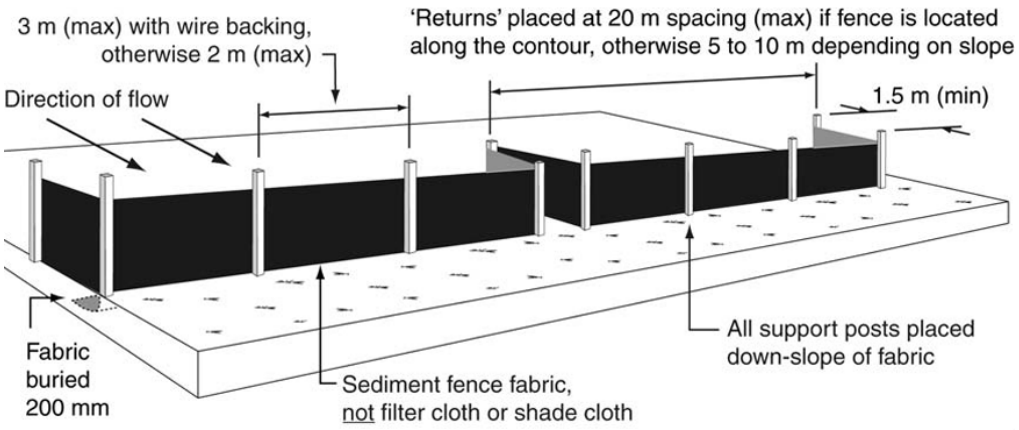
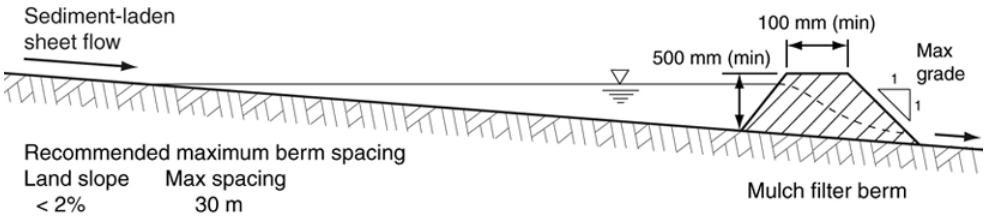
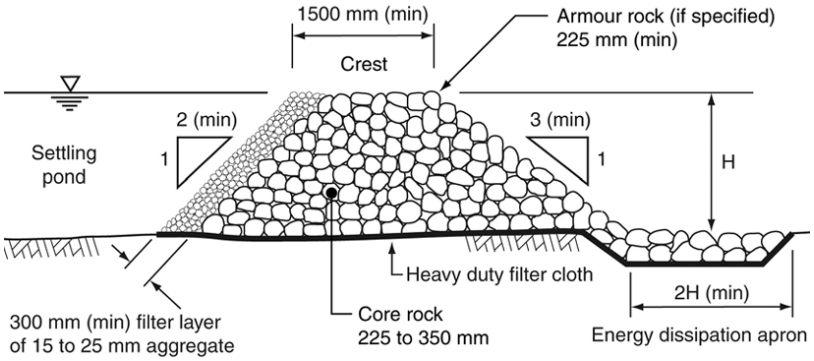
Control	Example drawing
Chute – spillway outlet[36]	

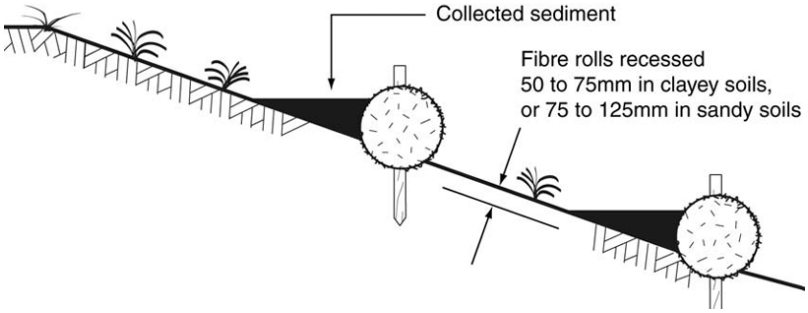
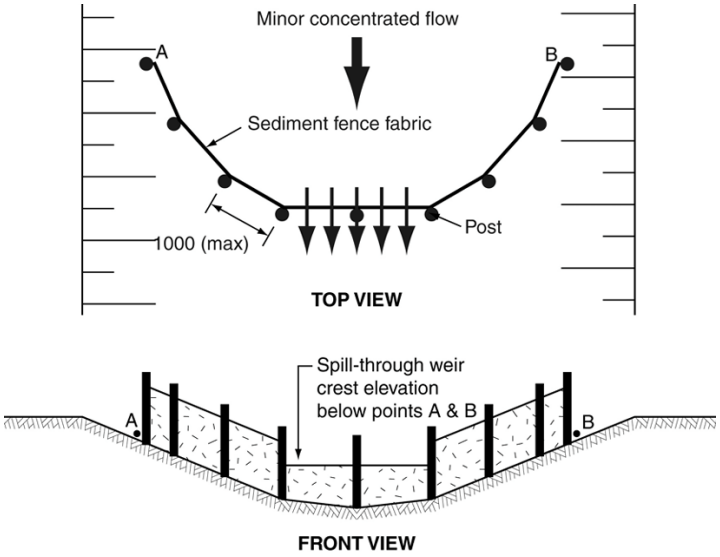
B-2 Sediment Controls

Table B.2: Sediment Control Specifications

Control	Example drawing
Sediment Basin – Type A	
Sediment Basin – Type B	
Sediment Basin – Type C	

[36] As seen in: Catchments and Creeks Pty Ltd (2010) *Chutes Part 1: General Information*: Drainage Control Technique, Figure 1 (pg. 1) accessed 24/02/2025 at: https://www.austieca.com.au//documents/item/296

Control	Example drawing
Sediment Basin – Type D	
Excavated sediment trap	
Sediment fence	
Mulch filter berm	 Recommended maximum berm spacing Land slope — Max spacing < 2% — 30 m 5% — 25 m 10% — 15 m 20% — 8 m
Rock filter dam – aggregate filter	

Control	Example drawing
Fibre rolls	
U-shaped sediment trap – BU 'wide'	

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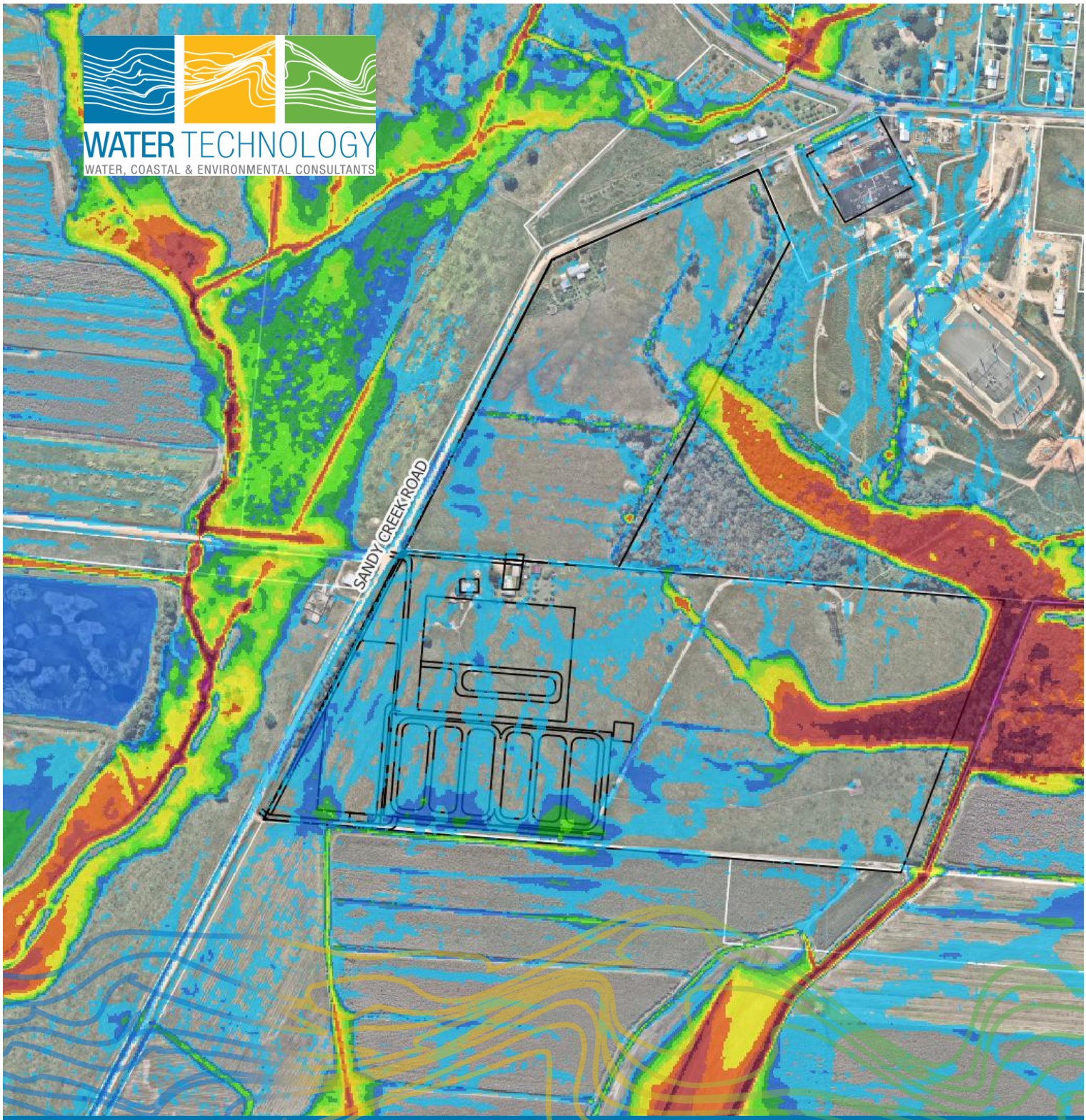
Appendix E

Stormwater Management Plan



WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Report

Tully BESS Stormwater Management Plan & Flood Assessment

Attexo

15 December 2025

Document Status

Version	Doc type	Reviewed by	Approved by	Date issued
V01	DRAFT	C. Wallis	A. Thompson	3 September 2025
V02	FINAL	C. Wallis	A. Thompson	15 December 2025

Project Details

Project Name	Tully BESS Stormwater Management Plan & Flood Assessment
Client	Attexo
Client Project Manager	Sue Walker
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ACKNOWLEDGEMENT OF COUNTRY

The Board and employees of Water Technology acknowledge and respect the Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of Country throughout Australia. We specifically acknowledge the Traditional Custodians of the land on which our offices reside and where we undertake our work.

We respect the knowledge, skills and lived experiences of Aboriginal and Torres Strait Islander Peoples, who we continue to learn from and collaborate with. We also extend our respect to all First Nations Peoples, their cultures and to their Elders, past and present.

Artwork by Maurice Goolagong 2023. This piece was commissioned by Water Technology and visualises the important connections we have to water, and the cultural significance of journeys taken by traditional custodians of our land to meeting places, where communities connect with each other around waterways.

The symbolism in the artwork includes:

- *Seven circles representing each of the States and Territories in Australia where we do our work*
- *Blue dots between each circle representing the waterways that connect us*
- *The animals that rely on healthy waterways for their home*
- *Black and white dots representing all the different communities that we visit in our work*
- *Hands that are for the people we help on our journey*

CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

Water Technology (WT) has been engaged by Attexo to prepare a Stormwater Management Plan (SMP) and Flood Assessment (FA) for the proposed Tully battery energy storage system (BESS), situated south of Tully in the Cassowary Coast Regional Council (CCRC) Local Government Area (LGA) in far north Queensland. The Location of the proposed site is presented in Figure 1-1.

1.1 Proposed Development

Attexo are assisting RWE Renewables Australia Pty Ltd (RWE) in submitting a development application for a proposed BESS, occupying an area of approximately 28.7 hectares (ha), that comprises of two freehold parcels, Lot 1 on RP735276 and Lot 1 on RP852238. The site is situated approximately 4 km south-west of Tully. The project is expected to have an approximate capacity of up to 200 MW / 800 MWh with grid connection proposed via the Powerlink owned 132 kV existing Tully Substation, located to the northeast on Lot 1 on RP716718. Figure 1-2 illustrates the BESS area with the layout of the batteries and supporting infrastructure. The proposal includes:

- BESS development area including earthworks, temporary construction ancillary facilities, foundations for installation of containerised battery system, drainage works, appropriate fencing, perimeter and site access road.
- An easement for an overhead electrical infrastructure connection running from the north of the BESS area to substation on the adjoining lot.
- Site access road off Sandy Creek Road.

1.2 Assessment Objectives and Scope

This report describes a conceptual SMP and FA to support the proposal and includes:

- A review and summary of relevant planning and legislative requirements as they relate to stormwater management and flooding.
- Identification of Environmental Values (EV's) and Water Quality Objectives (WQO's) applicable to the development.
- A SMP documenting the methodology and outcomes of the assessments undertaken to demonstrate that the proposed development achieves the stormwater quality requirements of CCRC and the Queensland State Government, including:
  - Compliance with the relevant Performance Outcomes associated with The Department of State Development, Infrastructure and Planning (DSDIP) State Code 9: Great Barrier Reef wetland protection area[1].
  - Details of construction phase erosion and sediment control measures.
  - MUSIC modelling to quantify changes to stormwater runoff quality during the operational phase.
  - Conceptual sizing of stormwater quality management measures to meet the relevant WQO's.
- A FA documenting modelling undertaken to characterise existing overland flow flood behaviour within and surrounding the site and quantify potential impacts of the proposal on overland flow flooding as well as:
  - Development of a local flood model (using TUFLOW) to characterise existing overland flow behaviour.
  - High-level recommendations to minimise impacts of flooding on the development.
  - Quantification of hydraulic impacts associated with the development and high-level recommendations to ensure the development does not cause material impacts on flooding external to the site.

[1] Queensland Department of State Development, Infrastructure, Local Government and Planning, Planning guidance – State Code 9: Great Barrier Reef wetland protection areas, 18/02/2022

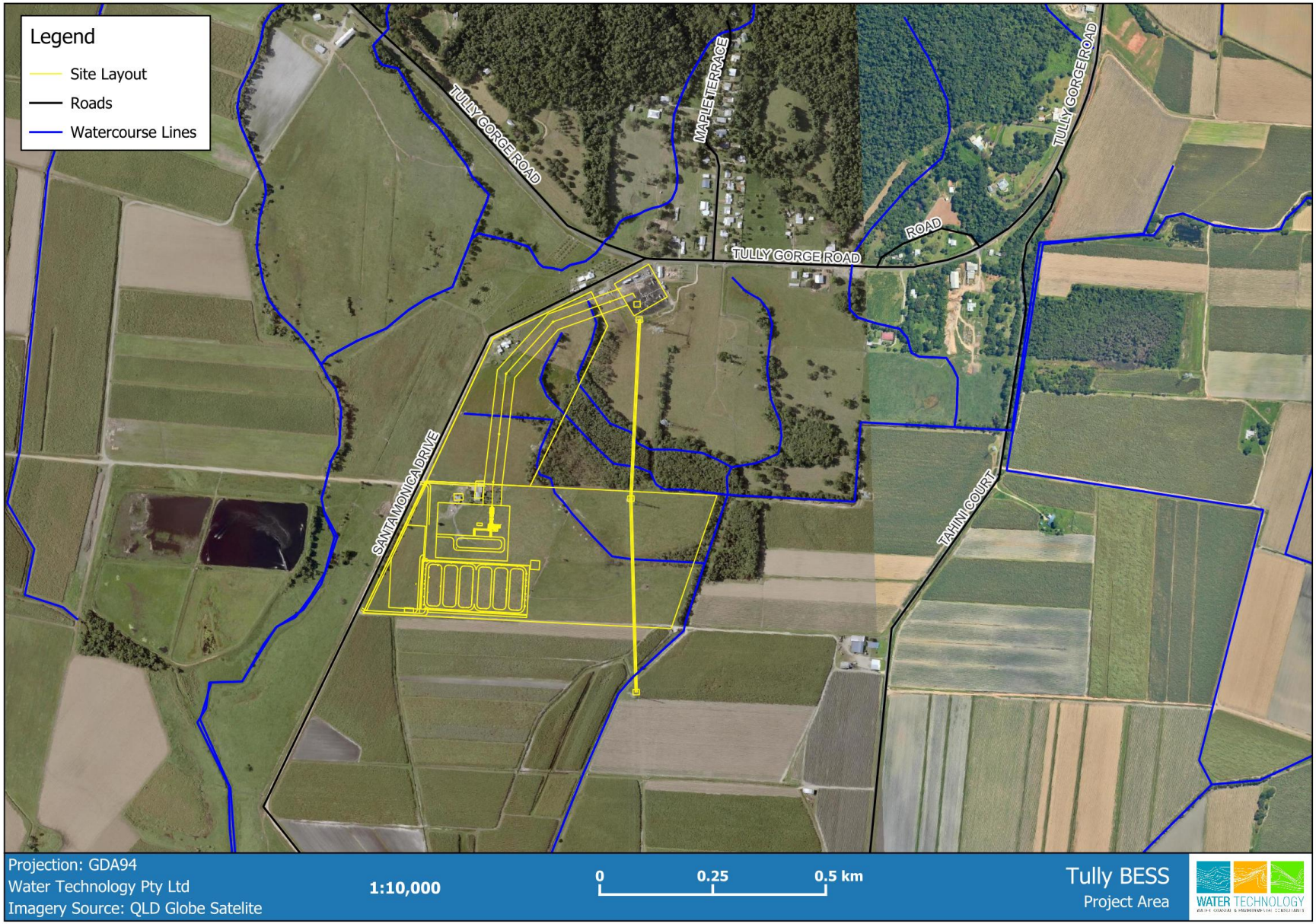

Figure 1-1 Tully BESS – Site Location

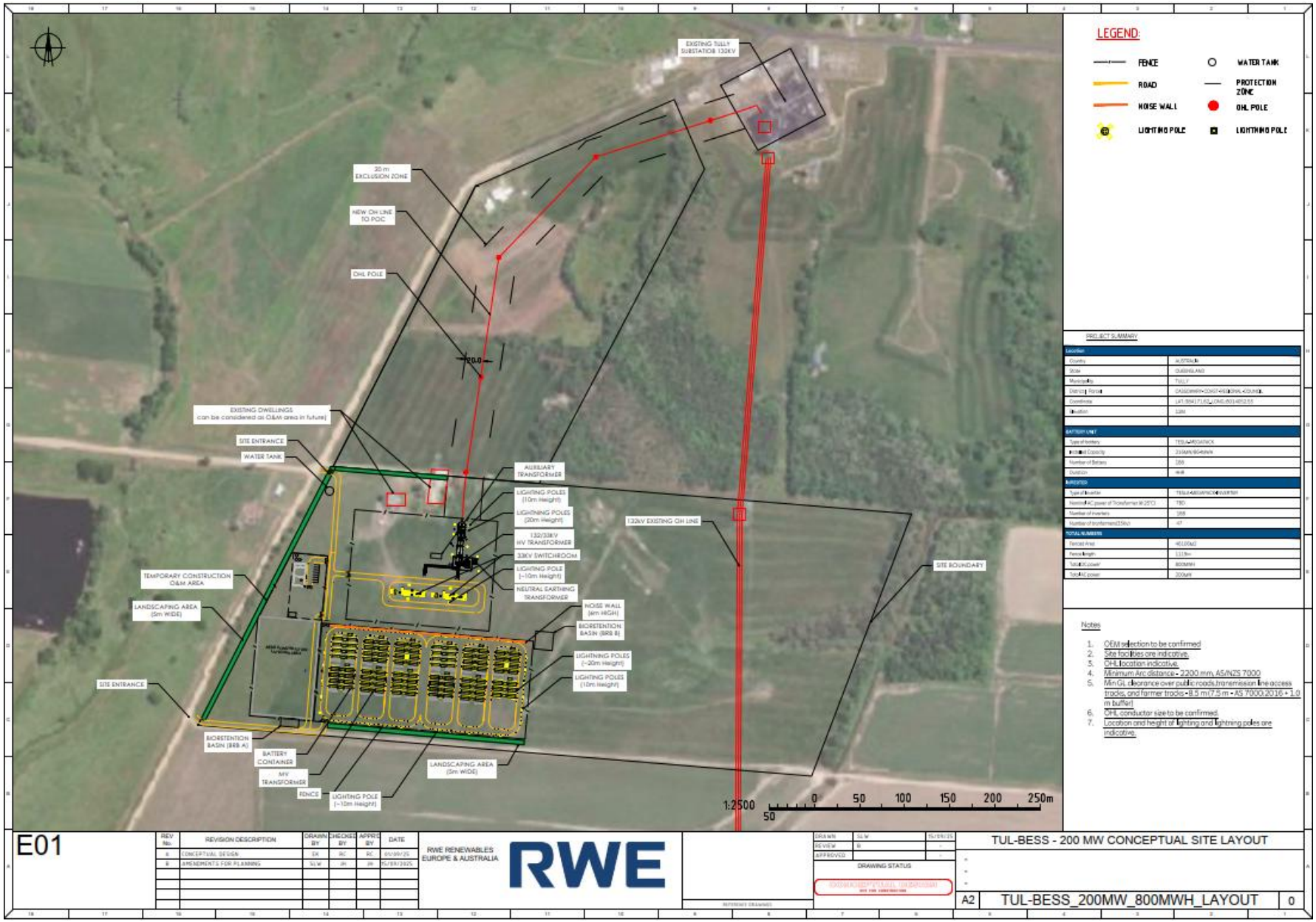

Figure 1-2 Tully BESS Site Layout

2 LEGISLATIVE CONTEXT

There are a number of legislative acts and policies in Queensland that govern development throughout the state. Those that are particularly relevant to the proposed Tully BESS in the context of the SMP are detailed in the following sections.

2.1 Environmental Protection Act 1994

The stated object of the act is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development). Subordinate to this act is the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 whose purpose is to achieve the *Environmental Protection Act (1994)* objectives in relation to waters and wetlands.

2.1.1 Environmental Protection (Water and Wetland Biodiversity) Policy 2019

The Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (EPP Water) is designed to uphold the objectives of the *Environmental Protection Act 1994* concerning the protection of Queensland's water environment while permitting ecologically sustainable development. It aims to determine Environmental Values (EV's) and Water Quality Objectives (WQO's) for Queensland waters progressively. EV's define water uses by both aquatic ecosystems and humans (such as drinking water, irrigation, aquaculture, and recreation), while WQO's set objectives for the physical, chemical, and biological characteristics of water (including nitrogen content, dissolved oxygen, turbidity, toxicants, and fish health).

The policy adopts the management framework outlined in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018) to guide its implementation.

2.2 Water Act 2000

The purpose of the act, with relevance to the project, is to provide a framework for the sustainable management of Queensland's water resources. This requires:

- Incorporating the principles of ecologically sustainable development;
- Sustaining the health of ecosystems, water quality, water-dependent ecological processes and biological diversity associated with watercourses, lakes, springs, aquifers and other natural water systems, including where practicable, reversing degradation that has occurred; and
- Recognising the interests of Aboriginal people and Torres Strait Islanders and their connection with water resources.

Subordinate to this act is the Water Plan (Wet Tropics) 2013. The Water Plan provides a framework for sustainable water management balancing human development with environmental systems including the reversal of degradation in natural ecosystems.

2.3 Planning Act 2016

The *Planning Act 2016* is the primary piece of legislation that governs land use planning and development in Queensland. It establishes a framework for the preparation and implementation of planning schemes that regulate the use of land in Queensland. The development of 'battery storage facilities' advances the purpose of the Planning Act under section 5 (c) and (h):

c. promoting the sustainable use of renewable and non-renewable natural resources, including biological, energy, extractive, land and water resources that contribute to economic development through employment creation and wealth generation

h. supplying infrastructure in a coordinated, efficient, and orderly way.

2.3.1 Planning Regulation 2017

The Planning Regulation 2017 is subordinate to the *Planning Act 2016*, detailing operational elements of the Planning Act. The Planning Regulation sets out the only land use terms that may be adopted in local planning schemes in Schedule 3. These are complemented by the use terms defined in Schedule 24 of the Planning Regulation. Battery storage facilities have not yet been given a State Code with assessable benchmarks under the State Development assessment Provisions.

2.3.2 State Code 9: Great Barrier Reef Wetland Protection Areas

The project site is located within the designated Great Barrier Reef wetland protection areas, as defined by the Map of Great Barrier Reef Wetland Protection Areas under State Code 9: Great Barrier Reef Wetland Protection Areas. Table 2-1 lists the performance outcomes from State Code 9 that are applicable to this SMP.

Table 2-1 State Code 9: Great Barrier Reef wetland protection areas

Performance outcomes
Hydrology
PO3 Development maintains or improves the existing surface and groundwater hydrology in a wetland protection area.
Water Quality
PO4 Development does not unacceptably impact the water quality of the wetland in the wetland protection area and in the wetland buffer
PO5 Development does not use the wetland in the wetland protection area for stormwater treatment

2.3.3 State Planning Policy (SPP) – Water Quality

The State Planning Policy (SPP) ensures Queensland's state interests are delivered through local planning and development assessment. The SPP identifies water quality as a state interest, and local governments must reflect it in their planning schemes; where a scheme has not fully integrated a state interest, the SPP's interim development assessment requirements apply. Development must achieve post-construction stormwater design objectives, including minimum reductions in:

- Total Suspended Solids (TSS): 80%
- Total Phosphorus (TP): 60%
- Total Nitrogen (TN): 45%
- Gross Pollutants (>5 mm): 90%

These are typically achieved through water sensitive urban design (WSUD) measures such as bioretention basins, swales, and gross pollutant traps (GPT).

2.3.4 Cassowary Coast Regional Council Planning Scheme 2015 (V4)

The Cassowary Coast Regional Council Planning Scheme advances state and regional policies through detailed local provisions. While the scheme does not specifically define Battery Energy Storage Systems (BESS), development remains subject to relevant zoning provisions and infrastructure standards, including stormwater management requirements specified in the desired standards of service. These provisions align with the State Planning Policy (SPP) – Water Quality objectives discussed in Section 2.2.

2.3.4.1 Desired Standards of Service

Section 4.4 of the Planning Scheme specifies the desired standards of service for the stormwater network:

1. Collect and convey stormwater in a system of natural and engineered channels, a piped drainage network and system of overland flow paths to a lawful point of discharge in a safe manner that minimises nuisance, damage and inundation of habitable rooms and protects life;
2. Manage the water quality within urban catchments and waterways to protect and enhance environmental values and pose no health risk to the community;
3. Adopt water-sensitive urban design principles and on-site water quality management to achieve relevant water quality objectives;
4. The design of the stormwater network is in accordance with the FNQROC Regional Development Manual – Issue 7 (2017).

2.4 Fisheries Act 1994

The primary purpose of this act as stated is to provide for the use, conservation and enhancement of the community's fisheries resources and fish habitats in a way that seeks to apply and balance the principles of and promote ecologically sustainable development. Of relevance to this project, this act manages the introduction of waterway barrier works that may impact fish movement through the project area.

2.5 Vegetation Management Act 1999

The *Vegetation Management Act 1999* provides a comprehensive framework for vegetation management in Queensland, including the protection of riparian vegetation, while the specific policies and guidelines for the protection and management of riparian vegetation in Queensland aim to ensure that this unique and important type of vegetation is protected and preserved for future generations. These include the following:

- Vegetation Management Regulation 2012: Subordinate to the Vegetation Management Act 1999 and provides accepted development vegetation clearing codes.
- Queensland Government Riparian Vegetation Management Guidelines: Provides guidance on the management of riparian vegetation and aims to ensure that riparian areas are protected and managed in an ecologically sustainable manner.
- State Planning Policy: Sets out the Queensland government's position on the protection of riparian vegetation and the requirement for local governments to include provisions for the protection of riparian areas in their planning schemes.
- Regional Ecosystems: Defined areas within Queensland that have similar vegetation types and ecological characteristics and include specific provisions for the protection and management of riparian vegetation.

2.6 Soil Conservation Act 1986

This act relates to the conservation of soil resources and mitigation of soil erosion through soil conservation measures.

2.7 Non-Statutory Water Quality Guidelines

2.7.1 Reef 2050 Water Quality Improvement Plan

The Reef 2050 Water Quality Improvement Plan is a strategic framework designed to safeguard the health of the Great Barrier Reef's marine ecosystems. It focuses on reducing sediment runoff, nutrient pollution, and pesticide contamination. Key elements include targeted actions, improved land management practices, robust monitoring, community engagement, research, and adaptive management. The plan involves stakeholders from various sectors and emphasizes the use of best management practices to minimize environmental impact.

These guidelines list specific water quality objectives for relevant catchments to achieve 2025 Great Barrier Reef water quality targets. This site is situated in the in the Tully Catchment which covers 1,683 km² (8% of the Wet Tropics region).

Table 2-2 summarises the 2025 end-of catchment anthropogenic water quality targets for the Tully Catchment and associated priorities for water quality improvement.

Table 2-2 End-of-catchment anthropogenic load reductions required from 2013 baseline

Region: Wet Tropics Region, Tully catchment water quality targets		
Parameter	**Target**	**Management Priority**
Dissolved inorganic nitrogen (DIN)	190 tonnes, 50% reduction	High
Fine sediment	17 kilo-tonnes, 20% reduction	Low
Particulate phosphorus (PP)	23 tonnes, 20% reduction	Low
Particulate nitrogen (PN)	68 tonnes, 20% reduction	Low
Pesticides	n/a	Low

2.7.2 Wet Tropics Water Quality Improvement Plan

The Wet Tropics Water Quality Improvement Plan (WQIP) was developed to establish and achieve water quality targets for the region, ensure the protection of the Great Barrier Reef. The plan identifies priority areas and outlines targeted management actions that aim to reduce pollutant loads, improve land management practises and enhance ecosystem resilience.

The short-term water quality and land management targets are in accordance with the broader Reef 2050 Water Quality Improvement Plan, reinforcing efforts to protect coastal and marine environments. The Wet Tropics region is divided into distinct catchment areas to facilitate localised and strategic interventions. Key pollutants of concern include fine sediment, nutrients and pesticides, which originate mainly from agriculture activities. While some catchments have been identified as priority areas for investment, the plan promotes a proactive and preventative approach to managing water quality risks across the region, ensuring long-term sustainability.

2.7.3 Application to the Project

While the Reef 2050 WQIP and the Wet Tropics WQIP are not statutory instruments, adopting their catchment-specific targets and best-practice measures supports compliance against State Code 9 by

(a) maintaining or improving site hydrology (PO3),

(b) preventing unacceptable water quality impacts to wetlands and their buffers (PO4), and

(c) ensuring wetlands are not used as part of the stormwater treatment system (PO5).

2.8 Other Relevant Guidelines

In addition to relevant legislation, several surface water and stormwater management guidelines have been considered to ensure best practice methods and design outcomes are utilised at Tully BESS. These include:

- Australian and New Zealand Governments (ANZG) 2018, Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia.
- Australian Drinking Water Guidelines, 2011 (Updated August 2018).
- Queensland Urban Drainage Manual, 2017.
- Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia - Geoscience Australia, 2019.
- Best Practice Erosion and Sediment Control, IECA, 2008.

3 CATCHMENT HYDROLOGY AND SITE CHARACTERISTICS

3.1 Topography and Catchments

The Tully catchment is located in the south of the Wet Tropics region. The location surrounding the site is relatively flat, with lower-lying regions at approximately 4 mAHD and higher elevations at 30 mAHD, the site topography is shown in Figure 3-1. The site is situated in the lower part of the Tully River Drainage Basin, which occupies an area of approximately 1,675 km² extending south from Innisfail, as shown in Figure 3-2. The Tully River Basin drains primarily to the Pacific Ocean, with additional contributions from the Hull River and smaller tributaries. Given the region's high rainfall and complex topography, the site is subject to dynamic hydrodynamic processes, including floodplain inundation, overland flow, and potential backwater effects from downstream constraints.

