Planning Assessment Report

Mount Hopeful Battery Project

FINAL

October 2025

umwelt

Planning Assessment Report

Mount Hopeful Battery Project

FINAL

Prepared by
Umwelt (Australia) Pty Limited

On behalf of
Neoen Australia Pty Ltd

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Abbreviations

Abbreviation	Definition
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ALC	Agricultural Land Classification
APZ	Asset Protection Zone
AQO	Acoustic Quality Objective
BESS	Battery Energy Storage System
BMP	Bushfire Management Plan
CBS	Community Benefit Sharing
CEMP	Construction Environmental Management Plan
CHMS	Cultural Heritage Management Strategy
CLO	Community Liaison Officer
DA	Development Application
DAMS	Development Assessment Mapping System
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEU	Development Engineering Unit
DAF	Department of Agriculture and Fisheries
EAR	Ecological Assessment Report
EPP (Noise)	Environmental Protection (Noise) Policy 2019
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPC	Engineering, Procurement and Construction
ESCP	Erosion and Sediment Control Plan
FSS	Fire Safety Study
FIFO	Fly-In Fly-Out
GW	Gigawatt
ha	Hectare
HIMP	Hazard and Incident Management Plan
HV	High Voltage
ICHA	Initial Cultural Heritage Assessment
IECA	International Erosion Control Association
km	Kilometre
kV	Kilovolt
LEC	Land and Environment Consultants Pty Ltd
LGIP	Local Government Infrastructure Plan
LGA	Local Government Area
LVIA	Landscape and Visual Impact Assessment

Abbreviation	Definition
MLES	Matters of Local Environmental Significance
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
MW	Megawatt
NC Act	*Nature Conservation Act 1992*
NEM	National Electricity Market
NIA	Noise Impact Assessment
O&M	Operations and Maintenance
OSOM	Oversize Over Mass
PO	Performance Outcome
PTI	Priority Transmission Investment
QFD	Queensland Fire Department
RRC	Rockhampton Regional Council
SARA	State Assessment and Referral Agency
SDAP	State Development Assessment Provisions
SMP	Stormwater Management Plan
SP	Survey Plan
SPP	State Planning Policy
SWMP	Stormwater Management Plan
TEC	Threatened Ecological Community
TIA	Traffic Impact Assessment
TLPI	Temporary Local Planning Instrument
URBS	Unit Hydrograph Rainfall-Runoff Routing Model
VM Act	*Vegetation Management Act*
vpd	Vehicles per day
WQO	Water Quality Objective
WRM	WRM Water & Environment Pty Ltd
WTG	Wind Turbine Generator

Executive Summary

The Mount Hopeful Battery Project is a grid-scale battery energy storage facility located at 1682 South Ulam Road, Bajool, within the Rockhampton Region Local Government Area (LGA). Developed by Neoen Australia Pty Ltd, the project seeks a Development Permit for a Material Change of Use for an Undefined Use (Battery Storage Facility) under the Rockhampton Region Planning Scheme 2015 (Planning Scheme). The facility will have a total capacity of up to 600 megawatts (MW), delivered in two stages. The Project's Disturbance Footprint covers approximately 48.8 hectares (ha) across three freehold land parcels and an unnamed road reserve.

The primary objective of the Mount Hopeful Battery is to store excess electricity from the grid and release it during periods of peak demand, thereby supporting the stability and reliability of the National Electricity Market (NEM). The Project will facilitate the integration of renewable energy, enhance grid flexibility, and contribute to Queensland's energy transition. Neoen's approach includes long-term community engagement, benefit-sharing programs, and a commitment to local employment and training opportunities.

The Project's Study Area was selected for its proximity to existing transmission infrastructure (Powerlink's 275 kV Feeder 812), minimal environmental constraints, and significant separation from sensitive receptors. The facility will be accessed via a new 1.6-kilometre (km) internal road from South Ulam Road. The design incorporates modular construction, minimising construction timeframes, waste, and impacts on the surrounding environment.

Comprehensive technical studies have been undertaken, including ecological, noise, traffic, stormwater, bushfire, and hazard assessments. Key findings include:

- The site is predominantly non-remnant (Category X) land, with minor patches of reef-regrowth vegetation (Category R). No threatened ecological communities (TECs) or essential habitats are present in the Study Area.
- Noise modelling demonstrates compliance with Acoustic Quality Objectives (AQO), being 40 dB(A) (day) and 35 dB(A) (night), at all sensitive receptors.
- Traffic impacts are temporary and manageable, with peak construction increasing daily traffic by up to 50% (from 202 to 306 vehicles per day) during peak construction (expected duration of 9 months).
- Stormwater and flood modelling confirm negligible impacts on downstream environments, with robust erosion and sediment controls in place.
- Bushfire risk is mitigated through a 30 metre (m) Asset Protection Zone (APZ), dedicated water tanks, and fire access trails.

Neoen has engaged extensively with local stakeholders, neighbours, and the Darumbal People Aboriginal Corporation. Community feedback has informed project design, particularly regarding fire safety, visual impacts, and benefit sharing. A Community Benefit Sharing (CBS) program will deliver targeted investments, local employment, and First Nations initiatives.

The proposal aligns with the Central Queensland Regional Plan (Regional Plan) and the Planning Scheme's Strategic Framework, assessment benchmarks and the Rockhampton Regional Council's (RRC) Draft Temporary Local Planning Instrument (TLPI). The project does not require referral to SARA, however, will be referred to Powerlink and Ergon for advice.

The Mount Hopeful Battery Project is recommended for approval, subject to reasonable and relevant conditions. It will deliver significant benefits to the local community and Queensland's electricity network while minimising environmental and amenity impacts through careful site selection, robust technical assessments, and ongoing stakeholder engagement.

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1.0 Introduction

1.1 Purpose

Umwelt has been engaged by Neoen Australia Pty Ltd (Neoen) to seek a development approval for the Mount Hopeful Battery Project (the Project). The Project is located at 1682 South Ulam Road, Bajool, and traverses three freehold land parcels and an unnamed road reserve, with a total area of 48.8 hectares (ha) (referred herein as the 'Study Area'). Refer to **Section 3.1** for a detailed description of the Study Area.

This development application seeks:

- Development Permit for Material Change of Use for an Undefined Use (Battery Storage Facility).
- The proposal involves:
    - Up to 600-megawatt (MW) battery storage facility over two stages:
        - Stage 1 – indicative capacity of 430 MW
        - Stage 2 – indicative capacity of 170 MW.
    - Ancillary infrastructure consisting of a high-voltage switching station, a high-voltage substation (with high-voltage transformers), medium-voltage transformers, inverters, overhead and underground cabling, access tracks, earthing and lightning protection, Operations and Maintenance (O&M) building, water retention pond, laydown areas for construction, security fencing.
    - Vehicle access from South Ulam Road via a 1.6 kilometre (km) new internal road.

This report details the nature of the Project and provides an assessment of the Project against the assessment benchmarks of the relevant statutory planning documents. Technical matters associated with the Project are addressed in appended technical reports. Based on these assessments, the Project is recommended for approval subject to reasonable and relevant conditions.

1.2 Development Overview

A summary of assessable development that is the subject of this development application is provided in **Table 1.1** below.

Table 1.1 Development Summary

Site Details	
Address	[redacted] South Ulam Road, Bajool QLD 4699
Study Area (Real Property Description)	Part of Lot 38 on DT40131, Lot 100 on SP289441, Lot 33 on DT40123 and unnamed road reserve (between Lot 38 on DT40131 and Lot 100 on SP289441)
Local Government	Rockhampton Regional Council (RRC)
Proposed Development	
Description	Development for a battery storage facility with a total capacity of 600 MW delivered over two (2) stages
Type of Approval Sought	Development Permit for Material Change of Use for an Undefined Use (Battery Storage Facility)
Category of Assessment	Impact Assessment
Assessment Manager	RRC
Assessment Framework	
Assessment Provisions	Rockhampton Region Planning Scheme (2015) – Version 15
Application	
Applicant Details	**Neoen** Jana Birkby Project Manager P: 0475 975 569 E: jana.birkby@neoen.com
Contact Details	**Umwelt** [redacted] Senior Environmental Planner P: [redacted] E: [redacted]@umwelt.com.au

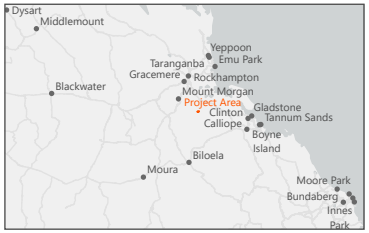


FIGURE 1.1

Project Locality

Legend

- Study Area
- Populated Place
- Road
- Major Watercourse
- Local Government Area



0 10 20

Kilometres

Scale 1:500,000 at A4
GDA2020 MGA Zone 56

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Image Source: ESRI Basemap (2025) | **Data Source:** Qld Spatial (2025)

1.3 Applicant

Founded in 2008, Neoen is an independent producer of sustainable energy and has a diverse power generation and energy storage portfolio including solar farms, wind farms and battery storage facilities. Neoen is one of the largest international private owner and operator of renewable energy assets globally, with close to 200 assets across three continents, with a growing portfolio across Australia.

Neoen is an end-to-end developer who takes a long-term approach - bringing projects from development, through construction and into operations, ensuring high quality projects that are well-integrated and make a valuable contribution to the community across their lifetime. Neoen delivers benefit-sharing commitments over the lifetime of all its Australian projects and has in-house expertise in all aspects of a project's lifecycle, including development, community engagement, construction, grid connection, procurement, financing, asset management and energy management.

Since expanding into the Australian market in 2012, Neoen has successfully developed and contracted 4.3 gigawatts (GW) of solar, wind and battery projects through organic growth, local partnerships and strategic acquisitions. Neoen's key achievements include:

- Constructing, owning and operating Australia's largest solar farm – Western Downs Solar Farm. This 460 MW facility is located in the Darling Downs region of Queensland.
- Constructing, owning and operating Queensland's largest battery – Western Downs BESS. This facility, built in two stages, has an aggregated capacity of 544 MW with two hours of storage. It is co-located with the Western Downs Solar Farm.
- Constructing, owning and operating Kaban Wind Farm – a 157 MW facility in the Atherton Tablelands, in Far North Queensland.

Neoen's track record, as well as the depth and substance of its relationships with landowners, communities, customers, governments and grid operators, bears testimony to its commitment and its ability to deliver quality projects.

Neoen also enjoys strong support and access to capital via its shareholder Brookfield. Brookfield represents a very credible and well- capitalised group with a track record support for the rollout of renewable energy assets globally.

1.4 Statutory Context

Under the *Planning Act 2016* (Planning Act), a development application is required for any development that is categorised as 'assessable development' under a relevant 'categorising instrument'. Categorising instruments are subordinate planning instruments created under the Planning Act and typically includes the Planning Regulation 2017 (Planning Regulation) and/or a local government planning scheme.

As previously mentioned, this development application seeks a Development Permit for Material Change of Use for an Undefined Use (Battery Storage Facility). The proposal satisfies the definition of a 'Material Change of Use' as defined within Schedule 2 of the Planning Act:

*'**Material change of use**, of premises, means any of the following that a regulation made under section 284(2)(a) does not prescribe to be minor change of use –*

- *the start of a new use of the premises*
- *the re-establishment on the premises of a use that has been abandoned.*
- *a material increase in the intensity or scale of the use of the premises'*

The Project has been previously approved as ancillary infrastructure under the Mount Hopeful Wind Farm Approval (ref: 2109-24892 SDA). However, as Neoen seeks to construct and operate the Project independently from the wind farm, it is considered 'the start of a new use of premises'.

1.4.1 Proposed Land Use

Battery Storage Facilities – Guidance for Local Government[1] (Department of State Development, Infrastructure, Local Government and Planning, 2022) was released for local planning schemes to incorporate appropriately regulated energy storage infrastructure, including battery storage facilities in Queensland. Accompanying this guide was the addition of a new definition within Schedule 24 of the Planning Regulation being:

*'**Battery storage facility** means use of premises for the operation of 1 or more battery storage devices.'*

***'Battery storage device** –*

a. means plant that –

i. converts electricity into stored energy; and

ii. releases stored energy as electricity; and

b. includes any equipment necessary for the operation of the plant.'

The above definition has not yet been integrated into the Rockhampton Region Planning Scheme (2015) – Version 5 (Planning Scheme) and therefore the Planning Scheme does not include a defined use for energy storage infrastructure, nor battery storage facilities. As such, the Project is considered an 'Undefined Use (Battery Storage Facility)'.

1.4.2 Assessment Manager

In accordance with Schedule 8, Table 2, Part 1(b)(i) of the Planning Regulation, the assessment manager for this application is the local government, which in this instance is RRC.

1.4.3 Level of Assessment

Under the Planning Scheme, the Study Area is located in the Rural Zone. In accordance with the Tables of Assessment, this proposal is subject to Impact Assessment, and therefore public notification will be required.

[1] Department of State Development, Infrastructure, Local Government and Planning, 2022. *Battery Storage Facilities – Guidance for Local Government*. State of Queensland. Available at: https://planning.statedevelopment.qld.gov.au/__data/assets/pdf_file/0026/78146/guidance-for-local-government-battery-storage-facilities.pdf

1.4.4 Planning Instrument Details

The key planning context information for the Study Area is summarised in **Table 1.2**.

Table 1.2 Planning Context Summary

Aspect	Details
Regional Plan	Central Queensland Regional Plan (2013)

Development Assessment Mapping System (DAMS)	• Fish Habitat Areas
	  ○ Queensland waterways for waterway barrier works
	  ▪ Low
	• Water Resources
	  ○ Water resource planning area boundaries
	• Native Vegetation
	  ○ Category R
	  ○ Category X

Other State Mapping	• Powerlink Easement • Ergon Easement
Rockhampton Region Planning Scheme (2015) – Version 15	

Strategic Framework	• Settlement Pattern
	  ○ Rural Area
	• Environmental
	  ○ Matters of State Environmental Significance (MSES)
	• Infrastructure
	  ○ Electricity transmission network (above 132 kV)

Zone	Rural Zone

Overlays	• Biodiversity
	  ○ MSES
	  ○ Waterways
	• Bushfire
	  ○ Medium
	  ○ Buffer
	• Steep Land
	  ○ Slope – 15–20%

1.4.5 Referral Agencies

SARA carries out the State's assessment functions on behalf of the Chief Executive administering the Planning Act, and reviews development proposals against the criteria outlined in the State Development Assessment Provisions (SDAP).

A review of Schedule 10 of the Planning Regulation has determined that the Material Change of Use application does not require referral to SARA. However, it requires referral (advice only) to the agencies outlined in **Table 1.3**.

Table 1.3 Referrals

Planning Regulation Reference	Referral Trigger	Referral Agency
Schedule 10, Part 9, Division 2, Table 2	Material Change of Use near a substation or subject to an electricity easement	Powerlink and Ergon (Advice only)

1.5 Approvals History

The following sections describe the State and Federal approvals relevant to the Project.

1.5.1 State

Original Approval (2109-24892 SDA)

On 17 June 2022, SARA issued a Development Permit for a Material Change of Use for a wind farm (97 wind turbine generators (WTGs) (Mount hopeful Wind Farm) and associated ancillary infrastructure (including a 400 MW battery storage facility) and Operational Works for clearing of native vegetation (ref: 2109-24892 SDA).

First Minor Change (2305-34727 SPD)

On 6 February 2024, the approval was changed through a minor change process (ref: 2305-34727 SPD) to reflect a reduction to 63 WTGs and other associated layout changes.

Second Minor Change (2504-45653 SPD)

A further minor change was approved by SARA on 10 June 2025 for the following amendments to the approval:

- The timing and wording of conditions for as constructed drawings and final Project Layout Plan.
- References to a new Vegetation Management Plan.
- Location of the battery storage facility on the Proposed Layout Plan.
- Inclusion of secondary access via Mount Hopeful Road.
- Minor administrative updates.

1.5.2 Commonwealth

EPBC Act Approval (2021/9137)

On 19 April 2024, Neoen received approval from the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the Mount Hopeful Wind Farm (EPBC 2021/9137). The approved action was 'to construct, operate and decommission a wind farm of up to 63 turbines, 45 kilometres (km) south of Rockhampton'. The approval included associated infrastructure comprising of battery modules, switchyard and associated ancillary infrastructure.

The EPBC Act approval (2021/9137) is currently being varied to change the layout of the battery and amend the timing of pre-commencement conditions to allow the battery to be constructed and operated ahead of the wind farm component.

1.6 Pre-lodgement Advice

1.6.1 Pre-lodgement Meeting #1

A pre-lodgement meeting with RRC was held on 3 June 2025. A summary of the key items discussed and how the proposal responds is outlined in **Table 1.4** . A copy of the pre-lodgement minutes received from RRC can be found in **Appendix M**.

Table 1.4 Pre-lodgement meeting #1 advice

Advice	Response
Development Assessment	
Land Use *The proposed land use is to be defined as an undefined use (battery storage system) and triggers an impact assessable development application. It would need to be demonstrated in the application material that the synchronous condenser is ancillary to the BESS or requires a combined Material Change of Use for Undefined Land Use & Major Electricity Infrastructure.*	This development application seeks approval for an Undefined Land Use (Battery Storage Facility). The synchronous condenser is no longer proposed as part of this development application.
Strategic Framework and Zoning *Due to the conflict with the Rural Zone Code and Strategic Framework, the applicant would need to demonstrate what relevant matters would apply in support of the proposal and why, on balance the proposal should be supported by Council despite conflicts with the assessment benchmarks.*	**Section 5.2.1** addresses the relevant Strategic Framework with context to the proposed development. A response to the Rural Zone Code is provided in **Appendix D.**
Amenity *Due to the application requiring public notification, it is recommended that the application material provides detail and consideration around the noise and amenity mitigation methods to be used throughout the duration of the land use activity on the site, including both the construction and operations stage. The application should also describe how the land will be rehabilitated once the use ceases operation.*	A Noise Impact Assessment (NIA) has been prepared for the Project's operational noise and is included at **Appendix F**. It is noted that audible noise during construction will be managed via mitigation measures presented in a project-specific Construction Environmental Management Plan (CEMP). Details on land rehabilitation at the cessation of operations is outlined in **Section 4.1.6**.
On-site Operations *Council recommends that extensive information around onsite operations during both the construction and operational stage are provided within the application material along with the below mentioned technical reporting.*	Details on on-site operations during the construction and operational stages are provided in **Section 4.0** are considered in all technical assessments.

Advice	Response
Supporting Documents *Council recommends the following reports, plans and documents to accompany the development application:* • *Bushfire Risk Assessment* • *Ecological Assessment* • *Emergency Management Plan* • *Stormwater Management Plan* • *Erosion and Sediment Control Plan* • *Acoustic Assessment report*	The following supporting documents are located in the appendices: • **Appendix E** - Ecological Assessment Report • **Appendix F** - Noise Impact Assessment • **Appendix G** - Traffic Impact Assessment • **Appendix H** - Stormwater Management Plan (including erosion and sediment control) • **Appendix I** - Bushfire Management Plan • **Appendix J** - Hazard and Incident Management Plan • **Appendix K** - Emergency Management Plan
Development Engineering Unit	
Stormwater and Flooding *A Site-based Stormwater Management Plan (SSMP) should be submitted for the development. The SSMP should include, but is not limited to:* • Concept stormwater layout; • Demonstration that the proposal will not adversely affect downstream properties or infrastructure from increases or concentration of runoff; and • Demonstration of how the existing overland flowpaths through the site are going to be managed (where applicable – if the BESS units are located within areas of the site subject to inundation).	Refer to **Appendix H** – Stormwater Management Plan.
Traffic *A Traffic Impact Assessment (TIA) should be submitted with the application. The TIA should detail:* • *Type and size of delivery vehicle(s) during construction;* • *Expected traffic volumes during construction and operational phases;* • *Construction period; and* • *Turn Warrant Assessment to determine any required intersection works (Project access and South Ulam Road).* • *Depending on the type of vehicles and volumes expected, there may be a requirement to rectify any damage caused to South Ulam Road once construction has been completed.*	Refer to **Appendix G** – Traffic Impact Assessment.
Water and Sewer • *The proposed development is located outside the Water Supply and Sewerage area of council. Adequate onsite water storage (Domestic and Firefighting) will be required.*	A response to RRC's Water and Sewer Code is located in **Appendix D** which provides information on on-site water storage.

Advice	Response
• *Information is to be provided about how the fire-fighting requirement will be provided for the use.*	
Erosion • *An Erosion and Sediment control plan will be required that complies with the state planning policy 2017.*	Refer to **Appendix H** – Stormwater Management Plan.
Public and Environmental Health	
Noise • *A detailed noise impact assessment will be required that outlines the noise generated from the development and the equipment being used along with any proposed mitigation measures if required. Basic short term background noise monitoring is recommended.*	Refer to **Appendix F** – Noise Impact Assessment.
Conditions *The applicant can expect the following standard conditions to be placed on an approval regarding:* • *External lighting complying with Australian Standard AS4282 "Control of the obtrusive effects of outdoor lighting"* • *Must not create an environmental nuisance with noise, light etc* • *If genuine noise nuisance complaints are received Council will request applicant to conduct monitoring and submit a report that details the monitoring undertaken and any proposed mitigation measures to Council.*	Noted and acknowledged.

1.6.2 Pre-lodgement Meeting #2

A second pre-lodgement meeting with RRC was held on 12 August 2025 regarding RRC's draft Temporary Local Planning Instrument (TLPI) for Renewable Energy and Battery Storage and its relevance to this development application. A summary of the key items discussed and how the proposal responds is outlined in **Table 1.5**. A copy of the pre-lodgement minutes received from RRC can be found in **Appendix M**.

Table 1.5 Pre-lodgement Meeting #2 Advice

Advice	Response
Development Assessment	
Council officers may have some regard to the draft Temporary Local Planning Instrument (TLPI), however it should be noted that it is a draft document that will be subject to change. Any relevant provisions in the draft TLPI would be used to inform and guide on potential solutions on relevant matters rather than prescribes particular outcomes.	Noted. A response to the draft TLPI is provided in **Appendix D.**

Advice	Response
As discussed, the Draft TLPI has been made available for public consultation and is undergoing state interest review. It can't currently be confirmed when a TLPI would or might be adopted as there are a significant number of unknown factors, including consideration of state interests and potential unconfirmed legislative amendments from the state government department.	Noted.
A referral agency response and/or connection enquiry response from Powerlink would be deemed as a relevant and reasonable justification towards demonstrating the suitability of the proposed (Battery Energy Storage System) BESS location in relation to electricity grid infrastructure.	The development application will be referred to both Powerlink and Ergon as advice agencies in accordance with the requirements of the Planning Regulation.
A formalised Landscape and Visual Impact Assessment (LVIA) is not expected to be necessary based on the remote location. It is however recommended that commentary be provided within the application material addressing and highlighting the remote location, siting of the facility, distance from the nearest sensitive receptors and any mitigation measures proposed to be undertaken if necessary.	Noted. No LVIA is provided as per RRC advice. Notwithstanding, a response to the Landscaping Code of the Planning Scheme is provided in **Section 6.8**, addressing matters regarding landscape and visual amenity.
Community concerns and interests are strongly based on fire hazards in relation to both bushfire and fire within the facility itself. Therefore, it is highly recommended that significant attention be given to these matters within the application material. It would be highly beneficial if the application can demonstrate alignment with the CFA guidelines.	Community engagement activities to date and details regarding how the outcomes from engagement have been integrated into the development application are summarised in **Section 2.0.** The following assessments have been prepared addressing bushfire and battery fire hazards: • Bushfire Management Plan (**Appendix I**) • Hazard Incident Management Plan (**Appendix J**)
An Emergency Management Plan can be provided at application stage or conditioned to be provided to Council at a later time. The Emergency Management Plan should address AS 3745 "Planning for Emergencies in Facilities" and any other relevant Australian Standards.	An Emergency Management Plan (**Appendix K**) has been prepared in support of the development application which confirms the Project's compliance with the relevant Australian Standards.
Conditions detailing the timing and methodology for decommissioning of the facility would be applied to any approval granted. Recommended that a Remediation and Decommission Strategy be prepared, potentially at Operational Works stage. The site will need to be returned to predevelopment condition and Council sufficiently notified with a more detailed Rehabilitation and Decommission Plan prepared prior to cessation of the use.	Details regarding how the Project will be decommissioned and the Study Area rehabilitated are provided in **Section 4.1.6**. It is acknowledged that a condition will be applied to the development approval requiring the preparation of a Decommissioning Management Plan, prior to the cessation of the use.

Advice	Response
Development Engineering Unit	
The engineering-related Technical Reports will need to be provided with the MCU application however depending on the proposed staging details, we can separate out specific conditions relating to the required works for that particular stage as necessary. It would be advisable to look at the traffic, stormwater / flooding, and erosion and sediment control aspects as part of Stage 1 as increasing the size or any infrastructure or adding extra provisions for Stage 2 may not be practical or cost-effective. Council's Development Engineering Unit (DEU) can provide more feedback on the required timing of the engineering provisions once a proposed staging plan has been provided.	The development application is supported by a range of technical assessment as confirmed in RRC's pre-lodgement advice. It is noted that all civil works to support the Project (Stage 1 and Stage 2) will be delivered prior to Stage 1. Therefore, it has been determined that only the Traffic Impact Assessment is required to provide details regarding Project staging.
Public and Environmental Health	
As discussed, the planning scheme and previous pre-lodgement advice from RRC points to the Acoustic Quality Objectives (AQO) under the Environment Protection (Noise) Policy 2019 (EPP Noise) as the applicable noise criteria. Council officers agree that the AQO is considered appropriate criteria for the proposed BESS development.	Noted. The Noise Impact Assessment **(Appendix F**) utilises the AQO under the EPP Noise as the applicable criteria, as confirmed by RRC.

2.0 Community and First Nations Engagement

2.1 Community Engagement

2.1.1 Neoen's Approach to Community Engagement

Neoen places high emphasis on open, relaxed, flexible and responsive engagement with communities throughout their portfolio of renewable energy projects across Australia. They understand that the success of a Project is largely dependent on the development of genuine, open and ongoing relationships with key stakeholders and members of the local community.

Stakeholder and community engagement is led by Neoen's project managers, with support from community engagement specialists, including Community Liaison Officers (CLO), who live and work within the communities where projects are built. Trusting relationships are developed between Neoen's people on the ground, who know the project the best, and the stakeholders that are part of and connected to their region and local community.

Neoen is an end-to-end project developer with a long-term approach. This model means that Neoen are often long-term neighbours and participants in the local community. As such they can establish and nurture relationships, develop partnerships, confident that they will be there to see projects and benefits to fruition.

2.1.2 Engagement History

Engagement for the Project started in 2018 as part of the development of the approved Mount Hopeful Wind Farm, as the Mount Hopeful Battery was initially proposed to be ancillary to the wind farm. Initial discussions with landholders who were identified as having land suitable began in 2018, and land was signed early 2020. Feasibility studies started in earnest in 2019.

As part of the planning phase of the Project, Neoen met with the Chief Executive Officer (CEO) of RRC and Advance Rockhampton's Executive Manager on 27 January 2021, in Rockhampton. A description of the Project was provided and strong messages of support for renewable energy development, and associated opportunities for the region, were conveyed. Neoen also met with the Banana Shire Council (BSC) Mayor and CEO on 25 January 2021 in Biloela. An overview of the Project was provided, along with expected timeframes. The Project was well received, with general sentiments of support for the benefits it could bring to the community.

Neoen subsequently met with Advance Rockhampton on 12 May 2021 to provide an update on the Project, and Advance Rockhampton was represented at the community information session held in Dululu on 13 May 2021.

On 24 and 25 March 2021, Neoen visited the project region, to meet with all neighbours within 5 km of a proposed turbine. Further engagement was carried out with other neighbours located within approximately 7 km of any proposed turbine. Where Neoen was not able to meet with neighbours during this trip, best endeavours were made to contact neighbours via phone.

During one-on-one sessions, information on the Project layout, construction practices and visualisations of the infrastructure within the landscape were presented. Neighbours were provided with the opportunity to ask questions and raise concerns relating to the Project. On 13 May 2021, two community information sessions were held. The first took place in Bajool and the second in Dululu. Both sessions were well attended, with many of the neighbours attending for further discussion on the Project.

A development application for the windfarm was lodged with the State Assessment and Referral Agency (SARA) in September 2021, following additional pre-lodgement meetings and consideration of feedback received from community information sessions. The windfarm received planning approval from the SARA in June 2022.

Neoen continued its engagement with neighbours and with the community throughout the development phase of the wind farm and battery through various engagement activities including:

- One on one engagement with potentially impacted neighbours.
- Sending summaries of the Frequently Asked Questions to provide thorough answers to questions asked during meetings.
- The employment of a dedicated CLO since 2021, based in Rockhampton.
- Regular engagement with local government representatives to provide project updates, and inform project design.
- Written updates to Local, State and Federal members on the Project's status.
- Updates on the Project website, and the issuance of Project newsletters to interested parties
- Attendance at regular local events, particularly those focused on job creation and local participation, as well as presentations on the Project at local conferences.
- The inclusion of contact details on the Project's website which redirect to the project manager's personal phone number and email address to provide a suitable point of contact for the community.
- Sponsorship of regional events, such as the Wowan Agricultural show days in 2023 and 2024, and the Biloela Christmas Festival.

2.1.3 Engagement for Mount Hopeful Battery (Standalone Project)

In May 2025, Neoen identified an opportunity to start construction on the battery ahead of the wind farm and to operate the battery as a standalone asset. Neoen contacted the RRC Mayor by email to communicate this proposed approach and then engaged with the RRC planning department to understand planning implications.

A first pre-lodgement meeting was held on 3 June 2025 in the presence of council planning officers, engineering services and Advance Rockhampton. Council confirmed the battery project would be impact assessable and provided advice on the level of information and reporting expected in the development application.

On 10 June 2025, Council resolved to prepare a Temporary Local Planning Instrument (TLPI) to regulate the assessment of battery projects, and a draft document was released for public review on 22 July 2025. Neoen then requested a follow-up pre-lodgement meeting to update the advice received from council and ensure the development application meets the expectations of the TLPI.

From June 2025, Neoen undertook engagement with the community focusing on battery. This included:

- Phone calls to neighbours and to residents of South Ulam Road and Mount Hopeful Road (access roads to the battery and wind farm project) to introduce the battery project, discuss anticipated impacts and understand concerns. Neighbours and residents were offered an opportunity to meet with the Neoen team in person.
- Sending a Project introduction letter to neighbours, road residents, and to Bajool residents (closest town to the battery project, at a 15 km distance to project site).
- Neoen held a BESS community information session at the Bajool School of Arts Hall on 20 August 2025, from 3pm to 7pm. The event was well-attended by the community, with the overwhelming majority of the attendees being from the local Bajool area. Around 40 community members attended across the 4-hour period, including many residents of South Ulam Rd and Mt Hopeful Rd. Most of the concerns raised related to fire risk and environmental impacts. Some prospective suppliers attended the event to obtain information about procurement opportunities. The feedback received has informed the website Frequently Asked Questions (FAQ) section and follow up was provided to those people who had requested individual responses to their queries.

2.1.4 Community Feedback

Consultation with the community highlighted both concerns and potential benefits associated with the Mount Hopeful Battery project. The feedback received is summarised in the sections below.

2.1.4.1 Safety and Fire Risk

Community members have concerns about the risk of a battery fire (whether caused by a thermal runaway within the battery modules or caused by an external bushfire spreading to the battery). The concern of the community on this question was heightened by the fire event that occurred at the Bouldercombe Battery facility in 2023. Neoen was questioned on how the project differed from earlier batteries affected by fire events, and how bushfire risks would be managed. Concerns extended to toxic fumes, firefighting water supply, and contaminated water run-off.

Neoen provided details about recent evolution in battery technologies, proposed fire risk mitigation, detection and suppression measures, and fire safety assessments prepared pre and post-development application (including the Hazard Incident Management Plan and Bushfire Management Plan, which are appended to the development application). Neoen's commitments include:

- Conducting a site-specific Fire Safety Study (FSS) at detailed design stage to model fire behaviour and confirm that fire will remain contained in the unlikely event of a thermal runaway.

- Provide firefighting water through two water tanks located within the battery precinct (approximate 576,000 litre (L) capacity will be confirmed through detailed design), one water tank located outside of the battery precinct (accessible to rural fire brigade) and a retention pond to safely capture and test run-off firefighting water before release.
- Provide for a 30 m-wide Asset Protection Zone (APZ) around the perimeter of the infrastructure, which will also include a fire access trail for emergency services.

2.1.4.2 Visual and Noise Impacts

Residents noted potential visual impacts from South Ulam Road and concerns about operational noise. Neoen confirmed that the facility is located 1.5 km from the road frontage and is partially screened by vegetation. Neoen committed to plant additional vegetation around the facility to reduce visibility. A Noise Impact Assessment demonstrates compliance with applicable standards: 40 dB at day-time and 35 dB at night-time at dwellings.

2.1.4.3 Traffic and Waste Management

Concerns centred on traffic increases during construction and litter on local access roads. A Traffic Impact Assessment found peak daily traffic on South Ulam Road may increase temporarily by 50% (from 202 to 306 vehicles per day) during peak construction (expected duration of 9 months), with negligible additional traffic once operational. Contractors will be responsible for waste management, and residents are encouraged to report issues directly to Neoen.

2.1.4.4 Environmental Impacts

Questions were asked about emissions, microplastics, and decommissioning. Neoen confirmed that battery systems are sealed, producing no gas, smoke or microplastics during normal operations. Testing before installation will also confirm compliance with air quality standards under abnormal conditions. At end-of-life, a Decommissioning and Rehabilitation Plan will be prepared in consultation with Council and the community, ensuring the land is returned to a safe condition suitable for rural used.

2.1.4.5 Perceived Benefits

Perceived benefits include:

- Some community members welcomed the opportunity to incorporate local artwork, such as murals, to enhance visual amenity and celebrate local culture.
- Road upgrades linked to the project may improve access.
- Local families welcomed opportunities for apprenticeships and training, providing skills aligned with Queensland's energy transition.
- Some residents expressed support for the role of batteries in stabilising the grid and reducing reliance on fossil fuels, aligning with Queensland's broader energy transition.

2.1.5 Approach to Benefit Sharing

To ensure both short and long-term benefits flow through to the community as a result of the Project, Neoen will establish a Community Benefit Sharing (CBS) program.

The CBS will be designed to deliver benefits to the local community in a way that aims to meet their needs, aspirations and that is linked to project-related impacts and issues. Specifically, our objectives are to:

- deliver significant and meaningful improvements to the community hosting the Project
- ensure a wide range of different stakeholder groups benefit from the Project
- empower the community to shape the design and implementation of the different initiatives
- build support for renewable energy in the Rockhampton area.

The CBS will likely include a mix of several mechanisms such as:

- Community Benefit Fund: a dedicated fund (with a proposed annual amount of $80,000) to support local projects, infrastructure, and organisations.
- First Nations Benefit Sharing: co-designed initiatives with the Darumbal people, including employment, training, and cultural heritage projects.
- Near Neighbour Benefit Scheme: tailored payments for neighbours most directly affected.
- Community Co-investment: potential fractional ownership opportunities, enabling local residents to invest directly.
- Targeted Local Investments: addressing specific issues identified by the community, such as road improvements or telecommunications gaps.

The program governance will include transparent processes, independent oversight, and flexibility to adapt to changing community needs over the 25+ year life of the project. Neoen will work with RRC, Advance Rockhampton and local groups to ensure benefits are delivered equitably and strategically.

2.2 First Nations Engagement

2.2.1 Engagement

Engagement with the Darumbal People Aboriginal Corporation for the Project began in June 2022, when Neoen and its consultants held a face-to-face project introduction meeting. This was followed by a second meeting in October 2022, held in Rockhampton, to begin shaping the cultural heritage approach and discuss the concept of a Cultural Heritage Management Strategy (CHMS). A CHMS review meeting was then held in March 2023 in Rockhampton to conduct a clause by clause review of the draft document.

On 13 May 2024, a detailed face-to-face meeting took place with Kristina Hatfield at the Darumbal office in Rockhampton. The discussion covered cultural heritage planning, Indigenous business engagement, and workforce opportunities. Key actions from this meeting included finalising agreements, planning for geotechnical monitoring, and exploring cultural awareness training and community collaboration.

Shortly after, on 12 June 2024, two formal agreements were signed: a Short Form Agreement covering construction, operation, and maintenance activities within the study area, including the access track, switchyard complex, and overhead transmission line and the CHMS, which formalised the cultural heritage management approach for the project.

In January 2025, Neoen presented a project update to the Darumbal board. This included updates on project progress, upcoming cultural heritage activities, and Darumbal Civil's capabilities. A draft letter was shared for Powerlink, requesting alignment with Neoen's existing cultural heritage agreements. Plans for a cultural induction video were discussed, along with strategies for promoting employment opportunities to Darumbal people and identifying preferred engagement channels and training partners. Input was also sought on Neoen's broader First Nations Engagement Plan.

A notification was issued in April 2025, by Neoen to Darumbal, to extend the study area, reflecting changes in the project scope and ensuring continued alignment with cultural heritage requirements.

In parallel with those engagement activities, Neoen has committed to several broader initiatives in partnership with the Darumbal People. This includes the appointment of a First Nations community liaison officer based in Rockhampton to lead engagement efforts, and the establishment of an annual community development fund, which will be distributed independently of Neoen's oversight. Neoen is also working to define First Nations employment and procurement targets, which will be passed on to the construction contractor. Additionally, mapping of First Nations businesses and job seekers is underway, with plans to collaborate with the Engineering, Procurement and Construction (EPC) contractor and Operations and Maintenance (O&M) contractors to identify job opportunities and work packages. Ongoing consultation with Traditional Owners is also taking place to connect employment and training providers with First Nations job seekers.

2.2.2 Assessment

Cultural heritage assessment activities for the Project began with an initial desktop study, which found no previously registered Aboriginal cultural heritage sites within the study area or its 1 km buffer, based on a search of the Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships (DSDSATSIP) database. Additionally, no listings were identified on state or federal heritage registers.

In August 2022, the Darumbal People undertook an Initial Cultural Heritage Assessment (ICHA) of the Study Area to further inform project planning. Additional cultural heritage surveys were conducted by Darumbal representatives alongside an archaeologist to capture the increased study area in June 2025. The 25.5 ha extension of the survey area was systematically assessed using pedestrian transects spaced approximately 10 m apart, supported by GIS mapping, GPS tracking, and photographic documentation. While no cultural heritage features were recorded during the survey, the landscape setting and limitations of the assessment led to a recommendation for ongoing cultural heritage monitoring during all initial ground-disturbing works, to manage the risk of uncovering subsurface deposits.

These findings were formally documented in a Cultural Heritage Assessment Report, completed on 30 June 2025, which outlined recommendations for monitoring and management moving forward.

3.0 Project Areas

3.1 Study Area

The Project is proposed to occur within the bounds of the 'Study Area' which covers an area of 48.8 ha and occurs across three freehold land parcels and an unnamed road reserve. The Study Area also accommodates a Powerlink transmission easement that comprises an existing 275 kilovolt (kV) transmission line, of which the Project will connect into.

The Study Area refers to the maximum extent in which the Project will be located and that was subject to field surveys for the Project. The land parcels which the Study Area intersects are provided in **Table 3.1.**

Table 3.1 Study Area Land Parcels

Lot and Plan	Area of Study Area within Land Parcel (ha)	Tenure
38 DT40131	14.7	Freehold
33 DT40123	0.3	Freehold
100 SP289441	31.1	Freehold
Unnamed road reserve between Lot 38 DT40131 and Lot 100 SP289441	2.6	Road

Key characteristics of the Study Area are detailed in **Table 3.2** below.

Table 3.2 Study Area Details

Aspect	Detail
Locality	• 45 km south of Rockhampton and 65 km west of Gladstone • Closest townships are Mount Morgan (approximately 15 km to the southeast) and Bajool (approximately 15 km to the southwest) • Within the RRC local government area (LGA)
Existing Land Use	Rural land (note – approval for the Mt. Hopeful Wind Farm has been granted over the Study Area).
Tenure	Freehold
Encumbrances	Combined Ergon and Powerlink easement running through the Study Area in a northwest to southeast direction.
Road Frontage	• South Ulam Road
Adjoining Land Uses	• North: Rural land • South: Rural land • East: Rural land, Mt. Kelly, Mt. Mccamley, Omya Australia Quarry • West: Mt. Helen

Aspect	Detail
Sensitive Receptors	Nine (9) sensitive receptors have been identified within 5 km of the Study Area, with the closest being located 1.65 km from the Study Area. The NIA is provided in **Appendix F** which modelled potential noise levels to identify any impacts on sensitive receptors. Based on the noise modelling assumptions and results presented in the assessment for the various fan speeds, the Project is predicted to comply with the AQO during the day, evening and night periods without the need for additional noise mitigation measures.
Topography	The Study Area is generally flat, ranging in elevation from 100 m to 130 m Australian Height Datum (AHD), sloping upwards east to west.
Vegetation	The Study Area is mostly cleared with small patches of non-remnant vegetation located throughout.
Waterways	One (1) unnamed watercourse is mapped throughout the Study Area, travelling in an east to west direction.
Geology	Three (3) surface rock types mapped within the Study Area being Qa-QLD, Raspberry Creek Formation and Bajool Quartz Diorite.
Soils	Langmorn – alluvial plains with eucalypt woodland, south-east of Rockhampton

The extent of the Study Area is shown in **Figure 3.1.**

3.2 Disturbance Footprint

The Disturbance Footprint represents the maximum extent of direct impacts for the Project, associated with the placement of the proposed infrastructure (**Section 4.1**), as shown in **Appendix C**. The Disturbance Footprint has a total area of 42 ha.

The Disturbance Footprint is intersected by an unnamed tributary of Eight Mile Creek. It is noted that although it intersects the Project's Disturbance Footprint, the Project design avoids the waterway with no permanent above or below ground infrastructure being placed within the waterway. The extent of the Disturbance Footprint is shown in **Figure 3.1.**

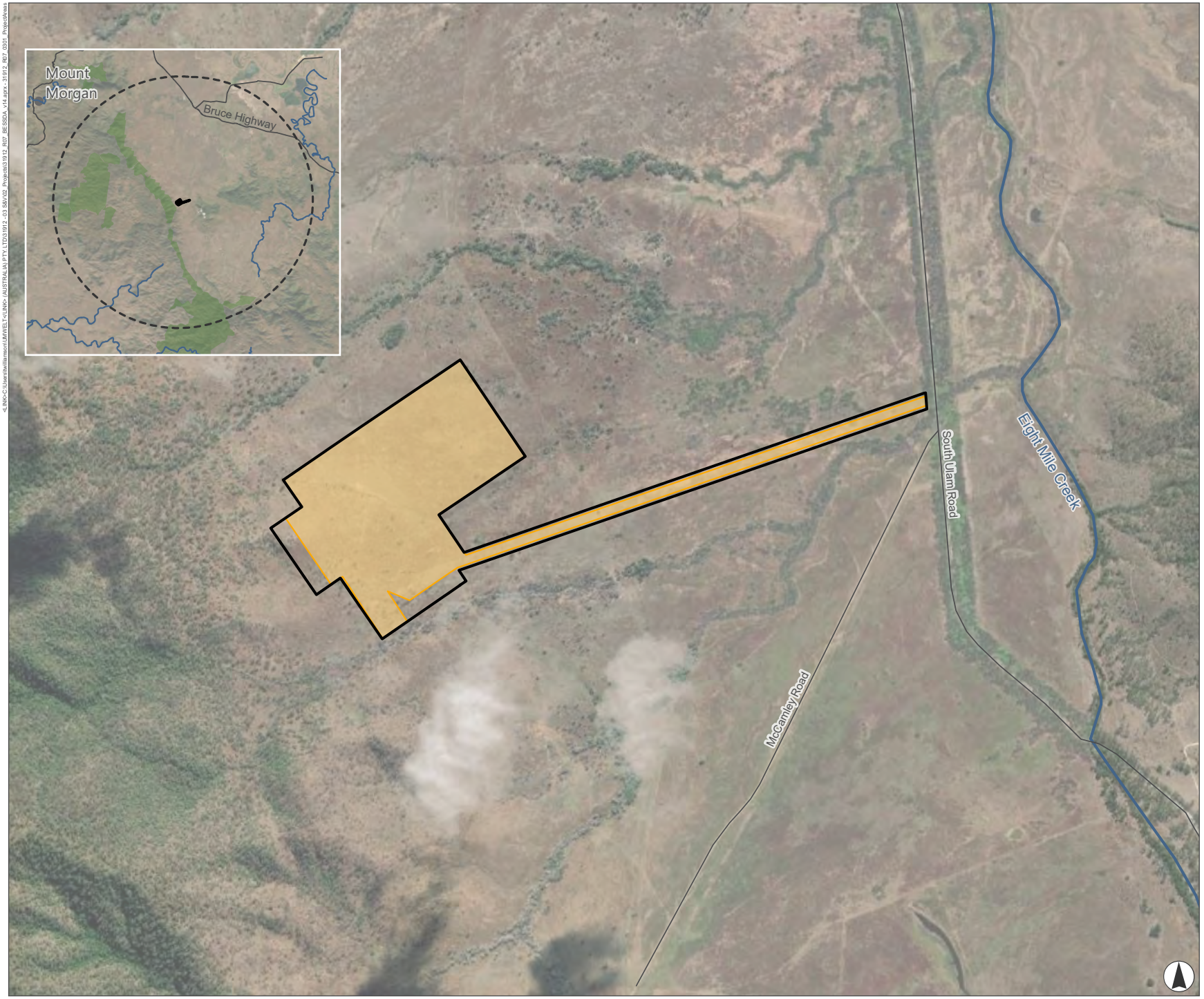
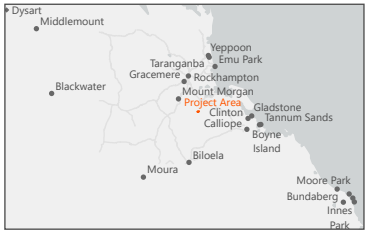


FIGURE 3.1

Project Areas

Legend

- Study Area
- Disturbance Footprint
- Desktop Assessment Area
- Road
- Major Watercourse



0 0.25 0.5

Kilometres

Scale 1:17,500 at A4
GDA2020 MGA Zone 56

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Image Source: ESRI Basemap (2025) | **Data Source:** Qld Spatial (2025)

4.0 Proposed Development

4.1 Project Description

The Project is a proposed grid-scale battery storage facility in Central Queensland with a planned capacity of up to 600 MW of power for a duration of up to four hours. The purpose of the Project is to store excess electricity from the grid, which will then be provided to the electricity network at times of peak demand. It will enhance the delivery of clean, reliable electricity to the National Electricity Market (NEM), while supporting grid stability and flexibility.

The Project is located near the rural town of Bajool, approximately 45 km south of Rockhampton and 65 km west of Gladstone, Queensland, within the Rockhampton Region LGA.

It is proposed to be delivered over two stages, which are described as follows:

- Stage 1: Indicative capacity of 430 MW, with construction expected to commence mid-2026 and to complete by end of 2028.
- Stage 2: Indicative additional capacity of 170 MW, with construction expected to commence in 2028 and to complete by end of 2029.

4.1.1 Project Components

Key components of the Project include:

- up to 650 Battery Modules
- up to 170 Medium Voltage (MV) Transformers
- 2 x High Voltage (HV) Transformers
- a HV Switching Station.

The Project will also encompass associated ancillary infrastructure necessary for the operation of the battery storage facility, including:

- Site access track.
- Overhead and underground electrical cables.
- Inverters.
- High voltage substation.
- Earthing and lightning protection.
- Security fencing, closed-circuit television (CCTV) and lighting.
- O&M building.
- Water retention pond.
- Lay down areas.

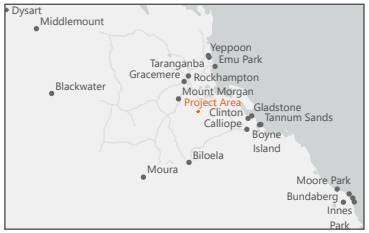


FIGURE 4.2

Project Design

Legend

- Study Area
- Access road
- BESS area
- Overhead and underground line
- Substation area
- Switchyard area
- Road



0 0.25 0.5

Kilometres

Scale 1:12,500 at A4
GDA2020 MGA Zone 56

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Image Source: ESRI Basemap (2025) | **Data Source:** Qld Spatial (2025)

4.1.2 Grid Connection

4.1.2.1 Connection Point

The Project is proposed to connect to the NEM via Feeder 812, an existing 275 kV transmission line operated by Powerlink that runs from Bouldercombe substation to Calliope River substation and traverses the Project's Study Area.

Feeder 812 is a key component of the Central Queensland transmission network. As part of the Gladstone Priority Transmission Investment (PTI) program, Powerlink have assessed the options to ensure ongoing reliability and security of supply in the Gladstone region to support electrification of major industry and have proposed to refurbish Feeder 812 into a new high-capacity double-circuit transmission line.

4.1.2.2 Connection Configuration

The battery modules will be connected to inverters, which convert direct current to grid compliant alternating current. This power will then flow through medium voltage power stations and into the Project substation using underground cables. The substation will then be connected to a new Powerlink switching station via underground cable, which will provide the interface with Feeder 812.

4.1.2.3 Engagement with Powerlink

Neoen has been engaging with Powerlink since 2018 to confirm network capacity and the suitability of the project site for both wind and battery development. An initial connection enquiry was submitted in April 2019 for a 500 MW wind farm, with Powerlink confirming feasibility and identifying the requirement for a 275 kV switchyard adjacent to the existing easement in their June 2019 response. A second connection enquiry was lodged in April 2025 for a 600 MW battery project to be delivered in two 300 MW stages. Powerlink's May 2025 response confirmed that no significant constraints were identified for connecting the first stage of the battery, with further assessment to be undertaken for the second stage once the Gladstone PTI program is confirmed. Further discussions with Powerlink indicated that the available network capacity for the first stage of the battery, prior to delivery of the Gladstone PTI program, was up to 430 MW. Based on this advice, Neoen submitted a connection application to Powerlink in June 2025 for a first battery stage of 430 MW.

4.1.3 Construction Methodology

Battery storage facilities are developed using modular construction techniques. This means that pre-assembled battery units are brought to the Study Area, facilitating more efficient construction. This has a range of benefits, including shorter construction timeframes, less waste and reduced noise and traffic impacts.

Generally, construction of the Project will require:

- Site inspection, survey and mobilisation.
- Leveling and compacting, mainly focused to the hardstand areas.
- Internal road works such as surfacing and kerbing.
- Installation of security systems (e.g. perimeter fencing, CCTV, lighting).

- Implementation of stormwater drainage systems.
- Temporary laydown area for equipment.
- Trenching and underground cabling.
- Installation of high and medium voltage transformers, electrical cabling, inverters and other associated electrical equipment.
- Installation of battery modules.
- Commissioning and testing of the Project.

4.1.3.1 Waste Management

During the construction phase of the project, waste will be managed in accordance with the *Waste Reduction and Recycling Act 2011* (Qld), local council requirements, and best practice environmental management. The following measures will be implemented during construction of the Project:

- **Waste segregation:** Waste streams such as general waste, recyclables (e.g. cardboard, metals, plastics), and regulated wastes (e.g. oils, paints, solvents) will be separated on site using clearly labelled bins or skips.
- **Reuse and recycling:** Where possible, construction materials such as timber, metal, and packaging will be reused or sent to licensed recycling facilities.
- **Regulated waste**: Any hazardous or regulated waste generated (e.g. contaminated soil, fuel or oil residues) will be collected, stored, and transported in accordance with legislative requirements by appropriately licensed contractors to an approved disposal facility.
- **Monitoring and training:** Site personnel will receive talks on waste handling procedures. Waste volumes and disposal records will be monitored and maintained.

4.1.3.2 Engineering Services

During construction, the Project will be adequately serviced through the implementation of the following measures:

- **Water supply:** The site will not be connected to the local water network. All water required for construction activities (e.g. dust suppression, minor concrete works) will be supplied by water carts delivered to site as required. Water fountains and bottles will be provided for drinking purposes.
- **Sewerage / wastewater:** Portable toilet facilities will be provided on site for construction personnel. These facilities will be regularly serviced by licensed contractors, with all waste transported to and disposed of at an approved wastewater treatment facility. No untreated wastewater will be discharged to land or water.

4.1.3.3 Geotechnical

The Project will require limited bulk earthworks, primarily for:

- Site grading to achieve appropriate drainage and foundation levels.
- Construction of foundations for battery units, inverters, transformers, and ancillary infrastructure.

- Internal access tracks and hardstand areas.

Detailed geotechnical investigations will be undertaken during the design phase to confirm subsurface conditions (e.g. soil type, depth to rock, groundwater, bearing capacity) and to inform foundation design.

Earthworks and foundations will be carried out in accordance with the following measures:

- All earthworks will be designed and constructed in accordance with relevant Australian Standards and local government requirements to ensure long-term stability.
- Cut and fill batters will be designed at stable angles or otherwise retained using engineered retaining structures if required.
- Compaction of fill materials will be carried out to achieve design densities and to minimise settlement risk.
- Drainage controls will be incorporated to avoid erosion or scouring around embankments, foundations, and access tracks.

Long-term site stability will be achieved through the following measures:

- Retaining walls or engineered structures (if required) will be designed to Australian Standards with adequate safety factors to account for long-term loads, weathering, and groundwater conditions.
- Periodic inspection and maintenance of civil works (e.g. drains, embankments, foundations) will be included in the site's operations and maintenance regime.

4.1.3.4 Construction Hours

Construction will occur during standard working hours, being 6:30 am – 6:30 pm Monday to Saturday. Where construction activities are required to occur outside of standard working hours, audible noise will be managed in accordance with a Project-specific CEMP, which will be prepared in consultation with neighbouring properties and include the following measures:

- Council will receive prior notification of out of hours works.
- Works will be conducted in accordance with an Out of Hours Guideline.
- Noise levels will not exceed the limits specified in the CEMP.
- Mitigation measures outlined in the CEMP will be implemented to minimise noise impacts on neighbouring properties.

4.1.3.5 Workforce

It is estimated that up to 150 workers will be working on-site per day, with peak number being experienced during the substation and switchyard works. Construction staff are expected to commute to site using a mixture of private vehicles (light vehicles and 4WDs) and minibuses. The majority of staff will be based out of Rockhampton, with fly-in fly-out (FIFO) workers also accommodated in Rockhampton, and will commute to site each day. A site office will be installed, with all visitors and staff required to report to the office upon entry.

4.1.3.6 Internal Roads

Internal roads will be established throughout the Disturbance Footprint and will be constructed of compacted gravel. These roads will have a width of approximately 5 m to allow for the safe delivery, unloading and installation of key Project components. The exact position of the internal roads will be determined during the detailed design phase.

4.1.4 Site Access

Vehicles will ingress/egress via South Ulam Road and travel along a 1.6 km internal access track to reach the Project infrastructure. The access track is needed due to the significant setback between the road frontage and the development.

4.1.5 Operation and Maintenance

The Project will operate under the control of a remote energy management system. It will be connected to the electricity network and operated remotely from Neoen's Operations Control Centre, currently located in Canberra. Day-to-day operations will require minimal on-site presence, with most system monitoring, performance optimisation, and dispatch activities managed off-site via secure communication systems.

On-site presence will consist of small crews of up to 10 staff managing maintenance of the facility including safety, monitoring, and general upkeep. Routine site inspections will occur periodically to check equipment condition, verify security systems, and perform preventive maintenance. Site access will be limited to authorised personnel only. Visitors and contractors will be required to comply with site health, safety, and environmental procedures.

Regular inspections and servicing will be carried out in accordance with manufacturer guidelines and industry standards. This will include checks of battery units, inverters, transformers, and ancillary equipment. If faults are identified (via remote monitoring or site inspections), qualified technicians will be dispatched to undertake repairs or replace defective components.

All maintenance activities will be conducted in compliance with relevant workplace health and safety legislation, electrical safety standards, and environmental protection requirements. Emergency response procedures (including fire safety, spill management, and incident reporting) will be implemented and reviewed regularly. Noise, waste, and traffic impacts associated with maintenance activities will be minimal and managed in accordance with approved management plans.

4.1.5.1 Waste Management

During the operational phase, the Project will generate minimal waste, primarily related to maintenance activities. The following measures will be implemented:

- **General waste and recyclables:** Routine waste (e.g. packaging from replacement parts, office waste) will be stored in appropriate containers and collected by licensed waste service providers.
- **Electronic waste:** Any electrical components or associated materials will be classified as regulated waste and managed in accordance with Queensland legislation. These will be removed by qualified contractors and returned to the manufacturer or sent to approved recycling or treatment facilities.

- **Liquid waste:** Any oils, coolants, or similar liquids generated during maintenance will be collected and removed by licensed contractors.
- **Continuous improvement**: Waste management procedures will be reviewed periodically to identify opportunities for waste minimisation, recycling, and compliance with evolving best practice.

4.1.5.2 Engineering Services

During the operation and maintenance, the Project will be adequately serviced through the implementation of the following measures:

- **Water supply:** As the site will not be connected to the local water network, drinking water for operational staff will continue to be supplied in fountains and/or bottles. Water required for firefighting and operational needs will be stored on site in dedicated tanks.
- **Sewerage / wastewater:** Permanent toilets will be installed within the Operations and Maintenance building. Wastewater will be managed via an approved on-site effluent treatment and disposal system (such as a septic system), appropriately sized for the level of usage anticipated during operation. The system will be designed, installed, and maintained in accordance with Queensland legislation and local government requirements. These facilities will be regularly serviced by licensed contractors, with all waste transported to and disposed of at an approved wastewater treatment facility. No untreated wastewater will be discharged to land or water.

4.1.6 Decommissioning and Rehabilitation

The Project will likely have operational lifespan of 20 to 30 years, after which Project infrastructure may be decommissioned and removed from the site and the land rehabilitated. Alternatively, the asset life may be extended by replacing/repowering existing infrastructure, subject to a further development approval.

Prior to any planned decommissioning of the asset, a detailed Decommissioning and Rehabilitation Plan will be prepared in consultation with the RRC, landowners, and the community, in accordance with best practice environmental management and relevant regulatory requirements. The Decommissioning and Rehabilitation Plan will detail the scope, timing, and methodology of decommissioning and rehabilitation works.

The plan will include the following key elements:

Decommissioning

- All above-ground infrastructure associated with the project, including battery units, inverters, transformers, cabling, fencing, and ancillary facilities, will be removed from the site unless otherwise agreed with the landholder.
- Electrical and battery equipment will be dismantled and transported off-site by suitably qualified contractors.
- Battery modules and other electronic components will be treated as regulated waste and transported to licensed recycling, treatment, or disposal facilities in accordance with all applicable legislation.

- Any underground services (e.g. footings, cabling, conduits) will be either removed or decommissioned to a safe and stable condition, as agreed with the landholder and relevant authorities.

Rehabilitation

- Once infrastructure is removed, disturbed areas will be regraded, topsoiled (where required), re-seeded with commensurate species and stabilised to ensure the land is returned to a safe and stable condition suitable for rural uses.
- Erosion and sediment control measures will be implemented during decommissioning works and maintained until rehabilitation is successful.
- The final landform will be free-draining, safe, and compatible with the surrounding landscape.

5.0 Regulatory Framework

5.1 Planning Instruments

5.1.1 Overview

Section 8 (1) of the Planning Act defines a *planning instrument* as an instrument that sets out policies for planning or development assessment, and is either-

(a) State planning instrument; or

(b) a local planning instrument.

This application is subject to Impact Assessment, therefore the planning instruments, and the matters the assessment manager must have regard to, are those identified in section 45(5) of the Planning Act and sections 30 and 31 of the Planning Regulation.

The following sections identify the planning instruments relevant to the development application.

5.1.2 State Planning Instruments

Section 8 (2) of the Planning Act defines a *State planning instrument* as a planning instrument made by the Minister to protect or give effect to State interests, and is either-

a) State Planning Policy (including temporary State planning policy); or

b) a regional plan.

The following sections provide commentary on the State planning instruments and their relevance to the development application.

5.1.2.1 State Planning Policy

Section 30(a)(2)(ii) of the Planning Regulation requires that impact assessment of the application must be carried out against the State Planning Policy (SPP), Part E, to the extent Part E is not identified in the planning scheme as being appropriately integrated in the planning scheme.

Part 2.1 of the Planning Scheme states that all aspects of the SPP has been fully integrated in the Planning Scheme, therefore a separate assessment against the SPP is not required.

5.1.2.2 Temporary State Planning Policy

Section 30(a)(2)(iii) of the Planning Regulation requires that impact assessment of the application must be carried out against any temporary SPP applying to the premises. In this instance, no temporary SPP applies to the Study Area.

5.1.2.3 Regional Plan

Section 30(2)(a)(i) of the Planning Regulation requires that impact assessment of the application must be carried out against the assessment benchmarks in the relevant regional plan for that region.

The Study Area is located within the Central Queensland Regional Plan 2013 (Regional Plan) area. In accordance with Part 2.2 of the Planning Scheme, the Planning Scheme, specifically the Strategic Framework, appropriately advances the Regional Plan. An assessment of the proposed development against the Strategic Framework therefore satisfies the requirements set out under s 30(2)(a)(i) of the Planning Regulation and is provided in **Section 5.2.1** of this report.

5.1.3 Local Planning Instruments

Section 8 (3) of the Planning Act defines *local planning instruments* as a planning instrument made by a local government, and is either-

a) a planning scheme

b) a temporary local planning instrument (TLPI); or

c) a planning scheme policy.

The following sections provide commentary on the local planning instruments and their relevance to the development application.

5.1.3.1 Planning Scheme

In accordance with Schedule 8, Table 2, Part 1(b)(i) of the Planning Regulation, the assessment manager for this application is the local government, which in this instance is RRC. As such, the Planning Scheme is the applicable *categorising instrument* for the development application and therefore must state both the category of development and the category of assessment. The Planning Scheme confirms that the category of development is *assessable development* and category of assessment is *impact assessment*.

As such, the assessment of the development application must be carried out against the assessment bench marks in the categorising instrument (Planning Scheme) and have regard to any other 'relevant matter'.

5.1.3.2 Temporary Local Planning Instrument

RRC has recently prepared a draft TLPI – Renewable Energy and Battery Storage under Section 23 of the Planning Act for developments in the Rockhampton Region LGA. The public were invited to comment on the draft TLPI between 6 August and 1 September 2025. Under the TLPI, BESS projects over 15 square metres would be impact assessable.

Although the draft TLPI is yet to be adopted by RRC, pre-lodgement advice (**Section 1.6.2**) received confirmed that the development should be prepared having regard to the assessment benchmarks and provisions in the draft TLPI. A response to the draft TLPI has therefore been prepared and can be found in **Appendix D**.

5.1.3.3 Planning Scheme Policy

The planning scheme policies that are considered relevant to this development application are:

- Bushfire management planning scheme policy
- Ecological assessment planning scheme policy

- Stormwater management planning scheme policy.

The development application has been prepared having regard to the relevant planning scheme policies, and are considered to be adequately reflected in the following technical assessments that have been prepared in support of the Project:

- Bushfire Management Plan (BMP) (**Appendix I**)
- Ecological Assessment Report (EAR) (**Appendix E**)
- Stormwater Management Plan (SMP) (**Appendix H**).

5.1.4 Local Government Infrastructure Plan

Section 30(2)(c) of the Planning Regulation requires that impact assessment of the application must be carried out against the local government's Local Government Infrastructure Plan (LGIP), if the local government is an infrastructure provider. The Project is located outside of the mapped LGIP areas, and it is therefore not applicable in this instance.

5.2 Planning Assessment

This application is to be assessed against the Planning Scheme. The assessment benchmarks under the Planning Scheme are addressed below.

5.2.1 Strategic Framework

The proposed development complies with the relevant aspects of the Planning Scheme's Strategic Framework. In particular, the following themes have been responded to below in **Table 5.1**, as they were identified on RRC's strategic framework mapping as applying to the Study Area: settlement pattern, environment and infrastructure.

Table 5.1 Strategic Framework Response

Outcome	Response
Theme – Settlement Pattern ***Element – Rural***	
(2) Rural land is not used for urban development and is to be protected for its productive, landscape and natural resource values	**Complies** The proposed Development Footprint will utilise approximately 4.4% of the total lot area that it is situated within, with the balance to be retained for its current rural use. Given its proximity to existing electrical infrastructure and minimal site constraints, the proposed location presents as the best option with the least impact. It should be noted that the operational lifespan of the Project is anticipated to be up to 30 years, after which the site will be returned to its current state following decommissioning. In addition, the subject site is not located in any mapped agricultural land classification (ALC) A or B areas, therefore productive agricultural capacity will not be impacted.
(4) Development will not alienate or impact on the productive agricultural capacity of rural areas.	

Outcome	Response
(16) Renewable energy technology uses will be supported where there are no adverse impacts on adjoining and nearby uses, including impacts associated with noise, light, emissions, infrastructure requirements or transport movements on transport networks.	**Complies** In accordance with the Noise Impact Assessment and Traffic Impact Assessment, the Project is unlikely to result in adverse impacts upon adjoining properties. In addition, the Study Area is located approximately 1.65 km from the nearest sensitive receptor and approximately 1.3 km from the road frontage which provides sufficient separation so that adverse impacts associated with noise, light, emissions, infrastructure requirements or transport movements are unlikely to be experienced. Refer to **Section 6.2** and **Section 6.3** for a summary of the Noise Impact Assessment and Transport Impact Assessment. The Project is co-located with existing transmission infrastructure in a remote location and is therefore considered to be sited in an appropriate location.
Theme – Natural Environment and Hazards ***Element – Areas of Environmental Significance***	
(1) A network of environmental areas and linking natural corridors of environmental significance are identified within the planning scheme area (as shown on strategic framework maps (SFM-5 to SFM-8) for protection and enhancement. These areas and corridors include: *(a) places of national, state and local environmental significance;* *(b) regulated vegetation;* *(c) flora and fauna habitats;* *(d) wetlands and watercourses, in particular, wetlands of high environmental significance in Great Barrier Reef catchments;* *(e) coastal areas;* *(f) undeveloped hill slopes;* *(g) areas of high environmental significance; and* *(h) natural corridors ensuring the ecological sustainability of flora and fauna.*	**Complies** The Project has been specifically sited to avoid significant environmental areas as much as possible and designed so that any potential impacts are mitigated or minimised. It is noted that although there is a watercourse that intersects the Project's Disturbance Footprint, the Project design avoids the waterway with no permanent above or below ground infrastructure being placed within the watercourse. Refer to **Appendix C** for further detail.
(3) Areas of environmental significance are protected, and development avoids significant environmental impacts. Where this cannot be reasonably achieved, impacts are minimised, and residual impacts are offset locally.	**Complies** The Project avoids the Bouldercombe Gorge Conservation Park and other nearby areas of environmental significance. It has been determined that no SDAP modules are triggered for MSES, and therefore significant residual impact (SRI) assessments are not required. Significant impacts on Matters of National Environmental Significance (MNES) will be offset under the requirements of the Project's EPBC Act approval (refer to **Section 1.5.2**)

Outcome	Response
Theme – Infrastructure and Services ***Element – Inter-regional Networks***	
(1) Key sites and corridors for current and future infrastructure and services are identified, preserved and protected (for example through the use of separation areas). These sites and corridors include those shown on the strategic framework maps (SFM-9 to SFM-12).	**Complies** The purpose of the Project is to provide support to the local electricity network by connecting into the existing transmission corridor that runs through the subject site. Given the electricity infrastructure corridor is integral to the proposed development, it will be preserved and protected.
(4) Utility installations and infrastructure services and their corridors including bulk water supply and networks, gas pipelines and electricity transmission and distribution lines, are protected from encroachment and impacts of development. The location of these installations will be considerate of the amenity and safety of sensitive land use(s) (as shown on the strategic framework maps SFM-9 to SFM-12).	**Complies** The Project intends to support the existing transmission network. Therefore, no impacts of development are anticipated.
(5) Development provides for the safe and efficient provision of energy infrastructure adequate to satisfy community's needs and where possible accommodate sustainable/alternative energy options such as solar.	**Complies** The Project will support the existing transmission network by providing energy storage capacity to meet the current and future demand from the electricity network. The Project also helps accommodate additional renewable energy sources by providing additional firming capacity and increasing grid stability.
Theme – Infrastructure and Services ***Element – Local Area Networks***	
(5) Opportunities for renewable and alternative energy generation are supported where there is no significant impact upon the local environment and community.	**Complies** The Project is located on a site that is remote (i.e. more than 15 km from a township) and well separated from sensitive land uses. This ensures noise generated by the Project is minimal at sensitive land uses. The Project has been sited so it is largely obscured from the local road network and away from the Bouldercombe Gorge Conservation Park, in effort to avoid significant impacts upon visual amenity and the surrounding environment.

5.2.2 Zone

The Study Area is located within the Rural Zone. An assessment has been carried out against the Rural Zone Code of the Planning Scheme, and it is considered that the Project is consistent with the intent of the zone. Refer to **Appendix D** for the full response.

5.2.3 Overlays

As previously outlined in **Section 1.4.4,** RRC overlays affecting the Study Area include:

- Biodiversity

- Bushfire
- Steep Land.

Mapping of the overlays is provided in **Appendix L**. A response to the relevant overlay codes is provided in **Appendix D.**

5.2.4 Codes

The Planning Scheme codes relevant to this application, and the location of the appended code responses are identified in **Table 5.2.**

Table 5.2 Planning Scheme Code

Planning Scheme Codes	Response Location
Rural Zone Code	**Appendix D** – prepared by Umwelt
Biodiversity Overlay Code	**Appendix D** – prepared by Umwelt
Bushfire Hazard Overlay Code	**Appendix I** – prepared by LEC
Steep Land Overlay Code	**Appendix D** – prepared by Umwelt
Access, Parking and Transport Code	**Appendix D** – prepared by Umwelt
Stormwater Management Code	**Appendix H** – prepared by WRM
Waste Management Code	**Appendix D** – prepared by Umwelt
Water and Sewer Code	**Appendix D** – prepared by Umwelt

6.0 Environmental Assessment

6.1 Ecology

A suite of flora and fauna assessments have been previously undertaken on land parcels adjacent to the Study Area for the wind farm component (approved under 2109-24892 SDA) from 2019–2024, which provide context to the ecological values which may occur within the Study Area.

The wider Project area (including wind farm properties) has been subject to over five years' of ecological surveys, including flora and fauna baselines surveys, bird and bat utilisation surveys (BBUS), bio condition assessments, protected plant and pre-clearance flora surveys. Details of these surveys and subsequent results can be found in the *Assessment of Matters of National Environmental Significant – Preliminary Documentation (2021/9137) (Umwelt 2024)*.

Results of the previous surveys have been utilised to inform the likelihood of occurrence for the Study Area and inform the Ecological Assessment Report (EAR) () that has been prepared in support of this application.

6.1.1 Existing Environment

The Study Area is mapped on the Regulated Vegetation Management Map (Version 7.07) as primarily containing Category X (non-remnant) vegetation. Patches of Category R (reef-regrowth) vegetation occur in the east and south-west corners of the Study Area. The extent of regulated vegetation within Study Area is outlined in **Table 6.1**.

Table 6.1 Regulated vegetation within the Study Area

Regulated Vegetation	Description	Extent (ha) with Study Area
Category R	An area which is a regrowth watercourse and drainage feature area located within 50 m of a watercourse located in the Burdekin, Burnett–Mary, Eastern Cape York, Fitzroy, Mackay Whitsunday or Wet Tropics catchments. The vegetation management framework regulates clearing of native vegetation within this buffer area.	0.5
Category X	Non-remnant vegetation.	48.3

A minor enclave of remnant alluvial woodland (Regional Ecosystem 11.3.4) is located in the eastern access road corridor. Ecological assessments, drawing on desktop studies, field-validated data, and extrapolations, identified that 13 species listed under the *Nature Conservation Act 1992* (NC Act)—including one flora and twelve fauna species—are either known or considered likely to occur in the area. Notably, no threatened ecological communities (TECs) were present or expected, and essential habitat, protected plant flora trigger mapping, connectivity areas, and Matters of Local Environmental Significance (MLES) were also absent within the Study Area.

One unnamed, ephemeral drainage line intersects the Study Area on a west to east trajectory. This is a stream order one watercourse under the VM Act and is mapped as having a 'low' fish passage risk level under the Fisheries Act. While this watercourse intersects the Disturbance Footprint, no permanent infrastructure is proposed to occur within 25 m of this watercourse. Where the access track intersects the watercourse, this will be constructed in accordance with the accepted development requirements for waterway barrier works (DAF 2018).

Whilst the watercourse within the Study Area was dry at the time of the survey, during intense periods of inundation, the aquatic environments within the Study Area may temporarily support assemblages of aquatic species and water sources for terrestrial fauna species.



Photo 6.1 Stream Order 1 Waterway within the Study Area

6.1.2 Potential Impacts

The greatest risk of impact on ecological values will occur during the construction phase. The construction activities will involve vegetation clearing/habitat loss, trenching and/or excavation and ground reinstatement. The vegetation types proposed to be cleared for the Project are detailed in **Table 6.2**.

Table 6.2 Vegetation Clearing Required

Value	Study Area (ha)	Disturbance Footprint (ha)
Category R (regrowth watercourse)	0.5	0.5
Category X (non-remnant)	48.3	41.5

Clearing of Category R vegetation, where necessary, will be carried out in accordance with the Accepted Development Vegetation Clearing Code – Clearing for Infrastructure.

The Project poses both direct and indirect threats to NC Act-listed species, primarily during the construction phase where vegetation clearing and associated habitat loss represent the most significant risks. Such potential impacts include:

Potential Direct Impacts

- habitat loss
- fragmentation and degradation
- soil erosion
- introduction and exacerbation of introduced flora species
- increased intensity and frequency of fires
- the disruption of breeding within the species life cycle
- strikes from moving vehicles/machinery
- entrapment in habitat during removal
- entrapment in trenches/holes.
- potential indirect impacts
- introduction and/or exacerbation of weeds
- introduction and/or exacerbation of pest fauna
- construction noise and vibration
- edge effects
- soil erosion and sedimentation
- dust generation.

Notable threatened species affected by the development include, Cycas megacarpa, Ghost bat, Greater glider, Koala and Squatter pigeon (southern). The ground-nesting Squatter pigeon (southern) is particularly vulnerable to direct mortality from construction activities.

However, the potential impact of fauna mortality is likely to be at a very low frequency given the extensive clearing that has been undertaken within the Study Area, the extent and condition of habitat (i.e. cleared pasture and cropping) and the mitigation measures that will be implemented.

The Project is being assessed in accordance with the provisions of the Planning Scheme. The assessment considers the site's environmental values and potential impacts to ensure the proposal aligns with the scheme's strategic framework and relevant codes. In particular, performance outcome (PO) 6 of the biodiversity overlay code is addressed below as it has been identified as an assessment benchmark that requires further justification through a performance solution to assist in demonstrating compliance with the code.

Impacts within the Disturbance Footprint where the watercourse buffer intersects are limited to clearing vegetation above 100 mm. This includes removal of the small, paddock trees and maintenance of grass to 100 mm tall. It is noted the area where the watercourse buffer intersects the Disturbance Footprint is limited to 0.1 ha of vegetation clearing. **Table 6.3** provides an assessment of this impact against PO6 for watercourses and wetlands in the biodiversity overlay code of the Rockhampton Region Planning Scheme. The potential project impacts are illustrated in **Figure 6.1**.

Table 6.3 Response to PO6 - Biodiversity Overlay Code

Development has no adverse impacts on:	Project response
Native vegetation	No native vegetation occurs within the watercourse buffer where it intersects with the Disturbance Footprint. The area is mapped as Category X on the Vegetation Management Regional Ecosystem Map, and it was ground-truthed as non-remnant vegetation. Sparse, small eucalypts occur within this area and will need to be cleared for the Project. Scattered native grasses occur, however, they will not be removed, only maintained (to <100 mm tall).
Habitat	The habitat values provided by vegetation within the watercourse buffer is of limited quality for species as the area is heavily managed and grazed, offering little refuge, foraging or connectivity resources for native species. Additionally, the area where the watercourse buffer intersects the Disturbance Footprint is limited in extent (0.1 ha). Common bird species may utilise this habitat intermittently. The removal of trees and maintenance of grass does not functionally change this habitat and species utilisation will likely remain consistent. The Project is not anticipated to otherwise have an adverse impact on the habitat provided by this area.
Ecological functions	The ecological function of this non-remnant paddock is typical of a highly modified community, providing limited habitat value, predominately restricted to the movement and/or foraging of highly mobile, generalist species. The removal of the few scattered paddock trees and shrubs, along with the maintenance of an existing grass layer is unlikely to materially change or degrade the existing ecological function (dispersal and foraging for generalist species) of the watercourse buffer. Given the small area of disturbance and the large extent of adjacent modified paddock / watercourse buffer, the existing ecological function of the area is anticipated to remain unchanged.

Development has no adverse impacts on:	Project response
Water quality	The watercourse (and associated buffer) that occurs within Disturbance Footprint is a stream order one watercourse that is highly ephemeral and would only hold water following periods of intense rain. This means there is a very low risk of nutrient loading or changes to hydrology. Vegetation below 100 mm and grass will be maintained to stabilise soil and minimise erosion and sediment run off. The Project is therefore not anticipated to result in an adverse impact on water quality.
Nature conservation values	The habitat values provided by vegetation within the watercourse buffer is of limited quality for species as the area is heavily managed and grazed, offering little refuge, foraging or connectivity resources for native species. It is considered unlikely that threatened flora species occur, with the exception of *Cycas megacarpa* in the broader area. This species was not recorded at this location during Field Surveys. This area has not been mapped as habitat for threatened fauna species. Additionally, the impacts are extremely limited in extent in this area and there is an abundance of similar, low-quality habitat within the immediate area. The Disturbance Footprint is intersected by an unnamed tributary of Eight Mile Creek which is mapped as a low risk 'Queensland waterway for waterway barrier works' in accordance with the *Fisheries Act 1994* (Fisheries Act). It is noted that although it intersects the Project's Disturbance Footprint, the Project design avoids the waterway with no permanent above or below ground infrastructure being placed within the waterway. Should any works be required within the waterway, they will be undertaken either in accordance with the 'Accepted development requirements for operational work that is constructing or raising waterway barrier works' (Department of Agriculture and Fisheries, 2018) or under a future development application for Operational Works.

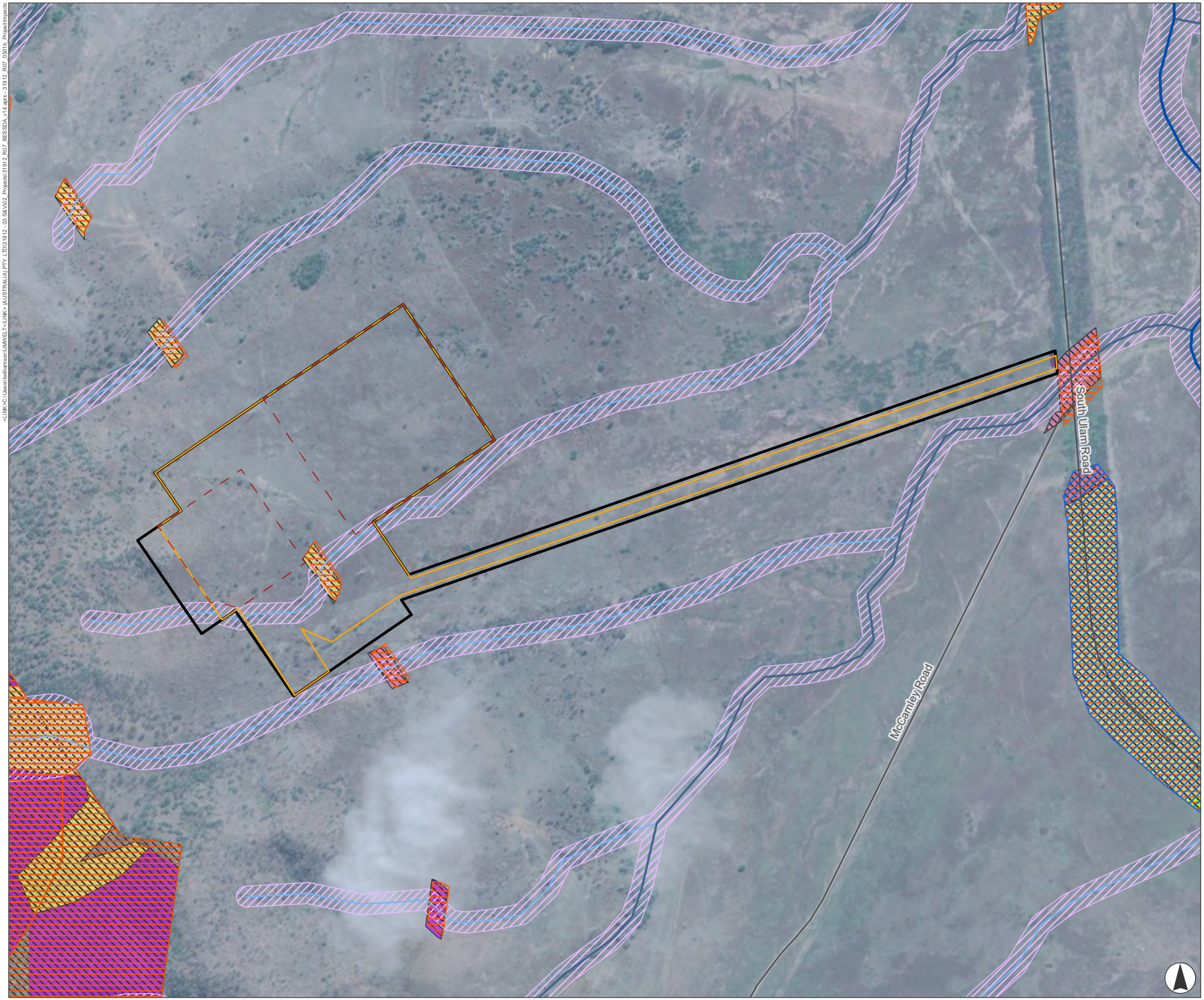


FIGURE 6.1

Project Impacts

Legend

- Study Area
- Disturbance Footprint
- Fence
- Road
- Essential Habitat
- Watercourse Buffers
- Matter of Local Environmental Significance
- Matters of State Environmental Significance
- State Biodiversity Corridor
- Protected Plants Trigger Map

Ground-truthed Regional Ecosystems

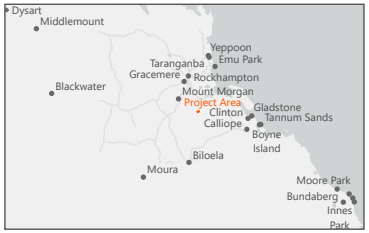
- 11.3.4 - Remnant

State Mapped Regional Ecosystems

- 11.12.1
- 11.3.4/11.3.2
- 11.3.4/11.3.25

VM Act Watercourse

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream



0 0.25 0.5

Kilometres

Scale 1:12,500 at A4
GDA2020 MGA Zone 56

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Image Source: ESRI Basemap (2025) | **Data Source:** Qld Spatial (2025)

6.1.3 Mitigation and Management Measures

Mitigation and management measures proposed to be implemented to reduce impacts are outlined in **Table 6.4** and further detailed in the EAR in **Appendix E** .

Table 6.4 Proposed Mitigation and Management Measures

Aspect	Mitigation and Management Measures

Vegetation Clearing	• Where vegetation clearing is proposed, boundaries will be clearly demarcated.
	• Where trees are to be removed, they will be felled away from areas of retained vegetation, where safe and practicable. Where trees unavoidably fall into retained areas, they will be left in-situ to mimic natural tree fall and provide habitat for ground-dwelling fauna.
	• Fauna spotter-catchers will be present during all vegetation clearing activities.
	• A CEMP will be developed and implemented and will include the measures described in this report, as well as:
	  ○ Appropriate measures will be implemented to minimise indirect impacts to native vegetation adjacent to the Project, including control of runoff and erosion.
	  ○ A site induction so that all staff and contractors are aware of site environmental values and controls.
	  ○ Management measures to limit the spread of the State Restricted weed, Lantana camara.

Fauna	• Micro-siting of Project infrastructure will aim to retain habitat trees where possible. • Where habitat features such as hollow logs cannot be retained in-situ, they will be relocated to adjacent areas of suitable habitat if safe and practical. • Construction personnel will be educated (through site inductions and toolbox talks) on the potential presence of fauna. • Where encountered, personnel shall keep their distance from fauna and not harm or trap them. • Where injured fauna is encountered, a wildlife carer or vet will be contacted.
Weeds and Pests	• Weed and hygiene control measures will be in place during construction in accordance with a Project CEMP. • Prior to entering the Study Area, the origin of construction materials, machinery and equipment will be determined and certified where applicable. • During construction and operation, waste will be contained within fauna proof bins so as not to attract pest species.
General Mitigation Measures	• Erosion and sediment control devices will be implemented in accordance with the Erosion and Sediment Control Plan (ESCP) to minimise the risk of potential sedimentation to sensitive receptors. • To minimise dust impacts, vegetation clearing will not be undertaken in high wind conditions unless dust suppression measures such as water tanks are being used.

Aspect	Mitigation and Management Measures
	• Hot/hazardous works will not to be undertaken during a Total Fire Ban or on a day with a Fire Danger Rating of 'Extreme' or 'Catastrophic'. • A dedicated firefighting water tank will be installed for firefighting during operations. Firefighting water will be provided from water carts during construction.
Species-specific Mitigation Measures	*All threatened and near threatened species* • In the very unlikely event that a flora or fauna individual listed under the EPBC Act and/or NC Act is damaged, removed or killed as a result of Project activities (without an appropriate permit), the relevant regulating body for that species will be notified within a maximum period of two (2) business days. • Cycas megacarpa. • Minimise impacts to individuals and mapped habitat for Cycas megacarpa. • Pre-clearance surveys for Cycas megacarpa have been undertaken within the Study Area and this data will be used for micro-siting purposes. • Areas proposed to be cleared will be demarcated to ensure no accidental clearing outside the Disturbance Footprint. • A pre-approved Cycas megacarpa Translocation Management Plan (CTMP) will be implemented through all Project phases (note that this is a conditioned requirement of the EPBC Act approval). This plan will provide detailed information regarding: ○ Species information including a description to aid identification. ○ Mitigation and management methods, including corrective actions. ○ Vegetation clearing requirements and methods to reduce impacts to surrounding individuals and their habitat. ○ Specific weed and pest management measures to reduce impacts on the long-term integrity of the remaining habitat and population, including high biomass weeds. ○ Erosion, sedimentation, and dust management requirements specific to the species. • This species is also considered a protected plant under the NC Act. The Nature Conservation (Plants) Regulation 2020 outlines the regulatory requirements for managing potential impacts on a protected plant. While the Study Area occurs outside of the protected plants trigger map, a permit is still required for the removal of Cycas megacarpa individuals. • Ghost bat. • Where pits, voids or trenches are required, include appropriate cover to prevent extended water retention in these spaces and/or subsequent breeding opportunities for cane toads. • Greater glider. • Where clearing is proposed for areas of Greater glider (southern and central) denning habitat, preclearance surveys must include canopy

Aspect	Mitigation and Management Measures
	searches and inspections of suitably sized hollows (>8 cm diameter). Where inspection of hollows cannot be safely undertaken prior to felling, the hollow-bearing tree will be slow felled to minimise the likelihood of injury or death and will be inspected by a qualified fauna spotter to confirm presence or absence of greater glider (southern and central). If an individual is found to be present, it will be inspected for injury and if healthy, relocated to an adjacent area of mapped breeding and denning habitat after dusk. If the individual is injured it will be transported to a local wildlife carer and rehabilitated prior to releasing in a suitable area adjacent to the location in which it was found. • In the unlikely event that a Greater glider (southern and central) is killed as a result of Project activities, DCCEEW will be notified within a maximum period of two (2) business days. • Koala. • Pre-clearance surveys will include canopy searches for koalas. If a koala is located during pre-clearance surveys or during clearing activities: ○ The individual must not be forcibly relocated. ○ Any tree which houses a koala as well as any tree with a crown that overlaps that tree will not be cleared until the koala vacates the tree on its own volition. ○ Allow a clearing buffer surrounding the tree, equal to the height of the tree or deemed suitable by the fauna spotter-catcher. ○ Any injured koala (and fauna in general) should be transported to a vet or recognised wildlife carer. ○ Requirements for koalas subject to handling to be examined and if suspected of Chlamydia infection will be taken to a predesignated veterinarian/wildlife care facility for treatment prior to release. • Clearing must be carried out in a way that ensures any koala present has time to move out of the clearing site without human intervention. • In the unlikely event that a koala is killed as a result of Project activities, DCCEEW will be notified within a maximum period of two (2) business days. • Vehicles may cause direct mortality to koalas (DAWE, 2022). Speed limit restrictions (40 km/hr) will be enforced throughout the site to minimise potential vehicle strike risk to the species. • Habitat degradation by invasion of weeds has the potential to increase impacts associated with land clearing (DAWE, 2022). A Weed and Pest Management Plan will be implemented to ensure no introduction or proliferation of invasive weed species or pest fauna species. This includes *Lantana camara* and *Cryptostegia grandiflora* (rubber vine), which are known habitat degrading species of the koala and have been identified as occurring on site. • Squatter pigeon (southern)

Aspect	Mitigation and Management Measures
	• Where clearing is proposed for areas of Squatter pigeon (southern) dispersal habitat, pre-clearance surveys must include flushing to encourage the movement of individuals out of the clearing area. • As squatter pigeon (southern) nests on the ground and is at high risk of direct mortality, nests should be identified and clearly demarcated by a spotter-catcher during pre-clearance surveys. If the spotter-catcher determines a nest to be active, it will be managed in accordance with an approved High-risk Species Management Plan (SMP). • To minimise the chances of a collision, in known squatter pigeon (southern) occurrence areas speed limits (in private areas) will be reduced to 40 km/hr or less and signage will be installed that indicates subspecies' presence. Signage will also be installed within the public access road corridor.

6.2 Acoustics

A Noise Impact Assessment (NIA) (**Appendix F**) has been prepared to assess the noise and vibration impacts associated with the Project during both the construction and operational activities. The assessment identifies the potential noise level emissions from the Project and provides the outcomes of noise modelling at nearby sensitive receptor locations.

6.2.1 Existing Environment

Baseline noise monitoring was undertaken at three locations (Locations A, B and C) in the vicinity of the Project's study area to ascertain the background noise levels of the existing environment, illustrated in **Figure 6.2**. The monitoring was undertaken over a period of two weeks, between 24 June 2025 and 9 July 2025. The noise monitoring locations are considered representative of the acoustic environment of the sensitive receptors located in the vicinity of the project.

Based on observations during the site visit and the monitoring results, the acoustic environment can be characterised as a quiet, rural and agriculture scene, generally comprising bird and insect noise, animal or cattle noise, infrequent road traffic noise and wind-induced foliage noise related to wind in the trees and long grass. These observations were confirmed as accurate by the noise monitoring results, as provided in Section 4.0 of the NIA**.**

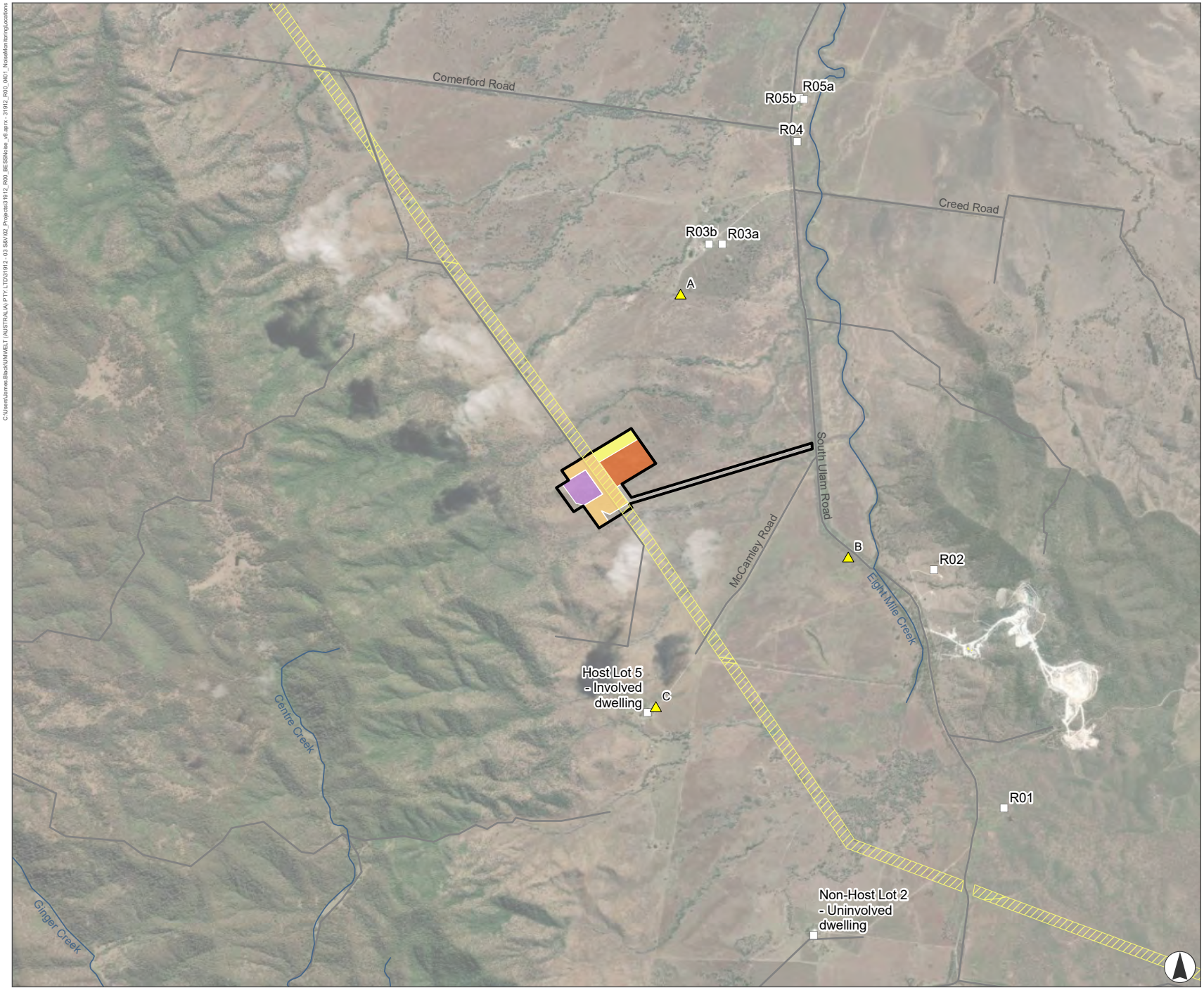


FIGURE 6.2

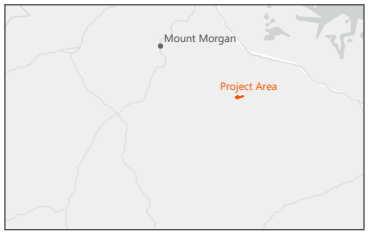
Noise Monitoring Locations

Legend

- Noise Logger
- Sensitive Receptors
- Roads
- Named Watercourse
- Easement
- Study Area

BESS Layout

- Access road
- BESS area
- Overhead and underground line
- Substation area
- Switchyard area



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Kilometres

Scale 1:50,000 at A4
GDA2020

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6.2.2 Potential Impacts

The Planning Scheme is the applicable local planning instrument for the Rockhampton Region LGA. Based on the Rural Zone Code of the Planning Scheme and the noise section of Planning Scheme Policy (PSP), it is considered that the AQO under the Environmental Protection (Noise) Policy 2019 (EPP (Noise)) represent the applicable benchmarks for the NIA. It is noted that this criteria has been confirmed by RRC via two separate pre-lodgement meetings (refer to **Section 1.6**) The noise criteria derived from the AQO is presented in **Table 6.5.**

Table 6.5 Noise Limits Derived in Accordance with EPP (Noise) Acoustic Quality Objectives

Period	Acoustic Quality Objective Internal Noise Level	Noise Limits [1] LAeq,adj,1hr dB(A)
Day (7am – 6pm)	35	40
Evening (6pm – 10pm)	35	40
Night (10pm – 7am)	30	35

Note 1: Allowing for 5 dB(A) noise reduction across the building façade in accordance with the EcoAccess Guideline: Planning for Noise Control). Typically, the reduction achieved across a semi-open façade is in the order of 5 dB(A) to 10 dB(A). In a contemporary setting, a correction of 5 dB(A) is commonly adopted as a conservative outcome.

The noise model (described in **Section 6.2**) was used to predict levels from the Project at the surrounding sensitive receptors under enhancing meteorological conditions. The noise modelling results have been presented utilising sound power levels associated with day-time mode[2] and night-time mode[3] fan speeds. The results for all receptors were assessed for the applicability of tonality penalties under the EcoAccess Guideline: Planning for Noise Control. A tonality penalty of 5 dB(A) has been applied to the predicted noise levels for all receptors.

The noise level predictions for the Project including +5 dB tonality penalty at different fan speeds are shown in **Table 6.6.**

Table 6.6 Predicted Noise Levels

Period	Predicted Noise Level LAeq,adj,1hr dB(A)	
	Day-time Mode	Night-time Mode
Host Lot 5 – Involved dwelling	39	30
Non-Host Lot 2 – Uninvolved dwelling	26	17
R01	27	18
R02	36	26
R03a	40	31
R03b	40	31
R04	33	24
R05a	31	22
R05b	39	30

[2] Daytime mode: Fan speed modelling undertaken for record hottest day and 10 hottest consecutive days indicates that the worst-case day time mode (between 7am and 10pm) is likely to be represented by the following combination of fan speeds for the two primary components - 100% for battery fans and 100% for PE fans.

[3] Night-time mode: Fan speed modelling undertaken for record hottest day and 10 hottest consecutive days indicates that the worst-case day time mode (between 7am and 10pm) is likely to be represented by the following combination of fan speeds for the two primary components - 100% for battery fans and 100% for PE fans.

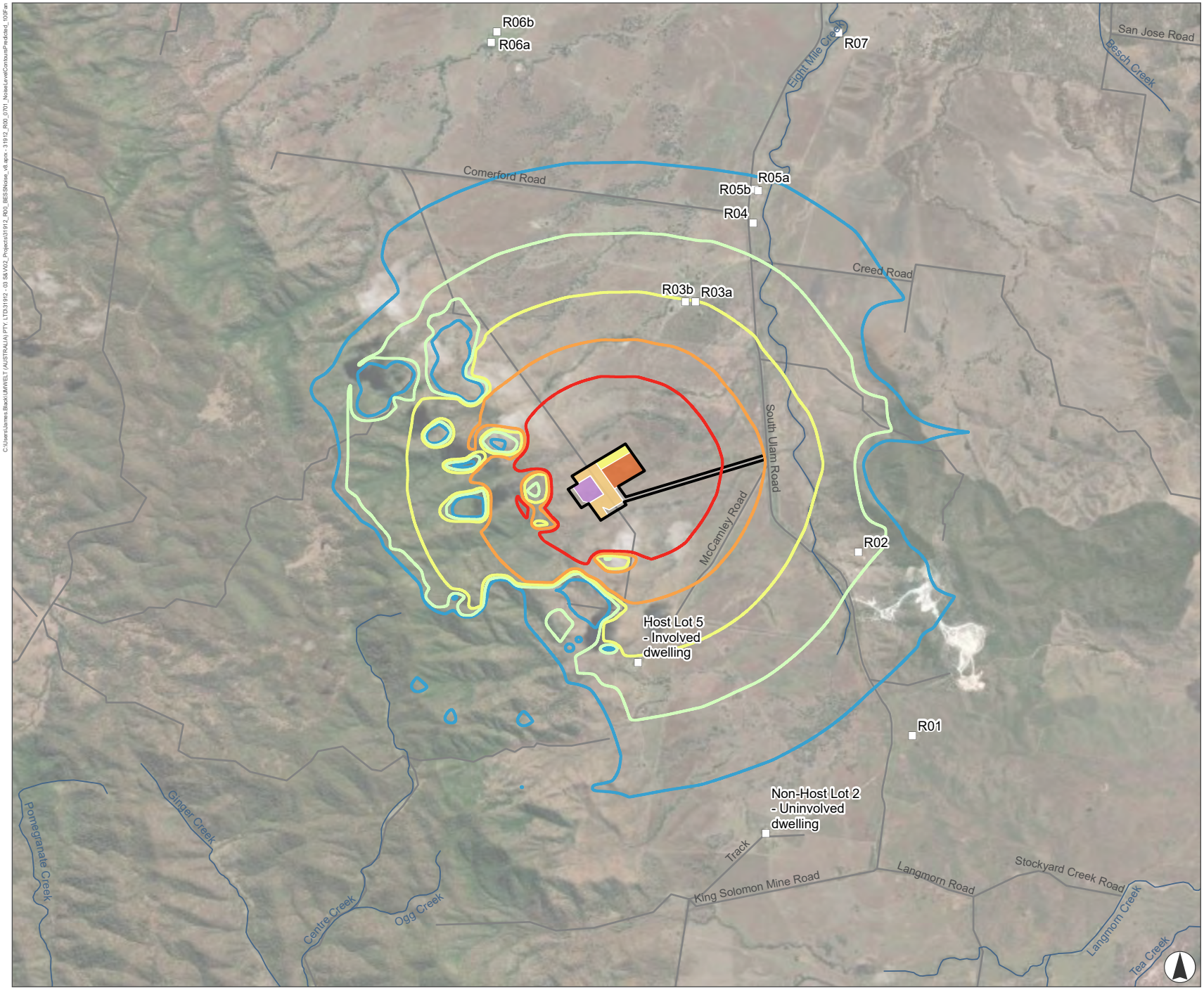


Image Source: ESRI Basemap (2024) | **Data Source:** NSW DFSI (2024)

FIGURE 6.3

Predicted LAeq,adj Noise Level Contours (Including + 5 dB Tonality Penalty) - Day-time Mode

Legend

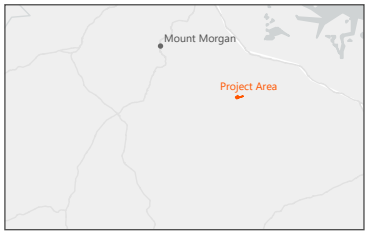
- Sensitive Receptors
- Roads
- Named Watercourse
- Study Area

Noise Contours

- 30dBA
- 35dBA
- 40dBA
- 45dBA
- 50dBA

BESS Layout

- Access road
- BESS area
- Overhead and underground line
- Substation area
- Switchyard area



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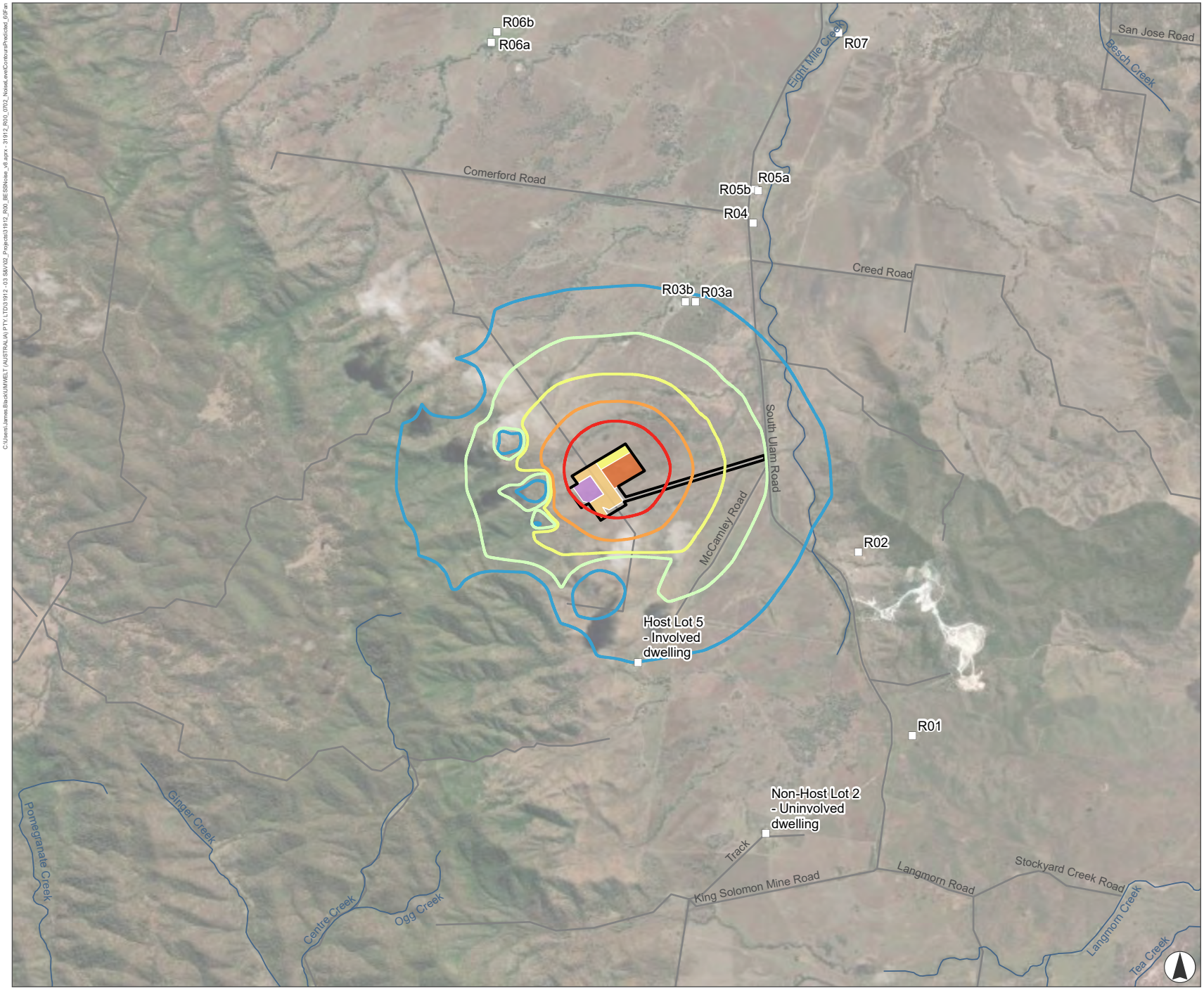
Kilometres

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FIGURE 6.3

Predicted LAeq,adj Noise Level Contours (Including + 5 dB Tonality Penalty) - Night-time Mode



Legend

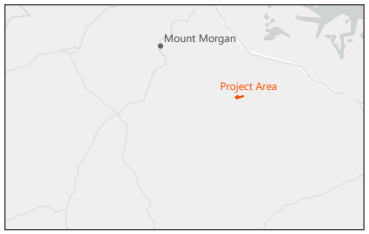
- Sensitive Receptors
- Roads
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Noise Contours

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- 35dBA
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6.2.3 Summary of Findings

As indicated in **Section 6.2.2**, the highest predicted noise level is 40 dB(A) LAeq,adj at R03a, based on day-time mode fan speed for the Telsa battery modules. This reduces to 31 dB(A) with night-time mode. Noise level contours (including the +5 dB tonality penalty) for the Tesla Megapack noise predictions are shown in **Figure 6.3** and **Figure 6.4** for day-time mode and night-time mode fan speeds respectively.

The predicted noise levels indicate that the AQO Daytime noise limit of 40 dB(A) can be achieved with day-time mode fan speed, similarly the AQO Night-time noise limit of 35 dB(A) can be achieved with night-time mode fan speed. Based on these noise level predictions the AQO noise limits can be achieved through the adoption of the representative fan speeds during the day and night periods.

Based on the noise modelling assumptions and results presented in the assessment for the various fan speeds, the Project is predicted to comply with the AQO during the day, evening and night periods without the need for additional noise mitigation measures. The prediction results (including a +5dB tonality penalty) indicate that the AQO Daytime noise limit of 40 dB(A) can be achieved with day-time mode fan speed, similarly the AQO Night-time noise limit of 35 dB(A) can be achieved with night-time mode fan speed.

Based on these noise level predictions the AQO noise limits can be achieved through the adoption of the representative fan speeds during the day and night periods.

6.3 Traffic

A Traffic Impact Assessment (TIA) (**Appendix F**) has been prepared to assess the potential traffic impacts of both the construction and operational phases of the Project on the surrounding road network. Notably, the Project proposes to provide access via a new access point to Lot 100 on SP289441, located on the western side of South Ulam Road approximately 16.773 km south of the Bruce Highway, and approximately 110 m north of McCamley Road.

Overall, the TIA found that the Project will have minimal impact on the surrounding road network during both the construction and operational phases.

Notwithstanding, the following potential impacts to the road network were identified:

- Oversize over mass (OSOM) manoeuvrability along transport routes during the construction phase of the Project, noting this is dependent on the expected configuration of the transport vehicle.
- New access to the Project is via the western side of South Ulam Road, approximately 16.8 km south of the Bruce Highway. As no access point currently exists at this location, the new site access intersection must be provided to service the expected Project traffic volumes.
- Additional heavy vehicle movements resulting from the Stage 1 and Stage 2 construction works is anticipated to lead to a significant (>5%) increase in pavement loadings on the RRC controlled road link of South Ulam Road.

To reduce these potential impacts, the following mitigation measures have been recommended by the TIA:

- Completion of minor works along the identified transport route to accommodate the swept paths of the OSOM transformer transport vehicles, as identified in the Preliminary Transport Route Assessment for the Project. It is noted that the exact extents and scope of these works will be determined in subsequent detailed design phases of the Project once the transformer transport vehicle configurations are confirmed.
- Construct new site access from South Ulam Road (LHS approx. Ch. 16.800km) to cater for Project volumes in accordance with the requirements for a bitumen road (<300 vehicles per day (vpd)) as per Standard Drawing CMDG-R-040 (Rural Road Access and Property Access Over Table Drains).
- Installation of advisory "truck turning" signage on the approaches to the proposed new site access on South Ulam Road during the construction phase, to highlight to motorists the presence of the Project access locations and the potential for turning vehicles to/from the side roads.
- Enter into an Infrastructure Agreement with RRC regarding the required mitigation works on South Ulam Road to offset the calculated pavement impacts of the Project. This Infrastructure Agreement will include a reference to a pre and post dilapidation inspections to be undertaken on the relevant sections of South Ulam Road by representatives of the proponent and RRC.

6.4 Stormwater

6.4.1 Surface Water

A SWMP (**Appendix H**) has been prepared by WRM Water & Environment Pty Ltd (WRM) to assess the stormwater and erosion and sediment control aspects of the Project in support of a development application to be lodged with RRC.

To simulate flood behaviour for 50%, 10%, and 1% Annual Exceedance Probability (AEP) events under current climate conditions a TUFLOW two-dimensional hydrodynamic model was utilised. The model used direct rainfall application with design rainfall depths and losses derived from Australian Rainfall and Runoff (ARR) 2019 guidelines, including climate change adjustments. Hydraulic roughness coefficients were assigned based on land use classifications, and boundary conditions were set downstream of the Study Area to minimise influence on local flood behaviour.

Flood hazard assessments classify the Study Area flood hazards mostly between categories H1 to H4, with significant hazards adjacent to access roads. Peak discharges at key locations within the Study Area range from 0.85 m^3/s to 80.25 m^3/s for the 50% AEP event, increasing to 2.38 m^3/s to 189.5 m^3/s for the 1% AEP event. Model validation against regional flood frequency estimates and calibrated URBS models supports the reliability of these results. The flood modelling therefore indicates that the Project will have negligible impact on flood depths and velocities due to minor landform alterations and infrastructure placement outside primary flow paths.

The Project is located within the Fitzroy River Basin, with environmental values including aquatic ecosystems, irrigation, stock water, recreation, drinking water, and cultural values. The Water Quality Objectives (WQO's) under the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (EP Water) are applicable to the Project and specify limits for nutrients, dissolved oxygen, turbidity, suspended solids, and pH to protect these values.

Although direct water quality data is unavailable, the Study Area is expected to have moderately disturbed water quality. Peak flow assessments using the Rational Method indicate that the increase in impervious area (1.6%) will result in a negligible rise of 0.33 m^3/s in the 1% AEP peak flow, posing minimal risk to downstream waterways. As a result, any additional flow from the Study Area is expected to be negligible and unlikely to have an impact on the receiving environment.

6.4.2 Erosion and Sedimentation

A hierarchy of control measures including drainage control, erosion control, and sediment control is recommended to minimise soil erosion and sediment transport during construction. The SWMP recommends the following high-level control measures that the detailed design may consider adopting in the construction ESCP:

- **Drainage controls** include stable channels and unsealed road runoff management.
- **Erosion controls** involve staged clearing, soil stabilisation, and various groundcover techniques such as mulching and revegetation.
- **Sediment controls** include sediment basins, fences, and check dams designed to achieve at least 80% hydrological effectiveness for sediment retention.
- It is recommended that erosion control devices are employed as soon as reasonably practicable to limit soil erosion and to protect the exposed areas of soils from raindrop impact erosion. All control measures are to be installed, managed and maintained in general accordance with the Best Practice Erosion and Sediment Control (BPESC) guidelines from the International Erosion Control Association (IECA) to:
    - divert clean water around construction activities
    - reduce water velocity and capture sediment on site
    - prevent sediment moving off-site and sediment-laden water entering any watercourse, drainage line, or drain inlet
    - minimise the amount of material transported from the site.

6.4.3 Contaminated Water

Potential contamination risks from chemical or hydrocarbon spills during construction are to be managed through a Project CEMP and ESCP. Key measures to be implemented include (but not limited to):

- Design, construction and maintenance of control measures will follow IECA's Best Practice handbook for guidelines (2008).
- Site drainage works will aim to minimise potential impacts on the existing overland flow paths.
- A CEMP and ESCP will be developed for the Project, detailing methods for minimising contaminant-bearing runoff following the IECA Best Practice Erosion and Sediment Handbook (IECA, 2008).
- Water will be used for dust suppression to minimise mobilisation and airborne contaminants.
- Safe storage of chemicals and hydrocarbon materials (e.g. away from waterways and drainage lines), to ensure that any spillages are contained.

- Inspections will be undertaken at least daily during periods of inclement weather, 24 hours before forecast rain, and within 24 hours following a rain event. During dry periods, a suitably qualified person will inspect control measures weekly.
- Use of glyphosate-based products (or similar non-residual and non-persistent herbicides) to manage weeds on-site to minimise the potential risk of harmful herbicide by-products entering the surface water receiving environment.
- Installation and operation of a septic tank to service the operations and maintenance building. Regulated wastes will be removed from the site and disposed of in a suitable facility by a licensed operator.

6.4.4 Summary of Findings

The key matters relevant to the surface water impacts of the Project are summarised below:

- Impacts to surface water resources may occur during the construction; however, these potential impacts can be mitigated to present negligible risk.
- Operational phase of the Project presents minimal risk provided that by the conclusion of the construction phase, appropriate groundcover and drainage are established.
- While the core area does not contain any areas of major flood hazard, significant flood hazard was identified adjacent to the access road that reaches the Project.
- The localised and confined nature of the Project is likely to result in minor impacts (if any) that do not pose a risk to drainage features, downstream watercourses or receiving waters.

Notwithstanding, it is considered that the Project will have minimal impact on surface water due to:

- Limited ground disturbance and low impervious area.
- Large volumes of pollutants are not being stored or handled on site.
- Construction phase risks to surface water can be effectively managed with established environmental practices and erosion and sediment controls.
- Infrastructure is sited outside the 1% Annual Exceedance Probability (AEP) flood extent therefore mitigating flood risk to critical assets.

Overall, surface impacts are minor and manageable, ensuring protection of environmental values and compliance with regulatory requirements.

6.5 Bushfire

A BMP (**Appendix I**) has been prepared by Land and Environment Consultants Pty Ltd (LEC) to assess the bushfire hazards, evaluate potential risks and outline mitigation measures for the Project in support of a development application to be lodged with RRC.

The Project falls within a medium potential bushfire intensity area and a grassfire hazard area as per the bushfire hazard overlay map, confirming the need for compliance with the Bushfire hazard overlay code of the Planning Scheme. The Project's components are regarded as 'community infrastructure providing essential services' as described in the SPP guidance material – bushfire. The Project could also be regarded as 'hazardous materials in the context of bushfire hazard' as described in the SPP

guidance material – bushfire. It is noted that hazards associated with the Project are addressed in the HIMP (**Appendix J**) and summarised in **Section 6.6.**

The BMP identifies that the Project's Study Area is potentially exposed to the following hazards and risks:

- Fire danger season and exposure (the Project is highly likely to experience bushfire or grassfire exposure due to the Study Areas fire history).
- Adjacent land use hazards (i.e., agricultural activities nearby and associated equipment use, hot works and potential burning for waste or hazard reduction).
- Water supply and access (the Study Area lacks mains water however contains several dams with uncertain reliability and access).
- To reduce the risk of bushfire hazard to a tolerable level, the following mitigation measures must be implemented for the Project, subject to detailed design:
- A 30-m-wide asset protection zone (APZ) must be established around the infrastructure and designed to achieve a radiant heat flux level of ≤ 10 kW/m^2, which is considered a tolerable radiant heat exposure outcome for this type of development (indicative location illustrated in **Figure 6.5**).
- A non-flammable surface must be established and maintained within indicative infrastructure areas and be free of weeds, woody regrowth and grass providing a barrier to fire travelling on or near the ground surface.
- Vegetation cleared from the Study Area must be mulched and used in rehabilitation works or removed from the Study Area (must not be windrowed or stockpiled for use after construction).
- A water tank(s) and/or outlet point must be provided within the Study Area (but outside the security fencing for infrastructure components) for rural fire fighting (location to be determined in consultation with the local Rural Fire Brigade Queensland).
- A fire access trail must be provided around the perimeter of the indicative infrastructure areas, generally aligned with the APZ and designed and constructed in accordance with QFD standards.
- Permanent buildings and structures within the Study Area must be designed and constructed in accordance with the relevant fire resistance and safe access and egress requirements of the National Construction Code – Building Code and Australia (NCC-BCA).
- The access track linking the Project with South Ulam Road is to be designed for heavy articulated vehicles and will meet the design standards for rural fire-fighting vehicles.

Through the implementation of the above mitigation measures, the Project is considered to comply with the Bushfire hazard overlay code of the Planning Scheme.

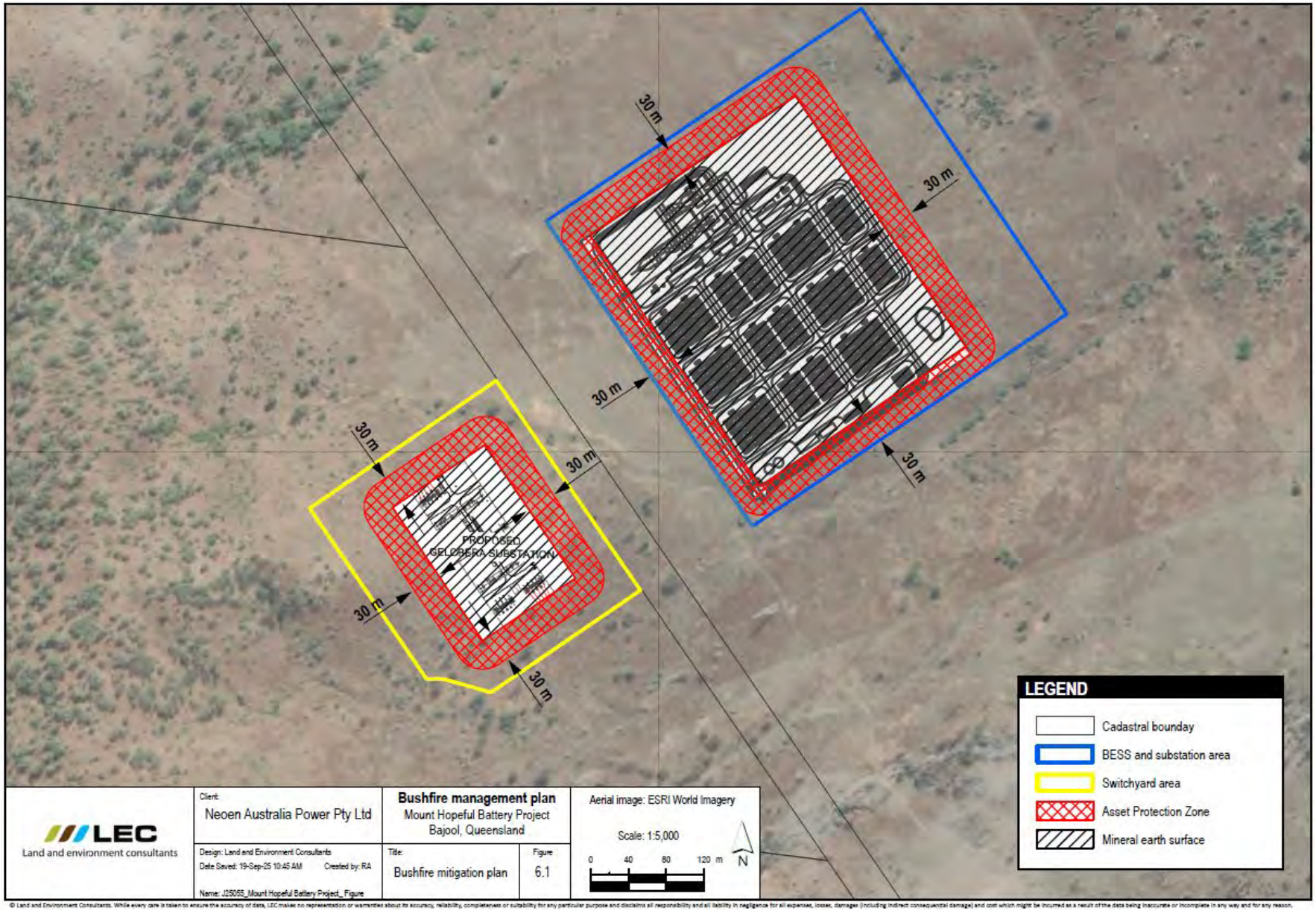


Figure 6.5 Bushfire Mitigation Plan (LEC, 2025)

6.6 Hazard and Incident Management Plan

A Hazard and Incident Management Plan (HIMP) (**Appendix J**) has been prepared by Riskcon Engineering to assess the potential risks and ensure the Project is appropriately designed. The key focus of the HIMP is assessing potential fire sources that may result from project operations.

Based on the assessment, it was concluded that, if battery units include the required certifications, fire detection measures, fire protection measures and appropriate separation to adjacent infrastructure, the site will be sufficiently safe. Additionally, the quantity of fire water for services to utilise shall be in accordance with AS 2419.1:202,1 providing sufficient capacity to respond to any fire scenario on site.

Recommendations from the HIMP include:

- Final separation distances between BESS units shall be defined with regard for the level of testing and outcomes of UL9540A reports provided by the selected supplier.
- Adopt an approach to minimise potential for incident propagation due to a MV transformer fire:
    - Consider orienting the BESS containers such that auxiliary equipment is located proximal to the MV transformer aisles of the installation, moving the battery storage compartments of the BESS outside of the 23 kW/m2 contour.
    - Increase spacing between MV transformers and BESS containers.
    - Provide heat shielding via increased bund height or firewalls (as with HV transformers).
    - Reassess impact during detailed design with specific MV transformer data.
- An emergency response plan shall be prepared in accordance with HIPAP No. 1 – Industry Emergency Planning Guidelines (Ref. [1]).
- It is noted that the HIMP is preliminary in nature and acts as a precursor to a Fire Safety Study (FSS), which will be prepared at the detailed design stage of the Project and incorporate the recommendations of the HIMP. A copy of the HIMP is provided in **Appendix J**.

6.7 Emergency Management

An Emergency Response Plan (ERP) (**Appendix K**) has been prepared by Riskcon Engineering to minimise any potential adverse impacts on people, property and the environment that may arise from incidents occurring or impacting onsite during the construction, operational, and decommissioning phases of the Project and addresses the following matters:

- Fire and explosion
- Battery fire
- Hazardous and dangerous materials spills
- Medical emergency or personal injury
- Natural events (e.g. floods and earthquakes)
- Bomb threats

- Collision of vehicles
- Civil disturbance, vandalism or on-site intruders
- Evacuation protocols
- Relevant emergency agencies (Queensland Fire Department, Queensland Ambulance Department, WorkSafe QLD etc.)
- Emergency response procedures
- Incident reporting.
- It is noted that ERP is preliminary in nature and will be updated throughout the life of project in consultation with emergency services. A copy of the ERP is provided in **Appendix K.**

6.8 Landscape and Visual

The Project is located approximately 1.3 km from its road frontage of South Ulam Road and approximately 1.65 km from the nearest sensitive receptor. Due to its remote location, it is unlikely that the Project will result in adverse landscape and visual amenity impacts. Further, the Project is visually obscured by scattered vegetation throughout the surrounding property, largely screening it from view from relevant viewpoints, neighbouring property boundaries (refer to **Figure 6.6**). This view was confirmed by Council officers via pre-lodgement meeting that a Landscape and Visual Impact Assessment (LVIA) was not necessary for the Project's development application.

As such, it is considered that the Project is appropriately sited to minimise potential landscape and visual amenity impacts and is unlikely to result in adverse effects on the surrounding visual amenity and rural streetscape character.

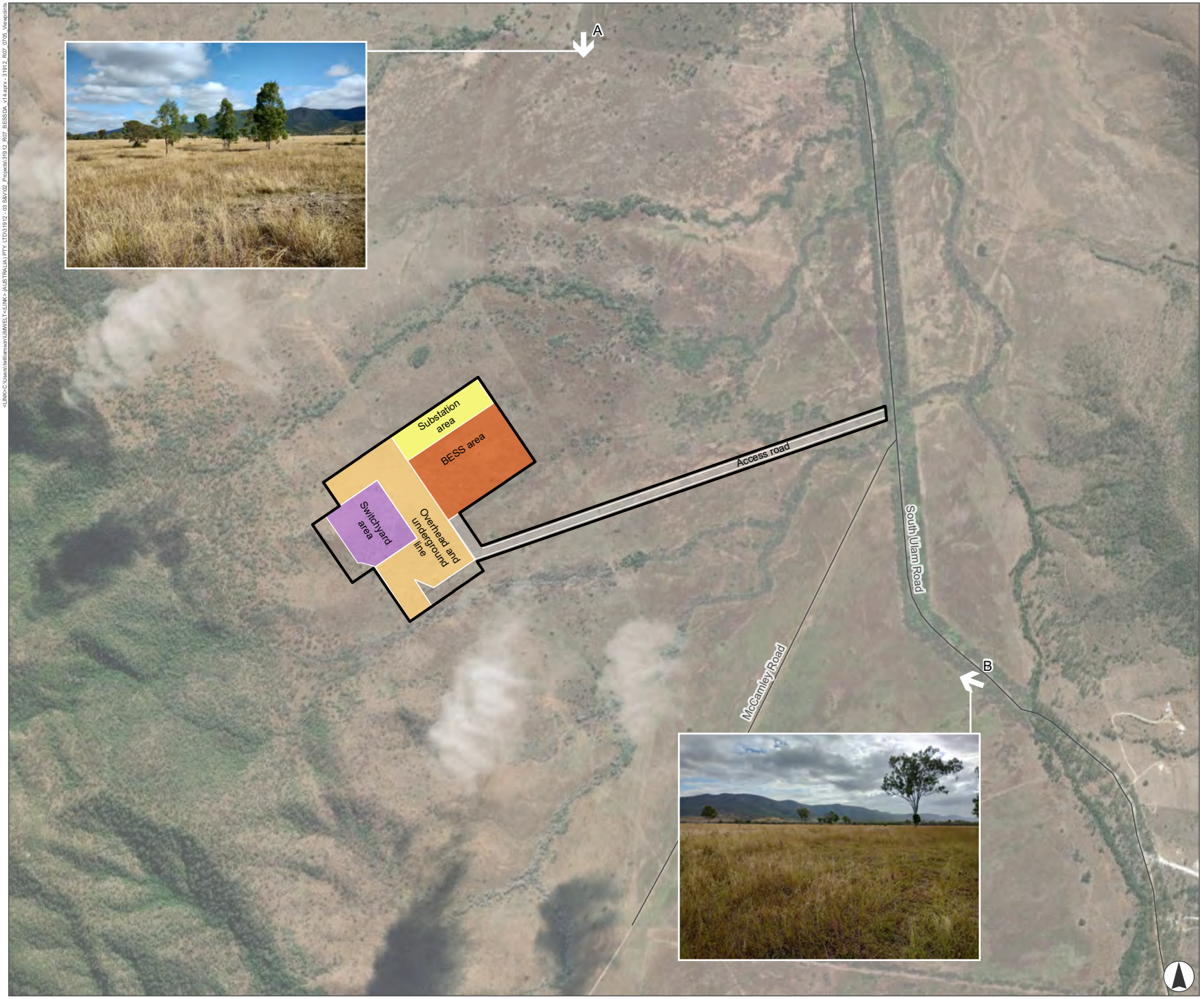
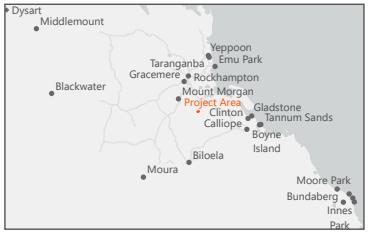


FIGURE 6.6

Viewpoints

Legend

- Study Area
- Access road
- BESS area
- Overhead and underground line
- Substation area
- Switchyard area
- Road
- Viewpoints



0 0.25 0.5

Kilometres

Scale 1:20,000 at A4
GDA2020 MGA Zone 56

umwelt

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Image Source: ESRI Basemap (2025) | **Data Source:** Qld Spatial (2025)

<UNK> C:\Users\lwilliamson\UMWELT<UNK> (AUSTRALIA) PTY LTD\31912 - 03 SIA\V02_Projects\31912_R07_BESSDA_v14.aprx - 31912_R07_0705_Viewpoints

7.0 Conclusion

Umwelt has been engaged by Neoen to seek a development approval to establish the Project on land at 1682 South Ulam Road, Bajool. The Study Area traverses over Lot 38 on DT40131, Lot 100 on SP289441, Lot 33 on DT40123 and road reserve (between Lot 38 DT40131 and Lot 100 SP89441) and has an area of 48.8 ha.

The Project will deliver up to 600 MW of battery storage capacity to support the stability of the existing transmission network and support the decarbonisation of the NEM. A Development Permit for Material Change of Use for Undefined Use (Battery Storage Facility) is sought. This Battery Storage Facility has been previously approved as ancillary infrastructure under development approval 2109-24892 SDA. This approval will allow the Battery Storage Facility to be constructed and operated as a standalone use.

This report demonstrates the proposal's consistency with the intent of the Planning Scheme, and appropriate justification for compliance with Performance Outcomes, in particular:

- The Study Area is uniquely positioned adjacent to essential grid assets, allowing for a direct and highly efficient connection to the transmission network. It prioritises co-location with existing electricity infrastructure.
- Noise modelling suggests the Project is predicted to comply with the AQO during the day, evening and night periods without the need for additional noise mitigation measures.
- The Project is located with a significant setback from South Ulam Road and the closest sensitive receptor, reducing impacts on amenity.
- The retention of vegetation along the South Ulam Road frontage and throughout the lot parcel provides natural screening whilst maintaining the rural streetscape character.
- The Project avoids significant environmental impacts by siting the Study Area in an area primarily consisting of Category X vegetation. Patches of Category R vegetation exist within the Study Area which will be cleared in accordance with the Accepted Development Vegetation Clearing Code – Clearing for Infrastructure.
- No threatened ecological communities (TECs) were present or expected, and essential habitat, protected plant flora trigger mapping, connectivity areas, and Matters of Local Environmental Significance (MLES) were also absent within the Study Area.
- The Project will implement bushfire mitigation measures such as the clearing of vegetation, establishment of a 30 m APZ, mineral earth surface, on-site water tanks, fire access trails and the construction of buildings in accordance with fire resistance provisions of the National Construction Code – Building Code and Australia (NCC-BCA).
- Based on the outcomes of this assessment, the proposal is considered to comply with the relevant assessment benchmarks of the Planning Scheme and is recommended for approval subject to reasonable and relevant conditions.

Appendix A

DA Form 1

DA Form 1 – Development application details

Approved form (version 1.6 effective 2 August 2024) made under section 282 of the Planning Act 2016.

This form **must** be used to make a development application **involving code assessment or impact assessment**, except when applying for development involving only building work.

For a development application involving **building work only**, use *DA Form 2 – Building work details*.

For a development application involving **building work associated with any other type of assessable development (i.e. material change of use, operational work or reconfiguring a lot)**, use this form (*DA Form 1*) **and** parts 4 to 6 of *DA Form 2 – Building work details*.

Unless stated otherwise, all parts of this form **must** be completed in full and all required supporting information **must** accompany the development application.

One or more additional pages may be attached as a schedule to this development application if there is insufficient space on the form to include all the necessary information.

This form and any other form relevant to the development application must be used to make a development application relating to strategic port land and Brisbane core port land under the *Transport Infrastructure Act 1994*, and airport land under the *Airport Assets (Restructuring and Disposal) Act 2008.* For the purpose of assessing a development application relating to strategic port land and Brisbane core port land, any reference to a planning scheme is taken to mean a land use plan for the strategic port land, Brisbane port land use plan for Brisbane core port land, or a land use plan for airport land.

Note: *All terms used in this form have the meaning given under the Planning Act 2016, the Planning Regulation 2017, or the Development Assessment Rules (DA Rules).*

PART 1 – APPLICANT DETAILS

1) Applicant details	
Applicant name(s) (*individual or company full name*)	Neoen Australia Pty Ltd c/- Umwelt (Australia) Pty Ltd
Contact name *(only applicable for companies)*	[redacted]
Postal address *(P.O. Box or street address)*	Level 20, 145 Ann Street
Suburb	Brisbane City
State	QLD
Postcode	4000
Country	AUS
Contact number	[redacted]@umwelt.com.au
Email address *(non-mandatory)*	[redacted]
Mobile number *(non-mandatory)*	[redacted]
Fax number *(non-mandatory)*	Level 20, 145 Ann Street
Applicant's reference number(s) *(if applicable)*	

1.1) Home-based business

☐ Personal details to remain private in accordance with section 264(6) of *Planning Act 2016*

2) Owner's consent

2.1) Is written consent of the owner required for this development application?

☒ Yes – the written consent of the owner(s) is attached to this development application
☐ No – proceed to 3)

PART 2 – LOCATION DETAILS

3) Location of the premises *(complete 3.1) or 3.2), and 3.3) as applicable)*

***Note**: Provide details below and attach a site plan for any or all premises part of the development application. For further information, see DA Forms Guide: Relevant plans.*

3.1) Street address and lot on plan

☒ Street address **AND** lot on plan (*all lots must be listed*), ***or***

☐ Street address **AND** lot on plan for an adjoining or adjacent property of the premises *(appropriate for development in water but adjoining or adjacent to land e.g. jetty, pontoon. All lots must be listed).*

a)	Unit No.	Street No.	Street Name and Type	Suburb
		[redacted]	South Ulam Road	Bajool
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
	4699	38	DT40131	Rockhampton Regional Council
b)	Unit No.	Street No.	Street Name and Type	Suburb
		1682	South Ulam Road	Bajool
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
		100	SP289441	Rockhampton Regional Council
c)	Unit No.	Street No.	Street Name and Type	Suburb
		1682	South Ulam Road	Bajool
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
	4699	33	DT40123	Rockhampton Regional Council

3.2) Coordinates of premises *(appropriate for development in remote areas, over part of a lot or in water not adjoining or adjacent to land e.g. channel dredging in Moreton Bay)*

***Note**: Place each set of coordinates in a separate row.*

☐ Coordinates of premises by longitude and latitude

Longitude(s)	Latitude(s)	Datum	Local Government Area(s) *(if applicable)*
		☐ WGS84 ☐ GDA94 ☐ Other:	

☐ Coordinates of premises by easting and northing

Easting(s)	Northing(s)	Zone Ref.	Datum	Local Government Area(s) *(if applicable)*
		☐ 54 ☐ 55 ☐ 56	☐ WGS84 ☐ GDA94 ☐ Other:	

3.3) Additional premises

☐ Additional premises are relevant to this development application and the details of these premises have been attached in a schedule to this development application

☐ Not required

4) Identify any of the following that apply to the premises and provide any relevant details

☒ In or adjacent to a water body or watercourse or in or above an aquifer

Name of water body, watercourse or aquifer: Unnamed tributary of Eight Mile Creek

☐ On strategic port land under the *Transport Infrastructure Act 1994*

Lot on plan description of strategic port land:

Name of port authority for the lot:

☐ In a tidal area

Name of local government for the tidal area *(if applicable)*:	
Name of port authority for tidal area *(if applicable)*	

☐ On airport land under the *Airport Assets (Restructuring and Disposal) Act 2008*	
Name of airport:	
☐ Listed on the Environmental Management Register (EMR) under the *Environmental Protection Act 1994*	
EMR site identification:	
☐ Listed on the Contaminated Land Register (CLR) under the *Environmental Protection Act 1994*	
CLR site identification:	

5) Are there any existing easements over the premises?

Note: Easement uses vary throughout Queensland and are to be identified correctly and accurately. For further information on easements and how they may affect the proposed development, see DA Forms Guide.

☒ Yes – All easement locations, types and dimensions are included in plans submitted with this development application

☐ No

PART 3 – DEVELOPMENT DETAILS

Section 1 – Aspects of development

6.1) Provide details about the first development aspect

a) What is the type of development? *(tick only one box)*

☒ Material change of use ☐ Reconfiguring a lot ☐ Operational work ☐ Building work

b) What is the approval type? *(tick only one box)*

☒ Development permit ☐ Preliminary approval ☐ Preliminary approval that includes a variation approval

c) What is the level of assessment?

☐ Code assessment ☒ Impact assessment *(requires public notification)*

d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots)*:

Battery Storage Facility and associated infrastructure.

e) Relevant plans

***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms guide: Relevant plans.*

☒ Relevant plans of the proposed development are attached to the development application

6.2) Provide details about the second development aspect

a) What is the type of development? *(tick only one box)*

☐ Material change of use ☐ Reconfiguring a lot ☐ Operational work ☐ Building work

b) What is the approval type? *(tick only one box)*

☐ Development permit ☐ Preliminary approval ☐ Preliminary approval that includes a variation approval

c) What is the level of assessment?

☐ Code assessment ☐ Impact assessment *(requires public notification)*

d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots)*:

e) Relevant plans

***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.*

☐ Relevant plans of the proposed development are attached to the development application

6.3) Additional aspects of development
☐ Additional aspects of development are relevant to this development application and the details for these aspects that would be required under Part 3 Section 1 of this form have been attached to this development application
☒ Not required
6.4) Is the application for State facilitated development?
☐ Yes - Has a notice of declaration been given by the Minister?
☒ No

Section 2 – Further development details

7) Does the proposed development application involve any of the following?	
Material change of use	☒ Yes – complete division 1 if assessable against a local planning instrument
Reconfiguring a lot	☐ Yes – complete division 2
Operational work	☐ Yes – complete division 3
Building work	☐ Yes – complete *DA Form 2 – Building work details*

Division 1 – Material change of use

***Note**: This division is only required to be completed if any part of the development application involves a material change of use assessable against a local planning instrument.*

8.1) Describe the proposed material change of use			
Provide a general description of the proposed use	Provide the planning scheme definition *(include each definition in a new row)*	Number of dwelling units *(if applicable)*	Gross floor area (m^2) *(if applicable)*
Battery Storage Facility	Undefined Use	n/a	n/a

8.2) Does the proposed use involve the use of existing buildings on the premises?
☐ Yes
☒ No

8.3) Does the proposed development relate to temporary accepted development under the Planning Regulation?	
☐ Yes – provide details below or include details in a schedule to this development application	
☒ No	
Provide a general description of the temporary accepted development	Specify the stated period dates under the Planning Regulation

Division 2 – Reconfiguring a lot

***Note**: This division is only required to be completed if any part of the development application involves reconfiguring a lot.*

9.1) What is the total number of existing lots making up the premises?

9.2) What is the nature of the lot reconfiguration? *(tick all applicable boxes)*	
☐ Subdivision *(complete 10)*	☐ Dividing land into parts by agreement *(complete 11)*
☐ Boundary realignment *(complete 12)*	☐ Creating or changing an easement giving access to a lot from a constructed road *(complete 13)*

10) Subdivision				
10.1) For this development, how many lots are being created and what is the intended use of those lots:				
Intended use of lots created	Residential	Commercial	Industrial	Other, please specify:
Number of lots created				

10.2) Will the subdivision be staged?	
☐ Yes – provide additional details below ☐ No	
How many stages will the works include?	
What stage(s) will this development application apply to?	

11) Dividing land into parts by agreement – how many parts are being created and what is the intended use of the parts?				
Intended use of parts created	Residential	Commercial	Industrial	Other, please specify:
Number of parts created				

12) Boundary realignment			
12.1) What are the current and proposed areas for each lot comprising the premises?			
Current lot		Proposed lot	
Lot on plan description	Area (m^2)	Lot on plan description	Area (m^2)
12.2) What is the reason for the boundary realignment?			

13) What are the dimensions and nature of any existing easements being changed and/or any proposed easement? *(attach schedule if there are more than two easements)*				
Existing or proposed?	Width (m)	Length (m)	Purpose of the easement? *(e.g. pedestrian access)*	Identify the land/lot(s) benefitted by the easement

Division 3 – Operational work

***Note**: This division is only required to be completed if any part of the development application involves operational work.*

14.1) What is the nature of the operational work?		
☐ Road work	☐ Stormwater	☐ Water infrastructure
☐ Drainage work	☐ Earthworks	☐ Sewage infrastructure
☐ Landscaping	☐ Signage	☐ Clearing vegetation
☐ Other – please specify:		

14.2) Is the operational work necessary to facilitate the creation of new lots? *(e.g. subdivision)*	
☐ Yes – specify number of new lots:	
☐ No	

14.3) What is the monetary value of the proposed operational work? *(include GST, materials and labour)*

$

PART 4 – ASSESSMENT MANAGER DETAILS

15) Identify the assessment manager(s) who will be assessing this development application

Rockhampton Regional Council

16) Has the local government agreed to apply a superseded planning scheme for this development application?

☐ Yes – a copy of the decision notice is attached to this development application
☐ The local government is taken to have agreed to the superseded planning scheme request – relevant documents attached
☒ No

PART 5 – REFERRAL DETAILS

17) Does this development application include any aspects that have any referral requirements?
***Note**: A development application will require referral if prescribed by the* Planning Regulation 2017.

☒ No, there are no referral requirements relevant to any development aspects identified in this development application – proceed to Part 6

Matters requiring referral to the **Chief Executive of the *Planning Act 2016***:

☐ Clearing native vegetation
☐ Contaminated land *(unexploded ordnance)*
☐ Environmentally relevant activities (ERA) *(only if the ERA has not been devolved to a local government)*
☐ Fisheries – aquaculture
☐ Fisheries – declared fish habitat area
☐ Fisheries – marine plants
☐ Fisheries – waterway barrier works
☐ Hazardous chemical facilities
☐ Heritage places – Queensland heritage place *(on or near a Queensland heritage place)*
☐ Infrastructure-related referrals – designated premises
☐ Infrastructure-related referrals – state transport infrastructure
☐ Infrastructure-related referrals – State transport corridor and future State transport corridor
☐ Infrastructure-related referrals – State-controlled transport tunnels and future state-controlled transport tunnels
☐ Infrastructure-related referrals – near a state-controlled road intersection
☐ Koala habitat in SEQ region – interfering with koala habitat in koala habitat areas outside koala priority areas
☐ Koala habitat in SEQ region – key resource areas
☐ Ports – Brisbane core port land – near a State transport corridor or future State transport corridor
☐ Ports – Brisbane core port land – environmentally relevant activity (ERA)
☐ Ports – Brisbane core port land – tidal works or work in a coastal management district
☐ Ports – Brisbane core port land – hazardous chemical facility
☐ Ports – Brisbane core port land – taking or interfering with water
☐ Ports – Brisbane core port land – referable dams
☐ Ports – Brisbane core port land – fisheries
☐ Ports – Land within Port of Brisbane's port limits *(below high-water mark)*
☐ SEQ development area
☐ SEQ regional landscape and rural production area or SEQ rural living area – tourist activity or sport and recreation activity
☐ SEQ regional landscape and rural production area or SEQ rural living area – community activity
☐ SEQ regional landscape and rural production area or SEQ rural living area – indoor recreation
☐ SEQ regional landscape and rural production area or SEQ rural living area – urban activity
☐ SEQ regional landscape and rural production area or SEQ rural living area – combined use
☐ SEQ northern inter-urban break – tourist activity or sport and recreation activity

☐ SEQ northern inter-urban break – community activity
☐ SEQ northern inter-urban break – indoor recreation
☐ SEQ northern inter-urban break – urban activity
☐ SEQ northern inter-urban break – combined use
☐ Tidal works or works in a coastal management district
☐ Reconfiguring a lot in a coastal management district or for a canal
☐ Erosion prone area in a coastal management district
☐ Urban design
☐ Water-related development – taking or interfering with water
☐ Water-related development – removing quarry material *(from a watercourse or lake)*
☐ Water-related development – referable dams
☐ Water-related development –levees *(category 3 levees only)*
☐ Wetland protection area

Matters requiring referral to the **local government:**
☐ Airport land
☐ Environmentally relevant activities (ERA) (*only if the ERA has been devolved to local government)*
☐ Heritage places – Local heritage places

Matters requiring referral to the **Chief Executive of the distribution entity or transmission entity:**
☒ Infrastructure-related referrals – Electricity infrastructure

Matters requiring referral to:
- The **Chief Executive of the holder of the licence**, if not an individual
- The **holder of the licence**, if the holder of the licence is an individual

☐ Infrastructure-related referrals – Oil and gas infrastructure

Matters requiring referral to the **Brisbane City Council:**
☐ Ports – Brisbane core port land

Matters requiring referral to the **Minister responsible for administering the *Transport Infrastructure Act 1994*:**
☐ Ports – Brisbane core port land *(where inconsistent with the Brisbane port LUP for transport reasons)*
☐ Ports – Strategic port land

Matters requiring referral to the **relevant port operator**, if applicant is not port operator**:**
☐ Ports – Land within Port of Brisbane's port limits *(below high-water mark)*

Matters requiring referral to the **Chief Executive of the relevant port authority:**
☐ Ports – Land within limits of another port *(below high-water mark)*

Matters requiring referral to the **Gold Coast Waterways Authority:**
☐ Tidal works or work in a coastal management district *(in Gold Coast waters)*

Matters requiring referral to the **Queensland Fire and Emergency Service:**
☐ Tidal works or work in a coastal management district *(involving a marina (more than six vessel berths))*

18) Has any referral agency provided a referral response for this development application?

☐ Yes – referral response(s) received and listed below are attached to this development application
☒ No

Referral requirement	Referral agency	Date of referral response

Identify and describe any changes made to the proposed development application that was the subject of the referral response and this development application, or include details in a schedule to this development application *(if applicable).*

PART 6 – INFORMATION REQUEST

19) Information request under the DA Rules

☒ I agree to receive an information request if determined necessary for this development application

☐ I do not agree to accept an information request for this development application

***Note**: By not agreeing to accept an information request I, the applicant, acknowledge:*

- *that this development application will be assessed and decided based on the information provided when making this development application and the assessment manager and any referral agencies relevant to the development application are not obligated under the DA Rules to accept any additional information provided by the applicant for the development application unless agreed to by the relevant parties*
- *Part 3 under Chapter 1 of the DA Rules will still apply if the application is an application listed under section 11.3 of the DA Rules or*
- *Part 2under Chapter 2 of the DA Rules will still apply if the application is for state facilitated development*

Further advice about information requests is contained in the DA Forms Guide.

PART 7 – FURTHER DETAILS

20) Are there any associated development applications or current approvals? *(e.g. a preliminary approval)*

☒ Yes – provide details below or include details in a schedule to this development application

☐ No

List of approval/development application references	Reference number	Date	Assessment manager
☒ Approval ☐ Development application	2109-24892 SDA	17June 2022	SARA
☒ Approval ☐ Development application	2504-45653 SPD	10 June 2025	SARA

21) Has the portable long service leave levy been paid? *(only applicable to development applications involving building work or operational work)*

☐ Yes – a copy of the receipted QLeave form is attached to this development application

☐ No – I, the applicant will provide evidence that the portable long service leave levy has been paid before the assessment manager decides the development application. I acknowledge that the assessment manager may give a development approval only if I provide evidence that the portable long service leave levy has been paid

☒ Not applicable *(e.g. building and construction work is less than $150,000 excluding GST)*

Amount paid	Date paid (dd/mm/yy)	QLeave levy number (A, B or E)
$		

22) Is this development application in response to a show cause notice or required as a result of an enforcement notice?

☐ Yes – show cause or enforcement notice is attached

☒ No

23) Further legislative requirements

Environmentally relevant activities

23.1) Is this development application also taken to be an application for an environmental authority for an **Environmentally Relevant Activity (ERA)** under section 115 of the *Environmental Protection Act 1994*?

☐ Yes – the required attachment (form ESR/2015/1791) for an application for an environmental authority accompanies this development application, and details are provided in the table below

☒ No

***Note**: Application for an environmental authority can be found by searching "ESR/2015/1791" as a search term at www.qld.gov.au. An ERA requires an environmental authority to operate. See www.business.qld.gov.au for further information.*

Proposed ERA number:		Proposed ERA threshold:	
Proposed ERA name:			

☐ Multiple ERAs are applicable to this development application and the details have been attached in a schedule to this development application.

Hazardous chemical facilities

23.2) Is this development application for a **hazardous chemical facility**?

☐ Yes – *Form 536: Notification of a facility exceeding 10% of schedule 15 threshold* is attached to this development application

☒ No

***Note**: See www.business.qld.gov.au for further information about hazardous chemical notifications.*

Clearing native vegetation

23.3) Does this development application involve **clearing native vegetation** that requires written confirmation that the chief executive of the *Vegetation Management Act 1999* is satisfied the clearing is for a relevant purpose under section 22A of the *Vegetation Management Act 1999*?

☐ Yes – this development application includes written confirmation from the chief executive of the *Vegetation Management Act 1999* (s22A determination)

☒ No

***Note**: 1. Where a development application for operational work or material change of use requires a s22A determination and this is not included, the development application is prohibited development.*

2. See https://www.qld.gov.au/environment/land/vegetation/applying for further information on how to obtain a s22A determination.

Environmental offsets

23.4) Is this development application taken to be a prescribed activity that may have a significant residual impact on a **prescribed environmental matter** under the *Environmental Offsets Act 2014*?

☐ Yes – I acknowledge that an environmental offset must be provided for any prescribed activity assessed as having a significant residual impact on a prescribed environmental matter

☒ No

***Note**: The environmental offset section of the Queensland Government's website can be accessed at www.qld.gov.au for further information on environmental offsets.*

Koala habitat in SEQ Region

23.5) Does this development application involve a material change of use, reconfiguring a lot or operational work which is assessable development under Schedule 10, Part 10 of the Planning Regulation 2017?

☐ Yes – the development application involves premises in the koala habitat area in the koala priority area

☐ Yes – the development application involves premises in the koala habitat area outside the koala priority area

☒ No

***Note**: If a koala habitat area determination has been obtained for this premises and is current over the land, it should be provided as part of this development application. See koala habitat area guidance materials at www.desi.qld.gov.au for further information.*

Water resources

23.6) Does this development application involve **taking or interfering with underground water through an artesian or subartesian bore, taking or interfering with water in a watercourse, lake or spring, or taking overland flow water under the *Water Act 2000***?

☐ Yes – the relevant template is completed and attached to this development application and I acknowledge that a relevant authorisation or licence under the *Water Act 2000* may be required prior to commencing development

☒ No

***Note**: Contact the Department of Resources at www.resources.qld.gov.au for further information.*

DA templates are available from planning.statedevelopment.qld.gov.au. If the development application involves:

- *Taking or interfering with underground water through an artesian or subartesian bore: complete DA Form 1 Template 1*
- *Taking or interfering with water in a watercourse, lake or spring: complete DA Form1 Template 2*
- *Taking overland flow water: complete DA Form 1 Template 3.*

Waterway barrier works

23.7) Does this application involve **waterway barrier works?**

☐ Yes – the relevant template is completed and attached to this development application

☒ No

DA templates are available from planning.statedevelopment.qld.gov.au. For a development application involving waterway barrier works, complete DA Form 1 Template 4.

Marine activities

23.8) Does this development application involve **aquaculture, works within a declared fish habitat area or removal, disturbance or destruction of marine plants?**

☐ Yes – an associated *resource* allocation authority is attached to this development application, if required under the *Fisheries Act 1994*

☒ No

***Note**: See guidance materials at www.daf.qld.gov.au for further information.*

Quarry materials from a watercourse or lake

23.9) Does this development application involve the **removal of quarry materials from a watercourse or lake** under the *Water Act 2000?*

☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development

☒ No

***Note**: Contact the Department of Resources at www.resources.qld.gov.au and www.business.qld.gov.au for further information.*

Quarry materials from land under tidal waters

23.10) Does this development application involve the **removal of quarry materials from land under tidal water** under the *Coastal Protection and Management Act 1995?*

☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development

☒ No

***Note**: Contact the Department of Environment, Science and Innovation at www.desi.qld.gov.au for further information.*

Referable dams

23.11) Does this development application involve a **referable dam** required to be failure impact assessed under section 343 of the *Water Supply (Safety and Reliability) Act 2008* (the Water Supply Act)?

☐ Yes – the 'Notice Accepting a Failure Impact Assessment' from the chief executive administering the Water Supply Act is attached to this development application

☒ No

***Note**: See guidance materials at www.resources.qld.gov.au for further information.*

Tidal work or development within a coastal management district

23.12) Does this development application involve **tidal work or development in a coastal management district**?

☐ Yes – the following is included with this development application:
- ☐ Evidence the proposal meets the code for assessable development that is prescribed tidal work *(only required if application involves prescribed tidal work)*
- ☐ A certificate of title

☒ No

***Note**: See guidance materials at www.desi.qld.gov.au for further information.*

Queensland and local heritage places

23.13) Does this development application propose development on or adjoining a place entered in the **Queensland heritage register** or on a place entered in a local government's **Local Heritage Register**?

☐ Yes – details of the heritage place are provided in the table below

☒ No

***Note**: See guidance materials at www.desi.qld.gov.au for information requirements regarding development of Queensland heritage places.*

For a heritage place that has cultural heritage significance as a local heritage place and a Queensland heritage place, provisions are in place under the Planning Act 2016 that limit a local categorising instrument from including an assessment benchmark about the effect or impact of, development on the stated cultural heritage significance of that place. See guidance materials at www.planning.statedevelopment.qldgov.au for information regarding assessment of Queensland heritage places.

Name of the heritage place:		Place ID:	

Decision under section 62 of the *Transport Infrastructure Act 1994*

23.14) Does this development application involve new or changed access to a state-controlled road?

☐ Yes – this application will be taken to be an application for a decision under section 62 of the *Transport Infrastructure Act 1994* (subject to the conditions in section 75 of the *Transport Infrastructure Act 1994* being satisfied)

☒ No

Walkable neighbourhoods assessment benchmarks under Schedule 12A of the Planning Regulation

23.15) Does this development application involve reconfiguring a lot into 2 or more lots in certain residential zones (except rural residential zones), where at least one road is created or extended?

☐ Yes – Schedule 12A is applicable to the development application and the assessment benchmarks contained in schedule 12A have been considered

☒ No

***Note**: See guidance materials at www.planning.statedevelopment.qld.gov.au for further information.*

PART 8 – CHECKLIST AND APPLICANT DECLARATION

24) Development application checklist	
I have identified the assessment manager in question 15 and all relevant referral requirement(s) in question 17 ***Note**: See the Planning Regulation 2017 for referral requirements*	☒ Yes
If building work is associated with the proposed development, Parts 4 to 6 of *DA Form 2 – Building work details* have been completed and attached to this development application	☐ Yes ☒ Not applicable
Supporting information addressing any applicable assessment benchmarks is with the development application ***Note**: This is a mandatory requirement and includes any relevant templates under question 23, a planning report and any technical reports required by the relevant categorising instruments (e.g. local government planning schemes, State Planning Policy, State Development Assessment Provisions). For further information, see DA Forms Guide: Planning Report Template.*	☒ Yes
Relevant plans of the development are attached to this development application ***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.*	☒ Yes
The portable long service leave levy for QLeave has been paid, or will be paid before a development permit is issued *(see 21)*	☐ Yes ☒ Not applicable

25) Applicant declaration
☒ By making this development application, I declare that all information in this development application is true and correct ☐ Where an email address is provided in Part 1 of this form, I consent to receive future electronic communications from the assessment manager and any referral agency for the development application where written information is required or permitted pursuant to sections 11 and 12 of the *Electronic Transactions Act 2001* ***Note**: It is unlawful to intentionally provide false or misleading information.*
Privacy – Personal information collected in this form will be used by the assessment manager and/or chosen assessment manager, any relevant referral agency and/or building certifier (including any professional advisers which may be engaged by those entities) while processing, assessing and deciding the development application. All information relating to this development application may be available for inspection and purchase, and/or published on the assessment manager's and/or referral agency's website. Personal information will not be disclosed for a purpose unrelated to the *Planning Act 2016*, Planning Regulation 2017 and the DA Rules except where: • such disclosure is in accordance with the provisions about public access to documents contained in the *Planning Act 2016* and the Planning Regulation 2017, and the access rules made under the *Planning Act 2016* and Planning Regulation 2017; or • required by other legislation (including the *Right to Information Act 2009*); or • otherwise required by law. This information may be stored in relevant databases. The information collected will be retained as required by the *Public Records Act 2002.*

PART 9 – FOR COMPLETION OF THE ASSESSMENT MANAGER – FOR OFFICE USE ONLY

Date received: | Reference number(s):

Notification of engagement of alternative assessment manager	
Prescribed assessment manager	
Name of chosen assessment manager	
Date chosen assessment manager engaged	
Contact number of chosen assessment manager	
Relevant licence number(s) of chosen assessment manager	

QLeave notification and payment *Note: For completion by assessment manager if applicable*			
Description of the work			
QLeave project number			
Amount paid ($)		Date paid (dd/mm/yy)	
Date receipted form sighted by assessment manager			
Name of officer who sighted the form			

Appendix C

Proposal Plans

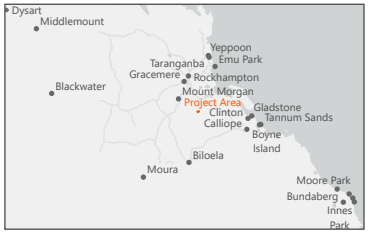


FIGURE 4.2

Project Design

Legend

- Study Area
- Access road
- BESS area
- Overhead and underground line
- Substation area
- Switchyard area
- Road



0 0.25 0.5

Kilometres

Scale 1:12,500 at A4
GDA2020 MGA Zone 56

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Image Source: ESRI Basemap (2025) | **Data Source:** Qld Spatial (2025)

Appendix D

Council Code Responses



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Table 9.3.1.3.1 — Development outcomes for assessable development

Performance outcomes	Acceptable outcomes	Comments
Access driveways		
PO1 Access driveways are located to avoid conflicts and designed to operate efficiently and safely, taking into account: a. the size of the parking area; b. the volume, frequency and type of vehicle traffic; c. the need for some land uses (for example hospitals) to accommodate emergency vehicle access; d. the type of use and the implications on parking and circulation, for example long-term or short-term car parking; e. frontage road function and conditions; and f. the capacity and function of the adjoining street system.	**AO1.1** Access driveways are not located within: a. twenty—five (25) metres of a signalised road intersection; b. twenty (20) metres of an un-signalised road intersection in an industrial or centres zone or ten (10) metres otherwise; and c. one (1) metre of any street signage, power poles, street lights, manholes, stormwater gully pits or other Council asset.	**Complies with AOs 1.1, 2.1 and 3.1** The new site access will be constructed in accordance with the requirements for a bitumen road (<300vpd) as per Standard Drawing CMDG-R-040 (Rural Road Access and Property Access Over Table Drains) to service the expected Project traffic volumes. Further to this, it is noted that additional hardstand areas will be required at the proposed site access location to accommodate the swept paths of the oversize over mass (OSOM) transformer transport vehicles, with the exact extents of these additional areas to be confirmed in subsequent detailed design phases of the Project once the final configuration of the transport vehicles is confirmed. The driveway location is sited to ensure no conflicts with road function and existing street infrastructure.
PO2 Access driveways do not disrupt existing road or footpath infrastructure.	**AO2.1** Access driveways: a. do not require the modification, relocation or removal of any infrastructure including street trees, fire hydrants, water meters and street signs; b. do not front a traffic island, speed control device, car parking bay, bus stop or other infrastructure within the road carriageway; c. must be sealed and to a formed road; d. are not constructed over an access point to equipment under the control of a regulatory	

	authority, including storm water pits, water meters, hydrants and telephone pits; and e. are raised or lowered to match the surface level of the driveway, where an access chamber is to be incorporated within the driveway.	
PO3 Access driveways are designed and constructed so as to: a. enable safe and functional vehicular access from the street to the property; and b. not cause a change in the level of a footpath.	**AO3.1** Access driveways are constructed in compliance with the Capricorn Municipal Development Guidelines.	
PO4 A driveway does not allow water to pond adjacent to any buildings or cause water to enter a building.	**AO4.1** A driveway has a minimum cross fall of one (1) metre (vertical) to 100 metres (horizontal) away from all adjoining buildings.	**Not applicable** There are no existing buildings adjoining the Study Area.
Parking		
PO5 Provision is made for on-site vehicle parking: a. to meet the demand likely to be generated by the development; and b. to avoid on-street parking where that would adversely impact on the safety or capacity of the road network or unduly impact on local amenity. Editor's note—SC6.6 — Car parking contributions planning scheme policy prescribes circumstances under which an applicant can satisfy PO5.	**AO5.1** AO5.1.1 On-site car parking is provided at the rates set out in Table 9.3.1.3.2 of the access, parking and transport code. OR AO5.1.2 Where a change of use of existing premises is proposed and there is no increase in the gross floor area, the existing number of on-site car parks is retained or increased. **AND** **AO5.2** All parking, loading and manoeuvring facilities for visitors and employees to be located on-site. **AND**	**Complies with PO5 and PO6** Appropriate parking facilities will be provided adjacent to the key areas on site (i.e. battery storage facility, substation and switchyard areas) in accordance with the requirements of all relevant standards, guidelines and policies. Due to the large area of land available within the Study Area for the required internal facilities (including the construction compounds and parking facilities), and the current setback from the external road network, it is not anticipated that either the construction or operations phases of the proposed Mount Hopeful Battery will lead to an overspill of parking or vehicle queuing at site accesses that

	AO5.3 Manoeuvring facilities to be of adequate dimensions to prevent any queuing in a roadway.	would lead to negative impacts to the operation of the surrounding road network, including South Ulam Road.
PO6 Parking and servicing facilities are designed to meet user requirements.	**AO6.1** Parking spaces, access and manoeuvring facilities, loading facilities and connections to the transport network are sealed and designed in accordance with Australian Standard AS 2890.	
PO7 Sites with more than one (1) road frontage (excluding laneways) gain access only from the lower order road, except if it will introduce traffic generated by a non—residential use into a street that is in a residential zone.	No acceptable outcome is nominated.	**Not applicable** Project has only one road frontage.
PO8 Parking areas are illuminated in a manner that maximises user safety but minimises the impacts on adjoining residents.	**AO8.1** Parking areas for uses that operate at night are illuminated in accordance with the requirements of Australian Standard AS 1158. **AND** **AO8.2** Lighting used in parking areas does not cause an environmental nuisance and complies with Australian Standard AS 4282.	**Complies with the AO** Project will be illuminated with security lighting in accordance with Australian Standard AS 1158 and Australian Standard AS 428.
PO9 Car parking areas, pathways and other elements of the transport network are designed to enhance public safety by discouraging crime and antisocial behaviour, having regard to: a. provision of opportunities for casual surveillance; b. the use of fencing to define public and private spaces, whilst allowing for appropriate sightlines; c. minimising potential concealment points and	No acceptable outcome is nominated. Editor's note—Refer to Crime Prevention Through Environmental Design (CPTED) guidelines for Queensland for guidance.	**Not applicable** The Project is located in a remote and rural location and as such anti-social behaviour that is more typically experienced in urban areas is not anticipated. Notwithstanding, the Project will be equipped with security fencing, CCTV and lighting for crime prevention.

assault locations; d. minimising opportunities for graffiti and other vandalism; and e. restricting unlawful access to buildings and between buildings.		
PO10 Parking and servicing areas are kept accessible and available for their intended use at all times during the normal business hours of the activity.	No acceptable outcome is nominated.	**Complies with the PO** Parking and servicing areas will be accessible and available as required for their intended use.
Transport impact Editor's note—Applicants should note that the Department of Transport and Main Roads may have additional requirements.		
PO11 Development contributes to the creation of a transport network which is designed to: a. achieve a high level of permeability and connectivity for all modes of transport, including pedestrians and cyclists, within the development and to the surrounding area; and b. encourage people to walk, cycle or use public transport to and from the site instead of using a car.	No acceptable outcome is nominated. Editor's note—Refer to SC6.19 — Structure plan planning scheme policy for guidance.	**Complies with the PO** Pedestrians and cyclists are not anticipated due to the nature and location of the Project. The access road and driveway design is considered appropriate for its use.
PO12 Development is located on roads that are appropriate for the nature of traffic (including vehicles, pedestrians and cyclists) generated, having regard to the safety and efficiency of the transport network.	**AO12.1** Traffic generated by the development is safely accommodated within the design capacity of roads as provided in SC6.15 — Road infrastructure and hierarchy planning scheme policy. **AND** **AO12.2** A road or street does not connect with another road or street that is more than two (2) levels higher or lower in the road hierarchy. **AND** **AO12.3**	**Complies with the PO** South Ulam Road is considered appropriate for the nature of the Project and its anticipated vehicle types during construction and operation. The TIA (**Appendix G**) prepared in support of the Project concludes that the Project's transport routes are suitable for the vehicle configurations and loading parameters of relevant bridge structures.

	The existing infrastructure fronting the proposed development is upgraded in accordance with SC6.15 — Road infrastructure and hierarchy planning scheme policy and Capricorn Municipal Development Guidelines.	
PO13 Where the nature of the development creates a demand, provision is made for set down and pick-up facilities by bus, taxis or private vehicle, which: a. are safe for pedestrians and vehicles; b. are conveniently connected to the main component of the development by pedestrian pathway; and c. provide for pedestrian priority and clear sightlines.	No acceptable outcome is nominated.	**Not applicable** Due to the nature of the Project, dedicated set down and pick up facilities are not required however safe pedestrian and vehicle connectivity will be provided within the Study Area.
Site access		
PO14 Development does not impact on the safety, operation or function of the road network or system.	**AO14.1** Vehicle manoeuvring into and from the site for all vehicles is designed in accordance with Australian Standard AS 2890, as updated from time to time. **AND** **AO14.2** No direct property access is gained to a highway, main road, urban arterial or sub arterial road as defined in SC6.15 — Road infrastructure and hierarchy planning scheme policy other than via a service road or a joint access arrangement with other sites. **AND** **AO14.3** Development that generates greater than 100 vehicle movements per day does not gain access to or from an urban access place or urban access streets as defined in SC6.15 — Road infrastructure and hierarchy planning scheme policy.	**Complies with the PO** Based on the identified increase in traffic numbers anticipated as a result of the construction (Stage 1 and Stage 2) and operations phases of the proposed Project, it is anticipated that the Project will have a minimal impact on the traffic operation of the surrounding road network, from a capacity perspective. Notwithstanding, the range of mitigation treatments have been recommended in the TIA (**Appendix G**) to ensure the safety and efficiency of the local and State road networks utilised by the Project are not comprised.

PO15 Development facilitates the orderly provision and upgrading of the transport network or contributes to the construction of transport network improvements.	No acceptable outcome is nominated.	**Complies with the PO** The TIA recommends that an Infrastructure Agreement is entered into with RRC to offset the calculated pavement impacts of the Project to South Ulam Road. The Project is not otherwise anticipating being required to contribute to the construction of transport network improvements.
PO16 On-site transport network infrastructure integrates safely and effectively with surrounding networks.	**AO16.1** Intersections, connections and access arrangements are designed in accordance with the Capricorn Municipal Development Guidelines and Australian Standard AS 2890.	**Complies with the AO** Access arrangements into the Project will be designed in accordance with Capricorn Municipal Development Guidelines and Australian Standard AS 2890
Pedestrian and cyclist facilities		
PO17 Development provides safe and convenient pedestrian and cycle movement to the site and within the site having regard to desire lines, users' needs, safety and legibility.	**AO17.1** Pedestrian and cyclist movements are designed in compliance with the Capricorn Municipal Development Guidelines and Australian Standard AS 2890.	**Not Applicable** Due to the remote and rural location of the Project, pedestrian and cycle movements are not considered.
PO18 Provision is made for adequate bicycle parking and end of trip facilities, to meet the likely needs of users and encourage cycle travel.	No acceptable outcome is nominated. Editor's note—Provisions are made for parking and end of trip facilities in accordance with the SC6.4 — Bicycle network planning scheme policy.	**Not Applicable** The Project is located in a remote and rural area. Accordingly, bicycle parking and end-of-trip facilities are not required.
Servicing		
PO19 Refuse collection vehicles are able to safely access on-site refuse collection facilities.	**AO19.1** Refuse collection areas are provided and designed in accordance with the waste management code and Australian Standard AS 2890.	**Complies with the AO** Refuse collection areas will be designed in accordance with Australian Standard AS 2890

Table 8.2.3.3.1 — Development outcomes for assessable development

Performance outcomes	Acceptable outcomes	Comments
Matters of state and local (high) environmental significance Editor's note—Refer to overlay map OM-3A		
PO1 Development is located, designed and operated to retain and protect significant natural assets, habitat and values to the greatest extent possible. Where this is not possible, impacts are minimised by: a. retaining native vegetation; b. allowing for the regeneration of native vegetation to the area, or rehabilitating with locally endemic plants in non-vegetated areas of the site; c. landscaping with locally native plants; d. locating and designing public access to avoid disturbance of ecological values; e. ensuring alterations to natural landforms, hydrology and drainage patterns do not significantly affect ecological values; and f. incorporating measures that avoid the disruption of threatened wildlife and their habitat by allowing for their safe movement through the site. Note—In areas where environmental values have been mapped but are no longer present a report certified by an appropriately qualified person that the development site does not contain any matters of environmental significance will be required. Note—An environmental offset is provided for any permanent, irreversible loss or reduction in matters of local (high) environmental significance caused by the development. An environmental offset is carried out as per	No acceptable outcome is nominated.	**Complies with the PO** The Disturbance Footprint, including the site access, is located on land that is largely cleared and mapped as Category X (non-remnant vegetation) with minor areas of Category R on the Vegetation Management Regional Ecosystem Map. This vegetation was ground-truthed as non-remnant. As such, it is considered that the Project adequately retains natural assets and the limited habitat values present to the greatest extent possible. See response to PO6 for assessment of impacts to mapped waterways. Refer to **Appendix E –** Ecological Assessment Report for further detail on potential impacts and mitigation measures.

the requirements of the Queensland Government's Environmental Offsets Policy, as amended from time to time.		
PO2 Development ensures native vegetation is retained, regenerated and rehabilitated in such a way as to: a. ensure protection of areas of vegetation within biodiversity corridors and wildlife habitats; b. maintain vegetation that is in patches of greatest size and smallest possible edge-to-area ratio; c. maximise the linkages between vegetation located on the subject site; d. maximise linkages between vegetation located on adjacent properties within the biodiversity network; e. allow the dispersal or movement through biodiversity corridors; and f. protect riparian vegetation in and adjacent to watercourses.	No acceptable outcome is nominated.	**Complies with the PO** The Disturbance Footprint is located on land that is mapped as Category X with minor areas of Category R on the Vegetation Management Regional Ecosystem Map. The vegetation was ground-truthed as non-remnant vegetation. It is acknowledged the proposed Disturbance Footprint does contain 0.6 ha of Category R vegetation. The mitigation hierarchy will be applied to avoid this vegetation to the greatest extent possible through micro-siting and design, Any potential clearing of this vegetation will be carried out in accordance with the Accepted Development Vegetation Clearing Code (ADVCC). Due to the cleared nature of the site, no impacts to vegetation linkages, dispersal or movement through biodiversity corridors is anticipated. For matters regarding riparian vegetation adjacent to watercourses, refer to the response to PO6. Refer to **Appendix E –** Ecological Assessment Report for further detail.
Matters of local (general) environmental significance Editor's note—Refer to overlay map OM-3A		
PO3 Development minimises impacts on biodiversity values by ensuring they are retained to the greatest extent possible. Editor's note—Minimising the impacts on biodiversity values can be achieved by:	No acceptable outcome is nominated.	**Not Applicable** The Study Area is not mapped as containing Matters of local (general) environmental significance.

a. retaining native vegetation; b. allowing for the regeneration of native vegetation; c. landscaping with native local plants; d. locating and designing public access (for example roads, bushfire separation areas etcetera) to avoid disturbance of ecological values; e. accommodating the safe movement of wildlife through the site; and f. limiting alterations to natural landforms and avoiding disturbance to natural waterways and drainage paths.		
Biodiversity corridors and wildlife habitats Editor's note—Refer to overlay map OM-3B		
PO4 Development maintains unimpeded movement of terrestrial and aquatic fauna that are associated with or are likely to use the biodiversity corridor as part of their normal life cycle by: a. ensuring development, including roads, pedestrian access and in-stream structures, do not create barriers to the movement of fauna (including fish passage) along or within biodiversity corridors; b. providing effective wildlife movement infrastructure in accordance with best practice and directing fauna to locations where wildlife movement infrastructure has been provided to enable fauna to safely negotiate a development area; and c. separating fauna from potential hazards through the use of appropriate fencing. Note—In areas where environmental values have been mapped but are no longer present a report certified by an appropriately qualified person that the development site does not contain any matters of environmental significance will be required.	No acceptable outcome is nominated.	**Not Applicable** The Study Area is not mapped as containing biodiversity corridors and wildlife habitat.