3.2 Land Use

The project area is predominantly used for grazing native vegetation, as identified by the Queensland Land Use Mapping Program. The surrounding catchment features also include areas of Environmental Significance according to Cassowary Coast Regional Council online planning scheme mapping, as shown in Figure 3-3.

3.3 Great Barrier Reef Wetland Protection Areas

Figure 3-4 shows the location of the mapped Great Barrier Reef Wetland Protection Areas in the vicinity of the project. The areas of high ecological significance identified in this dataset closely correspond to the areas of Environmental Significance shown in the Cassowary Coast Regional Council online planning scheme mapping, which includes mapped wetlands near the site. The proposed infrastructure has been designed to be located wholly outside these mapped high ecological significance areas.

However, the site is within the mapped Great Barrier Reef Wetland Protection Area trigger area, which means the development must be assessed against the provisions of State Code 9: Great Barrier Reef Wetland Protection Areas under the State Development Assessment Provisions (SDAP). Compliance with State Code 9 performance outcomes is addressed in Section 5.5.3.

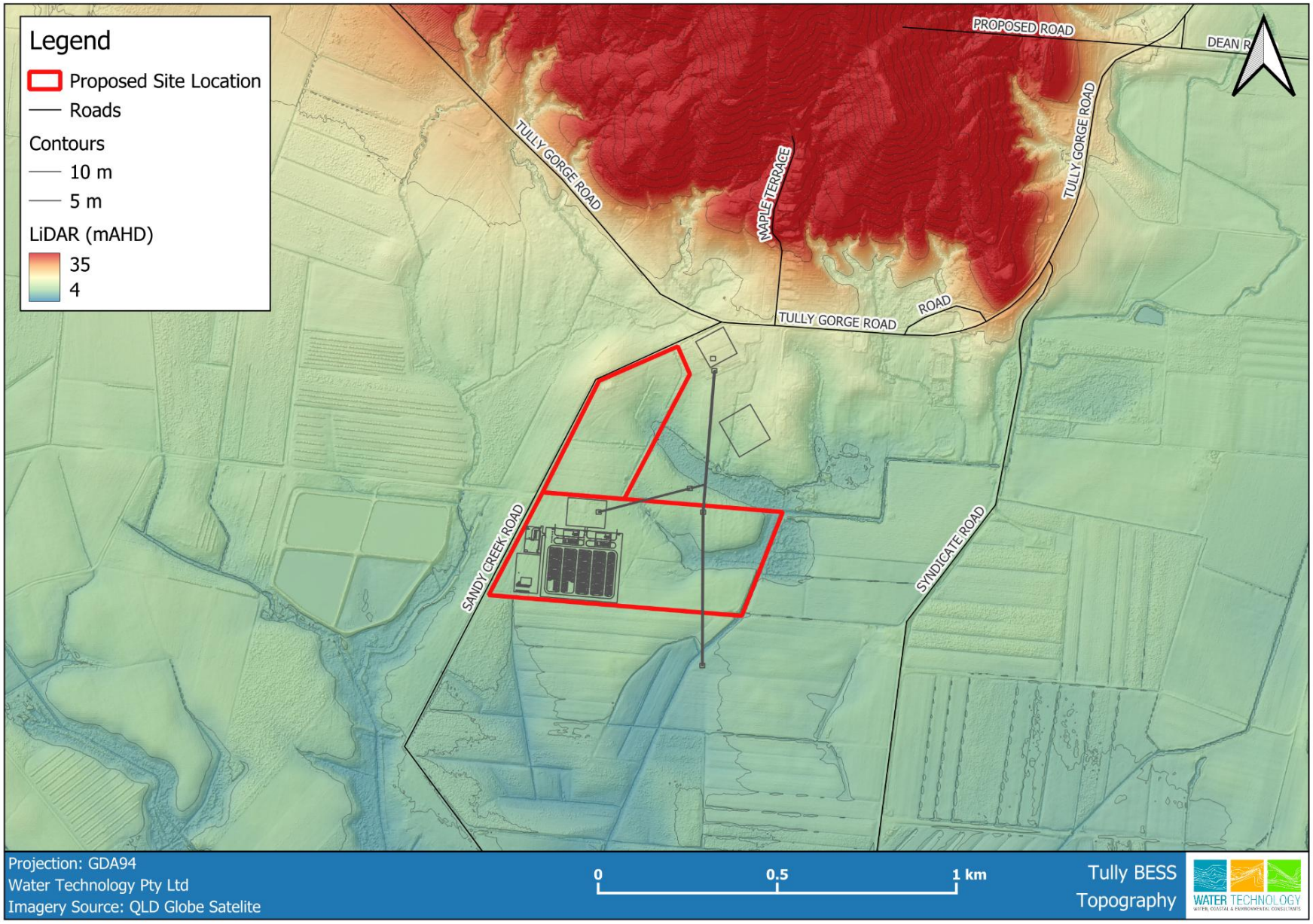

Figure 3-1 Site Topography and Local Catchment

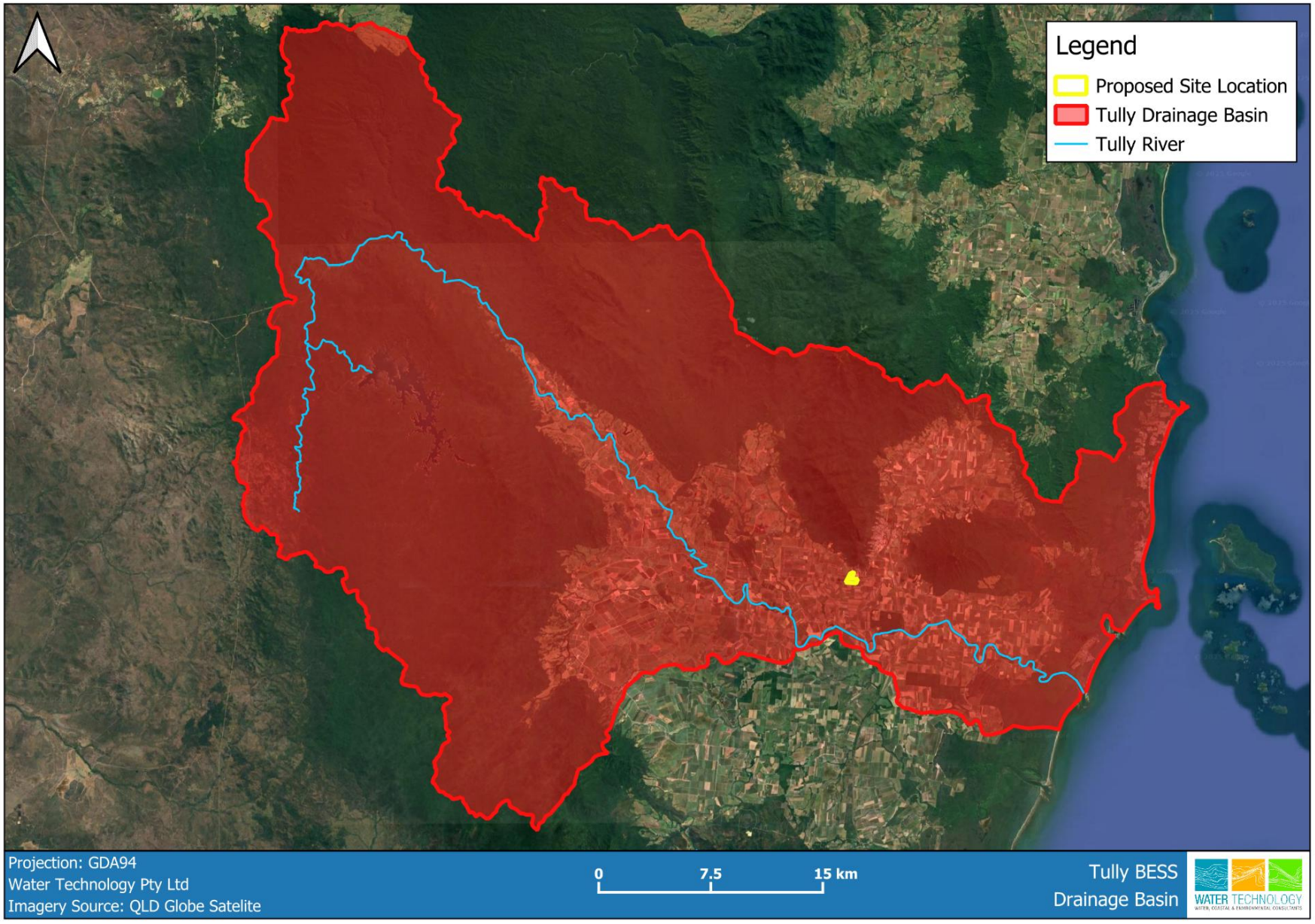

Figure 3-2 Tully Drainage Basin

Figure 3-3 Areas of Environmental Significance (Cassowary Coast Regional Council Online Planning Scheme)

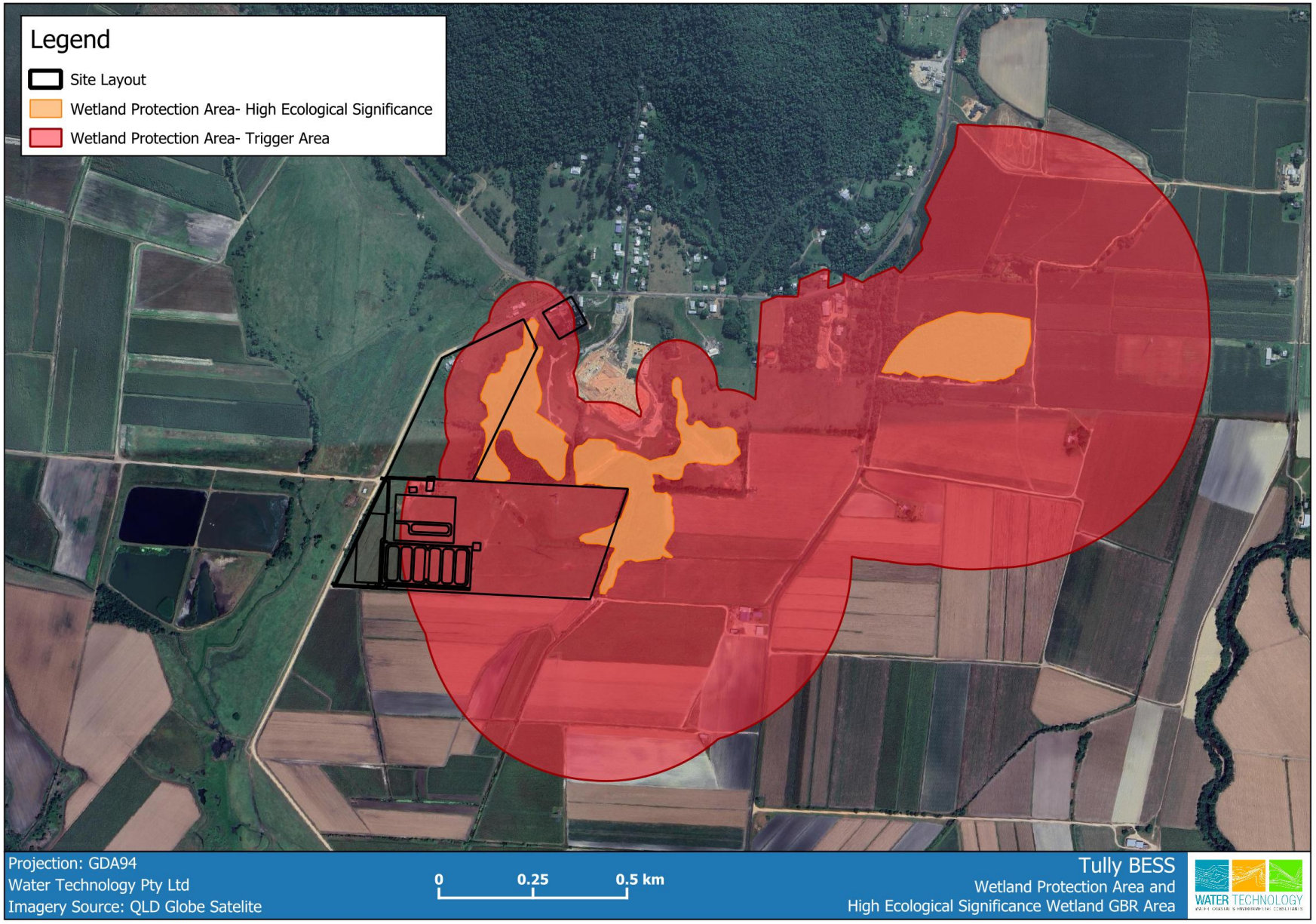

Figure 3-4 Great Barrier Reef Wetland Protection Areas

3.4 Climate

Tully Station is the nearest open station providing climate statistics and is located approximately 3 km northeast of the centroid of the project area. Annual rainfall statistics are provided in Table 3-1 with gauge locations presented in Figure 3-6.

Table 3-1 Annual Rainfall Statistics

Parameter	Units	Tully Sugar Mill	Bingil Bay
Station number		032042	32009
Rainfall record		1956-present	1925-present
Distance from project area centroid	km	3 km NE	24.5 km NE
Mean rainfall	mm/year	3,921	3,127
10th percentile rainfall	mm/year	2,881	2,339
Median rainfall	mm/year	3,825	3,002
90th percentile rainfall	mm/year	5,103	4,225
Maximum rainfall	mm/year	6,211	5,165

Figure 3-5 shows the mean monthly rainfall and pan-evaporation derived from the SILO point data for the Tully gauging station. Mean annual rainfall and evaporation at Tully are 3,921 mm and 1,833 mm, respectively. The wet season tends to occur from December - May, with lesser rainfall throughout the remainder of the year.

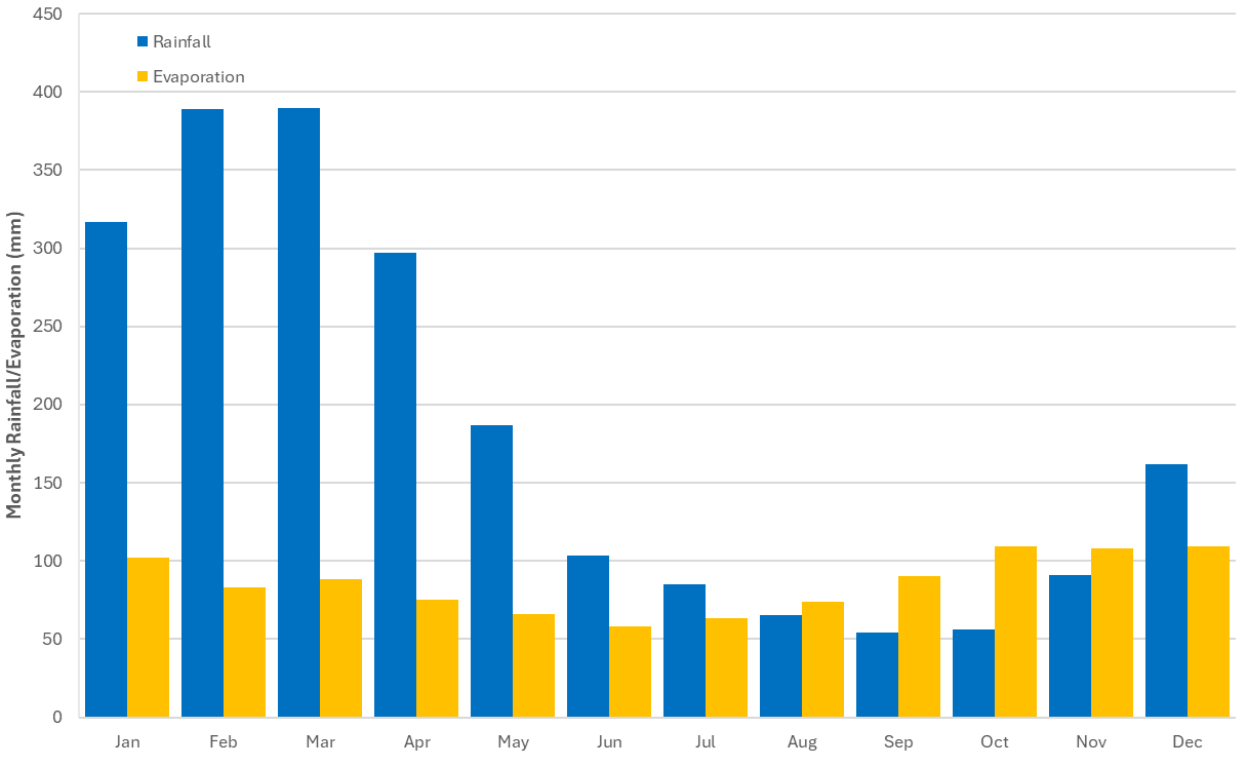

Figure 3-5 Mean Monthly Rainfall and Evaporation at Tully Sugar Mill (032042)

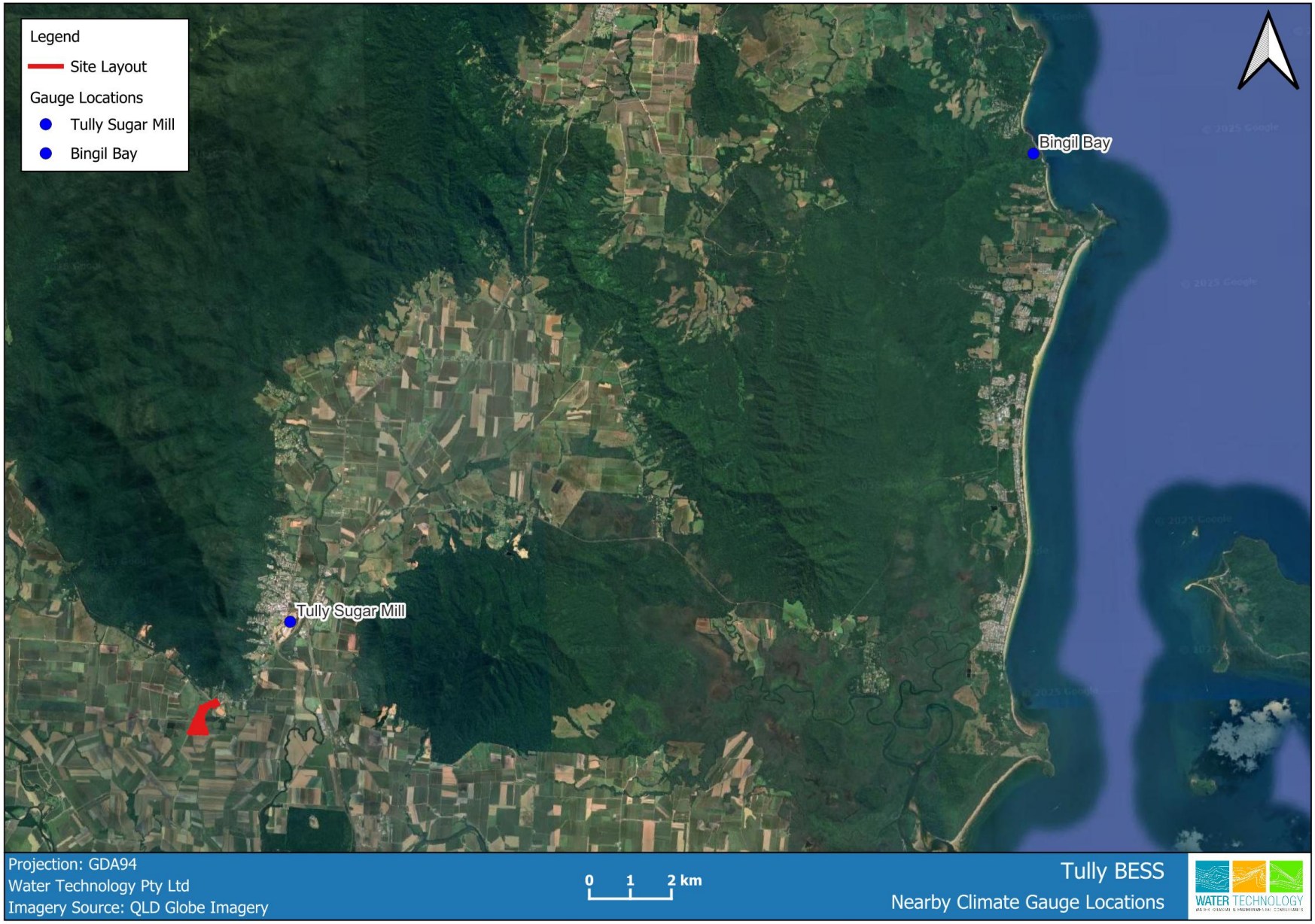

Figure 3-6 Gauge Locations

3.5 Soils

Soil data at a scale of 1:50,000 was accessed via Queensland Globe as illustrated in Figure 3-7. The Hewitt soil series dominates the site and typically comprises poorly drained soils formed on alluvial deposits, which may influence infiltration capacity and foundation design.

A portion of the site is mapped as MSC (Miscellaneous Soils Complex), a classification used for areas where detailed soil assessment is limited or where heterogeneous soil conditions occur. This designation indicates that site-specific geotechnical investigations will be important to confirm soil properties for earthworks and stormwater management design.

3.6 Geomorphology

A high-level desktop geomorphic assessment was undertaken to characterise the waterways assessed in this Study Area. The Study Area is located on the floodplain of the Tully River, at the southern foothills of Tully Gorge National Park. The geology of the area consists of alluvium materials underlain by granites. The area receives high rainfall and high intensity rainfall often leads to the River overtopping its bank and inundating the floodplains. Flat topography, regular inundation of the floodplain and poor infiltration of granitic geologies supported the development of extensive wetlands in the area historically.

To support the development of agriculture on the alluvial floodplains, many of these wetlands were drained and infilled. Channels were also constructed to divert flows. Consequently, most of the waterways in the Study Area are artificial or highly modified channels of Stream Order 1 and 2. The construction of this extensive channel network has greatly increased the drainage density of the landscape. Many of these drains have been constructed as straight channels, resulting in an increase in the efficiency of flow and sediment transfer downstream. The increase in flow rate also increases the risk of channel bank and/or bed erosion.

Extensive clearing of vegetation from the floodplain also contributed to the increased rate and volume of run-off. This further reduced the resilience of channel banks and bed. While lower order streams such as those bordering the Study Area are less likely to be affected by the cumulative effects of these erosive processes, localised disturbances may trigger changes such as channel deepening or widening.

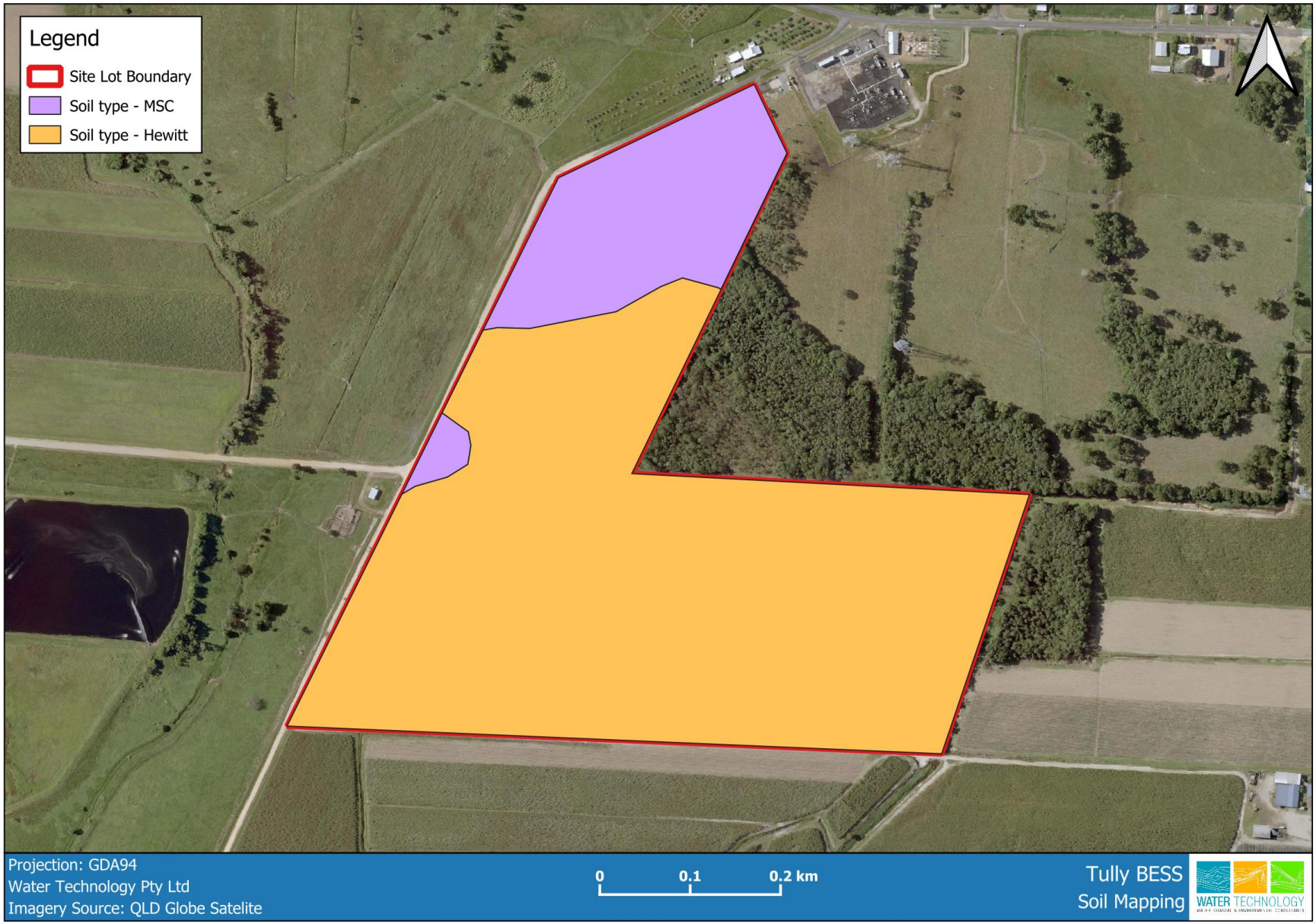

Figure 3-7 Site Soil Mapping

4 SURFACE WATER QUALITY

4.1 Environmental Values

The Environmental Protection (Water and Wetland Biodiversity) Policy 2019, which is subordinate legislation to the Environmental Protection Act 1994, provides a framework for identifying environmental values (EV) for a waterway and deciding water quality objectives (WQO) to protect or enhance those EV's. EV's for water are the qualities of water that make it suitable for supporting aquatic ecosystems and human water uses. These EVs need to be protected from the effects of habitat alteration, waste releases, contaminated runoff and changed flow to ensure healthy aquatic ecosystems and waterways that are safe for community use.

The site is located in Tully River (WQ1131 – Tully River, Murray River and Hinchinbrook Island Basins) and is mapped in the Environmental Protection (Water) Policy 2009, Wet Tropics Map Series. The site is located within the Tully River lowland fresh waters environmental value zone. The EVs specified for protection are as follows:

- Aquatic Ecosystems
- Irrigation
- Farm Supply
- Stock Water
- Human consumer
- Primary Recreation
- Secondary Recreation
- Visual Recreation
- Drinking Water
- Industrial Use
- Cultural and Spiritual Values

4.2 Water Quality Objectives

Water Quality Objectives are intended to protect the EV's of receiving waters and as such set out parameters for biological, chemical and other measures to be met in the receiving waters. The site is located in the Tully River lowland freshwaters and a management intent of 'moderately disturbed for the protection of aquatic ecosystems. Water quality should be maintained or improved in line with the WQOs. The relevant aquatic ecosystem WQOs for the Tully River catchment waters are outlined in Table 4-1 to Table 4-4.

The management of riparian vegetation related to WQOs shall be conducted with reference to regional vegetation management codes under the Vegetation Management Act 1999. This is aimed at maintaining water quality, bank stability and aquatic a terrestrial habitat. Clearing control varies according to stream order.

Table 4-1 Water quality objectives for nutrients and suspended soils to protect aquatic ecosystems EVs during high flow periods- 50th percentile

Parameter	Value*
Ammonia N	8 µg/L
Oxidised N	66 µg/L
Particulate N	153 µg/L
Dissolved organic nitrogen	106 µg/L
Total nitrogen	370 µg/L
Filterable reactive phosphorous	3 µg/L
Particulate P	10 µg/L
Dissolved organic phosphorous	5 µg/L
Total phosphorus	20 µg/L
Total suspended solids	20 mg/L

*High flow WQOs are based on measured data from high flow periods at a reference site on the Tully River in Tully Gorge National Park (gauging station 113015A).

Table 4-2 Water quality objectives for specific pesticides and biocides to protect aquatic ecosystem EVs for moderately disturbed developed fresh water

Parameter	Value
Atrazine	13 µg/l
Chlor-pyrifos	0.01 µg/l
Endo-sulfan	0.03 µg/l
Simazine	3.2 µg/l
Hexa-zinone	75 µg/l
2,4-D	280 µg/l
Tebu-thiuron	2.2 µg/l
Diazinon	0.01 µg/l

Table 4-3 Water quality objectives for ions, metals and chemical indicators in surface waters for general data across the Wet Tropics- 50th percentile

Parameter	Value
Na	7 mg/l
Ca	3 mg/l
Mg	2 mg/l
HCO3	25 mg/l
Cl	9 mg/l
SO4	1 mg/l
EC	72 mg/l
Hardness	17 mg/l
Alkalinity	20 mg/l
SAR	0.70

Table 4-4 Water quality objectives to protect human use environmental values (Source: DES 2020)

Environmental Value	Water quality objectives to protect EV
Suitability for drinking water supply	Local WQOs for drinking water supply are provided in Table 4 of DES (2020). Note: For water quality after treatment or at point of use refer to legislation and guidelines, including: ■ Public Health Act 2005 and Regulations ■ Water Supply (Safety and Reliability) Act 2008, including any approved drinking water management plan under the Act ■ Australian Drinking Water Guidelines.
Protection of the human consumer	Objectives as per AWQG and Australia New Zealand Food Standards Code, Food Standards Australia New Zealand, 2007 and updates.
Protection of cultural and spiritual values	Protect or restore indigenous and non-indigenous cultural heritage consistent with relevant policies and plans.
Suitability for industrial use	No WQOs are provided in this scheduling document for industrial uses. Water quality requirements for industry vary within and between industries. The AWQG do not provide guidelines to protect industries and indicate that industrial water quality requirements need to be considered on a case-by-case basis. This EV is usually protected by other values, such as the aquatic ecosystem EV.
Suitability for irrigation	ANZECC objectives for pathogens and metals are provided in Tables 8 and 9 of DES 2020. For other indicators, such as salinity, sodicity and herbicides, see AWQG.
Suitability for stock watering	Objectives as per AWQG, including median faecal coliforms <100 organisms per 100 mL. WQOs for total dissolved solids and metals are provided in Tables 10 and 11 of DES 2020, based on AWQG. For other objectives, such as cyanobacteria and pathogens, see AWQG.
Suitability for farm supply/use	Objectives as per AWQG.

Suitability for primary contact recreation	Objectives as per NHMRC (2008), including:
	■ water free of physical (floating and submerged) hazards
	■ temperature range: 16–34°C
	■ pH range: 6.5–8.5
	■ DO: >80%
	■ faecal contamination: designated recreational waters are protected against direct contamination with fresh faecal material, particularly of human or domesticated animal origin. Two principal components are required for assessing faecal contamination:
	  ■ assessment of evidence for the likely influence of faecal material.
	  ■ counts of suitable faecal indicator bacteria (usually enterococci).
	  ■ These two components are combined to produce an overall microbial classification of the recreational water body
	■ intestinal enterococci: 95th percentile ≤ 40 organisms per 100mL (for healthy adults) (NHMRC, 2008; Table 5.7).

Environmental Value	Water quality objectives to protect EV
Suitability for primary contact recreation	■ direct contact with venomous or dangerous aquatic organisms should be avoided. Recreational water bodies should be reasonably free of, or protected from, venomous organisms ■ waters contaminated with chemicals that are either toxic or irritating to the skin or mucous membranes are unsuitable for recreational purposes. ■ cyanobacteria/algae: Recreational water bodies should not contain: ■ Level 1: ≥ 10 µg/L total microcystins; or ≥ 50 000 cells/mL toxic Microcystis aeruginosa; or biovolume equivalent of ≥ 4 mm3 /L for the combined total of all cyanobacteria where a known toxin producer is dominant in the total biovolume; or ■ Level 2: ≥ 10 mm3 /L for total biovolume of all cyanobacterial material where known toxins are not present; OR cyanobacterial scums consistently present. Further details are contained in NHMRC (2008) and Table 12 of DES 2020.
Suitability for secondary contact recreation	Objectives as per NHMRC (2008), including: ■ intestinal enterococci: 95th percentile ≤ 40 organisms per 100 mL (for healthy adults) (NHMRC, 2008; Table 5.7). ■ cyanobacteria/algae—refer objectives for primary recreation, NHMRC (2008) and Table 12 of DES 2020.
Suitability for visual recreation	Objectives as per NHMRC (2008), including: ■ Recreational water bodies should be aesthetically acceptable to recreational users. The water should be free from visible materials that may settle to form objectionable deposits; floating debris, oil, scum and other matter; substances producing objectionable colour, odour, taste or turbidity; and substances and conditions that produce undesirable aquatic life. ■ cyanobacteria/algae—refer objectives for primary recreation, NHMRC (2008) and Table 12 of DES 2020.

5 STORMWATER MANAGEMENT PLAN

5.1 Construction Phase

5.1.1 Overview

Management of water quality during the construction phase is necessary to minimise environmental harm to downstream receiving waters. The following section provides a brief outline of the construction phase stormwater management requirements for the proposed development. Construction phase water quality management approaches are highly-site specific. Therefore, the management approach will be refined as more details of the construction timeline are known.

5.1.2 Construction Water Quality Management

Construction phase stormwater quality management will occur in accordance with current industry standards including the requirements of the *State Planning Policy (SPP)* and *Best Practice Erosion and Sediment Control (International Erosion Control Association (IECA) 2008)*. The main tenets of construction phase water quality management are contained in Table 5-1Table 5-1. These have been adapted from the SPP and a general management approach has been nominated for each issue. Further details of the management approach will be determined in the erosion and sediment control plan (ESCP) developed for the site by a suitably qualified person.

Table 5-1 Stormwater Management Actions (Construction Phase)

Issue	Management Actions
Drainage control	▪ Design storm and design life for temporary works: – Disturbed area open for <12 months – 1 in 2-year ARI event – Disturbed area open for 12-24 months – 1 in 5-year ARI event – Disturbed area open for >24 months – 1 in 10-year ARI event ▪ Design capacity excludes minimum 150 mm freeboard. ▪ Temporary culvert crossing – minimum 1 in 1-year ARI hydraulic capacity. ▪ Manage sheet flow to minimise gully and rill erosion. ▪ Temporary drainage to provide stable concentrated flow paths, catch drains and flow diversions where necessary. ▪ The disturbed area is anticipated to be greater than 2,500 m², therefore, a sediment basin will likely be required to manage sediment run-off and regulate flows. ▪ Temporary sediment basin/s to be constructed in accordance with the *Best Practice Erosion and Sediment Control Guideline (IECA 2008).*
Erosion control	▪ Stage clearing and construction activities to minimise exposed soil. ▪ Progressive stabilisation is to be undertaken in accordance with IECA 2008 Table 4-2 and nominated groundcover percentages achieved prior to the removal of control devices.
Sediment control	▪ Implement sediment controls such as sediment traps, silt fences, channel linings and check dams in accordance with construction ESCPs. ▪ Sediment traps are to be designed and positioned by a suitably qualified person to achieve site discharge water quality objectives.
Flow management	▪ Earthworks and the implementation of erosion and sediment controls are undertaken in ways which ensure flooding characteristics are not worsened.

5.2 Operational Phase

An assessment of stormwater quality at the site, including Water Sensitive Urban Design (WSUD) measures adopted to mitigate impacts to the quality of stormwater runoff from the developed site, has been undertaken using the Model for Urban Stormwater Conceptualisation (MUSIC).

The following section documents the conceptual sizing of a treatment train, consisting of a bioretention basin and vegetated swale, to inform site layout and civil design. These WSUD measures are proposed for the operational phase of the development and are, therefore, long-term water quality management measures following the post-construction phase of the proposed development. Potential pollutants from this development are listed in Table 5-2 below.

Table 5-2 Potential Pollutants from Site (Post-Construction Phase)

Pollutant Type	Pollutant sources
Sediment	Sediment brought in by vehicles, erosion, atmospheric deposition, organic matter, spills and accidents.
Nutrients	Fertiliser, decaying organic matter, animal faeces, detergents, atmospheric deposition.
Gross Pollutants	Litter such as food, drink and materials packaging and wrappers, leaf matter and grass clippings.
Hydrocarbons	Fuel and oil spills from cars and trucks, asphalt pavements.

5.3 MUSIC Model Schematisation

Water quality modelling of the proposed development has been undertaken using the Model for Urban Stormwater Conceptualisation (MUSIC). The MUSIC model allows the user to estimate the pollutant loads generated within and exported from the proposed BESS area within the site and quantify the relative effectiveness of the proposed stormwater quality treatment train. MUSIC provides quantitative modelling for Total Suspended Solids (TSS), Total Phosphorous (TP), Total Nitrogen (TN), and Gross Pollutants (GP).

The MUSIC model was set up in accordance with the *Water by Design MUSIC Modelling Guidelines (2018)* (WBD, 2018) which has been published under the Water by Design Program by the South-East Queensland Healthy Waterways Partnership. In addition, Healthy Waterways recommends using the latest version, MUSIC 6 to ensure compliance with stormwater pollutant load reduction objectives.

5.3.1 Catchment Areas

The proposed BESS layout was used to estimate sub-catchment areas for input to the MUSIC model, following a split catchment land use approach to modelling pollutant loads from the proposed development footprint within the site. Five land use areas were delineated for the post-development scenario, whilst a single land use was used to represent the pre-development scenario. The catchment areas adopted in the MUSIC modelling are shown on Figure 5-1. The sub catchment split is shown in Figure 5-2, and summarised in Table 5-3.

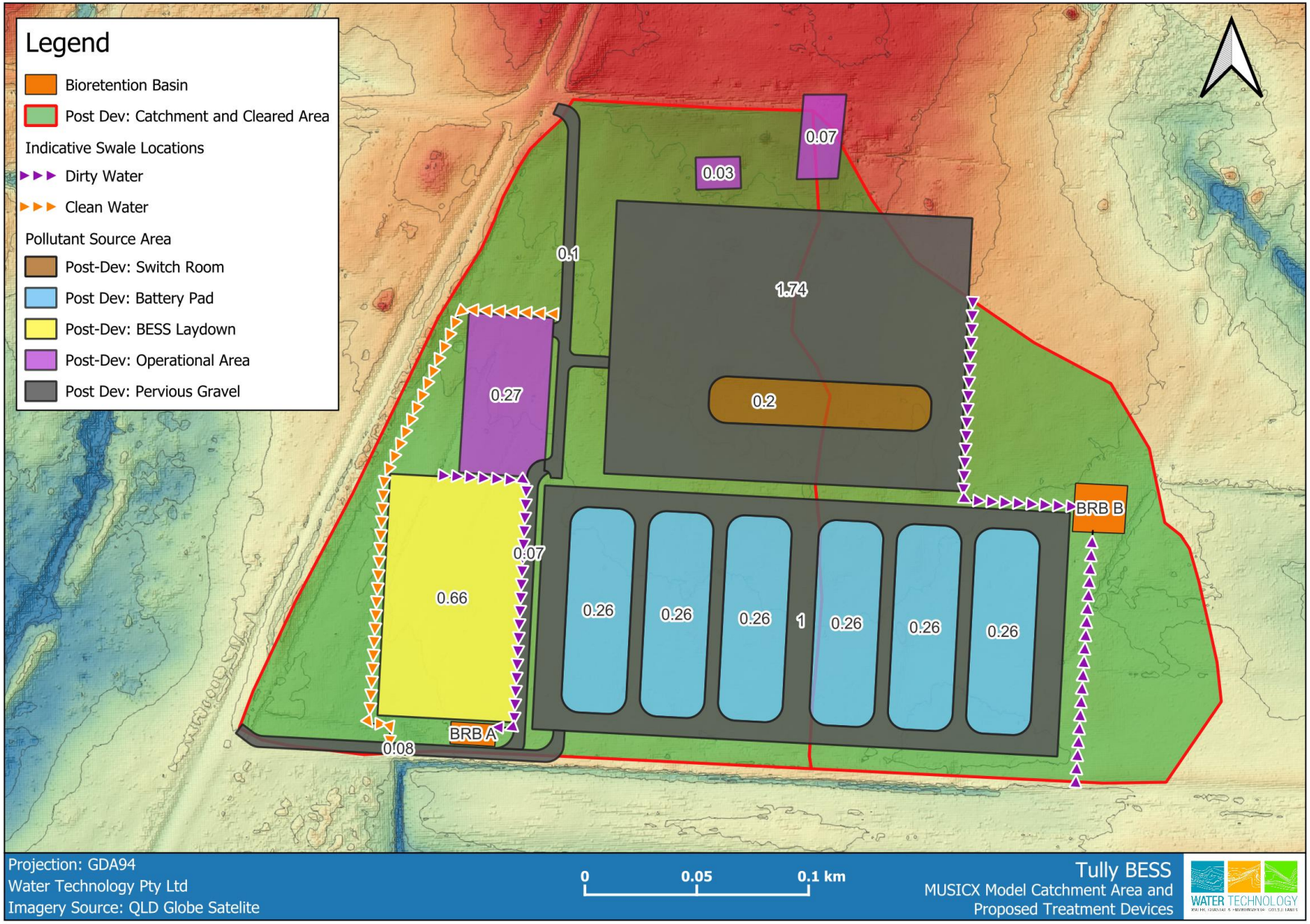

Figure 5-1 MUSICX Model Catchment Area Breakdown

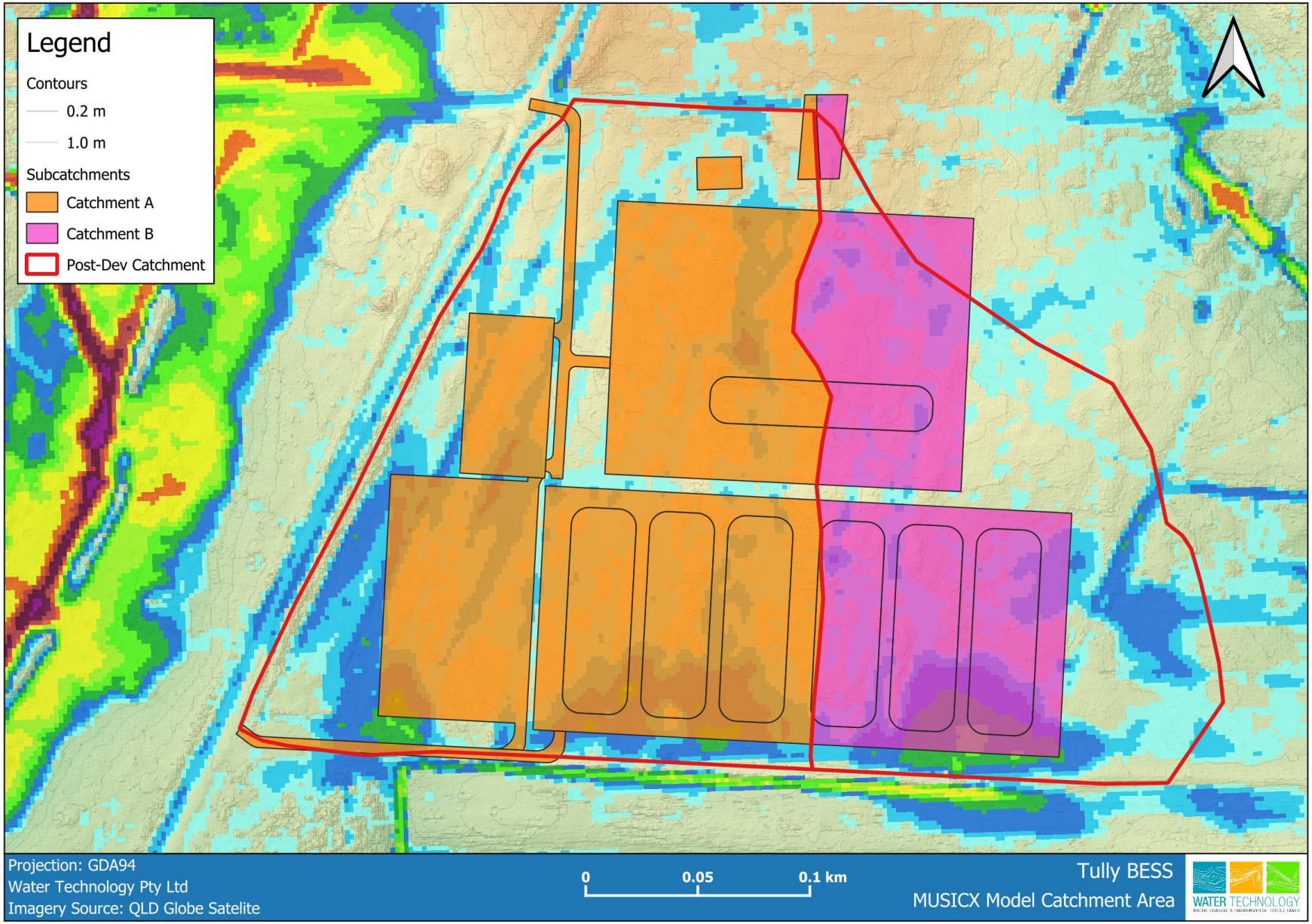

Figure 5-2 MUSICX Model Sub-catchment Areas

Table 5-3 Modelled BESS Sub-catchment Breakdown

Catchment	Total Area (ha)	Fraction Impervious (%)	MUSIC Model Landuse Type
Pre-developed Case Catchment A			
Existing	5.60	0	Rural residential
Post-Developed Catchment A			
Pervious Gravel	1.81	20%	Rural residential
Operational Area	0.33	95%	Rural residential
Battery Pad	0.79	95%	Rural residential
Switch Room	0.11	95%	Rural residential
Open Grass	1.85	0%	Rural residential
BESS Laydown	0.66	95%	Rural residential
Bioretention Basin	0.05	-	Rural residential
Total	**5.60**	**67%**	**n/a**
Pre-developed Case Catchment B			
Existing	3.50	0	Rural residential
Post-Developed Catchment AB			
Pervious Gravel	1.18	20%	Rural residential
Operational Area	0.04	95%	Rural residential
Battery Pad	0.77	95%	Rural residential
Switch Room	0.09	95%	Rural residential
Open Grass	1.40	0%	Rural residential
Bioretention Basin	0.02	-	Rural residential
Total	**3.50**	**61%**	**n/a**

5.3.2 Rainfall Runoff Parameters

WBD (2018) does not include any region-specific rainfall runoff parameters. However, the values recommended for southeast Queensland have been adopted for this study as they are the closest region with available data (see Table 5-4).

Table 5-4 Rainfall Runoff Parameters Adopted in MUSIC Modelling

Parameter	Rural Residential
Rainfall threshold (mm)	1
Soil storage capacity (mm)	98
Initial storage (% capacity)	10
Field capacity (mm)	80
Infiltration capacity coefficient a	84
Infiltration capacity coefficient b	3.3
Initial depth (mm)	50
Daily recharge rate (%)	100
Daily baseflow rate (%)	22
Daily deep seepage rate (%)	0

5.3.3 Pollutant Export Parameters

In the absence of any site-specific water quality or pollutant data, and in keeping with industry best practice the modelling adopted pollutant load export parameters from WBD (2018). The landuse types adopted in the model for the various site areas are displayed in Table 5-3 and the pollutant export parameters for each land use type are provided in Table 5-5.

Table 5-5 Pollutant export parameters

Landuse	Flow Type	TSS log^{10} values		TP log^{10} values		TN log^{10} values	
		Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
Rural Residential	Baseflow Parameters	0.53	0.24	-1.54	0.38	-0.52	0.39
	Stormflow parameters	2.26	0.51	-0.56	0.28	0.32	0.30

5.3.4 Rainfall and Evapotranspiration Data

As per the recommendations in WBD (2018), climate datasets were adopted from MUSIC's included data, with rainfall data sourced from the Tully Sugar Mill Radar 6-minute gauge, and monthly average areal potential evapotranspiration (PET) taken for the Tully Sugar Mill SILO dataset.

Rainfall, in the form of a 6-minute pluviometer data, was available from November 1972 to May 2010. From this, a ten-year period from 1 June 1999 to 31 May 2009 was selected for modelling purposes. The mean annual rainfall for the selected MUSICX dataset is 3,782 mm.

5.3.5 Treatment Nodes

The site has been split into two sub-catchments for the purposes of treating and directing clean and dirty water run-off. It is proposed to treat run off from the developed site and surrounding post-development catchment using grassed swales which channel flow into two (2) bioretention basins (BRB) located in each sub-catchment. BRB A will be located along the southern boundary of Subcatchment A and adjacent to the BESS laydown area at the down-slope end of the site. BRB B will be located to the east of Subcatchment B, adjacent to the right corner of battery pad laydown. The MUSIC model schematisation is shown below in Figure 5-3. The modelling considered a range of BRB sizes to determine the most suitable options within respect to achieving the required load reduction targets. The adopted model parameters for the proposed treatment devices is shown in Table 5-6 and Table 5-7. Indicative locations of the proposed treatment devices are shown in Figure 5-1.

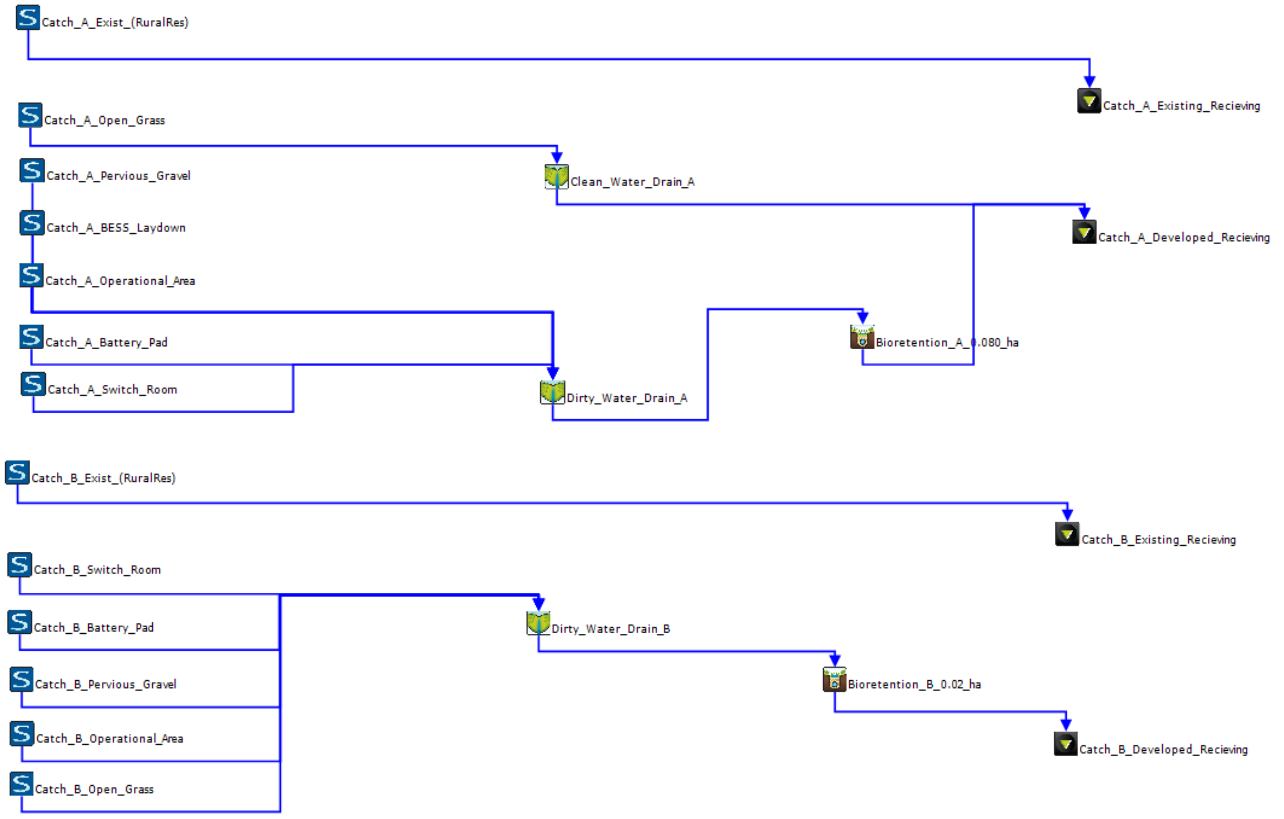

Figure 5-3 MUSIC Model Schematisation

Table 5-6 MUSIC Swale Properties

Parameter	Clean Water A	Dirt Water A	Dirty Water B
Low Flow By-pass (m^3/s)	0	0	0
Length (m)	235	150	260
Bed Slope %	1	1	1
Base Width (m)	3	3	3
Top Width (m)	4	4	4
Depth (m)	0.5	0.5	0.5
Vegetation Height (m)	0.25	0.25	0.25

Table 5-7 MUSIC Bioretention Basin Properties

Parameter	Bioretention Basin A Properties	Bioretention Basin B Properties
Low Flow By-pass (m³/s)	0	0
High Flow By-pass (m³/s)	1.5	1.5
Surface Area (m²)	800	200
Extended Detention Depth (m)	0.30	0.30
Filter Area (m²)	800	200
Unlined Filter Media Perimeter (m)	89	56
Filter Depth (m)	0.50	0.50
Saturated Hydraulic Conductivity (mm/hr)	200	200
TN Content of Filter Media (mg/kg)	400	400
Orthophosphate Content of Filter Media (mg/kg)	30	30

5.4 MUSIC Results and Discussion

Pollutant load reduction targets for the Tully Catchment have been set by the Great Barrier Reef Discharge Standards as described in the Reef 2050 Water Quality Improvement Plan (WQIP) 2017-2022 (State of Queensland, 2018). The relevant load reduction targets were described in Section 2.7. The performance of the proposed water quality treatment train must be compared to the pre-developed condition of the site, as required by the Reef WQIP's stipulation of achieving reductions compared to the 2013 baseline.

The results for BRB A, which are summarised in Table 5-8 show that the pollutant load reduction targets are met for all pollutants using a treatment train with a BRB with a filter area of 800 m² and one (1) vegetated swale of at least 150 m long. The clean water vegetated swale is 235 m long and diverts clean water along the western boundary of the development, offsite into a preexisting water way suitable for discharge.

Table 5-8 MUSIC Model Results Bioretention Basin A

Parameter	Pre-Developed Source Load (kg/yr)[1]	Developed Source Load (kg/yr)	Residual Load (kg/yr)	Required Load Reduction	Pollutant Reduction from developed source	Pollutant Reduction from pre-developed source	Target Achieved from pre-developed source
Total Suspended Solids (TSS)	46,705	60,330	993	*20%*	98%	98%	**YES**
Total Phosphorus (TP)	45	56	9	*20%*	84%	81%	**YES**
Total Nitrogen (TN)	312	428	154	*Nil*	64%	51%	*Nil*
Particulate Nitrogen (PN)[2]	94	128	46	*20%*	64%	51%	**YES**
Dissolved Inorganic Nitrogen (DIN)[3]	218	299	108	*50%*	64%	51%	**YES**
Gross Pollutants (GP)	0	1,285	0	*Nil*	100%	100%	*Nil*

[2] Particulate Nitrogen is calculated as 30% of TN
[3] Dissolved Inorganic Nitrogen (DIN) is calculated as 70% of TN

The results for BRB B, which are summarised in Table 5-9 show that the pollutant load reduction targets are met for all pollutants using a treatment train with a BRB filter area of 200 m² and two (2) vegetated swales with a combined length of at least 260 m.

Table 5-9 MUSIC Model Results Bioretention Basin B

Parameter	Pre-Developed Source Load (kg/yr)[1]	Developed Source Load (kg/yr)	Residual Load (kg/yr)	Required Load Reduction	Pollutant Reduction from developed source	Pollutant Reduction from pre-developed source	Target Achieved from pre-developed source
Total Suspended Solids (TSS)	27,614	35,005	730	*20%*	98%	97%	**YES**
Total Phosphorus (TP)	26	34	6	*20%*	84%	79%	**YES**
Total Nitrogen (TN)	212	257	106	*Nil*	59%	50%	*Nil*
Particulate Nitrogen (PN)[4]	64	77	32	*20%*	59%	50%	**YES**
Dissolved Inorganic Nitrogen (DIN)[5]	149	180	74	*50%*	59%	50%	**YES**
Gross Pollutants (GP)	0	651	0	*Nil*	100%	100%	*Nil*

5.4.1 Hazardous Materials

The introduction of contaminants to the project area for the construction, maintenance, operation and decommissioning of the project infrastructure poses a risk of these contaminants ending up in the receiving environment. Local storage of chemicals and fuels within the project area will increase this risk along with concrete batching and associated materials. Therefore, relevant guidelines and standards governing the storage and use of hazardous materials and waste removal will be followed to reduce this risk. Appropriate measures will be incorporated in the Final SMP, Construction Management Plan and Emergency Response Plan, which will be prepared in accordance with relevant conditions of the development approval.

5.4.2 Water Supply

5.4.2.1 Construction Phase

Water will be required during the construction phase for:

- Construction works
- Dust suppression
- Vegetation establishment

During the construction phase, water will be transported to the site by water tankers and stored appropriately at the site where required. Potable water will be supplied by contractors for their workforce during construction.

[4] Particulate Nitrogen is calculated as 30% of TN
[5] Dissolved Inorganic Nitrogen (DIN) is calculated as 70% of TN

5.4.2.2 Operational Phase

During the operational phase of the project there will be minimal demand for water. Potable water required by site personnel will be supplied by individuals as required. Any non-potable water requirements like short term dust suppression, cleaning or maintenance of vegetation will be transported to the site by water tankers as required. On-site water storage tanks will also be used to store water for firefighting.

5.5 Stormwater Quality Summary

An assessment of the proposed development has identified potential impacts on the environmental values of the surface waters in the receiving environment. However, these risks can be managed through proper design and the implementation of appropriate mitigation measures during the construction and operation of the BESS. The following provides details of the proposed mitigation measures.

5.5.1 Construction Phase

Any disturbance that involves the clearing of vegetation or earthworks should be carefully considered to ensure the project does not result in increased sediment loads and associated pollutants from entering the downstream receiving environment.

Construction of the proposed BESS represents the highest risk of erosion as there will be active disturbance occurring during this phase including earthworks. However, the construction period will be relatively short compared to the life of the project with construction expected to be completed within 18 months. All construction works should be completed in association with a detailed construction phase ESCP.

Once construction is complete, the risk of erosion will be greatly reduced as there will be no ongoing disturbance of soils. Further it is expected that disturbed areas not required for operations (including cut and fill batter slopes) will be revegetated.

5.5.2 Operational Phase

The surface water assessment showed that the proposed development has the potential to increase the quantity of pollutants discharging to the receiving environment. The MUSIC modelling outcomes demonstrate that the proposed BRB's and vegetated swales will benefit the receiving environment through pollutant load reduction and thus comply with the objectives of the Reef 2050 Water Quality Improvement Plan.

Appropriate measures for the safe handling and storage of chemicals and hazardous materials at the project site during the construction and operational phases should be included in the Final Stormwater Management Plan, Construction Management Plan and/or Emergency Response Plan as required.

5.5.3 Compliance note — State Code 9

The following address compliance with the requirements of PO3 to PO5 of State Code 9 Great Barrier Reef wetland protection areas:

- **PO3** (Hydrology) — Maintain or improve existing surface and groundwater hydrology in the wetland protection area.
  - The layout avoids deep cuts and does not involve significant excavation, limiting disruption to natural grades and subsoil profiles that control shallow groundwater flows and interflow. Catchment areas to each release point will also be maintained. This reduces the risk of altering the site's pre-development water balance and baseflow pathways.
  - Where practicable, external areas will use pervious finishes (e.g., gravel and grassed/vegetated surfaces) to reduce runoff volume and promote infiltration, consistent with WSUD source-control principles to maintain more natural flow pathways.

- Vegetated swales will safely convey frequent flows at shallow depth/velocity and provide pre-treatment, then discharge to bioretention basins sized and modelled as part of the stormwater treatment train in Section 5.3 and Section 5.4. Bioretention systems filter runoff through vegetated media then exfiltrate to surrounding soils and discharge via underdrainage pipes, supporting maintenance of the local water balance.
- Collectively, these measures temper frequent-flow peaks/velocities, reduce runoff volumes, and sustain shallow recharge/baseflow contributions, helping to maintain the pre-development hydrologic regime within the mapped Wetland Protection Area. This approach aligns with WSUD hydrologic intent and Queensland stormwater policy objectives for post-development management.

- **PO4** (Water quality) — No unacceptable impact on wetland/buffer water quality.
  - The stormwater strategy adopts WSUD treatment trains (including vegetated swales and bioretention) designed to achieve the Great Barrier Reef Discharge Standards as described in the Reef 2050 Water Quality Improvement Plan, with compliance demonstrated via MUSIC modelling. MUSIC modelling results presented in Section 5.4, show that the proposed water quality treatment infrastructure will result in a net improvement in the quality of water discharging from the site.
  - During construction, an Erosion and Sediment Control (ESC) plan will be developed and implemented minimising sediment export.
  - Infiltration measures will include adequate pre-treatment (e.g. vegetated swales) to avoid clogging and to protect groundwater quality.
  - Together, these measures reduce pollutant loads at the boundary and avoid unacceptable water-quality impacts to any downstream wetlands or buffers.
- **PO5** (Wetlands not used for stormwater treatment).
  - All stormwater treatment devices are sited outside mapped wetlands and their buffers; wetlands are not used for detention, polishing, or conveyance as part of the treatment train. Discharges will be released to constructed conveyance or upland areas with energy dissipation prior to any natural features, ensuring wetlands are not utilised for stormwater treatment, consistent with the Code.

6 FLOOD ASSESSMENT

6.1 Overview

The proposed site is partially inundated during regional flood events within the Tully River catchment. Additionally, multiple defined watercourses traverse the site, requiring a detailed assessment of existing flood constraints.

To support the local flood assessment for the development, a rain-on-grid hydraulic model has been developed using TUFLOW. The model is configured to simulate direct rainfall-runoff interactions across the terrain and incorporates hydrodynamic processes to assess flood behaviour. The hydrologic analysis was conducted in accordance with Australian Rainfall and Runoff 2019 (ARR2019) guidelines, utilising the TUFLOW ARR tool. Key design rainfall parameters include:

- Design Rainfall Data sourced from ARR2019 and BOM 2016 IFD, incorporating all ten (10) ARR2019 temporal patterns to evaluate peak discharge variability.
- Rainfall losses adopted from ARR2019 Data Hub, with an Initial Loss of 43 mm and a Continuing Loss of 4.9 mm/hr.
- Design rainfall was implemented as a direct rainfall boundary in the hydraulic model, enabling a rain-on-grid approach.