Editor's note—Biodiversity corridors have been mapped based on a minimum width of 500 metres.		
PO5 Development: a. retains and protects areas of wildlife habitat that support a critical life stage ecological process such as feeding, breeding or roosting for identified species; and b. incorporates measures as part of siting and design to protect and retain identified ecological values and underlying ecosystem processes within or adjacent to the development site.	**AO5.1** Development retains and protects native fauna feeding areas, nesting, breeding and roosting sites within the identified wildlife habitats. Editor's note—Development applications lodged with Council must identify all species listed that are present within or adjacent to the premises and habitats that may be affected by the proposal. In particular applications are to identify and describe how the development protects or enhances wildlife habitat at any critical life stage ecological processes within or adjacent to the development area. This should be reflected in an ecological assessment report prepared in accordance with the SC6.8 — Ecological assessment planning scheme policy.	**Not Applicable** The Study Area is not mapped as containing biodiversity corridors and wildlife habitat.
Wetlands and waterways Editor's note—Refer to overlay maps OM-3C and OM-3D		
PO6 Development has no adverse impacts on: a. native vegetation; b. habitat; c. ecological functions; d. water quality; and e. nature conservation values. Editor's note—Waterway buffers (aside from MSES-Waterways) have been mapped based on the following minimum widths: a. fifty (50) metres buffer (twenty-five (25) metres either side of the waterway) for stream orders 1 and 2; b. 100 metres (fifty (50) metres either side of the waterway) for stream orders 3 and 4; c. 200 metres for stream order 5 and above, except for the Fitzroy River; and d. for the Fitzroy River: 350 metres buffer (175 metres	No acceptable outcome is nominated.	**Complies with the PO** The Disturbance Footprint is intersected by an unnamed tributary of Eight Mile Creek, which is mapped as a 'Queensland waterway for waterway barrier works' in accordance with the *Fisheries Act 1994* (Fisheries Act). It is however noted that the watercourse buffer (50 m – stream order 1) intersects the Disturbance Footprint in the south-west corner of the Project. No permanent above or below ground infrastructure is proposed in the buffer area. Where the Project's access track intersects the watercourse, this will be constructed in accordance with the accepted development requirements (ADR) for waterway barrier works or otherwise under a separate

either side of the waterway) upstream of the Fitzroy River Barrage, and 450 metres (225 metres either side of the waterway) downstream of the Fitzroy River Barrage. Editor's note—Wetland buffers have a minimum width of: e. fifty (50) metres buffer (twenty-five (25) metres either side of the waterway) in urban areas; and f. 200 metres buffer (100 metres either side of the waterway) in non-urban areas. Editor's note—Vegetation clearing undertaken as a consequence of development occurs in compliance with the *Vegetation Management Act 1999* and *Nature Conservation Act 1992*.		development application for operational works. Impacts within the Disturbance Footprint where the watercourse 25 m buffer intersects are limited to clearing vegetation above 100 mm. This includes removal of the small paddock trees and maintenance of grass to 100 mm tall. Refer to the assessment provided in Table 5.4f the Ecological Assessment Report (**Appendix E**) which concludes that the management of vegetation within the prescribed waterway buffer is unlikely to result in an adverse impact on native vegetation, habitat, ecological functions, water quality or nature conservation values.
Hydrology		
PO8 Development: a. enhances or maintains the existing groundwater hydrological regime of all areas of environmental significance; and b. ensures that the water table and hydrostatic pressure in the area of environmental significance is returning to its natural state.	No acceptable outcome is nominated.	**Complies with the PO** The proposed development requires only minor modifications to landform. Impacts to exiting groundwater hydrological regimes in all areas of environmental significance will therefore be negligible. Refer to the Stormwater Management Plan (**Appendix H**).
Non-native pest management		
PO9 Development avoids the introduction of non-native pest species (plant or animal) that pose a risk to ecological integrity.	**AO9.1** Development does not introduce non-native pest species.	**Complies with the AO** A Project-specific Construction Environmental Management Plan (CEMP) will be prepared and implemented prior to construction that will include measures to protect the site from non-native pest species.
Ongoing management, construction and operation		

PO10 During construction and operation of development, ongoing management, monitoring and maintenance is undertaken to ensure impacts on environmentally significant areas, biodiversity values and ecological processes, including water quality and hydrology, are avoided or minimised. Editor's note—Construction and operation related to a development are carried out in accordance with an operational management plan where appropriate. This plan can form an amendment to an existing approved management plan for the site.	No acceptable outcome is nominated.	**Complies with the PO** Mitigation and management measures will be implemented for habitat areas and include (but not limited to): • Where vegetation clearing is proposed, boundaries will be clearly demarcated. • A CEMP will be developed and implemented and will include the measures described in the EAR. • Fauna spotter-catchers will be present during all vegetation clearing activities. • Micro-siting of infrastructure. This will aim to retain habitat trees where possible. • Where habitat features such as hollow logs cannot be retained in-situ, they will be relocated to adjacent areas of suitable habitat if safe and practical. • Construction personnel will be educated (through site inductions and toolbox talks) on the potential presence of fauna. • Where encountered, personnel shall keep their distance from fauna and not harm or trap them. • Where injured fauna is encountered, a wildlife carer or vet will be contacted Refer to **Appendix E –** Ecological Assessment Report for further detail.
PO11 Development adjoining a national park or other land in a protected area estate: a. maintains and where appropriate, improves access to a protected area estate; and b. maintains a buffer to a protected area estate in accordance with minimum best practice standards and includes characteristics to avoid development impacts.	No acceptable outcome is nominated.	**Not Applicable** The Project does not directly adjoin a national park or land in a protected area estate.

Editor's note—Protected area estates include the following classes, as defined in the *Nature Conservation Act 1992*: a. national park (scientific); b. national parks; c. national parks (Aboriginal land); d. national parks (Torres Strait Islander); e. national parks (Cape York Peninsula Aboriginal land); f. national parks (recovery); g. conservation parks; h. resource reserves; i. nature refuges; j. coordinated conservation area; k. wilderness areas; l. World Heritage management areas; and m. international agreement areas.		
PO12 Management arrangements facilitate the effective conservation and protection of matters of national, state or local environmental significance, ecological processes and biodiversity values.	**AO12.1** Areas supporting matters of national, state or local significance features, biodiversity values or ecological processes are: a. transferred into public ownership where the land is required for public access or for some other public purpose consistent with its ecological, open space or recreation functions, including: i. access for maintenance; ii. linking core and remnant habitat areas; iii. protecting water quality and ecological processes; and iv. other public benefit; or b. incorporated within private open space and included within a voluntary statutory covenant	**Complies with the PO** Impacts to Matters of National Environmental Significance (MNES) have been assessed and approved, as detailed in *Assessment of Matters of National Environmental Significance – Preliminary Documentation (2021/9137); Mount Hopeful Wind Farm (Umwelt 2024)*[1]. The EAR (**Appendix E**) concludes that there will be no residual impacts on matters of state or local environmental significance through the implementation of management measures.

[1] Preliminary Documentation - Mount Hopeful Wind Farm (2021/9137)

	that is registered under the *Land Title Act 1994*. Editor's note—Matters of national, state or local environmental significance include all areas shown on all biodiversity overlay maps.	
Rehabilitation		
PO13 Areas degraded as a result of development are rehabilitated by the proponent as near as is practical to the naturally occurring suite of native plant species and ecological communities. Editor's note—A rehabilitation plan supported by expert ecological advice prepared in accordance with SC6.8—Ecological assessment planning scheme policy as well as reference to SC6.12 — Landscape design and street trees planning scheme policy will assist in demonstrating achievement of this performance outcome.	No acceptable outcome is nominated.	**Complies with the PO** At the Project's end of life, a review will be conducted to determine whether it will be renewed or decommissioned. Decommissioning will adopt the best practice approach for the removal of infrastructure. Areas of disturbed land will be revegetated with species that were present prior to construction. It is acknowledged that a condition may be included as part of the decision notice requiring the preparation of a decommissioning and rehabilitation plan at a stated time prior to the cessation of the use as agreed with Council.
Reconfiguring a lot		
PO14 The ecological function and biodiversity values of existing habitat are maintained by ensuring that reconfiguring a lot does not result in the fragmentation of habitat.	**AO14.1** Reconfiguring a lot does not result in any additional lots where the entire site is subject to: a. matters of state or local (high) environmental significance; or b. biodiversity corridors and wildlife habitats; or c. waterways and wetlands. **AND** **AO14.2** Roads created as the result of reconfiguring a lot are located between the riparian corridor and any	**Not Applicable** The Project does not involve a ROL.

	additional lots created.	

DRAFT TEMPORARY LOCAL PLANNING INSTRUMENT (TLPI)

RENEWABLE ENERGY AND BATTERY ENERGY STORAGE FACILITIES

Table 9.2.3.3.1 Development outcomes for assessable development

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	RESPONSE
Site characteristics		
PO1 Development is located on land that is suited for the purpose and: (a) maintains water quality and hydrogeological processes; (b) maintains ecological biodiversity and ecological connectivity; (c) prevents adverse effects on environmental and water quality values and receiving waters; (d) ensures a stabilised surface and maintains the natural topography for the land; (e) avoids character areas and heritage places; (f) avoids productive agricultural land; and	**AO1.1** Development is not located on land subject to the: (a) Agricultural land classification overlay; (b) Biodiversity areas overlay; (c) Biodiversity corridors and wildlife habitats overlay; (d) Biodiversity waterways overlay; (e) Biodiversity wetlands overlay; (f) Bushfire hazard overlay; (g) Character overlay; (h) Coastal erosion prone area overlay; (i) Coastal hazard overlay; (j) Fitzroy River flood overlay;	**Complies with the PO** The Mount Hopeful Battery Project (the Project) is located on land that is subject to: • Biodiversity waterways overlay • Bushfire hazard overlay • Steep land overlay <u>Biodiversity and water quality</u> The ecological function of this non-remnant paddock is already highly modified and provides limited habitat value, therefore, it is considered that removing the few scattered paddock trees and maintaining the grass is unlikely to cause any meaningful change. The existing ecological function of the area is likely

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PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	RESPONSE
(g) avoids natural hazards, or where it cannot be avoided, mitigates against the impact of natural hazards.	(k) Floodplain investigation area overlay (l) Heritage place overlay; (m) Local catchment flood overlay; (n) Special management area overlay; (o) Steep land overlay; and (p) Water resource catchments overlay.	to remain the same. Please refer to **Appendix E** for further details on how the Project avoids and mitigates potential ecological impacts. The mapped watercourse (and associated buffer) that occurs within the Project's Disturbance Footprint is a stream order one watercourse that is highly ephemeral and would only hold water following periods of intense rain. This means there is a very low risk of nutrient loading or changes to hydrology. Vegetation below 100 mm and grass will be maintained to stabilise soil and minimise erosion and sediment run off. The Project is therefore not anticipated to result in an adverse impact on water quality. <u>Hydrogeological processes</u> The Stormwater Management Plan (**Appendix H**) concludes that due to the proposed modifications to the landform being minor, the impacts of the Project on the existing groundwater hydrological regime would be negligible. <u>Stability and topography</u> The Project is located on relatively flat land and will be undertaken in accordance with a geotechnical program that requires earthworks and foundations will be carried out in accordance with the relevant Australian Standards and engineering requirements to ensure long-term stability.

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	RESPONSE
		<u>Natural hazards</u> The Bushfire Management Plan (**Appendix I**) concludes that through the implementation of a 30 metre (m) asset protection zone (APZ) around above-ground infrastructure along with other mitigation measures such as appropriate access and fire water supply, the risk to people and property from bushfire hazard is reduced to a tolerable level. Other natural hazards including flooding have been considered for the Project. A Stormwater Management Plan (**Appendix H**) has been prepared which concludes that increases in flood impacts are unlikely through the implementation of a stormwater management system with the capacity to convey run off from impervious surfaces and local catchment flooding safely. <u>Agriculture</u> The Project is not located on land mapped as ALC Class A or B and is therefore considered to adequately avoid productive agricultural land. Notwithstanding, the balance of the property will continue to be used for low intensity grazing activity. <u>Heritage</u> The Project is not located on any mapped character areas or heritage places.
Facility location		

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	RESPONSE
PO2 Development is connected to the power grid network and has regard to: (a) safety of the network connection; (b) the location of the network connection and associated infrastructure; and (c) the scenic landscape character of the location. *Note—Compliance with this Performance outcome may be demonstrated by providing a technical assessment report including preliminary grid connection plans prepared by a suitably qualified professional.*	**AO2.1** AO2.1 Development is located within 2,000 metres of the existing or approved: (a) electricity network; or (b) substation. AO2.2 Battery storage facilities are located towards the centre of the site and not adjacent to sensitive land uses and property boundaries. AO2.3 Battery storage facilities in public areas (e.g. road reserve and parks) or residential zones are: (a) less than 2.4 metres in height; and (b) less than 4 metres in length. AO2.4 Battery storage facilities are designed to: (a) maximise passive cooling; (b) use mechanical cooling where the ambient temperatures could cause battery explosion and fire; and (c) contain battery explosions and fire.	**Complies with the PO** The Project is co-located with existing Powerlink transmission line infrastructure of which it will connect into. Neoen has been engaging with Powerlink since 2018 to confirm network capacity and the suitability of the Project. Correspondence provided by Powerlink confirms the suitability of the Project connecting the first stage of the battery, with the second stage to be confirmed by Powerlink following the confirmation of Gladstones Priority Transmission Investment (PTI) program. The Project Study Area was selected as it achieves both co-location and minimal impact to the scenic character of the location, due to the significant setback of the development from the road frontage and the nearest sensitive receptors.
Amenity		
PO3 Development is located to protect and manage adverse effects on the amenity of surrounding sensitive land uses and the existing streetscape and broader region, having regard to: (a) the intent of the zone and surrounding zones that may be affected;	**AO3.1** Development is setback: (a) 500 metres from Environmental Management and Conservation zone, except where siting is within 250 metres of a major electricity corridor or electricity easement; (b) 2,000 metres from a Township zone, Rural residential zone, residential zone, emerging	**Complies with PO3 and PO4** The Project's Disturbance Footprint represents approximately 4.4% of the property of which it is sited. As such, it is considered that it does not restrict the intent of its surrounding rural zoning.

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	RESPONSE
(b) the significance of the visual and character values; and (c) the streetscape character.	communities zone and any other surrounding sensitive land use; and (c) 30 metres from all property boundaries.	The Project is located approximately 1.3 kilometres (km) from its road frontage of South Ulam Road and approximately 1.65 km from the nearest sensitive receptor. Due to its remote location, negligible landscape and visual amenity impacts are anticipated. This view was confirmed by Council officers during pre-lodgement discussions; confirming that a Landscape and Visual Impact Assessment (LVIA) was not necessary for the Project's development application. Further, the Project is visually obscured by vegetation throughout the surrounding property, largely screening it from view from relevant viewpoints (refer to **Figure 7.5**). As such, it is considered that the Project is appropriately sited to reduce potential visual amenity impacts and is unlikely to result in adverse effects on the surrounding rural character. The Project's design and siting has had regard to the sensitivity of the landscape by: • Achieving co-location with existing infrastructure (representing a minor and incremental increase to cumulative amenity impacts). • Avoiding the placement of above and below ground infrastructure within mapped waterways.
PO4 Development has regard to: (a) the sensitivity of the landscape, visual intrusion from public roads, public viewer places and from sensitive land uses; (b) the size, height, scale, spacing, colour and surface reflectivity of the facilities components; (c) the number of facilities located close to each other within the same landscape; (d) the excessive removal, or planting of inappropriate species of vegetation; (e) the location, size, height and scale of other ancillary uses, buildings and works including major electricity corridor or easement, battery storage units and associated access roads; and (f) the proximity to environmentally sensitive areas such as public land, waterways and low-lying areas. *Note—a visual impact assessment will be required for sites visible from public roads, public viewer places and sensitive land uses. Visual impact assessment is required to be undertaken in accordance with the Scenic Amenity Planning Scheme Policy.* *Note—an ecological assessment and environmental management plan in accordance with the ecological assessment*	No acceptable outcome is nominated.	

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	RESPONSE
planning scheme policy will be required for development		• Siting the Project within areas of non-remnant vegetation only and minimising its removal to the greatest extent possible. • Developing the Project in a remote location, well setback from the road frontage, minimising the likelihood of impacts resulting from height, scale and reflectivity of the facilities components.
PO5 Development minimises impacts on character, amenity and landscape values by: (a) locating: i. with other energy facilities in circumstances where the cumulative visual impacts resulting from colocation are negligible; or ii. where possible and practical, in areas where the predominant land uses are energy facilities, industrial uses or commercial uses; and (b) facilitating future co-location with other energy facilities.	No acceptable outcome is nominated.	**Complies with the PO** It is considered that the co-location of the Project with existing Powerlink transmission infrastructure does not represent a cumulative impact given its setback distances from the road frontage and the nearest sensitive receptor. It is noted that the battery would be co-located with the approved Mount Hopeful Wind Farm, which is located on land to the west of the Project's Study Area. It is therefore considered that the Project is not a significant visual departure from the existing and approved infrastructure that does/will surround it.
Acoustic assessment measures		
PO6 Development is located to protect and manage adverse effects on the amenity of surrounding sensitive land uses, having regard to the outdoor (free field) daytime and night-time 'A' weighted equivalent acoustic level (Laeq), assessed at all noise affected existing or approved sensitive land uses.	AO6.1 Development has an outdoor (free field) night-time (10pm to 6am) acoustic level that does not exceed: (a) 35dB(A); or (b) the background noise (LA90) by more than 5dB(A); whichever is the greater.	**Not applicable** Council officers via pre-lodgement meeting confirmed that the appropriate criteria for the Project's noise assessment are the Acoustic Quality Objectives (AQO) under the Environmental Protection (Noise) Policy 2019 (EPP (Noise)). Refer to **Appendix F** for the full Noise Impact Assessment which

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	RESPONSE
	AO6.2 Development has an outdoor (free field) daytime (6am to 10pm) acoustic level that does not exceed: (a) 37dB(A); or (b) the background noise (LA90) by more than 5dB(A) whichever is the greater, for wind speed from cut-in to rated power of the wind turbine and each integer wind speed in between referenced to hub height.	demonstrates compliance with the AQO, and therefore, PO6.
Public safety		
PO7 The development is designed to: (a) optimise security; (b) minimise public safety incidents; (c) prevent unauthorised or accidental public access to the site; and (d) prevent impacts from crime. *Note—Compliance with this Performance Outcome may be demonstrated by providing a design concept plan that is consistent with the State government Crime Prevention Through Environmental Design Guidelines for Queensland.*	AO7.1 The site is secured by a fence to prevent unauthorised or accidental public access to the facility. AO7.2 Public warning and information signs are erected on a boundary or perimeter security fence to comply with workplace health and safety requirements. AO7.3 Battery storage facilities in public areas (e.g. road reserve and parks) are vandal proof.	**Complies with the AO** The Project is secured by security fencing along with CCTV and other crime prevention measures, including public warning and information signage. Given the Project's remote location, it is considered that the *State government Crime Prevention Through Environmental Design Guidelines for Queensland* are not relevant in this instance.
Landscaping		
PO8 Landscaping mitigates: (a) increases in heat on the microclimate; (b) minimises adverse visual impacts of the facility from the street, sensitive land uses and public viewer places; and (c) integrates existing native vegetation into the landscaping design in accordance with the	**AO8.1** Landscaping minimises increases in heat on the microclimate of the site and surrounds by: (a) locating landscaping around the Renewable energy facilities; and (b) including dense mature screen landscaping, a minimum of 10 metres wide around the Renewable energy facilities.	**Complies with the PO** Due to the Project's remote location, surrounded by vast rural land, it is highly unlikely the Project will result in increased heat within the microclimate of the area.

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	RESPONSE
Landscape design and street trees planning scheme policy.	**AO8.2.1** Within the building setbacks, dense mature landscaping screens facilities from the public roads, surrounding sensitive land uses, or any other highly visible public vantage point. OR **AO8.2.2** A 3 metre high screen fence is provided to screen all facilities from public roads, surrounding sensitive land uses, or any other highly visible public vantage point. **AO8.3** Retention of mapped native vegetation areas may be used as dense screening where more than 10 metre wide.	
PO9 Facilities assist with the movement of wildlife through the site by: (a) incorporating wildlife corridors and habitat refuges; and (b) incorporating fencing that allows the passage of small animals without unreasonably compromising the security of the facility.	No acceptable outcome is nominated.	**Complies with the PO** The Project will only restrict small areas (relative to its vast rural surrounds) of the property with security fencing. As such it is considered unlikely to impede the movement of wildlife through the site.
Hazards and risk mitigation		
PO10 Battery storage facilities are appropriately located, designed and separated to avoid harm or mitigate the risk of harm to people, surrounding land uses and environmental values by:	No acceptable outcome is nominated.	**Complies with the PO** The development application is supported by a: • Hazard Incident Management Plan (HIMP) (**Appendix J**)

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	RESPONSE
(a) avoiding or where unable to avoid, minimise the risks of fire, explosion, thermal emission and containment release on and from the premises; (b) avoiding or where unable to avoid, mitigate the risks to the use of bushfire (including airborne debris), flood and vehicular impact; and (c) facilitating effective and efficient fire and emergency service response in the event of a fire, bushfire, explosion, contamination leak or other incident triggering an emergency service response. *Note – Development applications should be supported by assessment material such as f a risk management plan, fire and bushfire management plan and emergency plan. These plans must be prepared by a suitably qualified and experienced person.* *Note—Compliance with this Performance Outcome may be demonstrated by addressing CFA Design Guidelines and Model Requirements*		• Bushfire Management Plan (BMP) (**Appendix I**) • Emergency Response Plan (ERP) (**Appendix K**). The HIMP concluded that with the required certifications, fire detection measures, fire protection measures and appropriate separation to adjacent infrastructure, the Project is sufficiently safe from battery fire hazard. Further, it was recommended that the Project's retention pond is designed so that it can capture 100% of the required fire water storage capacity. It is noted that the HIMP is a precursor to a project-specific Fire Safety Study (FSS) which is developed during the detailed design of the Project and will appropriately reflect the recommendations of the HIMP. For matters relating to risk of bushfire hazard, please refer to the response in PO1. The ERP provides adequate response procedures and notification and communication requirements in the event of an emergency which triggers an emergency response. It is therefore considered that through the implementation of the recommendations of the HIMP, BMP and ERP, the Project adequately mitigates the risk of harm to

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	RESPONSE
		people, surrounding land uses and the environment.
Emergency management		
PO11 Development has an emergency management plan that addresses natural hazards and extreme events to ensure that the facility does not unduly burden Emergency services. *Note—Compliance with this requirement may require the facilities to be consistent with AS.3745 Planning for emergencies in facilities battery explosion risk management*	No acceptable outcome is nominated.	**Complies with the PO** The Project is supported by an ERP (**Appendix K**) which has been prepared in compliance with AS.3745-2010. The ERP provides appropriate response procedures and notification and communication requirements in the event of an emergency which triggers an emergency response. It is noted that this document will be continuously updated throughout the life of the Project to ensure it adequately captures the detailed design and operation of the Project.
Construction management		
PO12 Development avoids, minimises or mitigates impacts on soils to ensure these can be maintained or returned to a pre-construction standard. *Note—Compliance with this Performance outcomes may be demonstrated by Transport impact assessment and management plan, for during both construction and operation of the Renewable energy facility.*	**AO12.1** Development on land mapped as ALC provide for removable options for the foundations instead of buried concrete foundations. **AO12.2** Construction management practices minimise impacts on soil such as: (a) storage of excavated ALC soils and replacing these as part of decommissioning; (b) maintaining a stabilised surface; and (c) identify site configurations to avoid land fragmentation and to manage overland flows and stormwater from any increase in impervious area.	**Complies with the PO** The Project is not located on ALC land and will require minimal ground disturbance for its construction. All site earthworks and foundation works will be carried out in accordance with the relevant Australian Standards and engineering requirements.

PERFORMANCE OUTCOMES	ACCEPTABLE OUTCOMES	RESPONSE
Decommissioning and rehabilitation		
PO13 Following cessation of the use, the site is rehabilitated to a condition which is suitable for other uses compatible with the planning scheme zone of the site.	**AO13.1** Restoration of land after decommissioning considers: (a) who will be responsible for decommissioning the facility; (b) at what stage the responsible authority will be advised the facility will be decommissioned; (c) the processes, plans and procedures for removing all built form and for restoring the land to its pre-developed or natural state; (d) where equipment and material will be disposed and if it can be reused or recycled; and (e) the timeline for the decommissioning work. **AO13.2** Restoration of the land is completed within 12 months after the use has ceased operation and the facility is decommissioned.	**Complies with the PO** The Project will likely have an operational life of 20 to 30 years, after which the infrastructure will be removed from the site and the land rehabilitated to a condition suitable for other uses that are compatible with its rural zoning. It is acknowledged that Council may include a condition for the preparation of a decommissioning management plan to be prepared prior to the cessation of the use.

Table 6.7.4.3.1 — Development outcomes for assessable development and requirements for accepted development

Performance outcomes	Acceptable outcomes	Comments
Where involving a new building or expansion to an existing building		
Built form		
PO1 Development does not adversely impact on the rural character of the locality, having regard to the scale and visibility of buildings.	**AO1.1** The height of buildings and structures does not exceed two (2) storeys and ten (10) metres above ground level, excluding silos, windmills and similar structures ancillary to rural uses. Note—Building heights on the airport obstacle limitation surface map OM-2A prevail over building heights detailed in the zone codes.	**Complies with the PO** The Project will involve structures exceeding 2 storeys and 10 m above ground level. Specifically, these structures consist of components of the switchyard and overhead line towers. The proposed Disturbance Footprint will utilise approximately 4.4% of the total lot area that it is situated within, with the balance to be retained for its current rural use. Given its co-location with existing Powerlink electrical infrastructure (above 10m) and minimal site constraints, the proposed location presents as the best option with the least impact. It should be noted that the operational lifespan of the Project is anticipated to be up to 30 years, in after which the site will be returned to its current state following decommissioning at the end of its operational life.
Land use		
Aquaculture		
PO2 Aquaculture that is low impact in nature is located and designed on sites of sufficient size and dimension, to minimise adverse impacts on the amenity, water quality and ecological values.	**AO2.1** Aquaculture activities using ponds or tanks that are less than or equal to ten (10) hectares in total water surface area are carried out in accordance with the Department of Agriculture, Fisheries and Forestry	**Not Applicable** The Project does not involve aquaculture activities.

<table>
<tr><td></td><td>Code for accepted development requirements for material change of use that is aquaculture as updated from time to time.</td><td></td></tr>
<tr><td colspan="2">Dwelling house or dwelling unit</td><td></td></tr>
<tr><td>PO3
Development does not compromise the continued operation of an intensive animal industry, extractive industry, or a similar potential use on neighbouring rural land.</td><td>AO3.1
Development:
a. is set back a minimum of twenty (20) metres from all site boundaries; and
b. is separated from an existing or approved:
i. intensive animal industry by a minimum of 1,000 metres; and
ii. extractive industry operation as follows:
<table><tr><th>Operation</th><th>Separation distance</th></tr><tr><td>Extractive industry operation involving blasting</td><td>1,000 metres</td></tr><tr><td>A hard rock extractive industry</td><td>500 metres</td></tr><tr><td>A sand and gravel extractive industry</td><td>200 metres</td></tr><tr><td>A designated haul route</td><td>100 metres</td></tr></table>AND
AO3.2
Where a secondary dwelling is proposed, that dwelling:
a. is contained within the same lot; and
b. is no more than eighty (80) square metres gross floor area.</td><td>Not Applicable
The Project does not involve a dwelling house or dwelling unit.</td></tr>
<tr><td>PO4
Dwellings have adequate access to services to ensure the safety and well-being of residents and the water</td><td>AO4.1
A dwelling
a. has a legal access to a constructed road; and</td><td>Not Applicable
The Project does not involve a dwelling house or dwelling unit.</td></tr>
</table>

supply is adequate for the current and future needs of the development.	b. where within a water supply area has a legal connection to Council's reticulated water supply. Editor's note—A constructed road can be sealed, graded or gravel. Editor's note—Where development is located outside of the water supply area refer to the requirements under the Plumbing Code of Australia.	
Caretaker's accommodation		
PO5 The development does not compromise the productivity of the use.	**AO5.1** No more than one (1) caretaker's accommodation is established on the site.	**Not Applicable** The Project does not involve caretaker's accommodation.
PO6 A caretaker's accommodation has adequate access to services to ensure the safety and well-being of residents and the water supply is adequate for the current and future needs of the development.	**AO6.1** A caretaker's accommodation: a. has a legal access to a constructed road; and b. where within a water supply area has a legal connection to Council's reticulated water supply. Editor's note—A constructed road can be sealed, graded or gravel. Editor's note—Where development is located outside of the water supply area refer to the requirements under the Plumbing Code of Australia.	**Not Applicable** The Project does not involve caretaker's accommodation.
Home based business		
PO7 Development for a home based business is operated, designed and sited in a manner that: a. is an appropriate scale and intensity; b. is integrated with the primary use of the site for a dwelling house; c. does not adversely affect the safety and private recreation needs of adjoining premises;	**AO7.1** The home based business has a maximum gross floor area of 100 square metres. **AND** **AO7.2** The home based business is carried out within an existing building or structure. Note—This does not include the parking of vehicles.	**Not Applicable** The Project does not involve a home-based business.

d. does not adversely affect the streetscape and street function; and e. does not compromise the character and amenity of the surrounding area by way of noise, light, dust, fumes, vibration, odour or storage of potentially hazardous materials.	**AND** **AO7.3** Hours of operation are between the hours of 07:00 and 19:00 Monday to Saturday and 08:00 and 19:00 Sunday and public holidays (except for a bed and breakfast accommodation or home based child care). **AND** **AO7.4** The home based business involves a minimum of one (1) resident of the dwelling. **AND** **AO7.5** A maximum of one (1) worker, not residing in the dwelling house, is employed in the home based business. **AND** **AO7.6** The home based business contains visitor parking within the site. **AND** **AO7.7** The home based business where for bed and breakfast accommodation: a. the combined total number of guests and permanent residents does not exceed twelve (12) persons at any one time; and b. guests stay a maximum of fourteen (14) consecutive nights. **AND** **AO7.8** Goods or services for sale or hire are not displayed where they are visible from the street frontage or an adjoining residential premise. **AND** **AO7.9** No more than one (1) commercial vehicle is associated	

	with the business and the vehicle does not exceed a gross vehicle mass of 4.5 tonnes tare weight unless associated with a home based business involving heavy vehicles. Editor's note—Refer to provisions under additional outcomes for home based business involving heavy vehicles. **AND** **AO7.10** The home based business does not generate traffic exceeding ten (10) vehicle trips per day and the trips are not by a vehicle exceeding a gross vehicle mass of 4.5 tonnes tare weight. **AND** **AO7.11** Noise levels do not exceed acoustic quality objectives under the *Environmental Protection (Noise) Policy 2019*, as updated from time to time.	
Additional outcomes for home based business involving heavy vehicles		
PO8 Development does not compromise the character and amenity of the surrounding area by way of noise, light, dust, fumes, vibration, odour or storage of potentially hazardous materials.	**AO8.1** A maximum of two (2) heavy vehicles and two (2) heavy trailers are stored on site at any one time. **AND** **AO8.2** Heavy vehicles and heavy trailers: a. are not started or manoeuvred on site between the hours of 22:00 and 06:00, or left running unattended for any period up to five (5) minutes; b. if used for the transport of cattle or waste disposal, are stored a minimum of 100 metres away from an adjoining dwelling; and c. do not have a refrigeration unit running while on-site if within 100 metres of a sensitive land use on an adjoining lot. **AND**	**Not Applicable** The Project does not involve a home-based business involving heavy vehicles.

	AO8.3 The business does not include the loading or unloading of vehicles or storage of goods. **AND** **AO8.4** The site has direct access to a minor urban collector road or higher order road, but not to a state controlled road. **AND** **AO8.5** Heavy vehicles are stored onsite and located a minimum distance of: a. twenty (20) metres from the frontage; and b. fifteen (15) metres from side and rear boundaries. **AND** **AO8.6** Only minor maintenance is carried out on the property and does not involve major body work and mechanical repairs.	
Roadside stall		
PO9 A roadside stall: a. does not impact on the amenity of adjoining land uses and the surrounding area; b. does not adversely affect the safety and efficiency of the road network; c. is ancillary to the farming use conducted on the same site; and d. sells only fresh produce grown locally.	**AO9.1** Any structure used for a roadside stall: a. has a maximum floor area of twenty (20) square metres; b. is located entirely within the property and not on the road reserve; and c. is set back from any boundary adjoining residential premises a minimum of six (6) metres. **AND** **AO9.2** Site access, car parking and storage areas: a. are located entirely within the property and not	**Not Applicable** The Project does not involve a roadside stall.

	on the road reserve; and b. use the same driveway as the primary property access. **AND** **AO9.3** The roadside stall is associated with a rural use conducted on the same site.	
Rural workers' accommodation		
PO10 The amenity of the rural workers' accommodation is not adversely impacted upon and appropriately separated from intensive rural and industrial uses.	**AO10.1** On-site cabins or dwellings housing workers are sited no closer than 250 metres to intensive rural uses and industrial uses.	**Not Applicable** The Project does not involve rural workers' accommodation.
PO11 The rural workers' accommodation has adequate access to services to ensure the safety and well-being of occupants and the water supply is adequate for the current and future needs of the development.	**AO11.1** Rural workers' accommodation: a. has a legal access to a constructed road; and b. where within a water supply area has a legal connection to Council's reticulated water supply. Editor's note—A constructed road can be sealed, graded or gravel. Editor's note—Where development is located outside of the water supply area refer to the requirements under the Plumbing Code of Australia.	**Not Applicable** The Project does not involve rural workers' accommodation.
Effects of development		
PO12 Outdoor lighting maintains the amenity of any adjoining residential zoned premises and does not adversely impact the safety of vehicles or pedestrians on the adjoining streets as a result of light emissions, either directly or by reflection.	**AO12.1** Outdoor lighting is designed, installed and maintained in accordance with the parameters and requirements of the Australian Standard AS 4282 — Control of the obtrusive effects of outdoor lighting, as updated from time to time.	**Complies with the AO** The Project does not adjoin residential zoned land. Notwithstanding, proposed security/nighttime lighting will comply with the relevant Australian Standards and will be directed into and downward to the project area to avoid impacts on the surrounding environment.

Where in the Alton Downs precinct Note—Where acceptable outcomes in this section vary from this code, the precinct based acceptable outcomes take precedence.		
PO13 Residential uses are sufficiently separated from road frontages in order to protect the amenity of residents and to ensure the character of the area is maintained.	**AO13.1** A dwelling house is setback a minimum of six (6) metres from front boundaries. Note—There is no specific setback to any other boundary.	**Not Applicable** The Project is not located within the Alton Downs Precinct.

Table 6.7.4.3.2 — Development outcomes for assessable development

Performance outcomes	Acceptable outcomes	Comments
General		
PO14 Development that does not involve rural uses: a. is located on the least productive parts of a site and not on land identified on the agricultural land classification (ALC) overlay maps; b. does not restrict the ongoing safe and efficient use of nearby rural uses; and c. is adequately separated or buffered where it is likely to be sensitive to the operational characteristics associated with rural uses, rural industries or extractive industries. Editor's note—Agricultural land classified as Class A or Class B is shown on the agricultural land classification overlay map OM-13. Editor's note—Applicants should have regard to the State Planning Policy Guideline — State Interest — Agriculture.	No acceptable outcome is nominated.	**Complies with the PO** The Project is not located on, or adjacent to, land identified on the ALC overlay mapping and the Project does not involve a rural use. The proposed Disturbance Footprint will utilise approximately 4.4% of the total lot area that it is situated within, with the balance to be retained for its current rural use. It is centrally sited, providing a setback of approximately 1.65 km from the nearest use and will be sufficiently screened from neighbouring rural uses. As such, the Project is not considered to restrict the ongoing safe and efficient use of nearby grazing activity.
PO15 Uses that require isolation from urban areas are accommodated only where:	No acceptable outcome is nominated.	**Complies with the PO** The Project cannot be located in an industrial or alternate zone due to the critical requirement for co-

a. they cannot be more appropriately located in an industrial or other relevant zone; b. they can be adequately separated from sensitive land use(s) (whether or not in the rural zone); and c. potential impacts can be appropriately managed. Editor's note—Applicants seeking approval for intensive animal industries are to refer to State Planning Policy Guideline — State Interest — Agriculture and consult with the relevant State government department prior to the lodgement of a development application. Council may require a study that, amongst other matters, identifies how the development is in accordance with Environmental Protection (Air) Policy 2019 or Environmental Protection (Noise) Policy 2019.		location with existing electrical infrastructure and future co-location with the approved Mount Hopeful Wind Farm. Co-location with existing electrical infrastructure is also a requirement under Council's draft TLPI. The site is uniquely positioned adjacent to essential grid assets, allowing for a direct and highly efficient connection to the local grid network. Potential impacts, particularly visual and noise related, have been proactively addressed through the strategic siting of the Project. The 1.32 km setback from South Ulam Road, combined with the 1.65 km distance from the nearest sensitive receptor, significantly mitigates potential visual effects and preserves the rural landscape character. In addition, the placement and design of the Project allows for effective management of operational impacts, including noise, ensuring they remain within acceptable limits and are unlikely to cause nuisance to nearby land users.
PO16 Ecological values, habitat corridors and soil and water quality are protected, having regard to: a. maximisation of vegetation retention and protection of vegetation from the impacts of development; b. avoidance of potential for erosion and minimisation of earthworks; c. retention and protection of natural drainage lines and hydrological regimes; and d. avoidance of leeching by nutrients, pesticides or other contaminants, or potential for salinity.	No acceptable outcome is nominated.	**Complies with the PO** The design of the Project has been optimised so that most of the Disturbance Footprint is located within cleared land. Where this is not possible, impacts are primarily within non-remnant areas, avoiding the clearance of native vegetation as much as possible. Mitigation and management measures will be implemented, including (but not limited to), the development of Construction Environmental Management Plan (CEMP), micro-siting infrastructure, demarcating clearing and construction

		areas, development and implementation of an ESCP, installation of sediment fences, stabilisation works to reduce erosion etc. The Stormwater Management Plan confirms that natural drainage lines will not be impacted. Further, the majority of the Study Area is mapped as very low erosion vulnerability. Notwithstanding, a project-specific Erosion and Sediment Control Plan (ESCP) will be prepared that includes measures that will be installed, managed and maintained in accordance with the relevant standards are guidelines. Similarly, a range of mitigation measures are proposed to minimise contamination risk to the receiving environment, including the safe storage of chemicals and the installation of a septic tank and appropriate drainage works in accordance with the relevant standards. Refer to **Appendix E** – Ecological Assessment Report and **Appendix H –** Stormwater Management Plan for further detail.
Land use		
Animal keeping — kennels or catteries		
PO17 Animal keeping (being kennels or catteries) is sited, constructed and managed such that: a. animals are securely housed; b. the use does not create a nuisance beyond the site boundaries; and c. the use does not create adverse environmental impacts.	**AO17.1** Animal keeping (being kennels or catteries) is located on a site having a minimum site area of three (3) hectares. **AND** **AO17.2** Animal enclosures are set back a minimum of 250 metres from any sensitive land use. **AND**	**Not Applicable** The Project does not involve animal keeping.

<table>
<tr>
<td></td>
<td>
AO17.3
Buildings used for animal keeping are:
a. constructed with impervious reinforced concrete floors; and
b. gravity drained to the effluent collection/treatment point.
AND
AO17.4
Animals are kept in fenced enclosures that are located inside buildings at all times between the hours of 18:00 and 07:00.
AND
AO17.5
A person who is responsible for the supervision of the operation of the development is accommodated on the premises at all times.
AND
AO17.6
Animal enclosures are set back to roads, streets and water resources as follows:
<table>
<tr><th>Location</th><th>Setback</th></tr>
<tr><td>Road frontages</td><td>50 metres</td></tr>
<tr><td>Top bank of creek, river, stream, wetland, edge of well, bore, dam, weir, intake or the like which provides potable water supply to the site or surrounds</td><td>100 metres</td></tr>
<tr><td>Top bank of dry or perennial gully</td><td>30 metres</td></tr>
</table>
</td>
<td></td>
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<tr>
<td>Aquaculture</td>
<td></td>
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<tr>
<td>PO18
Aquaculture is located and designed on sites of sufficient size and dimension, to minimise adverse</td>
<td>AO18.1
Aquaculture activities using ponds or tanks that are greater than ten (10) hectares in total water surface</td>
<td>Not Applicable
The Project does not involve aquaculture activities.</td>
</tr>
</table>

impacts on the amenity, water quality, ecological values and existing fish habitats.	area are carried out in accordance with State Planning Policy Guideline — State Interest — Agriculture Part D 4. Model land use code provisions for aquaculture, as updated from time to time.	
Bulk landscaping supplies, rural industry or wholesale nursery		
PO19 Development is located on sites: a. of sufficient size, to minimise adverse impacts on the amenity of adjoining land, in particular noise, odour, light and dust emissions; b. where the operation is within the safe and effective design capacity of the road system; and c. where the operation does not impact upon water quality.	**AO19.1** A minimum site area of two (2) hectares is required with at least fifteen (15) metre setback from any adjoining premises. **AND** **AO19.2** Sales, storage, handling, packaging and production areas are set back a minimum of: a. 100 metres from any dwelling on surrounding land; b. fifty (50) metres from state controlled roads and twenty (20) metres from all other roads; and c. thirty (30) metres from top bank of creek, river, stream or wetland edge of well, bore, dam, weir, or intake that provides potable water. **AND** **AO19.3** Infrastructure and material storage areas are confined to free draining areas and sites on slopes not exceeding ten (10) per cent. **AND** **AO19.4** There is direct access to a minor urban collector or higher order road.	**Not Applicable** The Project does not involve bulk landscape supplies, rural industry or wholesale nursery.
Intensive animal industry		
PO20 Intensive animal industry uses are sited, constructed	No acceptable outcome is nominated.	**Not Applicable**

and managed such that: a. animals are securely housed; b. the use does not create a nuisance on adjoining sensitive land uses; c. buildings used for intensive animal industry are constructed with floors, that are gravity drained to the effluent collection/treatment point; d. animal proof fencing or other appropriate barrier feature is provided of an appropriate height within the site to prevent the escape of animals; and e. a person who is responsible for the supervision of the operation of the development is accommodated on the premises at all times. Editor's note—Applicants seeking approval for intensive animal industries are to refer to State Planning Policy Guideline — State Interest — Agriculture and consult with the relevant State government department prior to the lodgement of a development application. Council may require a study that, amongst other matters, identifies how the development is in accordance with Environmental Protection (Air) Policy 2019 or Environmental Protection (Noise) Policy 2019.		The Project does not involve intensive animal husbandry.
PO21 Intensive animal industry does do not detract from the amenity of a nearby sensitive land use and community related activities and are not visible from any road or other public view point.	No acceptable outcome is nominated.	**Not Applicable** The Project does not involve intensive animal husbandry.
PO22 Intensive animal industry is not located within: a. a declared catchment area; or b. a declared groundwater area.	No acceptable outcome is nominated.	**Not Applicable** The Project does not involve intensive animal husbandry.
PO23 Intensive animal industry has suitable access to road	No acceptable outcome is nominated.	**Not Applicable** The Project does not involve intensive animal

or rail infrastructure via a sealed road to an access point with a state controlled road.		husbandry.
Intensive horticulture		
PO24 The region's water quality is protected from the inflow of waste water or run-off from intensive horticulture activities. Waste water or run-off from intensive horticulture: a. is contained and treated so that nutrients and sediments can be removed from the water; b. where possible, treated water is re-used; and c. waste water is only disposed of when acceptable nutrient levels are achieved. Editor's note—Applicants should have regard to the State Planning Policy Guideline — State Interest — Agriculture. Editor's note—The *Environmental Protection (Water and Wetland Biodiversity) Policy 2019* applies to intensive horticultural uses.	No acceptable outcome is nominated.	**Not Applicable** The Project does not involve intensive horticulture.
PO25 Intensive horticulture activities are not located within: a. a declared catchment area; or b. a declared groundwater area.	No acceptable outcome is nominated.	**Not Applicable** The Project does not involve intensive horticulture.
Outdoor sport and recreation or community use		
PO26 Development is provided primarily to service the needs of the surrounding rural area or is inappropriate in urban areas (as a result of amenity impacts or land area requirements). The development is located and designed to: a. minimise adverse impacts on the agricultural productive capacity of the site and the locality; b. minimise impacts on the amenity of the locality, in particular noise (including limiting	No acceptable outcome is nominated.	**Not Applicable** The Project does not involve outdoor sport and recreation or community use.

the hours of operation), odour, light and dust emissions; and c. operate within the safe and effective design capacity of the region's road system.		
Renewable energy facility — wind farms		
PO27 Wind farms are located, designed and operated to minimise impacts on the environment and residential amenity, having regard to such matters as shadow flicker, noise (including low frequency noise), avifauna, separation from dwellings and site boundaries and scenic amenity.	No acceptable outcome is nominated.	**Not Applicable** The Project does not involve renewable energy facility – wind farm.
Rural workers' accommodation, farm stay and tourism uses		
PO28 Tourism, short-term accommodation (farm stay) and rural workers' accommodation uses are: a. associated with and compatible with rural production, natural resources and scenic landscape features in the immediate vicinity; and b. not located in areas identified on the Agricultural Land Classification (ALC) overlay maps.	No acceptable outcome is nominated.	**Not Applicable** The Project does not involve rural workers' accommodation, farm stay or tourism uses.
Transport and freight uses		
PO29 Transport and freight uses, which do not meet the definition of a home based business involving (heavy vehicles), are not established in the rural zone.	No acceptable outcome is nominated.	**Not Applicable** The Project does not involve transport and freight uses.
Effects of development		
PO30	No acceptable outcome is nominated.	

Effective separation distances are provided to minimise conflicts with sensitive land use(s). Editor's note—Where potential conflicts between agricultural and residential land uses may occur, applicants should refer to State Planning Policy Guideline — State Interest — Agriculture. Applicants should consult with the relevant State government department prior to the lodgement of a development application.		**Complies with the PO** The Project is setback approximately 1.65 km from the closest sensitive land use. In addition, a Noise Impact Assessment has been undertaken for the Project to identify any noise impacts on sensitive land uses within 5 km. Results of the modelling show the Project is predicted to comply with the AQO during the day, evening and night periods without the need for additional noise mitigation measures. A copy of the Noise Impact Assessment is provided in **Appendix F.**
PO31 Development does not unduly impact on the existing amenity and character of the locality having regard to: a. the scale, siting and design of buildings and structures; b. visibility of buildings and structures when viewed from roads and other public view points; and c. any heritage places.	No acceptable outcome is nominated.	**Complies with the PO** The Study Area of the Project does not include any heritage places. The Project is proposed to be located centrally on the land parcels. This creates a setback of approximately 1.32 km from South Ulam Road Existing vegetation along the road frontage will be retained along with most of the existing vegetation along the watercourses that run throughout the Study Area. The central siting of the Project, significant setback from South Ulam Road and the retention of vegetation ensures the development is screened and minimises the impact upon amenity and character of the locality.
PO32 Development responds sensitively to on-site and	No acceptable outcome is nominated.	**Complies with the PO** The Project has been designed to ensure hazards

surrounding topography, drainage patterns, utility services, access, vegetation and adjoining land uses, such that: a. any hazards to people or property are avoided; b. any earthworks are minimised; c. the retention of natural drainage lines is maximised; d. the retention of existing vegetation is maximised; e. leeching by nutrients, pesticides or other contaminants, or potential for salinity is minimised; f. damage or disruption to sewer, stormwater and water infrastructure is avoided; and g. there is adequate buffering, screening or separation to adjoining development.		including battery fire can be adequately managed to minimise impacts to people, property and the environment. Refer to **Appendix J** for further information on hazard mitigation and management. The Project has been sited to avoid natural drainage lines and waterways to the greatest extent possible. The waterways that intersect the Study Area are avoided in design. Any works within these areas will be undertaken in accordance with accepted development requirements. The Project is sited in largely cleared areas. Any vegetation to be cleared is non-remnant and mapped as Category X and Category R vegetation which will be cleared in accordance with the Accepted Development Vegetation Clearing Code – Clearing for Infrastructure. A range of mitigation measures are proposed to minimise contamination risk to the receiving environment, including the safe storage of chemicals and the installation of a septic tank and appropriate drainage works in accordance with the relevant standards. The Project is not connected to sewer, stormwater or water infrastructure and as such will not damage or disrupt underground services.
PO33 Development is designed and managed so that it provides appropriate protection for community safety and health and avoids unacceptable risk to life and property.	No acceptable outcome is nominated.	**Complies with the PO** An Emergency Response Plan (ERP) has been prepared by Riskcon Engineering for the proposed development to minimise any potential adverse impacts on people, property and the environment. A copy of the ERP is located in **Appendix K.**

		A Hazard Incident Management Plan (HIMP) has been prepared to model and assess potential hazards, including battery fire. The assessment concludes that the risks can be adequately managed with the implementation of mitigation measures and design considerations in accordance with the relevant standards.
Reconfiguring a lot		
PO34 The further subdivision of land is limited to reflect the suitability of the land for primarily grazing purposes and to protect water quality, environmental and landscape values.	**AO34.1** Unless otherwise stated in a precinct the minimum lot size is 100 hectares.	**Not Applicable** The Project does not involve the reconfiguring of a lot.
Where in the Alton Downs precinct Note—Where outcomes in this section vary from this code, the precinct based outcomes take precedence.		
PO35 Development: a. is compatible with the residential amenity of the area and avoids impacts on surrounding dwellings; and b. has adequate water supply and sewerage treatment and disposal.	No acceptable outcome is nominated.	**Not Applicable** The Project is not located within the Alton Downs precinct.
PO36 The subdivision of land reflects the desired character of the area being smaller rural lots for primarily residential purposes.	**AO36.1** The minimum lot size in the precinct is eight (8) hectares. **AND** **AO36.2** Newly created lots must have access to a sealed road where sequential connection or integration with an existing sealed road can be achieved.	**Not Applicable** The Project is not located within the Alton Downs precinct.
Where in the cropping and intensive horticulture precinct		

Note—Where outcomes in this section vary from this code, the precinct based outcomes take precedence.		
PO37 Rural industries are established only where associated with rural production in the immediate vicinity.	No acceptable outcome is nominated.	**Not Applicable** The Project is not located within the cropping and intensive horticulture precinct.
PO38 The subdivision of land is limited to protect the ongoing viability and productivity of existing and potential cropping and horticulture uses.	**AO38.1** The minimum lot size in the precinct is forty (40) hectares.	**Not Applicable** The Project is not located within the cropping and intensive horticulture precinct.

Table 8.2.11.3.1 — Development outcomes for assessable development

Performance outcomes	Acceptable outcomes	Comments
All development		
PO1 Development incorporates design measures for the development (including ancillary buildings, structures and swimming pools) to ensure: a. the long-term stability of the site considering the full nature and end use of the development; b. site stability during all phases of construction and development; c. people and property are protected from a potential landslide event; and d. adjoining properties are not impacted by a potential landslide event.	No acceptable outcome is nominated. Editor's note—The preparation of a site specific geotechnical assessment report or landslide risk assessment in accordance with SC6.11 — Geotechnical report planning scheme policy can assist in demonstrating compliance with this acceptable outcome.	**Complies with the PO** A small portion to the west of the Disturbance Footprint is mapped as containing steep land of 15-20%. The development will require limited bulk earthworks, primarily for: • Site grading to achieve appropriate drainage and foundation levels, • Construction of foundations for battery units, inverters, transformers, and ancillary infrastructure, and • Internal access tracks and hardstand areas. Detailed geotechnical investigations will be undertaken during the design phase to confirm subsurface conditions (e.g. soil type, depth to rock, groundwater, bearing capacity) and to inform foundation design. All earthworks will be designed and constructed in accordance with relevant Australian Standards and local government requirements to ensure long-term stability. Cut and fill batters will be designed at stable angles or otherwise retained using engineered retaining structures if required. Compaction of fill materials will be carried out to achieve design densities and to minimise settlement risk. Drainage

		controls will be incorporated to avoid erosion or scouring around embankments, foundations, and access tracks. The Study Area will be designed to remain stable over the full operational life of the project. Retaining walls or engineered structures (if required) will be designed to Australian Standards with adequate safety factors to account for long-term loads, weathering, and groundwater conditions. Periodic inspection and maintenance of civil works (e.g. drains, embankments, foundations) will be included in the site's operations and maintenance regime.
PO2 Vegetation clearing on site does not increase the risk of a landslide event occurring.	No acceptable outcome is nominated. Editor's note—The preparation of a site specific geotechnical assessment report or landslide risk assessment in accordance with SC6.11 — Geotechnical report planning scheme policy can assist in demonstrating compliance with this acceptable outcome.	**Complies with the PO** The Project is sited in an area that is mostly cleared of vegetation and as such any vegetation clearing required will be minor and unlikely to result in increased landslide risk. Furthermore, the majority of the Study Area is flat with negligible areas of steepness.
PO3 Development involving the manufacture or storage of hazardous materials in bulk is not at risk from a landslide event.	**AO3.1** The manufacture or storage of hazardous materials in bulk does not occur within the steep land overlay area.	**Not Applicable** The Project does not involve the manufacture or storage of hazardous bulk material.
PO4 Emergency services and community uses are able to function effectively during and immediately after landslide events.	No acceptable outcome is nominated.	**Not Applicable** The Project does not involve emergency services or community uses.
Reconfiguring a lot		
PO5 Development ensures that on all new lots: a. future building location is not located on part of the site subject to a potential landslide;	**AO5.1** When a development footprint has a slope of, or greater than fifteen (15) per cent, each new lot has a minimum size and road frontage in accordance with	**Not Applicable** The Project does not involve a ROL.

b. the need for excessive work or changes to the finished landform to construct a building or vehicular access route within the development envelope nominated is avoided; and c. future building will not be adversely affected by, or be at unacceptable risk from, landslide activity originating on sloping land above the site. Editor's note—The preparation of a site specific geotechnical assessment report or landslide risk assessment in accordance with SC6.11 — Geotechnical report planning scheme policy can assist in demonstrating compliance with this performance outcome.	Table 8.2.11.3.2. Note—The minimum lot size and road frontage stated in Table 8.2.11.3.2 prevails over the reconfiguring a lot code to the extent of any inconsistency. **AND** **AO5.2** The development has: a. a frontage to a formed road; and b. any section of a driveway or road internal to a site is not steeper than twenty-five (25) per cent.	
Operational works		
PO6 Filling and excavation does not: a. occur on land that has a slope greater than or equal to fifteen (15) percent; and b. alter the existing flow of surface water or groundwater on the site.	No acceptable outcome is nominated. Editor's note—The preparation of a site specific geotechnical assessment report or landslide risk assessment in accordance with SC6.11 — Geotechnical report planning scheme policy can assist in demonstrating compliance with this acceptable outcome.	**Not Applicable** The Project does not involve operational work for filling and excavation.

Table 9.3.7.3.1 — Development outcomes for assessable development

Performance outcomes	Acceptable outcomes	Comments
Design of waste storage areas		
PO1 For on-site waste collection, waste storage areas are located and designed so that: a. they are easily accessed and convenient to use; b. sufficient space is provided for safe entry and exit and servicing by service vehicles without the need for manual handling; c. sufficient height clearance is provided for the safe operation of both front and side bin lifting operations; d. they are clear of car parking bays, loading bays and similar areas; and e. they are clear of footpaths and pedestrian access.	**AO1.1** Waste storage areas are designed and maintained in accordance with SC6.20 — Waste management planning scheme policy.	**Complies with the PO** During the construction phase of the Project, waste will be managed in accordance with the *Waste Reduction and Recycling Act 2011* (Qld), local council requirements, and best practice environmental management. Waste streams such as general waste, recyclables (e.g. cardboard, metals, plastics), and regulated wastes (e.g. oils, paints, solvents) will be separated on site using clearly labelled bins or skips, likely located at the end of the access road toward the BESS area. Where possible, construction materials such as timber, metal and packaging will be reused or sent to licensed recycling facilities. Any hazardous or regulated waste generated (e.g. contaminated soil, fuel or oil residues) will be collected, stored, and transported in accordance with legislative requirements by appropriately licensed contractors to an approved disposal facility. Site personnel will receive inductions and toolbox talks on waste handling procedures. Waste volumes and disposal records will be monitored and maintained. During the operational phase, the Project will generate minimal waste, primarily related to maintenance activities. Routine waste (e.g. packaging from replacement parts, office waste) will be stored in appropriate containers and collected by

		licensed waste service providers. Any electrical components or associated materials will be classified as regulated waste and managed in accordance with Queensland legislation. These will be removed by qualified contractors and returned to the manufacturer or sent to approved recycling or treatment facilities. Any oils, coolants, or similar liquids generated during maintenance will be collected and removed by licensed contractors. Waste management procedures will be reviewed periodically to identify opportunities for waste minimisation, recycling, and compliance with evolving best practice.
Kerbside waste servicing		
PO2 Kerbside collection of waste containers ensures the safety and amenity of road and footpath users.	**AO2.1** Waste bins are located on the footpath so that: a. bins are located one (1) metre apart from other bins and obstructions; b. all bins are accommodated within the street frontage of the site; c. a clear pedestrian access way two (2) metres wide is retained; and d. bins are capable of being serviced by the collection vehicle travelling forward, without having to reverse the vehicle.	**Not Applicable** Any waste generated by the Project will be disposed of by licensed contractors.
PO3 Waste storage minimises adverse impacts on adjoining properties.	**AO3.1** Waste storage areas are: a. integrated with the building design; or b. set back a minimum of two (2) metres from any boundary; and c. screened from neighbouring properties and the street by a fence of 1.8 metres minimum height; and	**Complies with AO3.1 and AO3.2** Waste storage areas will be confined to the Study Area which is located approximately 1.65 km from the nearest neighbour. Waste storage areas will be located in areas behind built form to screen from view. Storage containers will have lids to prevent access by wildlife and vermin, as well as the escape of

	d. not located directly adjoining dwelling units on the site and on neighbouring properties. **AND** **AO3.2** Waste bins are fitted with lids.	waste in windy conditions.
PO4 Waste storage areas: a. have a level area on impermeable, durable materials so that they are easily cleaned; and b. have adequate clearance between and around waste storage bins to allow for manoeuvring and washing of bins.	No acceptable outcome is nominated.	**Complies with the PO** Waste storage areas will be located within the Study Area on a level hardstand area. Sufficient clearance will be provided to allow maneuvering and washing.
Water management		
PO5 Waste storage areas are designed to separate stormwater and wash-down water.	**AO5.1** Wash-down water drains to either the reticulated sewerage system or an on-site sewerage facility if not in a sewer area. **AND** **AO5.2** Wash-down areas are: a. provided with a tap and water supply; and b. provided with a stormwater diversion valve and arrestor trap.	**Complies with the PO** Wash down areas will be provided with water supply from on-site tanks and will drain into an on-site effluent treatment and disposal system (such as a septic system).

Table 9.3.8.3.1 — Development outcomes for assessable development

Performance outcomes	Acceptable outcomes	Comments
Water		
PO1 A water supply is provided that is adequate for the current and future needs of the intended development.	**AO1.1** Where within a water supply planning area, the development is connected to Council's reticulated water supply system in accordance with SC6.21 — Water supply infrastructure planning scheme policy and the Capricorn Municipal Development Guidelines. Editor's note—A network analysis may be required to demonstrate compliance with this acceptable outcome. Editor's note—Where development is located outside of the water supply planning area to refer to the requirements under the Plumbing Code of Australia.	**Complies with the PO** The Study Area is not located within the water supply planning area. Accordingly, water supply will be provided commensurate to the construction and operational activities for the Project. All water required for construction activities (e.g. dust suppression, minor concrete works) will be supplied by water carts delivered to site as required. Bottled water will be provided for drinking purposes. As the site will not be connected to the local water network, drinking water for operational staff will continue to be supplied in bottled form. Water required for limited operational needs will be stored on site in dedicated tanks.
PO2 Reticulated water supply networks ensure that the installation is sustainable and minimises whole of life cycle costs.	**AO2.1** Where within a water supply planning area, water supply systems and connections are designed and constructed in accordance with SC6.21 — Water supply infrastructure planning scheme policy and the Capricorn Municipal Development Guidelines. Editor's note—A network analysis may be required to demonstrate compliance with this acceptable outcome. **AND** **AO2.2** Where within a water supply planning area, staged developments are connected to the water supply	**Not Applicable** The Study Area is not located within the water supply planning area and will not be connected to reticulated water. See response to PO1 for the proposed water supply.

	network and operational prior to the commencement of the use or endorsement of the survey plan.	
Sewer		
PO3 Sewerage treatment and disposal is provided that is appropriate for the level of demand generated, protects public health and avoids environmental harm.	**AO3.1** Where within a sewer planning area, the development is connected to Council's reticulated waste water system in accordance with SC6.17 — Sewerage infrastructure planning scheme policy and the Capricorn Municipal Development Guidelines. Editor's note—A network analysis may be required to demonstrate compliance with this acceptable outcome. Editor's note—Where development is located outside of the sewer planning area to refer to the requirements under the Plumbing Code of Australia.	**Complies with the PO** The Study Area is not located within the sewer supply planning area. Accordingly, sewer treatment and disposal will be provided commensurate with the construction and operational activities for the Project. Portable toilet facilities will be provided on site for construction personnel. These facilities will be regularly serviced by licensed contractors, with all waste transported to and disposed of at an approved wastewater treatment facility. No untreated wastewater will be discharged to land or water. Permanent toilets will be installed within the Operations and Maintenance building. Wastewater will be managed via an approved on-site effluent treatment and disposal system (such as a septic system), appropriately sized for the low level of usage anticipated during operation. The system will be designed, installed, and maintained in accordance with Queensland legislation and local government requirements. These facilities will be regularly serviced by licensed contractors, with all waste transported to and disposed of at an approved wastewater treatment facility. No untreated wastewater will be discharged to land or water.
PO4 Reticulated sewer networks ensure that the installation of infrastructure assets is sustainable and minimises whole of life cycle costs.	**AO4.1** Where within a sewer planning area, waste water systems and connections are designed and constructed in accordance with SC6.17 — Sewerage	**Not Applicable** The Study Area is not located within the sewer planning area and will not be connected to reticulated sewer.

	infrastructure planning scheme policy and the Capricorn Municipal Development Guidelines. Editor's note—A network analysis may be required to demonstrate compliance with this acceptable outcome. **AND** **AO4.2** Where within a sewer planning area, staged developments are connected to the waste water network and operational prior to the commencement of the use or endorsement of the survey plan.	See response to PO3 for the proposed water supply.
Point source waste water management		
PO5 The waste water management plan provides that waste water is managed in accordance with a waste management hierarchy that: a. avoids waste water discharge to waterways; or b. minimises waste water discharge to waterways by reuse, recycling, recovery and treatment for disposal to sewer, surface water and groundwater if it is agreed waste water discharge to waterways can not practically and reasonably be avoided.	**AO5.1** A waste water management plan (WWMP) is prepared by a suitably qualified person. The waste water management plan accounts for: a. waste water type; b. climatic conditions; c. water quality objectives; and d. best practice environmental management.	**Complies with the AO** Should council deem it necessary, a WWMP can be prepared for the Project as required by development approval conditions.

Appendix E

Ecological Assessment Report



umwelt

Ecology Assessment Report

Mount Hopeful Battery Project

Final

September 2025

Ecology Assessment Report

Mount Hopeful Battery Project

Final

Prepared by
Umwelt (Australia) Pty Limited

On behalf of
Neoen

Project Director:	David Gatfield
Project Manager:	Elliott Fairon
Report No.:	31912 /R07b
Date:	September 2025

This report was prepared using
Umwelt's ISO 9001 certified
Quality Management System.

Acknowledgement of Country



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Document Status

Rev No.	Reviewer Name	Date	Approved for Issue Name	Date
V1	Elliott Fairon	19 August 2025	David Gatfield	5 September 2025
V2	Elliott Fairon	23 September 2025	David Gatfield	25 September 2025

Executive Summary

Neoen Australia Pty. Ltd. (the Proponent) has engaged Umwelt to seek a Development Approval for the Mount Hopeful Battery Project (the Project) on land at 1682 South Ulam Road, Bajool.

Field surveys were undertaken within the Study Area. This report summarises the ecological values occurring within the Study Area, which is dominated by non-remnant vegetation, providing marginal quality habitat for Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and species listed as threatened under the *Nature Conservation Act 1992* (NC Act). One small patch of remnant RE 11.3.4 was ground-truthed in the very eastern extent of the Study Area.

One small patch of Category R vegetation occurs in the south-west of the Study Area, coinciding with a mapped stream order 1 watercourse. No essential habitat, protect plant trigger map, connectivity areas or Matters of Local Environmental Significance (MLES) occur within the Study Area.

Based on the results of the desktop assessment and field surveys, a total of 13 NC Act-listed species may occur within the Study Area, comprising one flora species (*Cycas megacarpa* which is present within the Study Area) and 12 fauna species.

Potential impacts to ecological values may arise throughout all phases of the Project; construction, operation and decommissioning, and may include both direct and indirect impacts, with vegetation clearing posing the biggest risk.

Where possible, the Project will avoid, mitigate and manage the impacts associated with construction, operation and decommissioning of the Project. Mitigation measures to be implemented to minimise unavoidable impacts will include, but not be limited to:

- Vegetation clearing measures.
- Fauna habitat removal measures.
- Noise, light, waste and dust management.
- Bushfire management.
- Measures to prevent modification to hydrology, erosion, contamination and sedimentation.
- Weed/animal pest monitoring and management.

Definitions and Abbreviations

Abbreviations	Descriptions
AHD	Australian Height Datum
ALA	Atlas of Living Australia
BBUS	Bird and Bat Utilisation Survey
BESS	Battery Energy Storage System
Biosecurity Act	*Biosecurity Act 2014*
BPAs	Biodiversity Planning Assessments
CCTV	Closed-circuit television
CEMP	Construction Environmental Management Plan
DA	Development application
DBH	Diameter at Breast Height
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DESI	Department of Environment, Science and Innovation
Disturbance Footprint	The maximum spatial extent of direct impacts as a result of the Project's proposed infrastructure
DoR	Department of Resources
DTMR	Department of Transport and Main Roads
EAR	Ecological Assessment Report
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Fisheries Act	*The Fisheries Act 1994*
GBO	General biosecurity obligation
GES	General ecological significance
GPS	Global Positioning System
ha	hectares
HES	High ecological significance
HV	High voltage
km	kilometres
kV	kilovolt
LGA	Local Government Area
m	metres
mm	millimetres
MLES	Matters of Local Environmental Significance
MNES	Matters of National Environmental Significance

Abbreviations	Descriptions
Mount Hopeful Windfarm	Mount Hopeful Windfarm is a project approved under the EPBC Act (EPBC ref 2021/9137) that occurs immediately adjacent the Project. The battery was originally included as a component of the windfarm.
MSES	Matters of State Environmental Significance
MV	Medium voltage
MW	Megawatt/s
NC Act	*Nature Conservation Act 1992*
NEW	National Electricity Market
Neoen	Neoen Australia Pty Ltd
Planning Act	*Planning Act 2016*
Planning Regulation	Planning Regulation 2017
Planning Scheme	Rockhampton Regional Council Planning Scheme 2015
PMST	Protected Matters Search Tool
PO	Performance Outcomes
PVMP	Property Vegetation Management Plan
RE/s	Regional Ecosystem/s
RRC	Rockhampton Regional Council
SPP	State Planning Policy
SPRAT	Species Profile and Threats Database
Study Area	The proposed area of development the battery energy storage system, switchyard and ancillary infrastructure component of the Project that was subject to assessment in this report.
TEC	Threatened Ecological Communities
the Project	Mount Hopeful Battery Energy Storage System
Umwelt	Umwelt (Australia) Pty Ltd
VM Act	*Vegetation Management Act 1999*
WoNS	Weeds of National Environmental Significance

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Appendix A Desktop Assessment Results

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1.0 Introduction

1.1 Project Background

Umwelt has been engaged by Neoen Australia Pty Ltd (Neoen) to seek a Development Approval (DA) for the Mount Hopeful Battery Project (the Project) on land at 1682 South Ulam Road, Bajool. The Study Area refers to the maximum extent in which the Project will be located and that was subject to field surveys for the Project. It comprises an area of 48.8 hectares (ha) and occurs across three land parcels (described as Lot 38 on DT40131, Lot 100 on SP289441, Lot 33 on DT40123) and an unnamed road reserve between Lot 38 DT40131 and Lot 100 SP289441) (the Study Area).

Umwelt has been engaged by Neoen to undertake an ecological assessment of the proposed BESS. The purpose of the assessment is to identify the ecological values known to, or likely to occur within the Study Area, and determine the extent of impact to Matters of State Environmental Significant (MSES) and Matters of Local Environmental Significance (MLES).

1.2 Project Description

The Project is a proposed grid-scale battery energy storage system (BESS) in Central Queensland. With a planned capacity of up to 600 megawatts (MW) of power for a duration of up to four hours, the Project will enhance the delivery of clean, reliable electricity to the National Electricity Market (NEM), while supporting grid stability and flexibility.

The Project is located near the rural town of Bajool, approximately 50 kilometres (km) south of Rockhampton and 70 km west of Gladstone, Queensland, within the Rockhampton Region Local Government Area (LGA). The Project is mapped within the Rural Zone of the Rockhampton Region Planning Scheme 2015 (planning scheme) and predominately used for low intensity agricultural activities, including cattle grazing. The Project is proposed to occur within the bounds of the Study Area which covers an area of 48.8 ha and occurs across three freehold land parcels and an unnamed road reserve. The Study Area also accommodates a Powerlink Queensland (PLQ) transmission easement that comprises an existing 275 kilovolt (kV) transmission line, of which the Project will connect into. The Study Area is sparsely vegetated with predominately non-remnant vegetation and is intersected by an unnamed tributary of Eight Mile Creek. The Project gains access via South Ulam Road to the east of the Study Area.

The Project is proposed to be delivered over two stages, which are indicatively described as follows:

- Stage 1 (indicative capacity of 430 MW): expected to commence mid-2026 and completed by end of 2028.
- Stage 2 (indicative additional capacity of 170 MW): expected to commence in 2028 and completed by end of 2029.

Key components of the Project include:

- Up to 650x Battery Modules.
- Up to 170x Medium Voltage (MV) Transformers.
- 2x High Voltage (HV) Transformers.

- a HV Switching Station.

The Project will also encompass associated ancillary infrastructure necessary to the operation of the BESS, including:

- Site access track.
- Overhead and underground electrical cables.
- Inverters.
- High voltage substation.
- Earthing and lightning protection.
- Security fencing, closed-circuit television (CCTV) and lighting.
- Operations and maintenance building.
- Water retention pond.
- Lay down areas.

1.3 Ecology Study Boundaries

1.3.1 Study Area

The Study Area refers to the maximum extent in which the Project will be located and that was subject to field surveys for the Project. It comprises an area of 48.8 ha and occurs across three freehold land parcels and an unnamed road reserve. The land parcels which the Study Area intersects are provided in **Table 1.1**.

Table 1.1 Study Area Land Parcels

Lot and Plan	Area of Study Area within Land Parcel (ha)	Tenure
38 DT40131	14.7	Freehold
33 DT40123	0.3	Freehold
100 SP289441	31.1	Freehold
Unnamed road reserve between Lot 38 DRT40131 and Lot 100 SP289441	2.6	Road

1.3.2 Disturbance Footprint

The Disturbance Footprint represents the maximum extent of direct impacts for the Project, associated with the placement of the proposed infrastructure (**Section 1.2**), as shown in **Figure 5.1.** The Disturbance Footprint comprises 42.0 ha.

1.3.3 Desktop Assessment Area

The desktop assessment area refers to a 20 km buffer of the Study Area which was assessed by desktop only (**Section 3.1**) and provides context for the ecological values which may occur within the Study Area.

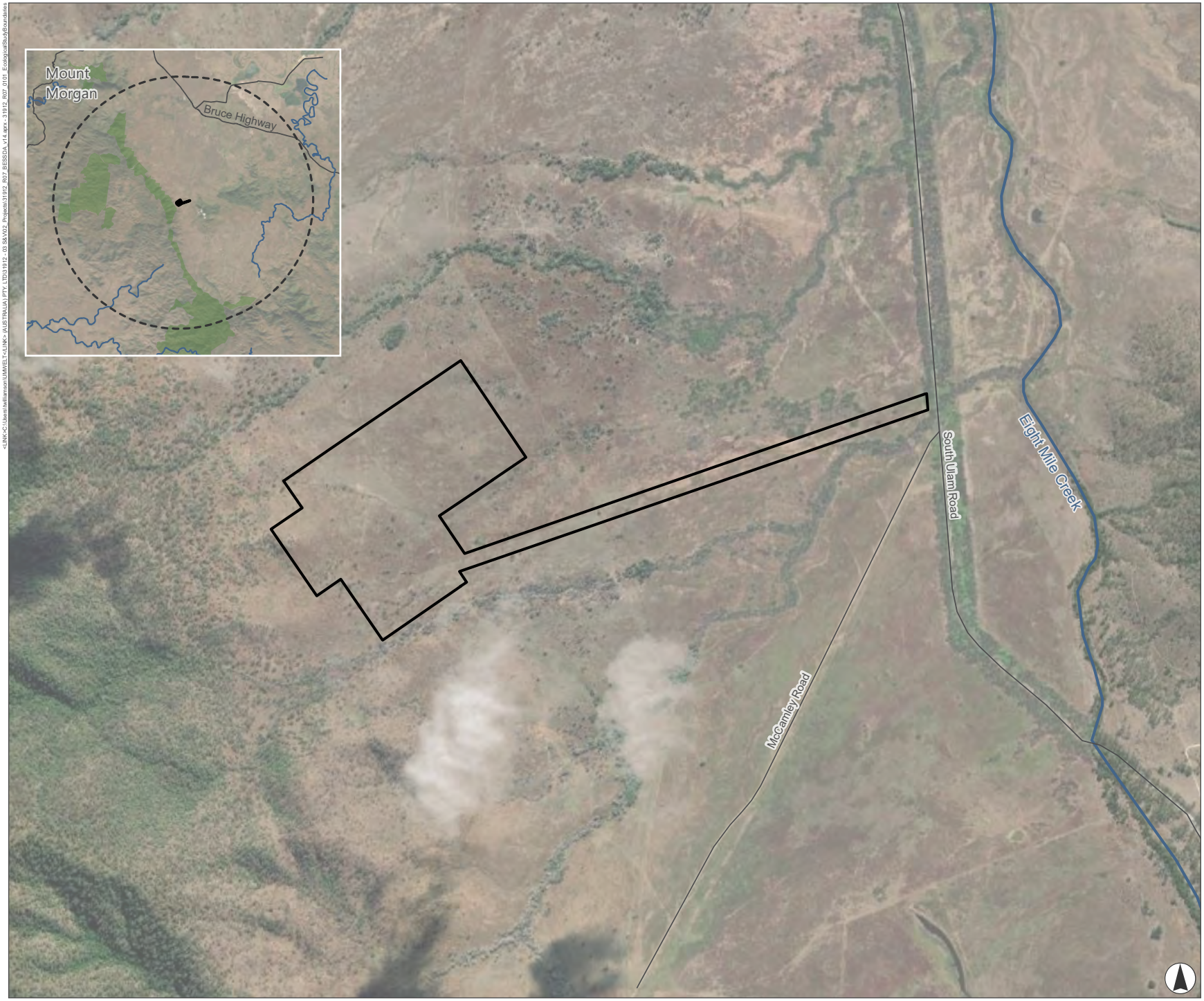
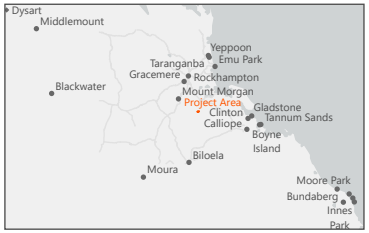


FIGURE 1.1

Ecological Study Boundaries

Legend

- Study Area
- Desktop Assessment Area
- Road
- Major Watercourse



0 0.25 0.5

Kilometres

Scale 1:17,500 at A4
GDA2020 MGA Zone 56

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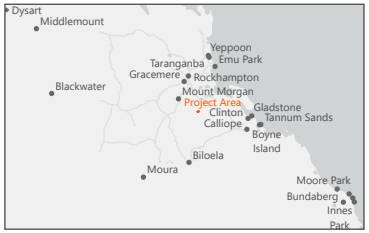


FIGURE 1.2

Project Design

Legend

- Study Area
- Access road
- BESS area
- Overhead and underground line
- Substation area
- Switchyard area
- Road



0 0.25 0.5

Kilometres

Scale 1:12,500 at A4
GDA2020 MGA Zone 56

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1.4 Scope and Objectives

Primary objectives of this ecological assessment are to describe the existing ecological values of the Study Area and provide a characterisation of resulting impacts from the construction and operation of the BESS, switchyard and associated ancillary infrastructure. The following scope of work was completed to support these objectives:

- A desktop assessment of relevant background information and available environmental databases to identify ecological values that may occur within the Study Area.
- Ground-truthing the occurrence, extent and condition of Regional Ecosystems (REs) in accordance with Neldner et. al. (2024).
- Assessment of the likelihood of occurrence for threatened (Critically Endangered, Endangered and Vulnerable) and Near Threatened species listed under the *Nature Conservation Act 1992* (NC Act) and Matters of National Environmental Significant (MNES) listed under the EPBC Act.
- Verify the extent and suitability of habitat for threatened and near threatened species known to occur, or with a high or moderate likelihood of occurring.
- Provide an overview of avoidance strategies and mitigation measures.
- Characterise the potential impacts on ecological values.

1.5 Qualification of Report Authors

Table 1.2 provides the qualifications of the authors of this report.

Table 1.2 Qualifications of Report Authors

Personnel	Project Role
David Gatfield Principal Ecologist/ QLD Ecology Manager Technical Reviewer	David is a Principal Ecologist with over 15 years' experience in the planning and implementation of terrestrial ecology surveys, including threatened species monitoring and impact assessments in support of State and Commonwealth approvals for large infrastructure and renewable projects. David has carefully managed ecological aspects of a variety of projects through the State and Commonwealth approval processes. David holds a Bachelor of Science.
Jacinta Harrison Senior Ecologist Report Author	Jacinta is a botanist in Umwelt's Brisbane ecology team, and she has a degree in Applied Science (Environmental Management). In her 7 years of professional experience, she has gained experience in coordinating and undertaking ecological and native vegetation surveys throughout Queensland and Victoria. Jacinta has been working throughout Queensland for the past three years, having undertaken mine rehabilitation monitoring of north-west Queensland, Regional Ecosystem mapping in the Brigalow Belt and protected plant surveys in central Queensland. Jacinta has been strongly involved within the Project, including protected plants and access route ecology mapping.

2.0 Legislative Context

2.1 Commonwealth

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is administered by the Commonwealth DCCEEW. Under the EPBC Act, if the Federal Minister for the Environment determines that an action is a 'controlled action' which would have or is likely to have a significant impact on MNES or Commonwealth land, then the action may not be undertaken without prior approval from the Minister. The EPBC Act identifies nine MNES:

- World Heritage properties.
- National Heritage places.
- Ramsar Wetlands of International Significance.
- Threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining).
- Water resources (in relation to coal seam gas development and large coal mining development).

Under the EPBC Act, any action that is likely to have a significant impact on these matters may be deemed a controlled action.

The Project has been approved under the EPBC Act as a component of the Mount Hopeful Windfarm project (EPBC ref 2021/9137). Neoen are currently seeking an amendment to approval conditions.

2.1.1.1 EPBC Act Environmental Offsets Policy

The *EPBC Act Environmental Offsets Policy* (EPBC Offset Policy) (Department of Sustainability Environment Water Populations and Communities 2012) outlines the approach for the use of environmental offsets under the EPBC Act.

Offsets are measures that compensate for the significant impacts of an action on MNES, after avoidance and mitigation measures are taken. Where appropriate, offsets are considered during the assessment phase of an environmental impact assessment under the EPBC Act, only after the Project has implemented avoidance and mitigation steps of the offset mitigation hierarchy to the greatest extent possible. The suitability of a proposed offset is considered as part of the decision to approve or not approve a proposed action under the EPBC Act. The EPBC Offset Policy provides guidance on how suitable offsets are determined.

Offsets under the EPBC Act for the Project are proposed as part of the Mount Hopeful Windfarm project and will be secured through the Offset Area Management Plan (OAMP).

2.2 State

2.2.1 Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NC Act) establishes a regulatory regime to manage flora and fauna within Queensland. Specifically, the NC Act regulates the 'take' (i.e. fell, remove, catch etc.) of flora and fauna and provides a permitting framework for such activities.

Under the NC Act, permits are required to:

- Tamper with an animal breeding place (i.e. a bower, burrow, cave, hollow, nest etc).
- Clear protected plants.

Threatened species are listed under the NC Act in the NC Act Animals Regulation and the NC Act Plants Regulation in the following categories:

- Least Concern/Special Least Concern.
- Near threatened.
- Vulnerable.
- Endangered.
- Critically endangered.
- Extinct in the wild / extinct.

Species listed under the NC Act may occur within the Study Area and have been considered in the likelihood of occurrence assessment (**Appendix B**). Where appropriate, mitigation measures will be implemented to minimise impacts on NC Act listed species (**Section 5.6**).

2.2.2 Vegetation Management Act 1999

The *Vegetation Management Act 1999* (VM Act) regulates the clearing of native vegetation in Queensland. Approval under the VM Act is required if remnant or certain types of regrowth vegetation is to be cleared, with applications for approval likely to be accompanied by a Property Vegetation Management Plan (PVMP).

Regrowth vegetation is mapped within the Study Area.

2.2.3 Biosecurity Act 2014

The *Biosecurity Act 2014* (Biosecurity Act) establishes a framework to regulate and control invasive plants and animals. Under the Biosecurity Act, landowners are responsible for taking all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is known as the general biosecurity obligation (GBO).

The Biosecurity Act categorises restricted matters (restricted plants and animals) into the following:

- Category 1: must be reported to an inspector within 24 hours (includes Red Imported Fire Ants, amongst others) (call Biosecurity Queensland on 13 25 23).
- Category 2: must be reported within 24 hours to an inspector or authorised officer (call Biosecurity Queensland on 13 25 23).

- Category 3: must not be distributed either by sale or gift,or released into the environment.
- Category 4: must not be moved.
- Category 5: must not be kept.
- Category 6: must not be fed (animals).
- Category 7: must be euthanised (animals).

One Biosecurity Act-listed flora species is present within the Study Area, and listed fauna species are considered likely to occur.

2.2.4 Planning Act 2016

The *Planning Act 2016* (Planning Act) is Queensland's key piece of legislation pertaining to the strategic planning and development of the State. The Planning Act mandates the framework of planning instruments and process for development assessment whilst incorporating the regulatory requirements of other Queensland environmental statutory legislation, such as the VM Act.

Subordinate to the Planning Act, the Planning Regulation 2017 (Planning Regulation) details the mechanics for the operation of the Planning Act. This includes prescription of accepted, prohibited and assessable development, assessment benchmarks for assessable development and identification of the assessment manager (i.e. the chief executive or local government).

2.3 Local

2.3.1 Rockhampton Regional Council Planning Scheme

The Project is located within the Rockhampton Region LGA. Applicable projects within the LGA are assessable against the local planning instrument, being the Planning Scheme.

The Planning Scheme is Rockhampton Regional Council's (RRC) tool for guiding the region's future growth and development and provides a consistent approach to land use planning. RRC have the jurisdictional authority to manage development in the region.

An assessment against the Biodiversity Areas Overlay Code is required, to address biodiversity requirements for the Projects DA.

2.3.1.1 Biodiversity Overlay Code

The purpose of the biodiversity overlay code is to protect, rehabilitate and manage areas of environmental significance and the ecological processes and biodiversity values of terrestrial and aquatic being:

- Land mapped as containing MSES or MLES.
- A biodiversity corridor or wildlife habitat.
- A waterway and its buffer area.

3.0 Methodology

3.1 Desktop Assessment

3.1.1 Database Searches

The Project has been approved under the EPBC Act, and while it is undergoing a request to amend conditions of approval, the changes in EPBC Act listings since the approval date not apply to this assessment. However, for completeness and to support local government approvals, any updates from the desktop assessment has been included as part of this report.

A desktop search was undertaken to identify ecological matters likely to be present within the Study Area. All existing data was reviewed to identify the presence or potential presence of threatened species and communities within the Study Area. The results were used to undertake a likelihood of occurrence assessment (**Appendix B**), which identified the threatened species and communities which may occur within the Study Area.

The following resources and databases were used to assess the potential EPBC Act and NC Act listed species within the Study Area:

- The Protected Matters Search Tool (PMST) (desktop assessment area) (Department of Climate Change, Energy, the Environment and Water 2025) (**Appendix A**).
- Wildlife Online extract with a radius of 20 km from the approximate centre of the Study Area (Department of the Environment, Tourism, Science and Innovation 2025) (**Appendix A**).
- Vegetation Management Regional Ecosystem map (Version 13) (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development 2024b).
- Protected Plants Flora Survey Trigger Map (Department of the Environment, Tourism, Science and Innovation 2023).
- Regulated Vegetation Management Map (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development 2024c).
- Waterways for Waterway Barrier Works identified under the *Fisheries Act 1994* (Fisheries Act) (Department of Agriculture, Fisheries and Forestry 2025).
- Mapped wetlands under the Queensland Wetlands Program and the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (i.e. high ecological significance (HES) and general ecological significance (GES) wetlands) under the Environmental Protection Regulation 2019.
- VM watercourse/drainage feature - 1:100 000 and 1:250 000 (Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development 2024).
- Atlas of Living Australia (ALA) database records (desktop assessment area) (Atlas of Living Australia 2025).
- Latest Queensland Globe available aerial photography (Queensland Globe 2025).
- Qld Herbarium Regional Ecosystem Description Database (REDD) (Version 13) (Queensland Herbarium 2024).
- State Planning Policy (SPP) interactive mapping system.
- RRC Planning Scheme Online Mapping.

3.2 Likelihood of Occurrence Assessment

A likelihood of occurrence assessment was completed for threatened flora and fauna species, TECs and migratory species identified in the desktop assessment as potentially occurring. Each value was assessed against the categories outlined below in **Table 3.1.** The assessment considered known records, distribution mapping extents, preferred habitat and ecological requirements of the species or community as well as field-verified vegetation communities.

Table 3.1 Likelihood of Occurrence Definitions

Potential to Occur	Description
Known	The listed species has been recorded in the Study Area during the past decade (or during the Project survey period). The record is considered valid and is associated with a high spatial confidence.
High	Given the extent, quality and suitability of habitat in the Study Area, the location of the Study Area relative to existing contemporary records (past 20 years) of the species (with consideration of sampling effort in the region and the species' detectability (e.g. cryptic species) it is highly likely that the species occurs in the Study Area. Also includes species likely to regularly occur within the Study Area during migratory, short-distance season or nomadic movements (including cases for which likelihood of occurrence is high regardless of the nature of habitat present in the Study Area).
Moderate	Potential or suitable habitat is present in the Study Area, however, given the distribution of records in the surrounding region and/or the species' detectability a moderate rating for likelihood of occurrence is deemed more appropriate that a low or high rating. Includes species that may be present or may occasionally utilise the Study Area but for which there may be little information or those that are either cryptic or occur at low densities. Also includes species that may occasionally occur in the Study Area during migratory, short-distance season or nomadic movements.
Low	The Study Area either contains limited suitable habitat or only potential/marginal habitat. The species is either very scarce or absent in the surrounding region. The species is deemed unlikely to occur within the Study Area based on the aforementioned factors. The species may disperse through or near the Study Area infrequently.
Unlikely	The Study Area is fundamentally unsuitable for the species, or the species is presumed extinct or locally extinct. For example, this is usually applied to marine species or seabird for terrestrial sites.

3.3 Field Assessment

3.3.1 Previous Ecological Studies

A suite of flora and fauna assessments have been undertaken on land parcels adjacent to the Study Area for the Mount Hopeful Windfarm from 2019–2024 which provide context to the ecological values which may occur within the Study Area. The following surveys have been undertaken within the Study Area as part of the Mount Hopeful Windfarm scope:

- Baseline flora of vegetation within the reserve of South Ulam Road (immediately adjacent the Study Area) (summer 2024).

- *Cycas megacarpa* targeted surveys (2024).

Further details of these surveys are provided in **Table 3.2**.

The wider Project area (including windfarm properties) has been subject to over five years' worth of ecological surveys, including flora and fauna baselines surveys, bird and bat utilisation surveys (BBUS), BioCondition assessments, protected plant and pre-clearance flora surveys. Results of these surveys have been utilised to inform the likelihood of occurrence for the Study Area.

3.3.2 Field Survey Effort

The field survey details are provided in **Table 3.2** along with weather conditions. Due to the remoteness of the Study Area and the absence of a local weather station, field survey weather conditions have been extracted from the DES SILO weather model (Queensland Government 2025) using coordinates central to the Study Area (-23.80,150.60). Variation in weather data results reflect the seasonality of field surveys. The methods employed during the field surveys are detailed in **Section 3.3.3** and **Section 3.3.4**.

Table 3.2 Field Survey Timing and Weather Conditions

Field Survey	Survey Dates	Survey Length	Rainfall (mm)	Maximum temperature (^{0}C)	Season
***Cycas megacarpa* targeted surveys (Ausecology)**	4–5 September 2023	2 days	0.0	27.4	Spring
Flora and fauna baseline	22 January 2024	1 day	0.0	34.5	Summer
Flora and fauna baseline	24–25 June 2025	2 days	0.0	26.7	Winter

3.3.3 Flora

The flora and vegetation surveys were undertaken to identify and record vascular flora species as well as classify and map vegetation communities. These surveys were undertaken to comply with relevant Commonwealth and State Government survey guidelines.

3.3.3.1 Vegetation Communities

Ground-truthing and validation of State vegetation community mapping within the Study Area was undertaken in accordance with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland Version 7.0* (Neldner et al., 2024). Vegetation sampling consisted of one secondary and ten quaternary surveys within representative examples of each RE observed within, and immediately adjacent to the Study Area, as shown in **Figure 3.1.**

Quaternary plots constitute rapid vegetation surveys which include marking the Global Positioning System (GPS) location and recording the dominant species in the characteristic layers, along with soil/landform and structural data. Secondary assessments incorporate environmental and overall structural information as well as a list of all species present, percentage cover and measures of abundance. To support data collected by secondary and quaternary sites, rapid flora and vegetation observation points were also made. These sites supplement quaternary and secondary flora assessment sites to achieve a detailed vegetation record/coverage of the Study Area. These points identified vegetation boundary change or dominant canopy species but didn't include height or cover observations at a location.

Additionally, one BioCondition assessment was undertaken within the Study Area. A BioCondition assessment measures various attributes against a benchmark condition to determine the ecological health and functionality of the habitat.

Vegetation within the Study Area was classified with reference to the RE Technical Descriptions within the *Regional Ecosystem Description Database version 13*, for Brigalow Belt bioregion (Queensland Herbarium 2024), and Specht's (Specht 1970) structural classification of structural land formations.

Vegetation within the Study Area was classified as 'remnant', 'regrowth' and 'non-remnant' according to the criteria below:

- Remnant – vegetation communities that conform within the definition under the VM Act and referenced by Neldner et al., (2024). Specifically, this comprises vegetation, part of which forms the predominant canopy of vegetation:
    - Covering more than 50% of the undisturbed predominant canopy.
    - Averaging more than 70% of the vegetation's undisturbed height.
    - Composed of species characteristics of the vegetation undisturbed predominant canopy.
- Regrowth – is non-remnant vegetation (>3 m height) that has a significant woody component but fails to meet the structural/floristic characteristics of remnant vegetation.
- Non-remnant – includes changes to vegetation caused by clearing or other extensive human disturbances and fails to meet the structural and/or floristic characteristics of remnant vegetation. It also includes cropping land.

3.3.3.2 Opportunistic Flora Observations

Incidental flora species observed during the survey were also recorded to provide a more comprehensive species list (**Appendix C**). Specimens of any plant taxa that could not be identified in the field were collected, pressed and dried in accordance with the requirements of the Queensland Herbarium (Queensland Herbarium and Bean 2016). Dried specimens were then identified through reference books and keys and through comparison with named species. Nomenclature used in this report follows that of the Census of the Flora of Australia (Brown and Bostock 2023). Introduced species are denoted by an asterisk in the text (*).

3.3.3.3 Targeted Threatened Flora Species Searches

With the exception of *Cycas megacarpa*, designated targeted flora searches were not undertaken during the field survey. Opportunistic searches for threatened flora species were completed throughout the field survey in areas of suitable habitat.

Cycas megacarpa Targeted Surveys

Targeted and opportunistic searches for *Cycas megacarpa*, listed as Endangered under the EPBC Act and the NC Act, were undertaken throughout the Mount Hopeful Windfarm survey program by Umwelt, and as part of preclearance surveys, in support of the *Mount Hopeful Windfarm Cycas megacarpa Translocation Management Plan* by Ausecology Pty Ltd (Ausecology) (Ausecology Unpublished) to assess the extent of its occurrence and densities within the Study Area.

Within the proposed Disturbance Footprint plus a 5 metre (m) buffer, Ausecology undertook individuals point counts (each individual was recorded with a GPS unit). This data, in conjunction with recent Umwelt field survey results, has been utilised to determine the extent of impacts on *Cycas megacarpa* individuals.

For all surveys the age class structure (e.g., development class) was recorded for each individual using the following classification:

- Juvenile (<50 centimetre (cm)).
- Sub-adult (0.5–1 m).
- Adult (>1–5 m).
- Large adult (>5 m).

3.3.3.4 Introduced Flora

Exotic flora species were recorded opportunistically within the Study Area, in conjunction with quaternary and secondary flora surveys. The survey focused on recording species listed as:

- Restricted matter flora species listed under the Biosecurity Act, Schedules 1 and 2.
- Weeds of National Environmental Significance (WoNS).

It is important to note that the data collected for weed species serves as an indicator and does not encompass all exotic flora within the Study Area. The primary aim of collecting the data was to gain insight into the dominant exotic flora and their threatening processes within the Study Area.

3.3.4 Fauna

A combination of field verification methodologies were employed to assess the likely occurrence of threatened fauna species identified during the desktop assessment and suitability of habitat. Survey methods employed during surveys were based on survey guidelines for threatened species published by the Commonwealth and State Government. As well as some targeted methods, the survey included undertaking habitat assessments, while simultaneously actively searching for species of interest.

While surveys within the Study Area were only undertaken across three days, results have been supplemented with data from the extensive survey effort undertaken within the Mount Hopeful Windfarm area (Umwelt 2024), adjacent to the Study Area. Ecological surveys in the adjacent windfarm area have occurred since 2019 and have included a variety of methods. The Study Area is highly modified and extremely limited suitable habitat is available for threatened fauna species, and therefore, the survey effort is considered adequate for this area.

Fauna field survey techniques are detailed in **Table 3.3** and displayed in **Figure 3.1.**

Table 3.3 Fauna Field Survey Techniques

Technique	Description	Effort
Methods undertaken within the Study Area		
Habitat assessments	Fauna habitat values were characterised using a comprehensive habitat assessment methodology within all accessible broad habitat types capturing variation in condition, vegetation types and disturbances. The presence and abundance of specific habitat resources was also assessed, including but not limited to: • Koala (*Phascolarctos cinereus*) food and potential shelter trees. • Hollow bearing trees and stags. • Fallen logs, woody debris and leaf litter. • Rocky features such as surface rocks, boulders, crevices, overhangs and caves. • Presence, abundance and type of mistletoe. • Presence/absence of wetland features, including gilgai formations. • Proximity to water and whether it is permanent or ephemeral. Habitat assessments were conducted and used to inform habitat mapping for each of the potentially occurring or known conservation significant species.	22 habitat assessments
Active diurnal searches	Active diurnal searches were conducted within all habitat types to identify the presence of fauna or signs of fauna activity including scats and scratches. Searches included scanning the trees and ground, searching beneath microhabitat such as rocks, fallen timber and peeling bark, digging through leaf litter and soil at tree bases and flushing birds from areas with a dense or grassy ground cover. Grass tussocks were gently disturbed to potentially flush ground-dwelling birds such as the threatened squatter pigeon (southern) (*Geophaps scripta scripta*). Disturbance to microhabitat features and reptiles was kept to a minimum. Active searches were completed opportunistically at Habitat Assessment sites.	Opportunistic at habitat assessments and whilst traversing the Study Area (12 hours).
Bird surveys	Roaming/meandering bird surveys using both visual and auditory identification were conducted within all habitat types. Active birding was also completed at watercourses where suitable.	All birds recorded over two days.
Opportunistic sightings	All fauna species observed incidentally throughout the Study Area were recorded.	All fauna recorded over two days.
Methods undertaken in neighbouring land parcels within the windfarm area		
Spotlighting and call playback	Spotlighting on foot was undertaken within all habitat types, though primarily targeting Eucalyptus woodlands to target species such as the koala, greater glider (southern and central) (*Petauroides volans*) and yellow-bellied glider (south-eastern) (*Petaurus australis australis*). Nocturnal spotlighting surveys were undertaken half-an-hour after sunset for a duration of approximately two hour per night.	Methods were undertaken within the adjacent land parcels as part of the Mount Hopeful Windfarm project (Umwelt 2024).

Technique	Description	Effort
	Call playback surveys were also undertaken targeting nocturnal bird species as well as koala within eucalypt woodland on hills and slopes.	
Bird survey (vantage point)	High points within the landscape with clear vantage of proposed turbines and adjacent valleys were surveyed for birds. All birds heard and observed were recorded along with flight heights and behaviours. Vantage point surveys were undertaken to characterise bird assemblages within the Study Area. The presence of threatened and migratory bird species was a key focus, including the white-throated needletail (*Hirundapus caudacutus*), fork-tailed swift (*Apus pacificus*), red goshawk (*Erythrotriorchis radiatus*) and squatter pigeon (southern).	
Elliott trapping	Type A aluminium Elliott traps targeting small mammals and reptiles were placed at approximately 10 m intervals along two transects. Traps were baited with a mixture of rolled oats, peanut butter, honey and vanilla essence, and checked each morning to identify and release captured fauna.	
Pitfall trapping	Pitfall trapping was undertaken using 20 litre (L) buckets dug into the ground until the top of the bucket was flush with the surface of the ground. Three buckets were used at each site separated by approximately 10 m. A drift fence, approximately 30 cm high, was erected between each bucket to direct small animals towards the pitfall traps.	
Camera trapping	Camera traps were deployed in strategic positions including fauna corridors and watering points such as dams and creek lines to record visitation by nocturnal and diurnal animals. Camera traps comprised baited set-ups using honey oat mix and/or sardines as an attractant.	
Acoustic bat call detection	Anabat Swift devices were deployed in representative microbat foraging and dispersal habitat including natural flyways, along watercourses and at bird survey vantage locations to record the presence of microbats. Data recorded on the bat recorders were analysed by a qualified specialist, Greg Ford of Balance! Environmental. The format and content of the analysis summary reports comply with nationally accepted standards for the interpretation and reporting of Anabat data. Anabat Swift devices were used in surveying for ghost bat (*Macroderma gigas*).	
Harp trapping	Single and double-bank harp traps were positioned in natural flyways associated with a creek line in locations of eucalypt woodlands to target microbat species. This method was used to target various microbat species including ghost bat.	
Koala SAT	Targeted searches for koala presence through identification of scats and scratched within all accessible broad habitat types (Phillips and Callaghan 2011).	

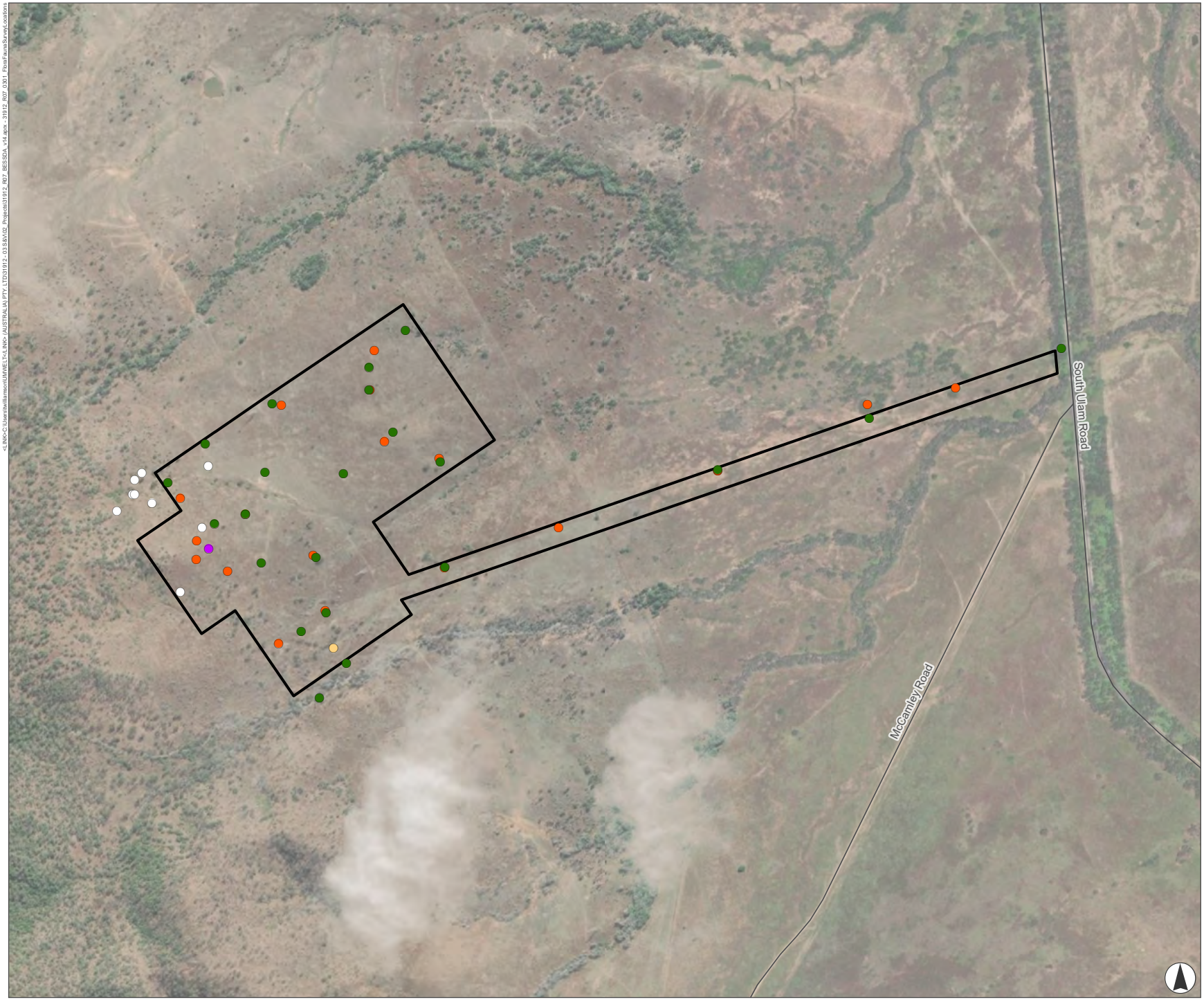
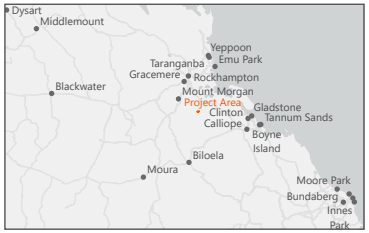


FIGURE 3.1

Flora and Fauna Survey Locations

Legend

- Study Area
- Road
- Flora Observation
- Habitat Assessment
- Quaternary
- Secondary
- Biocondition



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Kilometres

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3.4 Survey Limitations

This assessment has been completed using a combination of field-validated data, desktop information and reasonably extrapolated field survey results. As such, the results are subject to the level of accuracy and detail associated with this information.

A flora assessment has inherent limitations associated with the variability of vegetation communities across a survey location, and changes to the detectability and presence of species over time. It is recognised that field studies undertaken over just one season cannot always account for all potential floral diversity present across a survey location. Winter is considered a suboptimal time to undertake flora surveys as species tend to be dormant or not displaying reproductive material. The desktop assessment is undertaken to supplement the variability.

The detection of fauna species during habitat assessments is limited, given the cryptic and nocturnal nature of many fauna species. The species directly observed during the survey are opportunistic sightings only and not considered exhaustive. However, habitat assessment is an accepted method to identify the potentially occurring threatened and migratory species within the Study Area.

It should be noted that the objective of the survey was not to provide an exhaustive list of flora and fauna species present within in Study Area. The survey did however record common and dominant flora species as well as all fauna species observed. The results also consider the results of field surveys conducted within the wider Project area, particularly in consideration of highly-mobile species which are likely to traverse the landscape.

Despite the above, survey effort and coverage overall is considered appropriate as representative vegetation communities and habitat types were sampled, and an extensive suite of flora and fauna survey methodologies were employed. The limitations have been taken into consideration throughout this report.

4.0 Results

4.1 Environmental Context

4.1.1 Brigalow Belt Bioregion

The Study Area is located within the Brigalow Belt bioregion which encompasses approximately 216,000 km^2 of central Queensland, extending from Townsville, Qld in the north to Narrabri, New South Wales in the south (Sattler and Williams 1999). *Acacia harpophylla* (brigalow) forests and woodlands growing on clay soils are one of the major vegetation types that characterise the region (Sattler and Williams 1999). While historically *Acacia harpophylla* vegetation covered up to 6,000,000 ha of the bioregion in Queensland, extensive broad scale clearing, predominantly for agriculture, has greatly reduced the extent of this community throughout the bioregion (Sattler and Williams 1999). In addition to remnant *Acacia harpophylla* vegetation, other ecosystems that typify the bioregion include eucalypt forest and woodlands, grasslands, dry rainforest, cypress woodland and riparian communities (Sattler and Williams 1999).

4.1.2 Geology and Land Zones

The detailed surface geology mapping (Queensland Globe 2025) identified three surface geology types mapped within the Study Area (**Table 4.1**). Pre-clear land zone mapping indicates two land zones present within the Study Area.

Table 4.1 Geology and Land Zones within the Study Area

Geological Unit	Description	Land Zone
Qa	Qa-QLD (Clay, silt, sand and gravel; flood-plain alluvium)	3
PRgaj	Bajool Quartz Diorite	3
Dcr	Raspberry Creek Formation	3/12

4.1.3 Topography

The Study Area is located on a predominantly gently undulating to flat landscape, ranging from approximately 70–150 m Australian Height Datum (AHD). The surrounding landscape comprises a hilly range to the west and east, intermixed with gently undulating land to the north and south.

4.1.4 Hydrology

The Study Area is located within the Fitzroy River basin. The Fitzroy River basin encompasses an area greater than 156,000 km^2 and drains into the Great Barrier Reef Marine Park. The basin extends from Moranbah in the north, to Injune in the south. It includes the Nogoa River, Theresa Creek, Dawson River, Isaac River and Connors River.

One unnamed ephemeral drainage line intersects the Study Area (**Section 4.2.8**), which is a tributary of Eight Mile Creek, to the east of the Study Area. The drainage line will not be impacted by the Project. No dams or wetlands occur within the Study Area.

4.2 Ecological Values

4.2.1 Land Use and Study Area Characteristics

The Study Area is primarily utilised for agricultural purposes (grazing) and for utility services. The area has been heavily cleared and is near void of remnant vegetation. Treed vegetation is highly modified and sparse within the Study Area. A powerline easement intersects the western extent of the Study Area, running north-west to south-east. In the very east of the Study Area, adjacent the road reserve of South Ulam Road, a small patch of remnant vegetation has been ground-truthed.

There are no permanent residences, dwellings or infrastructure within the Study Area.

4.2.2 Regulated Vegetation

The Study Area is mapped on the Regulated Vegetation Management Map (Version 7.07) as primarily containing Category X (non-remnant) vegetation. A patch of Category R (reef-regrowth) vegetation occurs in the south-west corners of the Study Area (**Table 4.2** and **Figure 4.2**).

Table 4.2 Regulated Vegetation within the Study Area

Regulated Vegetation	Description	Extent (ha) within Study Area
Category R	An area which is a regrowth watercourse and drainage feature area located within 50 m of a watercourse located in the Burdekin, Burnett–Mary, Eastern Cape York, Fitzroy, Mackay–Whitsunday or Wet Tropics catchments. The vegetation management framework regulates clearing of native vegetation within this buffer area.	0.5
Category X	Non-remnant vegetation.	48.3

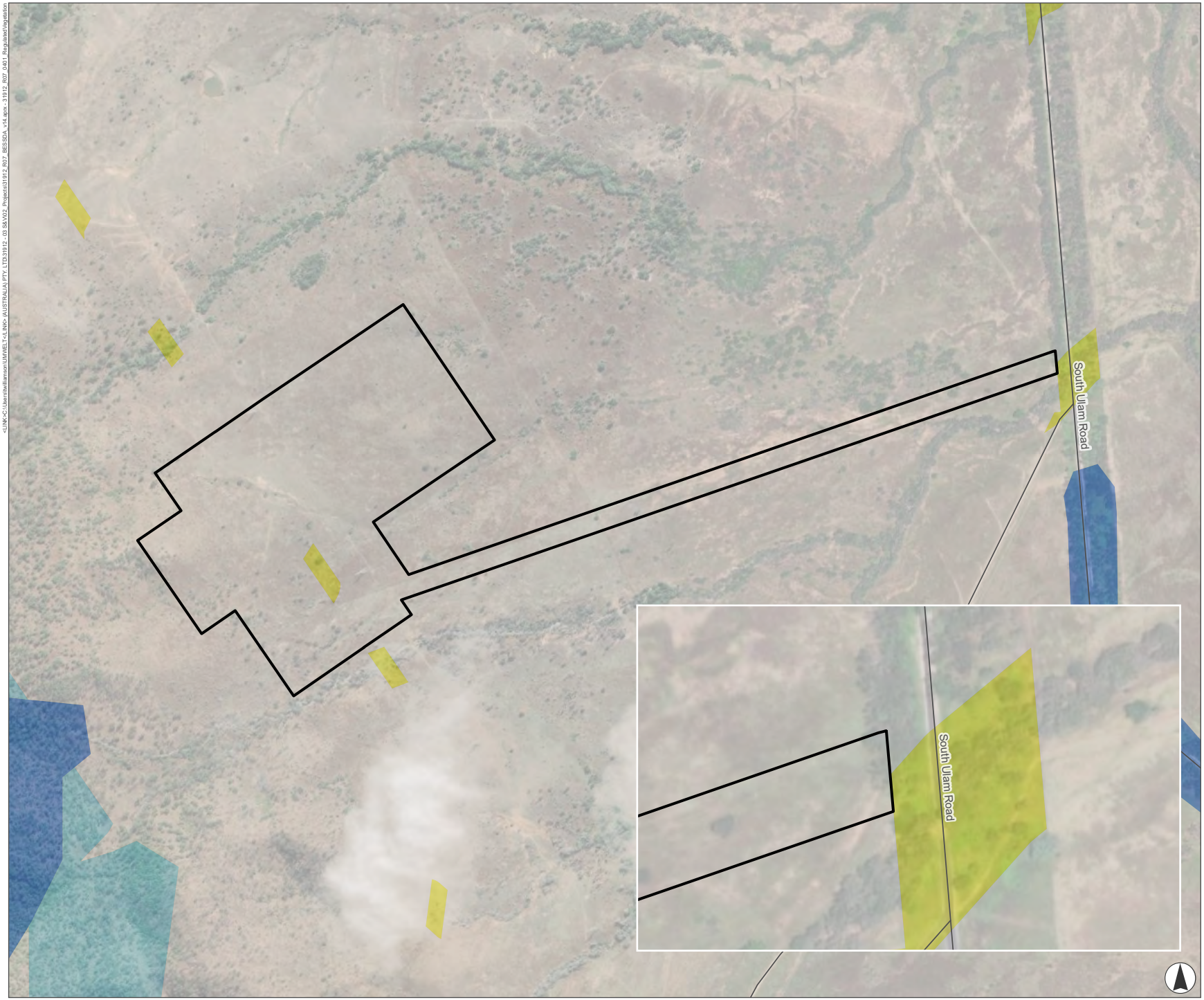


FIGURE 4.1

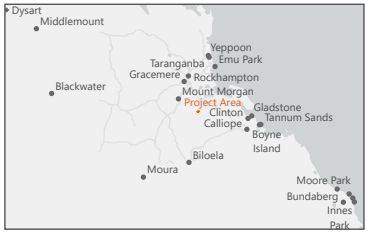
Regulated Vegetation

Legend

- Study Area
- Road

Regulated Vegetation Management Map

- Category B
- Category C
- Category R
- Category X



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4.2.3 Regional Ecosystems

The Study Area has been subject to historical clearing, livestock impacts, pasture improvement and weed encroachment. A review of the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development (DNRMMRRD) RE mapping (Version 13) shows the Study Area is largely mapped as non-remnant, with one patch of Category R vegetation mapped as RE 11.3.4/11.3.2 (**Figure 4.2**).

The field surveys ground-truthed one remnant RE within the Study Area (**Table 4.3, Figure 4.3**). In total, 0.1 ha of remnant vegetation was ground-truthed, comprising RE 11.3.4, listed as 'Of Concern' under the VM Act. The majority of the Study Area (99%) comprises non-remnant vegetation (48.7 ha).

A detailed description of ground-truthed REs, including representative photos of each RE, is provided in **Table 4.4.**

Table 4.3 Extent and Condition of REs Identified within the Study Area

RE	REDD Short Description	VM Act Status	Vegetation Condition	Ground-truthed Extent within the Study Area (ha)
11.3.2	Eucalyptus *populnea* (poplar box) woodland on alluvial plains	Of concern	Category R	0.0 (modelled only)
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. woodland on alluvial plains	Of concern	Remnant	0.1
			Category R	0.0 (modelled only)
Non-remnant	-	-	-	48.7
Total				**48.8**

Table 4.4 Ground-truthed Regional Ecosystems within the Study Area

RE	Field Description	Representative Photo
11.3.4	This RE is described as a *Eucalyptus tereticornis* and/or *Eucalyptus* spp. woodland on alluvial plains. Within the Study Area, this RE occurred as a very small patch within the very eastern extent of the Study Area, within the eastern portion of the access road. It was dominated by *Blakella tessellaris* (Moreton bay ash), with *Eucalyptus tereticornis* and *Eucalyptus crebra* (narrow-leaved red ironbark) throughout, up to 25 m tall. The canopy cover was approximately 30%. No shrubs were present, and the understorey was dominated by introduced grasses and forbs, including *Megathyrsus maximus* var. *maximus** (guinea grass) and *Clitoria ternatea** (butterfly pea). Native species were present, but not abundant within the understorey, including *Flemingia parviflora* (flemingia), *Cyperus gracilis* and *Imperata cylindrica* (blady grass).	

RE	Field Description	Representative Photo
Non-remnant	This vegetation is characterised by the dominance of exotic and native pasture grasses (including *Heteropogon contortus* (black speargrass) and *Bothriochloa pertusa* with occasional scattered emergent trees, typically *Eucalyptus crebra*, *Corymbia erythrophloia* (variable-barked bloodwood) and *Acacia leiocalyx*. Occasional native forbs were also scattered throughout the exotic pasture grasses. The introduced shrub *Lantana camara* (Lantana) occurred persistently throughout the Study Area, comprising approximately 1% cover. Extensive grazing activities are evident in addition to past land clearing. This vegetation community is associated with a diversity of landforms and soils.	 

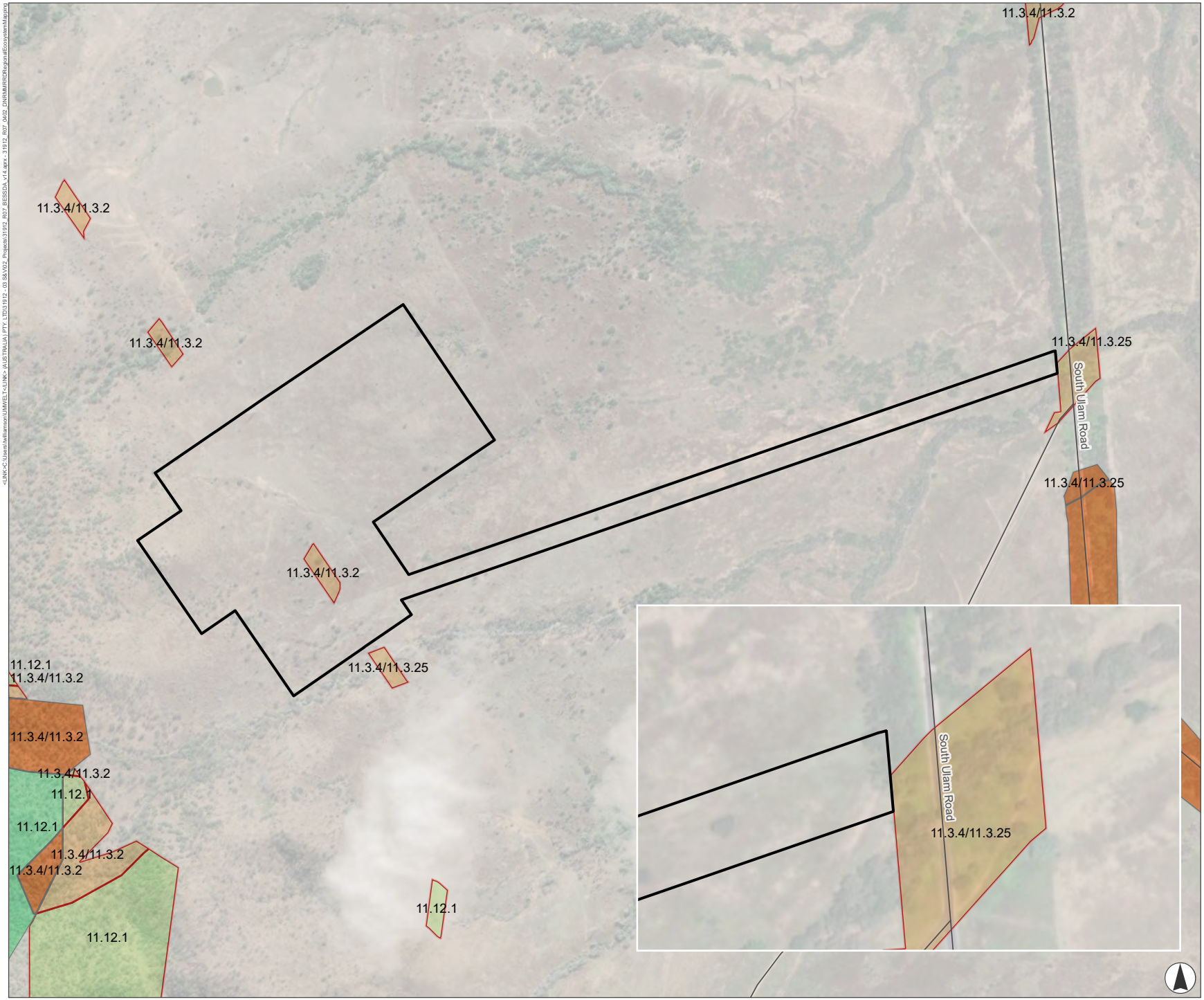


FIGURE 4.2

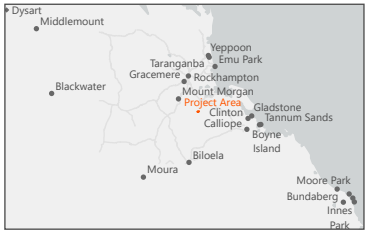
DNRMMRRD Regional Ecosystem Mapping (Version 13.0)

Legend

- Study Area
- Road

Regional Ecosystem Mapping (Version 13.0)

- Category A or B area containing of concern
- Category A or B area that is least concern
- Category C or R area containing of concern
- Category C or R area that is of least concern
- Non-remnant



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FIGURE 4.3

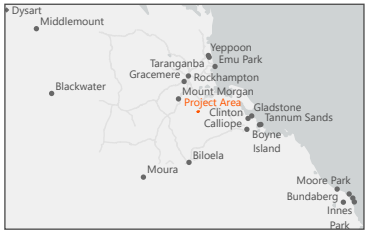
Ground-truthed Regional Ecosystem Mapping

Legend

- Study Area
- Road

Ground-truthed Regional Ecosystems

- 11.3.4 - Remnant
- Non-remnant



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4.2.4 Threatened Ecological Communities

A total of six TECs listed under the EPBC Act were highlighted through the desktop assessment (**Appendix A**). Of those TECs, two had potentially analogous vegetation modelled within the Study Area (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development 2024b) and were subject to further field assessment; *Poplar Box Grassy Woodland on Alluvial Plains* (Poplar Box Woodland) and *Weeping Myall Woodlands*. The results of the field survey confirmed that no analogous vegetation was present within the Study Area and these TEC are considered absent from the Study Area.

No analogous vegetation for the remaining five TECs was recorded within the Study Area and therefore, they are considered unlikely to occur (**Appendix B**).

4.2.5 Flora Diversity

A total of 58 flora species were recorded within the Study Area during the field survey, comprising 42 native and 16 introduced species. The dominant plant families recorded included: Leguminosae and Poaceae. A full flora species list is provided in **Appendix C**.

4.2.5.1 Introduced Flora Species

One introduced flora species recorded during field surveys listed as WONS and listed as State Restricted under the Biosecurity Act; *Lantana camara* (Lantana).

4.2.5.2 Threatened or Near Threatened Flora Species

A total of 18 flora species listed under the EPBC Act and/or NC Act were returned during the desktop assessment (**Appendix A**). Locations of the available records for threatened flora species previously recorded within the desktop assessment area are displayed on **Figure 4.6.**

One threatened species was recorded within the Study Area; *Cycas megacarpa*, which is listed as Endangered under the EPBC Act and NC Act (**Section 4.2.5.3**).

The likelihood of occurrence assessment did not identify any additional threatened flora species with a high or moderate likelihood of occurring within the Study Area based on suitable habitat identified during the field surveys and soundness of nearby records. All other species listed under the EPBC Act and/or NC Act are considered unlikely to occur within the Study Area.

All remaining threatened species are considered to have a low likelihood of occurring or are unlikely to occur within the Study Area and therefore are not discussed further. Refer to **Appendix B** for the full likelihood of occurrence assessment.

Table 4.5 Flora Likelihood of Occurrence Results

Scientific Name	Common Name	NC Act Status	EPBC Act Status
Known			
Cycas megacarpa	-	Endangered	Endangered

4.2.5.3 Cycas megacarpa

A total of 96 *Cycas megacarpa* individuals occur within the Study Area but only 29 occur within the Disturbance Footprint. A breakdown of the age-classes in provided in **Table 4.6** and displayed in **Figure 4.4.** Impacted to *Cycas megacarpa* are discuss in **Section 5.1.1.1**.

Table 4.6 *Cycas megacarpa* Individuals by Age-Class with the Study Area

Age-class	Count (Study Area)	Count (Disturbance Footprint)
Juvenile (0–0.5 m)	69	23
Sub-adult (0.5–1 m)	23	6
Adult (1–5 m)	4	0
Total	**96**	**29**

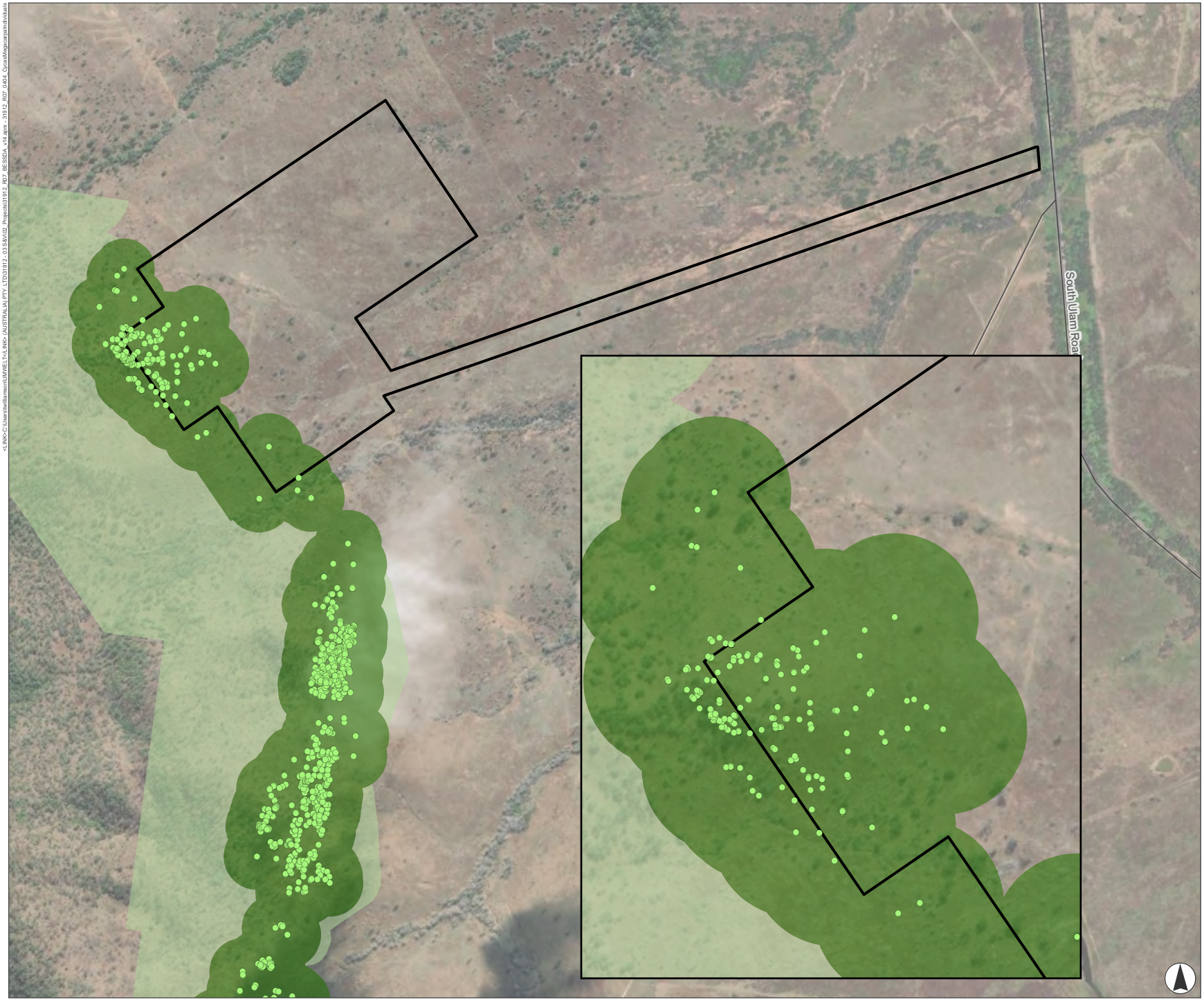


FIGURE 4.4

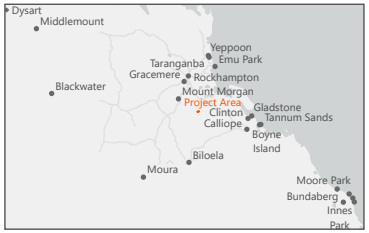
Cycas megacarpa Individuals

Legend

- Study Area
- Road
- *Cycas megacarpa* Records

***Cycas megacarpa* Habitat**

- Known (confirmed)
- Known (suspected)



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4.2.6 Fauna Habitat

The Study Area can be characterised into two terrestrial fauna habitat types based on the findings of the field surveys. The presence and extent of these habitat types is summarised in **Table 4.7** and displayed on **Figure 4.5**.

The 'non-remnant pasture' habitat type dominates the Study Area, occupying 99%. A description of each habitat type, relevant microhabitat features and associated MNES is provided in the following subsections.

Table 4.7 Summary of Terrestrial Habitat Types

Habitat Type	Extent (ha) within Study Area
Alluvial eucalypt woodland	0.1
Non-remnant pasture	48.7

4.2.6.1 Alluvial Eucalypt Woodland

Open woodland dominated by *Blakella tessellaris*, *Eucalyptus tereticornis* and *Eucalyptus crebra* occurred within the eastern extent of the Study Area, within the eastern portion of the access road. This patch is narrow and linear and has been subject to historic edge effects, such as weed incursion.

Given this patch occurs on an alluvial plain (land zone 3) and suitability of canopy trees, this vegetation may provide suitable climate refugia for koala (*Phascolarctos cinereus*). The shrub layer contained *Planchonia careya* (cockatoo apple) and the ground layer was dense and dominated by exotic grass (*Megathyrsus maximus* var. *maximus**). The dense, tall grassy ground cover smothered the patch. Microhabitat features, such as logs, surface rocks and litter were absent from this habitat. Due to this, it is not considered suitable habitat for squatter pigeon and collared delma (*Delma torquata*). Large trees with a >50 cm diameter at breast height (DBH) were present within this small patch of vegetation, satisfying denning requirements for greater glider (southern and central). Small and medium hollows were rare, however, may provide suitable denning habitat for other common hollow-dependent species.



Photo 4.1 Alluvial Eucalypt Woodland

4.2.6.2 Non-remnant Pasture

This habitat type was dominant within the Study Area and is characterised by non-remnant vegetation (Category X) which has been cleared for predominantly agricultural purposes. Habitat values within this habitat type are limited due to the historical clearing of native woody vegetation. Microhabitat, including hollow logs, surface rocks, boulders and coarse woody debris, were rare. Individual eucalypt trees (*Eucalyptus crebra* and *Eucalyptus tereticornis*), as well as stags, were scattered throughout the cleared paddocks and may provide occasional perching habitat for generalist bird species. The habitat may also facilitate the dispersal for a range of commonly occurring fauna species. The dominant species within the ground layer of this habitat type include *Bothriochloa pertusa**, *Heteropogon contortus* and isolated stands of *Lantana camara**.

A stream order one drainage line intersected the study site, however, is shallow, ephemeral and was dry at the time of the field survey. Occasional *Eucalyptus crebra* and *Eucalyptus tereticornis* occurred along the banks, in conjunction with *Lanata camara**. This habitat, within a suitable distance from a watercourse and with open ground cover, is considered suitable dispersal habitat for squatter pigeon. No suitable water sources, including farm dams, were present within the Study Area.

Airspace above this habitat type is considered foraging habitat suitable for fork-tailed swift (*Apus pacificus*) and white-throated needletail (*Hirundapus caudacutus*).



Photo 4.2 Non-remnant Pasture



FIGURE 4.5

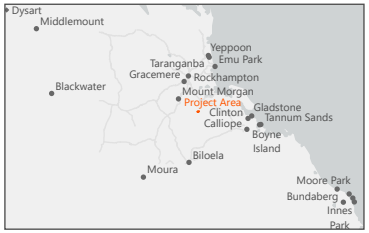
Fauna Habitat Types

Legend

- Study Area
- Road

Fauna Habitat Type

- Alluvial Eucalypt Woodland
- Non-remnant Pasture



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Kilometres

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4.2.7 Fauna Diversity

A total of 28 fauna species were identified within the Study Area throughout the field surveys all of which are birds. All of the fauna species recorded are native. The full list of fauna species recorded within the Study Area is provided in **Appendix C**.

4.2.7.1 Introduced Fauna Species

The field survey did not identify any introduced fauna species within the Study Area. However, due to the modified landscape and historical clearing, the Study Area is likely to host populations of numerous introduced fauna species.

Other species including feral cat (*Felis catus*), horse (*Equus caballus*), pig (*Sus scrofa*), wild dog (*Canis familiaris*) and cane toad (*Bufo marinus*), are considered likely to occur and have been recorded within the adjacent Mount Hopeful Windfarm.

4.2.7.2 Threatened and Near Threatened Fauna Species

No fauna species listed under the EPBC Act and/or NC Act were recorded within the Study Area during the field surveys.

A total of 63 fauna species listed as threatened or near threatened under the EPBC Act and/or NC Act were returned during the desktop assessment (**Appendix A**) including 46 birds, 10 mammals and 7 reptiles. Locations of the available desktop records for these fauna species previously recorded within the desktop assessment area are displayed on **Figure 4.6.**

The likelihood of occurrences assessment determined 12 fauna species listed under the NC Act with the potential to occur within the Study Area based on the habitat recorded during the field surveys: three have a high likelihood of occurring and nine have a moderate likelihood of occurring. One additional species is listed under the EPBC Act only. A summary of these species is provided in **Table 4.8.**

All remaining species are regarded as having a low likelihood of occurring or are unlikely to occur within the Study Area and therefore are not discussed further. Refer to **Appendix B** for the full likelihood of occurrence assessment.

Table 4.8 Fauna Likelihood of Occurrence Results

Scientific Name	Common Name	NC Act Status	EPBC Act Status
High likelihood of occurrence			
Apus pacificus	Fork-tailed swift	Special Least Concern	Migratory
Hirundapus caudacutus	White-throated needletail	Vulnerable	Vulnerable, Migratory
Phascolarctos cinereus	Koala	Endangered	Endangered
Moderate likelihood of occurrence			
Cuculus optatus	Oriental cuckoo	Special Least Concern	This species was delisted 8 November 2024, however, has been considered in this report as it was listed migratory at the time of the referral.
Dasyurus hallucatus	Northern quoll	-	Endangered
Geophaps scripta scripta	Squatter pigeon (southern)	Vulnerable	Vulnerable
Macroderma gigas	Ghost bat	Endangered	Vulnerable
Monarcha melanopsis	Black-faced monarch	Special Least Concern	These species was delisted 8 November 2024, however, has been considered in this report as it was listed migratory at the time of the referral.
Myiagra cyanoleuca	Satin flycatcher	Special Least Concern	
Petauroides volans	Greater glider (southern and central)	Endangered	Endangered
Rhipidura rufifrons	Rufous fantail	Special Least Concern	These species was delisted 8 November 2024, however, has been considered in this report as it was listed migratory at the time of the referral.
Symposiachrus trivirgatus	Spectacled monarch	Special Least Concern	
Tachyglossus aculeatus	Short-beaked echidna	Special Least Concern	-

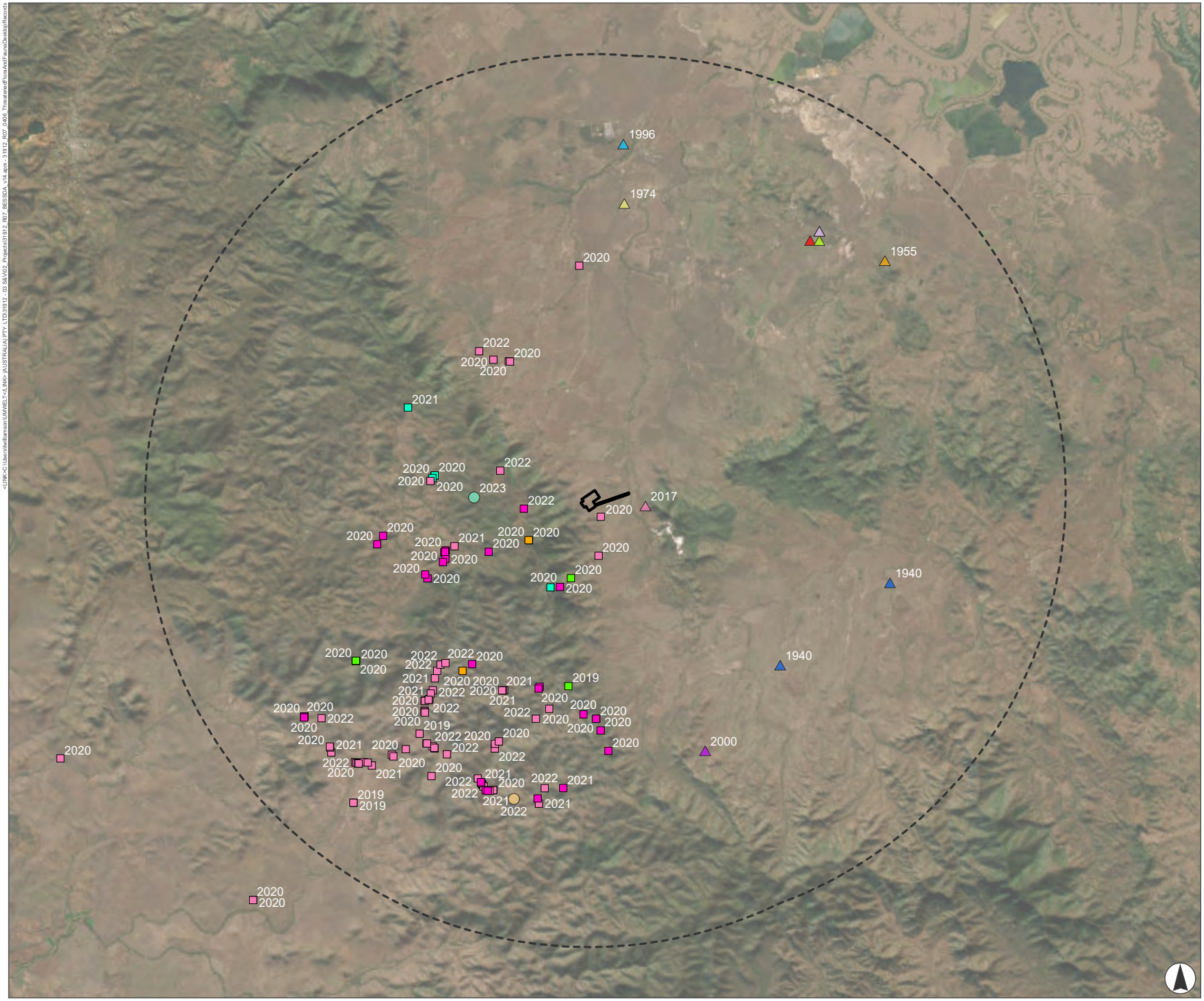


FIGURE 4.6

Threatened or Near Threatened Flora and Fauna Desktop Records

Legend

- Study Area
- Desktop Assessment Area

Threatened Fauna [Wildnet]

- Western Alaskan Bar-tailed Godwit
- Black-breasted Button-quail
- Collared Delma
- Common Greenshank
- Curlew Sandpiper
- Eastern Curlew
- Grey Snake
- Koala
- Little Tern
- Shy Albatross
- Squatter Pigeon (southern subspecies)

Theatened Flora [Wildnet]

- *Cossinia australiana*
- *Samadera bidwillii*

Threatened Species Records [Umwelt]

- Glossy Black-cockatoo
- Rufous Fantail
- Spectacled Monarch
- Squatter Pigeon
- White-throated Needletail

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Kilometres

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4.2.8 Wetlands and Watercourses

One unnamed, ephemeral drainage line intersects the Study Area on a west to east trajectory. This is a stream order one watercourse under the VM Act and is mapped as having a 'low' fish passage risk level under the Fisheries Act (**Figure 4.7**). While this watercourse intersects the Disturbance Footprint, no permanent infrastructure is proposed to occur within 25 m of this watercourse. Where the access track intersects the watercourse, this will be constructed in accordance with the accepted development requirements for waterway barrier works (DAF 2018).

A stream order two watercourse occurs to the south of the Study Area and will not be impacted by the Project.

Due to the small size and highly ephemeral nature of this watercourse, in-stream aquatic habitat is relatively simple with an absence of aquatic vegetation and course woody debris. The substrate is predominantly grassy and comprised of small to large rocks. The banks of the watercourse were largely cleared of trees, dominated by *Aristida* sp.. Where dry, drainage lines were present within the Study Area, few *Eucalyptus crebra* and *Eucalyptus tereticornis* were present along the banks as well as continuous thickets of *Lantana camara**.

Whilst the watercourse within the Study Area was dry at the time of the survey, during intense periods of inundation, the aquatic environments within the Study Area may temporarily support assemblages of aquatic species and water sources for terrestrial fauna species.

No farm dams or wetlands are present within the Study Area.



Photo 4.3 Stream Order 1 Waterway within the Study Area

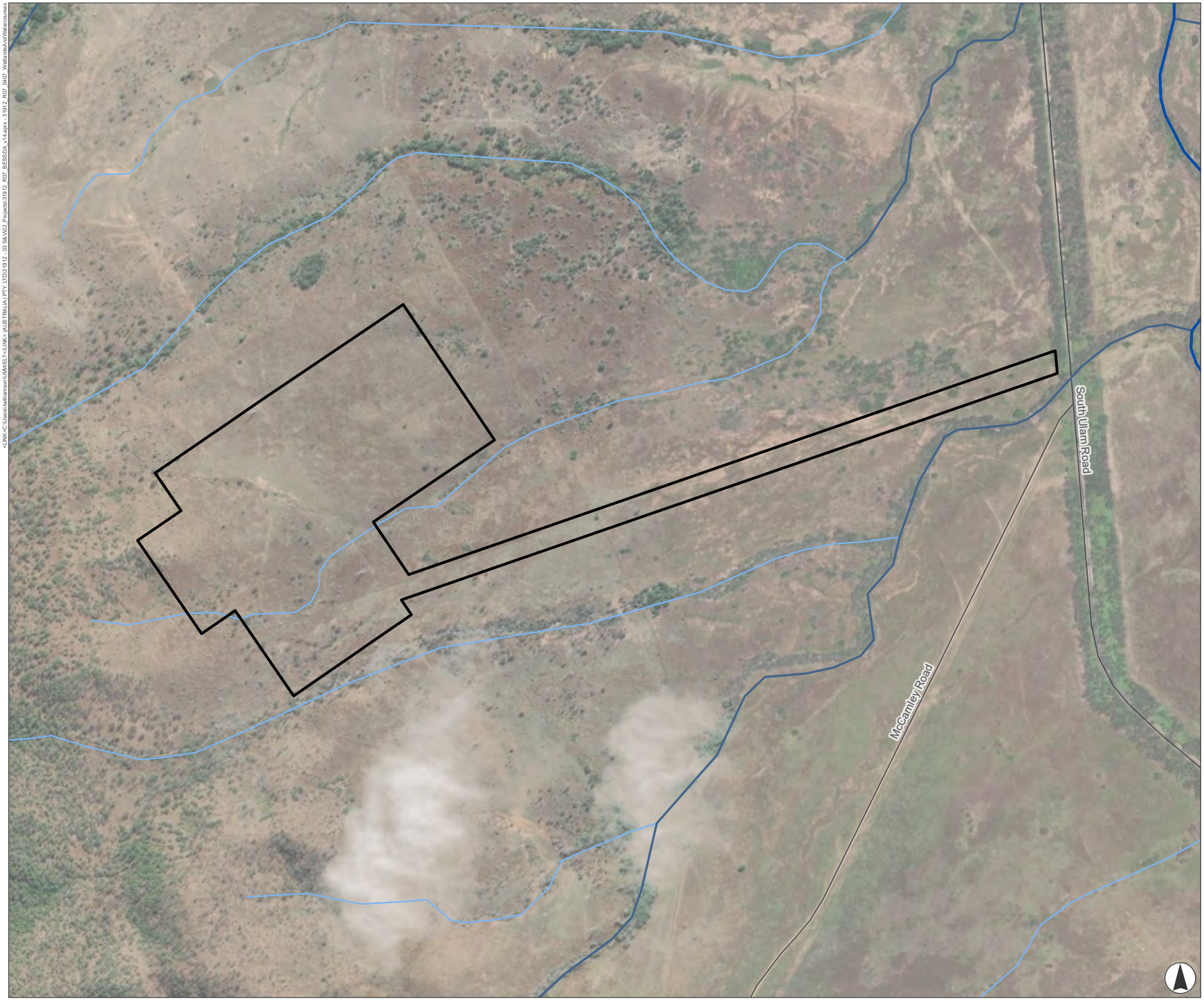


FIGURE 4.7

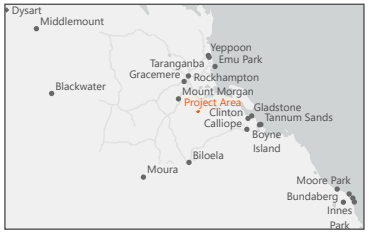
Wetlands and Watercourses

Legend

- Study Area
- Road

VM Act Watercourse

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream



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Kilometres

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4.2.9 Protected Plant Flora Trigger Mapping

The Study Area does not contain any 'high risk' areas on the Protected Plants Flora Trigger Map (Version 10.0) (Department of the Environment, Tourism, Science and Innovation 2023). The nearest 'high risk' area is located approximately 1 km west from the Study Area (**Figure 4.8**).

4.2.10 Essential Habitat

Review of the essential habitat mapping (Department of Natural Resources and Mines, Manufacturing and Regional and Rural Development 2024a) determined that no essential habitat is present within the Study Area. The closest area of essential habitat is approximately 250 m to the south, within the reserve of South Ulam Road. Essential habitat mapping is displayed in **Figure 4.8**.

4.2.11 Connectivity

The Study Area occurs within a mapped state biodiversity corridor, which is mapped based on the hilly range to the west of the Study Area. The biodiversity corridors mapped by the Queensland Government are displayed on **Figure 4.8**.

Although the Study Area is situated within a predominantly cleared landscape, dispersal opportunities to larger patches of vegetation do exist, albeit restricted. The Study Area is near void of patches of vegetation and comprises scattered trees. These trees are unlikely to provide dispersal opportunities for fauna species due to their scarcity. Remnant vegetation which occurs within the Study Area occurs adjacent South Ulam Road reserve, which provides dispersal opportunities to the north and south and to the nearby Eight Mile Creek.

4.2.12 Matters of Local Environmental Significance

No MLES occurs within the Study Area or adjacent areas or are proposed to be impacted by the Project (**Figure 4.9**).



FIGURE 4.8

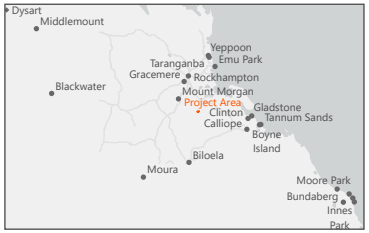
Protected Plant Trigger Map, Essential Habitat and Connectivity Areas

Legend

- Study Area
- Road
- Essential Habitat
- Protected Plants Trigger Map
- State Biodiversity Corridor

VM Act Watercourse

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream



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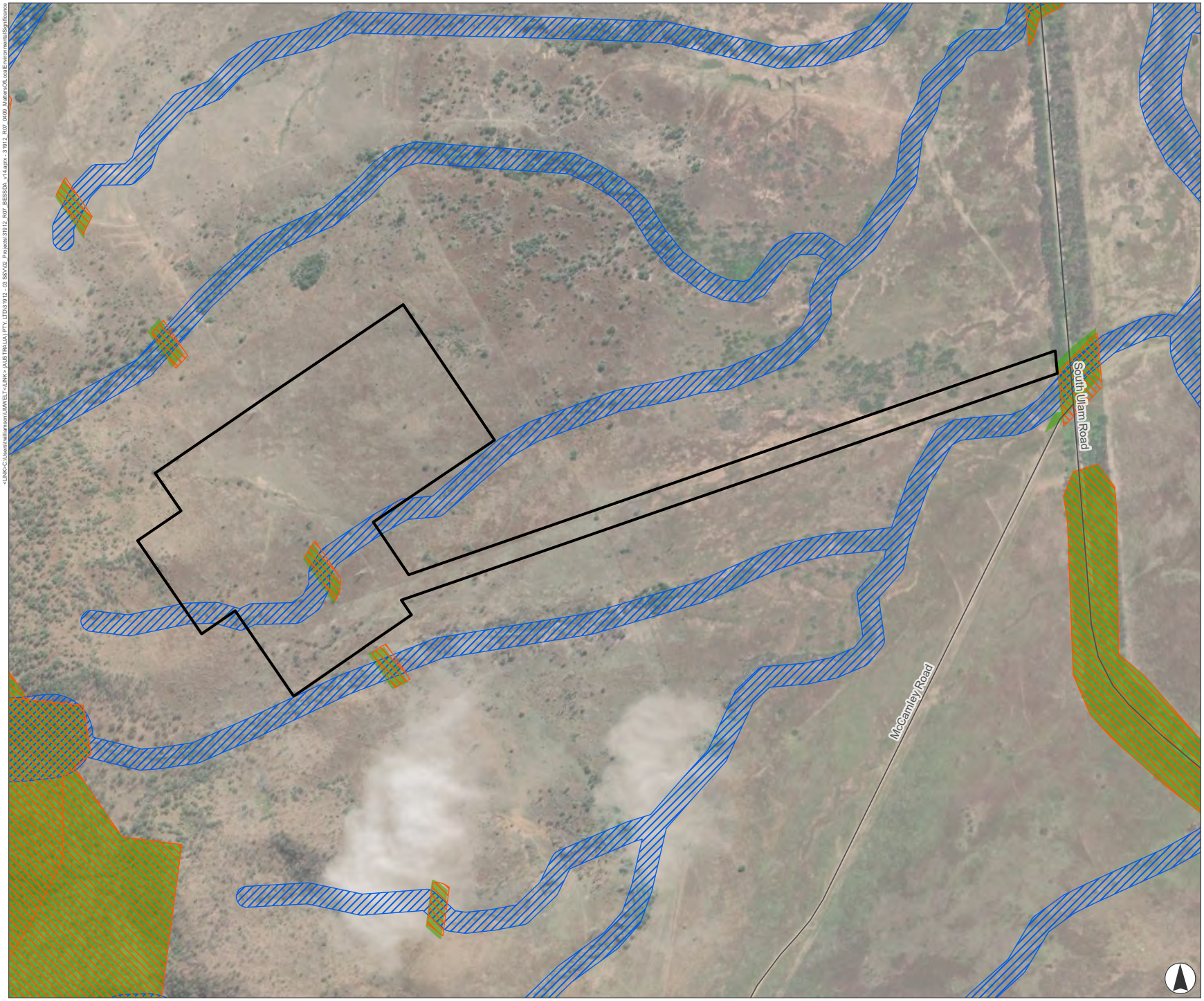
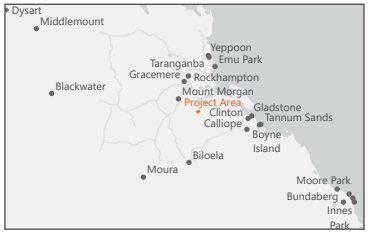


FIGURE 4.9

Matters of Local Environmental Significance

Legend

- Study Area
- Road
- Watercourse Buffers
- Matter of Local Environmental Significance
- Matters of State Environmental Significance



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5.0 Potential Impacts

Potential impacts to ecological values may arise throughout the life of the Project; construction, operation and decommissioning, and may include both direct and indirect impacts.

5.1 Construction

The greatest risk of impact on ecological values will occur during the construction phase. The construction activities will involve vegetation clearing/habitat loss, trenching and/or excavation and ground reinstatement. Direct and indirect impacts associated with construction are discussed in **Section 5.1.1** and **Section 5.1.2** respectively.

5.1.1 Direct Impacts

5.1.1.1 Vegetation Clearance and Habitat Loss

The most significant direct impacts occur during construction phase activities which require the clearance of vegetation and habitat, and associated land disturbance activities (i.e. levelling of ground). Potential impacts resulting from clearing native vegetation can include:

- Loss of habitat causing a reduction of biological diversity or loss of local populations and genotypes.
- Reduced patch size of vegetation communities potentially compromising the viability of the community and associated habitat.
- Loss of, or disturbance to microhabitat features such as tree hollows, leaf litter, ground timber, dense shrubs and hollows.
- Loss of floristic diversity and the food resources this provides such as foliage, flowers, nectar, fruit and seeds.
- Fragmentation of habitats resulting in reduced dispersal opportunities for fauna.
- Destruction of abiotic features necessary to support vegetation communities and habitat types.

The vegetation types proposed to be cleared for the Project are detailed in **Table 5.1**. The direct impact to habitat to known threatened species, or those determined as having a moderate or high likelihood of occurring within the Study Area are listed in **Table 5.2**.

Table 5.1 Vegetation Clearing Required for the Project

Value	VM Act Status	Study Area (ha)	Disturbance Footprint (ha)
Ground-truthed Regional Ecosystem			
Remnant RE 11.3.4	Of Concern	0.1	0.0[1]
State Mapped Regulated Vegetation			
Category R (regrowth watercourse)			
RE 11.3.2	Of Concern	0.1	0.1
RE 11.3.4	Of Concern	0.4	0.4
Category X (non-remnant)	-	48.3	41.5

[1] Rounded down to 0.0.

Table 5.2 Habitat Clearing Required for the Project

Species	Habitat Utilisation	Study Area (ha)	Disturbance Footprint (ha)
Threatened Flora Habitat			
Cycas megacarpa	*Cycas megacarpa* habitat	8.8	6.8
Threatened and Migratory Fauna Habitat			
Black-faced monarch	Foraging and dispersal	0.1	0.0[2]
Fork-tailed swift	Foraging and dispersal	48.8	42.0
Ghost bat	Seasonal foraging and dispersal	48.8	42.0
Greater glider	Current denning	0.1	0.0[4]
Koala	Climate refugia	0.1	0.0[4]
Northern quoll	Foraging and dispersal	0.1	0.0[4]
Oriental cuckoo	Foraging and dispersal	0.1	0.0[4]
Rufous fantail	Foraging and dispersal	0.1	0.0[4]
Satin flycatcher	Foraging and dispersal	0.1	0.0[4]
Short-beaked echidna	Foraging and dispersal	48.8	42.0
Spectacled monarch	Foraging and dispersal	0.1	0.0[4]
Squatter pigeon	Dispersal	4.4	2.2
White-throated needletail	Foraging and dispersal	0.1	0.0[4]

Cycas megacarpa direct impacts

A total of 29 *Cycas megacarpa* individuals occur within the Disturbance Footprint. A breakdown of these individuals by age-class is provided in **Table 4.6** and **Figure 4.4.**

Potential impacts on *Cycas megacarpa* resulting from the Project include habitat loss, fragmentation and degradation, soil erosion, dust generation, introduction and exacerbation of introduced flora species, increased intensity and frequency of fires and the disruption of breeding within the species life cycle. Mitigation measures (**Section 5.6**) will be implemented throughout the life of the Project.

5.1.1.2 Fauna Injury and Mortality

Fauna mortality is a direct impact that may occur during the construction phase. Fauna may be injured or killed during construction principally through:

- Strike from moving vehicles/machinery – key issue for ground dwelling species, particularly those with poor mobility.
- Entrapment in habitat during removal – key issue during tree felling for species that use tree hollows or hollow logs for roosting and denning; or for species which utilise subterranean habitat for refuge.
- Entrapment in trenches/holes – key issue for ground dwelling species (reptiles and small mammals), particularly those that are active at night and cannot detect trenches to avoid.

The potential impact of fauna mortality is likely to be at a very low frequency given the extensive clearing that has been undertaken within the Study Area, the extent and condition of habitat (i.e.

[2] Rounded down to 0.0.

cleared pasture and cropping) and the mitigation measures that will be implemented (spotter-catcher presence during clearing, appropriate speed limits, minimal night works, see **Section 5.6**). The impact duration will be limited to the construction period, with the impact magnitude likely to be low (rare occurrence of individuals). However, it is noted that this risk profile does differ between species and broader fauna groups. For example, cryptic species that are more likely to stay still when threatened rather than disperse away from the disturbance will have a higher mortality risk.

5.1.1.3 Loss of Fauna Movement Opportunities

The Study Area is compact and largely restricted to non-remnant areas. Patches of remnant vegetation proposed to be cleared are already fragmented from historical clearing for agriculture and construction of roads. Clearing of treed vegetation is linear in nature, with a maximum width of 50 m. This clearing is not expected to contribute significantly to loss of fauna movement opportunities within the landscape.

Development of battery will result in a permanent above-ground structure which may impede fauna movement. Fencing will be installed around the BESS and switchyard. While this may restrict fauna movement, due to the siting within non-remnant vegetation which provides marginal habitat for fauna species, it will primarily affect generalist or common species. The fenced area is relatively small in the context of the broader paddock, and the location is not considered a wildlife corridor.

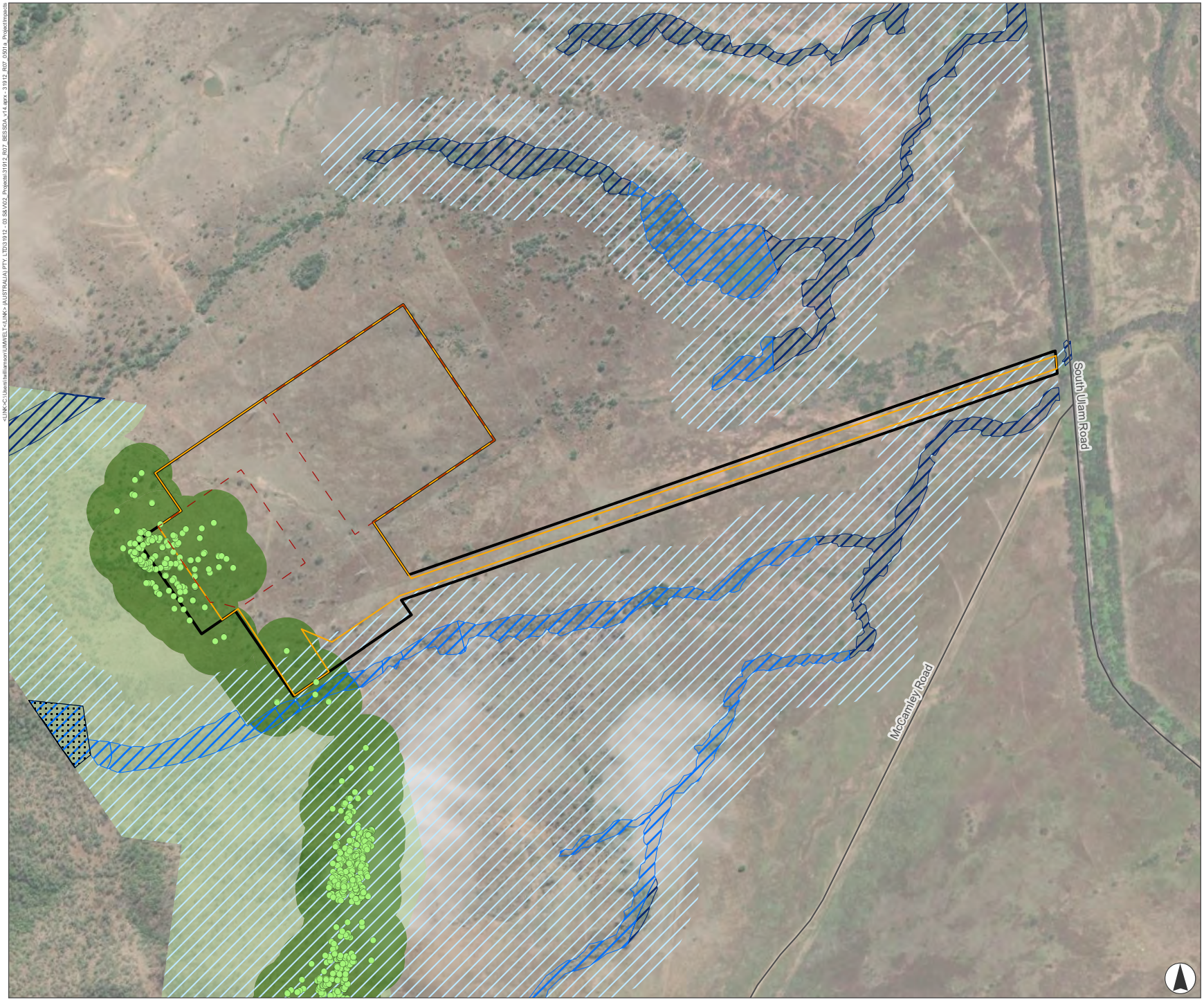


FIGURE 5.1a

Project Impacts

Legend

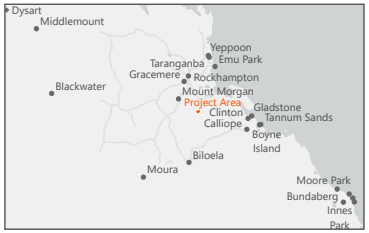
- Study Area
- Disturbance Footprint
- *Cycas megacarpa* Records
- Fence
- Road
- Yellow-bellied Glider Habitat

Squatter Pigeon Habitat

- Breeding
- Foraging
- Dispersal

***Cycas megacarpa* Habitat**

- Known (confirmed)
- Known (suspected)



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Kilometres

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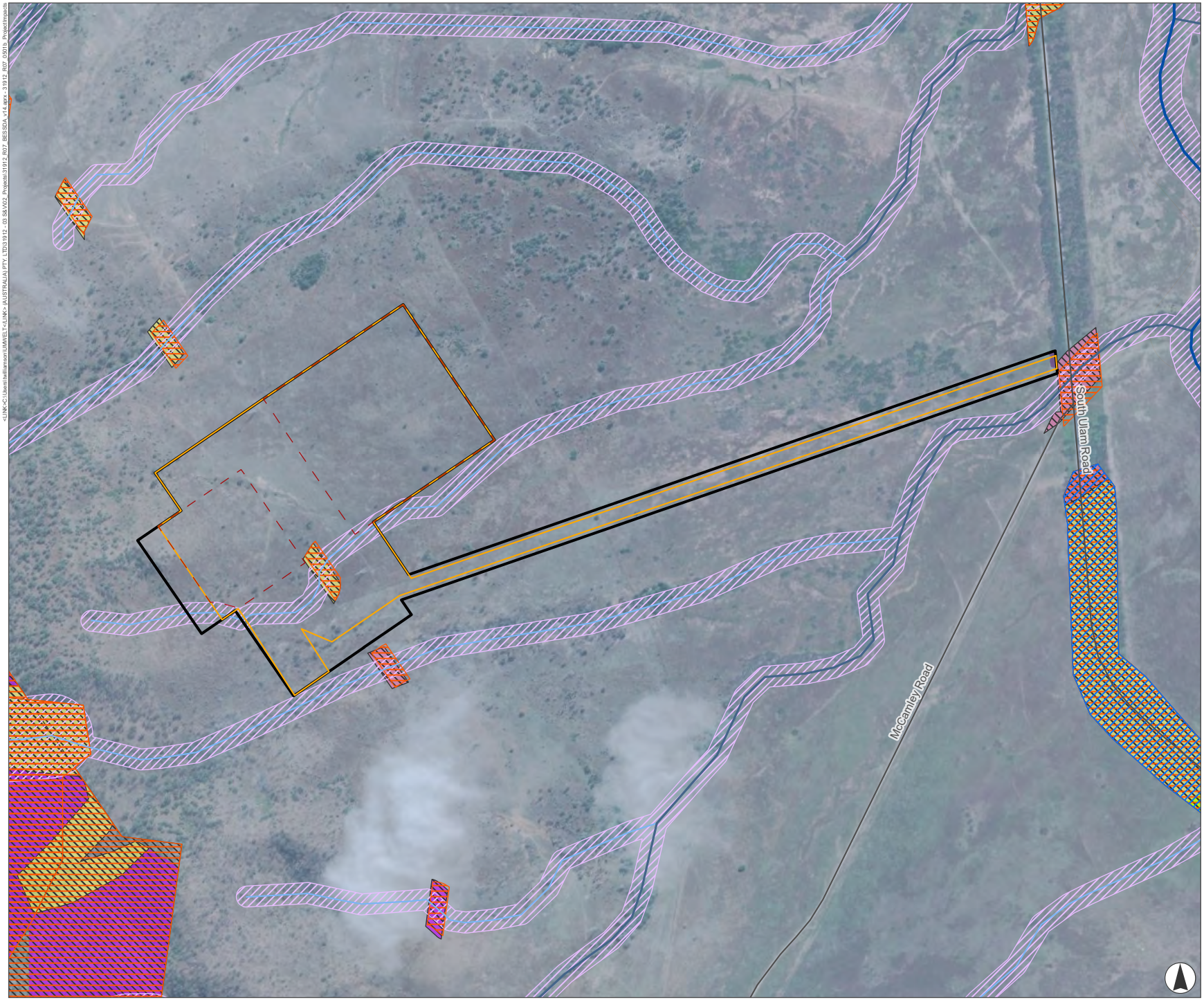


FIGURE 5.1b

Project Impacts

Legend

- Study Area
- Disturbance Footprint
- Fence
- Road
- Essential Habitat
- Watercourse Buffers
- Matter of Local Environmental Significance
- Matters of State Environmental Significance
- State Biodiversity Corridor
- Protected Plants Trigger Map

Ground-truthed Regional Ecosystems

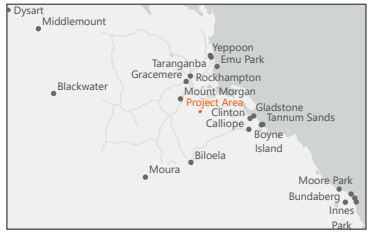
- 11.3.4 - Remnant

State Mapped Regional Ecosystems

- 11.12.1
- 11.3.4/11.3.2
- 11.3.4/11.3.25

VM Act Watercourse

- 1st Order Stream
- 2nd Order Stream
- 3rd Order Stream



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Kilometres

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GDA2020 MGA Zone 56

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5.1.2 Indirect Impacts

Proposed construction activities, including the loss of vegetation and habitat, may result in indirect or secondary impacts to flora, fauna and vegetation.

5.1.2.1 Introduction and/or Exacerbation of Weeds

Construction activities inherently have the potential to introduce and spread weeds and diseases. This can subsequently impact the integrity of remaining vegetation, increase the intensity and/or frequency of fire, as well as threaten the long-term survival of threatened species.

Introduced flora species are present throughout the Study Area, including WoNS. Given the long disturbance history and current land use practises within the Study Area, construction activities are unlikely to introduce new weed species or exacerbate existing ones. Nonetheless, best practice construction and operational methods will be implemented, including the development and implementation of a Construction Environmental Management Plan (CEMP), which would include weed management measures.

5.1.2.2 Introduction and/or Exacerbation of Pest Fauna

Pest fauna, such as red fox, feral cat and cane toads, are likely to occur within the Study Area. These species are known to predate on native fauna. Development of the battery is unlikely to materially increase the abundance of pest fauna given the short duration of construction and application of best practice construction and operational measures.

5.1.2.3 Noise and Vibration

The Disturbance Footprint is located primarily on cleared agricultural land and local fauna will have been subject to intermittent noise and vibration levels associated with this land use in the past. Nonetheless, construction activities will temporarily result in increased noise and vibration levels in the vicinity of the construction works. These will be intermittent and restricted to when construction works are being undertaken.

Noise and vibration impacts will be mitigated through development and implementation of a Project CEMP.

5.1.2.4 Edge Effects

The Project will be predominately within existing modified vegetation types, with only extremely limited loss of treed vegetation proposed. Nonetheless, edge effects resulting from removal of vegetation can reduce the condition and quality of remaining vegetation communities and habitat types. Primarily, this would occur where larger tracts of remnant vegetation are disturbed. However, the only clearing of treed vegetation clearing occurs within an isolated patch within the eastern extent of the Disturbance Footprint, which has been subject to disturbance previously, and is subject to severe weed incursion as recorded during field survey.

5.1.2.5 Soil Erosion and Sedimentation

Construction of the Project may result in soil exposure resulting in an increased risk of erosion and sedimentation, which in turn, may result in reduction of water quality and degradation of aquatic habitats. Soil erosion and sedimentation impacts will be mitigated through development and implementation of a Project Erosion and Sediment Control Plan (ESCP).

5.1.2.6 Dust Impacts

Earthworks and clearing of vegetation have the potential to increase dust levels. There is the potential for dust to settle on adjacent vegetation, particularly if excessive levels are sustained over extended periods. The majority of the Study Area is cleared agricultural land and is unlikely to be adversely impacted by increased dust levels. Nonetheless, best practice dust suppression will be undertaken during construction, in line with the Project CEMP.

5.2 Operation and Maintenance Phase

Operation of the battery is expected to extend across approximately 20-25 years. During operation, up to 10 personnel will be employed to operate and maintain the facility. It will operate 24 hours a day, typically charging during the day when excess renewable energy is being generated and discharging during peak period.

Noise generated by the operation equipment has the potential to impact fauna species by interrupting foraging and breeding behaviours, or complete avoidance and displacement from habitats. Given the position within a cleared agricultural landscape, and the limited habitat value this vegetation provides, it is anticipated these impacts are localised and unlikely to impact EPBC Act or NC Act listed species.

Impacts to fauna during the operation and maintenance phase of the Project are expected to be minimal and relate primarily to vehicle strikes. During operations when local staff may be accessing the site, there will be some vehicle activity. This is considered a very limited impact, and negligible in comparison to the existing threat levels.

5.3 Decommissioning and Rehabilitation Phase

At the battery's end of life, a review will be conducted to determine whether it will be renewed or decommissioned.

Decommissioning will adopt the best practice approach for the removal of infrastructure. Areas of disturbed land will be revegetated with species that were present prior to construction.

Direct impacts associated with the decommissioning and revegetation phase are expected to be minor. The main potential direct impact is vehicle and equipment strike. Indirect impacts associated with decommissioning and rehabilitation are expected to include noise and vibration, and dust generation as a result of increased vehicle and machinery use.

It is acknowledged that a condition may be included on the development permit requiring a Decommissioning Management Plan to be prepared and submitted prior to the cessation of the use.

5.4 Avoidance, Mitigation and Management

The avoidance, mitigation and management measures to be implemented to reduce the impacts of the Project on vegetation, flora and fauna are identified below. Specific mitigation measures for EPBC Act and/or NC Act listed flora and fauna species that are known, or considered to have a moderate or high likelihood to occur within the Study Area are discussed in **Section 5.6.3.**

5.5 Avoid and Minimise

5.5.1 Site Selection and Design

Neoen have undertaken a site selection process that minimises the impacts on ecological values. Additional consultation with PLQ was undertaken to optimise siting and confirm constructability of the PLQ switchyard required for the Project. The PLQ switchyard occurs adjacent the BESS, and due to the required switchyard construction area, further siting of the BESS was required. The siting of the BESS and switchyard has also considered pre-clearance survey data for *Cycas megacarpa*, completed to inform the preliminary *Cycas megacarpa* Translocation Management Plan (Ecologica Consulting 2024). The Project has been designed to avoid and minimise direct impacts on this species where possible.

Neoen's site selection process also considered the following factors:

- The Study Area is in close proximity to existing energy infrastructure.
- The Study Area is predominantly cleared, non-remnant vegetation, and as a result there is reduced impact to native vegetation and biodiversity (relative to other heavily vegetated locations).
- The Study Area is large enough to accommodate the BESS.
- There is good access to the road network, with minimal requirements to construct new access roads.

The design of the BESS, switchyard and associated ancillary infrastructure has been optimised so that most of the Disturbance Footprint is located within cleared land. Within the Disturbance Footprint, the infrastructure layout has been optimised through an iterative design process. A key consideration in the design concept was to maximise existing non-remnant areas and avoid the clearance of native vegetation. This was informed by the existing ecological report and other early environmental technical studies.

5.6 Mitigation and Management

Mitigation and management measures proposed to be implemented to reduce impacts from the Project are discussed in **Section 5.6.1.1** to **Section 5.6.3**.

5.6.1.1 Vegetation Clearing

Mitigation and management measures that relate to vegetation clearing include:

- Where vegetation clearing is proposed, boundaries will be clearly demarcated.
- Where trees are to be removed, they will be felled away from areas of retained vegetation, where safe and practicable. Where trees unavoidably fall into retained areas, they will be left in-situ to mimic natural tree fall and provide habitat for ground-dwelling fauna.
- Fauna spotter-catchers will be present during all vegetation clearing activities.
- A CEMP will be developed and implemented and will include the measures described in this report, as well as:

- Appropriate measures will be implemented to minimise indirect impacts to native vegetation adjacent to the Project, including control of runoff and erosion.
- A site induction so that all staff and contractors are aware of site environmental values and controls.
- Management measures to limit the spread of State Restricted weed, *Lantana camara**.

5.6.1.2 Fauna

Mitigation and management measures relating to fauna include:

- Micro-siting of Project infrastructure will aim to retain habitat trees where possible.
- Where habitat features such as hollow logs cannot be retained in-situ, they will be relocated to adjacent areas of suitable habitat if safe and practical.
- Construction personnel will be educated (through site inductions and toolbox talks) on the potential presence of fauna.
- Where encountered, personnel shall keep their distance from fauna and not harm or trap them.
- Where injured fauna is encountered, a wildlife carer or vet will be contacted.

5.6.1.3 Weeds and Pests

Mitigation and management measures related to weeds and pests include:

- Weed and hygiene control measures will be in place during construction in accordance with a Project CEMP.
- Prior to entering the Study Area, the origin of construction materials, machinery and equipment will be determined and certified where applicable.
- During construction and operation, waste will be contained within fauna proof bins so as not to attract pest species.