In the absence of stream gauge data, estimated peak flows were validated using the Rational Method. A range of design storms including the 10%, 1%, 0.2% and 0.5% AEP events were assessed hydraulically in the TUFLOW model to quantify the local flood extent to inform the proposed development. The subsequent sections of this report provide detailed insights into the catchment modelling undertaken as part of this site-specific study.

6.1.1 Model Extent and Topography

As outlined in Section 3.1, the site is located within the Tully River Drainage Basin, a hydrologically active region of the Wet Tropics. The topography generally slopes south toward the Tully River, which plays a key role in local drainage and flood dynamics, and southeast toward Babinda Creek, a tributary of the Tully River. To the north, the terrain rises steeply beyond 100 mAHD, forming part of the mountain ranges adjacent to Mount Bartle Frere. These mountains receive high rainfall and generate significant runoff, contributing to floodplain inundation during extreme events. Major roads, including Tully Gorge Road and the proposed road network, traverse these elevated areas and may influence surface water flow and drainage patterns.

The Tully River catchment, covering approximately 1,675 km², drains primarily to the Pacific Ocean, with additional contributions from the Hull River and smaller tributaries. Given the region's high rainfall and complex topography, the site is subject to dynamic hydrodynamic processes, including floodplain inundation, overland flow, and potential backwater effects from downstream constraints. These factors will be critical in assessing site-specific flooding constraints.

6.2 Hydraulic Model Setup

The model was developed using two TUFLOW methods to accurately simulate the catchment dynamics. A rain-on-grid approach was applied to represent the catchment. To support the local flood assessment for the development, a TUFLOW hydraulic model (build 2023-01-AE) utilising the HPC (Highly Parallelized Computations) solution scheme was adopted. TUFLOW is a 1D-2D linked hydraulic model that solves the depth-averaged shallow water equations. A range of design storms including the 10%, 5%, 2%, 1%, 0.2% and 0.5% AEP events were assessed hydraulically in the TUFLOW model to quantify the local flood extent to inform the proposed development.

6.2.1 Base Case Model

The following represents a summary of the setup of the TUFLOW hydraulic model, with the hydraulic model setup illustrated in Figure 6-1.

- Detailed grid resolution of 2m to adequately reflect the topography surrounding the site.
- Model topography is based on LiDAR collected in 2014.
- Two large HQ downstream boundaries with relatively flat slope of 0.001% for the hydraulic model was positioned approximately 1km downstream of the investigation area to ensure boundary conditions did not affect the model results at the area.
- Topography modifiers were applied to the model to represent channels through Tully George Road, Sandy Creek Road and Syndicate Road at culvert locations. This approach was adopted as the culverts are non-critical structures for the investigation area. However, satellite imagery confirms their existence, indicating they were constructed to facilitate the free movement of flow.

6.2.2 Surface Roughness

Floodplain roughness was represented using a Manning's "n" roughness coefficient assigned to various land uses and spatial areas throughout the model based on aerial imagery. These are presented in Table 6-1. A depth-varying Manning's n over a building footprint has been used to realistically represent the effects of buildings on overland flow during flooding. The waterways identified as waterway barrier works under the *Fisheries Act 1994* have been adopted in the model to represent Manning's roughness for waterways, as shown in Figure 6-1.

Table 6-1 Manning's "n" roughness coefficient used in model

Land Use	Manning's "n" roughness coefficient
Grass	0.04
Medium Vegetation	0.07
Road	0.02
Watercourse	0.05
Bare Soil	0.03
Buildings	0.02 at shallow depths (< 0.03 m) 0.3 at significant depths, (> 0.1 m)

6.2.3 Catchment Hydrology

The hydrological analysis was conducted using the ARR&R (2019) Datahub and BOM 2016 IFD data. The hydrological model simulated all ten (10) temporal patterns for each duration to ensure comprehensive analysis. Rainfall hydrographs for the specific area were extracted using the ARR TUFLOW tool, enabling accurate representation of local rainfall-runoff dynamics. Key design rainfall parameters include:

- Design Rainfall Data sourced from ARR2019 and BOM 2016 IFD, incorporating all ten (10) ARR2019 temporal patterns to evaluate peak discharge variability.
- Rainfall losses adopted from ARR2019 Data Hub, with an Initial Loss of 43 mm and a Continuing Loss of 4.9 mm/hr.
- Design rainfall was implemented as a direct rainfall boundary in the hydraulic model, enabling a rain-on-grid approach.

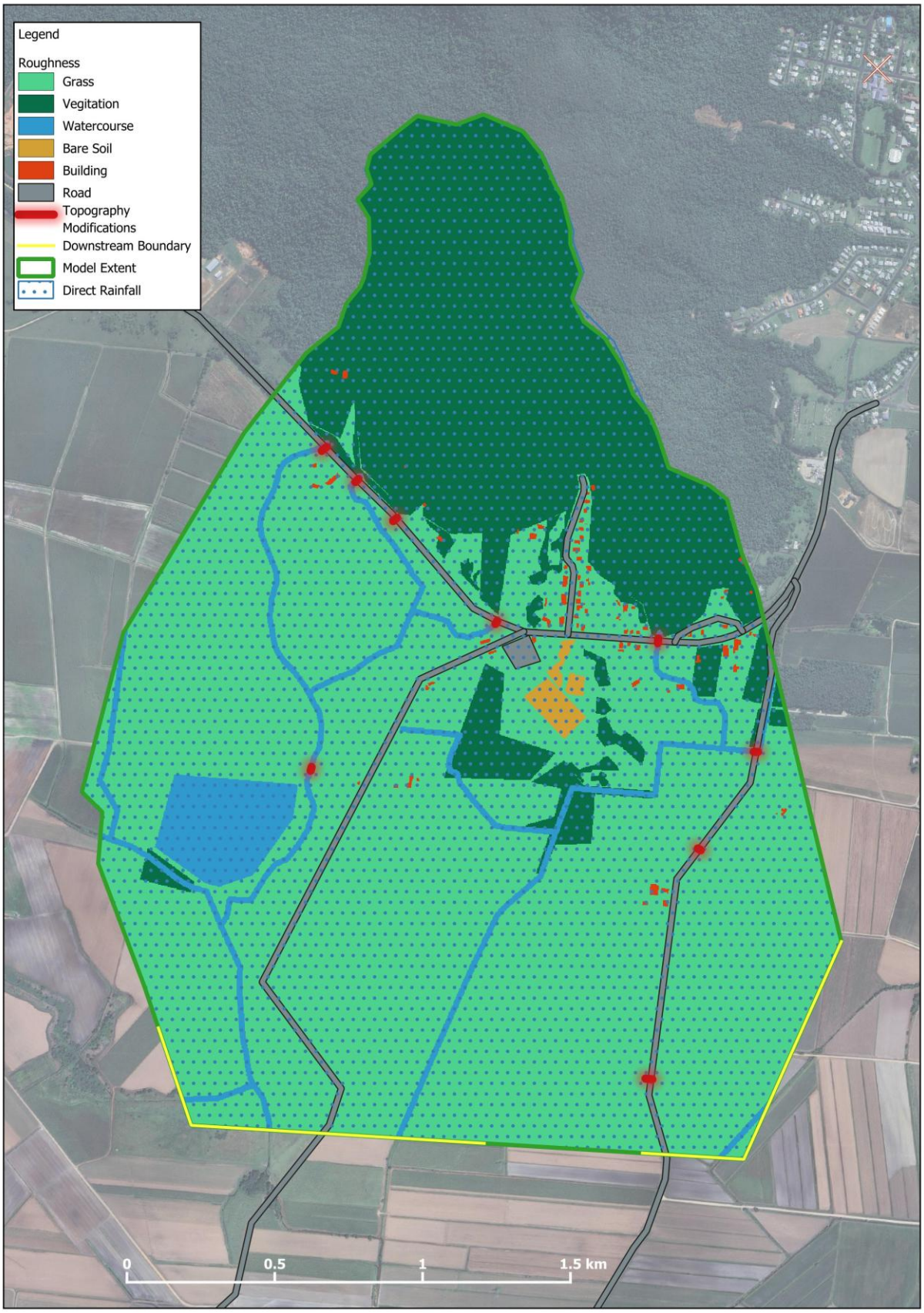

Figure 6-1 TUFLOW Model Layout

6.2.4 Validation of the Direct Rainfall Hydrology

This site-specific investigation involves an ungauged local catchment, and as such, no site-based data is available for calibrating runoff. Consequently, the TUFLOW direct rainfall modelling has been validated using the Rational Method, in accordance with the guidelines outlined in the Queensland Urban Drainage Manual (QUDM, 2008). Validation was conducted upstream of the Tully George Road before flows are impacted by the road itself, focusing on the primary drainage path to the north, which intersects the central area of the investigation area. The Rational Method parameters are summarised below and a comparison of discharges to the direct rainfall hydraulic model presented in Table 6-2.

- Stream length of 1.11 km
- Total catchment area of 33 ha.
- Fraction Imperviousness of 0.10 with medium soil permeability and dense vegetated coverage.

Table 6-2 Rational Method Comparison

Design Event	Rational Q (m^3/s)	TUFLOW Peak Flow (m^3/s)
1% AEP	8.86	7.7

The TUFLOW direct rainfall results are within 20% of the Rational Method results for the 1% AEP event. These flow comparisons are considered acceptable for the purposes of this study and accordingly the direct rainfall model was considered a reasonable representation of the investigation area hydrology.

6.3 Result Processing

For the direct rainfall modelling of the investigation area, the median grid for each duration was generated, followed by calculation of a max–max envelope in accordance with ARR2019 Guidelines. This process was applied across all flood events and all hydraulic variables, including peak water level, velocity, and depth. Within the infrastructure area of the site, the median temporal pattern analysis indicated notable variability. Critical storm durations ranged from 15–45 minutes for rare events and 30–45 minutes for more frequent events, confirming that shorter duration events generally represent the most critical scenarios for local flooding at the site.

Table 6-3 Critical Depth Durations

Scenario	Critical Duration
0.2% AEP	30-45 Minutes
0.5% AEP	30-45 Minutes
1% AEP	15-45 Minutes
2% AEP	15-45 Minutes
5% AEP	15-45 Minutes
10% AEP	15-45 Minutes

6.4 GIS Mapping

Appendix B provides the GIS mapping of the peak flood depth and velocity for the 10%, 5%, 2%, 1%. 0.5% and 0.2% AEP events. The flood inundation extents based on the TUFLOW model results for the 1% AEP event is presented in Figure 6-2. A 50mm depth cutoff has been applied to the depth mapping to filter out artifacts from the direct rainfall modelling approach.

6.5 Local Flood Assessment Results

The results of the assessment are summarised as follows:

- Overland flow approaching the site from the north (originating near Mount Tyson) is conveyed via culverts beneath Tully George Road. Downstream of the culverts, the flow diverges, with a portion directed east of the site and another portion flows west of the site toward Sandy Creek Road. Western flows are guided through natural topographic depressions, bypassing an agricultural dam located on a neighbouring lot. The water continues through agricultural land southeast of the site and ultimately discharges into the Tully River. These flows do not break out east of Sandy Creek Road and are not considered to pose a flood risk to the Subject Property.
- Flows travelling along the eastern side of the site traverse the site itself. A portion of this flow is intercepted by an irrigation channel running westward from Syndicate Road. This channel appears to break out just northeast of the proposed site, redirecting flows into a wetland area located immediately south of the developed section.
- The wetland functions as an ephemeral watercourse and is considered an ecologically significant feature in the context of the site. It receives not only redirected flow from the irrigation channel but also overland sheet flow from the north.
- The wetland system drains via the irrigation channel located east of the site. A secondary flow path branches into the site lot and discharges into a smaller additional downstream wetland area before continuing south. This path intersects with another smaller irrigation channel approximately 0.57 km south of the site, which also captures minor sheet flow from the western portion of the site.
- Flood modelling indicates the presence of shallow overland sheet flow across portions of the proposed BESS site. Flow depths are generally less than 0.15 m, with some areas of localised ponding evident along the southern boundary adjacent to the irrigation channel. These conditions are anticipated to be mitigated through site development works, including filling, grading, and re-leveling of the affected areas during construction.
    - This shallow sheet flow can be managed by appropriate site stormwater infrastructure which can be addressed during detailed design.
- Flow velocities across the proposed infrastructure areas of the site are generally low, remaining below 0.5 m/s.

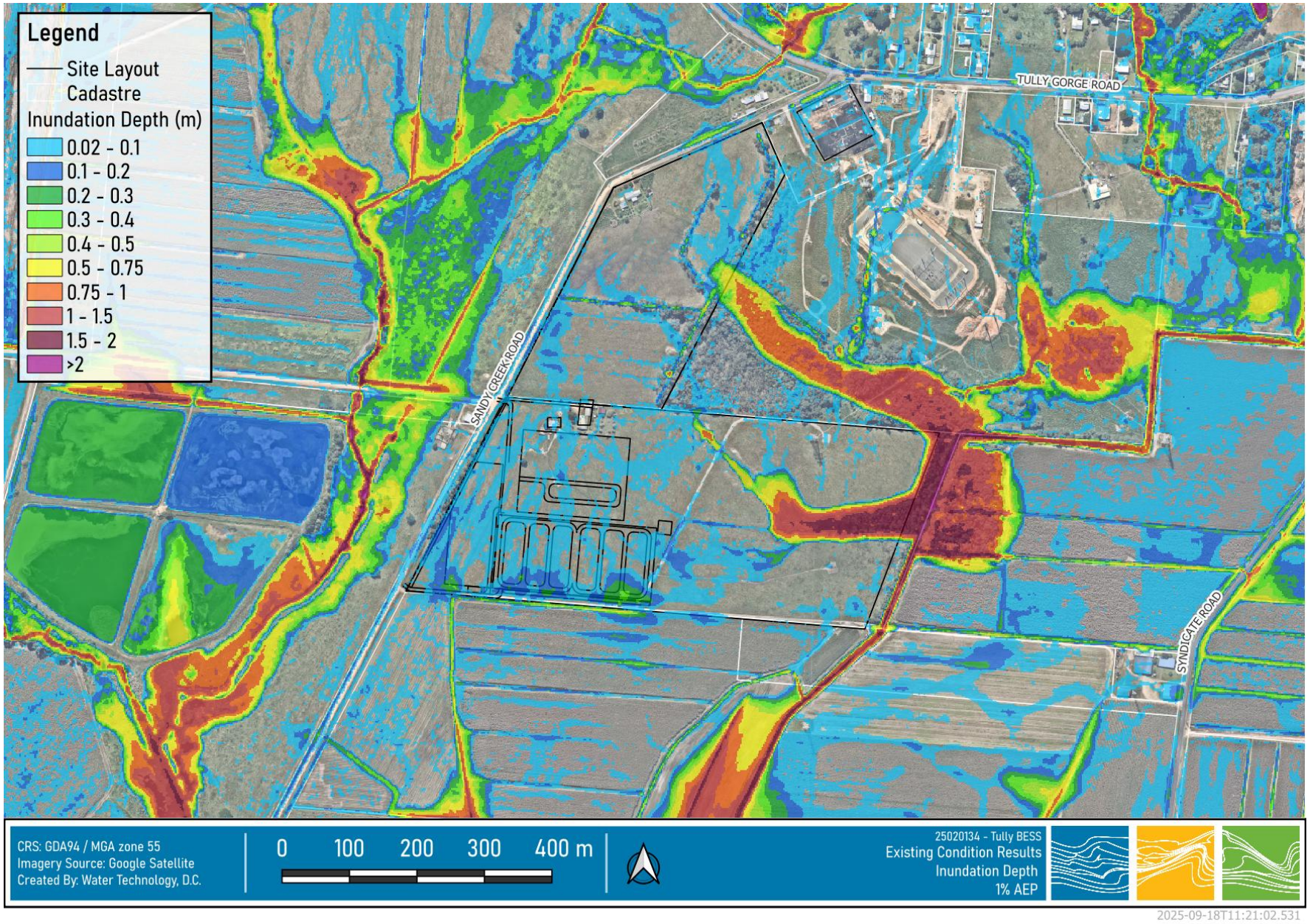

Figure 6-2 1% AEP Inundation Depth

6.6 Regional Flood Results

The regional flood model result grids were obtained from Cassowary Coast Regional Council and analysed to assess the potential impacts of regional flooding on the proposed site. The regional model is critical as it represents large-scale flood behaviour associated with the Tully River and its interaction with the site. Figure 6-4, Figure 6-5 and Figure 6-6 present the Q100 (1% AEP), Q200 (0.5% AEP), and Q500 (0.2% AEP) peak flood depths.

The results indicate that the site is only minimally affected in the 1% AEP event, with minor flood fringe inundation observed along the southern boundary. This inundation is consistent with localised pooling of water identified in the local model. Maximum flood depths in this event were recorded at 0.30 m in the southwest corner and 0.23 m in the southeast corner of the site.

Table 6-4 summarises the water levels and depths for these reference points (locations shown in Figure 6-3). It should be noted that ground levels at the reference points are approximately 11.23 m AHD at the western corner and 11.49 m AHD at the eastern corner.

More significant inundation occurs under the 0.5% AEP and 0.2% AEP events, which extend further across the site and have greater potential to impact the planned infrastructure. These peak water levels should be considered when designing earthworks levels to site sensitive infrastructure (i.e. substations) to ensure they meet local planning requirements.

Table 6-4 Regional Flood Depths at Key Reporting Locations

Event	Reporting Point	Water Level (m AHD)	Depth (m)
Q100	A	11.75	0.40
	B	11.74	0.23
Q200	A	12.16	0.81
	B	12.11	0.60
Q500	A	12.71	1.36
	B	12.63	1.12

The site is located on the outer edge of the Tully River floodplain, and only a small portion of the development footprint—approximately 5,000 m²—overlaps the 1% AEP (Q100) flood extent, representing a minor fraction of the overall site area. Within this overlap, modelled flood depths are generally less than 0.1 m, indicating shallow, low-velocity inundation.

Given the limited encroachment, minimal fill requirements, and the fact that the majority of infrastructure is located outside the Q100 extent, the proposed works are not expected to cause any measurable change to flood storage or conveyance. The shallow inundation depth combined with the absence of significant earthworks in the flood-affected zone means flood behaviour will remain effectively unchanged.

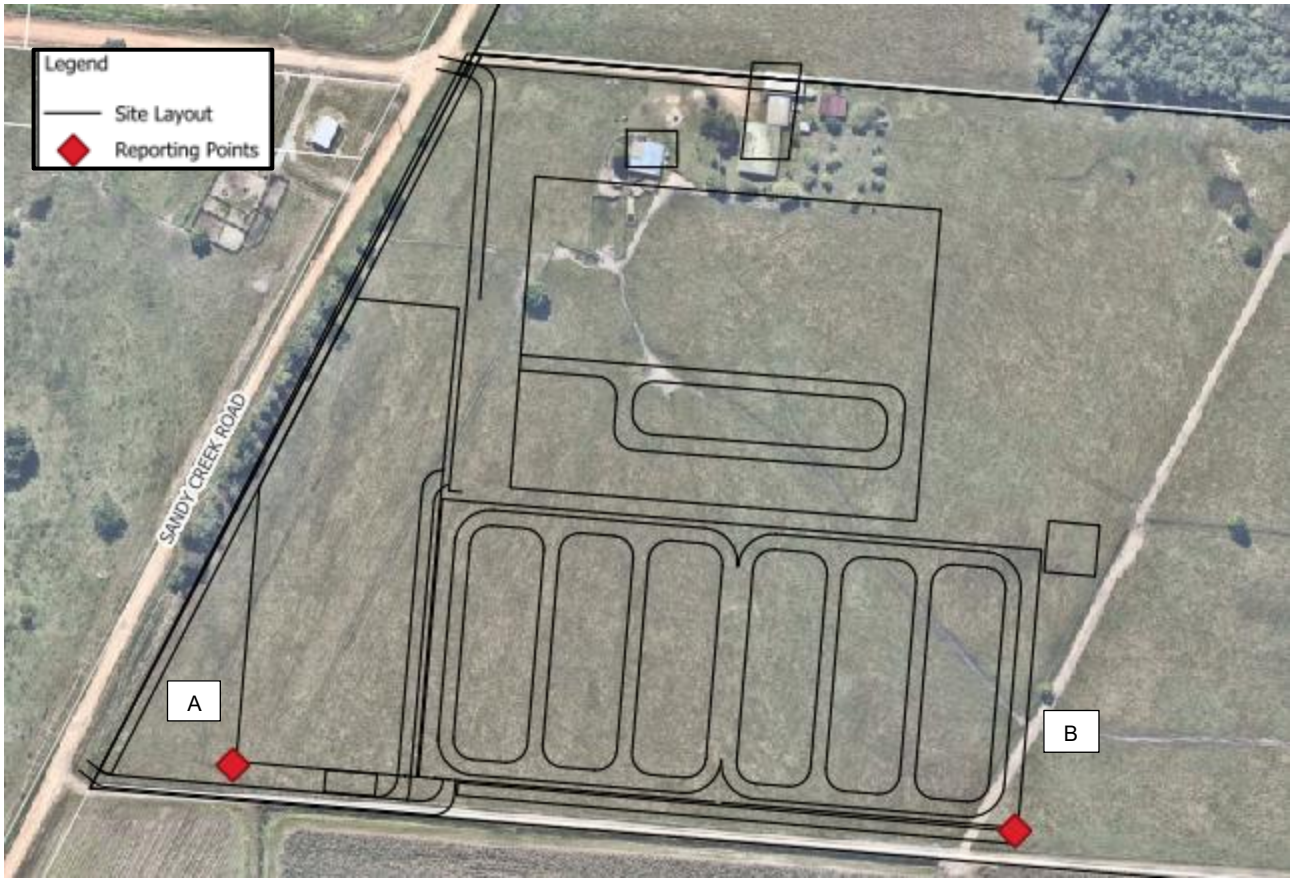

Figure 6-3 Key Reporting Locations

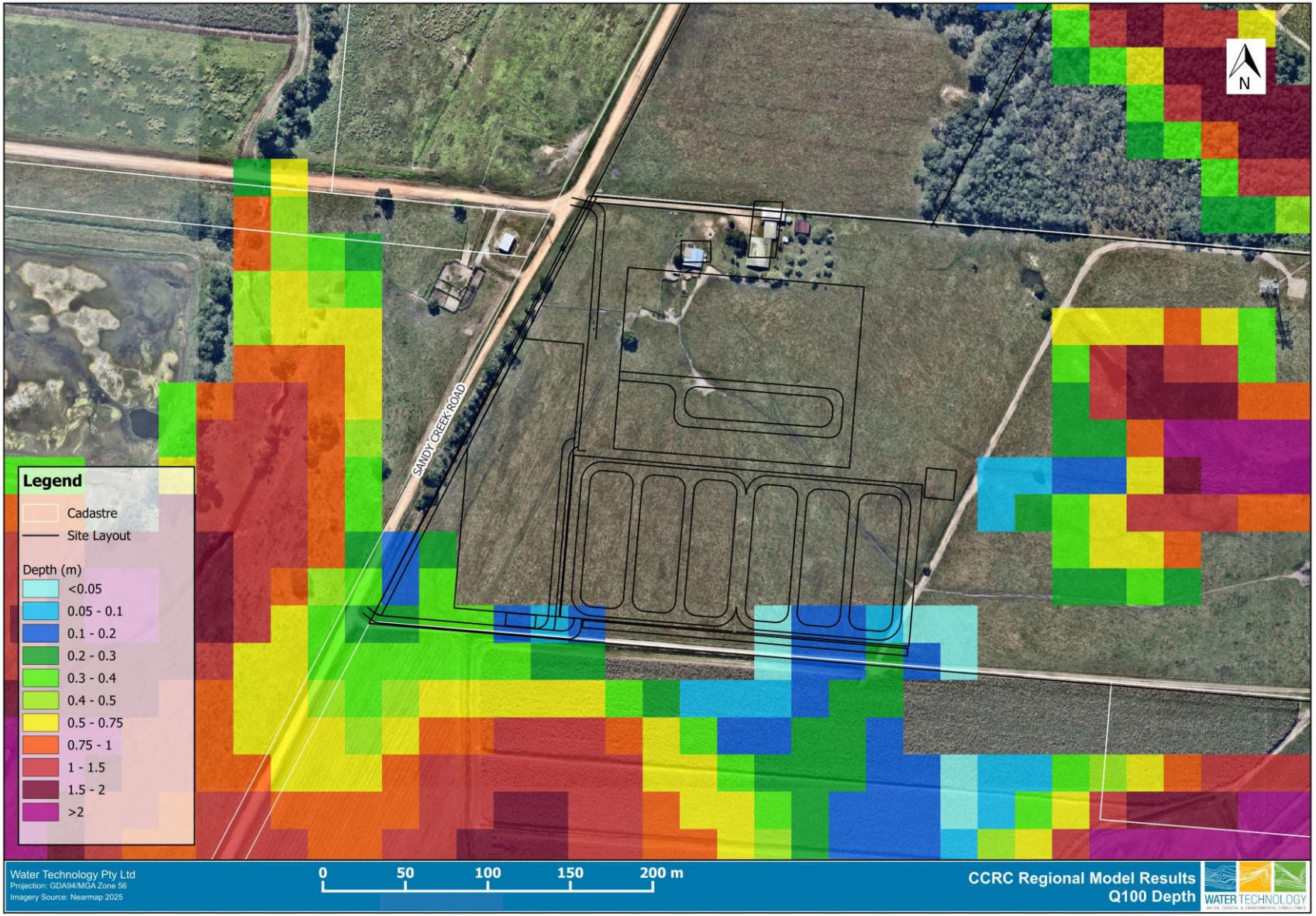

Figure 6-4 Q100 Regional Flood Results

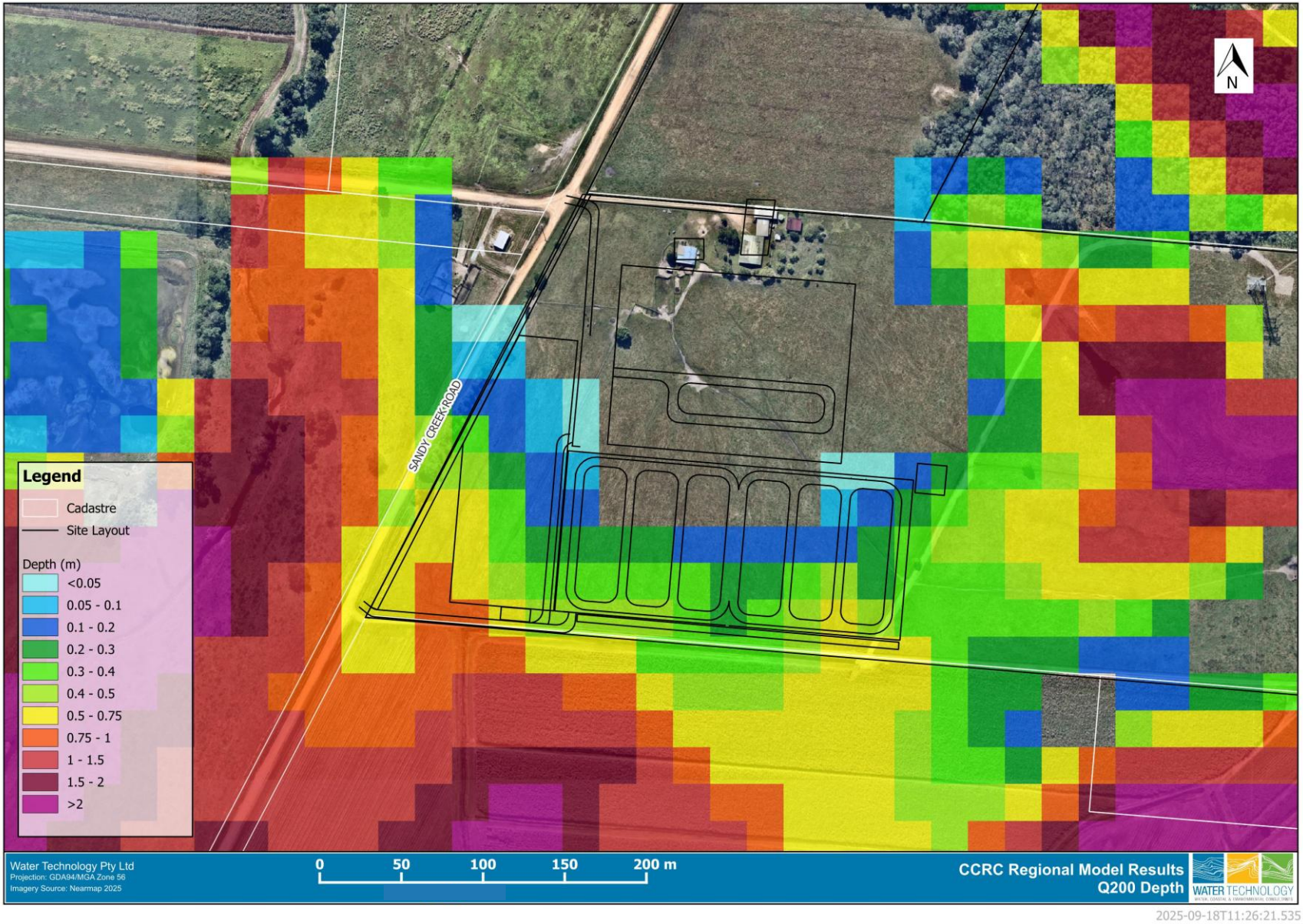

Figure 6-5 Q200 Regional Flood Results

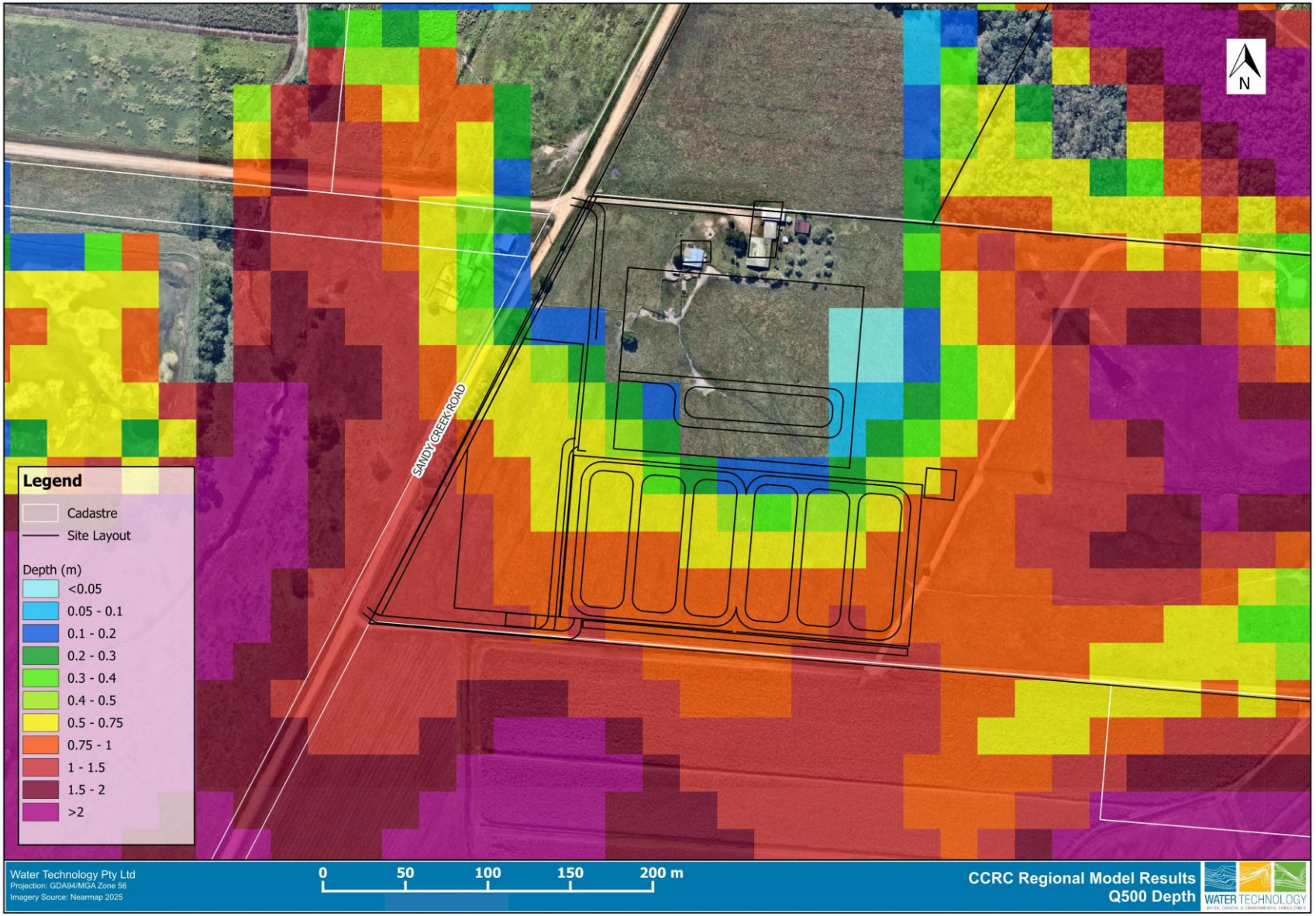

Figure 6-6 Q500 Regional Flood Results

6.7 Waterways and Fish Passage

Figure 6-8 illustrates the proposed development layout against the Department of Agriculture and Fisheries *Queensland waterways for waterway barrier works* spatial layer. This spatial layer classifies waterways defined by the *Fisheries Act* to assist in determining whether proposed barrier works are assessable or accepted (DAF, 2021). Waterways receive a fish passage attribute, a number between 1 and 5 which is additionally colour coded for easy reference. The classification does not indicate the relative importance of the fish habitat, rather it has been determined by several characteristics including stream order, stream slope and tidal influence.

- Waterways classified as 1 (low) (green) or 2 (medium) (amber) are typically in the upper reaches of a catchment where fish are typically smaller with stronger swimming abilities.
- Waterways classified as 3 (high) (red), 4 (major) (purple), or 5 (tidal) (grey) typically are host to a wider range of fish sizes and swimming abilities.

Figure 6-7 illustrates the assessment process matrix provided by DAF (2021) in the *Queensland waterways for waterway barrier works* spatial data layer: Guide to determining waterways Version 2.0 (April 2021). There were no waterway crossings identified for this project.

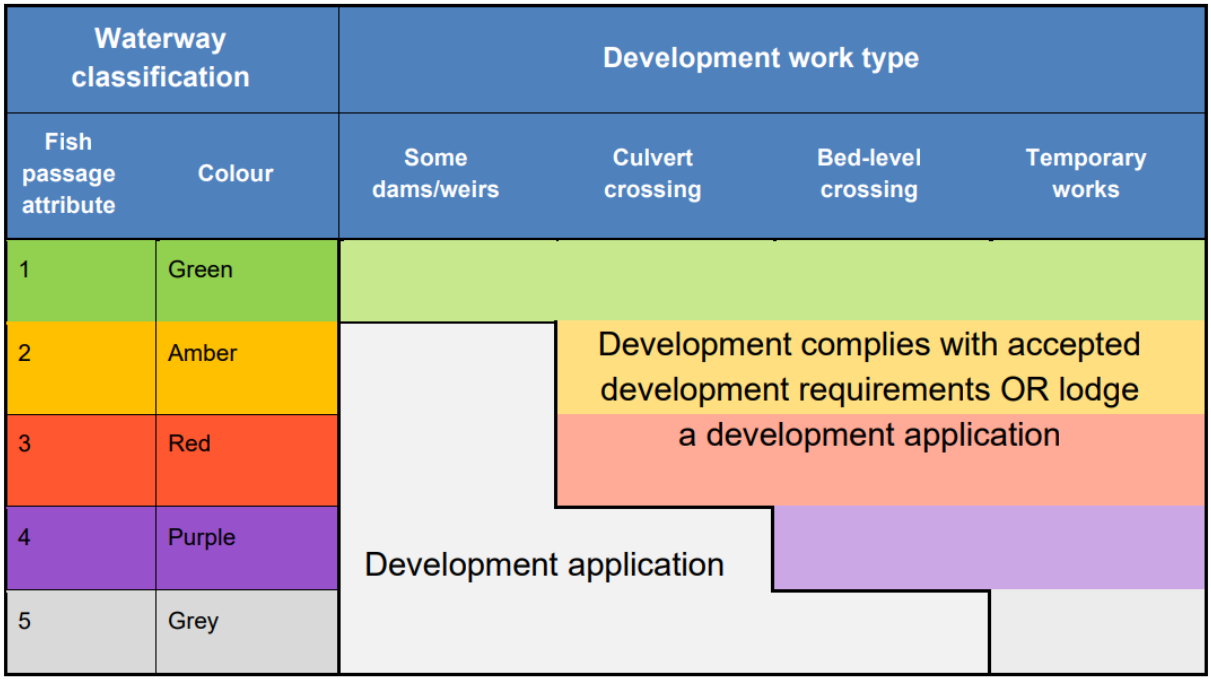

Figure 6-7 Assessment process matrix regarding waterway classification and proposed development work

Figure 6-8 Crossing Locations

7 SUMMARY

Water Technology was engaged by Attexo to prepare a Stormwater Management Plan (SMP) and Flood Assessment (FA) for the proposed Tully BESS facility located at Tully, Queensland. The SMP described modelling to quantity potential changes to runoff quality from the BESS and to undertake conceptual sizing of mitigation measures to meet relevant Water Quality Objectives (WQO's) for the development in respect of pollutant load reductions relative to the undeveloped site. Based on the modelling outcomes, the following measures are recommended to mitigate the potential impacts on stormwater quality:

- In Catchment A, a vegetated swale at least 150 m long to convey stormwater runoff from the developed site area to the end-of line treatment device and an end-of-line BRB with a minimum filter area of 800 m². It is proposed that the BRB will be located at the downslope end of the southern boundary, adjacent to the proposed location of the temporary construction area. A 235 m long vegetated swale will also be required to divert clean water runoff along the western boundary of the site.
- In Catchment B, vegetated swales with a combined length of 360 m in to convey stormwater runoff from the developed site area to the end-of line treatment device and end end-of-line BRB with a minimum filter area of 200 m². It is proposed that the BRB will be located to the east of the subcatchment, adjacent to the battery container.

Modelling demonstrated that the proposed stormwater quality management measures achieved the WQO's and provide an overall net improvement relative to baseline conditions. That is, the development returns a net improvement in the runoff water quality discharging from site.

The proposed stormwater treatment infrastructure ensures the proposed development complies with the requirements of PO3 to PO5 of State Code 9 Great Barrier Reef wetland protection areas by:

- **PO3** (Hydrology): Minimising earthworks, using pervious surfaces, and incorporating vegetated swales and bioretention basins to maintain natural flow paths and support infiltration, helping preserve surface and groundwater hydrology.
- **PO4** (Water quality): Implementing a WSUD treatment train designed to meet SPP and Reef 2050 water quality objectives, supported by MUSIC modelling and robust ESC measures during construction.
- **PO5** (Wetlands): Locating all stormwater treatment devices outside mapped wetlands and buffers, ensuring wetlands are not used for detention or treatment.

Appropriate measures for the safe handling and storage of chemical and hazardous materials at the project site during the construction and operational phases should be included in the Final Stormwater Management Plan, Construction Management Plan and/ or Emergency Response Plan as required.

The FA described modelling to characterise existing local flood behaviour at the site. The assessment found:

- Overland flow from the north is conveyed via culverts beneath Tully George Road before diverging east and west of the site, ultimately draining to the Tully River without posing a flood risk to the Subject Property.
- Flows along the eastern boundary interact with an irrigation channel and an adjacent wetland system, which functions as an ephemeral watercourse and receives both channel breakout and minor sheet flow from the north.
- Within the proposed BESS site, modelling indicates shallow sheet flow (<0.15 m) and localised ponding near the southern boundary, which is expected to be mitigated through construction earthworks and site grading. Flow velocities are generally low, remaining below 0.5 m/s.

The regional flood model results indicate that the site is only minimally affected in the 1% AEP event, with minor flood fringe inundation observed along the southern boundary. These impacts are consistent with localised pooling identified in the local model. More significant inundation occurs under the 0.5% AEP and 0.2% AEP events, which extend further across the site and have greater potential to impact the planned infrastructure. The regional flood levels should be considered when designing earthworks levels to site sensitive infrastructure (i.e. substations) to ensure they meet local planning requirements.

The site is located on the outer edge of the Tully River floodplain, and only a small portion of the development footprint—approximately 5,000 m²—overlaps the 1% AEP (Q100) flood extent, representing a minor fraction of the overall site area. Within this overlap, modelled flood depths are generally less than 0.1 m, indicating shallow, low-velocity inundation.

Given the limited encroachment, minimal fill requirements, and the fact that the majority of infrastructure is located outside the Q100 extent, the proposed works are not expected to cause any measurable change to flood storage or conveyance. The shallow inundation depth combined with the absence of significant earthworks in the flood-affected zone means flood behaviour will remain effectively unchanged.

Overall, the assessments described in this SMP and FA demonstrate that the proposed development, including the mitigation measures described above, returns a no-worsening of existing conditions with respect to flood as well as providing an improvement in stormwater runoff quality. Detailed design of the management and mitigation measures described conceptually within this report will be required to ensure the final design provides the intended outcomes.

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

APPENDIX A
WET TROPICS REGION: TULLY CATCHMENT WATER QUALITY TARGETS

APPENDIX B
FLOOD DEPTH AND VELOCITY MAPS

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Attexo
APEM Group

Appendix F

Bushfire Hazard Assessment and Management Plan

BUSHFIRE HAZARD ASSESSMENT AND MANAGEMENT PLAN

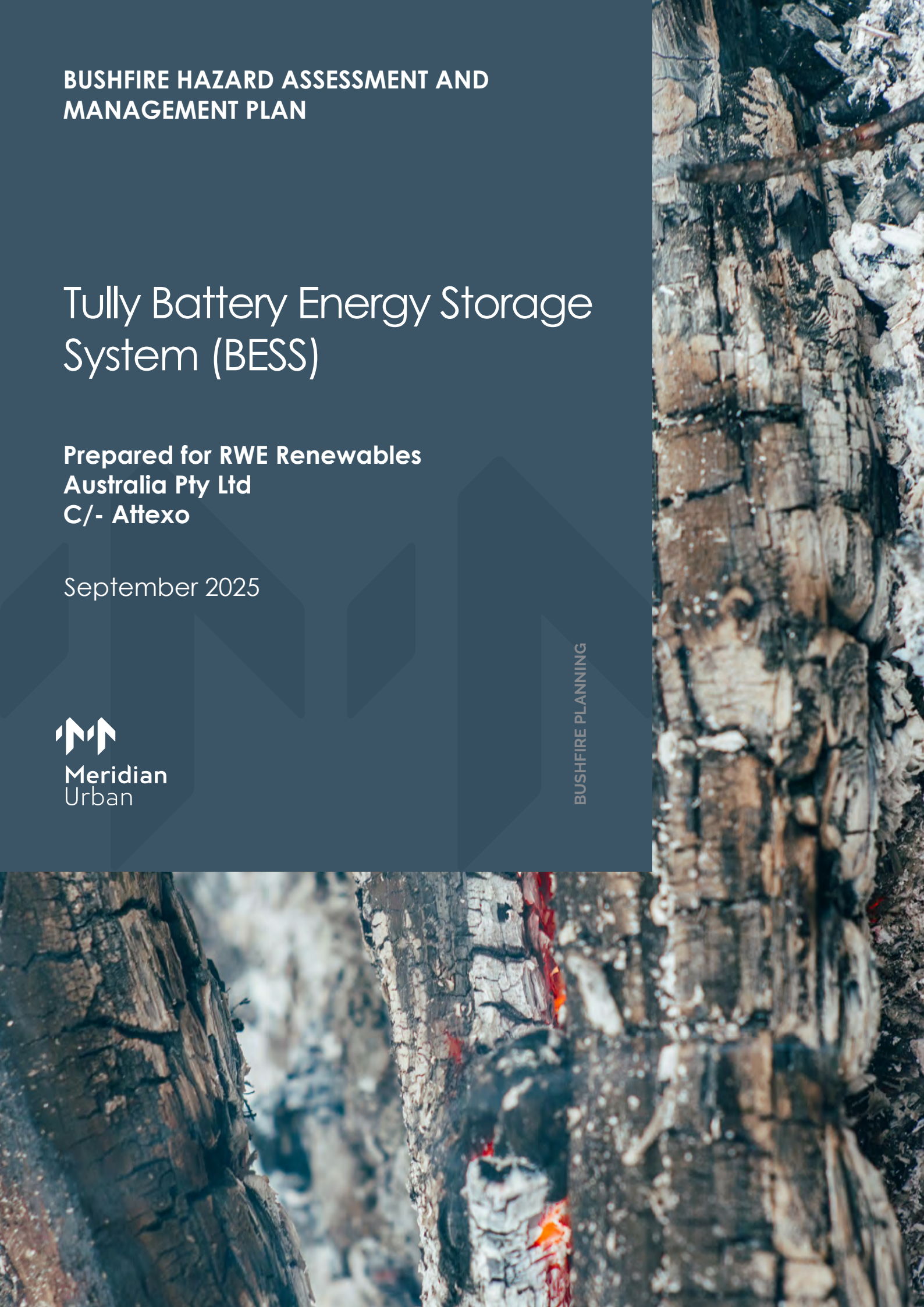
Tully Battery Energy Storage System (BESS)

Prepared for RWE Renewables Australia Pty Ltd
C/- Attexo

September 2025

Meridian Urban

BUSHFIRE PLANNING



ACKNOWLEDGEMENT OF COUNTRY

Meridian Urban acknowledges the Traditional Custodians of the lands and waters where we live and work.

As resilience practitioners we have a responsibility in listening to and elevating Indigenous voices through our practice, and meaningfully engaging in processes of reconciliation. We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers, and pay our respect to Elders past and present.

Meridian Urban's 'Reflect' Reconciliation Action Plan (RAP) details our commitments to advancing cultural change, active participation and inclusive and informed approaches, with a focus on increasing economic and social equity for Aboriginal and Torres Strait Islander peoples and supporting First Nations self-determination. A copy of our RAP can be viewed online at meridianurban.com.

Meridian Urban

QUALITY STATEMENT

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REVISION SCHEDULE

Rev No.	Date	Description	Prepared by	Reviewed by	Approved by
A	30/06/2025	Final	AA	LG	LG
B	11/09/2025	Final (updated layout)	AA	LG	LG
C	18/09/2025	Final (minor amendments)	AA	LG	LG

FPAA NSW BPAD Accreditation No. 33131

Member Planning Institute of Australia
Member Fire Protection Association of Australia
Member International Association of Wildland Fire
Member Natural Hazard Mitigation Association (USA)
Member of Association of Fire Ecology

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

DISCLAIMER

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This report is prepared for the benefit of the named Client only. No third party may rely upon any advice or work completed by Meridian Urban in relation to the services, including this report, except to the extent expressly agreed in writing by Meridian Urban.

It is acknowledged and agreed that the site may be subject to a degree of bushfire hazard. The client acknowledges and agrees that Meridian Urban has not created or contributed to the creation or existence of this hazard and the Client indemnifies Meridian Urban for claims arising out of or resulting from a bushfire event except to the extent attributable to the negligence of Meridian Urban.

The Client agrees that the Consultant shall have no liability in respect of any damage or loss incurred as a result of bushfire.

Tully Battery Energy Storage System (BESS)

Bushfire hazard assessment and management plan

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1 Introduction

Meridian Urban has been commissioned by RWE Renewables Australia Pty Ltd (RWE) C/- Attexo to provide a bushfire hazard assessment and associated bushfire management plan for a proposed Battery Energy Storage System (BESS) at Tully, in the Cassowary Coast Local Government Area.

This report supports a development application to Cassowary Coast Regional Council.

Part of the site is mapped as Bushfire Prone Area (High potential bushfire intensity and potential impact buffer) in both the Cassowary Coast Regional Council Planning Scheme (planning scheme) and the interactive mapping system that supports the State Planning Policy 2017 (SPP 2017).

This bushfire hazard assessment and management plan includes assessment against the relevant planning instruments being the planning scheme and SPP 2017 Natural hazards, risk and resilience (bushfire) State interest. The assessment has regard to the relevant SPP 2017 guidance material including Bushfire Resilient Communities Technical Reference Guide prepared by Queensland Fire and Emergency Services (QFES) (now Queensland Fire Department – QFD).

2 Site and Locality Context

This section of the report provides a description of the site and the locality.

2.1 Overview of the Site Details

Table 1 - Site Details

Site Address	Sandy Creek Road, Tully
RP Description	Lot 1 on RP852238 Lot 1 on RP735276 Lot 1 on RP716718 **(Figure 1)**
Lot Area	Lot 1 on RP852238 – 20.6ha Lot 1 on RP735276 – 8.094ha Lot 1 on RP716718 – 2.704ha Total – 31.4ha
Development Footprint	Approximately 9ha **(Figure 1)**
Local Government	Cassowary Coast Regional Council
Tenure	Freehold Easements for high voltage powerlines across the rear of the site
Current Land Use	Dwelling houses and ancillary structures
Local Brigade	Tully Auxiliary Station

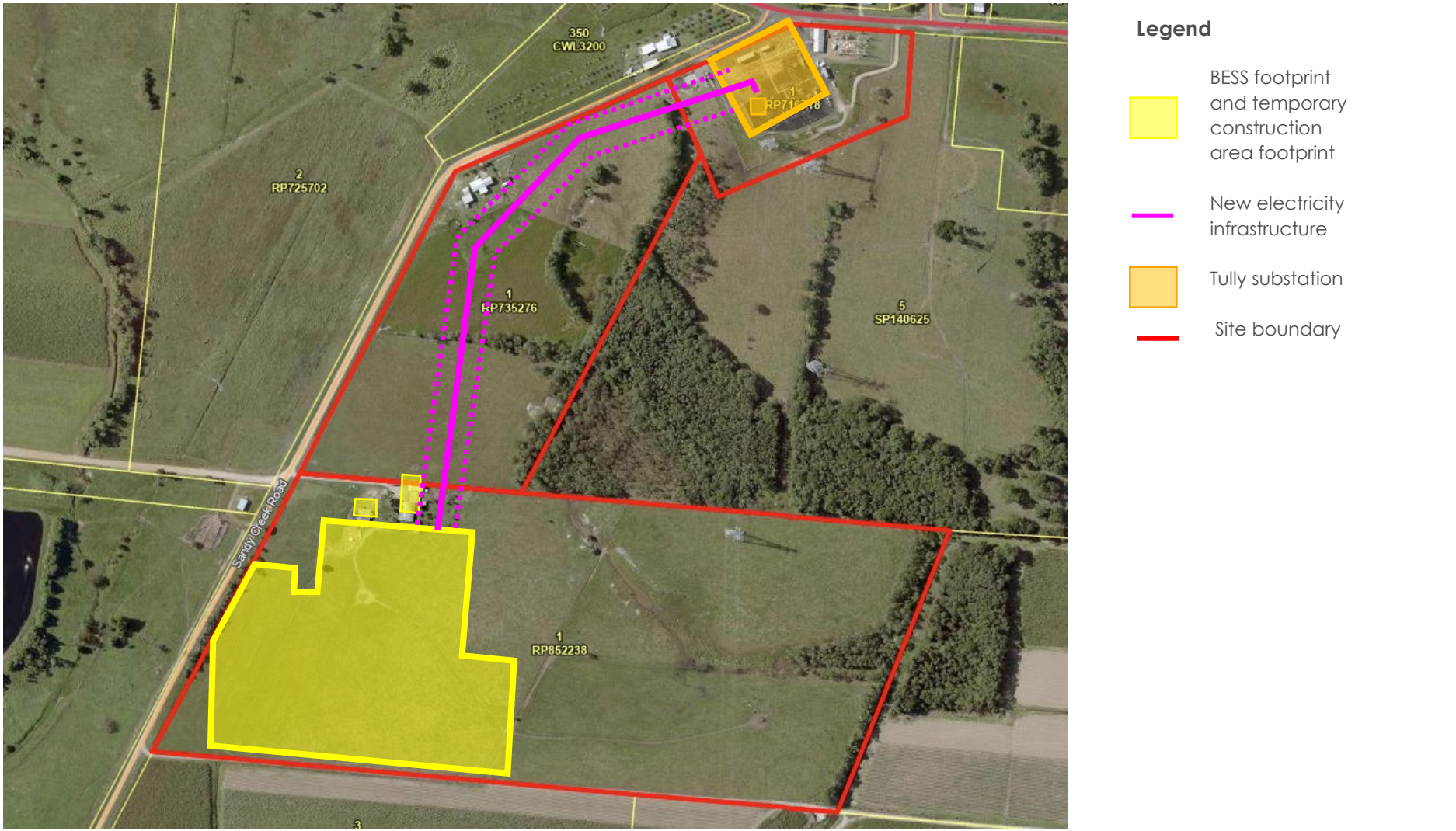

Figure 1 - Lot boundaries and Development Footprint
(Source: Queensland Globe 2025 and RWE)

2.2 Description of the Site

The proposed BESS site will be located on the western half of Lot 1 on RP852238. Lot 1 is relatively flat with a gentle slope from the west down to an unnamed tributary of Tully River (Sandy Creek) toward the eastern, rear boundary of the lot.

The site contains little vegetation, with only scattered vegetation following drainage / waterway corridors at the rear of the site.

The site has frontage to Sandy Creek Road along its western boundary and is not currently connected to a reticulated water supply.

A high voltage powerline traverses the rear of the site, connecting with a substation fronting Tully Gorge Road to the north of the site (Lot 1 on RP716718).

2.3 Description of the Locality

The site is approximately 4km (via Tully Gorge Road) to the south-west of the centre of Tully township and approximately 145km south of Cairns via the Bruce Highway.

The immediate surrounding land is predominately used for farming purposes, with the exception of the existing Tully substation, referred to above, and a new substation immediately to the east.

To the north and north-west of the site, across Tully Gorge Road, is a large expanse of heavily vegetated and elevated area, forming part of the Tully Gorge National Park and the Japoon National Park.

Sandy Creek Road provides access to the surrounding farming land and Tully Gorge Road provides access to Tully Gorge and the National Park area.

Refer to **Figure 2** for the context of the site in the locality.

Figure 2 - The Locality

(Source: Qld Globe, 2025)

3 Proposed Development

The proposed development is for a Battery Energy Storage System (BESS) and associated infrastructure on Lot 1 on RP852238. The BESS is intended to take electricity from the grid in periods of low demand, and feed back into the grid at periods of high demand.

The BESS is proposed on land in proximity to the existing Tully 132 kV substation (Lot 1 on RP716718) and a new Tully 275 kV substation (Lot 5 on SP140625). The BESS will be connected to the existing substation (Lot 1 on RP716718) via a transmission connection, consisting of overhead transmission line. The transmission connection traverses the adjoining Lot 1 on RP735276 to the north of the BESS site to connect with the substation.

The BESS and associated infrastructure will comprise a total development footprint of approximately 9ha and consists of:

- Up to 188 battery units (approx. 2.5ha), associated infrastructure, inverters, MV transformers, internal access roads, hardstand and security fencing
- Switching station comprising a 132/33 kV high voltage transformer, air insulated switchgear, an auxiliary transformer, two 33 kV switch rooms and potentially harmonic filters. The switch rooms will include the switchgear and a site office.
- Two vehicle access points to Sandy Creek Road, carparking and a perimeter road
- temporary construction and permanent operations and maintenance (O&M) area adjacent to Sandy Creek Road including operations and maintenance building, yard, parking areas and required office buildings, water tanks and storage sheds
- construction laydown area
- perimeter security fencing / gates
- grid connection via overhead transmission line traversing the adjoining Lot 1 on RP735276 and connecting to Lot 1 on RP716718
- landscape buffer / screen planting along the frontage and part-way along the side boundaries of Lot 1 on RP852238.

Access to the BESS site will be via new and upgraded crossovers to Sandy Creek Road. The development will be provided with static-on site water supply, the capacity of which will be as per the recommendations of this report.

The BES site is largely cleared of vegetation, with only scattered trees and shrubs will be removed during the construction phase of the project. The existing dwelling and structures on Lot 1 on RP852238 may be utilised as operations and management area at some point in the future.

The BESS will be operational 24 hours a day, every day of the year. The primary operation of the premises will be undertaken from a remote operations control centre, with physical monitoring and maintenance of the facility undertaken periodically. Planned maintenance activities will likely include:

- Monthly inspections (electricity, civil and environmental)
- Vegetation management (in line with various management plans)
- Other activities as defined in the O&M management plans
- During fire danger period weekly inspections of the APZ, access road, water supply, signage and building protection systems.

Corrective maintenance activities will likely include:

- Testing and replacement of faulty plant components (fuses, etc)
- Any other corrective actions within the O&M scope.

The proposed development layout is included in **Appendix A.**

4 Understanding Bushfire Hazard

Bushfires have long remained a fundamental characteristic of the Australian bush landscape. There remains a number of common factors which are associated with bushfire events, and these include the incidence of fire weather, availability of fuel along with its type, structure and continuity or fragmentation, and development at the bushland interface.

4.1 Bushfire Attack

Bushfire attack refers to the various methods in which bushfire may impact upon life and property and principally encompasses:

- Direct flame contact
- Ember and firebrand attack
- Radiant heat flux
- Fire-driven wind
- Smoke.

During the progression of a bushfire event, these methods either exclusively or in concert interact **(Figure 3)**. It is estimated that approximately 80 to 90 per cent of buildings lost to bushfire in Australia are located within 100m of the bushland interface, hence the relevance of statutory provisions and recommendations implemented across Australia which respond to various types of buildings within 100m of adjacent classifiable vegetation.

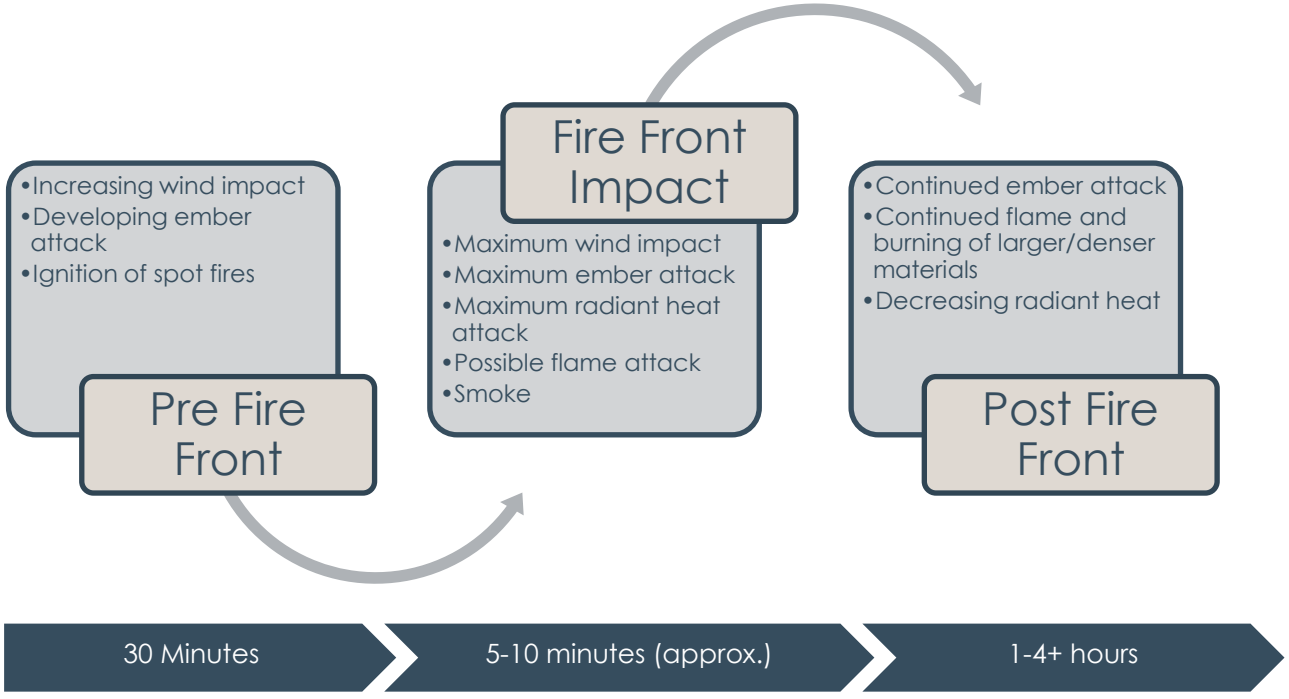

Figure 3 – The Typical Phases of Bushfire Attack

(Derived from Ramsay & Rudolph, 2003)

4.1.1 Direct Flame Contact

Direct flame attack refers to flame contact from the main fire front, where the flame which engulfs burning vegetation is one and the same as that which assumes contact with the building. It is estimated that only 10 to 20 per cent of buildings lost to bushfire occur as a direct result of flame attack based on research conducted by the CSIRO.

4.1.2 Ember and Firebrand Attack

The convective forces of bushfire raise burning embers into the atmosphere on prevailing winds and deposit them to the ground ahead of the fire front. Typically, ember attack occurs prior to the arrival of the fire front and continues during the impact of the fire front and for several hours afterwards, thus it is the longest lasting impact of bushfire attack. Firebrands occur in a very similar manner but relate to larger items of debris that may still be carried by the wind when alight, such as candle and ribbon barks.

In essence, building loss via ember attack relates largely to the vulnerabilities and peculiarities of each building, its distance from the classifiable vegetation and whether an occupant (or the like) is present to actively defend it. It is estimated by the CSIRO that approximately 80 to 90 per cent of buildings lost by bushfire are lost as a result of ember attack either in isolation or in combination with radiant heat impact.

4.1.3 Radiant Heat Flux

Exposure to radiant heat remains one of the leading threats to infrastructure assets associated with bushfire events **(Figure 4)**. Measured in kilowatts per m², radiant heat is the heat energy released from the fire front which radiates to the surrounding environment, deteriorating rapidly over distance. Radiant heat can pre-heat materials making them more susceptible to ignition, or can cause non-piloted ignition of certain materials if the energy transmitted reaches a threshold level. Radiant heat can also damage building materials, reducing the ability for the structure or asset to withstand.

Radiant heat flux (kW/m²)	Potential effects
Greater than 40	• unpiloted ignition of timber walls and fences
	• direct flame contact likely
	• extreme levels of radiant heat
29–40	• failure of toughened glass
	• direct flame contact possible, extreme levels of radiant heat
	• unpiloted ignition of some timber species after prolonged exposure (e.g. several minutes)[29]
19	• failure of screened float glass
16	• blistering of skin with > 5 seconds exposure
12.5	• failure of plain glass
	• piloted ignition of dry timber elements after prolonged exposure (e.g. several minutes)[30]
10	• fabrics inside a building could ignite spontaneously with long exposure
	• critical limit for emergency services – firefighters cannot operate
	• life threatening with < 1 minute exposure in protective clothing.
7	• fatal to an unprotected person after exposure for several minutes
4.7	• firefighter in protective clothing will feel pain (60 seconds exposure)
3	• firefighters can operate for a short period (10 minutes)
2	• pain is felt on bare skin after 1 minute exposure (non-fatal)
	• firefighters with protective clothing can withstand this exposure level for a few minutes however, they are likely to experience rise in core body temperature
1	• maximum for indefinite skin exposure
0.5	• direct sunlight at noon on a bright sunny day

Figure 4 – The Effects of Radiant Heat

(Source: Queensland Fire and Emergency Services, 2019)

4.1.4 Fire Driven Wind

The convective forces of bushfire typically result in strong to gale force fire-driven winds, which in itself can lead to damage. The typical effects of fire driven wind include the conveyance of embers, damage from branches and debris hitting the assets, as well as direct damage to vulnerable components. Fire driven wind is not a form of bushfire attack that is currently addressed by planning and building provisions, beyond those required for wind loads generally.