5.6.2 General Mitigation Measures

General mitigation and management measures include:

- Erosion and sediment control devices will be implemented in accordance with a Project ESCP to minimise the risk of potential sedimentation to sensitive receptors.
- To minimise dust impacts, vegetation clearing will not be undertaken in high wind conditions unless dust suppression measures such as water tanks are being used.
- Hot/hazardous works will not to be undertaken during a Total Fire Ban or on a day with a Fire Danger Rating of ‘Extreme’ or ‘Catastrophic’.
- A dedicated firefighting water tank will be installed for firefighting during operations. Firefighting water will be provided from water carts during construction.

5.6.3 Species-specific Mitigation Measures

Mitigation and management measures specific to relevant known, or potentially (high and moderate) occurring threatened species within the Study Area are detailed in **Table 5.3** below.

Key threatening processes are detailed in the made/adopted National Recovery Plans, SPRAT database, Approved Conservation or Conservation Listings. These documents have been reviewed to ensure the mitigation measures are appropriate and relevant.

Table 5.3 Species-Specific Mitigation Measures

Relevant MNES	Mitigation Measures
All threatened and near-threatened species	• In the very unlikely event that a flora or fauna individual listed under the EPBC Act and/or NC Act is damaged, removed or killed as a result of Project activities (without an appropriate permit), the relevant regulating body for that species will be notified within a maximum period of 2 business days.
Cycas megacarpa	• Minimise impacts to individuals and mapped habitat for *Cycas megacarpa*. • Pre-clearance surveys for *Cycas megacarpa* have been undertaken within the Study Area and this data will be used for micro-siting purposes. • Areas proposed to be cleared will be demarcated to ensure no accidental clearing outside the Disturbance Footprint. • A pre-approved *Cycas megacarpa* Translocation Management Plan (CTMP) (which is a requirement of the EPBC Act approval) will be implemented through all Project phases. This plan will provide detailed information regarding: ○ Species information including a description to aid identification. ○ Mitigation and management methods, including corrective actions. ○ Vegetation clearing requirements and methods to reduce impacts to surrounding individuals and their habitat. ○ Specific weed and pest management measures to reduce impacts on the long-term integrity of the remaining habitat and population, including high-biomass weeds. ○ Erosion, sedimentation, and dust management requirements specific to the species. • This species is also considered a protected plant under the NC Act. The *Nature Conservation (Plants) Regulation 2020* outlines the regulatory requirements for managing potential impacts on a protected plant. While the Study Area occurs outside of the protected plants trigger map, a permit is still required for the removal of *Cycas megacarpa* individuals.
Ghost bat	• Where pits, voids or trenches are required, include appropriate cover to prevent extended water retention in these spaces and/or subsequent breeding opportunities for cane toads.
Greater glider	• Where clearing is proposed for areas of greater glider (southern and central) denning habitat, preclearance surveys must include canopy searches and inspections of suitably sized hollows (>8 cm diameter). Where inspection of hollows cannot be safely undertaken prior to felling, the hollow-bearing tree will be slow felled to minimise the likelihood of injury or death and will be inspected by a qualified fauna spotter to confirm presence or absence of greater glider (southern and central). If an individual is found to be present, it will be inspected for injury and if healthy, relocated to an adjacent area of

Relevant MNES	Mitigation Measures
	mapped breeding and denning habitat after dusk. If the individual is injured, it will be transported to a local wildlife carer and rehabilitated prior to releasing in a suitable area adjacent to the location in which it was found. • In the unlikely event that a greater glider (southern and central) is killed as a result of Project activities, DCCEEW will be notified within a maximum period of 2 business days.
Koala	• Pre-clearance surveys will include canopy searches for koalas. If a koala is located during pre-clearance surveys or during clearing activities: ○ The individual must not be forcibly relocated. ○ Any tree which houses a koala as well as any tree with a crown that overlaps that tree will not be cleared until the koala vacates the tree on its own volition. ○ Allow a clearing buffer surrounding the tree, equal to the height of the tree or deemed suitable by the fauna spotter-catcher. ○ Any injured koala (and fauna in general) should be transported to a vet or recognised wildlife carer. ○ Requirements for koalas subject to handling to be examined and if suspected of Chlamydia infection will be taken to a predesignated veterinarian/wildlife care facility for treatment prior to release. • Clearing must be carried out in a way that ensures any koala present has time to move out of the clearing site without human intervention. • In the unlikely event that a koala is killed as a result of Project activities, DCCEEW will be notified within a maximum period of 2 business days. • Vehicles may cause direct mortality to koalas (DAWE, 2022). Speed limit restrictions (40 km/hour) will be enforced throughout the site to minimise potential vehicle strike risk to the species. • Habitat degradation by invasion of weeds has the potential to increase impacts associated with land clearing (DAWE, 2022). A Weed and Pest Management Plan will be implemented to ensure no introduction or proliferation of invasive weed species or pest fauna species. This includes *Lantana camara* and *Cryptostegia grandiflora* (rubber vine), which are known habitat degrading species of the koala and have been identified as occurring on site.
Squatter pigeon (southern)	• Where clearing is proposed for areas of squatter pigeon (southern) dispersal habitat, pre-clearance surveys must include flushing to encourage the movement of individuals out of the clearing area. • As squatter pigeon (southern) nests on the ground and is at high risk of direct mortality, nests should be identified and clearly demarcated by a spotter-catcher during pre-clearance surveys. If the spotter-catcher determines a nest to be active, it will be managed in accordance with an approved High-risk Species Management Plan (SMP). • To minimise the chances of a collision, in known squatter pigeon (southern) occurrence areas speed limits (in private areas) will be reduced to 40 km/hr or less and signage will be installed that indicates subspecies' presence. Signage will also be installed within the public access road corridor.

5.7 State and Local Government

5.7.1 Significant Residual Impacts

Under various State assessment frameworks, if the Project is likely to have a significant residual impact (SRI) on an MSES, environmental offsets may be required for the Project.

This Project is assessed under the Planning Act, and therefore utilises the *Significant Residual Impact Guideline; For matters of state environmental significance and prescribed activities under the Sustainable Development Act 2009* (Department of State Development 2014). Section **1.4** and **Table 1.1** of this document identifies the State Development Assessment Provisions (SDAP) modules that are relevant to MSES. It has been identified that none of the SDAP modules are triggered by the Project, and therefore SRI assessments are not required.

5.7.2 Rockhampton Regional Council Planning Scheme

The Project is being assessed in accordance with the provisions of the Rockhampton Regional Council Planning Scheme. The assessment considers the site's environmental values and potential impacts to ensure the proposal aligns with the scheme's strategic framework and relevant codes. In particular, performance outcome (PO) 6 of the biodiversity overlay code is addressed below as it has been identified as an assessment benchmark that requires further justification through a performance solution to assist in demonstrating compliance with the code.

5.7.2.1 P06 – Wetlands and Waterways

Impacts within the Disturbance Footprint where the watercourse buffer intersects are limited to clearing vegetation above 100 mm. This includes removal of the small, paddock trees and maintenance of grass to 100 mm tall. It is noted the area where the watercourse buffer intersects the Disturbance Footprint is limited to 0.1 ha of vegetation clearing. **Table 5.4** provides an assessment of this impact against PO6 for watercourses and wetlands in the biodiversity overlay code of the Rockhampton Region Planning Scheme.

Table 5.4 Project Response to PO6 – Wetlands and Waterways

Development has no adverse impacts on:	Project response
Native vegetation	No native vegetation occurs within the watercourse buffer where it intersects with the Disturbance Footprint. The area is mapped as Category X on the Vegetation Management Regional Ecosystem Map, and it was ground-truthed as non-remnant vegetation. Sparse, small eucalypts occur within this area and will need to be cleared for the Project. Scattered native grasses occur, however, they will not be removed, only maintained (to <100 mm tall).
Habitat	The habitat values provided by vegetation within the watercourse buffer is of limited quality for species as the area is heavily managed and grazed, offering little refuge, foraging or connectivity resources for native species. Additionally, the area where the watercourse buffer intersects the Disturbance Footprint is limited in extent (0.1 ha). Common bird species may utilise this habitat intermittently. The removal of trees and maintenance of grass does not functionally change this habitat and species utilisation will likely remain consistent. The Project is not anticipated to otherwise have an adverse impact on the habitat provided by this area.
Ecological functions	The ecological function of this non-remnant paddock is typical of a highly modified community, providing limited habitat value, predominately restricted to the movement and/or foraging of highly mobile, generalist species. , The removal of the few scattered paddock trees and shrubs, along with the maintenance of an existing grass layer is unlikely to materially change or degrade the existing ecological function (dispersal and foraging for generalist species) of the watercourse buffer. Given the small area of disturbance and the large extent of adjacent modified paddock / watercourse buffer, the existing ecological function of the area is anticipated to remain unchanged.
Water quality	The watercourse (and associated buffer) that occurs within Disturbance Footprint is a stream order one watercourse that is highly ephemeral and would only hold water following periods of intense rain. This means there is a very low risk of nutrient loading or changes to hydrology. Vegetation below 100 mm and grass will be maintained to stablilise soil and minimise erosion and sediment run off. The Project is therefore not anticipated to result in an adverse impact on water quality.
Nature conservation values	The habitat values provided by vegetation within the watercourse buffer is of limited quality for species as the area is heavily managed and grazed, offering little refuge, foraging or connectivity resources for native species. It is considered unlikely that threatened flora species occur, with the exception of *Cycas megacarpa* in the broader area. This species was not recorded at this location during Field Surveys. This area has not been mapped as habitat for threatened fauna species. Additionally, the impacts are extremely limited in extent in this area and there is an abundance of similar, low quality habitat within the immediate area.

6.0 Conclusion

The aim of this ecological assessment report was to provide a summary of the ecological values and potential impacts that may result from the construction of the battery.

Using a combination of desktop information, field-validated data, and extrapolated field survey results, the potential presence and habitat extent of ecological values within the Study Area was determined. The Study Area is majority non-remnant vegetation, with a very small patch of remnant alluvial woodland (comprising RE 11.3.4) in the very east of the Study Area, within the eastern portion of the access road.

A total of 13 NC Act-listed species were considered to have a moderate or high likelihood of occurring or are known to occur within the Study Area, including one flora species and 12 fauna species. No TECs were present or considered likely to occur.

Both direct and indirect impacts on NC Act-listed species may occur as a result of the Project, with the greatest risk occurring during the construction phase, owing to the vegetation clearing and associated habitat loss proposed. Essential habitat, protected plant flora trigger mapping, connectivity areas and MLES do not occur within the Study Area. No SDAP modules were triggered by the Project and therefore, no SRI assessments were undertaken.

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Appendix A

Desktop Assessment Results



Australian Government

Department of Climate Change, Energy, the Environment and Water

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: 13-Jun-2025

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

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:	1
National Heritage Places:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	63
Listed Migratory Species:	30

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:	None
Listed Marine Species:	35
Whales and Other Cetaceans:	2
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:	4
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	13
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

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Natural			
Great Barrier Reef	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
Brigalow (Acacia harpophylla dominant and co-dominant)	Endangered	Community known to occur within area	In buffer area only
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area	In buffer area only
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions	Endangered	Community may occur within area	In feature area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions	Endangered	Community likely to occur within area	In buffer area only
Weeping Myall Woodlands	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			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In buffer area only
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically 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 may occur within area	In buffer area only
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Epthianura crocea macgregori Capricorn Yellow Chat, Yellow Chat (Dawson) [67090]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
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 known to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely 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
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Neochmia ruficauda ruficauda Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within 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
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat known to occur within area	In feature area

MAMMAL

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat may occur within area	In feature area
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
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area	In feature area
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely 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 feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
Sousa sahulensis Australian Humpback Dolphin [87942]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
PLANT			
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Bulbophyllum globuliforme Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Cadellia pentastylis Ooline [9828]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Cossinia australiana Cossinia [3066]	Endangered	Species or species habitat likely to occur within area	In feature area
Cupaniopsis shirleyana Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cycas megacarpa [55794]	Endangered	Species or species habitat known to occur within area	In feature area
Cycas ophiolitica [55797]	Endangered	Species or species habitat may occur within area	In feature area
Decaspermum struckoilicum Struck Oil Myrtle [78796]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eucalyptus raveretiana Black Ironbox [16344]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Leichhardtia brevifolia listed as Marsdenia brevifolia](#) [91893]	Vulnerable	Species or species habitat may occur within area	In feature area
[Leuzea australis listed as Rhaponticum australe](#) Austral Cornflower, Native Thistle [9363]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Polianthion minutiflorum](#) [82772]	Vulnerable	Species or species habitat may occur within area	In feature area
[Samadera bidwillii](#) Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Delma torquata](#) Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area	In feature area
[Denisonia maculata](#) Ornamental Snake [1193]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Egernia rugosa](#) Yakka Skink [1420]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Elseya albagula](#) Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat known to occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat known to occur within area	In feature area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Rheodytes leukops Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle, White-eyed River Diver [1761]	Endangered	Species or species habitat may occur within area	In feature area
SHARK			
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area	In buffer area only
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to 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
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Phaethon lepturus](#) White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Marine Species			
[Anoxypristis cuspidata](#) Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat likely to occur within area	In buffer area only
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Crocodylus porosus](#) Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Lepidochelys olivacea](#) Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Mobula alfredi as Manta alfredi](#) Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Orcaella heinsohni Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area	In buffer area only
Sousa sahulensis as Sousa chinensis Australian Humpback Dolphin [87942]	Vulnerable	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 likely to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In buffer area only
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 ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[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 may occur within area	In buffer area only
[Gallinago hardwickii](#)			
Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Limosa lapponica](#)			
Bar-tailed Godwit [844]		Species or species habitat known 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 buffer area only
[Tringa nebularia](#)			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

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

Scientific Name	Threatened Category	Presence Text	Buffer Status
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]		Breeding likely to 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 ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known 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 may occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat known 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 likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may 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
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In buffer area only
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely 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
Pachyptila turtur Fairy Prion [1066]		Species or species habitat may occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pterodroma cervicalis](#) White-necked Petrel [59642]		Species or species habitat may 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 known to occur within area overfly marine area	In feature area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat may occur within area overfly marine area	In feature area
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In buffer area only
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Crocodylus porosus](#) Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eretmochelys imbricata			
Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Lepidochelys olivacea			
Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Orcaella heinsohni			
Australian Snubfin Dolphin [81322]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sousa sahulensis			
Australian Humpback Dolphin [87942]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Bouldercombe Gorge	Resources Reserve	QLD	In feature area
Fitzroy River	Fish Habitat Area (A)	QLD	In buffer area only
Mount Hopeful	Conservation Park	QLD	In buffer area only
Pindari	Nature Refuge	QLD	In buffer area only

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Fitzroy River Delta	QLD	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Geotechnical Investigations for Balaclava Island Coal Export Terminal	2011/5905		Completed	In buffer area only
Gladstone - Fitzroy Pipeline	2007/3501		Post-Approval	In buffer area only
Mount Hopeful Wind Farm	2021/9137		Post-Approval	In feature area
Controlled action				
Arrow Bowen Pipeline (CSG), QLD	2012/6459	Controlled Action	Post-Approval	In buffer area only
Balaclava Island Coal Export Terminal	2009/5158	Controlled Action	Completed	In buffer area only
Blackwater to Gladstone Gas Pipeline Project	2011/6034	Controlled Action	Completed	In buffer area only
Construct and operate 447km high pressure gas transmission pipeline	2009/4976	Controlled Action	Post-Approval	In buffer area only
Expansion of Salt Fields Bajool-Port Alma Operation	2003/1022	Controlled Action	Completed	In buffer area only
Fitzroy Terminal Project	2011/6069	Controlled Action	Completed	In buffer area only
install & operate gas pipeline	2005/2059	Controlled Action	Post-Approval	In buffer area only
Nickel and cobalt laterite mine, High-pressure acid leach plant, slurry pipeline	2005/2257	Controlled Action	Completed	In buffer area only
Not controlled action				
Bajool - Port Alma Road Safety Upgrade Project	2019/8511	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

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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Appendix B

Likelihood of Occurrence Assessment



umwelt

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Threatened Ecological Community						
Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions			Endangered	-	The TEC is associated with floodplains and drainage areas of the Darling Riverine Plains and Brigalow Belt South IBRA bioregions. This community is represented by eucalypt woodland where *Eucalyptus coolabah* subsp. *coolabah* (coolabah) and/or *Eucalyptus largiflorens* (black box) are the dominant canopy species. The understorey tends to be grassy. The following REs may be synonymous with this TEC: RE 11.3.3, 11.3.15, 11.3.16, 11.3.28, 11.3.37.	Unlikely. No REs that are synonymous with this TEC were modelled or recorded within the Study Area.
Weeping myall woodlands			Endangered	-	The TEC occurs on the inland alluvial plains west of the Great Dividing Range in NSW and Qld. This community is an open woodland to woodland in which *Acacia pendula* (weeping myall) trees are the sole or dominant overstorey species. The following REs may be synonymous with this TEC: 11.3.2, 11.3.28.	Unlikely. One synonymous RE (11.3.2) was modelled to occur within the Study Area from the State Mapped REs. This RE was confirmed to be absent from the Study Area during field surveys.

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Brigalow (*Acacia harpophylla* dominant and co-dominant)			Endangered	-	The TEC is characterised by the presence of brigalow which is usually dominant in the tree layer or co-dominant with other species such as *Casuarina cristata* (belah), *Acacia* spp. or *Eucalyptus* spp. The structure of the vegetation ranges from open forest to open woodland. The following REs may be synonymous with this TEC: RE 11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.5.16, 11.9.1, 11.9.5, 11.11.14, 11.12.21.	Unlikely. No REs that are synonymous with this TEC were modelled or recorded within the Study Area.
Poplar Box Grassy Woodland on Alluvial Plains			Endangered	-	The TEC occurs on alluvial soils and is typically a grassy woodland with a canopy dominated by *Eucalyptus populnea* (poplar box) with an understorey of mostly grasses and herbs. The following REs may be synonymous with this TEC: 11.3.2, 11.3.17, 11.4.7, 11.4.12, 12.3.10.	Unlikely. One synonymous RE (11.3.2) was modelled to occur within the Study Area from the State Mapped REs. This RE was confirmed to be absent from the Study Area during field surveys.
Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community			Endangered	-	This TEC occurs in low-lying coastal flats, floodplains, drainage lines, lake margins, wetlands, and estuarine fringes where soils are at least occasionally saturated, waterlogged, or inundated. The soils are typically hydrosols (grey-black clay-loam and/or sandy loam	Unlikely. No REs that are synonymous with this TEC were modelled or recorded within the Study Area.

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					soils) and sometimes organosols (peaty soils). The vegetation structure varies from forest to woodland, with a canopy dominated by *Casuarina glauca*, while Eucalypt species can emerge from the canopy. If a mid-layer is present, it is typically sparse, but a sub-canopy of smaller trees can often be present, typically composed of canopy species. The ground layer typically comprises forbs, ferns, sedges, grasses, and/or plant litter, but can often be patchy. The habitat supports a diverse range of flora and fauna, including many species adapted to saline or brackish groundwater conditions. The following REs may be synonymous with this TEC: 12.1.1, 12.3.20	
Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions			Endangered	-	The TEC occurs within the Brigalow Belt Bioregions in Queensland, New South Wales, the Northern Territory and Western Australia. This community is a form of seasonal sub-tropical rainforest that occurs in areas that experience seasonally dry periods with vegetation that is characterized by trees with	Unlikely. No REs that are synonymous with this TEC were modelled or recorded within the Study Area.

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					microphyll sized leaves and emergent Brachychiton spp.. The following REs may be synonymous with this TEC: 12.2.3, 11.3.11, 11.4.1, 11.5.15, 11.8.3, 11.8.6, 11.8.13, 11.9.4, 11.9.8, 11.11.18.	
Flora						
Poaceae	Hairy-joint grass	*Arthraxon hispidus*	Vulnerable	Vulnerable	This species thrives in or on the edges of rainforest and wet eucalypt forest, often near creeks or swamps. In the South-East Queensland Bioregion, it is also found around freshwater springs on coastal foreshore dunes, in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests. It can also grow with bog mosses in mound springs.	Unlikely. No rainforest or wet eucalypt forest occurs within the Study Area which is largely non remnant. A small patch of alluvial eucalypt woodland occurs in the east of the Study Area (RE 11.3.4) but is degraded and dominated by weeds in the understorey and is considered unsuitable for the species. The species has not been recorded within 150 km of the Study Area (ALA).
Rutaceae	Three-leaved bosistoa	*Bosistoa transversa*	Vulnerable	Least Concern	This species grows in lowland subtropical rainforest up to 300 m ASL. It is often found on steep slopes with dark organic loam over basalt. Associated species include *Heritiera actinophylla* (white booyong), *Syzygium moorei* (smooth-bark rose apple), *Endiandra pubens* (hairy walnut),	Unlikely. No lowland subtropical rainforest occurs within the Study Area which is largely non remnant with a small portion of alluvial eucalypt woodland. The closest record occurs approximately 40 km to the east of the Study Area (ALA).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					and *Dendrocnide excelsa* (shiny leaf stinging tree). Umwelt also have records that are associated with notophyll or Auracarian dominated vegetation communities.	
Orchidaceae	Miniature moss-orchid	*Bulbophyllum globuliforme*	Vulnerable	Near threatened	The species is host-specific, only growing on *Araucaria cunninghamii* (hoop pine), where it colonises the upper branches of mature trees. The *Araucaria cunninghamii* occurs in upland (usually 100-900 m ASL) subtropical rainforest communities.	Unlikely. The host species (*Araucaria cunninghamii*) is not present, nor is it considered likely to occur within the Study Area. The closest record of *Bulbophyllum globuliforme* occurs approximately 62 km south-east of the Study Area.
Surianaceae	Ooline	*Cadellia pentastylis*	Vulnerable	Vulnerable	This species occurs in a range of vegetation types including semi-evergreen vine thicket, *Acacia harpophylla-Casuarina cristata*, *Eucalyptus populnea*, and *Acacia catenulata* communities. Ooline often grows on the edges of sandstone and basalt escarpments, at elevations of 200–500 m ASL. It prefers moderately fertile soils (sandstone/basaltic) that are often used for agriculture and pasture development.	Unlikely. Suitable habitat is not present within the Study Area. The species is a conspicuous tree and was not observed within the Study Area. The closest records occur approximately 74 km to the south-west of the Study Area (ALA).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Sapindaceae	Cossinia	*Cossinia australiana*	Endangered	Endangered	This species prefers edges of dry rainforests but can also exist scattered within closed forests. It grows in Araucarian microphyll vine forest and relict semi-evergreen vine thicket on various soils like red volcanic soil and black loam. Associated species include *Alyxia ruscifolia, Capparis arborea, Drypetes deplanchei, Flindersia australis, Owenia venosa,* and *Siphonodon australis*. Associated vine species include *Cissus oblonga, Malaisia scandens,* and *Melodorum leichhardtii*. Some populations occur in remnant vegetation, providing protection from broad-scale clearing.	Unlikely. Suitable dry rainforest habitat is not present within the Study Area which is largely non remnant with a small portion of alluvial eucalypt woodland. The closest records occur approximately 13 km south of the Study Area (ALA).
Sapindaceaae	Wedge-leaf tuckeroo	*Cupaniopsis shirleyana*	Vulnerable	Vulnerable	This species grows in dry rainforest and scrubby urbanized areas, typically on moderate to very steep slopes, screeslope gullies, and rocky stream channels. It is found at elevations of 60–550 m ASL.	Unlikely. Suitable dry rainforest habitat is not present within the Study Area which is largely non remnant with a small portion of alluvial eucalypt woodland. The closest record occurs approximately 44 km east of the Study Area from 1993 (ALA).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Cycadaceae	-	*Cycas megacarpa*	Endangered	Endangered	It is found in woodland or open woodland dominated by eucalypts, particularly *Blakella citriodora* and *Eucalyptus crebra*, but also *Corymbia erythrophloia, E. melanophloia*, and *Lophostemon confertus*. The species typically grows on rocky substrates derived from acid volcanics, ironstone, or mudstone, and rarely on alluvium. *Cycas megacarpa* thrives in woodland or open woodland environments, often on rocky substrates. It is adapted to habitats subjected to periodic fires, which adult plants can resist, although foliage may be destroyed and stems scarred. The species is also found on rainforest margins and in areas with sandy loams or shallow clay loams, often stony.	**Known**. This species has been recorded within the Study Area.
Cycadaceae	Marlborough blue	*Cycas ophiolitica*	Endangered	Endangered	This species grows in eucalypt open forest and woodland communities with a grassy understorey. It is frequently found on shallow, stony, infertile soils developed on sandstone and serpentinite. The species is often associated with species such as *Blakella dallachiana, Corymbia erythrophloia, Corymbia xanthope*, and *Eucalyptus fibrosa*. The	Unlikely. The Study Area occurs to the south of the known extent of the species. Habitat within the Study Area is considered marginal for the species. This species is noted on red clay soils near Marlborough, and often found on shallow, stony, infertile soils, which are developed on sandstone and serpentinite; all of these soils types are absent

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					climate in its habitat is tropical, characterized by hot, humid summers and mild, dry winters. The species is adapted to habitats subjected to periodic fires, which adult plants can resist, although the foliage may be destroyed and stems scarred.	from the Study Area. The closest record occurs 34 km to the north of the Study Area, however, this record has a spatial uncertainty of 2 km (ALA).
Combretaceae	-	*Dansiea elliptica*	-	Near threatened	The species occurs in lowland dry rainforest and vine thicket (notophyll vineforests, semi evergreen vine thickets) on substrates derived from greywacke (southern populations) or rhyolite and basalt (northern populations). Species associated with D. elliptica from a site in semi evergreen vine thicket include *Flindersia australis* and *Casuarina cristata*. In the Rundle Ranges, species such as *Gossia bidwillii, Drypetes deplanchei, Planchonella cotinifolia, Pleiogynium timorense* and *Terminalia porphyrocarpa* occur with *D. elliptica*. In notophyll-mesophyll rainforest in north-east Queensland, associated species include a canopy of *Polyscias elegans, Flindersia* spp., *Elaeocarpus eumundi, Synima, Cryptocarya mackinnoniana* and *Cryptocarya*	Unlikely. No suitable lowland dry rainforest or vine thicket habitat occurs within the Study Area which is largely non remnant with a small portion of alluvial eucalypt woodland. The closest record occurs approximately 8 km to the east, from 2000, and has a spatial accuracy of 2 km (ALA).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					vulgaris on soil derived from rhyolite.	
Myrtaceae	-	*Decaspermum struckoilicum*	Endangered	Endangered	The species is only known from two populations in Qld, both about 8 km east of Mount Morgan, in the area known as Struck Oil. It occurs in semi-evergreen vine thicket on brown or reddish soil, often in disturbed areas and at elevations up to 300 m. The northern population comprises only 1 plant, where the northern population possibly comprises 17. Both populations occur in remnant vegetation.	Unlikely. No suitable semi-evergreen vine thicket habitat occurs within the Study Area. This species has an extremely limited distribution. The closest record occurs approximately 22 km to the north-east of the Study Area (ALA).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Poaceae	Bluegrass	*Dichanthium setosum*	Vulnerable	Least Concern	This species is associated with heavy basaltic black soils and stony red-brown hard-setting loam with clay subsoil. It is found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land, and highly disturbed pasture. The species is also found in habitats that overlap with several EPBC Act-listed threatened ecological communities, including semi-evergreen vine thickets of the Brigalow Belt and Brigalow (*Acacia harpophylla* dominant and co-dominant).	Unlikely. While suitable habitat may be present within cleared woodland and high disturbed pasture, the species has not been recorded within 200 km of the Study Area (ALA).
Myrtaceae	-	*Eucalyptus raveretiana*	Vulnerable	Vulnerable	This species thrives on the banks of rivers, creeks, and other watercourses, preferring clayey or loamy soils. Several populations are located in areas of remnant vegetation, which are protected from broad-scale vegetation clearing.	Unlikely. No suitable river, creek or watercourse habitat occurs within the Study Area. A small patch of alluvial eucalypt woodland occurs in the east of the Study Area, which is regrowth vegetation and is heavily degraded. The species was not recorded within this patch. The closest records approximately 40 km to the north-west of the Study Area (ALA).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Hernandiaceae	-	*Hernandia bivalvis*	-	Near Threatened	This species exhibits a restricted distribution within central coastal and south-eastern Queensland, documented from near Proserpine to Mount Tamborine. This arboreal species preferentially inhabits rainforests established on rocky pavements and outcrops characterized by shallow soils. Queensland Herbarium records primarily associate *H. bivalvis* with two distinct rainforest communities: vine thicket and microphyll vine forest. Furthermore, its elevational range extends up to 620 m ASL.	Unlikely. No suitable rainforest habitat occurs within the Study Area which is largely non remnant with a small portion of alluvial eucalypt woodland. The closest record occurs approximately 9 km to the north-west of the Study Area, from 2006 (ALA).
Apocynaceae	Shrubby bush pear	*Leichhardtia brevifolia*	Vulnerable	Vulnerable	This species is known to occur in woodlands dominated by *Corymbia erythrophloia* and *Eucalyptus crebra*, with dense *Themeda triandra* understorey on basalt. Plants occurring north of Rockhampton grow on serpentine rock outcrops or on black crumbly soils derived from serpentine in woodland dominated by *Corymbia xanthope* and *Eucalyptus fibrosa*.	Unlikely. No suitable woodland habitat, rocky outcrops or serpentine rocks occurs within the Study Area. The closest record occurs approximately 42 km to the north, from 2005 (ALA).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Asteraceae	-	*Leuzea australis*	Vulnerable	Vulnerable	Within Qld this species has a known distribution range of 600 km from Mt Moffat to Gatton. While the total population size and extent of occurrence are unknown, one population has been estimated to contain 1,000 individual plants. Most populations, however, are significantly smaller. This species typically grows in eucalypt open forests with grassy understories, often found on roadsides and road reserves. It is commonly associated with *Chloris gayana, Cirsium vulgare, Eucalyptus tereticornis* and *Angophora floribunda* on black clay soil.	Unlikely. An extremely limited area of suitable eucalypt open forest habitat occurs within the Study Area. Clacking black clay soils are not present within the Study Area. The species was not observed within this area during field surveys. The closest record occurs approximately 78 km to the south of the Study Area, from 1947 (ALA).
Combretaceae	-	*Macropteranthes leiocaulis*	-	Near threatened	The species occurs in central-east Queensland, known from Mingela Bluff south of Townsville to Binjour Plateau west of Maryborough in dry rainforest, vine thicket communities, semi-evergreen vine thickets and araucarian microphyll vine forests.	Unlikely. No suitable rainforest or vine thicket habitat is present within the Study Area which is largely non remnant with a small portion of alluvial eucalypt woodland. The closest record occurs approximately 13 km to the north-east, from 1943, with a spatial accuracy of 25 km.

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Rhamnaceae	-	*Polianthion minutiflorum*	Vulnerable	Vulnerable	This species has a scattered distribution across five locations in eastern Queensland. Ranging approximately 800 km, records exist from Redcliffe Vale (west of Mackay) south to the Kingaroy area. Its preferred habitat includes forest and woodland on sandstone slopes and gullies. These areas may have skeletal soil or deeper soils near weathered laterite. Specific documented locations include Redcliffe Vale, near Blackwater, the Callide Range, East Boogalgopal, and the Kingaroy area. While the extent of its occurrence is unknown, herbarium records suggest varying population densities across its range, from rare to common. This species falls within the Burdekin, Fitzroy, and Burnett Mary (Queensland) Natural Resource Management Regions.	Unlikely. No forest or woodland habitat on sandstone slopes and gullies occur within the Study Area. The closest record occurs approximately 48 km to the south, from 1995 (ALA).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Simaroubaceae	Quassia	*Samadera bidwillii*	Vulnerable	Vulnerable	The species occurs in lowland rainforest or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland. It is commonly found in areas adjacent to both temporary and permanent watercourses in locations up to 510 m altitude. The species occurs on lithosols, skeletal soils, loam soils, sands, silts and sands with clay subsoils.	Unlikely. No suitable rainforest habitat, and extremely limited open forest and woodland habitat occurs within the Study Area. The closest record occurs approximately 5 km to the west of the Study Area, from 2023 (ALA).
Fauna						
Bird	Common sandpiper	*Actitis hypoleucos*	Migratory, Marine	Special Least Concern	This species utilises a wide range of coastal wetlands and some inland wetlands with varying levels of salinity. The species is mostly found around muddy margins or rocky shores and rarely on mudflats. It has been recorded in estuaries and deltas of streams, as well as on banks further upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties.	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. No other wetland habitat is present within the Study Area. Records from the region occur. The closest record is approximately 24 km north of the Study Area, dated 2014 (ALA, 2025).
Bird	Fork-tailed swift	*Apus pacificus*	Migratory, Marine	Special Least Concern	This species is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher.	**High**. Likely to occur overhead throughout the Study Area, as this species frequently visits the region on migration and utilises updrafts from hills and ridges to

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
						maintain flight. The nearest record is approximately 21 km north-east of the Study Area, dated 2023 (ALA, 2025).
Bird	Ruddy turnstone	*Arenaria interpres*	Vulnerable, Migratory, Marine	Special Least Concern	This species can be found along rocky shores, sandy beaches, and mudflats, often near estuaries, inlets, and coastal lagoons.	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. No other wetland habitat is present within the Study Area. Records from the region occur along the coast. The closest record is approximately 35 km north of the Study Area near Gracemere, undated with a high spatial uncertainty of 54 km (ALA, 2025).
Bird	Australasian bittern	*Botaurus poiciloptilus*	Endangered	Endangered	This species occurs mainly in freshwater wetlands and, rarely, in estuaries or tidal wetlands. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats,	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. No other wetland habitat is present within the Study Area. The nearest record is approximately 36 km north-east of the Study Area along the banks

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					particularly those dominated by sedges, rushes and reeds.	of the Fitzroy River, dated 2003 (ALA, 2025).
Bird	Sharp-tailed sandpiper	*Calidris acuminata*	Vulnerable, Migratory, Marine	Special Least Concern	This species prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland. It also occurs in salt works and sewage farms.	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. No other wetland habitat is present within the Study Area. The majority of records from the region occur along the coast. The closest record occurs approximately 12 km north-east of the Study Area, dated 2004 (ALA).
Bird	Curlew sandpiper	*Calidris ferruginea*	Critically Endangered, Migratory	Critically Endangered	This species mainly occurs on intertidal mudflats in sheltered coastal areas such as estuaries, bays, inlets and lagoons, and around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded less often inland, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand, occurring in both fresh and brackish waters.	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. No other wetland habitat is present within the Study Area. Records from the region occur along the coast away from the site. Two records occur approximately 16 km north-east of the Study Area, dated 1997 and undated (ALA, 2025).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Bird	Pectoral sandpiper	*Calidris melanotos*	Migratory	Special Least Concern	This species prefers shallow fresh to saline wetlands. It is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. No other wetland habitat is present within the Study Area. Two records occur approximately 66 km north-east of the Study Area, dated 1987 and 1990 (ALA, 2025).
Bird	Red-necked stint	*Calidris ruficollis*	Migratory	Special Least Concern	This species has been recorded in all coastal regions and found inland in all states when conditions are suitable. They are mostly found in coastal areas, including in sheltered inlets, bays, lagoons, and estuaries with intertidal mudflats, often near spits, islets, and banks and, sometimes, on protected sandy or coralline shores. They are occasionally recorded in other wetland areas where suitable.	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. No other wetland habitat is present within the Study Area. Records from the region occur along the coast. Two records occur approximately 16 km north-east of the Study Area, dated 1997 and undated (ALA, 2025).
Bird	Glossy black-cockatoo (northern)	*Calyptorhynchus lathami erebus*	-	Vulnerable	This species prefers habitat dominated by *Allocasuarina* spp., or open sclerophyll forests and woodlands with a stratum of *Allocasuarina* spp. beneath a	Low. No habitat woodlands or forests dominated by *Allocasuarina* spp. or *Casuarina* species were present within the Study Area and no mature

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					canopy of myrtaceous species. Has been recorded using habitat with mixed species of *Allocasuarina* spp., *Casuarina* spp., *Callitris* spp. and *Acacia harpophylla*. Requires tree hollows, usually mature Eucalyptus for breeding.	eucalypt trees bearing large hollows suitable to this species were present within the Study Area. An ALA record from 1994 with a spatial uncertainty of 20 km occurs approximately 22 km north-west of the Study Area (ALA, 2025). No other non-historical records are located in proximity to the Study Area.
Bird	Greater sand plover	*Charadrius leschenaultii*	Vulnerable, Migratory	Vulnerable	This species is almost entirely coastal, inhabiting littoral and coastal wetlands. It occurs in a variety of sheltered coastal habitat including beaches, mudflats and sand banks. It roosts on sand spits and banks usually above the high tide mark.	Unlikely. Suitable habitat does not occur within the Study Area. Records for this species occur within the wider Project region though are further east towards the coast. The nearest record is approximately 22 km north-east of the Study Area, dated 2023 (ALA, 2025).
Bird	Oriental cuckoo	*Cuculus optatus*	This species was delisted 8 November 2024, however, has been considered in this report as it was listed migratory at	Special Least Concern	This species uses a range of vegetated habitats such as monsoon rainforest, wet sclerophyll forest, open woodlands and often along edges of forests, or ecotones between forest types.	**Moderate**. This species is unlikely to occur within majority of the Study Area due to the dominance of non-remnant vegetation, however, a small area of open-woodland habitat occurs within the reserve of South Ulam Road in the eastern portion of the Study Area. This habitat may provide suitable habitat for oriental cuckoo. The Study Area occurs within the species 'may occur' distribution.

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
			the time of the referral.			This species has been recorded within 32 km north-west of the Study Area (record undated and spatial uncertainty of 9 km) (ALA, 2025).
Bird	Coxen's fig-parrot	*Cyclopsitta diophthalma coxeni*	Critically Endangered	Critically Endangered	This species occurs in rainforest habitats including subtropical rainforest, dry rainforest, littoral and developing littoral rainforest, and vine forest, from sea level to approximately 900 m ASL. The species is likely to favour alluvial areas that support figs and other trees with fleshy fruits. It has also been recorded in other habitat types including corridors of riparian vegetation in woodland, open woodland or other types of cleared habitat and isolated stands of fig or other trees on urban, agricultural or cleared land.	Unlikely. The Study Area is located north of the historic range of the species. The Study Area does not provide suitable habitat of vine forest and riparian woodland habitats. The closest record is over 120 km south-east of the Study Area, within the Bulburin National Park (dated 1970) (ALA, 2025).
Bird	Yellow chat	*Epthianura crocea macgregori*	Critically Endangered	Endangered	This species occupies seasonally inundated marine plains with salt-tolerant grasses and sedges, and patches of samphire. These marine plains are generally treeless with the exception of adjacent mangroves and generally receive significant freshwater flows during the wet season (December–February) before drying out. These wetlands are generally less than 5	Unlikely. The Study Area is not located within a tidal influenced area and lacks marine plains. Three records occur within 15 km of the Study Area on ALA. All records are recent (2012, 2016, 2018) and verified (ALA, 2025). However, due to sensitivity concerns, the coordinates of the records have been generalised by 2 km. Chats have a high

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					m ASL and either below or within 1.5 m of the highest astronomical tide. It is found at one location in Curtis Island National Park, and on private land at eight locations in the Fitzroy River delta and eight locations in the Broad Sound region. The total population size is estimated to be between 220–280 individuals, with the majority found in the Broad Sound, followed by the Fitzroy River delta and Curtis Island National Park. The bird is associated with levy banks or check banks that prevent saltwater ingress, which increase the wetland area, extend the period of freshwater inundation, and support the salt-tolerant sedges used for breeding.	dispersal capacity and adaptations for nomadism that allow them to exploit unpredictable environments, particularly following rainfall. Despite this, the distance from tidal areas and poor connection value afforded through narrow roadside vegetation (with low shrub cover) suggests the species is unlikely to occur.
Bird	Red goshawk	*Erythrotriorchis radiatus*	Vulnerable	Endangered	This species occurs in coastal and sub-coastal tall open forests and woodlands, preferring areas with a mosaic of vegetation types, permanent water and abundant small birds. This species is associated with gorge and escarpment country in partially cleared country in eastern Queensland. In eastern Australia, populations seem to move from inland nest sites to coastal plains	Low. This species was recently reported to be extinct in the region (Briggs & Noske 2021), and no records occur within the wider area surrounding the Study Area. Due to the lack of permanent water and the location of the Study Area in the region, no potential breeding habitat is identified. Habitat within the Study Area is unlikely to be suitable for foraging and

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					in winter, thus occupying home ranges of 50-220 km^2.	dispersal. Two historical records (both dated 1955) occur approximately 50 km north of the Study Area (ALA, 2025).
Bird	Grey falcon	*Falco hypoleucos*	Vulnerable	Vulnerable	This species frequents timbered lowland plains, particularly A*cacia* shrublands that are crossed by tree-lined water courses. It has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter.	Low. The Study Area is dominated by non-remnant, cleared vegetation which may create suitable hunting habitat for grey falcon in winter. One stream order 1 watercourse intersects the Study Area, however, very limited trees line this watercourse. One record occurs in Rockhampton approximately 46 km north of the Study Area, however, this record is undated and has a spatial uncertainty of 10 km (ALA, 2025).
Bird	Latham's snipe	*Gallinago hardwickii*	Vulnerable, Migratory	Special Least Concern	In Australia, this species occurs in permanent and ephemeral wetlands up to 2,000 m ASL. They usually inhabit open, freshwater wetlands with low, dense vegetation such as swamps,	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species.

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					flooded grasslands or heathlands, around bogs and other water bodies.	No other wetland habitat is present within the Study Area. Records from the region occur along the coast. The closest records occur near Bajool, approximately 20 km north-east of the Study Area (ALA, 2025). These records range from 2007 to 2023.
Bird	Squatter pigeon (southern)	*Geophaps scripta scripta*	Vulnerable	Vulnerable	This species occurs in open, dry woodland with a grassy understorey in proximity to permanent water. It prefers areas of sandy soil with sparser cover of low grasses; and is less common on heavier soils with dense grass cover.	**Moderate**. No farm dams or permanent water sources were present within the Study Area. The Study Area is therefore unlikely to provide any suitable breeding or foraging habitat for this species. However, the species has been identified more broadly in the area and may utilise the habitat within portions of Study Area as dispersal habitat. One ALA record, dated 2017, occurs approximately 1 km south of the Study Area (ALA, 2025).
Bird	Painted honeyeater	*Grantiella picta*	Vulnerable	Vulnerable	This species mostly occurs in woodland habitats which have an abundance of mistletoes. These woodlands are usually dominated by *Acacia* spp. (e.g. *A. harpophylla, A. pendula*, and *A. aneura*), *Casuarina cristata* and *Allocasuarina luehmannii*. Also	Low. Non-remnant habitat dominates the Study Area. A small area of eucalypt woodland occurs along the eastern extent of the Study Area within the reserve of South Ulam Road, however, no habitat dominated by mistletoe, Acacia, *Casuarina*

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					found in *Callitris glaucophylla* woodlands in the eastern part of their range, if mistletoes are abundant.	*cristata* or *Allocasuarina luehmannii* species. were observed. The closest record is approximately 48 km north of the Study Area in Rockhampton (ALA, 2025). However, the record has a high spatial uncertainty of 10 km and is dated 1881. The Study Area is just outside the species 'known' or 'may occur' distribution.
Bird	White-throated needletail	*Hirundapus caudacutus*	Vulnerable, Migratory	Vulnerable	This species is found across a range of habitats, more often over wooded areas, where it is almost exclusively aerial, though it roosts in tree hollows and the foliage canopy. It forages for insects aerially, flying anywhere between 'cloud level' and 'ground level', often forming mixed feeding flocks with other species. The species roosts in tall trees at night, mainly in forests.	**High**. The species was recorded in adjacent properties to the Study Area during surveys for the windfarm. White-throated needletail is unlikely to forage within the Study Area given the lack of suitable foliage present that is required foraging purposes, however, may still fly over the Study Area for dispersal purposes. Three records occur approximately 18 km north of the Study Area, dated 2021-2022 (ALA, 2025).
Bird	Caspian tern	*Hydroprogne caspia*	Migratory	Special Least Concern	This species can be found in various habitats that include seacoasts, bays, estuaries, lakes, marshes, and rivers.	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. No other wetland habitat is

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
						present within the Study Area. Records from the region occur along the coast, at least 18 km north-east of the Study Area (ALA, 2025).
Bird	Bar-tailed Godwit	*Limosa lapponica*	Migratory	-	This species is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons, and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh.	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. No other wetland habitat is present within the Study Area. Records from the region occur along the coast. The majority of records occur at least 18 km north-east of the Study Area (ALA, 2025).
Bird	Black-faced monarch	*Monarcha melanopsis*	This species was delisted 8 November 2024, however, has been considered in this report as it was listed migratory at the time of the referral.	Special Least Concern	This species primarily inhabits rainforests and wet forests. It is also found in eucalypt woodlands, coastal scrub, and damp gullies.	**Moderate**. Habitat potentially suitable for foraging and dispersal of this species has been identified in a remnant, small, open-forest patch (RE 11.3.4) within the eastern extent of the Study Area. The closest record is approximately 26 km north-west of the Study Area in Bouldercombe National Park dated 2022 (ALA, 2025).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Bird	Yellow wagtail	*Motacilla flava*	Migratory, Marine	Special Least Concern	Habitat requirements for this species are highly variable but typically include open grassy flats near water. Habitats include open areas with low vegetation such as grasslands, airstrips, pastures, sports fields; damp open areas such as muddy or grassy edges of wetlands, rivers, irrigated farmland, dams, waterholes; sewage farms, sometimes utilise tidal mudflats and edges of mangroves.	Unlikely. Suitable habitat for this species does not exist within the Study Area. The Study Area is dominated by non-remnant with no farm dams or damp, open areas present. The closest record of this species to the Study Area is approximately 72 km to the south-east of the Study Area, in Gladstone, dated 2016 (ALA, 2025).
Bird	Satin flycatacher	*Myiagra cyanoleuca*	This species was delisted 8 November 2024, however, has been considered in this report as it was listed migratory at the time of the referral.	Special Least Concern	This species primarily inhabits tall, wet sclerophyll forests and woodlands, particularly in densely vegetated gullies, along Australia's east coast. It also frequents higher areas and is found in eucalypt woodlands.	**Moderate**. Habitat potentially suitable for foraging and dispersal of this species has been identified in a remnant, small, open-woodland patch (RE 11.3.4) within the eastern extent of the Study Area. The closest record is approximately 13 km east of the Study Area, undated and a spatial uncertainty of 9 km (ALA, 2025).
Bird	Star finch (eastern, southern)	*Neochmia ruficauda ruficauda*	Endangered	Endangered	This species inhabits tall grass and reed beds associated with swamps and watercourses. It may also be found in grassy woodlands, open forests and mangroves. The	Low. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					condition of preferred habitat varies according to season, grazing pressure and fire.	wetland habitat for the species. The closest two records are in Rockhampton, 48 km north of the Study Area, both undated (ALA, 2025).
Bird	Eastern curlew	*Numenius madagascariensis*	Critically Endangered	Endangered	This species occurs in sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. This species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. They are often recorded among saltmarsh and on mudflats fringed by mangroves, sometimes within the mangroves. They are also found in coastal saltworks and sewage farms.	Unlikely. The closest record occurs approximately 14 km east of the Study Area, dated 1977 (ALA, 2025). The closest non-historical record occurs approximately 18 km north-east of the Study Area, dated 2016. However, due to the inland location of the Study Area and an absence of wetland habitat, the Study Area is unlikely to provide suitable habitat for this species.
Bird	Whimbrel	*Numenius phaeopus*	Migratory	Special Least Concern	This species is a regular migrant to Australia and New Zealand, with a primarily coastal distribution. It is often found on the intertidal mudflats of sheltered coasts. It is also found in harbours, lagoons, estuaries, and river deltas, often those with mangroves, but also open, unvegetated mudflats.	Unlikely. Two records occur approximately 16 km north-east of the Study Area, dated 1997 and undated (ALA, 2025). The closest recent record occurs approximately 20 km north of the Study Area, dated 2021. However, due to the inland location of the Study Area and an absence of wetland habitat, the

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
						Study Area is unlikely to provide suitable habitat for this species.
Bird	Osprey	*Pandion haliaetus*	Migratory, Marine	Special Least Concern	This species favours habitat that are in coastal areas, especially the mouths of large rivers, lagoons and lakes but also along the larger coastal rivers such as the Clarence where nesting occurs upriver of Grafton, NSW. In east and south-east Australia, this species mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts; usually with a dense shrubby understorey often including ferns.	Unlikely. The Study Area does not contain suitable foraging watercourses for this species. Records for the species within the broader project region are associated with the coast, and the large creeks and rivers. The closest, recent record is approximately 19 km east of the Study Area, dated 2022 (ALA, 2025).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Bird	White-tailed Tropicbird	*Phaethon lepturus*	Migratory	Special Least Concern	This species occupies marine habitats in tropical waters with sea-surface temperatures of more than 22°C. This species breeds on islands and atolls, where it nests in a variety of habitats including on bare sandy ground, in closed-canopy rainforest, on rocky cliffs and in quarries. It feeds over warm waters of low salinity close to Christmas Island. In Australian waters they are more pelagic.	Unlikely. This species is pelagic, and no suitable habitat occurs within the Study Area. All records for this species are off the coastline and do not occur within 50 km of the Study Area (ALA, 2025).
Bird	Glossy ibis	*Plegadis falcinellus*	Migratory, Marine	Special Least Concern	This species prefers habitat for foraging and breeding are freshwater marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation. This species is occasionally found in coastal locations such as estuaries, deltas, saltmarshes and coastal lagoons.	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. Majority of records from the region occur along the coast. The closest record occurs approximately 16 km north-east of the Study Area, dated 2017 (ALA, 2025).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Bird	Southern black-throated finch	*Poephila cincta cincta*	Endangered	Endangered	This species inhabits grassy, open woodlands and forests, typically dominated by *Eucalyptus* spp. (including *E. crebra*, *E. camaldulensis* and *E. melanophloia*), *Corymbia* spp. and *Melaleuca* spp, and occasionally in tussock grasslands or other habitats often along or near watercourses, or in the vicinity of water.	Unlikely. The location of the Study Area is outside of this species current 'may occur' distribution. Some grassy woodland habitat is present within the eastern extent of the Study Area, however, the groundcover is dominated by exotic species are primarily exotic and not tussock grasses. The closest record is in Rockhampton, 45 km north of the Study Area, is undated and has a spatial uncertainty of 2 km (ALA, 2025).
Bird	Rufous fantail	*Rhipidura rufifrons*	This species was delisted 8 November 2024, however, has been considered in this report as it was listed migratory at the time of the referral.	Special Least Concern	This species primarily inhabits the lower levels of dense vegetation in and around damp forest gullies, rainforests, and woodlands, often near water sources. They can also be found in swamp woodlands and mangroves.	**Moderate**. Habitat potentially suitable for foraging and dispersal of this species has been identified in a remnant, small, open-forest patch (RE 11.3.4) within the eastern extent of the Study Area. The closest record is approximately 17 km north-east of the Study Area, dated 2020 (ALA, 2025).
Bird	Australian painted snipe	*Rostratula australis*	Endangered	Endangered	This species occurs in shallow freshwater wetlands or saltmarshes, including inundated	Unlikely. No wetland or inundated habitat is present within the Study Area. Records of

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					grasslands, dams and bore drains, generally with good cover of grasses or low scrub.	this species occur within the wider Project region but are found on low lying marsh and swamp land which is not present within the Study Area. The closest record is 19 km east of the Study Area, dated 2014.
Bird	Little tern	*Sternula albifrons*	Migratory	Special Least Concern	This is a coastal species that lives and breeds in sheltered environments, such as lagoons, estuaries, lakes and bays, where they can find exposed sandbanks or sand-spits for nesting and roosting. They also inhabit ocean beaches, but less frequently. They feed on small fish and crustaceans in shallow waters, often near their colonies or the entrances of rivers and lagoons.	Unlikely. Two records occur approximately 16 km north-east of the Study Area, dated 1997 and undated (ALA, 2025). The closest recent record occurs approximately 20 km north of the Study Area, dated 2021. However, due to the inland location of the Study Area and a lack of suitable wetland habitat, the Study Area is unlikely to provide suitable habitat for this species.
Bird	Spectacled monarch	*Symposiachrus trivirgatus*	This species was delisted 8 November 2024, however, has been considered in this report as it was listed migratory at	Special Least Concern	This species inhabits various lush environments, including subtropical and tropical moist lowland forests, mangrove forests, and moist montane forests. They prefer areas with dense undergrowth and are often found near water sources like wet gullies and waterside vegetation. Their habitat also includes mangrove forests.	**Moderate**. Habitat potentially suitable for foraging and dispersal of this species has been identified in a remnant, small, open-forest patch (RE 11.3.4) within the eastern extent of the Study Area. The closest record is approximately 17 km north-east of the Study Area, dated 2020 (ALA, 2025).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
			the time of the referral.			
Bird	Campbell albatross	*Thalassarche impavida*	Vulnerable	Special Least Concern	This species is a seabird that nests on Campbell Island and Jeanette Marie, New Zealand. It spends the rest of the year in the waters around southern Australia, the Tasman Sea and the South Pacific Ocean. It feeds mainly in the areas south of New Zealand and the Chatham Rise to the Ross Sea. The species nests on ledges and steep slopes covered in low native grasses, tussocks and mud (Brooke 2004). Foraging during short trips extends 150-640 km from the breeding colony, mainly over subantarctic waters within the 1,000 m depth contour on the Campbell Plateau. Longer trips extend up to 2,000 km from the colony, ranging from subtropical to Antarctic waters, but mainly to the	Unlikely. This species is pelagic and no suitable habitat occurs within the Study Area. No records occur in Queensland.

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					Polar Frontal Zone or to the east of the Campbell Plateau.	
Bird	Wandering tattler	*Tringa incana*	Migratory	Special Least Concern	This species is found in mountains and hilly regions, as well as along streams and lakes in areas that are rocky, mossy, or covered with scrubby vegetation, and in damp meadows. Occasionally, it can also be found in forest clearings away from water. Additionally, this species can also be located in rocky seacoasts and islands, jetties, and sandy beaches of oceanic islands.	Unlikely. No suitable habitat is present within the Study Area. Two records occur approximately 16 km north-east of the Study Area, undated and dates 1997 (ALA, 2025).
Bird	Common greenshank	*Tringa nebularia*	Migratory	Special Least Concern	The species 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.	Unlikely. The nearest record occurs approximately 12 km north-east of the Study Area, dated 2004 (ALA, 2025). However, due to the inland location of the Study Area and a lack of wetland habitat, the Study Area is unlikely to provide suitable habitat for this species.

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Bird	Marsh sandpiper	*Tringa stagnatilis*	Migratory	Special Least Concern	This species inhabits warm inland wetlands from open steppe to boreal forest. It can be found in a variety of habitats, including shallow freshwater and brackish marshlands, grassy or marshy lake-edges, river valleys, flooded meadows, and occasionally salt-lake margins. It also occurs in inland freshwater and brackish wetlands such as rice paddy-fields, swamps, salt-pans, salt-marshes, sewage works, and marshy lake-edges. Although rare on open coastlines, it can occasionally be found on estuaries, lagoons, and intertidal mudflats	Unlikely. Multiple records occur approximately 16 km north-east of the Study Area, dated 1997 to 2019 (ALA, 2025). However, due to the inland location of the Study Area and a lack of wetland habitat, the Study Area is unlikely to provide suitable habitat for this species.
Bird	Black-breasted button-quail	*Turnix melanogaster*	Vulnerable	Vulnerable	This species is restricted to rainforests and forests, mostly in areas with 770-1,200 mm rainfall per annum. It prefers drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, Araucarian microphyll vine forest and Araucarian notophyll vine forest. They may also be found in low, dense acacia thickets and, in littoral areas, in vegetation behind sand dunes.	Low. No suitable forests or vine thickets are present within the Study Area. The nearest record is approximately 17 km north-east of the Study Area, dated 1955 (ALA, 2025).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Bird	Lesser sand plover	*Charadrius mongolus*	Endangered, Migratory	Endangered	This species can be found in several habitats such as beaches, mudflats, saltmarshes, and lagoons, which provide the necessary resources of food, shelter, and nesting sites. The species is known to occur in Queensland, specifically in the far north at Roebuck Bay, along the coastline of Cape York Peninsula, and in the Gulf of Carpentaria. These regions are significant stopover locations during the bird's migration and serve as essential wintering places for the species.	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. No other wetland habitat is present within the Study Area. Two records for the species occur approximately 17 km north-east of the Study Area, dated 2007 and 2023 (ALA, 2025).
Bird	Western Alaskan bar-tailed godwit	*Limosa lapponica baueri*	Endangered, Migratory	Vulnerable	This species feeds on intertidal flats and beaches, mainly on molluscs, crustaceans, worms, and insects. They prefer the upper tidal zone and feed mostly during the day. This species roost on sandflats, spits, banks, or sometimes mudflats, lagoons, and bays. They may also use artificial wetlands. They roost in high tide and move to lower tide areas for feeding. The species nest on dry elevated sites in the tundra, such as ridges, hummocks, or thickets.	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. No other wetland habitat is present within the Study Area. Records from the region occur along the coast. Majority of records occur at least 18 km north-east of the Study Area (ALA, 2025).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Bird	Southern giant-petrel	*Macronectes giganteus*	Endangered, Migratory, Marine	Endangered	This species breeds on six subantarctic and Antarctic islands under Australian control: Macquarie Island, Heard Island and McDonald Islands (Southern Ocean), and Giganteus Island, Hawker Island, and Frazier Island (Australian Antarctic Territories). This species ranges from Antarctic to subtropical waters, spending summers primarily in Antarctic regions, reaching as far south as the pack ice and the continent itself. Breeding sites encompass the Antarctic continent, peninsula, islands, subantarctic islands, and South America. In Antarctica, where there's no vegetation, nests are on exposed, snow-free coastal areas, open gravel plains, rocky features, ridges, slopes, mounds, raised beaches, or offshore rocks, ranging from 5-120 m ASL.	Unlikely. This species is pelagic and no suitable habitat occurs within the Study Area. No records occur within 30 km of the Study Area, with all records occurring along the coast. The nearest record is located approximately 66 km north of the Study Area, near Mulara, dated 1997 (ALA, 2025).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Bird	Fairy Prion (southern)	*Pachyptila turtur subantarctica*	Vulnerable	Least Concern	This species was first recorded on Macquarie Island. confirmed breeding locations are near this island at Langdon Point and Davis Point. A secondary location exists on the nearby Bishop and Clerk Islands (Garnett and Crowley 2000). The total population is estimated at around 50 breeding pairs (Brothers 1984). This species utilizes crevices, hollows beneath cushions of the perennial herb *Colobanthus muscoides*, or burrows in peaty soil covered by the perennial herb *Cotula plumosa* for nesting are constructed at the end of a burrow or within a suitable rocky crevice.	Unlikely. This species is pelagic and no suitable habitat occurs within the Study Area. No records occur within 100 km of the Study Area, with all records occurring along the coast (ALA, 2025).
Bird	Shy albatross	*Thalassarche cauta*	Endangered, Migratory, Marine	Endangered	This species, endemic to Australia, breeds on three Tasmanian island colonies (Albatross Island, Pedra Branca, Mewstone) in the southern Indian Ocean. These rocky islands provide nesting habitat, where the species constructs mound nests using soil, grass, and roots. The species occurs in coastal areas, large bays, and open seas.	Unlikely. This species is pelagic, and no suitable habitat is present within the Study Area. One record occurs 12 km (dated 2000) to the south of the Study Area, however, is considered unreliable. Comments from the records metadata state the observation is from Yeppoon, 60 km north of the Study Area (ALA, 2025).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Mammal	Large-eared pied bat	*Chalinolobus dwyeri*	Vulnerable	Endangered	This species requires a combination of sandstone cliff/escarpment to provide roosting habitat that is adjacent to higher fertility sites, particularly box gum woodlands or river/rainforest corridors which are used for foraging. Most records are from canopied habitat, although narrow connecting riparian strips in otherwise cleared habitat are sometimes quite heavily used. No maternity roost sites are known in Queensland.	Low. No suitable habitat within the Study Area exists for this species. The Study Area predominantly is dominated by non-remnant vegetation and no box gum woodlands or river/ rainforest corridors are present. Sandstone cliffs suitable for roosting within or nearby the Study Area are absent. No records are present within 100 km of the Study Area (ALA, 2025).
Mammal	Northern quoll	*Dasyurus hallucatus*	Endangered	Least Concern	This species is highly adaptable, and can occupy a diverse range of habitats, including eucalypt forests, woodlands, rainforests, sandy lowlands and beaches, shrublands, grasslands and deserts. While rocky areas are the preferred habitat for denning purposes, the species is also known to occupy non-rocky lowland habitats such as beach scrub communities in central Queensland. They generally encompass surroundings that are vegetated to provide foraging and dispersal opportunities. Rocky habitats, which are often rugged and dissected, provide high relief	**Moderate**. A small area of eucalypt dominated open-woodland habitat occurs along the eastern end of the Study Area, within the reserve of South Ulam Road and may provide suitable foraging and dispersal habitat for this species. Suitable habitat does not occur within most of the Study Area where non-remnant vegetation is the dominant habitat type. Northern quoll was recorded from surveys within remnant habitats associated with high relief area to the west of the Study Area. The nearest ALA record occurs approximately 22 km north-east

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					and are the most suitable habitats for the species. Hollow logs are also important to offer shelter and habitat for the species and are known to be used by the species for nesting and denning. Other denning sites for the species include termite mounds and tree hollows.	of the Study Area, near Bouldercombe Gorge National Park, dated 1994 with a spatial uncertainty of 20 km.
Mammal	Ghost bat	*Macroderma gigas*	Vulnerable	Endangered	This species occurs throughout 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 species are undisturbed caves or mineshafts which have several openings.	**Moderate**. The majority of the Study Area comprises non-remnant vegetation and is considered unsuitable for this species, however, a small area of eucalypt open-woodland habitat within the eastern extent of the Study Area (within the reserve of South Ulam Road) may provide suitable foraging and dispersal habitat, particularly during the non-breeding season when the species is known to disperse large distances (up to 150 km from permanent roosts). Suitable roosting habitat is not found within the Study Area nor is it known from any location within 20 km. This species is known historically from the Rockhampton region, and the Mt Etna maternity roost is located 56 km north of the Study Area.

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
						The closest record to the Study Area is 36 km to the north, from 1994 which has a spatial uncertainty of 20 km (ALA, 2025). However, due to the habitat within the eastern extent of the Study Area potentially providing suitable foraging and dispersal habitat, the species has conservatively been determined to have a moderate likelihood of occurring.
Mammal	South-eastern long-eared bat	*Nyctophilus corbeni*	Vulnerable	Vulnerable	This species inhabits a range of inland dry forest habitats including *Eucalyptus camaldulensis, Acacia harpophylla* and other arid and semi-arid habitats; in southern Queensland it is more common in box, ironbark and cypress pine forests on sandy soils. The species is most abundant in vegetation with a distinct canopy and a dense, cluttered shrub layer, and in large, continuous remnants. Roosts solitarily in tree hollows, crevices, and under loose bark (particularly on dead *Allocasuarina luehmannii* or *Casuarina cristata*).	Low. No suitable areas of large, continuous remnant vegetation with a dense, cluttered shrub layer is present within the Study Area. No records occur within 100 km; however, records are generally lacking due to the inability to distinguish this genus based on call data.

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Mammal	Yellow-bellied glider	*Petaurus australis australis*	Vulnerable	Vulnerable	This species occurs in eucalypt-dominant forests and woodlands. Prefers large, patches of mature old-growth forest that provide suitable trees for foraging and shelter. This species require a diverse range of tree species for food throughout the year, feed on sap from certain tree species and are unlikely to persist in forests dominated by only one or two tree species. Locally favoured trees (in order of importance) are *Eucalyptus longirostrata* and *Eucalyptus biturbinata*), *Eucalyptus tereticornis*, *Eucalyptus moluccana* and *Corymbia citriodora*. They have been found in tree hollows with a minimum entrance size of 5 cm. Stags (standing dead trees) account for only 2% of den trees in certain forest types.	Low. The majority of the Study Area comprises non-remnant vegetation is considered unsuitable for yellow-bellied glider. A small patch of eucalypt woodland within the reserve of South Ulam Road was deemed marginal habitat, however, occurs in an isolated, fragmented patch with poor connectivity. Additionally, it also has poor floristic diversity and few mature trees. Therefore, this habitat is not considered suitable. This species has been recorded on adjacent properties during field surveys for the Project. The closest ALA record occurs approximately 22 km north of the Study Area, near Mount Morgan dated 1994 and a spatial uncertainty of 20 km.

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Mammal	Koala (combined populations of Qld, NSW and the ACT	*Phascolarctos cinereus*	Endangered	Endangered	This species inhabits a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by eucalypt species. The species is limited by habitat (restricted to below 800 m ASL), temperature and, at the western and northern ends of the range, leaf moisture.	**High**. This species is known to the region, including the approved Mt Hopeful wind farm site (recorded from higher elevation woodland). A small patch of open-forest dominated by *E. crebra* and *E. tereticornis* occurs along the eastern extent of the Study Area and may provide potential climate refugia habitat. The closest record is approximately 11 km south-east of the Project Area, dated 1940 and a spatial uncertainty of 9 km (ALA, 2025).
Mammal	Grey-headed flying-fox	*Pteropus poliocephalus*	Vulnerable	Least Concern	This species requires both foraging resources and roosting sites. For foraging, the species utilises rainforests, open forests, closed and open woodlands, *Melaleuca* swamps and *Banksia* woodlands. They roost in aggregations of various sizes on exposed branches. Roost sites are typically located near water, such as lakes, rivers or the coast. Roost vegetation includes rainforest patches, stands of *Melaleuca*, mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and	Low. Habitat potentially suitable for foraging has been identified in a remnant, small, open-forest patch (RE 11.3.4) within the eastern extent of the Study Area. This small area contains suitable winter/spring foraging species including *E. crebra* and *E. tereticornis*. The closest known roost is located 42 km north of the Study Area, at Kabra (camp 362), however this roost has not recorded grey-headed flying-foxes since 2017. A camp at Wowan (camp 755), 45 km south-west of the Study Area

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					suburban areas. The grey-headed flying-fox is highly mobile and the national population is fluid, moving up and down the east coast in search of food.	exits, however, has not recorded the species since 2019. The closest record of the species is 46 km north of the Study Area in Rockhampton (no date provided). A number of other records occur in the wider Rockhampton area (ALA, 2025). However, the species range may be contracting south as it is no longer thought to regularly inhabit the Rockhampton region, as per its Listing Advice. Given the Study Area is not proximal to a known roost, the species is considered to have a low likelihood of utilising the Study Area at any time.
Mammal	Short-beaked echidna	*Tachyglossus aculeatus*	-	Special Least Concern	This species occupies a variety of habitat types including non-remnant vegetation in both coastal and inland regions.	**High**. Suitable habitat is present within the Study Area. The closest record is approximately 16 km north-east of the Study Area, dated 1993 (ALA, 2025).
Mammal	Greater glider (southern and central)	*Petauroides volans*	Endangered	Endangered	This species is largely restricted to eucalypt forests and woodlands; it is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows.	**Moderate**. The closest record occurs approximately 40 km east of the Study Area, dated 2024 and a spatial uncertainty of 30 km. This species is known to the region, including the approved Mount Hopeful Windfarm site (recorded from higher elevation woodland).The majority of the

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
						Study Area contains non-remnant vegetation and is considered unsuitable for greater glider (southern and central), however, a small area of the eastern extent within South Ulam Road reserve contains large trees with a DBH >50 cm and medium sized hollows (although rare) is conservatively considered as providing suitable denning habitat.
Mammal	Water mouse	*Xeromys myoides*	Vulnerable	Vulnerable	This species habitat includes mangrove communities and adjacent sedgelands, grasslands and freshwater wetlands. A supralittoral bank where present maybe be utilised by this species for nesting. The water mouse may nest or forage in the following Queensland Regional Ecosystems considered essential habitat for this species: 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.	Unlikely. No appropriate watercourses or wetlands are present within the Study Area. The closest record is approximately 22 km north-east of the Study Area, dated 2024 (ALA, 2025).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Reptile	Salt-water crocodile	*Crocodylus porosus*	Migratory	Vulnerable	This species mostly occurs in tidal rivers, coastal floodplains and channels, billabongs and swamps up to 150 km inland from the coast. It usually inhabits the estuarine reaches of rivers. In Queensland, the species is usually restricted to coastal waterways and floodplain wetlands. Floating rafts of vegetation provide important nesting habitat.	Unlikely. One stream order 1 watercourse intersects the Study Area, however, is highly ephemeral and seldom flows and is therefore unlikely to provide suitable wetland habitat for the species. No other wetland habitat is present within the Study Area. The closest record is approximately 22 km north-west of the Study Area, near Bouldercombe Gorge Conservation Park, undated and a spatial uncertainty of 1 km (ALA, 2025).
Reptile	Collared delma	*Delma torquata*	Vulnerable	Vulnerable	This species is typically found in eucalypt-dominated woodlands and open-forests in Qld Regional Ecosystem Land Zones 3 (alluvium), 9 (undulating country on fine-grained sedimentary rocks), and 10 (sandstone ranges). The presence of rocks, logs, coarse woody debris, and leaf litter are essential characteristics of its microhabitat.	Low. A small area of eucalypt dominated open-woodland with a land zone of 3 (RE 11.3.4) occurs along the eastern end of the Study Area within the reserve of South Ulam Road. However, this patch was dominated by dense introduced grasses and lacked the required microhabitat for the species. A record from 1989 is located within the south of the Project Area (12 km south of the Study Area). However, details of the record indicate it has a spatial inaccuracy of 100 km (ALA, 2025). Record is thus considered unreliable.

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Reptile	Ornamental snake	*Denisonia maculata*	Vulnerable	Vulnerable	This species inhabits lower-lying subtropical areas with deep-cracking clay soils and adjacent slightly elevated ground of clayey and sandy loams. The species is also found in vegetation of woodland and shrub land, including *Acacia harpophylla*, riverside woodland and open forest, particularly on natural levees.	Unlikely. Suitable habitat does not exist within the Study Area. No deep-cracking clay soils or sandy loams were present. The closest record occurs approximately 30 km north of the Study Area, dated 1973 (ALA, 2025).
Reptile	Yakka skink	*Egernia rugosa*	Vulnerable	Vulnerable	This species occurs in a variety of drier forests and woodlands, usually on well-drained, gritty soils, including *Eucalyptus populnea* on alluvial soils, *Callitris glaucophylla* on sands, *Allocasuarina luehmannii*, *Acacia harpophylla, A. catenulata* and *A. aneura*. The species inhabits burrows, abandoned rabbit warrens, and hollow logs or in deep rock crevices.	Low. Suitable habitat does not exist within the Study Area. Non-remnant vegetation with scattered trees dominated the Study Area. The nearest record occurs approximately 21 km north-east of the Study Area, undated and a spatial uncertainty of 2 km, therefore considered unreliable (ALA, 2025).
Reptile	Southern snapping turtle	*Elseya albagula*	Critically Endangered	Critically Endangered	This species is only found in the Burnett, Fitzroy, Raglan and Mary River drainages of south-east Queensland. It prefers permanent flowing water habitats where there are suitable shelters and refuges.	Unlikely. This species has been recorded from creeks in the wider region. The Study Area lacks suitable watercourses to support this species. The closest record occurs approximately 15 km east of the Study Area (ALA, 2025).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
Reptile	Dunmall's snake	*Furina dunmalli*	Vulnerable	Vulnerable	This species has been found in a broad range of habitats, including forests and woodlands on black alluvial cracking clay/clay loams dominated by including *Acacia harpophylla* and other *Acacia* spp., *Callitris* spp. or *Allocasuarina luehmannii*, and various *Corymbia citriodora, Eucalyptus crebra* and *E. melanophloia*) and *Callitris glaucophylla* open forest and woodland associations on sandstone derived soils.	Low. Cracking clay or clay loam soils do not occur within the Study Area. The Study Area is within the species 'may' occur range on SPRAT. One record from 1971 occurs at Raglan, 22 km north-east of the Study Area. The only other record in the wider region occurs within Rockhampton.
Reptile	Grey snake	*Hemiaspis damelii*	Endangered	Endangered	In Queensland, this species habitat is *Acacia harpophylla* and *Casuarina cristata* woodlands on heavy, dark brown to black cracking clay soils, particularly in association with water bodies, areas with small gullies and ditches, and floodplain environments where the species shelters beneath logs, rocks and soil cracks (Queensland Government 2020). Habitat in Queensland also includes *Dichanthium sericeum* and/or *Astrebla* spp. grassland on alluvial plains with cracking clay soils (Queensland Herbarium 2021). This species occurrence on the western downs of Queensland has	Unlikely. The Study Area does not contain any habitat on cracking clay soils. The Study Area is within the species 'may' occur range on SPRAT. An undated record occurs at Bajool, 16 km north of the Study Are with a 3.6 km spatial uncertainty (ALA, 2025).

Family/Type	Common name	Scientific name	EPBC Act listing	NC Act listing	Habitat	Likelihood of Occurrence
					a strong positive association with red sodosol soils which have a strong texture contrast between the A horizon and sodic B horizon, and which are often quite dense and coarsely structured (blocky, prismatic or columnar peds) favouring the crack-inhabiting and foraging ecology of this species (Apan et al. 2010). Key attributes of grey snake habitat are the floodplains and ephemeral wetlands which provide breeding habitat for the frog species that are its main prey, the presence of the frog species themselves, and the heavy clay soils which provide and cracks and crevices that the species uses in its hunting strategy and for shelter	

Appendix C

Flora and Fauna Species List



C.1 Flora

Family	Scientific name	Common name	EPBC Act Status	NC Act Status
Amaranthaceae	*Gomphrena conica**	-	-	-
Apocynaceae	*Alyxia ruscifolia*	-	-	Least concern
Apocynaceae	*Cryptostegia grandiflora**	Rubber vine	-	-
Apocynaceae	*Gomphocarpus physocarpus**	Balloon cottonbush	-	-
Asteraceae	*Ageratum conyzoides* subsp. *conyzoides**	-	-	-
Asteraceae	*Chrysocephalum apiculatum*	Yellow buttons	-	Least concern
Asteraceae	*Cirsium vulgare**	Spear thistle	-	-
Asteraceae	*Cyanthillium cinereum*	-	-	Least concern
Asteraceae	*Pterocaulon redolens*	-	-	Least concern
Cactaceae	*Opuntia tomentosa**	Velvety tree pear	-	-
Campanulaceae	*Wahlenbergia gracilis*	Sprawling bluebell	-	Special least concern
Celastraceae	*Denhamia oleaster*	-	-	Least concern
Convolvulaceae	*Evolvulus alsinoides*	-	-	Least concern
Cycadaceae	*Cycas megacarpa*	-	Endangered	Endangered
Cyperaceae	*Cyperus gracilis*	-	-	Least concern
Cyperaceae	*Fimbristylis dichotoma*	Common fringe-rush	-	Least concern
Euphorbiaceae	*Euphorbia hirta**	-	-	-
Laxmanniaceae	*Lomandra filiformis*	-	-	Least concern
Lecythidaceae	*Planchonia careya*	Cockatoo apple	-	Least concern
Leguminosae	*Acacia leiocalyx*	-	-	Least concern
Leguminosae	*Chamaecrista rotundifolia**	-	-	-
Leguminosae	*Crotalaria montana*	-	-	Least concern
Leguminosae	*Flemingia parviflora*	Flemingia	-	Least concern
Leguminosae	*Indigofera linnaei*	Birdsville indigo	-	Least concern
Leguminosae	*Indigofera pratensis*	-	-	Least concern
Leguminosae	*Neptunia* sp.	-	-	Least concern
Leguminosae	*Stylosanthes scabra**	-	-	-
Leguminosae	*Vachellia bidwillii*	-	-	Least concern
Leguminosae	*Vachellia karroo**	Karroo thorn	-	-

Family	Scientific name	Common name	EPBC Act Status	NC Act Status
Malvaceae	*Malvastrum americanum* var. *americanum**	-	-	-
Malvaceae	*Sida cordifolia**	-	-	-
Malvaceae	*Sida hackettiana*	-	-	Least concern
Moraceae	*Ficus opposita*	-	-	Least concern
Myrtaceae	*Blakella tessellaris*	Moreton Bay ash	-	Least concern
Myrtaceae	*Corymbia erythrophloia*	Variable-barked bloodwood	-	Least concern
Myrtaceae	*Eucalyptus crebra*	Narrow-leaved red ironbark	-	Least concern
Myrtaceae	*Eucalyptus tereticornis*	-	-	Least concern
Myrtaceae	*Melaleuca bracteata*	-	-	Least concern
Myrtaceae	*Melaleuca leucadendra*	Broad-leaved tea-tree	-	Least concern
Oxalidaceae	*Oxalis* sp.	-	-	Least concern
Phyllanthaceae	*Phyllanthus virgatus*	-	-	Least concern
Pittosporaceae	*Pittosporum spinescens*	-	-	Least concern
Poaceae	*Aristida sp.*	-	-	Least concern
Poaceae	*Bothriochloa bladhii*	-	-	Least concern
Poaceae	*Bothriochloa pertusa**	-	-	-
Poaceae	*Eragrostis* sp.	-	-	Least concern
Poaceae	*Heteropogon contortus*	Black speargrass	-	Least concern
Poaceae	*Imperata cylindrica*	Blady grass	-	Least concern
Poaceae	*Megathyrsus maximus* var. *maximus*	Guinea grass	-	Least concern
Poaceae	*Melinis repens**	Red natal grass	-	-
Poaceae	*Sarga leiocladum*	-	-	Least concern
Polygonaceae	*Polygonum* sp.	-	-	Least concern
Portulacaceae	*Portulaca pilosa**	-	-	-
Rhamnaceae	*Alphitonia excelsa*	Soap tree	-	Least concern
Sapotaceae	*Planchonella* sp.	-	-	Least concern
Scrophulariaceae	*Eremophila debilis*	Winter apple	-	Least concern
Sparrmanniaceae	*Grewia latifolia*	Dysentery plant	-	Least concern
Verbenaceae	*Lantana camara**	Lantana	-	-

C.2 Fauna

Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status
Acanthizidae	*Gerygone olivacea*	White-throated gerygone	-	Least concern
Accipitridae	Aquila *audax*	Wedge-tailed eagle	-	Least concern
Alcedinidae	*Dacelo novaeguineae*	Laughing kookaburra	-	Least concern
Artamidae	*Cracticus nigrogularis*	Pied butcherbird	-	Least concern
Artamidae	*Gymnorhina tibicen*	Australian magpie	-	Least concern
Artamidae	*Strepera graculina*	Pied currawong	-	Least concern
Cacatuidae	*Cacatua galerita*	Sulphur-crested cockatoo	-	Least concern
Cacatuidae	Eolophus roseicapilla	Galah	-	Least concern
Campephagidae	*Coracina novaehollandiae*	Black-faced cuckoo-shrike	-	Least concern
Cuculidae	*Cacomantis flabelliformis*	Fan-tailed cuckoo	-	Least concern
Corvidae	*Corvus orru*	Torresian crow	-	Least concern
Falconidae	*Falco berigora*	Brown falcon	-	Least concern
Falconidae	*Falco cenchroides*	Nankeen kestrel	-	Least concern
Maluridae	*Malurus melanocephalus*	Red-backed fairy-wren	-	Least concern
Meliphagidae	*Entomyzon cyanotis*	Blue-faced honeyeater	-	Least concern
Meliphagidae	*Lichenostomus virescens*	Singing honeyeater	-	Least concern
Meliphagidae	*Lichmera indistincta*	Brown honeyeater	-	Least concern
Meliphagidae	*Manorina melanocephala*	Noisy miner	-	Least concern
Meliphagidae	*Melithreptus albogularis*	White-throated honeyeater	-	Least concern
Motacillidae	*Anthus novaeseelandiae*	Australasian pipit	-	Least concern
Monarchidae	*Grallina cyanoleuca*	Magpie-lark	-	Least concern
Pachycephalidae	*Pachycephala rufiventris*	Rufous whistler	-	Least concern
Pardalotidae	*Pardalotus striatus*	Striated pardolote	-	Least concern

Family	Scientific Name	Common Name	EPBC Act Status	NC Act Status
Psittaculidae	*Aprosmictus erythropterus*	Red-winged parrot	-	Least concern
Psittaculidae	*Platycercus adscitus*	Pale-headed rosella	-	Least concern
Psittaculidae	*Trichoglossus moluccanus*	Rainbow lorikeet	-	Least concern
Rhipiduridae	*Rhipidura albiscapa*	Grey fantail	-	Least concern
Rhipiduridae	*Rhipidura leucophrys*	Willie wagtail	-	Least concern

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Appendix F

Noise Impact Assessment



Mt Hopeful Battery Project

Noise Impact Assessment

Final

September 2025

Mt Hopeful Battery Project

Noise Impact Assessment

Final

Prepared by
Umwelt (Australia) Pty Limited

On behalf of
Neoen Australia Pty Ltd (Neoen)

Project Director:	Chris Lee
Project Manager:	Elliot Fairon
Technical Director:	Stephen Lyons
Report No.:	31912 / R01
Date:	September 2025

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Document Status

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Acronyms

Acronym	Definition
AO	Acceptable Outcome
AQO	Acoustic Quality Objectives
BESS	Battery Energy Storage System
CONCAWE	Conservation of Clean Air and Water in Europe
EPP (Noise)	Environmental Protection (Noise) Policy 2019
PO	Performance Outcome
PSP	Planning Scheme Policy
RRC	Rockhampton Regional Council
TLPI	Temporary Local Planning Instrument

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1.0 Introduction

Umwelt is engaged by Neoen Australia Pty Ltd (Neoen) to prepare a Noise Impact Assessment (NIA) to assess the potential noise level emissions from the proposed Battery Energy Storage System (BESS) facility. This Assessment is provided to support the lodgement of a development application to Rockhampton Regional Council (RRC) for the Mount Hopeful Battery Project (the Project).

2.0 Project Description

The Project is a proposed grid-scale battery energy storage system (BESS) in Central Queensland (the Project). With a planned capacity of up to 600 megawatts (MW) of power for a duration of up to four hours, the Project will enhance the delivery of clean, reliable electricity to the National Electricity Market (NEM), while supporting grid stability and flexibility.

The Project is located near the rural town of Bajool, approximately 50 kilometres (km) south of Rockhampton and 70 km west of Gladstone, Queensland, within the Rockhampton Region Local Government Area (LGA). The Project is mapped within the Rural Zone of the Rockhampton Region Planning Scheme 2015 (planning scheme) and predominately used for low intensity agricultural activities, including cattle grazing. The Project is proposed to occur within the bounds of the 'Study Area' which covers an area of 49 hectares (ha) and occurs across three freehold land parcels and two local roads, being South Ulam Road and an unnamed road reserve. The Study Area also accommodates a Powerlink transmission easement that comprises an existing 275 kilovolt (kV) transmission line, of which the Project will connect into. The Study Area is sparsely vegetated with predominately non-remnant vegetation and is intersected by an unnamed tributary of Eight Mile Creek. The Project gains access via South Ulam Road to the east of the Study Area.

The Project is proposed to be delivered over two stages, which are indicatively described as follows:

- Stage 1: 430 MW expected to commence mid-2026 and completed by end of 2028.
- Stage 2: Additional 170 MW expected to commence in 2028 and completed by end of 2029.

Key components of the Project include:

- Up to 650x Battery Modules
- Up to 170x Medium Voltage (MV) Transformers
- 2x High Voltage (HV) Transformers
- A HV Switching Station.

The Project will also encompass associated ancillary infrastructure necessary to the operation of the BESS, including:

- Site access track
- Overhead and underground electrical cables
- Inverters
- High voltage substation
- Earthing and lightning protection
- Security fencing, closed-circuit television (CCTV) and lighting
- O&M building
- Water retention pond
- Lay down areas.

C:\Users\James.Beck\UMWELT (AUSTRALIA) PTY LTD\1912 - 03 SSV\02_Projects\31912_R00_BESSNoise_v9.aprx - 31912_R00_0201_ProposedLocationBESSSwitchyard



FIGURE 2.1

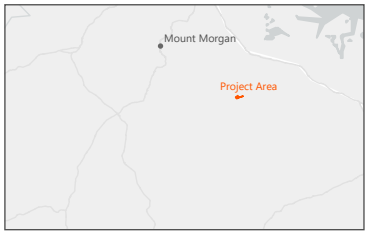
Indicative Project Layout

Legend

- Easement
- Study Area

BESS Layout

- Access road
- BESS area
- Overhead and underground line
- Substation area
- Switchyard area



0 0.25 0.5

Kilometres

Scale 1:17,500 at A4
GDA2020

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Image Source: ESRI Basemap (2024) | **Data Source:** NSW DFSI (2024)

3.0 Sensitive Receptors

Sensitive residential receptors within approximately 5 km of the proposed BESS facility were identified using publicly available aerial imagery (Google Earth) for inclusion in the noise model. These receptors have not been ground-truthed to understand if the structures identified in the aerial photography are residential or commercial, the assumption is that they are used for residential purposes. The nine sensitive receptors identified through aerial imagery for this assessment are shown in Figure 3.1, and their coordinates are provided in Table 3.1.

Table 3.1 Sensitive Receptor Coordinates

Receptor Label	GDA 2020 MGA Zone56	
	X, m	Y, m
Host Lot 5 - Involved dwelling	257573	7364136
Non-Host Lot 2 - Uninvolved dwelling	259039	7362079
R01	260657	7363297
R02	260018	7365518
R03a	258143	7368531
R03b	258031	7368530
R04	258774	7369501
R05a	258787	7369911
R05b	258825	7369899

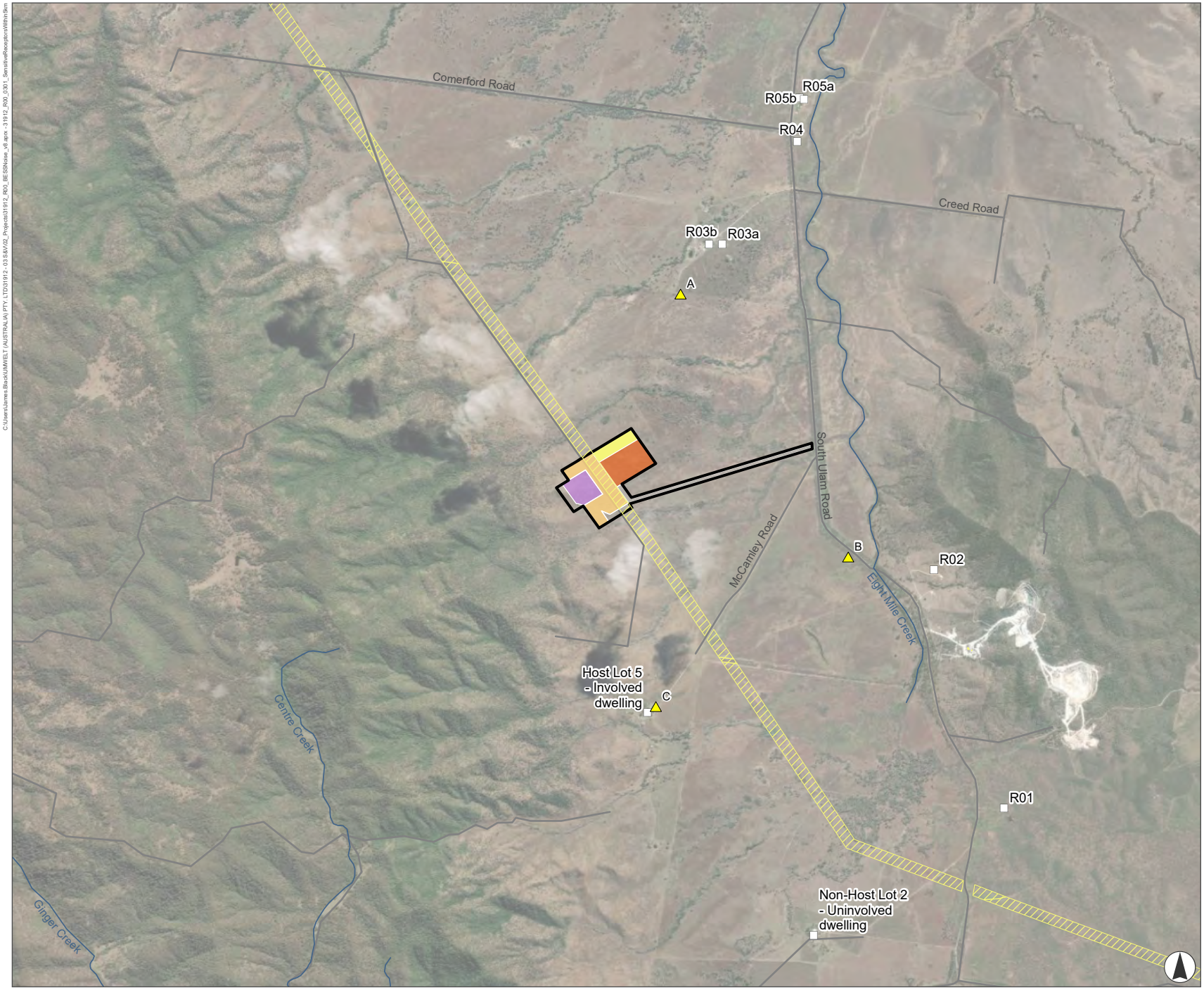


FIGURE 3.1

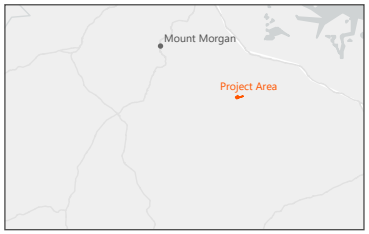
Sensitive Receptors within a 5km Radius of the Battery Energy Storage System Location

Legend

- Sensitive Receptors
- Noise Logger
- Roads
- Named Watercourse
- Easement
- Study Area

BESS Layout

- Access road
- BESS area
- Overhead and underground line
- Substation area
- Switchyard area



0 1 2

Kilometres

Scale 1:50,000 at A4
GDA2020

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Image Source: ESRI Basemap (2024) | **Data Source:** NSW DFSI (2024)

4.0 Existing Environment - Background Noise Levels

Baseline noise monitoring was undertaken at three locations (Locations A, B and C) in the vicinity of the BESS study area. The monitoring locations are presented in Figure 4.1.

The monitoring was undertaken over a period of two weeks, between 24/06/2025 and 09/07/2025. The instrumentation was field calibrated during installation. However, due to availability of calibration instrumentation a calibration check was unable to be taken at the completion of the monitoring period.

The meteorological data captured by the onsite weather station has been incorporated within the data analysis. Periods of elevated wind and rainfall have been excluded.

The noise monitoring results are summarised in Table 4.1, Table 4.2 and Table 4.3 for Locations A, B and C respectively. The Rating Background Level (RBL) for each period at each location is presented in Table 4.4. The noise monitoring locations are considered representative of acoustic environment of the sensitive receptors located in the vicinity of the project. The noise monitoring results and local weather conditions are presented graphically in Appendix A, Appendix B and Appendix C for Locations A, B and C respectively.

Based on observations during the site visit and the monitoring results, the acoustic environment can be characterised as a quiet, rural and agriculture scene, generally comprising bird and insect noise, animal or cattle noise, infrequent road traffic noise and wind-induced foliage noise related to wind in the trees and long grass.

Table 4.1 Summary Statistics – Location A

Parameter	Period	Statistic, dB(A)					
		Average	10th %'ile	25th %'ile	Median	75th %'ile	90th %'ile
LAmax	D	55	48	51	55	59	62
	E	47	39	44	48	52	54
	N	45	29	40	47	51	58
LA10	D	41	34	37	40	44	47
	E	40	24	35	42	47	51
	N	36	21	30	37	44	48
LAeq	D	39	32	35	39	42	45
	E	37	23	31	38	45	49
	N	34	20	28	36	41	46
LA90	D	32	24	27	32	35	39
	E	33	19	22	33	42	47
	N	29	19	21	28	36	44

Table 4.2 Summary Statistics – Location B

Parameter	Period	Statistic, dB(A)					
		Average	10th %'ile	25th %'ile	Median	75th %'ile	90th %'ile
LAmax	D	63	55	59	63	67	70
	E	51	40	43	51	57	63
	N	51	35	42	52	60	66
LA10	D	47	39	42	46	51	55
	E	42	28	32	44	50	55
	N	40	25	32	43	48	53
LAeq	D	46	39	42	46	49	53
	E	40	26	31	42	49	54
	N	39	24	29	42	47	51
LA90	D	36	27	30	35	41	46
	E	35	22	24	33	45	52
	N	32	20	23	30	42	47

Table 4.3 Summary Statistics – Location C

Parameter	Period	Statistic, dB(A)					
		Average	10th %'ile	25th %'ile	Median	75th %'ile	90th %'ile
LAmax	D	66	57	61	65	71	76
	E	47	37	42	47	51	57
	N	45	32	37	44	53	60
LA10	D	44	38	41	45	48	50
	E	36	25	30	36	43	47
	N	34	21	25	35	43	48
LAeq	D	44	38	41	44	47	51
	E	35	25	29	34	41	46
	N	32	20	23	33	41	45
LA90	D	30	24	26	29	34	38
	E	31	19	24	30	38	44
	N	28	18	19	27	36	40

Table 4.4 Rating Background Levels (RBL)

Parameter	Period	Location A	Location B	Location C
RBL, dB(A)	D	25	28	25
	E	28	27	25
	N	25 (19)[1]	25 (22)[1]	25 (18)[1]

Note 1: A Rating Background Level (RBL) of 25 dB(A) has been adopted as the observed/measured RBL is lower than the minimum RBL of 25 dB(A) in accordance with the EcoAccess Guideline: Planning for Noise Control.

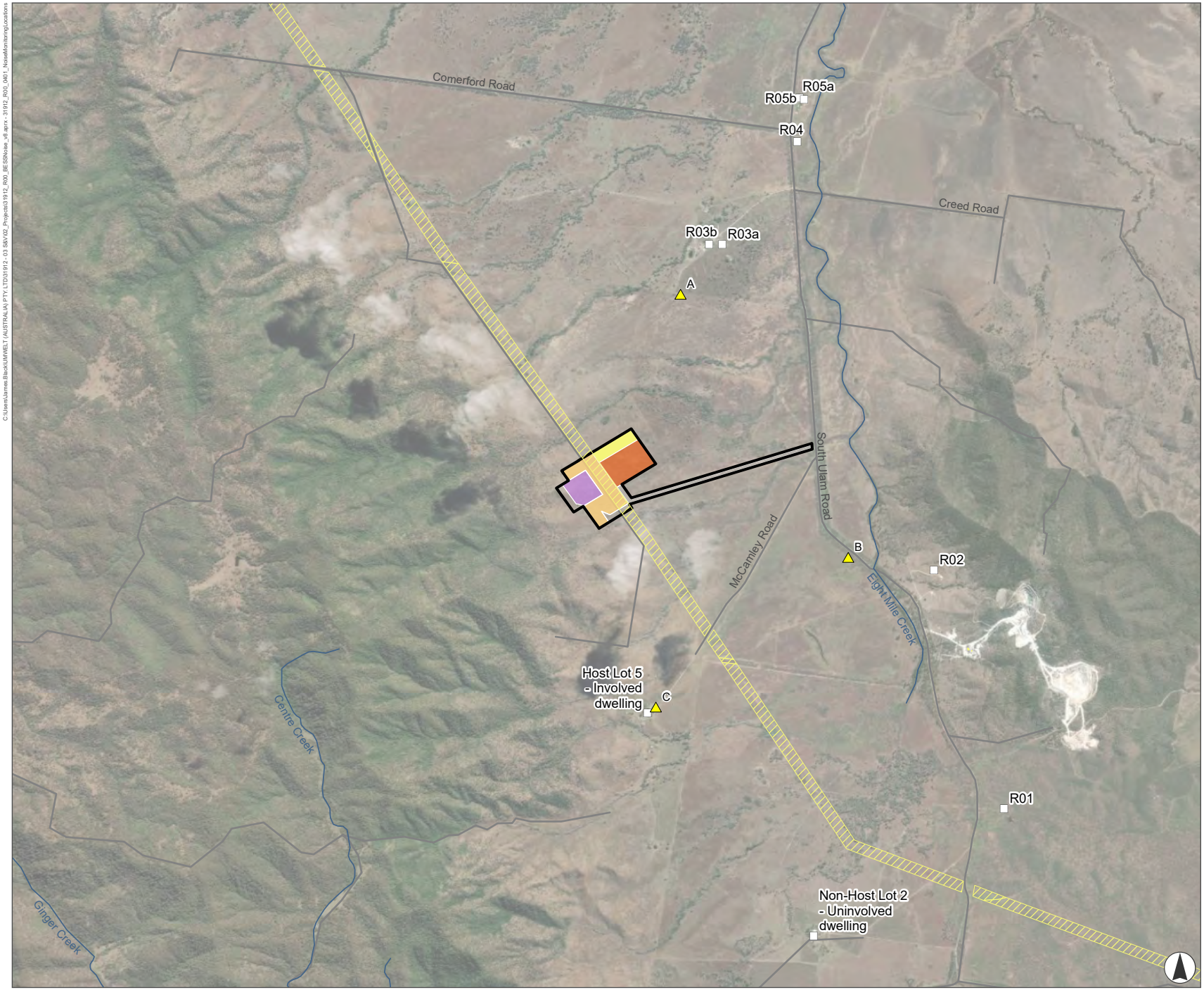


FIGURE 4.1

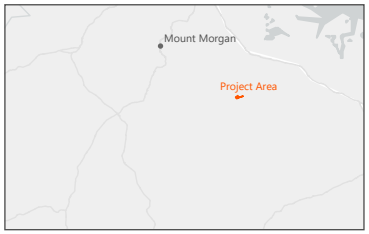
Noise Monitoring Locations

Legend

- Noise Logger
- Sensitive Receptors
- Roads
- Named Watercourse
- Easement
- Study Area

BESS Layout

- Access road
- BESS area
- Overhead and underground line
- Substation area
- Switchyard area



0 1 2

Kilometres

Scale 1:50,000 at A4
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5.0 Project Noise Criteria

5.1 Rockhampton Region Planning Scheme 2015

The Rockhampton Region Planning Scheme 2015 (Planning Scheme) is the current planning scheme for the Rockhampton Region Local Government Area (LGA).

The project site is designated as a Rural Zone under the planning scheme, therefore RRC's Rural Zone Code is applicable to the project. However, the Rural Zone Code doesn't include any specific noise-related performance outcomes relevant to this project. Although it is noted that the general intent of the Rural Zone Code in relation to noise is to *not cause adverse impacts on sensitive land use(s) in relation to traffic, noise and air quality*. In achieving this general intent, the Rural Zone Code points to the Environmental Protection (Noise) Policy 2019 (EPP (Noise)) when addressing the acceptability of noise emissions from other use types. The intent, as drawn from A07.11, is that the project noise levels do not exceed the Acoustic Quality Objectives (AQO) under the EPP (Noise).

In addition to the Rural Zone Code, the Planning Scheme also includes Planning Scheme Policy (PSP) (SC6.3 Air, noise and hazard assessments planning scheme policy) that considers noise. Subsection SC6.3.2 Noise impact assessment requirements of the PSP provides a methodology for assessing the noise impacts from industry uses onto sensitive uses. More specifically, the PSP states the following in relation to the conclusions from the noise impact assessment:

(3) Conclusion:

(a) The conclusion should include a description about:

- *(i) the current industry noise impacts;*
- *(ii) forecast noise impacts from the proposed development;*
- *(iii) proposed mitigation measures; and*
- *(iv) discussion of the likely effectiveness of the objectives in the Environmental Protection (Noise) Policy 2019.*

(b) This will include:

- *(i) an explanation of noise mitigation measures used to achieve the indoor noise objectives of the Environmental Protection (Noise) Policy 2019; and*
- *(ii) a statement of limitation of noise mitigation treatments and, if applicable, explanation of why some treatments may not be reasonable, feasible or cost effective.*

Based on the Rural Zone Code and the noise section of PSP, it is considered that the AQO under the EPP (Noise) represent the benchmarks for the noise impact assessment for this project.

5.2 Environment Protection (Noise) Policy 2019

The noise criteria applicable to the development are the AQO under the EPP (Noise). The noise limits derived in accordance with the AQO are presented in Table 5.1. Due to the nature of the noise source, the LAeq represents an appropriate assessment parameter.

Table 5.1 Noise Limits Derived in Accordance with EPP (Noise) Acoustic Quality Objectives

Period	Acoustic Quality Objective Internal Noise Level	Noise Limits [1] LAeq,adj,1hr dB(A)
Day (7am – 6pm)	35	40
Evening (6pm – 10pm)	35	40
Night (10pm – 7am)	30	35

Note 1: Allowing for 5 dB(A) noise reduction across the building façade in accordance with the EcoAccess Guideline: Planning for Noise Control. Typically, the reduction achieved across a semi-open façade is in the order of 5 dB(A) to 10 dB(A). In a contemporary setting, a correction of 5 dB(A) is commonly adopted as a conservative outcome.

5.3 RRC DRAFT TLPI Renewable Energy and Battery Storage

RRC has proposed a draft Temporary Local Planning Instrument (TLPI) – Renewable Energy and Battery Storage, this includes assessment benchmarks in relation to noise emissions from projects. Following pre-lodgement discussions with RCC it is understood that the assessment benchmarks relating to noise emissions are unlikely to be implemented in its current form.

Overall, it is considered that the AQO is the more appropriate criteria for BESS developments, noting its application in the recent State Code 26: Solar Farm Development of the SDAP. This is consistent with the pre-lodgement advice received from Council. State Code 26 makes reference to achieving the AQO under the EPP (Noise) at the sensitive receptors and is presented in Table 5.2.

Table 5.2 State Code 26: Solar Farm Development - Noise Limits

Section	Performance Outcome
Acoustic Amenity	PO11 Development is located, designed, constructed and operated to meet the acoustic quality objectives for sensitive receptors on or adjoining the site identified in the Environmental Protection (Noise) Policy 2019.

6.0 Noise Modelling Methodology

Noise modelling has been undertaken to assess the potential impacts of the operation BESS facility at nearby sensitive receptor locations. The noise levels from the BESS have been predicted using the proprietary noise modelling software SoundPLAN (v9.1). The CONCAWE noise level prediction methodology adopted for this project. Terrain information for the area has incorporated project elevation information and 1-second Shuttle Radar Topography Mission (SRTM) Digital Elevation Model.

To represent worst-case results, downwind noise enhancing meteorological conditions were modelled and are represented by:

- neutral conditions: Atmospheric Stability Class 'D', wind speed 3 m/s; or equivalent
- temperature inversion conditions: Atmospheric Stability Class 'F', wind speed 2 m/s.

The preliminary BESS facility layout has been incorporated into the noise model and multiple individual noise sources for the battery modules and transformers. The supplier for the battery modules has not yet been selected. The modelling has been prepared using information from Tesla Megapack MP2 XL, which are considered as a conservative battery model for noise modelling purposes. The battery modules were modelled as building structures with the noise energy located on top of the structure, approximately 2.8 m above ground level.

The indicative sound power levels used in the model are presented in Table 6.1 and have been estimated from supplier datasheets and correspondence with Neoen. Spectral data was supplied, which allowed for the assessment of tonal penalties.

Table 6.1 Indicative Operational Equipment Sound Power Levels

Noise Source	Quantity	Indicative Sound Power Level per unit (dB(A) / dB(Z))
Tesla Megapack (Battery and Inverter unit) (MP2 XL 5-fan (4h)) [1]	650	Day-time 7 am – 10 pm (refer to Note 2): 94 dB(A) / 104 dB(Z)[2] Night-time 10 pm – 7 am (refer to Note 3): 84 dB(A) / 94 dB(Z)[3]
HV Transformer	2	89 dB(A) / 97 dB(Z)
MV Transformer	163	82 dB(A) / 95 dB(Z)

Note: 1. Indicative noise level data was sourced from information supplied to Umwelt by Neoen, including the document Tesla MP2XL FN03 – Q3'2024.

2. Fan speed modelling undertaken for record hottest day and 10 hottest consecutive days indicates that the worst-case day time mode (between 7 am and 10 pm) is likely to be represented by the following combination of fan speeds for the two primary components - 100% for battery fans and 100% for PE fans.

3.Fan speed modelling undertaken for record hottest day and 10 hottest consecutive days indicates that the worst-case night time mode (between 10 pm and 7 am) is likely to be represented by the following combination of fan speeds for the two primary components - 60% for battery fans and 20% for PE fans.

7.0 Predicted Noise Levels

The noise model was used to predict levels from the BESS facility at the surrounding sensitive receptors under enhancing meteorological conditions. The noise modelling results have been presented utilising sound power levels associated with day-time and night-time operational modes. The results for all receptors were assessed for the applicability of tonality penalties under the EcoAccess Guideline: Planning for Noise Control. A tonality penalty of 5 dB(A) has been applied to the predicted noise levels for all receptors.

The noise level predictions for the BESS facility including +5 dB tonality penalty at different fan speeds are shown in Table 7.1.

Table 7.1 Predicted Noise Levels

Period	Predicted Noise Level LAeq,adj,1hr dB(A)	
	Day-time mode	Night-time mode
Host Lot 5 - Involved dwelling	39	30
Non-Host Lot 2 - Uninvolved dwelling	26	17
R01	27	18
R02	36	26
R03a	40	31
R03b	40	31
R04	33	24
R05a	31	22
R05b	39	30

As indicated in **Table 7.1**, the highest predicted noise level is 40 dB(A) LAeq,adj at R03a, based on Day-time mode for the Telsa battery modules. This reduces to 31 dB(A) with Night-time mode. Noise level contours (including the +5 dB tonality penalty) for the Tesla Megapack noise predictions are shown in **Figure 7.1** to **Figure 7.2** for Day-time and Night-time modes respectively.

The predicted noise levels indicate that the AQO Daytime noise limit of 40 dB(A) can be achieved with Day-time operational mode, similarly the AQO Night-time noise limit of 35 dB(A) can be achieved with Night-time operational mode. . Based on these noise level predictions the AQO noise limits can be achieved through the adoption of the representative fan speeds during the day and night periods.

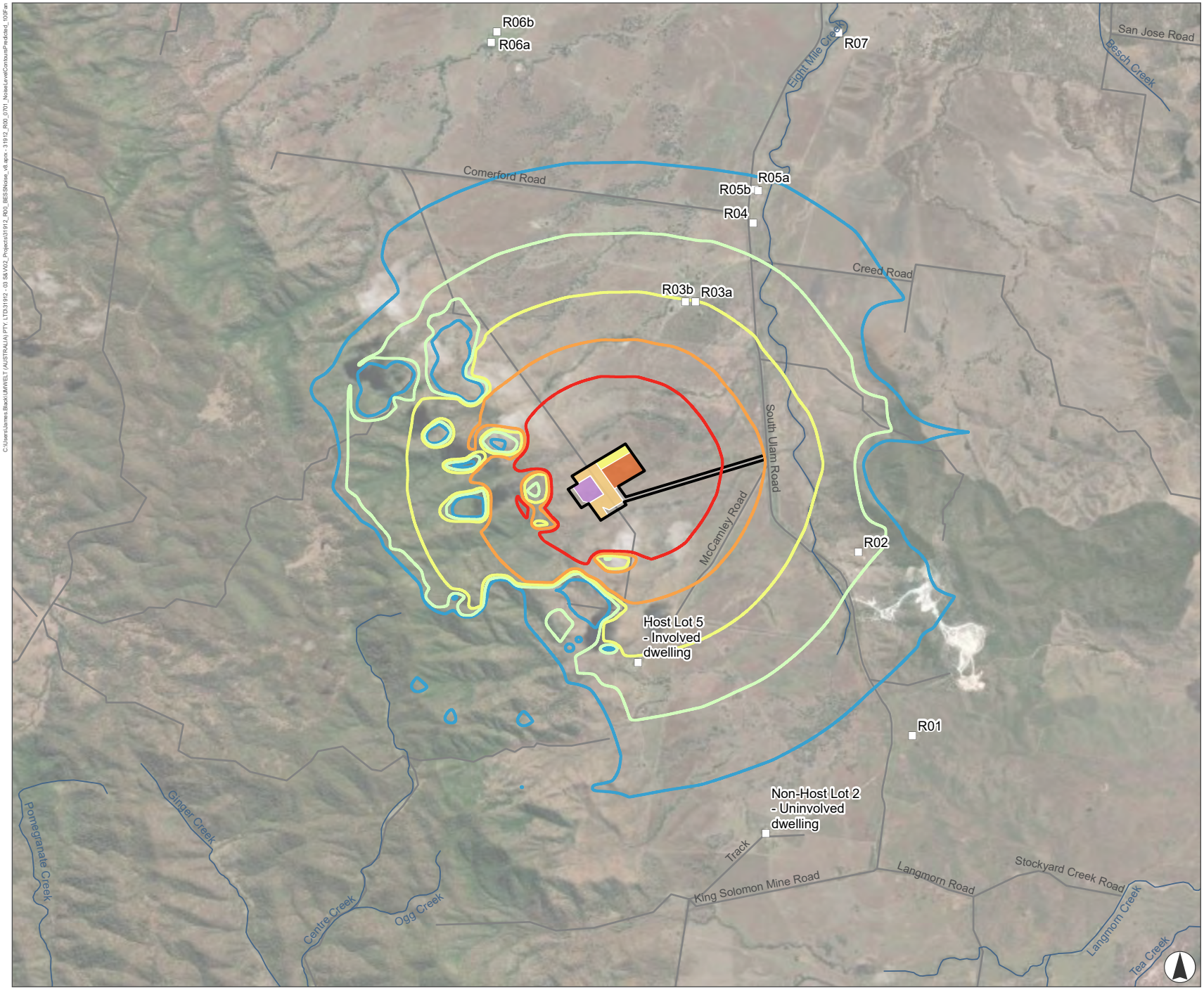


FIGURE 7.1

Predicted LAeq,adj Noise Level Contours (Including + 5 dB Tonality Penalty) - Day-time Mode

Legend

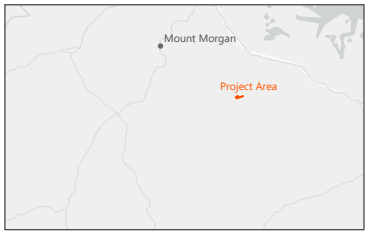
- Sensitive Receptors
- Roads
- Named Watercourse
- Study Area

Noise Contours

- 30dBA
- 35dBA
- 40dBA
- 45dBA
- 50dBA

BESS Layout

- Access road
- BESS area
- Overhead and underground line
- Substation area
- Switchyard area



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Kilometres

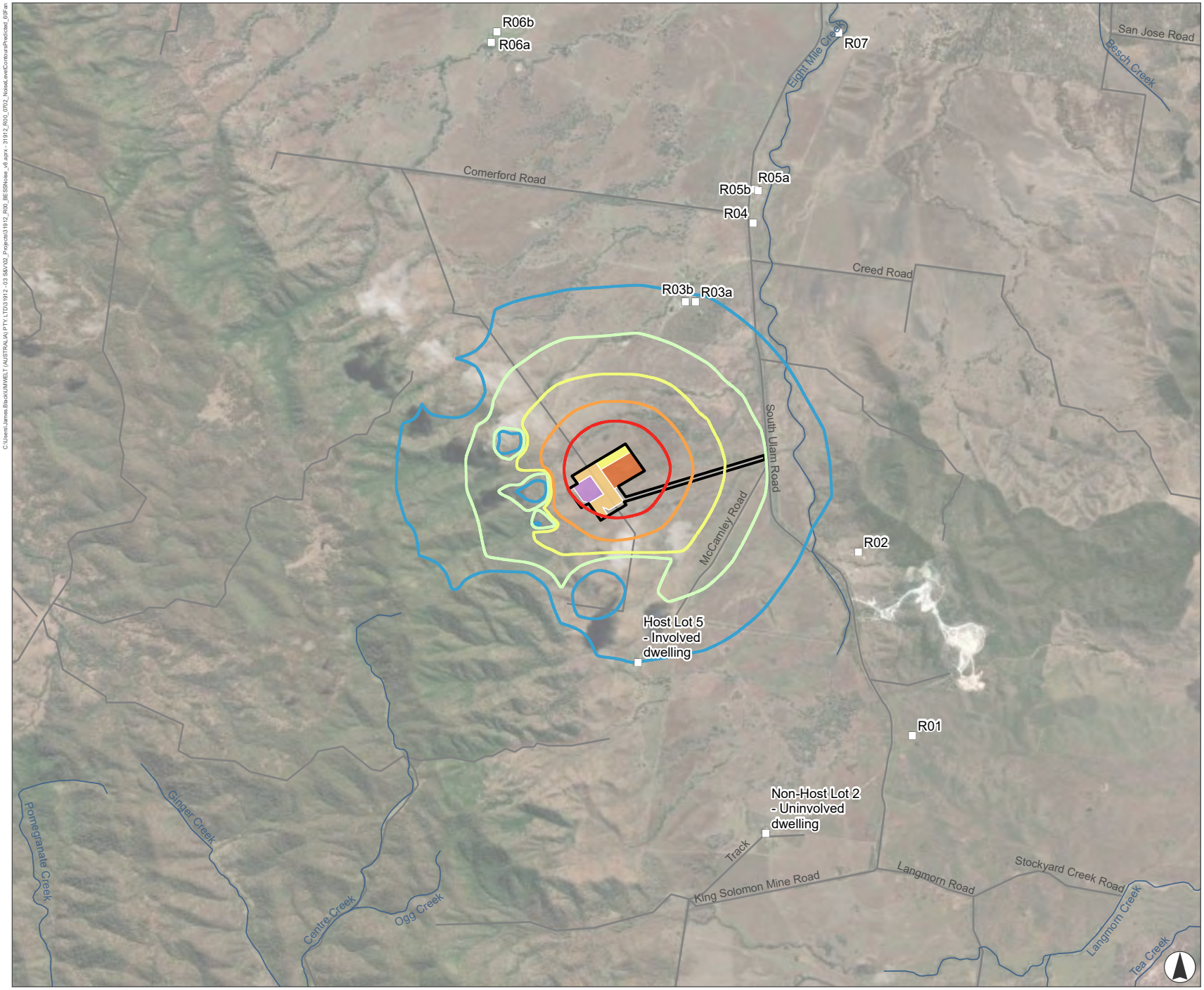
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Image Source: ESRI Basemap (2024) | **Data Source:** NSW DFSI (2024)

FIGURE 7.2

Predicted LAeq,adj Noise Level Contours (Including + 5 dB Tonality Penalty) - Night-time Mode



Legend

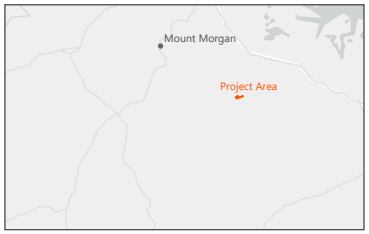
- Sensitive Receptors
- Roads
- Named Watercourse
- Study Area

Noise Contours

- 30dBA
- 35dBA
- 40dBA
- 45dBA
- 50dBA

BESS Layout

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- BESS area
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- Switchyard area



0 1 2

Kilometres

Scale 1:65,000 at A4
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Image Source: ESRI Basemap (2024) | **Data Source:** NSW DFSI (2024)

8.0 Conclusions

Based on the noise modelling assumptions and results presented in the assessment for the Day-time and Night-time operational modes, the BESS facility is predicted to comply with the AQO during the day, evening and night periods without the need for additional noise mitigation measures. The prediction results (including a +5dB tonality penalty) indicate that the AQO Daytime noise limit of 40 dB(A) can be achieved with Day-time operational mode, similarly the AQO Night-time noise limit of 35 dB(A) can be achieved with Night-time operational mode. Based on these noise level predictions the AQO noise limits can be achieved through the adoption of the representative fan speeds during the day and night periods.

9.0 References

Rockhampton Regional Council, 2015. Rockhampton Region Planning Scheme.

Rockhampton Regional Council, 2025. Draft Temporary Local Planning Instrument Renewable Energy and Battery Storage.

Queensland Government, 2025. State Development Assessment Provisions v3.3, State Code 23: Wind Farm Development.

Queensland Government, 2025. State Development Assessment Provisions v3.3, State Code 26: Solar Farm Development.

Queensland Government, 2019. Environmental Protection (Noise) Policy.

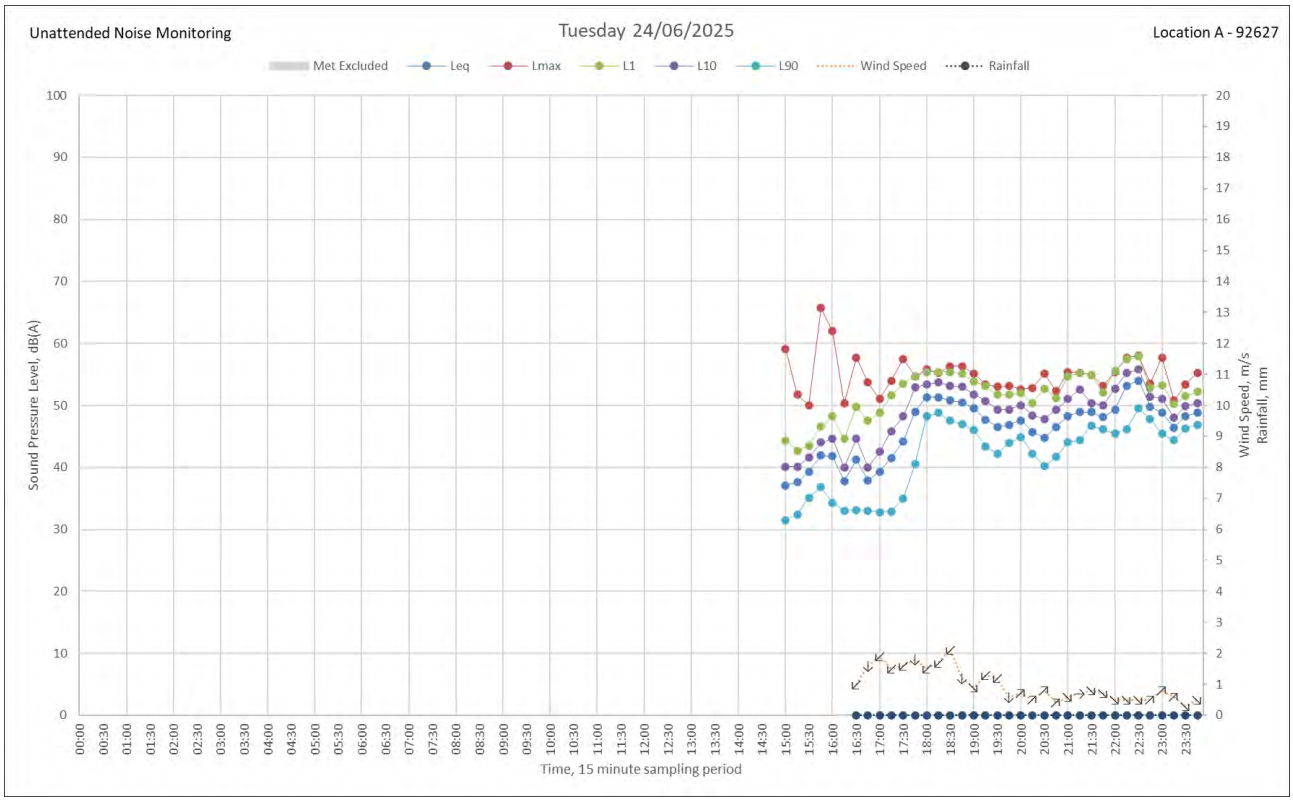
Department of Environment, Science and Innovation (DESI), 2004. EcoAccess Guideline: Planning for Noise Control.

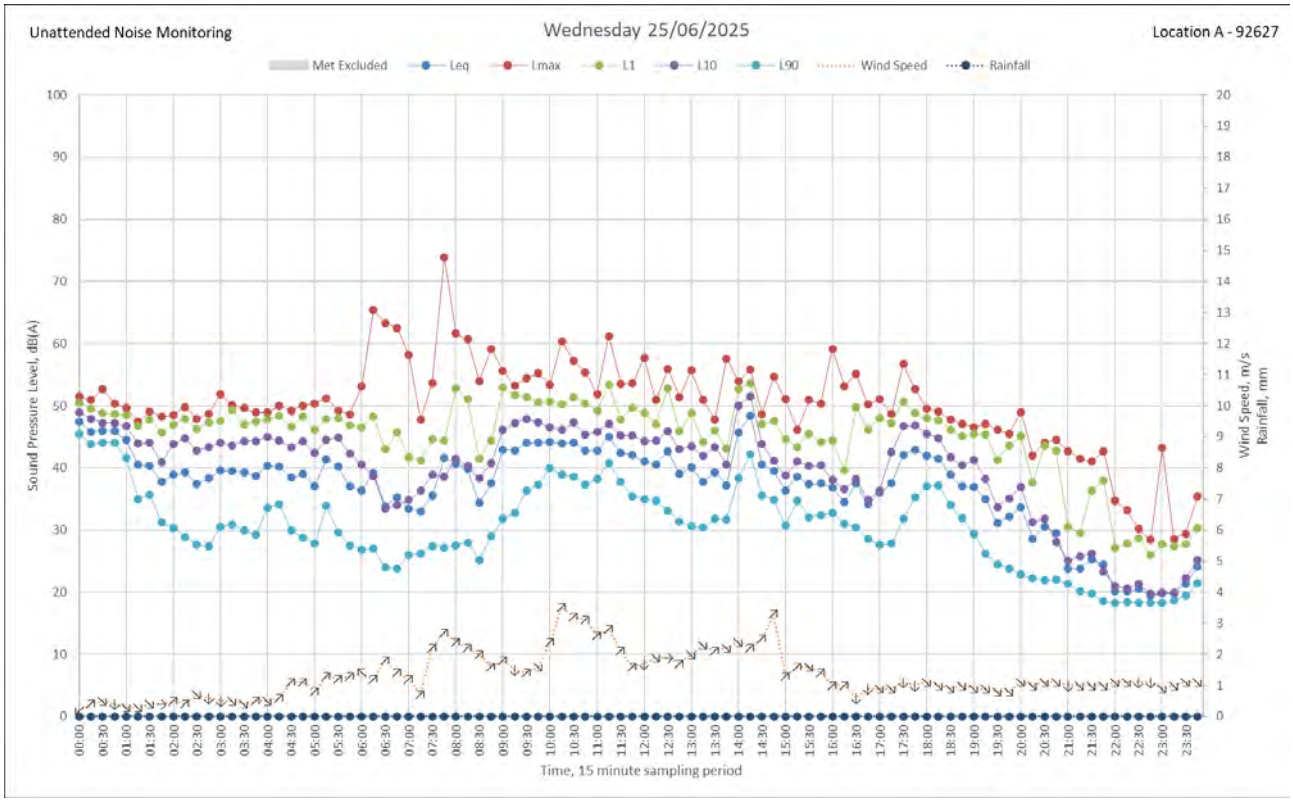
Manning, C. 1981. The propagation of noise from petroleum and petrochemical complexes to neighbouring communities. CONCAWE Report No 4/81.

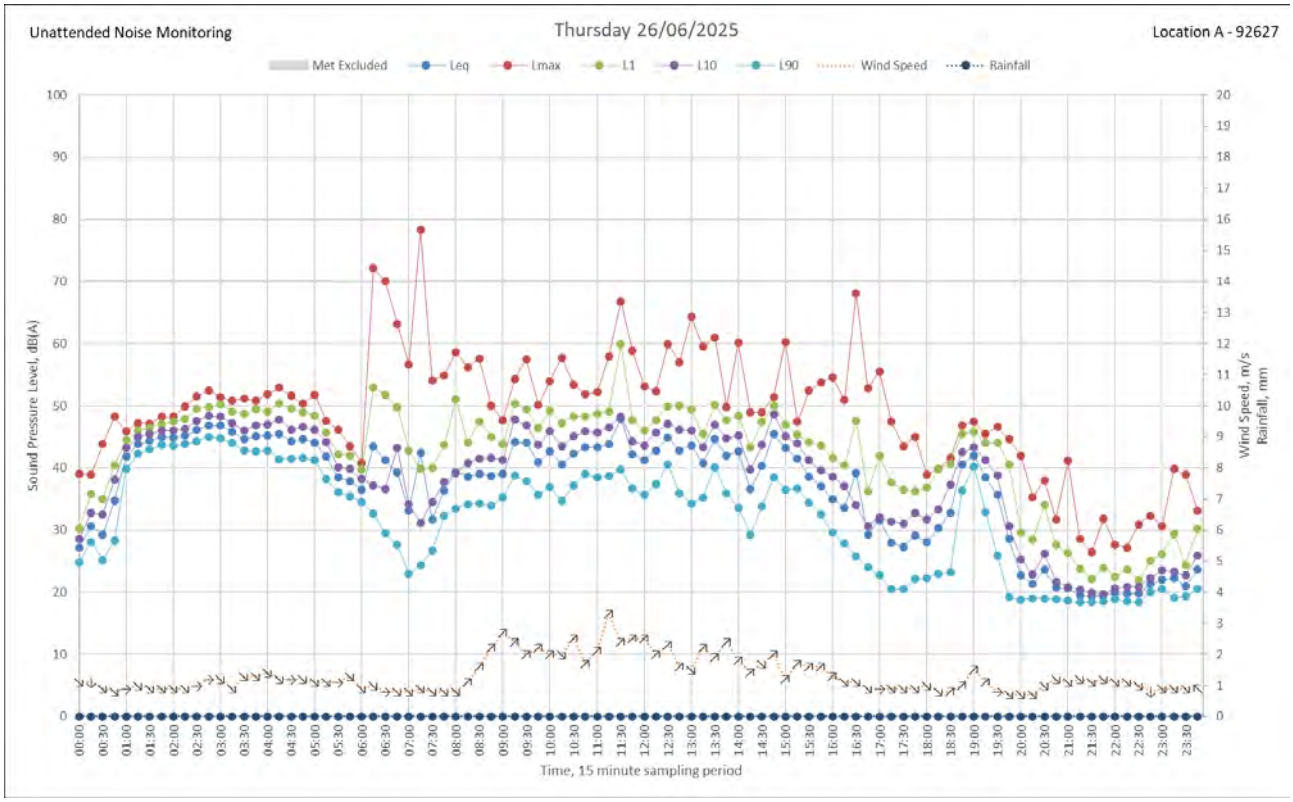
Appendix A

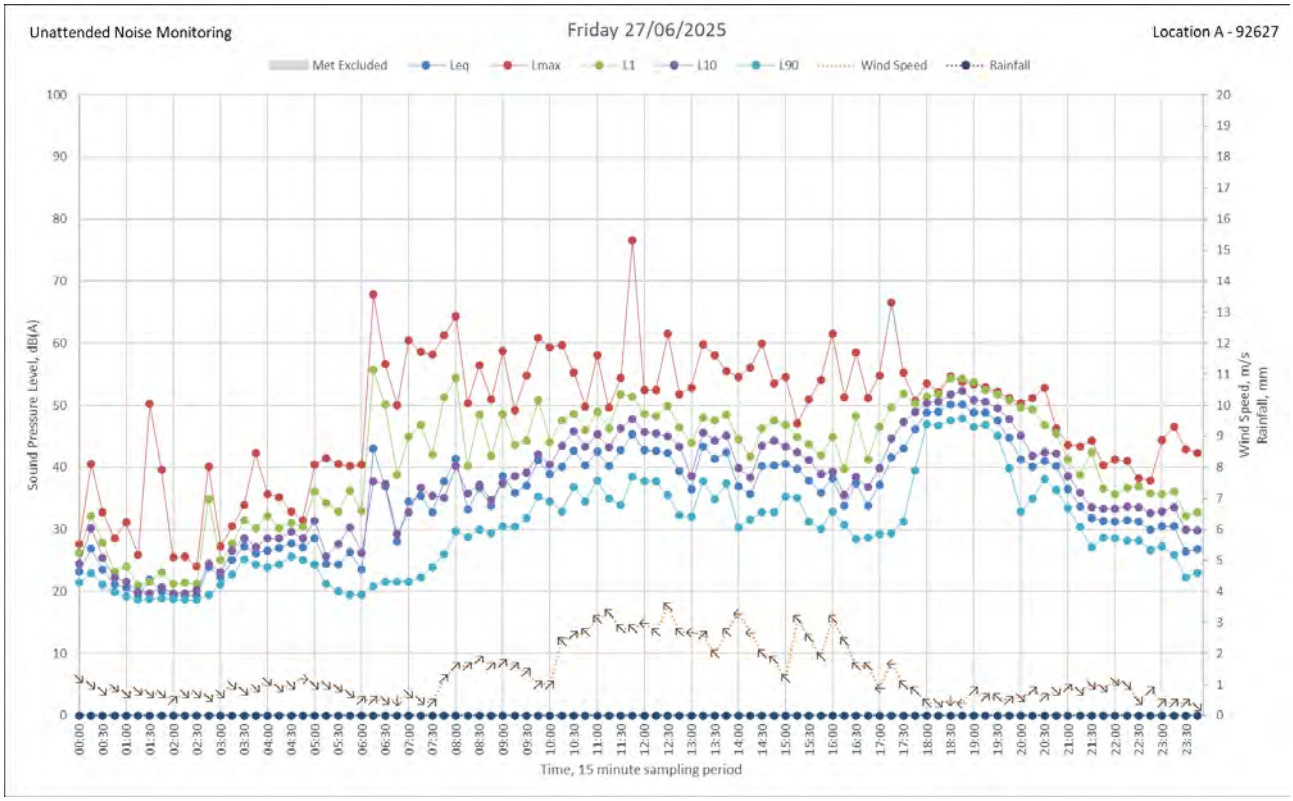
Monitoring Results – Location A

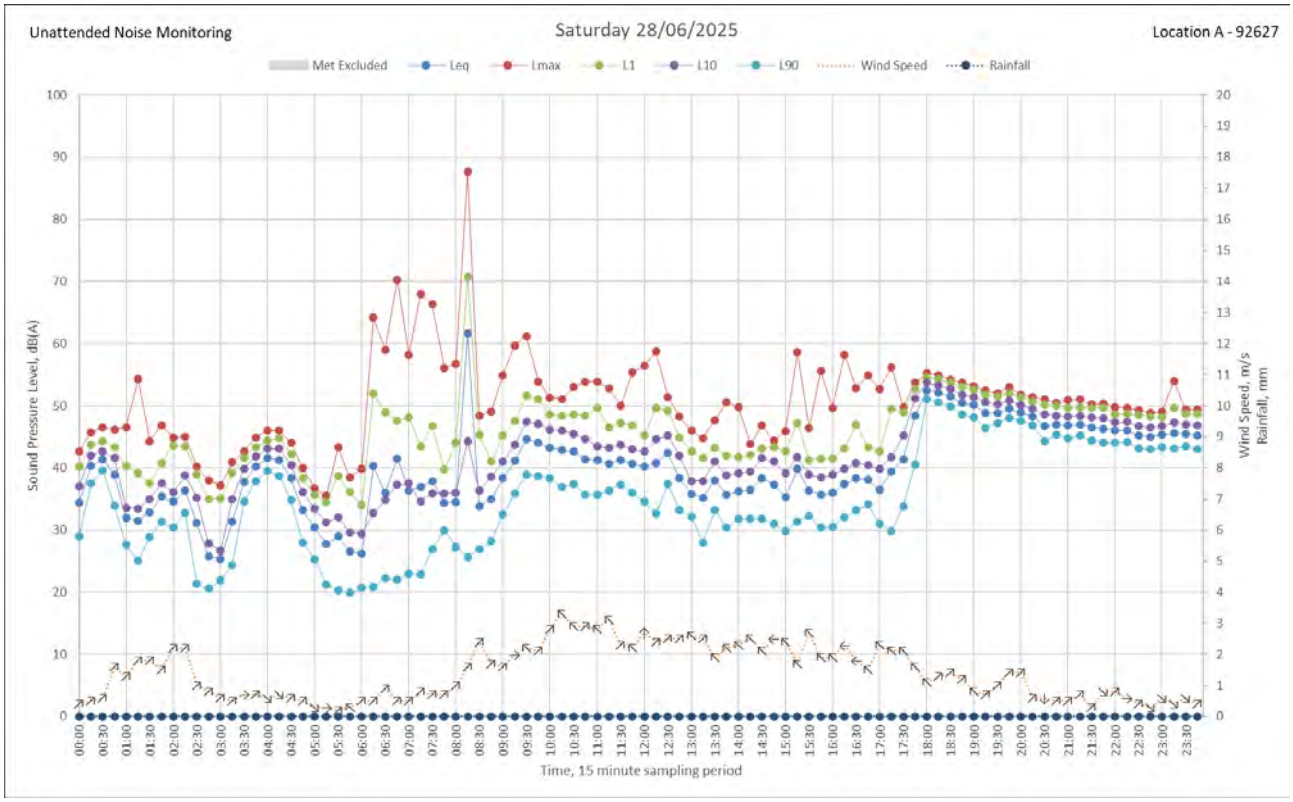


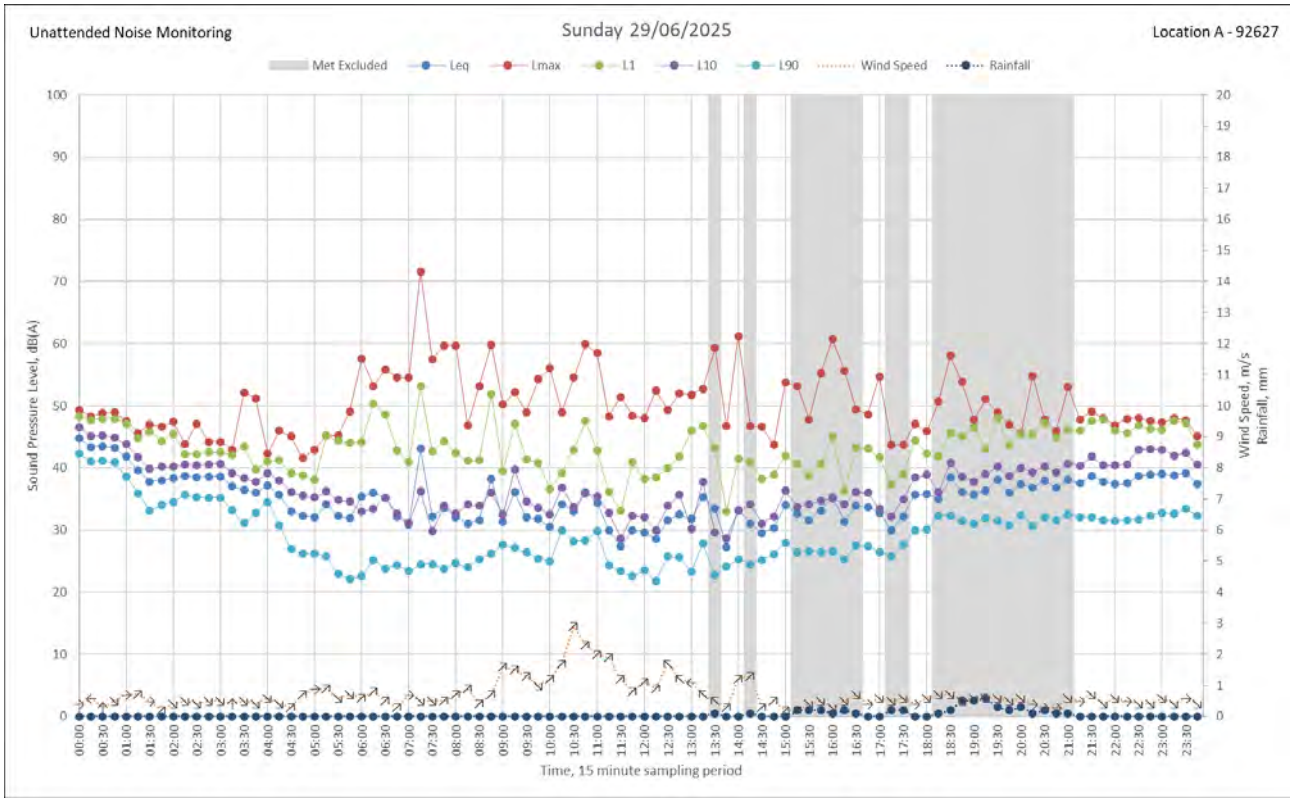

Unattended Noise Monitoring
Tuesday 24/06/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

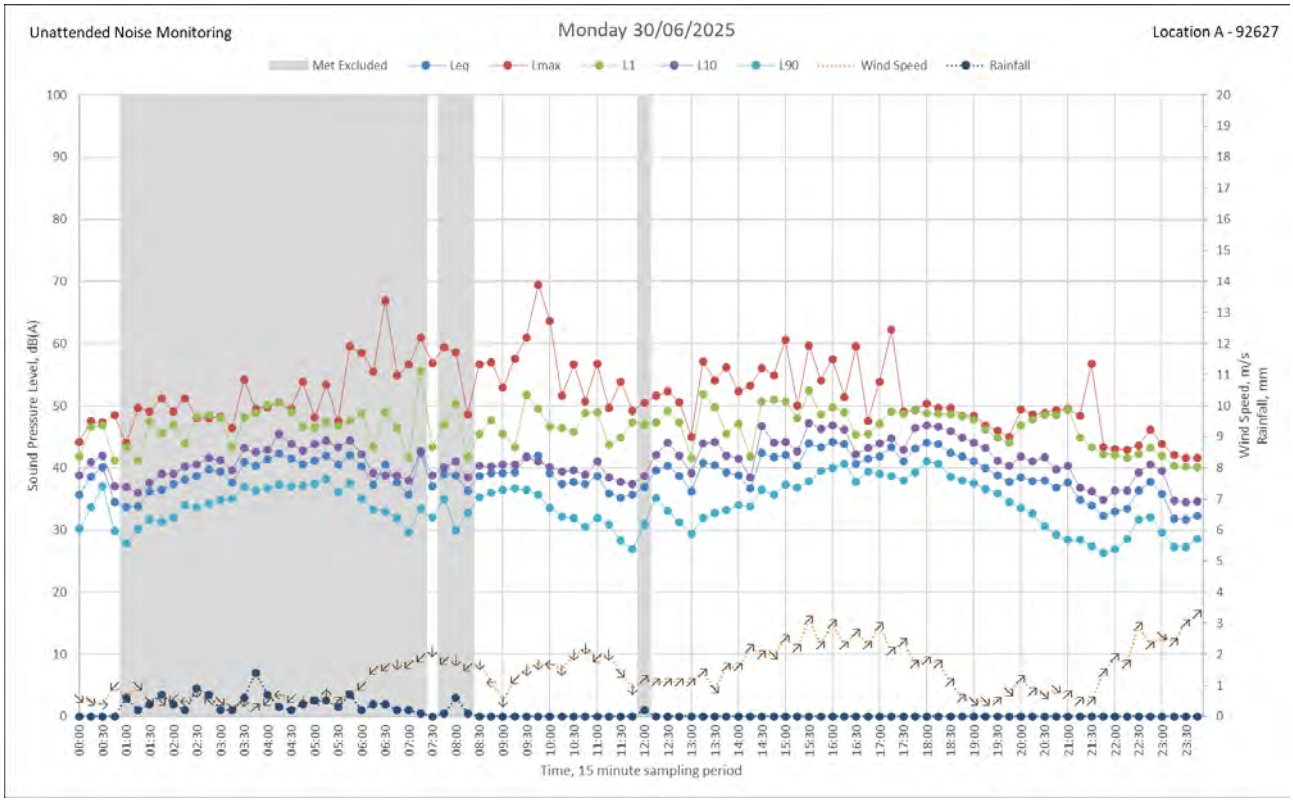

Unattended Noise Monitoring
Wednesday 25/06/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

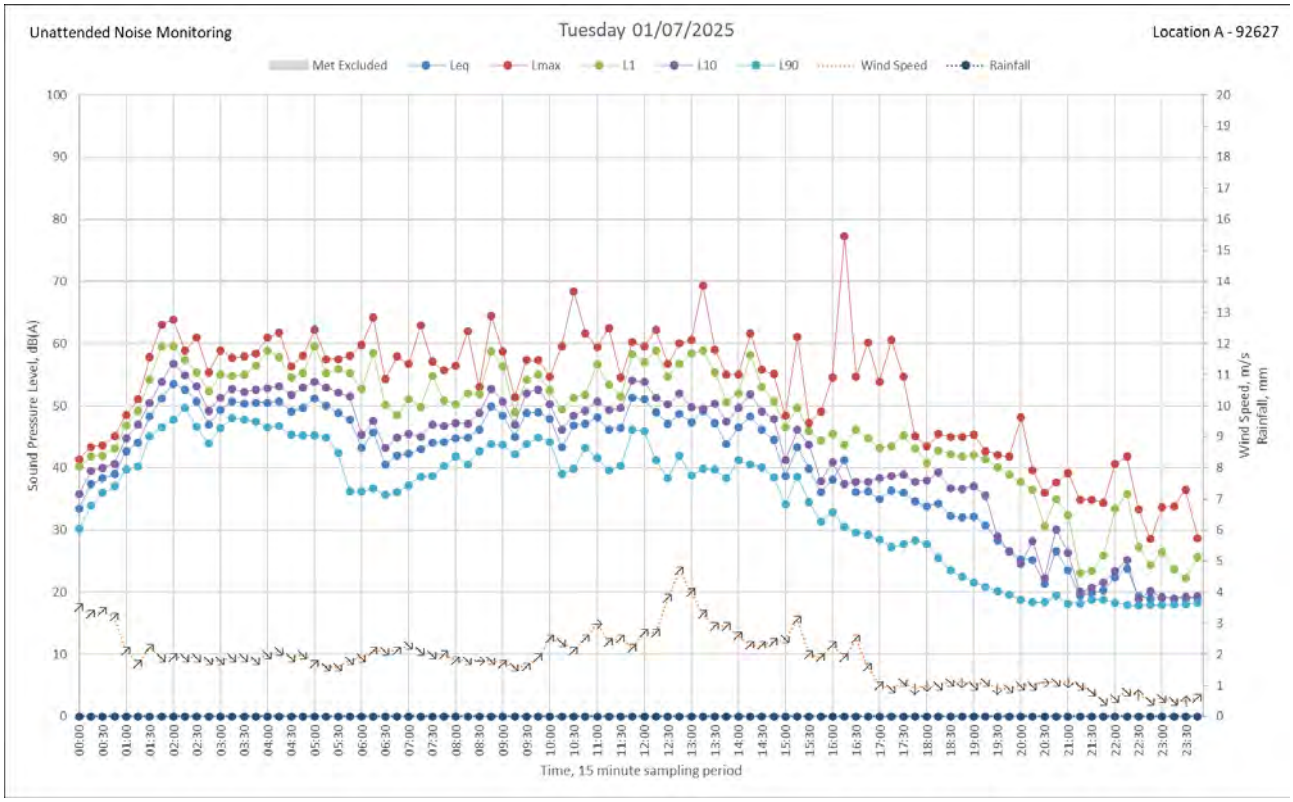

Unattended Noise Monitoring
Thursday 26/06/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

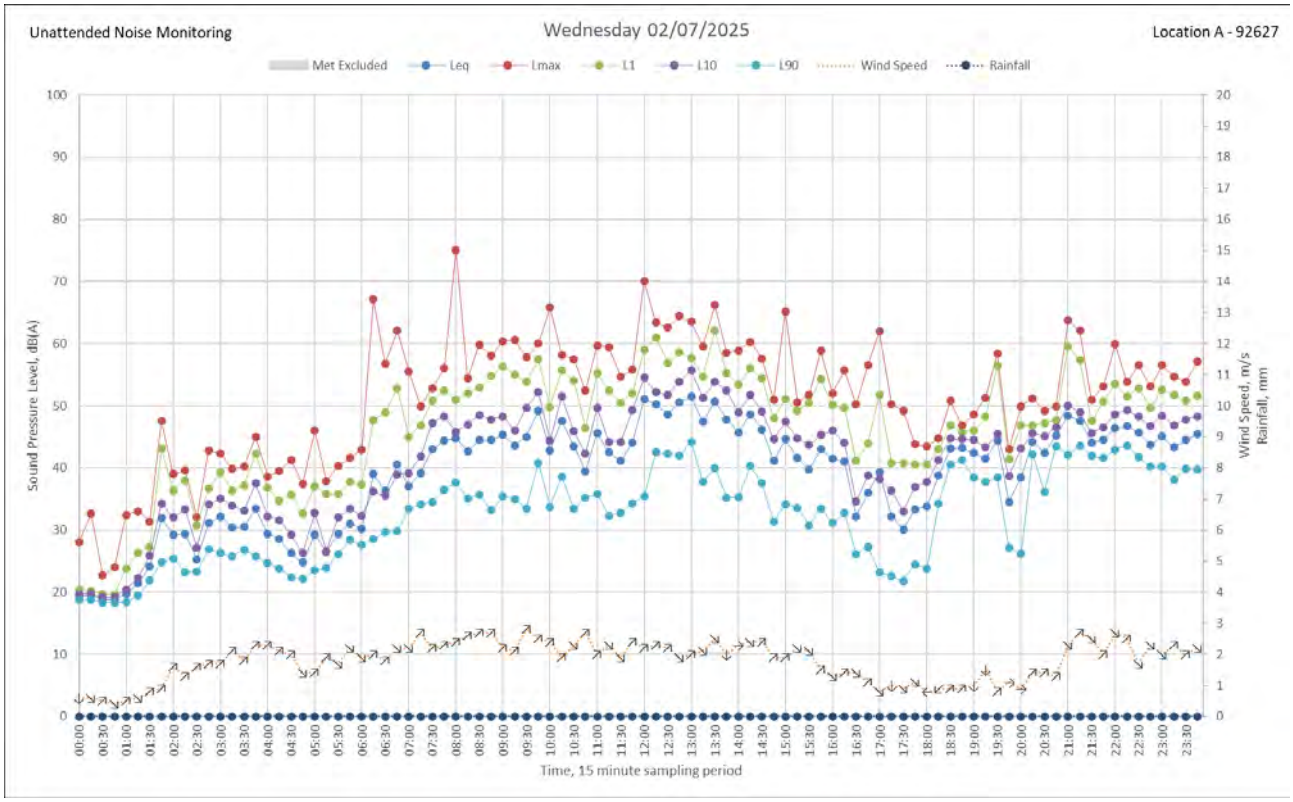

Unattended Noise Monitoring
Friday 27/06/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

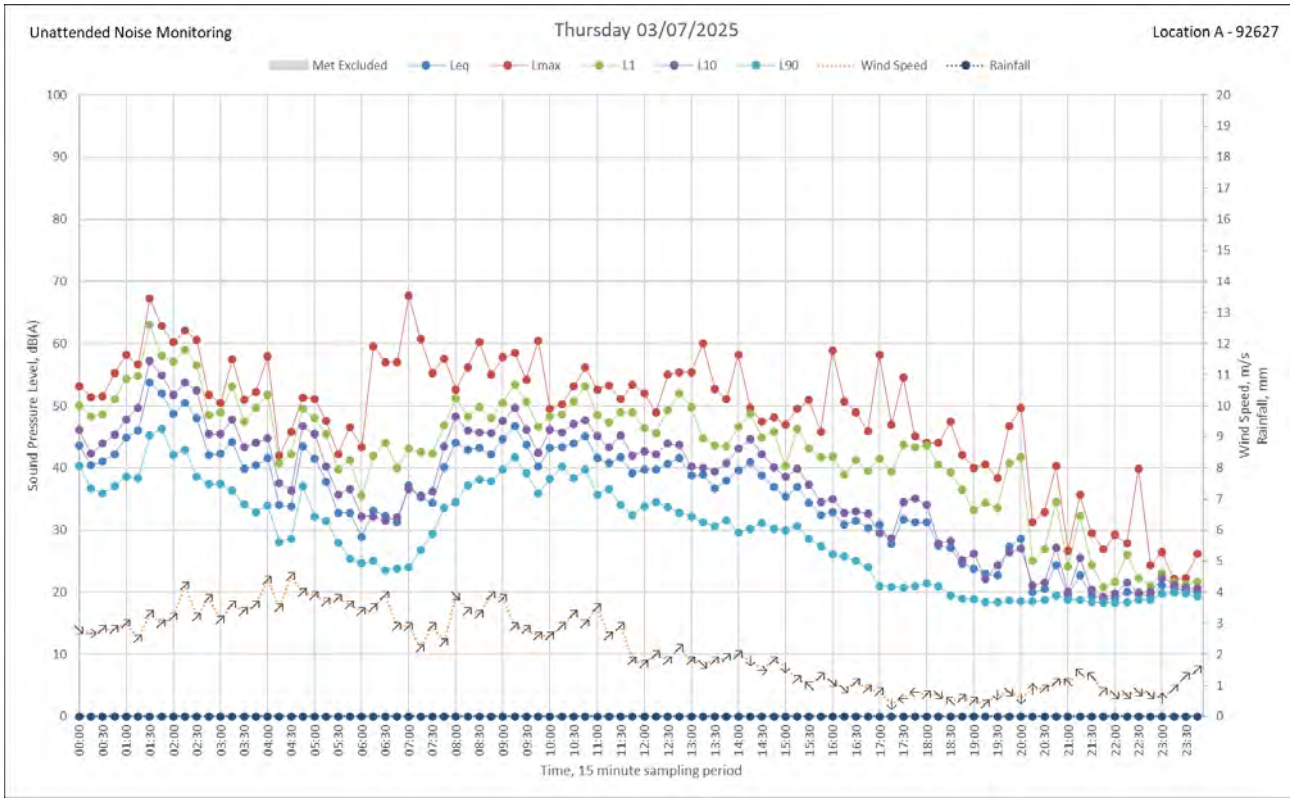

Unattended Noise Monitoring
Saturday 28/06/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

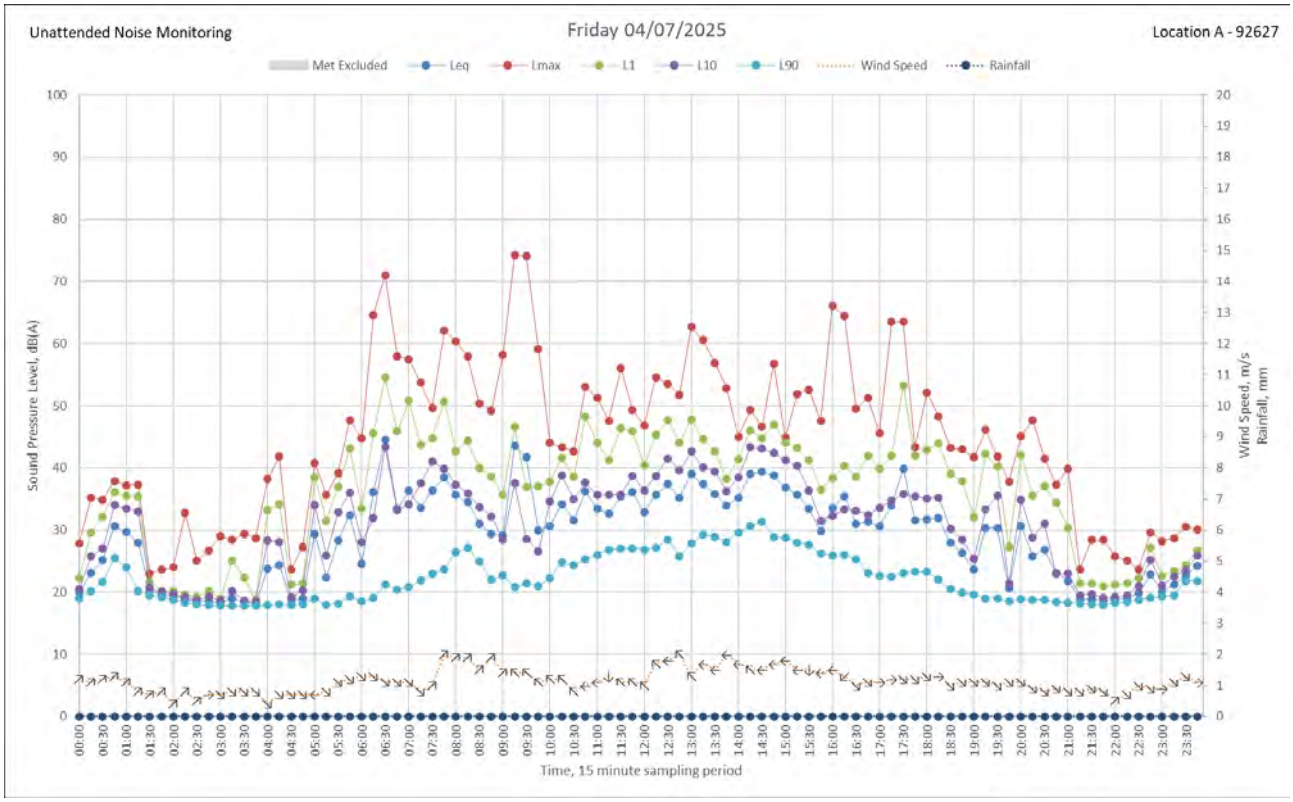

Unattended Noise Monitoring
Sunday 29/06/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

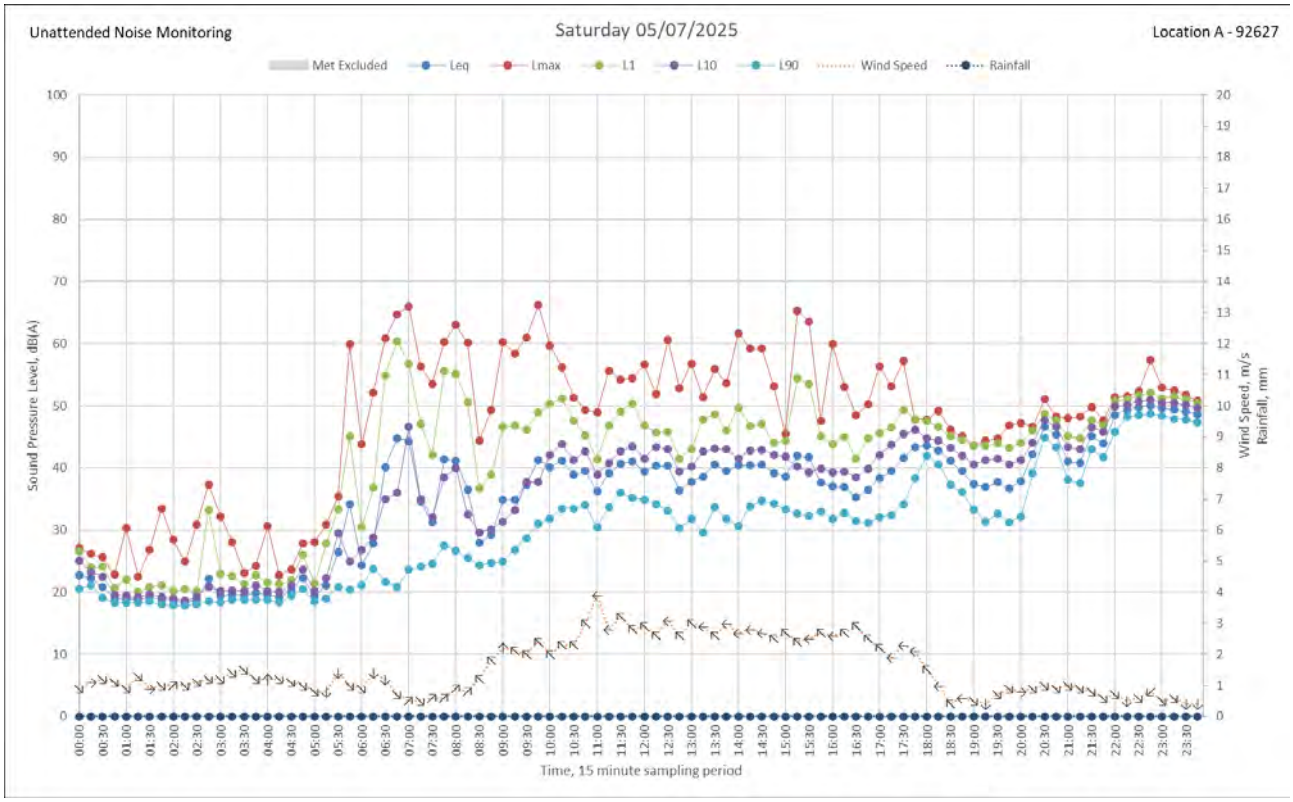

Unattended Noise Monitoring
Monday 30/06/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

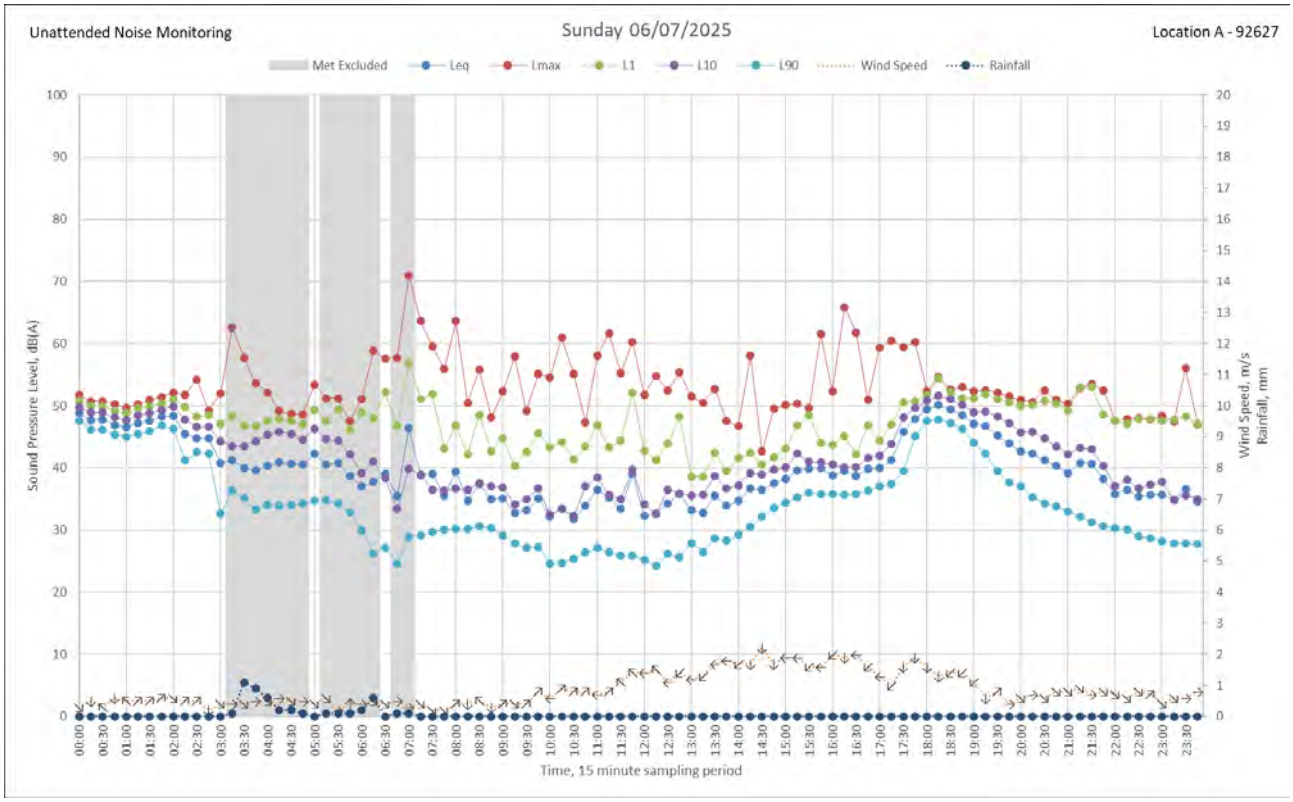

Unattended Noise Monitoring
Tuesday 01/07/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

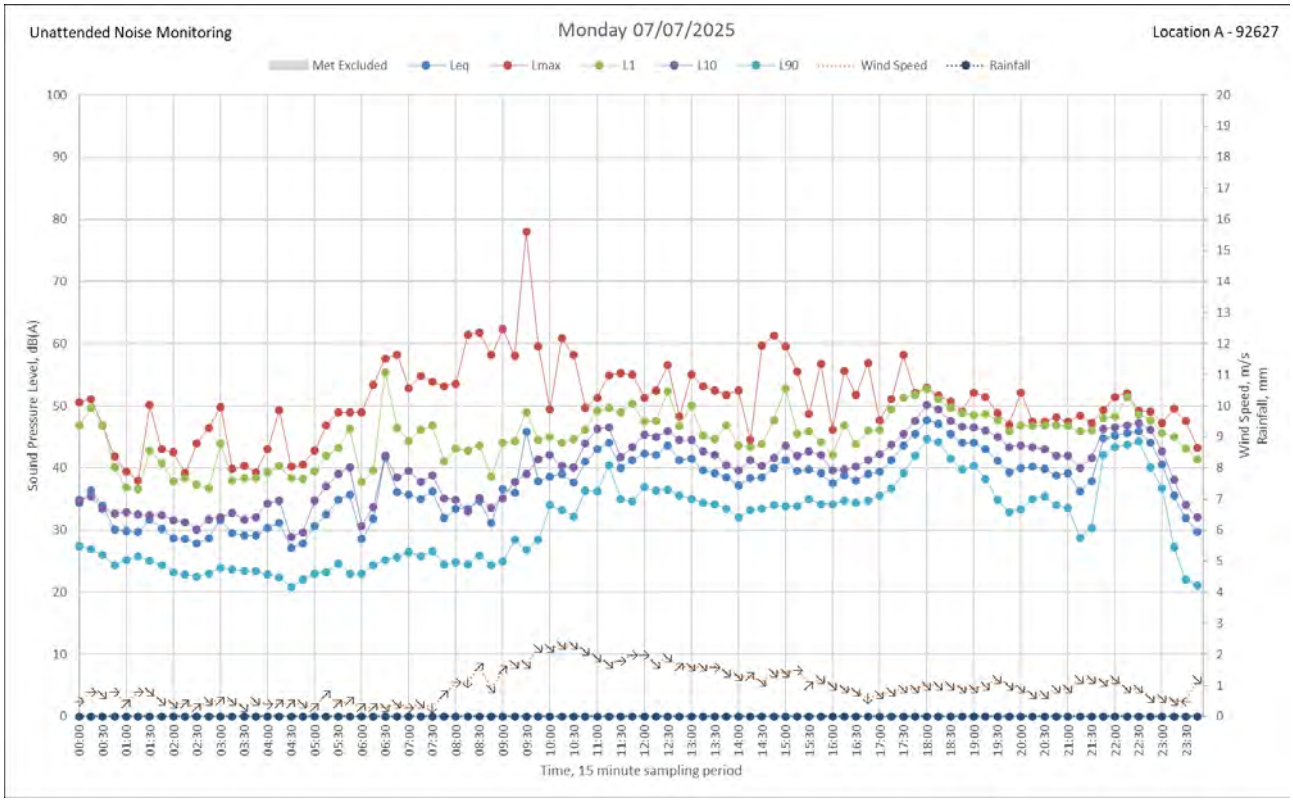

Unattended Noise Monitoring
Wednesday 02/07/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

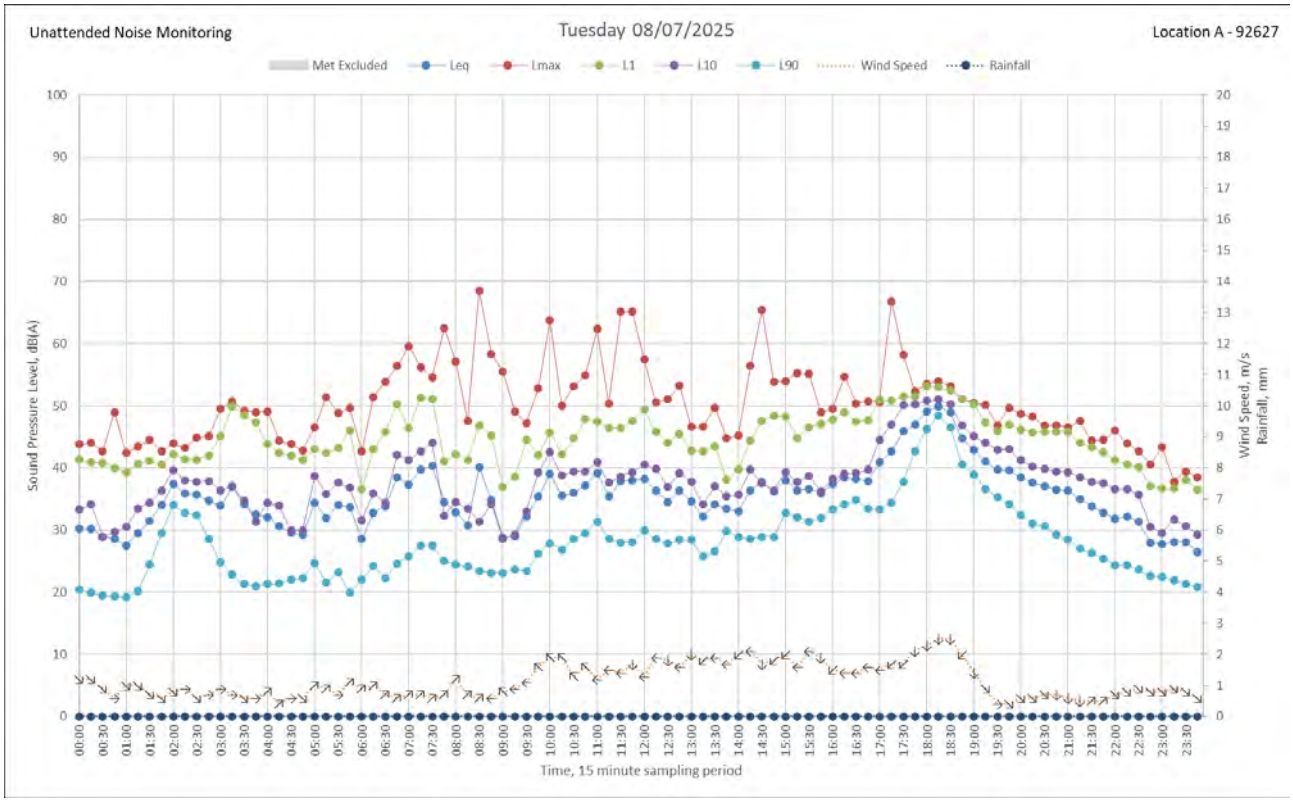

Unattended Noise Monitoring
Thursday 03/07/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

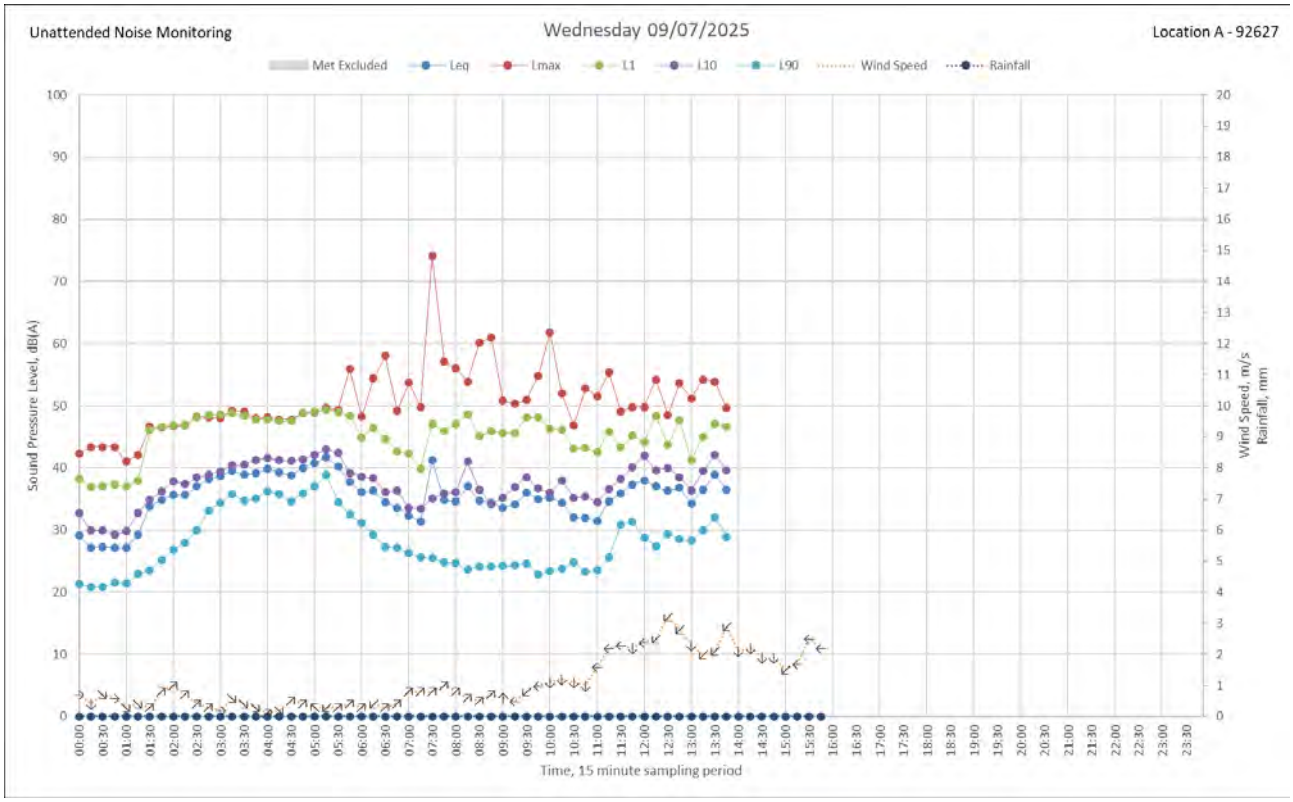

Unattended Noise Monitoring
Friday 04/07/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period


Unattended Noise Monitoring
Saturday 05/07/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period


Unattended Noise Monitoring
Sunday 06/07/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period


Unattended Noise Monitoring
Monday 07/07/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

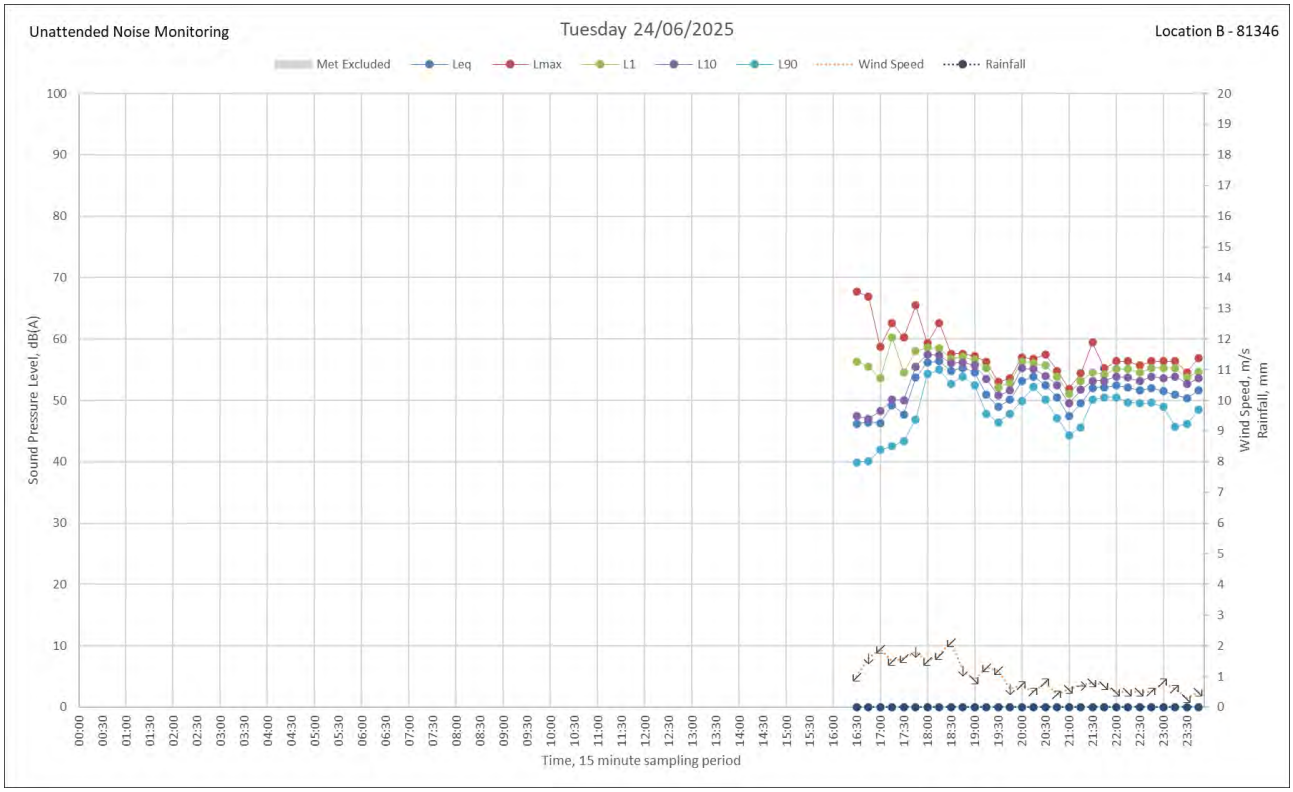

Unattended Noise Monitoring
Tuesday 08/07/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