4.1.5 Smoke

Smoke emission remains a secondary effect of bushfire and is one which is typically not addressed by bushfire hazard assessment, or by planning and building provisions. Irrespective, it is important to note the potentially severe impact of smoke emission on the human respiratory system. It can lead to difficulties in breathing, severe coughing, blurred or otherwise compromised vision, and can prove fatal. It is also important to note that toxic smoke can occur during bushfire, particularly where buildings or materials are ignited.

4.2 Vegetation Communities

Fuel load and arrangement represents a considerable component in dictating to a large degree the behaviour of fire in terms of intensity, rate of spread and flame height, and typically relates top dead plant material less than 6mm thick, and live plan material thinner than 3mm. On this basis, it stands to reason that different vegetation groups yield very different fire behaviour and intensity by virtue of their characteristics and fuel load output. The characteristics are not necessarily related to ecological values but remain a function of the propensity for certain groups of vegetation to ignite and sustain fire due to fuel load and arrangement, it can guide estimates on how quickly fire might spread and the likely fire behaviour and intensity which may occur.

Vegetation type, density and arrangement can further influence fire behaviour and intensity. Vertical and horizontal continuity is also a significant element. Thus, vegetation forms a critical element of analysis throughout this report.

4.3 Topography and Aspect

Topography (effective slope) and to a lesser degree, aspect, are also factors which influence fire behaviour and intensity. Topography influences the rate of spread, doubling for every 10 degrees of upslope and slowing by half for every 10 degrees downslope, as a general rule. Aspect can also affect bushfire behaviour where areas with northerly and / or westerly aspects experience a higher level of solar access than those areas with a southern or eastern aspect. Notwithstanding, in times of drought and below average rainfall moisture levels in soil and vegetation in more sheltered areas with southerly and easterly aspects can also decrease substantially giving rise to significantly higher fuel abundance where the preceding fire regime has been less frequent or intense.

4.4 Fire Weather

It remains important to understand the influence of fire weather with regard to how it can affect bushfire risk levels on a daily, weekly or seasonal basis.

In Queensland hot-air fire wind is typically generated by west, north-west and south-westerlies which are prevalent during the fire season which for Far North Queensland generally extends from July to February, annually. However, intense fire conditions can occur on different wind and at different times of the year depending on monsoonal seasons, changes to relative humidity and preceding drought conditions.

Notwithstanding the above, it is noted bushfires do not always conform to widely-accepted characteristics. Other fire weather conditions must also be contemplated such as preceding

weather conditions such as low rainfall, heatwave, drought, air temperature and relative humidity. If the area has been subject to drought or low rainfall for a period of time, vegetation health tends to deteriorate with increased leaf drop, curing and drying. This contributes to increased ground fuel loads and general increased ignition susceptibility. Prolonged dry periods also reduce soil moisture content.

Air temperatures and extended periods of higher than average air temperatures also contribute to fire weather. In conjunction, low relative humidity (i.e. low air moisture content) is also a contributing factor to increased fire weather.

In concert, all of the above factors can impact on the ability for fire to propagate, and alter behaviour and intensity characteristics and as such, fire weather is a significant component of bushfire hazard. Whilst an assessment of vegetation types, fuel loads, effective slope and other factors can be readily undertaken, fire weather can fluctuate across days, weeks and seasons and can have a significant impact on the potential for bushfire threat as well as influence bushfire behaviour and intensity.

The Forest Behaviour Index (FBI) is a new method to readily advise the community of the likely ability of fire suppression based on fire weather, which is used to inform[1] the Fire Danger Rating (FDR) System at **Figure 5**. This has replaced the Forest Fire Danger Index (FFDI) insofar as it relates to fire danger ratings, but continues to be used for bushland hazard assessment, at the time this report was written.

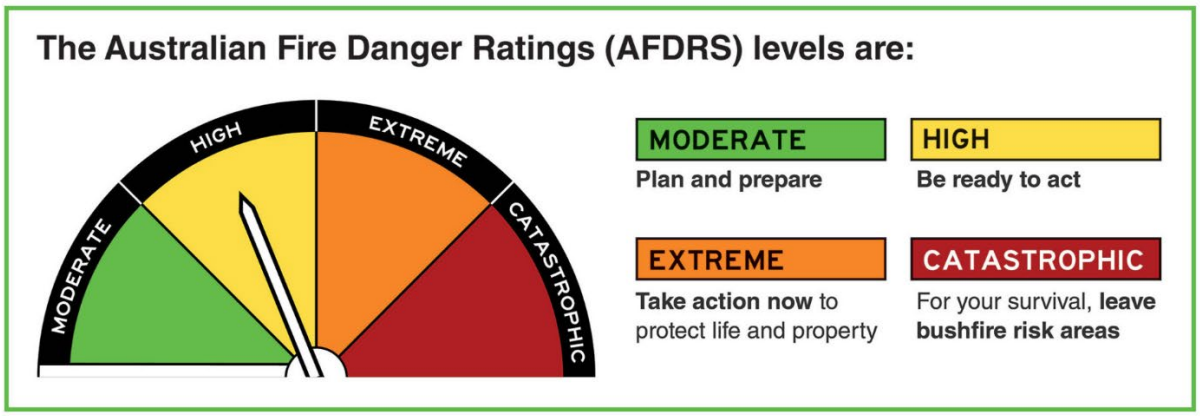

Figure 5 – Australian fire danger rating system

(Source: AFAC, 2022)

[1] Via the 'fire behaviour index'

5 Bushfire Regulatory Context

This section of the report sets out an overview of the regulatory context for the assessment of bushfire hazard relevant to the development and site.

This report supports a development application to the relevant assessing authority, being Cassowary Coast Regional Council, for a Development Permit for a Material change of use for an Undefined use and Major electricity infrastructure.

In this instance, the relevant statutory planning instruments include:

- **Cassowary Coast Regional Council Planning Scheme 2015:**
  - Bushfire hazard code.
- **State Planning Policy 2017**:
  - Natural Hazards, Risk and Resilience State Interest, including:
    - State Interest Policies.
    - Assessment benchmarks.
    - Supporting Technical Reference Guide 'Bushfire Resilience Communities 2019.'

Guidance has also been sought from:

- Renewable Energy Facilities Design Guidelines and Model Requirements, prepared by the Victoria Country Fire Authority, Version 4 August 2023
- Large -scale battery energy storage systems, AFAC Guideline, version 1.0 5 February 2025 Doctrine ID: 3105

Commentary is also provided on any relevant Building Assessment Provisions that may be applicable to subsequent building applications, for information and guidance purposes only.

5.1 Planning Scheme

5.2 Relevant Planning Scheme

The site is within the Cassowary Coast Regional Council Planning Scheme 2015 area. The current version of the planning scheme version 4 effective 16 December 2019.

5.3 Bushfire Hazard Overlay Map

Part 8.1(7)(c) of the planning scheme identifies the Bushfire Hazard Overlay as an overlay for the planning scheme. The overlays are mapped in Schedule 2 (Mapping) of the planning scheme.

Figure 6 is an extract from the Bushfire hazard overlay map as it pertains to the site, as well as the area surrounding the development footprint out to 150m (shown indicatively with the blue dashed line).

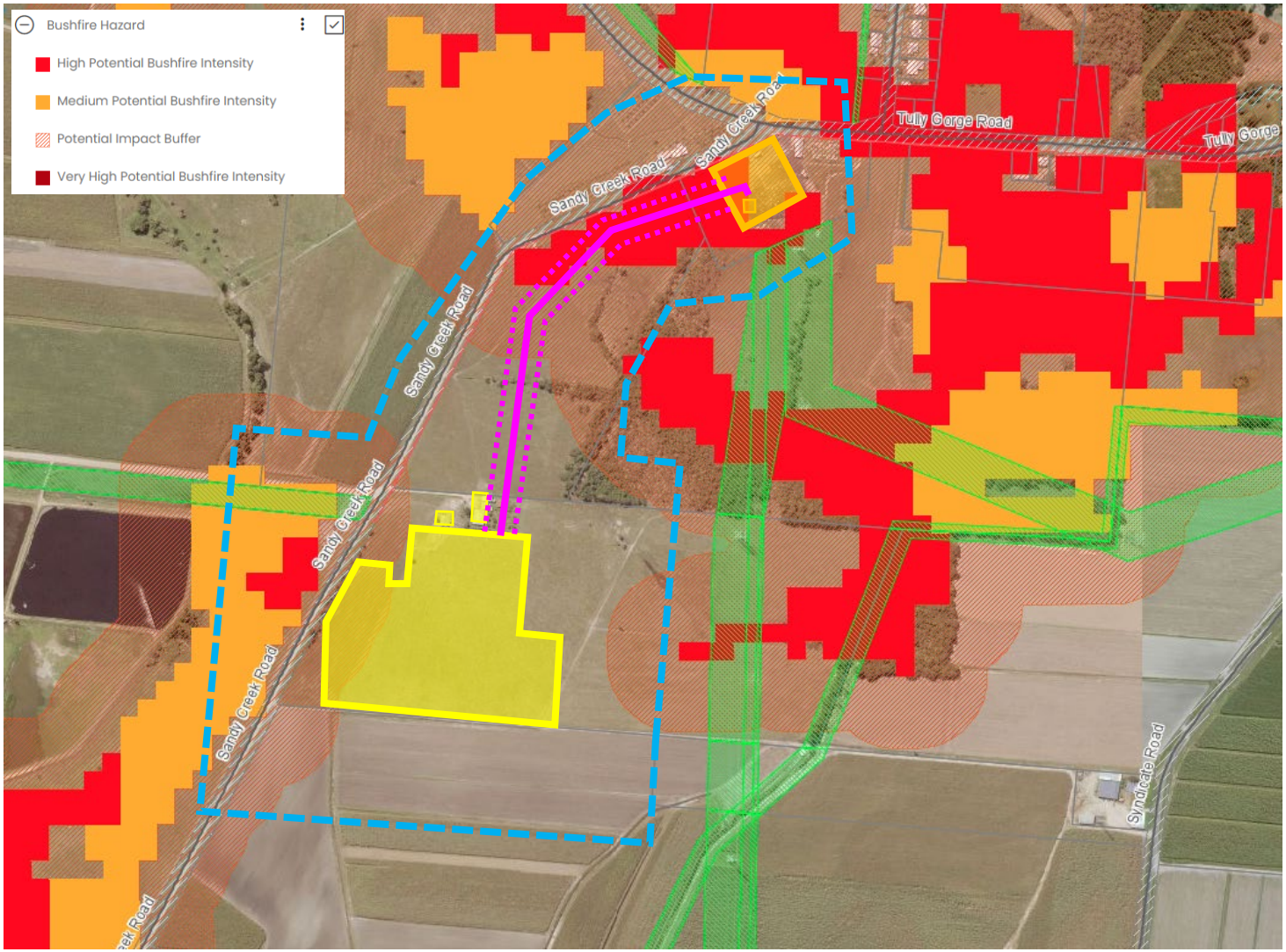

Figure 6 - Extract from the Bushfire Hazard Overlay Map
(Source: Cassowary Coast Planning Scheme 2015)

Based on this Council mapping, the majority of the BESS site is outside the mapped bushfire hazard area, with only the far western portion of the footprint within the Potential impact buffer. The broader area contains patches of High potential bushfire intensity towards the north-east and east, associated with the vegetated waterway / drainage areas in this location. The transmission connection also crosses the Potential impact buffer area and a patch of High potential bushfire intensity to the north of the BESS site.

Land to the south-west, west and north-west is also mapped predominately Medium potential bushfire intensity area and Potential impact buffer.

Bushfire hazard is also mapped as present across the wider locality **(Figure 7),** particularly some of the elevated and vegetated land to the north and north-west of the site, which extends into the Tully Gorge National Park. Various patches are also present throughout the agricultural areas surrounding the site. The accuracy of this mapping is discussed later in Section 6.2 of this report.

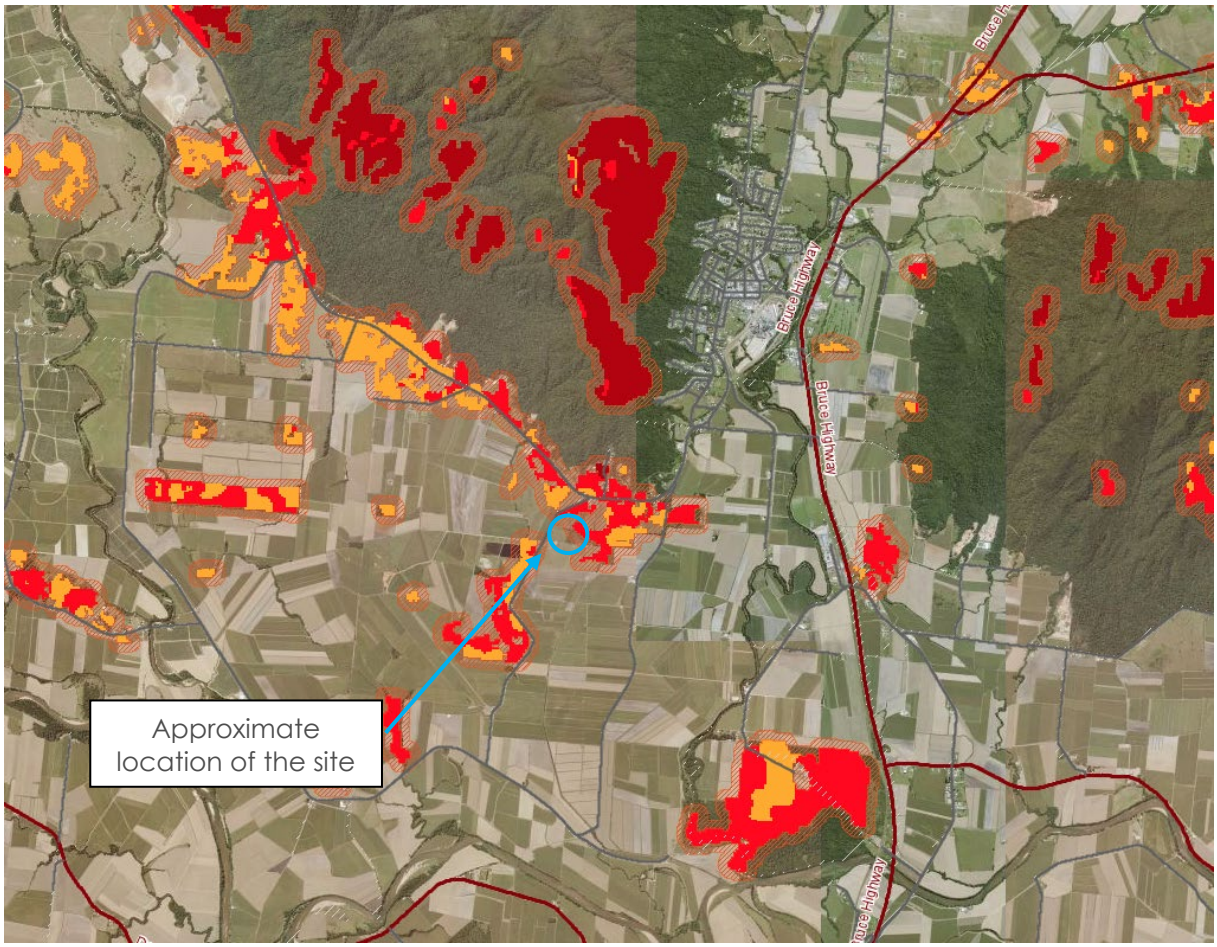

Figure 7 - Bushfire Hazard in the Wider Locality
(Source: Cassowary Coast Planning Scheme 2015)

5.4 Bushfire Hazard Code

The Bushfire hazard code is identified is a relevant assessment benchmark for any assessable material change of use and reconfiguring a lot in the Very high, high or medium potential bushfire intensity area of the planning scheme. Whilst the BESS site itself is outside this area, the grid connection does pass through an area of High potential bushfire intensity.

The planning scheme does not explicitly identify the Bushfire hazard code as an assessment benchmark for assessable development in the potential impact buffer (which affects part of the BESS site). This is likely due to the age of the planning scheme (prepared under the now superseded State Planning Policy 2014) and is inconsistent with the approach taken in the State Planning Policy 2017, which applies the assessment benchmarks of the SPP to all bushfire prone areas, including the potential impact buffer.

Therefore, assessment of the whole development (including the BESS site and grid connection) has been carried out against the Bushfire hazard code in **Appendix B.**

This assessment relies on the outcomes of the bushfire hazard assessment and recommendations of the bushfire management plan as described in Sections 6 to 8 of this report.

This assessment demonstrates the development complies with the Bushfire hazard code.

5.5 State Planning Policy 2017

The Cassowary Coast Planning Scheme 2015 (section 2.1) states that the State Planning Policy (SPP), including those aspects relevant to Natural hazards, risk and resilience, is reflected in the planning scheme. However, it does not specify which version of the SPP is reflected.

Given the scheme was initially drafted under the SPP 2014, it is likely the scheme reflects the now superseded SPP. As noted in section 5.4 above, this is evident in the exclusion of the potential impact buffer from the trigger for the Bushfire hazard overlay code.

Therefore, a complete assessment against the SPP 2017 has also been carried out below.

5.5.1 State-wide Bushfire Prone Areas Map

The SPP 2017 is underpinned by the State-wide bushfire prone area mapping. An extract of that mapping relevant to the site is provided in **Figure 8.**

As is evident, the SPP Bushfire Prone Area mapping is consistent with the Bushfire Hazard Overlay mapping in the planning scheme.

Figure 8 - Extract of the SPP Bushfire Prone Areas Map

(Source: State Planning Policy Interactive Mapping System, 2025)

5.5.2 State Interest Policies and Assessment Benchmarks

For the purpose of this report the Natural Hazards, Risk and Resilience State Interest Policy statements (4),(5) and (6) and Assessment Benchmarks (3), (4), (5), (6) and (7) of the SPP have been assessed in **Table 2.** This assessment relies on the outcomes of the bushfire hazard assessment and recommendations of the bushfire management plan as described in **Sections 6 to 9** of this report.

Table 2 - SPP State interest policy compliance assessment

SPP Natural Hazards Assessment Benchmark	Compliance Statement
State interest policy (4) and Assessment benchmark (3) Development avoids natural hazard areas, or where it is not possible to avoid the natural hazard area, development mitigates the risks to people and property to an acceptable or tolerable level.	**Complies –** The majority of the BESS site is outside the mapped bushfire prone area, with only a portion of the western part of the facility within the Potential impact buffer. Notwithstanding the mapping, the area to the west of the site is not considered hazardous, as there is currently very limited vegetation cover in this area (the accuracy of the mapping is discussed further in Section 6 of this report). Similarly, the grid connection passes through an area of mapped High potential bushfire intensity towards the existing sub-station site. Again, this mapping is not accurate and this area is not considered hazardous as there is little to no vegetation. On this basis, the BESS site and grid connection is considered to be wholly outside a bushfire prone area. Notwithstanding, the BESS site and part of the grid connection are within 150m of vegetation that (based on the verified regional ecosystems provided) has the potential to become hazardous as it reaches remnant status to the east. In this instance, a suite of mitigation measures are recommended to contribute toward tolerable risk to people and property. These mitigation measures include: • The siting of the BESS site far as possible from the hazardous vegetation and within areas not mapped as Bushfire Prone Area • The provision of further separation through asset protection zones • Use of the perimeter track around the BESS facility • Access and egress from the BESS site away from the hazardous vegetation • Static water supply
State interest policy (5)(a) Assessment benchmark (4) Development supports and does not hinder disaster management response or recovery capacity and capabilities.	**Complies –** Disaster management response and recovery capacity and capabilities is supported by the proposed development through the provision of: • Sufficient water supply is to be available through on-site static water supply. • Separation between the vulnerable components of the proposed

SPP Natural Hazards Assessment Benchmark	Compliance Statement
	development (i.e. the BESS site) and the hazardous vegetation to provide access for emergency services. • Emergency management procedures to support operations.
State interest policy (5)(b) Assessment benchmark (5) Development directly, indirectly and cumulatively avoids an increase in the severity of the natural hazard and the potential for damage on the site or to other properties.	**Complies -** The proposal does not include any known changes to the vegetation hazard class adjacent to the development footprint (through rehabilitation or revegetation) that would increase the severity of bushfire or potential for damage on the site or other properties. Notwithstanding, the vegetation hazard assessment has been carried out assuming the adjoining regrowth vegetation to the east of the site is likely to reach remnant status.
State interest policy (5)(c) and Assessment benchmark (6) Risks to public safety and the environment from the location of hazardous materials and the release of these materials as a result of a natural hazard are avoided.	**Complies –** The risk to public safety and the environment from the storage of hazardous materials on site, namely the battery system itself, can be mitigated through the siting of these components as far as practicable from the hazardous vegetation, the provision of asset protection zones and suitable operational procedures for emergency events.
State interest policy (5)(d) Assessment benchmark (7) The natural processes and the protective function of landforms and the vegetation that can mitigate risks associated with the natural hazard are maintained or enhanced.	**Not applicable -** The natural processes and surrounding landforms will not be affected by the proposal in a way that would increase risk associated with bushfire hazard.
State interest policy (6) Community infrastructure is located and designed to maintain the required level of functionality during and immediately after a natural hazard event.	**Complies -** Community infrastructure in the context of bushfire hazard is not explicitly defined in the State Planning Policy. However, a definition is provided in the Example planning scheme assessment benchmarks guidance material that supports the SPP. Examples of community infrastructure for essential services include educational establishment, emergency services and hospital. Other infrastructure that may perform an important role and be required to function during and immediately after a bushfire hazard event may also be considered community infrastructure including showgrounds and sports facilities. The Cassowary Coast planning scheme (Bushfire hazard code PO4 and AO4.1) includes provisions about community infrastructure, which includes substation and power station. Whilst the BESS itself is not a major switch yard, power station or substation, as an energy storage system it

SPP Natural Hazards Assessment Benchmark	Compliance Statement
	functions similar to those uses and therefore the functionality of the facility during and immediately after a bushfire event should be considered. It is acknowledged that immediately after a bushfire event the operation of the facility will be at the direction of the operators and will be subject to a number of factors that sit outside a planning assessment (i.e. direction from emergency services, safety, protection of infrastructure, staffing etc.). Notwithstanding, it is considered that the various mitigation measures recommended in this report, including separation from hazardous vegetation, provision of water supply and operational procedures will support the functionality of the facility during and immediately after a bushfire event, as far as practicable through planning considerations. Compliance with Policy (6) is therefore achieved.

5.5.3 Bushfire Resilient Communities 2019

The 'Bushfire Resilient Communities – Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire' (October 2019)' (BRC) supports the SPP and associated SPP guidance material.

It provides technical guidance and the policy positions of Queensland Fire Department (QFD) and is relevant to making or assessing development applications. The technical guidance includes procedures for undertaking a Bushfire Hazard Assessment and preparing a Bushfire Management Plan.

Assessment against the relevant policy positions of BRC (as per Section 2 of that document) are provided below.

- ***Policy 4 – Disaster management capacity and capabilities are maintained to mitigate the risks to people and property to an acceptable and tolerable level.***

  Response: Refer to response to SPP assessment benchmark 4.

- ***Policy 6 – Vulnerable uses are not located in the bushfire prone area unless there is an overwhelming community need for the development of a new or expanded service, there is no suitable alternative location and site planning can appropriately mitigation the risk.***

  Response: Vulnerable uses in the context of bushfire hare not explicitly defined in BRC or the State Planning Policy. Similar to community infrastructure, they are defined in the Example planning scheme assessment benchmarks guidance material that supports the SPP. Again, that definition does not include a BESS.

  Notwithstanding, other uses could be considered vulnerable uses in the context of bushfire due to their vulnerabilities to the effects of bushfire, their economic or community value or their likelihood of explosion / combustion if exposed to radiant heat or ember attack. A BESS could be considered one such use. In this instance, this report has considered the BESS a vulnerable use.

As noted above, the BESS and grid connection are located outside the bushfire prone area, based on the verified vegetation classes and on-ground vegetation status. Adequate separation is also provided between the BES site and adjoining vegetation that may have the potential to become hazardous.

Sections 6-9 of this report further demonstrate that site planning can appropriately mitigate the risk to people and property associated with the use to a tolerable level.

- ***Policy 7 – Revegetation and rehabilitation avoids an increase in the exposure or severity of bushfire hazard.***

  Response: Refer to response to SPP assessment benchmark 5.

- ***Policy 8 – Development does not locate buildings or structures used for storage or manufacture of materials that are hazardous in the context of a bushfire within a bushfire prone area unless there is no suitable alternative location.***

  Response: Refer to response to SPP assessment benchmark 6.

- ***Policy 9 – The protective function of vegetation arrangements that can mitigate bushfire risk are maintained.***

  Response: Refer to response to SPP assessment benchmark 7.

- ***Policy 10 – Community infrastructure for essential services are not located in bushfire prone areas unless there is an overwhelming community need for the development of a new or expanded service and there is no suitable alternative location, and further, the infrastructure can be demonstrated to function effectively during and immediately after a bushfire event.***

  Response: See response to BRC Policy 6 and SPP Policy 6 above.

5.6 Building Assessment Provisions

Whilst this report supports a planning application, it is relevant to note that a subsequent building application may be required for parts of the proposal. Certain building applications are subject to additional requirements (building assessment provisions) where in a bushfire prone area. It is not within the scope of this report to address the building assessment provisions. The following advice is provided to assist with consideration of potential building assessment provisions.

5.6.1 Designated Bushfire Prone Area for Building Purposes

A planning scheme may designate all, or part, of its area as a designated bushfire prone area for the purposes of the assessment of building applications under the *Building Act 1975*. Designation will trigger certain building applications to be assessed against the building assessment provisions that apply to a building in bushfire prone areas, including the Building Code of Australia (BCA). The BCA is the document called the National Construction Code (NCC) (volume 1 and 2, including Qld appendixes).

The BCA / NCC bushfire provisions are applicable to Class 1 (dwelling), Class 2 (more than one dwelling), Class 3 (residential building providing long-term or transient accommodation), select Class 9 (health-care building, early childhood centre, primary or secondary school (or similar educational establishment) and residential care building) and associated Class 10a structures.

The Cassowary Coast Planning Scheme does not state that land identified in the Bushfire hazard overlay map is designated bushfire prone area for the purposes of the BCA.

Notwithstanding, the use is assumed to not involve a Class 1, Class 2, Class 3 or select Class 9 building. Therefore further commentary on the BCA is not provided.

6 Bushfire Hazard Assessment

6.1 Methodology

This Bushfire Hazard Assessment has been conducted in accordance with Part 5 of the Bushfire Resilient Communities guidance material supporting the implementation of the State Planning Policy, prepared by QFES (now QFD).

Section 5 of the Bushfire Resilient Communities Technical Reference Guideline articulates the process for undertaking a bushfire hazard assessment. The process includes the three stages illustrated below **(Figure 9)**. The reliability assessment is provided at Section 6.2 and the hazard assessment in Section 6.3. The separation and radiant heat discussions are provided at Section 9 of this report.

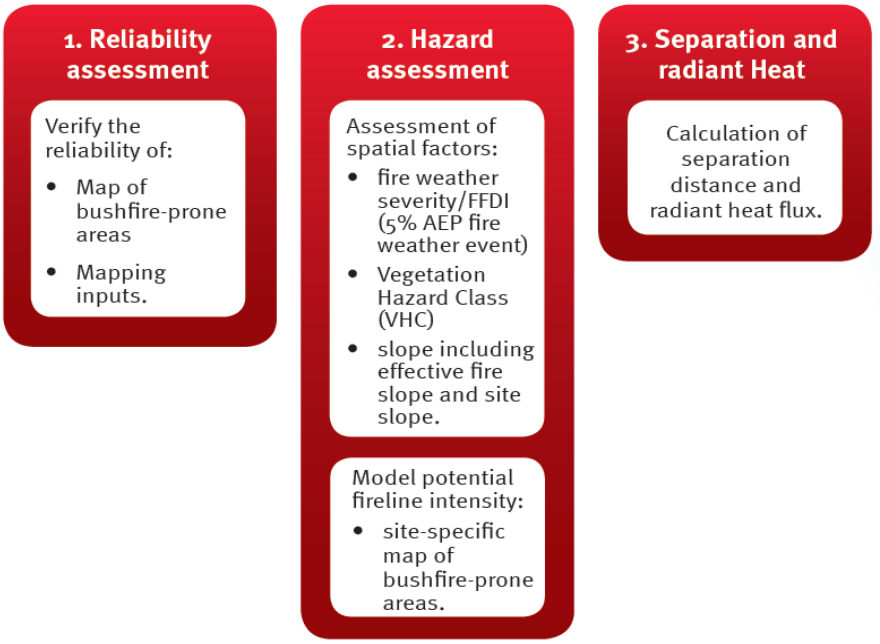

Figure 9 – Overview of the Bushfire Hazard Assessment process as per Bushfire Resilient Communities

(Source: Queensland Fire and Emergency Services, 2019)

A range of instruments and documents have been utilised to perform a desktop analysis. These instruments include:

- State-wide bushfire prone area mapping
- Proposal plans
- Verified regional ecosystem data provided by the project ecologist
- Aerial imagery (Queensland Globe)
- QFD Bushfire Resilient Communities MapViewer and guideline
- State Planning Policy July 2017
- Bushfire Resilient Communities Guideline
- Cassowary Coast Planning Scheme:
    - Bushfire hazard code

6.2 Reliability Assessment

Section 5.3 of the BRC allows for a reliability assessment to be undertaken as the first stage of a Bushfire Hazard Assessment to determine whether the site's observed characteristics are consistent with the inputs used to create the state-wide bushfire prone area mapping (and in this instance the planning scheme mapping) previously discussed in **Section 5.3** of this report.

Having regard to vegetation hazard classes, topography and fire weather severity inputs used to inform the current state-wide bushfire prone area mapping, the site's observed and verified characteristics (discussed at Section 6.3.2) **are not** considered 'generally consistent'[2] with the state-wide bushfire prone area mapping. Of particular note:

- the bushfire prone area to the north-west, west and south-west of the BESS site does not reflect the observed site's characteristics, most notably this area is largely cleared of vegetation and is better identified as VHC 38.5 Cropping and horticulture which has very low potential fuel loads and is not hazardous vegetation.
- some patches immediately adjacent to the BESS site within Lot 1 on RP852238 and Lot 1 on RP735276 are largely cleared of vegetation and have been verified as non-remnant vegetation. This area is unlikely to reach regrowth or remnant status due to the ongoing agricultural land uses, unless actively rehabilitated (which it is understood is not proposed as part of this project).
- areas of regrowth vegetation to the north-east of the BESS site that are currently excluded from the BPA mapping have the potential to become remnant vegetation due to their proximity to a waterway corridor and other remnant vegetation. For the purposes of this bushfire hazard assessment, these areas have been included as hazardous vegetation based on their verified REs.

This is covered in more detail in the following hazard assessment in Section 6.3.

6.3 Hazard Assessment

6.3.1 Fire Weather

The QFD Bushfire Resilient Communities MapViewer includes Forest Fire Danger Index (FFDI) mapping which is climate-adjusted for a 5 per cent annual exceedance probability (AEP) fire weather event as at 2050. BRC MapViewer identifies this area of Far North Queensland as subject to an **FFDI of 50.**

6.3.2 Vegetation Communities

Vegetation classification is important for a number of reasons, namely it is an indicator of the level of fire intensity and fire behaviour associated with specific types of vegetation and it also indicates the fuel loads which may exist in certain locations. The vegetation communities within 150m of the development footprint form the basis of this assessment, as per that required by the Bushfire Resilient Communities Guideline process for undertaking a bushfire hazard assessment.

Areas of non-remnant vegetation which have not yet reached maturity are assessed as mature communities, accounting for the future hazard profile of lands within 150m of the development footprint. This is particularly relevant to the areas to the north-east of the BESS site.

[2] Terminology as used by the Bushfire Resilient Communities reliability assessment methodology at Section 5.3.1 of that document.

Desktop Vegetation Assessment

Figure 10 below identifies the current extent of mapped vegetation communities, illustrated via VHC tiles mapping in the QFD BRC MapViewer. The BESS and grid connection footprint and immediate surrounds (within 150m) contain mapped:

- BVG 9-15 Eastern eucalypt woodlands to open forests (**VHC 9.1** Moist to dry eucalypt open forests on coastal lowlands and ranges)
- BVG 21 – 22 Melaleuca open woodlands on depositional plains:
    - **VHC 21.3** Shrubland associated with Melaleuca dry woodlands on sandplains or depositional plains)
    - **VHC 22.1** Melaleuca open forests on seasonally inundated lowland coastal swamps
- BVG 38 Cropping and horticulture (**VHC 38.5** Cropping and horticulture).

As is evident, areas of VHC 9.1 and 21.3 to the north-west, west and south-west of the BESS site are not reflective of the vegetation on the ground. This area is more appropriately VHC 38.5.

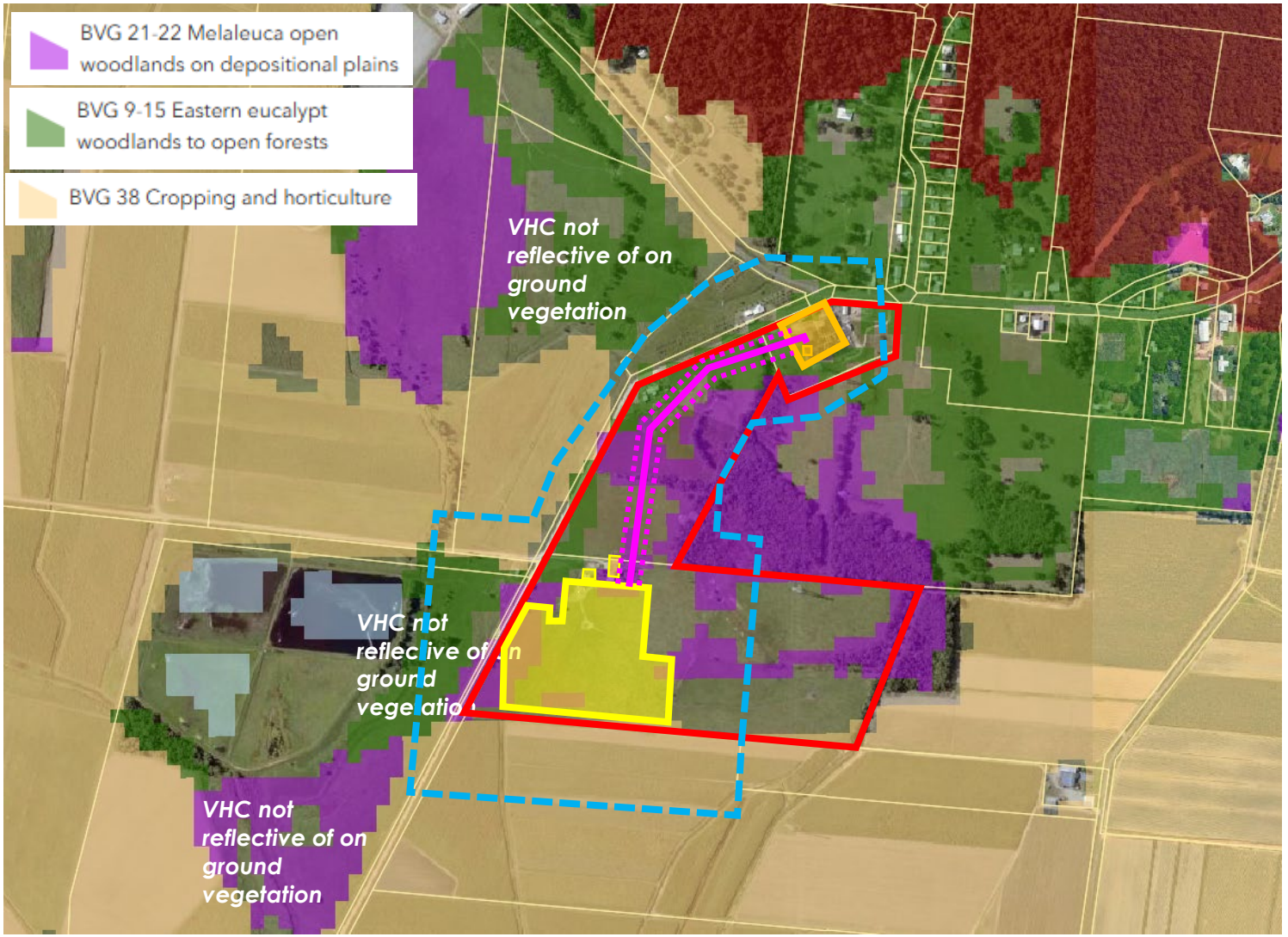

Figure 10 – BRC MapViewer Vegetation Hazard Class (VHC) Tiles

(Source: QFD, 2025)

The State Government regional ecosystem mapping for the site is shown in **Figure 11.** The regional ecosystems (all identified as regrowth vegetation) within 150m of the site include:

- 7.3.8d
- 7.3.5a
- 7.3.7a.

Notably, the regrowth regional ecosystems to the west of the site are beyond 150m from the BESS footprint. Those within 150m of the grid connection to the north-west of the existing Tully substation are unlikely to reach remnant status in the near future, due to the ongoing use of the land for agricultural and other purposes. These regional ecosystems have therefore been excluded from this assessment.

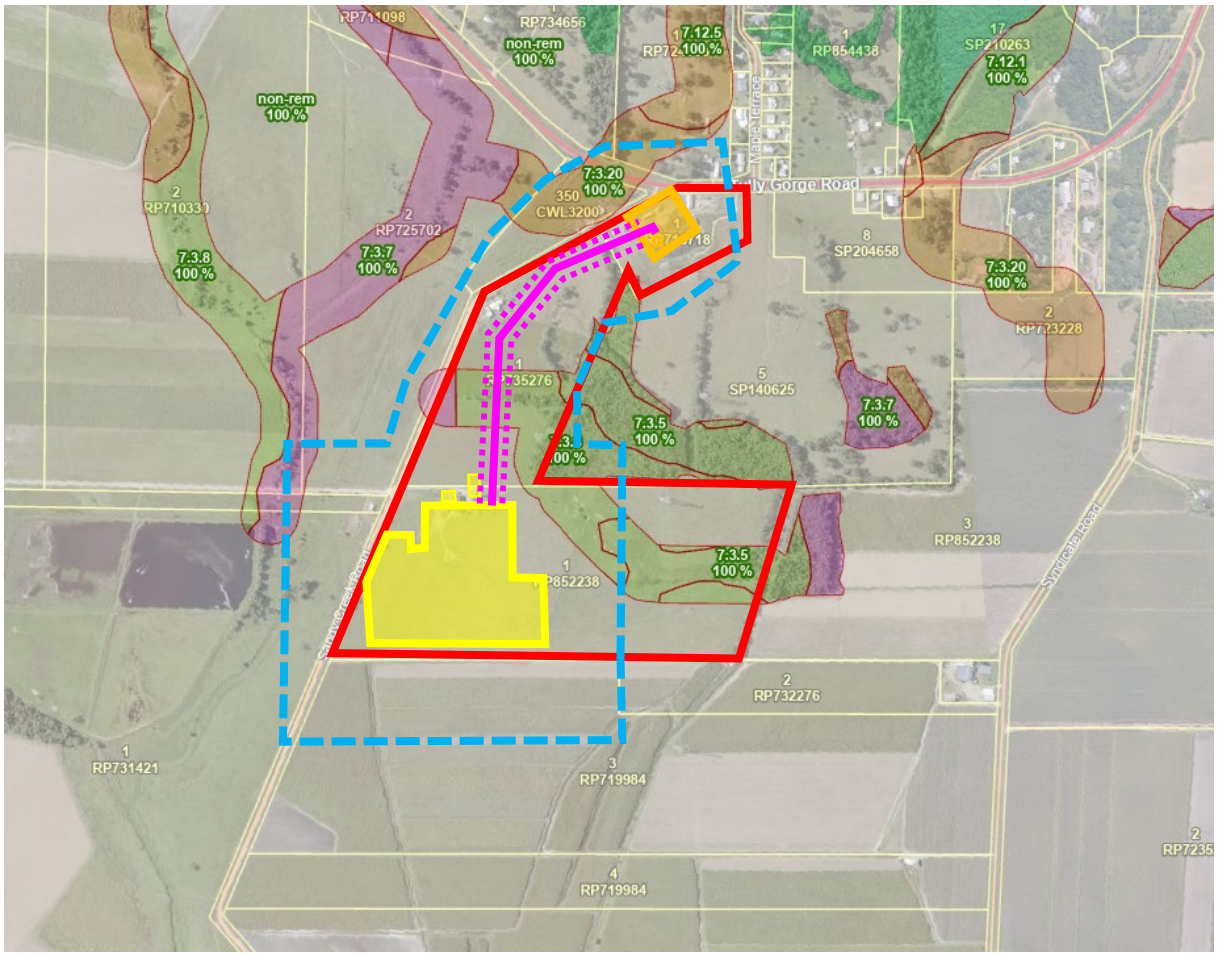

Figure 11 – Regional Ecosystem Mapping

(Source: Qld Globe, 2025)

Verified Vegetation Assessment

The regional ecosystems in immediate proximity to the BESS site have been verified by the project ecologist as shown in **Figure 12**. The verified regional ecosystems include:

- 7.3.5 (both remnant and regrowth areas)
- 7.3.7a (regrowth areas).

A considerable amount of the mapped area has been identified as non-remnant vegetation.

Where verification of vegetation has not occurred within the 150m buffer, it is assumed for the purposes of this assessment the regional ecosystems are consistent with the two RE's verified above or the State RE mapping.

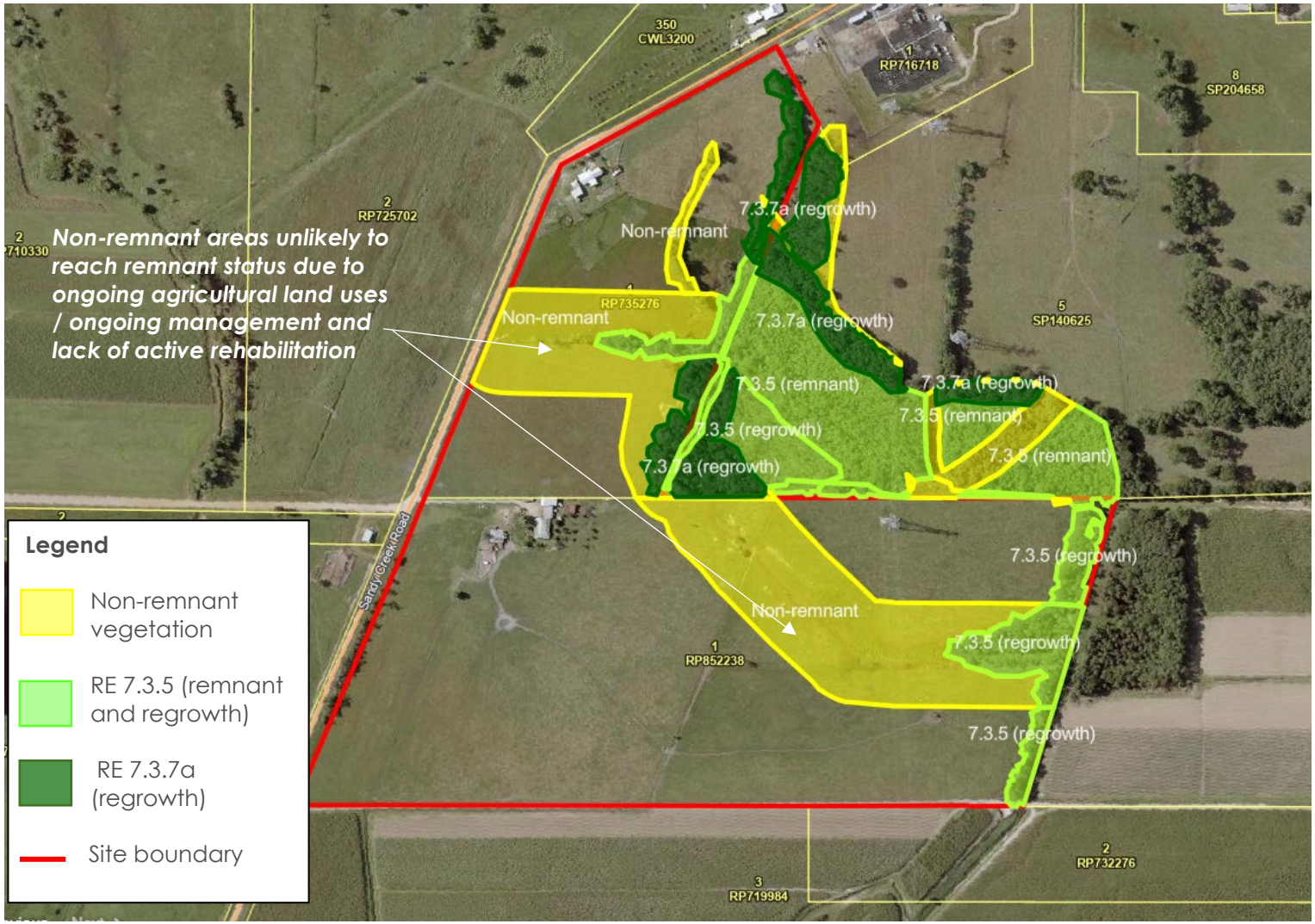

Figure 12 – Verified Regional Ecosystem Mapping

Source: Attexo

The Vegetation Hazard Class (VHC) conversion and associated potential fuel loads for the mapped and verified REs are set out in the table following **(Table 3)**, pursuant to Part 6 of the BRC.

Table 3 - Vegetation Communities within the site and within 150m of the BESS footprint (remnant and non-remnant)

RE	RE Description	RE Structure Code	VHC	VHC Description	Understorey (Surface + Near Surface) Potential Fuel Load (t/ha)	Total Potential Fuel Load (t/ha)
7.3.8d	Melaleuca viridiflora, Lophostemon suaveolens and Allocasuarina littoralis open shrubland, on poorly drained alluvial plains	Open Forest	21.3	Melaleuca dry open forests on sandplains or depositional plains	6.6	7.5
7.3.5a	Melaleuca quinquenervia open forest, woodland and shrubland, on poorly drained alluvial plains	Closed Forest	22.1	Melaleuca open forests on seasonally inundated lowland coastal swamps	23.4	28.4
7.3.5*	Melaleuca quinquenervia and/or Melaleuca cajuputi subsp. platyphylla closed forest to shrubland on poorly drained alluvial plains	Closed Forest	22.1	Melaleuca open forests on seasonally inundated lowland coastal swamps	23.4	28.4
7.3.7a*	Eucalyptus pellita and Corymbia intermedia open forest to woodland, on poorly drained alluvial plains and swamps	Open Forest	9.1	Moist to dry eucalypt open forests on coastal lowlands and ranges	21.0	24.2

*Regional ecosystems verified on site by the project ecologist.

The vegetation which potentially constitutes a hazard within 150m of the BESS footprint is confirmed to be dominated by a mix of remnant and non-remnant vegetation and is dominated by VHC 22.1, with some areas of VHC 9.1, when aligned with the verified regional ecosystem data. Areas currently mapped by BRC Mapviewer as VHC 21.3 have been verified as the potential to become VHC 9.1.

VHC 22.1 has the higher total potential fuel load of 28.4 t/ha. The remaining vegetation (VHC 9.1) has a total potential fuel load of 24.2 t/ha.

Photographs of VHCs have been provided by the project ecologist in **Figure 13** and **Figure 14**.

Figure 13 - RE 7.3.5

Figure 14 - RE 7.3.7a

Pursuant to the vegetation structural classes assessment of Part 6 of the Bushfire Resilient Communities Guideline, the vegetation (within 150m of the BESS footprint) is characterised broadly as Trees closed – mid dense, as per **Table 4.**

Table 4 - Assessment of Vegetation Structure in accordance with Part 6 of the BRC

RE	Life Form and Height	Vegetation structure class	Dominant life form	Density
7.3.5 7.3.7a	Trees Medium 10-30m	Trees closed – mid dense	Trees	Closed to mid-dense

6.3.3 Effective Slope and Site Slope

Effective slope relates to the topography beneath classified vegetation, as this influences fire speed and rate of spread – namely, that the speed of fire doubles for every 10 degrees incline.

An effective slope assessment has been conducted based on 1m contour data provided by Attexo and Qld Globe (for a distance of 150m from the BESS footprint) in **Figure 15**.

The effective slope assessment demonstrates the mapped hazardous vegetation to the **north-east** is approximately 1 degree downslope of the proposed BESS footprint.

The overall site slope (the slope within the BESS footprint itself) is approximately 1 degree from the northern extent down to the southern extent of the footprint.

It is noted that the overall site slope within the development footprint will likely be subject to some cut and fill to accommodate the new BESS.

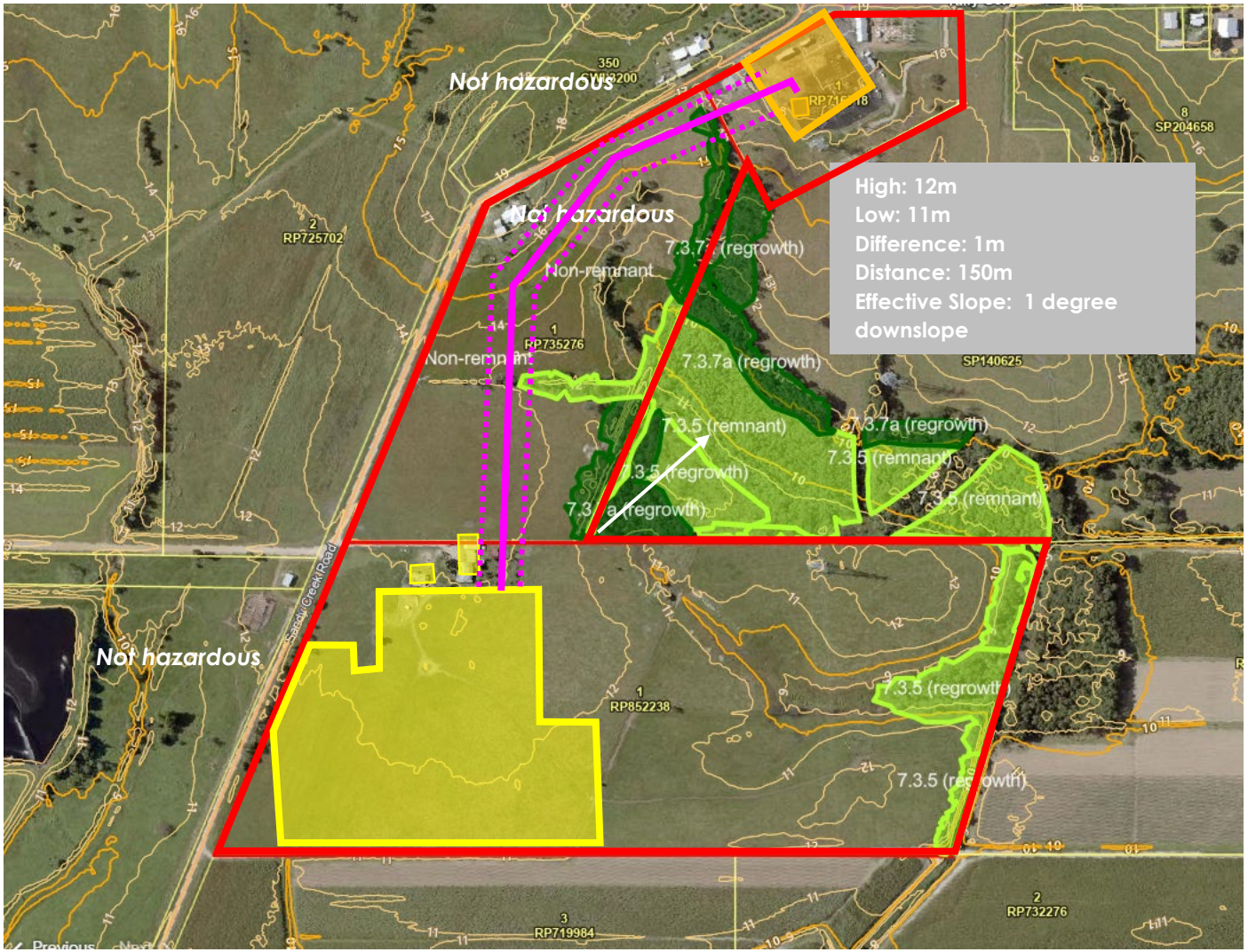

Figure 15 - Effective Slope Assessment

Source: Attexo and Qld Globe, 2025

6.3.4 Aspect

Aspect can affect bushfire behaviour where slopes with northerly and/or westerly aspects experience a higher level of solar access than those areas with a southern or eastern aspect. This generally translates to drier fuels with lower moisture content and increased dead/drying/curing material.

Notwithstanding, in times of drought and below average rainfall, moisture levels in soil and vegetation in more sheltered areas with southerly and easterly aspects can also decrease substantially giving rise to significantly higher fuel abundance where the preceding fire regime has been less frequent or intense. Thus, aspect is of only partial consequence in this respect and this is reflected by the current SPP mapping methodology and information made publicly available by QFD.

The nearby hazardous vegetation generally maintains a north-easterly aspect.

6.3.5 Fire History

In relation to historical fire activity in the area, ignitions have occurred in the general region.

A review of fire scar mapping using the Queensland Globe platform identifies wildfire or hazard reduction burns on the site and in the immediate area over the last 20 years, including an event to the north east in 2010 **(Figure 16).**

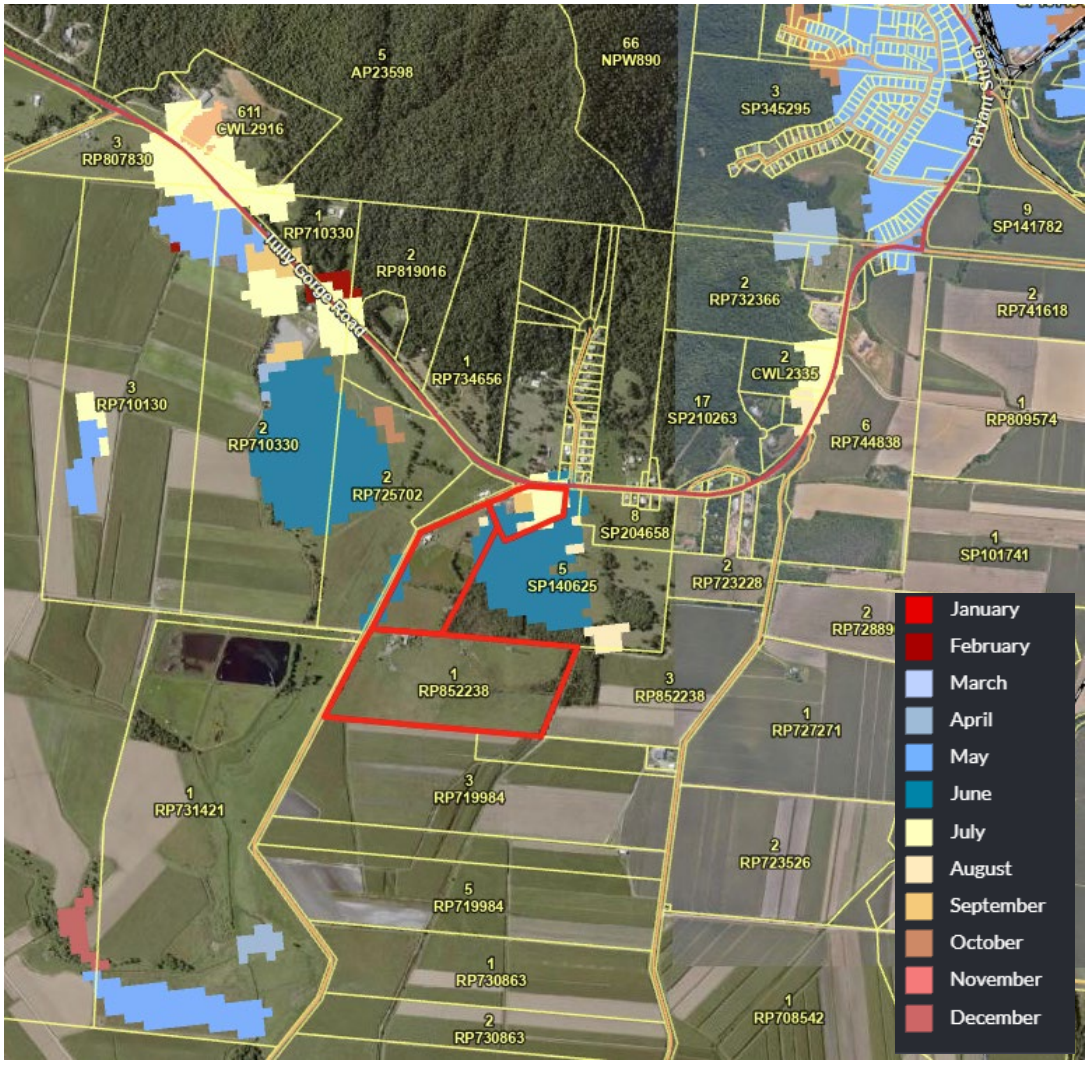

Figure 16 - Historical Fire Scar Mapping within the Site and Locality

(Source: Queensland Globe, 2025)

6.3.6 Ignition Sources

Likely ignition sources in the area include ignition from rural and agricultural activities including burning and harvesting of sugar cane, slashing and use of power tools. Other general ignitions may include roadside ignition (potentially caused by cigarette butts thrown from vehicles) and arcing powerlines, noting high voltage lines are located to the east of the BESS site. Ignitions may also occur from activities associated with the nearby substation activities.

Fire risk and ignitions associated with the BESS facility itself such as electrical hazards, chemical hazards, explosions and fire spread between batteries is an issue for a fire engineering safety plan and will not be addressed by this report.

7 Qualitative Assessment: Bushfire Behaviour Assessment, Extent of Hazard and Bushfire Intensity

This section of the report provides commentary on bushfire behaviour on and around the site and fireline intensity within proximity to the development footprint.

7.1 Fire runs and disruptions

In terms of fire runs, due to the nature of the surrounding landscape fire runs are more likely from the north-east of the BESS facility, from the direction of mapped hazardous vegetation. Grass fire however may occur from any direction, due to the extent of surrounding agricultural land.

The terrain in the immediate area is generally flat, with a gentle slope down to the north-east towards the waterway / drainage corridor. Consequently the vegetation in this area is slightly (1 degree) downslope of the BESS footprint. This downslope is unlikely to have a significant effect on fire behaviour.

Beyond this, the land further to the north is steeply sloping and heavily vegetated, however this vegetation is separated from the site by cleared areas and Tully Gorge Road, and is largely mapped as low bushfire intensity due to the vegetation communities in this area.

Wind conditions in any event are likely to have a substantial effect on fire behaviour.

7.2 Fireline intensity

It is appropriate to consider the potential fireline intensity of vegetation within 150m of the development footprint for each of the vegetation classes identified and using the highest effective slope metric observed.

There are two verified vegetation hazard classes identified within 150m the site: VHC 22.1 and VHC 9.1, with VHC 22.1 being the dominant VHC.

The corresponding fireline intensity, as informed by the VHC, fuel loads, fire weather (FFDI) and effective slope) are High potential bushfire intensity for VHC 22.1 (**Figure 17**) and Medium potential bushfire intensity for VHC 9.1 (**Figure 18**).

This is not entirely consistent with the State Bushfire Prone Area mapping due to inconsistencies with the type and extent of verified vegetation communities (as discussed in section 6 of this report).

RE code	RE Label	Vegetation Hazard Class	Potential Fuel Load (t/ha)	Fire Weather Severity (FFDI)	Maximum Landscape Slope (degrees)	Potential Fireline Intensity (kw/m) *	Potential Bushfire Intensity *
7.3.5	Melaleuca quinquenervia and/or Melaleuca cajuputi subsp. platyphylla closed forest to shrubland on poorly drained alluvial plains	22.1	28.4	50	1	26,790	High

Cells in yellow can be modified

* From: Leonard, J., Newnham, G., Opie, K., and Blanchi, R. (2014) A new methodology for state-wide mapping of bushfire prone areas in Queensland. CSIRO, Australia.

For further information or advice on the use of this tool contact sdu@qfes.qld.gov.au

Figure 17 - Fireline intensity verification - QFD Fireline Intensity Calculator prepared by CSIRO (RE 7.3.5 and VHC 22.1)

RE code	RE Label	Vegetation Hazard Class	Potential Fuel Load (t/ha)	Fire Weather Severity (FFDI)	Maximum Landscape Slope (degrees)	Potential Fireline Intensity (kw/m) *	Potential Bushfire Intensity *
7.3.7a	Eucalyptus pellita and Corymbia intermedia open forest to woodland, on poorly drained alluvial plains and swamps	9.1	24.2	50	1	19,452	Medium

Cells in yellow can be modified

* From: Leonard, J., Newnham, G., Opie, K., and Blanchi, R. (2014) A new methodology for state-wide mapping of bushfire prone areas in Queensland. CSIRO, Australia.

For further information or advice on the use of this tool contact sdu@qfes.qld.gov.au

Figure 18 - Fireline intensity verification - QFD Fireline Intensity Calculator prepared by CSIRO (RE 7.3.7a and VHC 9.1)

8 Bushfire Risk Analysis

In addition to examining potential bushfire behaviour, the consideration of bushfire risk is important. As per the Queensland Emergency Risk Management Framework (QERMF) prepared by QFD, this involves the consideration of:

- Likelihood
- Consequence
- Vulnerability.