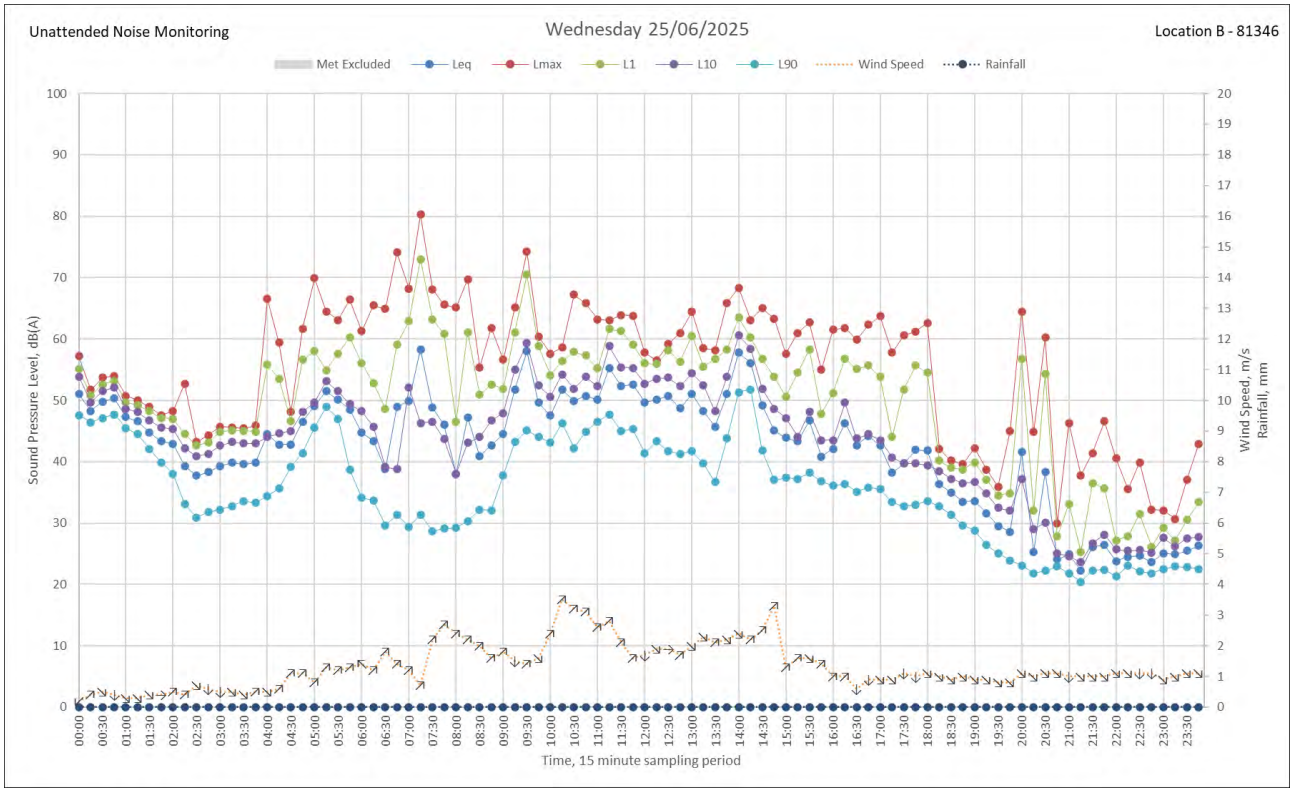

Unattended Noise Monitoring
Wednesday 09/07/2025
Location A - 92627
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

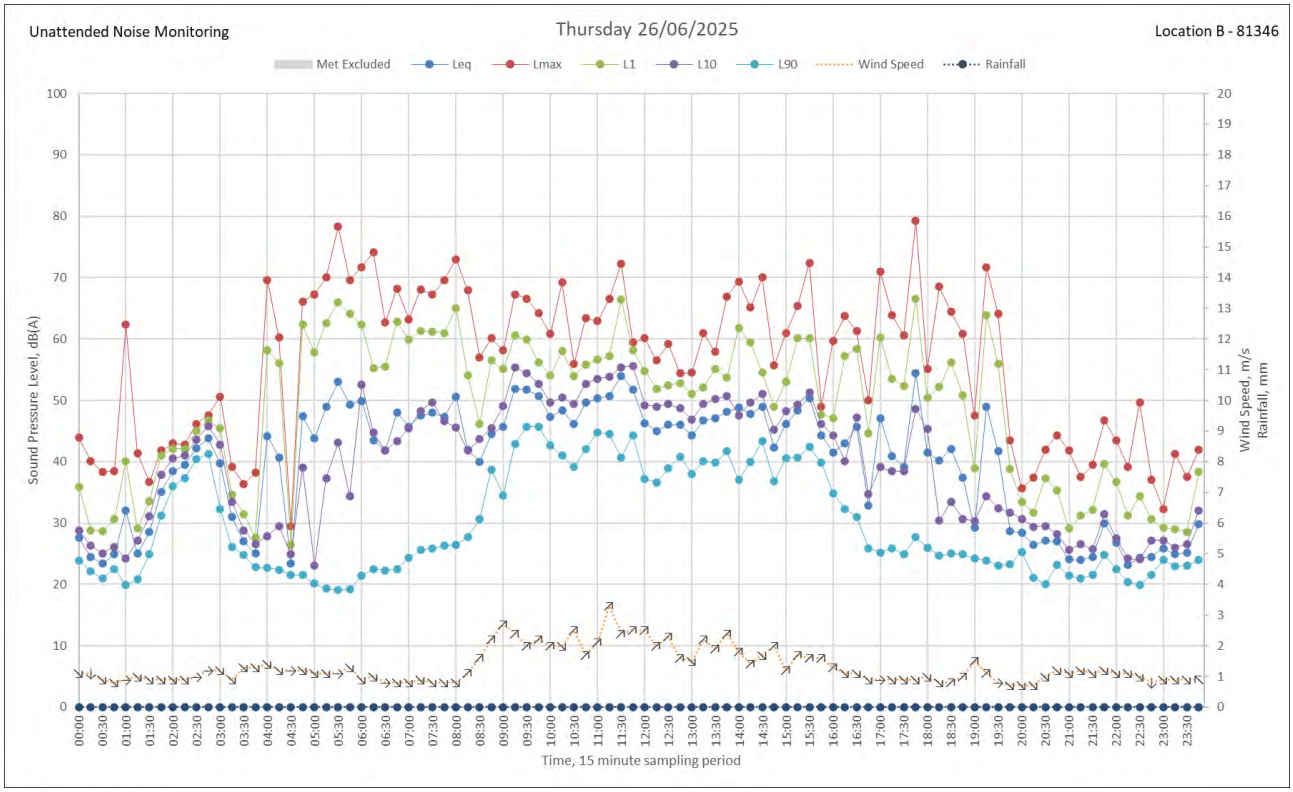
Appendix B

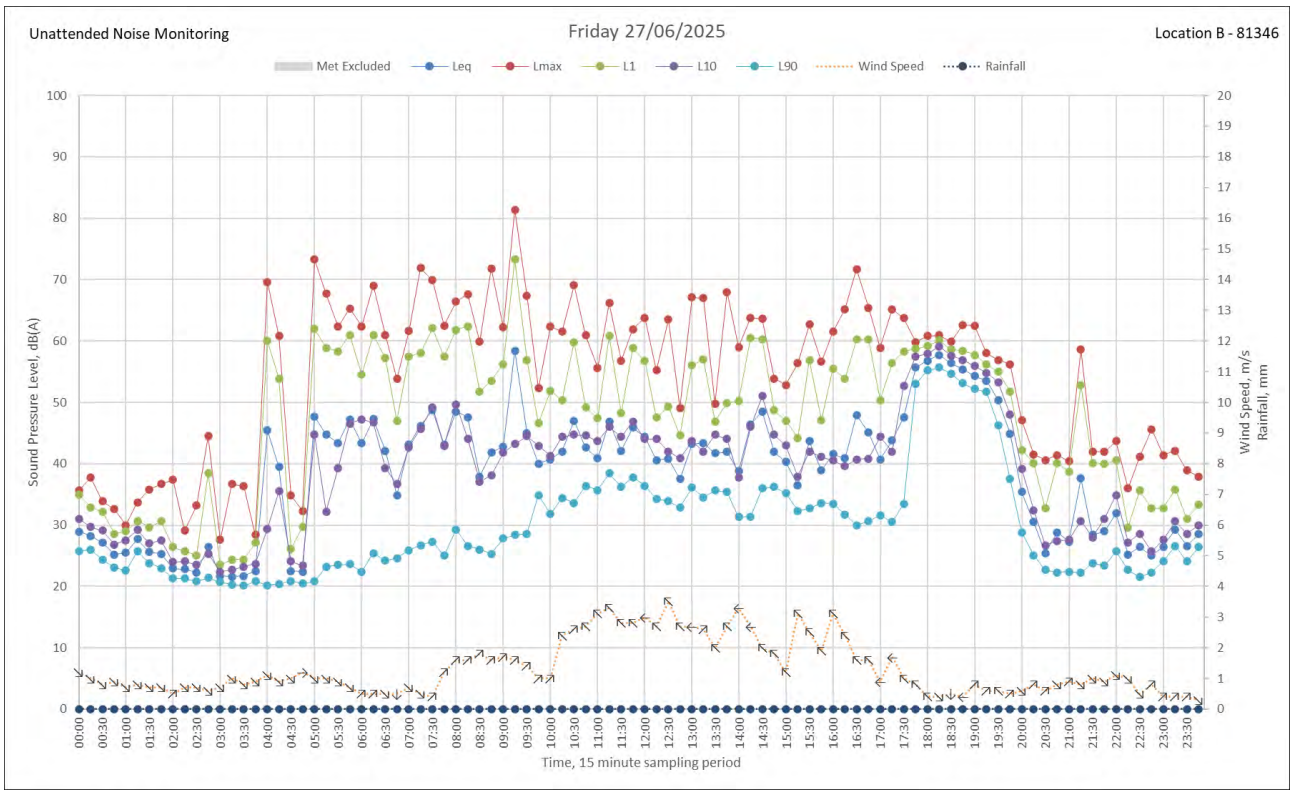
Monitoring Results – Location B

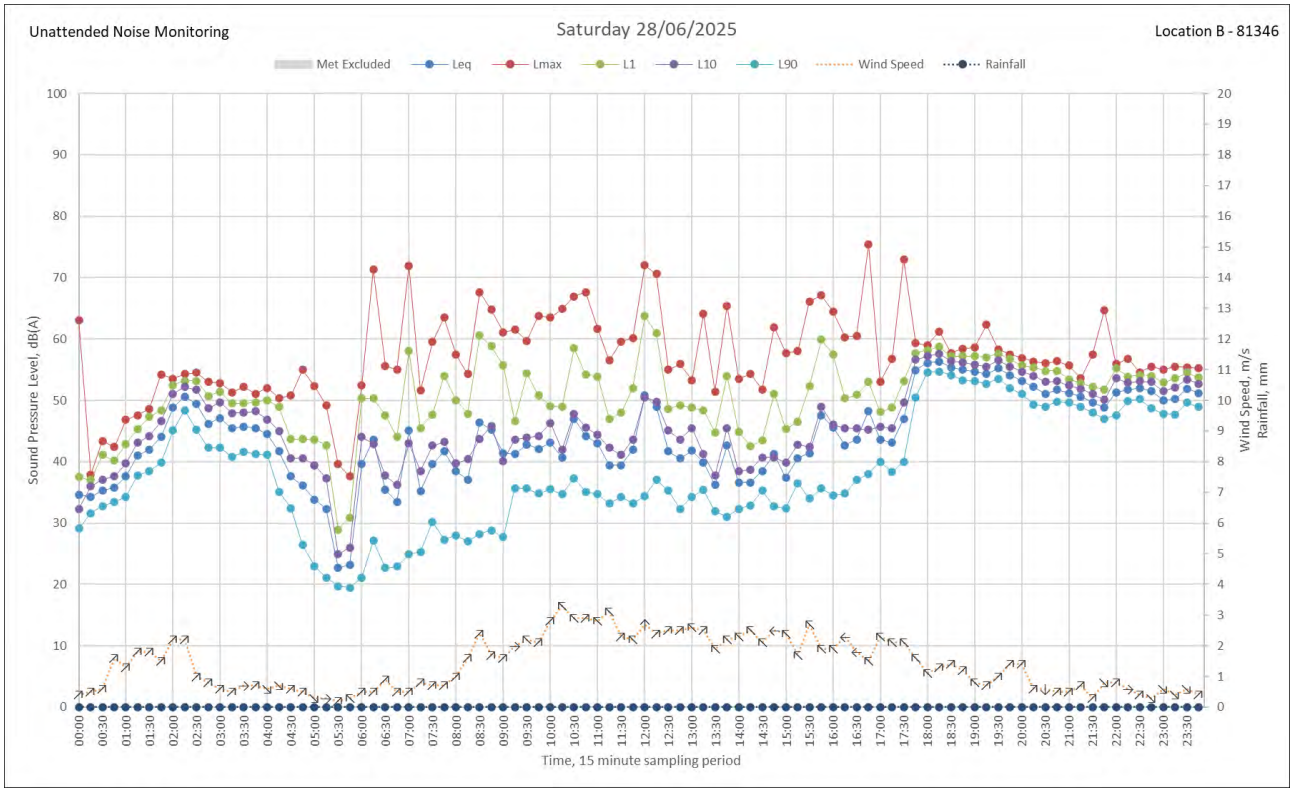


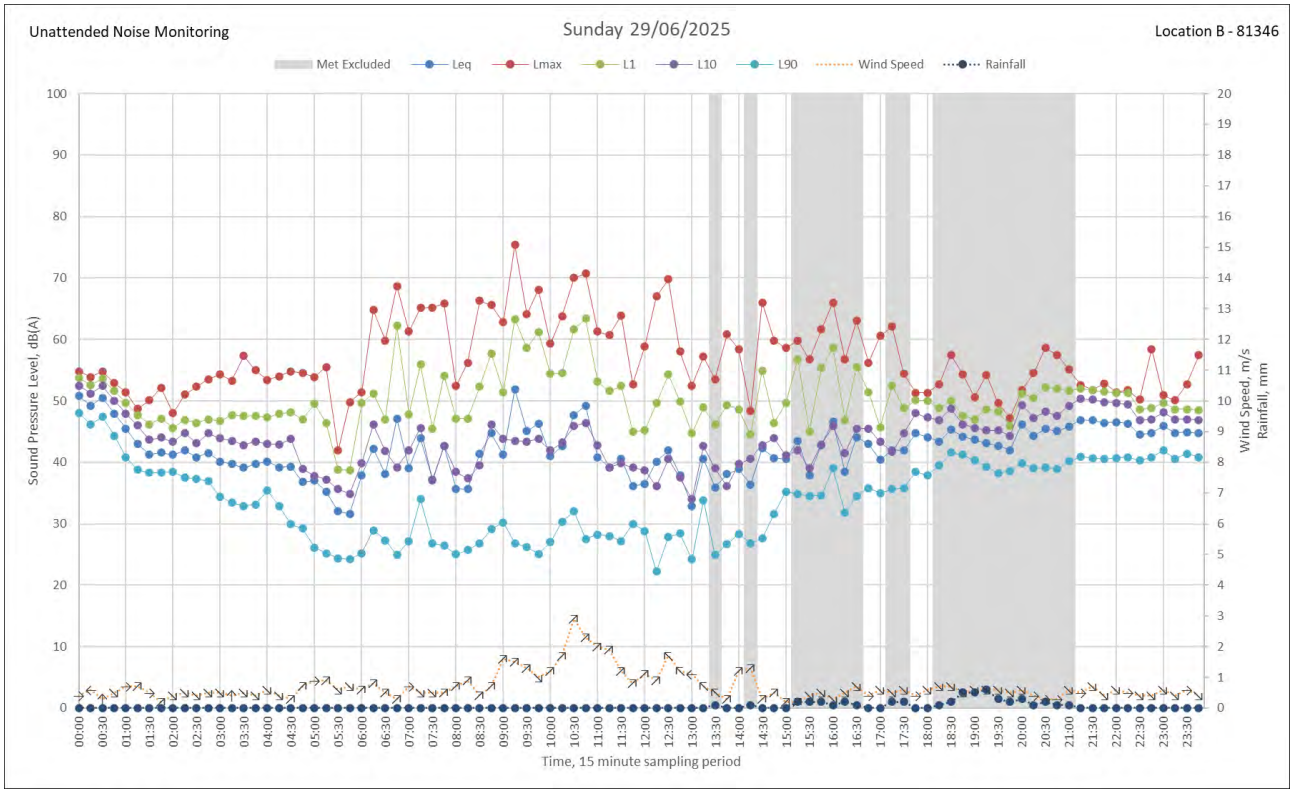

Unattended Noise Monitoring
Tuesday 24/06/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

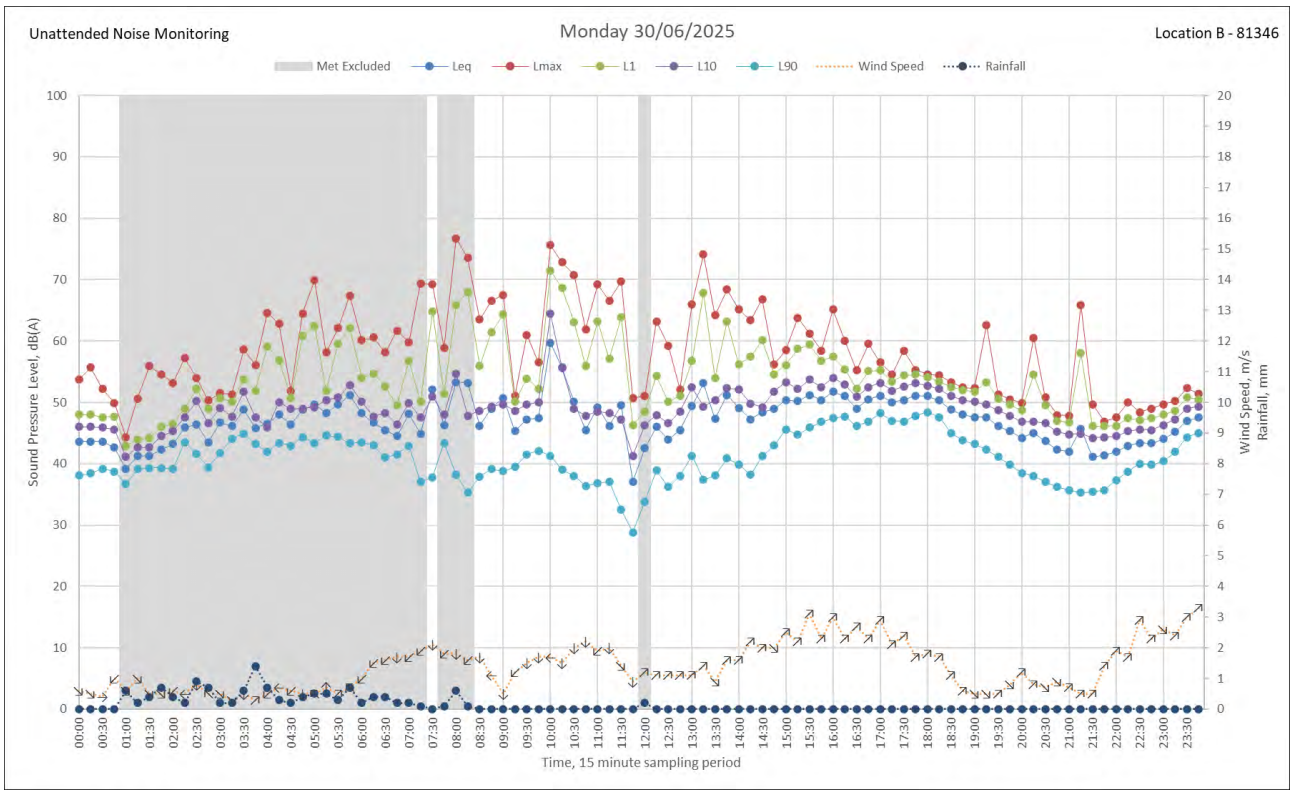

Unattended Noise Monitoring
Wednesday 25/06/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

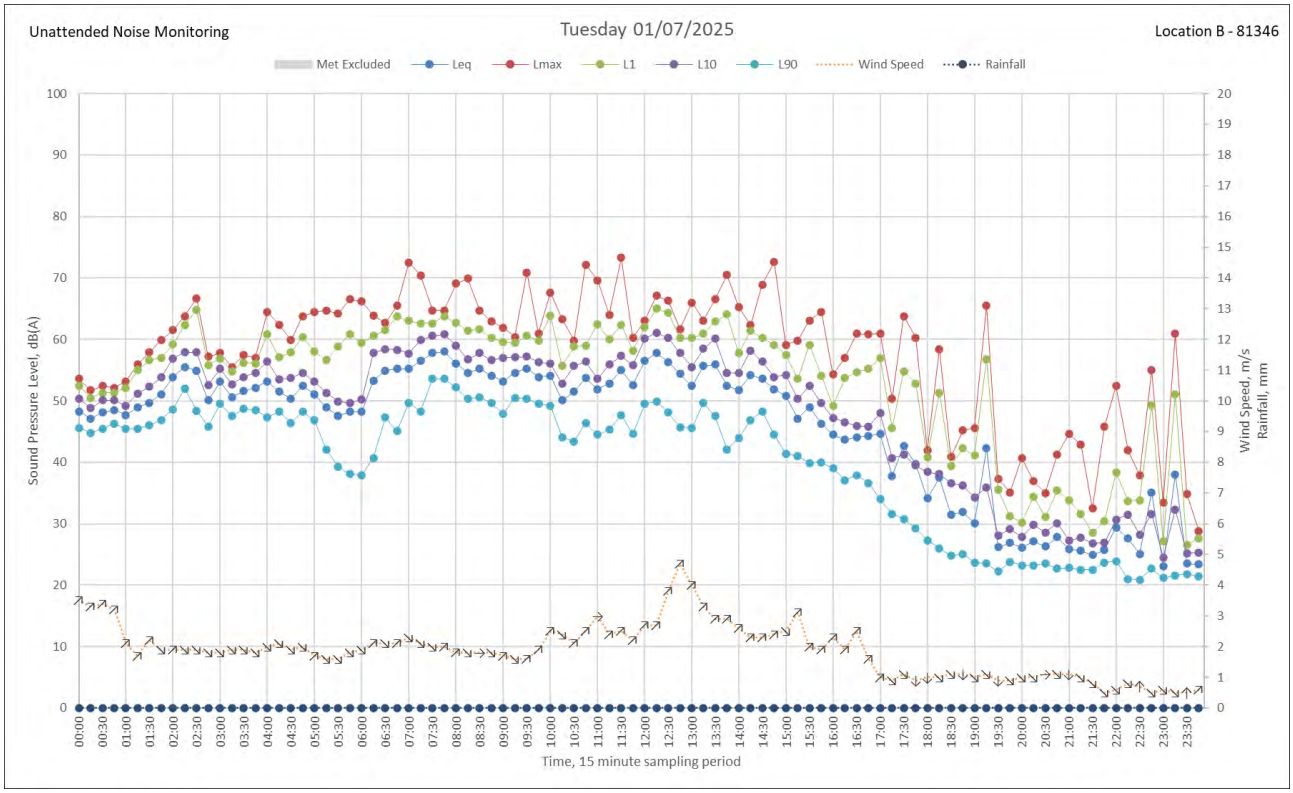

Unattended Noise Monitoring
Thursday 26/06/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

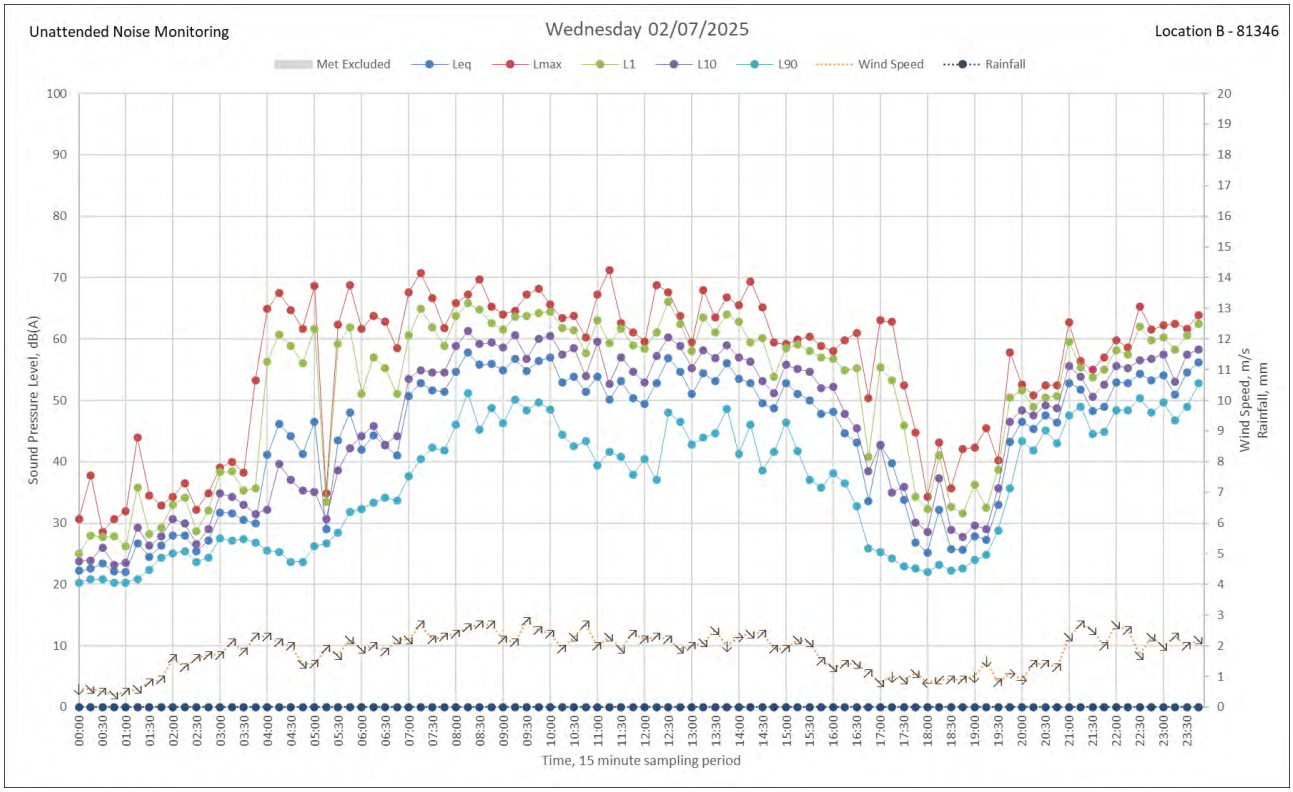

Unattended Noise Monitoring
Friday 27/06/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

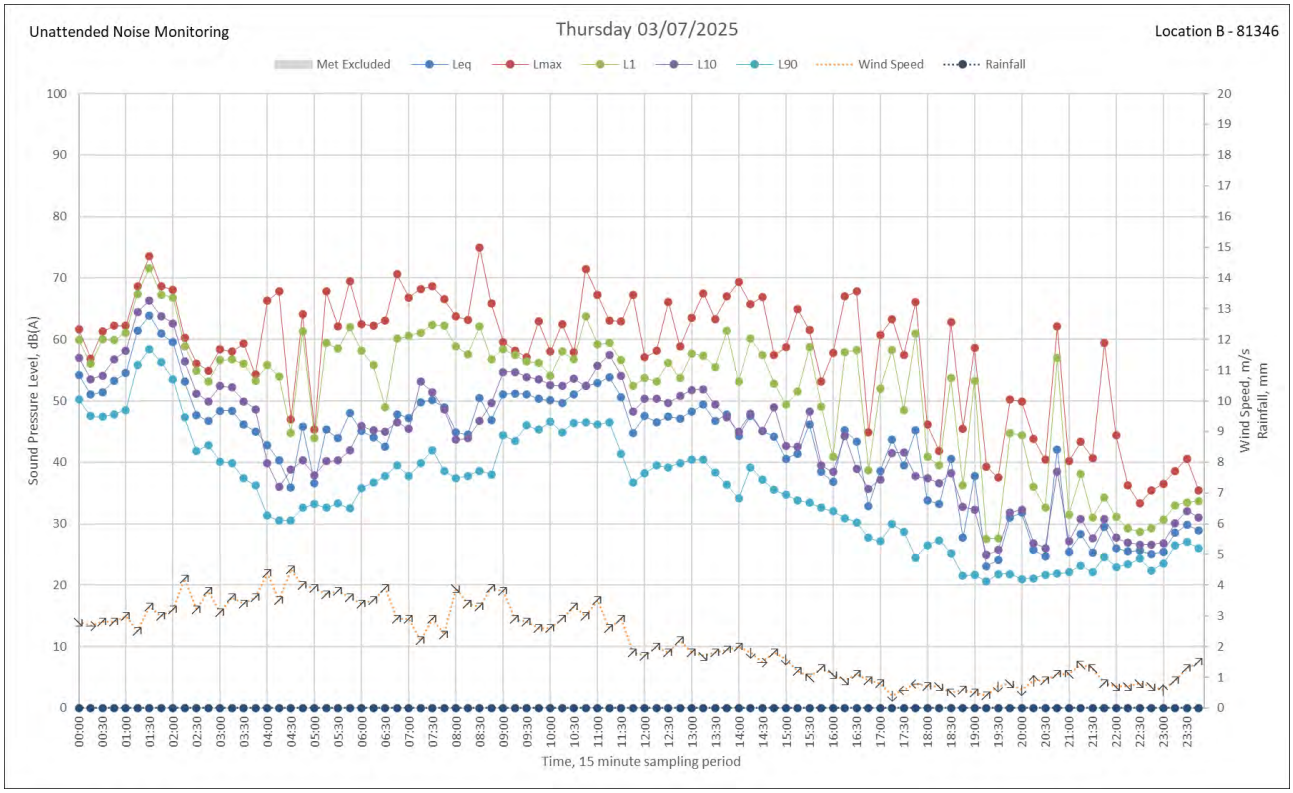

Unattended Noise Monitoring
Saturday 28/06/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

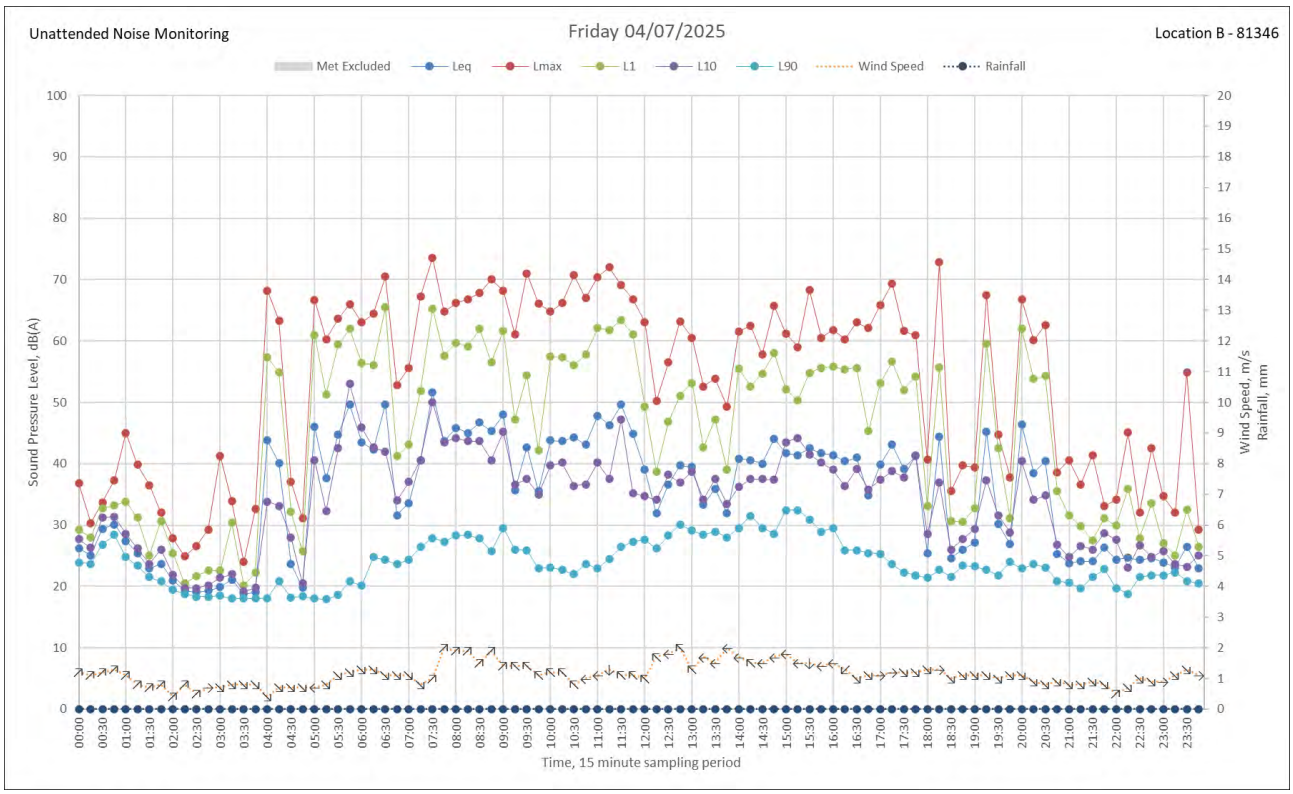

Unattended Noise Monitoring
Sunday 29/06/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

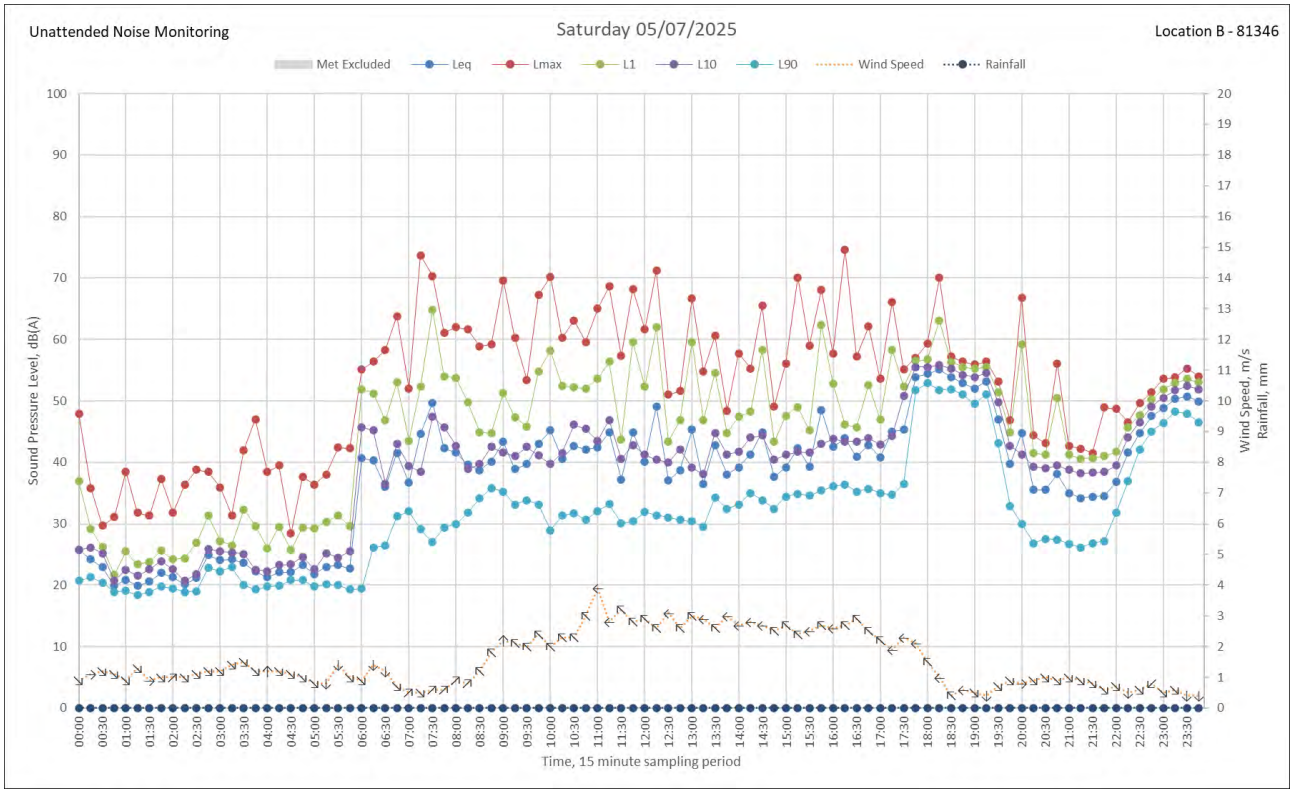

Unattended Noise Monitoring
Monday 30/06/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

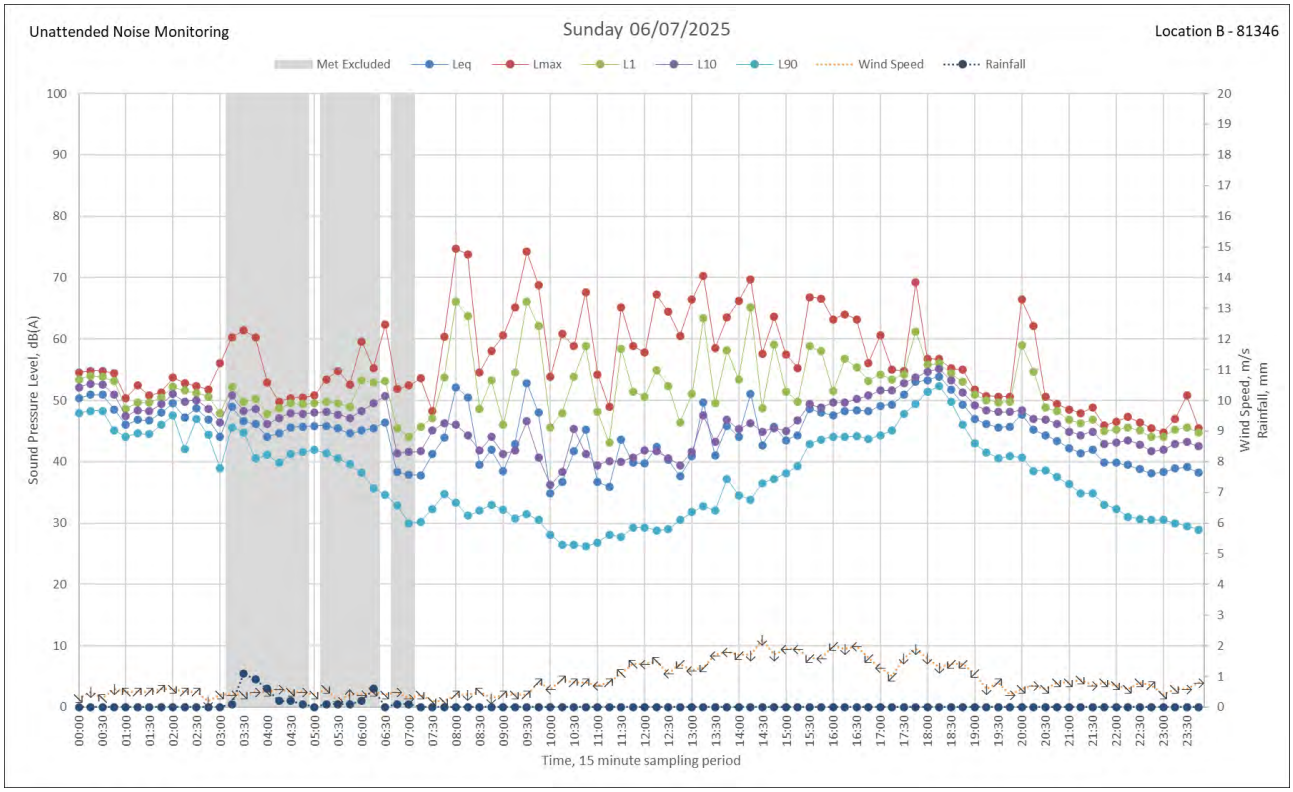

Unattended Noise Monitoring
Tuesday 01/07/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

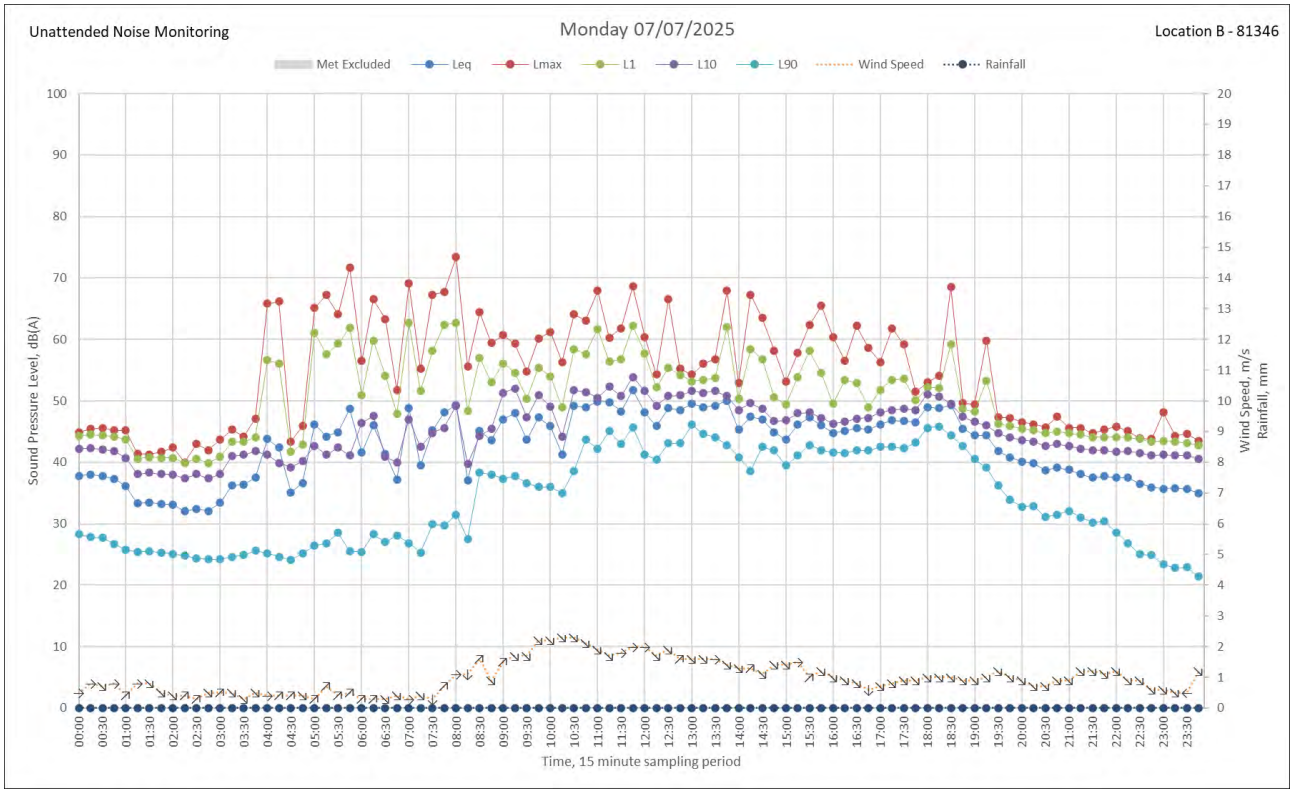

Unattended Noise Monitoring
Wednesday 02/07/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

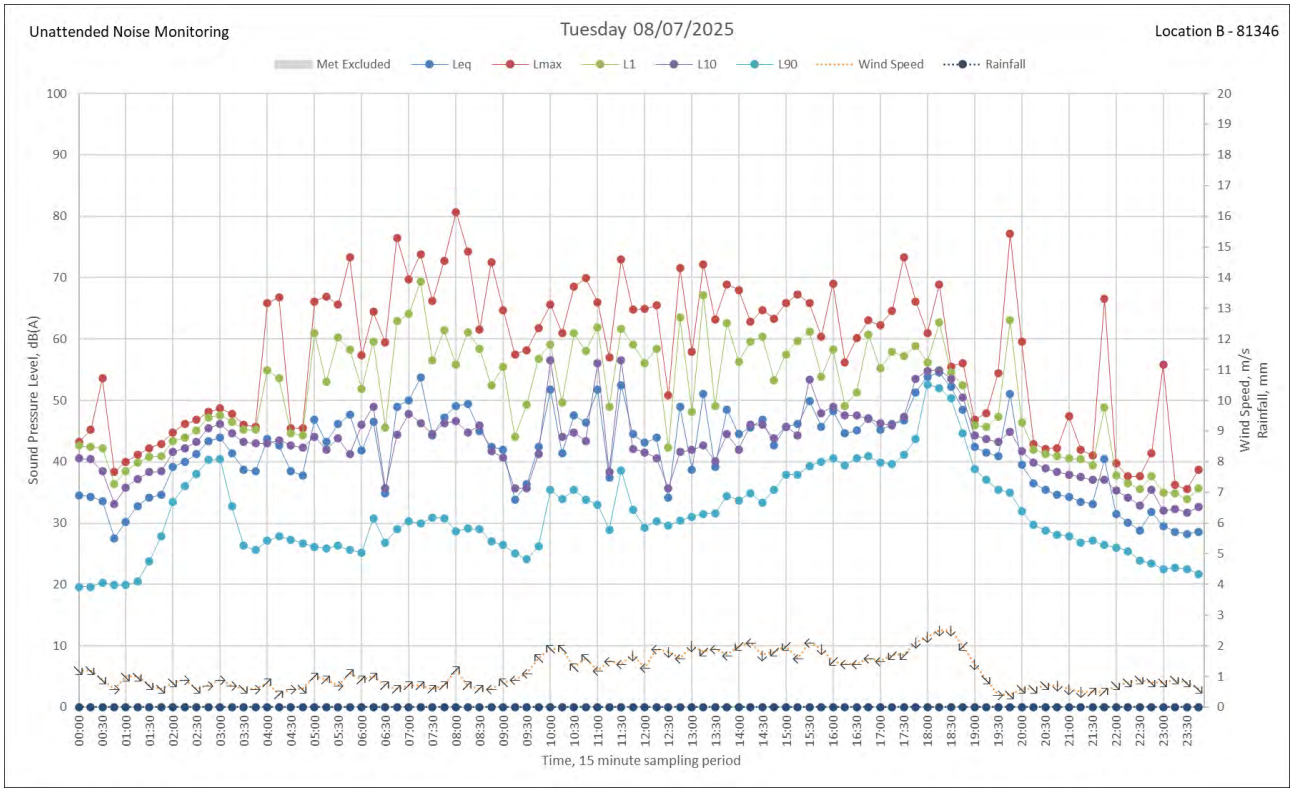

Unattended Noise Monitoring
Thursday 03/07/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

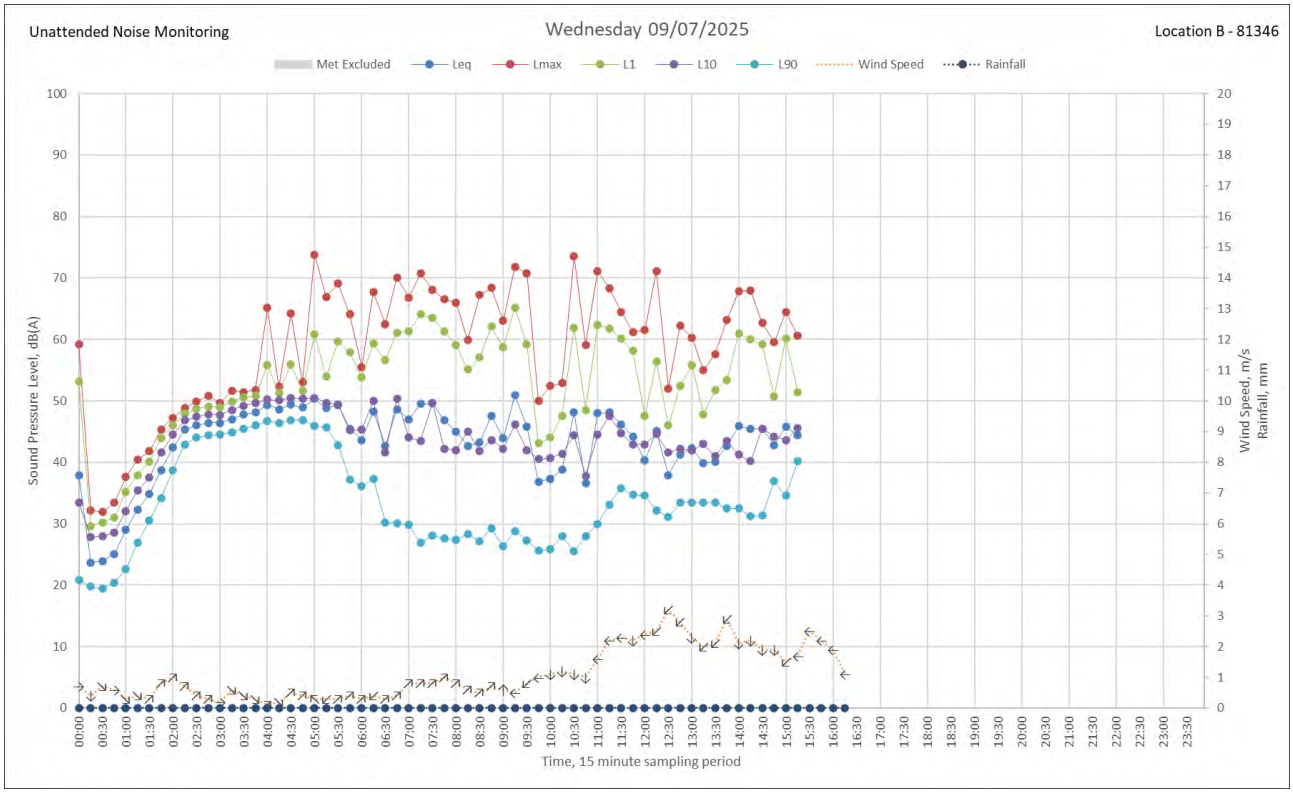

Unattended Noise Monitoring
Friday 04/07/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period


Unattended Noise Monitoring
Saturday 05/07/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period


Unattended Noise Monitoring
Sunday 06/07/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period


Unattended Noise Monitoring
Monday 07/07/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

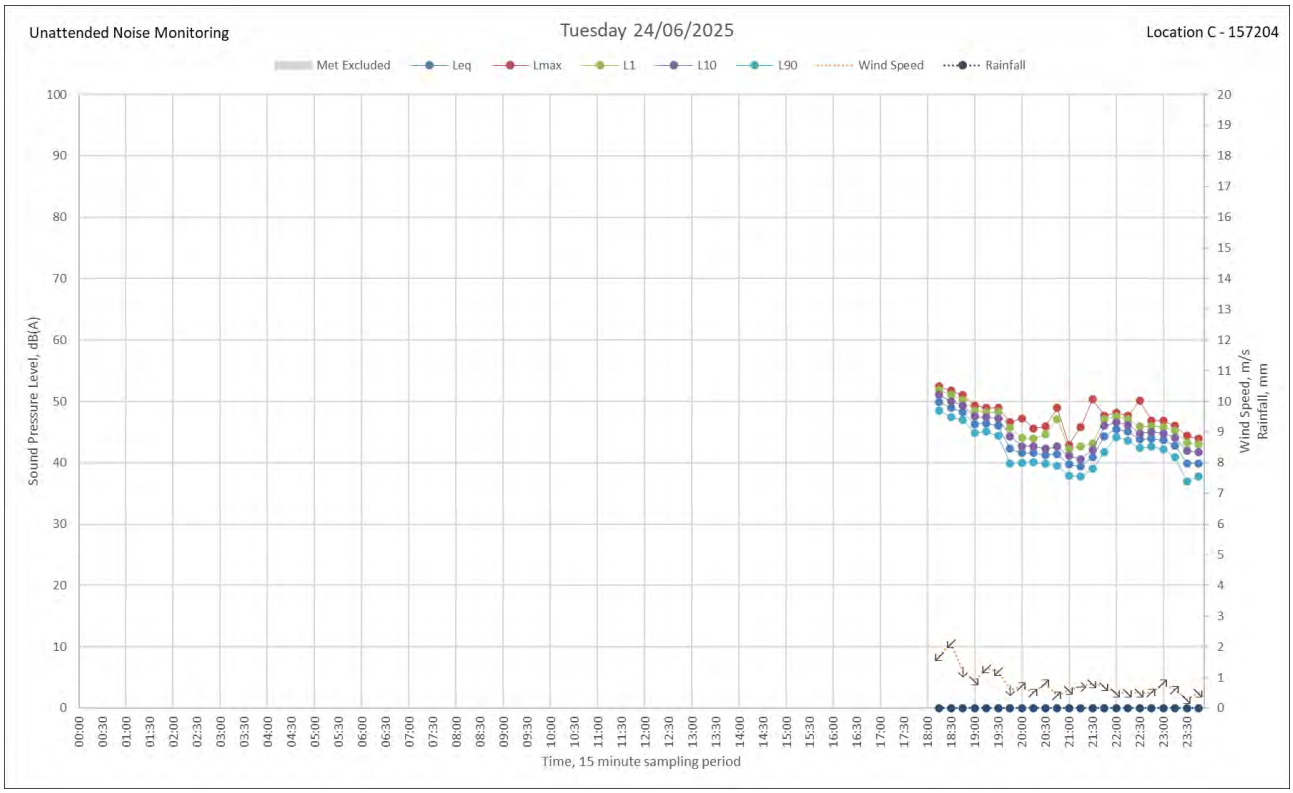

Unattended Noise Monitoring
Tuesday 08/07/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

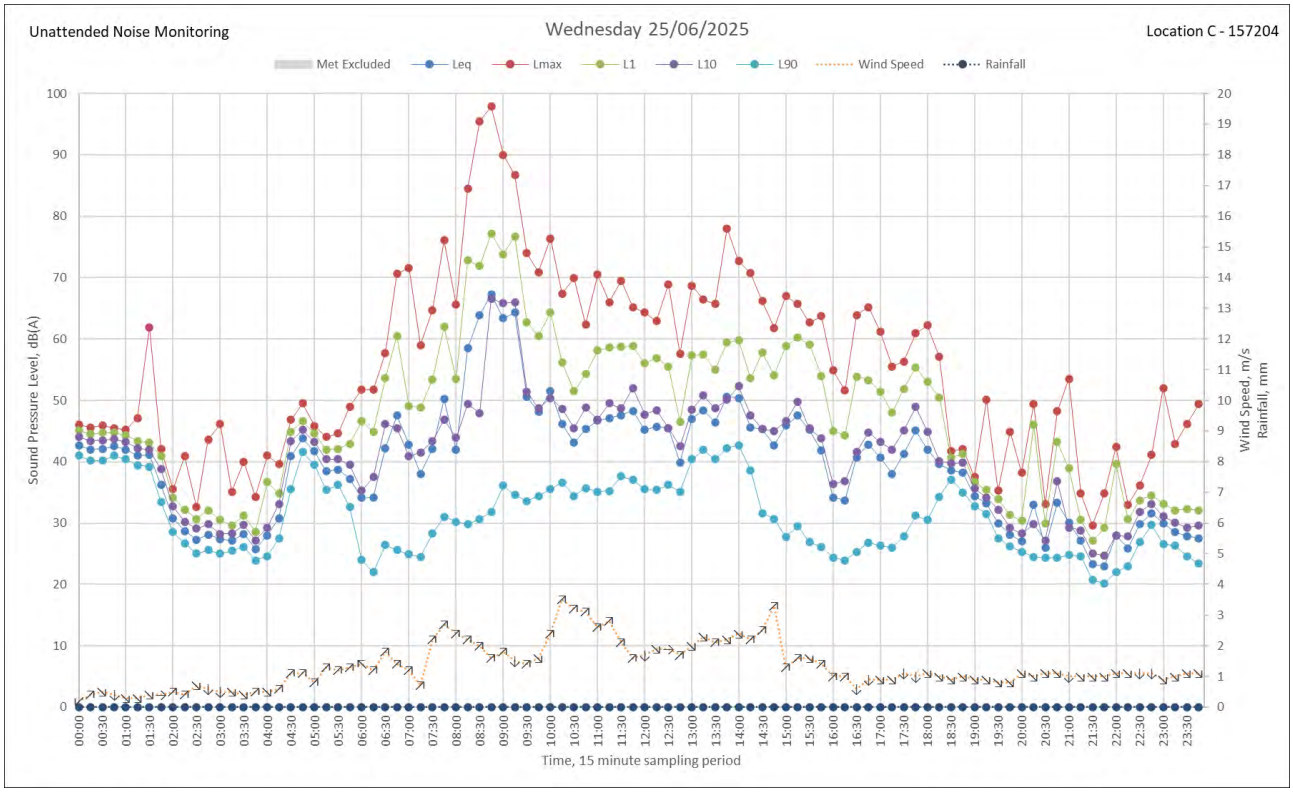

Unattended Noise Monitoring
Wednesday 09/07/2025
Location B - 81346
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

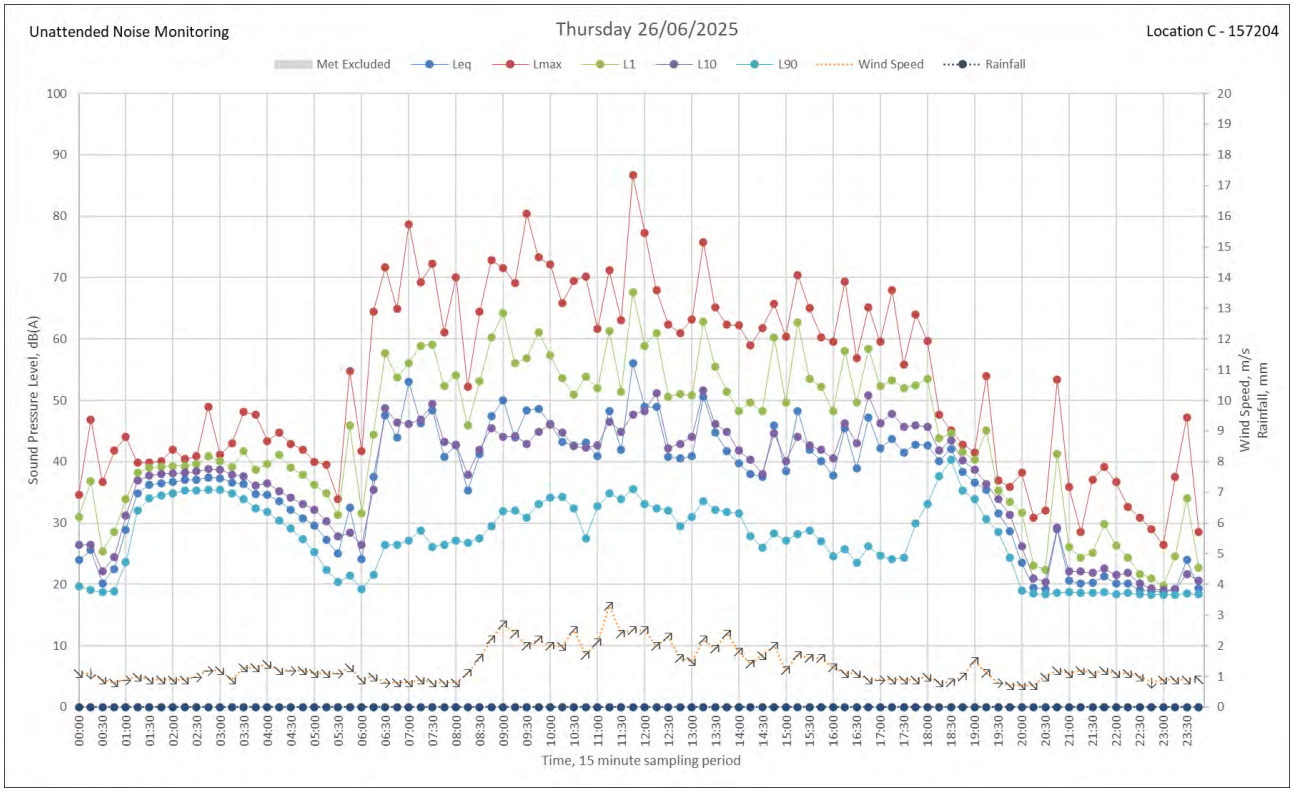
Appendix C

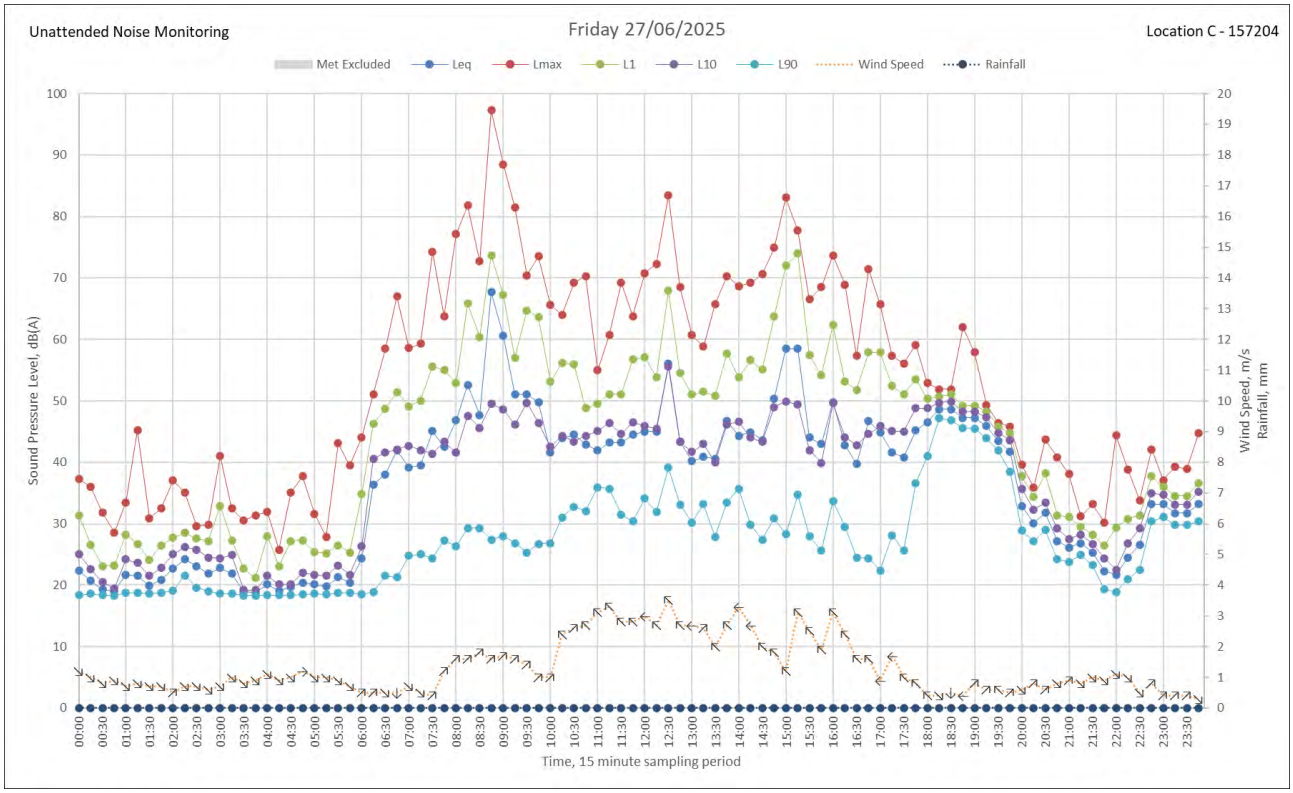
Monitoring Results – Location C

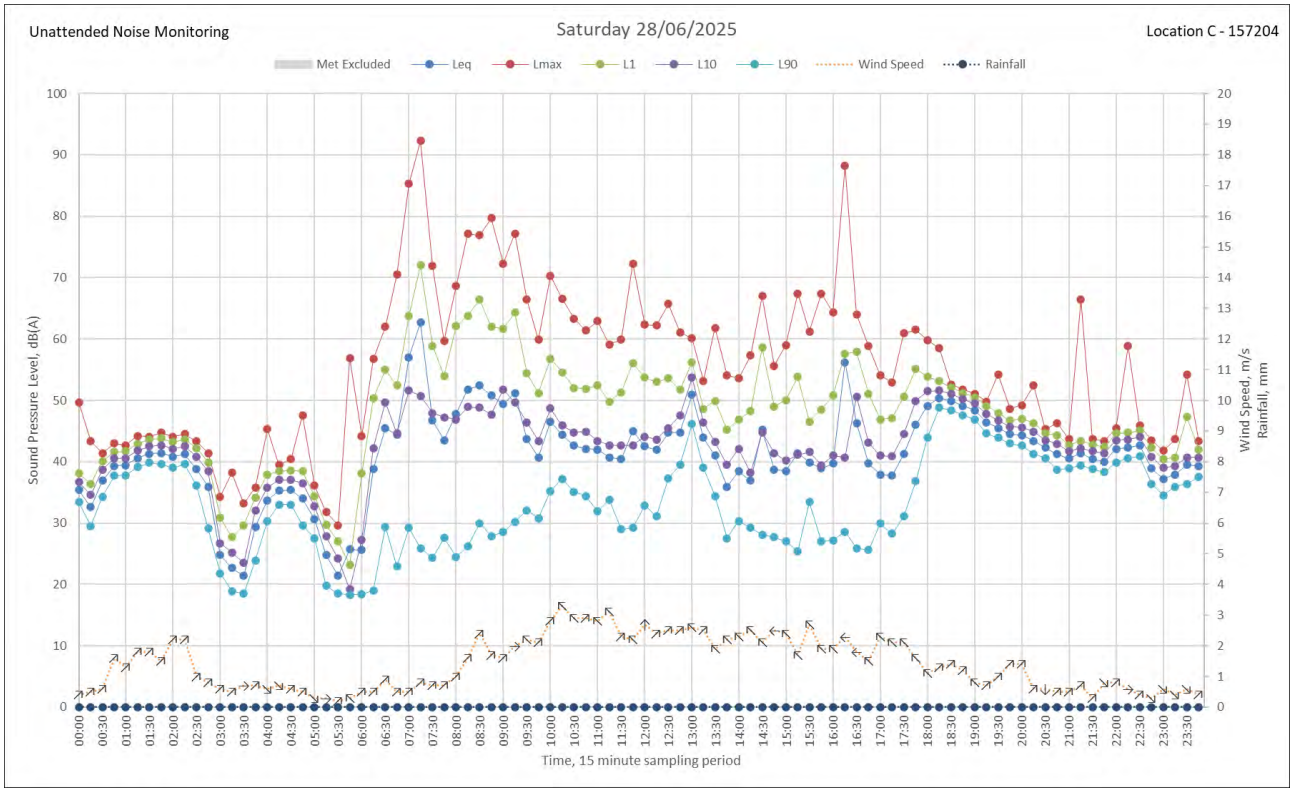


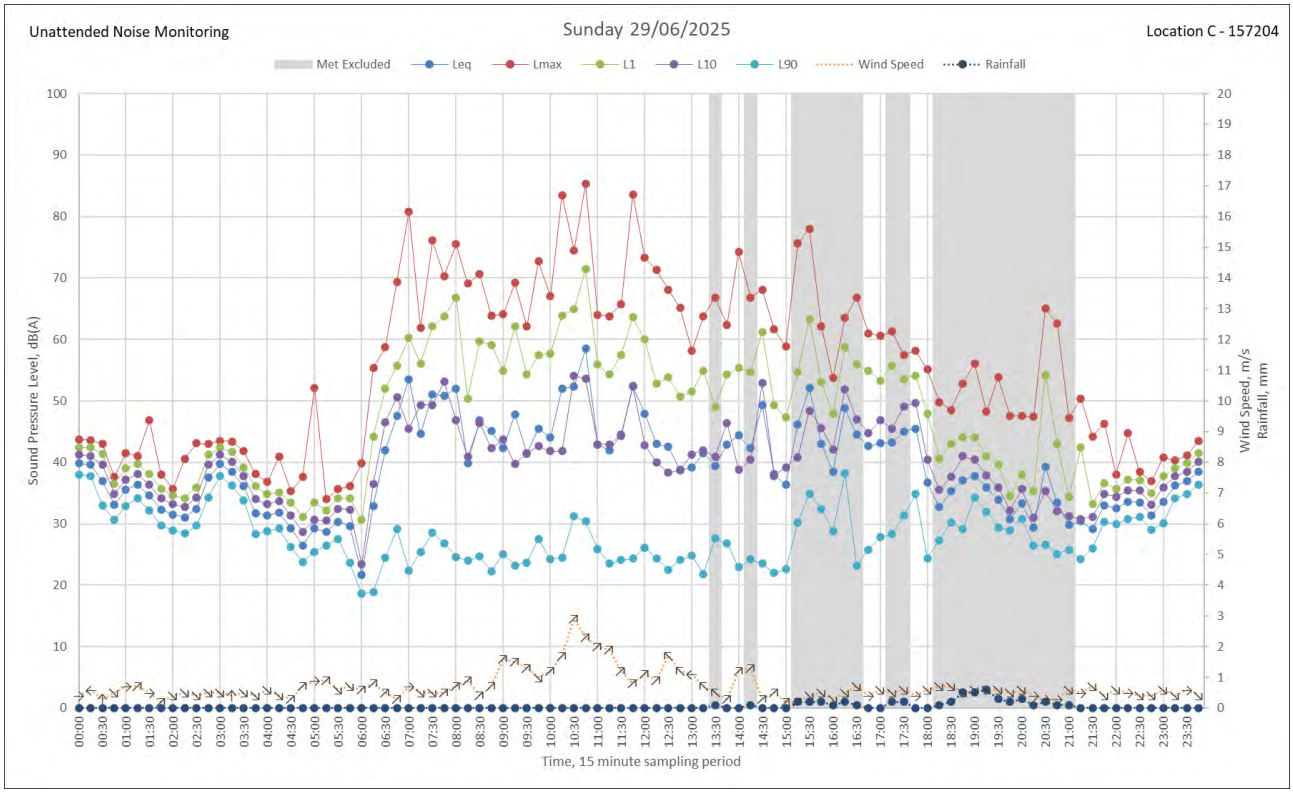

Unattended Noise Monitoring
Tuesday 24/06/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

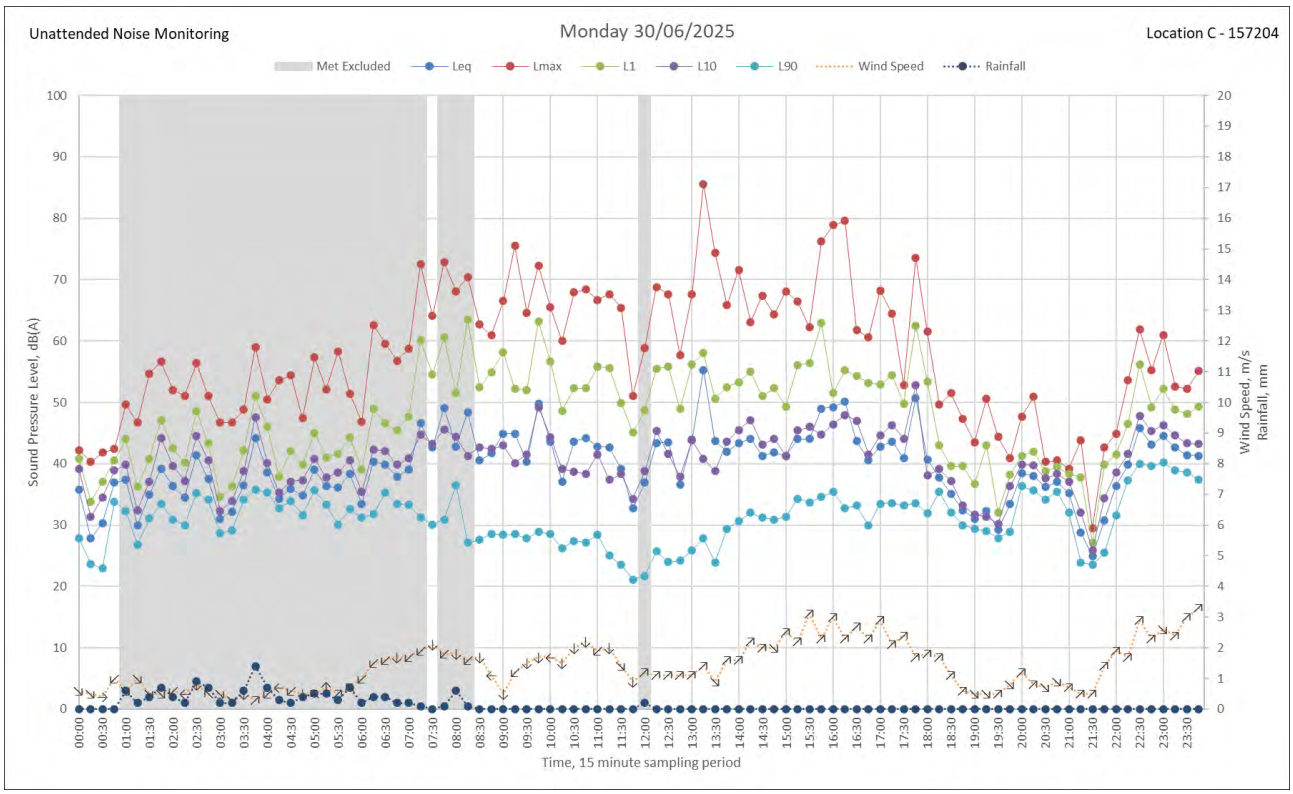

Unattended Noise Monitoring
Wednesday 25/06/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

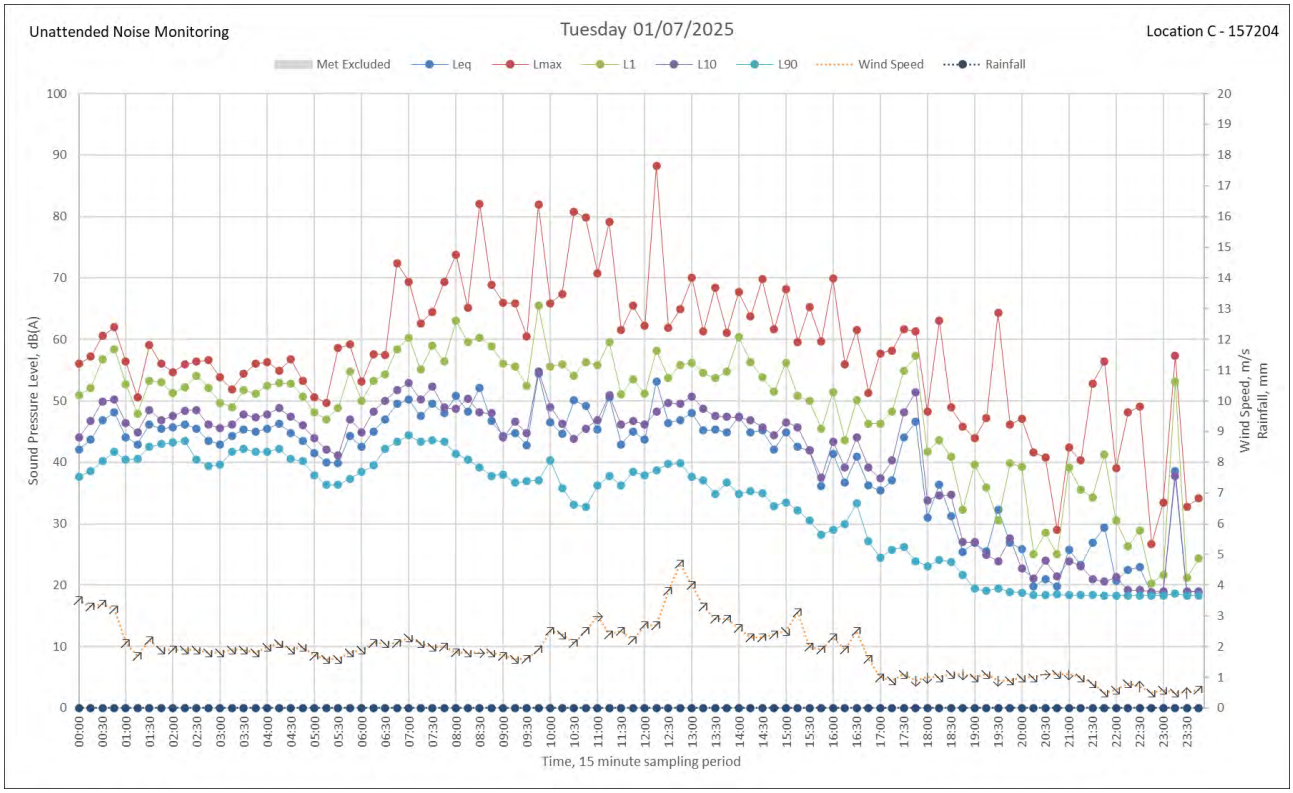

Unattended Noise Monitoring
Thursday 26/06/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

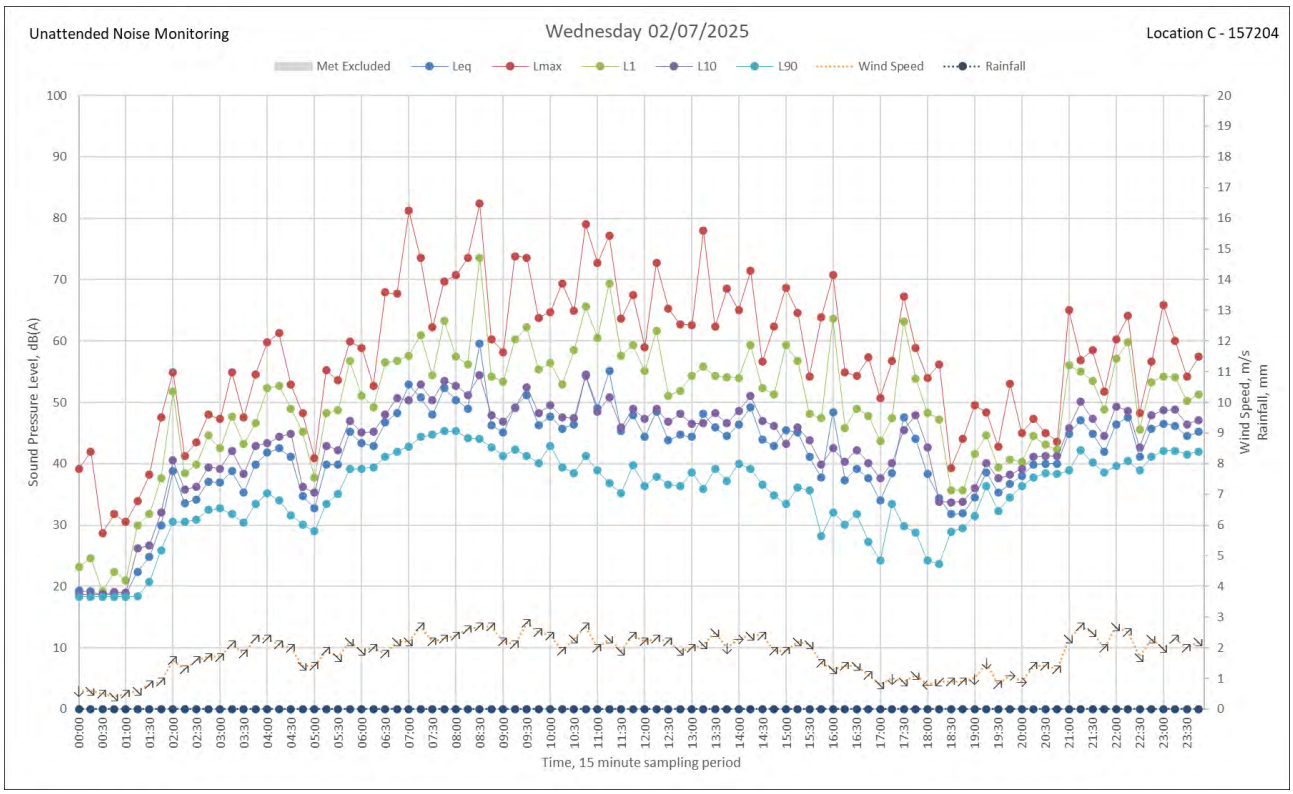

Unattended Noise Monitoring
Friday 27/06/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

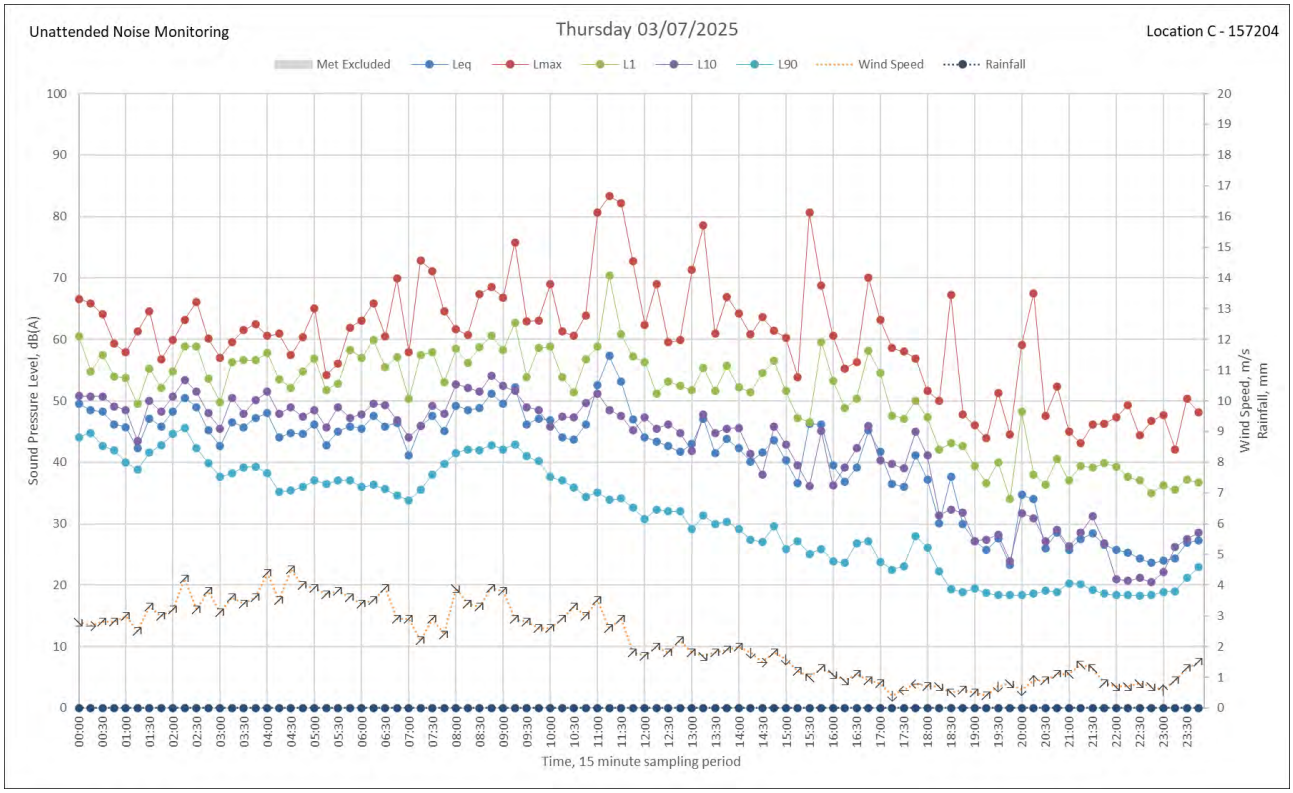

Unattended Noise Monitoring
Saturday 28/06/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

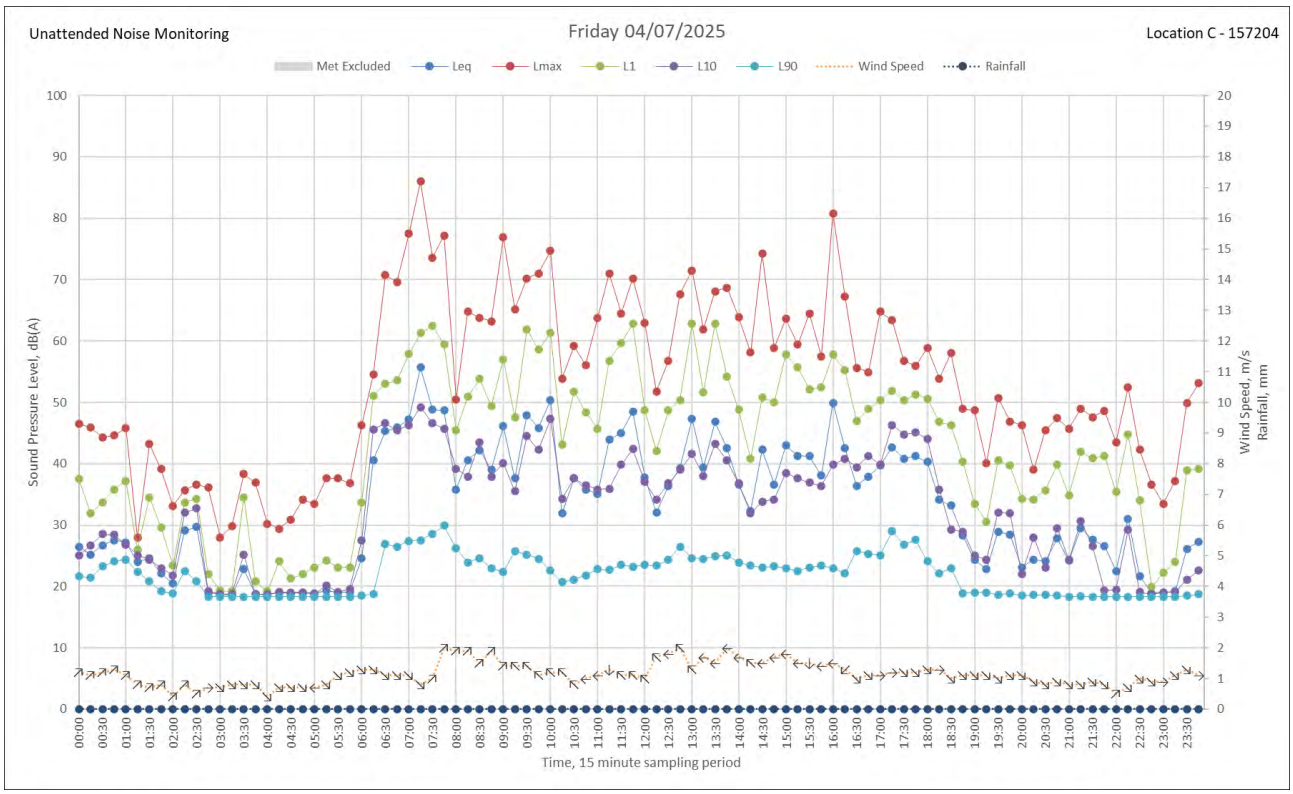

Unattended Noise Monitoring
Sunday 29/06/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

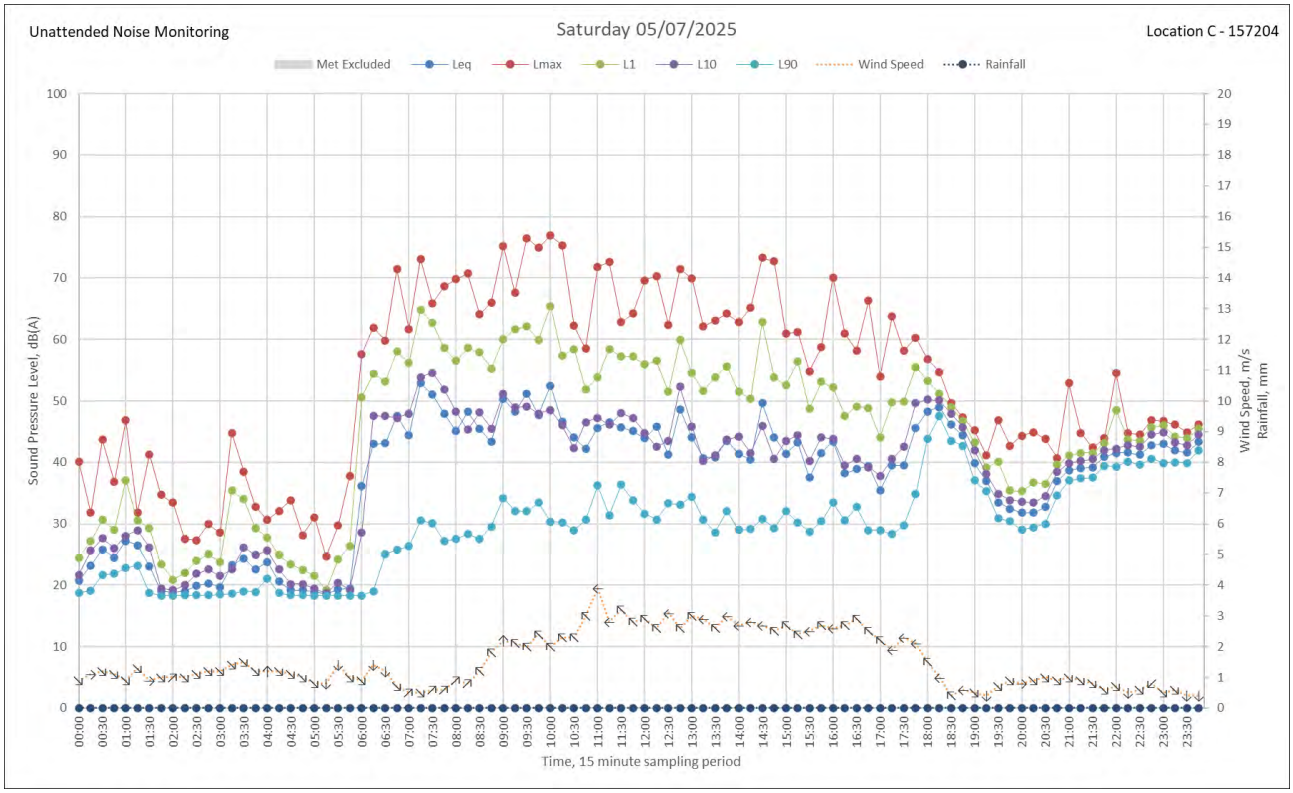

Unattended Noise Monitoring
Monday 30/06/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

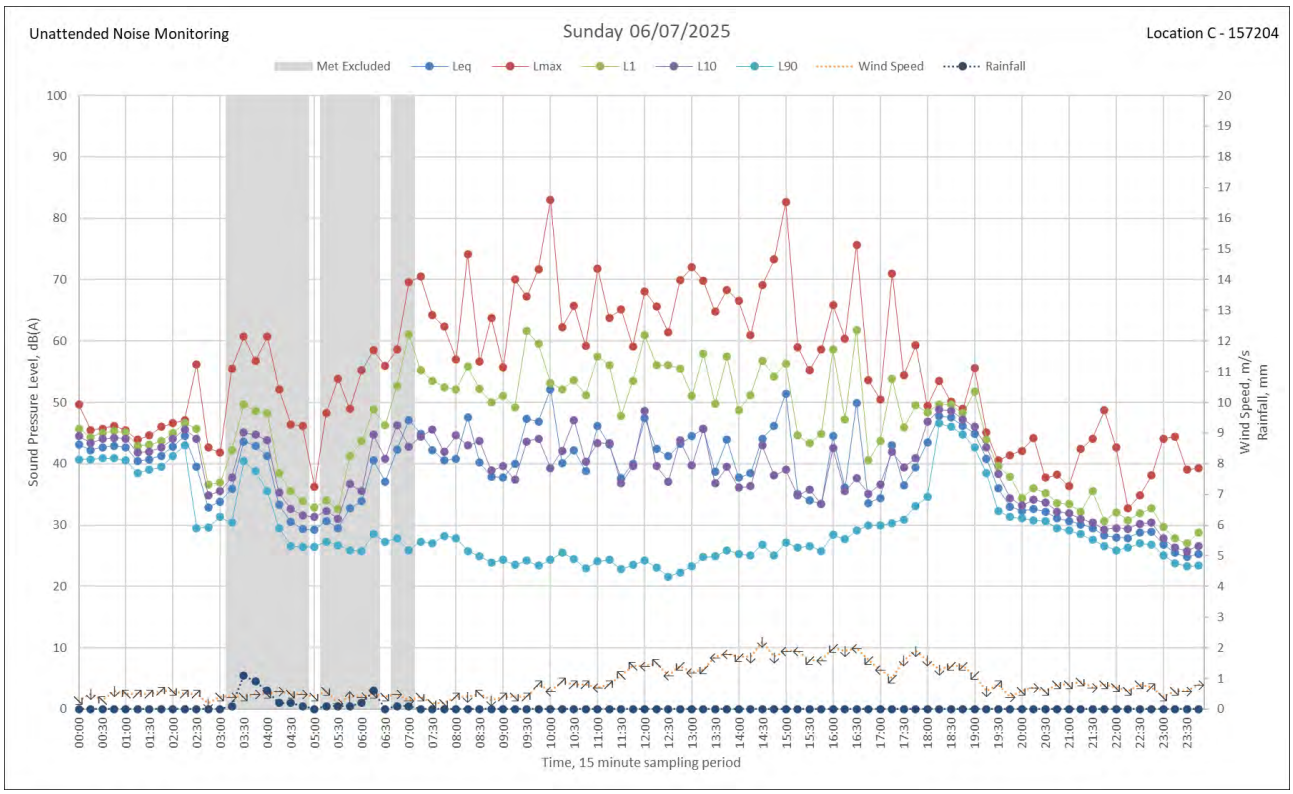

Unattended Noise Monitoring
Tuesday 01/07/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

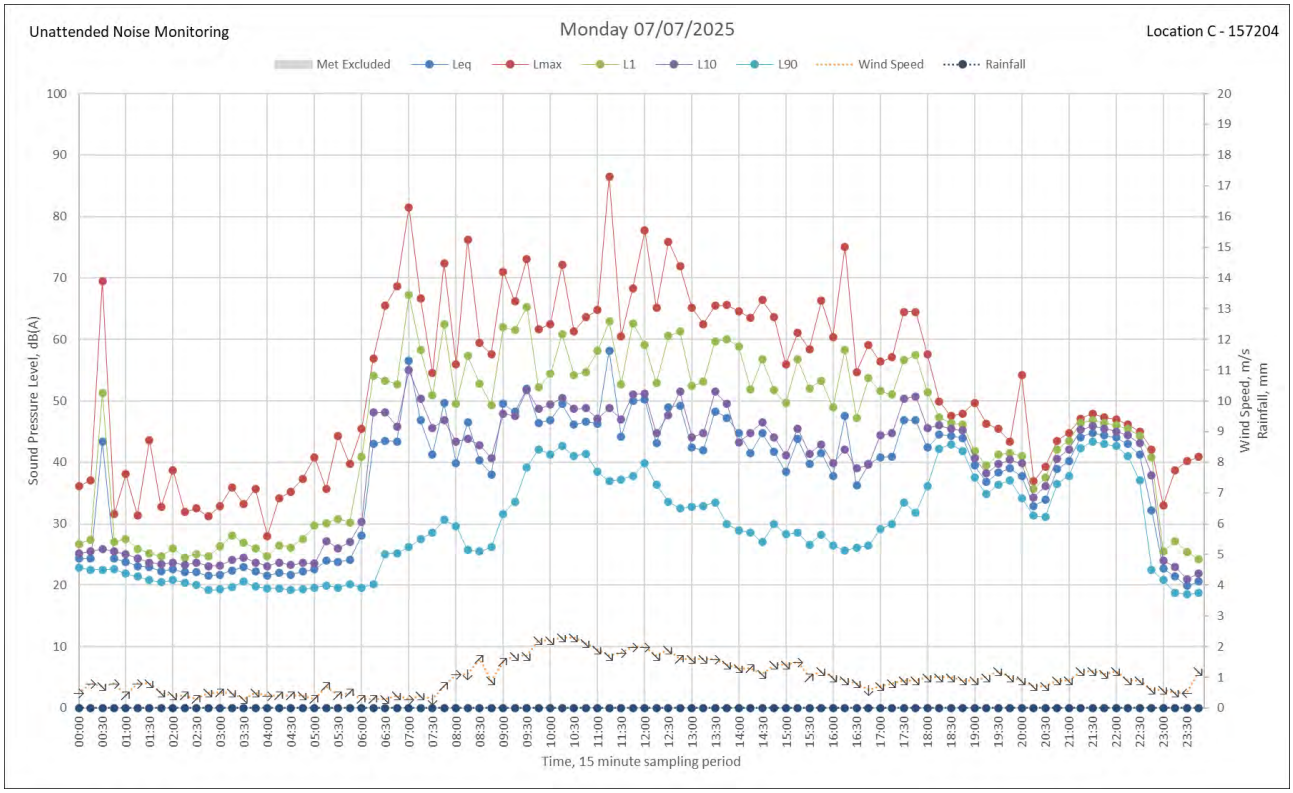

Unattended Noise Monitoring
Wednesday 02/07/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

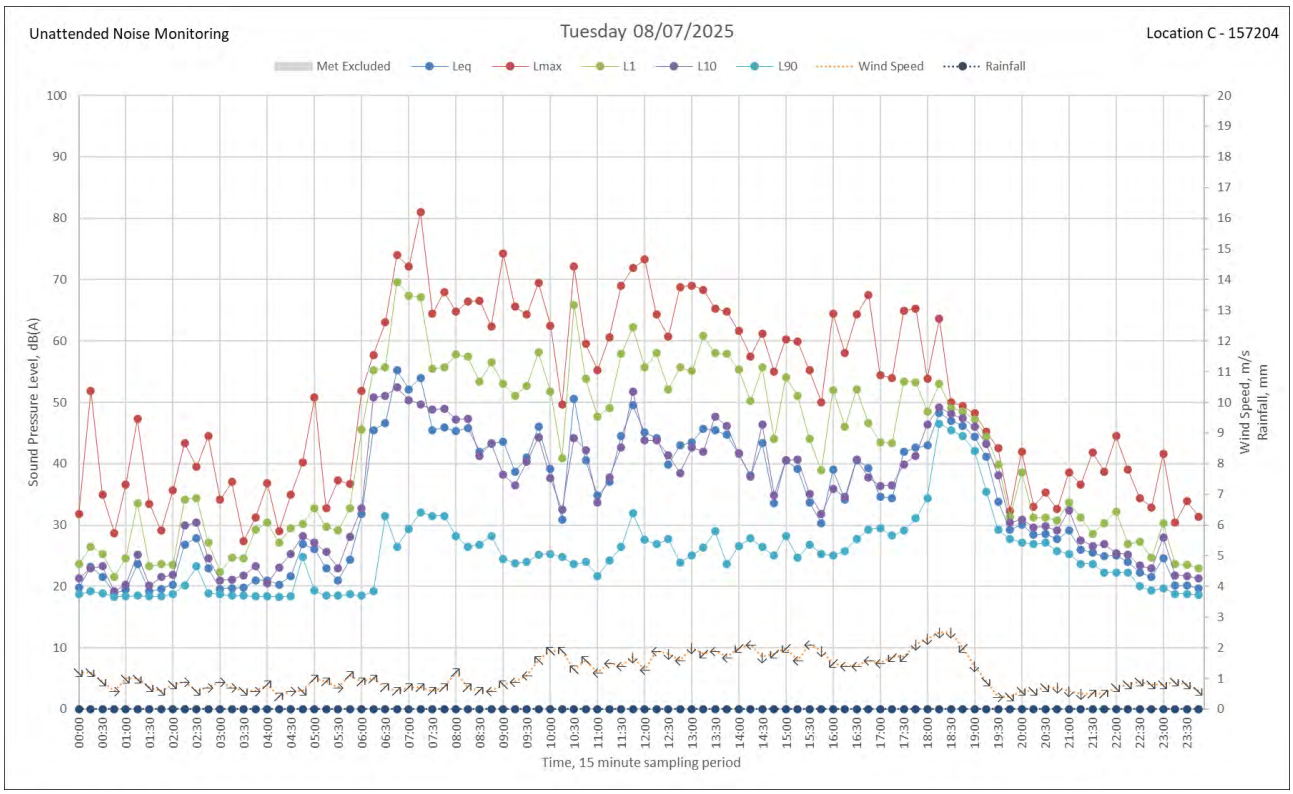

Unattended Noise Monitoring
Thursday 03/07/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

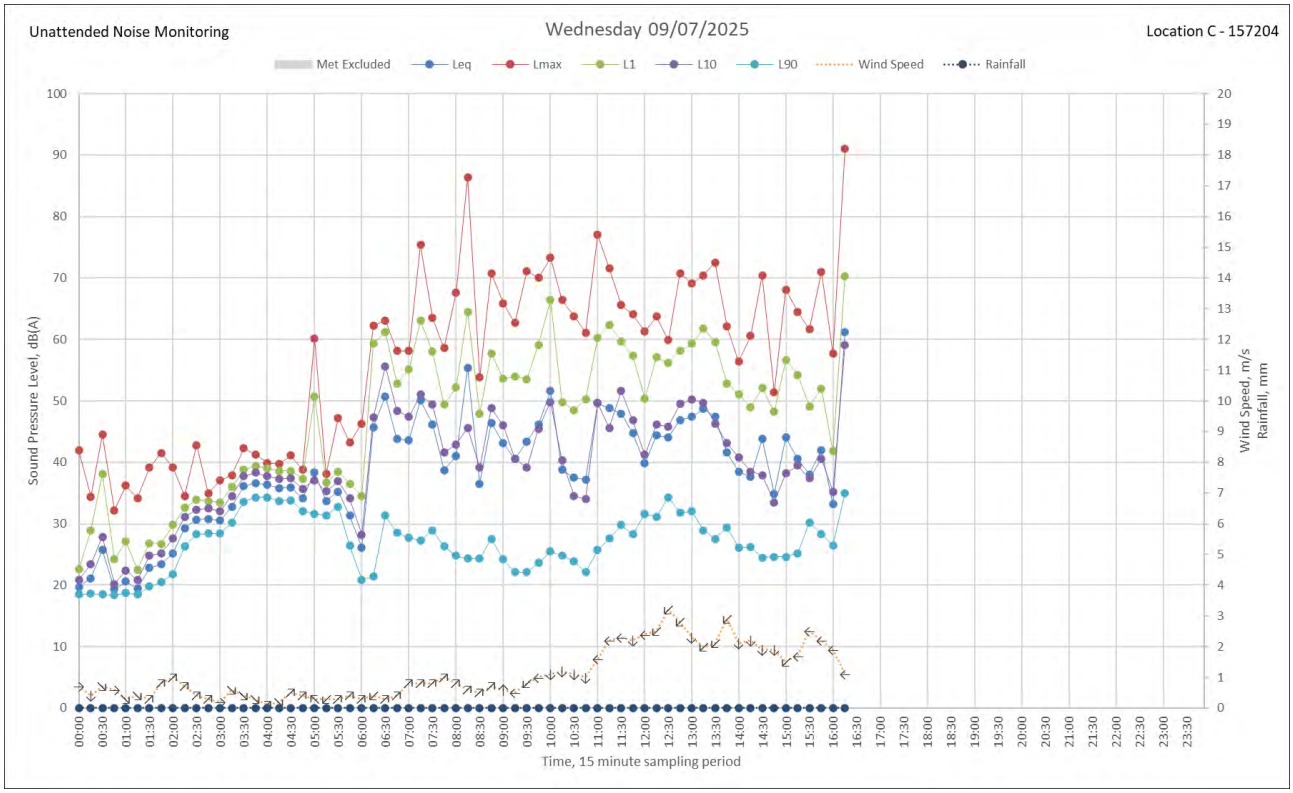

Unattended Noise Monitoring
Friday 04/07/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period


Unattended Noise Monitoring
Saturday 05/07/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period


Unattended Noise Monitoring
Sunday 06/07/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period


Unattended Noise Monitoring
Monday 07/07/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period


Unattended Noise Monitoring
Tuesday 08/07/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period


Unattended Noise Monitoring
Wednesday 09/07/2025
Location C - 157204
Met Excluded
Leq
Lmax
L1
L10
L90
Wind Speed
Rainfall
Sound Pressure Level, dB(A)
Wind Speed, m/s
Rainfall, mm
Time, 15 minute sampling period

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Appendix G

Traffic Impact Assessment



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Mount Hopeful Battery Project

Traffic Impact Assessment

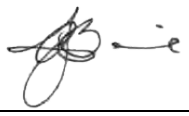
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Executive Summary

Access Traffic Consulting was commissioned by Umwelt (Australia) Pty Ltd on behalf of Neoen Australia Pty Ltd (Neoen) to undertake a revised Traffic Impact Assessment (TIA) in support of a proposed Mount Hopeful Battery Project (the Project).

The Project is to be located approximately 50 km south of the regional centre of Rockhampton, on land parcels within the Rockhampton Regional Council Local Government Areas (LGAs).

This report has been prepared to determine the level of potential impacts of both the construction and operational phases of the Project on the operation of the surrounding road network. The outcomes of the TIA will be used in support of the development application for the Project with Rockhampton Regional Council (RRC).

The assessment identified that the Project's construction phase was the most critical in terms of traffic impact, with only negligible traffic volumes (and therefore impacts) expected to be generated by the Project's operational phase.

The assessment identified that the proposed construction works were conservatively forecast to generate the following peak daily traffic volumes on the external network, noting that these are peak daily volumes and unlikely to be realised every day:

Stage 1

- Up to 92 vehicles per day (vpd) (46vpd each direction) on the state-controlled road network (section of Bruce Highway 10E between South Ulam Road and Rockhampton).
- Up to 106vpd (53 vpd each direction) on the RRC controlled link of South Ulam Road.

Stage 2

- Up to 56 vehicles per day (vpd) (28vpd each direction) on the state-controlled road network (section of Bruce Highway 10E between South Ulam Road and Rockhampton).
- Up to 64vpd (32 vpd each direction) on the RRC controlled link of South Ulam Road.

Based on the identified increases in traffic volumes forecast, the construction and operations phases of the Project are expected to have a minor impact to the surrounding road network, with the technical assessment completed identifying the requirement for the following upgrade works and mitigation treatments to be provided as part of the Project to maximise the safety and operational performance of the surrounding road network:

- Completion of minor works along the identified transport route to accommodate the swept paths of the OSOM transport vehicles, as identified in the Preliminary Transport Route Assessment for the Project. It is noted that the exact extents and scope of these works will be determined in subsequent detailed design phases of the Project once the transport vehicle configurations are confirmed.
- Construct new site access from South Ulam Road (LHS approx. Ch. 16.800km) to cater for Project volumes. The new site access is to be provided in accordance with the requirements for a bitumen road (<300vpd) as per Standard Drawing CMDG-R-040 (Rural Road Access and Property Access Over Table Drains).
- Installation of advisory "truck turning" signage be installed on the approaches to the proposed new site access on South Ulam Road during the construction phase, to highlight to motorists the presence of the Project access locations and the potential for turning vehicles to/from the side roads.

In addition to the traffic assessments completed, a preliminary desktop pavement impact assessment of the relevant road network was also undertaken for the construction phase of the Project. The results of the assessment indicate that the heavy vehicle movements associated with Stages 1 and 2 of the Project are

expected to lead to negligible increases in pavement loadings on all identified sections of the state-controlled road network, with calculated values of loading increase generally below the typical 5% increase trigger threshold.

The results also indicated that the additional heavy vehicle movements from the Stage 1 and Stage 2 construction works was anticipated to lead to a significant (>5%) increase in pavement loadings on the RRC controlled road link of South Ulam Road.

Further to this, while no percentage increase could be established due to the lack of current traffic data for the identified Gladstone Regional Council (GRC) controlled Red Rover Road and Don Young Drive it is anticipated that the limited use of these local roads for small number (approx. 5) OSOM movements for the transformer (x2) and switchroom (x3) component transport operations for the Project will have a negligible increase in pavement loadings on these road links.

Based on this, it is recommended that the proponent enter into an Infrastructure Agreement with RRC regarding the required mitigation works on South Ulam Road to offset the calculated pavement impacts of the Project. It also recommended that this infrastructure agreement include a reference to the requirement for pre and post dilapidation inspections to be undertaken on the relevant sections of South Ulam Road (RRC) by representatives of the proponent and the Council (RRC). These inspections are required to identify and document the current condition of the roads (pre construction) and establish the required maintenance and/or rehabilitation works (to be completed by the proponent at no cost to Council) deemed necessary to reinstate the roads to their documented condition prior to the introduction of Project traffic (post construction).

In light of the information provided above, it can be considered that conditional to the provision of the identified upgrade works and the proponent entering into a suitable infrastructure agreement with RRC to mitigate the construction phase pavement impacts to South Ulam Road, that the construction (Stage 1 and Stage 2) and operations phases of the proposed Mount Hopeful Battery will have minimal impact on the relevant sections of the local government and state controlled road networks.

Therefore it is recommended that the Project be approved from a traffic engineering perspective.

1.0 Introduction

1.1 Project Background

Neoen Australia Pty Ltd (Neoen), is the proponent of the Mount Hopeful Battery Project (the Project), which is an advanced battery energy storage system (BESS) project with a capacity to deliver up to 600 megawatts of power for a duration of up to 4 hours.

The Project is located near the rural town of Bajool, approximately 50 kilometres (km) south of Rockhampton and 70 km west of Gladstone, Queensland, within the Rockhampton Region Local Government Area (LGA). The Project is mapped within the Rural Zone of the Rockhampton Region Planning Scheme 2015 (planning scheme) and predominately used for low intensity agricultural activities, including cattle grazing.

The Project is proposed to occur within the bounds of the 'Study Area' which covers an area of 49 hectares (ha) and occurs across three freehold land parcels and two local roads, being South Ulam Road and an unnamed road reserve.

The Study Area also accommodates a Powerlink transmission easement that comprises an existing 275 kilovolt (kV) transmission line, of which the Project will connect into. The Study Area is sparsely vegetated with predominately non-remnant vegetation and is intersected by an unnamed tributary of Eight Mile Creek. The Project gains access via South Ulam Road to the east of the Study Area.

The Project is proposed to be delivered over two stages, which are indicatively described as follows:

- Stage 1: Indicative capacity of 430 MW, with construction expected to commence mid-2026 and to be completed by end of 2028.
- Stage 2: Indicative additional capacity of 170 MW, with construction expected to commence in 2028 and to be completed by end of 2029.

1.2 Scope and Study Area

Access Traffic Consulting was commissioned by Umwelt (Australia) Pty Ltd on behalf of Neoen to undertake a Traffic Impact Assessment (TIA) for the Project.

This TIA was carried out to identify the expected Project traffic volumes and establish the anticipated level of potential traffic impacts of both the construction and operations phases of the Project on the operation of the surrounding state and local government controlled road networks.

Further to this, the outcomes of this preliminary TIA will be used in support of the development application for the BESS to Rockhampton Regional Council (RRC) (the assessment manager).

The following methodology was adopted to undertake the required assessments as part of the TIA, as summarised in the key tasks listed below.

- Broadly identify the existing transport infrastructure which is of relevance to the Project.
- Estimate traffic generation associated with the construction and operations phases of the Project and the distribution of this Project traffic on the identified road network, including the movement of materials, plant and equipment in addition to the construction and operations phase workforce.
- Assess the potential impact of the Project on the surrounding transport infrastructure during both the construction and operations phases.
- Identify potential mitigation and management strategies to be implemented during the construction and operations phases to offset the impact of the proposed Project (if required).

The adopted methodology centres on establishing a background or "without Project" traffic scenario for the identified transport routes and comparing this with a scenario including the Project generated traffic, i.e. the "with Project" scenario. The process allows for the assessment of the traffic impacts of the Project in regard to road safety, access requirements, intersection operations, road link capacity, pavement and other transport infrastructure. Following this, if required, potential mitigation and/or management measures would be formulated to address the potential traffic impacts caused by the proposed Project.

1.2.1 Study Area

As noted above, the Project is located near the rural town of Bajool, approximately 50 kilometres (km) south of Rockhampton and 70 km west of Gladstone, Queensland, within the Rockhampton Region Local Government Area (LGA). The Study Area comprises an area of 49.0 hectares (ha) and occurs across three freehold land parcels and one unnamed road reserve, as shown in **Figure 1**.

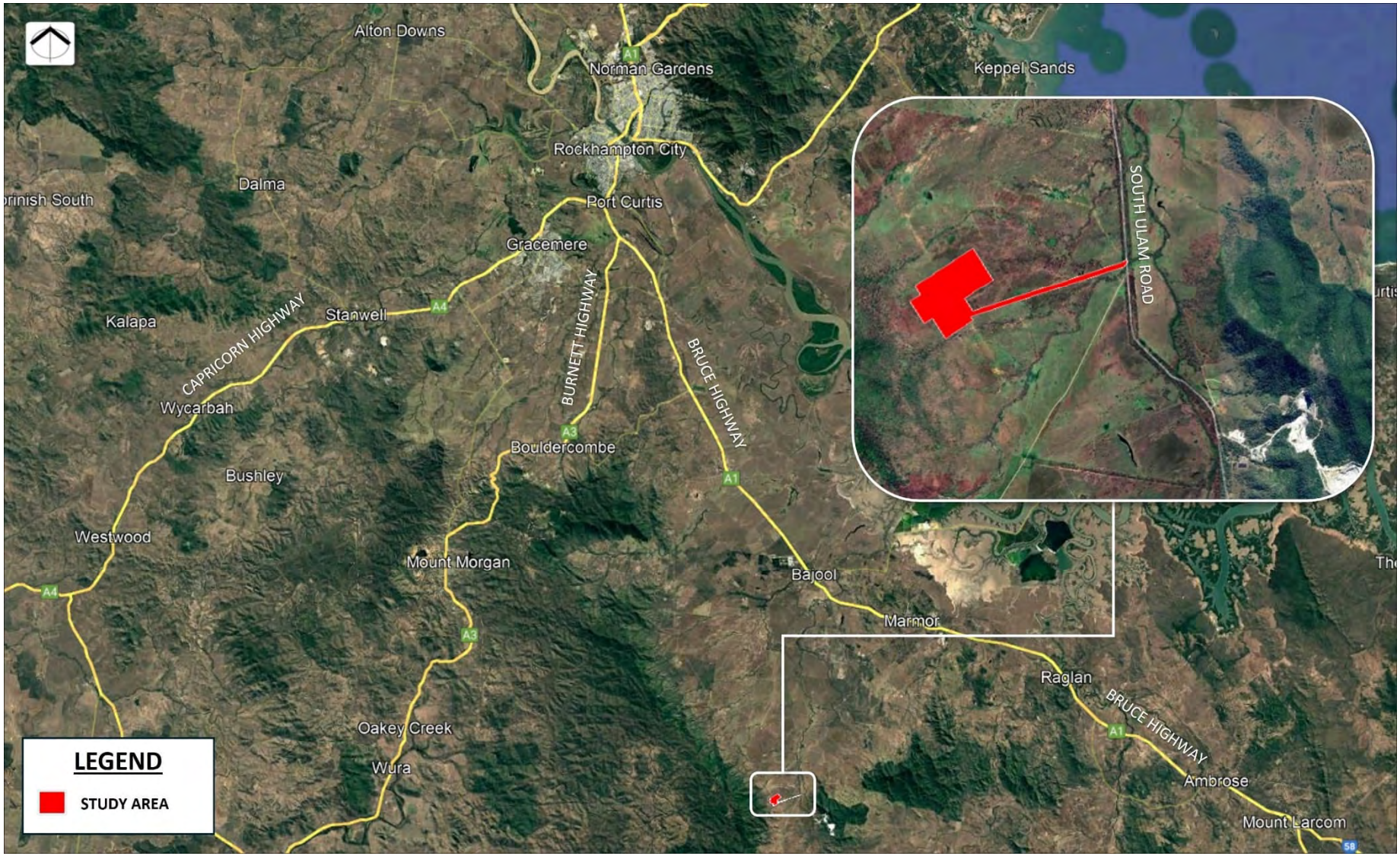


Figure 1 Mount Hopeful Battery Project – Site Location **[Source: Google Earth Pro]**

2.0 Existing Conditions

2.1 Land Use and Zoning

Currently the land contained within the identified Study Area is generally used for agricultural purposes, mainly grazing. The land is identified as a "rural" under the zoning mapping contained within the current Rockhampton Regional Council (RRC) planning scheme, as shown in **Figure 2**.

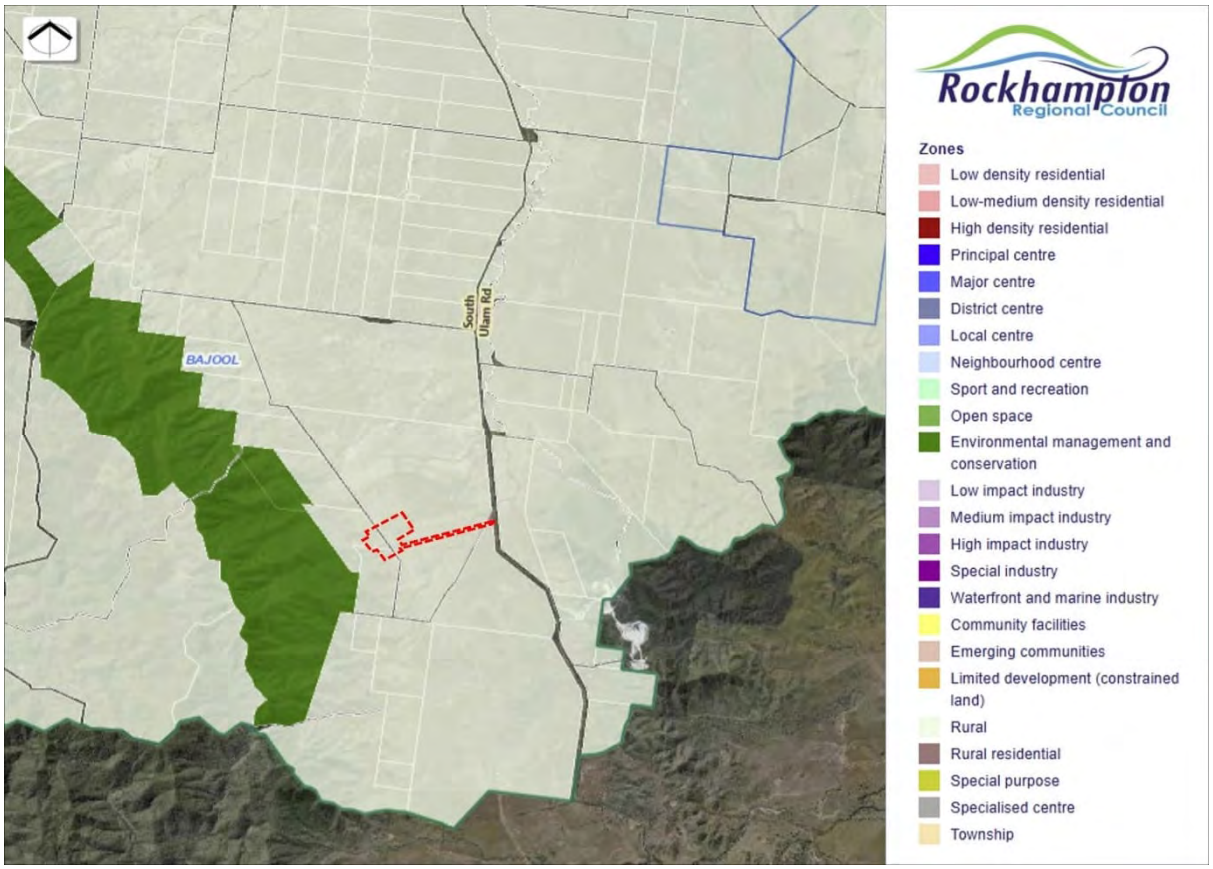


Figure 2 Land Use Zoning **[Source: RRC Online Mapping]**

2.2 Adjacent Land Use / Approvals

As shown in **Figure 2** above, all of the adjacent land parcels to the Study Area are currently zoned rural land under the Rockhampton Regional Council planning scheme. Further to this, no active or planned development approvals which could influence this TIA are understood to be currently held over the adjacent properties.

2.3 Surrounding Road Network Details

2.3.1 State Controlled Road Links

2.3.1.1 Gladstone Port Access Road (183)

The Gladstone Port Access Road is an approved B-double route approximately 850m in length and provides a connection from the Port of Gladstone to the external state-controlled road network via Hanson Road (Gladstone-Mount Larcom Road).

The road currently operates as a two-way, two-lane carriageway with a posted speed limit of 60km/h. It is anticipated that this link will be utilised by Project traffic as part of the delivery movements for the battery component and electrical infrastructure components for the Project, which are likely to originate from the Port of Gladstone.

2.3.1.2 Gladstone-Mount Larcom Road (181)

The full length of Gladstone – Mount Larcom Road is expected to be relevant to the Project, with various sections of the link anticipated to be utilised for the delivery of equipment and the battery component and electrical infrastructure components for the Project.

Gladstone – Mount Larcom Road is an approved B-Double route that contains both urban and rural road conditions, with the urban section within Gladstone operating as a two-way, four lane, median divided carriageway with a posted speed limit of 60km/h before transitioning to a higher speed (100 km/h) rural connection with a standard two-way, two-lane configuration.

2.3.1.3 Bruce Highway (10E – Benaraby-Rockhampton)

The section of the Bruce Highway (10E) relevant to the Project is the length between the intersections of the Dawson Highway (TMR Ch. 11.445km) in Calliope and the Capricorn Highway at Yeppen (TMR Ch. 116.961km), which will be utilised by both general (material / equipment) construction vehicles and staff vehicles associated with the Project. In general, this section of the Highway is a two-way, two-lane road approved for B-Double use, with a posted speed limit of 100 km/h, except within built-up areas through townships where the posted speed typically decreases to 60km/h.

2.3.1.4 Dawson Highway (46A – Gladstone-Biloela)

The Dawson Highway is proposed to be utilised as part of a diversion for the oversize overmass (OSOM) transport operations, as the route for these over mass components. The section of the link relevant to the Project spans between the intersection with Don Young Drive (TMR Ch. 7.129km) to the intersection with the Bruce Highway at Calliope (TMR Ch. 19.050km). In general, this section of the Highway is a two-way, two-lane road approved for B-Double use, with a posted speed limit of 100 km/h, except within built-up areas through townships where the posted speed typically decreases to 60km/h.

2.3.2 Local Government Controlled Road Links

2.3.2.1 South Ulam Road (RRC)

South Ulam Road is identified as a minor rural collector road which is controlled by the Rockhampton Regional Council. The section of this road relevant to the Project is the 16.773km section from the Bruce Highway to the proposed secondary site access, which is expected to be utilised by Project traffic (staff and material/equipment delivery heavy vehicles) associated with the construction phase and operations phase of the Project. The link is also an approved B-double route, and currently provides a 6.5m wide two-way two-lane sealed carriageway as shown in **Figure 3** and **Figure 4**.



Figure 3 Northern End of South Ulam Road



Figure 4 Southern End of South Ulam Road

2.3.2.1 Red Rover Road (GRC)

Red Rover Road is an industrial collector style road controlled by Gladstone Regional Council. The length of the link relevant to the Project is the full 3.390 km length between the Gladstone-Mount Larcom Road and Don Young Drive, which is proposed to be utilised as part of the transport route for the OSOM components. The link is an approved B-double route with the current configuration providing a two-way two-lane sealed carriageway with a typical width of 11m.

2.3.2.2 Don Young Drive (GRC)

Similarly, Don Young Drive is also an industrial collector style road controlled by Gladstone Regional Council, which in conjunction with Red Rover Road provides a connection between Gladstone-Mount Larcom Road and the Dawson Highway. The full length of the link is considered relevant to the Project and is proposed to be utilised as part of the transport route for the OSOM components. The link is also an approved B-double route, providing an 11m wide two-way two-lane sealed carriageway.

2.3.3 Intersections

In terms of the traffic impact assessment for the Project, the critical intersections on the external road network were identified to be the access intersection from the state-controlled road network to the proposed Study Area being the existing Bruce Highway / South Ulam Road intersection. Further details of the current configuration of this intersection are provided below. All other intersections on the external road network were noted to either only be primarily utilised by OSOM transport vehicles or higher order intersections whose use is in accordance with existing approved heavy vehicle routes.

Furthermore, the movements of OSOM vehicles for the Project are only temporary and expected to travel out of hours and under full escort. Apart from any required route works to cater for the OSOM vehicles, they are not anticipated to have a significant impact on the operation of the external intersections. As such, no further assessment of the capacity or operational performance of the other external network intersections was deemed warranted.

2.3.3.1 Bruce Highway / South Ulam Road

The current configuration of the Bruce Highway / South Ulam Road intersection is a standard three-way priority controlled (give way) rural intersection. A single approach and departure lane is provided on each approach to the intersection, with a full length channelised right turn (CHR) and short auxiliary left turn (AULs) treatments provided on the northern and southern Bruce Highway approach respectively for the turning movements into South Ulam Road, as shown in **Figure 7**. In addition, based on site observations it is noted that suitable site distances are available to/from South Ulam Road in both directions of travel along the Bruce Highway (refer **Figure 5** and **Figure 6**).



Figure 5 North on Bruce Highway from South Ulam Rd



Figure 6 South on Bruce Highway from South Ulam Rd



Figure 7 Bruce Highway / South Ulam Road - Existing Configuration **[Source: Qld Globe]**

2.4 Traffic Volumes

2.4.1 Road Link Volumes

The existing background traffic volumes on the road sections deemed relevant to the Project were typically established using the available AADT segment traffic count data provided by TMR. These road segment volumes were utilised with the identified 10-year growth rates (average growth rate, compounding annually) for the relevant road sections to establish a forecast of the current (2025) traffic volumes. It is noted that for any segments where a historical 10-year growth rate was negative, a conservative growth rate of 1.0% was applied to estimate the volume forecasts.

No traffic count data was available for the relevant sections of the GRC controlled links of Red Rover Road and Don Young Drive. However, as the use of these roads by Project traffic is limited to the OSOM transport vehicles which will be travelling under permit and full escort, the current traffic volumes on the links are not deemed critical for the assessment as the traffic impact is considered minor (due to traffic management controls) and as such these roads have been disregarded in terms of the road link / capacity assessment.

Further to this, as no daily volume traffic count data was available for RRC controlled link of South Ulam Road, an estimate of the daily traffic volumes on this link was established from the total recorded 12-hour inbound and outbound traffic volumes on the approach as identified in the intersection count provided by TMR (refer **Appendix B**).

The daily directional volumes on the approach were then estimated by applying a 12-hour volume to daily (ADT) traffic volume adjustment factor of 1.3 for low volume roads, as specified in Section 5.2.1 of Austroads *Guide to Pavement Technology: Selection and Design of Sprayed Seals*. A conservative 1% growth rate was then applied to the recorded volumes (2022) to forecast current (2025) volumes on the link.

Based on the volume data and assumptions identified above, estimates of the traffic volumes on the relevant roads forming the Project transport routes were established, as summarised in **Table 1**.

Table 1 Current (2025) AADT Traffic Volumes

AADT Segment			Base Year	Base Year AADT			Base Year HV%		Base Year HVs		10-Yr GR%	Current (2025) AADT			Current (2025) HVs	
ID	Start Ch.	End Ch.		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz
Gladstone Port Access Road (183)																
61605	0.000	0.858	2023	950	886	1,836	31.96%	42.33%	304	375	*1.00%*	969	904	1,873	310	383
Gladstone – Mount Larcom Road (181)																
160360	0.000	***0.175***	2023	5,650	5,948	11,598	8.85%	8.60%	500	512	*1.00%*	5,764	6,068	11,831	510	522
160361	***0.175***	0.675	2023	5,316	6,043	11,359	14.61%	17.13%	777	1,035	*1.00%*	5,423	6,164	11,587	792	1,056
60071	0.675	***0.919***	2023	3,900	3,574	7,474	13.77%	17.32%	537	619	*1.00%*	3,978	3,646	7,624	548	631
	0.919	1.409	2023	3,900	3,574	7,474	13.77%	17.32%	537	619	*1.00%*	3,978	3,646	7,624	548	631
60073	1.409	3.258	2023	3,737	3,657	7,394	15.09%	12.33%	564	451	*1.00%*	3,812	3,731	7,543	575	460
61052	3.258	***3.830***	2023	4,186	5,144	9,330	15.92%	19.78%	666	1,017	*1.00%*	4,270	5,247	9,518	680	1,038
	3.830	4.625	2023	4,186	5,144	9,330	15.92%	19.78%	666	1,017	*1.00%*	4,270	5,247	9,518	680	1,038
60074	4.625	***12.292***	2023	3,207	3,230	6,437	19.17%	20.76%	615	671	*1.00%*	3,271	3,295	6,566	627	684
60076	***12.292***	32.140	2023	1,754	1,758	3,512	23.74%	28.18%	416	495	*1.00%*	1,789	1,793	3,583	425	505
Red Rover Road (GRC)																
GRC	0.000	3.390	-	No Information Available												
Don Young Drive (GRC)																
GRC	0.000	2.280	-	No Information Available												
Dawson Highway (46A Gladstone – Biloela)																
60065	***7.150***	***19.305***	2023	3,835	3,659	7,494	17.32%	13.62%	664	498	*1.00%*	3,912	3,733	7,645	678	508
Bruce Highway (10E Benaraby – Rockhampton)																
60006	11.445	***45.420***	2023	2,174	2,111	4,285	26.01%	35.67%	565	753	*1.00%*	2,218	2,153	4,371	577	768
60023	***45.420***	***75.469***	2023	3,112	3,146	6,258	31.22%	27.30%	972	859	1.27%	3,192	3,226	6,418	996	881
	75.469	85.308	2023	3,112	3,146	6,258	31.22%	27.30%	972	859	1.27%	3,192	3,226	6,418	996	881
160954	85.308	***86.183***	2023	3,326	3,111	6,437	28.42%	28.37%	945	883	*1.00%*	3,393	3,174	6,566	964	900

AADT Segment			Base Year	Base Year AADT			Base Year HV%		Base Year HVs		10-Yr GR%	Current (2025) AADT			Current (2025) HVs	
ID	Start Ch.	End Ch.		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz
	86.183	87.080	2023	3,326	3,111	6,437	28.42%	28.37%	945	883	*1.00%*	3,393	3,174	6,566	964	900
61551	87.080	108.938	2023	3,588	3,569	7,157	30.95%	26.82%	1,110	957	1.55%	3,700	3,680	7,381	1,145	987
60130	108.938	114.388	2022	2,861	2,635	5,496	27.44%	33.99%	785	896	*1.00%*	2,948	2,715	5,663	809	923
60024	114.388	116.961	2023	5,575	5,344	10,919	15.02%	17.15%	837	916	2.21%	5,824	5,583	11,407	875	957
South Ulam Road (RRC)																
RRC	0.000	16.773	2022	87	105	192	43.28%	35.80%	38	38	*1.00%*	90	108	198	39	39

Red Rover Road chainage assumed to run south from Gladstone-Mount Larcom Road | Don Young Drive chainage assumed to run south from Red Rover Road | South Ulam Road chainage assumed to run south-west from Bruce Highway.

TMR Chainage 0.175km (181) – Intersection of Gladstone-Mount Larcom Road / Gladstone Port Access Road | TMR Chainage 0.919km (181) – Intersection of Gladstone-Mount Larcom Road / Lord Street | TMR Chainage 3.830km (181) – Intersection of Gladstone-Mount Larcom Road / Red Rover Road | TMR Chainage 7.150km (46A) – Intersection of Dawson Highway / Don Young Drive | TMR Chainage 19.305km (46A) – Intersection of Dawson Highway / Bruce Highway | TMR Chainage 45.420km (10E) – Intersection of Bruce Highway / Gladstone-Mount Larcom Road | TMR Chainage 75.469km (10E) – Intersection of Bruce Highway / Bills Road | TMR Chainage 86.183km (10E) – Intersection of Bruce Highway / South Ulam Road

2.4.2 Intersection Volumes

2.4.2.1 Bruce Highway / South Ulam Road

An estimate of the current (2025) traffic volumes at the Bruce Highway / South Ulam Road intersection has been established based on the latest available (2022) TMR count for the intersection, with suitable growth rates for the relevant approach roads adopted from **Table 2** to forecast the current (2025) traffic volumes.

As the available count data did not extend to capture the expected PM project peak (6:00-7:00pm), the assessment of the intersection has been undertaken conservatively adopting the AM (8:45-9:45am) and PM (1:00-2:00pm) road network peaks identified within the count.

Further details of the calculations to establish the traffic volumes at the Bruce Highway / South Ulam Road intersection are provided in **Appendix C**, with a summary of the forecast intersection volumes shown in **Figure 8** and **Figure 9**.

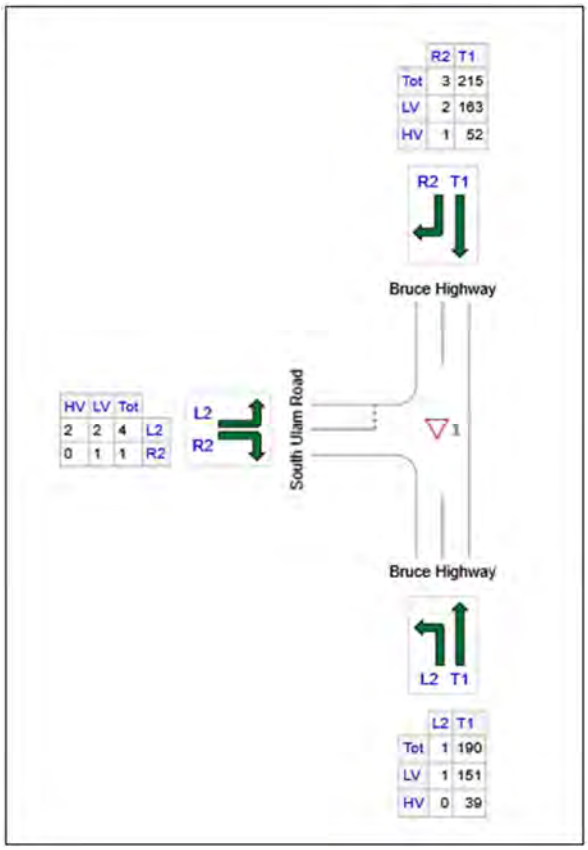


Figure 8 Bruce Highway / South Ulam Road Intersection 2025 AM Peak Hour Traffic Volumes

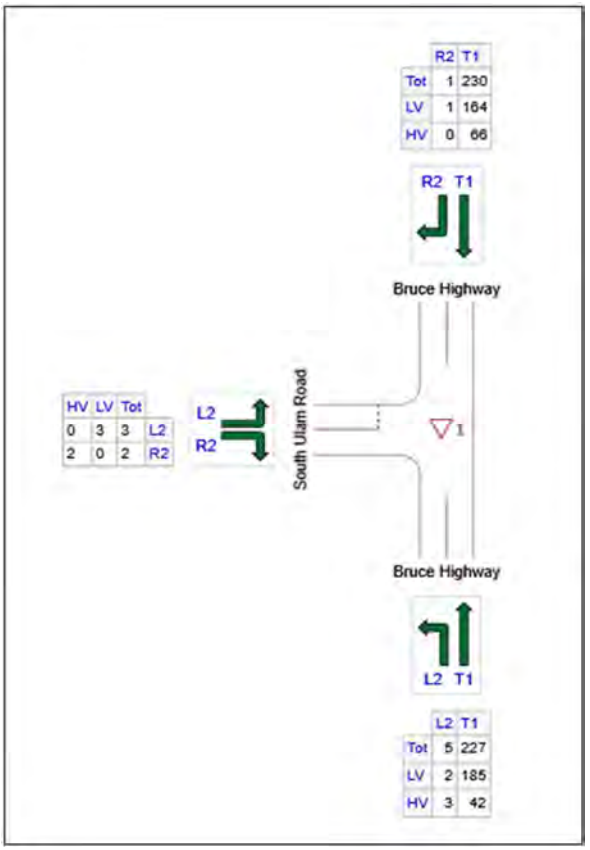


Figure 9 Bruce Highway / South Ulam Road Intersection 2025 AM Peak Hour Traffic Volumes

2.5 Intersection and Network Performance

2.5.1 Road Links

Based on the background traffic volumes forecast and the existing configurations of the road links identified to be relevant to the Project, it is expected that all sections of the proposed Project transport routes would currently be operating satisfactorily and within capacity (based on road type / classification) under existing traffic conditions.

2.5.2 Intersections

2.5.2.1 Performance Metrics

To understand the operational performance of the relevant intersections, detailed intersection analysis was undertaken utilising the Signalised Intersection Design and Research Aid (SIDRA) software package (Ver 9.0). The critical performance metrics of the intersection analysis, and acceptable limits of operation outputs for priority-controlled intersections are provided below.

Degree of Saturation (DOS) – Defined as the ratio of the volume of traffic observed making a movement (in vehicles per hour) compared to the maximum capacity for that movement (vehicles per hour). For priority-controlled intersections, the maximum acceptable degree of saturation is noted to be 80% or 0.800.

Level of Service (LOS) & Average Delay (sec) – Is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. The LOS is closely linked to the delay time (in seconds), which can be expected over all vehicles making a movement in the peak hour. The different Levels of Service (SIDRA) are summarised in **Table 2.**

Table 2 Intersection Level of Service (LOS) Criteria

LOS	Description	Average Delay
A	Free-flow operation (best conditions)	≤ 14.5 sec
B	Reasonable free-flow operations	14.5 – 28.5 sec
C	At or near free-flow operations	28.5 – 42.5 sec
D	Decreasing free-flow operations	42.5 – 56.5 sec
E	Operations at capacity	56.5 – 70.5 sec
F	A breakdown in vehicular flow (worst conditions)	≥ 70.5 sec

In terms of acceptable limits of operation for priority-controlled intersections, a maximum LOS of C and delay of 42.5 seconds applies.

95th Percentile (95%ile) Queue – Defined as the maximum queue length, in metres, that can be expected in 95% of observed queue lengths in the peak hour. For acceptable operation of a priority-controlled intersection, all vehicle queues for individual movements must be contained within the extents of their own lane (in particular for turning lanes), with no vehicle flows or movements to be blocked by queued vehicles.

2.5.2.2 Bruce Highway / South Ulam Road Intersection

An assessment of the current operational performance of the existing configuration of the key Bruce Highway / South Ulam Road intersection has been undertaken, based upon the forecast current (2025) AM peak and PM peak period traffic volumes at the intersection as identified in **Figure 8** and **Figure 9** above.

The results of the completed intersection analysis are summarised in **Table 3**, with the detailed results provided for reference in **Appendix D**.

Table 3 SIDRA Results – Bruce Highway (10E) / South Ulam Road Intersection (Existing Configuration)

Analysis Scenario	Intersection Degree of Saturation	Level of Service**	Intersection Average Delay (sec)	Maximum 95% Back of Queue Length (m)
Bruce Highway (10E) / South Ulam Road				
2025 AM Peak Background	0.133	LOS B	0.2	0.2
2025 PM Peak Background	0.146	LOS B	0.2	0.4

** LOS value identified is for worst movement at the intersection, not the overall intersection.

These results revealed that the current configurations of both intersections are expected to be operate satisfactorily for the forecast current (2025) background or pre project traffic conditions. This is shown by the calculated values of Degree of Saturation (DOS), Level of Service (LOS), average delay and vehicle queue lengths for both intersections being well within acceptable limits of operation for a priority-controlled intersection.

2.6 Road Safety Issues

2.6.1 Road Crash History Review

A review of the road crash history on the sections of the Bruce Highway (500m either side of South Ulam Road) and the relevant length of South Ulam Road, was undertaken using the road crash data available from the Queensland Globe database (2001-2023). From this analysis, 5 recorded crashes were identified on the relevant sections of the network, including the Bruce Highway / South Ulam Road intersection and South Ulam Road. A summary of the details of the recorded crash data is provided for reference in **Table 4**.

Table 4 Summary of Road Crash History

Crash Reference Number	Crash Year	Crash Severity	Crash Type	DCA Code	Crash Description
Bruce Highway & South Ulam Road					
247626	2019	Medical Treatment	Single Vehicle	609	Pass & Misc: Hit Animal
247568	2015	Medical Treatment	Multi Vehicle	303	Vehicles Same Direction: Right Rear
247553	2014	Medical Treatment	Multi Vehicle	303	Vehicles Adjacent Approach: Right-Thru
247545	2013	Hospitalisation	Single Vehicle	805	Off Path Curve: Out of Control on Carriageway
247446	2008	Hospitalisation	Single Vehicle	803	Off Path Curve: Off Carriageway on RT Bend Hit Object

Based on the limited number of crashes recorded, the variety of crash types, lack of crash clusters and the current traffic volumes on the relevant road sections, it can be concluded that there is no specific road feature or design deficiency at either location which is directly contributing to the recorded vehicle crashes, which should be addressed as part of the Project.

2.7 Pavement Loadings

Estimates were generated for the forecast background pavement loadings on each of the identified road segments over the proposed Project duration. Traffic loads on the pavement are defined in terms of Equivalent Standard Axle (ESA) for granular pavements and Standard Axle Repetitions (SAR) for other pavement types.

The ESA for the background traffic heavy vehicle component on the network was calculated based on the identified heavy vehicle percentages for the relevant road sections, with the following assumptions applied to this calculation.

- The existing percentage of heavy vehicles will be maintained for future years.
- The impact of light vehicles can be ignored as the contribution to pavement loading (ESAs) is negligible in comparison to heavy vehicles.
- Equivalent Standard Axles per Heavy Vehicle (ESAs/HV) were adopted as follows (based on advice previously received from TMR for similar pavement impact assessments):
  - 2.9 ESAs/HV for the Bruce Highway.
  - 3.2 ESAs/HV for all other roads (including local government roads).

- The background period of the assessment is the proposed overall duration of the Project i.e. 37 months (not including project float) which equates to approximately 1,125 days.

A summary of the forecast background ESAs for the each of the relevant road segments during the proposed timeframe of the Project (Q3 2026 to Q4 2029) is provided in **Table 5**, with the forecast background ESAs used as the basis for the assessment of the pavement impact of the overall Project, which is detailed further in **Section 5.6.1**.

2.8 Transport Infrastructure

The proposed transport routes for the Project include sections of the state and local government controlled road networks, including Gladstone Port Access Road, Gladstone Mount Larcom Road, Bruce Highway, Dawson Highway, South Ulam Road, Red Rover Road and Don Young Drive. It is noted that these road links include a number of bridge and major culvert structures along their relevant lengths, which may potentially be impacted by loading from the OSOM vehicle movements associated with the Project, in particular the large OSOM transformer transport vehicle configurations.

As such, details of the proposed OSOM vehicle configurations for the Project will need to be provided to TMR so that a structural assessment of the relevant bridge and major culvert structures along the identified transport routes can be undertaken.

Notwithstanding this, it is expected that suitable transport vehicle configurations for the OSOM vehicle movements for the Project can be provided to enable the vehicles to meet any identified loading parameters of the bridge and culvert structures along the identified OSOM transport route for the Project.

Table 5 Forecast Future Background ESAs

Segment ID	AADT Segment		Base Data Year	Base Year HV %		Base Year HV Volume		10 Yr. GR %	2026 HV Volumes		ESAs / HV	No. Days	Background ESAs	
	Start (km)	End (km)		Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz			Gaz	A-Gaz
Gladstone Port Access Road (183)														
61605	0.000	0.858	2023	31.96%	42.33%	304	375	*1.00%*	313	386	3.2	1,125	1,126,675	1,391,584
Gladstone-Mount Larcom Road (181)														
160360	0.000	**0.175**	2023	8.85%	8.60%	500	512	*1.00%*	515	527	3.2	1,125	1,855,321	1,898,003
160361	**0.175**	0.675	2023	14.61%	17.13%	777	1,035	*1.00%*	800	1,067	3.2	1,125	2,881,792	3,840,939
60071	0.675	1.409	2023	13.77%	17.32%	537	619	*1.00%*	553	638	3.2	1,125	1,992,627	2,296,835
60073	1.409	3.258	2023	15.09%	12.33%	564	451	*1.00%*	581	465	3.2	1,125	2,092,376	1,673,075
61052	3.258	**3.830**	2023	15.92%	19.78%	666	1,017	*1.00%*	687	1,048	3.2	1,125	2,472,690	3,775,328
	3.830	4.625	2023	15.92%	19.78%	666	1,017	*1.00%*	687	1,048	3.2	1,125	2,472,690	3,775,328
60074	4.625	**12.292**	2023	19.17%	20.76%	615	671	*1.00%*	633	691	3.2	1,125	2,281,122	2,488,040
60076	**12.292**	32.140	2023	23.74%	28.18%	416	495	*1.00%*	429	510	3.2	1,125	1,545,033	1,838,177
Dawson Highway (46A Gladstone – Biloela)														
60065	**7.150**	**19.305**	60065	17.32%	13.62%	664	498	*1.00%*	684	513	3.2	1,125	2,464,567	1,849,128
Bruce Highway (10E Benaraby – Rockhampton)														
60006	11.445	**45.420**	2023	26.01%	35.67%	565	753	*1.00%*	583	776	2.9	1,125	1,901,408	2,532,018
60023	**45.420**	**75.469**	2023	31.22%	27.30%	972	859	1.27%	1,009	892	2.9	1,125	3,293,262	2,911,221
	75.469	85.308	2023	31.22%	27.30%	972	859	1.27%	1,009	892	2.9	1,125	3,293,262	2,911,221
160954	85.308	**86.183**	2023	28.42%	28.37%	945	883	*1.00%*	974	909	2.9	1,125	3,178,497	2,967,801
	86.183	87.080	2023	28.42%	28.37%	945	883	*1.00%*	974	909	2.9	1,125	3,178,497	2,967,801
61551	87.080	108.938	2023	30.95%	26.82%	1,110	957	1.55%	1,163	1,002	2.9	1,125	3,795,458	3,271,572
60130	108.938	114.388	2022	27.44%	33.99%	785	896	*1.00%*	817	932	2.9	1,125	2,666,237	3,041,786
60024	114.388	116.961	2023	15.02%	17.15%	837	916	2.21%	894	979	2.9	1,125	2,918,141	3,193,906
South Ulam Road (RRC)														
RRC	0.000	16.773	2022	43.28%	35.80%	38	38	*1.00%*	39	39	3.2	1,125	141,283	141,283

3.0 Proposed Project Details

3.1 Study Area Plan

A preliminary plan of development for the Project was provided by Neoen. This layout identified the currently proposed Study Area boundaries and site access location, as shown in **Figure 10** overpage.

A detailed copy of this plan is provided for reference in **Appendix E**.

As shown in **Figure 10**, the Project is a BESS comprising of up to 650 battery modules as well as associated infrastructure, proposed to be delivered over two (2) stages. The primary vehicular access point to the proposed BESS facility is proposed to be provided via a new access point to Lot 100 on SP289441, located on the western side of South Ulam Road approximately 16.773km south of the Bruce Highway, and approximately 110m north of McCamley Road. This new access point is anticipated to cater for all Project traffic during both the construction and operations phase of the Project.

The proposed site layout also identifies the proposed alignment of the internal access tracks, as well as the location of the associated electrical infrastructure for the Project, including the battery storage, substation and switchyard areas.

3.2 Project Details

Information regarding the proposed construction activities and ultimate day to day operation of the proposed Mount Hopeful Battery Project has been provided by the proponent (Neoen), with a summary of the key site elements of the Project provided in **Table 6.**

Table 6 Key Elements of Mount Hopeful Battery Project

Element	Quantity	
	Stage 1	Stage2
Accesses	1 (South Ulam Rd)	
Length of Access Tracks (Battery Site)	1,800 m	
Number of Battery Storage Areas	1	
Number of Substation Areas	1	
Number of Switchyards	1	
Number of Battery Modules	466	184
Number of HV Transformers (OSOM)	2	0

3.2.1 Construction Phase

Based on information provided by the proponent (Neoen) it is understood that the construction of the Project is anticipated to be completed in two (2) stages, over an overall period of 40 months, commencing in Q3 (September) 2026 (pending approvals) and concluding in Q4 (December) 2029, with this overall period noted to include provision for 3 months Project float.

Further to this, construction of Stage 1 of the Project is proposed to be completed over 26 months, between Q3 (September) 2026 and Q4 (October) 2028, with the construction of Stage 2 to be completed over 17 months, commencing in Q3 (August) 2028 and concluding in Q4 (December) 2029, noting a slight overlap of approximately three (3) months in the Stage 1 and Stage 2 construction works.

Preliminary details of the proposed construction phase activities have been provided, with a high-level summary of the key construction tasks, the likely order of completion and anticipated timeframes provided in **Table 7**.

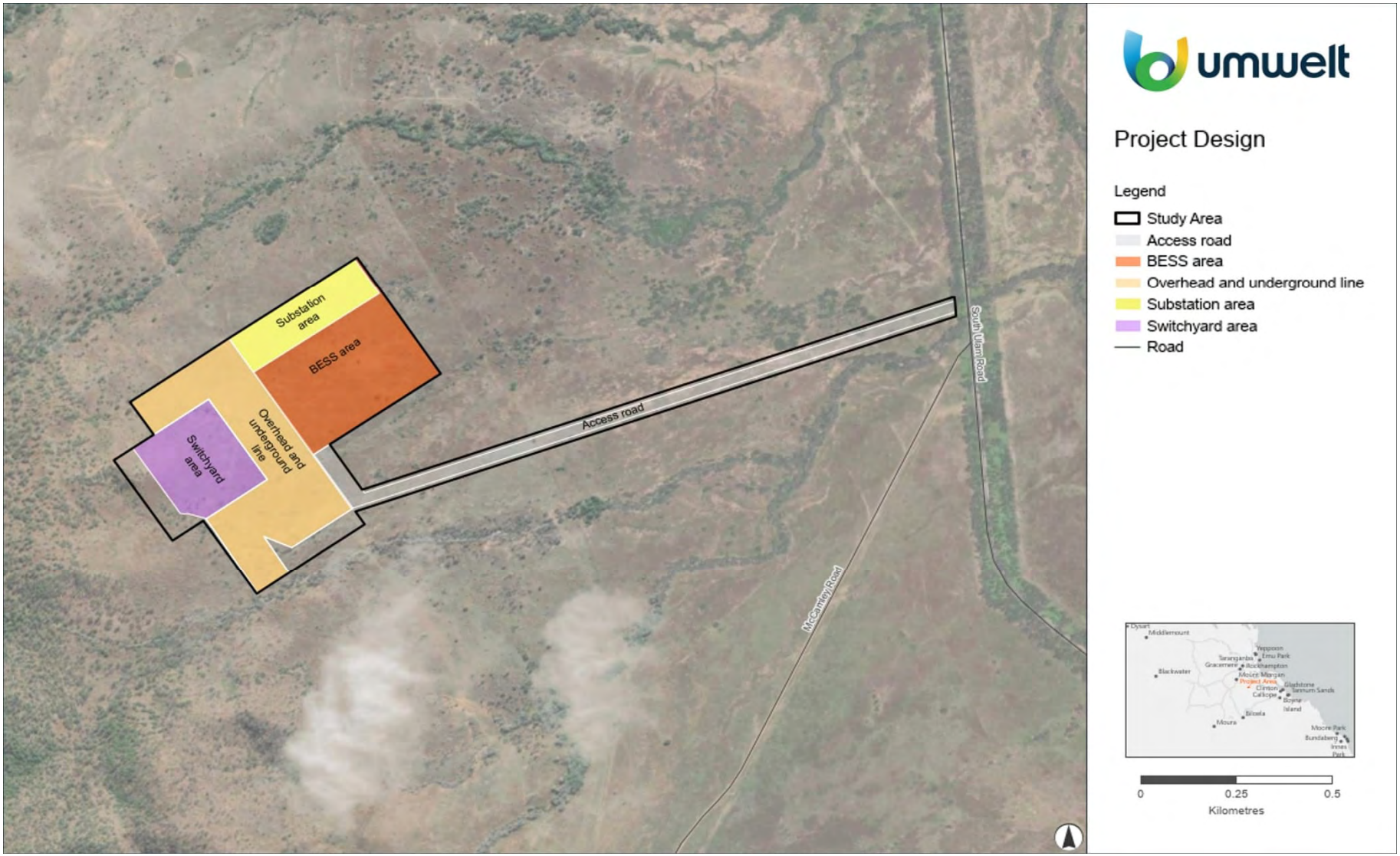


Figure 10 Proposed Site Layout – Mount Hopeful Battery Project **[Source: Umwelt]**

Based on the proposed schedule, the peak period of construction for Stage 1 is expected to occur between Q2 and Q4 2027, while the peak period of construction for Stage 2 is expected to occur between Q3 2028 and Q2 2029

Further to this, the proposed hours of the construction operations for both stages of the Project are anticipated to typically be 12 hours per day (6:30am to 6:30pm) Monday to Saturday, equating to approximately 24 working days per month.

3.2.2 Operations Phase

The operations phase of the Project will commence upon completion of the construction works, with the BESS to be operated by a relatively small number of staff (up to 10 staff), with heavy vehicle movements to/from the Project during the operations phase expected to be limited to occasional movements (in the order of 1 vehicle per week) associated with maintenance activities, routine removal of waste or deliveries to the site operations facility.

Table 7 Proposed Construction Schedule – Mount Hopeful Battery Project [Source: Neoen]

| ID | TASK | DURATION (MONTHS) | MONTH | | |

3.3 Project Transport Routes

3.3.1 Project Construction Phase

The following transport routes are anticipated to be utilised for the construction phase of both Stage 1 and Stage 2 of the Project:

- The main workforce during construction will consist of local workers commuting generally from Rockhampton, and specialist FIFO workers, who will commute daily to/from the Study Area from Rockhampton via the relevant sections of the Bruce Highway and the RRC controlled link of South Ulam Road.
- Construction equipment (bulk earthworks plant, prefabricated buildings) and materials (such as concrete, reinforcing steels and road gravels) will primarily be sourced locally (as far as reasonably practical) and travel to/from the Study Area via the Bruce Highway and the RRC controlled link of South Ulam Road.
  - General equipment and materials (including concrete) for the Project will be sourced from Rockhampton.
  - Gravel materials for the Project are expected to be sourced from local quarry operations in Marmor (via Bills Road).
  - Site water, fuel and waste collection services for the Project are all expected to be sourced from Rockhampton.
- Battery components for the BESS and ancillary electrical components for the BESS, substation and switchyard site areas are proposed to be delivered to the Port of Gladstone, before being transported to the Study Area by road using a route consisting of the state-controlled Gladstone Port Access Road, Gladstone-Mount Larcom Road, Bruce Highway and the RRC controlled link of South Ulam Road.
- Larger electrical infrastructure components such as the transformers and the switch rooms for the battery storage facility are proposed to be transported from the Port of Gladstone to both site areas by specialist OSOM transport vehicles.

  A preliminary transport route assessment for the largest transformer (200T) and switchroom component from the Port of Gladstone to the Study Area has been undertaken by Rex J Andrews (see **Appendix A**). This report identifies two route options for the transformer dependant on the expected configuration of the transport vehicle, with one for the larger 12x8 12x8 beamset trailer configuration and a second for the shorter (but taller) 16x8 platform trailer configuration

  Based on the assessment completed, a general OSOM and two (2) preliminary OSOM transformer transport routes have been identified, with a summary of the identified OSOM routes provided in **Table 8** overpage, with the transformer transport routes indicatively shown in **Figure 11** and **Figure 12**.

Further to this, it is noted that the beamset trailer configuration and associated transport route have been adopted for the purpose of the traffic assessment for the Project, while the final transport configuration and transport route will be confirmed in subsequent stages of the Project.

It is also noted that the initial OSOM transformer vehicle configurations identified in the route assessment completed (refer **Appendix A**) will need to be provided to TMR to enable the assessment of the relevant bridge and major culvert structures along the identified transport routes to be undertaken.

Notwithstanding this, it is expected that suitable transport vehicle configurations for the transformer components can be made to enable the vehicles to meet any identified loading parameters of these relevant bridge structures along the identified OSOM transport route for the Project.

Table 8 Preliminary OSOM Component Transport Routes

Mount Hopeful Battery Project - OSOM Component Transport Routes	
OSOM Transport Option 1	
Components	Transformer (12x8 12x8 Beamset Trailer Configuration) & Switchroom
Road Links	Macfarlane Drive (GPC) / John Bates Drive (GPC) / Gladstone Port Access Road (TMR) / Gladstone-Mt Larcom Road (TMR) / Red Rover Road (GRC) / Don Young Drive (GRC) / Dawson Highway (TMR) / Bruce Highway (TMR) / South Ulam Road (RRC)
OSOM Transport Option 2	
Components	Transformer (16x8 Platform Trailer Configuration)
Road Links	Macfarlane Drive (GPC) / Flinders Parade (GRC) / Lord Street (GRC) / Gladstone-Mt Larcom Road (TMR) / Red Rover Road (GRC) / Don Young Drive (GRC) / Dawson Highway (TMR) / Bruce Highway (TMR) / South Ulam Road (RRC)

3.3.2 Project Operations Phase

- The workforce during the operations phase of the Project will consist of a small number of local workers (i.e. up to 10 staff) who are expected to reside locally to the Project (likely in Rockhampton) and commute daily via the Bruce Highway and South Ulam Road.
- Heavy vehicle movements during the operations phase of the Project are anticipated to be extremely low, with only occasional movements to/from site (in the order of 1 vehicle per week from Rockhampton) associated with maintenance activities, routine removal of waste and delivery of consumables to the site operations facility.

3.4 Site Access

The key element of the proposed access arrangements for the site is the connection to the Bruce Highway, which is proposed to be gained via the existing Bruce Highway / South Ulam Road intersection. This intersection is located on the left-hand side of the carriageway (gazettal direction) at approximate TMR chainage 86.183 km (10E). From this intersection, Project traffic is proposed to travel along the RRC controlled South Ulam Road to the proposed Project site entrance, located approximately 16.8 km south of the Bruce Highway.

As no access point currently exists at this location, it is proposed that a new site access in accordance with the requirements for a bitumen road (<300vpd) as per Standard Drawing CMDG-R-040 (Rural Road Access and Property Access Over Table Drains) be provided to service the expected Project traffic volumes. Further to this, it is noted that additional hardstand areas will be required at the proposed site access location to accommodate the swept paths of the OSOM transformer transport vehicles, with the exact extents of these additional areas to be confirmed in subsequent detailed design phases of the Project once the final configuration of the transport vehicles is confirmed.

Finally, based on the expected Project traffic volumes, it is anticipated that the current sealed configuration of South Ulam Road will be adequate to cater for the traffic volumes anticipated to be generated by the Project.

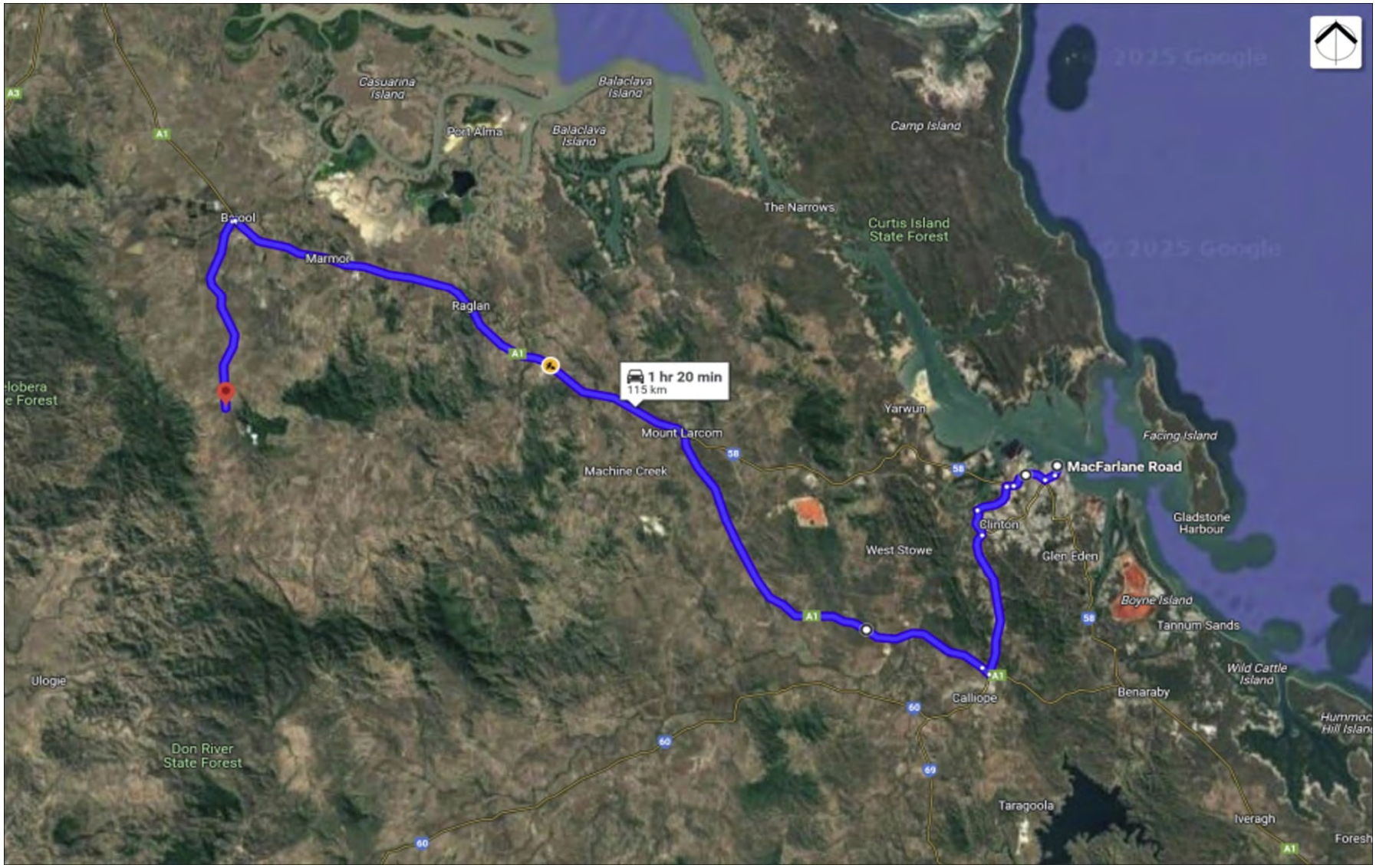


Figure 11 OSOM Transformer (12x8 12x8 Beamset Trailer Configuration) & Switchroom Transport Route **[Source: Rex J Andrews / Neoen]**



Figure 12 OSOM Transformer Transport Route (16x8 Platform Trailer Configuration) **[Source: Rex J Andrews / Neoen]**

3.5 Internal Site Facilities

As previously identified, the proposed plan of development (refer **Appendix E**) identifies the provision of a single access track (approximately 1.8km in length), which provides vehicular access and a connection between the proposed BESS facility (and associated infrastructure) and the external road network (South Ulam Road). The plan of development for the Project also identifies a number of site facilities, including the proposed battery storage facility, substation and switchyard areas, as shown in Error! Reference source not found. above.

Further to this, whilst not currently shown on the proposed site layout it is understood that the suitable parking facilities will be provided adjacent to the key areas on site (i.e. battery storage facility, substation and switchyard areas) in accordance with the requirements of all relevant standards, guidelines and policies.

Due to the large area of land available within the Study Area for the required internal facilities (including the construction compounds and parking facilities), and the current setback from the external road network, it is not anticipated that either the construction or operations phases of the proposed Mount Hopeful Battery Project will lead to an overspill of parking or vehicle queuing at site accesses that would lead to negative impacts to the operation of the surrounding road network, including South Ulam Road.

3.6 OSOM Transformer Transport Route Upgrades

An OSOM transport route assessment (refer **Appendix A**) has been separately undertaken for the Project by Rex J Andrews Transport to assess route options and potential adjustments to the road network to accommodate the proposed OSOM movements including transport of the large transformer components.

As identified above, this assessment identified two route transport route options dependant on the expected configuration of the transformer transport vehicle. In addition to identifying the proposed transport routes, the assessment also highlighted a number of specific locations or pinch points along the preliminary OSOM transport routes where mitigation works are expected to be required to accommodate the swept paths and vehicle clearance envelopes of the proposed OSOM transformer transport vehicle configurations.

Further details of the route pinch points, and the currently proposed works are outlined in the transport route assessment included for reference in **Appendix A**., with a summary of the mitigation works requirements for each potential OSOM vehicle configuration provided in **Table 9** and **Table 10**.

Table 9 OSOM Transformer Transport (12x8 12x8 Beamset Trailer) Route Modification Summary

KM Index	Location	Section of Road	Procedure	Comments
0.0	Gladstone	Mac Farlane Road onto John Bates Drive.	Exit port and turn right via bypass on inside of corner	**Modifications required:** Security required to open gates and exit Port. Loads to use bypass on inside of corner installed for previous projects.
0.9	Gladstone	John Bates Drive onto Port Access Road	Loads to travel to the left onto a temporary hardstand prior to the roundabout.	**Modifications required:** Corner has been modified for Clarke Creek windfarm. Signs to be removed and replaced and loads to travel over island.
1.6	Gladstone	Port access road under Goondoon Street	Loads are to travel under this structure in the far-left lane.	**Modifications required:** The transformer transport vehicle will need to be checked for clearance while passing under this structure.
1.8	Gladstone	Port Access Road onto Glenlyon Street	Loads to turn right from the correct side of Port Access Road and onto the incorrect side of Glenlyon Street before travelling back to the correct side of Glenlyon Street before travelling through the break in the median trip and back onto the correct side of the road at walking pace.	**Modifications required:** Corner has been modified for Clarke Creek windfarm.
2.1	Gladstone	Glenlyon Street onto Hanson Road	Travel directly ahead.	**Modifications required:** Nil.
4.9	Gladstone	Hanson Road through the Blain Drive roundabout	Loads to travel through the roundabout on the correct side of the road at walking pace.	**Modifications required:** Roundabout has been modified for Clarke Creek windfarm. Sign to be removed and replaced.
5.5	Gladstone	Hanson Road onto Red Rover Road	Load to travel onto incorrect side of Red Rover Rd using the modified centre island.	**Modifications required:** Roundabout has been modified for Clarke Creek windfarm. Delineators on centre island to be removed and replaced.
8.8	Gladstone	Red Rover Road onto Don Young Drive	Continue straight ahead.	**Modifications required:** Nil.
11.1	Gladstone	Don Young Drive onto Dawson Highway	Load to cross to incorrect side of road and cut corner.	**Modifications required:** Nil.
23.2	Calliope	Dawson Hwy onto Bruce Hwy	Loads to cross to incorrect side of Dawson Hwy then enter Bruce Hwy via the off ramp.	**Modifications required:** Sign to be relocated or made removable.
98.0	Bajool	Bruce Hwy onto South Ulam Road	Left hand turn	**Modifications required:** Nil.
115.0	Bajool	South Ulam Road into proposed Site Entry	Right hand turn	**Modifications required:** Suitable site entry and site access roads to be constructed.

Table 10 OSOM Transformer Transport (16x8 Platform Trailer) Route Modification Summary

KM Index	Location	Section of Road	Procedure	Comments
0.6	Barney Point	Macfarlane Road under Conveyor	Loads will travel directly ahead under the conveyor in the far-right side of the road.	**Pinchpoint procedure:** Loads to slow to a crawl and pass under this structure in the far right side of the road. **Traffic control:** Pilots to control local traffic. this section of road. **Road furnishings:** No cars to be parked on the right side of the road. **Modifications required:** Nil.
0.8	Barney Point	Exiting Port onto Macfarlane Road	Left hand turn from incorrect side to the incorrect side	**Pinchpoint procedure:** Security guard to open gate out of port. **Traffic control:** Pilots to control local traffic. this section of road. **Modifications required:** Trees to be trimmed.
1.0	Gladstone Central	Macfarlane Road onto Flinders Parade	Travel directly ahead through the security gate	**Pinchpoint procedure:** Security guard to lower bollards. **Traffic control:** QPS/Pilots to control local traffic. **Modifications required:** Trees to be trimmed.
1.0 to 1.3	Gladstone Central	Flinders Parade foreshore	Travel directly on the foreshore access road	**Pinchpoint procedure:** Security guard to lower bollards. **Traffic control:** QPS/Pilots to control local traffic. **Modifications required:** Trees to be trimmed.
1.3	Gladstone	Flinders Parade foreshore onto Flinders Parade	Loads are to travel directly ahead	**Pinchpoint procedure:** Security guard to lower and raise bollards.
1.6	Gladstone	Goondoon Street onto Lord Street	Loads are to turn right turn from Goondoon Street crossing onto the incorrect side of the road before returning to the correct side of onto Lord Street.	**Modifications required:** Nil.
1.7	Gladstone	Lord Street Roundabout at Bryan Jordan Drive	Loads are to travel directly ahead on Lord Street on the correct side of the roundabout.	**Modifications required:** Signs to be relocated or made removable. Median strip and kerb to be made trafficable.
2.15	Gladstone	Lord Street onto Hanson Road	Right hand turn from Lord Street onto Hanson Road.	**Modifications required:** Nil.
4.5	Gladstone	Hanson Road through the Blain Drive roundabout	Loads to travel through the roundabout on the correct side of the road.	**Modifications required:** Nil.

KM Index	Location	Section of Road	Procedure	Comments
5.1	Gladstone	Hanson Road onto Red Rover Road roundabout	Loads to turn left at the roundabout onto incorrect side of road using modifications made on centre island.	**Modifications required:** Delineators to be removed and reinstalled
10.7	Gladstone	Don Young Drive onto Dawson Highway	Right hand turn	**Modifications required:** Nil.
22.6	Calliope	Dawson Hwy onto Bruce Hwy	Loads to cross to incorrect side of Dawson Hwy then enter Bruce Hwy via the off ramp.	**Modifications required:** Nil.
97.7	Bajool	Bruce Hwy onto South Ulam Road	Left hand turn	**Modifications required:** Nil.
114.3	Bajool	South Ulam Road into proposed site entry	Right hand turn	**Modifications required**: Suitable site entry and site access roads to be constructed.

4.0 Project Traffic Volumes

There will be two distinct periods of development traffic generation for the Project, being the construction (Stage 1 and Stage 2) and operations phases. The expected traffic generation and distribution during all relevant phases of the Project is discussed in the sections below.

4.1 Construction Phase

As identified above, the construction of the Project is anticipated to be completed in two (2) stages, over an overall period of 40 months, commencing in Q3 (September) 2026 (pending approvals) and concluding in Q4 (December) 2029, with this overall period noted to include provision for 3 months Project float.

Construction of Stage 1 of the Project is proposed to be completed over 26 months, between Q3 (September) 2026 and Q4 (October) 2028, with the construction of Stage 2 to be completed over 17 months, commencing in Q3 (August) 2028 and concluding in Q4 (December) 2029, noting a slight overlap of approximately three (3) months in the Stage 1 and Stage 2 construction works.

Based on the proposed schedule (refer **Table 7**), the peak period of construction for Stage 1 is expected to occur between Q2 and Q4 2027, while the peak period of construction for Stage 2 is expected to occur between Q3 2028 and Q2 2029. From information provided by Neoen, it has been identified that the main traffic generating activities occurring within both the Stage 1 and Stage 2 construction phases of the Project are the transport of the various construction materials / equipment to site and the daily construction staff movements. Further details of these activities, including the Project traffic generation and its expected distribution on the surrounding road network, are provided in the following sections.

4.1.1 Materials and Equipment Delivery Movements

Neoen has provided preliminary information and assumptions regarding the expected construction phase of the Project based on their experience in developing similar battery storage facility developments. This information has been used to calculate the expected material and equipment quantities for both the Stage 1 and Stage 2 construction works for the Project and the associated vehicle movements for the delivery of these materials / items, based on the following general assumptions:

- General equipment, plant and materials for the Project are proposed to be imported to site from Rockhampton.
- The BESS components, as well as the general (non OSOM) electrical components for the substation and switchyard site areas are proposed to be imported to site from the port facilities in Gladstone.
- Similarly, the larger OSOM transformer electrical infrastructure and site switch room components are also expected to be imported to site from the port facilities in Gladstone.
- Gravel materials for the internal access roads, site entrance and site areas are conservatively assumed to be 100% imported to site, with no internal sources currently identified within the Study Area.

  At this stage, it is indicatively assumed that the gravel materials for the Study Area will be sourced from local quarries to the south on the Bruce Highway at Marmor.
- Construction water requirements for the site have also conservatively been assumed to be 100% imported. For the purpose of this assessment, it has been assumed that the construction water will be sourced standpipe facilities in Rockhampton.
- Concrete for the Project is also proposed to be imported to site as wet concrete in trucks from commercial suppliers in Rockhampton.

A calculated breakdown of the Project generated traffic movements by construction task, including the duration of transport, is summarised in **Table 11** with the detailed calculations completed to convert operational / construction information into vehicle movements included for reference in **Appendix F**.