The QERMF Framework is illustrated in **Figure 19.**

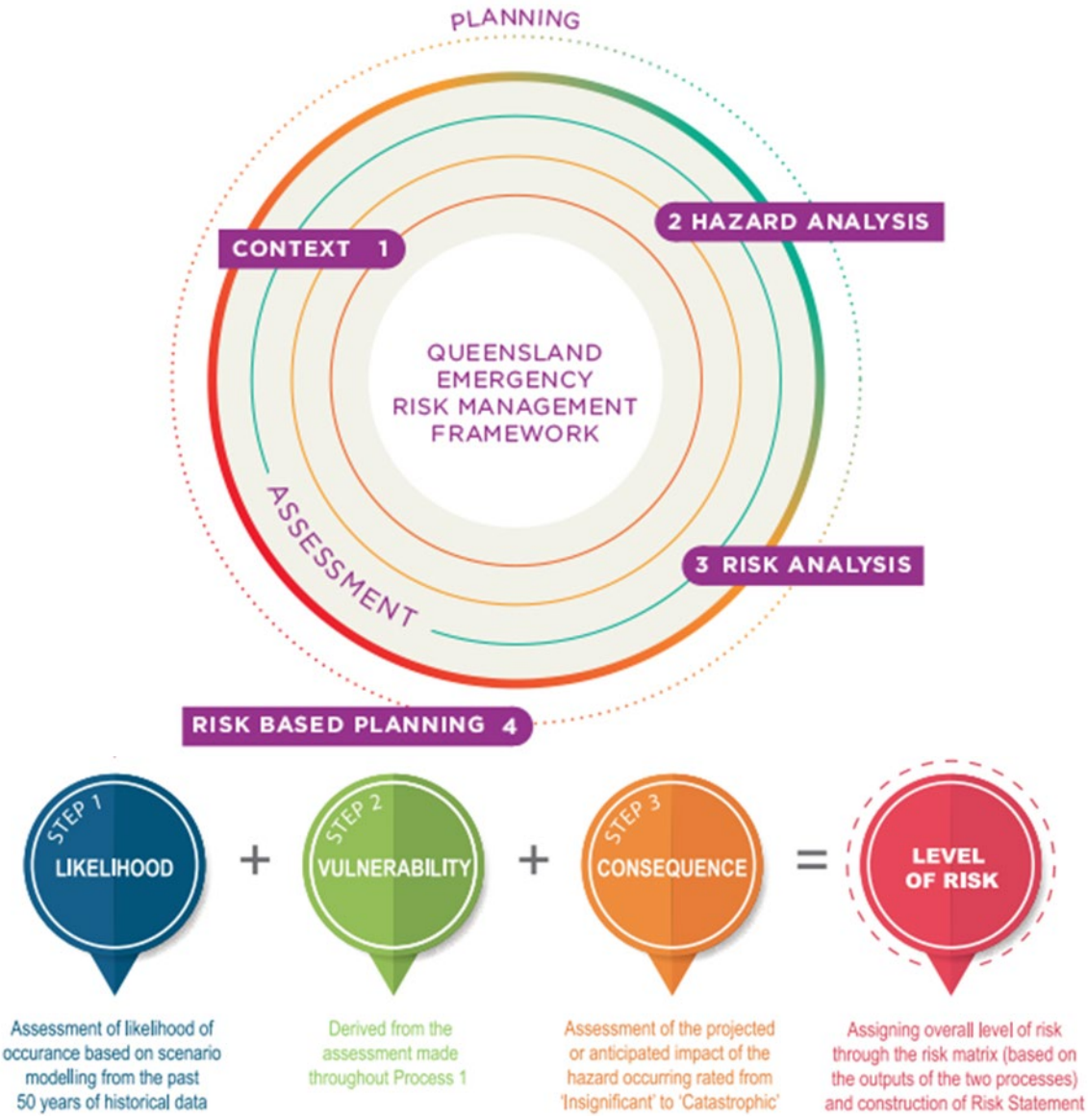

Figure 19 - QERMF Overview

From a risk vulnerability perspective, the proposed BESS facility and associated infrastructure is susceptible to radiant heat and flame contact. In addition, it also maintains a level of ignition probability.

Table 5 outlines the assessment of the untreated bushfire risk associated with the proposed facility.

Table 5 - Assessment of likelihood, vulnerability and consequence in accordance with the QERMF

LIKELIHOOD:	Likely
VULNERABILITY:	Low
CONSEQUENCE:	
People	Minor
Financial and economic	Minor
Community and social	Insignificant
Public administration	Insignificant
Environment	Minor

The QERMF provides a fit-for-purpose risk matrix which incorporates the assessment of vulnerability, in addition to likelihood and consequence factors. The QERMF risk matrix is provided in **Table 6.**

Table 6 - Risk matrix as per Appendix 4 of the QERMF

Likelihood (X)		Rare (1)					Unlikely (2)					Possible (3)					Likely (4)					Almost Certain (5)				
Vulnerability (Y)		V.Low (1)	Low (2)	Mod (3)	High (4)	Extr (5)	V.Low (1)	Low (2)	Mod (3)	High (4)	Extr (5)	V.Low (1)	Low (2)	Mod (3)	High (4)	Extr (5)	V.Low (1)	Low (2)	Mod (3)	High (4)	Extr (5)	V.Low (1)	Low (2)	Mod (3)	High (4)	Extr (5)
Consequence (Z)	INSIGNIFICANT (1)	VL1	VL2	VL3	L4	L5	VL2	VL3	L4	L5	L6	VL3	L4	L5	L6	M7	L4	L5	L6	M7	M8	L5	L6	M7	M8	H9
	MINOR (2)	VL2	VL3	L4	L5	L6	VL3	L4	L5	L6	M7	L4	L5	L6	M7	M8	L5	L6	M7	M8	H9	L6	M7	M8	H9	H10
	MODERATE (3)	VL3	L4	L5	L6	M7	L4	L5	L6	M7	M8	L5	L6	M7	M8	H9	L6	M7	M8	H9	H10	M7	M8	H9	H10	H11
	MAJOR (4)	L4	L5	L6	M7	M8	L5	L6	M7	M8	H9	L6	M7	M8	H9	H10	M7	M8	H9	H10	H11	M8	H9	H10	H11	E12
	CATASTROPHIC (5)	L5	L6	M7	M8	H9	L6	M7	M8	H9	H10	M7	M8	H9	H10	H11	M8	H9	H10	H11	E12	H9	H10	H11	E12	E13

Key: V.L= Very low; L = Low; M = Medium; H = High; E = Extreme

Scale: 1 (lowest) to 13 (highest)

Table 3 - Risk Matrix

Having regard to the assessment of likelihood (of impact), vulnerability and consequence for the proposed BESS facility and associated infrastructure (without treatment), the overall risk level is as follows:

OVERALL RISK:	**Low (L6)**

The bushfire management provisions contained in the following sections of this report provide a risk management approach to maintain a tolerable / low overall risk for the facility.

9 Bushfire Management and Mitigation

There are a number of options available to address and mitigate the risk to the proposed BESS and associated infrastructure. This includes opportunities to reduce the likelihood and severity of bushfire hazard affecting subject site through a suite of mitigation and management measures.

These measures include:

- Asset protection zones
- Building construction
- Access and egress
- Water supply and fire-fighting infrastructure
- Hazardous material storage
- Rehabilitation / revegetation
- Bushfire management during construction
- Operational procedures.

9.1 Asset Protection Zones

Stage 3 of the Bushfire Resilient Communities Technical Reference Guide for undertaking a bushfire hazard assessment requires an assessment of radiant heat exposure and required separation, or asset protection, to mitigate the use from potential bushfire hazard threat.

An asset protection zone (APZ) is an area which surrounds a building, structure or infrastructure and is intended to be maintained in perpetuity in a no or low fuel condition. An APZ can:

- limit radiant heat exposure, the transmissivity of which diminishes over distance
- avoids flame contact
- in some cases, provide working areas for fire-fighting and defence around facilities by reducing the impact of radiant heat
- provide access around facilities
- mitigate risk of ignition from the proposed facility.

9.1.1 APZ Calculation

Queensland does not currently have specific guidance for the recommended asset protection zone width for Battery Energy Storage Facilities. The Bushfire Resilient Communities technical reference guide recommends the adoption of a 1,200 flame temperate and 10kW/m^2 radiant heat threshold for vulnerable uses and essential infrastructure assets generally. As discussed previously in Section 5 of this report, a BESS facility and associated infrastructure may be considered essential infrastructure. Therefore, both the 1,200 flame temperate and the 10kW/m^2 radiant heat threshold has been recommended in this instance.

FLAMESOL calculations are provided in **Figure 20** and **Figure 21** to demonstrate the required separation (APZ) from the development footprint and hazardous vegetation to achieve a 10 kW/m^2 radiant heat flux level. This APZ distances are a function of fire weather, fuel load and topography. The highest fuel load (VHC 22.1) is adopted for the purposes of calculating the APZ.

Based on these calculations it is recommended that a **48.1m** wide APZ is provided along the northern and eastern sides of the BESS facility. A 10m wide APZ is also recommended along the

western and southern sides of the BES, including the temporary construction areas to accommodate for grass fire. The adjoining road reservation can form part of this APZ where necessary.

The recommended APZs are shown in the Bushfire Management Plan included in **Appendix C.**

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Calculated March 18, 2025, 4:07 pm (MDc v.4.9)

VHC 22.1

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	50	Rate of spread	1.5 km/h
Vegetation Classification	Forest	Flame length	13.18 m
Understorey fuel load	23.4 t/ha	Flame angle	66 °, 72 °, 76 °, 79 °, 80 ° & 85 °
Total fuel load	28.4 t/ha	Elevation of receiver	5.74 m, 5.9 m, 5.87 m, 5.75 m, 5.65 m & 4.64 m
Vegetation height	n/a	Fire intensity	22,073 kW/m
Effective slope	1 °	Transmissivity	0.86, 0.842, 0.8169999999999999, 0.794, 0.782 & 0.728
Site slope	1 °	Viewfactor	0.414, 0.3074, 0.2072, 0.1407, 0.1142 & 0.0307
Flame width	100 m	Minimum distance to < 40 kW/m²	15.6 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	20.9 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	29.9 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	41.1 m
		Minimum distance to < 10 kW/m²	48.1 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Figure 20 - Flamesol Calculation for VHC 22.1

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FPA AUSTRALIA

Calculated March 18, 2025, 4:10 pm (MDc v.4.9)

VHC 9.1

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	50	Rate of spread	1.35 km/h
Vegetation Classification	Forest	Flame length	11.67 m
Understorey fuel load	21.0 t/ha	Flame angle	66 °, 72 °, 77 °, 80 °, 81 ° & 85 °
Total fuel load	24.2 t/ha	Elevation of receiver	5.09 m, 5.22 m, 5.21 m, 5.09 m, 4.99 m & 4.01 m
Vegetation height	n/a	Fire intensity	16,879 kW/m
Effective slope	1 °	Transmissivity	0.865, 0.848, 0.824, 0.8, 0.788 & 0.732
Site slope	1 °	Viewfactor	0.4121, 0.3059, 0.2059, 0.1393, 0.1132 & 0.0305
Flame width	100 m	Minimum distance to < 40 kW/m²	13.9 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	18.6 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	27 m
Flame temperature	1,200 K	Minimum distance to < 12.5 kW/m²	37.6 m
		Minimum distance to < 10 kW/m²	44.2 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Figure 21 - Flamesol Calculation for VHC 9.1

With regard to the proposed overhead grid connection. It is recommended the infrastructure is located more than 14.6m from the nearest hazardous vegetation to the east. This is based on a 1,090K flame temperature and 29kW/m^2 radiant heat threshold on the basis that such infrastructure **(Figure 22)**. The current infrastructure corridor of 20m will achieve adequate separation. It is assumed this corridor will be maintained in a low fuel state. The existing narrow vegetation corridors can be retained, however it is recommended these are not actively revegetated or rehabilitated in a manner that would increase the fuel load.

FLAMESOL
FPA AUSTRALIA

Calculated June 30, 2025, 4:35 pm (MDc v.4.9)

Electricity Infrastructure

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	50	Rate of spread	1.5 km/h
Vegetation Classification	Forest	Flame length	13.18 m
Understorey fuel load	23.4 t/ha	Flame angle	54 °, 64 °, 72 °, 77 °, 78 ° & 84 °
Total fuel load	28.4 t/ha	Elevation of receiver	5.14 m, 5.66 m, 5.89 m, 5.89 m, 5.81 m & 5.01 m
Vegetation height	n/a	Fire intensity	22,073 kW/m
Effective slope	1 °	Transmissivity	0.875, 0.857, 0.832, 0.80700000000000001, 0.794 & 0.73
Site slope	1 °	Viewfactor	0.5989, 0.4428, 0.2998, 0.2032, 0.1651 & 0.0449
Flame width	100 m	Minimum distance to < 40 kW/m²	10.8 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	14.6 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	21.4 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	30.4 m
		Minimum distance to < 10 kW/m²	36.2 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Figure 22 - Flamesol Calculation for overhead electricity infrastructure

9.1.2 Activities within the APZ

All ongoing activities and permanent infrastructure and buildings associated with the BESS facility is not to occur within the APZ, including any fuel, water and materials storage.

Vehicle parking areas, perimeter roads / tracks may occur within the APZ.

The potential use of the existing dwellings / structures within the APZ for O&M area in the future (as shown on the proposal plan) is noted. These dwellings are adequately separated from the nearest hazardous vegetation to allow for this use. The proposed infrastructure corridor (40m) for the grid connection will also ensure those dwelling remain separated from hazardous vegetation.

9.1.3 Ground Treatments and Landscaping within the APZ

As the APZ area is already largely cleared of vegetation, no further understorey clearing is required. It is recommended that the APZ is maintained as mown grass, rock cover or bare earth.

Individual tree specimens can be retained, provided canopies are separated at maturity.

Any landscaping within the APZ should adopt the principles and species selection in accordance with the provisions set out in Section 8 of the Bushfire Resilient Communities technical reference guide. These principles include:

- *landscape design that reduces vulnerability to bushfire attack* – this includes layout of landscaped areas that avoid continuous vegetation
- *plant selection that avoids or minimises opportunities for ignition of landscaping features* (see Figure 20 on p.47-28 of BRC for the characteristics of low flammability species)
- *long-term landscaping management arrangements that reduce exposure to bushfire attack* (regular mowing, removing accumulated leaf litter and woody debris, clearing understorey vegetation).

The proposal includes landscaping / screening planting along the Sandy Creek Road frontage and part way along the side boundaries of Lot 1 on RP852238. This planting is considered acceptable given the separation from existing hazardous vegetation and the narrow width (2m to 5m). It is recommended that the species selection is in accordance with BRC (section 8) as noted above.

9.1.4 Fencing and Retaining Walls

Fencing materials can have a considerable impact on the propagation of fire. Likewise, some fencing materials can alleviate exposure to radiant heat.

Any fencing or barriers within the APZ must not be constructed from timber. Instead, fencing and barrier materials, including the proposed noise wall, must be fire resistant. Steel mesh fencing can be used.

In addition, any retaining walls required should be constructed of fire resistant or fire retardant material such as concrete, stone, masonry or the like and not constructed from timber.

9.2 Building Construction

It is noted the BESS facility and associated infrastructure includes both temporary and permanent buildings. It is assumed the buildings will not be a Class 1, Class 2, Class 3 or select Class 9 building and therefore are unlikely to have building construction requirements (i.e. BAL design requirements) imposed at building approval stage.

Given the intended location of the proposed buildings on the western side of the facility and away from nearby hazardous vegetation, no recommendations are made regarding any (voluntary) BAL construction standards for those buildings.

9.3 Access and Egress

Access and egress are significant in terms of a range of aspects of bushfire prevention and ability for firefighting. Road design must cater for emergency access and egress in times of potential bushfire emergency events.

It is understood that access to the facility is to be provided directly to Sandy Creek Road via a newly constructed / upgraded access points. The access points should be conditioned to be capable of providing access for firefighting and other emergency vehicles.

The site has direct access to a local road network of an adequate standard to accommodate emergency service vehicles, as well as evacuating personnel. That local network connects with the Bruce Highway (a state-controlled road) a short distance from the site and is not subject to a significant amount of exposure to bushfire hazard.

9.4 Water Supply and Fire-Fighting Infrastructure

It is understood that the site is currently connected to a reticulated water supply and the O&M building as a minimum will be connected to reticulated water supply. Notwithstanding, reticulated supply with sufficient pressure and capacity, particularly during a bushfire event, is not guaranteed. Therefore a dedicated static supply is recommended.

Queensland does not currently provide specific guidance for static water supply for bushfire fire-fighting purposes for a BESS facility. The recommendations provided below are informed and adopted from the general static water supply guidance provided by BRC and the Renewable Energy Facilities Design Guidelines and Model Requirements (v4, Aug 2023), prepared by the State of Victoria Country Fire Authority.

It is recommended the static water supply:

- provides for a minimum 40,000L dedicated solely for bushfire fighting purposes
- is located at the vehicle access point to the facility – in proximity to Sandy Creek Road access
- positioned at least 10 metres from any infrastructure (i.e. sub-station, switch rooms, battery containers)
- positioned so that any hoses and equipment is capable of reaching all external areas of the facility
- are either below ground or constructed of non-flammable materials such as concrete or steel that is not likely to fail when exposed to excessive heat
- provided with a 50mm male camlock fitting for emergency fire service use (or as otherwise instructed by QFD)
- is provided with clear access within 6 metres of the tank for a medium rigid vehicle (15 tonne fire appliance)
- is clearly identified by directional signage at the street frontage.

This is to be established during construction and maintained in perpetuity. A program must be put in place through operational strategies to ensure the tanks are checked and filled on a regular basis.

The above recommendations are in addition to any on-site static water supply requirements for operational purposes, such as building fire, electrical and chemical fires within the facility and do not override any other requirements set out in Australian Standards.

9.5 Hazardous Material Storage

If hazardous chemicals or materials are stored on the site, they should be:

- Stored furthest from the hazardous vegetation as possible – in this instance, ideally on the western side of the facility
- Stored in screened areas and screening is constructed of fire resistant materials
- Stored in areas separated from buildings and other use areas.

9.6 Rehabilitation / Revegetation

At this stage no details of any required or proposed rehabilitation / revegetation on the site has been provided. If any rehabilitation or revegetation occurs, the recommendations of this report may change.

9.7 Bushfire Management During Construction

The abovementioned bushfire management and mitigation measures are recommended during the operation of the facility and apply in perpetuity. Separate bushfire measures are recommended during the construction period of the project. Adoption of the measures provided below are expected to reduce, to a tolerable level, both the risk of bushfire ignition by construction and the threat that bushfire in the wider area poste to the site and people during construction.

The recommended bushfire protection measures during the construction phase include:

- Temporary buildings for construction should be located as close as possible to Sandy Creek Road access, to limit exposure and aid in efficient evacuation
- Temporary vehicle access for construction is provided directly to Sandy Creek Road and is of an adequate standard to accommodate emergency service vehicles
- Access to water supply for fire suppression and /or protection of structures or equipment is provided.

As the BESS site and recommended APZ is already largely cleared of vegetation, no specific recommendations are provided regarding the timing / staging of vegetation clearing during the construction phase.

The above recommendations should be incorporated into any construction emergency management plans for the site.

9.8 Operational Procedures

It is expected that various operational procedures including work place health and safety plans and evacuation plans will be implemented for the facility. Bushfire, including the relevant recommendations of this report and those additional recommendations set out below, must be included in these procedures.

9.8.1 Activities on Adjoining Land

It is recommended that the operator engages with adjoining property owners regarding harvesting of cane, including the burning of cane, in proximity to the property boundaries. It is recommended that burning or any activities that could cause potential ignitions does not occur in proximity to the site. If burning is required, the presence of the Rural Fire Brigade may

be required to reduce the risk of ignitions at the BESS site. Consultation should be carried out with the local brigade accordingly.

9.8.2 Evacuation Procedures

Evacuation of the facility post-construction is likely to be limited to a small number of persons.

Ideally, fire weather conditions and current warnings are considered prior to any staff attending the facility during the fire season. Operational plans will be required to identify evacuation requirements, which should consider evacuation to the township of Tully. Ideally, workers are not permitted on site on 'Extreme' and 'Catastrophic' fire danger days, and any other day where a fire event is occurring within approximately 20 kilometres of the site.

10 Conclusion & Recommendations

This report considers the bushfire hazard profile and mitigation measures required for a new Battery Energy Storage System (BESS) and associated infrastructure.

Based upon this detailed analysis, it is considered that the proposed development offers the ability to implement a suite of measures that contribute to mitigating the threat of bushfire hazard and reducing the risk to people and property to a tolerable level.

The following recommendations are made by this report:

1. **Asset Protection Zone:** A **48.1m** wide APZ is provided along the northern and eastern sides of the BESS facility. A 10m wide APZ is also recommended along the western and southern sides of the BESS to accommodate for grass fire. The treatment and ongoing management of the APZ is set out in further detail in the report. The overhead grid connection should be located a minimum of 14.6m clear of any hazardous vegetation.

2. **Water supply:** A static water supply provides for a minimum of 40,000L dedicated solely for bushfire fighting purposes. The recommended location and design of the static water supply is set out in further detail in the report.

3. **Access and egress:** Direct access to the BESS facility is provided to Sandy Creek Road.

4. **Hazardous materials and chemical storage:** Are located away from the hazardous vegetation.

5. **Bushfire management during construction:** the recommended bushfire management measures are adopted during the construction phase of the project.

6. **Operational procedures:** incorporate the relevant bushfire recommendations of this report.

APPENDICES

Meridian Urban

Appendix A – Proposed Development Plan

Appendix B - Assessment against the Bushfire Hazard Code

Bushfire Hazard Code

Overall Outcomes

Purpose and Overall Outcome	Response
2. The purpose of the code will be achieved through the following overall outcomes:	
(a) development is designed to: (i) avoid or minimise the risk of loss of life from bushfire; (ii) minimise the damage to property from bushfire; (iii) assist emergency services in responding to any bushfire threat.	**Complies –** This report demonstrates that the BESS facility and associated infrastructure appropriately avoids the bushfire prone area and various mitigation measures, including adequate separation, can be adopted to minimise risk to people and property to a tolerable level. These measures include appropriate access and fire-fighting infrastructure for emergency services.

Identified requirements and assessment benchmarks

Performance outcomes	Acceptable outcomes	Response
Avoidance		
PO1 Development avoids areas of very high, high or medium potential bushfire intensity where practicable.	**AO1.1** Development is not located in an area of very high, high or medium potential bushfire intensity. *Note—A site-specific bushfire hazard assessment will be necessary to demonstrate that a proposed development site is low bushfire risk despite being mapped as an area of very high, high or medium potential bushfire intensity.*	**Complies –** The BESS facility is located outside the mapped area of very high, high and medium potential bushfire intensity. The western portion of the BESS footprint is partially is affected by the Potential impact buffer, however as discussed in this report that mapping is not an accurate reflection of the site characteristics or vegetation present in this area. Similarly, the grid connection passes through an area of mapped High potential bushfire intensity, but again the mapping is not reflective of the on ground vegetation status.
Mitigation		
PO2 Development maintains the safety of people and property by mitigating the risk of bushfire through: (a) lot design;	**AO2.1** One water tank with fire brigade fittings is provided within 100 metres of each Class 1, 2, 3 or 4 building where the development: (a) involves new or existing buildings with a gross floor area greater than 50m2;	**Not applicable –** The proposal does not include any Class 1, 2, 3 or 4 buildings.

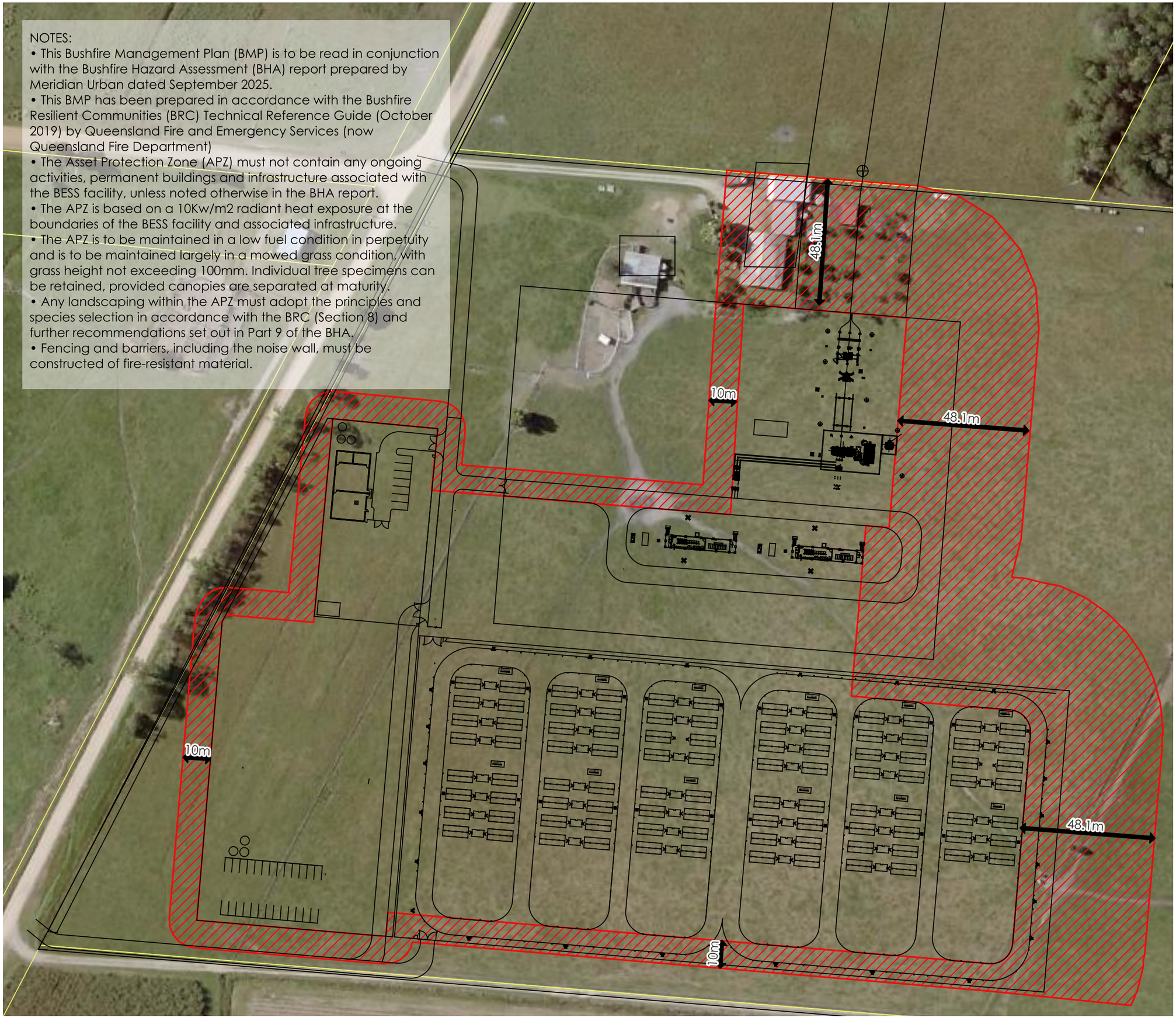
Performance outcomes	Acceptable outcomes	Response
(b) including firebreaks that provide adequate access for fire-fighting and other emergency vehicles; (c) providing adequate road access for safe evacuation and fire-fighting and other emergency vehicles; (d) providing an adequate and accessible water supply for fire-fighting purposes.	(b) is located in an area not serviced by a reticulated water supply; (c) where a water tank is provided for the purpose of household water supply.	
	AO2.2 Lots created for a residential activity are designed so that their size and shape allow for efficient emergency access to buildings for fire-fighting appliances (e.g. by avoiding long narrow lots with long access drives to buildings).	**Not applicable –** The proposal is not for a residential subdivision.
	AO2.3 Where development will result in multiple buildings or lots: (a) firebreaks are provided by a perimeter road that separates lots from areas of bushfire hazard and that road has: (i) a minimum cleared width of 20 metres; (ii) a constructed road width and weather standards complying with Planning Scheme Policy SC6.3 FNQROC Development Manual, or (b) fire maintenance trails are located as close as practicable to the boundaries of the lots and the adjoining bushfire hazard, and the fire maintenance trails: (i) have a minimum cleared width of 6 metres; (ii) have a formed width and gradient, and erosion control devices complying with Planning Scheme Policy SC6.3 FNQROC Development Manual; (iii) have vehicular access at each end;	**Response to AO2.3 and 2.4: Complies with PO2 –** The recommendations of this report include an asset protection zone around the perimeter of the facility to provide separation between the facility and nearby hazardous vegetation, as well as a separation to mitigate against grassfire. This separation has been determined in accordance with the methodology set out in BRC. The proposed APZ will also facilitate access for fire fighting vehicles. The facility also incorporates a perimeter road / track around the batteries.

Performance outcomes	Acceptable outcomes	Response
	(iv) provide passing bays and turning areas for fire-fighting vehicles; (v) are either located on public land or within an access easement that is granted in favour of the Queensland Fire and Rescue Service.	
	AO2.4 Where development will result in multiple buildings or lots, cleared firebreaks at least 6 metres wide are provided adjacent to vegetation within the site to allow the burning of sections and access for bushfire response.	
	AO2.5 New roads are designed and constructed as follows: (a) in accordance with Planning Scheme Policy SC6.3 FNQROC Development Manual; (b) to have a maximum gradient of 12.5%; (c) no cul-de-sacs are created, unless the road is a perimeter road isolating the development from a bushfire hazard.	**Not applicable –** No new roads are proposed or required as part of the development.
Firebreaks		
PO3 The establishment of firebreaks minimises impacts on areas of environmental significance.	**AO3.1** The establishment of a firebreak in accordance with PO2, AO2.3 and AO2.4 above must not involve the clearing of native vegetation unless a site-specific bushfire hazard assessment demonstrates that the bushfire hazard is very high, high or medium on that site.	**Complies –** The recommended APZ set out in this report does not require the clearing of native vegetation as it is located in existing cleared areas of the site.
Community Infrastructure		
PO4 Development for community infrastructure in the form of emergency services, an emergency shelter, air services, hospital, educational	**AO4.1** Development for community infrastructure as identified in PO4:	**Complies –** Whilst the definition of community infrastructure does not explicitly include a BESS facility, it does include a substation, which has a similar function. As noted in response to AO1.1 above, the

Performance outcomes	Acceptable outcomes	Response
establishment, substation, a power station, telecommunications facility or utility installation or stores of valuable records or items of historic or cultural significance, is able to function effectively during and immediately after bushfire events.	(a) is not located on land in an area of very high, high or medium potential bushfire intensity; or (b) does not involve any new building work other than extending the gross floor area of an existing building by less than 20m2; or (c) is designed to function effectively during and immediately after bushfire events. *Note—For AO4.1(a), a site-specific bushfire hazard assessment is necessary to demonstrate that although the site is mapped as an area of area of very high, high or medium potential bushfire intensity, the bushfire risk is low on that site.* *Note—To comply with AO4.1(c), the development application will need to include a comprehensive Bushfire Management Plan and the development must be able to comply with this Plan.*	BESS facility and associated infrastructure is located outside of verified areas of very high, high and medium potential bushfire intensity. A bushfire hazard assessment and bushfire management plan are provide in this report and demonstrate compliance with AO4.1.
Bushfire Management Plan		
PO5 Development complies with a bushfire management plan where the development: (a) is in an area of very high or high potential bushfire intensity; or (b) involves the manufacture or bulk storage of hazardous materials.	No acceptable outcome prescribed.	**Complies –** Whilst the development footprint is not within an area of very high or high potential bushfire intensity, a bushfire management plan has been prepared due to the proximity of the development to areas confirmed as high and medium potential bushfire intensity. That bushfire management plan is included in **Appendix C** and based on the recommendations set out in this report.

Appendix C – Bushfire Management Plan

NOTES:
- This Bushfire Management Plan (BMP) is to be read in conjunction with the Bushfire Hazard Assessment (BHA) report prepared by Meridian Urban dated September 2025.
- This BMP has been prepared in accordance with the Bushfire Resilient Communities (BRC) Technical Reference Guide (October 2019) by Queensland Fire and Emergency Services (now Queensland Fire Department)
- The Asset Protection Zone (APZ) must not contain any ongoing activities, permanent buildings and infrastructure associated with the BESS facility, unless noted otherwise in the BHA report.
- The APZ is based on a 10Kw/m2 radiant heat exposure at the boundaries of the BESS facility and associated infrastructure.
- The APZ is to be maintained in a low fuel condition in perpetuity and is to be maintained largely in a mowed grass condition, with grass height not exceeding 100mm. Individual tree specimens can be retained, provided canopies are separated at maturity.
- Any landscaping within the APZ must adopt the principles and species selection in accordance with the BRC (Section 8) and further recommendations set out in Part 9 of the BHA.
- Fencing and barriers, including the noise wall, must be constructed of fire-resistant material.



RWE TULLY BATTERY ENERGY STORAGE SYSTEM (BESS)

Bushfire Management Plan

LEGEND

- BESS Site Layout
- Asset Protection Zone (10Kw/m2)
- Dimensions

0 25 50 m

Project No: 24-130 Map No: 1 of 1

Meridian Urban

Coordinate System: GDA 2020 MGA Zone 55
Printed at: A3
Creation Date: 19/03/2025

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