Table 11 Summary of Total Project Material / Equipment Delivery Heavy Vehicle Movement Volumes

Task	Duration	Total Vehicles	Type of Vehicles	Max Vehicles per Day
STAGE 1 - CONSTRUCTION				
Task A – Site Mobilisation	1 month	40 vehicles (external), including: • 40 semi/low loader movements from Rockhampton.	Semi / Low Loaders	2 vehicles / day
Task B – Site Access and Internal Access Roads	2 months	148 vehicles (external), including: • 137 truck and dog movements from local quarry. • 11 water cart movements from Rockhampton.	Truck & Dog Trailers Water Cart	4 vehicles / day
Task C – Civil Works	6 months	1,329 vehicles (external), including: • 338 concrete truck movements from Rockhampton. • 68 water cart movements from Rockhampton. • 923 truck and dog movements from local quarry.	Concrete Trucks Water Truck Truck & Dog Trailers	10 vehicles / day
Task D – Electrical Installation (BESS)	9 months total Transport 6 months	644 vehicles (external), including: • 466 BESS module transport movements from Port of Gladstone. • 168 semi-trailer movements from Port of Gladstone. • 10 truck and dog movements from local quarry.	Special Transport Vehicles (Permit) Semi-Trailers Truck & Dog Trailers	5 vehicles / day
Task E – Substation Works	9 months total Transport 6 months	15 vehicles (external), including: • 5 OSOM movements (2x transformer and 3x switch rooms) from Port of Gladstone. • 10 truck and dog movements from local quarry.	OSOM Special Transport Vehicles (Permit) Truck & Dog Trailer	1 vehicle / day
Task F – Switchyard Works	19 months total Transport 6 months	110 vehicles (external), including: • 100 semi-trailer movements from Port of Gladstone. • 10 truck and dog movements from local quarry.	Semi-Trailers Truck & Dog Trailers	1 vehicle / day
Task G – Testing and Commissioning	9 months	50 vehicles total (external), including: • 50 rigid truck movements from Rockhampton.	Rigid Truck	1 vehicle / day

Task	Duration	Total Vehicles	Type of Vehicles	Max Vehicles per Day
Task H – Finalisation / Commissioning / Demobilisation	9 months total Transport 3 months	100 vehicles total (external), including: • 100 semi-trailer movements from Rockhampton.	Semi-Trailers	2 vehicles / day
Site Water *(Does not include internal water truck movements)*	26 months total	237 vehicles total (external) • 237 water cart movements from Rockhampton.	Water Cart	1 vehicle / day
STAGE 2 - CONSTRUCTION				
Task 2A – Civil Works	3 months	308 vehicles (external), including: • 79 concrete truck movements from Rockhampton. • 16 water cart movements from Rockhampton. • 213 truck and dog movements from local quarry.	Concrete Trucks Water Truck Truck & Dog Trailers	5 vehicles / day
Task 2B – Electrical Installation (BESS)	6 months total Transport 4 months	255 vehicles (external), including: • 184 BESS module transport movements from Port of Gladstone. • 66 semi-trailer movements from Port of Gladstone. • 5 truck and dog movements from local quarry.	Special Transport Vehicles (Permit) Semi-Trailers Truck & Dog Trailers	3 vehicles / day
Task 2C– Substation Works	1 month	5 vehicles (external), including: • 5 truck and dog movements from local quarry.	Truck & Dog Trailer	1 vehicle / day
Task 2D – Testing and Commissioning	3 months	25 vehicles total (external), including: • 25 rigid truck movements from Rockhampton.	Rigid Truck	1 vehicle / day
Task 2E – Finalisation / Commissioning / Demobilisation	2 months	35 vehicles total (external), including: • 35 semi-trailer movements from Rockhampton.	Semi-Trailers	1 vehicle / day
Site Water *(Does not include internal water truck movements)*	17 months total	78 vehicles total (external) • 78 water cart movements from Rockhampton.	Water Cart	1 vehicle / day

Task	Duration	Total Vehicles	Type of Vehicles	Max Vehicles per Day
OVERALL CONSTRUCTION				
Site Fuel	37 months total	161 vehicles total (external) • 161 semi tanker movements from Rockhampton.	Semi Fuel Tanker	1 vehicle / day
Site Waste Collection	37 months total	161 vehicles total (external) • 161 semi-trailer movements from Rockhampton.	Semi-Trailers	1 vehicle / day

4.1.2 Construction Staff Movements

The proponent has also provided the following information and assumptions regarding the proposed staff movements for the Stage 1 and Stage 2 construction phases of the Project:

- Maximum (peak) construction daily workforce for Stage 1 is expected to be 150 staff, which is expected to occur over a nine (9) month period (Q2 to Q4 2027).
- Outside of peak construction the daily staff numbers for the Stage 1 works will vary between 20-75 staff.
- Maximum (peak) construction daily workforce for Stage 2 is expected to be 50 staff, which is expected to occur over a six (6) month period (Q4 2028 to Q2 2029).
- Outside of peak construction the daily staff numbers for the Stage 2 works will vary between 20-30 staff.
- The main workforce during construction will consist of local workers commuting generally from Rockhampton, and specialist FIFO workers, who will commute daily to/from the Study Area from Rockhampton via the relevant sections of the Bruce Highway and South Ulam Road.
- Construction staff for the Project to are expected to commute to site using a mixture of private vehicles (light vehicles and 4WDs) and minibuses, with an average capacity of 2 staff per vehicle and 20 staff members per bus.
- The split of private vehicles and minibus usage by staff is anticipated to be approximately 50% / 50% for staff. Furthermore, it is noted that it has been assumed that if the staff numbers are less than 100, that 100% of staff are expected to travel to/from the subject site using private vehicles.

Based on these general staff assumptions, the expected local and non-local staff numbers and associated vehicle movements were established, with **Table 12** summarising the expected staff vehicle movement numbers for the Project and the cumulative overall (staff and heavy vehicle) vehicle movements for the Project .

Table 12 Mount Hopeful Battery Project - Forecast Daily Project Vehicle Movements (Construction Phase)

ID	Task	MONTH																																								
		Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
		Q3	Q4 2026			Q1 2027			Q2 2027			Q3 2027			Q4 2027			Q1 2028			Q2 2028			Q3 2028			Q4 2028			Q1 2029			Q2 2029			Q3 2029			Q4 2029		
STAGE 1 – CONSTRUCTION PHASE																																									
1A	Mobilisation	2																																							
1B	Site Access & Internal Access Road		3	3																																					
1C	Civil Works		8	8	8	8	8	8																																	
1D	Electrical Installation (BESS)								4	4	4	4	4	4	4	4	4	4	4	4	4	4	4																			
1E	Substation Works								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																			
1F	Switchyards Works					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																	
1G	Testing and Commissioning														1	1	1	1	1	1	1	1	1	1																		
1H	Finalisation / Commissioning / Demobilisation																								2	2	2															
1W	Site Water	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1														
STAGE 2 – CONSTRUCTION PHASE																																									
2A	Civil Works																								4	4	4															
2B	Electrical Installation (BESS)																											3	3	3	3	3	3								
2C	Substation Works																																1								
2D	Testing and Commissioning																																	1	1	1					
2E	Site Water																																				1	1			
2W	Site Water																								1	1	1	1	1	1	1	1	1	1	1	1	1	1			
GENERAL CONSTRUCTION TRAFFIC																																									
F	Site Fuel	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
WC	Site Wast Collection	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Total Maximum Daily Heavy Vehicles		**5**	**14**	**14**	**11**	**12**	**12**	**12**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**10**	**10**	**10**	**10**	**10**	**10**	**5**	**5**	**5**	**10**	**10**	**10**	**6**	**6**	**6**	**6**	**6**	**7**	**4**	**4**	**4**	**4**	**4**	**0**	**0**	**0**

			MONTH																																								
			Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
			Q3	Q4 2026			Q1 2027			Q2 2027			Q3 2027			Q4 2027			Q1 2028			Q2 2028			Q3 2028			Q4 2028			Q1 2029			Q2 2029			Q3 2029			Q4 2029		
Stage 1 Staff Numbers			10	50	50	50	75	75	75	150	150	150	150	150	150	150	150	150	75	75	75	75	75	75	75	20	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stage 2 Staff Numbers			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	30	30	50	50	50	50	50	50	20	20	20	20	20	0	0	0
Total Staff Numbers			**10**	**50**	**50**	**50**	**75**	**75**	**75**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**20**	**20**	**20**	**20**	**20**	**0**	**0**	**0**
Staff	**Vehicle**	100% **Capacity**	**Utilisation by Staff**	*10*	*50*	*50*	*50*	*75*	*75*	*75*	*150*	*150*	*150*	*150*	*150*	*150*	*150*	*150*	*150*	*75*	*75*	*75*	*75*	*75*	*75*	*75*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*20*	*20*	*20*	*20*	*20*	*0*	*0*	*0*
Local Staff (Rockhampton)	100%			*10*	*50*	*50*	*50*	*75*	*75*	*75*	*150*	*150*	*150*	*150*	*150*	*150*	*150*	*150*	*150*	*75*	*75*	*75*	*75*	*75*	*75*	*75*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*20*	*20*	*20*	*20*	*20*	*0*	*0*	*0*
	Mini Bus	20	50%	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	LV	2	50%	*5*	*25*	*25*	*25*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*25*	*25*	*25*	*25*	*25*	*25*	*25*	*25*	*25*	*10*	*10*	*10*	*10*	*10*	*0*	*0*	*0*
Daily Construction Staff Vehicle Movements				**5**	**25**	**25**	**25**	**38**	**38**	**38**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**10**	**10**	**10**	**10**	**10**	**0**	**0**	**0**
Daily Project (Construction) Vehicle Movements				**10**	**39**	**39**	**36**	**50**	**50**	**50**	**51**	**51**	**51**	**51**	**51**	**51**	**51**	**52**	**52**	**48**	**48**	**48**	**48**	**43**	**43**	**43**	**35**	**35**	**35**	**31**	**31**	**31**	**31**	**31**	**32**	**14**	**14**	**14**	**14**	**14**	**0**	**0**	**0**

4.2 Operations Phase

The proponent (Neoen) has also advised that the workforce during operations phase of the Project (i.e. following the completion of the construction stages) will only consist of a small number of local workers (up to 10 staff) who are expected to reside locally to the Study Area (most likely in Rockhampton).

Further to this, the heavy vehicle movements during the operations phase of the Project are likely to be extremely low (approx. 1 HV per week), associated with maintenance activities, routine removal of waste or deliveries to the site operations facility, and considered to be negligible from a traffic engineering or transport planning perspective.

In light of the information regarding the Project traffic volumes provided above, it can clearly be seen that the construction stage of the Project is critical in terms of the impact upon the public road network and has been used as the basis of the assessment of this impact considering road safety, road capacity, and pavement impact.

4.3 Project Traffic Volumes on the Network

The volumes of traffic forecast to be generated by staff and equipment / materials delivery as part of the Stage 1 and Stage 2 construction phases have been distributed onto the public road network based upon an understanding of the locations from which these equipment / materials are intended to be sourced / delivered, and other Project operational information provided by the proponent.

4.3.1 Road Links

As previously identified, the use of the external road network by typical day to day Project traffic is anticipated to be generally limited to the state controlled network and the RRC controlled link of South Ulam Road.

Notwithstanding this, it is also noted that a small number of local roads controlled by GRC (Red Rover Road, Don Young Drive) are also proposed to be utilised as part of the proposed transport route for the larger OSOM transformer and switchroom component movements from the Port of Gladstone to the Study Area.

Detailed calculations were undertaken to establish the peak daily Project traffic volumes on the relevant sections of the road network (refer **Appendix F**), with the identified peak volumes experienced during the peak construction phases of Stage 1 and Stage 2 of the Project noted to occur at the following times as per **Table 12** above:

- **Stage 1 -** Month 8-16 (April - December 2027) - Where heavy vehicle movements for construction tasks 1D,1E,1F,1G and the site water and fuel transport and waste collection are being completed concurrently with peak staff movements to the Project.
- **Stage 2 -** Month 27-32 (November 2028 – April 2029) - Where heavy vehicle movements for construction tasks 2B, 2C and the site water and fuel transport and waste collection are being completed concurrently with peak staff movements to the Project.

A summary of the calculated Project traffic volumes (conservatively based on the total of the individual maximum movements from concurrently scheduled construction activities) for each identified road link is provided in **Table 13** overpage.

Table 13 Forecast Maximum Project Traffic Volumes on External Road Network

Road ID	Road Description	AADT Segment ID	AADT Segment		Stage 1 Construction Maximum Daily Project Traffic			Stage 2 Construction Maximum Daily Project Traffic		
			Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
183	Gladstone Port Access Road	61605	0.000	0.858	7	7	14	3	3	6
181	Gladstone - Mount Larcom Road	160360	0.000	***0.175***	0	0	0	0	0	0
		160361	***0.175***	0.675	7	7	14	3	3	6
		60071	0.675	1.409	7	7	14	3	3	6
		60073	1.409	3.258	7	7	14	3	3	6
		61052	3.258	***3.830***	7	7	14	3	3	6
			3.830	4.625	6	6	12	3	3	6
		60074	4.625	12.292	6	6	12	3	3	6
		60076	12.292	32.140	6	6	12	3	3	6
GRC	Red Rover Road	GRC	0.000	3.390	1	0	1	0	0	0
GRC	Don Young Drive	GRC	0.000	2.280	1	0	1	0	0	0
46A	Dawson Highway (Gladstone - Biloela)	60065	***7.150***	***19.305***	1	0	1	0	0	0
10E	Bruce Highway (Benaraby - Rockhampton)	60006	11.445	***45.420***	1	0	1	0	0	0
		60023	***45.420***	***75.469***	7	7	14	3	3	6
			75.469	85.308	7	7	14	4	4	8
		160954	85.308	***86.183***	7	7	14	4	4	8
			86.183	87.080	46	46	92	28	28	56
		61551	87.080	108.938	46	46	92	28	28	56
		60130	108.938	114.388	46	46	92	28	28	56
		60024	114.388	116.961	46	46	92	28	28	56
RRC	South Ulam Road	RRC	0.000	16.773	53	53	106	32	32	64

TMR Chainage 0.175km (181) – Intersection of Gladstone-Mount Larcom Road / Gladstone Port Access Road | TMR Chainage 0.919km (181) – Intersection of Gladstone-Mount Larcom Road / Lord Street | TMR Chainage 3.830km (181) – Intersection of Gladstone-Mount Larcom Road / Red Rover Road | TMR Chainage 7.150km (46A) – Intersection of Dawson Highway / Don Young Drive | TMR Chainage 19.305km (46A) – Intersection of Dawson Highway / Bruce Highway | TMR Chainage 45.420km (10E) – Intersection of Bruce Highway / Gladstone-Mount Larcom Road | TMR Chainage 75.469km (10E) – Intersection of Bruce Highway / Bills Road | TMR Chainage 86.183km (10E) – Intersection of Bruce Highway / South Ulam Road

4.3.2 Intersections

From the information regarding the proposed staff and heavy vehicle movement numbers during the critical construction phase of Stage 1 and Stage 2 of the Project, the peak hour volumes at the key Bruce Highway / South Ulam Road intersection were established.

A summary of the resultant peak hour Project traffic volumes at this intersection for the peak Stage 1 and Stage 2 construction periods is outlined in **Figure 13** and **Figure 14** (Stage 1) as well as **Figure 15** and **Figure 16** (Stage 2), with further details of the calculations undertaken to establish these volumes are provided for reference in **Appendix C**.

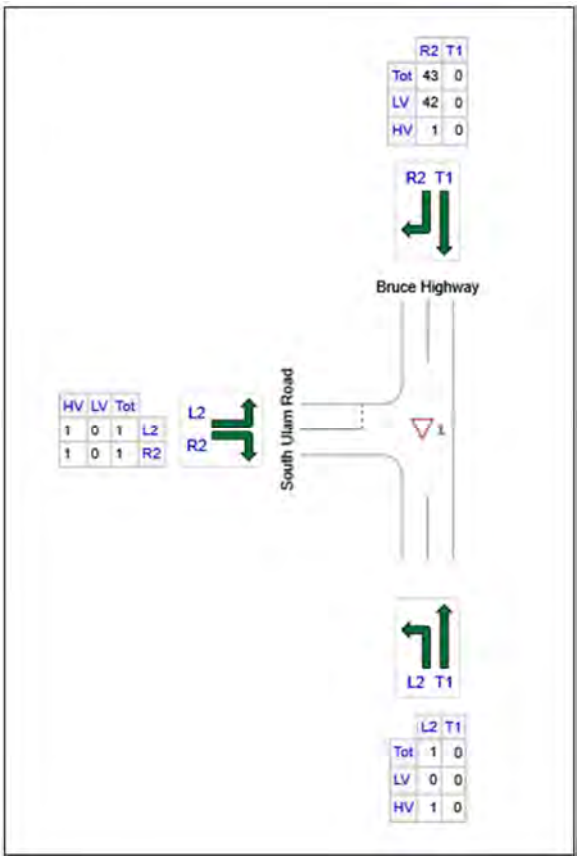


Figure 13 Bruce Highway / South Ulam Road Intersection AM Peak Stage 1 (Peak Construction) Volumes

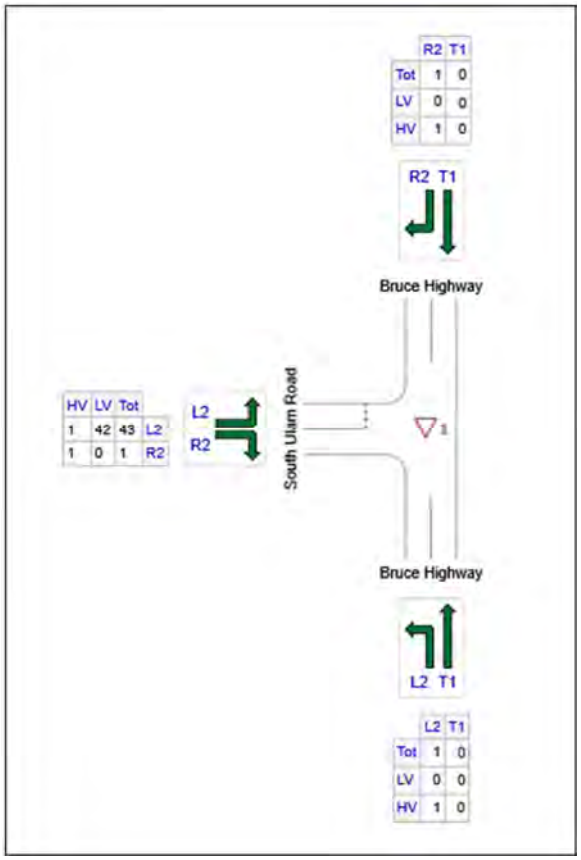


Figure 14 Bruce Highway / South Ulam Road Intersection PM Peak Stage 1 (Peak Construction) Volumes

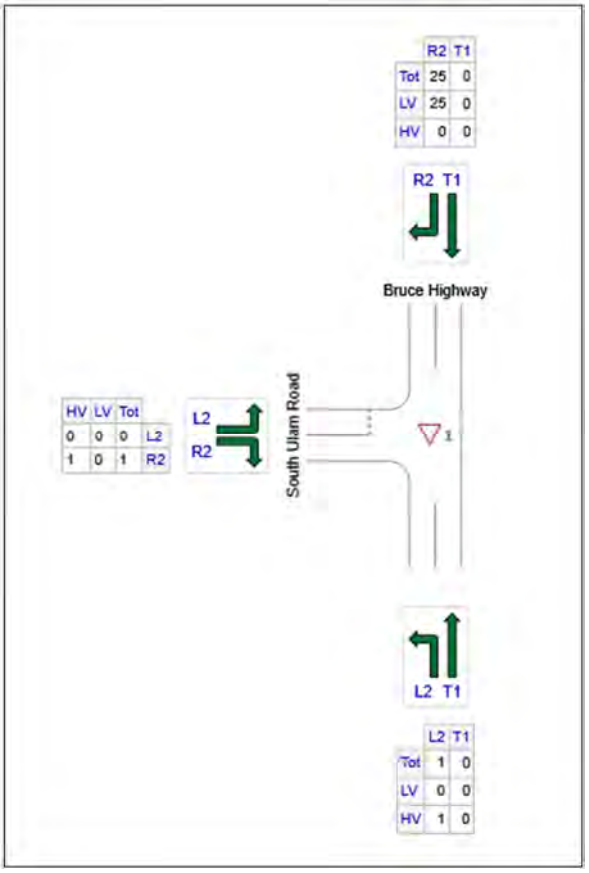


Figure 15 Bruce Highway / South Ulam Road Intersection AM Peak Stage 2 (Peak Construction) Volumes

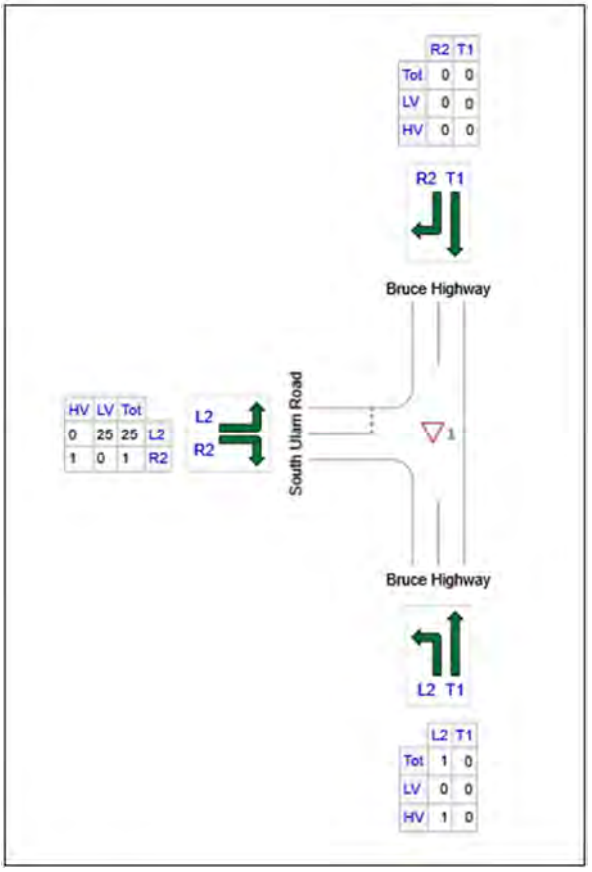


Figure 16 Bruce Highway / South Ulam Road Intersection PM Peak Stage 2 (Peak Construction) Volumes

5.0 Impact Assessment and Mitigation

Based on the information provided above, it was determined that the critical elements of the surrounding road network in terms of the potential impact of the Project were the identified road links forming the proposed transport routes for the site, and the key intersection of Bruce Highway / South Ulam Road. Further assessment of the impact of the Project on these elements is provided in the following sections.

5.1 With and Without Project Traffic Volumes

5.1.1 Road Link Volumes

5.1.1.1 Construction Phase

As identified above, the peak traffic generation from the Project is expected to occur during the peak construction period for the Project, with the expected maximum traffic volumes from the site identified in **Table 13** above.

Based on these volumes and the adopted distribution identified in **Section 4.3** above, the forecast pre project and "peak construction" traffic volumes on the relevant sections of the road network during Stage 1 (2027) and Stage 2 (2029) of the Project were established, as summarised in **Table 14** and **Table 15**.

Table 14 Forecast Background and "Peak Construction" Traffic Volumes (Stage 1)

Site ID	Road Segment		Background Daily Volumes			Project Peak Construction Traffic (Daily)			Peak Construction Daily Volumes		
	Start (km)	End (km)	2027			Gaz	A-Gaz	Bi-Dir	2027		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
Gladstone Port Access Road (183)											
61605	0.000	0.858	989	922	1,911	*7*	*7*	*14*	996	929	1,925
Gladstone – Mount Larcom Road (181)											
160360	0.000	***0.175***	5,879	6,190	12,069	*0*	*0*	*0*	5,879	6,190	12,069
160361	***0.175***	0.675	5,532	6,288	11,820	*7*	*7*	*14*	5,539	6,295	11,834
60071	0.675	1.409	4,058	3,719	7,777	*7*	*7*	*14*	4,065	3,726	7,791
60073	1.409	3.258	3,889	3,805	7,694	*7*	*7*	*14*	3,896	3,812	7,708
61052	3.258	***3.830***	4,356	5,353	9,709	*7*	*7*	*14*	4,363	5,360	9,723
	3.830	4.625	4,356	5,353	9,709	*6*	*6*	*12*	4,362	5,359	9,721
60074	4.625	***12.292***	3,337	3,361	6,698	*6*	*6*	*12*	3,343	3,367	6,710
60076	***12.292***	32.140	1,825	1,829	3,655	*6*	*6*	*12*	1,831	1,835	3,667
Red Rover Road (GRC)											
GRC	0.000	3.390	-	-	-	*1*	*0*	*1*	-	-	-
Don Young Drive (GRC)											
GRC	0.000	2.280	-	-	-	*1*	*0*	*1*	-	-	-
Dawson Highway (46A Gladstone – Biloela)											
60065	***7.150***	***19.305***	3,991	3,808	7,798	*1*	*0*	*1*	3,992	3,808	7,799

Site ID	Road Segment		Background Daily Volumes			Project Peak Construction Traffic (Daily)			Peak Construction Daily Volumes		
	Start (km)	End (km)	2027			Gaz	A-Gaz	Bi-Dir	2027		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
Bruce Highway (10E Benaraby – Rockhampton)											
60006	11.445	***45.420***	2,262	2,197	4,459	*1*	*0*	*1*	2,263	2,197	4,460
60023	***45.420***	***75.469***	3,273	3,309	6,582	*7*	*7*	*14*	3,280	3,316	6,596
	75.469	85.308	3,273	3,309	6,582	*7*	*7*	*14*	3,280	3,316	6,596
160954	85.308	***86.183***	3,461	3,237	6,698	*7*	*7*	*14*	3,468	3,244	6,712
	86.183	87.080	3,461	3,237	6,698	*46*	*46*	*92*	3,468	3,244	6,712
61551	87.080	108.938	3,816	3,795	7,611	*46*	*46*	*92*	3,862	3,841	7,703
60130	108.938	114.388	3,007	2,769	5,776	*46*	*46*	*92*	3,053	2,815	5,868
60024	114.388	116.961	6,084	5,832	11,917	*46*	*46*	*92*	6,130	5,878	12,009
South Ulam Road (RRC)											
RRC	0.000	16.773	92	111	202	*53*	*53*	*106*	145	164	308

Table 15 Forecast Background and "Peak Construction" Traffic Volumes (Stage 2)

Site ID	Road Segment		Background Daily Volumes			Project Peak Construction Traffic (Daily)			Peak Construction Daily Volumes		
	Start (km)	End (km)	2029			Gaz	A-Gaz	Bi-Dir	2029		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
Gladstone Port Access Road (183)											
61605	0.000	0.858	1,008	941	1,949	*3*	*3*	*6*	1,011	944	1,955
Gladstone – Mount Larcom Road (181)											
160360	0.000	***0.175***	5,998	6,314	12,312	*0*	*0*	*0*	5,998	6,314	12,312
160361	***0.175***	0.675	5,643	6,415	12,058	*3*	*3*	*6*	5,646	6,418	12,064
60071	0.675	1.409	4,140	3,794	7,934	*3*	*3*	*6*	4,143	3,797	7,940
60073	1.409	3.258	3,967	3,882	7,849	*3*	*3*	*6*	3,970	3,885	7,855
61052	3.258	***3.830***	4,444	5,460	9,904	*3*	*3*	*6*	4,447	5,463	9,910
	3.830	4.625	4,444	5,460	9,904	*3*	*3*	*6*	4,447	5,463	9,910
60074	4.625	***12.292***	3,404	3,429	6,833	*3*	*3*	*6*	3,407	3,432	6,839
60076	***12.292***	32.140	1,862	1,866	3,728	*3*	*3*	*6*	1,865	1,869	3,734
Red Rover Road (GRC)											
GRC	0.000	3.390	-	-	-	*0*	*0*	*0*	-	-	-
Don Young Drive (GRC)											
GRC	0.000	2.280	-	-	-	*0*	*0*	*0*	-	-	-
Dawson Highway (46A Gladstone – Biloela)											
60065	***7.150***	***19.305***	4,071	3,884	7,955	*0*	*0*	*0*	4,071	3,884	7,955

Site ID	Road Segment		Background Daily Volumes			Project Peak Construction Traffic (Daily)			Peak Construction Daily Volumes		
	Start (km)	End (km)	2029			Gaz	A-Gaz	Bi-Dir	2029		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
Bruce Highway (10E Benaraby – Rockhampton)											
60006	11.445	***45.420***	2,308	2,241	4,549	*0*	*0*	*0*	2,308	2,241	4,549
60023	***45.420***	***75.469***	3,357	3,393	6,750	*0*	*0*	*0*	3,360	3,396	6,756
	75.469	85.308	3,357	3,393	6,750	*3*	*3*	*6*	3,361	3,397	6,758
160954	85.308	***86.183***	3,531	3,302	6,833	*4*	*4*	*8*	3,535	3,306	6,841
	86.183	87.080	3,531	3,302	6,833	*4*	*4*	*8*	3,535	3,306	6,841
61551	87.080	108.938	3,935	3,914	7,849	*28*	*28*	*56*	3,963	3,942	7,905
60130	108.938	114.388	3,067	2,825	5,892	*28*	*28*	*56*	3,095	2,853	5,948
60024	114.388	116.961	6,356	6,093	12,449	*28*	*28*	*56*	6,384	6,121	12,505
South Ulam Road (RRC)											
RRC	0.000	16.773	93	113	206	*32*	*32*	*64*	125	145	270

TMR Chainage 0.175km (181) – Intersection of Gladstone-Mount Larcom Road / Gladstone Port Access Road | TMR Chainage 0.919km (181) – Intersection of Gladstone-Mount Larcom Road / Lord Street | TMR Chainage 3.830km (181) – Intersection of Gladstone-Mount Larcom Road / Red Rover Road | TMR Chainage 7.150km (46A) – Intersection of Dawson Highway / Don Young Drive | TMR Chainage 19.305km (46A) – Intersection of Dawson Highway / Bruce Highway | TMR Chainage 45.420km (10E) – Intersection of Bruce Highway / Gladstone-Mount Larcom Road | TMR Chainage 75.469km (10E) – Intersection of Bruce Highway / Bills Road | TMR Chainage 86.183km (10E) – Intersection of Bruce Highway / South Ulam Road

5.1.1.2 Operations Phase

As previously outlined, Neoen has advised that the predominant Project traffic volumes during the operations phase will be the movements to/from the site by the relatively small number of local workers (i.e up to 10 staff) who are expected to reside locally to the Project (likely Rockhampton).

Further to this, it has been advised that heavy vehicle movements during the operations phase of the Project will be extremely low (1 per week) and associated with maintenance activities, routine removal of waste or deliveries to the site operations facility.

Based on the above, the increase in traffic volumes on the road network as a result of the operations phase of the Project can be seen to be very minor. As such, the corresponding traffic impacts of the ongoing operation of the Project can be considered negligible, and no further traffic assessment of the relevant road links is deemed necessary.

5.1.2 Intersection Volumes

To establish the anticipated "in construction" traffic volumes at the key Bruce Highway / South Ulam Road intersections, the Project construction traffic volumes identified in **Figure 13** and **Figure 14** (Stage 1) and **Figure 15** and **Figure 16** (Stage 2) (refer **Section 4.3.2**) were added to the estimated 2027 (Stage 1) and 2029 (Stage 2) background or pre project traffic volumes at the intersection.

The resultant background and "peak construction" traffic volumes at the intersection are summarised in **Figure 17** to **Figure 20** (2027) and **Figure 21** to **Figure 24** (2029) respectively.

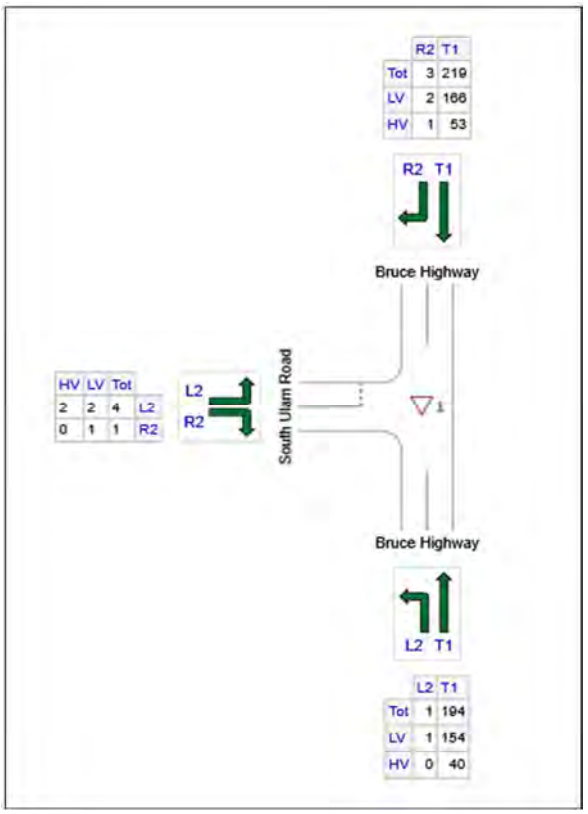


Figure 17 Bruce Highway / South Ulam Road Intersection 2027 AM Peak Background Traffic Volumes

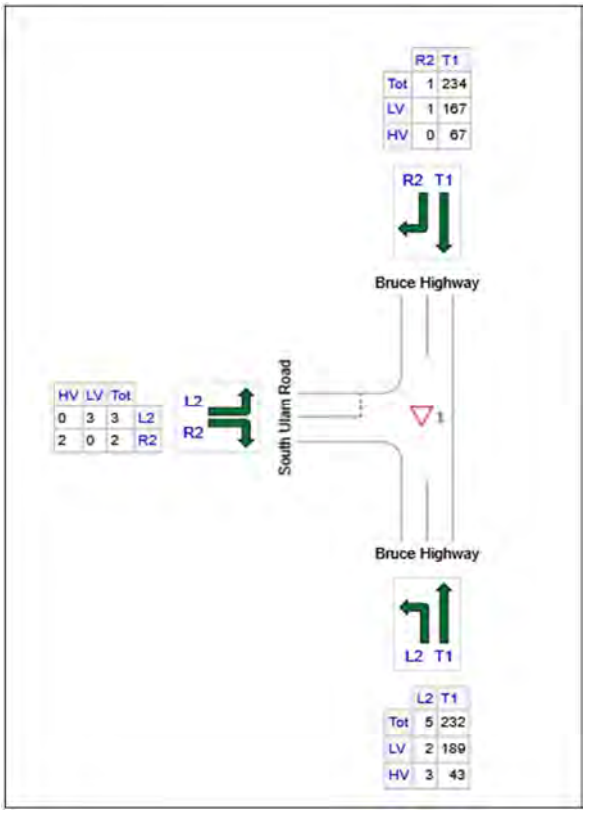


Figure 18 Bruce Highway / South Ulam Road Intersection 2027 PM Peak Background Traffic Volumes

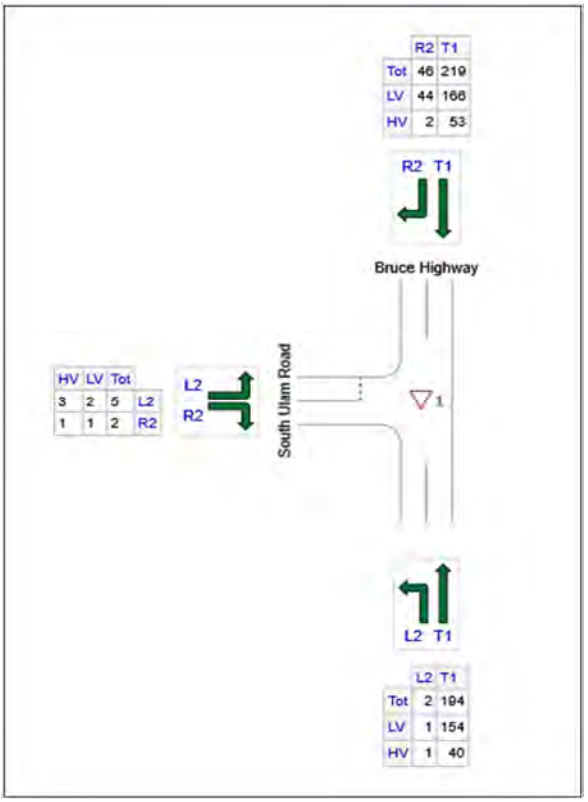


Figure 19 Bruce Highway / South Ulam Road Intersection 2027 AM Peak "Peak Construction" Volumes

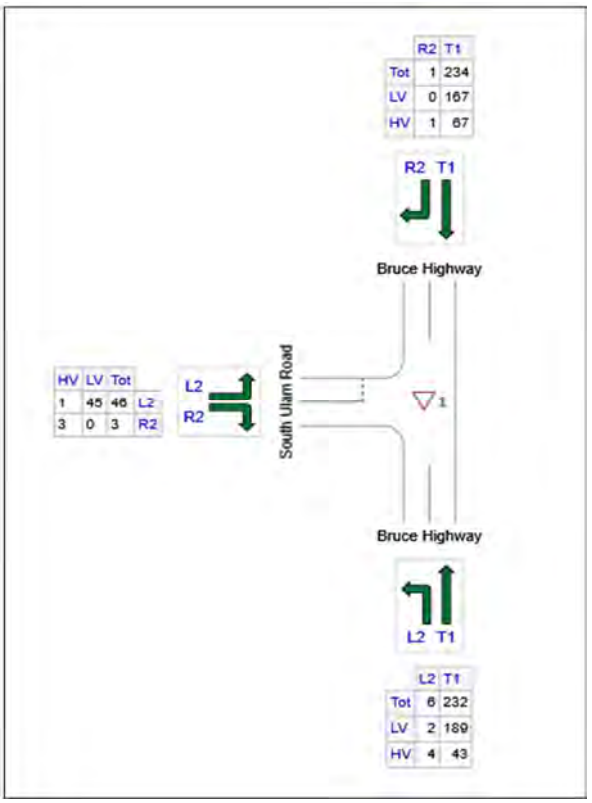


Figure 20 Bruce Highway / South Ulam Road Intersection 2027 PM Peak "Peak Construction" Volumes

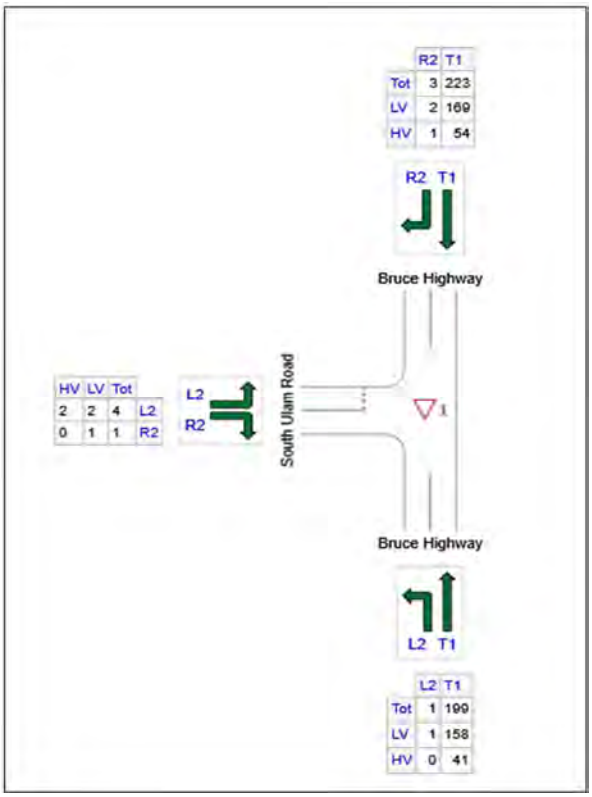


Figure 21 Bruce Highway / South Ulam Road Intersection 2029 AM Peak Background Traffic Volumes

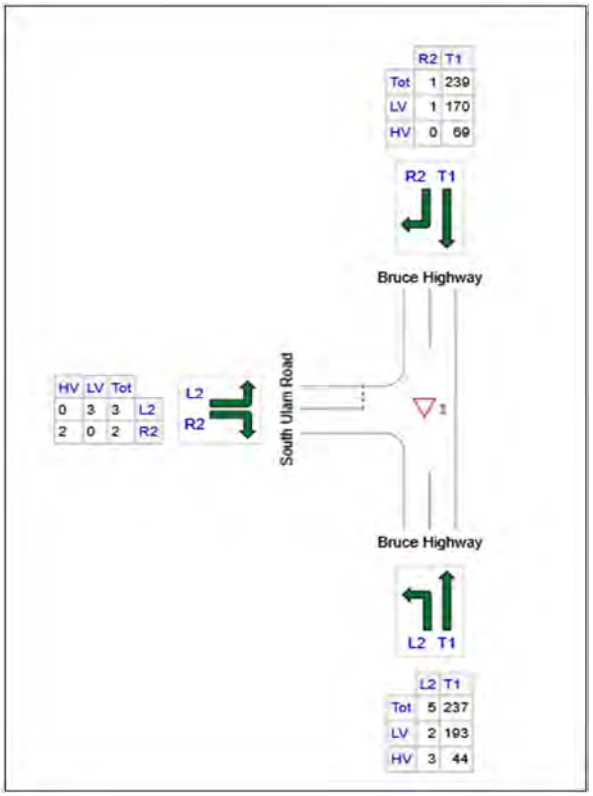


Figure 22 Bruce Highway / South Ulam Road Intersection 2029 PM Peak Background Traffic Volumes

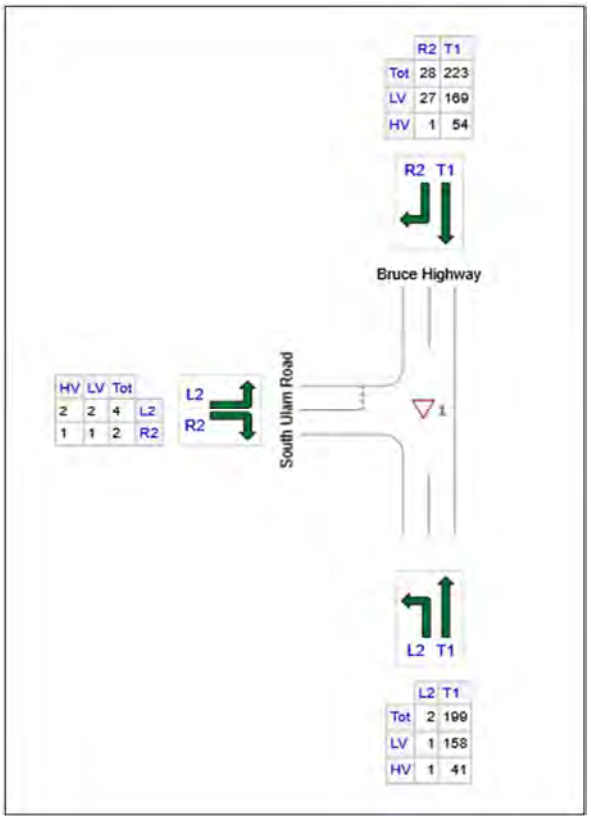


Figure 23 Bruce Highway / South Ulam Road Intersection 2029 AM Peak "Peak Construction" Volumes

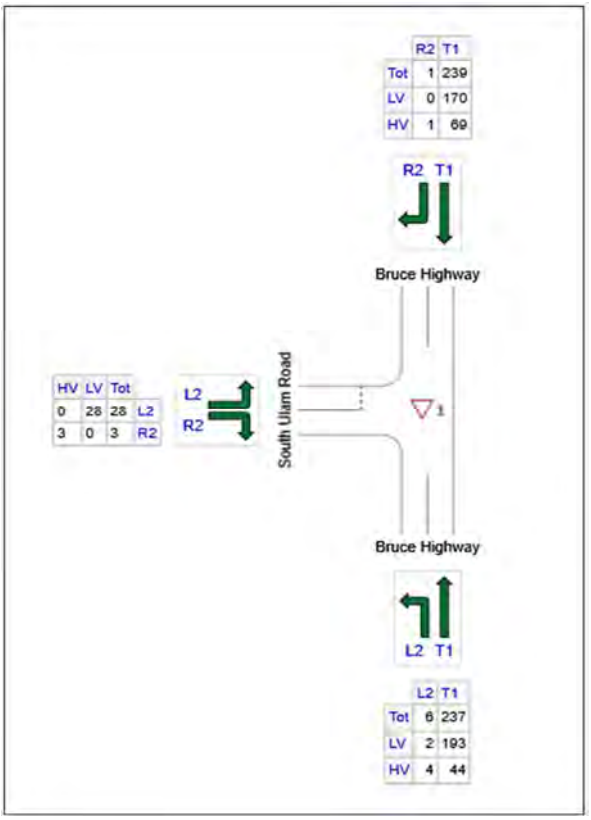


Figure 24 Bruce Highway / South Ulam Road Intersection 2029 PM Peak "Peak Construction" Volumes

5.2 Access and Frontage Impact Assessment and Mitigation

5.2.1 Critical Intersections

An assessment has been undertaken to establish the appropriate turn treatments at the identified intersection of Bruce Highway / South Ulam Road intersections based on the forecasts in construction traffic volumes for both Stage 1 and Stage 2 of the Project. This assessment is based on the turn treatment warrants identified in Figure 2.26(a) of Austroads *Guide to Traffic Management - Part 6: Intersections, Interchanges and Crossings* for higher speed highway intersections.

The forecast turning movement volumes at the proposed intersections during the peak Stage 1 and Stage 2 construction periods identified in **Figure 19** to **Figure 20** and **Figure 23** and **Figure 24** respectively above have been used as the basis of this assessment, with the results shown in **Figure 25** (Stage 1) and **Figure 26** (Stage 2). Further details of the turn warrant assessment calculations are included for reference as **Appendix G.**

5.2.1.1 Bruce Highway / South Ulam Road

Figure 25 and **Figure 26** below demonstrate that the identified Stage 1 and Stage 2 peak construction traffic volumes require the provision of a channelised right turn (CHR) and basic left turn (BAL) treatments at the key Bruce Highway / South Ulam Road.

Therefore it can be seen that the existing configuration of the intersection which provides both a channelised right turn (CHR) and a higher order short auxiliary left turn (AULs) treatments will be more than adequate to accommodate the minor increases in peak hour volumes associated with the Stage 1 and Stage 2 construction activities for the Proejct.

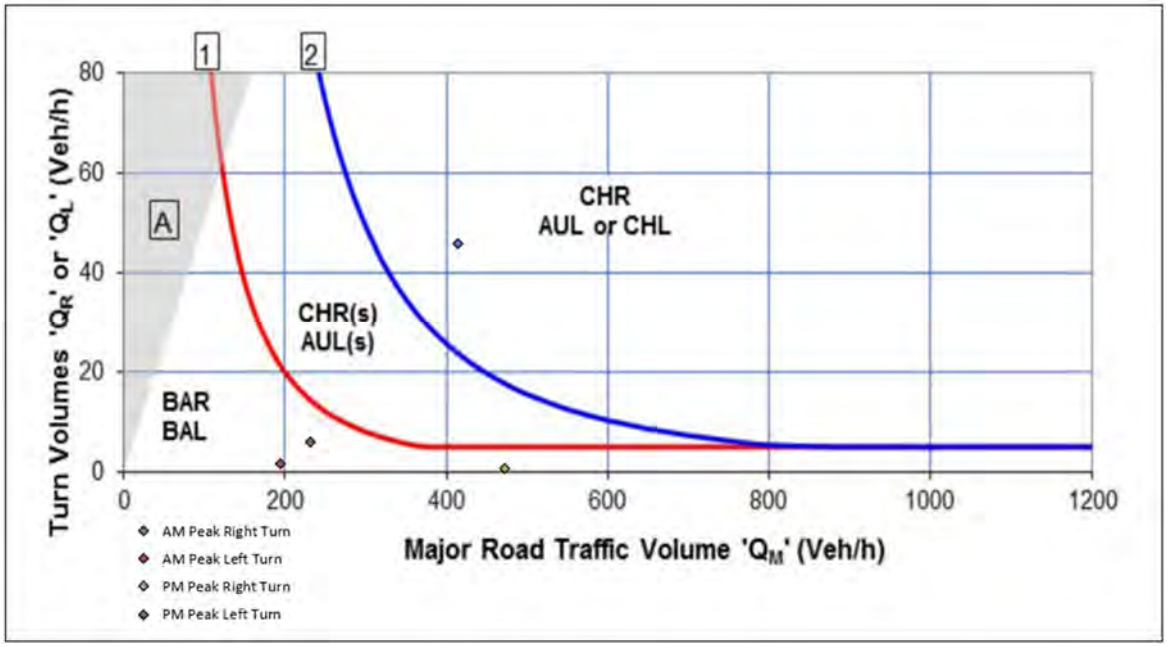


Figure 25 Bruce Highway / South Ulam Road Intersection Turn Warrants – 2027 Stage 1 "Peak Construction"

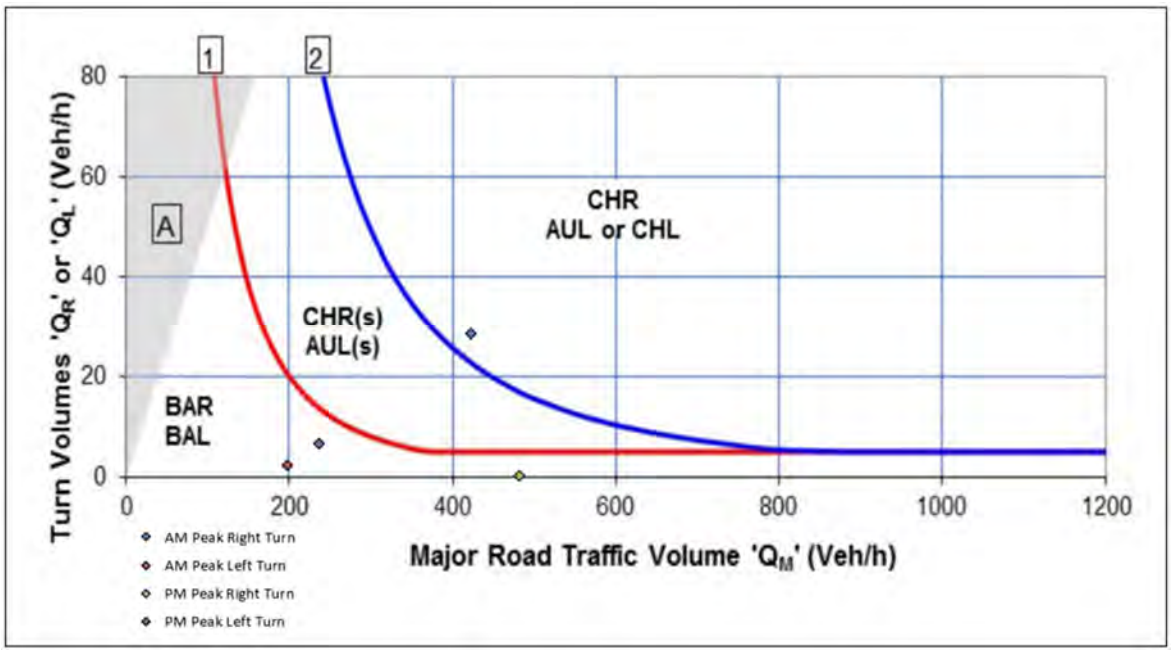


Figure 26 Bruce Highway / South Ulam Road Intersection Turn Warrants – 2029 Stage 2 "Peak Construction"

5.2.2 Site Access

Access to the Project is proposed via a new site access on the western side of South Ulam Road, approximately 16.8 km south of the Bruce Highway. As no access point currently exists at this location, it is proposed that a new site access intersection in accordance with the requirements for an access from a bitumen road (<300vpd) as per Standard Drawing CMDG-R-040 (Rural Road Access & Property Access Over Table Drains) be provided to service the expected Project traffic volumes,

Notwithstanding this, it is noted that additional hardstand areas will be required at the proposed site access location to accommodate the swept paths of the OSOM transformer transport vehicles (indicative extents shown in **Figure 27** below), with the exact extents of these additional areas to be confirmed in subsequent detailed design phases of the Project once the final configuration of the transport vehicles are confirmed.

In addition, it is recommended that advisory "truck turning" signage be installed on the approaches to the new access on South Ulam Road during the construction phase, to highlight to motorists the presence of the Project access and the potential for turning heavy vehicles to/from the site.

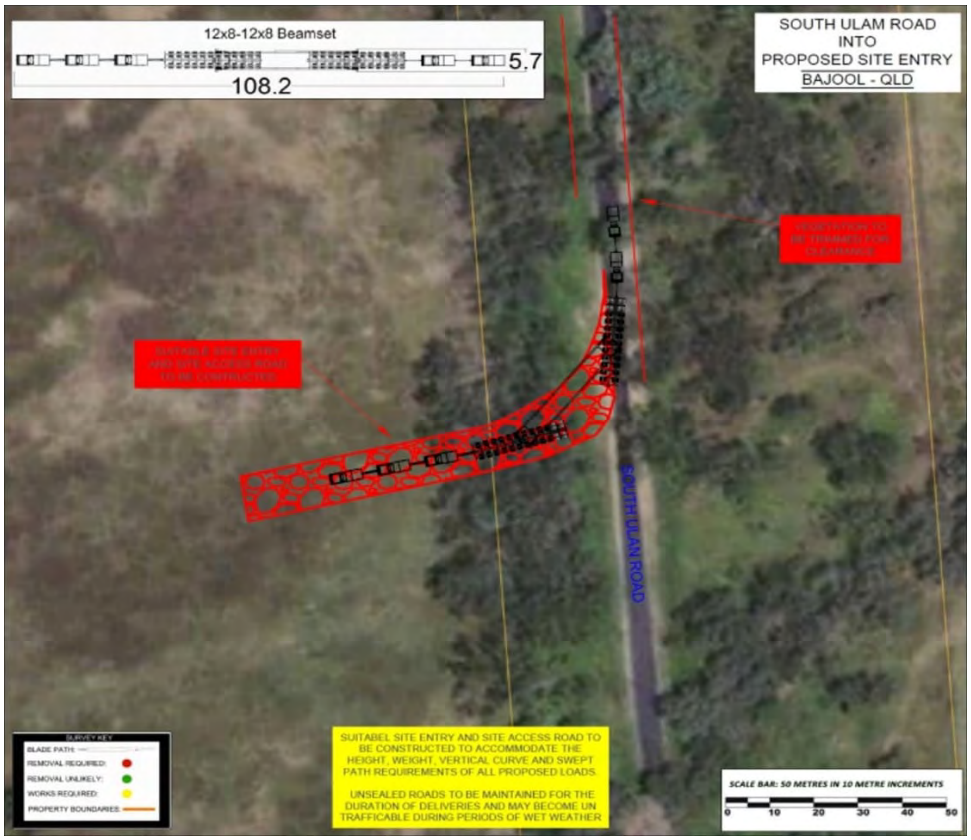


Figure 27 Indicative Hardstand Area at Site Access for OSOM Vehicle Swept Paths [Source: Rex J Andrews]

5.3 Road Safety Impact Assessment and Mitigation

Based on the road environments (<8,000vpd) of the relevant sections of the surrounding road network, it was determined that the completion of a lower order road safety assessment would be sufficient to establish the existing and post development road safety risks relevant to the Project, in accordance with the provisions of TMR's *Guide to Traffic Impact Assessment*.

As part of this road safety assessment a site inspection of the existing traffic conditions at the proposed site access locations and the adjacent road network was undertaken by Andrew Barrie (RPEQ / TMR Senior Road Safety Auditor). To establish the level of risk regarding the existing and expected post development road safety considerations identified, a safety risk score matrix as shown in **Figure 28** was utilised, with the results of the road safety risk assessment summarised in **Table 16**.

Figure 9.3.2(a) – Safety risk score matrix

		Potential consequence				
		Property only (1)	Minor injury (2)	Medical treatment (3)	Hospitalisation (4)	Fatality (5)
Potential likelihood	Almost certain (5)	M	M	H	H	H
	Likely (4)	M	M	M	H	H
	Moderate (3)	L	M	M	M	H
	Unlikely (2)	L	L	M	M	M
	Rare (1)	L	L	L	M	M

L: Low risk
M: Medium risk
H: High risk

Figure 28 Adopted Risk Score Matrix [Source: TMR GTIA]

Table 16 Project Road Safety Assessment – Mount Hopeful Battery Project

		Existing / Pre-Development			In Construction				In Construction with Mitigation		
Risk Item		Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score	Mitigation Measure	Likelihood	Consequence	Risk Score
1	Both stages of the Project are expected to lead to an increase in turning vehicle movements at the existing Bruce Highway / South Ulam Road intersection. These increases in turning vehicles has the potential to lead to an increase in vehicle conflicts at the proposed intersection location.	Unlikely	Hospitalisation	**Medium**	Unlikely	Hospitalisation	**Medium**	**No mitigation works required.** Detailed intersection analysis identified that existing intersection configuration (CHR / AULs) is adequate to cater for the proposed in construction traffic volumes at the intersection.	Unlikely	Hospitalisation	**Medium**
2	Both stages of the Project are also expected to lead to an increase in vehicle movements on relevant sections of the Gladstone Port Access Road, Gladstone-Mount Larcom Road, Bruce Highway and South Ulam Road. This increase in vehicle movements has the potential to lead to an increase in vehicle conflicts on the external road network .	Unlikely	Medical Treatment	**Medium**	Unlikely	Medical Treatment	**Medium**	**No mitigation works required.** In general, the forecast additional traffic volumes from Project are relatively low, with the higher volumes during the construction phase of both stages noted to only be temporary. Notwithstanding this, the road link impact assessment undertaken has identified that the current configuration of all relevant road links are expected to be adequate to cater for the temporary increase in traffic volumes on the network as a result of both Stage 1 and Stage 2 of the Project.	Unlikely	Medical Treatment	**Medium**
3	The Project is also expected to lead to a small number (approx. 5) of OSOM transport vehicle movements on the external road network, including Gladstone Port Access Road, Red Rover Road, Don Young Drive, Dawson Highway, Bruce Highway and South Ulam Road. This increase in large OSOM vehicles has the potential to impact the operation of the external road network.	Unlikely	Medical Treatment	**Medium**	Moderate	Medical Treatment	**Medium**	**All large OSOM transport vehicle movements to be undertaken under relevant permits, and under escort where required.** **Furthermore, OSOM movements are to be undertaken in accordance with the procedural requirements as identified in a relevant Traffic Management Plan to be prepared for the OSOM transport operations for the Project.**	Unlikely	Medical Treatment	**Medium**

5.4 Intersection Impact Assessment and Mitigation

SIDRA analysis was undertaken to establish the operational performance of the key Bruce Highway / South Ulam Road intersection, with this analysis considering the 2027 (Stage 1) and 2029 (Stage 2) AM and PM peak periods during the identified peak construction period for the Project.

A summary of the results of the completed intersection analysis is provided in **Table 17** and **Table 18** below, with detailed SIDRA output summaries included for reference in **Appendix D.**

Table 17 Stage 1 (Peak Construction) SIDRA Results – Bruce Highway / South Ulam Road Intersection

Analysis Scenario	Intersection Degree of Saturation	Level of Service**	Intersection Average Delay (sec)	Maximum 95% Back of Queue Length (m)
Bruce Highway / South Ulam Road				
2027 Background AM Peak	0.135	LOS A	0.2	0.2
2027 Background PM Peak	0.148	LOS B	0.2	0.4
2027 "Peak Construction" AM Peak	0.135	LOS A	0.8	1.2
2027 "Peak Construction" PM Peak	0.148	LOS B	0.8	1.6

** LOS value identified is for worst movement at the intersection, not the overall intersection.

Table 18 Stage 2 (Peak Construction) SIDRA Results – Bruce Highway / South Ulam Road Intersection

Analysis Scenario	Intersection Degree of Saturation	Level of Service**	Intersection Average Delay (sec)	Maximum 95% Back of Queue Length (m)
Bruce Highway / South Ulam Road				
2029 Background AM Peak	0.138	LOS A	0.2	0.2
2029 Background PM Peak	0.152	LOS B	0.2	0.4
2029 "Peak Construction" AM Peak	0.138	LOS A	0.6	0.7
2029 "Peak Construction" PM Peak	0.152	LOS B	0.6	1.1

** LOS value identified is for worst movement at the intersection, not the overall intersection.

The results above indicate that the existing configuration (CHR/AULs) of the Bruce Highway / South Ulam Road intersections are expected to operate satisfactorily during both the Stage 1 and Stage 2 peak construction phase traffic scenarios identified of the Project, with all values for DOS, LOS, average delay and vehicle queue length being within acceptable limits of operation for priority-controlled intersections.

As such, it can be concluded that the existing configuration of the Bruce Highway / South Ulam Road can be considered appropriate to cater for the additional traffic volumes generated by the peak construction phase of both Stage 1 and Stage 2 of the proposed Project.

5.5 Road Link Capacity Assessment and Mitigation

A summary of the assessment of the percentage increase in daily traffic volumes on the road network as a result of the critical construction phase traffic from both Stage 1 and Stage 2 of the Project is shown in **Table 19** and **Table 20**, with further details of the calculations undertaken provided in **Appendix F**.

As can be seen by the results, the addition of the forecast construction phase traffic volumes from Stage 1 and Stage 2 of the Project is shown to have a minimal impact on all identified sections of the state-controlled road network, with all increases shown to be well below the standard 5% increase trigger.

In regard to the local government controlled links, the results in **Table 19** and **Table 20** identified significant (>5%) increases in traffic volumes for the relevant lengths of RRC controlled South Ulam Road as part of the Stage 1 and Stage 2 construction works.

Notwithstanding this, the primary reason for the large percentage increases identified on these roads is the relatively low background traffic volume on this link (approx. 202vpd (2027 – Stage 1) and 206vpd (2029 – Stage 2)), with the expected maximum increase in traffic volumes on South Ulam Road during the peak construction phase of the Project in the range of 106vpd (53vpd inbound / 53vpd outbound) for Stage 1 and 64vpd (32vpd inbound / 32vpd outbound) for Stage 2.

Further to this, it is noted that these identified peak increases in Project traffic volumes are only anticipated to be generated for a short period, in the order nine (9) months for Stage 1 and six (6) months for Stage 2, with reduced volumes anticipated from the Project for the remainder of the overall construction period.

Looking closer at the "impacted" sections of local government controlled road network, the total peak "peak construction" volumes on South Ulam Road will be in the order of 306vpd (Stage 1) and 270vpd (Stage 2). Based on these forecast volumes and the temporary nature of the increases in traffic volumes due to the Stage 1 and Stage 2 construction works, it is expected that the existing configuration of South Ulam Road will be adequate to cater for the temporary increases in Project traffic.

Finally, while no percentage increases have been calculated, it is also noted that the limited OSOM transport movements for the Project will also lead to a negligible increase (approx. 1vpd) on the GRC controlled road links of Red Rover Road and Don Young Drive (GRC).

Based on the current configurations of these links, and the fact that the increase in traffic volumes on the links will be limited to the 5 OSOM transport movements travelling under escort, it is anticipated that in general the current configuration and capacity of the these links will be more than suitable to cater for the temporary increase in Project traffic (assuming the mitigation works identified in the Preliminary Transport Route Assessment are undertaken – refer **Appendix A**).

Table 19 Road Link Daily Traffic Volume Comparison (Stage 1 Peak Construction)

Site ID	Road Segment		Background Daily Volumes			Stage 1 Peak Construction Traffic (Daily)			% Increase in Daily Volumes		
	Start (km)	End (km)	2027			Gaz	A-Gaz	Bi-Dir	2027		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
Gladstone Port Access Road (183)											
61605	0.000	0.858	989	922	1,911	*7*	*7*	*14*	0.71%	0.76%	0.73%
Gladstone – Mount Larcom Road (181)											
160360	0.000	***0.175***	5,879	6,190	12,069	*0*	*0*	*0*	0.00%	0.00%	0.00%
160361	***0.175***	0.675	5,532	6,288	11,820	*7*	*7*	*14*	0.13%	0.11%	0.12%
60071	0.675	1.409	4,058	3,719	7,777	*7*	*7*	*14*	0.17%	0.19%	0.18%
60073	1.409	3.258	3,889	3,805	7,694	*7*	*7*	*14*	0.18%	0.18%	0.18%
61052	3.258	***3.830***	4,356	5,353	9,709	*7*	*7*	*14*	0.16%	0.13%	0.14%
	3.830	4.625	4,356	5,353	9,709	*6*	*6*	*12*	0.14%	0.11%	0.12%
60074	4.625	***12.292***	3,337	3,361	6,698	*6*	*6*	*12*	*0.18%*	*0.18%*	*0.18%*
60076	***12.292***	32.140	1,825	1,829	3,655	*6*	*6*	*12*	*0.33%*	*0.33%*	*0.33%*
Red Rover Road (GRC)											

Site ID	Road Segment		Background Daily Volumes			Stage 1 Peak Construction Traffic (Daily)			% Increase in Daily Volumes		
	Start (km)	End (km)	2027			Gaz	A-Gaz	Bi-Dir	2027		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
GRC	0.000	3.390	-	-	-	*1*	*0*	*1*	-	-	-
Don Young Drive (GRC)											
GRC	0.000	2.280	-	-	-	*1*	*0*	*1*	-	-	-
Dawson Highway (46A Gladstone – Biloela)											
60065	***7.150***	***19.305***	3,991	3,808	7,798	*1*	*0*	*1*	0.03%	0.00%	0.01%
Bruce Highway (10E Benaraby – Rockhampton)											
60006	11.445	***45.420***	2,262	2,197	4,459	*1*	*0*	*1*	0.04%	0.00%	0.02%
60023	***45.420***	85.308	3,273	3,309	6,582	*7*	*7*	*14*	0.21%	0.21%	0.21%
160954	85.308	***86.183***	3,461	3,237	6,698	*7*	*7*	*14*	0.21%	0.21%	0.21%
	86.183	87.080	3,461	3,237	6,698	*7*	*7*	*14*	0.20%	0.22%	0.21%
61551	87.080	***107.400***	3,816	3,795	7,611	*46*	*46*	*92*	1.33%	1.42%	1.37%
	107.400	108.938	3,816	3,795	7,611	*46*	*46*	*92*	1.21%	1.21%	1.21%
60130	108.938	114.388	3,007	2,769	5,776	*46*	*46*	*92*	1.53%	1.66%	1.59%
60024	114.388	116.961	6,084	5,832	11,917	*46*	*46*	*92*	0.76%	0.79%	0.77%
South Ulam Road (RRC)											
RRC	0.000	16.773	92	111	202	*53*	*53*	*106*	**57.9%**	**47.89%**	**52.42%**

TMR Chainage 0.175km (181) – Intersection of Gladstone-Mount Larcom Road / Gladstone Port Access Road | TMR Chainage 0.919km (181) – Intersection of Gladstone-Mount Larcom Road / Lord Street | TMR Chainage 3.830km (181) – Intersection of Gladstone-Mount Larcom Road / Red Rover Road | TMR Chainage 7.150km (46A) – Intersection of Dawson Highway / Don Young Drive | TMR Chainage 19.305km (46A) – Intersection of Dawson Highway / Bruce Highway | TMR Chainage 45.420km (10E) – Intersection of Bruce Highway / Gladstone-Mount Larcom Road | TMR Chainage 75.469km (10E) – Intersection of Bruce Highway / Bills Road | TMR Chainage 86.183km (10E) – Intersection of Bruce Highway / South Ulam Road

Table 20 Road Link Daily Traffic Volume Comparison (Stage 2 Peak Construction)

Site ID	Road Segment		Background Daily Volumes			Stage 2 Peak Construction Traffic (Daily)			% Increase in Daily Volumes		
	Start (km)	End (km)	2029			Gaz	A-Gaz	Bi-Dir	2029		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
Gladstone Port Access Road (183)											
61605	0.000	0.858	1,008	941	1,949	*3*	*3*	*6*	0.30%	0.32%	0.31%
Gladstone – Mount Larcom Road (181)											
160360	0.000	***0.175***	5,998	6,314	12,312	*0*	*0*	*0*	0.00%	0.00%	0.00%
160361	***0.175***	0.675	5,643	6,415	12,058	*3*	*3*	*6*	0.05%	0.05%	0.05%
60071	0.675	1.409	4,140	3,794	7,934	*3*	*3*	*6*	0.07%	0.08%	0.08%
60073	1.409	3.258	3,967	3,882	7,849	*3*	*3*	*6*	0.08%	0.08%	0.08%
61052	3.258	***3.830***	4,444	5,460	9,904	*3*	*3*	*6*	0.07%	0.05%	0.06%
	3.830	4.625	4,444	5,460	9,904	*3*	*3*	*6*	0.07%	0.05%	0.06%
60074	4.625	***12.292***	3,404	3,429	6,833	*3*	*3*	*6*	0.09%	0.09%	0.09%

Site ID	Road Segment		Background Daily Volumes			Stage 2 Peak Construction Traffic (Daily)			% Increase in Daily Volumes		
	Start (km)	End (km)	2029			Gaz	A-Gaz	Bi-Dir	2029		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
60076	***12.292***	32.140	1,862	1,866	3,728	*3*	*3*	*6*	0.16%	0.16%	0.16%
Red Rover Road (GRC)											
GRC	0.000	3.390	-	-	-	*0*	*0*	*0*	-	-	-
Don Young Drive (GRC)											
GRC	0.000	2.280	-	-	-	*0*	*0*	*0*	-	-	-
Dawson Highway (46A Gladstone – Biloela)											
60065	***7.150***	***19.305***	4,071	3,884	7,955	*0*	*0*	*0*	0.00%	0.00%	0.00%
Bruce Highway (10E Benaraby – Rockhampton)											
60006	11.445	***45.420***	2,308	2,241	4,549	*0*	*0*	*0*	0.00%	0.00%	0.00%
60023	***45.420***	***75.469***	3,357	3,393	6,750	*3*	*3*	*6*	0.09%	0.09%	0.09%
	75.469	85.308	3,357	3,393	6,750	*4*	*4*	*8*	0.12%	0.12%	0.12%
160954	85.308	***86.183***	3,531	3,302	6,833	*4*	*4*	*8*	0.11%	0.12%	0.12%
	86.183	87.080	3,531	3,302	6,833	*28*	*28*	*56*	0.79%	0.85%	0.82%
61551	87.080	108.938	3,935	3,914	7,849	*28*	*28*	*56*	0.71%	0.72%	0.71%
60130	108.938	114.388	3,067	2,825	5,892	*28*	*28*	*56*	0.91%	0.99%	0.95%
60024	114.388	116.961	6,356	6,093	12,449	*28*	*28*	*56*	0.44%	0.46%	0.45%
South Ulam Road (RRC)											
RRC	0.000	16.773	93	113	206	*32*	*32*	*64*	**34.27%**	**28.34%**	**31.03%**

TMR Chainage 0.175km (181) – Intersection of Gladstone-Mount Larcom Road / Gladstone Port Access Road | TMR Chainage 0.919km (181) – Intersection of Gladstone-Mount Larcom Road / Lord Street | TMR Chainage 3.830km (181) – Intersection of Gladstone-Mount Larcom Road / Red Rover Road | TMR Chainage 7.150km (46A) – Intersection of Dawson Highway / Don Young Drive | TMR Chainage 19.305km (46A) – Intersection of Dawson Highway / Bruce Highway | TMR Chainage 45.420km (10E) – Intersection of Bruce Highway / Gladstone-Mount Larcom Road | TMR Chainage 75.469km (10E) – Intersection of Bruce Highway / Bills Road | TMR Chainage 86.183km (10E) – Intersection of Bruce Highway / South Ulam Road

5.6 Pavement Impact Assessment and Mitigation

5.6.1 Construction Phase

The assessment of the potential pavement impact of the Project's construction traffic consists of a comparison of the overall pavement loading (in Equivalent Standard Axles) during the background traffic volumes on the network and those during the identified peak construction periods for the Project, most notably from the associated heavy vehicle movements during these periods.

The pavement loading (in ESAs/SAR$_4$) for the background traffic within the expected periods was calculated based on the identified heavy vehicle percentages for the relevant sections of the network, adopting the following assumptions:

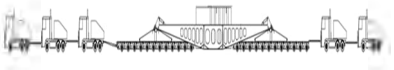
- The percentage of heavy vehicles identified in the available traffic data utilised for the assessment will be maintained for future years, with the overall background traffic numbers assumed to increase each year by the identified 10-year growth rates for each road link as per **Table 1** above.
- The impact of light vehicles can be ignored as the contribution to pavement loading is negligible in comparison to heavy vehicles.

- The adopted values for the Equivalent Standard Axles per Heavy Vehicle (ESAs/HV) for each relevant road link are in accordance with the standard values identified by TMR, being 2.9 ESAs/HV for the Bruce Highway and 3.2 ESAs/HV for all other road links.
- The background period of the assessment for the construction phase is the proposed duration of construction for the overall Project (37 months (not including Project float) or 1,125 days).

The pavement loading generated by the Project construction traffic was then calculated based on the estimated number of heavy vehicle movements during construction and the average loaded and unloaded ESAs/HV values for each vehicle configuration.

It is noted that indicative loading values for the OSOM transformer and switch room movements have been adopted based on calculated values from similar component movements from previous battery projects, noting that the transformer and switch room loading information below will need to be reassessed in subsequent stages of the Project when the transport vehicle configurations have been confirmed. Notwithstanding this, the identified vehicle loadings in **Table 21** are considered adequate to complete the pavement assessment for the Project.

Table 21 Assumed Vehicle Class and ESA/HV Values

Vehicle Class	Vehicle Configuration	Task	Average Loaded ESAs / HV	Average Unloaded ESAs / HV
4 Axle Rigid		Concrete transport. Site water transport. General site deliveries.	4.13	0.36
6 Axle Semi-trailer (GML)		General material and equipment transport / fuel transport / waste collection	5.54	1.68
Truck and 4 Axle Dog (GML)		Gravel material transport	6.15	1.64
3x Prime mover with 12x8 12x8 beamset trailer and 2 x Prime mover		200T transformer transport (Option 1)	70.21	26.57
2x Prime mover with 16x8 platform trailer and 1 x Prime mover		200T transformer transport (Option 2)	72.65	14.55
Prime mover with 10x8 platform trailer		Site switch room transport	6.46	4.79

A summary of the comparison of the background and Project generated pavement loadings is provided in **Table 22** overpage, with further details of the Project pavement loading calculations undertaken included for reference in **Appendix H.**

Table 22 Project Pavement Loading Comparison

Site ID	Road Segment		Background ESA			Project Generated ESA			% Increase in ESAs		
	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
Gladstone Port Access Road (183)											
61605	0.000	0.858	1,126,675	1,391,584	2,518,259	*1,721*	*5,611*	*7,332*	0.15%	0.40%	0.29%
Gladstone-Mount Larcom Road (181)											
160360	0.000	***0.175***	1,855,321	1,898,003	3,753,324	*0*	*0*	*0*	0.00%	0.00%	0.00%
160361	***0.175***	0.675	2,881,792	3,840,939	6,722,731	*5,611*	*1,721*	*7,332*	0.19%	0.04%	0.11%
60071	0.675	1.409	1,992,627	2,296,835	4,289,462	*5,611*	*1,721*	*7,332*	0.28%	0.07%	0.17%
60073	1.409	3.258	2,092,376	1,673,075	3,765,452	*5,611*	*1,721*	*7,332*	0.27%	0.10%	0.19%
61052	3.258	***3.830***	2,472,690	3,775,328	6,248,018	*5,611*	*1,721*	*7,332*	0.23%	0.05%	0.12%
	3.830	4.625	2,472,690	3,775,328	6,248,018	*5,451*	*1,653*	*7,104*	0.22%	0.04%	0.11%
60074	4.625	***12.292***	2,281,122	2,488,040	4,769,162	*5,451*	*1,653*	*7,104*	0.24%	0.07%	0.15%
60076	***12.292***	32.140	1,545,033	1,838,177	3,383,210	*5,451*	*1,653*	*7,104*	0.35%	0.09%	0.21%
Red Rover Road (GRC)											
GRC	0.000	3.390	-	-	-	*160*	*68*	*227*	-	-	-
Don Young Drive (GRC)											
GRC	0.000	2.280	-	-	-	*160*	*68*	*227*	-	-	-
Dawson Highway (46A Gladstone – Biloela)											
60065	***7.150***	***19.305***	2,464,567	1,849,128	2,464,567	*160*	*68*	*227*	0.01%	0.00%	0.01%
Bruce Highway (10E Benaraby – Rockhampton)											
60006	11.445	***45.420***	1,901,408	2,532,018	4,433,426	*160*	*68*	*227*	0.01%	0.00%	0.01%
60023	***45.420***	***75.469***	3,293,262	2,911,221	6,204,483	*5,611*	*1,721*	*7,332*	0.17%	0.06%	0.12%
	75.469	85.308	3,293,262	2,911,221	6,204,483	*13,594*	*3,849*	*17,443*	0.41%	0.13%	0.28%
160954	85.308	***86.183***	3,178,497	2,967,801	6,146,298	*13,594*	*3,849*	*17,443*	0.43%	0.13%	0.28%

Site ID	Road Segment		Background ESA			Project Generated ESA			% Increase in ESAs		
	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
	86.183	87.080	3,178,497	2,967,801	6,146,298	*1,681*	*5,958*	*7,638*	0.05%	0.20%	0.12%
61551	87.080	108.938	3,795,458	3,271,572	7,067,030	*1,681*	*5,958*	*7,638*	0.04%	0.18%	0.11%
60130	108.938	114.388	2,666,237	3,041,786	5,708,023	*1,681*	*5,958*	*7,638*	0.06%	0.20%	0.13%
60024	114.388	116.961	2,918,141	3,193,906	6,112,047	*1,681*	*5,958*	*7,638*	0.06%	0.19%	0.12%
South Ulam Road (RRC)											
RRC	0.000	16.773	141,283	141,283	282,566	*19,551*	*5,530*	*25,082*	**13.84%**	3.91%	**8.88%**

TMR Chainage 0.175km (181) – Intersection of Gladstone-Mount Larcom Road / Gladstone Port Access Road | TMR Chainage 0.919km (181) – Intersection of Gladstone-Mount Larcom Road / Lord Street | TMR Chainage 3.830km (181) – Intersection of Gladstone-Mount Larcom Road / Red Rover Road | TMR Chainage 7.150km (46A) – Intersection of Dawson Highway / Don Young Drive | TMR Chainage 19.305km (46A) – Intersection of Dawson Highway / Bruce Highway | TMR Chainage 45.420km (10E) – Intersection of Bruce Highway / Gladstone-Mount Larcom Road | TMR Chainage 75.469km (10E) – Intersection of Bruce Highway / Bills Road | TMR Chainage 86.183km (10E) – Intersection of Bruce Highway / South Ulam Road

The results in **Table 22** indicate that the heavy vehicle movements associated with the construction phase of Stage 1 and Stage 2 of the Project are expected to lead to negligible increases in pavement loadings on all of the identified sections of the state-controlled road network, with calculated values of loading increase well below the typical 5% increase trigger threshold.

In addition to the state-controlled road network, the results indicated that the additional heavy vehicle movements from the Stage 1 and Stage 2 construction works was anticipated to lead to a significant (>5%) increase in pavement loadings on the RRC controlled road link of South Ulam Road.

Further to this, while no percentage increase could be established due to the lack of current traffic data for the identified GRC controlled Red Rover Road and Don Young Drive it is anticipated that the limited use of these local roads for small number (approx. 5) OSOM movements for the transformer (x2) and switchroom (x3) component transport operations for the Project will have a negligible increase in pavement loadings on these road links.

Based on this, it is recommended that the proponent enter into an Infrastructure Agreement with RRC regarding the required mitigation works on South Ulam Road to offset the calculated pavement impacts of the Project.

It also recommended that this infrastructure agreement include a reference to the requirement for pre and post dilapidation inspections to be undertaken on the relevant sections of South Ulam Road (RRC) by representatives of the proponent and the appropriate Council (RRC / GRC). These inspections are required to identify and document the current condition of the roads (pre construction) and establish the required maintenance and/or rehabilitation works (to be completed by the proponent at no cost to Council) deemed necessary to reinstate the roads to their documented condition prior to the introduction of Project traffic (post construction).

5.6.2 Operations Phase

As identified above, it is understood that the operations phase of the Project will only generate relatively low traffic volumes on the network (up to 10 light vehicles to/from site daily), with negligible heavy vehicle movements (approximately 1 HV per week) associated with maintenance activities, routine removal of waste or deliveries to the site operations facility.

Therefore, it can be considered that this phase of the Project will have a negligible impact to the operation (and pavement loadings) of all relevant road links.

5.7 Transport Infrastructure Impact Assessment and Mitigation

5.7.1 Bridge Structures

As identified above, the OSOM transformer vehicle configurations identified in the route assessment will need to be provided to TMR to enable the assessment of the relevant bridge and major culvert structures along the identified transport routes to be undertaken.

Notwithstanding this, it is expected that suitable transport vehicle configurations for the transformer components can be made to enable the vehicles to meet any identified loading parameters of these relevant bridge structures along the identified OSOM transport route for the Project.

6.0 Conclusions and Recommendations

6.1 Summary of Impacts and Mitigation Measures Proposed

6.1.1 Traffic Impacts

Based on the identified increase in traffic numbers anticipated as a result of the construction (Stage 1 and Stage 2) and operations phases of the proposed Project, it is anticipated that the Project will have a minimal impact on the traffic operation of the surrounding road network, from a capacity perspective.

Notwithstanding this, the following mitigation treatments are recommended to maximise vehicle safety on the sections of the road network utilised by Project traffic:

- Completion of minor works along the identified transport route to accommodate the swept paths of the OSOM transformer transport vehicles, as identified in the Preliminary Transport Route Assessment for the Project (refer **Appendix A**). It is noted that the exact extents and scope of these works will be determined in subsequent detailed design phases of the Project once the transformer transport vehicle configurations are confirmed.
- Construct new site access from South Ulam Road (LHS approx. Ch. 16.800km) to cater for Project volumes. The new site access is to be provided in accordance with the requirements for a bitumen road (<300vpd) as per Standard Drawing CMDG-R-040 (Rural Road Access and Property Access Over Table Drains), noting that additional hardstand area will be required at the proposed site access location to accommodate the swept paths of the OSOM transformer transport vehicles, with the exact extents of these additional areas to be confirmed in subsequent detailed design phases of the Project once the final configuration of the transport vehicles are confirmed.
- Installation of advisory "truck turning" signage be installed on the approaches to the proposed new site access on South Ulam Road during the construction phase, to highlight to motorists the presence of the Project access locations and the potential for turning vehicles to/from the side roads.

6.1.2 Pavement Impacts

In addition to the traffic assessments completed, a preliminary desktop pavement impact assessment of the relevant road network was also undertaken for the construction phase of the Project. The results of the assessment indicate that the heavy vehicle movements associated with Stages 1 and 2 of the Project are expected to lead to negligible increases in pavement loadings on all identified sections of the state-controlled road network, with calculated values of loading increase generally below the typical 5% increase trigger threshold.

The results also indicated that the additional heavy vehicle movements from the Stage 1 and Stage 2 construction works was anticipated to lead to a significant (>5%) increase in pavement loadings on the RRC controlled road link of South Ulam Road.

Further to this, while no percentage increase could be established due to the lack of current traffic data for the identified GRC controlled Red Rover Road and Don Young Drive it is anticipated that the limited use of these local roads for small number (approx. 5) OSOM movements for the transformer (x2) and switchroom (x3) component transport operations for the Project will have a negligible increase in pavement loadings on these road links.

Based on this, it is recommended that the proponent enter into an Infrastructure Agreement with RRC regarding the required mitigation works on South Ulam Road to offset the calculated pavement impacts of the Project. It also recommended that this infrastructure agreement include a reference to the requirement for pre and post dilapidation inspections to be undertaken on the relevant sections of South Ulam Road (RRC) by representatives of the proponent and the Council (RRC). These inspections are required to identify

and document the current condition of the roads (pre construction) and establish the required maintenance and/or rehabilitation works (to be completed by the proponent at no cost to Council) deemed necessary to reinstate the roads to their documented condition prior to the introduction of Project traffic (post construction).

6.1.3 Recommendations

In light of the information provided above, it can be considered that conditional to the provision of the identified upgrade works and the proponent entering into a suitable infrastructure agreement with RRC to mitigate the construction phase pavement impacts to South Ulam Road, that the construction (Stage 1 and Stage 2) and operations phases of the proposed Mount Hopeful Battery Project will have minimal impact on the relevant sections of the local government and state controlled road networks.

6.2 Certification Statement and Authorisation

A copy of the RPEQ certification and authorisation statement covering this assessment of the proposed Mount Hopeful Battery Project is included for reference as **Appendix I**.

Appendix A – Preliminary OSOM Transport Route Assessment

REX J ANDREWS
ENGINEERED TRANSPORTATION

ROUTE STUDY



MT HOPEFUL BESS

AUGUST 7, 2025

CLIENT: NEOEN

PORT: GLADSTONE

REVISION: REV01

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1.0 Version History

Rev	Date	Change	Responsible	Approved
00	26/06/25	Report compiled	E Novak	✓
00	29/06/25	Report completed	W Andrews	✓
01	08/08/25	Client updates	W Andrews	✓

2.0 Introduction

Rex J Andrews Engineered Transportation have been engaged by NEOEN to undertake a route study for the proposed Mt Hopeful BESS Project in Queensland, Australia.

The Mount Hopeful BESS is a large-scale battery project proposed in Central Queensland, within the Rockhampton and Banana Shire areas.

The final project capacity is expected to be around 600MW.

The study is based on a desktop survey as well as utilising observations and previous experience on sections of the routes to outline the proposed transport of Battery Energy Storage System (BESS) equipment from the port of Gladstone to the Mt Hopeful Windfarm Project.

Should the project proceed a detailed transport study will be required to confirm the route is suitable and quantify the modifications required, in particular the suitability of South Ulam Road.

3.0 Project Data

Date of Latest Route Assessment: 26/06/2025
Survey Undertaken By. (Rex J Andrews P/L)
Project Name. Mt Hopeful Windfarm BESS
Location. Gladstone Port (QLD) to Bajool (QLD)

Transport of a transformer 11000l*4200b*4500h and 200T.

2 different transport methods
1 x 12x8-12x8 Beamset
1 x 16x8 Platform Trailer

Switch room 18100l x 4150b x 3550h and mass 48 T

1 x 10x8 Platform Trailer

4.0 Port of Import - Auckland Point, Gladstone

The BESS equipment is to be imported from various countries and arriving on ships into the Port of Gladstone. The ideal berth for these shipments is the Auckland point berth.

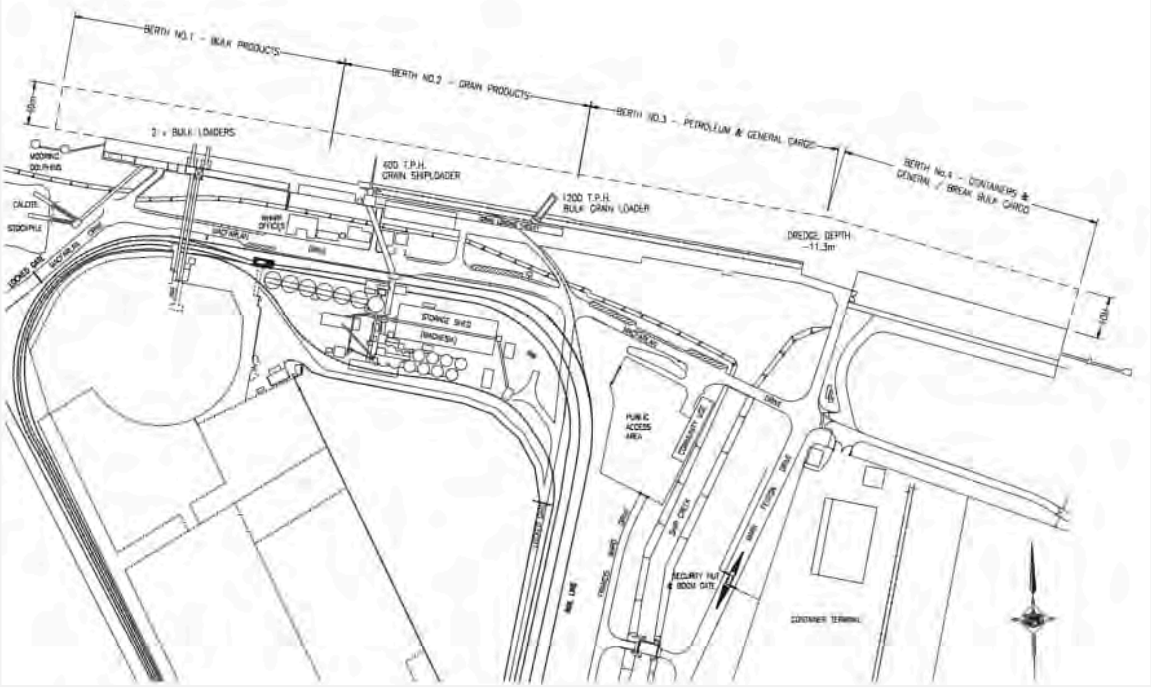


Figure 1 – Auckland Point berths

AUCKLAND POINT BERTH No. 4 DETAILS

Owner	Gladstone Ports Corporation
Operated by	Multi-User
Type of facility	Multi-user wharf designed to handle containerised, breakbulk and general cargoes and heavy lift
Access	By road and rail
Working hours	24/7
Location	Berth 4 is located at the Port Central Precinct before entrance to Auckland Inlet and adjacent to Auckland Hill, 32km from the Fairway Buoy.
Wharf length	220m
Wharf Deck	Reinforced concrete supported on steel piles
Maximum Deck load	5 tonnes per square meter
Design vessel size	70,000 DWT (max), Panamax Class Bulk Carrier and Container Class10,000DWT (min)
Max vessel length	255m LOA
Max berthing displacement	85,000 Tonnes (max)
Berth pocket width	40m
Berth pocket length	300m
Berth pocket depth	11.4m (Design), 12.6m declared*
Uniformly Distributed Loads	Wharf deck uniformly distributed load (UDL) of 50kPa Relieving slab (UDL) of 20kPa to 15m landward. Heavy transport access path relieving slabs to 50kPa UDL
Uniformly Distributed Loads	12.5t maximum wheel load
Heavy Lift vehicle	Mega lift truck equivalent load 38kPa
Mobile crane	50t mobile crane outrigger load to 45 tonnes at 5 metres c/c
Wharf Crane	40 tonnes wheel load, 6 wheel per corner
Mobile Harbour Crane	Crane pads manufactured to suit 50kPa deck loading. There are 2 permanent mobile harbour cranes at the Auckland Point 4 berth. 1 x Aurizon LHM550 150T mobile harbour crane 1 x NSS LHM550 150T mobile harbour crane
Vehicle loading	Semi-trailer T44 to AUSTROADS 1992, B-Double Truck

5.0 Site Location

The project is located near the town of Bajool and lies approximately:
- 45km south of Rockhampton
- 60km west of Gladstone

The project site is in the municipal boundary of Rockhampton.

Entry to the project is from the East via Bajool.



Figure 2 - Site Location

6.0 Transport Summary

The study is based on all components entering Australia via the Port of Gladstone's Auckland Point Berth. The components would be stored on the berth or delivered directly to site.

The below routes have been selected as most likely routes based on previous experience gaining approval to transport similar weight loads from Gladstone Port through to the Bruce Highway.

The study considered the alternate route via Hanson Road and Mt Larcom Road however this route has been rejected on numerous occasions previously with lighter mass loads and was therefore not considered.

The selected routes have previously been used for transporting transformers with weights of up to 230t.

ROUTE 1: GLADSTONE PORT TO MT HOPEFUL BESS
Components: Loads up to 5.1m high. Transformer in Beamset & Switch Room on Platform Trailer.
From: Port of Gladstone Berth No.4
To: Bajool (Mt Hopeful BESS), QLD
Distance: 115.0 kilometres
Route: MacFarlane Road, John Bates Drive, Port Access Road, Glenlyon Street, Hanson Road, Red Rover Road, Don Young Drive, Dawson Highway, Bruce Highway, South Ulam Road.
GPS Link for route: https://maps.app.goo.gl/nsMq4MHPTLWh8fCw7

ROUTE 2A: GLADSTONE PORT TO FLINDERS PARADE
Components: Loads over 5.1 metres in overall height. (Max height 6.2m). Transformer on 16x8 Platform Trailer
From: Port of Gladstone Berth No.4
To: Flinders Parade Gladstone
Distance: 1.3 kilometres
Route: Macfarlane Road, Flinders Parade.
GPS Link for route: https://maps.app.goo.gl/iidfzS37CtDDopWJA

ROUTE 2B: FLINDERS PARADE TO MT HOPEFUL BESS
Components: Loads over 5.1 metres in overall height (Max height 6.2m). Transformer on 16x8 Platform Trailer
From: Flinders Parade Gladstone
To: Bajool (Mt Hopeful BESS), QLD
Distance: 113.0 kilometres
Route: Flinders Parade, Goondoon Street, Lord Street, Hanson Road, Red Rover Road, Don Young Drive, Dawson Highway, Bruce Highway, South Ulam Road.
GPS Link for route: https://maps.app.goo.gl/FaLX3Kon8CG4AMAj7

7.0 Route 1 - Study

ROUTE 1: GLADSTONE PORT TO MT HOPEFUL BESS
Components: Loads up to 5.1m high. transformer in Beamset & Switch Room on Platform Trailer
From: Port of Gladstone Berth No.4
To: Bajool (Mt Hopeful BESS), QLD
Distance: 115.0 kilometres
Route: John Bates Drive, Port Access Road, Glenlyon Street, Hanson Road, Red Rover Road, Dawson Highway, Bruce Highway, South Ulam Road.
GPS Link for route: https://maps.app.goo.gl/nsMq4MHPTLWh8fCw7

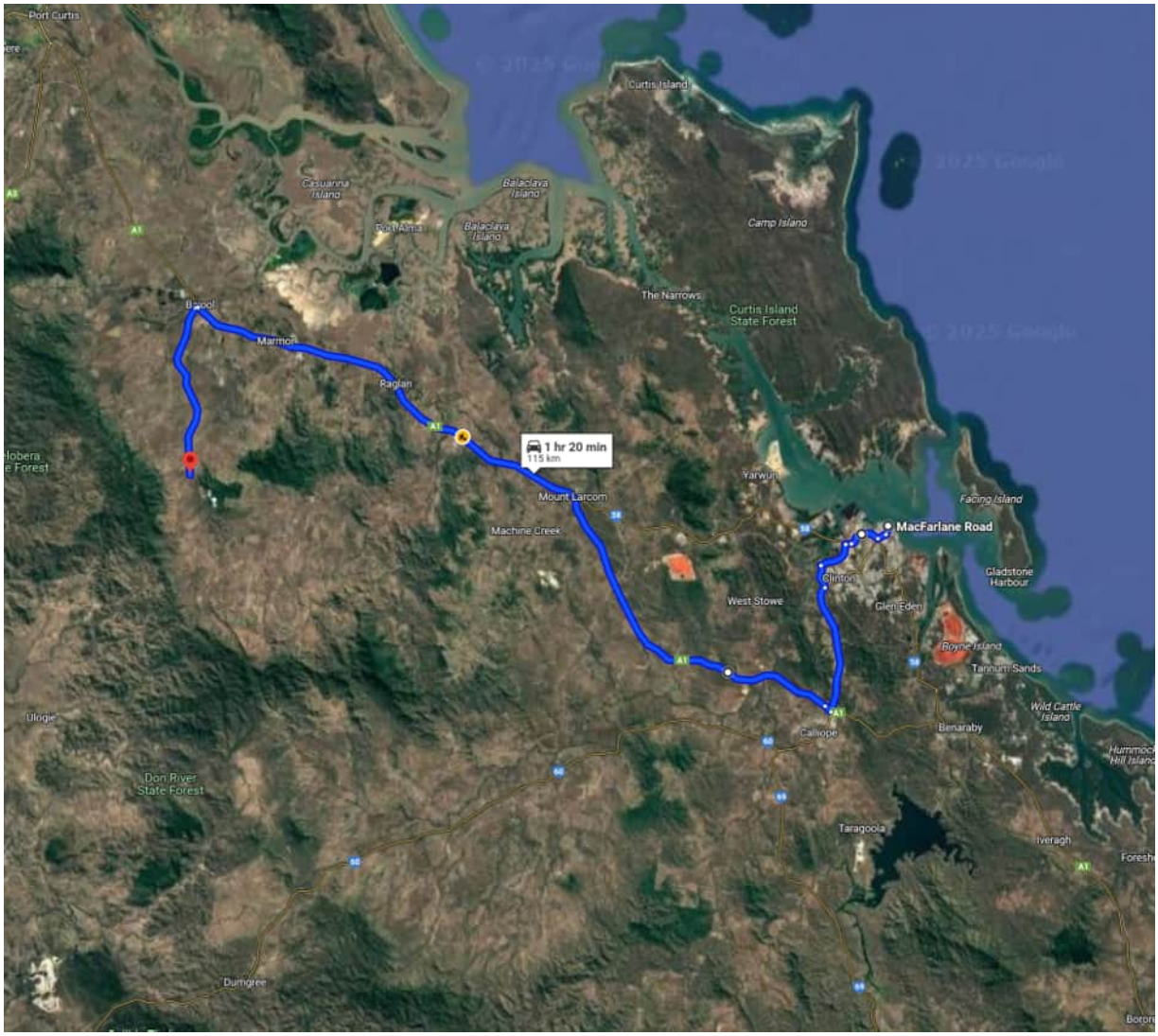


Figure 3 - Route 1

KEY	
CAUTION	
ROAD MODIFICATIONS REQUIRED	

KM index	Location	Section of road	Existing Measurement	Procedure	Notes
0.0	Gladstone	Mac Farlane Road onto John Bates Drive. GPS Link: https://maps.app.goo.gl/9GWnR6n1YvJH7XCr7	Width: 12.0m Length: 80.0m	Exit port and turn right via bypass on inside of corner	Security required to open gates and exit Port. Loads to use bypass on inside of corner installed for previous projects.
0.9	Gladstone	John Bates Drive onto Port Access Road GPS Link: https://goo.gl/maps/yesGGkaeMqLStLqB7	Width: 13.0m into 9.0m Length: 50.0m	Loads to travel to the left onto a temporary hardstand prior to the roundabout.	**Modifications required:** Corner has been modified for Clarke Creek windfarm. Signs to be removed and replaced and loads to travel over island.
1.6	Gladstone	Port access road under Goondoon Street GPS Link: https://goo.gl/maps/DAgZw69gAQhU7hdQ9	Width: 7.0m Height: L: 5.402m C: 5.32m R: 5.175m	Loads are to travel under this structure in the far-left lane. Loads that exceed 5.1 metres are not to travel under this structure and must use routes 2A&B.	**Modifications required:** This blade will need to be checked for clearance while passing under this structure.
1.8	Gladstone	Port Access Road onto Glenlyon Street GPS Link: https://goo.gl/maps/7apkuHTU4xtRsrAn9	Width: 10.0m into 11.0m Length: 50.0m	Loads to turn right from the correct side of Port Access Road and onto the incorrect side of Glenlyon Street before travelling back to the correct side of Glenlyon Street before travelling through the break in the median strip and back onto the correct side of the road at walking pace.	**Modifications required:** Corner has been modified for Clarke Creek windfarm
2.1	Gladstone	Glenlyon Street onto Hanson Road GPS Link: https://goo.gl/maps/j2QFDRG6kcvExWUv7	Width: 8.0m	Travel directly ahead.	No problems with this section of road.

KM index	Location	Section of road	Existing Measurement	Procedure	Notes
4.9	Gladstone	Hanson Road through the Blain Drive roundabout GPS Link: https://goo.gl/maps/6C49zBakKJXZjckw9	Width: 8.0m into 8.0m Length: 50.0m	Loads to travel through the roundabout on the correct side of the road at walking pace.	**Modifications required:** Roundabout has been modified for Clarke Creek windfarm. Sign to be removed and replaced.
5.5	Gladstone	Hanson Road onto Red Rover Road GPS Link: https://goo.gl/maps/o2UqPC9cvomkR2nZ7	Width: 8.0m into Length: 50.0m	Load to travel onto incorrect side of Red Rover Rd using the modified centre island.	**Modifications required:** Roundabout has been modified for Clarke Creek windfarm. Delineators on centre island to be removed and replaced.
8.8	Gladstone	Red Rover Road onto Don Young Drive GPS Link: https://goo.gl/maps/j21AWjo6brmQKiz98	Width: 7.0m Length: 120.0m	Continue straight ahead	**Modifications required:** Nil.
11.1	Gladstone	Don Young Drive onto Dawson Highway GPS Link: https://goo.gl/maps/zn6AY8WmiG7YXpcC9	Width: 8.50m Length: 50.0m	Load to cross to incorrect side of road and cut corner.	**Modifications required:** Nil.
23.2	Calliope	Dawson Hwy onto Bruce Hwy GPS Link: https://maps.app.goo.gl/Xrevwd2DDFCakVAp7	Width: 6.50m Length: 45.0m	Loads to cross to incorrect side of Dawson Hwy then enter Bruce Hwy via the off ramp.	Sign to be relocated or made removable.
98.0	Bajool	Bruce Hwy onto South Ulam Road GPS Link: https://maps.app.goo.gl/Jrr9qAe45W9hFx2d8	Width: 12.0m Length: 60.0m	Left hand turn	**Modifications required:** Nil.
South Ulam Road has only been assessed by desktop study. Should the project proceed a detailed study is required to ensure the route can accommodate the height, weight, swept path and vertical curves of all proposed loads.					
115.0	Bajool	South Ulam Road into proposed site entry GPS Link: https://maps.app.goo.gl/LwmzM1FYZd1fSc9j7	TBD	Right hand turn	**Modifications required:** Suitable site entry and site access roads to be constructed.
Site entries and all site roads to constructed to appropriate standards to accommodate the height, weight, swept path and vertical curves of all proposed loads. Unsealed roads to be maintained for the duration of deliveries and may become un trafficable during periods of wet weather.					

0.0 **Km's:** MacFarlane Road onto John Bates Drive

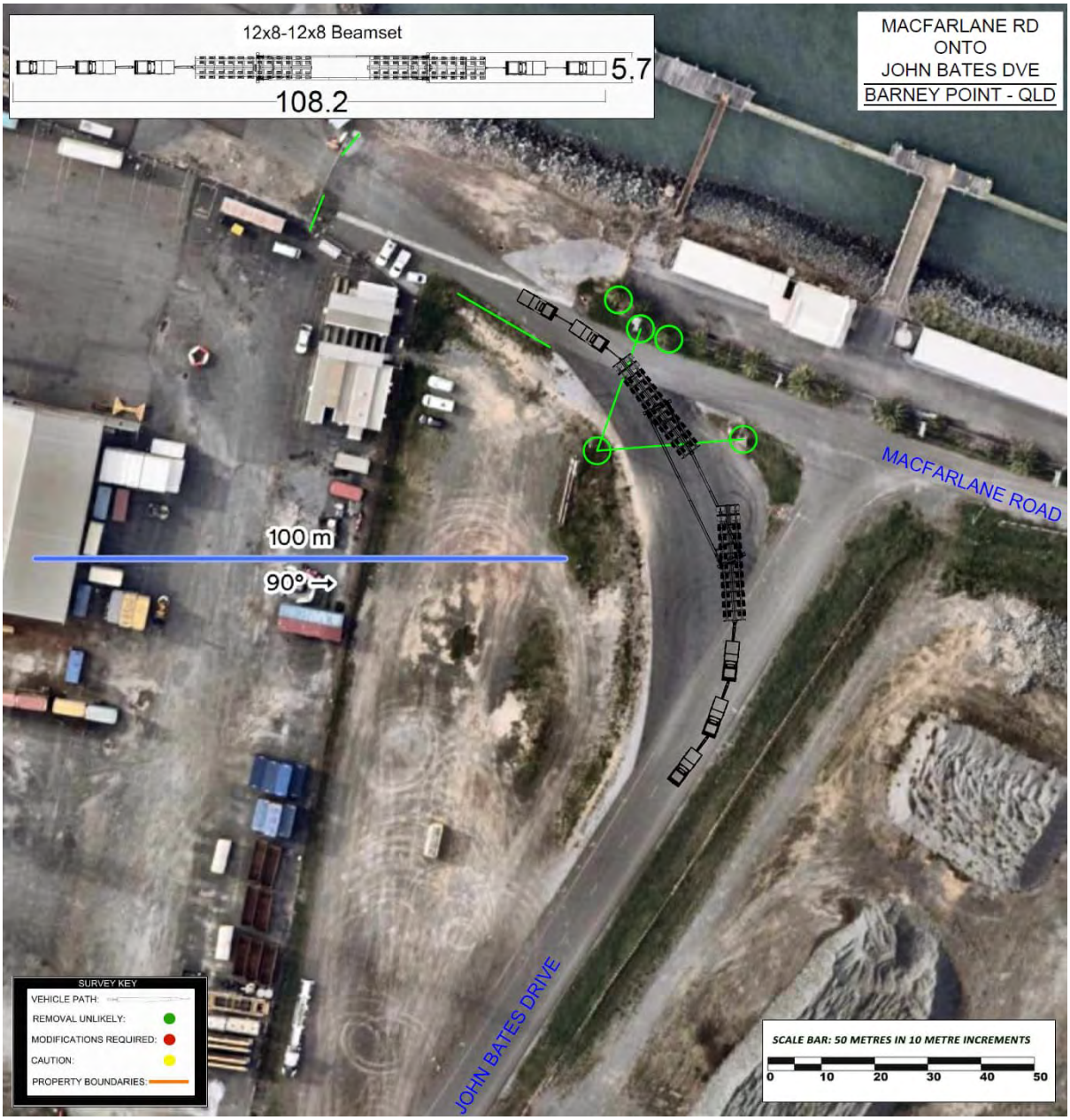


Figure 4 - MacFarlane Road onto John Bates Drive

GPS Link: https://maps.app.goo.gl/9GWnR6n1YvJH7XCr7
Procedure: Exit port and turn right via bypass on inside of corner. Security required to open gates and exit Port.
Modifications required: Nil.

0.9 Km's: John Bates Drive onto Port Access Road

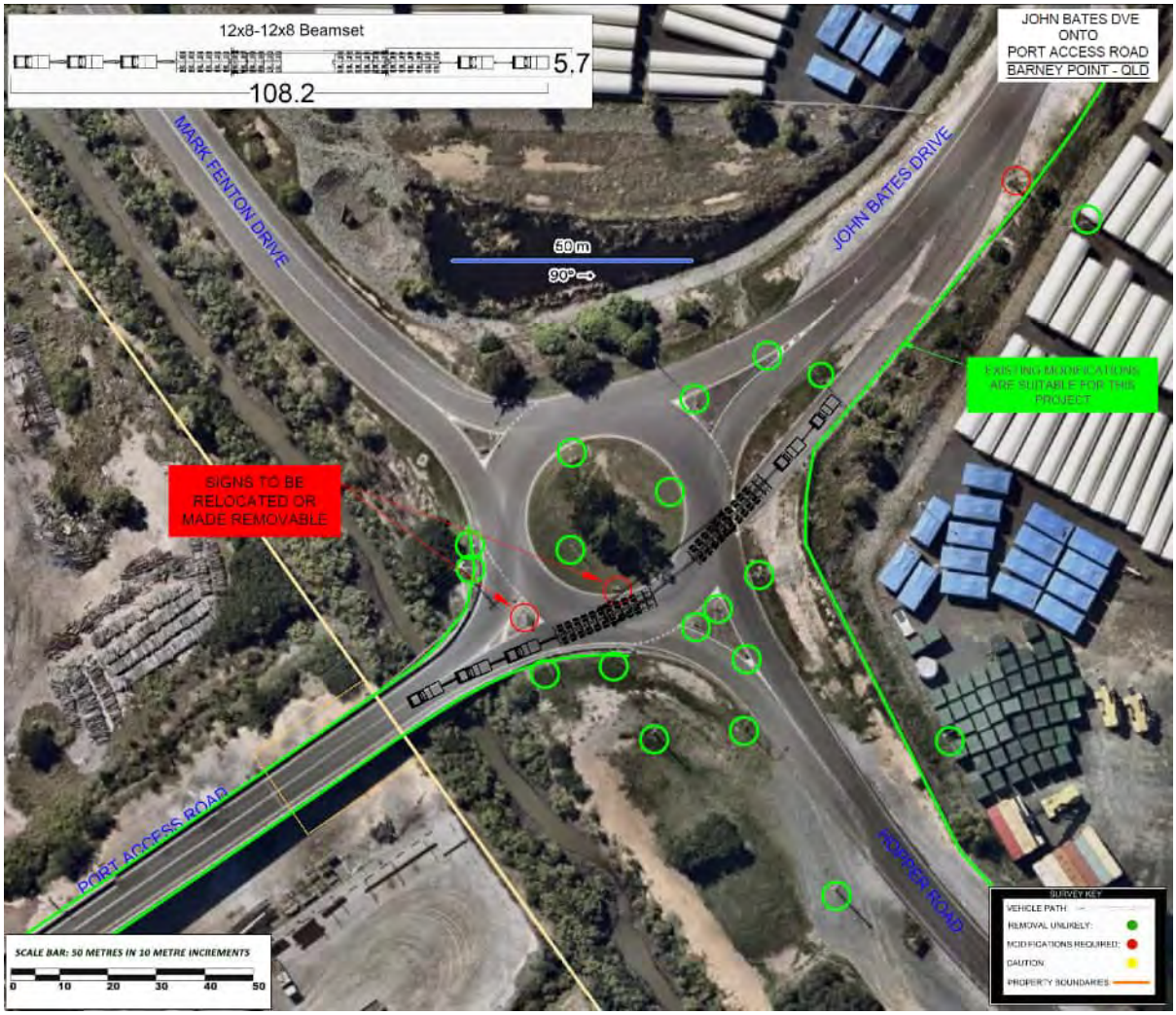


Figure 5 - John Bates Drive onto Port Access Road

GPS Link: https://goo.gl/maps/yesGGkaeMqLStLqB7
Procedure: Loads to travel to the left onto a temporary hardstand prior to the roundabout.
Modifications required: Corner has been modified for Clarke Creek windfarm. Signs to be removed and replaced and loads to travel over island.

1.6 Km's: Port Access Road under Goondoon St Overbridge

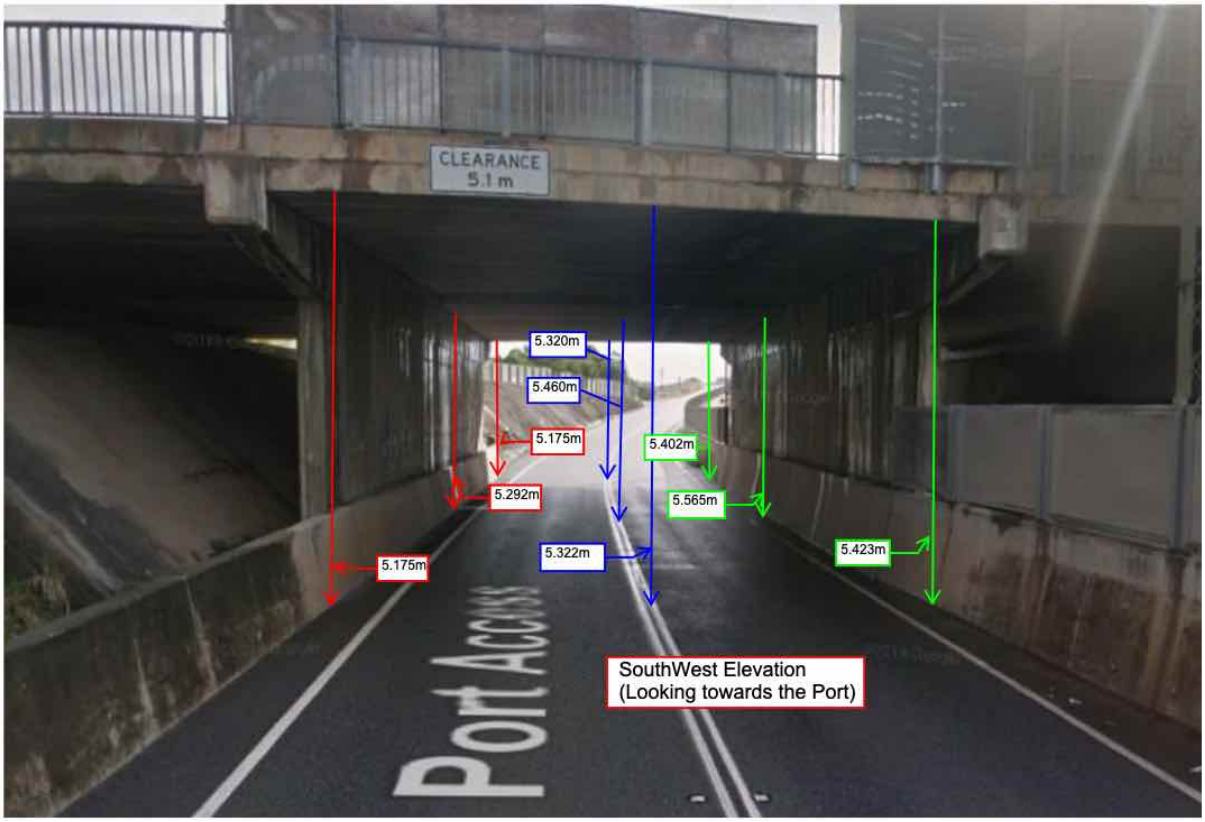


Figure 6 - Bridge Clearance Measurements

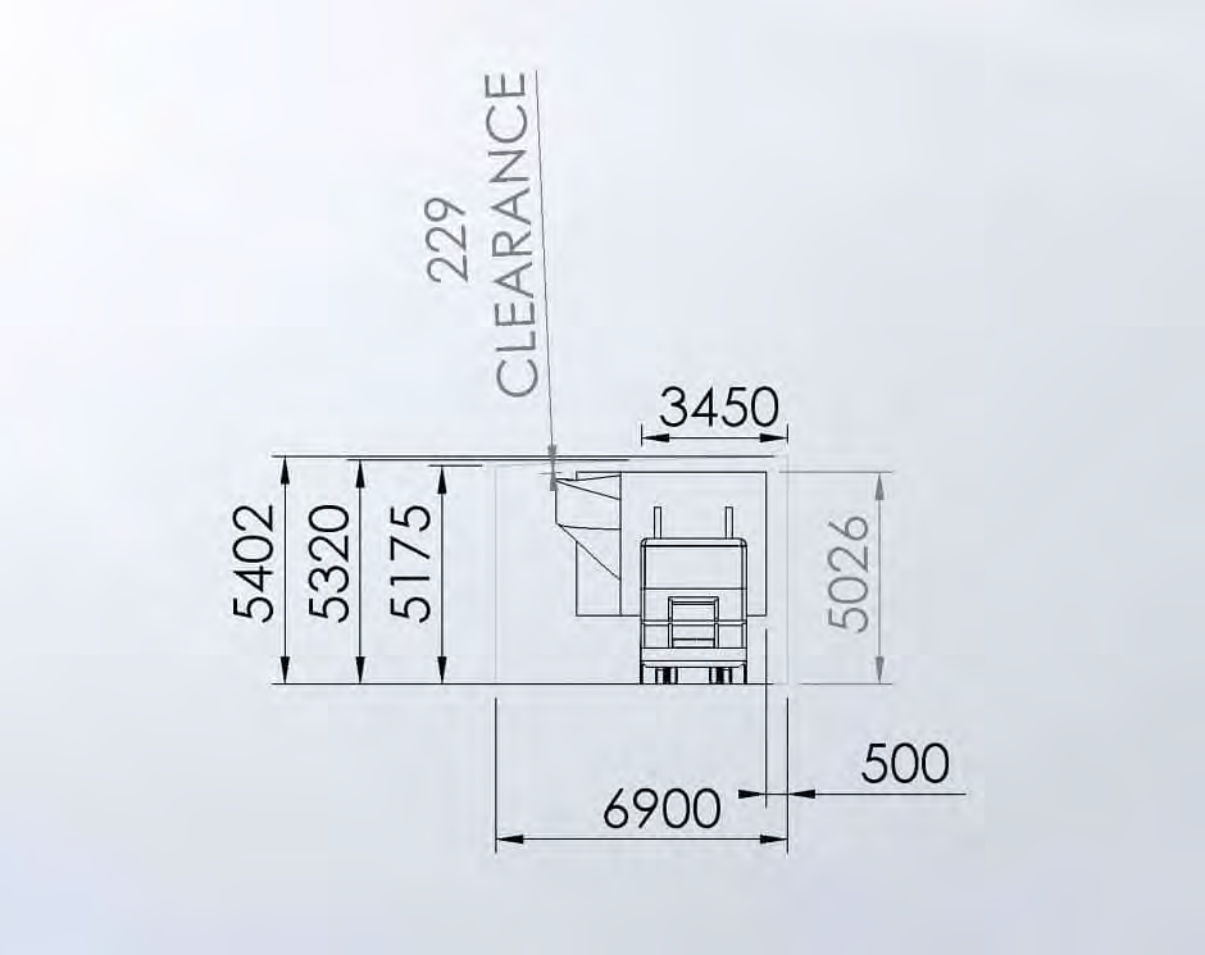


Figure 7 - Bridge clearance showing the largest component traveling under the structure

Procedure: Loads are to travel under this structure in the far-left lane at walking pace and under the guidance of a spotter. Loads that exceed 5.1 metres are not to travel under this structure and must use route 2.
Road modifications: Nil.

GPS Link: https://goo.gl/maps/DAgZw69gAQhU7hdQ9

1.8 Km's: Port Access Road onto Glenlyon Street

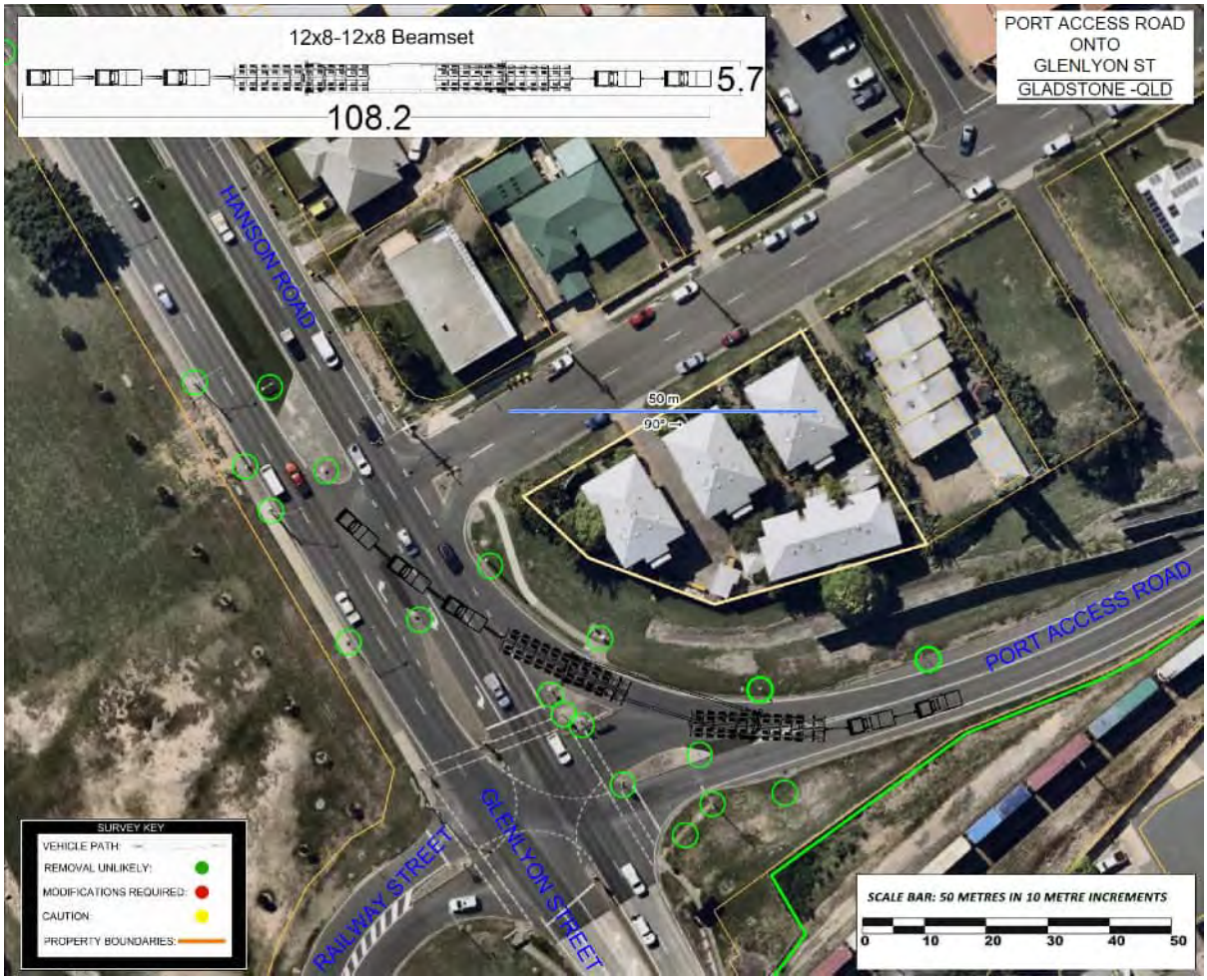


Figure 8 - Port Access Road onto Glenlyon Street

GPS Link: https://goo.gl/maps/7apkuHTU4xtRsrAn9
Procedure: Loads to turn right from the correct side of Port Access Road and onto the incorrect side of Glenlyon Street before travelling back to the correct side of Glenlyon Street before travelling through the break in the median strip and back onto the correct side of the road at walking pace.
Modifications required: Corner has been modified for Clarke Creek windfarm

4.9 Km's: Hanson Road Through Roundabout at the Intersection of Blain Drive

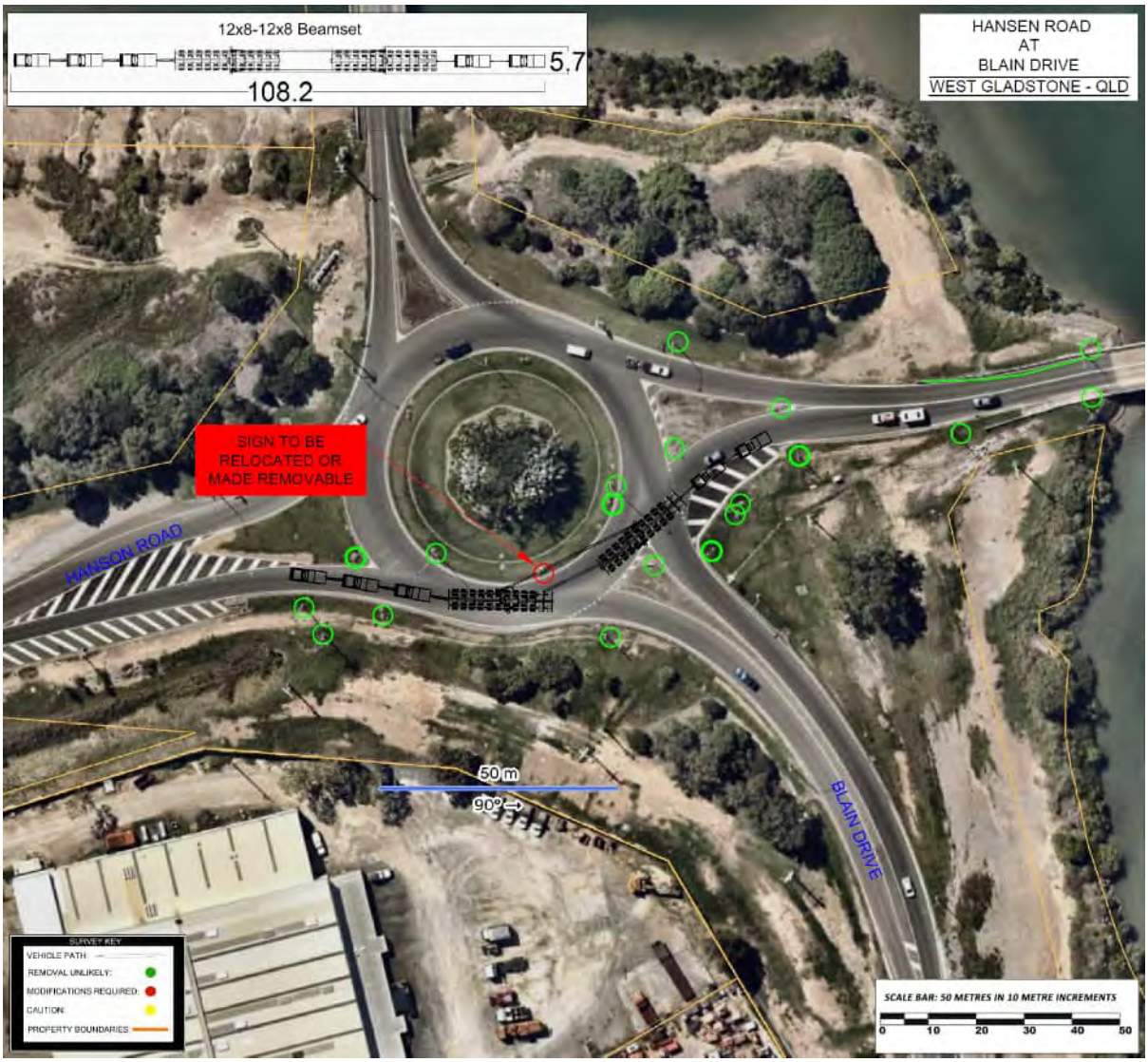


Figure 9 - Hanson Road through roundabout at the intersection of Blain Drive

GPS Link: https://goo.gl/maps/6C49zBakKJXZjckw9
Procedure: Loads to travel through the roundabout on the correct side of the road at walking pace.
Modifications required: Roundabout has been modified for Clarke Creek windfarm. Sign to be removed and replaced.

5.5 Km's: Hanson Road Through Roundabout at the Intersection of Red Rover Road

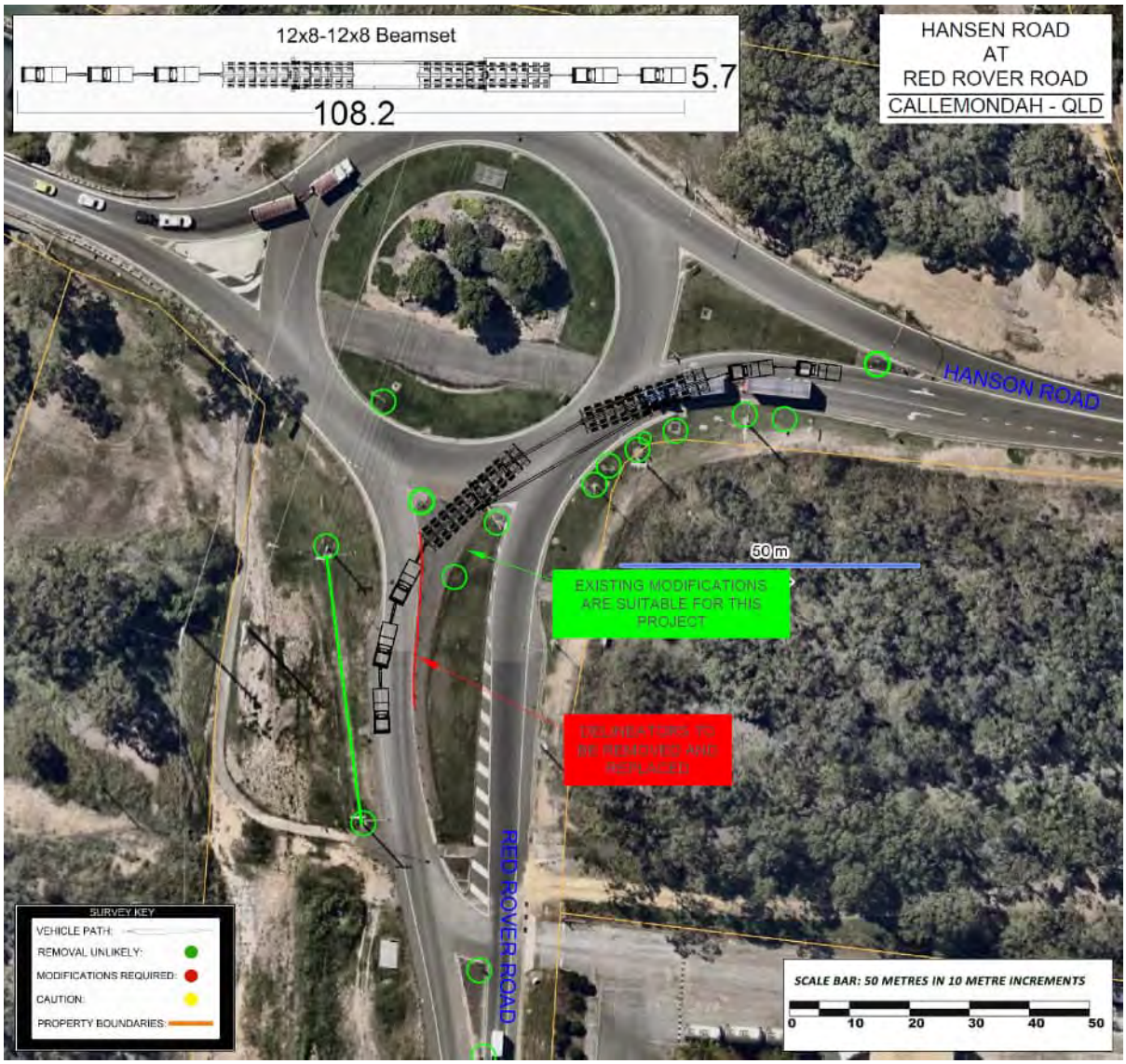


Figure 10 - Hanson Road through roundabout at the intersection of Red Rover Road

GPS Link: https://goo.gl/maps/o2UqPC9cvomkR2nZ7
Procedure: Load to travel onto incorrect side of Red Rover Rd using the modified centre island.
Modifications required: Roundabout has been modified for Clarke Creek windfarm. Delineators on centre island to be removed and replaced.

11.1 Km's: Don Young Drive onto Dawson Highway

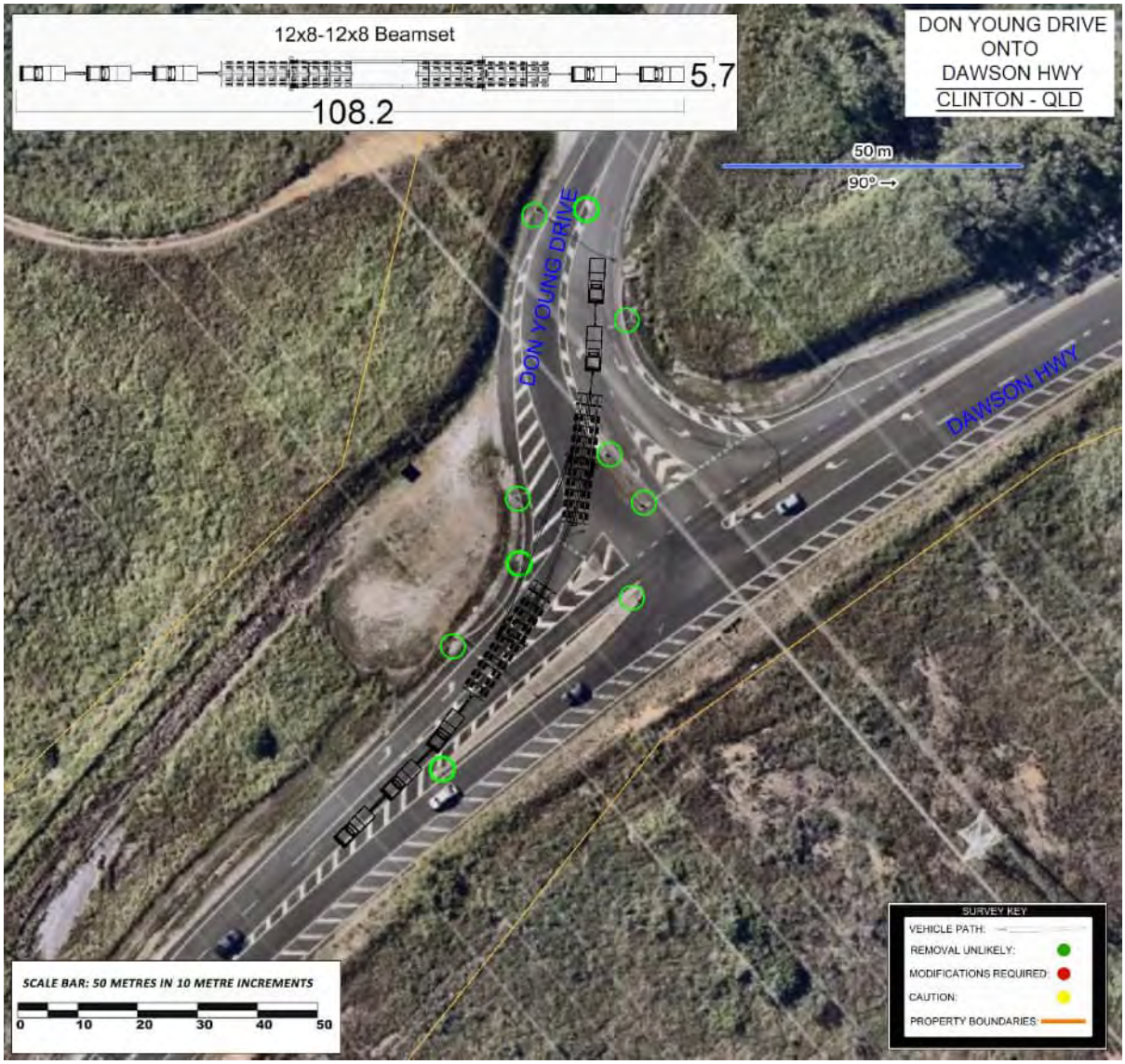


Figure 11 - Don Young Drive onto Dawson Highway

GPS Link: https://goo.gl/maps/zn6AY8WmiG7YXpcC9
Procedure: Load to cross to incorrect side of road and cut corner.
Modifications required: Nil.

23.2 Km's: Dawson Highway onto Bruce Highway

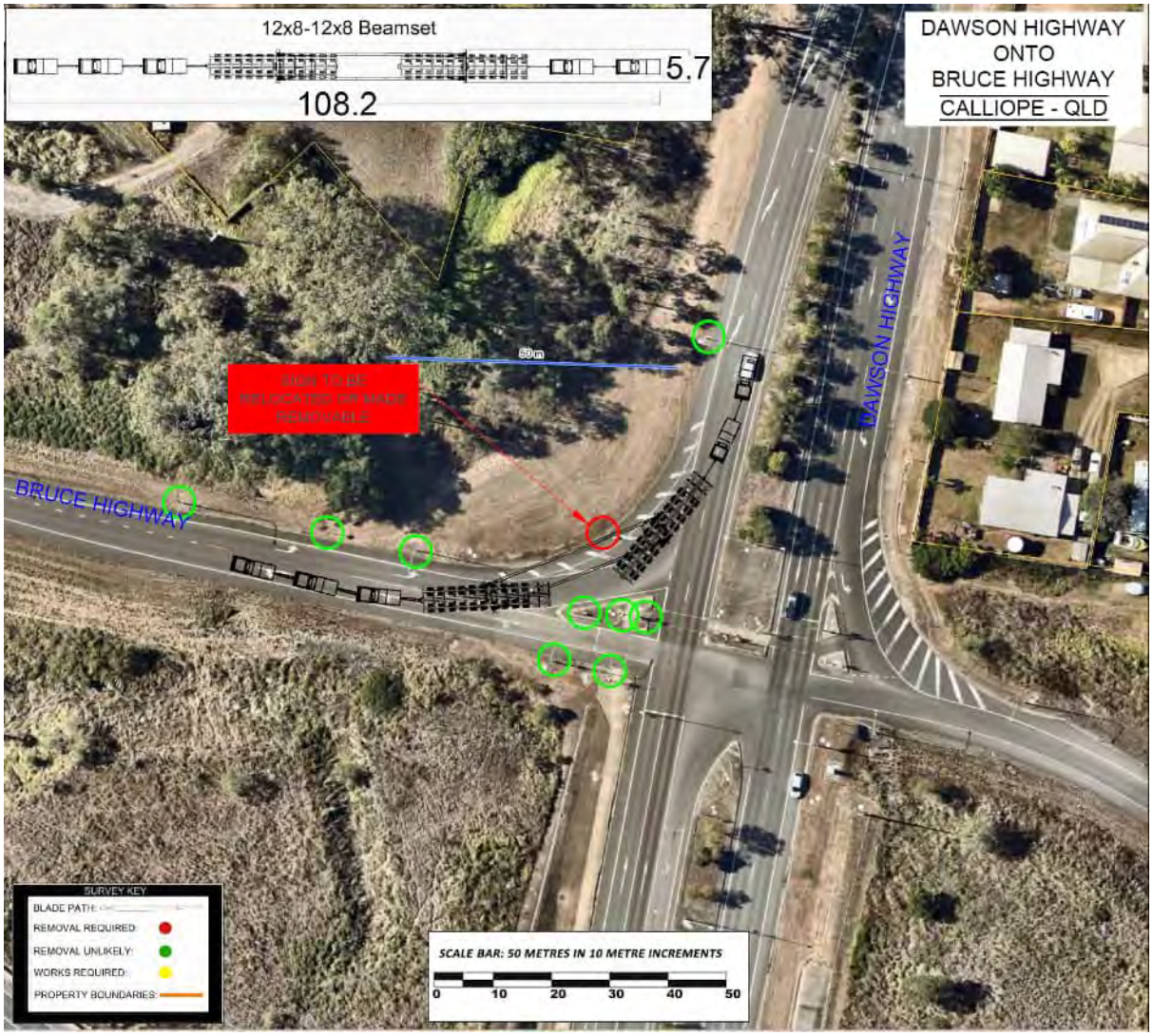


Figure 12 - Dawson Highway onto Bruce Highway

GPS Link: https://maps.app.goo.gl/Xrevwd2DDFCakVAp7
Procedure: Loads to cross to incorrect side of Dawson Hwy then enter Bruce Hwy via the off ramp.
Modifications required: Sign to be relocated or made removable.

98.0 Km's: Bruce Highway onto South Ulam Road

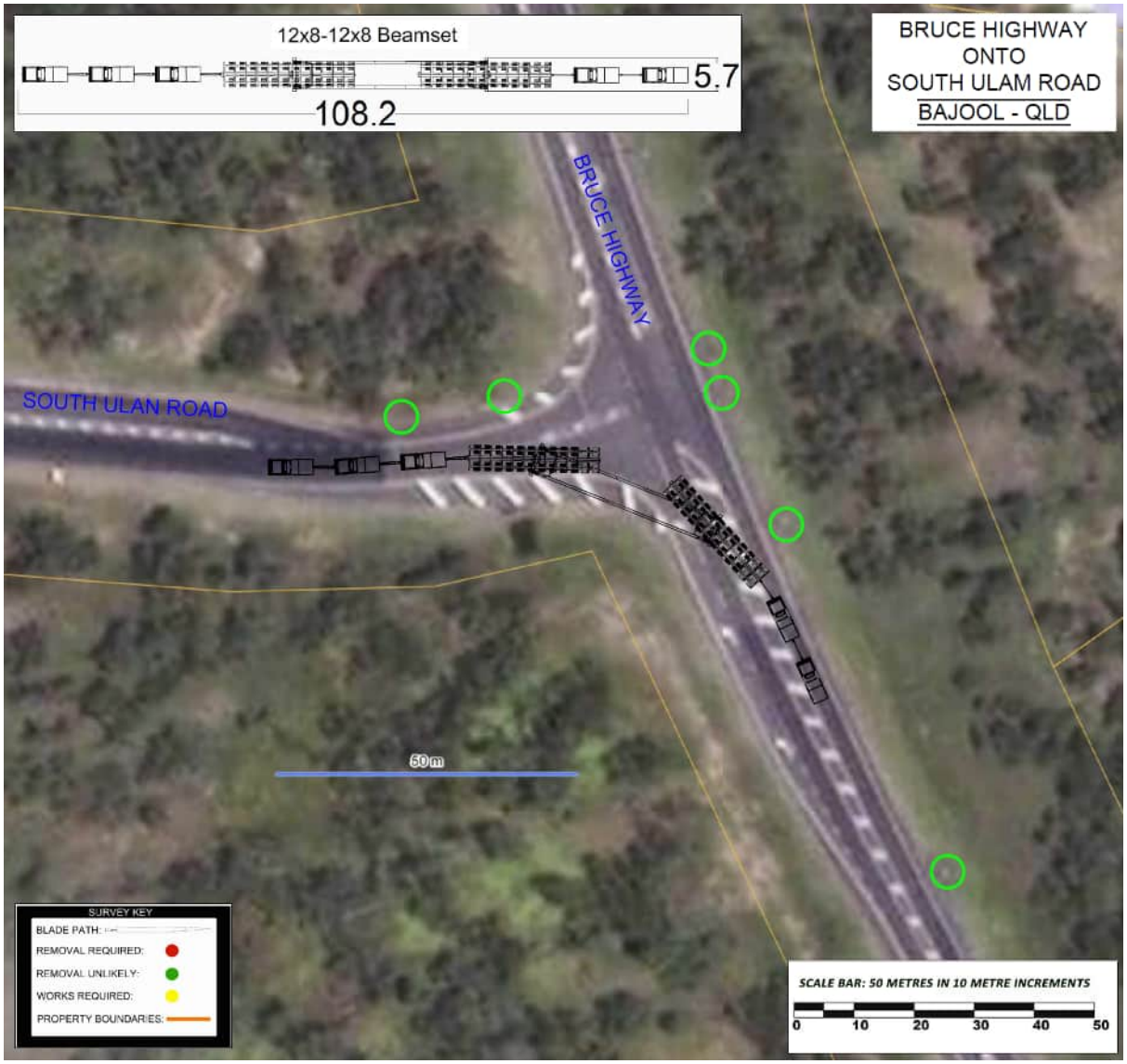


Figure 13 - Bruce Highway onto South Ulam Road

GPS Link: https://maps.app.goo.gl/Jrr9qAe45W9hFx2d8
Procedure: Left hand turn
Modifications required: Nil.

115.0 Km's: South Ulam Road into Proposed Site Entry

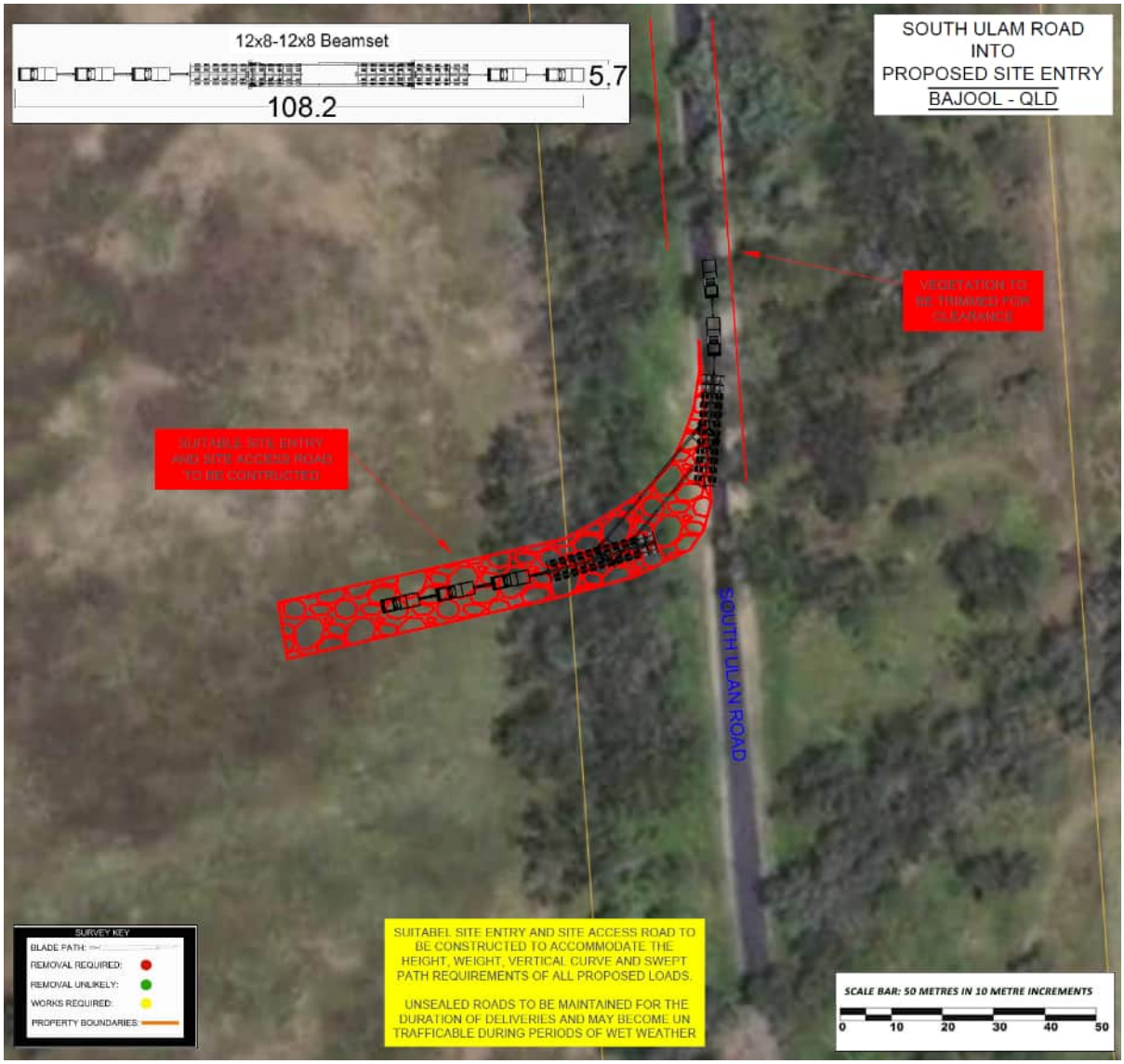


Figure 14 - South Ulam Road into Proposed Site Entry

GPS Link: https://maps.app.goo.gl/LwmzM1FYZd1fSo9j7
Procedure: Right hand turn
Modifications required: Suitable site entry and site access roads to be constructed. Site entries and all site roads to constructed to appropriate standards to accommodate the height, weight, swept path and vertical curves of all proposed loads. Unsealed roads to be maintained for the duration of deliveries and may become un trafficable during periods of wet weather.

8.0 Route 1 - Conclusion

SWEPT PATH

- modifications shown in above to be undertaken as a minimum. Many modifications have been undertaken for a previous project and need it needs to be confirmed they are still in effect for the time period proposed for this project.

SITE ENTRANCES AND SITE ROADS

- All site access roads are to be constructed to appropriate standards to accommodate the swept path, vertical curve and weight requirements of all proposed loads. Roads are to be maintained during the life of the project.

DIMENSION-WEIGHT:

- All bridges structures will need to be assessed for capacity of the loads that will use this route.

DIMENSION-WIDTH:

- Route is suitable for loads up to 6.5 Metres in width.

DIMENSION-HEIGHT UNDER STRUCTURES

- Loads that exceed 5.1 metres in height cannot travel on this route. The lowest structure on route is the Port Access Road overpass which has 5.2 metres in the centre of the road and 5.3 metres in the left hand lane.
- Loads that exceed 5.1m will need to use Route 2.

OVERHEAD UTILITIES:

- The route will need to be approved for a travel height of 5.2 metres.

RAIL CROSSINGS/CORRIDORS:

- Approval required from rail managers to cross rail lines or access rail corridors.

PAVEMENT:

- The road pavement is of Highway quality up to the site entries.
- Unsealed roads will need to be upgraded to an all-weather material, with a suitable road width and maintained for the duration of the project.

VEGETATION

- Minor trimming is required on sections of the route. The report shows these locations.

ROADWORKS:

- There are currently several sections of roadwork on route that are okay for these size loads. TMR will need to discuss any future roadworks with the project if they are likely to conflict with these movements.

TRAVEL RESTRICTIONS:

- All routes are listed as daytime travel only. No travel restrictions are in place on these routes except for Statewide public holidays and the Easter and Christmas curfew periods. More data is available through the QLD Main Roads website: https://www.service.transport.qld.gov.au/ExcessMassExternal/PublicConditionReport.jsp
- Night travel is possible on this route, but will need to be applied for through a TMP and specific trip permits.

SOUTH ULAM ROAD

- South Ulam Road has only been assessed by desktop study. Should the project proceed a detailed study is required to ensure the route can accommodate the height, weight, swept path and vertical curves of all proposed loads.

9.0 Route 2A – Study

ROUTE 2A: GLADSTONE PORT TO FLINDERS PARADE
Components: Loads over 5.1 metres in overall height. (Max height 6.2m).
Transformer on 16x8 Platform Trailer
From: Port of Gladstone Berth No.4
To: Flinders Parade Gladstone
Distance: 1.3 kilometres
Route: Macfarlane Road, Flinders Parade.
GPS Link for route: https://maps.app.goo.gl/iidfzS37CtDDopWJA



Figure 15 - Route 2A

KEY	
CAUTION	
ROAD MODIFICATIONS REQUIRED	

KM index	Location	Section of road	Existing Measurement	Procedure	Notes
0.6	Barney Point	Macfarlane Road under conveyor GPS Link: https://goo.gl/maps/1LvCfMGy3xhaenrZA	HEIGHTS: Left fogline: 5.31 Left lane centre: 5.8 Centre of road: 6.1 Right lane centre: 6.6 Right fogline: 7.6	Loads will travel directly ahead under the conveyor in the far-right side of the road.	**Pinchpoint procedure:** Loads to slow to a crawl and pass under this structure in the far-right side of the road. **Traffic control:** Pilots to control local traffic. this section of road. **Road furnishings:** No cars to be parked on the right side of the road. **Modifications required:** Nil.
0.8	Barney Point	Exiting Port onto Macfarlane Road GPS Link: https://goo.gl/maps/WYdTeC8277tiWW4A8	Width: 10.0m into 5.5m Length: 50.0m	Left hand turn from incorrect side to the incorrect side	**Pinchpoint procedure:** Security guard to open gate out of port. **Traffic control:** Pilots to control local traffic. this section of road. **Modifications required:** Trees to be trimmed.
1.0	Gladstone Central	Macfarlane Road onto Flinders Parade foreshore GPS Link: https://goo.gl/maps/icriXxJmoqJAL56v7	Width: 6.0m Length: 50.0m	Travel directly ahead through the security gate	**Pinchpoint procedure:** Security guard to lower bollards. **Traffic control:** QPS/Pilots to control local traffic. **Modifications required:** Trees to be trimmed.
1.0 to 1.3	Gladstone Central	Flinders Parade foreshore GPS Link: https://goo.gl/maps/7Y5pxTeNo3iU1rJB9	Width: 6.0m Length: 50.0m	Travel directly on the foreshore access road	**Pinchpoint procedure:** Security guard to lower and raise bollards. **Traffic control:** QPS/Pilots to control local traffic. **Modifications required:** Trees to be trimmed.

0.6 Km's: Gladstone Port Conveyor No.1

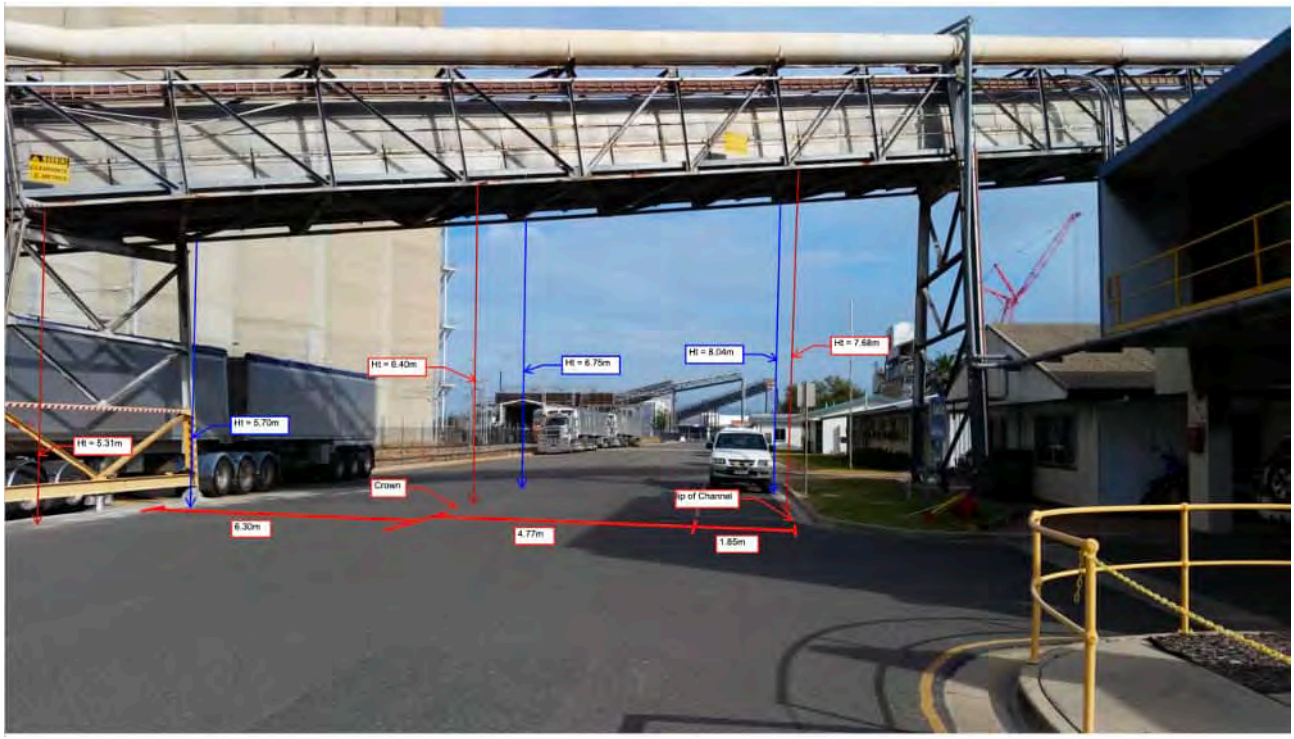


Figure 16 - Conveyor Clearance Measurements

GPS Link: https://goo.gl/maps/1LvCfMGy3xhaenrZA
Clearances under the conveyor:
Left fogline: 5.31
Left lane centre: 5.8
Centre of road: 6.1
Right lane centre: 6.6
Right fogline: 7.6
Procedure: Loads are to travel under this structure in the far-right lane at walking pace and under the guidance of a spotter.
Pilot 1: Warn all oncoming traffic inside the port.
Pilot 2: Warn all traffic behind the load.
Road furnishings requiring removal: No cars are to be parked on the right-hand side of the road.
Modifications required: Nil.

0.8 Km's: Exiting Port onto Macfarlane Road

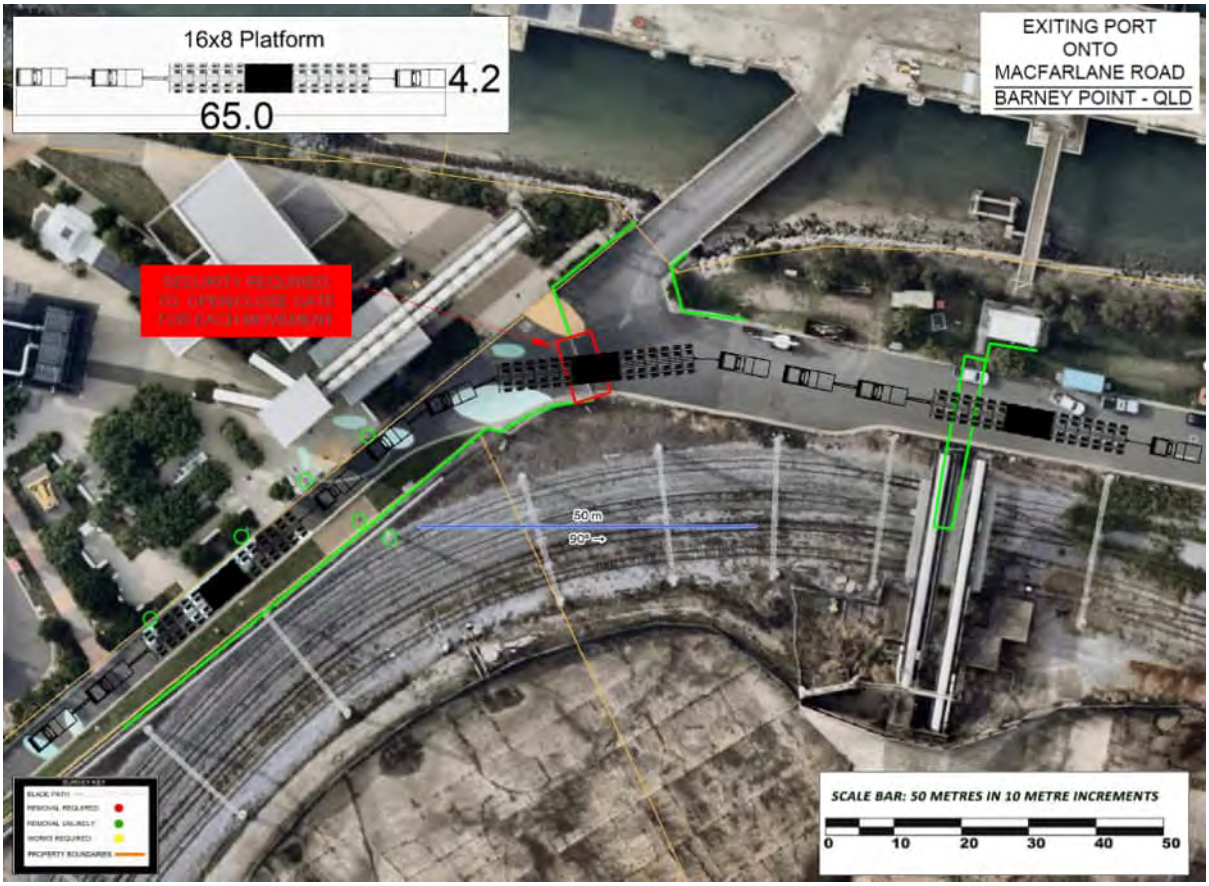


Figure 17 - Macfarlane Road at Gladstone

GPS Link: https://goo.gl/maps/WYdTeC8277tiWW4A8
Procedure: Towers to turn left from the incorrect side to the incorrect side. Security guard to open gate out of port.
Modifications required: Vegetation to be trimmed as required.

1.0 Km's: Macfarlane Road onto Flinders Parade Foreshore

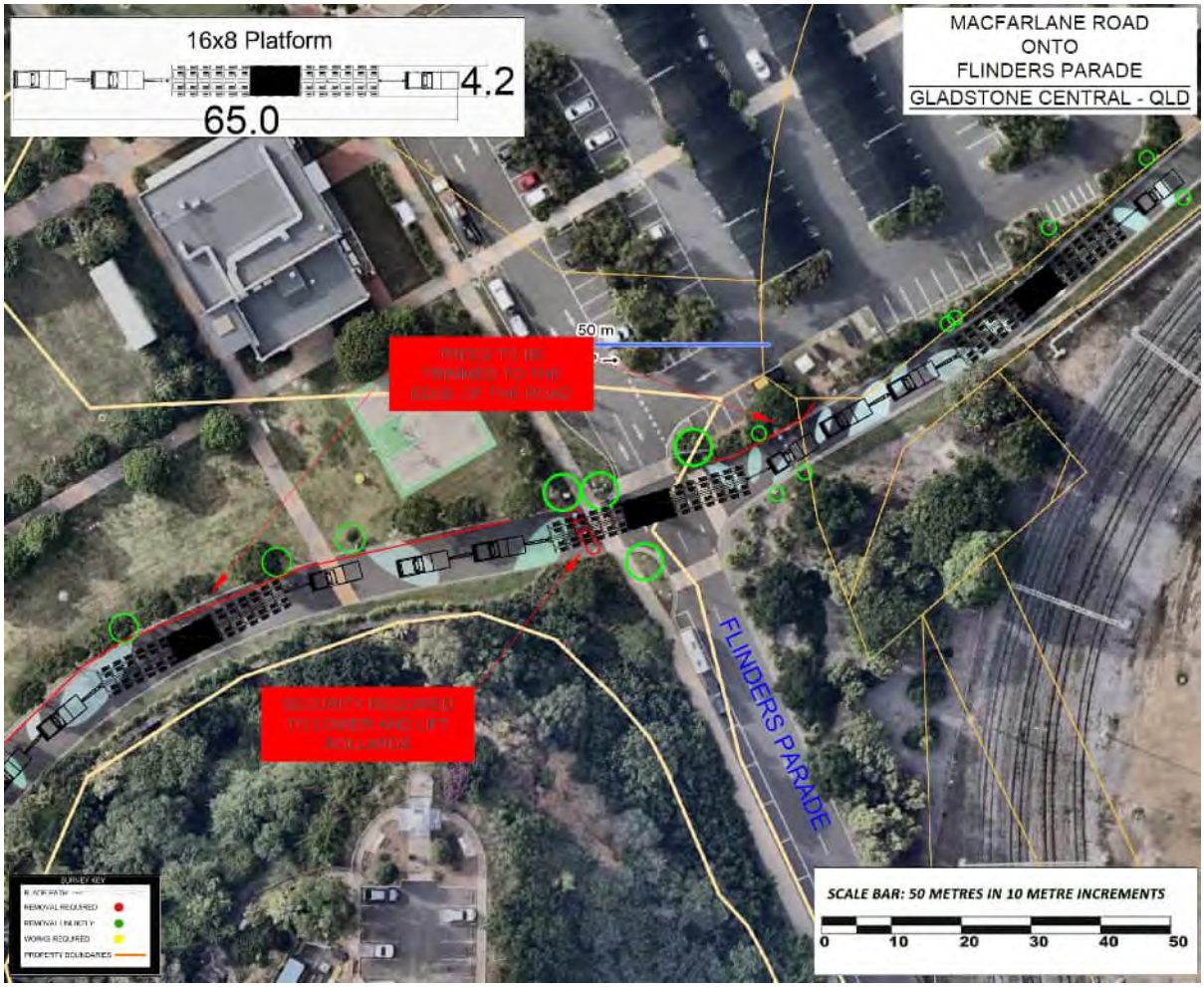


Figure 18 - Macfarlane Road at Gladstone

GPS Link: https://goo.gl/maps/icriXxJmoqJAL56v7
Procedure: Loads are to travel directly ahead from Macfarlane Road onto Flinders Parade foreshore.
Road furnishings requiring removal: Security guard to lower bollards and raise them after load passes through.
Modifications required: Trees will need to be trimmed.

1.1 Km's: Flinders Parade Foreshore

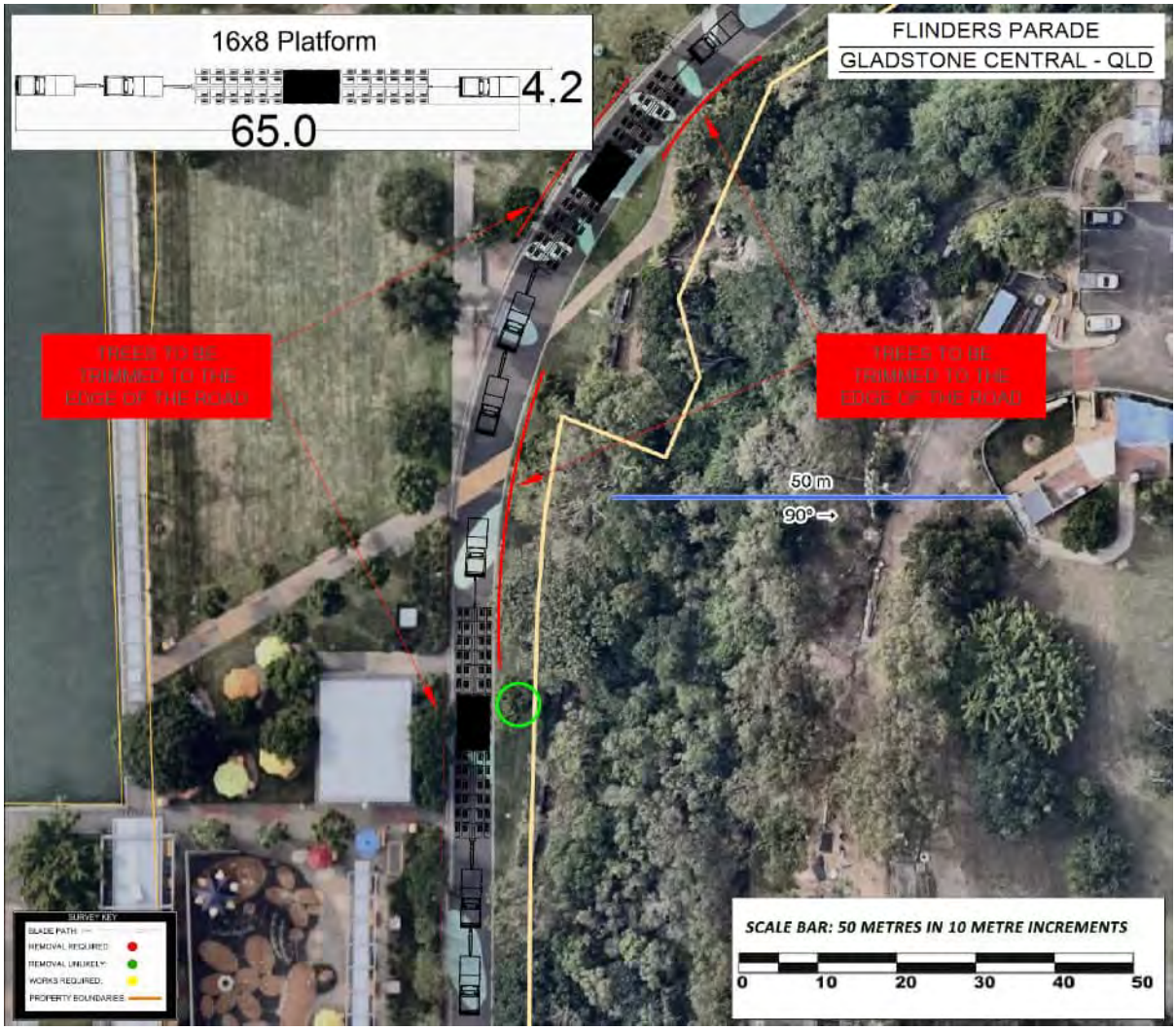


Figure 19 - Flinders Parade Foreshore

GPS Link: https://goo.gl/maps/eRVdG2Cmnd1JFBJm8
Procedure: Loads are to travel around a left-hand bend on Flinders Parade foreshore.
Modifications required: Trees will need to be trimmed.

1.3 Km's: Flinders Parade Foreshore



Figure 20 - Flinders Parade Foreshore

GPS Link: https://goo.gl/maps/W92yQL7dKuo4Qf5A8
Procedure: Loads are to travel directly ahead on Flinders Parade foreshore and onto Flinders Parade.
Modifications required: Trees will need to be trimmed.

10.0 Route 2B - Study

ROUTE 2B: FLINDERS PARADE TO MT HOPEFUL BESS
Components: Loads over 5.1 metres in overall height (Max height 6.2m). Transformer on 16x8 Platform Trailer
From: Flinders Parade Gladstone
To: Bajool (Mt Hopeful BESS), QLD
Distance: 113.0 kilometres
Route: Flinders Parade, Goondoon Street, Lord Street, Hanson Road, Red Rover Road, Don Young Drive, Dawson Highway, Bruce Highway, South Ulam Road.
GPS Link for route: https://maps.app.goo.gl/FaLX3Kon8CG4AMAj7

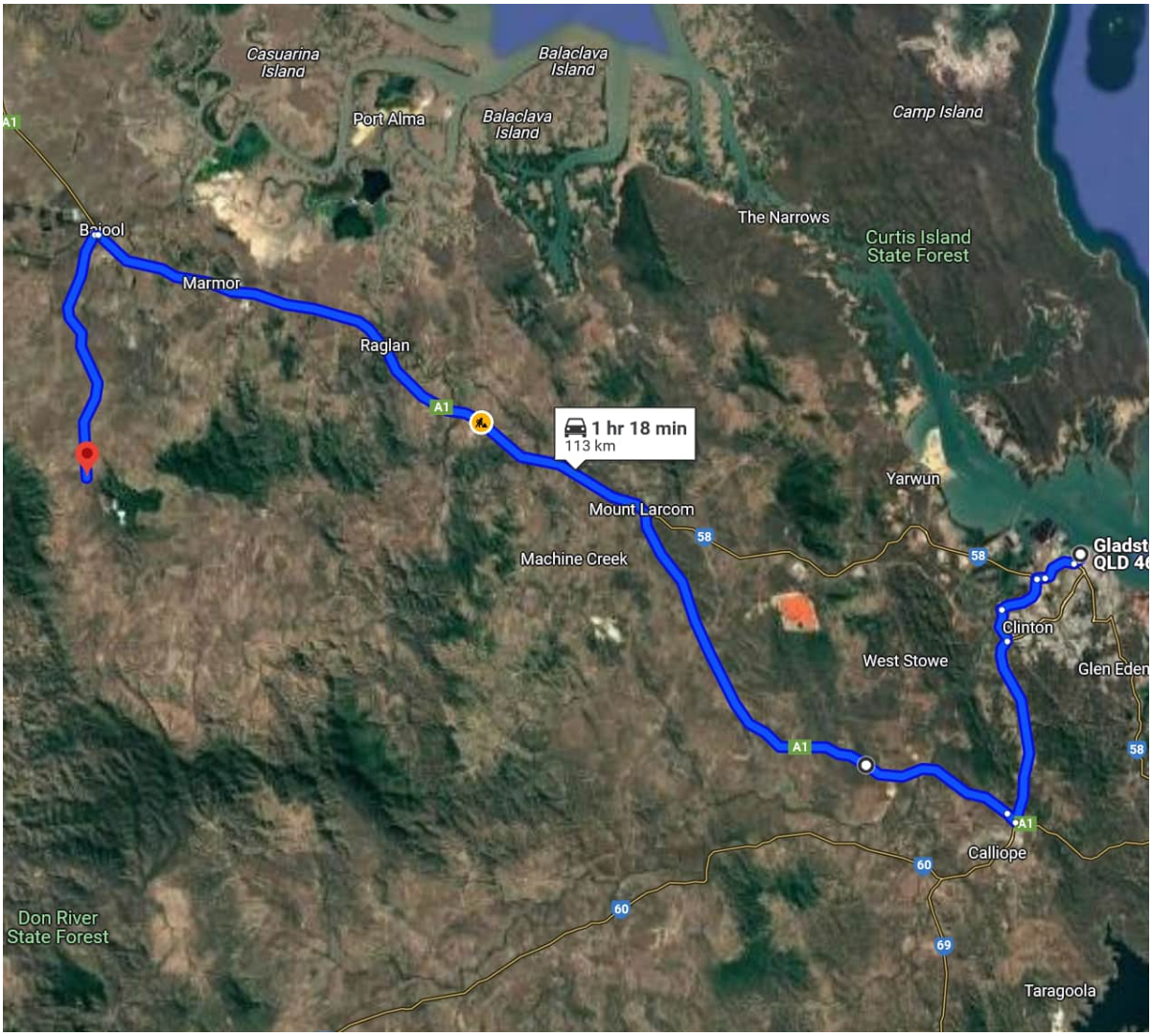


Figure 21 - Route 2B

KEY	
CAUTION	
ROAD MODIFICATIONS REQUIRED	

KM index	Location	Section of road	Existing Measurement	Procedure	Notes
0.00	Gladstone	Flinders Parade foreshore onto Flinders Parade GPS Link: https://goo.gl/maps/2f9CLTjvyjSUhYuf6	Width: 7.0m Length: 50.0m	Loads are travel directly ahead	**Pinchpoint procedure:** Security guard to lower and raise bollards.
0.25	Gladstone	Flinders Parade onto Goondoon Street GPS Link: https://goo.gl/maps/2f9CLTjvyjSUhYuf6	Width: 7.0m Length: 50.0m	Travel directly ahead	No problems with this section of road.
0.3	Gladstone	Goondoon Street onto Lord Street GPS Link: https://goo.gl/maps/21ifRBgbvXYSfo718	Width: 7.0m Length: 42.0m	Loads are to turn right turn from Goondoon Street crossing onto the incorrect side of the road before returning to the correct side of onto Lord Street.	No problems with this section of road.
0.4	Gladstone	Lord Street Roundabout at Bryan Jordan Drive GPS Link: https://goo.gl/maps/FwpNKSk5vkBBnJvR9	Width: 6.5m Length: 50.0m	Loads are to travel directly ahead on Lord Street on the correct side of the roundabout.	Signs to be relocated or made removable. Median strip and kerb to be made trafficable.
0.85	Gladstone	Lord Street onto Hanson Road GPS Link: https://goo.gl/maps/nXE6q9uBKThUaEFC7	Width: 7.0m Length: 40.0m	Right hand turn from Lord Street onto Hanson Road.	No problems with this section of road.
3.2	Gladstone	Hanson Road through the Blain Drive roundabout GPS Link: https://goo.gl/maps/6C49zBakKJXZjckw9	Width: 8.0m into 8.0m Length: 50.0m	Loads to travel through the roundabout on the correct side of the road.	No problems with this section of road.
3.8	Gladstone	Hanson Road onto Red Rover Road roundabout GPS Link: https://goo.gl/maps/o2UqPC9cvomkR2nZ7	Width: 8.0m into 8.0m Length: 50.0m	Loads to turn left at the roundabout onto incorrect side of road using modifications made on centre island.	Delineators to be removed and reinstalled.

KM index	Location	Section of road	Existing Measurement	Procedure	Notes
7.2	Gladstone	Red Rover Road onto Don Young Drive GPS Link: https://goo.gl/maps/5Wv3CWxQC399vrpUA	Width: 8.0m	Travel directly ahead	No problems with this section of road.
9.4	Gladstone	Don Young Drive onto Dawson Highway GPS Link: https://goo.gl/maps/ZjfcCqBpnaDRfWet6	Width: 8.0m Length: 50.0m	Right hand turn	No problems with this section of road.
21.3	Calliope	Dawson Hwy onto Bruce Hwy GPS Link: https://maps.app.goo.gl/Xrevwd2DDFCakVAp7	Width: 6.50m Length: 45.0m	Loads to cross to incorrect side of Dawson Hwy then enter Bruce Hwy via the off ramp.	No problems with this section of road.
96.4	Bajool	Bruce Hwy onto South Ulam Road GPS Link: https://maps.app.goo.gl/Jrr9qAe45W9hFx2d8	Width: 12.0m Length: 60.0m	Left hand turn	**Modifications required:** Nil.
South Ulam Road has only been assessed by desktop study. Should the project proceed a detailed study is required to ensure the route can accommodate the height, weight, swept path and vertical curves of all proposed loads.					
113.0	Bajool	South Ulam Road into proposed site entry GPS Link: https://maps.app.goo.gl/LwmzM1FYZd1fSo9j7	TBD	Right hand turn	**Modifications required:** Suitable site entry and site access roads to be constructed.
Site entries and all site roads to constructed to appropriate standards to accommodate the height, weight, swept path and vertical curves of all proposed loads. Unsealed roads to be maintained for the duration of deliveries and may become un trafficable during periods of wet weather.					

0.3 Km's: Flinders Parade onto Lord Street

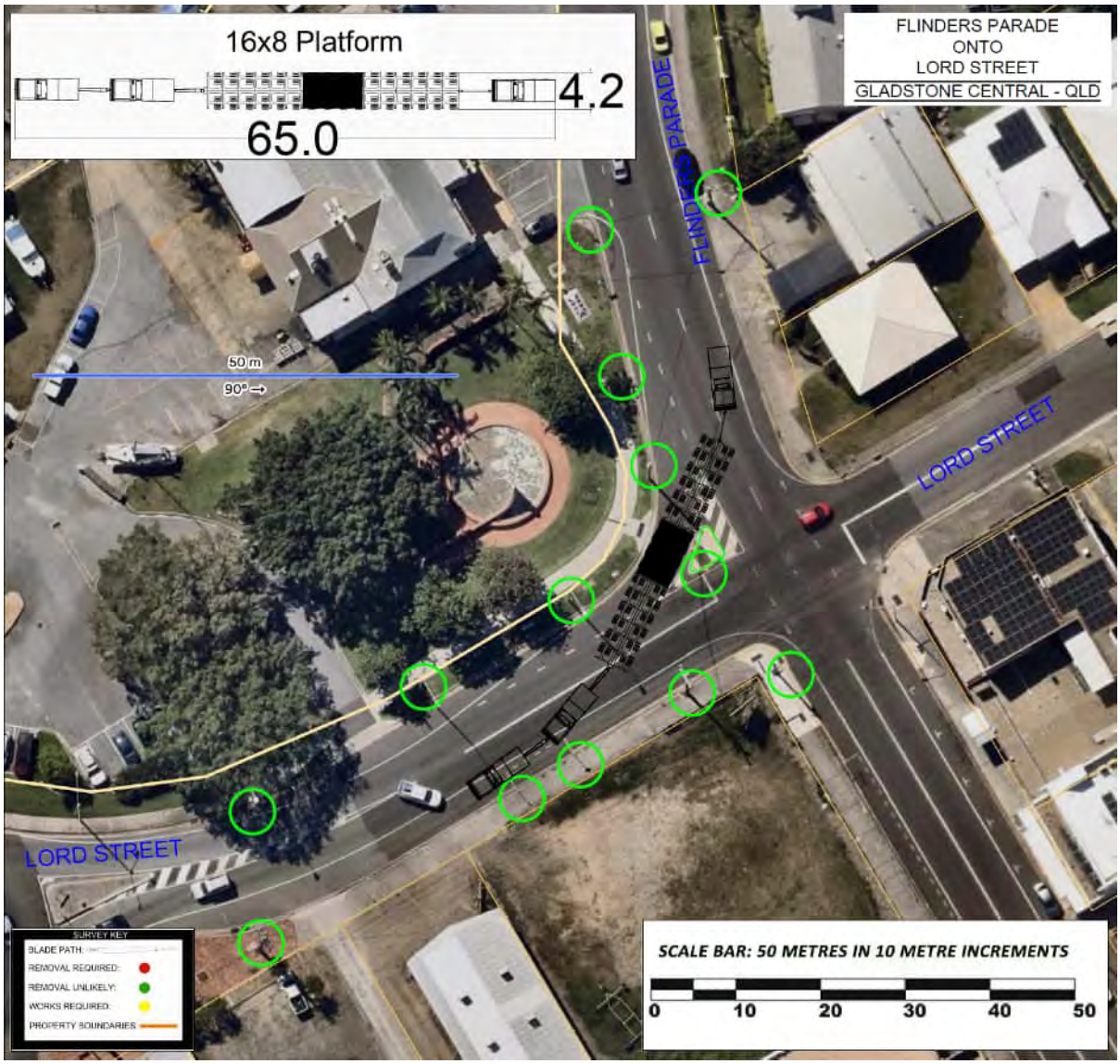


Figure 22 - Goondoon Street onto Lord Street at Gladstone

GPS Link: https://goo.gl/maps/2f9CLTjvyjSUhYuf6
Procedure: Loads are to turn right turn from Goondoon Street crossing onto the incorrect side of the road before returning to the correct side of onto Lord Street.
Modifications required: Nil.

0.4 Km's: Lord Street through roundabout at the intersection of Bryan Jordan Drive

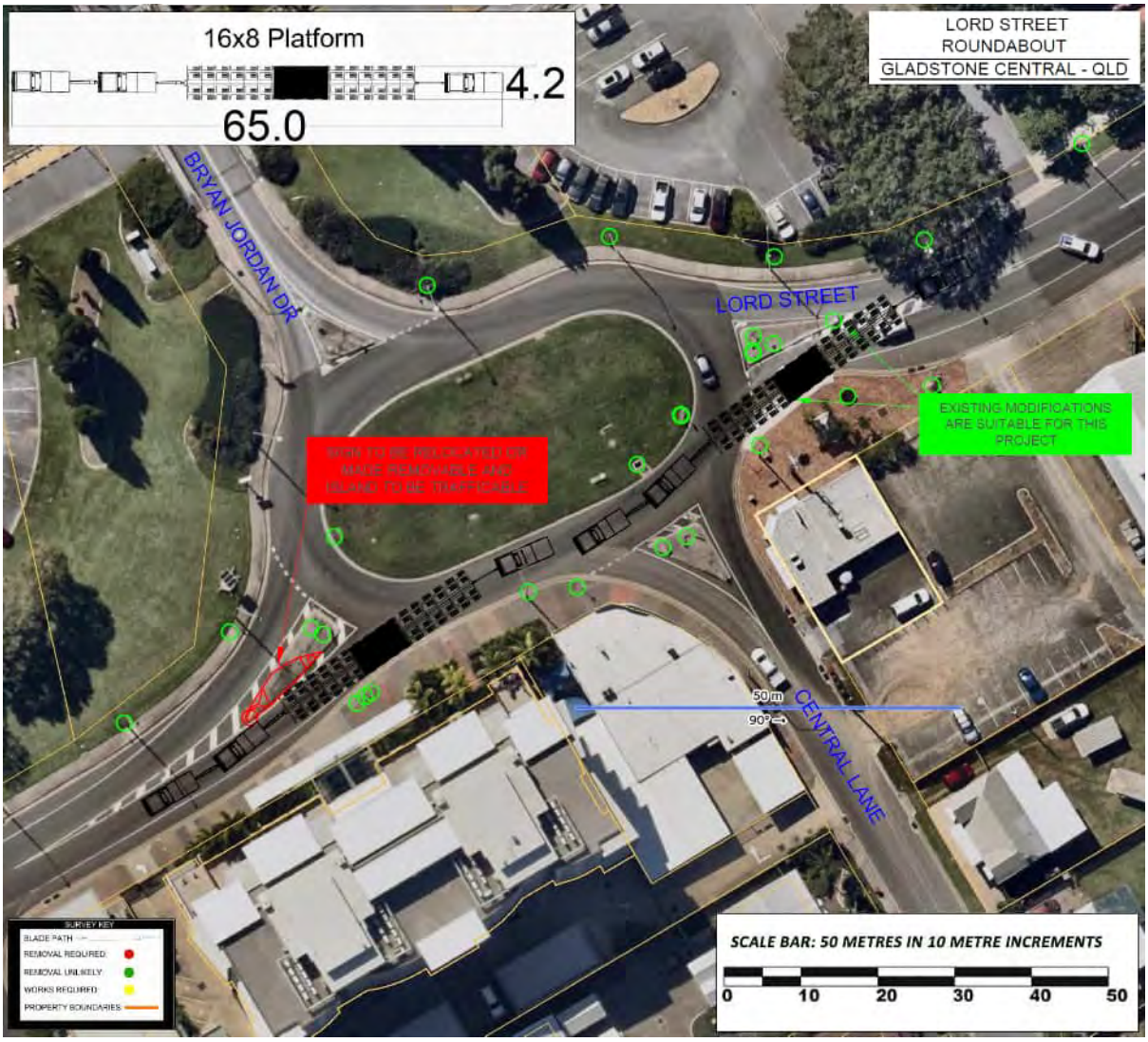


Figure 23 - Lord Street through roundabout at the intersection of Bryan Jordan Drive in Gladstone

GPS Link: https://goo.gl/maps/FwpNKSk5ykBBnJyR9
Procedure: Load will need to cross over the centre median strip and over the edge of the paved area on the correct side of the road.
Modifications required: Signs to be relocated or made removable. Median strip and kerb to be made trafficable.

0.85 Km's: Lord Street onto Hanson Road

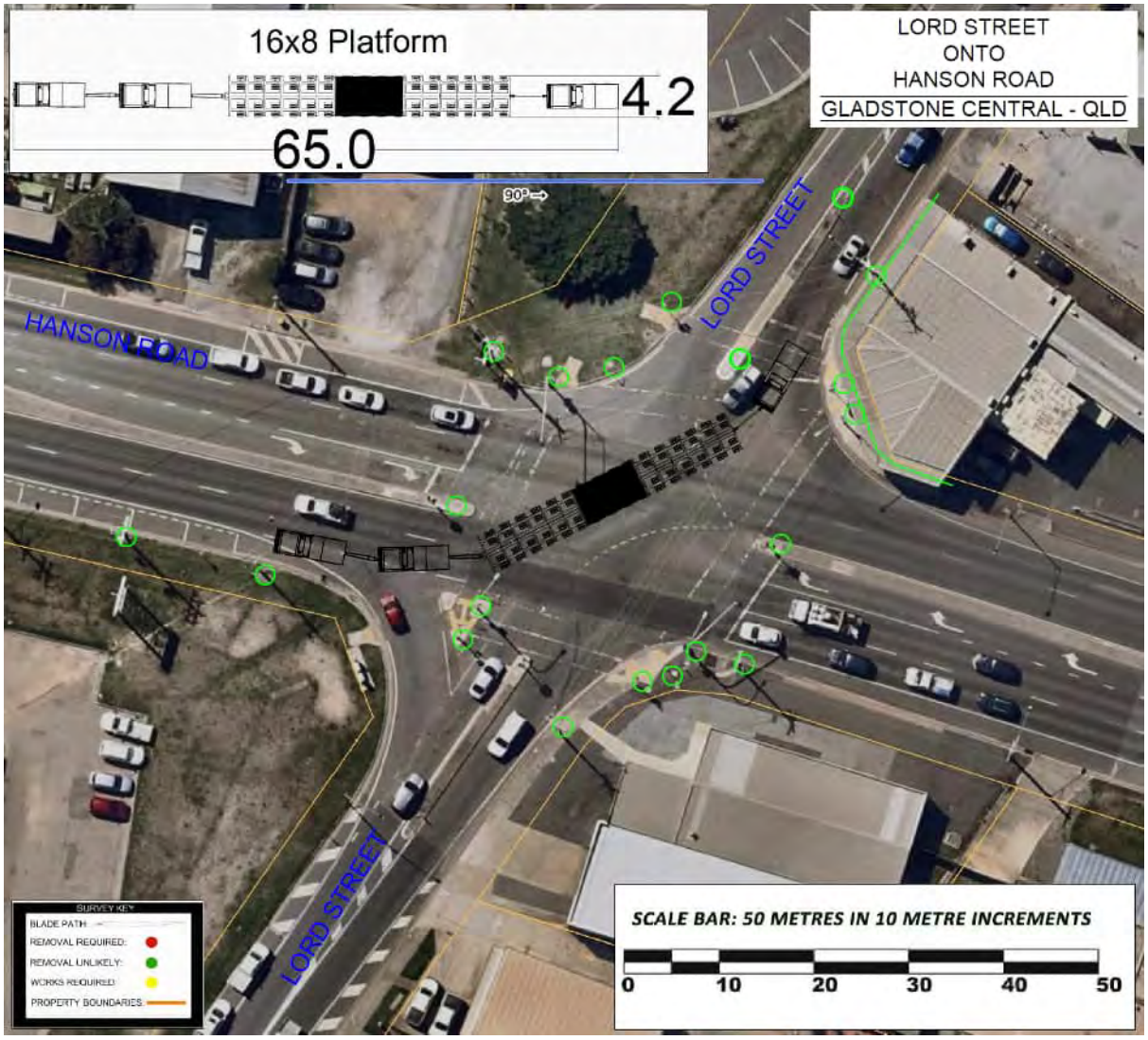


Figure 24 - Lord Street onto Hanson Road at Gladstone

GPS Link: https://goo.gl/maps/nXE6q9uBKThUaEFC7
Procedure: Right hand turn from Lord Street onto Hanson Road.
Modifications required: Nil

3.2 Km's: Hanson Road Through Roundabout at the Intersection of Blain Drive

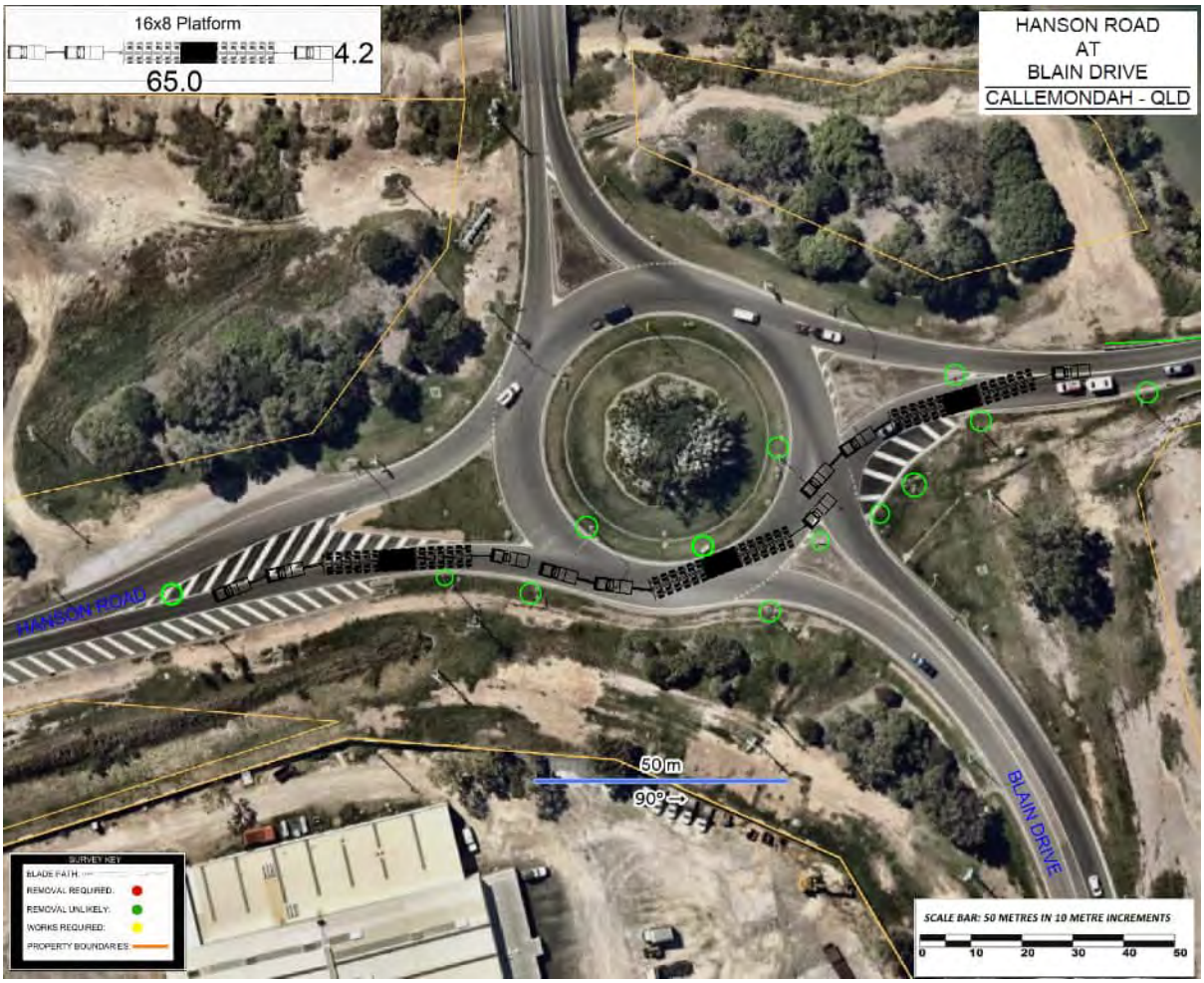


Figure 25 - Hanson Road through roundabout at the intersection of Blain Drive

GPS Link: https://goo.gl/maps/6C49zBakKJXZjckw9
Procedure: Loads to travel through the roundabout on the correct side of the road at walking pace.
Modifications required: Nil.

3.8 Km's: Hanson Road Through Roundabout at the Intersection of Red Rover Road

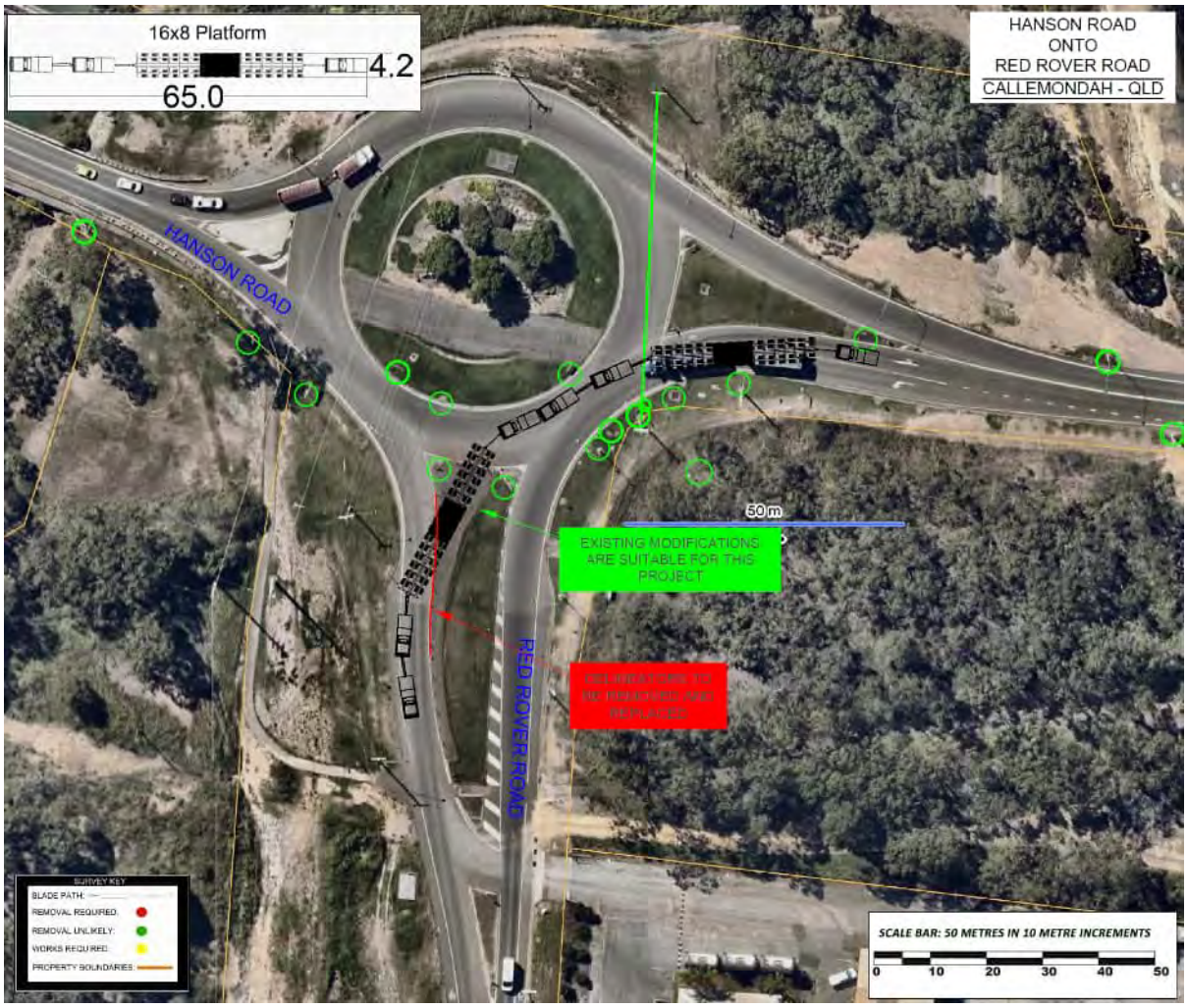


Figure 26 - Hanson Road through roundabout at the intersection of Red Rover Road

GPS Link: https://goo.gl/maps/o2UqPC9cvomkR2nZ7
Procedure: Loads to turn left at the roundabout onto incorrect side of road using modifications made on centre island.
Modifications required: Delineators to be removed and reinstalled.

9.4 Km's: Don Young Drive onto Dawson Highway

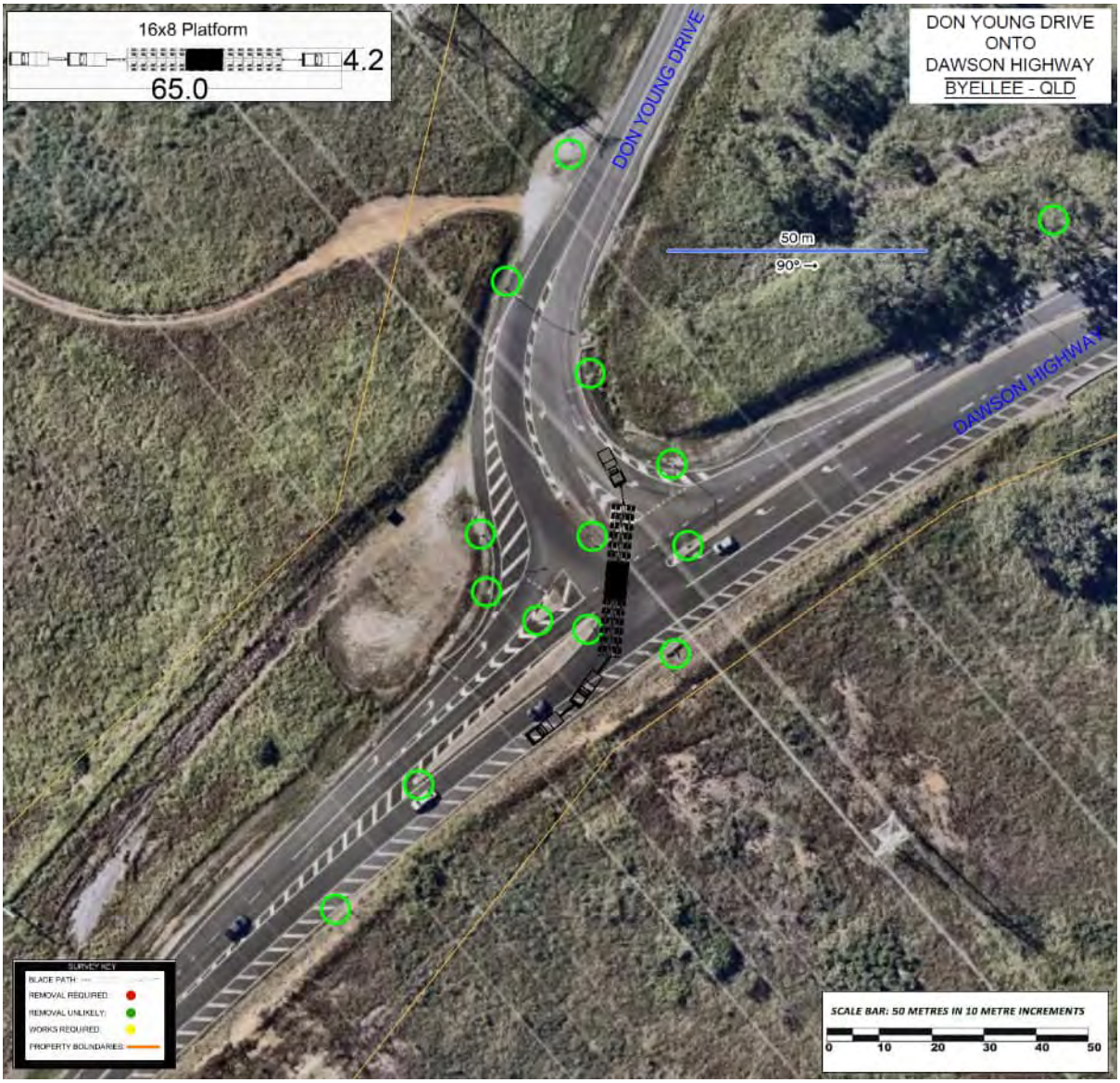


Figure 27 - Don Young Drive onto Dawson Highway

GPS Link: https://goo.gl/maps/zn6AY8WmiG7YXpcC9
Procedure: Right hand turn
Modifications required: Nil.

21.3 Km's: Dawson Highway onto Bruce Highway

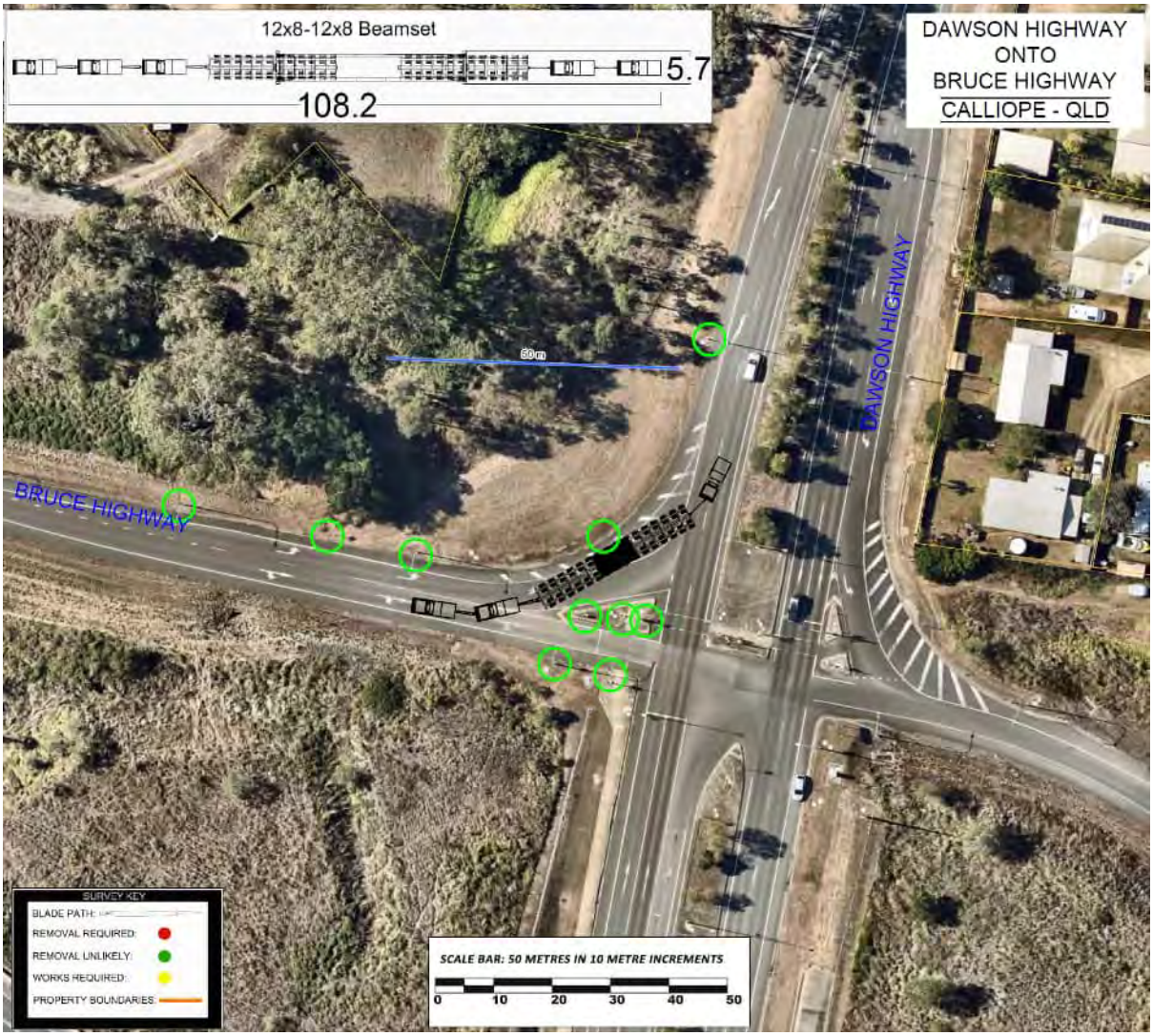


Figure 28 - Dawson Highway onto Bruce Highway

GPS Link: https://maps.app.goo.gl/Xrevwd2DDFCakVAp7
Procedure: Loads to cross to incorrect side of Dawson Hwy then enter Bruce Hwy via the off ramp.
Modifications required: Nil.

96.4 Km's: Bruce Highway onto South Ulam Road

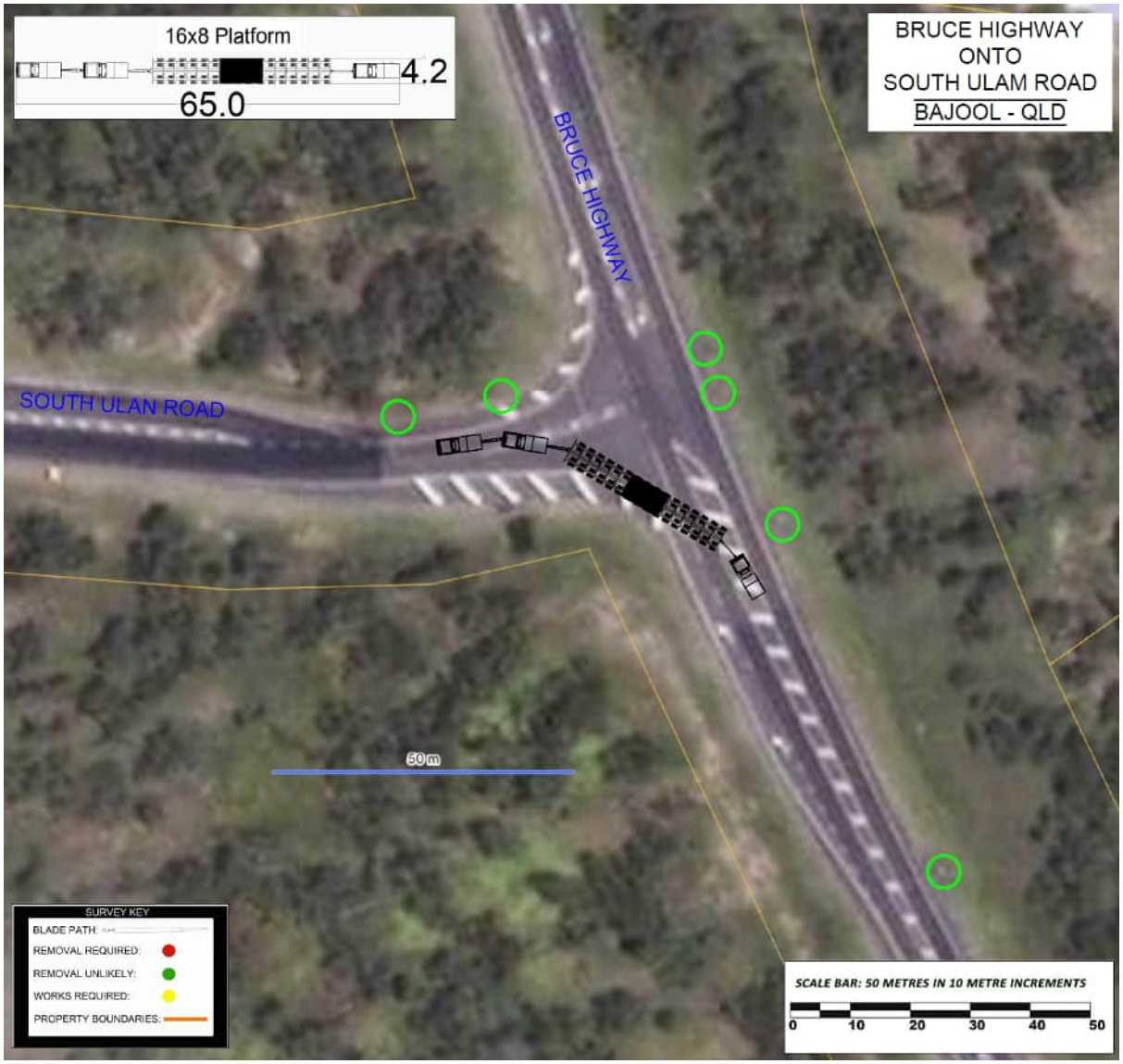


Figure 29 - Bruce Highway onto South Ulam Road

GPS Link: https://maps.app.goo.gl/Jrr9qAe45W9hFx2d8
Procedure: Left hand turn
Modifications required: Nil.

113.0 Km's: South Ulam Road into Proposed Site Entry



Figure 30 - South Ulam Road into Proposed Site Entry

GPS Link: https://maps.app.goo.gl/LwmzM1FYZd1fSo9j7
Procedure: Right hand turn
Modifications required: Suitable site entry and site access roads to be constructed. Site entries and all site roads to constructed to appropriate standards to accommodate the height, weight, swept path and vertical curves of all proposed loads. Unsealed roads to be maintained for the duration of deliveries and may become un trafficable during periods of wet weather.

11.0 Route 2 - Conclusion

PORT PRECINCT

- Vegetation trimming required on foreshore.
- Approvals required to access the closed section of Flinders Parade.
- Security required to get loads back through the port and Foreshore.

DIMENSION-WEIGHT:

- There is an internal bridge that is inside the port secure zone. Similar sized loads have crossed this structure in the past, but the loads listed in this report will need to be assessed by Gladstone Port corporation.
- All bridges structures will need to be assessed for capacity of the loads that will use this route.

DIMENSION-LENGTH:

- Road modifications are required for the length of some of the proposed components. The modifications are listed in the route reports.

DIMENSION-WIDTH:

- Up to 6.5 metres wide.

DIMENSION-HEIGHT UNDER STRUCTURES

- There is a gantry/conveyer inside the port secure zone that is adequate for a loaded height of up to 6.4 metres.

OVERHEAD UTILITIES:

- The route will need to be pre-lifted to allow a maximum loaded height of 6.2 metres.

PAVEMENT:

- The road pavement is of Highway quality up to the site entry.
- Unsealed roads will need to be upgraded to an all-weather material, with a suitable road width and maintained for the duration of the project.

VEGETATION

- Vegetation to be trimmed in several locations.

TRAVEL RESTRICTIONS:

- All routes are listed as daytime travel only. No travel restrictions are in place on these routes except for Statewide public holidays and the Easter and Christmas curfew periods. More data is available through the QLD Main Roads website: https://www.service.transport.qld.gov.au/ExcessMassExternal/PublicConditionReport.jsp
- Night travel is possible on this route, but will need to be applied for through a TMP and specific trip permits.

SITE ENTRANCES AND SITE ROADS

- All site access roads are to be constructed to appropriate standards to accommodate the swept path, vertical curve and weight requirements of all proposed loads. Roads are to be maintained during the life of the project.

SOUTH ULAM ROAD

- South Ulam Road has only been assessed by desktop study. Should the project proceed a detailed study is required to ensure the route can accommodate the height, weight, swept path and vertical curves of all proposed loads.

12.0 Evaluation

Assessment of the proposed routes was conducted by Rex J Andrews Engineered Transportation based on a desktop survey as well as utilising observations and previous experience on sections of the identified routes transporting equipment similar to the proposed equipment on various other projects.

The assessment was conducted utilising the knowledge, experience and intellectual property of Rex J Andrews Engineered Transportation on purpose-built equipment and is not intended for use by other parties.

The assessment considered the key constraints encountered on the routes and an estimation of the amount of work required to make the route viable based on previous experience. Table 1 shows the evaluation of each route and provides an overall ranking to give guidance on the most suitable route for the development from a transport perspective.

The assessment was based on operational factors and equipment capability and does not consider external factors such as regulatory, landholder, environmental, cultural or any other external factors beyond the knowledge or control of Rex J Andrews Engineered Transportation.

Should the project proceed a detailed transport study will be required to confirm the route is suitable and quantify the modifications required, in particular the suitability of South Ulam Road.

1	No Work
2	Some Work
3	Moderate Amount of Work
4	Large Amount of Work

		Harbour	Road Modification	Road Furnishings	Vegetation	Site Entrance	Bridge Calculations	Overhead Utilities	Overall Work Required
Route 1	Transformer in Beamset & Switch Room on Platform Trailer	**1**	**1**	**2**	**2**	**4**	**3**	**2**	**2.0**
Route 2A	Transformer on 16x8 Platform Trailer	**1**	**1**	**1**	**2**	**NA**	**2**	**2**	**1.5**
Route 2B	Transformer on 16x8 Platform Trailer	**NA**	**1**	**2**	**2**	**4**	**3**	**3**	**2.5**

Table 1 - Route Evaluation

13.0 References

Rex J Andrews Route Study 528 REV01
Rex J Andrews P/L Drawings
NEOEN
Google Earth/Maps
Nearmaps
NHVR (OSOM)
NHVAS Maintenance Management (NHVAS21193)
NHVAS Basic Fatigue Management (NHVAS21193)
Australian Load Restraint Guide

Disclaimer: This route study is a guide only, government approvals would be required before these routes could be deemed suitable for transporting the components over the listed routes.

Any and all parties using the information contained in this submission do so at their own risk.

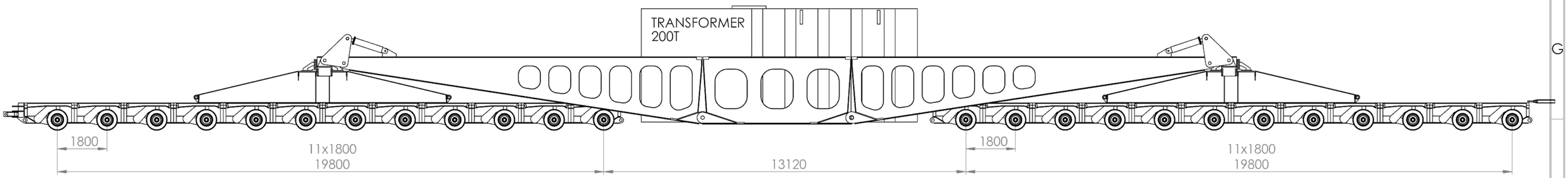
RJA accepts no responsibility for the use of all information contained within this report.

Actual approved routes may differ from those surveyed.

Proposed routes may change subject to approvals from authorities.

This study was undertaken using data supplied by Rex J Andrews P/L. Equipment and swept paths might vary if using transport methodology other than the data supplied by Rex J Andrews.

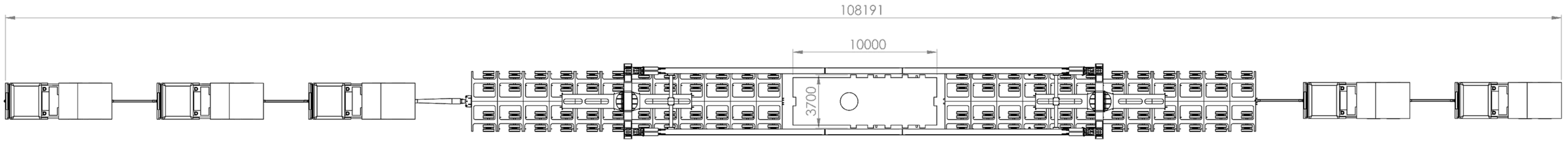
14.0 Appendix 1 – Transport Drawings (Examples)

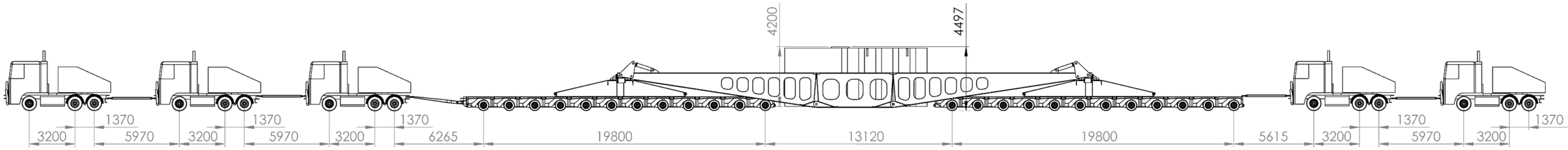


215/75R17.5x96 @4.2m
T 73.2T
P 100.0T
G 173.2T (14.4T/ROW)

215/75R17.5x96 @4.2m
T 73.2T
P 100.0T
G 173.2T (14.4T/ROW)

DETAIL VIEW OF TRAILERS



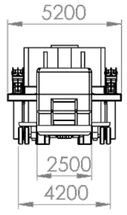


11R22.5 T 6.25T P 0.0T G 6.25T
11R22.5@2.5m T 18.5T P 0T G 18.5T
11R22.5 T 6.25T P 0.0T G 6.25T
11R22.5@2.5m T 18.5T P 0T G 18.5T
11R22.5 T 6.25T P 0.0T G 6.25T
11R22.5@2.5m T 18.5T P 0T G 18.5T

215/75R17.5x96 @4.2m
T 73.2T
P 100.0T
G 173.2T (14.4T/ROW)

215/75R17.5x96 @4.2m
T 73.2T
P 100.0T
G 173.2T (14.4T/ROW)

11R22.5 T 6.25T P 0.0T G 6.25T
11R22.5@2.5m T 18.5T P 0T G 18.5T
11R22.5 T 6.25T P 0.0T G 6.25T
11R22.5@2.5m T 18.5T P 0T G 18.5T



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THIRD ANGLE PROJECTION
DIMENSIONS IN MILLIMETRES
TOLERANCES
- LINEAR ± 2.0

REV		DATE	DRN	CKD	APP
0	ISSUED FOR APPROVAL	3/06/2020	J.S	J.S	W.A
R	ISSUED FOR REVIEW	3/06/2020	J.S	J.S	

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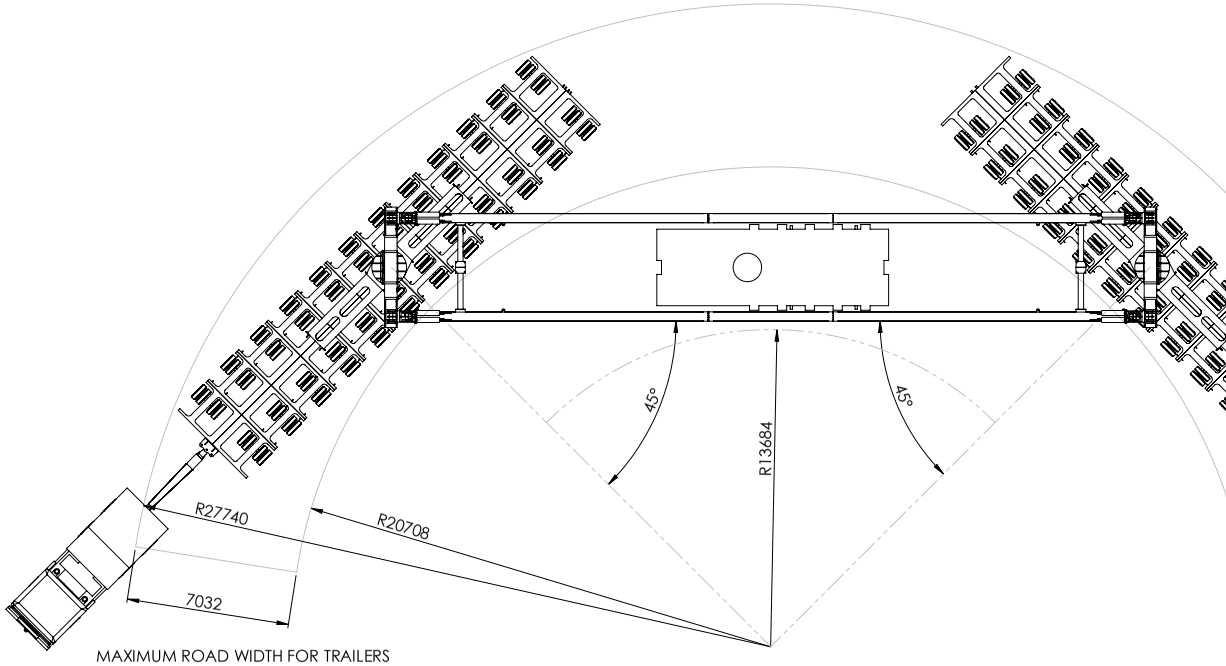
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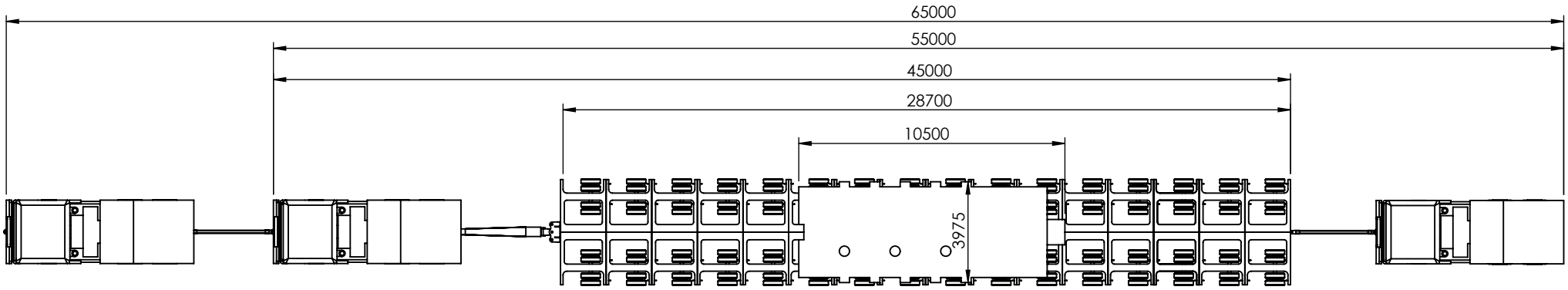
MAXIMUM ROAD WIDTH FOR TRAILERS

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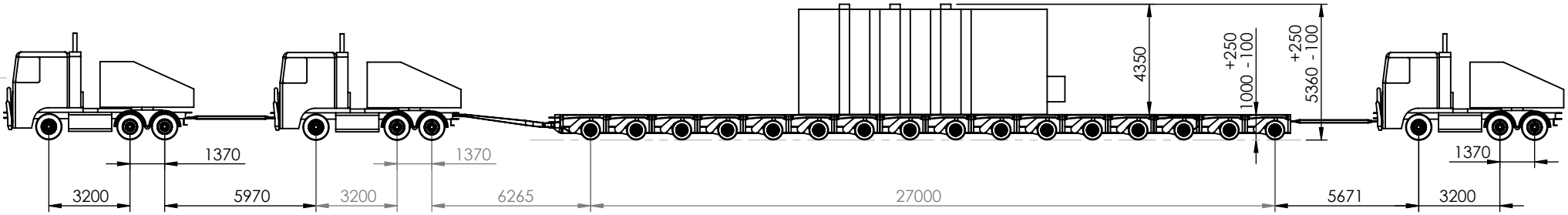
THIRD ANGLE PROJECTION
DIMENSIONS IN MILLIMETRES
TOLERANCES
- LINEAR ± 2.0

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R	ISSUED FOR REVIEW	14/12/2020	J.S

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200T TRANSFORMER



11R22.5	11R22.5	11R22.5	11R22.5
T 6.0T	T 18.5T	T 6.0T	T 18.5T
P 0.0T	P 0.0T	P 0.0T	P 0.0T
G 6.0T	G 18.5T	G 6.0T	G 18.5T

16x8 215/75R17.5 @4.2m
T 72.0T
P 200.0T
G 272.0T (17.0T/ROW)

11R22.5	11R22.5
T 6.0T	T 18.5T
P 0.0T	P 0.0T
G 6.0T	G 18.5T

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TRUCKS	1	2	3
TARE	96.5T	121T	145.5T
GVM	296.5T	321T	345.5T

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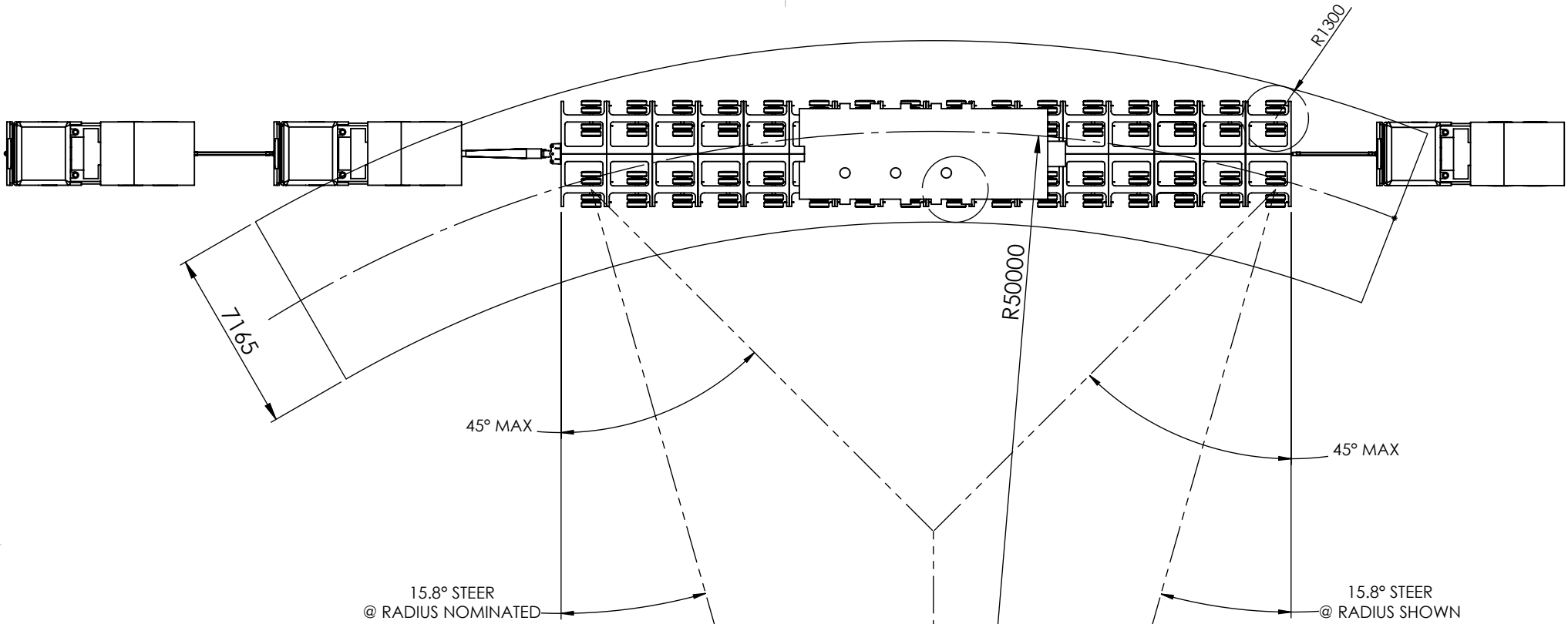
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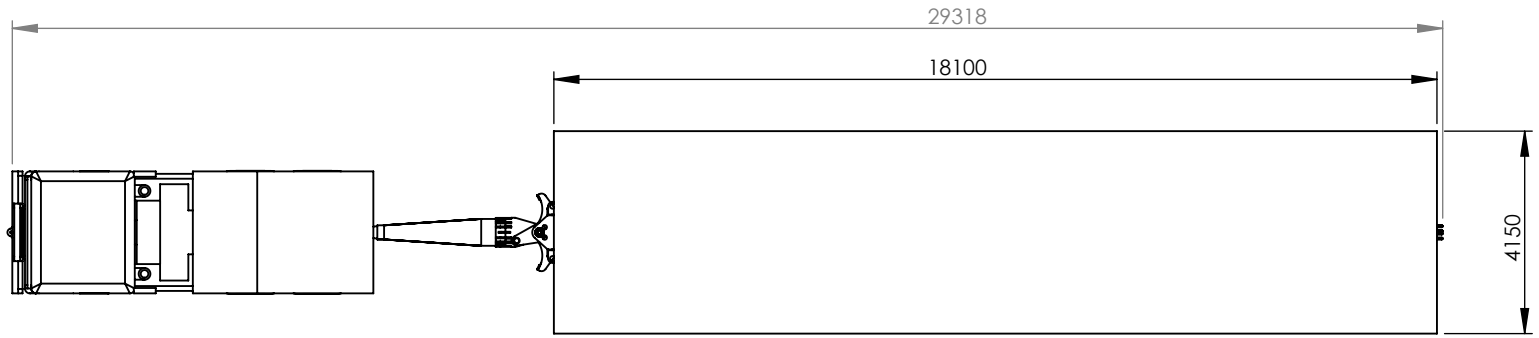
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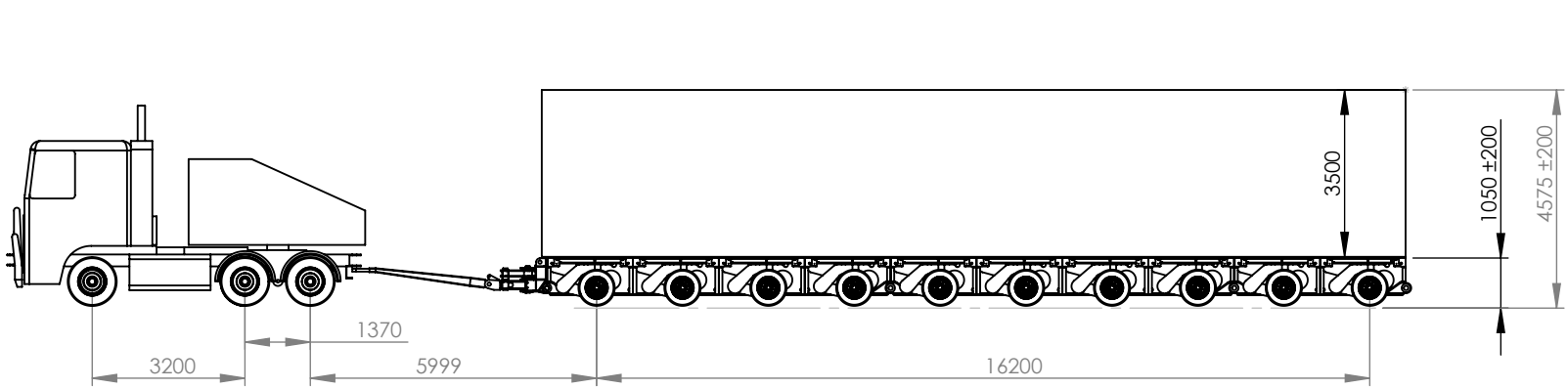
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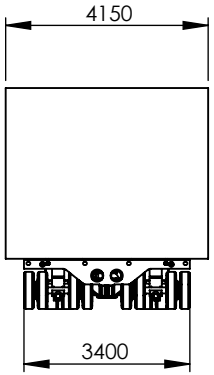
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11R22.5x8 @2.5m T 18.5T P 0.0T G 18.5T

10x8 215/75R17.5 @ 3.4m T 31.0T P 48.0T G 79.0T (7.9T/ROW)

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TARE	55.5T
GVM	103.5T

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- LINEAR ± 5.0

REV		DATE	DRN	CKD	APP
0	ISSUED FOR APPROVAL	07/08/2025	J.S	H.A	R.A
R	ISSUED FOR REVIEW	07/08/2025	J.S	H.A	

REX J ANDREWS PTY LIMITED
ENGINEERED TRANSPORTATION

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TRANSPORT PROPOSAL

SWITCHROOM
48T
10x8

DO NOT SCALE

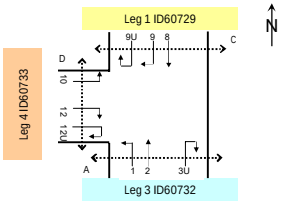
DRG NO: SWITCH_18.1m_48T_10x8

A4

Appendix B – Bruce Highway / South Ulam Road Intersection Count

Job No.	: AUQLD3303
Client	: DTMR FITZROY REGION
Suburb	: BAJOOL/MARMOR
Location	: IC V_8 Intersection ID6123 - Bruce Hwy (10E) / Sth Ulam Rd
	Chainage 85.95 Lat/Lon -23.653984, 150.641673
Day/Date	: 29 MARCH 2022
Weather	: Fine
Description	: Classified Intersection Count
	: 15 mins Data

	Class 1	Class 2	Class 3
Classifications	LIGHT	HEAVY	CYCLIST



Approach	Leg 3 ID60732											
Direction	Direction 1 (Left Turn)				Direction 2 (Through)				Direction 3U (U Turn)			
Time Period	LIGHT	HEAVY	CYCLIST	Total	LIGHT	HEAVY	CYCLIST	Total	LIGHT	HEAVY	CYCLIST	Total
6:00 to 6:15	0	0	0	0	13	11	0	24	0	0	0	0
6:15 to 6:30	1	0	0	1	18	11	0	29	0	0	0	0
6:30 to 6:45	0	0	0	0	21	11	0	32	0	0	0	0
6:45 to 7:00	0	1	0	1	26	9	0	35	0	0	0	0
7:00 to 7:15	0	1	0	1	30	11	0	41	0	0	0	0
7:15 to 7:30	0	1	0	1	26	11	0	37	0	0	0	0
7:30 to 7:45	0	0	0	0	20	7	0	27	0	0	0	0
7:45 to 8:00	0	0	0	0	21	1	0	22	0	0	0	0
8:00 to 8:15	0	0	0	0	32	11	0	43	0	0	0	0
8:15 to 8:30	0	0	0	0	35	10	0	45	0	0	0	0
8:30 to 8:45	1	0	0	1	37	8	0	45	0	0	0	0
8:45 to 9:00	1	0	0	1	40	6	0	46	0	0	0	0
9:00 to 9:15	0	0	0	0	35	14	0	49	0	0	0	0
9:15 to 9:30	0	0	0	0	34	6	0	40	0	0	0	0
9:30 to 9:45	0	0	0	0	38	12	0	50	0	0	0	0
9:45 to 10:00	0	1	0	1	33	21	0	54	0	0	0	0
10:00 to 10:15	0	0	0	0	34	8	0	42	0	0	0	0
10:15 to 10:30	0	0	0	0	38	11	0	49	0	0	0	0
10:30 to 10:45	0	2	0	2	44	12	0	56	0	0	0	0
10:45 to 11:00	0	1	0	1	33	18	0	51	0	0	0	0
11:00 to 11:15	0	1	0	1	40	7	0	47	0	0	0	0
11:15 to 11:30	0	0	0	0	45	14	0	59	0	0	0	0
11:30 to 11:45	0	2	0	2	31	16	0	47	0	0	0	0
11:45 to 12:00	1	0	0	1	48	6	0	54	0	0	0	0
12:00 to 12:15	0	0	0	0	38	6	0	44	0	0	0	0
12:15 to 12:30	0	0	0	0	60	10	0	70	0	0	0	0
12:30 to 12:45	0	0	0	0	60	7	0	67	0	0	0	0
12:45 to 13:00	0	1	0	1	51	8	0	59	0	0	0	0
13:00 to 13:15	0	2	0	2	42	10	0	52	0	0	0	0
13:15 to 13:30	1	0	0	1	40	14	0	54	0	0	0	0
13:30 to 13:45	0	0	0	0	52	9	0	61	0	0	0	0
13:45 to 14:00	1	1	0	2	46	8	0	54	0	0	0	0
14:00 to 14:15	0	0	0	0	34	9	0	43	0	0	0	0
14:15 to 14:30	0	0	0	0	41	14	0	55	0	0	0	0
14:30 to 14:45	1	0	0	1	55	14	0	69	0	0	0	0
14:45 to 15:00	1	0	0	1	60	10	0	70	0	0	0	0
15:00 to 15:15	0	0	0	0	41	16	0	57	0	1	0	1
15:15 to 15:30	1	0	0	1	32	9	0	41	0	0	0	0
15:30 to 15:45	0	0	0	0	46	14	0	60	0	0	0	0
15:45 to 16:00	0	0	0	0	49	11	0	60	0	0	0	0
16:00 to 16:15	0	0	0	0	46	5	0	51	0	0	0	0
16:15 to 16:30	0	0	0	0	37	11	0	48	0	0	0	0
16:30 to 16:45	0	0	0	0	47	8	0	55	0	0	0	0
16:45 to 17:00	0	0	0	0	34	6	0	40	0	0	0	0
17:00 to 17:15	0	0	0	0	38	15	0	53	0	0	0	0
17:15 to 17:30	0	0	0	0	26	9	0	35	0	0	0	0
17:30 to 17:45	0	0	0	0	30	7	0	37	0	0	0	0
17:45 to 18:00	0	0	0	0	22	15	0	37	0	0	0	0
12hr Totals	9	14	0	23	1,799	497	0	2,296	0	1	0	1

Approach	Leg 1 ID60729												Leg 4 ID60733												Crossing Pedestrians				
Direction	Direction 8 (Through)				Direction 9 (Right Turn)				Direction 9U (U Turn)				Direction 10 (Left Turn)				Direction 12 (Right Turn)				Direction 12U (U Turn)								
Time Period	LIGHT	HEAVY	CYCLIST	Total	LIGHT	HEAVY	CYCLIST	Total	LIGHT	HEAVY	CYCLIST	Total	LIGHT	HEAVY	CYCLIST	Total	LIGHT	HEAVY	CYCLIST	Total	LIGHT	HEAVY	CYCLIST	Total	A		C	D	Total
6:00 to 6:15	23	7	0	30	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0		0	0	0
6:15 to 6:30	26	7	0	33	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	0		0	0	0
6:30 to 6:45	16	7	0	23	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
6:45 to 7:00	17	12	0	29	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
7:00 to 7:15	31	13	0	44	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
7:15 to 7:30	35	12	0	47	0	2	0	2	0	0	0	0	2	1	0	3	1	0	0	1	0	0	0	0	0		0	0	0
7:30 to 7:45	33	11	0	44	2	0	0	2	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	0		0	0	0
7:45 to 8:00	40	16	0	56	2	1	0	3	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0		0	0	0
8:00 to 8:15	42	11	0	53	1	0	0	1	0	0	0	0	0	2	0	2	1	1	0	2	0	0	0	0	0		0	0	0
8:15 to 8:30	23	5	0	28	2	1	0	3	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0		0	0	0
8:30 to 8:45	23	14	0	37	1	1	0	2	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	0		0	0	0
8:45 to 9:00	46	8	0	54	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
9:00 to 9:15	34	13	0	47	1	0	0	1	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0		0	0	0
9:15 to 9:30	44	17	0	61	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0		0	0	0
9:30 to 9:45	34	12	0	46	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0		0	0	0
9:45 to 10:00	26	10	0	36	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0		0	0	0
10:00 to 10:15	34	14	0	48	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
10:15 to 10:30	33	11	0	44	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	0		0	0	0
10:30 to 10:45	30	12	0	42	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0		0	0	0
10:45 to 11:00	26	5	0	31	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
11:00 to 11:15	32	5	0	37	0	1	0	1	0	0	0	0	1	2	0	3	0	0	0	0	0	0	0	0	0		0	0	0
11:15 to 11:30	27	18	0	45	0	1	0	1	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0		0	0	0
11:30 to 11:45	30	8	0	38	1	0	0	1	0	0	0	0	2	0	0	2	0	1	0	1	0	0	0	0	0		0	0	0
11:45 to 12:00	23	16	0	39	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	1	0	0	0	0	0		0	0	0
12:00 to 12:15	22	11	0	33	1	0	0	1	0	0	0	0	2	2	0	4	0	0	0	0	0	0	0	0	0		0	0	0
12:15 to 12:30	38	9	0	47	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0		0	0	0
12:30 to 12:45	22	15	0	37	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
12:45 to 13:00	25	11	0	36	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0		0	0	0
13:00 to 13:15	35	19	0	54	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0		0	0	0
13:15 to 13:30	36	20	0	56	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0		0	0	0
13:30 to 13:45	46	16	0	62	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0		0	0	0
13:45 to 14:00	42	9	0	51	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0		0	0	0
14:00 to 14:15	19	13	0	32	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0		0	0	0
14:15 to 14:30	38	11	0	49	1	0	0	1	0	0	0	0	0	1	0	1	2	1	0	3	0	0	0	0	0		0	0	0
14:30 to 14:45	36	11	0	47	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0		0	0	0
14:45 to 15:00	34	8	0	42	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
15:00 to 15:15	31	16	0	47	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0		0	0	0
15:15 to 15:30	31	6	0	37	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0		0	0	0
15:30 to 15:45	31	11	0	42	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
15:45 to 16:00	29	3	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
16:00 to 16:15	30	5	0	35	1	0	0	1	0	0	0	0	1	1	0	2	1	0	0	1	0	0	0	0	0		0	0	0
16:15 to 16:30	24	5	0	29	1	0	0	1	0	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0		0	0	0
16:30 to 16:45	29	15	0	44	1	1	0	2	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0		0	0	0
16:45 to 17:00	24	14	0	38	1	0	0	1	0	0	0	0	4	1	0	5	1	0	0	1	0	0	0	0	0		0	0	0
17:00 to 17:15	25	11	0	36	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0		0	0	0
17:15 to 17:30	25	8	0	33	2	0	0	2	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0		0	0	0
17:30 to 17:45	35	11	0	46	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0		0	0	0
17:45 to 18:00	21	5	0	26	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
12hr Totals	1,456	527	0	1,983	29	15	0	44	0	0	0	0	38	19	0	57	14	10	0	24	0	0	0	0	0		0	0	0

Appendix C – Intersection Volume Forecast Calculations

UMW0125-001 | Mount Hopeful Battery Project

Bruce Highway / South Ulam Road

Peak Hour Intersection Volume Forecasts

AM PEAK

GR %	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
YEAR	Bruce Highway North				South Ulam Road West				Bruce Highway South			
	T		R		L		R		L		T	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
2022	158	50	2	1	2	2	1	0	1	0	147	38
2023	160	51	2	1	2	2	1	0	1	0	148	38
2024	161	51	2	1	2	2	1	0	1	0	150	39
2025	163	52	2	1	2	2	1	0	1	0	151	39
2026	164	52	2	1	2	2	1	0	1	0	153	40
2027	166	53	2	1	2	2	1	0	1	0	154	40
2028	168	53	2	1	2	2	1	0	1	0	156	40
2029	169	54	2	1	2	2	1	0	1	0	158	41
STAGE 1 PROJECT TRAFFIC	0	0	42	1	0	1	0	1	0	1	0	0
STAGE 2 PROJECT TRAFFIC	0	0	25	0	0	0	0	1	0	1	0	0
STAGE 1 PEAK CONSTRUCTION	166	53	44	2	2	3	1	1	1	1	154	40
STAGE 2 PEAK CONSTRUCTION	169	54	27	1	2	2	1	1	1	1	158	41

PM PEAK

GR %	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
YEAR	Bruce Highway North				South Ulam Road West				Bruce Highway South			
	T		R		L		R		L		T	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
2022	159	64	0	0	3	0	0	2	2	3	180	41
2023	161	65	0	0	3	0	0	2	2	3	182	41
2024	162	65	0	0	3	0	0	2	2	3	184	42
2025	164	66	0	0	3	0	0	2	2	3	185	42
2026	165	67	0	0	3	0	0	2	2	3	187	43
2027	167	67	0	0	3	0	0	2	2	3	189	43
2028	169	68	0	0	3	0	0	2	2	3	191	44
2029	170	69	0	0	3	0	0	2	2	3	193	44
STAGE 1 PROJECT TRAFFIC	0	0	0	1	42	1	0	1	0	1	0	0
STAGE 2 PROJECT TRAFFIC	0	0	0	0	25	0	0	1	0	1	0	0
STAGE 1 PEAK CONSTRUCTION	167	67	0	1	45	1	0	3	2	4	189	43
STAGE 2 PEAK CONSTRUCTION	170	69	0	0	28	0	0	3	2	4	193	44

Stage 1 - Project Scenario (Schedule Task D + E+ F + G + Max Staff + Water + Fuel)

Heavy Vehicle Movements to South Ulam Road

Task	Bruce Highway North				South Ulam Road West				Bruce Highway South			
	T		R		L		R		L		T	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
D	0	0	0	0	0	0	0	5	0	5	0	0
E	0	0	0	0	0	0	0	1	0	1	0	0
F	0	0	0	0	0	0	0	1	0	1	0	0
G	0	0	0	1	0	1	0	0	0	0	0	0
Water	0	0	0	1	0	1	0	0	0	0	0	0
Fuel	0	0	0	1	0	1	0	0	0	0	0	0
Waste	0	0	0	1	0	1	0	0	0	0	0	0
Total (12 hrs)	**0**	**0**	**0**	**4**	**0**	**4**	**0**	**7**	**0**	**7**	**0**	**0**
Peak Hour	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**0**

Stage 1 - Staff Vehicle Movements to South Ulam Road

AM Peak Hour	**0**	**0**	**42**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PM Peak Hour	**0**	**0**	**0**	**0**	**42**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Stage 2 - Project Scenario (Schedule Task B + C + Max Staff + Water + Fuel)

Heavy Vehicle Movements to South Ulam Road

Task	Bruce Highway North				South Ulam Road West				Bruce Highway South			
	T		R		L		R		L		T	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
B	0	0	0	0	0	0	0	3	0	3	0	0
C	0	0	0	0	0	0	0	1	0	1	0	0
Water	0	0	0	1	0	1	0	0	0	0	0	0
Fuel	0	0	0	1	0	1	0	0	0	0	0	0
Waste	0	0	0	1	0	1	0	0	0	0	0	0
Total (12 hrs)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**4**	**0**	**0**
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**

Stage 2 - Staff Vehicle Movements to South Ulam Road

AM Peak Hour	**0**	**0**	**25**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PM Peak Hour	**0**	**0**	**0**	**0**	**25**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Appendix D – SIDRA Results – Bruce Highway / South Ulam Road Intersection

MOVEMENT SUMMARY

Site: 1 [EXISTING 2025 AM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Bruce Highway															
1	L2	All MCs	1	0.0	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	52.9
2	T1	All MCs	200	20.5	200	20.5	0.115	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			201	20.4	201	20.4	0.115	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Bruce Highway															
8	T1	All MCs	226	24.2	226	24.2	0.133	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	3	33.3	3	33.3	0.003	7.1	LOS A	0.0	0.1	0.34	0.54	0.34	50.6
Approach			229	24.3	229	24.3	0.133	0.1	NA	0.0	0.1	0.00	0.01	0.00	59.8
West: South Ulam Road															
10	L2	All MCs	4	50.0	4	50.0	0.007	7.5	LOS A	0.0	0.2	0.37	0.56	0.37	49.6
12	R2	All MCs	1	0.0	1	0.0	0.007	9.2	LOS A	0.0	0.2	0.37	0.56	0.37	51.7
Approach			5	40.0	5	40.0	0.007	7.8	LOS A	0.0	0.2	0.37	0.56	0.37	50.0
All Vehicles			436	22.7	436	22.7	0.133	0.2	NA	0.0	0.2	0.01	0.01	0.01	59.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [EXISTING 2025 PM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Bruce Highway															
1	L2	All MCs	5	60.0	5	60.0	0.004	6.2	LOS A	0.0	0.0	0.00	0.57	0.00	50.5
2	T1	All MCs	239	18.5	239	18.5	0.136	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			244	19.4	244	19.4	0.136	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7
North: Bruce Highway															
8	T1	All MCs	242	28.7	242	28.7	0.146	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	1	0.0	1	0.0	0.001	6.5	LOS A	0.0	0.0	0.34	0.52	0.34	51.8
Approach			243	28.6	243	28.6	0.146	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
West: South Ulam Road															
10	L2	All MCs	3	0.0	3	0.0	0.012	6.5	LOS A	0.0	0.4	0.53	0.61	0.53	48.8
12	R2	All MCs	2	100.0	2	100.0	0.012	18.7	LOS B	0.0	0.4	0.53	0.61	0.53	45.8
Approach			5	40.0	5	40.0	0.012	11.4	LOS A	0.0	0.4	0.53	0.61	0.53	47.5
All Vehicles			493	24.1	493	24.1	0.146	0.2	NA	0.0	0.4	0.01	0.01	0.01	59.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [PRE DEV 2027 AM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Bruce Highway															
1	L2	All MCs	1	0.0	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	52.9
2	T1	All MCs	204	20.6	204	20.6	0.118	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			205	20.5	205	20.5	0.118	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Bruce Highway															
8	T1	All MCs	231	24.2	231	24.2	0.135	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	3	33.3	3	33.3	0.003	7.1	LOS A	0.0	0.1	0.34	0.54	0.34	50.6
Approach			234	24.3	234	24.3	0.135	0.1	NA	0.0	0.1	0.00	0.01	0.00	59.8
West: South Ulam Road															
10	L2	All MCs	4	50.0	4	50.0	0.007	7.5	LOS A	0.0	0.2	0.37	0.56	0.37	49.6
12	R2	All MCs	1	0.0	1	0.0	0.007	9.3	LOS A	0.0	0.2	0.37	0.56	0.37	51.7
Approach			5	40.0	5	40.0	0.007	7.9	LOS A	0.0	0.2	0.37	0.56	0.37	50.0
All Vehicles			444	22.7	444	22.7	0.135	0.2	NA	0.0	0.2	0.01	0.01	0.01	59.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [PRE DEV 2027 PM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Bruce Highway															
1	L2	All MCs	5	60.0	5	60.0	0.004	6.2	LOS A	0.0	0.0	0.00	0.57	0.00	50.5
2	T1	All MCs	244	18.5	244	18.5	0.139	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			249	19.4	249	19.4	0.139	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7
North: Bruce Highway															
8	T1	All MCs	246	28.6	246	28.6	0.148	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	1	0.0	1	0.0	0.001	6.6	LOS A	0.0	0.0	0.35	0.52	0.35	51.8
Approach			247	28.5	247	28.5	0.148	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
West: South Ulam Road															
10	L2	All MCs	3	0.0	3	0.0	0.012	6.6	LOS A	0.0	0.4	0.54	0.62	0.54	48.7
12	R2	All MCs	2	100.0	2	100.0	0.012	19.1	LOS B	0.0	0.4	0.54	0.62	0.54	45.7
Approach			5	40.0	5	40.0	0.012	11.6	LOS A	0.0	0.4	0.54	0.62	0.54	47.4
All Vehicles			502	24.1	502	24.1	0.148	0.2	NA	0.0	0.4	0.01	0.01	0.01	59.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [STG 1 PEAK CONST 2027 AM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South:															
1	L2	All MCs	2	50.0	2	50.0	0.002	6.1	LOS A	0.0	0.0	0.00	0.57	0.00	50.9
2	T1	All MCs	204	20.6	204	20.6	0.118	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			206	20.9	206	20.9	0.118	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
North: Bruce Highway															
8	T1	All MCs	231	24.2	231	24.2	0.135	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	48	4.3	48	4.3	0.043	6.6	LOS A	0.2	1.2	0.33	0.58	0.33	51.7
Approach			279	20.8	279	20.8	0.135	1.2	NA	0.2	1.2	0.06	0.10	0.06	58.3
West: South Ulam Road															
10	L2	All MCs	5	60.0	5	60.0	0.013	7.8	LOS A	0.0	0.5	0.44	0.59	0.44	48.2
12	R2	All MCs	2	50.0	2	50.0	0.013	14.1	LOS A	0.0	0.5	0.44	0.59	0.44	48.9
Approach			7	57.1	7	57.1	0.013	9.6	LOS A	0.0	0.5	0.44	0.59	0.44	48.4
All Vehicles			493	21.4	493	21.4	0.135	0.8	NA	0.2	1.2	0.04	0.07	0.04	58.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [STG 1 PEAK CONST 2027 PM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Bruce Highway															
1	L2	All MCs	6	66.7	6	66.7	0.005	6.3	LOS A	0.0	0.0	0.00	0.57	0.00	50.2
2	T1	All MCs	244	18.5	244	18.5	0.139	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			251	19.7	251	19.7	0.139	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
North: Bruce Highway															
8	T1	All MCs	246	28.6	246	28.6	0.148	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	1	100.0	1	100.0	0.002	9.2	LOS A	0.0	0.1	0.43	0.54	0.43	46.8
Approach			247	28.9	247	28.9	0.148	0.1	NA	0.0	0.1	0.00	0.00	0.00	59.8
West: South Ulam Road															
10	L2	All MCs	48	2.2	48	2.2	0.061	6.7	LOS A	0.2	1.6	0.39	0.61	0.39	51.3
12	R2	All MCs	3	100.0	3	100.0	0.061	20.3	LOS B	0.2	1.6	0.39	0.61	0.39	48.1
Approach			52	8.2	52	8.2	0.061	7.5	LOS A	0.2	1.6	0.39	0.61	0.39	51.1
All Vehicles			549	22.8	549	22.8	0.148	0.8	NA	0.2	1.6	0.04	0.07	0.04	58.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [PRE DEV 2029 AM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Bruce Highway															
1	L2	All MCs	1	0.0	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	52.9
2	T1	All MCs	209	20.6	209	20.6	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			211	20.5	211	20.5	0.121	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Bruce Highway															
8	T1	All MCs	235	24.2	235	24.2	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	3	33.3	3	33.3	0.003	7.2	LOS A	0.0	0.1	0.35	0.54	0.35	50.5
Approach			238	24.3	238	24.3	0.138	0.1	NA	0.0	0.1	0.00	0.01	0.00	59.8
West: South Ulam Road															
10	L2	All MCs	4	50.0	4	50.0	0.007	7.6	LOS A	0.0	0.2	0.38	0.57	0.38	49.5
12	R2	All MCs	1	0.0	1	0.0	0.007	9.4	LOS A	0.0	0.2	0.38	0.57	0.38	51.6
Approach			5	40.0	5	40.0	0.007	8.0	LOS A	0.0	0.2	0.38	0.57	0.38	50.0
All Vehicles			454	22.7	454	22.7	0.138	0.2	NA	0.0	0.2	0.01	0.01	0.01	59.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [PRE DEV 2029 PM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Bruce Highway															
1	L2	All MCs	5	60.0	5	60.0	0.004	6.2	LOS A	0.0	0.0	0.00	0.57	0.00	50.5
2	T1	All MCs	249	18.6	249	18.6	0.142	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			255	19.4	255	19.4	0.142	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7
North: Bruce Highway															
8	T1	All MCs	252	28.9	252	28.9	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	1	0.0	1	0.0	0.001	6.6	LOS A	0.0	0.0	0.35	0.52	0.35	51.8
Approach			253	28.8	253	28.8	0.152	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
West: South Ulam Road															
10	L2	All MCs	3	0.0	3	0.0	0.012	6.6	LOS A	0.0	0.4	0.55	0.62	0.55	48.5
12	R2	All MCs	2	100.0	2	100.0	0.012	19.6	LOS B	0.0	0.4	0.55	0.62	0.55	45.6
Approach			5	40.0	5	40.0	0.012	11.8	LOS A	0.0	0.4	0.55	0.62	0.55	47.3
All Vehicles			513	24.2	513	24.2	0.152	0.2	NA	0.0	0.4	0.01	0.01	0.01	59.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [STG 2 PEAK CONST 2029 AM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South:															
1	L2	All MCs	2	50.0	2	50.0	0.002	6.1	LOS A	0.0	0.0	0.00	0.57	0.00	50.9
2	T1	All MCs	209	20.6	209	20.6	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			212	20.9	212	20.9	0.121	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
North: Bruce Highway															
8	T1	All MCs	235	24.2	235	24.2	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	29	3.6	29	3.6	0.026	6.5	LOS A	0.1	0.7	0.33	0.57	0.33	51.8
Approach			264	21.9	264	21.9	0.138	0.8	NA	0.1	0.7	0.04	0.06	0.04	58.9
West: South Ulam Road															
10	L2	All MCs	4	50.0	4	50.0	0.011	7.6	LOS A	0.0	0.4	0.45	0.59	0.45	48.5
12	R2	All MCs	2	50.0	2	50.0	0.011	13.9	LOS A	0.0	0.4	0.45	0.59	0.45	48.8
Approach			6	50.0	6	50.0	0.011	9.7	LOS A	0.0	0.4	0.45	0.59	0.45	48.6
All Vehicles			482	21.8	482	21.8	0.138	0.6	NA	0.1	0.7	0.03	0.04	0.03	59.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 1 [STG 2 PEAK CONST 2029 PM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Bruce Highway															
1	L2	All MCs	6	66.7	6	66.7	0.005	6.3	LOS A	0.0	0.0	0.00	0.57	0.00	50.2
2	T1	All MCs	249	18.6	249	18.6	0.142	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			256	19.8	256	19.8	0.142	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
North: Bruce Highway															
8	T1	All MCs	252	28.9	252	28.9	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	1	100.0	1	100.0	0.002	9.3	LOS A	0.0	0.1	0.44	0.54	0.44	46.7
Approach			253	29.2	253	29.2	0.152	0.1	NA	0.0	0.1	0.00	0.00	0.00	59.8
West: South Ulam Road															
10	L2	All MCs	29	0.0	29	0.0	0.043	6.7	LOS A	0.1	1.1	0.41	0.61	0.41	51.1
12	R2	All MCs	3	100.0	3	100.0	0.043	20.4	LOS B	0.1	1.1	0.41	0.61	0.41	47.8
Approach			33	9.7	33	9.7	0.043	8.0	LOS A	0.1	1.1	0.41	0.61	0.41	50.7
All Vehicles			541	23.5	541	23.5	0.152	0.6	NA	0.1	1.1	0.03	0.04	0.03	59.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Appendix E – Plan of Development

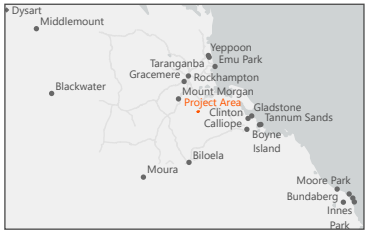


FIGURE 1.2

Project Design

Legend

- Study Area
- Access road
- BESS area
- Overhead and underground line
- Substation area
- Switchyard area
- Road



0 0.25 0.5

Kilometres

Scale 1:12,500 at A4
GDA2020 MGA Zone 56

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Image Source: ESRI Basemap (2025) | **Data Source:** Qld Spatial (2025)

Appendix F – Project Traffic Volumes and Impact Calculations

UMW0125-001 | Mount Hopeful Battery Project

Site Properties

Site Components

Element	Qty	Unit
Length Access Track	1,800	m
Number of Substation Areas	1	ea
Number of BESS Areas	1	ea
Number of Switchyard Areas	1	ea
Staff Water Demand (L/Day)	30	L/day
Average Construction Staff (Stage 1)	90	staff
Overall Construction Period (Stage 1)	791	days
Dust Suppression Construction Period (Stage 1)	791	days
Average Construction Staff (Stage 1)	35	staff
Overall Construction Period (Stage 1)	426	days
Dust Suppression Construction Period (Stage 1)	426	days
% Site Area Dust Suppression per day	10%	
Dust Suppression Water Rate (KL/m2/day)	0.0015	KL/m2/day
% of Gravel Materials Sourced Onsite	0%	%
% of Gravel Materials Imported	100%	%
% of Water Sourced Onsite	0%	%
% of Water Imported	100%	%
% of Bedding Sand (Electrical) Sourced Onsite	0%	%
% of Bedding Sand (Electrical) Imported	100%	%

Site Areas (Each Area)

Element	Number Sites	Total Hardstand Area	Unit	% Gravel	Gravel Area	% Concrete	Concrete Area	Unit
Substation Area (Stage 1)	1	32,610	m2	95%	30,979	5%	1,630	m2
BESS Area (Stage 1)	1	80,270	m2	95%	76,257	5%	4,014	m2
Switchyard Area (Stage 1)	1	81,100	m2	95%	77,045	5%	4,055	m3
Substation Area (Stage 2)	1	12,890	m2	95%	12,246	5%	645	m2
BESS Area (Stage 2)	1	31,730	m2	95%	30,143	5%	1,586	m2

Material Assumptions

Element	Qty	Unit
Access Track Width	5.5	m
Access Track Pavement Depth	0.2	m
Substation Area Concrete Depth	0.2	m
Substation Area Gravel Depth	0.1	m
BESS Area Concrete Depth	0.2	m
BESS Area Gravel Depth	0.1	m
Switchyard Area Concrete Depth	0.2	m
Switchyard Area Gravel Depth	0.1	m

Movements

Site Component Vehicle Movements

Element	Task	Qty per Unit	Unit	Site Qty	Site Transport Qty	Vehicle Type	Vehicle Capacity	Movements
Mobilisation (Buildings / EW Plant) (Stage 1)	1A			40	40	Semi / Low Loader	1	40
BESS - Battery Components (Stage 1)	1D	-	each	466	466	Semi	1	466
BESS - Ancilliary Components (Stage 1)	1D	-	each	50	50	Semi	1	50
BESS - Trench Bedding Sand Materials (Stage 1)	1D	-	each	10	10	Truck & Dog Trailer	1	10
BESS - Electrical Components (MV Transformers) (Stage 1)	1D	-	each	118	118	Semi	1	118
BESS - Battery Components (Stage 2)	2B	-	each	184	184	Semi	1	184
BESS - Ancilliary Components (Stage 2)	2B	-	each	20	20	Semi	1	20
BESS - Trench Bedding Sand Materials (Stage 2)	2B	-	each	5	5	Truck & Dog Trailer	1	5
BESS - Electrical Components (MV Transformers) (Stage 2)	2B	-	each	46	46	Semi	1	46
Substation - Trench Bedding Sand Materials (Stage 1)	1E	-	each	10	10	Truck & Dog Trailer	1	10
Substation - Transformers (Stage 1)	1E	-	each	2	2	OSOM Special	1	2
Substation - Switch Room (Stage 1)	1E	-	each	3	3	OSOM Special	1	3
Substation - Trench Bedding Sand Materials (Stage 2)	2C	-	each	5	5	Truck & Dog Trailer	1	5
Switchyard - Electrical Components (Stage 1)	1F	-	each	100	100	Semi	1	100
Switchyard - Trench Bedding Sand Materials (Stage 1)	1F	-	each	10	10	Truck & Dog Trailer	1	10
Testing & Commissioning - Ancillary Components (Stage 1)	1G	-	each	50	50	Rigid Truck	1	50
Testing & Commissioning - Ancillary Components (Stage 2)	2D	-	each	25	25	Rigid Truck	1	25
							Total	**1,119**

Demobilisation

Element	Task	Qty per Unit	Unit	Site Qty	Site Transport Qty	Vehicle Type	Vehicle Capacity	Movements
BESS Area Decommissioning (Stage 1)	1H	-	each	20	20	Semi	1	20
Substation Area Decommissioning (Stage 1)	1H	-	each	20	20	Semi	1	20
Swithyard Area Decommissioning (Stage 1)	1H	-	each	20	20	Semi	1	20
General Demobilisation (Buildings / EW Plant) (Stage 1)	1H			40	40	Semi	1	40
BESS Area Decommissioning (Stage 2)	2E	-	each	10	10	Semi	1	10
Substation Area Decommissioning (Stage 2)	2E	-	each	10	10	Semi	1	10
General Demobilisation (Buildings / EW Plant) (Stage 2)	2E			15	15	Semi	1	15
							Total	**135**

Construction Materials

Element	Task	Qty per Unit	Unit	Volume (m3)	Site Qty (tonnes)	Site Transport Qty	Vehicle Type	Vehicle Capacity (tonnes)	Movements
Substation Area Concrete (Stage 1)	1C	2.5	t/m3	326	815	815	Concrete Truck	14.4	57
Substation Area Gravel Material (Stage 1)	1C	1.8	t/m3	3,098	5,576	5,576	Truck & Dog Trailer	36	155
Substation Area Construction Water (Stage 1)	1C	1	t/m3	155	155	155	14KL Water Cart	14	12
BESS Area Concrete (Stage 1)	1C	2.5	t/m3	803	2,007	2,007	Concrete Truck	14.4	140
BESS Area Gravel Material (Stage 1)	1C	1.8	t/m3	7,626	13,726	13,726	Truck & Dog Trailer	36	382
BESS Area Construction Water (Stage 1)	1C	1	t/m3	381	381	381	14KL Water Cart	14	28
Switchyard Area Concrete (Stage 1)	1C	2.5	t/m3	811	2,028	2,028	Concrete Truck	14.4	141
Switchyard Area Gravel Material (Stage 1)	1C	1.8	t/m3	7,705	13,868	13,868	Truck & Dog Trailer	36	386
Swithcyard Area Construction Water (Stage 1)	1C	1	t/m3	385	385	385	14KL Water Cart	14	28
Substation Area Concrete (Stage 2)	2A	2.5	t/m3	129	322	322	Concrete Truck	14.4	23
Substation Area Gravel Material (Stage 2)	2A	1.8	t/m3	1,225	2,204	2,204	Truck & Dog Trailer	36	62
Substation Area Construction Water (Stage 2)	2A	1	t/m3	61	61	61	14KL Water Cart	14	5
BESS Area Concrete (Stage 2)	2A	2.5	t/m3	317	793	793	Concrete Truck	14.4	56
BESS Area Gravel Material (Stage 2)	2A	1.8	t/m3	3,014	5,426	5,426	Truck & Dog Trailer	36	151
BESS Area Construction Water (Stage 2)	2A	1	t/m3	151	151	151	14KL Water Cart	14	11
Access Intersection Pavement Materials (Stage 1)	1B	1.8	t/m3	750	1,350	1,350	Truck & Dog Trailer	36	38
Access Intersection Construction Water (Stage 1)	1B	1	t/m3	38	38	38	14KL Water Cart	14	3
Access Track Pavement Materials (Stage 1)	1B	1.8	t/m3	1,980	3,564	3,564	Truck & Dog Trailer	36	99
Access Track Construction Water (Stage 1)	1B	1	t/m3	99	99	99	14KL Water Cart	14	8
Site Water - Staff Compound (Stage 1)	1W	1	t/m3	2,135	2,135	2,135	14KL Water Cart	14	153
Site Water - Dust Suppression (Stage 1)	1W	1	t/m3	1,175	1,175	1,175	14KL Water Cart	14	84
Site Water - Staff Compound (Stage 2)	2W	1	t/m3	447	447	447	14KL Water Cart	14	32
Site Water - Dust Suppression (Stage 2)	2W	1	t/m3	633	633	633	14KL Water Cart	14	46
Site Fuel - Overall	FU					160	Semi Tanker	1	161
Waste Collection - Overall	WC					160	Semi	1	161
								Total	**2,422**

ACCESS TRAFFIC CONSULTING

UMW0125-001 | Mount Hopeful Battery Project

Site Vehicle Movement Summary - Stage 1

Assumed Work Days per Month 24 days

TASK 1A - MOBILISATION

Task Transport Duration 1 month

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Mobilisation (Buildings / EW Plant) (Stage 1)	40	Semi / Low Loader	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	40	40	2
South Ulam Road (Bruce Highway - Site Access)	40	40	2

TASK 1B - SITE ACCESS AND INTERNAL ACCESS ROAD

Task Transport Duration 2 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Access Intersection Pavement Materials (Stage 1)	38	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Access Intersection Construction Water (Stage 1)	3	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Access Track Pavement Materials (Stage 1)	99	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Access Track Construction Water (Stage 1)	8	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	137	69	3
Bruce Highway (South Ulam Road - Rockhampton)	11	6	1
South Ulam Road (Bruce Highway - Site Access)	148	74	4

TASK 1C - CIVIL WORKS

Task Transport Duration 6 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation Area Concrete (Stage 1)	57	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Gravel Material (Stage 1)	155	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Substation Area Construction Water (Stage 1)	12	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Concrete (Stage 1)	140	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Gravel Material (Stage 1)	382	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS Area Construction Water (Stage 1)	28	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Switchyard Area Concrete (Stage 1)	141	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Switchyard Area Gravel Material (Stage 1)	386	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Swithcyard Area Construction Water (Stage 1)	28	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	923	154	7
Bruce Highway (South Ulam Road - Rockhampton)	406	68	3
South Ulam Road (Bruce Highway - Site Access)	1,329	222	10

TASK 1D - ELECTRICAL INSTALLATION (BESS)

Task Transport Duration (Delivery) 6 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS - Battery Components (Stage 1)	466	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Ancilliary Components (Stage 1)	50	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Trench Bedding Sand Materials (Stage 1)	10	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS - Electrical Components (MV Transformers) (Stage 1)	118	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	634	106	5
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	634	106	5
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	634	106	5
Bruce Highway (Bills Road - South Ulam Road)	644	108	5
Bruce Highway (South Ulam Road - Rockhampton)	0	0	0
South Ulam Road (Bruce Highway - Site Access)	644	108	5

TASK 1E - SUBSTATION WORKS

Task Transport Duration (Delivery) 6 months A

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation - Trench Bedding Sand Materials (Stage 1)	10	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Substation - Transformers (Stage 1)	2	OSOM Special	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
Substation - Switch Room (Stage 1)	3	OSOM Special	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	5	1	1
Gladstone Mount Larcom Road (GPAR to Red Rover Road)	5	1	1
Gladstone Mount Larcom Road (Red Rover Road to Bruce Highway)	0	0	0
Red Rover Road (Gladstone Mount Larcom Road to Don Young Drive)	5	1	1
Don Young Drive (Red Rover Road to Dawson Highway)	5	1	1
Dawson Highway (Don Young Drive to Bruce Highway)	5	1	1
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	5	1	1
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	5	1	1
Bruce Highway (Bills Road - South Ulam Road)	15	3	1
Bruce Highway (South Ulam Road - Rockhampton)	0	0	0
South Ulam Road (Bruce Highway - Site Access)	15	3	1

TASK 1F - SWITCHYARD WORKS

Task Transport Duration (Delivery) 6 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Switchyard - Electrical Components (Stage 1)	100	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
Switchyard - Trench Bedding Sand Materials (Stage 1)	10	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	100	17	1
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	100	17	1
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	100	17	1
Bruce Highway (Bills Road - South Ulam Road)	110	19	1
Bruce Highway (South Ulam Road - Rockhampton)	0	0	0
South Ulam Road (Bruce Highway - Site Access)	110	19	1

TASK 1G - TESTING AND COMMISSIONING

Task Transport Duration 9 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Testing & Commissioning - Ancillary Components (Stage 1)	50	Rigid Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	50	6	1
South Ulam Road (Bruce Highway - Site Access)	50	6	1

TASK 1H - FINALISATION / COMMISSIONING / DEMOBILISATION

Task Transport Duration 3 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS Area Decommissioning (Stage 1)	20	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Decommissioning (Stage 1)	20	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Swithyard Area Decommissioning (Stage 1)	20	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
General Demobilisation (Buildings / EW Plant) (Stage 1)	40	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	100	34	2
South Ulam Road (Bruce Highway - Site Access)	100	34	2

TASK 1W - SITE WATER

Task Transport Duration (Staff Water) 26 months
Task Transport Duration (Dust Supression Water) 6 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Site Water - Staff Compound (Stage 1)	153	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Site Water - Dust Suppression (Stage 1)	84	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	237	20	1
South Ulam Road (Bruce Highway - Site Access)	237	20	1

TASK F - SITE FUEL

Task Transport Duration 37 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Site Fuel - Overall	161	Semi Tanker	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	161	5	1
South Ulam Road (Bruce Highway - Site Access)	161	5	1

TASK WC - SITE WASTE COLLECTION

Task Transport Duration 37 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Waste Collection - Overall	161	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	161	5	1
South Ulam Road (Bruce Highway - Site Access)	161	5	1

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Site Vehicle Movement Summary - Stage 2

Assumed Work Days per Month 24 days

TASK 2A - CIVIL WORKS

Task Transport Duration 3 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation Area Concrete (Stage 2)	23	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Gravel Material (Stage 2)	62	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Substation Area Construction Water (Stage 2)	5	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Concrete (Stage 2)	56	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Gravel Material (Stage 2)	151	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS Area Construction Water (Stage 2)	11	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	213	71	3
Bruce Highway (South Ulam Road - Rockhampton)	95	32	2
South Ulam Road (Bruce Highway - Site Access)	308	103	5

TASK 2B - ELECTRICAL INSTALLATION (BESS)

Task Transport Duration (Delivery) 4 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS - Battery Components (Stage 2)	184	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Ancilliary Components (Stage 2)	20	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Trench Bedding Sand Materials (Stage 2)	5	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS - Electrical Components (MV Transformers) (Stage 2)	46	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	250	63	3
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	250	63	3
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	250	63	3
Bruce Highway (Bills Road - South Ulam Road)	255	64	3
Bruce Highway (South Ulam Road - Rockhampton)	0	0	0
South Ulam Road (Bruce Highway - Site Access)	255	64	3

TASK 2C - SUBSTATION WORKS

Task Transport Duration (Delivery) 1 months A

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation - Trench Bedding Sand Materials (Stage 2)	5	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Red Rover Road)	0	0	0
Gladstone Mount Larcom Road (Red Rover Road to Bruce Highway)	0	0	0
Red Rover Road (Gladstone Mount Larcom Road to Don Young Drive)	0	0	0
Don Young Drive (Red Rover Road to Dawson Highway)	0	0	0
Dawson Highway (Don Young Drive to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	5	5	1
Bruce Highway (South Ulam Road - Rockhampton)	0	0	0
South Ulam Road (Bruce Highway - Site Access)	5	5	1

TASK 2D - TESTING AND COMMISSIONING

Task Transport Duration 3 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Testing & Commissioning - Ancillary Components (Stage 2)	25	Rigid Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	25	9	1
South Ulam Road (Bruce Highway - Site Access)	25	9	1

TASK 2E - FINALISATION / COMMISSIONING / DEMOBILISATION

Task Transport Duration 2 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS Area Decommissioning (Stage 2)	10	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Decommissioning (Stage 2)	10	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
General Demobilisation (Buildings / EW Plant) (Stage 2)	15	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	35	18	1
South Ulam Road (Bruce Highway - Site Access)	35	18	1

TASK 2W - SITE WATER

Task Transport Duration (Staff Water) 17 months
Task Transport Duration (Dust Supression Water) 3 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Site Water - Staff Compound (Stage 2)	32	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Site Water - Dust Suppression (Stage 2)	46	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	78	18	1
South Ulam Road (Bruce Highway - Site Access)	78	18	1

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Project Staff Movements

Project Timeframe

Element	Qty	Unit
Hours per day	12	hrs
Working days per week	7	days
Working days per month	30	days

Construction Workforce

Element	Max Staff	Unit
Peak Workforce - Stage 1	150	staff
Peak Workforce - Stage 2	50	staff

Construction Workforce Distribution - Stage 1 (Peak)

Location	Distribution	Unit	Qty	Vehicle Type	% Vehicle	Staff No. per Vehicle Type	Average Vehicle Capacity	Movements Round Trip (per day)
Rockhampton	100%	%	150	LV	50%	75	2	38
				Bus	50%	75	20	4
							Total	**42**

Construction Workforce Distribution - Stage 2 (Peak)

Location	Distribution	Unit	Qty	Vehicle Type	% Vehicle	Staff No. per Vehicle Type	Average Vehicle Capacity	Movements Round Trip (per day)
Rockhampton	100%	%	50	LV	100%	50	2	25
							Total	**25**

Operations

Element	Qty	Unit
Hours per day	12	hrs
Working days per week	6	days
Working days per month	24	days
Peak Workforce	10	each

Location	Distribution	Unit	Qty	Vehicle Type	Vehicle Capacity	Movements 2-way (per day)
Rockhampton	100%	%	10	LV	1	10
					Total	**10**

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Project Traffic Schedule (South Ulam Road)

ID	Task	MONTH	Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
			Q3	Q4 2026			Q1 2027			Q2 2027			Q3 2027			Q4 2027			Q1 2028			Q2 2028			Q3 2028			Q4 2028			Q1 2029			Q2 2029			Q3 2029			Q4 2029		
STAGE 1 - CONSTRUCTION PHASE																																									
1A	Mobilisation		2																																						
1B	Site Access & Internal Access Road			4	4																																				
1C	Civil Works			10	10	10	10	10	10																																	
1D	Electrical Installation (BESS)									5	5	5	5	5	5	5	5	5	5	5	5	5	5	5																		
1E	Substation Works									1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																		
1F	Switchyards Works						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																
1G	Testing and Commissioning															1	1	1	1	1	1	1	1	1	1	1	1																
1H	Finalisation / Commissioning / Demobilisation																								2	2	2																
1W	Site Water		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1												
STAGE 2 - CONSTRUCTION PHASE																																									
2A	Civil Works																								5	5	5																
2B	Electrical Installation (BESS)																											3	3	3	3	3	3									
2C	Substation Works																																	1								
2D	Testing and Commissioning																																		1	1	1					
2E	Site Water																																					1	1			
2W	Site Water																								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
GENERAL CONSTRUCTION TRAFFIC																																									
F	Site Fuel		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
WC	Site Wast Collection		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Total Maximum Daily Heavy Vehicles			**5**	**17**	**17**	**13**	**14**	**14**	**14**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**11**	**11**	**11**	**11**	**11**	**11**	**5**	**5**	**5**	**11**	**11**	**11**	**6**	**6**	**6**	**6**	**6**	**7**	**4**	**4**	**4**	**4**	**4**	**0**	**0**	**0**

				MONTH	Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
					Q3	Q4 2026			Q1 2027			Q2 2027			Q3 2027			Q4 2027			Q1 2028			Q2 2028			Q3 2028			Q4 2028			Q1 2029			Q2 2029			Q3 2029			Q4 2029		
Stage 1 Staff Numbers					10	50	50	50	75	75	75	150	150	150	150	150	150	150	150	150	75	75	75	75	75	75	75	20	20	20	0	0	0	0	0	0	0	0	0	0	0	0
Stage 2 Staff Numbers					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	30	30	50	50	50	50	50	50	20	20	20	20	0	0	0
Total Staff Numbers					**10**	**50**	**50**	**50**	**75**	**75**	**75**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**75**	**75**	**75**	**75**	**75**	**75**	**75**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**50**	**20**	**20**	**20**	**20**	**20**	**0**	**0**	**0**
Staff	**Vehicle**	100% **Capacity**	**Utilisation by Staff**		*10*	*50*	*50*	*50*	*75*	*75*	*75*	*150*	*150*	*150*	*150*	*150*	*150*	*150*	*150*	*150*	*75*	*75*	*75*	*75*	*75*	*75*	*75*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*20*	*20*	*20*	*20*	*20*	*0*	*0*	*0*
Local Staff (Rockhampton)	100%				*10*	*50*	*50*	*50*	*75*	*75*	*75*	*150*	*150*	*150*	*150*	*150*	*150*	*150*	*150*	*150*	*75*	*75*	*75*	*75*	*75*	*75*	*75*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*50*	*20*	*20*	*20*	*20*	*20*	*0*	*0*	*0*
	Mini Bus	20	50%		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	LV	2	50%		*5*	*25*	*25*	*25*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*38*	*25*	*25*	*25*	*25*	*25*	*25*	*25*	*25*	*25*	*10*	*10*	*10*	*10*	*10*	*0*	*0*	*0*
Daily Construction Staff Vehicle Movements					**5**	**25**	**25**	**25**	**38**	**38**	**38**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**42**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**25**	**10**	**10**	**10**	**10**	**10**	**0**	**0**	**0**
Daily Project (Construction)Vehicle Movements					**10**	**42**	**42**	**38**	**52**	**52**	**52**	**52**	**52**	**52**	**52**	**52**	**52**	**52**	**53**	**53**	**49**	**49**	**49**	**49**	**43**	**43**	**43**	**36**	**36**	**36**	**31**	**31**	**31**	**31**	**31**	**32**	**14**	**14**	**14**	**14**	**14**	**0**	**0**	**0**

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Stage 1 Project Traffic Impact % Calculations

Road ID	Road Description	AADT Segment	AADT Segment		Base Data Year	Base Year AADT			Base Year HV%		Base Year HV		10 Yr GR%	2027 AADT			2027 HV	
			Start (km)	End (km)		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz
183	Gladstone Port Access Road	61605	0.000	0.858	2023	950	886	1,836	31.96%	42.33%	304	375	*1.00%*	989	922	1,911	316	390
181	Gladstone - Mount Larcom Road	160360	0.000	***0.175***	2023	5,650	5,948	11,598	8.85%	8.60%	500	512	*1.00%*	5,879	6,190	12,069	520	532
		160361	***0.175***	0.675	2023	5,316	6,043	11,359	14.61%	17.13%	777	1,035	*1.00%*	5,532	6,288	11,820	808	1,077
		60071	0.675	1.409	2023	3,900	3,574	7,474	13.77%	17.32%	537	619	*1.00%*	4,058	3,719	7,777	559	644
		60073	1.409	3.258	2023	3,737	3,657	7,394	15.09%	12.33%	564	451	*1.00%*	3,889	3,805	7,694	587	469
		61052	3.258	***3.830***	2023	4,186	5,144	9,330	15.92%	19.78%	666	1,017	*1.00%*	4,356	5,353	9,709	693	1,059
			3.830	4.625	2023	4,186	5,144	9,330	15.92%	19.78%	666	1,017	*1.00%*	4,356	5,353	9,709	693	1,059
		60074	4.625	12.292	2023	3,207	3,230	6,437	19.17%	20.76%	615	671	*1.00%*	3,337	3,361	6,698	640	698
		60076	12.292	32.140	2023	1,754	1,758	3,512	23.74%	28.18%	416	495	*1.00%*	1,825	1,829	3,655	433	516
-	Red Rover Road	GRC	0.000	3.390	-	No Information Available												
-	Don Young Drive	GRC	0.000	2.280	-	No Information Available												
46A	Dawson Highway (Gladstone - Biloela)	60065	***7.150***	***19.305***	2023	3,835	3,659	7,494	17.32%	13.62%	664	498	*1.00%*	3,991	3,808	7,798	691	519
10E	Bruce Highway (Benaraby - Rockhampton)	60006	11.445	***45.420***	2023	2,174	2,111	4,285	26.01%	35.67%	565	753	*1.00%*	2,262	2,197	4,459	588	784
		60023	***45.420***	***75.469***	2023	3,112	3,146	6,258	31.22%	27.30%	972	859	1.27%	3,273	3,309	6,582	1,022	903
			75.469	85.308	2023	3,112	3,146	6,258	31.22%	27.30%	972	859	1.27%	3,273	3,309	6,582	1,022	903
		160954	85.308	***86.183***	2023	3,326	3,111	6,437	28.42%	28.37%	945	883	*1.00%*	3,461	3,237	6,698	984	918
			86.183	87.080	2023	3,326	3,111	6,437	28.42%	28.37%	945	883	*1.00%*	3,461	3,237	6,698	984	918
		61551	87.080	108.938	2023	3,588	3,569	7,157	30.95%	26.82%	1,110	957	1.55%	3,816	3,795	7,611	1,181	1,018
		60130	108.938	114.388	2022	2,861	2,635	5,496	27.44%	33.99%	785	896	*1.00%*	3,007	2,769	5,776	825	941
		60024	114.388	116.961	2023	5,575	5,344	10,919	15.02%	17.15%	837	916	2.21%	6,084	5,832	11,917	914	1,000
-	South Ulam Road	RRC	0.000	***16.773***	2022	87	105	192	43.28%	35.80%	38	38	*1.00%*	92	111	202	40	40

STG 1 % INCREASE		
Gaz %	A-Gaz %	Bi-Dir %
0.71%	0.76%	0.73%
0.00%	0.00%	0.00%
0.13%	0.11%	0.12%
0.17%	0.19%	0.18%
0.18%	0.18%	0.18%
0.16%	0.13%	0.14%
0.14%	0.11%	0.12%
0.18%	0.18%	0.18%
0.33%	0.33%	0.33%
-	-	-
-	-	-
0.03%	0.00%	0.01%
0.04%	0.00%	0.02%
0.21%	0.21%	0.21%
1.53%	1.66%	1.59%
0.76%	0.79%	0.77%
57.90%	47.89%	52.42%

STG 1 PEAK CONST		
Gaz	A-Gaz	Bi-Dir
996	929	1,925
5,879	6,190	12,069
5,539	6,295	11,834
4,065	3,726	7,791
3,896	3,812	7,708
4,363	5,360	9,723
4,362	5,359	9,721
3,343	3,367	6,710
1,831	1,835	3,667
-	-	-
-	-	-
3,992	3,808	7,799
2,263	2,197	4,460
3,280	3,316	6,596
3,280	3,316	6,596
3,468	3,244	6,712
3,468	3,244	6,712
3,862	3,841	7,703
3,053	2,815	5,868
6,130	5,878	12,009
145	164	308

ACCESS TRAFFIC CONSULTING

Road ID	Road Description	AADT Segment	AADT Segment		Dev Traffic (Daily) - Construction																									
					Gazettal													A-Gazettal													Bi-Dir
			Start (km)	End (km)	1A	1B	1C	1D	1E	1F	1G	1H	1 Water	1 Staff	Fuel	Waste	Max	1A	B	C	1D	1E	1F	1G	1H	1 Water	1 Staff	Fuel	Waste	Max	
183	Gladstone Port Access Road	61605	0.000	0.858	0	0	0	5	1	1	0	0	0	0	0	0	**7**	0	0	0	5	1	1	0	0	0	0	0	0	**7**	**14**
181	Gladstone - Mount Larcom Road	160360	0.000	***0.175***	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
		160361	***0.175***	0.675	0	0	0	5	1	1	0	0	0	0	0	0	**7**	0	0	0	5	1	1	0	0	0	0	0	0	**7**	**14**
		60071	0.675	1.409	0	0	0	5	1	1	0	0	0	0	0	0	**7**	0	0	0	5	1	1	0	0	0	0	0	0	**7**	**14**
		60073	1.409	3.258	0	0	0	5	1	1	0	0	0	0	0	0	**7**	0	0	0	5	1	1	0	0	0	0	0	0	**7**	**14**
		61052	3.258	***3.830***	0	0	0	5	1	1	0	0	0	0	0	0	**7**	0	0	0	5	1	1	0	0	0	0	0	0	**7**	**14**
			3.830	4.625	0	0	0	5	0	1	0	0	0	0	0	0	**6**	0	0	0	5	0	1	0	0	0	0	0	0	**6**	**12**
		60074	4.625	12.292	0	0	0	5	0	1	0	0	0	0	0	0	**6**	0	0	0	5	0	1	0	0	0	0	0	0	**6**	**12**
		60076	12.292	32.140	0	0	0	5	0	1	0	0	0	0	0	0	**6**	0	0	0	5	0	1	0	0	0	0	0	0	**6**	**12**
-	Red Rover Road	GRC	0.000	3.390	0	0	0	0	1	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**1**
-	Don Young Drive	GRC	0.000	2.280	0	0	0	0	1	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**1**
46A	Dawson Highway (Gladstone - Biloela)	60065	***7.150***	***19.305***	0	0	0	0	1	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**1**
10E	Bruce Highway (Benaraby - Rockhampton)	60006	11.445	***45.420***	0	0	0	0	1	0	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**1**
		60023	***45.420***	***75.469***	0	0	0	5	1	1	0	0	0	0	0	0	**7**	0	0	0	5	1	1	0	0	0	0	0	0	**7**	**14**
			75.469	85.308	0	3	7	5	1	1	0	0	0	0	0	0	**7**	0	3	7	5	1	1	0	0	0	0	0	0	**7**	**14**
		160954	85.308	***86.183***	0	3	7	5	1	1	0	0	0	0	0	0	**7**	0	3	7	5	1	1	0	0	0	0	0	0	**7**	**14**
			86.183	87.080	2	1	3	0	0	0	1	2	1	42	1	1	**46**	2	1	3	0	0	0	1	2	1	42	1	1	**46**	**92**
		61551	87.080	108.938	2	1	3	0	0	0	1	2	1	42	1	1	**46**	2	1	3	0	0	0	1	2	1	42	1	1	**46**	**92**
		60130	108.938	114.388	2	1	3	0	0	0	1	2	1	42	1	1	**46**	2	1	3	0	0	0	1	2	1	42	1	1	**46**	**92**
		60024	114.388	116.961	2	1	3	0	0	0	1	2	1	42	1	1	**46**	2	1	3	0	0	0	1	2	1	42	1	1	**46**	**92**
-	South Ulam Road	RRC	0.000	***16.773***	2	4	10	5	1	1	1	2	1	42	1	1	**53**	2	4	10	5	1	1	1	2	1	42	1	1	**53**	**106**

UMW0125-001 | Mount Hopeful Battery Project

Stage 2 Project Traffic Impact % Calculations

Road ID	Road Description	AADT Segment	AADT Segment		Base Data Year	Base Year AADT			Base Year HV%		Base Year HV		10 Yr GR%	2029 AADT			2029 HV	
			Start (km)	End (km)		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz
183	Gladstone Port Access Road	61605	0.000	0.858	2023	950	886	1,836	31.96%	42.33%	304	375	*1.00%*	1,008	941	1,949	322	398
181	Gladstone - Mount Larcom Road	160360	0.000	***0.175***	2023	5,650	5,948	11,598	8.85%	8.60%	500	512	*1.00%*	5,998	6,314	12,312	531	543
		160361	***0.175***	0.675	2023	5,316	6,043	11,359	14.61%	17.13%	777	1,035	*1.00%*	5,643	6,415	12,058	824	1,099
		60071	0.675	1.409	2023	3,900	3,574	7,474	13.77%	17.32%	537	619	*1.00%*	4,140	3,794	7,934	570	657
		60073	1.409	3.258	2023	3,737	3,657	7,394	15.09%	12.33%	564	451	*1.00%*	3,967	3,882	7,849	599	479
		61052	3.258	***3.830***	2023	4,186	5,144	9,330	15.92%	19.78%	666	1,017	*1.00%*	4,444	5,460	9,904	707	1,080
			3.830	4.625	2023	4,186	5,144	9,330	15.92%	19.78%	666	1,017	*1.00%*	4,444	5,460	9,904	707	1,080
		60074	4.625	12.292	2023	3,207	3,230	6,437	19.17%	20.76%	615	671	*1.00%*	3,404	3,429	6,833	653	712
		60076	12.292	32.140	2023	1,754	1,758	3,512	23.74%	28.18%	416	495	*1.00%*	1,862	1,866	3,728	442	526
-	Red Rover Road	GRC	0.000	3.390	-	No Information Available												
-	Don Young Drive	GRC	0.000	2.280	-	No Information Available												
46A	Dawson Highway (Gladstone - Biloela)	60065	***7.150***	***19.305***	2023	3,835	3,659	7,494	17.32%	13.62%	664	498	*1.00%*	4,071	3,884	7,955	705	529
10E	Bruce Highway (Benaraby - Rockhampton)	60006	11.445	***45.420***	2023	2,174	2,111	4,285	26.01%	35.67%	565	753	*1.00%*	2,308	2,241	4,549	600	799
		60023	***45.420***	***75.469***	2023	3,112	3,146	6,258	31.22%	27.30%	972	859	1.27%	3,357	3,393	6,750	1,048	926
			75.469	85.308	2023	3,112	3,146	6,258	31.22%	27.30%	972	859	1.27%	3,357	3,393	6,750	1,048	926
		160954	85.308	***86.183***	2023	3,326	3,111	6,437	28.42%	28.37%	945	883	*1.00%*	3,531	3,302	6,833	1,003	937
			86.183	87.080	2023	3,326	3,111	6,437	28.42%	28.37%	945	883	*1.00%*	3,531	3,302	6,833	1,003	937
		61551	87.080	108.938	2023	3,588	3,569	7,157	30.95%	26.82%	1,110	957	1.55%	3,935	3,914	7,849	1,218	1,050
		60130	108.938	114.388	2022	2,861	2,635	5,496	27.44%	33.99%	785	896	*1.00%*	3,067	2,825	5,892	842	960
		60024	114.388	116.961	2023	5,575	5,344	10,919	15.02%	17.15%	837	916	2.21%	6,356	6,093	12,449	955	1,045
-	South Ulam Road	RRC	0.000	***16.773***	2022	87	105	192	43.28%	35.80%	38	38	*1.00%*	93	113	206	40	40

STG 2 % INCREASE		
Gaz %	A-Gaz %	Bi-Dir %
0.30%	0.32%	0.31%
0.00%	0.00%	0.00%
0.05%	0.05%	0.05%
0.07%	0.08%	0.08%
0.08%	0.08%	0.08%
0.07%	0.05%	0.06%
0.07%	0.05%	0.06%
0.09%	0.09%	0.09%
0.16%	0.16%	0.16%
-	-	-
-	-	-
0.00%	0.00%	0.00%
0.00%	0.00%	0.00%
0.09%	0.09%	0.09%
0.12%	0.12%	0.12%
0.12%	0.12%	0.12%
0.91%	0.99%	0.95%
0.44%	0.46%	0.45%
34.27%	28.34%	31.03%

STG 2 PEAK CONST		
Gaz	A-Gaz	Bi-Dir
1,011	944	1,955
5,998	6,314	12,312
5,646	6,418	12,064
4,143	3,797	7,940
3,970	3,885	7,855
4,447	5,463	9,910
4,447	5,463	9,910
3,407	3,432	6,839
1,865	1,869	3,734
-	-	-
-	-	-
4,071	3,884	7,955
2,308	2,241	4,549
3,360	3,396	6,756
3,361	3,397	6,758
3,535	3,306	6,841
3,535	3,306	6,841
3,963	3,942	7,905
3,095	2,853	5,948
6,384	6,121	12,505
125	145	270

ACCESS TRAFFIC CONSULTING

Road ID	Road Description	AADT Segment	AADT Segment		Dev Traffic (Daily) - Construction																					
					Gazettal										A-Gazettal											Bi-Dir
			Start (km)	End (km)	2A	2B	2C	2D	2E	2 Water	2 Staff	Fuel	Waste	Max	2A	2B	2C	2D	2E	2 Water	2 Staff	Fuel	Waste	Max	
183	Gladstone Port Access Road	61605	0.000	0.858	0	3	0	0	0	0	0	0	0	**3**	0	3	0	0	0	0	0	0	0	**3**	**6**
181	Gladstone - Mount Larcom Road	160360	0.000	***0.175***	0	0	0	0	0	0	0	0	0	**0**	0	0	0	0	0	0	0	0	0	**0**	**0**
		160361	***0.175***	0.675	0	3	0	0	0	0	0	0	0	**3**	0	3	0	0	0	0	0	0	0	**3**	**6**
		60071	0.675	1.409	0	3	0	0	0	0	0	0	0	**3**	0	3	0	0	0	0	0	0	0	**3**	**6**
		60073	1.409	3.258	0	3	0	0	0	0	0	0	0	**3**	0	3	0	0	0	0	0	0	0	**3**	**6**
		61052	3.258	***3.830***	0	3	0	0	0	0	0	0	0	**3**	0	3	0	0	0	0	0	0	0	**3**	**6**
			3.830	4.625	0	3	0	0	0	0	0	0	0	**3**	0	3	0	0	0	0	0	0	0	**3**	**6**
		60074	4.625	12.292	0	3	0	0	0	0	0	0	0	**3**	0	3	0	0	0	0	0	0	0	**3**	**6**
		60076	12.292	32.140	0	3	0	0	0	0	0	0	0	**3**	0	3	0	0	0	0	0	0	0	**3**	**6**
-	Red Rover Road	GRC	0.000	3.390	0	0	0	0	0	0	0	0	0	**0**	0	0	0	0	0	0	0	0	0	**0**	**0**
-	Don Young Drive	GRC	0.000	2.280	0	0	0	0	0	0	0	0	0	**0**	0	0	0	0	0	0	0	0	0	**0**	**0**
46A	Dawson Highway (Gladstone - Biloela)	60065	***7.150***	***19.305***	0	0	0	0	0	0	0	0	0	**0**	0	0	0	0	0	0	0	0	0	**0**	**0**
10E	Bruce Highway (Benaraby - Rockhampton)	60006	11.445	***45.420***	0	0	0	0	0	0	0	0	0	**0**	0	0	0	0	0	0	0	0	0	**0**	**0**
		60023	***45.420***	***75.469***	0	3	0	0	0	0	0	0	0	**3**	0	3	0	0	0	0	0	0	0	**3**	**6**
			75.469	85.308	3	3	1	0	0	0	0	0	0	**4**	3	3	1	0	0	0	0	0	0	**4**	**8**
		160954	85.308	***86.183***	3	3	1	0	0	0	0	0	0	**4**	3	3	1	0	0	0	0	0	0	**4**	**8**
			86.183	87.080	2	0	0	1	1	1	25	1	1	**28**	2	0	0	1	1	1	25	1	1	**28**	**56**
		61551	87.080	108.938	2	0	0	1	1	1	25	1	1	**28**	2	0	0	1	1	1	25	1	1	**28**	**56**
		60130	108.938	114.388	2	0	0	1	1	1	25	1	1	**28**	2	0	0	1	1	1	25	1	1	**28**	**56**
		60024	114.388	116.961	2	0	0	1	1	1	25	1	1	**28**	2	0	0	1	1	1	25	1	1	**28**	**56**
-	South Ulam Road	RRC	0.000	***16.773***	5	3	1	1	1	1	25	1	1	**32**	5	3	1	1	1	1	25	1	1	**32**	**64**

Appendix G – Turn Warrants Assessment

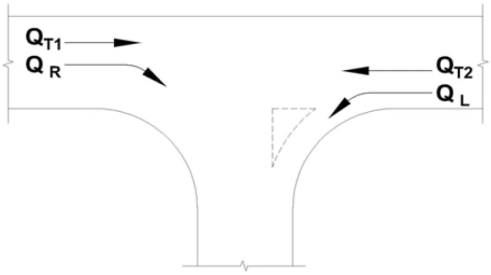
Turn Warrant Assessment

Intersection:	**Bruce Highway / South Ulam Road**
Year / Peak:	**2027 AM & PM**
Scenario:	**Stage 1 Peak Construction**

Assessment based on Austroads Guide to Road Design, Part 4b. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	PM Peak
Q_{T1} =	219	234
Q_R =	46	1

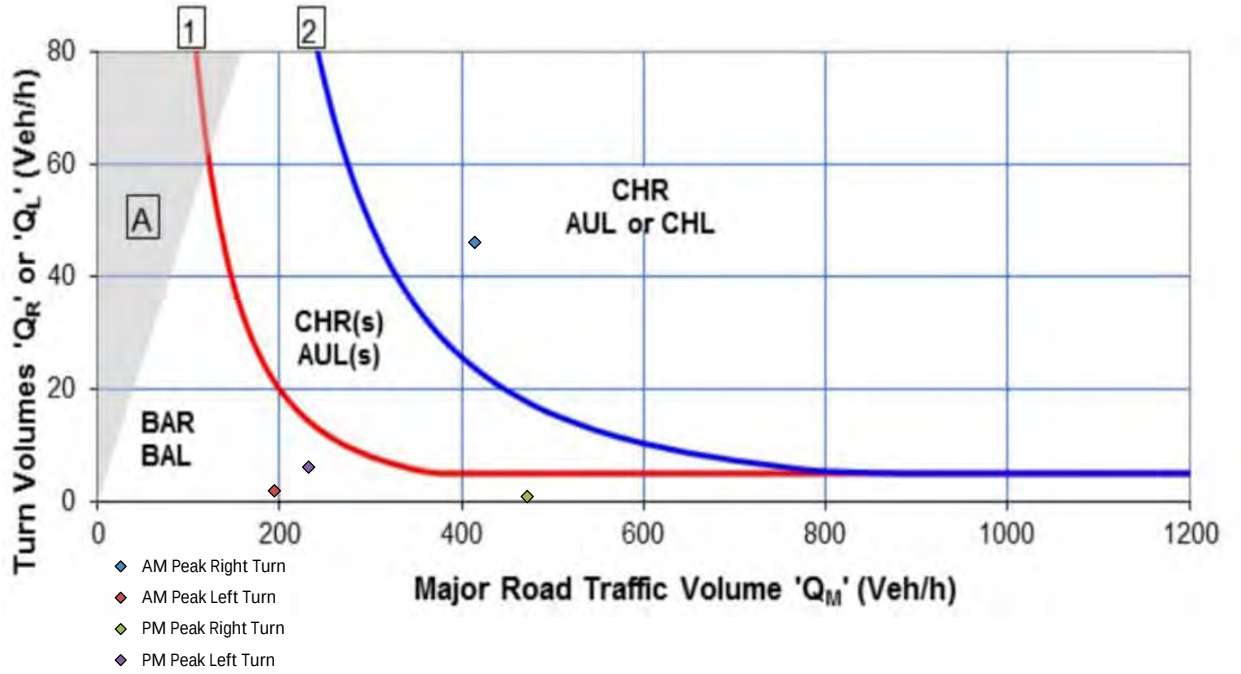
	AM Peak	PM Peak
Q_{T2} =	194	232
Q_L =	2	6



South Ulam Road

Splitter Island?	No
Design speed (km/h)	110

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	415	46
Left	194	2
PM Peak		
Right	473	1
Left	232	6



Recommended treatments:

Right Turn	CHR
Left Turn	BAL

Legend

BAR	Basic Right Turn	BAL	Basic Left Turn
CHR(S)	Channelised Right Turn (short)	AUL(S)	Auxiliary Left Turn (short)
CHR	Channelised Right Turn	AUL	Auxiliary Left Turn
		CHL	Channelised Left Turn

Comments:

Existing intersection configuration (CHR / AULs) is expected to be adequate to cater for expected Stage 1 project "in construction" traffic volumes.

Prepared by:	A. Barrie
Reviewed by:	A. Barrie
Date:	12/09/2025

Turn Warrant Assessment

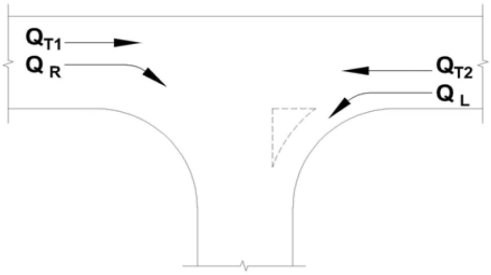
Intersection:	**Bruce Highway / South Ulam Road**
Year / Peak:	**2029 AM & PM**
Scenario:	**Stage 2 Peak Construction**

Assessment based on Austroads Guide to Road Design, Part 4b. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	*PM Peak*
Q_{T1} =	223	239
Q_R =	28	0

Splitter Island? No

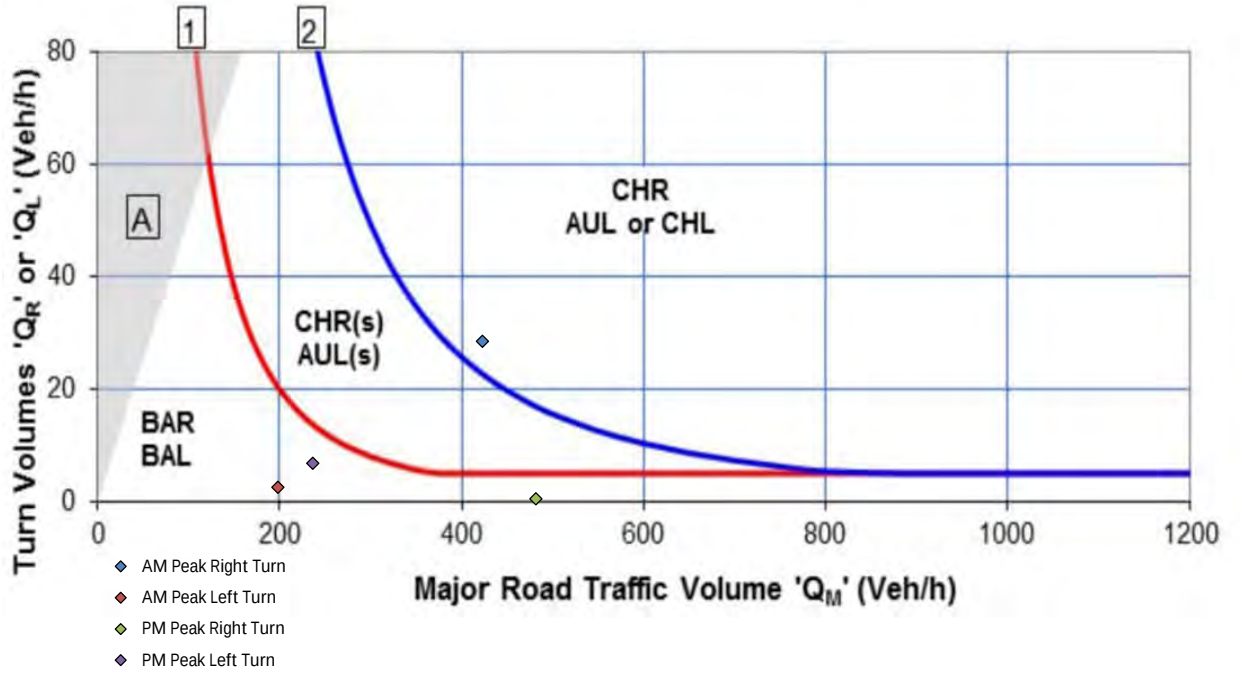
Design speed (km/h) 110



South Ulam Road

	AM Peak	*PM Peak*
Q_{T2} =	198	237
Q_L =	2	6

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	423	28
Left	198	2
PM Peak		
Right	482	0
Left	237	6



Recommended treatments:

Right Turn	CHR
Left Turn	BAL

Legend

BAR	Basic Right Turn	BAL	Basic Left Turn
CHR(S)	Channelised Right Turn (short)	AUL(S)	Auxiliary Left Turn (short)
CHR	Channelised Right Turn	AUL	Auxiliary Left Turn
		CHL	Channelised Left Turn

Comments:

Existing intersection configuration (CHR / AULs) is expected to be adequate to cater for expected Stage 2 project "in construction" traffic volumes.

Prepared by:	A. Barrie
Reviewed by:	A. Barrie
Date:	12/09/2025

Appendix H – Project Pavement Loading and Impact Calculations

UMW0125-001 | Mount Hopeful Battery Project

Project Pavement Loading - Stage 1

TASK A - MOBILISATION

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Mobilisation (Buildings / EW Plant) (Stage 1)	40	Semi / Low Loader	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	67	222
South Ulam Road (Bruce Highway - Site Access)	222	67

TASK B - SITE ACCESS AND INTERNAL ACCESS ROAD

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Access Intersection Pavement Materials (Stage 1)	38	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Access Intersection Construction Water (Stage 1)	3	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Access Track Pavement Materials (Stage 1)	99	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Access Track Construction Water (Stage 1)	8	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs
14KL Water Cart (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
14KL Water Cart (4 Axle Rigid) Loaded (100%)	4.13	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	843	225
Bruce Highway (South Ulam Road - Rockhampton)	4	45
South Ulam Road (Bruce Highway - Site Access)	888	229

TASK C - CIVIL WORKS

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation Area Concrete (Stage 1)	57	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Gravel Material (Stage 1)	155	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Substation Area Construction Water (Stage 1)	12	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Concrete (Stage 1)	140	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Gravel Material (Stage 1)	382	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS Area Construction Water (Stage 1)	28	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Switchyard Area Concrete (Stage 1)	141	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Switchyard Area Gravel Material (Stage 1)	386	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Swithcyard Area Construction Water (Stage 1)	28	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Concrete Truck (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
Concrete Truck (4 Axle Rigid) Loaded (100%)	4.13	ESAs
Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs
14KL Water Cart (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
14KL Water Cart (4 Axle Rigid) Loaded (100%)	4.13	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	5,676	1,514
Bruce Highway (South Ulam Road - Rockhampton)	146	1,677
South Ulam Road (Bruce Highway - Site Access)	7,353	1,660

TASK D - ELECTRICAL INSTALLATION (BESS)

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS - Battery Components (Stage 1)	466	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Ancilliary Components (Stage 1)	50	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Trench Bedding Sand Materials (Stage 1)	10	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS - Electrical Components (MV Transformers) (Stage 1)	118	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs
Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	1,065	3,512
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	3,512	1,065
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	3,512	1,065
Bruce Highway (Bills Road - South Ulam Road)	3,512	1,065
Bruce Highway (South Ulam Road - Rockhampton)	0	0
South Ulam Road (Bruce Highway - Site Access)	3,512	1,065

TASK E - SUBSTATION WORKS

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation - Trench Bedding Sand Materials (Stage 1)	10	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Substation - Transformers (Stage 1)	2	OSOM Special	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
Substation - Switch Room (Stage 1)	3	OSOM Special	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs
Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs
OSOM Transformer Transport Unloaded (0%)	26.57	ESAs
OSOM Transformer Transport Loaded (100%)	70.21	ESAs
OSOM Switchroom Transport Unloaded (0%)	4.79	ESAs
OSOM Switchroom Transport Loaded (100%)	6.46	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	68	160
Gladstone Mount Larcom Road (GPAR to Red Rover Road)	160	68
Gladstone Mount Larcom Road (Red Rover Road to Bruce Highway)	0	0
Red Rover Road (Gladstone Mount Larcom Road to Don Young Drive)	160	68
Don Young Drive (Red Rover Road to Dawson Highway)	160	68
Dawson Highway (Don Young Drive to Bruce Highway)	160	68
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	160	68
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	160	68
Bruce Highway (Bills Road - South Ulam Road)	221	84
Bruce Highway (South Ulam Road - Rockhampton)	0	0
South Ulam Road (Bruce Highway - Site Access)	221	84

TASK F - SWITCHYARD WORKS

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Switchyard - Electrical Components (Stage 1)	100	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
Switchyard - Trench Bedding Sand Materials (Stage 1)	10	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs
Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	168	554
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	554	168
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	554	168
Bruce Highway (Bills Road - South Ulam Road)	616	184
Bruce Highway (South Ulam Road - Rockhampton)	0	0
South Ulam Road (Bruce Highway - Site Access)	616	184

TASK G - TESTING AND COMMISSIONING

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Testing & Commissioning - Ancillary Components (Stage 1)	50	Rigid Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Rigid Truck (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
Rigid Truck (4 Axle Rigid) Loaded (100%)	4.13	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	18	207
South Ulam Road (Bruce Highway - Site Access)	207	18

TASK H - FINALISATION / COMMISSIONING / DEMOBILISATION

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS Area Decommissioning (Stage 1)	20	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Decommissioning (Stage 1)	20	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Swithyard Area Decommissioning (Stage 1)	20	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
General Demobilisation (Buildings / EW Plant) (Stage 1)	40	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	554	168
South Ulam Road (Bruce Highway - Site Access)	168	554

TASK 1W - SITE WATER

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Site Water - Staff Compound (Stage 1)	153	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Site Water - Dust Suppression (Stage 1)	84	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

14KL Water Cart (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
14KL Water Cart (4 Axle Rigid) Loaded (100%)	4.13	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	85	979
South Ulam Road (Bruce Highway - Site Access)	979	85

TASK F - SITE FUEL

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Site Fuel - Overall	161	Semi Tanker	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	270	892
South Ulam Road (Bruce Highway - Site Access)	892	270

TASK WC - SITE WASTE COLLECTION

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Waste Collection - Overall	161	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	270	892
South Ulam Road (Bruce Highway - Site Access)	892	270

ACCESS TRAFFIC CONSULTING

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Project Pavement Loading - Stage 2

TASK 2A - CIVIL WORKS

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation Area Concrete (Stage 2)	23	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Gravel Material (Stage 2)	62	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Substation Area Construction Water (Stage 2)	5	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Concrete (Stage 2)	56	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Gravel Material (Stage 2)	151	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS Area Construction Water (Stage 2)	11	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Concrete Truck (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
Concrete Truck (4 Axle Rigid) Loaded (100%)	4.13	ESAs
Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs
14KL Water Cart (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
14KL Water Cart (4 Axle Rigid) Loaded (100%)	4.13	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	1,310	349
Bruce Highway (South Ulam Road - Rockhampton)	34	392
South Ulam Road (Bruce Highway - Site Access)	1,702	384

TASK 2B - ELECTRICAL INSTALLATION (BESS)

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS - Battery Components (Stage 2)	184	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Ancilliary Components (Stage 2)	20	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Trench Bedding Sand Materials (Stage 2)	5	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS - Electrical Components (MV Transformers) (Stage 2)	46	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs
Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	420	1,385
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	1,385	420
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	1,385	420
Bruce Highway (Bills Road - South Ulam Road)	1,385	420
Bruce Highway (South Ulam Road - Rockhampton)	0	0
South Ulam Road (Bruce Highway - Site Access)	1,385	420

TASK 2C - SUBSTATION WORKS

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation - Trench Bedding Sand Materials (Stage 2)	5	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access

Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Red Rover Road)	0	0
Gladstone Mount Larcom Road (Red Rover Road to Bruce Highway)	0	0
Red Rover Road (Gladstone Mount Larcom Road to Don Young Drive)	0	0
Don Young Drive (Red Rover Road to Dawson Highway)	0	0
Dawson Highway (Don Young Drive to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	31	8
Bruce Highway (South Ulam Road - Rockhampton)	0	0
South Ulam Road (Bruce Highway - Site Access)	31	8

TASK 2D - TESTING AND COMMISSIONING

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Testing & Commissioning - Ancillary Components (Stage 2)	25	Rigid Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Rigid Truck (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
Rigid Truck (4 Axle Rigid) Loaded (100%)	4.13	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	9	103
South Ulam Road (Bruce Highway - Site Access)	103	9

TASK 2E - FINALISATION / COMMISSIONING / DEMOBILISATION

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS Area Decommissioning (Stage 2)	10	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Decommissioning (Stage 2)	10	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
General Demobilisation (Buildings / EW Plant) (Stage 2)	15	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	194	59
South Ulam Road (Bruce Highway - Site Access)	59	194

TASK 1W - SITE WATER

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Site Water - Staff Compound (Stage 2)	32	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Site Water - Dust Suppression (Stage 2)	46	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

14KL Water Cart (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
14KL Water Cart (4 Axle Rigid) Loaded (100%)	4.13	ESAs

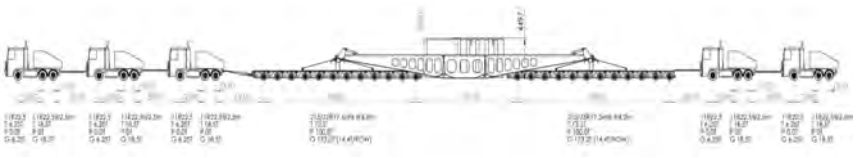
Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	28	322
South Ulam Road (Bruce Highway - Site Access)	322	28

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OSOM Transport Vehicle Loading (SARs) Calculations

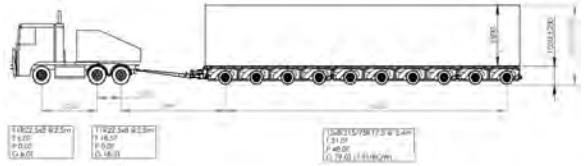
OSOM Transport Vehicle Loading Summary

Vehicle Description	Unloaded			Loaded		
	SAR_4	SAR_8	SAR_{12}	SAR_4	SAR_8	SAR_{12}
OSOM Transformer	26.57	32.75	197.35	70.21	84.82	356.46
Switchroom	4.79	6.03	37.23	6.46	7.12	37.28



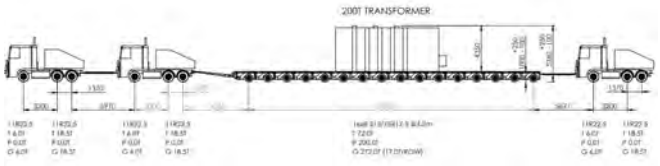
OSOM - Transformer (200T) (9x Prime Mover 12x8-12x8 Reamset 2x Prime Mover)

Transformer	1 PM		2 PM		3 PM		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1 PM		2 PM		Totals	
Axles	Single	Tandem	Single	Tandem	Single	Tandem	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Tandem	Single	Tandem		
Tyres	Single	Dual	Single	Dual	Single	Dual	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Single	Dual	Single	Dual		
Base Load / SAR_4	5.4	13.8	5.4	13.8	5.4	13.8	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	5.4	13.8	5.4	13.8		
Unloaded																																				
Axle Group Load (t)	6.25	18.5	6.25	18.5	6.25	18.5	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.25	18.5	6.25	18.5	270.15	tonne
SAR_4's	1.795	3.230	1.795	3.230	1.795	3.230	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060	1.795	3.230	1.795	3.230	***26.57***	***SAR 4***
SAR_8's	2.077	4.330	2.077	4.330	2.077	4.330	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	2.077	4.330	2.077	4.330	***32.75***	***SAR 8***
SAR_{12}'s	5.779	33.691	5.779	33.691	5.779	33.691	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.779	33.691	5.779	33.691	***197.35***	***SAR 12***
Loaded																																				
Axle Group Load (t)	6.25	18.5	6.25	18.5	6.25	18.5	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40	6.25	18.5	6.25	18.5	469.35	tonne
SAR_4's	1.795	3.230	1.795	3.230	1.795	3.230	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.879	1.795	3.230	1.795	3.230	***70.21***	***SAR 4***
SAR_8's	2.077	4.330	2.077	4.330	2.077	4.330	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.199	2.077	4.330	2.077	4.330	***84.82***	***SAR 8***
SAR_{12}'s	5.779	33.691	5.779	33.691	5.779	33.691	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	6.630	5.779	33.691	5.779	33.691	***356.46***	***SAR 12***



OSOM - Switchroom (52.1T) (Prime Mover with 8x8 Low Loader)

Switchroom																																				
Axles	Single	Tandem	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single																						Totals	
Tyres	Single	Dual	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad																							
Base Load / SAR_4	5.4	13.8	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3																							
Unloaded																																				
Axle Group Load (t)	6.0	18.5	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1																						55.50	tonne
SAR_4's	1.524	3.230	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004																						***4.79***	***SAR 4***
SAR_8's	1.694	4.330	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001																						***6.03***	***SAR 8***
SAR_{12}'s	3.541	33.691	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																						***37.23***	***SAR 12***
Loaded																																				
Axle Group Load (t)	6.00	18.5	7.90	7.90	7.90	7.90	7.90	7.90	7.90	7.90	7.90	7.90	7.90																						103.50	tonne
SAR_4's	1.524	3.230	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170																						***6.46***	***SAR 4***
SAR_8's	1.694	4.330	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109																						***7.12***	***SAR 8***
SAR_{12}'s	3.541	33.691	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005																						***37.28***	***SAR 12***



OSOM - Transformer (200T) (2x Prime Mover 16x8-Platform 1x Prime Mover)

Switchroom					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16															Totals	
Axles	Single	Tandem	Single	Tandem	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single														
Tyres	Single	Dual	Single	Dual	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Quad	Single	Dual														
Base Load / SAR_4	5.4	13.8	5.4	13.8	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	12.3	5.4	13.8														
Unloaded																																				
Axle Group Load (t)	6.00	18.5	6.00	18.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	6.00	18.5													145.50	tonne
SAR_4's	1.524	3.230	1.524	3.230	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	1.524	3.230													***14.65***	***SAR 4***
SAR_8's	1.694	4.330	1.694	4.330	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	1.694	4.330													***16.17***	***SAR 8***
SAR_{12}'s	3.541	33.691	3.541	33.691	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.541	33.691													***111.69***	***SAR 12***
Loaded																																				
Axle Group Load (t)	6.00	18.5	6.00	18.5	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	6.00	18.5													345.50	tonne
SAR_4's	1.524	3.230	1.524	3.230	3.649	3.649	3.649	3.649	3.649	3.649	3.649	3.649	3.649	3.649	3.649	3.649	3.649	3.649	3.649	3.649	1.524	3.230													***72.65***	***SAR 4***
SAR_8's	1.694	4.330	1.694	4.330	5.043	5.043	5.043	5.043	5.043	5.043	5.043	5.043	5.043	5.043	5.043	5.043	5.043	5.043	5.043	5.043	1.694	4.330													***98.78***	***SAR 8***
SAR_{12}'s	3.541	33.691	3.541	33.691	48.588	48.588	48.588	48.588	48.588	48.588	48.588	48.588	48.588	48.588	48.588	48.588	48.588	48.588	48.588	48.588	3.541	33.691													***869.10***	***SAR 12***

ACCESS TRAFFIC CONSULTING

UMW0125-001 | Mount Hopeful Battery Project

Project Pavement Impact % Calculations

Road ID	Road Description	AADT Segment	AADT Segment		Base Data Year	Base Year AADT			Base Year HV%		Base Year HV		10 Yr GR%	2026 AADT			2026 HV		ESAs / HV	Days / Year	Background ESAs		
			Start (km)	End (km)		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz			Gaz	A-Gaz	Bi-Dir
183	Gladstone Port Access Road	61605	0.000	0.858	2023	950	886	1,836	31.96%	42.33%	304	375	*1.00%*	979	913	1,892	313	386	3.2	1,125	1,126,675	1,391,584	2,518,259
181	Gladstone - Mount Larcom Road	160360	0.000	***0.176***	2023	5,650	5,948	11,598	8.85%	8.60%	500	512	*1.00%*	5,821	6,128	11,949	515	527	3.2	1,125	1,855,321	1,898,003	3,753,324
		160361	***0.175***	0.675	2023	5,316	6,043	11,359	14.61%	17.13%	777	1,035	*1.00%*	5,477	6,226	11,703	800	1,067	3.2	1,125	2,881,792	3,840,939	6,722,731
		60071	0.675	***1.409***	2023	3,900	3,574	7,474	13.77%	17.32%	537	619	*1.00%*	4,018	3,682	7,700	553	638	3.2	1,125	1,992,627	2,296,835	4,289,462
		60073	1.409	3.258	2023	3,737	3,657	7,394	15.09%	12.33%	564	451	*1.00%*	3,850	3,768	7,618	581	465	3.2	1,125	2,092,376	1,673,075	3,765,452
		61052	3.258	***3.830***	2023	4,186	5,144	9,330	15.92%	19.78%	666	1,017	*1.00%*	4,313	5,300	9,613	687	1,048	3.2	1,125	2,472,690	3,775,328	6,248,018
			3.830	4.625	2023	4,186	5,144	9,330	15.92%	19.78%	666	1,017	*1.00%*	4,313	5,300	9,613	687	1,048	3.2	1,125	2,472,690	3,775,328	6,248,018
		60074	4.625	***12.292***	2023	3,207	3,230	6,437	19.17%	20.76%	615	671	*1.00%*	3,304	3,328	6,632	633	691	3.2	1,125	2,281,122	2,488,040	4,769,162
		60076	***12.292***	32.140	2023	1,754	1,758	3,512	23.74%	28.18%	416	495	*1.00%*	1,807	1,811	3,618	429	510	3.2	1,125	1,545,033	1,838,177	3,383,210
-	Red Rover Road	GRC	0.000	3.390	-	No Information Available													-	-	-	-	-
-	Don Young Drive	GRC	0.000	2.280	-	No Information Available													-	-	-	-	-
46A	Dawson Highway (Gladstone - Biloela)	60065	***7.160***	***10.305***	2023	3,835	3,659	7,494	17.32%	13.62%	664	498	*1.00%*	3,951	3,770	7,721	684	513	3.2	1,125	2,464,567	1,849,128	4,313,695
10E	Bruce Highway (Benaraby - Rockhampton)	60006	11.445	***45.420***	2023	2,174	2,111	4,285	26.01%	35.67%	565	753	*1.00%*	2,240	2,175	4,415	583	776	2.9	1,125	1,901,408	2,532,018	4,433,426
		60023	***45.420***	***75.469***	2023	3,112	3,146	6,258	31.22%	27.30%	972	859	1.27%	3,232	3,267	6,499	1,009	892	2.9	1,125	3,293,262	2,911,221	6,204,483
			75.469	85.308	2023	3,112	3,146	6,258	31.22%	27.30%	972	859	1.27%	3,232	3,267	6,499	1,009	892	2.9	1,125	3,293,262	2,911,221	6,204,483
		160954	85.308	***86.183***	2023	3,326	3,111	6,437	28.42%	28.37%	945	883	*1.00%*	3,427	3,205	6,632	974	909	2.9	1,125	3,178,497	2,967,801	6,146,298
			86.183	87.080	2023	3,326	3,111	6,437	28.42%	28.37%	945	883	*1.00%*	3,427	3,205	6,632	974	909	2.9	1,125	3,178,497	2,967,801	6,146,298
		61551	87.080	108.938	2023	3,588	3,569	7,157	30.95%	26.82%	1,110	957	1.55%	3,757	3,738	7,495	1,163	1,002	2.9	1,125	3,795,458	3,271,572	7,067,030
		60130	108.938	114.388	2022	2,861	2,635	5,496	27.44%	33.99%	785	896	*1.00%*	2,977	2,742	5,719	817	932	2.9	1,125	2,666,237	3,041,786	5,708,023
		60024	114.388	116.961	2023	5,575	5,344	10,919	15.02%	17.15%	837	916	2.21%	5,953	5,706	11,659	894	979	2.9	1,125	2,918,141	3,193,906	6,112,047
-	South Ulam Road	RRC	0.000	16.773	2022	87	105	192	43.28%	35.80%	38	38	*1.00%*	91	110	200	39	39	3.2	1,125	141,283	141,283	282,566

ESA increase %		
Gaz %	A-Gaz %	Bi-Dir
0.15%	0.40%	0.29%
0.00%	0.00%	0.00%
0.19%	0.04%	0.11%
0.28%	0.07%	0.17%
0.27%	0.10%	0.19%
0.23%	0.05%	0.12%
0.22%	0.04%	0.11%
0.24%	0.07%	0.15%
0.35%	0.09%	0.21%
-	-	-
-	-	-
0.01%	0.00%	0.01%
0.01%	0.00%	0.01%
0.17%	0.06%	0.12%
0.41%	0.13%	0.28%
0.43%	0.13%	0.28%
0.05%	0.20%	0.12%
0.04%	0.18%	0.11%
0.06%	0.20%	0.13%
0.06%	0.19%	0.12%
13.84%	3.91%	8.88%

Road ID	Road Description	Seg.	AADT Segment		Project Construction ESAs																																				Bi-Dir
			Start (km)	End (km)	Gazettal																	A-Gazettal																			
					1A	1B	1C	1D	1E	1F	1G	1H	1Water	2A	2B	2C	2D	2E	2Water	Fuel	Waste	Total	A	B	C	D	E	F	G	H	Water	2A	2B	2C	2D	2E	2Water	Fuel	Waste	Total	
183	Gladstone Port Access Road	61605	0.000	0.858	0	0	0	1,065	68	168	0	0	0	0	420	0	0	0	0	0	0	**1,721**	0	0	0	3,512	160	554	0	0	0	0	1,385	0	0	0	0	0	0	0	**5,611**	**7,332**
181	Gladstone - Mount Larcom Road	160360	0.000	***0.176***	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**0**
		160361	***0.176***	0.675	0	0	0	3,512	160	554	0	0	0	0	1,385	0	0	0	0	0	0	**5,611**	0	0	0	1,065	68	168	0	0	0	0	420	0	0	0	0	0	0	0	**1,721**	**7,332**
		60071	0.675	***1.409***	0	0	0	3,512	160	554	0	0	0	0	1,385	0	0	0	0	0	0	**5,611**	0	0	0	1,065	68	168	0	0	0	0	420	0	0	0	0	0	0	0	**1,721**	**7,332**
		60073	1.409	3.258	0	0	0	3,512	160	554	0	0	0	0	1,385	0	0	0	0	0	0	**5,611**	0	0	0	1,065	68	168	0	0	0	0	420	0	0	0	0	0	0	0	**1,721**	**7,332**
		61052	3.258	***3.830***	0	0	0	3,512	160	554	0	0	0	0	1,385	0	0	0	0	0	0	**5,611**	0	0	0	1,065	68	168	0	0	0	0	420	0	0	0	0	0	0	0	**1,721**	**7,332**
			3.830	4.625	0	0	0	3,512	0	554	0	0	0	0	1,385	0	0	0	0	0	0	**5,451**	0	0	0	1,065	0	168	0	0	0	0	420	0	0	0	0	0	0	0	**1,653**	**7,104**
		60074	4.625	***12.292***	0	0	0	3,512	0	554	0	0	0	0	1,385	0	0	0	0	0	0	**5,451**	0	0	0	1,065	0	168	0	0	0	0	420	0	0	0	0	0	0	0	**1,653**	**7,104**
		60076	***12.292***	32.140	0	0	0	3,512	0	554	0	0	0	0	1,385	0	0	0	0	0	0	**5,451**	0	0	0	1,065	0	168	0	0	0	0	420	0	0	0	0	0	0	0	**1,653**	**7,104**
-	Red Rover Road	GRC	0.000	3.390	0	0	0	0	160	0	0	0	0	0	0	0	0	0	0	0	0	**160**	0	0	0	0	68	0	0	0	0	0	0	0	0	0	0	0	0	0	**68**	**227**
-	Don Young Drive	GRC	0.000	2.280	0	0	0	0	160	0	0	0	0	0	0	0	0	0	0	0	0	**160**	0	0	0	0	68	0	0	0	0	0	0	0	0	0	0	0	0	0	**68**	**227**
46A	Dawson Highway (Gladstone - Biloela)	60065	***7.160***	***10.305***	0	0	0	0	160	0	0	0	0	0	0	0	0	0	0	0	0	**160**	0	0	0	0	68	0	0	0	0	0	0	0	0	0	0	0	0	0	**68**	**227**
10E	Bruce Highway (Benaraby - Rockhampton)	60006	11.445	***45.420***	0	0	0	0	160	0	0	0	0	0	0	0	0	0	0	0	0	**160**	0	0	0	0	68	0	0	0	0	0	0	0	0	0	0	0	0	0	**68**	**227**
		60023	***45.420***	***75.469***	0	0	0	3,512	160	554	0	0	0	0	1,385	0	0	0	0	0	0	**5,611**	0	0	0	1,065	68	168	0	0	0	0	420	0	0	0	0	0	0	0	**1,721**	**7,332**
			75.469	85.308	0	843	5,676	3,512	221	616	0	0	0	1,310	1,385	31	0	0	0	0	0	**13,594**	0	225	1,514	1,065	84	184	0	0	0	0	349	420	8	0	0	0	0	0	**3,849**	**17,443**
		160954	85.308	***86.183***	0	843	5,676	3,512	221	616	0	0	0	1,310	1,385	31	0	0	0	0	0	**13,594**	0	225	1,514	1,065	84	184	0	0	0	0	349	420	8	0	0	0	0	0	**3,849**	**17,443**
			86.183	87.080	67	4	146	0	0	0	18	554	85	34	0	0	9	194	28	270	270	**1,681**	222	45	1,677	0	0	0	207	168	979	392	0	0	103	59	322	892	892	**5,958**	**7,638**
		61551	87.080	108.938	67	4	146	0	0	0	18	554	85	34	0	0	9	194	28	270	270	**1,681**	222	45	1,677	0	0	0	207	168	979	392	0	0	103	59	322	892	892	**5,958**	**7,638**
		60130	108.938	114.388	67	4	146	0	0	0	18	554	85	34	0	0	9	194	28	270	270	**1,681**	222	45	1,677	0	0	0	207	168	979	392	0	0	103	59	322	892	892	**5,958**	**7,638**
		60024	114.388	116.961	67	4	146	0	0	0	18	554	85	34	0	0	9	194	28	270	270	**1,681**	222	45	1,677	0	0	0	207	168	979	392	0	0	103	59	322	892	892	**5,958**	**7,638**
-	South Ulam Road	RRC	0.000	16.773	222	888	7,353	3,512	221	616	207	168	979	1,702	1,385	31	103	59	322	892	892	**19,551**	67	229	1,660	1,065	84	184	18	554	85	384	420	8	9	194	28	270	270	**5,530**	**25,082**

Appendix I – TIA RPEQ Certification and Authorisation

Certification of Traffic Impact Assessment Report

Registered Professional Engineer Queensland

for

Project Title:	Mount Hopeful Battery Project

As a professional engineer registered by the Board of Professional Engineers of Queensland pursuant to the *Professional Engineers Act 2002* as competent in my areas of nominated expertise, I understand and recognise:

- the significant role of engineering as a profession, and that
- the community has a legitimate expectation that my certification affixed to this engineering work can be trusted, and that
- I am responsible for ensuring its preparation has satisfied all necessary standards, conduct and contemporary practice.

As the responsible RPEQ, I certify:

i) I am satisfied that all submitted components comprising this traffic impact assessment, listed in the following table, have been completed in accordance with the *Guide to Traffic Impact Assessment* published by the Queensland Department of Transport and Main Roads and using sound engineering principles, and

ii) where specialised areas of work have not been under my direct supervision, I have reviewed the outcomes of the work and consider the work and its outcomes as suitable for the purposes of this traffic impact assessment, and that

iii) the outcomes of this traffic impact assessment are a true reflection of results of assessment, and that

iv) I believe the strategies recommended for mitigating impacts by this traffic impact assessment,

v) embrace contemporary practice initiatives and will deliver the desired outcomes.

Name:	Andrew Barrie	**RPEQ No:**	12801
RPEQ Competencies:	Civil	**Date:**	19 September 2025
Signature:			
Postal Address:	PO Box 9864, Frenchville QLD 4701		
Email:	andrew.barrie@accesstraffic.com.au		

Traffic impact assessment components to which this certification applies	✓
1. Introduction	
Background	✓
Scope and study area	✓
Pre-lodgement meeting notes	✓
2. Existing Conditions	
Land use and zoning	✓
Adjacent land uses / approvals	✓
Surrounding road network details	✓
Traffic volumes	✓
Intersection and network performance	✓
Road safety issues	✓
Site access	N/A
Public transport (if applicable)	N/A
Active transport (if applicable)	N/A
Parking (if applicable)	N/A
Pavement (if applicable)	✓
Transport infrastructure (if applicable)	✓
3. Proposed Development Details	
Development site plan	✓
Operational details (including year of opening of each stage and any relevant catchment / market analysis)	✓
Proposed access and parking	✓
4. Development Traffic	
Traffic generation (by development stage if relevant and considering light and heavy vehicle trips)	✓
Trip distribution	✓
Development traffic volumes on the network	✓
5. Impact Assessment and Mitigation	
With and without development traffic volumes	✓
Construction traffic impact assessment and mitigation (if applicable)	✓
Road safety impact assessment and mitigation	✓
Access and frontage impact assessment and mitigation	✓
Intersection delay impact assessment and mitigation	✓
Road link capacity assessment and mitigation	✓
Pavement impact assessment and mitigation	✓
Transport infrastructure impact assessment and mitigation	✓
Other impacts assessment relevant to the specific development type / location (if applicable)	N/A
6. Conclusions and Recommendations	
Summary of impacts and mitigation measures proposed	✓
Certification statement and authorisation	✓



ACCESS TRAFFIC
CONSULTING

TRAFFIC IMPACT ASSESSMENTS | SITE FEASIBILITY STUDIES | INTERSECTION ANALYSIS
ROAD SAFETY AUDITS | ROAD SAFETY INVESTIGATIONS | PAVEMENT IMPACT ASSESSMENTS
TRANSPORT ROUTE ASSESSMENTS | TRANSPORT PLANNING | ACCESS MANAGEMENT STATEGIES
PEER REVIEWS | PARKING FACILITY DESIGN | SERVICE FACILITY DESIGN

Appendix H

Stormwater Management Plan



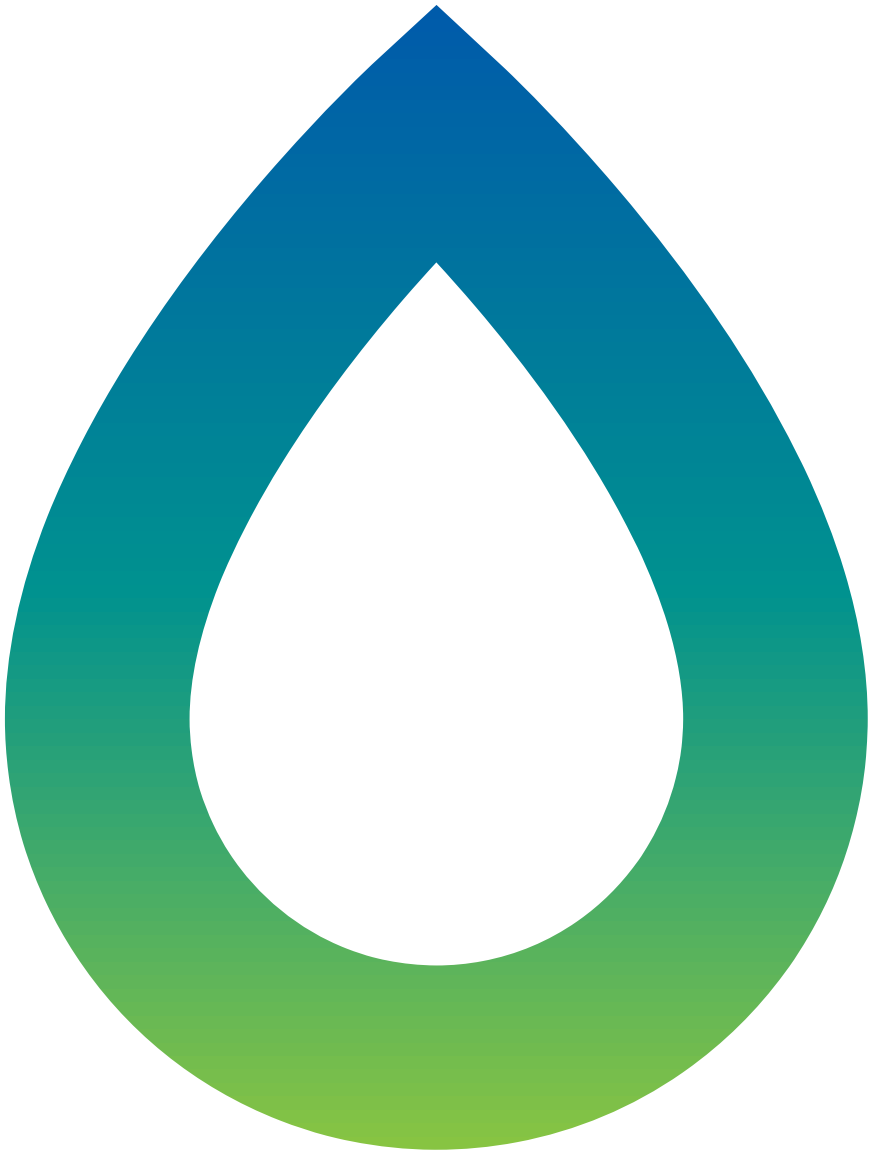
MOUNT HOPEFUL BATTERY

Stormwater Management Plan

Umwelt on behalf of Neoen Pty Ltd

24 September 2025

2390-01-B3



DETAILS

Report Title	Mount Hopeful Battery, Stormwater Management Plan
Client	Umwelt on behalf of Neoen Pty Ltd

THIS REVISION

Report Number	2390-01-B3
Date	24 September 2025
Author	Tarkan Pasin
Reviewer	Lindsay Millard

NOTE: This report has been prepared on the assumption that all information, data and reports provided to us by our client, on behalf of our client, or by third parties (e.g. government agencies) is complete and accurate and on the basis that such other assumptions we have identified (whether or not those assumptions have been identified in this advice) are correct. You must inform us if any of the assumptions are not complete or accurate. We retain ownership of all copyright in this report. Except where you obtain our prior written consent, this report may only be used by our client for the purpose for which it has been provided by us.

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1 INTRODUCTION

1.1 OVERVIEW

The Mount Hopeful Battery is a proposed grid-scale battery energy storage system (BESS) in Central Queensland (the Project). With a planned capacity of up to 600 megawatts (MW) of power for a duration of up to four hours, the Project will enhance the delivery of clean, reliable electricity to the National Electricity Market (NEM), while supporting grid stability and flexibility.

The Project is located near the rural town of Bajool, approximately 50 kilometres (km) south of Rockhampton and 70 km west of Gladstone, Queensland, within the Rockhampton Region Local Government Area (LGA). The Project is mapped within the Rural Zone of the Rockhampton Region Planning Scheme 2015 (Planning Scheme) and predominantly used for low-intensity agricultural activities, including cattle grazing. The Project is proposed to occur within the bounds of the 'Study Area', which covers an area of 49 hectares (ha) and occurs across three freehold land parcels and two local roads, being South Ulam Road and an unnamed road reserve. The Study Area also accommodates a Powerlink transmission easement that comprises an existing 275 kilovolt (kV) transmission line, into which the Project will connect. The Study Area is sparsely vegetated with predominantly non-remnant vegetation and is intersected by an unnamed tributary of Eight Mile Creek. The Project gains access via South Ulam Road to the east of the Study Area, as shown on Figure 1.1.

The Project is proposed to be delivered over two stages, which are described as follows:

- Stage 1: Indicative capacity of 430 MW, with construction expected to commence mid-2026 and be completed by the end of 2028.
- Stage 2: An indicative additional capacity of 170 MW, with construction expected to commence in 2028 and be completed by the end of 2029.

Key components of the Project include:

- Up to 650x Battery Modules
- Up to 170x Medium Voltage (MV) Transformers
- 2x High Voltage (HV) Transformers
- A HV Switching Station.

The Project will also encompass associated ancillary infrastructure necessary to the operation of the BESS, including:

- Site access track
- Overhead and underground electrical cables
- Inverters
- High voltage substation
- Earthing and lightning protection
- Security fencing, closed-circuit television (CCTV) and lighting
- O&M building
- Water retention pond
- Lay down areas

Umwelt commissioned WRM Water & Environment Pty Ltd (WRM) to assist with the stormwater management aspects to support the Project. The purpose of this technical assessment is to help with the lodgement of a development application to the Rockhampton Council.

1.2 PROJECT CONTEXT

The Project will connect to Powerlink's 275kV Feeder 812, between Bouldercombe and Calliope River substations, through a new switching station that will be delivered as part of the Project and will unlock the connection of additional generation, including the windfarm.

The Project will also support the grid as Powerlink is looking at options to ensure ongoing reliability and security of supply in the anticipation of closure of the Gladstone Power Station and to support the electrification of major industry in the Gladstone region.

The Project has received development approvals from the Queensland Government and the Commonwealth (through DCCEEW) under the assumption that the battery will be ancillary to the wind farm. Since the Project was approved, Neoen has identified an opportunity to use the battery as a standalone asset to provide system strength services to Powerlink. A new development permit application for the project will be made to the RRC to allow standalone operations of the battery.

1.3 REPORT STRUCTURE

This report is structured as follows:

- Section 2 provides details on the regulatory framework;
- Section 3 outlines the proposed infrastructure and catchment context;
- Section 4 describes the development of the hydraulic modelling;
- Section 5 presents the modelling results and impacts of the proposed development;
- Section 6 discusses the stormwater impacts as they relate to environmental values;
- Section 7 provides the erosion and sediment control principles and control measures;
- Section 8 is the contamination risk assessment;
- Section 9 contains the development outcomes table;
- Section 10 summarises the findings of the study; and,
- Section 11 is a list of references.

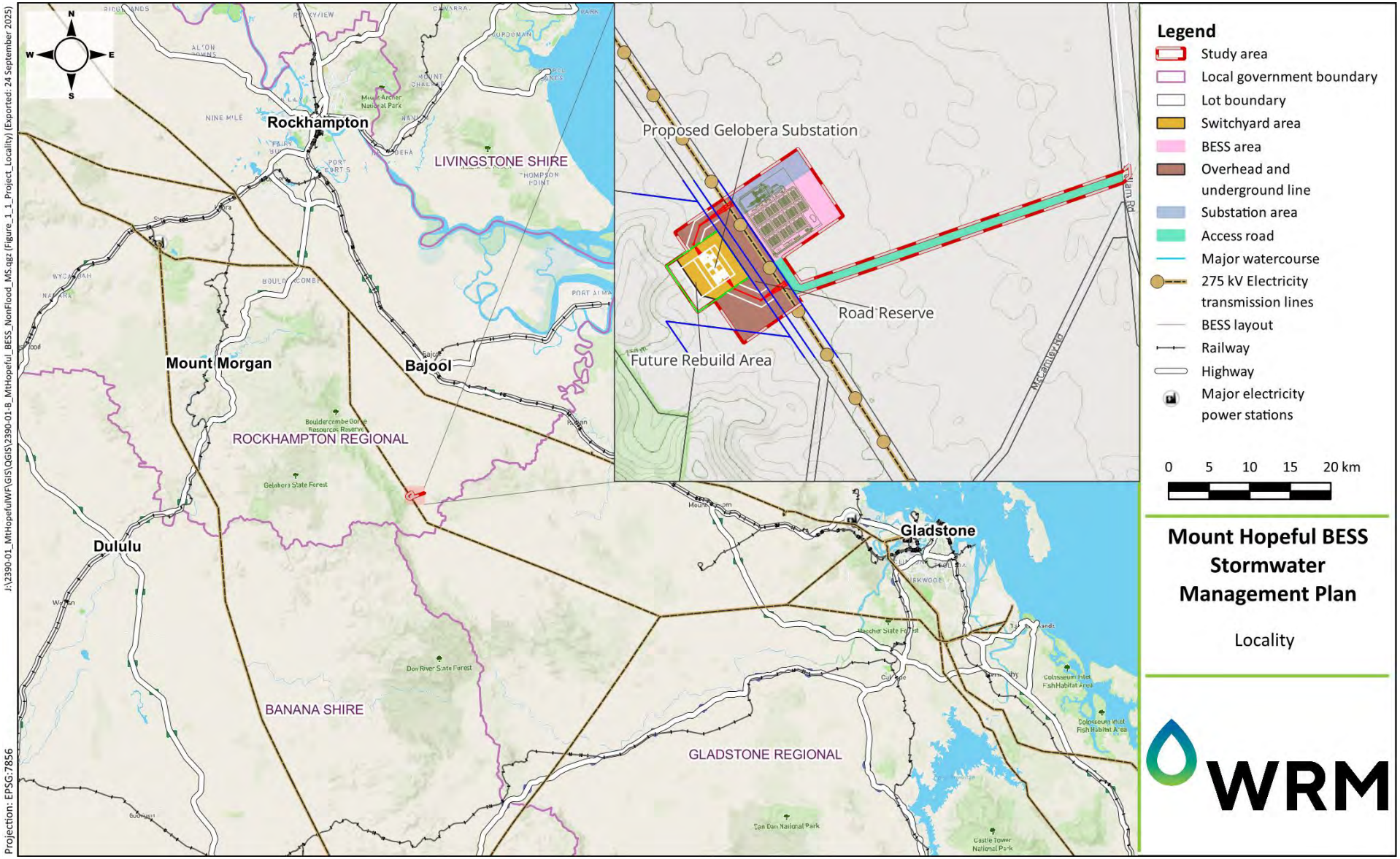


Figure 1.1 Project Locality

2 REGULATORY FRAMEWORK

2.1 OVERVIEW

This section outlines the regulatory framework (including legislation, policies, and standards) at the State level that applies to surface water management for the Project. In undertaking these assessments, the key relevant Acts of Queensland include:

- *Water Act* 2000 (Water *Act*);
- *Planning Act* 2016 (Planning Act);
- *Environmental Protection Act* 1994 (EP *Act*); and
- *Environmental Protection* (Water and Wetland Biodiversity) *Policy* 2019 (EPP Water).

2.2 ENVIRONMENTAL PROTECTION ACT

All persons have a legal duty under the *EP Act* Section 319 to take all reasonable and practicable measures to minimise or prevent environmental harm. Such harm can be caused if sediment from a construction site enters (washes, blows, falls or otherwise) into drains or waterways. Section 443 of the EP Act stipulates that a person must not cause or allow a contaminant to be placed in a position where it could reasonably be expected to cause serious or material environmental harm or environmental nuisance (e.g. placing a stockpile adjacent to a waterway). Section 440ZG of the *EP Act* requires that a person must not unlawfully deposit a prescribed water contaminant or at another place, and in a way so that the contaminant could reasonably be expected to wash, blow, fall or otherwise move into waters or stormwater drainage.

The Principal Contractor who becomes aware of serious or material harm in association with their work (e.g. significant loss of sediment from their site works into a watercourse) has a legal duty under Section 320A of the EP Act to notify the Department of Environment, Tourism, Science and Innovation (DETSI).

2.2.1 EPP Water and Wetland Biodiversity

The *EPP Water* is subordinate legislation under the EP Act. The EPP Water seeks to protect Queensland's waters while allowing for ecologically sustainable development. Queensland waters include water in rivers, streams, wetlands, lakes, aquifers, estuaries, and coastal areas. This purpose is achieved within a framework that includes:

- identifying environmental values (EVs)
- determining water quality guidelines (WQGs), and
- water quality objectives (WQOs) to enhance or protect the environmental values.

The EVs and WQOs applying to the Project are outlined in Section 6.2.

2.3 WATER ACT

In Queensland, the Water Act is the primary statutory document that establishes a system for planning, allocating and using non-tidal water. The Department of Local Government, Water and Volunteers (DLGWV) administer the Water Act.

The *Water Act* prescribes the process for preparing Water Plans (WPs) and Water Management Protocols (WMPs) for specific catchments within Queensland. Under this process, WPs are prepared to identify:

- desired outcomes, measures and strategies for achieving the outcomes;
- performance indicators;
- amounts of water available for consumptive use and future use;
- specifications of water management areas and trading zones; and
- criteria for deciding water licences.

The WMPs provide details of:

- water dealing/trading rules;
- water sharing rules for unsupplemented water;
- seasonal water assignment rules; and
- any volumes of unallocated water reserved for particular purposes or stated locations.

The WPs and WMPs determine the conditions for granting water allocation licences, permits, and other authorities, as well as the rules for water trading and sharing. The WP sets Environmental Flow Objectives (EFOs) to protect waterway health, and Water Allocation Security Objectives (WASOs) to maintain community water supplies.

The majority of the flow through the Study Area could be described as occurring within "drainage features" and would not be considered watercourses. None of the activities proposed for The Project would disturb the bed and banks, and therefore, as no watercourses will be disturbed, licensing will not be required under the Water Act.

2.4 PLANNING ACT

The Planning Act is the mechanism for assessing all developments within Queensland. The Planning Act is supported by the *Planning Regulation* 2017 (the Planning Regulation), the State Planning Policy, and the Planning Scheme. The Planning Act provides the overarching principles for managing stormwater within the Study Area.

The Planning Scheme provides a strategic framework for planning and development and is the primary instrument governing surface water resources (specifically stormwater) within the Study Area. Assessment benchmarks are based on principles of ecological sustainability established by the Planning Act and are the basis for the measures of Planning Schemes.

2.5 STATE PLANNING POLICY

Section 2.1 of the Planning Scheme states that state interests, including Water quality, Natural hazards, risk, and resilience, have been appropriately integrated into the planning scheme. Stormwater management for the Project will comply with the following desired outcomes under the State Planning Policy 2017.

2.5.1 Drainage control desired outcomes:

- Manage stormwater flows around or through areas of exposed soil to avoid contamination;
- Manage sheet flows to avoid or minimise the generation of rill or gully erosion;
- Provide stable concentrated flow paths to achieve the construction phase stormwater management design objectives for temporary drainage works, which, for a design life >24 months, requires drainage structures to pass the 10% Annual Exceedance Probability (AEP) flood event, and culvert crossings to pass the 63% AEP flood event;

- Provide emergency spillways for sediment basins to achieve the construction phase stormwater management design objectives for emergency spillways on temporary sediment basins, which require spillway capacity for a 2% AEP flood event.

2.5.2 Waterway stability and flood flow management desired outcomes:

- Where measures are required to meet post-construction waterway stability objectives, the reduction in mean annual load is to reduce: total suspended solids by 85%, total phosphorous by 60%, total nitrogen by 45% and gross pollutants by 90%;
- Earthworks and the implementation of erosion and sediment controls are undertaken in ways that ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction for all events up to and including the 10% AEP.

2.5.3 Litter, hydrocarbons and other contaminants: desired outcomes:

- Remove gross pollutants and litter;
- Avoid the release of oil or visible sheen to released waters; and,
- Dispose of waste containing contaminants at authorised facilities.

2.6 ROCKHAMPTON REGIONAL COUNCIL PLANNING SCHEME

2.6.1 Overview

The Planning Scheme is the current local planning instrument that regulates the management of stormwater for the Study Area within the RRC LGA. Section 3.4.1 Strategic Outcomes of the Planning Scheme states that:

- The community highly values the natural environment and landscape for their contribution to the planning scheme area's biodiversity, economic prosperity, culture, character, and sense of place. These areas are to be protected from incompatible development;
- Development does not create unsustainable impacts on:
  - The natural functioning of floodplains;
  - Environmentally significant areas, including areas of state and locally significant vegetation, which provide fauna habitat and support biodiversity; and
  - The quality of water entering waterways, wetlands, and local catchments;
- Development does not increase the risk to human life and property in areas that are affected, or potentially affected, by storm-surge, erosion, sea-level rise or other coastal processes, flooding, bushfire, or landslide. This occurs through the avoidance of natural hazards in new development areas;
- Strategic and iconic scenic landscape values are protected from potential adverse impacts of development.

Specific outcomes for the water resources, catchment management and healthy waters element detailed in the Planning Scheme are as follows:

1) The Fitzroy River and other waterways and floodplains in the planning scheme area are recognised for their multiple values, including hydrologic functioning, ecological processes, nature conservation and outdoor recreation. They continue to be maintained for the quality and quantity of water available for both natural processes and consumptive uses;

2) New development occurs following the identified settlement pattern (SFM-1 to SFM-4) to ensure efficient water treatment and distribution;

3) Development within urban, new urban and future urban areas (SFM-1 to SFM-4) minimises the disturbance to natural drainage and flow rates, impact on groundwater levels and landscape features. Development does not increase the risk of erosion;

4) Water quality and the health of associated ecosystems are achieved by:

   a. protecting water resource catchments, in particular the Fitzroy River, including all feeder systems upstream of the barrage and Dam 7 at Mount Morgan from development;

   b. necessary regulation and continued monitoring and controls on the quality of water entering the Fitzroy River from western tributaries, in particular control of the quality and timing of water discharging from industry and mining;

   c. incorporating total water cycle management, water sensitive urban design and wastewater quality management measures; and

   d. efficient water use and improved demand management;

5) The release of acid sulphate soils and associated metal contaminants into the environment is avoided;

6) Land development enables sustainable stormwater infrastructure which protects water quality, environmental values and maintains or enhances community health, safety and amenity;

7) Natural waterways and nutrient hazard areas are not disturbed or diminished by development unless there is an overriding community benefit for the development and the impacts are mitigated.

8) Public access and use of the state coastal land, watercourses and water bodies is maintained, but does not diminish the environmental values, water supply reliability and recreational benefit for future generations.

Performance outcomes within the Planning Scheme relating to the Stormwater Management Code are listed in *Table* 9.3.6.3.1 *Development Outcomes* for *Assessable Development*[1] which is reproduced in Section 10.

[1] https://rockeplan.rockhamptonregion.qld.gov.au/Pages/Plan/Book.aspx?exhibit=current

3 PROJECT AND CATCHMENT CONTEXT

3.1 OVERVIEW

The following provides a brief explanation of infrastructure as it relates to flooding. The BESS and switchyard infrastructure will be installed on a bench with a finished level that provides 300 mm of freeboard to the peak modelled 1% AEP water surface.

Figure 1.1 shows the Project locality, and provides mapping of the critical infrastructure assets within the Study Area. The Project includes the construction and operation of BESS, ancillary infrastructure, and site access. Figure 3.4 shows the topographic and drainage features in the vicinity of the Study Area.

3.2 EXISTING ENVIRONMENT

The Project is located on a freehold rural property traversed by a 275kV transmission line, allowing direct connection to the grid. The project's location in a sparsely populated area, outside mapped agricultural land, has allowed for the minimisation of its social and environmental impacts.

3.3 PROPOSED INFRASTRUCTURE

Key components of the Project include:

- Up to 650x Battery Modules
- Up to 170x Medium Voltage (MV) Transformers
- 2x High Voltage (HV) Transformers
- A HV Switching Station.

The Project will also encompass associated ancillary infrastructure necessary to the operation of the BESS, including:

- Site access track
- Overhead and underground electrical cables
- Inverters
- High voltage substation
- Earthing and lightning protection
- Security fencing, closed-circuit television (CCTV) and lighting
- O&M building
- Water retention pond
- Lay down areas

3.3.1 Construction

The Project will be delivered in two stages to provide a total capacity of up to 600MW at the connection point and a storage duration of approximately four hours. Construction is anticipated to commence by mid-2026, pending development approval from the RRC and final investment decision.

The construction timeline for the Project is as follows:

- Stage 1: indicative capacity of 430 MW, with construction expected to commence mid-2026 and to be completed by the end of 2028.

- Stage 2: Indicative additional capacity of 170 MW, with construction expected to commence in 2028 and to be completed by the end of 2029.

Material will be sourced from nearby quarries, and no onsite excavation is planned.

3.3.2 Personnel

Construction of the Project is anticipated to be completed in two (2) stages, over an overall period of 40 months, commencing in Q3 (September) 2026 (pending approvals) and concluding in Q4 (December) 2029, with this overall period noted to include provision for 3 months Project float. Construction personnel are expected to vary between 20 and 150, with around 75 to 150 personnel during the 20-month installation period. The staff will be based in Rockhampton and travel either by passenger car or bus.

Once the site is operational, daily staff numbers are expected to vary between five and ten. Staff will travel from Rockhampton.

3.4 PROPOSED ACTIVITIES ON THE SITE

The activities during the construction, operational and decommissioning phases are listed below.

3.4.1 Construction phase

- Civil works, including vegetation removal, earthworks, construction of two benches (one for the batter infrastructure, one for the switchyard), drainage, erosion and sediment controls;
- Temporary site amenities;
- Construction of a new 1.7 km access road linking to South Ulam Road.
- Staggered delivery of shipping containers and equipment;
- Mechanical installation of the mounting structure and modules;
- Installation of battery modules;
- Installing electrical cabling, inverters and associated electrical equipment; and,
- No major chemical stores are required.

3.4.2 Operational phase

- Full servicing of substation equipment;
- No major chemical stores are required; however, minor storage of hazardous goods and materials will be managed through an approved Environmental Management Plan (EMP).
- Permanent staff members required for the ongoing operation of the facility; and
- Vehicle movements generated by the facility once operational will be minimal, limited to staff movements.

3.4.3 Decommissioning phase

- The Project is proposed to be operational for between 20 and 30 years. After this time, the facility will either be upgraded or decommissioned.
- Decommissioning would consist of the removal of all above-ground infrastructure for recycling or disposal, the revegetation of all disturbed land, and the return of the land to agricultural use.

3.5 AVAILABLE DATASETS

3.5.1 Climate data

Climate data was obtained from the SILO database of historical climate records for Australia hosted by the Queensland Government's Department of Environment, Tourism, Science and Innovation (DETSI). This service interpolates raw rainfall and evaporation records from the Bureau of Meteorology (BoM) to provide a spatially and temporally complete climate dataset. Climate data was obtained for the SILO grid point closest to the Study Area between 01/01/1889 and 31/05/2025.

Climate statistics showing the annual and monthly variation are shown in Figure 3.1 (monthly rainfall and evaporation), Table 3.1 and in Figure 3.2(annual rainfall). The variability of climate rainfall is also shown as a time series trace in Figure 3.3, which demonstrates the variability of rainfall sequences at the site. Large annual rainfall totals were recorded for the water years 1956, 2010, and 1973. Conversely, the lowest rainfall totals occurred in 1957, 1919, and 2019.

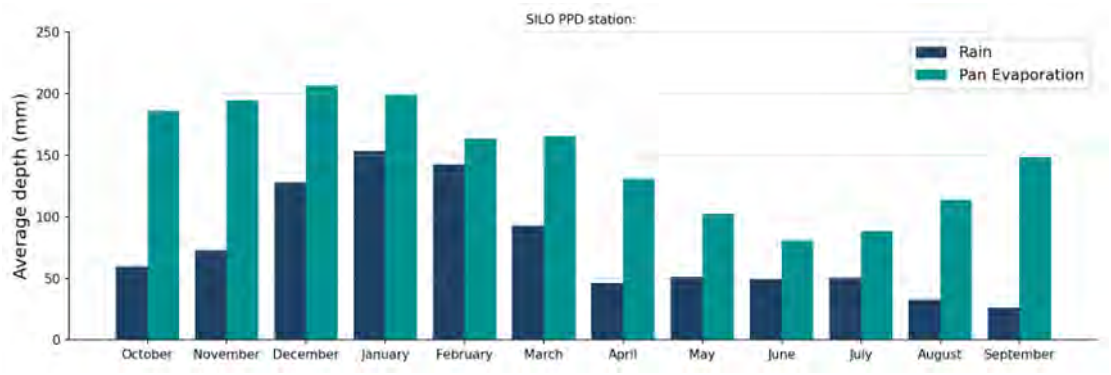


Figure 3.1 Monthly variance for rainfall and pan evaporation

Table 3.1 Annual Rainfall and Evaporation (mm) for Study Area

Percentile	Annual Rain (mm)	Pan Evaporation (mm)
10th percentile	567.68	1676
25th percentile	703.0	1756
50th percentile	890.5	1756
75th percentile	1064.5	1794
90th percentile	1198.9	1909

Data source: https://www.longpaddock.qld.gov.au/silo/

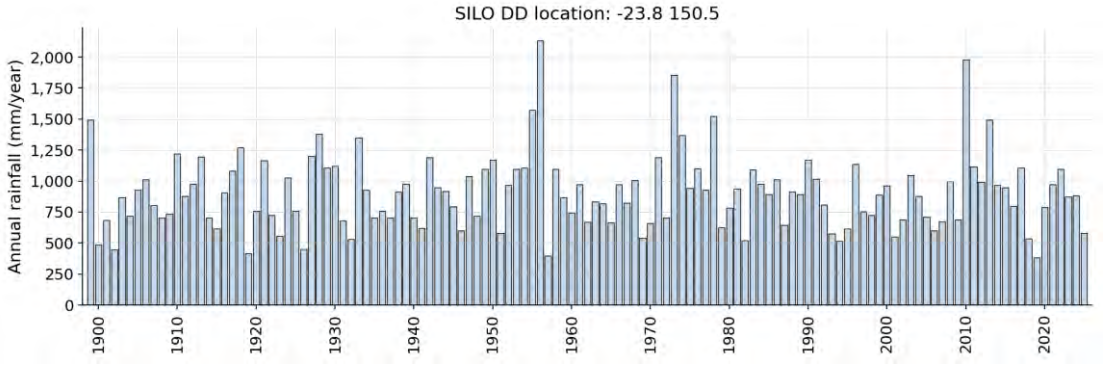


Figure 3.2 Annual rainfall totals

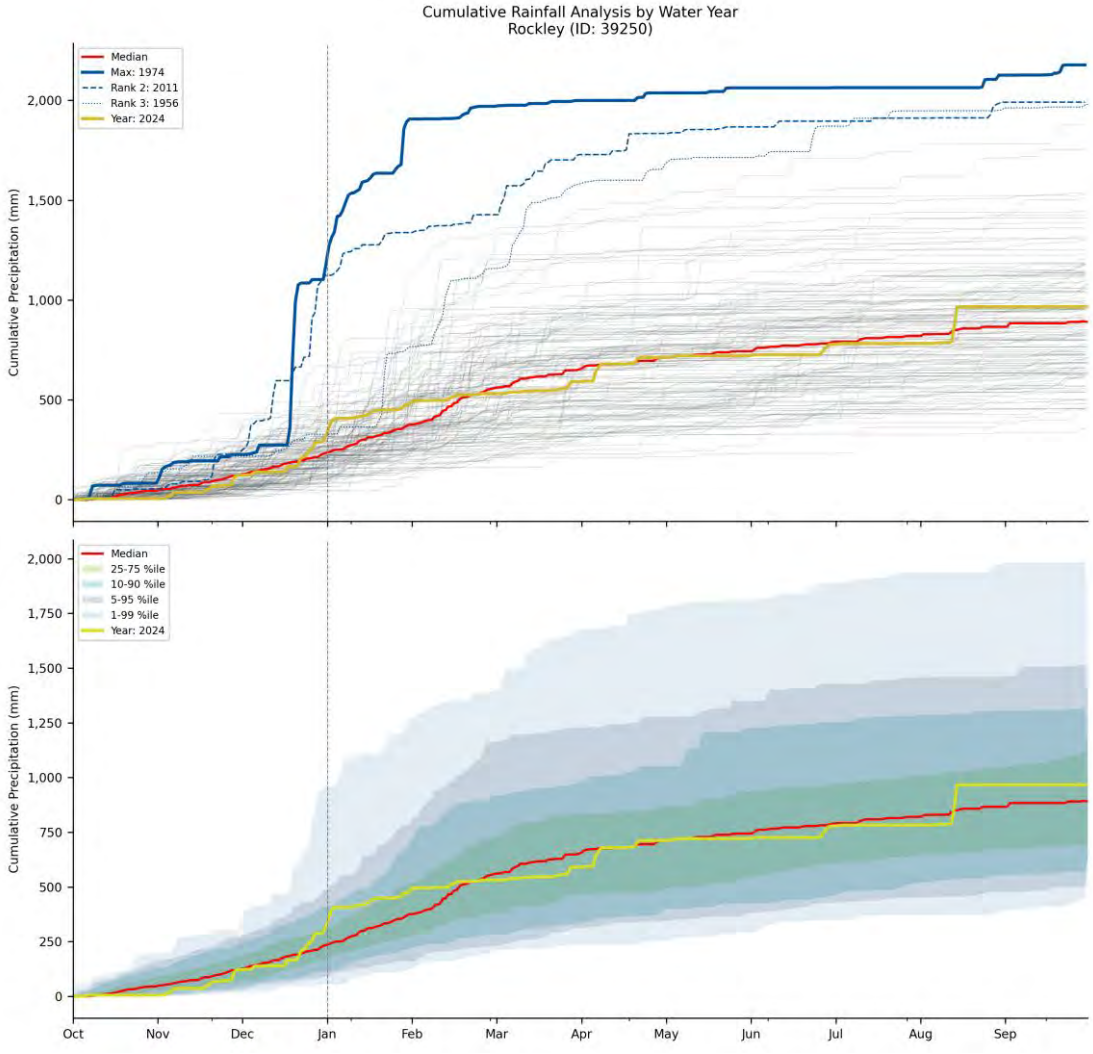


Figure 3.3 Climate observation and total rainfall variance

3.5.2 Topographic data

Neoen provided LiDAR survey data at a 0.5 m, 1.0 m and 5.0 m grid resolution covering most of the Study Area. The remaining gaps were filled with Copernicus (30 m) data to ensure continuity between datasets. Streamlines were identified and burned into drainage paths between the various data sources.

The switching station is situated at the base of the mountain range, with slopes that run from west to east. The highest elevation within the switching station development corridor is around 168 m AHD. The access road has an average slope of 2.3%

3.5.3 Watercourses

The waterway network adjacent to the Study Area is shown in Figure 3.4. As shown, there are limited mapped streams within the Study Area, and no major watercourses are present. Streams that were identified within the Study Area were either drainage features (zero) or minor streams of first and second Strahler order. Within the Study Area, State Code 18's waterway barrier works layer mapped the watercourses as low (green) see Figure 3.5. Outside of the Study Area, some tributaries of Eight Mile Creek are mapped as moderate (amber) watercourses. The Study Area includes an access road and overhead transmission lines that will traverse the flow paths. Construction works for the access road will be conducted in accordance with State Code 18's Acceptable Development Requirements (ADR).

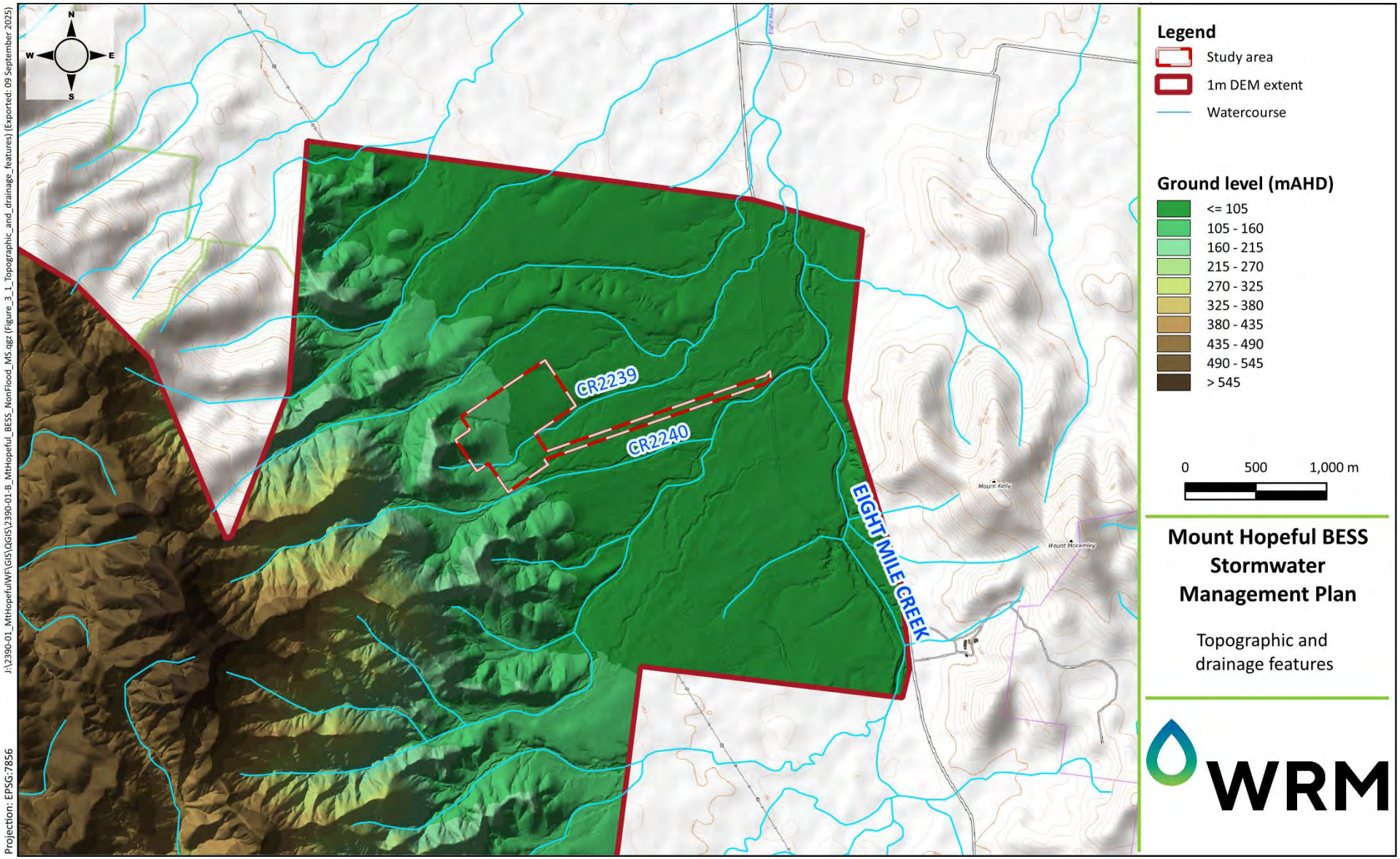


Figure 3.4 Topography and drainage features

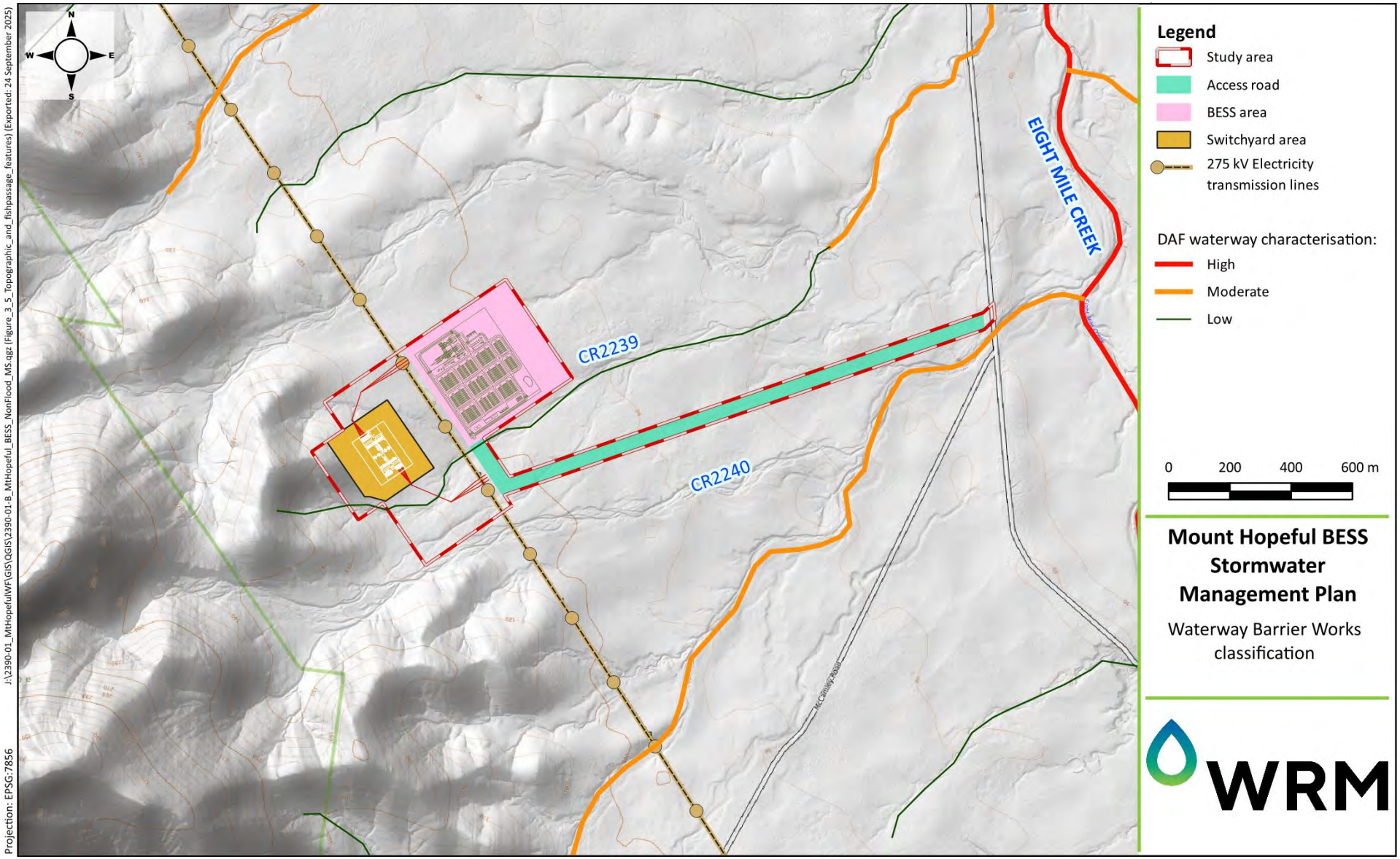


Figure 3.5 Waterway Barrier Works classification

4 MODELLING APPROACH

4.1 OVERVIEW

A TUFLOW hydrodynamic model was developed to simulate the existing conditions' flow behaviour in the Study Area for the 50%, 10%, and 1% AEP events under the current climate. Discharges within the Study Area were estimated by applying rainfall directly to the topographic surface in the hydraulic model. Design discharges were determined using the ensemble methodology described in Australian Rainfall & Runoff (ARR) (Ball et al., 2019). An ensemble of 10 temporal patterns is modelled for each storm duration to derive a range of estimated peak discharges for storms of different severity, represented by an annual exceedance probability (AEP). The storm duration with the highest median peak discharge of the ensemble is selected, and the temporal pattern that produces the median peak discharge is used for design event modelling.

The direct rainfall (rain-on-grid) approach was adopted for the assessment, and design rainfall depth data, as well as design losses, and storm pre-burst details were obtained from Australian Rainfall and Runoff (ARR) datahub, following the ARR v4.2 guidelines.

Preliminary TUFLOW hydraulic model runs for a range of durations and temporal patterns were used to identify the critical storm durations for the Study Area, and relevant design storm temporal patterns.

Design storm modelling results were post-processed to derive design flood characteristics (e.g., peak flood depths and extents) for each climate scenario for the existing catchment. The impacts of climate change for each AEP event were assessed by subtracting the current climate event results from the future climate event results. This difference map showed the location and magnitude of predicted climate impacts.

Details of the direct rainfall hydraulic modelling are described in Section 5.4.

4.2 NOTE ON FLOOD TERMINOLOGY

This report discusses concepts related to flood risk. A design flood is a probabilistic or statistical estimate, typically based on a probability analysis of flood or rainfall data. An AEP is assigned to this estimate. The frequency of flood events is expressed as an AEP; for example, a flood with a 10% AEP means there is a 10% probability (or 1 in 10 chance) that floods of that magnitude or greater will occur each year. While the related concept of Annual Recurrence Interval (ARI) is now outdated due to the confusion it causes, a flood with a 10-year ARI refers to floods of equal or greater magnitude occurring once every ten years on average.

The frequency of flood events can be categorised into five broad descriptive groups: ‘Very Frequent’, ‘Frequent’, ‘Rare’, ‘Very Rare’, and ‘Extreme’. This report classifies a 1% AEP flood as Very Rare, but acknowledges it remains within the credible limit when extrapolating from historical climate records. In recent years, climate data has shown the influence of non-stationarity, with evidence indicating that flood magnitudes—based on historical data—are becoming more frequent. This trend is expected to continue as our climate warms, leading to increased atmospheric moisture.

Very rare design flood events are beneficial for planning purposes due to their remote likelihood of occurrence. Extreme floods are considered well beyond the credible limits of historical records and contain significant uncertainty, serving mainly as theoretical upper bounds. Very rare flood events are essential for planning as they present a remote chance of occurring within the asset's lifetime. For long-lived, high-consequence assets, it may be appropriate to determine a design flood probability related to potential consequences over the asset’s lifespan. For example, the 0.2% AEP (1 in 500)

derived from historical data can be used as a proxy for the expected future climate conditions at a 1% AEP level, considering the planning horizon.

Estimating an actual or historic flood resulting from a specific rainfall event is inherently different; it is a deterministic process. All causes and effects are directly linked to the particular event under analysis. The antecedent conditions present at the time of the rainfall are reflected in the resulting flood, and these conditions must be taken into account in the estimate. No definitive information about the probability of a historic flood can be obtained from considering a single flood event alone.

4.3 DESIGN RAINFALL DEPTHS

Design rainfall depths were obtained using the following methodology:

- Design rainfalls based on historic climate, for the 50%, 10% and 1 % AEP events were obtained from the Design Rainfall Data System[2] based on a single point location at the centroid of the Study Area.
- Current climate rainfall estimates were increased in line with the ARR v4.2 climate change guidance. The increase in rainfall depths increases, depending on duration, by 9 to 18% at 2030, using SSP2. Areal reduction factors derived for the Study Area's catchment were applied to these design rainfalls. Table 4.1 shows the areally reduced design rainfall depths for the 50% (1 in 2) to 1% (1 in 100) AEP for durations from 30 minutes to 24 hours.

Table 4.1 Adopted design rainfall depths – historic and current climate estimates

Duration (mins)	Design rainfall depths (mm)					
	50% AEP	10% AEP	1% AEP	50% AEP	10% AEP	1% AEP
	Historic Climate 2016 IFD			Current Climate IFD 2030 SSP2		
30	27.2	41.1	59	32.2	48.6	69.8
60	36.3	55	79.6	42.9	65.1	94.2
90	41.5	63.5	92.7	48.4	74.1	108.1
120	45.5	70	102.9	52.6	80.9	118.9
180	51.5	80.3	119.9	58.9	91.8	137.0
270	58.2	93.2	144.3	65.8	105.4	163.2
360	63.8	104.9	167.5	71.7	117.9	188.3
540	72.8	123.6	206.4	81.2	137.9	230.2
720	80.1	139.7	239.1	88.9	154.9	265.2
1080	92	167.6	296.6	101.4	184.6	326.7
1440	101.1	189.7	345.5	110.9	208.0	378.9

Source: BOM.gov.au, Latitude: -23.8029, Longitude: 150.6139
Note: Adopted values reflect adjustments to BoM depths subject to ARR Data Hub adjustments for areal reduction explained below.

[2] http://www.bom.gov.au/water/designRainfalls/revised-ifd/

4.3.1 ARR data hub

Recommended design event parameters were based on current ARR guidelines (referred to as ARR 2019) (Ball et al, 2019), available from the ARR Data Hub portal[3]. Key design event parameters include:

- Initial and continuous loss rates;
- Design storm pre-burst depths;
- Areal reduction factors; and
- Design storm temporal patterns.

4.3.2 Design rainfall losses and pre-burst rainfall

The Storm initial loss (IL) and continuing loss (CL) method of accounting for rainfall losses was adopted based on ARR Data Hub recommendations. An initial loss (IL) and a continuing loss (CL) were adopted, with median pre-burst depths obtained from the Data Hub used to adjust the initial loss with 1% AEP. IL and CL were derived by extrapolating between rainfall losses adopted for infrequent events (up to 1% AEP) and the minimum rainfall loss, noting that:

- Initial losses (ILs) for infrequent events were derived based on the Probability Neutral Burst ILs provided by ARR datahub. This approach results in a unique Initial Loss for each duration;
- Continuing losses (CLs) for infrequent events were derived based on the suggested data hub and regional flood study CLs.

Table 4.2 provides the initial and continuing losses for the infrequent events used to interpolate the 0.5% and 0.2% AEP rainfall losses. Table 4.3 provides the Probability Neutral Burst Initial Loss values referred to by Table 4.2.

Table 4.2 Adopted design rainfall losses

Losses	Infrequent (to 1% AEP)
Initial loss (mm)	Probability Neutral Burst Initial Loss (see Table 4.3)
Continuing loss (mm/h)	1.6

Table 4.3 Probability Neutral Burst Initial Loss (Current Climate)

Storm duration	Probability Neutral Burst Initial Loss (mm)		
	50% AEP	10% AEP	1% AEP
30 minutes	9.9	8.9	6.3
1 hour	19.8	17.8	12.7
2 hours	20.0	18.1	7.8
3 hours	18.7	17.9	9.0
4.5 hours	18.7	14.3	1.1
6 hours	18.6	10.8	-6.8

[3] https://data.arr-software.org/

9 hours	19.6	11.3	-17.3
12 hours	20.5	11.9	-27.9

4.3.3 Design temporal patterns

Design event hydrology was modelled using the ensemble of temporal patterns approach following ARR 2019. The design temporal patterns were adopted from the areal temporal patterns from ARR 2019. Temporal patterns were obtained from the ARR data hub based on a point location at the centroid of the catchment. The ARR guidelines provide 10 temporal patterns, resulting in 10 unique design storms for each critical duration and each AEP. The model was run using the representative temporal patterns for storm durations between 10 minutes and 24 hours for the 50%, 10% and 1% AEP events. The critical storm duration was identified as the duration that produces the highest median peak discharge from the 10 design storms for each storm duration.

4.4 HYDRAULIC MODELLING

The 2023-03-AF version of the two-dimensional TUFLOW hydrodynamic model was used to simulate the existing catchment flow behaviour in the Study Area for the 50%, 10%, and 1% AEP events under current climate conditions.

The direct rainfall (rain-on-grid) approach was adopted for the assessment. The TUFLOW hydraulic model was run for durations and temporal patterns to identify the critical storm duration and median temporal pattern within the Study Area.

4.4.1 Topography and grid cell size

The 0.5 m and 1 m survey data provided by Neoen (resampled as 1 m data) were used, with the Copernicus satellite 30 m dataset used to fill gaps in the data. Figure 3.4 shows the combination of the mentioned data sources applied in the model. A 20 m grid size resolution was adopted for hydraulic modelling in combination with TUFLOW's sub-grid sampling (SGS) (Method C) functionality at 2 m sampling distance. The 20 m cell size (with 2 m SGS) provided adequate resolution to capture key drainage features and overland flow paths, while maintaining reasonable simulation times.

4.4.2 Boundary conditions

Figure 4.1 shows the TUFLOW hydraulic model domain. Within the domain, the direct rainfall (rain-on-grid) approach was applied, with flows reported to outflow boundaries upstream of Eight Mile Creek. A normal depth rating curve (HQ) type boundary condition was implemented as the downstream model boundaries. The model boundaries were set well downstream of the Study Area to minimise any influence on predicted flood behaviour near the Study Area. The downstream boundary conditions assumed normal depth slopes between 0.01 and 0.02 m/m, calculated from the channel slopes extracted from topographic data. This normal depth slope is typical of the water surface slopes.

4.4.3 Hydraulic structures

No hydraulic structures were identified or surveyed within the Study Area. The proposed design does not require any hydraulic structures to be included within the model.

4.4.4 Hydraulic resistance

The TUFLOW model represents hydraulic resistance using Manning's 'n' values. Analysis of available aerial imagery showed seven general land use classifications of relevance in the Study Area. The adopted Manning's 'n' values for each land use classification are listed in Table 4.4. These values are typical for models constructed in Southern Queensland.

Table 4.4 Adopted hydraulic roughness coefficients

Land use description	Manning's 'n' coefficient
Medium vegetation	0.060
Light vegetation	0.045
Exposed dirt/unsealed road	0.025
Roads	0.020
Water body/lake	0.020
Bed channel	0.025

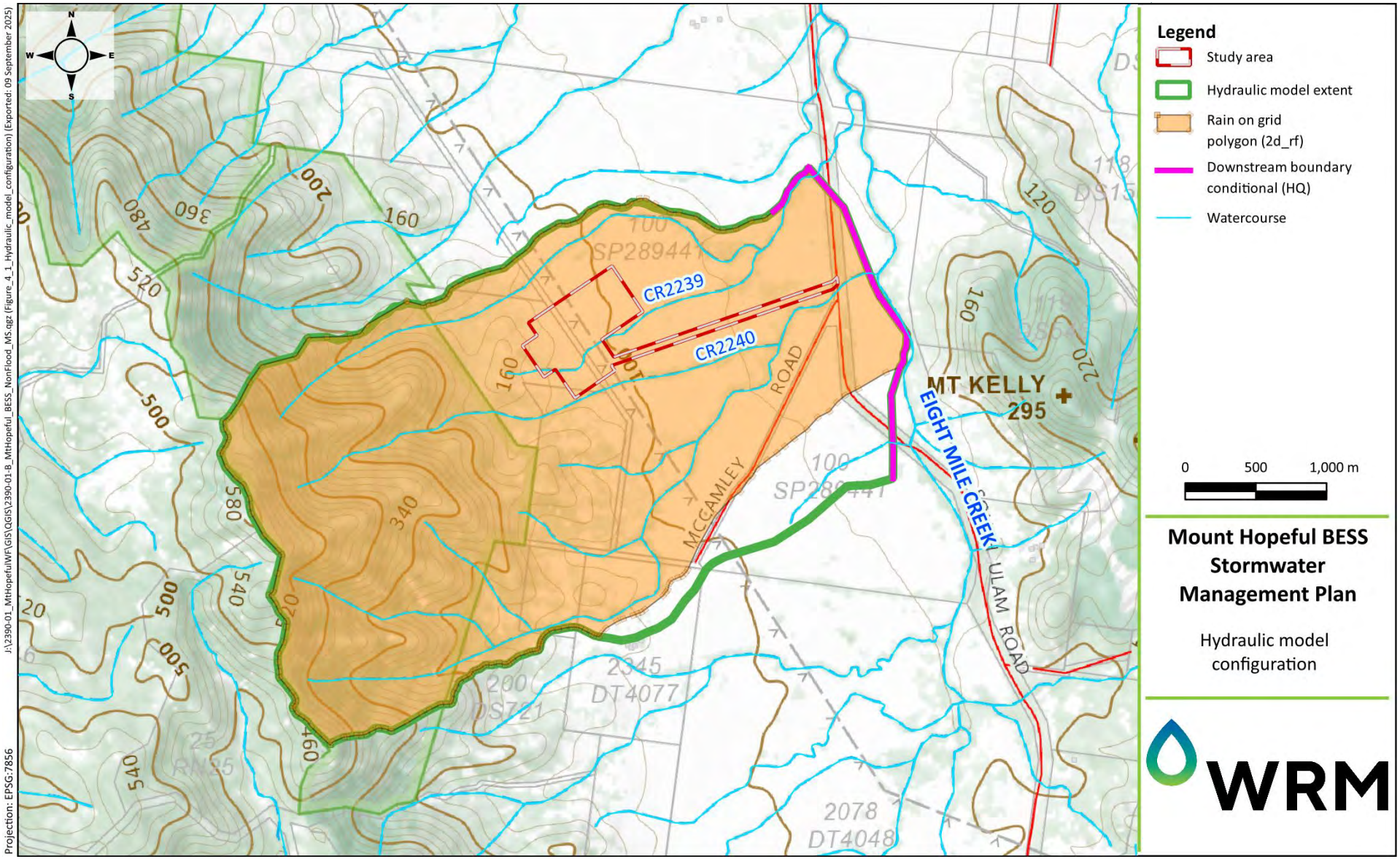


Figure 4.1 Hydraulic model configuration

5 HYDRAULIC MODEL RESULTS AND ANALYSIS

5.1 OVERVIEW

This section discusses the likely impact on flood behaviour for the current climate scenario. Flood modelling was undertaken to estimate the change in flood flows for the 50%, 10% and 1% AEP future climate. This section appraises surface water flooding behaviour concerning the infrastructure shown in Figure 1.1.

Due to the minor modifications to landform and hydrological regime, the impacts of the development on flood depth and velocities are negligible. The site infrastructure is to be located outside of the primary flow paths. As a result, flood impacts are considered to be minor in all modelled events. Key locations are shown in Figure 5.1.

5.2 LIMITATIONS

Modelling accuracy is subject to numerous sources of uncertainty. Some potential sources of inaccuracy leading to uncertainty in the hydraulic model are as follows:

- Inaccurate topographic information – The hydraulic model relies upon the representation of the ground topography to model the movement of water across the land. The DEM used to inform the model topography was captured at different times and with differing resolutions. This also implies a variance in vertical and horizontal accuracy for the survey. The accuracy of the DEM may impact the accuracy of model results. For example, the model may not be well-represented in minor flow paths smaller than the DEM resolution.
- No calibration to historical events—It is best practice to calibrate a hydraulic model to a historical event. However, calibration data for historical events is not available, making model calibration impossible. While the model parameters have been chosen in line with ARR 2019 recommendations and within industry-accepted bounds, the ability of the model to reproduce actual flood behaviour is untested.
- Critical duration—A representative critical duration and temporal pattern have been selected to represent the flood behaviour within the Study Area. However, future detailed design (e.g., of waterway crossings at South Ulam Road) may need to model additional durations to determine the critical duration for that location of interest.

5.3 DESIGN FLOOD EVENTS

The flood assessment has estimated flood extents, depths and velocities for the 50%, 10% and 1% AEP events for the current climate scenario. The flood maps, available in Appendix C, show overland flow paths. For clarity, minor shallow depths (< 50mm) were removed from the maps. This depth would typically be managed via stormwater infrastructure. The purpose was a preliminary investigation to appraise flood risk that can inform the layout of site infrastructure.

The resulting output grids are statistically analysed to generate maximum water surface (depth), velocity values, and flood hazard from the critical infrastructure of the Study Area.

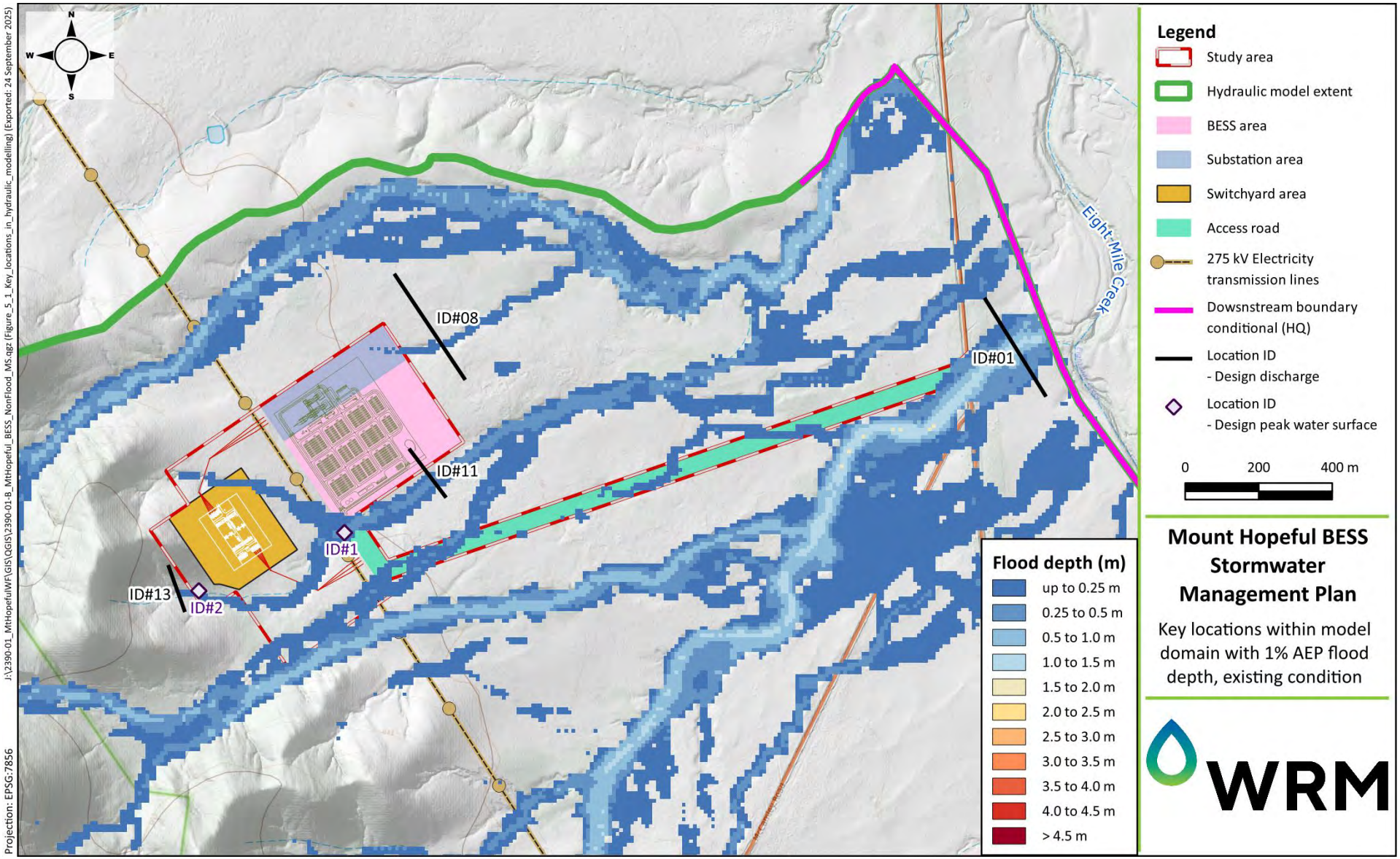


Figure 5.1 Key locations in hydraulic modelling

Summary observations about the existing condition flood behaviour are as follows:

- 50% AEP: Results show the water is confined to the minor drainage features within the model extent. General overland flood flow depths outside the drainage features are minimal and shallow. The drainage features within the BESS and Switchyard Area have confined and shallow depths.
- 10% AEP: The active flow paths through the model's extent remain as shallow and confined within the drainage features. General drainage feature flood flow depths are increasing, but remain short-lived due to the storm's duration being short. Minor drainage lines at the northern and southern corners of the switchyard area are forming but remain shallow. These flow paths will be considered and allowed for during the detailed design phase; this will ensure conveyance is uninterrupted.
- 1% AEP: The active flow paths within the model extent are becoming deep and are breaking out of the drainage feature's top of bank. Access along South Ulam Road and McCamley Road is inundated. The location of flooding within the BESS and Switchyard areas remains contained within the Study Area. Flood hazard near the BESS and Switchyard areas is considered (H1 and H2) as being unsuitable for small vehicles. General overland flood flow depths and velocities are becoming significant, and erosive flows are likely to cause impact to surrounding areas, which may impact post-flood event access. The drainage feature flowing through South Ulam Road to Eight Mile Creek is mapped as being H5 and H6, and so care with the road access interface at this location should be considered.

Table 5.1 presents the design discharge results for key locations, see Figure 5.1 under the current climate scenario (2030) using the SSP2 pathway. The flows shown are representative of the catchment area and slope reporting to the key location.

Table 5.1 Design discharge at key locations - Current Climate

Location ID	Nearby Location	50% AEP (m^3/s)	10% AEP (m^3/s)	1% AEP (m^3/s)
ID#13	Switchyard area	0.63	1.03	1.44
ID#08	Substation area	1.85	3.25	5.02
ID#11	BESS area	5.63	8.6	12.78
ID#01	Outlet to Eight Mile Creek	44.11	73.75	139.25

Table 5.1 presents the critical duration results for key locations.

Table 5.2 Critical durations at key locations - Current Climate

Location ID	Nearby Location	50% AEP	10% AEP	1% AEP
ID#13	Switchyard area	30 min	30 min	30 min
ID#08	Substation area	30 min	30 min	30 min
ID#11	BESS area	30 min	30 min	30 min
ID#01	Outlet to Eight Mile Creek	30 min	45 min	20 min

Table 5.1 presents the peak modelled elevations for the current climate scenario (2030) using the SSP2 pathway. The peak modelled depths are mapped on Figure 5.1 and within Appendix C.

Table 5.3 Design peak water surface at key locations - Current Climate

Location ID	Nearby Location	50% AEP (mAHD)	10% AEP (mAHD)	1% AEP (mAHD)
ID#1	BESS area	98.92	100.65	100.68
ID#2	Switchyard area	117.24	117.36	117.4

5.4 MODEL VALIDATION

5.4.1 Regional Flood Frequency Flows

The Regional Flood Frequency Estimation approach, described in ARR2019 (Ball et al, 2019), was used to validate the model estimates. The Regional Flood Frequency Estimation (RFFE) is an online tool. [4] developed for Australian Rainfall and Runoff to estimate design flows for ungauged catchments. It is based on gauged data using a region-of-influence approach. Figure 5.2 is a plot of the comparison between model design peak discharges, RFFE estimates and the nearby gauges. These flow estimate values are also in Table 5.4. These flows were estimated based on a two km^2 catchment located through the BESS and switchyard area.

Table 5.4 Regional Flood Frequency Estimation

AEP	TUFLOW model (m^3/s)	Predicted flow (m^3/s)	Confidence Interval 5th %ile	Confidence Interval 95th %ile
1%	28.9	1550	370	6340
10%	19.9	408	151	1080
50%	12.7	85.5	33.8	215

[4] https://rffe.arr-software.org/

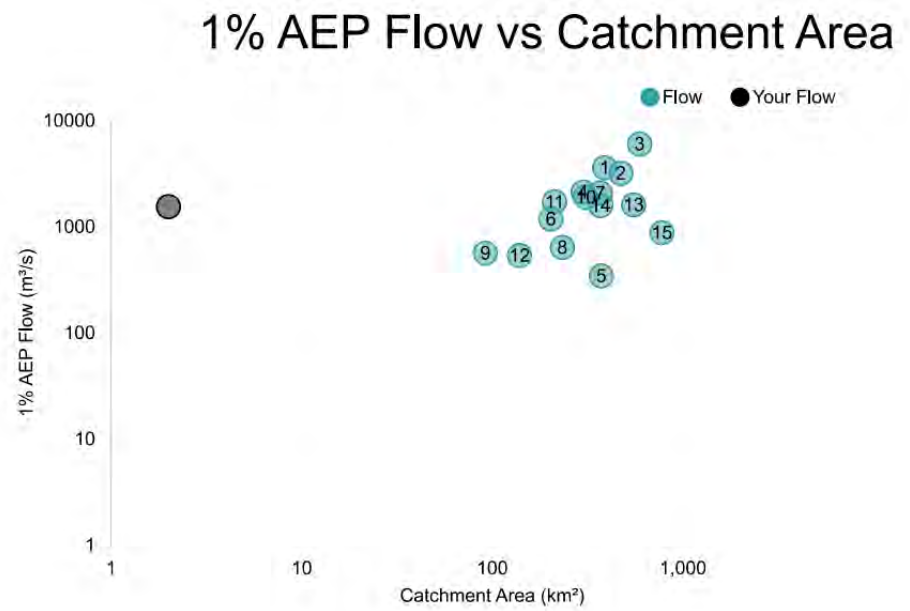


Figure 5.2 RFFE results compared to nearby gauged regional flood frequency locations

Visually, the flows estimated by RFFE are too high to be sensible. An alternative approach compared the TUFLOW model results against a suite of calibrated URBS models from throughout Australia. The peak modelled flows from TUFLOW are shown as a magenta line on Figure 5.3. This approach provides comfort that the RFFE values can be disregarded and that the model results do validate against other similar-sized catchments.

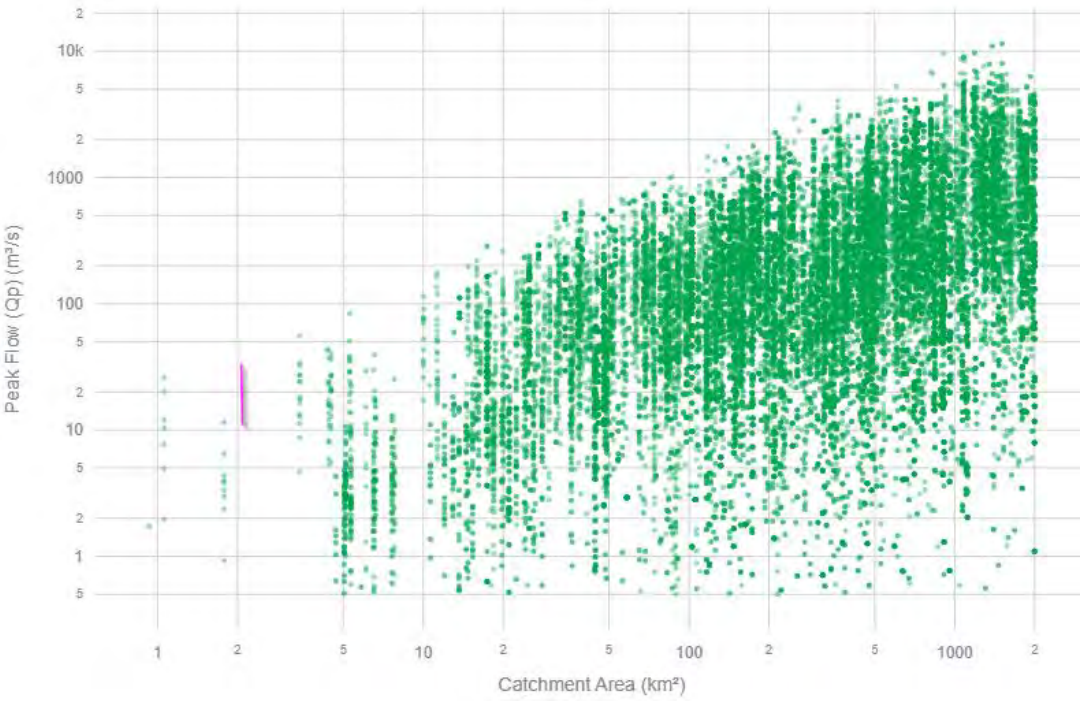


Figure 5.3 Calibrated Australian URBS model results compared with TUFLOW (magenta) peak values

5.4.2 Rational Method calculation

The peak discharges estimated from the TUFLOW model were validated against the Rational Method estimated peak discharges for the 50%, 10% and 1% AEP design events at a flow path near the BESS area, see Table 5.5. The adopted values of Manning's 'n' roughness and rainfall losses were refined during model validation to obtain design discharges generally consistent with the Rational Method. Details of the Rational Method calculation are presented in Appendix A.

Overall, the validation demonstrates that the TUFLOW model provides reasonable estimates of design discharges compared to those obtained using the Rational Method. On this basis, the model is suitable to assess the flood characteristics for the study area.

Table 5.5 Comparison between TUFLOW and the Rational Method

Location ID	Nearby Location	50% AEP (m^3/s)	10% AEP (m^3/s)	1% AEP (m^3/s)
ID#11	TUFLOW flow at BESS area	5.63	8.6	12.78
	Rational Method check	4.65	8.49	15.10

5.5 FLOOD MAPPING

The future climate flood extents, depths and velocities for the Study Area are shown in Appendix C. These flood maps show a variety of overland flow paths.

Flood hazards were considered in accordance with Australian Emergency Management guidelines, which present several hazard categories for flood modelling results, as shown in Figure 5.4.

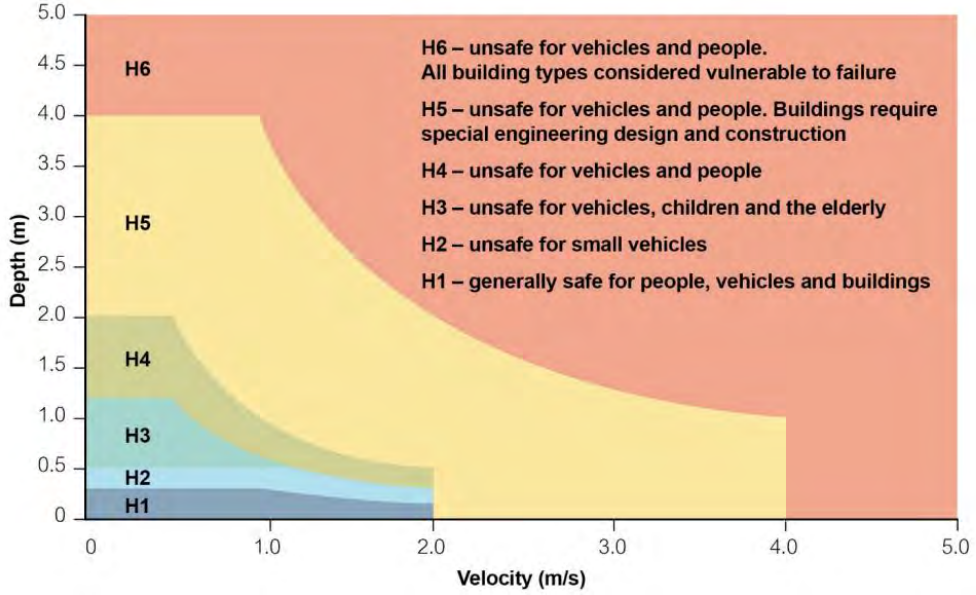


Figure 5.4 Flood Hazard Classification

Summary observations related to flood behaviour, flood maps are provided in Appendix A, are as follows:

- 50% AEP: The flood-mapped results indicate that the flows are confined to the minor drainage features within the Study Area. Flow paths are developing on the south and north of the Study

Area, though peak modelled flood depths and velocities remain low. The Flood Hazards are typically categorised as H1 to H3 within the Study Area extent.

- 10% AEP: The flow paths through the Study Area are beginning to spread outside their natural watercourses. In general, flood flow depths and velocities are becoming slightly more hazardous throughout the Study Area. The flow paths north and south of the Study Area are becoming more prominent. The Flood Hazards are typically categorised as H1 to H4 within the Study Area extent.
- 1% AEP: The flow paths have spread outside of their natural watercourses. Flood flow depths and velocities have become more hazardous throughout the Study Area. Additionally, the flow paths on the north and south of the Study Area have become less prominent due to spilling. The Flood Hazards are typically categorised as H1 to H4 within the Study Area extent.

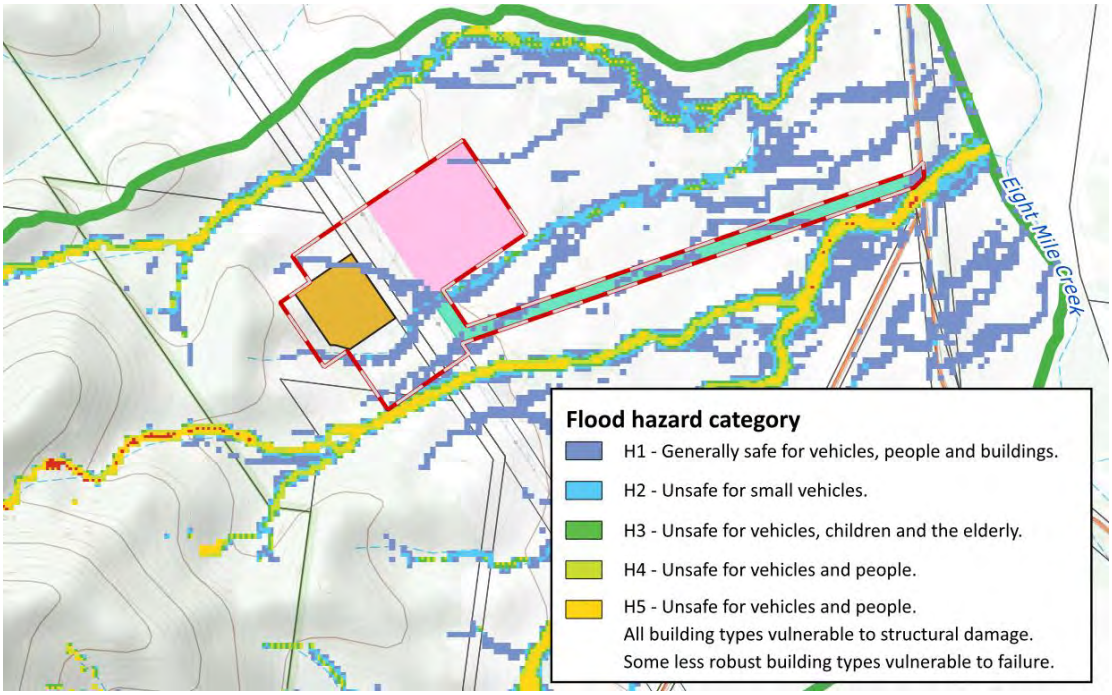


Figure 5.5 Extract of 10% AEP flood hazard map

6 STORMWATER IMPACT ASSESSMENT

6.1 OVERVIEW

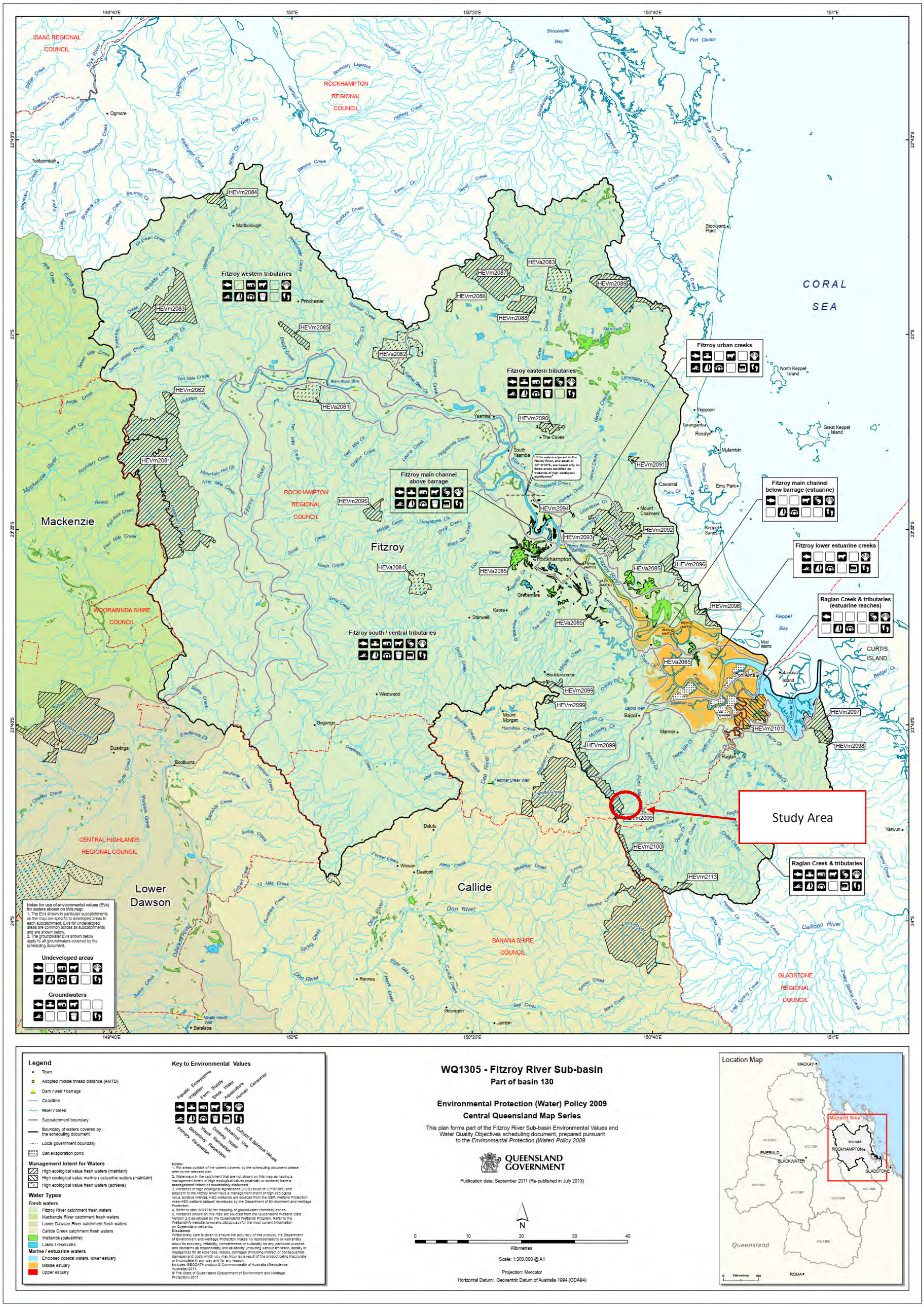
The Study Area is shown on map WQ1305 as being located in Basin 130 in the Fitzroy River Basin (WQ1305). Schedule 1 of the *EPP Water*[5] (EP Policy) locates the Study Area within Fitzroy South/Central tributaries[6], see Figure 6.1. The applicable Environmental Values and Water Quality Objectives were written in accordance with the provisions of the EP Act. The EP Policy provides a framework for identifying environmental values (EVs) for Queensland waters and deciding the water quality objectives (WQOs) to protect or enhance those EVs, including the identified EVs and WQOs under Schedule 1.

6.2 ENVIRONMENTAL VALUES

The Fitzroy River Sub-basin Environmental Values and Water Quality Objectives document contains EVs for waters in the South/Central tributaries, fresh waters as listed under Schedule 1 of the EPP (Water). The applicable Environmental Values are as follows:

- Aquatic ecosystems - intrinsic value of aquatic ecosystems, habitat in waterways;
- Irrigation - water supply for irrigation;
- Farm supply/use - non-potable farm water supply;
- Stock water - water supply for the production of healthy livestock;
- Human consumer - producing aquatic foods from natural waterways;
- Primary recreation - full body contact and frequent immersion;
- Visual recreation – uses that require no direct contact with water;
- Drinking water - suitable as a supply to the water treatment plant; and
- Cultural and spiritual values – scientific, social or cultural heritage.

[5] https://www.legislation.qld.gov.au/view/pdf/2023-10-20/sl-2019-0156


Study Area
Fitzroy western tributaries
Fitzroy eastern tributaries
Fitzroy urban creeks
Fitzroy main channel above barrage
Fitzroy main channel below barrage (estuarine)
Fitzroy lower estuarine creeks
Raglan Creek & tributaries (estuarine reaches)
Fitzroy south / central tributaries
Raglan Creek & tributaries
ISAAC REGIONAL COUNCIL
ROCKHAMPTON REGIONAL COUNCIL
WOORABINDA SHIRE COUNCIL
CENTRAL HIGHLANDS REGIONAL COUNCIL
BANANA SHIRE COUNCIL
GLADSTONE REGIONAL COUNCIL
Mackenzie
Fitzroy
Callide
Lower Dawson
CORAL SEA
Rockhampton
Gladstone
Emerald
Blackwater
Roma
Mapped Area
Legend
Key to Environmental Values
Water Types
Management Intent for Waters
Notes for use of environmental values (EVs) for waters shown on this map:
Undeveloped areas
Groundwaters
WQ1305 - Fitzroy River Sub-basin
Part of basin 130
Environmental Protection (Water) Policy 2009
Central Queensland Map Series
This plan forms part of the Fitzroy River Sub-basin Environmental Values and Water Quality Objectives scheduling document, prepared pursuant to the Environmental Protection (Water) Policy 2009.
QUEENSLAND GOVERNMENT
Publication date: September 2011 (Re-published in July 2013)
Kilometres
Scale: 1:300,000 @ A1
Projection: Mercator
Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)
Location Map

6.3 WATER QUALITY OBJECTIVES

Water Quality Objectives (WQOs) are defined under the Water Act and EPP Water to protect the identified EVs for a particular receiving environment. Relevant local guideline values are determined at a sub-basin level. Relevant aquatic ecosystem WQOs for baseflow conditions for the Surface Fresh Waters (Management Intent – Moderately Disturbed) are outlined as follows, and the values are based on:

The Fitzroy South / Central tributaries Fresh Waters water quality guidelines values:

ammonia N:	<30 µg/L
oxidised N:	<8 µg/L
total nitrogen:	<1300 µg/L
filterable reactive phosphorus (FRP):	<7 µg/L
total phosphorus:	<130 µg/L
chlorophyll a:	<8 µg/L
dissolved oxygen:	60%–110% saturation
turbidity:	<110 NTU
suspended solids:	< 35 mg/L
pH:	6.5–7.5

6.4 SURFACE WATER QUALITY

No direct water quality measurements or qualitative water quality information is available for any watercourses relevant to the Study Area. Water quality within the Study Area is expected to be commensurate with moderately disturbed streams nearby that are subject to limited vegetation clearing, grazing and erosion.

During the detailed design phase, the contractor will prepare a site stormwater management plan (SMP), and an erosion and sediment control plan (ESCP) with consideration of the construction methodology.

6.5 STORMWATER IMPACT ASSESSMENT

The base case and developed case peak flows for the catchment were assessed using the Rational Method, as outlined in the Queensland Department of Transport and Main Roads Drainage Manual. While the site is rural, the urban method was used as it allows for an assessment of an increase in runoff due to an increase in impervious areas. The rainfall intensities were extracted from the 2016 Intensity Frequency Duration (IFD) tool as provided by the Bureau of Meteorology and discussed in Section 4.2.

6.5.1 Development impacts on existing catchment

The hardstand and other impervious areas being introduced by this Project total around 12,000 m^2 (one hectare). The immediate stormwater catchment draining to this area is 60 ha and is part of the 200 hectares of local catchment draining past the BESS and switchyard area. This means that only 1.6% of the development site will be converted into an impervious area. The total size of the Eight Mile Creek catchment that this site drains to is around 33 km^2.

Table 6.1 Assessment of Peak Stormwater Flow

	Impervious Coverage	Mainstream Length	Equal area slope (%)	Time of Concentration (mins)	Runoff Coefficient (C_{10})	1% AEP Peak Flow (m^3/s)
Base Case	0%	1.4 km	2.51	25	0.70	88.94
Developed	1.6%	1.4 km	2.51	25	0.73	89.27

A review of the peak flow calculations indicates an increase of 0.33 m^3/s in the 1% AEP peak flow arriving at Eight Mile Creek. It must be noted that the development area is substantially smaller than the Eight Mile Creek catchment, and is expected to generate a peak outflow well before the peak flow flows past the site. As a result, any additional flow of the site to the peak flow is expected to be negligible. Therefore, the Study Area's impact on stormwater runoff is not likely to have any significant effect on the receiving environment.

As a result, any additional flow from the Study Area is expected to be negligible. Therefore, changes to the stormwater runoff from the development site are not likely to have any significant impact on the receiving environment.

7 EROSION AND SEDIMENT CONTROL PRINCIPLES

7.1 PURPOSE

At the time of writing, detailed design information is not available to WRM; as such, this is not intended to be the construction ESCP. This document does not include detailed engineering design of controls and structures, and it does not provide plans showing the layout of all erosion controls across the site. However, the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control Guidelines (2012) was considered in the preparation of this document as a foundation for best practice to be adopted.

The scope and purposes are to provide:

- Initial indication of the potential erosion and sedimentation hazards of the Project through a desktop review of the existing environment and planned Project activities.
- Suitable control measures and determine whether erosion and control maintenance and monitoring requirements need to be adopted for the Project.
- The foundation for the detailed ESCP, which will be developed later as the Project progresses into the detailed design phase.

7.2 EROSION AND SEDIMENT CONTROL

The detail in this section was developed to guide the management, reduction and mitigation of enhanced erosion and sediment transport in the design phase of the Project. This plan was prepared following industry standards and developed based on the following hierarchy of control measures:

1. Drainage Control
2. Erosion Control
3. Sediment Control

It is preferable to manage erosion through drainage control and erosion control as this will prevent or minimise the generation of dislodged sediments. Sediment control measures aim to trap sediments to prevent them from leaving the Study Area. Therefore, the most efficient and cost-effective way to minimise sedimentation is to minimise the extent, duration and severity of soil erosion as this will reduce the amount of sediment control measures required. For erosion and sediment control to be effective, the following are required:

- Ensure erosion and sediment control measures are designed and constructed effectively.
- Ensure that erosion and sediment control techniques are site-specific and take into account local soils, weather and construction conditions as discussed in Section 3.
- Minimise soil erosion, wherever possible, instead of relying on down-slope sediment control methods.
- Control water movement through the Study Area.

- Minimise the duration and extent of bare soil exposure through prompt stabilisation of disturbed areas and implementation of groundcover as soon as practicable.
- Utilise existing topography and adopt construction practices that minimise soil erosion and sediment discharge from the Study Area.
- Maximise sediment retention on site.
- Integrate erosion and sediment control issues/measures into the planning phases of the Study Area.
- Maintain erosion and sediment control measures in proper working order at all times.
- Monitor the Study Area and adjust erosion and sediment control practices to maintain the required performance standard.

7.2.1 Erosion and Sediment Control Criteria

The selection of suitable control measures is typically made once the stormwater drainage plan is known and before works commencing on-site.

The choice of overall strategy and suitable control measures can be informed based on the detailed design drawings and runoff calculations. The strategy and approach is to notify the Principal Contractor, and their suitably qualified representative is to be appointed by the site supervisor with input from a suitable environmental team member. Appropriate control measures will be applied to all stages of a project, may be constructed from on-site materials, are cost-effective and durable, and perform to the required standard. When deciding on a control measure, it is also essential to take into account site-specific aspects such as:

- The site topography;
- The properties of the surface where the control measures will be implemented, as well as the material downstream of the control measure;
- Type of disturbance;
- Length of disturbance;
- Site-specific constraints, e.g. proximity of local watercourse; and
- Overall purpose of implementing erosion and sediment control at a particular location.

Control measures should be specific to the site location and the phase of the Project and be planned and installed by a suitably qualified person, following best practice guidelines and industry standards.

7.3 DRAINAGE CONTROL MEASURES

A brief overview of the drainage control measures that the detailed design may consider adopting is provided below. The detailed design and construction erosion and sediment control plan is to ensure that the drainage control desired outcomes are addressed:

- Manage stormwater flows around or through areas of exposed soil to avoid contamination.

- Manage sheet flows to avoid or minimise the generation of rill or gully erosion.
- Provide stable concentrated flow paths to achieve the construction phase stormwater management design objectives for temporary drainage works, which, for a design life >24 months, requires drainage structures to pass the 10% AEP flood event, and culvert crossings to pass the 63% AEP flood event.
- Provide emergency spillways for sediment basins to achieve the construction phase stormwater management design objectives for emergency spillways on temporary sediment basins, which require spillway capacity for a 2% AEP flood event.

7.3.1 Drainage Channels

Temporary drainage channels should be designed and constructed with a grade that generates flow velocities not exceeding the maximum allowable flow velocity for the given surface material. Suppose the flow velocity is above the speed that a surface material can sustain. In that case, the drainage channel may erode, often along the invert of the drain, and result in bank slumping and widening of the channel. Measures that may be implemented to decrease flow velocities are:

- Increasing the channel width;
- Reducing the channel slope;
- Reducing the catchment area;
- Increasing channel roughness; and
- Installing rock check dams, coir log rolls, check dams or similar in the channel.

The scour resistance of a drainage channel may also be increased through a channel liner. It is currently unknown whether permanent drainage diversions will be required; therefore, controls relating to this have not been discussed. If the detailed design phase of the Project determines that permanent drainage lines or diversion channels are necessary, controls for these will be outlined in the ESCP of the detailed design phase.

7.3.2 Drainage Control for Unsealed Roads

To reduce the erosion risk of an unsealed road, the following practices may be applicable:

- Stormwater runoff should be allowed to shed in regular intervals. Depending on the road material and the surrounding environment, runoff can either be discharged into a sediment trap or via a level spreader into adjacent vegetation.
- Stormwater collected in table drains should be discharged in regular intervals. This may not always be possible, and some environments may require different control measures.
- Table drains should be constructed in a U shape rather than a V shape.
- If road construction is required across a slope, the road should be positioned as close as possible to the contour of the land, as this will avoid concentrated flows.
- If road construction is required diagonally across a slope, it is likely that upslope stormwater runoff will be collected as concentrated flow. The collected runoff should be shed at regular intervals using a level spreader or drainage channels constructed

7.4 EROSION CONTROL MEASURES

During construction activities, the most common forms of water erosion are splash erosion, sheet erosion, rill erosion and gully erosion. Several erosion control measures are available to minimise erosion. The appropriate erosion control method will vary from site to site as well as within the Study Area. Factors that should be considered are the upstream catchment, slope, topography, climate, soil type, underlying geology, disturbance type and the receiving environment.

The detailed design and Construction Erosion and Sediment Control Plan are to ensure that the desired erosion control outcomes are addressed:

- Stage clearing and construction works to minimise the area of exposed soil at any one time.
- Effectively cover or stabilise exposed soils before predicted rainfall.
- Prior to completion of works for the development, and before removal of sediment controls, all site surfaces must be effectively stabilised using methods that will achieve effective short-term stabilisation.

While the physical methods may vary, all erosion control measures aim at providing ground cover to the disturbed land. A list of erosion control measures that may be adopted is provided below.

- Cellular Confinement Systems
- Compost Blanket
- Gravelling
- Hydromulching
- Mulching
- Revegetation
- Soil Binders
- Mesh/Jute Matting

7.5 SEDIMENT CONTROL MEASURES

Sediment control measures should not solely be relied on and should always be used in combination with the drainage control and erosion control measures outlined above. Priority should be placed on erosion and drainage control measures to prevent soil dislocation and sediment generation.

The detailed design and Construction Erosion and Sediment Control Plan are to ensure that the sediment control desired outcomes are addressed:

- Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk.
- All exposed areas greater than 2500 m^2 must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).

- Earthworks and the implementation of erosion and sediment controls are undertaken in ways that ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction for all events up to and including the 1% AEP.

Sediment control measures trap the coarser sediment fractions, but smaller sediments such as silts and clays are not retained. Sediment basins are designed to collect runoff still laden with finer sediments. These sediments settle out in the sediment basin. If dispersive soils are present, a flocculation agent is required to settle sediments. A list of sediment control techniques that can be adopted is provided below.

- Check Dam
- Grass Filter Strips
- Rock Filter Dam
- Sediment Basin
- Sediment Fence

7.6 EROSION RISK ASSESSMENT

To understand the requirement for erosion and sediment control measures, the erosion potential for an area needs to be assessed through a risk assessment process. For this assessment, the following aspects, which all influence the erosion potential of a site and the appropriate management practices, should be included:

- Soil classification;
- Average slope of disturbance area;
- Location within the catchment;
- Proximity to waterways;
- Extent and duration of soil disturbance; and
- Whether run-off from upslope areas can be controlled.

A potential erosion risk identification is carried out to assess the possible risks stemming from proposed activities required for the construction of the Project. At a high level, the assessment considered the temporal and spatial erosion risks that may occur and identified the risk location that will require erosion control measures during the construction phase.

7.7 SOIL ERODIBILITY RISK

An assessment of soil erodibility was undertaken in 2017 by the Department of Science, Information Technology and Innovation (Zund, 2017) in the Fitzroy Natural Resource Management (NRM) region. A site-specific report for the Study Area using this assessment process was obtained in the form of a FORAGE Erodible Soils report (Queensland Government 2024). The FORAGE Erodible Soils report contains three risk maps and is available in Appendix B:

- Map 1 - Overall Soil Erodibility,
- Map 2 - Surface Soil Erodibility and

- Map 3 - Subsoil Erodibility.

Soil erodibility refers to the likelihood that a particular soil is susceptible to erosion by water and wind. The overall FORAGE soil erodibility classification is created by combining surface soil stability and subsoil dispersiveness. Surface soil stability is influenced by surface cover, which is a function of climate, soil fertility, rockiness and land management. Subsoil dispersiveness is influenced by subsoil attributes such as cation balance, clay type and salinity. **Table 7.1** below identifies the mapped surface soil and subsoil dispersibility conditions for the Study Area.

Table 7.1 Site FORAGE Report Description

FORAGE Report	Description
Surface Soil	Moderately stable surface soils across most of the Study Area, with a few isolated areas of non-cohesive surface soils located on the higher ridge areas within the Study Area.
Subsoil Dispersibility	Predominantly weakly dispersive subsoils are present, with non-dispersive subsoils located centrally and on the eastern site boundary, and some highly dispersive subsoils located in the higher ridge areas within the Study Area.

As shown in Appendix B, the overall soil erodibility of the area is mapped as having very low erosion vulnerability across most of the area, with areas of moderate erosion vulnerability soils located on the higher ridges.

The soil erodibility dataset helps identify soils susceptible to gully and stream bank erosion. Gullies typically develop when the protective surface soil is disturbed and erosive forces encounter subsoil, particularly those that are dispersive in nature.

Whether the occurrence of soil erosion occurs depends on a variety of factors, including soil properties, topography, land use, rainfall intensity, surface cover and land management practices. However, the assessment provided above does not incorporate external influences affecting erosion rates.

7.8 RECOMMENDATIONS

Erosion is dependent on the likelihood and intensity of predicted and/or expected rainfall. Where construction activities are scheduled during the dry season when rainfall is unlikely or limited, the required erosion protection measures may be significantly less than if construction were to occur during the wet season (IECA, 2012).

Erosion control devices should be employed as soon as reasonably practicable to limit soil erosion and to protect the exposed areas of soil from raindrop impact erosion. Best practice land erosion control and site rehabilitation are mainly dependent on the likelihood and timing of rainfall and wind events.

All control measures are to be installed, managed and maintained in general accordance with the Best Practice Erosion and Sediment Control (BPESC) guidelines for Australia (International Erosion Control Association) to:

- Divert clean water around construction activities;
- Reduce water velocity and capture sediment on site;

- Prevent sediment from moving off-site and sediment-laden water from entering any watercourse, drainage line, or drain inlet; and,
- Minimise the amount of material transported from the site.

The Principal Contractor is responsible for implementing all erosion and sediment control measures, and these must be implemented following best practice principles. A range of control measures is available for use across the Study Area, and those recommended in this section are based on the IECA's 'Best Practice Erosion and Sediment Control' documents (2012).

The selection and implementation of appropriate ESC measures are dependent on several factors, including the anticipated disturbance duration, slope, soil characteristics, and availability of materials, among others.

All erosion, sediment and drainage control measures must remain in place until all construction works are completed and surfaces are stabilised and revegetated.

Control measures to be implemented as part of the Project to manage and minimise impacts on water resources for each risk area identified above. The identified control measures will be confirmed and amended as necessary in a detailed ESCP before construction commences.

7.8.1 CONTROL MEASURE STANDARD DRAWINGS AND FACT SHEETS

Standard drawings and fact sheets for the proposed control measures outlined above can be found via Best Practice Erosion and Sediment Control, International Erosion Control Association (Australasia) (IECA 2012). Links to each are provided below.

- Fact Sheets:

https://www.austieca.com.au/publications/book-4-design-fact-sheets

- Standard Drawings:

https://www.austieca.com.au/publications/book-6-standard-drawings

8 CONTAMINATION RISK ASSESSMENT

8.1 SOIL CONTAMINATION MANAGEMENT

The identification and correct handling of potentially hazardous substances is an essential consideration during the construction phase. Spills/leaks from any chemical or hydrocarbon sources will be managed through prescribed controls and measures documented in a site-specific EMP. Best Practice Erosion and Sediment Control Handbook[7] (IECA, 2008) outlines well-established approaches to mitigate contamination risks that will be included within the construction methodology. During the detailed design phase, the contractor will prepare an erosion and sediment control plan (ESCP) in consideration of their construction methodology.

At a high level, a range of mitigation measures identified to minimise contamination risk are as follows:

- Design, construction and maintenance of control measures will follow IECA's Best Practice handbook for guidelines (2008) (also known as the White Book), which Queensland Local Councils and State Agencies such as Department of Transport and Main Roads and Department of Local Government, Water and Volunteers endorse;
- Disturbance Footprint drainage works will aim to minimise potential impacts on the existing overland flow paths. Where possible, stream crossings will be built in accordance with the IECA's Best Practice Erosion and Sediment Handbook (2008), Book 4, which provides Design Facts Sheets. In particular, the factsheets titled Temporary Watercourse Crossing Culverts TCC-1 and Temporary Watercourse Crossing Fords (TFC-1).
- A construction management plan and ESCP will be developed for the Project, detailing methods for minimising contaminant-bearing runoff following the IECA Best Practice Erosion and Sediment Handbook (IECA, 2008).
- Safe storage of chemicals and hydrocarbon materials (e.g. away from waterways and drainage lines), to ensure that any spillages are contained;
- Inspections will be undertaken at least daily during periods of inclement weather, 24 hours before forecast rain, and within 24 hours following a rain event. During dry periods, a suitably qualified person will inspect control measures weekly.
- Use of glyphosate-based products (or similar non-residual and non-persistent herbicides) to manage weeds on-site to minimise the potential risk of harmful herbicide by-products entering the surface water receiving environment;
- Installation and operation of a septic tank to service the operations and maintenance building; this will be designed and operated in accordance with Queensland Plumbing and Wastewater Code guidelines, relevant statutory requirements and Australian Standards (AS/NZS 1546). Regulated wastes will be removed from the site and disposed of in a suitable facility by a licensed operator.

[7] Available at: https://www.austieca.com.au//publications/best-practice-erosion-and-sediment-control-bpesc-document

9 DEVELOPMENT OUTCOMES FOR ASSESSABLE DEVELOPMENT

9.1 OVERVIEW

The section outlines the application as it relates to the stormwater management code. Part 5 of the Planning Scheme outlines the categories of development and provides the tables of assessment for the Development Code. Table 9.1 presents and responds to the Performance and Acceptable Outcomes of the stormwater management development code in the Planning Scheme's Section 9.3.6.

The purpose of the stormwater management code is to provide for sustainable stormwater infrastructure which protects water quality, environmental values and maintains or enhances community health, safety and amenity.

The purpose of the stormwater management code is to ensure that the proposed development achieves the following outcomes:

- Acceptable levels of stormwater run-off quality and quantity are achieved by applying water-sensitive urban design principles;
- Public health and safety are protected, and development avoids damage or nuisance caused by stormwater flows;
- Development includes a stormwater management system which minimises impacts on natural catchment hydrological processes;
- Development ensures that the environmental values of waterways are protected or enhanced;
- Development maintains or enhances the efficiency and integrity of the stormwater infrastructure network;
- The whole life-cycle cost of stormwater infrastructure is minimised; and,
- New development infrastructure is designed to support and complement existing and planned stormwater infrastructure.

Table 9.1 Extract of Table 9.3.6.3.1 Development Outcomes for assessable development

Source: Rockhampton Region Planning Scheme 2015 rockeplan.rockhamptonregion.qld.gov.au

Performance Outcomes	Acceptable Outcomes	Assessment for the Project
PO1 Development provides a stormwater management system that achieves the integrated management of stormwater to: a) ensure that flooding impacts do not increase, including upstream or downstream of the development site; b) avoid net worsening of stormwater peak discharges and runoff volumes; c) utilises the use of water-sensitive urban design principles; and d) ensure the site maximises opportunities for capture and reuse.	**AO1.1** Development provides a stormwater management system designed in compliance with SC6.18—Stormwater management planning scheme policy, SC6.10—Flood hazard planning scheme policy, the Queensland Urban Drainage Manual, Capricorn Municipal Development Guidelines, and Australian Rainfall and Runoff. **AO1.2** Stormwater is conveyed to a lawful point of discharge in accordance with the Queensland Urban Drainage Manual.	**Complies with AO1.1 and AO1.2**. Stormwater modelling was undertaken and complies with QUDM, CMDF, and ARR 2019. Stormwater is lawfully discharged. The development will implement an integrated stormwater management system that effectively manages stormwater flows and quality while providing environmental protection. The design will maintain floodplain storage capacity and detention system functionality, ensuring no increase in flooding impacts upstream or downstream of the site. The system incorporates water-sensitive urban design principles while strategically locating treatment systems to safeguard people and property, enable safe maintenance access, and minimise environmental impact on natural waterways.

Performance Outcomes	Acceptable Outcomes	Assessment for the Project
PO2 Development provides a stormwater management system which: a) has sufficient capacity to safely convey run-off, taking into account increased run-off from impervious surfaces and flooding in local catchments; b) maximises the use of natural waterway corridors and natural channel design principles; and c) efficiently integrates with existing stormwater treatments upstream and downstream.	**AO2.1** Development provides a stormwater management system which is designed in compliance with ***SC6.18 — Stormwater management planning scheme policy, Queensland Urban Drainage Manual***, Capricorn Municipal Development Guidelines and Australian Rainfall and Runoff.	**Complies with AO2.1**. The stormwater system adheres to ***SC6.18***, and hydrologic and hydraulic modelling was completed following ARR 2019 v4.2. The development will deliver a stormwater management system with the capacity to convey runoff from impervious surfaces and local catchment flooding safely. The design will maintain flood plain storage capacity and incorporate natural waterway corridors and channel design principles, while seamlessly integrating with upstream and downstream flow paths. The system's design will safeguard people and property, enable safe maintenance access, and enhance environmental outcomes through water-sensitive urban design principles.

Performance Outcomes	Acceptable Outcomes	Assessment for the Project
PO3 Development ensures that the location and design of stormwater detention and water quality treatment facilities: a) minimise risk to people and property; b) provide for safe access and maintenance; and c) provide for the safe recreational use of stormwater management features.	**AO3.1** Development provides for stormwater detention and water quality treatment facilities, which are located outside of a waterway. **AO3.2** Development provides for stormwater detention in accordance with SC6.18 — Stormwater management planning scheme policy, Queensland Urban Drainage Manual, Capricorn Municipal Development Guidelines and Australian Rainfall and Runoff. **AO3.3** Development provides a stormwater quality treatment system designed in accordance with the State Planning Policy - Water Quality.	**Complies with AO3.1, AO3.2 and AO3.3**. No detention of stormwater is proposed within the waterway. Development modelling complies with SMP, QUDM and ARR 2019. Proposed water quality management is undertaken in line with best practices and SPP-WQ. ***Refer to Section 6***

Performance Outcomes	Acceptable Outcomes	Assessment for the Project
PO4 Development and drainage works, including stormwater channels, creek modification works, bridges, culverts and major drains, protect and enhance the environmental values of the waterway corridors and drainage paths and permit terrestrial and aquatic fauna movement.	**AO4.1** Development ensures natural waterway corridors and drainage paths are retained. **AO4.2** Development incorporates the use of natural channel design principles in constructed components to maximise environmental benefits and waterway stability in accordance with the Queensland Urban Drainage Manual, Capricorn Municipal Development Guidelines and Australian Rainfall and Runoff. **AO4.3** Development provides stormwater outlets into waterways, creeks, wetlands, and overland flow paths with energy dissipation to minimise scour, in accordance with the Queensland Urban Drainage Manual, Capricorn Municipal Development Guidelines, and Australian Rainfall and Runoff.	**Complies with AO4.1, AO4.2 and AO4.3.** Development retains natural waterway corridors and incorporates components to ensure waterway stability by maintaining stream channel velocities. Stormwater is lawfully discharged, and the risk of scour is managed by avoiding concentrated flow paths. ***Refer to Section 5.*** Modelling was undertaken following guidelines in ARR 2019, QUDM and CMDG.
PO5 Development protects and enhances the environmental and water quality values of waterways, creeks and estuaries within or external to the site.	No acceptable outcome is nominated.	**Complies with PO5** Waterway environmental qualities are maintained. The proposed Project is designed to safeguard people and property, enable safe access for maintenance, and minimise environmental impact on natural waterways.

Performance Outcomes	Acceptable Outcomes	Assessment for the Project
PO6 All overland flow paths are maintained under tenure arrangements that facilitate efficient infrastructure and enhance environmental sustainability.	No acceptable outcome is nominated.	**Complies with PO6**: Overland flow paths are not diverted and do not pose a risk to infrastructure or the environment.
PO8 Development ensures that the location and design of stormwater detention and water quality treatment minimise risk to people and property, provide for safe access and maintenance, and minimise ecological impacts to creeks and waterways.	**AO8.1** Development provides a stormwater management system designed in accordance with SC6.10 Flood hazard planning scheme policy and SC6.18 Stormwater management planning scheme policy.	**Complies with AO8.1** Proposed works are in accordance with the Flood Hazard planning scheme and Stormwater planning scheme***. Refer to Sections 5 and 6***.. The development's stormwater treatment systems will be strategically located and designed to safeguard people and property, enable safe access for maintenance, and minimise environmental impact on natural waterways.
PO11 Development ensures that there is sufficient site area to accommodate an effective stormwater management system.	No acceptable outcome is nominated.	**Complies with PO11**. Proposed works have ample room available to accommodate the Stormwater management system. ***Refer to Sections 5 and 6.***

Performance Outcomes	Acceptable Outcomes	Assessment for the Project
PO12 Development provides for the orderly development of stormwater infrastructure within a catchment, having regard to the: a) existing capacity of stormwater infrastructure within and external to the site, and any planned stormwater infrastructure upgrades; b) safe management of stormwater discharge from existing and future upslope development; and c) implications for adjacent and down-slope development.	No acceptable outcome is nominated.	**Complies with PO12**. Proposed works can be completed to ensure the safe management of stormwater discharge from existing and future developments, both upslope and downslope. ***Refer to Sections 5 and 6.***
PO13 Development provides proposed stormwater infrastructure, which: a) remains fit for purpose for the life of the development and maintains full functionality in the design storm event; and b) can be safely accessed and maintained in a cost-effective way.	No acceptable outcome is nominated.	**Complies with PO13**, Proposed stormwater infrastructure that is fit for purpose for the life of the development and maintains full functionality in the design storm event; and can be safely accessed and maintained in a cost-effective manner.

Performance Outcomes	Acceptable Outcomes	Assessment for the Project
PO14 Development ensures that all reasonable and practicable measures are taken to manage the impacts of erosion, turbidity and sedimentation, both within and external to the development site, from construction activities, including vegetation clearing, earthworks, civil construction, installation of services, rehabilitation, revegetation and landscaping to protect: a) the environmental values and water quality objectives of waters; b) waterway hydrology; and c) the maintenance and serviceability of stormwater infrastructure.	**AO14.1** The erosion and sediment control plan is to be designed and implemented in accordance with the Capricorn Municipal Development Guidelines.	**Complies with AO14.1** The development of a conceptual ESCP development and adheres to the principles outlined in IECA Best Practice for Erosion & Sediment Control (2008) as well as those provided in CMDG. ***Refer to Section 6***.

Performance Outcomes	Acceptable Outcomes	Assessment for the Project
PO15 For development proposals within the Fitzroy River sub-basin, relevant environmental values are recognised and enhanced, and appropriate water quality objectives are addressed.	**AO15.1** Development complies with the provisions of the State Planning Policy - Guideline - Water Quality. **AO15.2** Development adjoining the full supply height above the Fitzroy River Barrage includes the provision of an effective buffer that assists in filtering runoff, including: a) a buffer distance of 100 metres to the water supply height of the barrage, which excludes cropping or grazing of a low intensity nature; and b) fencing and water troughs installed on the land to prevent encroachment of animals within 100 metres of the full supply height above the barrage.	**Complies with AO15.1 and AO15.2**. The proposed design adheres to the principles outlined in the SPP, specifically the state interest in Water Quality Policy. ***Refer to Section 6.*** The development is well above the FSL of the Fitzroy River tidal barrage.

Performance Outcomes	Acceptable Outcomes	Assessment for the Project
PO16 The development is compatible with the land use constraints of the site for: a) achieving stormwater design objectives; and b) avoiding or minimising the entry of contaminants into, and transport of contaminants in, stormwater.	**AO16.1** Development is undertaken in accordance with a stormwater management plan that: a) incorporates stormwater quality control measures to achieve the design objectives set out in the State Planning Policy – Guideline – Water Quality; b) provides for achievable stormwater quality treatment measures reflecting land use constraints, such as soil type, landscape features (including landform), nutrient hazardous areas, acid sulphate soil and rainfall erosion potential; and c) accounts for development type, construction phase, local landscape, climatic conditions and design objectives.	**Complies with AO16.1** The proposed Project incorporates stormwater quality control measures that achieve the design objectives set out in SPP Water Quality. ***Refer to Sections 3 and 6***. These sections detail soil type, landscape features, rainfall erosion potential, local landscape, climatic conditions and design objectives.

Performance Outcomes	Acceptable Outcomes	Assessment for the Project
PO17 The waterway is designed for stormwater flow management, stormwater quality management and the following end-use purposes: a) amenity including aesthetics, b) landscaping and recreation; c) flood management; d) stormwater harvesting as part of an integrated water cycle management plan; e) as a sustainable aquatic habitat; and f) the protection of water environmental values.	No acceptable outcome is nominated.	**Complies with PO17.** The design and construction will deliver a waterway that effectively manages stormwater flows and quality while providing aesthetic value, recreational opportunities, flood mitigation, water harvesting capabilities, aquatic habitat preservation, and environmental water protection. ***Refer to Sections 3 and 6***.
PO19 The construction phase for the waterway is compatible with protecting water environmental values in existing natural waterways.	**AO19.1** Erosion and sediment control measures are incorporated during construction to achieve design objectives set out in State Planning Policy - Guideline - Water Quality.	**Complies with AO19.1**. The cESCP has outlined principles that will achieve design objectives in SPP - Water Quality. ***Refer to Section 6***.
PO20 Stormwater overflows from the waterway do not result in lower water quality objectives in existing natural waterways.	**AO20.1** Stormwater run-off entering non-tidal waterways is pre-treated before release in accordance with the guideline design objectives, water quality objectives of local waterways, and any relevant local area stormwater management plan.	**Complies with AO20.1** As required by design objectives, the stormwater run-off discharging from the Study Area will achieve the water quality objectives of local waterways, and any relevant local area stormwater management plan. ***Refer to Sections 5 and 6***

10 SUMMARY OF FINDINGS

This Stormwater Management Plan has considered the potential impacts on surface water associated with the Mount Hopeful Battery Project. The Project will have minimal impact on stormwater quality or quantity as it involves limited ground disturbance, does not store or handle large volumes of pollutants, and once constructed, does not increase stormwater runoff.

For these reasons, the key potential risks to surface water are only associated with the Project's construction. These risks can be adequately managed through the application of well-established construction environmental management practices and appropriate design.

Key issues relevant to the surface water impacts of the Project are summarised below:

- Impacts to surface water resources occur during the construction; however, these potential impacts can be mitigated to present negligible risk.
- Operational phase of the Project presents minimal risk provided that by the conclusion of the construction phase, appropriate groundcover and drainage are established;
- While the core area does not contain any areas of major flood hazard, significant flood hazard was identified adjacent to the access road that reaches the Project.
- The localised and confined nature of the Project is likely to result in minor impacts (if any) that do not pose a risk to drainage features, downstream watercourses or receiving waters.

Overall, it is considered that the potential contamination impacts associated with the Project can be appropriately managed by developing and implementing an erosion and sediment control plan that contains best practice drainage, erosion and sediment controls for the various stages of work.

This study assessed the likely impact on surface water flows for the current climate. Rain on grid flood modelling was undertaken for the flows generated during the 50%, 10% and 1% AEP design flood events. The location of infrastructure should be determined depending on the consequences of the flood risk. Where vital infrastructure, such as the BESS, switchgear and substation should, at a minimum, be located outside the 1% AEP future climate flood extent. The flood risk of as-constructed infrastructure should be assessed to determine the impacts that the introduction of hydraulic structures has had on flow paths. Current guidance, ARR 2019 v4.2, provides a method for determining an allowance of debris blockage at hydraulic structures. The Project also assessed the Planning Scheme's Stormwater Management Code and concluded the project complies with all relevant performance outcomes.

11 REFERENCES

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Zund, P.R. 2017,	*Fitzroy NRM Region Soil Erodibility: User Guide,* Department of Science, Information Technology, Innovation, Queensland Government, Brisbane.

APPENDIX A ARR DATA HUB

A.1 DURATIONS LESS THAN ONE HOUR - ARR DATA HUB

[STARTTXT]

Input Data Information
[INPUTDATA]
Latitude,-23.803200
Longitude,150.615150
[END_INPUTDATA]

River Region
[RIVREG]
Division, North East Coast
River Number,30
River Name, Fitzroy River (Qld)
[RIVREG_META]
Time Accessed,31 July 2025 04:23PM
Version,2016_v1
[END_RIVREG]

ARF Parameters
[LONGARF]
Zone, East Coast North
a,0.327
b,0.241
c,0.448
d,0.36
e,0.00096
f,0.48
g,-0.21
h,0.012
i,-0.0013
[LONGARF_META]
Time Accessed,31 July 2025 04:23PM
Version,2016_v1
[END_LONGARF]

Storm Losses
[LOSSES]
ID,16076.0
Storm Initial Losses (mm),20.0
Storm Continuing Losses (mm/h),1.6
[LOSSES_META]
Time Accessed,31 July 2025 04:23PM

Version,2016_v1
[END_LOSSES]

Temporal Patterns
[TP]
code, ECnorth
Label, East Coast North
[TP_META]
Time Accessed,31 July 2025 04:23PM
Version,2016_v2
[END_TP]

Areal Temporal Patterns
[ATP]
code, ECnorth
arealabel, East Coast North
[ATP_META]
Time Accessed,31 July 2025 04:23PM
Version,2016_v2
[END_ATP]

Median Preburst Depths and Ratios
[PREBURST]
min (h)\AEP(%),50,20,10,5,2,1
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90 (1.5),1.8 (0.041),1.5 (0.026),1.3 (0.019),1.1 (0.014),6.0 (0.065),9.6 (0.093)
120 (2.0),0.5 (0.010),1.5 (0.024),2.3 (0.030),2.9 (0.034),8.3 (0.082),12.4 (0.109)
180 (3.0),1.7 (0.032),2.2 (0.030),2.5 (0.029),2.8 (0.028),7.6 (0.065),11.2 (0.085)
360 (6.0),1.8 (0.028),6.4 (0.071),9.5 (0.087),12.4 (0.097),20.5 (0.133),26.6 (0.150)
720 (12.0),0.0 (0.001),5.1 (0.044),8.4 (0.059),11.7 (0.068),32.0 (0.150),47.2 (0.191)
1080 (18.0),0.1 (0.001),6.9 (0.051),11.5 (0.067),15.8 (0.076),25.1 (0.096),32.0 (0.105)
1440 (24.0),0.0 (0.000),6.2 (0.041),10.3 (0.053),14.3 (0.060),41.9 (0.139),62.6 (0.176)
2160 (36.0),0.0 (0.000),4.8 (0.027),8.0 (0.035),11.1 (0.039),27.7 (0.075),40.1 (0.092)
2880 (48.0),0.0 (0.000),3.4 (0.017),5.6 (0.022),7.8 (0.024),16.7 (0.040),23.5 (0.047)
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Time Accessed,31 July 2025 04:23PM
Version,2018_v1
Note, Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.
[END_PREBURST]From preburst class

10% Preburst Depths
[PREBURST10]
min (h)\AEP(%),50,20,10,5,2,1
60 (1.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

90 (1.5),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
120 (2.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
180 (3.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
360 (6.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
720 (12.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.4 (0.002),0.6 (0.003)
1080 (18.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
1440 (24.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),1.0 (0.003),1.8 (0.005)
2160 (36.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
2880 (48.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
[PREBURST10_META]
Time Accessed,31 July 2025 04:23PM
Version,2018_v1
Note, Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.
[END_PREBURST10]From preburst class

25% Preburst Depths
[PREBURST25]
min (h)\AEP(%),50,20,10,5,2,1
60 (1.0),0.0 (0.000),0.1 (0.002),0.2 (0.003),0.2 (0.003),0.6 (0.007),0.9 (0.010)
90 (1.5),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.3 (0.003),0.5 (0.005)
120 (2.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.5 (0.005),0.8 (0.007)
180 (3.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.2 (0.002),0.3 (0.002)
360 (6.0),0.0 (0.000),0.1 (0.001),0.1 (0.001),0.2 (0.001),1.3 (0.008),2.1 (0.012)
720 (12.0),0.0 (0.000),0.1 (0.001),0.1 (0.001),0.2 (0.001),6.0 (0.028),10.4 (0.042)
1080 (18.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),4.3 (0.017),7.6 (0.025)
1440 (24.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),4.5 (0.015),7.8 (0.022)
2160 (36.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),10.8 (0.029),18.9 (0.043)
2880 (48.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)
[PREBURST25_META]
Time Accessed,31 July 2025 04:23PM
Version,2018_v1
Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.
[END_PREBURST25]From preburst class

75% Preburst Depths
[PREBURST75]
min (h)\AEP(%),50,20,10,5,2,1
60 (1.0),6.9 (0.176),12.3 (0.238),15.9 (0.264),19.4 (0.281),26.6 (0.332),32.1 (0.359)
90 (1.5),11.0 (0.250),14.4 (0.246),16.6 (0.242),18.8 (0.239),30.9 (0.335),40.0 (0.389)
120 (2.0),10.4 (0.217),16.0 (0.250),19.7 (0.262),23.3 (0.270),43.7 (0.430),59.1 (0.518)
180 (3.0),20.0 (0.374),23.2 (0.321),25.3 (0.296),27.3 (0.277),52.3 (0.445),71.0 (0.537)
360 (6.0),18.7 (0.285),37.3 (0.412),49.6 (0.456),61.5 (0.481),86.0 (0.556),104.4 (0.591)

720 (12.0),16.9 (0.208),35.7 (0.307),48.2 (0.336),60.1 (0.349),106.5 (0.499),141.2 (0.571)
1080 (18.0),13.7 (0.147),31.7 (0.233),43.7 (0.256),55.1 (0.265),96.7 (0.370),127.9 (0.418)
1440 (24.0),2.8 (0.027),34.9 (0.228),56.1 (0.290),76.6 (0.321),104.4 (0.346),125.3 (0.352)
2160 (36.0),4.1 (0.035),28.0 (0.157),43.9 (0.191),59.1 (0.205),73.9 (0.201),85.0 (0.195)
2880 (48.0),5.3 (0.042),22.1 (0.112),33.3 (0.130),43.9 (0.135),61.8 (0.148),75.2 (0.151)
4320 (72.0),0.0 (0.000),15.5 (0.070),25.8 (0.088),35.7 (0.095),47.9 (0.098),57.1 (0.098)
[PREBURST75_META]
Time Accessed,31 July 2025 04:23PM
Version,2018_v1
Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.
[END_PREBURST75]From preburst class

90% Preburst Depths
[PREBURST90]
min (h)\AEP(%),50,20,10,5,2,1
60 (1.0),21.4 (0.549),35.4 (0.686),44.7 (0.741),53.6 (0.778),65.3 (0.813),74.1 (0.830)
90 (1.5),59.3 (1.343),59.3 (1.011),59.2 (0.862),59.2 (0.753),83.3 (0.903),101.3 (0.984)
120 (2.0),52.8 (1.103),57.9 (0.906),61.3 (0.816),64.6 (0.748),129.4 (1.272),178.0 (1.562)
180 (3.0),47.9 (0.894),69.4 (0.960),83.6 (0.978),97.2 (0.983),180.2 (1.533),242.4 (1.831)
360 (6.0),62.9 (0.961),99.6 (1.101),123.9 (1.139),147.2 (1.151),197.9 (1.278),235.9 (1.335)
720 (12.0),41.1 (0.504),79.7 (0.684),105.3 (0.735),129.9 (0.753),203.3 (0.953),258.3 (1.044)
1080 (18.0),65.6 (0.704),95.4 (0.699),115.2 (0.675),134.2 (0.644),174.6 (0.669),204.9 (0.670)
1440 (24.0),43.8 (0.428),95.9 (0.628),130.4 (0.674),163.5 (0.685),203.1 (0.672),232.8 (0.655)
2160 (36.0),41.2 (0.354),104.0 (0.584),145.6 (0.635),185.5 (0.645),177.5 (0.482),171.5 (0.393)
2880 (48.0),33.7 (0.266),78.3 (0.397),107.8 (0.420),136.2 (0.419),144.3 (0.345),150.4 (0.301)
4320 (72.0),18.6 (0.132),47.0 (0.211),65.8 (0.224),83.8 (0.223),100.0 (0.205),112.2 (0.192)
[PREBURST90_META]
Time Accessed,31 July 2025 04:23PM
Version,2018_v1
Note,Preburst interpolation methods for catchment-wide preburst have been slightly altered. Point values remain unchanged.
[END_PREBURST90]From preburst class

Climate Change Factors
[CCF]
[SSP1-2.6]
,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours,18 Hours,>24 Hours
2030,1.18,1.17,1.16,1.14,1.13,1.12,1.12,1.11,1.1,1.1
2040,1.21,1.19,1.17,1.16,1.15,1.14,1.13,1.12,1.11,1.11
2050,1.22,1.2,1.18,1.17,1.15,1.15,1.14,1.13,1.12,1.11
2060,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
2070,1.24,1.22,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
2080,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
2090,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
2100,1.22,1.2,1.19,1.17,1.16,1.15,1.14,1.13,1.12,1.12

[END_SSP1-2.6]
[SSP2-4.5]
,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours,18 Hours,>24 Hours
2030,1.18,1.17,1.16,1.14,1.13,1.12,1.12,1.11,1.1,1.1
2040,1.22,1.2,1.19,1.17,1.16,1.15,1.14,1.13,1.12,1.12
2050,1.27,1.24,1.23,1.21,1.19,1.18,1.17,1.16,1.15,1.14
2060,1.3,1.27,1.25,1.23,1.21,1.2,1.19,1.18,1.16,1.16
2070,1.33,1.3,1.28,1.26,1.24,1.22,1.21,1.19,1.18,1.17
2080,1.37,1.33,1.31,1.28,1.26,1.24,1.22,1.21,1.2,1.19
2090,1.4,1.36,1.34,1.31,1.28,1.26,1.24,1.23,1.21,1.2
2100,1.41,1.37,1.35,1.32,1.29,1.27,1.25,1.24,1.22,1.21
[END_SSP2-4.5]
[SSP3-7.0]
,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours,18 Hours,>24 Hours
2030,1.18,1.17,1.16,1.14,1.13,1.12,1.12,1.11,1.1,1.1
2040,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12
2050,1.29,1.26,1.24,1.22,1.2,1.19,1.18,1.17,1.16,1.15
2060,1.35,1.32,1.3,1.27,1.25,1.23,1.22,1.2,1.19,1.18
2070,1.42,1.38,1.35,1.32,1.29,1.28,1.26,1.24,1.22,1.21
2080,1.5,1.45,1.42,1.38,1.35,1.33,1.3,1.28,1.26,1.25
2090,1.59,1.53,1.49,1.44,1.4,1.38,1.35,1.33,1.3,1.29
2100,1.66,1.59,1.55,1.5,1.45,1.42,1.39,1.37,1.34,1.32
[END_SSP3-7.0]
[SSP5-8.5]
,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours,18 Hours,>24 Hours
2030,1.2,1.18,1.17,1.16,1.14,1.13,1.13,1.12,1.11,1.11
2040,1.26,1.24,1.22,1.2,1.18,1.17,1.16,1.15,1.14,1.14
2050,1.34,1.31,1.29,1.26,1.24,1.23,1.21,1.2,1.18,1.18
2060,1.42,1.38,1.35,1.32,1.29,1.28,1.26,1.24,1.22,1.21
2070,1.52,1.47,1.43,1.4,1.36,1.34,1.31,1.29,1.27,1.26
2080,1.63,1.57,1.52,1.48,1.43,1.4,1.37,1.35,1.33,1.31
2090,1.77,1.69,1.64,1.58,1.52,1.49,1.45,1.42,1.39,1.37
2100,1.86,1.77,1.71,1.64,1.58,1.54,1.5,1.47,1.43,1.41
[END_SSP5-8.5]
[Climate_Change_INITIAL_LOSS]
,Losses SSP1-2.6,Losses SSP2-4.5,Losses SSP3-7.0,Losses SSP5-8.5
2030,1.02,1.02,1.02,1.03
2040,1.03,1.03,1.03,1.03
2050,1.03,1.03,1.04,1.04
2060,1.03,1.04,1.04,1.05
2070,1.03,1.04,1.05,1.06
2080,1.03,1.05,1.06,1.07
2090,1.03,1.05,1.07,1.08
2100,1.03,1.05,1.07,1.09
[END_Climate_Change_INITIAL_LOSS]
[Climate_Change_CONTINUING_LOSS]

,Losses SSP1-2.6,Losses SSP2-4.5,Losses SSP3-7.0,Losses SSP5-8.5
2030,1.04,1.05,1.05,1.05
2040,1.05,1.05,1.06,1.06
2050,1.06,1.06,1.07,1.08
2060,1.06,1.07,1.08,1.1
2070,1.06,1.08,1.1,1.12
2080,1.06,1.09,1.11,1.14
2090,1.06,1.09,1.13,1.16
2100,1.06,1.1,1.14,1.18
[END_Climate_Change_CONTINUING_LOSS]
[TEMPERATURE_CHANGES]
,SSP1-2.6,SSP2-4.5,SSP3-7.0,SSP5-8.5
2030,1.2,1.2,1.2,1.3
2040,1.3,1.4,1.5,1.6
2050,1.4,1.7,1.8,2.1
2060,1.5,1.9,2.2,2.5
2070,1.5,2.1,2.5,3.0
2080,1.5,2.2,2.9,3.5
2090,1.5,2.4,3.3,4.1
2100,1.4,2.5,3.6,4.5
[END_TEMPERATURE_CHANGES]

[CCF_META]
Time Accessed,31 July 2025 04:23PM
Version,2024_v1
Note,Updated climate change factors for IFD Initial loss and continuing loss based on IPCC AR6 temperature increases from the updated Climate Change Considerations (Book 1: Chapter 6) in ARR (Version 4.2). ARR recomends the use of Current and near-term (2030 midpoint). Medium-term (2050 midpoint) and Long-term (2090 midpoint)
[END_CCF]

[ENDTXT]

A.2 DURATION BETWEEN 1 – 12 HOURS ARR DATA HUB

[STARTTXT]

Input Data Information

[INPUTDATA]

Latitude,-23.802900

Longitude,150.613850

[END_INPUTDATA]

River Region

[RIVREG]

Division,North East Coast

River Number,30

River Name,Fitzroy River (Qld)

[RIVREG_META]

Time Accessed,04 July 2025 01:58PM

Version,2016_v1

[END_RIVREG]

ARF Parameters

[LONGARF]

Zone,East Coast North

a,0.327

b,0.241

c,0.448

d,0.36

e,0.00096

f,0.48

g,-0.21

h,0.012

i,-0.0013

[LONGARF_META]

Time Accessed,04 July 2025 01:58PM

Version,2016_v1

[END_LONGARF]

Storm Losses

[LOSSES]

ID,16076.0

Storm Initial Losses (mm),20.0

Storm Continuing Losses (mm/h),1.6

[LOSSES_META]

Time Accessed,04 July 2025 01:58PM

Version,2016_v1

[END_LOSSES]

Temporal Patterns

[TP]

code,ECnorth

Label,East Coast North

[TP_META]

Time Accessed,04 July 2025 01:58PM

Version,2016_v2

[END_TP]

Areal Temporal Patterns

[ATP]

code,ECnorth

arealabel,East Coast North

[ATP_META]

Time Accessed,04 July 2025 01:58PM

Version,2016_v2

[END_ATP]

Median Preburst Depths and Ratios

[PREBURST]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),0.7 (0.018),1.8 (0.035),2.6 (0.043),3.3 (0.048),5.8 (0.072),7.6 (0.085)

90 (1.5),1.8 (0.041),1.5 (0.026),1.3 (0.019),1.1 (0.014),6.0 (0.065),9.6 (0.093)

120 (2.0),0.5 (0.010),1.5 (0.024),2.3 (0.030),2.9 (0.034),8.3 (0.082),12.4 (0.109)

180 (3.0),1.7 (0.032),2.2 (0.030),2.5 (0.029),2.8 (0.028),7.6 (0.065),11.2 (0.085)

360 (6.0),1.8 (0.028),6.4 (0.071),9.5 (0.087),12.4 (0.097),20.5 (0.133),26.6 (0.150)

720 (12.0),0.0 (0.001),5.1 (0.044),8.4 (0.059),11.7 (0.068),32.0 (0.150),47.2 (0.191)

1080 (18.0),0.1 (0.001),6.9 (0.051),11.5 (0.067),15.8 (0.076),25.1 (0.096),32.0 (0.105)

1440 (24.0),0.0 (0.000),6.2 (0.041),10.3 (0.053),14.3 (0.060),41.9 (0.139),62.6 (0.176)

2160 (36.0),0.0 (0.000),4.8 (0.027),8.0 (0.035),11.1 (0.039),27.7 (0.075),40.1 (0.092)

2880 (48.0),0.0 (0.000),3.4 (0.017),5.6 (0.022),7.8 (0.024),16.7 (0.040),23.5 (0.047)

4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),3.2 (0.007),5.6 (0.010)

[PREBURST_META]

Time Accessed,04 July 2025 01:58PM

Version,2018_v1

Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

[END_PREBURST]From preburst class

10% Preburst Depths

[PREBURST10]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

90 (1.5),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

120 (2.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

180 (3.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

360 (6.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

720 (12.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.4 (0.002),0.6 (0.003)

1080 (18.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

1440 (24.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),1.0 (0.003),1.8 (0.005)

2160 (36.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

2880 (48.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

[PREBURST10_META]

Time Accessed,04 July 2025 01:58PM

Version,2018_v1

Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

[END_PREBURST10]From preburst class

25% Preburst Depths

[PREBURST25]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),0.0 (0.000),0.1 (0.002),0.2 (0.003),0.2 (0.003),0.6 (0.007),0.9 (0.010)

90 (1.5),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.3 (0.003),0.5 (0.005)

120 (2.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.5 (0.005),0.8 (0.007)

180 (3.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.2 (0.002),0.3 (0.002)

360 (6.0),0.0 (0.000),0.1 (0.001),0.1 (0.001),0.2 (0.001),1.3 (0.008),2.1 (0.012)

720 (12.0),0.0 (0.000),0.1 (0.001),0.1 (0.001),0.2 (0.001),6.0 (0.028),10.4 (0.042)

1080 (18.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),4.3 (0.017),7.6 (0.025)

1440 (24.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),4.5 (0.015),7.8 (0.022)

2160 (36.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),10.8 (0.029),18.9 (0.043)

2880 (48.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

4320 (72.0),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000),0.0 (0.000)

[PREBURST25_META]

Time Accessed,04 July 2025 01:58PM

Version,2018_v1

Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

[END_PREBURST25]From preburst class

75% Preburst Depths

[PREBURST75]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),6.9 (0.176),12.3 (0.238),15.9 (0.264),19.4 (0.281),26.6 (0.332),32.1 (0.359)

90 (1.5),11.0 (0.250),14.4 (0.246),16.6 (0.242),18.8 (0.239),30.9 (0.335),40.0 (0.389)

120 (2.0),10.4 (0.217),16.0 (0.250),19.7 (0.262),23.3 (0.270),43.7 (0.430),59.1 (0.518)

180 (3.0),20.0 (0.374),23.2 (0.321),25.3 (0.296),27.3 (0.277),52.3 (0.445),71.0 (0.537)

360 (6.0),18.7 (0.285),37.3 (0.412),49.6 (0.456),61.5 (0.481),86.0 (0.556),104.4 (0.591)

720 (12.0),16.9 (0.208),35.7 (0.307),48.2 (0.336),60.1 (0.349),106.5 (0.499),141.2 (0.571)

1080 (18.0),13.7 (0.147),31.7 (0.233),43.7 (0.256),55.1 (0.265),96.7 (0.370),127.9 (0.418)

1440 (24.0),2.8 (0.027),34.9 (0.228),56.1 (0.290),76.6 (0.321),104.4 (0.346),125.3 (0.352)

2160 (36.0),4.1 (0.035),28.0 (0.157),43.9 (0.191),59.1 (0.205),73.9 (0.201),85.0 (0.195)

2880 (48.0),5.3 (0.042),22.1 (0.112),33.3 (0.130),43.9 (0.135),61.8 (0.148),75.2 (0.151)

4320 (72.0),0.0 (0.000),15.5 (0.070),25.8 (0.088),35.7 (0.095),47.9 (0.098),57.1 (0.098)

[PREBURST75_META]

Time Accessed,04 July 2025 01:58PM

Version,2018_v1

Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

[END_PREBURST75]From preburst class

90% Preburst Depths

[PREBURST90]

min (h)\AEP(%),50,20,10,5,2,1

60 (1.0),21.4 (0.549),35.4 (0.686),44.7 (0.741),53.6 (0.778),65.3 (0.813),74.1 (0.830)

90 (1.5),59.3 (1.343),59.3 (1.011),59.2 (0.862),59.2 (0.753),83.3 (0.903),101.3 (0.984)

120 (2.0),52.8 (1.103),57.9 (0.906),61.3 (0.816),64.6 (0.748),129.4 (1.272),178.0 (1.562)

180 (3.0),47.9 (0.894),69.4 (0.960),83.6 (0.978),97.2 (0.983),180.2 (1.533),242.4 (1.831)

360 (6.0),62.9 (0.961),99.6 (1.101),123.9 (1.139),147.2 (1.151),197.9 (1.278),235.9 (1.335)

720 (12.0),41.1 (0.504),79.7 (0.684),105.3 (0.735),129.9 (0.753),203.3 (0.953),258.3 (1.044)

1080 (18.0),65.6 (0.704),95.4 (0.699),115.2 (0.675),134.2 (0.644),174.6 (0.669),204.9 (0.670)

1440 (24.0),43.8 (0.428),95.9 (0.628),130.4 (0.674),163.5 (0.685),203.1 (0.672),232.8 (0.655)

2160 (36.0),41.2 (0.354),104.0 (0.584),145.6 (0.635),185.5 (0.645),177.5 (0.482),171.5 (0.393)

2880 (48.0),33.7 (0.266),78.3 (0.397),107.8 (0.420),136.2 (0.419),144.3 (0.345),150.4 (0.301)

4320 (72.0),18.6 (0.132),47.0 (0.211),65.8 (0.224),83.8 (0.223),100.0 (0.205),112.2 (0.192)

[PREBURST90_META]

Time Accessed,04 July 2025 01:58PM

Version,2018_v1

Note,Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

[END_PREBURST90]From preburst class

Climate Change Factors

[CCF]

[SSP1-2.6]

,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours,18 Hours,>24 Hours

2030,1.18,1.17,1.16,1.14,1.13,1.12,1.12,1.11,1.1,1.1

2040,1.21,1.19,1.17,1.16,1.15,1.14,1.13,1.12,1.11,1.11

2050,1.22,1.2,1.18,1.17,1.15,1.15,1.14,1.13,1.12,1.11

2060,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12

2070,1.24,1.22,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12

2080,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12

2090,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12

2100,1.22,1.2,1.19,1.17,1.16,1.15,1.14,1.13,1.12,1.12

[END_SSP1-2.6]

[SSP2-4.5]

,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours,18 Hours,>24 Hours

2030,1.18,1.17,1.16,1.14,1.13,1.12,1.12,1.11,1.1,1.1

2040,1.22,1.2,1.19,1.17,1.16,1.15,1.14,1.13,1.12,1.12

2050,1.27,1.24,1.23,1.21,1.19,1.18,1.17,1.16,1.15,1.14

2060,1.3,1.27,1.25,1.23,1.21,1.2,1.19,1.18,1.16,1.16

2070,1.33,1.3,1.28,1.26,1.24,1.22,1.21,1.19,1.18,1.17

2080,1.37,1.33,1.31,1.28,1.26,1.24,1.22,1.21,1.2,1.19

2090,1.4,1.36,1.34,1.31,1.28,1.26,1.24,1.23,1.21,1.2

2100,1.41,1.37,1.35,1.32,1.29,1.27,1.25,1.24,1.22,1.21

[END_SSP2-4.5]

[SSP3-7.0]

,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours,18 Hours,>24 Hours

2030,1.18,1.17,1.16,1.14,1.13,1.12,1.12,1.11,1.1,1.1

2040,1.23,1.21,1.2,1.18,1.17,1.16,1.15,1.14,1.13,1.12

2050,1.29,1.26,1.24,1.22,1.2,1.19,1.18,1.17,1.16,1.15

2060,1.35,1.32,1.3,1.27,1.25,1.23,1.22,1.2,1.19,1.18

2070,1.42,1.38,1.35,1.32,1.29,1.28,1.26,1.24,1.22,1.21

2080,1.5,1.45,1.42,1.38,1.35,1.33,1.3,1.28,1.26,1.25

2090,1.59,1.53,1.49,1.44,1.4,1.38,1.35,1.33,1.3,1.29

2100,1.66,1.59,1.55,1.5,1.45,1.42,1.39,1.37,1.34,1.32

[END_SSP3-7.0]

[SSP5-8.5]

,<1 hour,1.5 Hours,2 Hours,3 Hours,4.5 Hours,6 Hours,9 Hours,12 Hours,18 Hours,>24 Hours

2030,1.2,1.18,1.17,1.16,1.14,1.13,1.13,1.12,1.11,1.11

2040,1.26,1.24,1.22,1.2,1.18,1.17,1.16,1.15,1.14,1.14

2050,1.34,1.31,1.29,1.26,1.24,1.23,1.21,1.2,1.18,1.18

2060,1.42,1.38,1.35,1.32,1.29,1.28,1.26,1.24,1.22,1.21

2070,1.52,1.47,1.43,1.4,1.36,1.34,1.31,1.29,1.27,1.26

2080,1.63,1.57,1.52,1.48,1.43,1.4,1.37,1.35,1.33,1.31

2090,1.77,1.69,1.64,1.58,1.52,1.49,1.45,1.42,1.39,1.37

2100,1.86,1.77,1.71,1.64,1.58,1.54,1.5,1.47,1.43,1.41

[END_SSP5-8.5]

[Climate_Change_INITIAL_LOSS]

,Losses SSP1-2.6,Losses SSP2-4.5,Losses SSP3-7.0,Losses SSP5-8.5

2030,1.02,1.02,1.02,1.03

2040,1.03,1.03,1.03,1.03

2050,1.03,1.03,1.04,1.04

2060,1.03,1.04,1.04,1.05

2070,1.03,1.04,1.05,1.06

2080,1.03,1.05,1.06,1.07

2090,1.03,1.05,1.07,1.08

2100,1.03,1.05,1.07,1.09

[END_Climate_Change_INITIAL_LOSS]

[Climate_Change_CONTINUING_LOSS]

,Losses SSP1-2.6,Losses SSP2-4.5,Losses SSP3-7.0,Losses SSP5-8.5

2030,1.04,1.05,1.05,1.05

2040,1.05,1.05,1.06,1.06

2050,1.06,1.06,1.07,1.08

2060,1.06,1.07,1.08,1.1

2070,1.06,1.08,1.1,1.12

2080,1.06,1.09,1.11,1.14

2090,1.06,1.09,1.13,1.16

2100,1.06,1.1,1.14,1.18

[END_Climate_Change_CONTINUING_LOSS]

[TEMPERATURE_CHANGES]

,SSP1-2.6,SSP2-4.5,SSP3-7.0,SSP5-8.5

2030,1.2,1.2,1.2,1.3

2040,1.3,1.4,1.5,1.6

2050,1.4,1.7,1.8,2.1

2060,1.5,1.9,2.2,2.5

2070,1.5,2.1,2.5,3.0

2080,1.5,2.2,2.9,3.5

2090,1.5,2.4,3.3,4.1

2100,1.4,2.5,3.6,4.5

[END_TEMPERATURE_CHANGES]

[CCF_META]

Time Accessed,04 July 2025 01:58PM

Version,2024_v1

Note,Updated climate change factors for IFD Initial loss and continuing loss based on IPCC AR6 temperature increases from the updated Climate Change Considerations (Book 1: Chapter 6) in ARR (Version 4.2). ARR recomends the use of Current and near-term (2030 midpoint). Medium-term (2050 midpoint) and Long-term (2090 midpoint)

[END_CCF]

Table A.1 Rational Method calculation worksheet

Catchment:	ID#11

Catchment area and coefficient of runoff	
Catchment Area (ha)	200.00
C_{10}	0.18

Standard inlet time	
Standard inlet time (mins)	30.0

Channel characteristics	
Channel length (m)	250
Channel slope (m/m)	0.015
Manning's 'n'	0.040
Channel bottom width (m)	15.00
Channel side slope (m/m)	0.050

Design Discharges

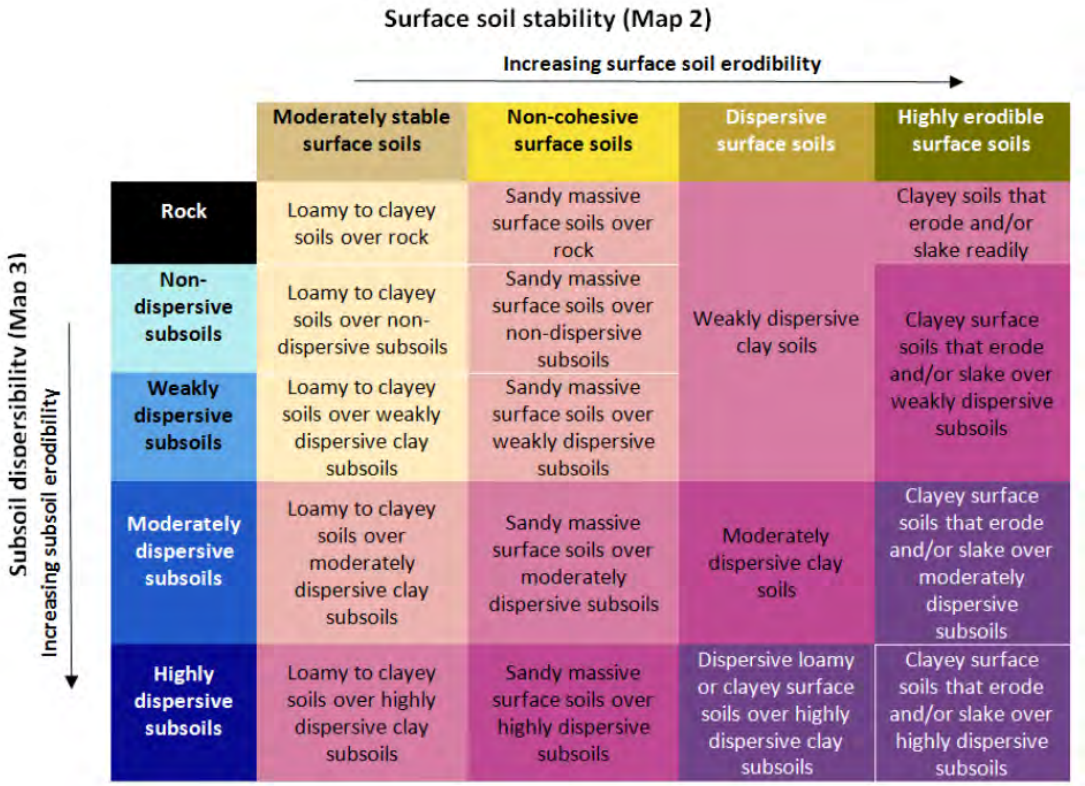
ARI (years)	AEP (%)	Frequency Factor F_y	C_y	Channel Velocity[a] (m/s)	Channel Travel Time (mins)	t_c[b] (mins)	Rainfall Intensity (mm/h)	Peak Discharge (m^3/s)
1	63	0.80	0.14	0.96	4.36	34.4	50.5	3.93
1.44	50	0.85	0.15	1.01	4.13	34.1	56.3	4.65
4.48	20	0.95	0.17	1.14	3.66	33.7	74.7	6.90
10	10	1.00	0.18	1.21	3.43	33.4	87.3	8.49
20	5	1.05	0.18	1.28	3.25	33.3	99.6	10.2
50	2	1.15	0.20	1.38	3.03	33.0	116.2	13.0
100	1	1.20	0.21	1.44	2.90	32.9	129.5	15.1

a - Channel velocity calculated using Mannings's equation

b - Time of Concentration (t_c) = Overland Flow Travel Time + Channel Travel Time

APPENDIX B ERODIBLE SOILS REPORT

B.1 ERODIBLE SOILS MATRIX



Subsoil dispersibility (Map 3)	Moderately stable surface soils	Non-cohesive surface soils	Dispersive surface soils	Highly erodible surface soils
Rock	Loamy to clayey soils over rock	Sandy massive surface soils over rock	Weakly dispersive clay soils	Clayey soils that erode and/or slake readily
Non-dispersive subsoils	Loamy to clayey soils over non-dispersive subsoils	Sandy massive surface soils over non-dispersive subsoils		Clayey surface soils that erode and/or slake over weakly dispersive subsoils
Weakly dispersive subsoils	Loamy to clayey soils over weakly dispersive clay subsoils	Sandy massive surface soils over weakly dispersive subsoils		
Moderately dispersive subsoils	Loamy to clayey soils over moderately dispersive clay subsoils	Sandy massive surface soils over moderately dispersive subsoils	Moderately dispersive clay soils	Clayey surface soils that erode and/or slake over moderately dispersive subsoils
Highly dispersive subsoils	Loamy to clayey soils over highly dispersive clay subsoils	Sandy massive surface soils over highly dispersive subsoils	Dispersive loamy or clayey surface soils over highly dispersive clay subsoils	Clayey surface soils that erode and/or slake over highly dispersive subsoils

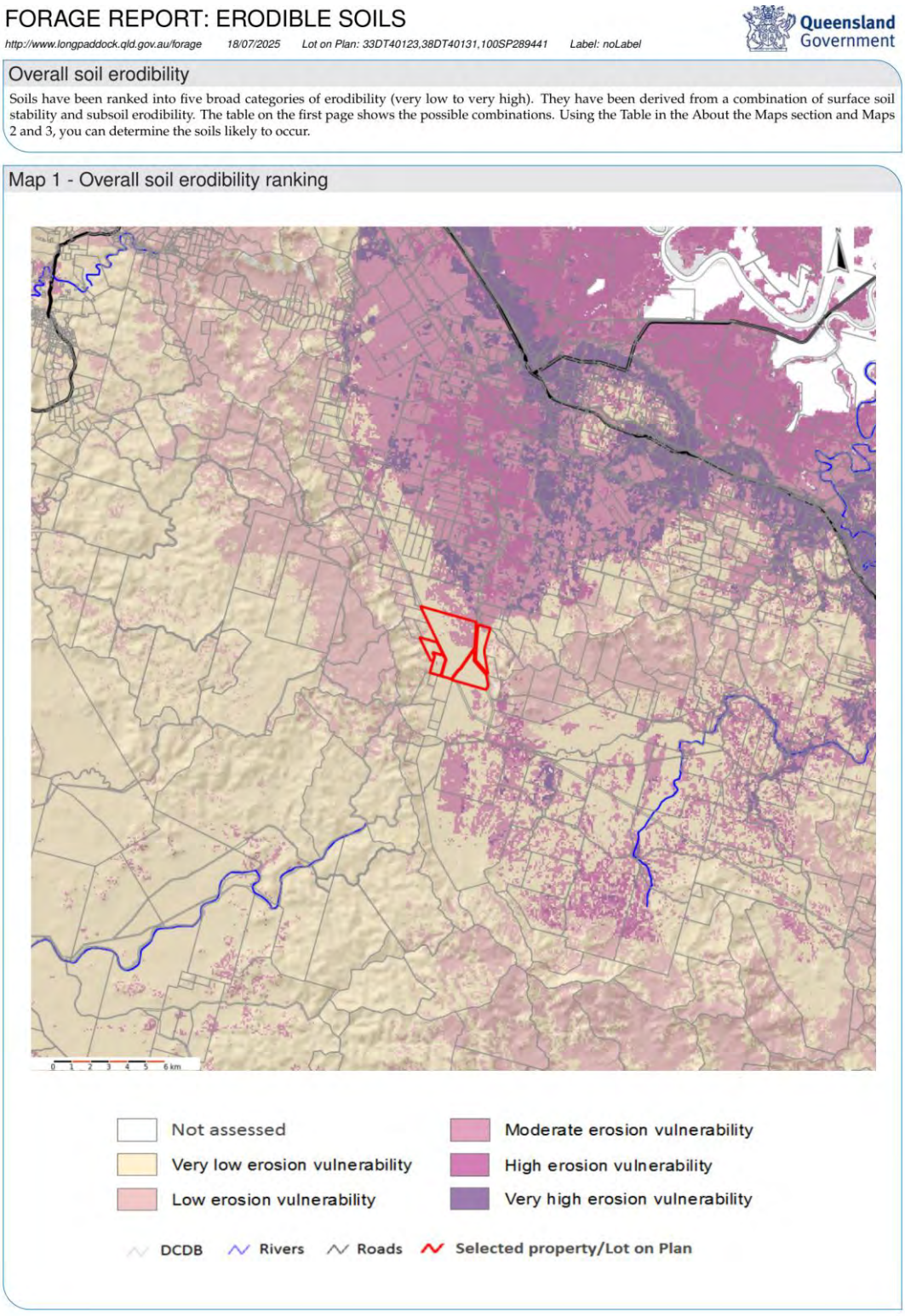


Figure B.1 Map 1 overall soil erodibility ranking

FORAGE REPORT: ERODIBLE SOILS

http://www.longpaddock.qld.gov.au/forage 18/07/2025 Lot on Plan: 33DT40123,38DT40131,100SP289441 Label: noLabel

Queensland Government

Surface soil

The surface soils have been classified into the following four categories. These categories generally relate to increasing surface soil erodibility:

1. Moderately stable surface soils are usually structured and resilient to degradation .
2. Non-cohesive surface soils are sandy soils that are not structured or only weakly so and non-cohesive. These soils are easily eroded.
3. Dispersive surface soils are loamy or clayey soils that are sodic, hardsetting and are likely to disperse in water.
4. Highly erodible surface soils are clayey soils that are sodic and dominated by shrink/swell clays that readily disperse.

Map 2 - Surface soil stability

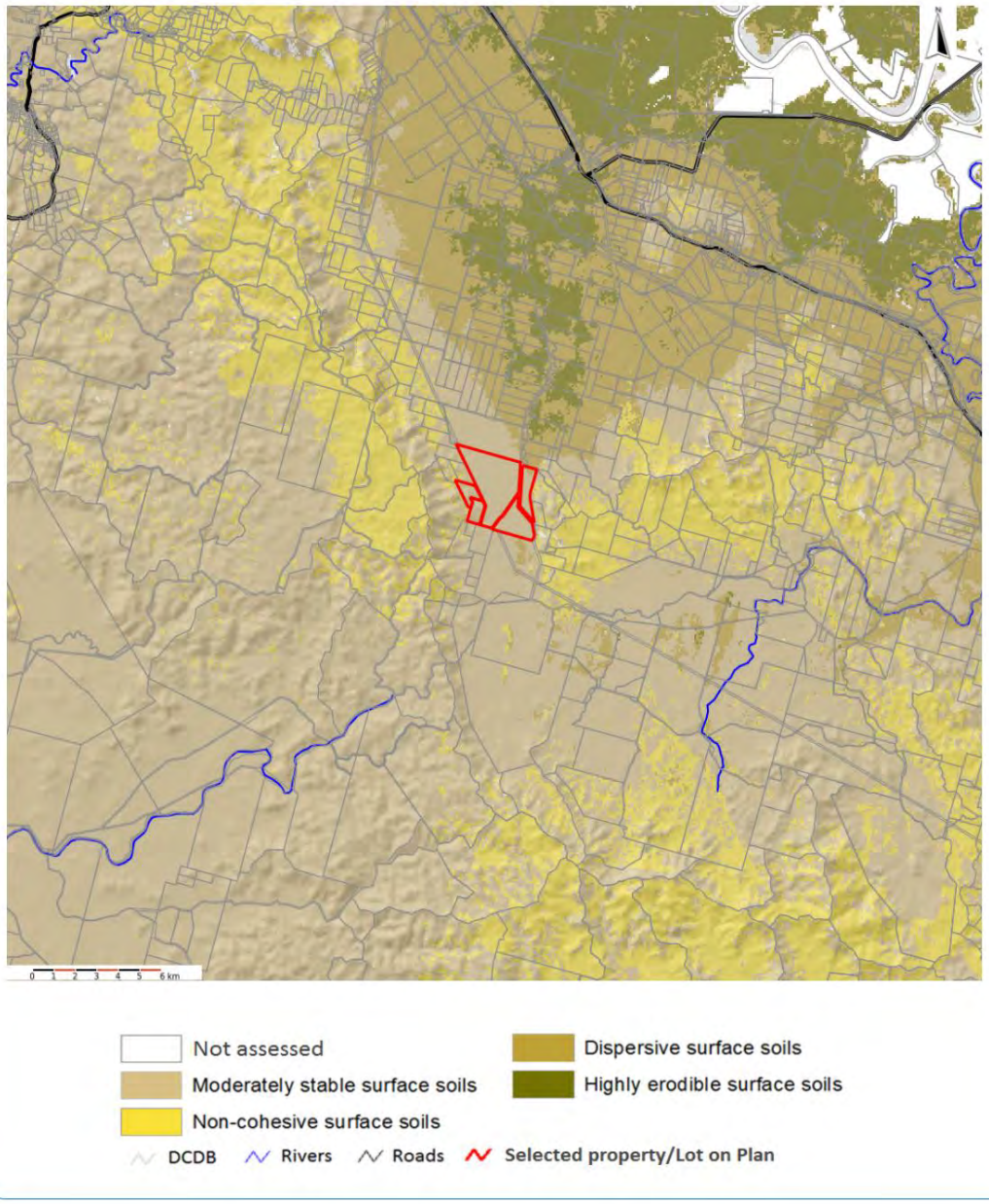


Figure B.2 Map 2 Surface Soil stability

FORAGE REPORT: ERODIBLE SOILS

http://www.longpaddock.qld.gov.au/forage 18/07/2025 Lot on Plan: 33DT40123,38DT40131,100SP289441 Label: noLabel

Queensland Government

Subsoil

The subsoils have been classified into the following four categories:

1. Non-dispersive subsoils that are non-sodic or only weakly sodic and are unlikely to disperse.
2. Weakly dispersive subsoils are sodic subsoils that are saline or dominated by carbonate nodules that prevent these subsoils from dispersing readily.
3. Dispersive subsoils are sodic subsoils that disperse readily.
4. Highly dispersive subsoils are sodic subsoils that are also dominated by magnesium ions that enhance the dispersive affect.

Map 3 - Subsoil dispersibility

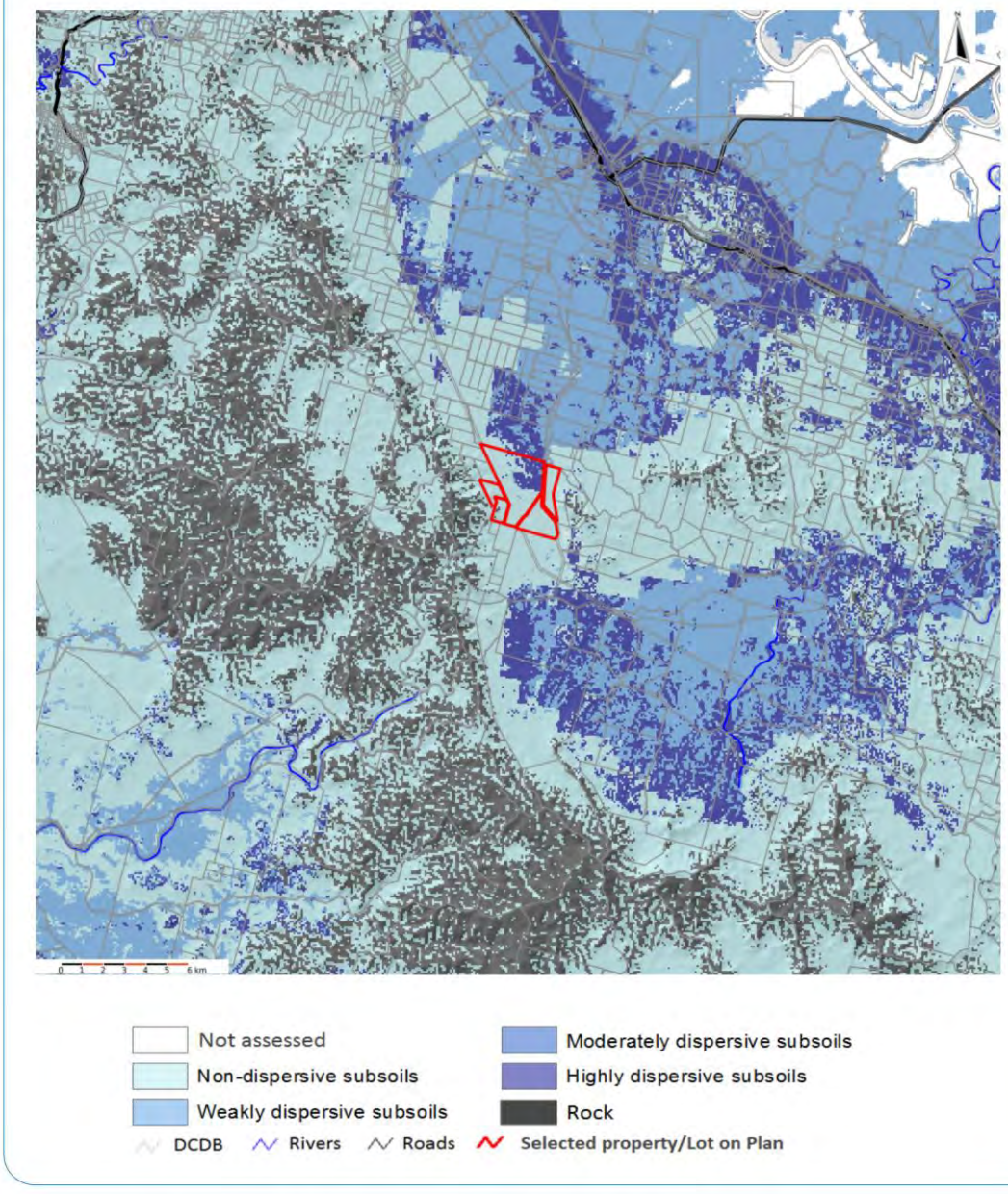


Figure B.3 Map 3 subsoil dispersibility

APPENDIX C FLOOD MAPS

C.1 PEAK MODELLED FLOOD DEPTH

C.1.1 1% AEP Flood Event

C.1.2 10% AEP Flood Event

C.1.3 50% AEP Flood Event

C.2 PEAK MODELLED FLOOD VELOCITY

C.2.1 1% AEP Flood Event

C.2.2 10% AEP Flood Event

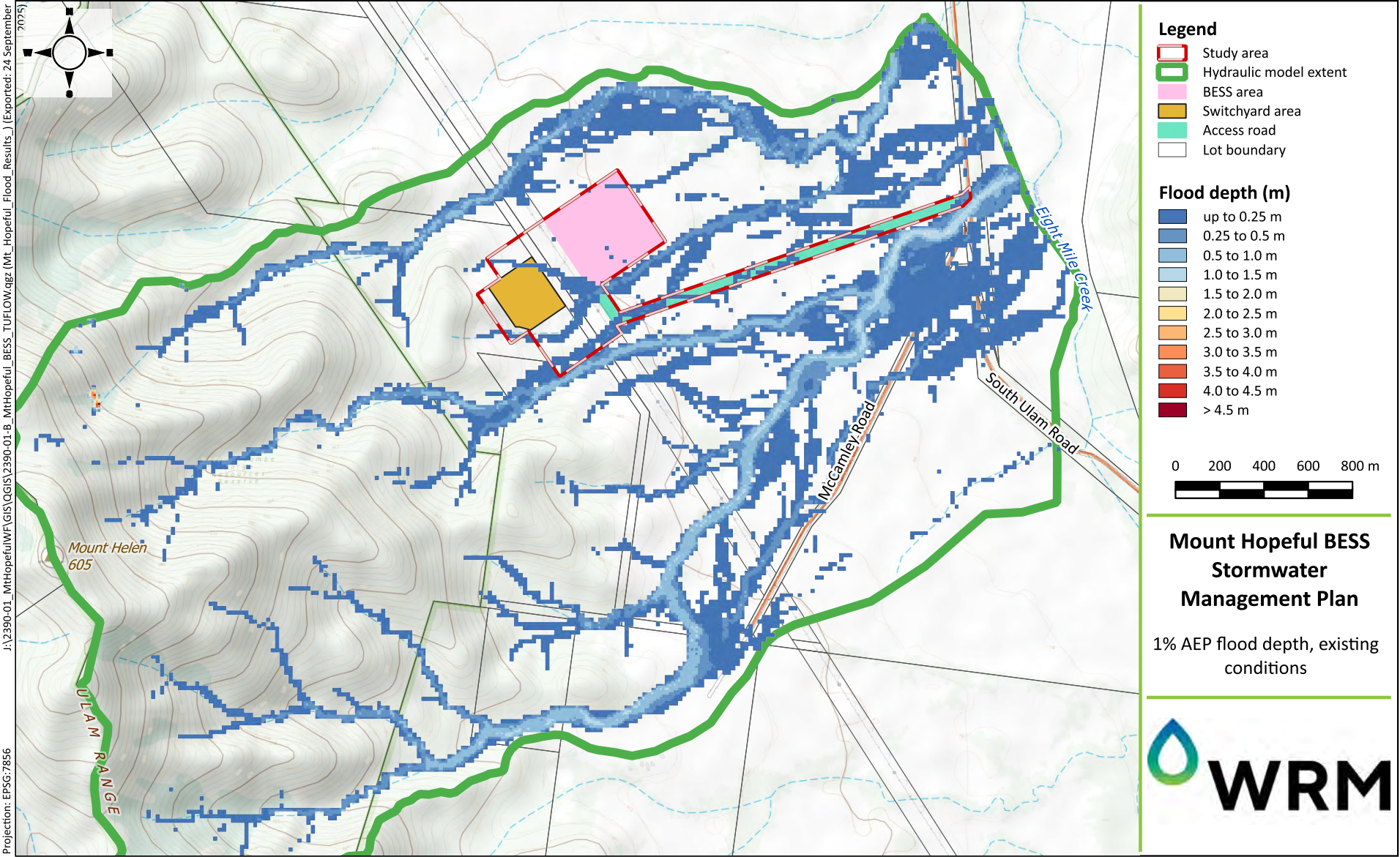
C.2.3 50% AEP Flood Event

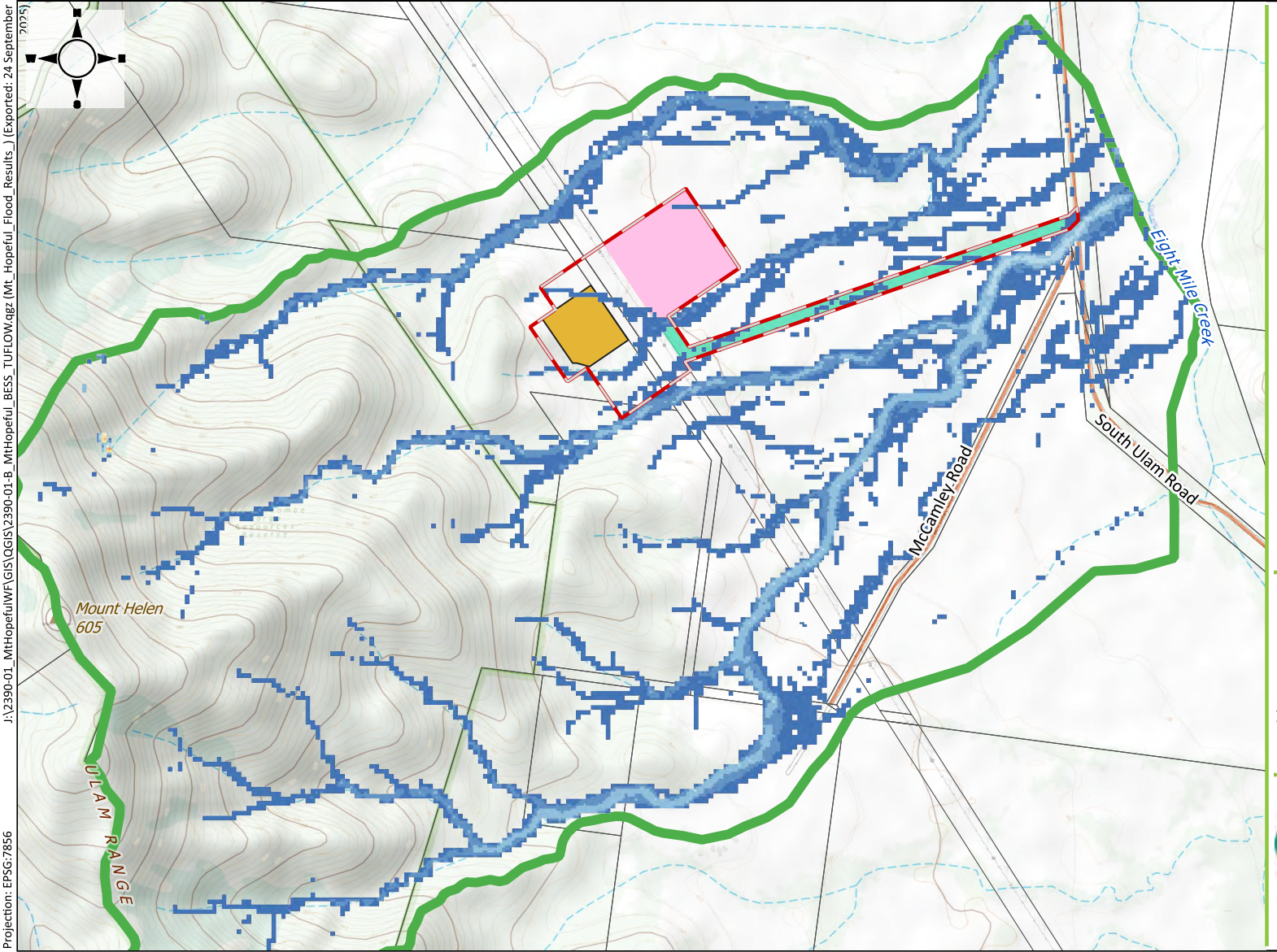
C.3 PEAK MODELLED FLOOD HAZARD

C.3.1 1% AEP Flood Event

C.3.2 10% AEP Flood Event

C.3.3 50% AEP Flood Event


Legend
Study area
Hydraulic model extent
BESS area
Switchyard area
Access road
Lot boundary
Flood depth (m)
up to 0.25 m
0.25 to 0.5 m
0.5 to 1.0 m
1.0 to 1.5 m
1.5 to 2.0 m
2.0 to 2.5 m
2.5 to 3.0 m
3.0 to 3.5 m
3.5 to 4.0 m
4.0 to 4.5 m
> 4.5 m
0 200 400 600 800 m
Eight Mile Creek
South Ulam Road
McCamley Road
Mount Helen
605
ULAM RANGE
Mount Hopeful BESS Stormwater Management Plan
1% AEP flood depth, existing conditions
WRM
J:\2390-01_MtHopefulWF\GIS\QGIS\2390-01-B_MtHopeful_BESS_TUFLOW.qgz (Mt_Hopeful_Flood_Results_) (Exported: 24 September 2025)
Projection: EPSG:7856



Legend

- Study area
- Hydraulic model extent
- BESS area
- Switchyard area
- Access road
- Lot boundary

Flood depth (m)

- up to 0.25 m
- 0.25 to 0.5 m
- 0.5 to 1.0 m
- 1.0 to 1.5 m
- 1.5 to 2.0 m
- 2.0 to 2.5 m
- 2.5 to 3.0 m
- 3.0 to 3.5 m
- 3.5 to 4.0 m
- 4.0 to 4.5 m
- > 4.5 m

0 200 400 600 800 m

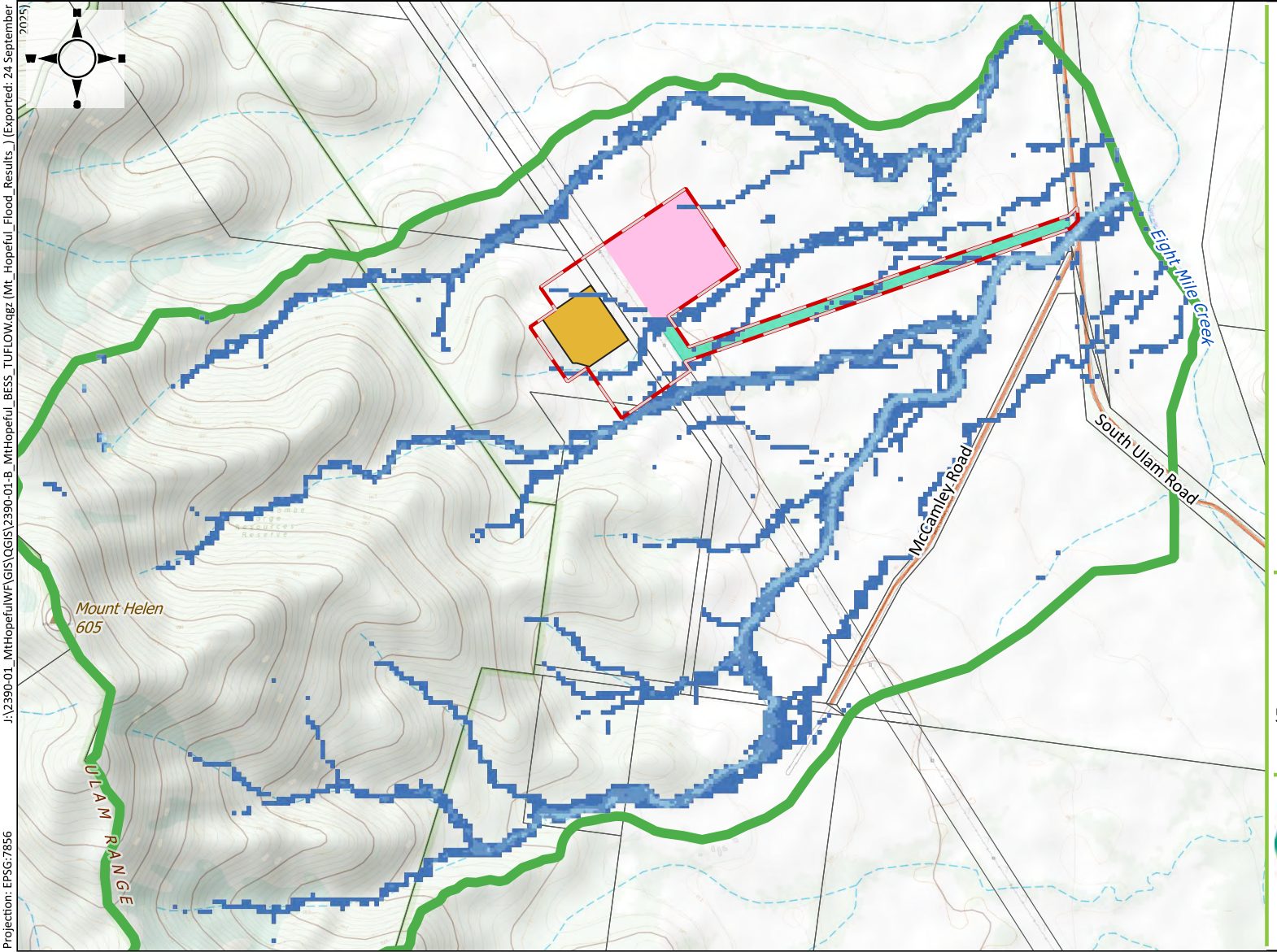
Mount Hopeful BESS Stormwater Management Plan

10% AEP flood depth, existing conditions

WRM

J:\2390-01_MtHopefulWF\GIS\QGIS\2390-01-B_MtHopeful_BESS_TUFLOW.qgz (Mt_Hopeful_Flood_Results_) (Exported: 24 September 2025)

Projection: EPSG:7856



Legend

- Study area
- Hydraulic model extent
- BESS area
- Switchyard area
- Access road
- Lot boundary

Flood depth (m)

- up to 0.25 m
- 0.25 to 0.5 m
- 0.5 to 1.0 m
- 1.0 to 1.5 m
- 1.5 to 2.0 m
- 2.0 to 2.5 m
- 2.5 to 3.0 m
- 3.0 to 3.5 m
- 3.5 to 4.0 m
- 4.0 to 4.5 m
- > 4.5 m

0 200 400 600 800 m

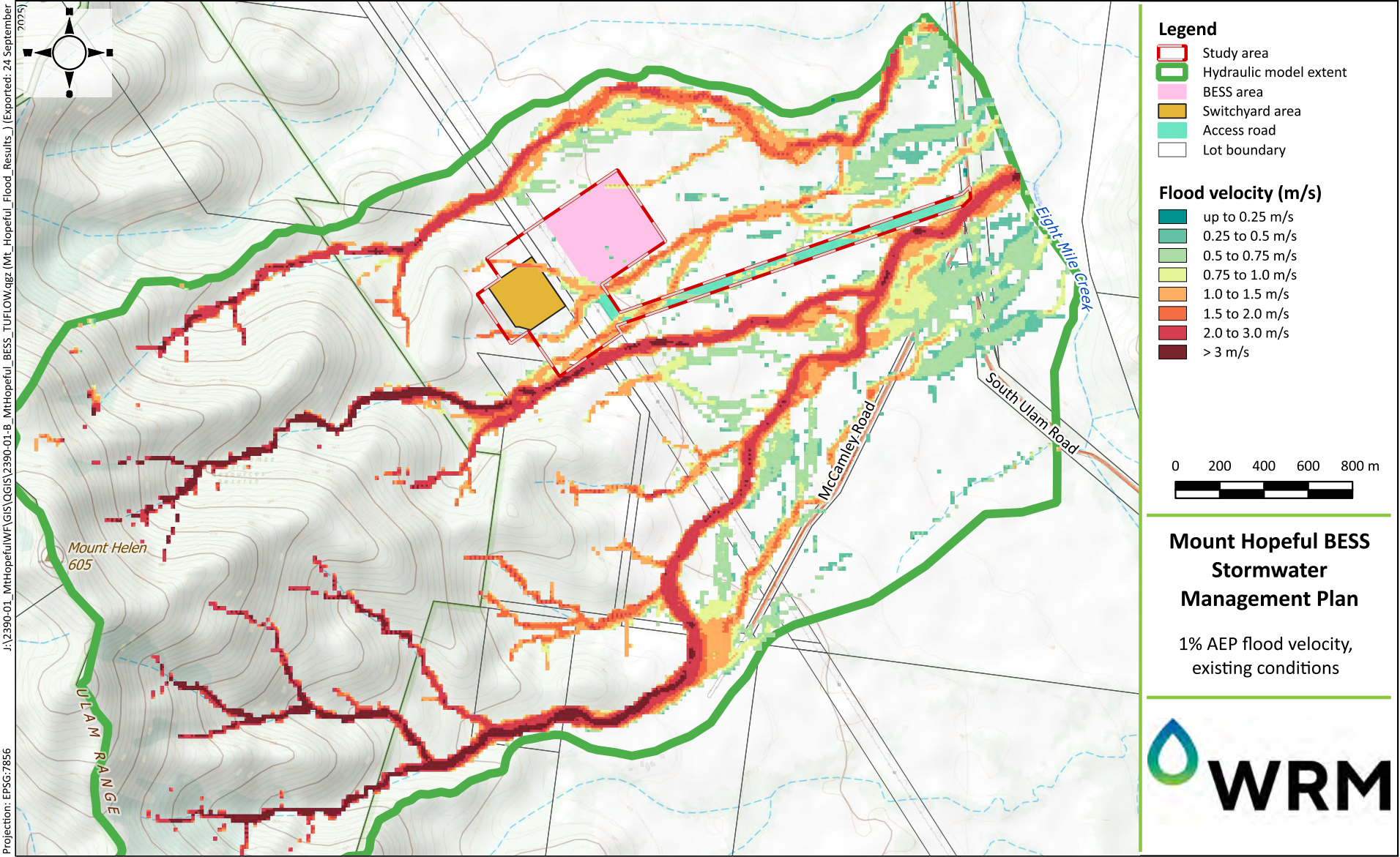
Mount Hopeful BESS Stormwater Management Plan

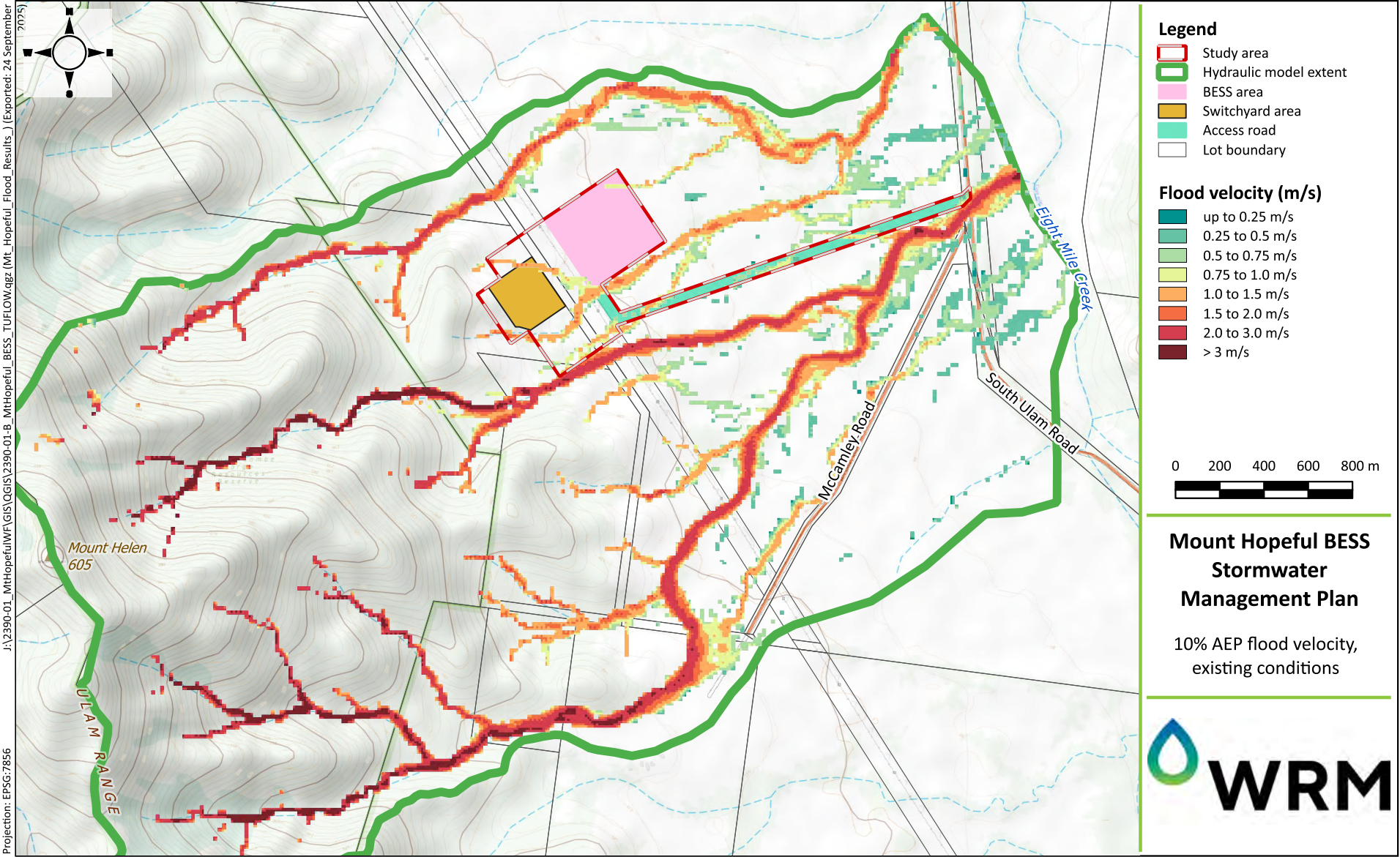
50% AEP flood depth, existing conditions

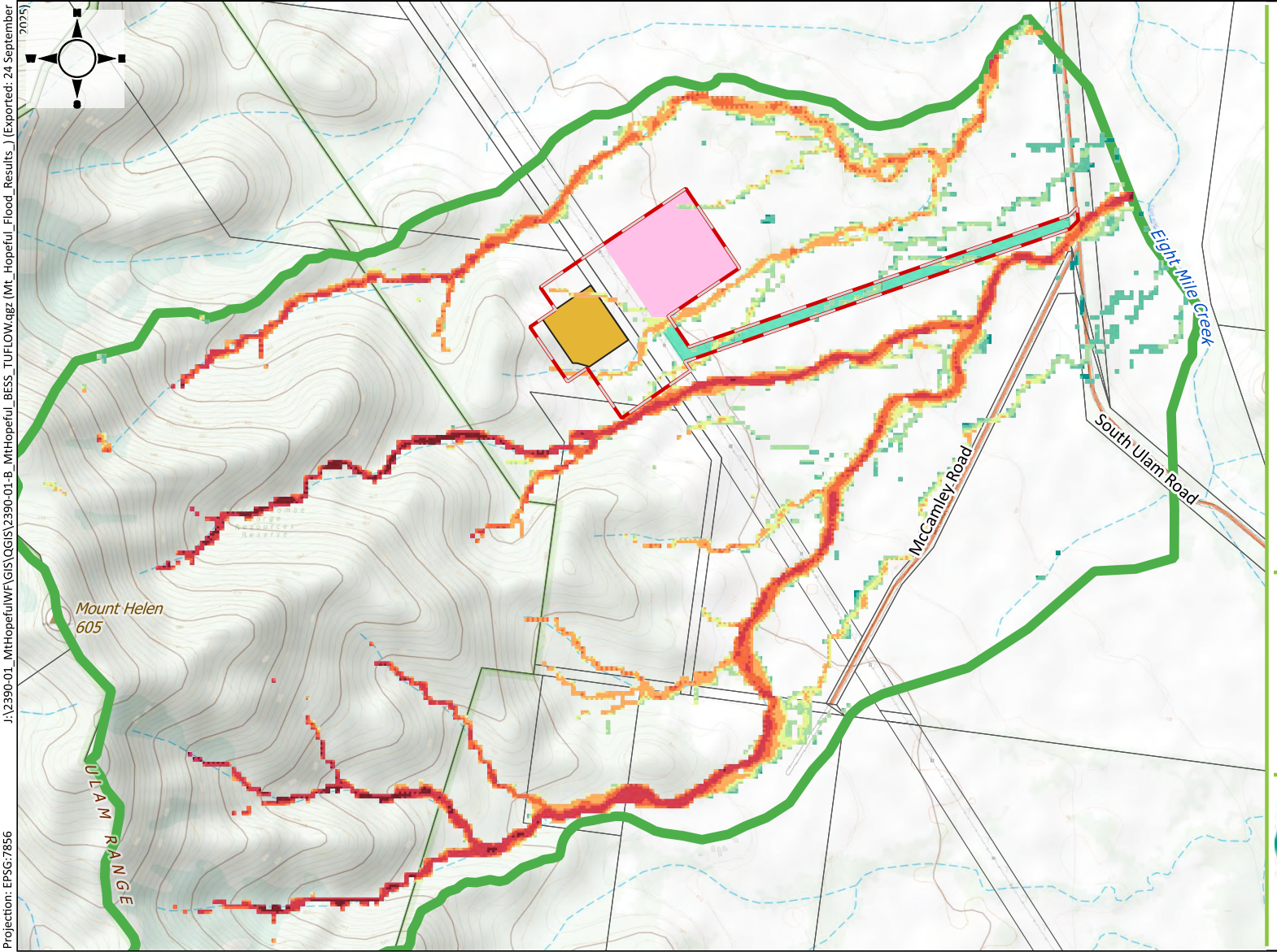
WRM

J:\2390-01_MtHopefulWF\GIS\QGIS\2390-01-B_MtHopeful_BESS_TUFLOW.qgz (Mt_Hopeful_Flood_Results_) (Exported: 24 September 2025)

Projection: EPSG:7856


Legend
Study area
Hydraulic model extent
BESS area
Switchyard area
Access road
Lot boundary
Flood velocity (m/s)
up to 0.25 m/s
0.25 to 0.5 m/s
0.5 to 0.75 m/s
0.75 to 1.0 m/s
1.0 to 1.5 m/s
1.5 to 2.0 m/s
2.0 to 3.0 m/s
> 3 m/s
0 200 400 600 800 m
Mount Hopeful BESS Stormwater Management Plan
1% AEP flood velocity, existing conditions
WRM
Eight Mile Creek
South Ulam Road
McCamley Road
Mount Helen
605
ULAM RANGE
J:\2390-01_MtHopefulWF\GIS\QGIS\2390-01-B_MtHopeful_BESS_TUFLOW.qgz (Mt_Hopeful_Flood_Results_) (Exported: 24 September 2025)
Projection: EPSG:7856


Legend
Study area
Hydraulic model extent
BESS area
Switchyard area
Access road
Lot boundary
Flood velocity (m/s)
up to 0.25 m/s
0.25 to 0.5 m/s
0.5 to 0.75 m/s
0.75 to 1.0 m/s
1.0 to 1.5 m/s
1.5 to 2.0 m/s
2.0 to 3.0 m/s
> 3 m/s
0 200 400 600 800 m
Mount Hopeful BESS Stormwater Management Plan
10% AEP flood velocity, existing conditions
WRM
Eight Mile Creek
McCamley Road
South Ulam Road
Mount Helen
605
ULAM RANGE
J:\2390-01_MtHopefulWF\GIS\QGIS\2390-01-B_MtHopeful_BESS_TUFLOW.qgz (Mt_Hopeful_Flood_Results_) (Exported: 24 September 2025)
Projection: EPSG:7856



Legend

- Study area
- Hydraulic model extent
- BESS area
- Switchyard area
- Access road
- Lot boundary

Flood velocity (m/s)

- up to 0.25 m/s
- 0.25 to 0.5 m/s
- 0.5 to 0.75 m/s
- 0.75 to 1.0 m/s
- 1.0 to 1.5 m/s
- 1.5 to 2.0 m/s
- 2.0 to 3.0 m/s
- > 3 m/s

0 200 400 600 800 m

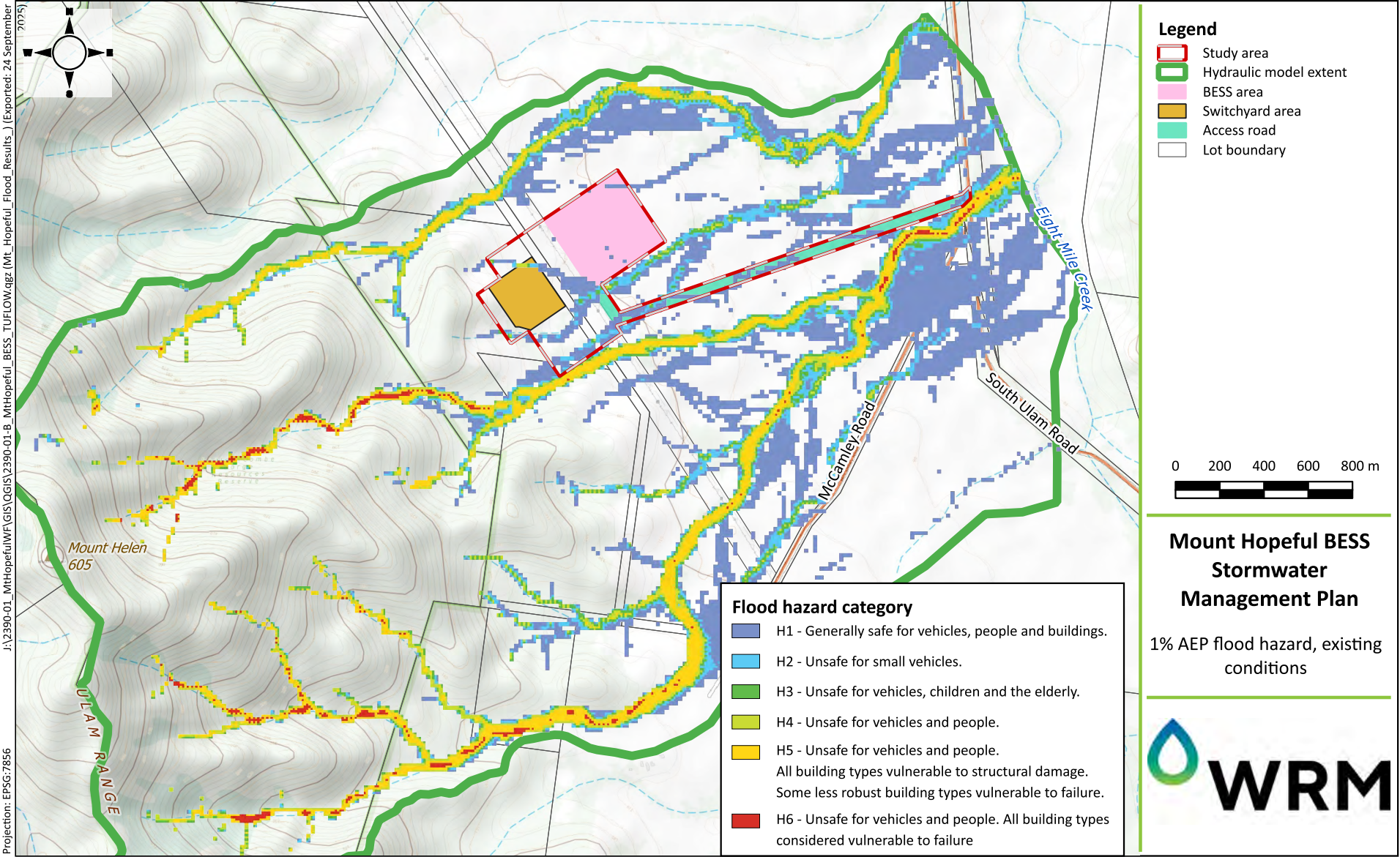
Mount Hopeful BESS Stormwater Management Plan

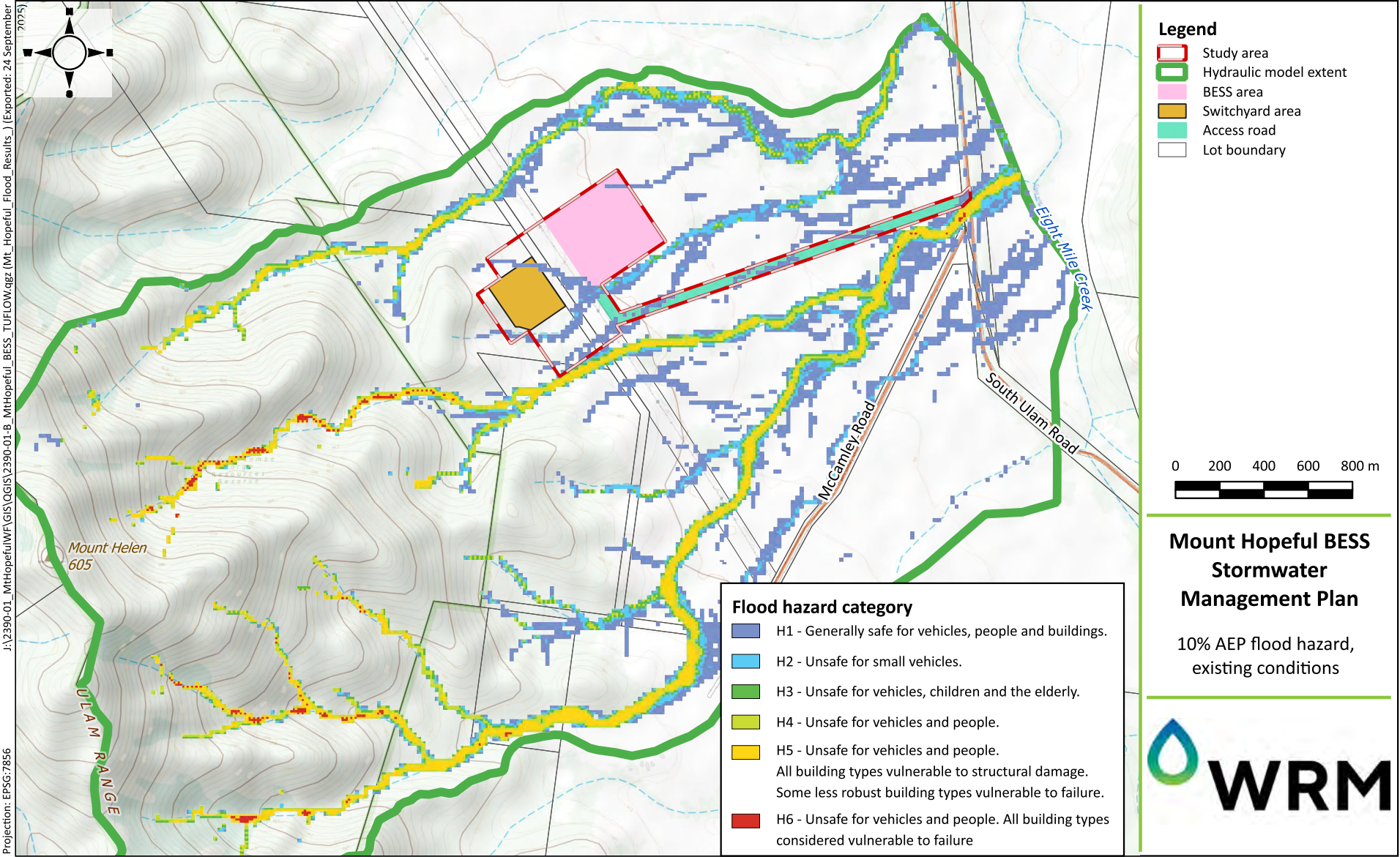
50% AEP flood velocity, existing conditions

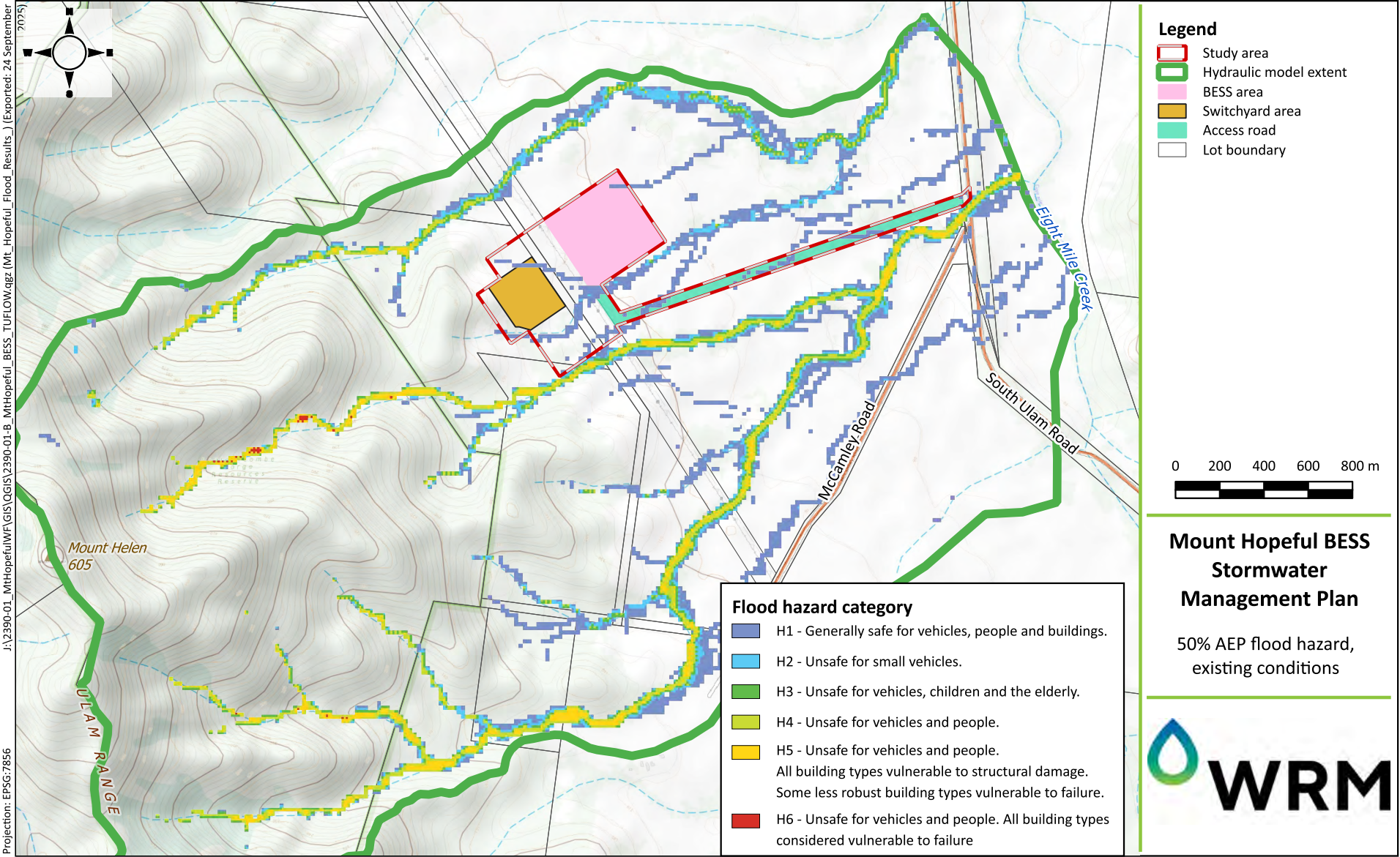
WRM

J:\2390-01_MtHopefulWF\GIS\QGIS\2390-01-B_MtHopeful_BESS_TUFLOW.qgz (Mt_Hopeful_Flood_Results_) (Exported: 24 September 2025)

Projection: EPSG:7856


Legend
Study area
Hydraulic model extent
BESS area
Switchyard area
Access road
Lot boundary
0 200 400 600 800 m
Mount Hopeful BESS Stormwater Management Plan
1% AEP flood hazard, existing conditions
Flood hazard category
H1 - Generally safe for vehicles, people and buildings.
H2 - Unsafe for small vehicles.
H3 - Unsafe for vehicles, children and the elderly.
H4 - Unsafe for vehicles and people.
H5 - Unsafe for vehicles and people.
All building types vulnerable to structural damage.
Some less robust building types vulnerable to failure.
H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure
Eight Mile Creek
South Ulam Road
McCamley Road
Mount Helen
605
ULAM RANGE
WRM
J:\2390-01_MtHopefulWF\GIS\QGIS\2390-01-B_MtHopeful_BESS_TUFLOW.qgz (Mt_Hopeful_Flood_Results_) (Exported: 24 September 2025)
Projection: EPSG:7856


Legend
Study area
Hydraulic model extent
BESS area
Switchyard area
Access road
Lot boundary
0 200 400 600 800 m
Flood hazard category
H1 - Generally safe for vehicles, people and buildings.
H2 - Unsafe for small vehicles.
H3 - Unsafe for vehicles, children and the elderly.
H4 - Unsafe for vehicles and people.
H5 - Unsafe for vehicles and people.
All building types vulnerable to structural damage.
Some less robust building types vulnerable to failure.
H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure
Eight Mile Creek
McCamley Road
South Ulam Road
Mount Helen
605
ULAM RANGE
Mount Hopeful BESS Stormwater Management Plan
10% AEP flood hazard, existing conditions
WRM
J:\2390-01_MtHopefulWF\GIS\QGIS\2390-01-B_MtHopeful_BESS_TUFLOW.qgz (Mt_Hopeful_Flood_Results_) (Exported: 24 September 2025)
Projection: EPSG:7856


Legend
Study area
Hydraulic model extent
BESS area
Switchyard area
Access road
Lot boundary
0 200 400 600 800 m
Mount Hopeful BESS Stormwater Management Plan
50% AEP flood hazard, existing conditions
WRM
Flood hazard category
H1 - Generally safe for vehicles, people and buildings.
H2 - Unsafe for small vehicles.
H3 - Unsafe for vehicles, children and the elderly.
H4 - Unsafe for vehicles and people.
H5 - Unsafe for vehicles and people.
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Eight Mile Creek
McCamley Road
South Ulam Road
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J:\2390-01_MtHopefulWF\GIS\QGIS\2390-01-B_MtHopeful_BESS_TUFLOW.qgz (Mt_Hopeful_Flood_Results_) (Exported: 24 September 2025)
Projection: EPSG:7856



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Appendix I

Bushfire Management Plan



Bushfire management plan

Mount Hopeful Battery Project | South Ulam Road | Bajool | Queensland
Prepared for Neoen Australia Power Pty Ltd | 24 September 2025

Land and Environment Consultants Pty Ltd
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Bushfire management plan

Final V1

Report 25055 | Neoen Australia Power Pty Ltd | 24 September 2025

Approved by Robert Janssen

Position Managing principal

Signature 

Date 24 September 2025

This report has been prepared in accordance with the brief provided by the client and has relied upon the information collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of the client and no responsibility will be taken for its use by other parties. The client may, at its discretion, use the report to inform regulators and the public.

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Document control

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Draft	15 August 2025	R. Janssen	LEC
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Disclaimer

Notwithstanding the precautions adopted in this report, it should always be remembered that bushfires burn under a range of conditions. An element of risk, no matter how small always remains, and although AS 3959-2018 is designed to improve the performance of such buildings, there can be no guarantee, because of the variable nature of bushfires, that any building will withstand bushfire attack on every occasion.

It should be noted that upon lodgement of a development proposal, State Government, council and/or the fire service may recommend additional construction requirements.

Although every care has been taken in the preparation of this report, Land and Environment Consultants Pty Ltd accept no responsibility resulting from the use of the information in this report.

1 Introduction

Land and Environment Consultants Pty Ltd (**LEC**) was engaged to prepare a bushfire management plan (**BMP**) for the proposed Mount Hopeful Battery Project (**the Project**).

The Project is proposed to occur across three freehold parcels, including lot 38/DT40131, lot 100/SP289441 and lot 33/DT40123, and an unnamed road reserve (**the site**).

A development permit application will be made for the Project under the Rockhampton Region Planning Scheme 2015.

The site is identified as a bushfire hazard area by the *Bushfire hazard overlay map* (**Bushfire hazard overlay map**) in the Rockhampton Region Planning Scheme 2015 online mapping (RRC 2025). Therefore, the development permit application for the Project is subject to assessment and compliance with the Rockhampton Region Planning Scheme 2015 *Bushfire hazard overlay code* (**Bushfire hazard overlay code**). Rockhampton Regional Council may also consider the example bushfire overlay code in *Natural Hazards, Risk and Resilience – Bushfire, State Planning Policy State Interest guidance material* (DSDMIP 2019) (**SPP guidance material – bushfire**) to be relevant to the development permit application.

This BMP has been prepared in general accordance with the methods and guidance in schedule 6.5 *Bushfire management planning scheme policy* (**schedule 6.5**) of the Rockhampton Region Planning Scheme 2015 and *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience - Bushfire'* (QFES 2019a) (**BRC guide**) which was prepared by the former Queensland Fire and Emergency Services to provide technical guidance for the implementation of the SPP guidance material – bushfire. It also considers guidelines for a battery energy storage system (**BESS**) in *Large-scale Battery Energy Storage System Installations* (AFAC 2025).

This BMP documents the bushfire hazard assessment and demonstrates how the Project will comply with the Bushfire hazard overlay code. It includes:

- an introduction (this section) and description of methods and information resources used for the preparation of this BMP;
- description of the site and Project;
- bushfire hazard assessment;
- identification of bushfire hazards associated with the site and Project;
- radiant heat exposure assessment;
- a plan for mitigating the potential risk of bushfire hazards; and
- assessment of compliance with the Bushfire hazard overlay code.

Please note, this BMP does not consider fire hazards associated with the BESS including (amongst other things) electrical hazards, chemical hazards, explosions, potential fire spread due to the proximity of battery enclosures or mechanical damage to battery enclosures. These matters are addressed in a hazard incident management plan for the development permit application. Subject to approval of the development permit application, a separate fire safety study would be undertaken during the detailed design phase.

1.1 Bushfire management plan review

This BMP has been prepared for a development permit application. Upon approval of the Project, the appointed construction contractor and operational contractor may wish to prepare their own version of this BMP to distil the matters which are specific to their contract or to include corporate documentation or procedures. Notwithstanding, this does not permit the construction contractor or

operational contractor to change or deviate from the mitigation measures specified in Chapter 6 or associated development permit conditions.

1.2 Method

To meet requirements of schedule 6.5 of the Rockhampton Region Planning Scheme 2015, the SPP guidance material - bushfire and BRC guide, the following tasks were undertaken:

- desktop review of relevant information sources including:
  - the Bushfire hazard overlay map;
  - fire history data in the Queensland Globe (DR 2025); and
  - data in the Queensland Spatial Data Catalogue (DNRMMRRD 2025) (**Qspatial**) which is referenced in the *Bushfire Resilient Communities MapViewer User Guide* (QFD 2025), ie regional ecosystem (**RE**) map, vegetation hazard class (**VHC**) map and severe fire weather map;
- a drive over the site and field inspection for vegetation characteristics, current land management practices, slope and evidence of previous fires;
- bushfire hazard assessment in general accordance with the method in the BRC guide;
- radiant heat exposure assessment using the Fire Protection Association of Australia *BAL calculator V4.9* (**BAL calculator**) which models the 'method 2' bushfire attack level assessment procedure in the *Australian Standard* (**AS 3959-2018**) *Construction of buildings in bushfire prone areas* (Standards Australia 2018); and
- assessment of the Project against the Bushfire hazard overlay code.

Aerial imagery of the site and measuring tools were accessed online from Google Earth and Queensland Globe to assist in validating observations and measurements made during the field inspection.

1.3 Suitably qualified person

This BMP was prepared by Robert Janssen who is a suitably qualified and experienced bushfire management consultant with respect to criteria in section 10.2 of the BRC guide.

Robert is the managing principal at LEC and has over 25 years of experience in bushfire planning and operations. He has prepared bushfire management plans for residential, commercial and industrial property developments, utilities, government facilities and conservation estates.

Robert's formal qualifications as an environmental scientist and consulting experience are coupled with 10 years of experience as a nationally accredited fire-fighter with the national parks and wildlife service in New South Wales and Queensland.

2 Description of the site and the Project

This chapter provides a description of the site and the Project.

2.1 The site

The site is located near the rural town of Bajool, approximately 50 kilometres (**km**) south of Rockhampton and 70 km west of Gladstone, within the Rockhampton Regional local government area of Council. It is agricultural land which has been cleared of bushland vegetation and historically used for low intensity agricultural activities, including cattle grazing. It does not have access to a mains water connection.

The site is sparsely vegetated with predominantly non-remnant vegetation. Notwithstanding, woody regrowth has been allowed to naturally regenerate in the western part of the site.

The topography of the site is a relatively flat plain which has shallow drainage lines including an unnamed tributary of Eight Mile Creek.

A Powerlink Queensland (**Powerlink**) transmission easement, which accommodates an existing 275 kilovolt (**kV**) overhead transmission line (**OHTL**) runs north-south through the site.

2.2 The Project

The Project is a proposed grid-scale BESS with a planned capacity of up to 600 megawatts (**MW**) of power for a duration of up to four hours. It is proposed to be delivered in two stages, which are indicatively described as follows:

- stage 1: 430 MW expected to commence mid-2026 and completed by end of 2028.
- stage 2: additional 170 MW expected to commence in 2028 and completed by end of 2029.

Key components of the Project include:

- up to 650x battery modules
- up to 170x medium voltage transformers
- 2x high voltage (**HV**) transformers
- a HV switching station.

The Project will also encompass associated ancillary infrastructure necessary to the operation of the BESS, including:

- access track
- overhead and underground electrical cables
- inverters
- HV substation
- earthing and lightning protection
- security fencing, closed-circuit television and lighting
- operations and maintenance building
- water retention pond; and
- lay down areas.

The site plan in Appendix 1 shows the conceptual design of the Project.

2.3 Bushfire hazard overlay map

The Bushfire hazard overlay map for the site is provided in Appendix 2. It shows that the land parcel extent of the site is affected by bushfire hazard areas with medium, high and very high potential bushfire intensity and potential impact buffer.

The BESS, substation and switchyard infrastructure has been sited in a location which is not affected by the bushfire hazard areas identified by the Bushfire hazard overlay map.

3 Bushfire hazard assessment

This chapter provides details about the desktop review, field inspection and bushfire hazard assessment.

3.1 Severe fire weather

The severe fire weather map in Qspatial indicates the 5 % annual exceedance probability forest fire danger index (**FFDI**) for the site is 69. An FFDI value of 69 has been used for the potential bushfire intensity calculations in Section 3.4 and the radiant heat exposure assessment in Section 5.5.

For the assessment of grassfire attack, the FFDI value of 69 has been converted to a grassland fire danger index (**GFDI**) value of 100, based on the GFDI values in Table B1 of AS 3959-2018.

3.2 Fire history

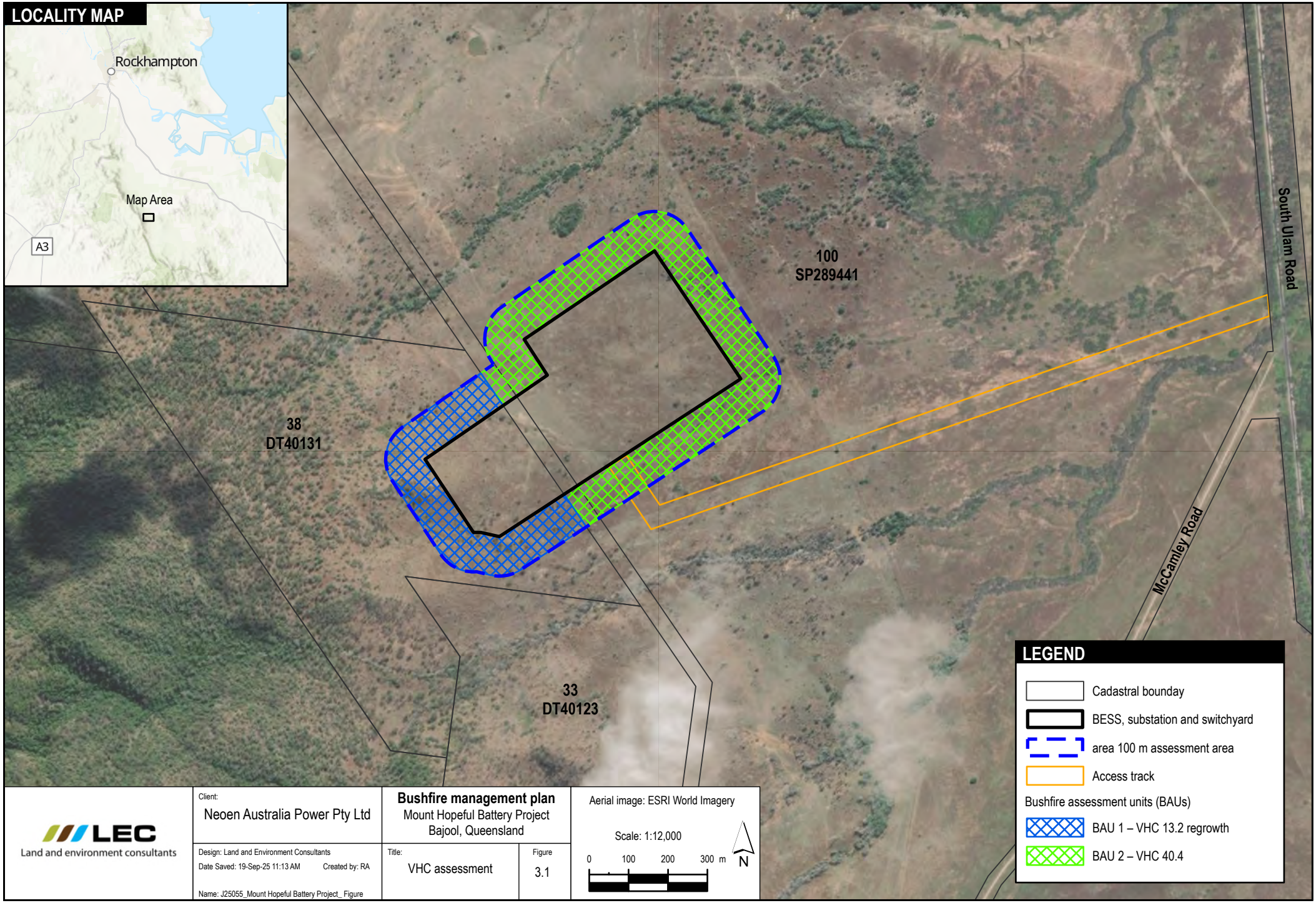
Fire history data indicates the site and adjoining land are regularly burnt. The fire history data does not identify whether the fires are planned burns or unplanned bushfires.

3.3 Field inspection

A drive over the site was performed by LEC on 14 November 2022. Observations were recorded about current land use and management, vegetation characteristics, the slope of land and evidence of previous fires.

Bushfire assessment units (**BAUs**) have been used to describe characteristics of vegetation within 100 metres (**m**) of the proposed BESS, HV switching station, HV substation and operations and maintenance building (**infrastructure area**), and are shown in Figure 3.1.

Table 3.1 provides a summary of the desktop review, observations from the field inspection and notes about the bushfire hazard assessment of BAUs. Features of vegetation within BAUs are shown in Photographs 3.1-3.2.



LEC
Land and environment consultants

Client:
Neoen Australia Power Pty Ltd

Bushfire management plan
Mount Hopeful Battery Project
Bajool, Queensland

Design: Land and Environment Consultants
Date Saved: 19-Sep-25 11:13 AM Created by: RA
Name: J25055_Mount Hopeful Battery Project_ Figure

Title:
VHC assessment

Figure
3.1

Aerial image: ESRI World Imagery

Scale: 1:12,000

0 100 200 300 m

N

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Table 3.1 Site observations

BAU	State Mapping VHC	Ground truthed VHC	Notes
BAU 1	VHC 13.2 *Dry to moist eucalypt woodlands on undulating metamorphics and granite* (**VHC 13.2**) and VHC 40.4 C*ontinuous low grass or tree cover* (**VHC 40.4**)	VHC 13.2 regrowth	BAU 1 is located within part of the site where woody regrowth has been allowed to naturally regenerate. It is conservatively assessed based on the pre-clear RE map in Qspatial and the corresponding broad vegetation group and VHC. BAU 1 is assessed as a bushfire prone hazard class with continuous bushfire fuel.
BAU 2	VHC 40.4	VHC 40.4	BAU 2 is aligned with sparsely vegetated paddocks which are dominated by grasslands. BAU 2 is assessed as a grassfire prone hazard class with continuous grassfire fuel.



Photograph 3.1 Example of VHC 13.2 regrowth (in the distance)



Photograph 3.2 Example of VHC 40.4

3.4 Potential bushfire intensity calculations

The potential bushfire intensity of BAUs was determined using the Queensland Public Safety Business Agency *Potential Bushfire Intensity Calculator* (version November 2014) which is an Excel spreadsheet calculator that models the bushfire hazard assessment method in Section 4.2.4 of the BRC guide.

Section 3.1 of the BRC guide defines bushfire hazard classes as follows:

- very high – potential bushfire intensity > 40,000 kilowatts/m (**kW/m**);
- high – potential bushfire intensity 20,000-40,000 kW/m;
- medium – potential bushfire intensity 4,000-20,000 kW/m; and
- non bushfire hazard - potential bushfire intensity <4,000 kW/m.

Results of the potential bushfire intensity calculations which determine the bushfire hazard class of BAUs shown in Figure 3.1 are presented in Table 3.2.

Table 3.2 Potential bushfire intensity

BAU	VHC	Potential fuel load (tonnes (t)/ha)[1]	Slope (°)	Potential bushfire intensity (kW/m)	Bushfire hazard class
BAU 1	VHC 13.2 regrowth	14.4	2	10,184	Medium
BAU 2	VHC 40.4	5	2	1,228	Non-bushfire hazard class[2]

Notes 1 Potential fuel load taken from the BRC guide.
2 VHC 40.4 is classified as a grassfire prone hazard class in Figure 14 of the BRC guide.

3.5 Bushfire hazard areas

Results of the potential bushfire intensity calculations in Table 3.2 generally align with the Bushfire hazard overlay map and confirm that the Project is located within a bushfire hazard area with a medium potential bushfire intensity and a grassfire hazard area.

The Project is not located in a high or very high potential bushfire intensity area.

The results also confirm the development permit application for the Project is subject to assessment and compliance with the Bushfire hazard overlay code.

4 Bushfire hazards associated with the site

This chapter identifies bushfire hazards associated with the site.

4.1 Fire danger season

The fire danger season at the site starts in August, peaks in September and will begin to fall when consistent summer rainfall occurs. Typically, the worst fire weather conditions will be experienced during the fire danger season when the wind direction is from the north or west.

An FFDI of 69 will be associated with hot, dry and windy conditions. If a bushfire or grassfire starts and takes hold under these conditions, it will be difficult to control and fast moving in bushland or grassland vegetation.

4.2 Fire history

As discussed in Section 3.2, fire history data indicates that the site and adjoining land regularly burns. Therefore, it is considered almost certain that the Project will be exposed to bushfire or grassfire attack in the future.

4.3 Potential directions of bushfire attack

The Project could be exposed to bushfire attack through BAU 1 and grassfire attack through BAU 2, shown in Figure 3.1. Bushfire attack and grassfire attack scenarios are further analysed in Section 5.5.

4.4 Potential bushfire hazards from adjacent land uses

Fire history data does not identify the ignition source of fires which have occurred within and adjoining the site.

The adjacent agricultural land use is considered to be a bushfire hazard to the Project. It is common for agricultural activities involving the operation of equipment and machinery, and hot works to result in unplanned ignitions and fires. In addition, landowners may light fires to burn waste or for fuel hazard reduction.

Direct attack of a fire in close proximity to the Project's electrical infrastructure may not be possible. Therefore, there will be a strong reliance on asset protection zones (**APZs**) around above ground infrastructure for bushfire protection.

4.5 Water and access for emergency services

The site does not have access to a mains water connection.

There are numerous dams within and adjacent to the site. However, the standard of vehicle access to these features and the reliability of their water supply is unknown, and they should not be relied upon

The site has access to a public road network which will provide access and egress for emergency services and future occupants.

5 Bushfire hazards associated with the Project

This chapter identifies potential bushfire hazards associated with the Project.

5.1 Siting and design

The Project will be designed to mitigate the risk of bushfire hazard determined by the bushfire hazard assessment in this BMP.

The topography of the site does not involve steep slopes or ridgelines that could exacerbate bushfire intensity and make access and egress difficult

Above ground infrastructure will be separated from bushfire and grassfire hazard areas by appropriately designed and maintained APZs.

5.2 Land use

The Project will not involve a vulnerable use as defined in the SPP guidance material- bushfire.

The BESS, HV switching station and HV substation could be regarded as being consistent with 'community infrastructure providing essential services' as described in the SPP guidance material – bushfire. Infrastructure within these components of the Project will have an APZ which is designed to achieve a radiant heat flux level ≤ 10 kW/m^2 at the infrastructure which is considered a tolerable radiant heat exposure outcome for community infrastructure for essential services in the BRC guide.

The BESS could also be regarded as 'hazardous materials in the context of bushfire hazard' which is also described in the SPP guidance material - bushfire. Fire hazards associated with the BESS including (amongst other things) electrical hazards, chemical hazards, explosions, potential fire spread due to the proximity of battery enclosures or mechanical damage to battery enclosures are matters which are outside of the scope of this BMP and are addressed in the hazard incident management plan for the development permit application.

5.3 Fire-fighting water supply

Fire water tanks will be located inside the BESS security fence for the purpose of facility fire-fighting. These water tanks are separate to the mitigation measures in this BMP with respect to bushfire hazard.

A fire-fighter water supply outlet point for rural fire-fighting will be provided outside of the BESS and HV substation security fencing. It will be designed in general accordance with the Bushfire hazard overlay code requirements.

5.4 Access and egress

The Project will establish an access track that will link the infrastructure area to South Ulam Road. The access track will be designed for heavy articulated vehicles and will meet the design standards for rural fire-fighter vehicles.

A fire access trail will also be provided around the perimeter of the infrastructure area. It will be designed for rural fire-fighter vehicles in general accordance with the Bushfire hazard overlay code requirements.

5.5 Radiant heat exposure

The Bushfire hazard overlay code does not identify a radiant heat exposure outcome that is specifically relevant to the Project's infrastructure. Therefore, this BMP defers to the SPP guidance material – bushfire and BRC guide which require community infrastructure providing essential services and

hazardous materials in the context of bushfire hazard, to be setback from hazardous vegetation by a distance which achieves a radiant heat flux level of ≤ 10 kW/m^2 at the above ground infrastructure. These setbacks are also known as APZs which were previously referenced in Sections 4.4 and 5.1.

The purpose of an APZ is to minimise the impact of bushfire attack on above ground infrastructure and to provide emergency services with access and an operational space for bushfire-fighting, maintenance works and bushfire/grassfire fuel hazard reduction activities.

As discussed in Section 4.3, the Project could be exposed to bushfire attack through BAU 1 and grassfire attack through BAU 2, which are shown in Figure 3.1. The radiant heat profile of these bushfire and grassfire attack scenarios was analysed using the BAL calculator. Inputs used in the BAL calculator and results are provided in Appendix 3.

Results of the radiant heat exposure assessment have been used to design the APZ specified in Section 6.1.

6 Bushfire mitigation plan

This chapter identifies bushfire mitigation measures that must be implemented as part of the Project to comply with the Bushfire hazard overlay code.

It is the total of the mitigation measures in this chapter that will reduce the risk of bushfire hazard to a tolerable level. Failure to implement all actions in their entirety could result in an increased level of exposure to bushfire hazards.

6.1 Asset protection zones

An APZ which is 30 m wide must be established and maintained around the BESS and substation area and switchyard area as shown in Figure 6.1.

It must be shown in survey plans and identified on-site with markers so that it can be maintained consistently in perpetuity.

The APZs must be cleared of weeds and woody vegetation and have a mineral earth or grass surface. If a grass surface is chosen, it must be maintained at a height ≤ 100 millimetres (**mm**) (or as low as is practically possible) during winter and spring.

Storage or stockpiling must not be permitted within the APZs at any time.

Temporary construction facilities and laydown areas must have a 10 m wide temporary APZ.

6.2 Surface under infrastructure

A mineral earth surface must be established and maintained inside the BESS and HV substation security fence as shown in Figure 6.1. It must be maintained free of weeds, woody regrowth and grass.

When used in the context of bushfire management, mineral earth means a non-flammable surface, either natural or prepared, which has no vegetation or vegetation debris. As a result, it provides a barrier to fire travelling on or near the ground surface.

6.3 Cleared vegetation

Vegetation cleared from the infrastructure areas must be mulched and used in rehabilitation works or removed from the site. It must not be windrowed or stockpiled for use after construction.

6.4 Fire-fighting water supply

A fire-fighter water supply outlet point must be provided adjacent to the infrastructure area, ie outside of the BESS and HV substation security fence, for rural fire-fighting. Its location must be determined in consultation with the local Rural Fire Brigade Queensland (**RFBQ**).

The fire-fighter water supply outlet point can be connected to a 40,000 litre (**l**) reserve section within the proposed fire water tanks inside the BESS security fence or a separate 40,000 l water tank located outside of the security fence which is made of metal or concrete.

The fire-fighter water supply outlet point must have RFBQ fire-fighting fittings – we recommend consulting with the local RFBQ to confirm the standard of fittings in use at the locality. All above ground fittings, ie connections, valves and pipes, must be made of metal.

The fire-fighter water supply outlet point must be within 4 m of a hardstand area where a rural fire truck can park to refill. The hardstand area must have an all-weather surface and the load bearing capacity and dimensions suitable for a vehicle mass of 15 t and an axel load of 9 t.

The fire-fighter water supply outlet point must be identified by reflective wayfinding signage. An example of the wayfinding signage is provided below. It must have a reflective white background and black symbology which is at least 125 mm high.



As stated in Section 5.3, requirements in this section are separate to requirements for fire water tanks and hydrants within the BESS security fence, which are to be determined by a fire engineer.

6.5 Fire access trail

A fire access trail must be provided around the perimeter of the infrastructure area, ie generally aligned with the APZs. It must be designed and constructed in general accordance with the standard required by a 4x4 medium pumper/tanker which is described in Appendix 1 of *Fire hydrant and Vehicle Access Guidelines for Residential, Commercial and Industrial lots* (QFES 2019b) (**Fire hydrant and vehicle access guidelines**). Appendix 1 of Fire hydrant and vehicle access guidelines is provided in Appendix 4.

The design criteria for a 4x4 medium pumper/tanker are as follows:

- trafficable surface of 4 m except for short constrictions to 3.5 m for no more than 30 m in length where an obstruction cannot be reasonably avoided or removed;
- corners have a minimum inner radius of 6 m and a minimum formed width of 6 m;
- trafficable surface and crossing structures are capable of carrying vehicles with a vehicle mass of 15 t and an axle load of 9 t;
- maximum grade is not more than 15° and maximum crossfall is not more than 6°;
- minimum vertical clearance of 4 m above the trafficable surface; and
- where the width of the trafficable surface is < 6 m wide, capacity for passing is provided every 250 m comprising a widened trafficable surface of at least 6 m for a length of at least 20 m or a 6 m wide and 8 m deep reversing bay.

Short sections which do not comply with the slope and width criteria outlined above are permissible where topography or environmental constraints do not permit compliance.

Drainage for the fire access trail must be designed and constructed in accordance with relevant standards.

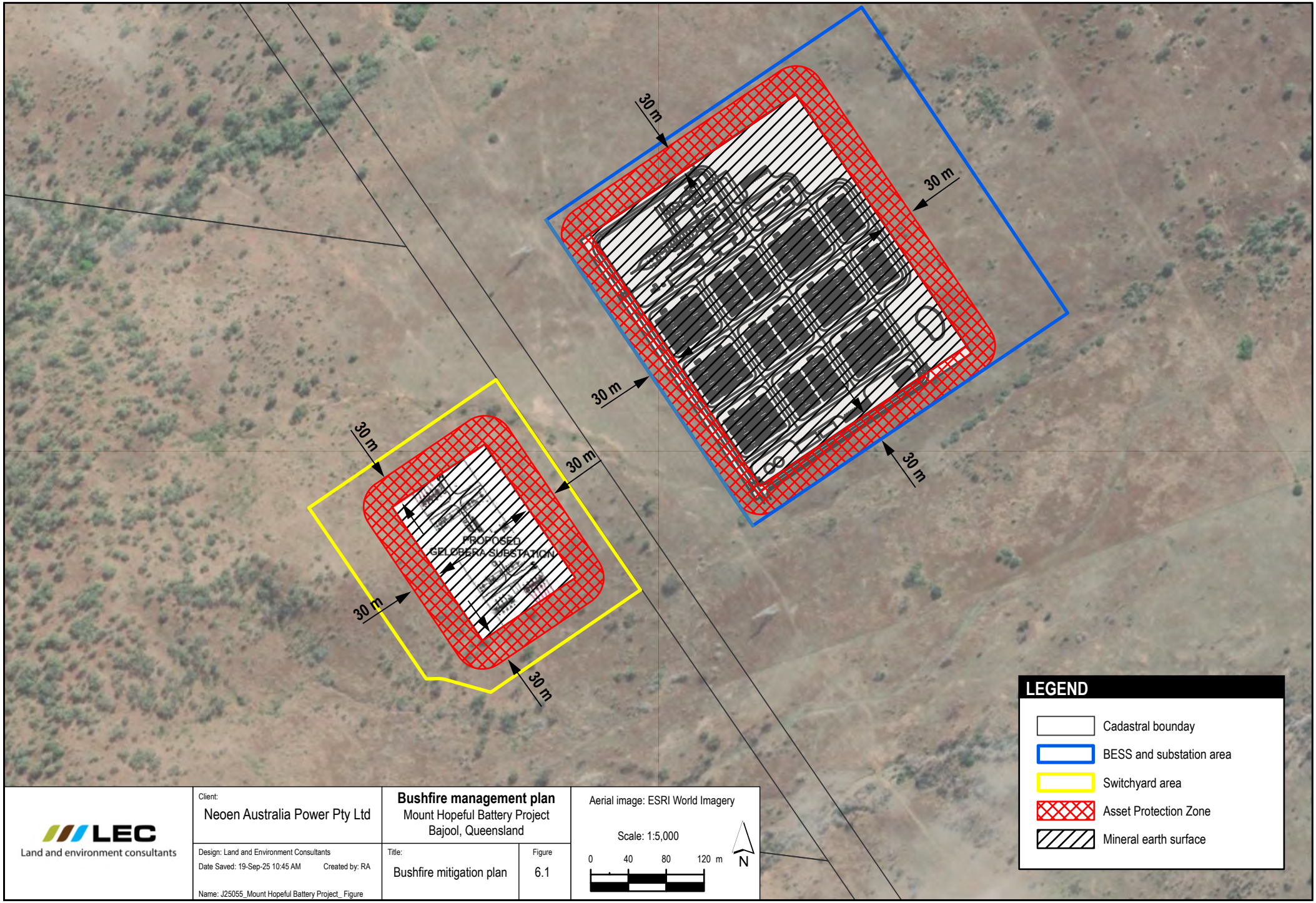
The fire access trail must be inspected every year and maintained in accordance with the specifications above prior to winter.

6.6 Buildings

Permanent buildings and structures must be designed and constructed in accordance with the fire resistance and safe access and egress requirements of the *National Construction Code-Building Code of Australia* (ABCB 2022) (**NCC-BCA**) and governing Queensland laws, codes and standards that apply to the building industry.

Fire detection and first attack fire-fighting equipment in buildings and throughout the BESS must comply with specifications in the NCC–BCA and any Queensland specific requirements.

These matters will be dealt with in detail through the building certification and approvals process.



LEC
Land and environment consultants

Client:
Neoen Australia Power Pty Ltd

Bushfire management plan
Mount Hopeful Battery Project
Bajool, Queensland

Design: Land and Environment Consultants
Date Saved: 19-Sep-25 10:45 AM Created by: RA
Name: J25055_Mount Hopeful Battery Project_ Figure

Title: Bushfire mitigation plan

Figure: 6.1

Aerial image: ESRI World Imagery

Scale: 1:5,000

0 40 80 120 m

N

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7 Closing

This BMP was prepared by a suitably qualified and experienced person and is in general accordance with schedule 6.5 of the Rockhampton Region Planning Scheme 2015, SPP guidance material - bushfire and BRC guide.

The bushfire hazard assessment determined the Project is affected by a bushfire hazard area with a medium potential bushfire intensity and a grassfire hazard area, and is subject to compliance with the Bushfire hazard overlay code.

Mitigation measures that must implemented as part of the Project are specified in Chapter 6. With the implementation of these mitigation measures the Project complies with the Bushfire hazard overlay code as demonstrated in Appendix 5.

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Appendix 1 Proposed site plan

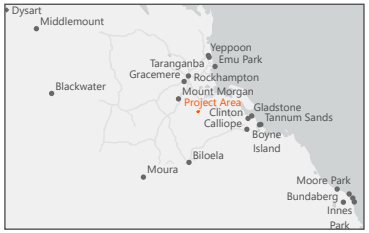


FIGURE 1.2

Project Design

Legend

- Study Area
- Access road
- BESS area
- Overhead and underground line
- Substation area
- Switchyard area
- Road



0 0.25 0.5

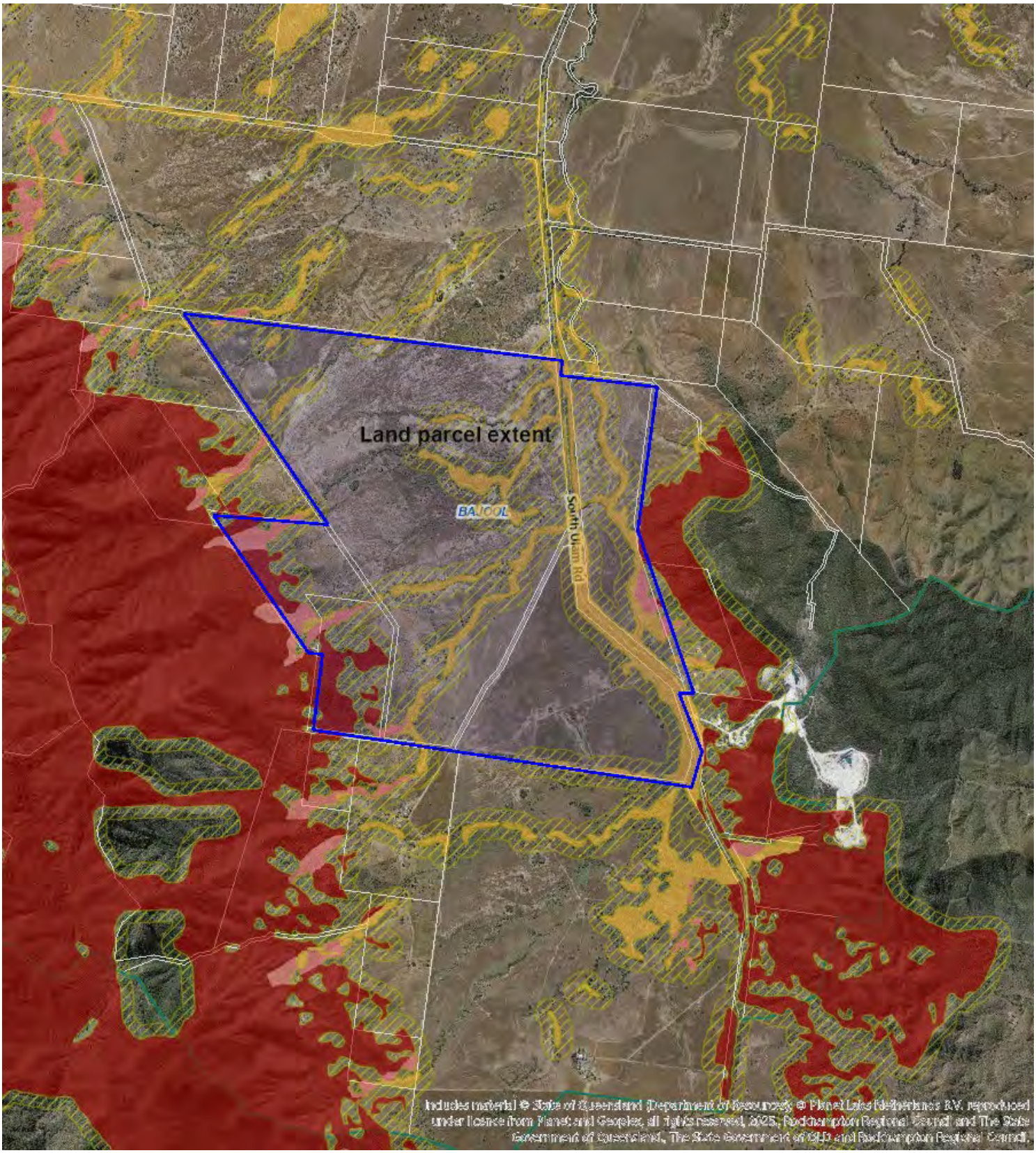
Kilometres

Scale 1:12,500 at A4
GDA2020 MGA Zone 56

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Image Source: ESRI Basemap (2025) | **Data Source:** Qld Spatial (2025)

Appendix 2 Bushfire hazard overlay map


Land parcel extent
BAJOOL
South Ulam Rd
Includes material © State of Queensland (Department of Resources) © Planet Labs (Netherlands) B.V. reproduced under licence from Planet and Geoplex, all rights reserved, 2025, Rockhampton Regional Council and The State Government of Queensland, The State Government of GHD and Rockhampton Regional Council.

Map Legend

Bushfire Hazard Classification

- Very High
- High
- Medium

Buffer

Appendix 3 Radiant heat exposure assessment

Bushfire attack through BAU 1

- Forest fire danger index – 69
- Vegetation – VHC 13.2 *Dry to moist eucalypt woodlands on undulating metamorphics and granite*
- Understorey fuel load –12.8 tonnes/hectare (**t/ha**)
- Total fuel load – 14.4 t/ha
- Effective slope – 2° slope
- Site slope – 0° slope (constructed pad)
- Flame width – 100 m

FLAMESOL
FPA AUSTRALIA

Calculated August 12, 2025, 11:25 am (MDc v.4.9)

J25055

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	69	Rate of spread	1.21 km/h
Vegetation Classification	Woodland	Flame length	9.630000000000001 m
Understorey fuel load	12.8 t/ha	Flame angle	53 °, 64 °, 72 °, 77 °, 79 ° & 84 °
Total fuel load	14.4 t/ha	Elevation of receiver	3.84 m, 4.33 m, 4.58 m, 4.69 m, 4.72 m & 4.79 m
Vegetation height	n/a	Fire intensity	9,052 kW/m
Effective slope	2 °	Transmissivity	0.882, 0.868, 0.847, 0.824, 0.8110000000000001 & 0.741
Site slope	0 °	Viewfactor	0.5944, 0.4369, 0.2943, 0.1985, 0.1614 & 0.0442
Flame width	100 m	Minimum distance to < 40 kW/m²	8 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	10.9 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	16.1 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	23.5 m
		Minimum distance to < 10 kW/m²	28.3 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

Grassfire attack through BAU 2

- Grassland fire danger index (conversion from Table B2 in AS 3959-2018) - 100
- Vegetation – VHC 40.4 *Continuous low grass or tree cover*
- Understorey fuel load –4.5 t/ha
- Total fuel load – 5 t/ha
- Effective slope – 2° slope
- Site slope – 0° slope (constructed pad)
- Flame width – 100 m

FLAMESOL
FPA AUSTRALIA

Calculated August 12, 2025, 11:24 am (MDc v 4.9)

J25055

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Grassland Fire Danger Index	100	Rate of spread	14.92 km/h
Vegetation Classification	Grassland	Flame length	7.4 m
Understorey fuel load	4.5 t/ha	Flame angle	54 °, 64 °, 73 °, 78 °, 80 ° & 85 °
Total fuel load	5 t/ha	Elevation of receiver	2.99 m, 3.32 m, 3.53 m, 3.61 m, 3.64 m & 3.68 m
Vegetation height	n/a	Fire intensity	38,552 kW/m
Effective slope	2 °	Transmissivity	0.886, 0.875, 0.858, 0.837, 0.825 & 0.752
Site slope	0 °	Viewfactor	0.5872000000000001, 0.4348, 0.2898, 0.1955, 0.1589 & 0.0436
Flame width	100 m	Minimum distance to < 40 kW/m²	6.2 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	8.4 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	12.6 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	18.5 m
		Minimum distance to < 10 kW/m²	22.6 m

Rate of Spread - Noble et al, 1980

Flame length - Purton, 1982

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Appendix 4 Queensland Fire Department vehicle specifications

Appendix 1

QFRS Vehicle Specifications

	Vehicle	Dimensions (in Meters)										Tyres		Weights (In Kilograms)				OEM Weights (In Kilograms)				Turning Circle (in Meters)	
												Trailing Axles Only		Registerable AL and RGVM	Trailing Axles Only			Trailing Axles Only					
	Vehicle Description	Height	Head Clearance (HC)	FO	LA	DA1	RO	LR (=LA+DA1+RO)	Total Length	W^2	W (=W*2)	TS-1	TS-2	AL-F kg	AL-1 kg	AL-2 kg	Gross Mass	F kg	L-1 kg	L-2 kg	Gross Mass	Wall to Wall	Curb to Curb
1	**Urban Pumper - Medium** (**Type 3** -UPUMPM) Scania P280	3.100	3.800	1.495	4.300		2.470	6.770	8.265	2.500	1.250	305/70/R22.5		6500	9000		15000	7100	11500		18600	16.5	15.2
2	**16m Telescopic Aerial Pump** (**Type 4A** - UTAP16) Freightliner	3.700	4.100	1.225	5.720		2.100	7.820	9.045	2.450	1.225	11R22.5		6000	9000		15000	6350	10430		16000	23.0	22.0
3	**4x2 Pumper / Tanker - Light** (**Type 1** - UPT4x2L) Mitsubishi FK417	3.000	3.200	1.195	4.250		2.055	6.305	7.500	2.440	1.220	11R22.5		3300	7700		11000	3300	7700		11000	19.8	17.4
4	**4x2 Pumper / Tanker - Medium** (**Type 2** - UPT4x2M) Mitsubishi FM618	3.500	3.500	1.245	4.280		2.055	6.335	7.580	2.440	1.220	11R22.5		5100	9000		13500	5100	9000		13500	22.1	19.6
5	**4x2 Pumper Tanker - Medium** (**Type 2** - UPT4X2M) Isuzu FTR900	3.226	3.500	1.440	4.600		2.144	6.744	8.184	2.450	1.225	275/70R22.5		6000	9000		15000	6000	9200		15000		
5a	**4x2 Pumper Tanker - Medium** (**Type 2** - UPT4X2M) Isuzu FTR900	2.910	3.500	1.365	4.500		2.110	6.610	8.300	2.470	1.235	275/70R22.5		6000	9000		15000	6300	9200		15000	23.0	20.0
5b	**4x2 Pumper Tanker - Medium** (**Type 2** - UPT4X2M) Isuzu FTR900	3.100	3.600	1.600	4.610		2.330	6.940	8.540	2.470	1.235	275/70R22.5		6000	9000		15000	6300	9200		15000	18.1	16.0
5c	**4x4 Pumper Tanker - Medium** (**Type 2** - UPT4X4M) Isuzu FTS 800 4x4 crew	3.200	3.600	1.600	4.800		2.340	7.140	8.600	2.500	1.250	275/70R22.5		4700	9000		13900	4700	9200		13900	22.3	20.7
6	**Hydraulic Platform Turntable Ladder** (**Type 6L** - UALP40) Scania P1134 (8x4)	3.750	4.300	1.570	5.900	1.350	2.890	10.140	11.710	2.450	1.225	275/70R22.5	275/70R22.5	10580		18210	28790 (ATO)	14200 (Twin Steer)	9200	9200	33000	30.7	29.1
7	**Hydraulic Platform Turntable Ladder** (**Type 6L** - UALP30) Scania P114G (6x4)	3.600	4.180	1.498	4.098	1.360	2.186	7.644	9.142	2.500	1.250	275/75R22.5	275/75R22.5	7000		14650	21650 (ATO)	8000	10500	10500	26100		
7a	**Hydraulic Platform Turntable Ladder** (**Type 6L** - UALP44) Scania P380 (8x4)	3.700	4.180	2.100	4.900	1.355	2.650	8.905	11.005	2.500	1.250	295/80R22.5	305/80R22.5	11060		22540	33600 (ATO)	16000 (Twin Steer)	12000	12000	40000	23.0	22.0
8	**Urban Pumper - Light** (**Type 3** - UPUMPL) Mercedes Atego	2.900	2.900	1.440	4.160		2.260	6.420	7.860	2.500	1.250	305/70/19.5		6000	9000		15000	6100	10500		16000	19.4	17.1
9	**Urban Pumper - Medium** (**Type 4** - UPUMPM) Scania P94DB	2.960	3.150	1.750	4.500		2.100	6.600	8.350	2.500	1.250	275/70R22.5		6000	9000		15000	7100	11500		18600	18.4	16.8
10	**Urban Pumper Tanker - Heavy** (**Type 4T** - UPTH) Scania P94GB (6x4)	3.064	3.150	1.613	4.520	1.360	2.264	8.144	9.757	2.450	1.225	305/70R22.5	305/70R22.5	6000		16500	22500	7100	9500	9500	26100	20.8	19.2
11	**4x4 Pumper / Tanker Light** (**Type 2[4x4]** - UPT4x4L)	2.700	3.129	1.270	4.200		1.800	6.000	5.900	2.450	1.225	8.25R20		3170	6830		10000	3170	6830		10000	17.4	15.2
12	**4x4 Pumper / Tanker Medium** (**Type 2 [4x4]** - UPT4x4M)	3.300	3.900	1.560	4.250		2.264	6.514	7.600	2.460	1.230	275/70/R22.5		5400	9000		13000	5400	9200		13000	20.5	18.0
13	**Hazmat Tender Light** (**Type 8** - UHAZL) Mercedes Sprinter Van	2.610	2.800	0.939	4.025		1.625	5.650	6.589	1.988	0.994	195/70/15		1750	3200		4490	1750	3200		4490	14.3	13.6
14	**Hazmat Tender Heavy** (**Type 8** - UHAZH)	3.500	3.550	1.613	5.527	1.350	2.265	9.142	10.755	2.440	1.220	275/70/R22.5		6000		16500	22500	7100	9500	9500	26100	24.2	21.8
15	**Hazmat Tender Medium** (**Type 8** - UHAZM)	3.600	3.700	1.700	5.380		2.940	8.320	10.020	2.500	1.250	305/70R 19.5		6000	10000		16000 (ATO)	6100	10500		16000	24.2	21.8
16	**Rescue Tender Light** (**Type 5** - URTL)	2.640	2.800	0.950	4.600		1.900	6.500	6.600	2.400	1.200	225/70/R19.F5		2730	6150		8650	2730	6150		8650	16.5	
17	**Rescue Tender Medium** (**Type 5** - URTM)	3.100	3.800	1.750	4.180		2.270	6.450	8.200	2.500	1.250	305/70/19.5		6000	9000		15000	6100	10500		16000	16.5	15.2
17a	**Rescue Tender Medium** (**Type 5** - URTM) Scania P280	3.200	3.800	1.700	4.300		2.480	6.780	8.480	2.500	1.250	305/70/19.5		6500	9000		15000	7500	11500		19000	16.5	15.2
18	**Urban Incident Support Vehicle - Command**	3.800	3.900	1.440	4.160		2.640	6.800	9.150	2.500	1.250	305/70R19.5		6000	9000		15000	6100	10500		16000	19.4	17.1

Appendix 5 Bushfire hazard overlay code assessment

8.2.4 Bushfire hazard overlay code

8.2.4.1 Application

This code applies to development where the code is identified in the table of assessment for the bushfire hazard overlay and applies to any areas included on the bushfire hazard overlay map OM-4.

When using this code, reference should be made to section 5.3.2 and where applicable, section 5.3.3 located in Part 5.

Editor's note—The bushfire hazard area is a natural hazard area for the purpose of State Planning Policy. Within this area, susceptibility to bushfire has been identified. The area identified in the bushfire hazard overlay maps may not reflect the full extent of the area that may be affected by bushfire.

Note—The bushfire hazard overlay code provisions do not apply to an approved building envelope established in response to bushfire hazard and secured by a valid development approval given under this or a previous planning scheme.

8.2.4.2 Purpose

1. The purpose of the bushfire hazard overlay code is to manage development outcomes in bushfire hazard areas so that risk to life, property, community, economic activity and the environment as a result of bushfire is avoided or minimised.
2. The purpose of the code will be achieved through the following overall outcomes:
    a. development is compatible with the level of risk associated with the bushfire hazard;
    b. development location, siting and design responds to the risk of bushfire hazard and minimises risk to personal safety and property;
    c. development enables access and evacuation of people and emergency services vehicles, and access to water supplies during a bushfire hazard event;
    d. development involving the manufacture or storage of hazardous materials does not increase the risk to public safety or the environment in a bushfire event;
    e. natural processes and the protective function of landforms or vegetation are maintained in bushfire hazard areas;
    f. essential community infrastructure and community facilities are located and designed to function effectively during and immediately after bushfire hazard events; and
    g. development contributes to effective and efficient disaster management response and recovery capabilities.

Editor's note—For the purposes of Section 12 (1) of the Building Regulations 2006, the bushfire hazard areas defined by the planning scheme under map OM-4 is also designated to be the bushfire hazard area.

8.2.4.3 Specific benchmarks for assessment

Table 8.2.4.3.1 — Development outcomes for assessable development and requirements for accepted development

Performance outcomes	Acceptable outcomes	Comments
Access		
PO1 Development ensures that the location, siting, and design of development and associated driveways and access routes: a. avoid potential for entrapment during a bushfire; b. facilitate safe and efficient emergency services to access and egress the site during a bushfire; and c. enables safe evacuation of the site during a bushfire for site occupants.	**AO1.1** AO1.1.1 Where the development is located in an urban area, the development: a. has direct access to a constructed, all-weather, public road capable of carrying emergency service vehicles; b. has a maximum single access driveway length of sixty (60) metres from the street to the development; and c. access driveways have a maximum gradient of 12.5 per cent. OR AO1.1.2 Where the development is located in a non-urban area, the development: a. has direct access to a constructed, all-weather, public road capable of carrying emergency service vehicles; b. is separated from hazardous vegetation by a public road or fire trail with a minimum width of four (4) metres and at least six (6) metres clear	**Complies with PO1** The Mount Hopeful Battery Project (**the Project**) is in a non-urban area. It will establish an access track that will link the infrastructure area to South Ulam Road. The access track will be designed for heavy articulated vehicles and will meet the design standards for rural fire-fighter vehicles. Any requirement for the access tracks to be designed for urban fire trucks will be advised by a separate fire safety study. A fire access trail will also be provided around the perimeter of the proposed battery energy storage system (**BESS**), high voltage (**HV**) switching station, HV substation and operations and maintenance building (**infrastructure area**). It will be designed for rural fire-fighter vehicles (a 4x4 medium pumper/tanker). Specifications for the fire access trail are provided in Section 6.5 of the bushfire management plan (**BMP**).

	of vegetation, with a minimum of 4.8 metres vertical clearance and a maximum gradient of 12.5 per cent; and c. has: i. a maximum single access driveway length of sixty (60)metres from the street to the development; or ii. access driveways that are greater than sixty (60)metres from the street to the dwelling provide a turning circle with a minimum radius of eight (8) metres every (60) metres.	
Water supply for fire fighting purposes		
PO2 Development provides adequate and accessible water supply for fire fighting purposes which is safely located and freely accessible for fire fighting.	**AO2.1** AO2.1.1 In a reticulated water supply area fire hydrants in: a. residential areas are above ground single outlet fire hydrants and provided at not less than eighty (80) metre intervals and at each street intersection; and Editor's note—To remove any doubt, these intervals also apply to common access ways within a common private title b. commercial and industrial areas are above or below ground fire hydrants and provided at not less than ninety (90) metre intervals and at each street intersection. Above ground fire hydrants are to be fitted with dual valve outlets in these areas. Editor's note—Fire hydrants are designed and installed in accordance with Australian Standard 2419.1 Fire hydrant installations — system design, installation and commissioning, unless specified by the relevant water entity. OR	**Complies with AO2.1.2** The site is not serviced by mains water and there are no hydrants. Section 6.4 of the BMP requires a fire-fighter water supply outlet point to be provided adjacent to the infrastructure area, ie outside of the BESS and HV substation security fence, for rural fire-fighting and provides specifications for this water supply.

	AO2.1.2 Where a reticulated water supply is not available or the development is not within eighty (80) metres of a hydrant, a water tank is provided within ten (10) metres of the building or structure, and the water tank has: c. a take-off connection from the building to the tank which is at a level that provides on-site water storage of not less than the water requirement outlined in Table 8.2.4.3.3; d. a hardstand area allowing heavy rigid fire appliance access within six (6) metres of a tank; and e. fire brigade tank fittings consisting of: i. for above ground tanks, A. fifty (50) millimetre ball valve and male camlock coupling; and B. above ground water pipe fittings that are metal; or ii. for underground tanks, an access hole of 200 millimetre diameter (minimum) to allow access for suction lines. Note—Plastic tanks are not recommended; however, if they are fully submerged with above ground access points they are acceptable. Note—Where water tanks are required, swimming pools, creeks and dams should not be used as a substitute for a dedicated static supply as these sources of water are not reliable during drought conditions.	
Activities involving hazardous materials		
PO3 Public safety and the environment are not adversely	**AO3.1** Development does not involve the manufacture or	**Complies with PO3** The BESS, substation and switchyard infrastructure

affected by the impacts of bushfire on hazardous materials.	storage of hazardous materials within a bushfire hazard area. Editor's note—Refer to the *Work Health and Safety Act 2011* and associated regulation, the *Environmental Protection Act 1994* and the relevant building assessment provisions under the *Building Act 1975* for requirements related to the manufacture and storage of hazardous substances.	have been sited outside the medium, high and very high bushfire hazard areas and buffer areas identified by the *Bushfire hazard overlay map* in the Rockhampton Region Planning Scheme 2015 online mapping. The BESS component of the Project could be regarded as 'hazardous materials in the context of bushfire hazard' which described in the *Natural Hazards, Risk and Resilience – Bushfire, State Planning Policy State Interest guidance material 2019* (**SPP guidance material – bushfire**). Fire hazards associated with the BESS including (amongst other things) electrical hazards, chemical hazards, explosions, potential fire spread due to the proximity of battery enclosures or mechanical damage to battery enclosures. These matters are addressed in a hazard incident management plan for the development permit application. Subject to approval of the development permit application, a separate fire safety study would be undertaken during the detailed design phase. In addition, the BESS will have an asset protection zone (**APZ**) which is designed to achieve a radiant heat flux level ≤ 10 kilowatts/square metre (**kW/m^2**) at the BESS infrastructure which is identified as a tolerable radiant heat exposure outcome for hazardous materials in the context of bushfire hazard in *Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience - Bushfire' QFES 2019* (**BRC guide**). Specifications for the APZ are provided in Section 6.1 of the BMP. The APZ for the BESS will be complemented by a rural fire-fighting water supply and fire access trail

		around the perimeter of the BESS. Specifications for the rural fire-fighting water supply and fire access trail are provided in Sections 6.4 and 6.5 of the BMP, respectively.
Development within the high and very high bushfire hazard areas		
Avoiding the hazard		
PO4 The development is compatible with the level of risk associated with the bushfire hazard.	**AO4.1** The development has a Bushfire Attack Level of less than 12.5. Editor's note—The Bushfire Attack Level is calculated in accordance with the methodology described in the Australian Standard AS 3959 — Construction of buildings in bushfire prone areas.	**Not applicable** The bushfire hazard assessment in Chapter 3 of the BMP confirmed that the Project's infrastructure, ie the BESS, HV switching station, HV substation and operations and maintenance building, are not affected by a bushfire hazard area with a high or very high potential bushfire intensity. Notwithstanding, with the implementation of the APZs specified in Section 6.1 of the BMP, the Project's infrastructure will be separated from hazardous vegetation by a distance which achieves a radiant heat flux level ≤ 10 kW/m^2 at the BESS, HV switching station, HV substation and operations and maintenance building, which correlates with bushfire attack level (**BAL**) 12.5 in the *Australian Standard* (**AS 3959-2018**) *Construction of buildings in bushfire prone areas.*

Table 8.2.4.3.2 — Development outcomes for assessable development

Performance outcomes	Acceptable outcomes	Comments
Land use		
PO5 Essential community infrastructure and community	**AO5.1** The following uses are not located in high or very high	**Not applicable** The BESS, HV switching station and HV substation

facilities and highly vulnerable development are located, designed and sited to: a. protect the safety of people during a bushfire; b. not increase the exposure of people to the risk from a bushfire event; c. minimise the risk to vulnerable populations; and d. ensure essential community infrastructure can function effectively during and immediately after bushfire events.	bushfire hazard areas: a. child-care centre; b. detention facility; c. educational establishment; d. emergency services; e. hospital; f. industrial use involving manufacture or storage of hazardous materials; g. multiple dwelling; h. outstation; i. relocatable home park; j. residential care facility; k. retirement facility; l. rooming accommodation; m. shopping centre; n. short-term accommodation; o. telecommunications facility; p. tourist park; q. tourist attraction; r. transport depot; and s. utility installation.	could be regarded as being consistent with 'community infrastructure providing essential services' as described in the SPP guidance material – bushfire. The bushfire hazard assessment in Chapter 3 of the BMP confirmed that the Project's infrastructure, ie the BESS, HV switching station, HV substation and operations and maintenance building, are not affected by a bushfire hazard area with a high or very high potential bushfire intensity. Notwithstanding, with the implementation of the APZs specified in Section 6.1 of the BMP, the Project's infrastructure will be separated from hazardous vegetation by a distance which achieves a radiant heat flux level ≤ 10 kW/m^2 at the BESS, HV switching station, HV substation and operations and maintenance building, which correlates with BAL-12.5 in AS 3959-2018.
Reconfiguring a lot		
General		
PO6 Where reconfiguration is undertaken a separation distance from hazardous vegetation is provided. Editor's note—The preparation of a bushfire management plan in accordance with SC6.5 — Bushfire management planning scheme policy can assist in demonstrating compliance with this performance outcome.	**AO6.1** In urban areas lots are separated from hazardous vegetation by a distance: a. that achieves a Bushfire Attack Level of twenty-nine (29) or less at all boundaries; and b. is contained wholly within the development site. **OR** **AO6.2** In non-urban areas a building envelope of reasonable dimensions is provided on each lot which achieves a	**Not applicable** The Project does not involve the reconfiguration of a lot for a subdivision in a non-urban area. Notwithstanding, with the implementation of the APZs specified in Section 6.1 of the BMP, the Project's infrastructure will be separated from hazardous vegetation by a distance which achieves a radiant heat flux level ≤ 10 kW/m^2 at the BESS, HV switching station, HV substation and operations and maintenance building, which correlates BAL 12.5 in

	Bushfire Attack Level of twenty-nine (29) or less at all boundaries Editor's note—Where a separation distance is proposed to be achieved by utilising existing cleared developed areas external to the site, certainty must be established (through tenure or other means) that the land will remain cleared of hazardous vegetation. For staged developments, temporary separation distances, perimeter roads or fire trails may be absorbed as part of subsequent stages.	AS 3959-2018, which is less than BAL-29.
PO7 In urban areas development includes a constructed perimeter road between the lots and hazardous vegetation with reticulated water supply. The access is available for both fire fighting and maintenance works.	**AO7.1** In urban areas lot boundaries are separated from hazardous vegetation by a public road which: a. has a two lane sealed carriageway; b. contains a reticulated water supply; c. is connected to other public roads at both ends and at intervals of no more than 500 metres; d. accommodates geometry and turning radii in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines; e. has a minimum of 4.8 metres vertical clearance above the road; f. is designed to ensure hydrants and water access points are not located within parking bay allocations; and g. incorporates roll-over kerbing.	**Not applicable** The Project does not involve the reconfiguration of a lot for a subdivision and is not in an urban area.
PO8 In non-urban areas development includes a perimeter road or an all-weather fire access trail which is available for both fire fighting and maintenance/hazard reduction works.	**AO8.1** In non-urban areas the development includes a perimeter road or an all-weather fire access trail which: a. separates the development from the hazardous vegetation with a width of at least twenty (20) metres; b. with a minimum formed width of four (4) metres;	**Not applicable** The Project does not involve the reconfiguration of a lot for a sub-division. Notwithstanding, a fire access trail will be provided around the perimeter of the infrastructure area, ie generally aligned with the APZs. It will be designed and constructed in general accordance with the standard required by a 4x4 medium pumper/tanker

	c. a minimum of 4.8 metres vertical clearance above the road; d. has a turning circle with a minimum radius of eight (8) metres every sixty (60) metres; e. has adequate drainage and erosion control devices; f. has a gradient no greater than 12.5 per cent and a cross fall of no greater than ten (10) degrees; g. has access at each end of the perimeter road or the fire trail from a public road; h. has the access point signed and direction of travel identified; and i. has a suitable arrangement in place to ensure maintenance in perpetuity.	which is described in Appendix 1 of *Fire hydrant and Vehicle Access Guidelines for Residential, Commercial and Industrial lots 2019* (**Fire hydrant and vehicle access guidelines**). Design criteria for the fire access trail are provided in Section 6.5 of the BMP.
PO9 Road widths and construction within the development are adequate for fire emergency vehicles.	No acceptable outcome is nominated.	**Not applicable** The Project does not involve the reconfiguration of a lot for a subdivision. Notwithstanding, the Project will establish an access track that will link the infrastructure area to South Ulam Road. The access track will be designed for heavy articulated vehicles and will meet the design standards for rural fire-fighter vehicles. Any requirement for the access track to be designed for urban fire trucks will be advised by a separate fire safety study.
Emergency services access		
PO10 Development facilitates the safe and efficient access and egress of emergency services during a bushfire event.	**AO10.1** The development includes a perimeter road or a fire access trail which: a. separates the development from the hazardous vegetation;	**Complies with AO10.1** A fire access trail will be provided around the perimeter of the infrastructure area, ie generally aligned with the APZs. It will be designed and constructed in general accordance with the standard

	b. is a minimum of ten (10) metres in width, with a minimum formed width of four (4) metres; c. is a minimum of six (6) metres clear of standing flammable vegetation; d. has passing bays twenty (20) metres long by three (3) metres (additional to the trail width), or turning facilities every 200 metres; e. has adequate drainage and erosion control devices; f. has a gradient no greater than 12.5 per cent and a cross fall of no greater than ten (10) degrees; g. has access at each end of the perimeter road or the fire trail from a public road; h. has the access point signed and direction of travel identified; and i. has a suitable arrangement in place to ensure maintenance in perpetuity.	required by a 4x4 medium pumper/tanker which is described in Appendix 1 of Fire hydrant and vehicle access guidelines. Design criteria for the fire access trail are provided in Section 6.5 of the BMP.
PO11 Road widths and construction within the development are adequate for fire emergency vehicles to gain access to a safe working area close to dwellings and near water supplies whether or not on-street parking spaces are occupied.	**AO11.1** Road access minimum clearances of 3.5 metres wide and 4.8 metres high are provided for safe passage of emergency vehicles. Editor's note—For further information on how to address the above criteria please see Queensland Fire and Emergency Service: Fire hydrant and vehicle access guidelines for residential, commercial and industrial lots.	**Complies with AO11.1** The Project will establish an access track that will link the infrastructure area to South Ulam Road. The access track will be designed for heavy articulated vehicles and will meet the design standards for rural fire-fighter vehicles. Any requirement for the access track to be designed for urban fire trucks will be advised by a separate fire safety study.
PO12 Hydrants are suitably identified so that fire services can locate them at all hours.	**AO12.1** Hydrants are identified as specified in Queensland Fire and Emergency Services: Fire hydrant and vehicle access guidelines for residential, commercial and industrial lots. Editor's note—Fire hydrants are designed and installed in accordance with Australian Standard 2419.1 Fire hydrant	**Not applicable** The site is not serviced by mains water and hydrants will not be installed outside of the infrastructure area. Notwithstanding, a water tank and outlet point will be provided adjacent to the infrastructure area, ie outside of the BESS and HV substation security

	installations — system design, installation and commissioning, unless specified by the relevant water entity.	fence, for rural fire-fighting. Specifications for the water tank and outlet are provided in Section 6.4 of the BMP. These specifications include the requirement for the water tank outlet to be identified by reflective wayfinding signage.

Table 8.2.4.3.3 — Water storage requirements

Lot size / use type	Water requirement (per lot)
Lots less than 1,000 square metres	5,000 litres
Lots between 1,000 square metres and less than one (1) hectare	10,000 litres
Lots greater than one (1) hectare	20,000 litres

Appendix J

Hazard and Incident Management Plan



Riskcon engineering

Hazard Incident Management Plan

Mount Hopeful Battery

Umwelt (Australia) Pty Ltd
Document No. RCE-25268_MtHopefulBESS_HIMP_Final_25Sep25_Rev(1)
Date 25/09/2025

Hazard Incident Management Plan

Mount Hopeful Battery

Umwelt (Australia) Pty Ltd

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Quality Management

Rev	Date	Remarks	Prepared By	Reviewed By
A	24th July 2025	Draft issued for comment	Chris Butson	Renton Parker
0	18th September 2025	Updated to final		
1	25th September 2025	Updated based on comments from Neoen		

Executive Summary

Background

Umwelt (Australia) Pty Ltd are engaged by Neoen Australia Pty Ltd (Neoen) to prepare the planning studies for the Mount Hopeful Battery Project in Rockhampton QLD. The Project is an advanced Battery Energy Storage System (BESS) project with a capacity to deliver up to 600 megawatts of power for a duration of up to 4 hours supporting the grid in terms of ongoing reliability and security.

To support the required approval, it has been proposed to develop a Hazard Incident Management Plan (HIMP) which will assess the potential risks at the site and ensure that the design sufficiently addresses the unique hazards and risks. This document has been produced as a prelude to a Fire Safety Study (FSS) with the intention of providing a basis for review by approval authorities, including the Queensland Fire Department (QFD), and to improve the project outcomes during detailed design.

Umwelt have engaged Riskcon Engineering Pty Ltd (Riskcon) to prepare the HIMP for the site and the assessment is provided in the following document.

Conclusions

A Hazard Incident Management Plan per the HIPAP No. 2 guidelines was prepared for the Mt Hopeful BESS Project located in Rockhampton. The analysis performed in the HIMP was based on credible fire scenarios to assess whether the protection measures at the site were adequate to combat the hazards associated with the quantities and types of commodities being stored. Based on the assessment, it was concluded that, if BESS units include the required certifications, fire detection measures, fire protection measures and appropriate separation to adjacent infrastructure that the site will be sufficiently safe.

Additionally, the quantity of fire water for services to utilise shall be in accordance with AS 2419.1:2021 and provided sufficient capacity to respond to any fire scenario on site. Several recommendations have been made below.

Recommendations

Based on the analysis, the following recommendations have been made:

- Final separation distances between BESS units shall be defined with regard for the level of testing and outcomes of UL9540A reports provided by the selected supplier.
- Adopt an approach to minimise potential for incident propagation due to a MV transformer fire:
  - Consider orienting the BESS containers such that auxiliary equipment is located proximal to the MV transformer aisles of the installation, moving the battery storage compartments of the BESS outside of the 23 kW/m^2 contour.
  - Increase spacing between MV transformers and BESS containers.
  - Provide heat shielding via increased bund height or firewalls (as with HV transformers).
  - Reassess impact during detailed design with specific MV transformer data.
- An emergency response plan shall be prepared in accordance with HIPAP No. 1 – Industry Emergency Planning Guidelines (Ref. [1]).

- The retention pond shall be sized such that it can capture 100% of the fire water storage capacity.

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Abbreviations

Abbreviation	Description
ADG	Australian Dangerous Goods Code
APZ	Asset Protection Zone
AS	Australian Standard
BESS	Battery Energy Storage System
BMS	Battery Management System
DA	Development Application
DGS	Dangerous Goods
EMS	Emergency Management System
FBIM	Fire Brigade Intervention Model
FMDS	Fm Global Datasheet
FRNSW	Fire And Rescue New South Wales
HIMP	Hazard Incident Management Plan
HIPAP	Hazardous Industry Planning Advisory Paper
HV	High Voltage
LEL	Lower Explosive Limit
LFP	Lithium Iron Phosphate
LGA	Local Government Area
LI-ION	Lithium Ion
MV	Medium Voltage
NFPA	National Fire Protection Association
NZS	New Zealand Standard
O&M	Operations And Maintenance
PPM	Parts Per Million
QFD	Queensland Fire Department
QFES	Queensland Fire And Emergency Services
SEP	Surface Emissive Power
STEL	Short Term Exposure Limit
UL	Underwriters Laboratories
VBB	Victoria Big Battery Fire

1.0 Introduction

1.1 Background

Umwelt (Australia) Pty Ltd are engaged by Neoen Australia Pty Ltd (Neoen) to prepare the planning studies for the Mount Hopeful Battery Project in Rockhampton QLD. The Project is an advanced Battery Energy Storage System (BESS) project with a capacity to deliver up to 600 megawatts of power for a duration of up to 4 hours supporting the grid in terms of ongoing reliability and security.

To support the required approval, it has been proposed to develop a Hazard Incident Management Plan (HIMP) which will assess the potential risks at the site and ensure that the design sufficiently addresses the unique hazards and risks. This document has been produced as a prelude to a Fire Safety Study (FSS) with the intention of providing a basis for review by approval authorities, including the Queensland Fire Department (QFD), and to improve the project outcomes during detailed design.

Umwelt have engaged Riskcon Engineering Pty Ltd (Riskcon) to prepare the HIMP for the site and the assessment is provided in the following document.

1.2 Objectives

The objectives of the HIMP are to:

- Review the site operations and dangerous goods (DG) storages at the site for the potential to initiate or propagate an incident at the site.
- Identify heat radiation impacts from potential fire sources at the site and determine the potential impacts on the surrounding areas.
- Review the proposed fire safety features and determine the adequacy of the fire safety systems based on the postulated fires.
- Review the site's proposed layout, water supply and water containment to determine risk of incident propagation and ability for fire services intervention.

1.3 Scope of Services

The scope of work is for the preparation of a HIMP for the facility to assess the potential hazards at the site to ensure the fire protection systems are commensurate with the identified hazards. Queensland Fire and Emergency Services (QFES) refer to the Australasian Fire and Emergency Services Authorities Council (AFAC) Large Scale BESS Guideline (Ref [2]) for identifying and addressing risk associated with BESS projects. This includes guidance on methodologies for development of Fire Safety Studies (FSS), which are analogous to HIMPs. The AFAC Guidelines refer to the following methodologies:

- The Fire and Rescue Victoria (FRV) fire safety guideline GL54 – Fire Safety Study;
- The NSW Department of Planning Hazardous Industry Planning Advisory Paper (HIPAP) No. 2 Fire Safety Study (2011);
- Country Fire Authority (CFA) Design Guidelines and Model Requirements for Renewable Energy Facilities (2023).

The development of this HIMP has been based on the methodology of HIPAP No.2 (Ref. [3]) and focuses on the storage of commodities associated with the new development at the site in addition to the existing operations at the site as required. A review of the following components of the HIMP are within the scope of work:

- Determination of risk and consequences from fire or explosion scenarios throughout the facility.
- The preparation of a report on fire prevention, fire detection, fire alarm and fire suppression systems for the site.
- Firewater storage capacity for compliance with Australian Standards and Regulations.
- Recommendations based upon the study for implementation in the final design.

2.0 Methodology

2.1 Hazard Incident Management Plan Approach

The following methodology was used in the preparation of the HIMP for the facility. The methodology is to follow items required by HIPAP No. 2 (Ref. [3]).

- The fire hazards associated with the facility were identified to determine whether there were any fire or explosion hazards that may impact offsite or result in a potential to escalate. Where fire hazards with the potential to impact offsite or escalate were identified, these were carried forward for consequence assessment.
- The heat radiation impacts or overpressure impacts (consequences) from each of the postulated incidents from the proposed equipment were then estimated and potential impacts on surrounding areas assessed.
- Impacts of the fires from the proposed equipment were plotted on a layout plan of the proposed facility, to determine whether heat radiation impacts any critical areas (i.e. adjacent storage areas, fire services, safety systems, etc.) and whether such impact affected the ability of firefighters to respond to the postulated fire. The heat radiation impact from incidents at adjacent sites on the buildings and structures at the facility were then assessed against the maximum permissible levels in HIPAP No. 4 (Ref. [4]).
- The firefighting strategies were then assessed to determine whether these strategies require update in light of the location of the proposed equipment and storage areas.
- The response times for Queensland Fire & Emergency Service (QFES) and Queensland Fire Department (QFD) in the immediate vicinity were assessed.
- A report was then developed for submission to the client and the regulatory authority.

2.2 Limitations and Assumptions

In this instance, the HIMP is developed based on applicable limitations and assumptions for the development which are listed as follows:

- The report is specifically limited to the project described in **Section 3.2** and the methodology and approach outlined in **Section 2.1**.
- The report is based on the information provided.
- The report does not provide guidance in respect of incidents that relate to sabotage or vandalism of fire safety systems.
- The assessment is limited to the objectives of the HIMP as provided in the guidelines issued as HIPAP No. 2 (Ref. [3]) and does not consider property damage such as building and contents damage caused by fire, potential increased insurance liability and loss of business continuity.
- Malicious acts or arson with respect to fire ignition and safety systems are limited in nature and are outside the scope of this report. Such acts can potentially overwhelm fire safety systems and therefore further strategies such as security, housekeeping and management procedures may better mitigate such risks.

- This report is prepared in good faith and with due care for information purposes only and should not be relied upon as providing any warranty or guarantee that ignition or a fire will not occur.

3.0 Site Description

3.1 Site Location

The site is located within the Rockhampton Regional Council local government area (LGA), approximately 50 km south of Rockhampton and 70 km west of Gladstone. **Figure 3-1** shows the regional location of the site.

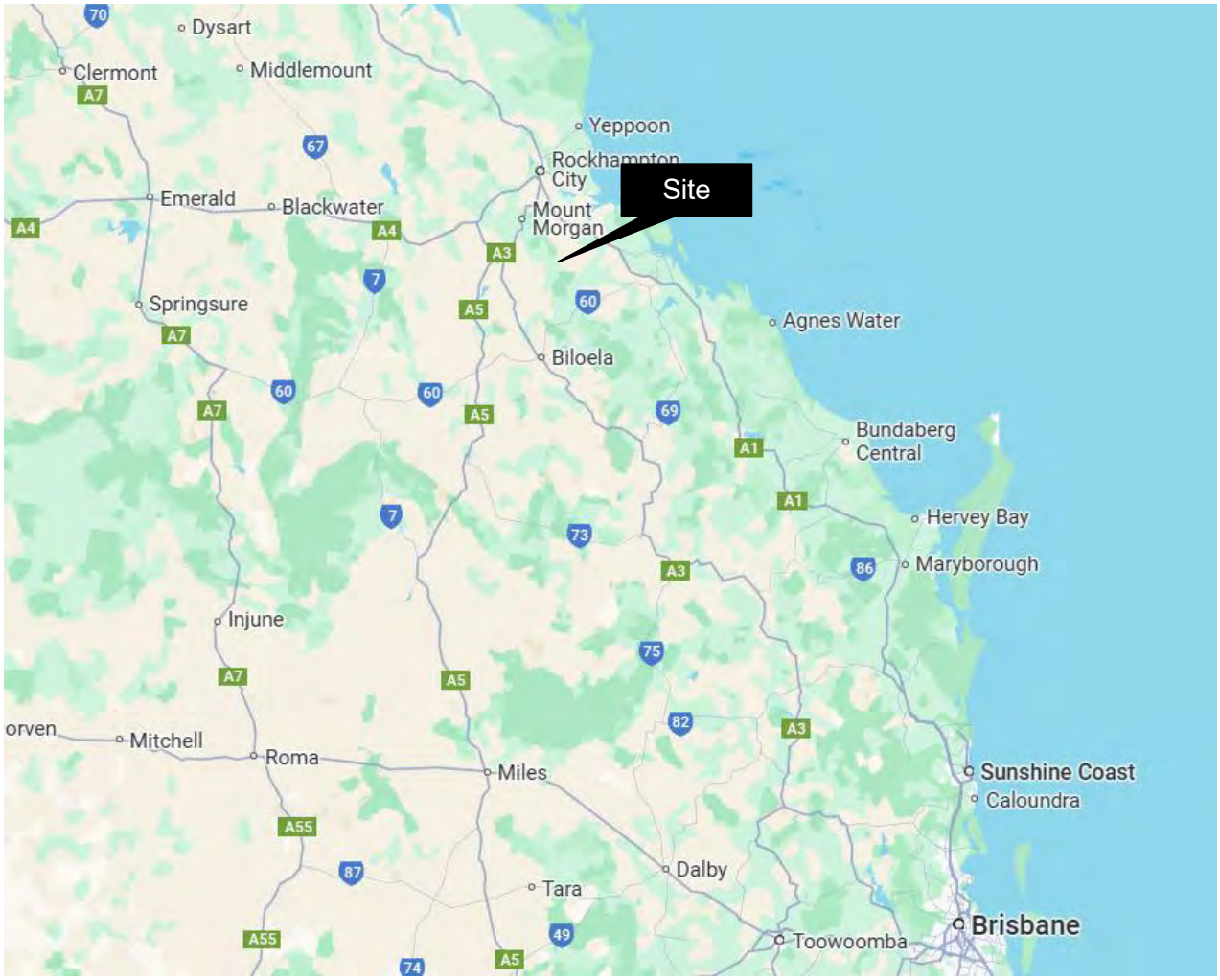


Figure 3-1: Site Location (Source – Google Maps)

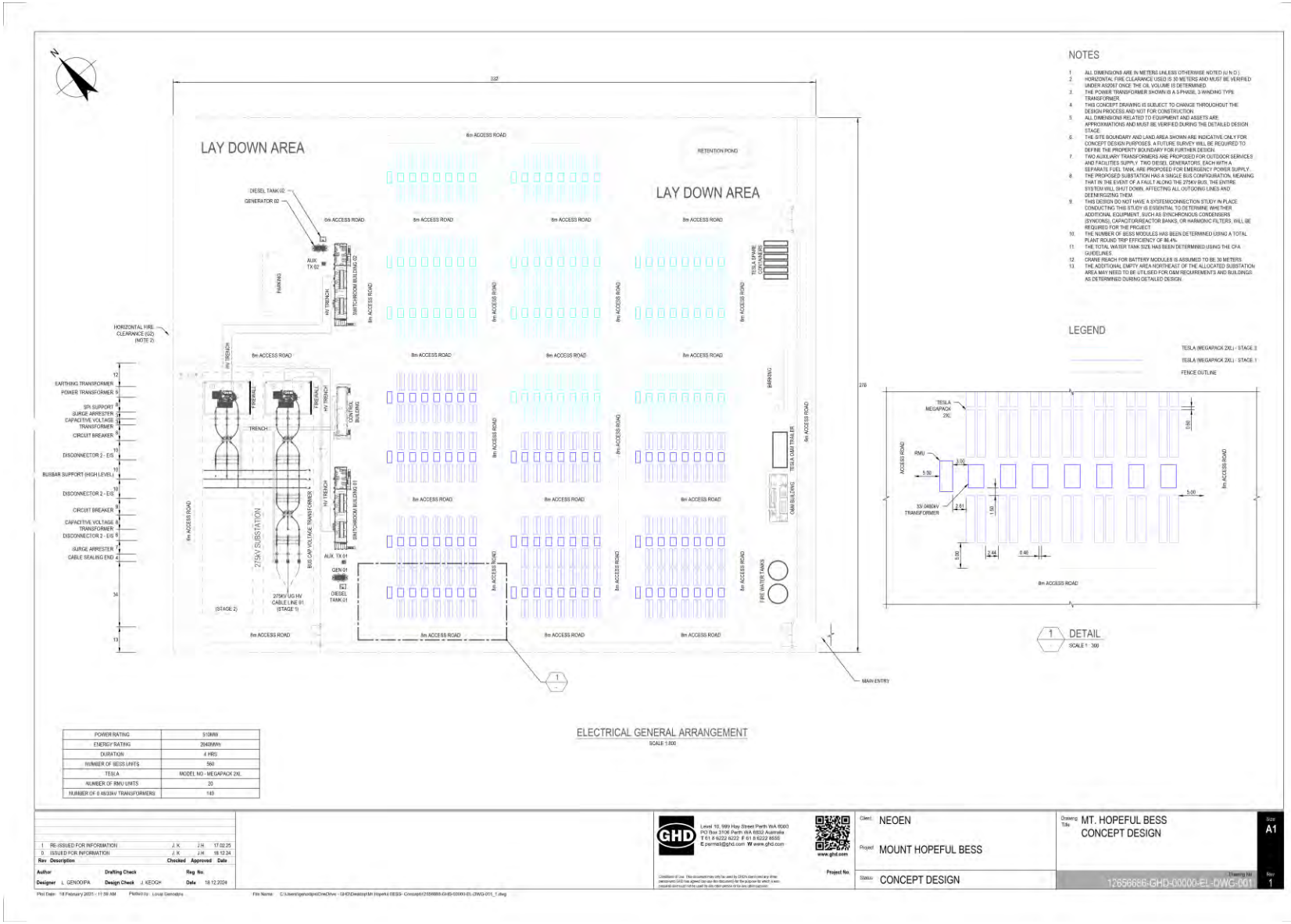


Figure 3-2: Proposed Site Layout

3.2 General Description

The Mount Hopeful Battery is a proposed grid-scale battery energy storage system (BESS) in Central Queensland (the Project). With a planned capacity of up to 600 megawatts (MW) of power for a duration of up to four hours, the Project will enhance the delivery of clean, reliable electricity to the National Electricity Market (NEM), while supporting grid stability and flexibility.

The Project is located near the rural town of Bajool, approximately 50 kilometres (km) south of Rockhampton and 70 km west of Gladstone, Queensland, within the Rockhampton Region Local Government Area (LGA). The Project is mapped within the Rural Zone of the Rockhampton Region Planning Scheme 2015 (planning scheme) and predominately used for low intensity agricultural activities, including cattle grazing. The Project is proposed to occur within the bounds of the 'Study Area' which covers an area of 49 hectares (ha) and occurs across three freehold land parcels and two local roads, being South Ulam Road and an unnamed road reserve. The Study Area also accommodates a Powerlink transmission easement that comprises an existing 275 kilovolt (kV) transmission line, of which the Project will connect into. The Study Area is sparsely vegetated with predominately non-remnant vegetation and is intersected by an unnamed tributary of Eight Mile Creek. The Project gains access via South Ulam Road to the east of the Study Area.

The Project is proposed to be delivered over two stages as follows:

- Stage 1: indicative capacity of 430 MW, with construction expected to commence mid-2025 and to complete by end of 2028.
- Stage 2: indicative additional capacity of 170 MW, with construction expected to commence in 2028 and to complete by end of 2029.

Key components of the Project include:

- Up to 650x Battery Modules
- Up to 170x Medium Voltage (MV) Transformers
- 2x High Voltage (HV) Transformers
- A HV Switching Station.

The Project will also encompass associated ancillary infrastructure necessary to the operation of the BESS, including:

- Site access track
- Overhead and underground electrical cables
- Inverters
- High voltage substation
- Earthing and lightning protection
- Security fencing, closed-circuit television (CCTV) and lighting
- O&M building
- Water retention pond
- Lay down areas

- Fire water tanks with total capacity in accordance with AS 2419.1 (Ref. [5])
- Two Control Buildings
- Harmonic filters

3.3 Quantities of Dangerous Goods

The classes and quantities of DGs provided in **Table 3-1**.

Table 3-1: Maximum Quantities of Dangerous Goods Stored & Preliminary Risk Screening

Class	Packing Group	Description	Quantity
2.1	n/a	Spray paint	0.01 T
2.2	n/a	Refrigerant R134A in battery packs (1.5 kg per pack)	0.96 T
3	II	Paints and solvents	0.2 T
8	II	Cleaning products	1 T
9	n/a	Lithium Batteries	722 T*
C1	n/a	Diesel fuel	17 T
C2	n/a	Transformer oils in HV transformers	172 kL
C2	n/a	Transformer oils in MV transformers	541 kL

*Note that this is based on the weight of LFP cells contained within the battery packs.

4.0 Hazard Identification

4.1 Introduction

A hazard identification table has been developed and is presented at **Appendix A**. Those hazards identified to have a potential fire or explosion impact are assessed in the following sections of this document.

4.2 Properties of Dangerous Goods

The type of DGs and quantities stored and used at the site has been described in **Section 3**. **Table 4-1** provides a description of the DGs to be stored and handled at the site, including the Class and the hazardous material properties of the DG Class.

Table 4-1: Properties* of the Dangerous Goods and Materials Stored at the Site

Class	Hazardous Properties
2.2 – Non-flammable, non-toxic gases	Class 2.2 gases are gases which are asphyxiant – gases which dilute or replace the oxygen normally in the atmosphere; or are oxidising – gases which may, generally by providing oxygen , cause or contribute to the combustion of other material more than air does; or gases which do not come under other divisions (flammable and / or toxic).
9 – Miscellaneous DGs	Class 9 substances and articles (miscellaneous dangerous substances and articles) are substances and articles which, during transport present a danger not covered by other classes. Releases to the environment may cause damage to sensitive receptors within the environment. It is noted that the Class 9s stored within this project are lithium-ion batteries which may undergo thermal runaway (i.e. escalating reaction resulting in heat which ultimately leads to failure of the battery and a fire).
Combustible Liquids	Combustible liquids are typically long chain hydrocarbons with flash points exceeding 60.5°C. Combustible liquids are difficult to ignite as the temperature of the liquid must be heated to above the flash point such that vapours are generated which can then ignite. This process requires either sustained heating or a high-energy ignition source.

* The Australian Code for the Transport of Dangerous Goods by Road and Rail (Ref. [6])

4.3 Hazard Identification

Based on the hazard identification table presented in **Appendix A**, the following hazardous scenarios have been developed:

- Li-ion battery fault, thermal runaway and fire
- Li-ion battery fire, toxic smoke plume
- Electrical equipment failure and fire
- Transformer internal arcing, oil spill, ignition and bund fire
- Transformer electrical surge protection failure and explosion
- Refrigerant gas release
- Release of diesel, ignition and pool fire

Each identified scenario is discussed in further detail in the following sections.

4.4 Li-Ion Battery Fault, Thermal Runaway and Fire

Lithium ion (Li-ion) batteries are composed of a metallic anode and cathode which allows for electrons released from the anode to travel to the cathode where positively charged ions in the solute migrate to the cathode and are reduced. The flow of electrons provides the source of energy which is discharged from a battery and used for work. In a Li-ion battery, the lithium metal composites (a composite of lithium with other metals such as cobalt, manganese, nickel, or any combination of these metals) oxidises (loses an electron) becoming a positively charged ion in solution which migrates through the battery separator to the cathode. At the same time, the lost electron travels through the circuit to the cathode. The lithium ions in solution then recombine with the electron at the cathode forming lithium metal within the cathodic metal composite. This process is shown in **Figure 4-1**.

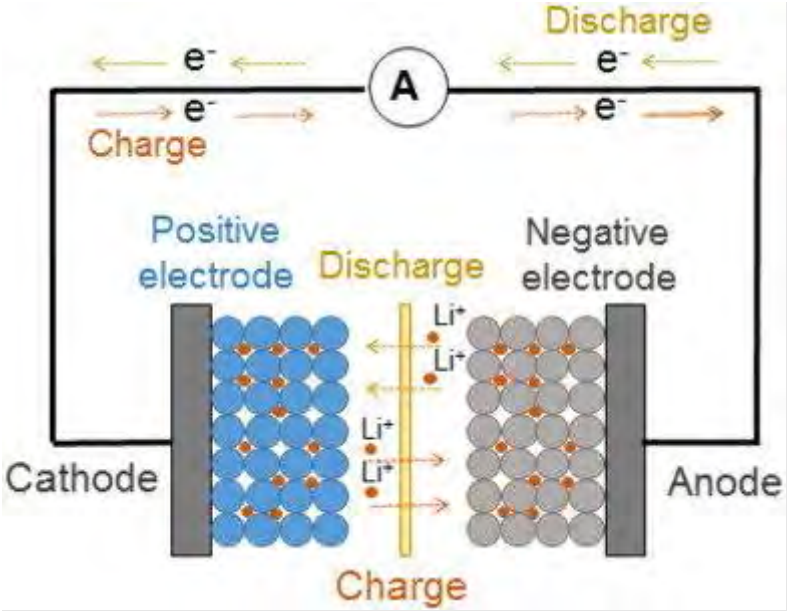


Figure 4-1: Cathode and Anode of a Battery (Source Research Gate)

The key hazard associated with Lithium-ion-BESS (Li-BESS) systems is thermal runaway which can be initiated in a cell by several initiating events including (Ref. [7]):

- Manufacturing defects
- Overcharging
- Overheating
- Mechanical abuse

During thermal runaway, cells can release a large quantity of both toxic and flammable gases creating a risk for explosion and toxicity to bystanders. Thermal runaway in a single cell within a BESS unit has potential to induce thermal runaway propagation which may eventually lead to larger-scale fire and/or explosion incidents (Ref. [8]).

The likelihood and consequence of thermal runaway in a BESS is dependent on several factors including the design, battery chemistry and installed systems. Although the battery supplier has not been selected yet, it is understood that the battery chemistry will be lithium-ion phosphate (LiFePO4, or simply LFP). LFP cells are the current standard for large-scale BESS systems accounting for approximately 80% of the total battery storage market as of 2023, this is largely due

to lower cost, higher cycle lives and safety considerations when compared to other chemistries such as nickel manganese cobalt (NMC)(Ref. [9]). Although NMC has a higher energy density, LFP batteries have begun to dominate the grid-scale energy market due to the following advantages when compared to NMC (Ref. [10]):

- Longer cycle life and less capacity reduction over time
- Higher thermal stability and less prone to overheating
- Better mechanical stability
- More stable electrochemically with fewer side reactions which accelerate degradation
- More resilient to state of charge (SOC) and depth of discharge (DOD) with less degradation from deep cycling

As the supplier of the battery units has not yet been selected, a UL9540A cannot be provided. However, in accordance with the relevant national and state-based guidelines, the selected supplier will hold a UL9540A certification for the selected product at cell, module and unit level (as required based on sequential testing). UL9540A tests typically show no cell-to-cell propagation, no flaming outside of the unit and no explosion hazards. When unit level testing is conducted, fire suppression systems are not included demonstrating a high unlikelihood that a fire would propagate to a full BESS fire. UL9540A tests may be provided at request when a supplier is selected.

The final selection for the BESS supplier will provide a product that is compliant with NFPA 68, 69 and 855. The selected system will include appropriate fire protection which generally includes but is not limited to:

- Shut-down separator (for overheating)
- Tear-away tab (for internal pressure relief)
- Vent (pressure relief in case of severe outgassing)
- Thermal interrupt (overcurrent/overcharging/environmental exposure)
- Battery Management Systems (BMS) – constant monitoring of the voltage, temperature and state of charge of individual cells to aid in early detection of a fault condition. Upon detection of cell fault, the BMS disconnects and isolates the cell to prevent propagation of the incident, and alarms the site Emergency Management System (EMS).
- Manual emergency stop button
- Fire suppression system
- Deflagration panels
- Sparker systems

UL9540 A testing of LFP modules and units typically shows no propagation beyond the module however, should a larger issue such as electrical faults or arcing in a number of cells occur, thermal runaway in multiple cells may occur causing the entire unit to catch fire. The spacing between units and fire suppression installed would then be relied upon to prevent fire spread and risk of incident propagation between BESS units. Therefore, this incident has been carried forward for further analysis.

4.5 Li-ion Battery Fire and Toxic Gas Dispersion

As noted in **Section 4.4**, there is the potential for a BESS failure to occur resulting in a fire which may result in toxic by-products of combustion to form. As part of the BESS testing, off gases generated from the thermally running away battery cells are captured and tested to determine the off-gas composition in terms of flammability and toxicity. As noted previously, the supplier has not been selected therefore off-gas sampling results are not available. However, data from numerous testing reports of cell testing shows that only carbon dioxide and carbon monoxide are produced in large quantities. These have been reviewed in further detail in the following subsections.

4.5.1 Carbon Dioxide

Carbon dioxide is a colourless, odourless, dense gas which is naturally forming and is present in the atmosphere at concentrations around 415 ppm (0.0415%). At low concentrations carbon dioxide is physiologically impotent and at low concentrations does not appear to have any toxicological effects. However, as the concentration grows it increases the respiration rate with Short Term Exposure Limit (STEL) occurring at 30,000 ppm (3%), above 50,000 ppm (5%) a strong respiration effect is observed along with dizziness, confusion, headaches, and shortness of breath. Concentrations in excess of 100,000 ppm (10%) may result in coma or death.

Carbon dioxide is a by-product of combustion where hydrocarbon or carbon-based materials are involved. A typical combustion reaction producing carbon from a hydrocarbon has been provided in **Equation A-1**. This reaction proceeds when there is an excess of oxygen to the fuel being consumed and is known as complete combustion as it is the most efficient reaction pathway.

$$C_3H_8(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(g)$$ **Equation A-1**

The lithium-ion batteries are predominantly composed of metal structures. However, during a fire event ancillary equipment and materials within the batteries will be involved in the fire including wiring, plastics, anodes, etc. which will liberate carbon dioxide. However, a review of the toxicological impacts indicates high concentrations would be required to result in injury or fatality. Based upon a review of the sensitive areas, and the similar BESS fires (i.e. Victoria BESS fire), it is not considered that the formation of carbon dioxide in a fire would be sufficient to result in downwind impacts sufficient to cause injury or fatality. In other words, there would be insufficient production of carbon dioxide to generate a plume of sufficient concentration to displace the required oxygen for a significant downwind consequence to occur. Therefore, this incident has not been carried forward for further analysis.

4.5.2 Carbon Monoxide

Carbon monoxide an odourless, colourless gas which is slightly denser than air and occurs naturally in the atmosphere at concentrations around 80 ppb. Carbon monoxide is a toxic gas as it irreversibly binds with haemoglobin which prevents these molecules from carrying out the function of oxygen / carbon dioxide exchange. The loss of 50% of the haemoglobin may result in seizures, coma or death which can occur at concentration exposures of approximately 600 ppm (0.06%).

Carbon monoxide is by-product of combustion if there is insufficient oxygen to enable complete combustion. The reaction pathway for the formation of carbon monoxide is provided in **Equation 4-1**.

$$2C_3H_8(g) + 7O_2(g) \rightarrow 6CO(g) + 8H_2O(g)$$ **Equation 4-1**

As noted, in **Section 4.5.1** there is the potential for a fire to occur with the BESS units which could form carbon monoxide if there is insufficient oxygen to sustain complete combustion. However, it is noted that the combustible load within the BESS which could result in the formation of carbon monoxide is relatively low compared to the available oxygen in the surrounding atmosphere. Therefore, it is considered that the formation of carbon monoxide at levels which would result in a substantial downwind impact are not considered credible. Therefore, this incident has not been carried forward for further analysis.

4.6 Electrical Equipment Failure and Fire

Electrical equipment is located within the switch room which may fail resulting in overheating, arcing, etc. which could initiate a fire. In the event of a fire, it may begin to propagate to adjacent combustible materials (i.e. wiring). It is noted that electrical equipment fires typically start by smouldering before flame ignition occurs resulting in a slow fire development.

The type of equipment and provided fire protection used within switch rooms is ubiquitous throughout the world and across industry segments and is therefore not a unique fire scenario. Therefore, this incident has not been carried forward for further analysis.

4.7 Transformer Internal Arcing, Oil Spill, Ignition and Bund Fire

Transformers contain oil which is used to insulate the transformers during operation. If arcing occurs within the transformer (e.g. due to a low oil level), the high energy passing through the coolant vaporises the oil into light hydrocarbons (methane, ethane, acetylene, etc.) resulting in rapid pressurisation within the reservoir. To minimise the likelihood of such occurrence, transformers are fitted with a low oil pressure switch, oil temperature monitoring and switches, gas formation detectors and a pressure surge protection. These devices identify potential oil and pressure events within the transformer, isolating power and alarming operators.

Notwithstanding the protection systems, if the pressure rise exceeds the structural integrity of the reservoir, and the installed pressure relief devices, the reservoir can rupture allowing the release of oil into the bund. The rupture also allows oxygen to enter the reservoir. The temperature of the gases is above the auto ignition point, but this does not occur until oxygen is present. When oxygen enters the reservoir, the gases auto ignite which generates sufficient heat to ignite the oil in the bund.

Transformers are insulated using oil which can be mineral, synthetic, natural ester oil or other types which may have flashpoints from 140°C to 300°C. Due to the flash point, transformer oil are classified as non-dangerous goods under the Australian Dangerous Goods Code (Ref. [6]) as the oil would need to be heated significantly before any flammable vapour is given off. As ignition of the fluid is extremely difficult, and a fire occurring from an oil-insulated transformer is not considered a credible scenario.

Notwithstanding this, due to the number of transformers on site, this incident has been carried forward for further analysis for conservatism.

4.8 Transformer Electrical Surge Protection Failure and Explosion

Transformers generate large amounts of heat as a result of the high electrical currents. As detailed in **Section 4.7**, oil is used as an insulating material within the transformers to protect the mechanical components. However, if the transformer gets an extreme surge of energy, such as that which could occur due to a lightning strike, and the electrical surge protection measures fail, the oil may

start to decompose and vapourise, resulting in gas bubbles of hydrogen and methane (Ref. [11]) as temperatures above the autoignition of the gases.

The formation of gases will increase the pressure within the transformer which can result in the transformer structure rupturing which allows the ingress of oxygen. As the oxygen enters, the concentration of flammable gases falls within the explosive limits which are above their autoignition temperatures which ignite resulting in increased formation of hot gaseous products resulting in an explosion. The explosion may generate significant overpressure, sparks and fire and would result in a whole transformer fire, as discussed in **Section 4.7**.

In order to protect against overheating and explosions, transformers have surge protection, which programs them to shut down upon detection of an energy spike. However, the surge protection can have a slight delay. In the event of a major lightning strike, significant oil deterioration or physical damage such as a fallen tree, the surge protection may be too slow to stop an electrical overload (Ref. [12]).

Although there is the potential for an explosion to occur which may result in impacts to fire protection equipment; however, as noted, these units are ubiquitous and have a low potential for failure. The transformers will be protected against lightning as per the requirements of AS 2067:2016 (Ref. [13]) and the transformer oils typically have a high-flash point reducing the risk of flammable vapour generation. Therefore, this incident has not been carried forward for further analysis.

4.9 Refrigerant Gas Release and Asphyxiation Hazard

The refrigeration system will be used to providing air conditioning and temperature control in the control room and other areas requiring temperature control. A simplified explanation of how a refrigeration system operates to cool an area is provided below.

A refrigeration system contains four essential components:

1. Compressor
2. Expansion valve
3. Refrigerant
4. Heat exchanging pipework

Figure 4-2 has been provided to aid in the description of how the refrigeration system operates to cool a specific area. The refrigeration system cycles the refrigerant gas through the system.

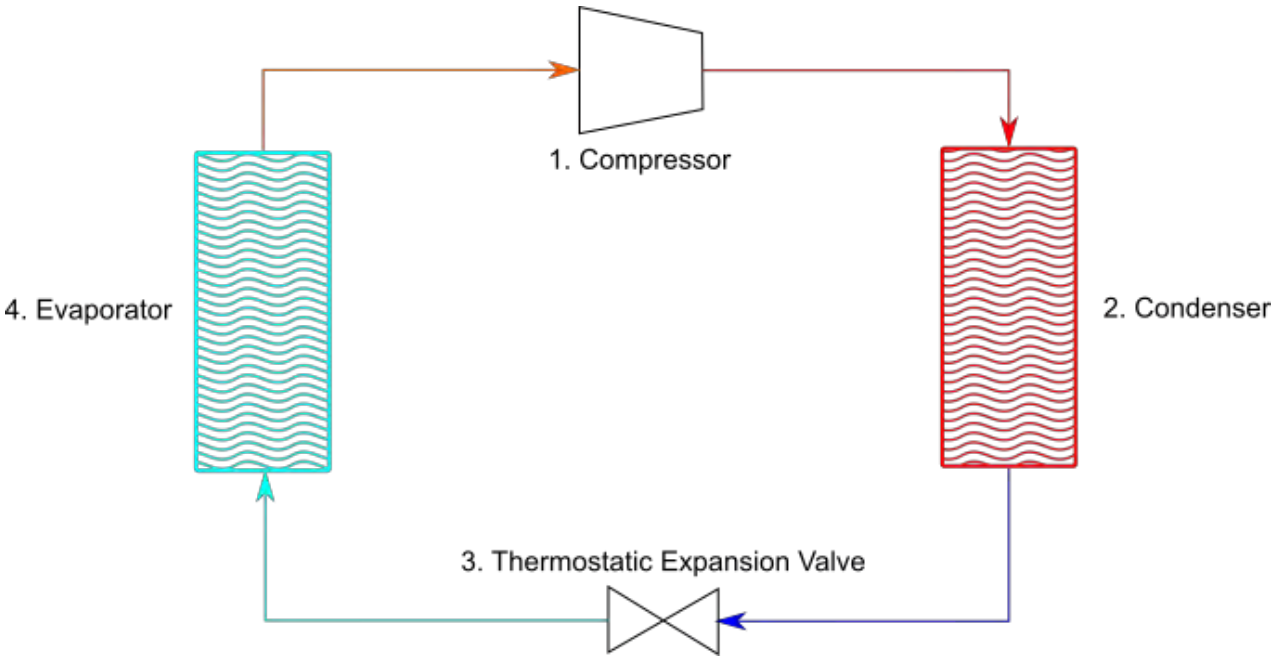


Figure 4-2: Refrigeration Flow Diagram

1. Refrigerant gas from the evaporator enters the compressor where it is pressurised (red) which increases the temperature of the gas. The gas travels along the pipework to the condenser.
2. The condenser is coiled to provide a large surface area to allow the hot gas to dissipate heat. As the gas releases heat through the coils, the gas condenses into a pressurised liquid (dark blue).
3. The pressurised liquid enters the thermostatic expansion valve where it expands across the valve seat, resulting in a sudden drop of pressure of the liquid refrigerant and rapid expansion which cools the liquid (light blue).
4. The cooled refrigerant enters the evaporator which is coiled to provide a large surface area to facilitate exchange of heat from the area to be cooled into the refrigerant. As the refrigerant absorbs heat it boils into a gaseous state.
5. On completion of the cycle, the refrigerant is drawn into the compressor and the cycle repeats.

Refrigeration systems are commonly used in all air conditioning systems which are not subject to frequent releases and if they do occur the leaks are minor resulting in minimal amounts of escaped gas. Therefore, a rupture release would not be a credible scenario given the ubiquitous nature of these systems. In the event a small release occurs it will be dissipated quickly via wind movement around the refrigeration unit prevent accumulation. Additionally, the refrigerant to be used (R-134A) in the BESS units is considered non-toxic and only poses asphyxiation risks in the event of a release. As the units are located outdoors, and each unit only carries a small quantity of the refrigerant there is no risk of toxic impact or asphyxiation; hence, this incident has not been carried forward for further analysis.

4.10 Release of Diesel, Ignition and Pool Fire

Diesel will be used on site equipment primarily during construction but may be present during operations where equipment needs to be moved / relocated / site vehicles. The diesel will likely be stored in a portable refuelling tank which typically are double skinned (i.e. integrally bunded) tanks complying with AS 1940-2017 (Ref. [14]). The presence of two tanks (i.e. inner and outer tank) results in the potential for external leakage to be incredibly low as this requires the failure of both tanks simultaneously. Therefore, a full release of diesel fuel from the tanks would not be expected to occur.

Nonetheless, if a substantial release did occur, combustible liquids do not emit flammable vapours which results in the ignition probability being incredibly. To ignite the spill, a sustained ignition source with sufficient energy would be required to be exposed to create sufficient heat to vapourise the liquid to initiate combustion. Should this occur, the fire would grow to the dimensions of the spill which would be unlikely to be sufficient to result in an offsite impact.

Due to the low likelihood of release, ignition and consequences impacts from a diesel pool fire an offsite impact is not considered to be a credible scenario; hence, this incident has not been carried forward for further analysis.

5.0 Consequence Analysis

5.1 Incidents Carried Forward for Consequence Analysis

The following incidents were identified to have the potential to impact fire protection systems or to complicate firefighting interventions:

- Li-ion battery fault, thermal runaway and fire.
- HV Transformer internal arcing, oil spill, ignition and bund fire.
- MV Transformer internal arcing, oil spill, ignition and fire.

Each incident has been assessed in the following sections. A detailed analysis of each scenario is outlined in **Appendix B**, along with the criteria used to assess each incident.

5.2 Li-Ion Battery Fault, Thermal Runaway and Fire

There is potential that a Li-Ion battery may fault resulting in thermal decomposition and fire which may spread throughout the whole fire unit if not isolated / protected. A detailed review of the test assessment was conducted in **Appendix B** using the view factor method. A maximum cell temperature (488 K) was adopted for the assessment. This is typical of data from cells driven to thermal runaway during UL9540A testing. This temperature was used to determine the Surface Emissive Power (SEP) of the batteries undergoing thermal runaway. The calculation resulted in a SEP of 2.5 kW/m^2 which would be insufficient to result in incident propagation between BESS units.

Based on the test data and the calculated SEP, it is considered that the potential for BESS propagation to occur is unlikely. A review of the proposed layout indicated that the minimum distance between adjacent BESS containers is proposed as 0.46 m. Note that this distance is indicative only and will have to be confirmed through detailed authoritative assessment, including UL9540 certification and UL9540A testing. While the assessment indicated that there should be no propagation risk, depending on the selected supplier, this distance may align with current guidance.

FM Global Data Sheet (FMDS) 5-33 (Ref. [15]) specifies the following separation distances for BESS units:

- Sides that contain access panels, doors or deflagration vents - 1.5 m.
- Sides that have solid walls having no openings – based on installation-level testing.

As the supplier has not yet been identified, the separation distance on sides that have solid walls is currently unknown. Additionally, many suppliers have not yet conducted installation level fire testing, in this case, FMDS 5-33 refers back to the 1.5 m separation distance minimum on all sides.

NFPA 855 (Ref. [16]) specifies that the minimum distance between groups shall be a minimum of 0.9 m, however this is based on a maximum capacity of 50 kWh which is exceeded by all commercial grid-level BESS containers. NFPA 855 (Ref. [16]) then directs energy capacities and spacings to be based on performance criteria from UL9540A test reports which have shown no flaming outside of the unit.

Therefore, depending on the selected supplier, the minimum separation distance as required by industry standards may vary. Therefore, the following recommendation has been made:

- Final separation distances between BESS units shall be defined with regard for the level of testing and outcomes of UL9540A reports provided by the selected supplier.

5.3 HV Transformer Internal Arcing, Oil Spill, Ignition and Bund Fire

There is potential that arcing may occur within the transformers which may lead to generation of gases and pressure above the structural integrity of the oil reservoir which may rupture leaking oil into the bund. As a result of the arcing and rupture, the oil may ignite leading to a bund fire within the dimensions of the bund. A detailed analysis has been conducted in **Appendix B** and the radiant heat impact distances estimated for this scenario are shown in **Table 5-1.** The radiant heat contours associated with a fire occurring within a transformer bund are shown in **Figure 5-1**.

Table 5-1: Radiant Heat from a Transformer Fire

Heat Radiation (KW/m^2)	Distance (m)
35	0
23	17
12.6	23
4.7	32
3.0	37

The 23 kW/m^2 contour has been used to assess the potential for propagation of the incident. As shown in **Figure 5-1**, the 23 kW/m^2 contour does not impact any other critical infrastructure and so incident propagation is not expected. Regardless, the following two options are being considered to ensure no fire impact on between the transformers:

- Allow for sufficient spacing between transformers which will be verified under AS 2067:2016 (Ref. [13]) taking into account final oil volume; or
- Install a firewall between transformers.

There are no fixed fire protection systems in proximity to the transformer; hence, these are unimpacted by the 3 kW/m^2 contour. As the options will ensure no impact from a transformer fire on the adjacent transformer, no further recommendations are made.

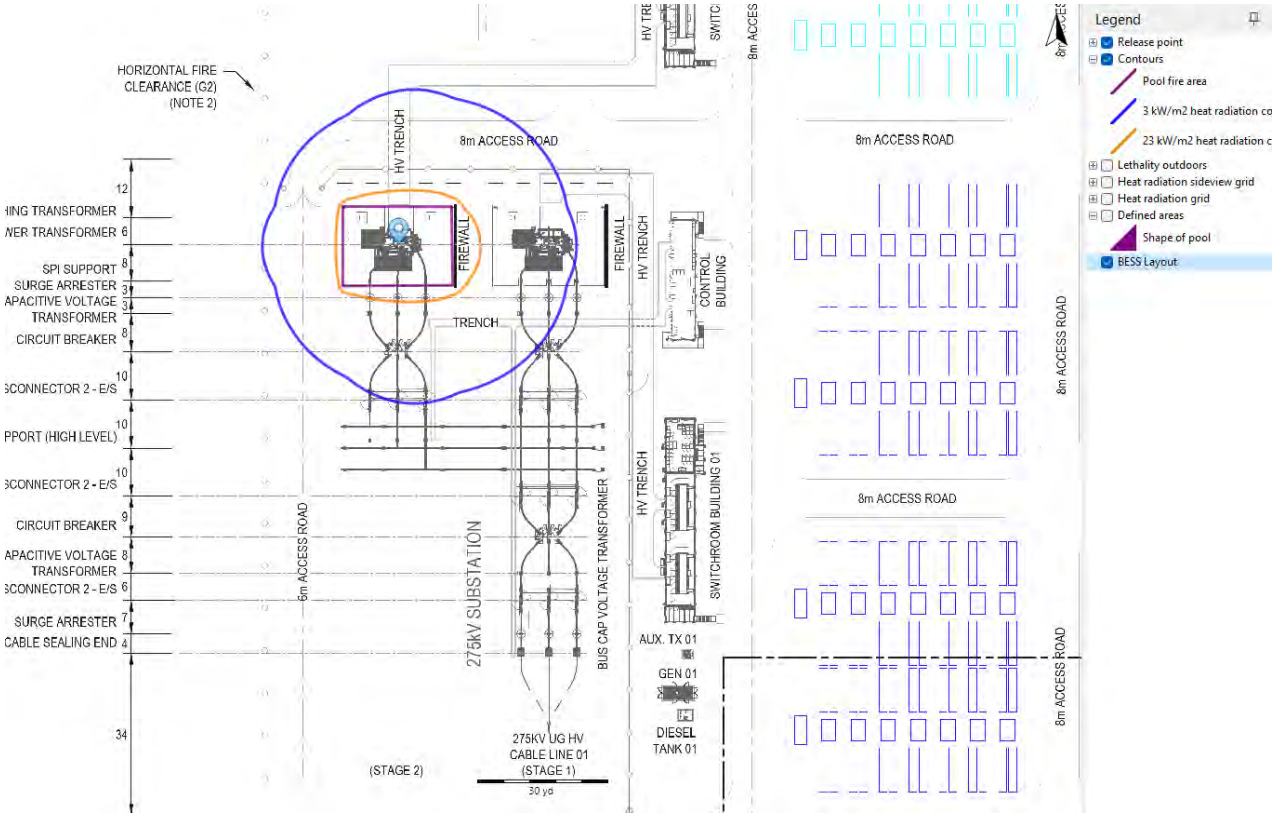


Figure 5-1: HV Transformer Fire Radiant Heat Contours

5.4 MV Transformers Internal Arcing, Oil Spill, Ignition and Fire

There is potential that arcing may occur within the MV transformers which may lead to generation of gases and pressure above the structural integrity of the oil reservoir which may rupture leaking oil into the bund. As a result of the arcing and rupture, the oil may ignite leading to a bund fire within the dimensions of the bund. A detailed analysis has been conducted in **Appendix B** and the radiant heat impact distances estimated for this scenario are shown in **Table 5-2**. The radiant heat contours associated with a fire occurring within the MV transformers are shown in **Figure 5-2**.

Table 5-2: Radiant Heat from a PCU and Auxiliary Transformer Fire

Heat Radiation (KW/m^2)	Distance (m)
35	4
23	5
12.6	6
4.7	8
3.0	9

The 23 kW/m^2 contour has been used to assess the potential for propagation of the incident. As shown in **Figure 5-2**, the 23 kW/m^2 contour shows a slight impact under a wind speed of 2 m/s on the BESS units located in parallel with the transformers. Additional sensitivity analysis was conducted to determine the impact of the following parameters on the resultant heat radiation contours:

- Wind speed (up to 5 m/s) - to align with prevailing wind direction and speed at 3pm as measured by the Bureau of meteorology (BoM).
- Non-burning area (up to 20% of pool fire area) – due to equipment penetrations into the bund, a certain % of the pool fire surface does not contain oil and therefore does not burn reducing the area of the radiating surface.
- Shielding (up to 0.5 m) – where there the bund is above the level of the pool fire, it provides a shielding effect to heat radiation reducing the distance of the contours.

Under all sensitivity scenarios, the 23 kW/m^2 contour still had some impact on the adjacent BESS units, this may risk incident propagation due to increased heating of the battery cells, inducing thermal runaway. The bunding of the transformer oil and protection systems of the BESS will mitigate the risk of incident propagation through cooling systems and the BMS, however options should be considered to reduce the reduce the risk of incident propagation due to an MV transformer bund fire:

- Consider orienting the BESS containers such that auxiliary equipment is located proximal to the MV transformer aisles of the installation, moving the battery storage compartments of the BESS outside of the 23 kW/m^2 contour.
- Increase spacing between MV transformers and BESS containers.
- Provide heat shielding via increased bund height or firewalls (as with HV transformers).

At the time of assessment, the transformer oil type, exact dimensions and design of the transformers and bunding is not finalised, further assessment once these parameters are known will allow for a more detailed assessment. It is recommended to build on this modelling and reassess as the design progresses.

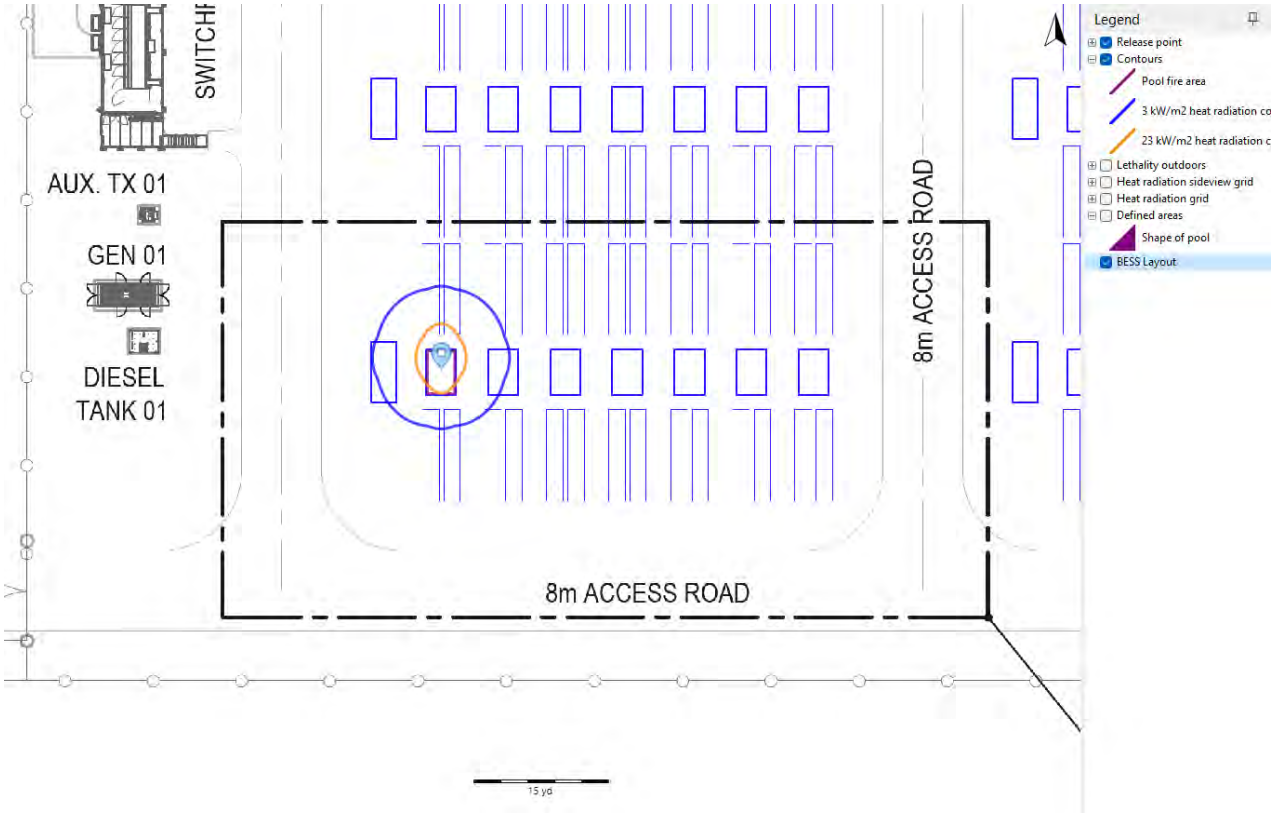


Figure 5-2: MV Transformer Fire Radiant Heat Contours

6.0 Details of Prevention, Detection, Protection and Mitigation Measures

The fire safety systems at the site can be split into four main categories:

- **Fire Prevention** – systems, installed to prevent the conditions that may result in initiating fire.
- **Fire Detection** – systems installed to detect fire and raise alarm so that emergency response can be affected (both evacuation and firefighting)
- **Fire Protection** – systems installed to protect against the impacts of fire or explosion (e.g. fire walls)
- **Fire Mitigation** – systems installed to minimise the impacts of fire and to reduce the potential damage (e.g. fire water application)

Each category has been reviewed in the following sections, with respect to the existing systems incorporated into the design and those to be provided as part of the recommendations herein.

6.1 Fire Prevention

This section describes the fire prevention strategies and measures that will be undertaken at the site.

6.1.1 Control of Ignition Sources

The control of ignition sources reduces the likelihood of igniting a release of material. The site shall include a number of controls for ignition sources. These include controls for fixed potential ignition sources and controls for introduced ignition sources.

- A permit to work or clearance system will be used - hot work will be controlled as part of the permit to work system.
- Designated smoking areas within the site (i.e. external from building areas).

Table 6-1 presents the potential ignition sources and incidents for the facility which may lead to ignition and fire. The table also summarises the controls that will be used to reduce the likelihood of these potential sources of ignition and incidents resulting in a fire.

Table 6-1: Summary of Control of Ignition Sources

Ignition Source	Control
Smoking	No smoking policy for the site with smoking only permitted in designated areas.
Electrical	Fixed electrical equipment to be designed and installed to AS/NZS 3000:2018 (Ref. [17]).
Hot Work	A permit to work system and risk assessment prior to starting work will be provided for each job involving the introduction of ignition sources.

6.1.2 Housekeeping

The risk of fire can be significantly reduced by maintaining high standards of housekeeping. The site shall maintain a high housekeeping standard, ensuring all debris is cleaned up and removed from areas. In addition, the site will have vegetation management procedures to prevent accumulation of combustible vegetation in proximity to the site equipment and to minimise the

potential for bushfire escalation as well as asset protection zones (APZs) determined by a bushfire management plan.

6.1.3 Work Practices

The following work practices will be undertaken to reduce the likelihood of an incident. They include:

- DG identification
- Placarding & signage within the site where required
- Forms of chemical and DG information
- Availability of Safety Data Sheets
- Compliance with the Work Health and Safety Regulation 2011 (Ref. [18])
- Safe work practices
- Personal Protective Equipment
- Emergency response plan and procedures
- Bushfire Management Plan
- Training of personnel

6.1.4 Emergency Response Plan

Emergency management is critical in controlling and responding to an emergency. Therefore, to ensure that an appropriate emergency response plan is developed, the following recommendation has been made:

- An emergency response plan shall be prepared in accordance with HIPAP No. 1 – Industry Emergency Planning Guidelines (Ref. [1]).

6.1.5 Site Security

Maintaining a secure site reduces the likelihood either of a fire being started maliciously by intruders or by accident. Access to the site will be restricted at all times and only authorised personnel will be permitted within the site.

6.2 Fire Detection

This section discusses the detection and protection from fires for the hazardous incidents previously identified. These include detection of fire pre-conditions, detection of a fire suppression activated condition and prevention of propagation. As the provider of the BESS containers is currently unknown, this section is based on minimum requirements that any provider will need to incorporate in the supplied units.

6.2.1 Detection and Alarming

BESS units are to be equipped with sensors to detect the early signs of a fire and provide both auditory and visual alarms at the local and remote levels. Additionally, BESS systems include BMS monitoring for abnormal operation which will selectively shut down systems if incipient stages of thermal runaway or a fire are detected. Fire detection and alarms are also to be provided in switchrooms and control rooms.

6.3 Fire Protection

BESS units can include several fire protection systems including:

- Overpressure vents (deflagration panels)
- Ventilation and smoke exhaust
- Separation between BESS units (discussed in **Section 5.0**).

6.4 Fire Mitigation

6.4.1 Fire Water Supply

The site shall be provided with fire water via tank storage. The water storage capacity will be determined in accordance with AS 2419.1:2021 (Ref. [5]) to ensure that adequate water storage is available to respond to emergencies.

6.4.2 Fire Suppression

BESS systems may include fire suppression devices such as aerosol-based suppression systems or internal sprinklers.

6.4.3 Battery Management Systems

The BMS for all commercial batteries are designed to detect fire and thermal runaway in its incipient stages and safely shut down and isolate the systems at risk. As the supplier has not yet been determined, the action taken by the system is unknown however any selected unit will include a BMS.

6.4.4 Non-Combustible Construction

All BESS containers shall be constructed of non-combustible materials to prevent incident propagation via propagation of combustible materials.

6.4.5 Vegetation Management and Fuel Load Control

The fuel load on the site will be managed through housekeeping, management of vegetations and APZ maintenance.

7.0 Local Brigade Access and Egress

7.1 Overview

In order to assess the likely fire brigade response times an indicative assessment of fire brigade intervention has been undertaken based on the methods defined in the Fire Brigade Intervention Model (FBIM, Ref. [19]). **Figure 7-1** illustrates the site layout with entry points to the site and fire services infrastructure.

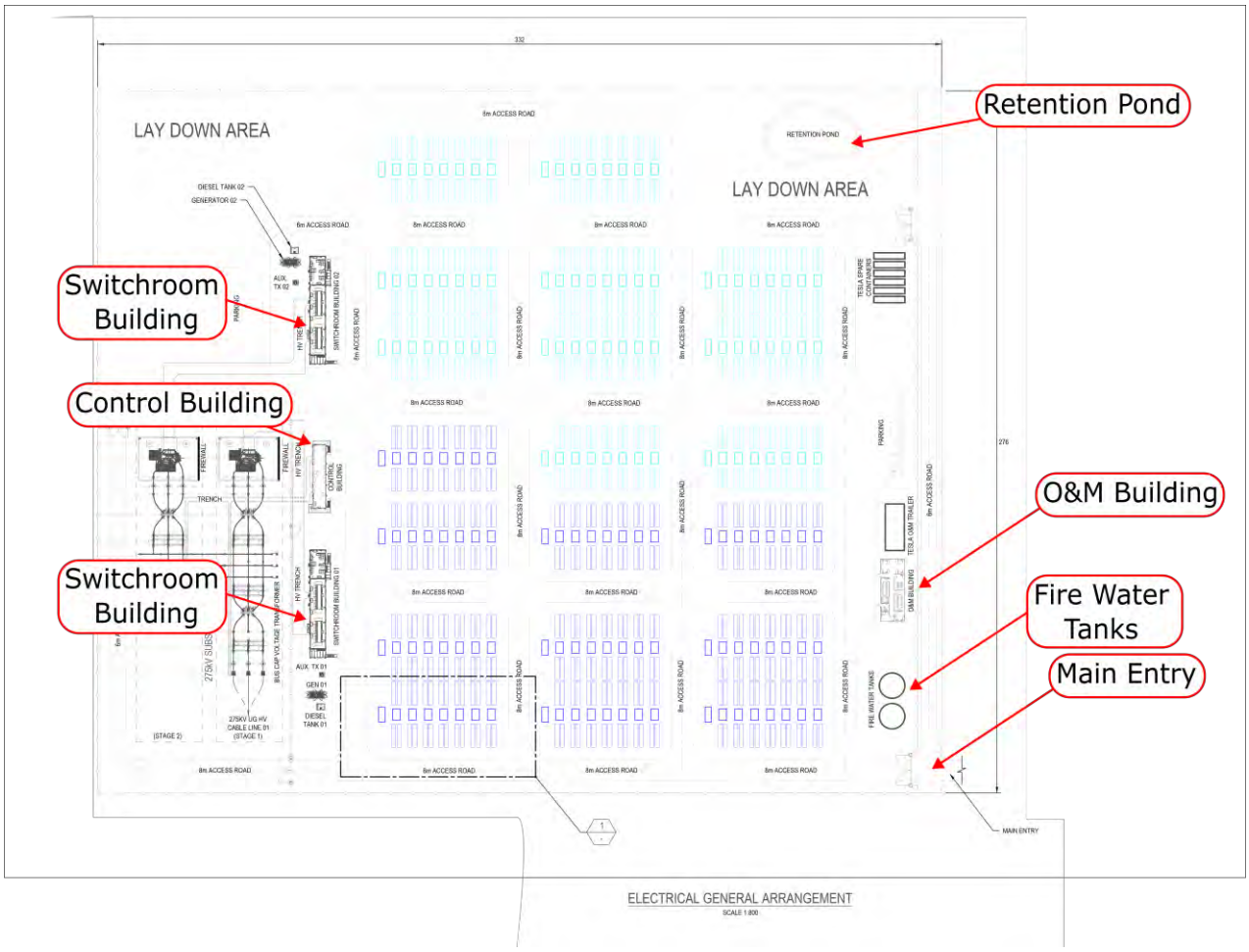


Figure 7-1: Fire Service Entry Point and Site Infrastructure

The closest fire stations to the site are described in **Table 7-1**. The location of the stations relative to the site are shown in **Figure 7-2.**

Table 7-1: Station Locations

Station Name	Station Address	Distance (km)	Time (min)
Rockhampton	113 Kent St, Rockhampton	52.5	42
Mt Morgan	32 Morgan St, Mount Morgan	75	58



Figure 7-2: Location of Site with Respect to Closest Fire Stations

7.2 Response Time – Fire Brigade Intervention Model (FBIM)

Due to the nature of the Fire Brigade Intervention Model (FBIM, Ref. [19]), it is necessary to justify the results through the inclusion of assumptions. The accuracy of results weighs heavily upon the measure of which assumptions are made and the sources from which they are derived. The model produced details the time it will take for brigade personnel within the aforementioned location to receive notification of a fire, time to respond and dispatch resources, time for resources to reach the fire scene, time for the initial determination of the fire location, time to assess the fire, time for fire fighter travel to location of fire, and time for water setup such that suppression of the fire can commence. The following sections are details the assumptions utilised in this FBIM assessment.

7.2.1 Location of Fire

This FBIM will only be an indicative model of one fire scenario within the facility. For conservative purposes, the FBIM will consider a fire in the furthest incident from the point of entry.

7.2.2 Time between Ignition and Detection

- It is assumed that the initial brigade notification is via a direct contact by the site personnel.
- It was conservatively assumed that the time from ignition, detection and notification to fire brigade is 30 minutes or 1,800 seconds, due to the remote nature of the site.

7.2.3 Time to Dispatch Resources

- Based on available station data, the Rockhampton station is operational 24 hours, 7 days a week and therefore no allowance is made for call out. The Mt Morgan station, whilst being closer to the site by distance is not occupied and is further based on travel time, therefore it has been assumed that resources would be dispatched from Rockhampton.
- Therefore, with a brigade call out time of 1,800 seconds and travel time to the site of 2,520 s fire brigade can be expected to arrive on site 4,320 seconds after fire ignition (72 minutes).

7.2.4 Time for Initial Determination of Fire Location

- On arrival, the fire location may not be visible to the approaching brigade personnel, thus requiring information to be obtained from the site emergency box.
- Fire brigade personnel assemble at the office area.
- Fire brigade tactical fire plans will be provided.

7.2.5 Time to Assess the Fire

- Horizontal egress speeds have been based on fire brigade personnel dressed in turnout uniform in BA. An average travel speed of 1.4 m/s with a standard deviation of 0.6 m/s as shown in **Table 7-2**. As such, for the purposes of the calculations, a horizontal travel speed of 1.40 – (1.28x0.6) = 0.63 m/s is utilised.

Table 7-2: FBIM data for Horizontal Travel Speeds

Graph	Travel Conditions	Speed	
		Mean	SD*
Q1	Dressed in turnout uniform	2.3	1.4
Q2	Dressed in turnout uniform with equipment	1.9	1.3
Q3	Dressed in turnout uniform in BA with or without equipment	1.4	0.6
Q4	Dressed in full hazardous incident suit in BA	0.8	0.5

*Standard Deviation

Horizontal travel distances will include the following:

- Travel from the entrance to the main water tank is approximately 20 m. Travel time to the water tanks is considered negligible.
- From the water tank, the furthest point on the site is the northern corner which is approximately 472 m via internal access roads. Assuming vehicles are limited to 10 km/h on site to maintain safety, this will take approximately 170 s to travel.
- It was assumed that QFES would only be required to travel approximately 100 m on foot. Coupled with an egress speed of 0.63 m/s results in a horizontal travel time of up to 63 seconds.
- Thus, the total horizontal travel time to respond to an incident in the farthest location would be expected to be up to 233 seconds.

7.2.6 Time for Water Setup

- The first appliance would be expected to commence the initial attack on the fire.

- Time taken to connect and charge QFES tanker units to the water tanks and collect the water is based on Table X of the Fire Brigade Intervention Model Guidelines, which indicates an average time of 201.6 seconds, and a standard deviation of 115.6 seconds. Using a 90th percentile approach as documented in the FBIM (Ref. [19]), the standard deviation is multiplied by a constant *k*, in this case being equal to 1.28. Therefore, the time utilised in this FBIM is 201.6 + (1.28x115.6) = 350 s.

7.2.7 Search and Rescue

Search and Rescue of the site will consist of a perimeter search of the control building located adjacent to the BESS area. It was assumed this will provide firefighting personnel with an additional 1,000 m of travel.

At a speed of 0.63 m/s, this will take firefighting personnel approximately 630 seconds.

7.2.8 Summary

As summarised in **Table 7-3** the FBIM (Ref. [19]) indicates that the arrival times of the brigade from the nearest fire stations is approximately 72 minutes after fire ignition, and it is estimated that it takes another 12.6 minutes for the fire brigade to carry out activities including the determination of fire location and preparation of firefighting equipment. As such, the initial attack on the fire is expected to commence approximately 85 minutes after fire ignition (note rounding affects the basic addition of the reported figures).

Table 7-3: Summary of the Fire Brigade Intervention Model (FBIM)

Fire Station	Alarm Time	Travel Time	Time for Access & Assessment	Set-up Time	Time of Attack	Time for Search & Rescue
Rockhampton	1,800 s	2,520 s	233 s	350 s	5,073 s	630 s

8.0 Fire Water Supply & Contaminated Fire Water Retention

8.1 Detailed Fire Water System Assessment

Fire water will be supplied via storage tanks which are sized in accordance with AS 2419.1:2021 (Ref. [5]) open yard storage. The total quantity of fire water to be supplied to site is not currently known, however based on the size of the site, AS 2419.1:2021 would require 4 fire hydrants flowing simultaneously for 4-hours resulting in a total storage capacity of 576 kL.

The fire hazards assessed in **Section 5.0** identified that there is a low potential for a fire to occur within the BESS units and that in the event of thermal runaway the radiant heat generated would be unlikely to result in incident propagation. As incident propagation is unlikely, the quantity of firewater provided will be suitable for prevention of spot fires and protection adjacent equipment. As such, the fire risk would be expected to be adequately managed by the provided water supply.

8.2 Contaminated Water/Fire Water Retention

From previous incidents, it has been well established that application of fire water to a BESS fire does not result in extinguishment as the fire will continue until the energy has been discharged from the battery. In some cases, application of fire water to a BESS fire can exacerbate the risk due the formation of toxic byproducts. Therefore, the approach for combatting a BESS fire is to prevent propagation to adjacent units and equipment as well as preventing any spot fires which may be initiated during an incident. This is especially true as the risk from applying water to a potentially energised system far exceeds the benefit of the fire water application.

As the site will be provided with fire water supply in accordance with AS 2419.1:2021, there is potential that up to 576 kL of water be discharged on site in the event of a BESS fire to combat fire spread. This has potential to contaminate the surrounding environment if it is not contained. Based on this the following recommendation is made:

- The retention pond shall be sized such that it can capture 100% of the fire water storage capacity.

9.0 Conclusion and Recommendations

9.1 Conclusions

A Hazard Incident Management Plan per the HIPAP No. 2 guidelines was prepared for the Mt Hopeful BESS Project located in Rockhampton. The analysis performed in the HIMP was based on credible fire scenarios to assess whether the protection measures at the site were adequate to combat the hazards associated with the quantities and types of commodities being stored. Based on the assessment, it was concluded that, if BESS units include the required certifications, fire detection measures, fire protection measures and appropriate separation to adjacent infrastructure that the site will be sufficiently safe.

Additionally, the quantity of fire water for services to utilise shall be in accordance with AS 2419.1:2021 and provided sufficient capacity to respond to any fire scenario on site. Several recommendations have been made below.

9.2 Recommendations

Based on the analysis, the following recommendations have been made:

- Final separation distances between BESS units shall be defined with regard for the level of testing and outcomes of UL9540A reports provided by the selected supplier.
- Adopt an approach to minimise potential for incident propagation due to a MV transformer fire:
  - Consider orienting the BESS containers such that auxiliary equipment is located proximal to the MV transformer aisles of the installation, moving the battery storage compartments of the BESS outside of the 23 kW/m^2 contour.
  - Increase spacing between MV transformers and BESS containers.
  - Provide heat shielding via increased bund height or firewalls (as with HV transformers).
  - Reassess impact during detailed design with specific MV transformer data.
- An emergency response plan shall be prepared in accordance with HIPAP No. 1 – Industry Emergency Planning Guidelines (Ref. [1]).
- The retention pond shall be sized such that it can capture 100% of the fire water storage capacity.

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Appendix A

Hazard Identification Table

Appendix A

A1. Hazard Identification Table

ID	Area/Operation	Hazard Cause	Hazard Consequence	Safeguards
1	Battery Storage	• Battery fault / failure • Failure of Li-ion battery protection systems	• Thermal runaway resulting in fire or explosion • Incident propagation through battery cells • Toxic smoke dispersion	• Batteries are tested by manufacturer prior to sale / installation (UL9540A certified) • Overcharging and electrical circuit protection • Battery monitoring systems • Batteries are not located in areas where damage could easily occur (i.e. within the fenced property) • Electrical systems designed per AS/NZS 3000:2018 (Ref. [17]) • Ventilation • Explosion venting • Smoke & gas detection • Aerosol suppression system
2	Switch rooms, communications, etc.	• Arcing, overheating, sparking, etc. of electrical systems	• Ignition of processors and other combustible material within servers and subsequent fire	• Fires tend to smoulder rather than burn • Isolated location • Switch room separation from other sources of fire
3	Transformers	• Arcing within transformer, vaporisation of fluid and rupture of fluid reservoir	• Transformer fluid release spill, ignition and fire	• Transformer oils tend to have a high flash point • Transformers are bunded • Electrical protection for transformer faults • Control of ignition sources – no smoking / open flames around the transformers
4	Main transformer	• Power surge to transformers (e.g. from lightning, fault, etc.)	• Major failure of surge protection in transformer, vapourisation of mineral oil, ignition and explosion	• Transformers have surge protection system to shut down upon detection of extreme energy input • Lightning protection to prevent lightning strikes impacting transformers • Control of ignition sources – no smoking / open flames around the transformers

ID	Area/Operation	Hazard Cause	Hazard Consequence	Safeguards
5	Ancillary transformers	• Power surge to transformers (e.g. fault)	• Major failure of surge protection in transformer, vapourisation of mineral oil, ignition and explosion	• Transformers are in containers which protect from lightning and cables are underground. • Control of ignition sources – no smoking / open flames around the transformers

Appendix B

Consequence Analysis

Appendix B

B1. Incidents Assessed in Detailed Consequence Analysis

The following incidents are assessed for consequence impacts.

- Li-ion battery fault, thermal runaway and fire.
- HV Transformer internal arcing, oil spill, ignition and bund fire.
- MV Transformer internal arcing, oil spill, ignition and fire.

Each incident has been assessed in the sections below.

B2. Radiant Heat Physical Impacts

Appendix Table B-1 provides noteworthy heat radiation values and the corresponding physical effects of an observer exposed to these values (Ref. [4]).

Appendix Table B-1: Heat Radiation and Associated Physical Impacts

Heat Radiation (kW/m^2)	Impact
35	• Cellulosic material will pilot ignite within one minute's exposure • Significant chance of a fatality for people exposed instantaneously
23	• Likely fatality for extended exposure and chance of a fatality for instantaneous exposure • Spontaneous ignition of wood after long exposure • Unprotected steel will reach thermal stress temperatures which can cause failure • Pressure vessel needs to be relieved or failure would occur
12.6	• Significant chance of a fatality for extended exposure. High chance of injury • Causes the temperature of wood to rise to a point where it can be ignited by a naked flame after long exposure • Thin steel with insulation on the side away from the fire may reach a thermal stress level high enough to cause structural failure
4.7	• Will cause pain in 15-20 seconds and injury after 30 seconds exposure (at least second degree burns will occur)
3.0	• Criteria used by FRNSW to determine accessibility of equipment

Gexcon - Effects

The modelling was prepared using Effects where appropriate, which is proprietary software owned by Gexcon and has been developed based upon the TNO Coloured books and updated based upon CFD modelling tests and physical verification experiments. The software can model a range of incidents including pool fires, flash fires, explosions, jet fires, toxic dispersions, warehouse smoke plumes, etc.

B3. View Factor Radiant Heat Model

The modelling for the BESS units was carried out using a manual view factor calculation method outlined below.

B4.1 Radiant Heat Flux

The heat flux (Q) for the view factor model is given by **Equation B-1**.

$$Q = \tau EF \qquad \textbf{Equation B-1}$$

Where;

- Q = heat flux (kW/m^2) at the target
- F = geometric view factor
- τ = transmissivity
- E = SEP (kW/m^2)

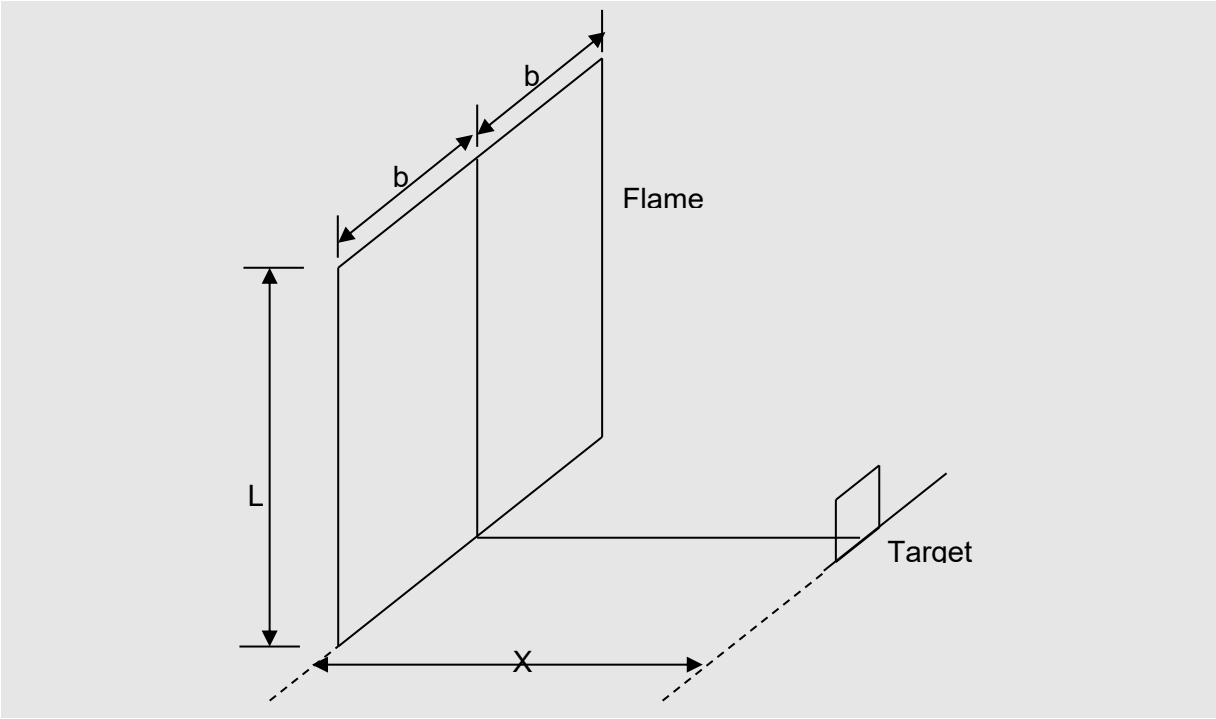
Each of the required inputs is determined in the sections following.

B4.2 View Factor

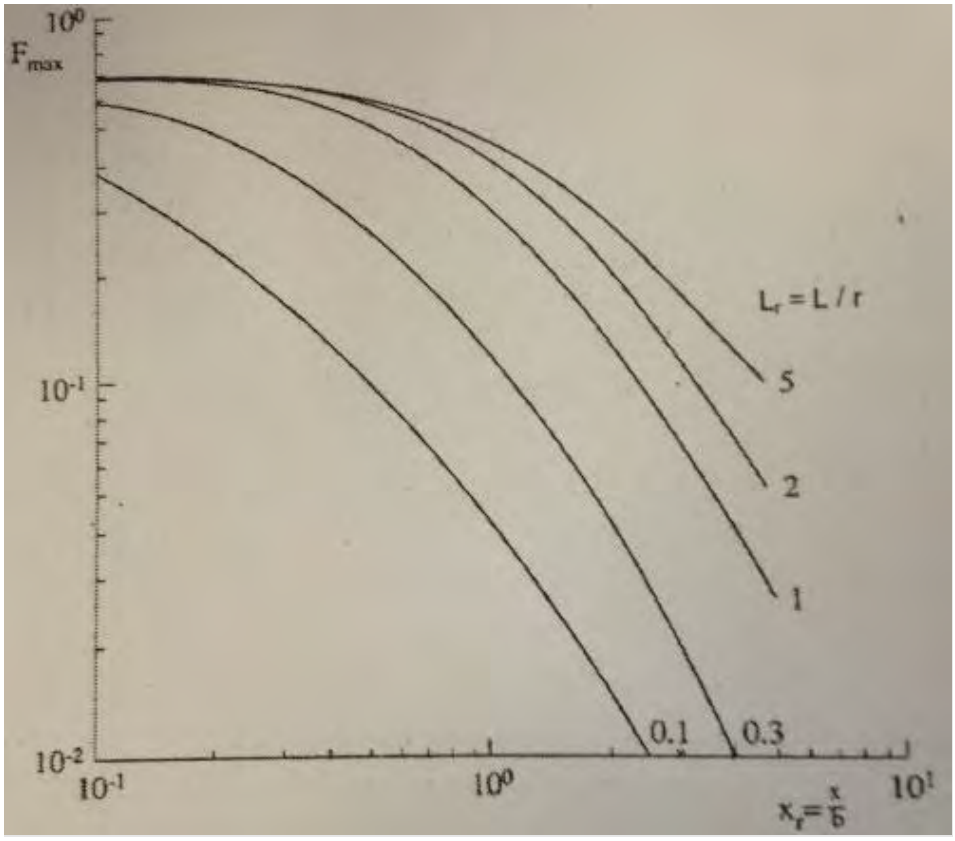
The view factor for a flat surface fire is estimated using the scenario shown in **Appendix Figure B-1** where the flame is the vertical surface of height L and length 2b with receiver located centrally and at a distance of X. Two dimensionless parameters are calculated, and the view factor read from **Appendix Figure B-2**. The dimensionless parameters are shown in **Equation B-2** and **Equation B-3**.

$$L_r = \frac{L}{b} \qquad \textbf{Equation B-2}$$

$$X_r = \frac{X}{b} \qquad \textbf{Equation B-3}$$



Appendix Figure B-1: Vertical Flame Geometry View Factor Geometry



Appendix Figure B-2: Vertical Flame Maximum View Factor (Ref. [20])

B4.3 Transmissivity

The transmissivity is estimated using **Equation B-4**.

$$\tau = 1.006 - 0.01171(\log_{10} X(H_2O) - 0.02368(\log_{10} X(H_2O))^2 - 0.03188(\log_{10} X(CO_2) + 0.001164(\log_{10} X(CO_2))^2$$

Equation B-4

Where:

- $X(H_2O) = (R_H \times L \times S_{mm} \times 2.88651 \times 10^2)/T$
- $X(CO_2) = L \times 273/T$

And;

- R_H = percentage relative humidity
- L = distance to target (m)
- S_{mm} = saturated water vapour pressure in mm mercury at temperature (at 200°C S_{mm} = 11,549)
- T = temperature (473 K assumed air is heated to 200°C)

B4. Li-Ion Battery Fault, Thermal Runaway and Fire

The BESS units are not currently selected, however for the purpose of this assessment, the dimensions of a typical 20ft shipping container have been used as this represents an approximation of the measurements of many branded BESS containers. Shipping containers often have dimensions (H x L x W) of approximately 2.6 m x 6.1 m x 2.4 m which typically includes space for the chiller and HVAC system and auxiliary controls. The dimensions of the battery surface area

facing outwards from the BESS unit when opened has conservatively estimated to be 2.5 m x 4.8 m.

To determine the radiant heat impacts from the BESS in the event of a fire it is necessary to assume the height of the flame. The rule of thumb for most flammable liquid fires is that the height is 2 times the width of the flame; however, a review of the Victorian Big Battery (VBB) fire indicates that it did not align with rule of thumb approach.

Based upon the VBB it has been assumed that the maximum height of the flame is 1 m above the height of the BESS unit. From the VBB it was apparent that only the flame through the roof was exposed as a radiant surface; hence, the assumed flame height of 1 m above the BESS container has been taken as the value of L for input into **Equation B-2**.

It is necessary to calculate the Surface Emissive Power (SEP) of the radiant surface to calculate the radiant heat at the target. UL 9540 A test data from commonly installed BESS units indicates that the maximum temperature reached by the initiating cell where thermal runaway was induced is approximately 215 ˚C or 488 K. Therefore, for the purposes of modelling this temperature has been used.

The following equation can be used to estimate the SEP of the flame:

$$SEP = \varepsilon \sigma T^4$$ **Equation B-5**

Where:

- ε = flame emissivity (taken as 0.78 (Ref. [21]))
- σ = 5.67x10^{-11} kW/m^2.k^4
- T = Temperature (488 K)

Substituting into the above equation yields:

$$SEP = 0.78 \times 5.67 \times 10^{-11} \times 488^4 = 2.5 \frac{kW}{m^2}$$

B5. HV Transformer Internal Arcing, Oil Spill, Ignition and Bund Fire

Transformers contain oil to provide cooling and insulation. If arcing occurs within the transformer, the oil will rapidly heat generating gases above their auto ignition point. The pressure of the gases may rupture the reservoir allowing oxygen to enter resulting in the gases auto igniting. The oil is released from the reservoir and is ignited by the burning gases.

The transformer is bunded and so in the event of a spill and ignition, the pool fire will have dimensions of the bund. The inputs for the model are provided in **Appendix Table B-2**.

Appendix Table B-2: HV Transformer Fire Modelling Inputs

Input	Value	Justification
Chemical name	Linoleic acid	Transformer oil to be used is a natural ester, which is typically a combustible liquid of some formulation which have high flash points. For the purposes of providing a conservative analysis, linoleic acid has been selected. This material has a flash point of approximately 200ºC. Natural ester oils typically have flash points exceeding 330ºC, thus this material selection is considered to be conservative.

Input	Value	Justification
Type of pool fire calculation	Rew & Hulbert	The model has been developed for modelling fires based on the radiant heat emitted from the radiant surface. The model uses the clear and sooty portions of the flame to estimate the radiant heat at the target. The terminology (i.e. pool fire) is because these models were originally developed from liquid pool fires. However, the model actually works by looking at the flame surface to estimate the radiant heat that is emitted from that surface. The flame surface is present irrespective of the material burning (i.e. a solid or liquid pool will have a flame that will have a clear and sooty portion). Based on the above discussion, it is considered that the Rew & Hulbert model is appropriate for modelling the fire.
Type of pool fire source	Instantaneous	Conservative as it assumes full fire immediately
Soot definition	Calculated	Calculated
Total mass released	86,000 kg	Mass of oil in the transformer
Temperature of pool	20°C	Conditions expected to be observed regularly. Also, negligible impact on results.
Type of pool	Polygon	Modelled based on transformer bund area.
Max pool surface area	24 m x 17 m	Actual transformer bund area has been indicated to be 13.5 m x 10.3 m. The current layout indicates a larger area which has been used to add conservatism to the model.
Height of confined pool above ground level	0 m	Modelled at ground level
Include shielding to bottom side of flame	Yes	
Height of shielding	0.5	Allowance for bunding
Wind speed	2 m/s	Fire seat enclosed in building and unlikely to be impacted by wind at fire seat.
Wind direction	Any direction	Toward infrastructure
Ambient temperature	20°C	Conditions expected to be observed regularly. Also, negligible impact on results.
Ambient pressure	101.33 kPa	Atmospheric pressure
Ambient relative humidity	60%	Typical humidity in the area
CO2 concentration	0.0004	CO2 concentration in atmosphere

The results of the analysis are shown in **Appendix Table B-3.**

Appendix Table B-3: Heat Radiation Impacts from a HV Transformer Bund Fire

Heat Radiation (KW/m^2)	Distance (m)
35	0

Heat Radiation (KW/m^2)	Distance (m)
23	17
12.6	23
4.7	32
3.0	37

B6. MV Transformer, Internal Arcing, Oil Spill, Ignition and Fire

The MV transformers include oil to provide cooling and insulation. If arcing occurs within the transformer, the oil will rapidly heat generating gases above their auto ignition point. The pressure of the gases may rupture the reservoir allowing oxygen to enter resulting in the gases auto igniting. The oil is released from the reservoir and is ignited by the burning gases.

Provided documentation indicates that the transformers include a bund which is approximately the same dimensions as the transformer footprint (3.6 m x 2.5 m). If a spill from the transformer was to occur, it would fill the base of the bund resulting in a pool fire with the dimensions of the bund. The inputs for the model are provided in **Appendix Table B-4**.

Appendix Table B-4: MV Transformer Fire Modelling Inputs

Input	Value	Justification
Chemical name	Linoleic acid	Transformer oil to be used is a natural ester, which is typically a combustible liquid of some formulation which have high flash points. For the purposes of providing a conservative analysis, linoleic acid has been selected. This material has a flash point of approximately 200^{o}C. Natural ester oils typically have flash points exceeding 330^{o}C, thus this material selection is considered to be conservative.
Type of pool fire calculation	Rew & Hulbert	The model has been developed for modelling fires based on the radiant heat emitted from the radiant surface. The model uses the clear and sooty portions of the flame to estimate the radiant heat at the target. The terminology (i.e. pool fire) is because these models were originally developed from liquid pool fires. However, the model actually works by looking at the flame surface to estimate the radiant heat that is emitted from that surface. The flame surface is present irrespective of the material burning (i.e. a solid or liquid pool will have a flame that will have a clear and sooty portion). Based on the above discussion, it is considered that the Rew & Hulbert model is appropriate for modelling the fire.
Type of pool fire source	Instantaneous	Conservative as it assumes full fire immediately
Soot definition	Calculated	Calculated
Total mass released	3,300 kg	
Temperature of pool	20^{o}C	Conditions expected to be observed regularly. Also, negligible impact on results.
Type of pool	Polygon	Modelled based on transformer bund area.

Input	Value	Justification
Max pool surface area	3.6 m x 2.5 m	Dimension of PCU transformer bund
Height of confined pool above ground level	0 m	Modelled at ground level
Include shielding to bottom side of flame	No	No shielding provided in modelling.
Height of shielding	n/a	n/a
Wind speed	2 m/s	Fire seat enclosed in bund and unlikely to be impacted by wind.
Wind direction	Any direction	Toward BESS units
Ambient temperature	20°C	Conditions expected to be observed regularly. Also, negligible impact on results.
Ambient pressure	101.33 kPa	Atmospheric pressure
Ambient relative humidity	60%	Typical humidity in the area
CO2 concentration	0.0004	CO2 concentration in atmosphere

The results of the analysis are shown in **Appendix Table B-5**.

Appendix Table B-5: Heat Radiation Impacts from a MV Transformer Fire

Heat Radiation (KW/m^2)	Distance (m)
35	4
23	5
12.6	6
4.7	8
3.0	9

Appendix K

Emergency Response Plan



Mount Hopeful Battery – Emergency Response Plan

25th September 2025

Prepared by Riskcon Engineering Pty Ltd on behalf of Neoen Australia Pty Ltd

Emergeny Response Plan

Mt Hopeful BESS

Neoen Australia Pty Ltd

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Quality Management

Rev	Date	Remarks	Prepared By	Reviewed By
A	14th August 2025	Issued draft for comment	Chris Butson	Renton Parker
0	18th September 2025	Updated based on comments from Neoen		
1	25th September 2025			

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Abbreviations

Acronym	Definition
AC	Alternating Current
APZ	Asset Protection Zone
AS	Australian Standard
BESS	Battery Energy Storage System
CA	Combat Agency
CW	Chief Warden
DC	Direct Current
DETSI	Department Of Environment, Tourism, Science And Innovation
DGs	Dangerous Goods
EPC	Engineering, Procurement and Construction (Contractor)
ERC	Emergency Response Coordinator
ERP	Emergency Response Plan
ESIP	Emergency Services Information Package
HIPAP	Hazardous Industry Planning Advisory Paper
HSE	Health, Safety, Environment
O&M	Operations & Maintenance
PPE	Personal Protective Equipment
PV	Photovoltaic
QAS	Queensland Ambulance Service
QFD	Queensland Fire Department
QPS	Queensland Police Service
SDS	Safety Data Sheet
TFB	Total Fire Ban
WHS	Work Health and Safety

1.0 Introduction

This Emergency Response Plan (ERP) has been prepared for Neoen Australia Pty Ltd (Neoen) for the Mount Hopeful Battery Project (the Project) located near the rural town of Bajool, approximately 50 kilometres (km) south of Rockhampton and 70 km west of Gladstone, Queensland, within the Rockhampton Region Local Government Area (LGA). With a planned capacity of up to 600 megawatts (MW) of power for a duration of up to four hours, the Project will enhance the delivery of clean, reliable electricity to the National Electricity Market (NEM), while supporting grid stability and flexibility.

The contents of this document are to be read and understood by all Neoen personnel at the site and contractors working within the site. It is a requirement that all those with emergency responsibilities as defined in this plan have a copy of this ERP and receive the appropriate level of training needed to allow sufficient response to the incidents identified in this ERP.

The guidelines in this document are simple, but if you are in doubt about any aspect of safety or procedures you must consult the company supervisor in charge immediately.

1.1 Aim of the Emergency Response Plan

This preliminary ERP has been prepared to support the lodgement of a Development Application (DA) for assessment by Rockhampton Regional Council with the aim to minimise any potential adverse impacts on people, property, and the environment that may arise from incidents occurring or impacting onsite during the construction, operational, and decommissioning phases of the Project. The ERP will be updated by the Neoen's EPC Contractor in consultation with emergency services.

This ERP aims to:

- Provide a clear understanding of how to handle and react to any emergency at the Project facility (including non-dangerous and Dangerous Goods (DGs)).
- Prevent or minimise the impact of an emergency.
- Facilitate a return to normal operations as soon as possible.

1.2 Definition of an Emergency

Throughout this document, the term "emergency" refers to a situation that harms (or threatens to harm) people, property, or the environment. The term applies to an event that causes this ERP to be activated. Incidents such as a minor spill of hazardous material onsite, which can be managed without activating this ERP, are not regarded as emergencies by this ERP.

If there is any doubt, any event should be treated as an emergency, leading to the activation of this ERP.

1.3 Levels of an Emergency

The three levels of emergency are defined as:

1) Local Alert: Any situation that threatens life, property, or the environment at one location onsite but may not spread to other areas onsite.
2) Site Alert: Where effects may spread to other areas on the site.

3) External Alert: Where effects may spread and impact people, property, or the environment outside the site.

Each of these three levels of emergency may be further classified as:

- Minor Emergency: Where the emergency can be handled entirely onsite, and no assistance is required from public emergency services.
- Major Emergency: Where the situation requires the assistance of public emergency services, such as ambulance, fire brigade, or police.

An External Alert is automatically considered a Major Emergency, as action cannot be taken outside the site boundary independently of public emergency services. The site boundary delineates the physical, geographical, and legal parameters within which the Site operates, facilitating accurate resource management and regulatory compliance.

1.4 Objectives of the Emergency Response Plan

This ERP provides guidance on response actions to be taken in an emergency that may occur within all areas of the site, aiming to minimize the potential for loss of life, injury to people, damage to the environment, and harm to property.

The objectives of the ERP, listed in order of priority, are:

1) Protection of human life and rescue of people.
2) Protection of the environment.
3) Protection of property, equipment, and products.
4) Restoration of safety to affected areas.
5) Restoration of facilities.
6) Resumption of normal operations.

1.5 Authorisation

During construction, while Neoen's EPC Contractor will be responsible for the development of the ERP, the Site Manager will be responsible for preparing, distributing, and updating the ERP onsite. Once operational, this duty shifts to the Operations and Maintenance (O&M) Site Manager for the Site, who is responsible for preparing, distributing, and updating the ERP. The authority to distribute and execute the plan falls under their delegation. To maximize its usefulness, the Site Manager encourages controlled copyholders and all other interested parties to suggest potential improvements.

The Chief Warden (CW) for the Site will be responsible for implementing the emergency requirements under the direction of the Site Manager. The CWs responsibilities include monitoring the emergency response elements (hardware and software) and raising issues to the attention of the Site Manager for corrections, changes, or updates. The Site Manager may then delegate the responsibility for corrections, changes, and updates to the CW as required.

Section 9.0 gives details on reviewing and updating this ERP.

This ERP has been developed using the guidelines published in the Hazardous Industry Planning Advisory Paper (HIPAP) No. 1 (Ref. [1]) and in accordance with Emergency Planning: Guidelines for Hazardous Industry 1998 (Ref. [2]) fulfils the requirements of the Work Health and Safety (WHS)

Regulation 2011 (Ref. [3]) which requires an emergency plan to be prepared for a facility storing and handling dangerous goods in excess of the threshold quantities listed in the WHS Regulation.

Signed: Chief Warden

.....

.....

[name]:

2.0 Site Description

The Mount Hopeful Battery is a proposed grid-scale battery energy storage system (BESS) in Central Queensland (the Project). With a planned capacity of up to 600 megawatts (MW) of power for a duration of up to four hours, the Project will enhance the delivery of clean, reliable electricity to the National Electricity Market (NEM), while supporting grid stability and flexibility.

The Project is located near the rural town of Bajool, approximately 50 kilometres (km) south of Rockhampton and 70 km west of Gladstone, Queensland, within the Rockhampton LGA **(Figure 2-1)**. The Project is mapped within the Rural Zone of the Rockhampton Region Planning Scheme 2015 (planning scheme) and predominately used for low intensity agricultural activities, including cattle grazing. The Project is proposed to occur within the bounds of the 'Study Area' which covers an area of 49 hectares (ha) and occurs across three freehold land parcels and two local roads, being South Ulam Road and an unnamed road reserve. The Study Area also accommodates a Powerlink transmission easement that comprises an existing 275 kilovolt (kV) transmission line, of which the Project will connect into. The Study Area is sparsely vegetated with predominately non-remnant vegetation and is intersected by an unnamed tributary of Eight Mile Creek. The Project gains access via South Ulam Road to the east of the Study Area.

The Project is proposed to be delivered over two stages, which are indicatively described as follows:

- Stage 1: indicative capacity of 430 MW , with construction expected to commence mid-2026 and to complete by end of 2028.
- Stage 2: indicative additional capacity of 170 MW, with construction expected to commence in 2028 and to complete by end of 2029.

Key components of the Project include:

- Up to 650x Battery Modules
- Up to 170x Medium Voltage (MV) Transformers
- 2x High Voltage (HV) Transformers
- A HV Switching Station.

The Project will also encompass associated ancillary infrastructure necessary to the operation of the BESS, including:

- Site access track
- Overhead and underground electrical cables
- Inverters
- High voltage substation
- Earthing and lightning protection
- Security fencing, closed-circuit television (CCTV) and lighting
- O&M building
- Water retention pond
- Lay down areas

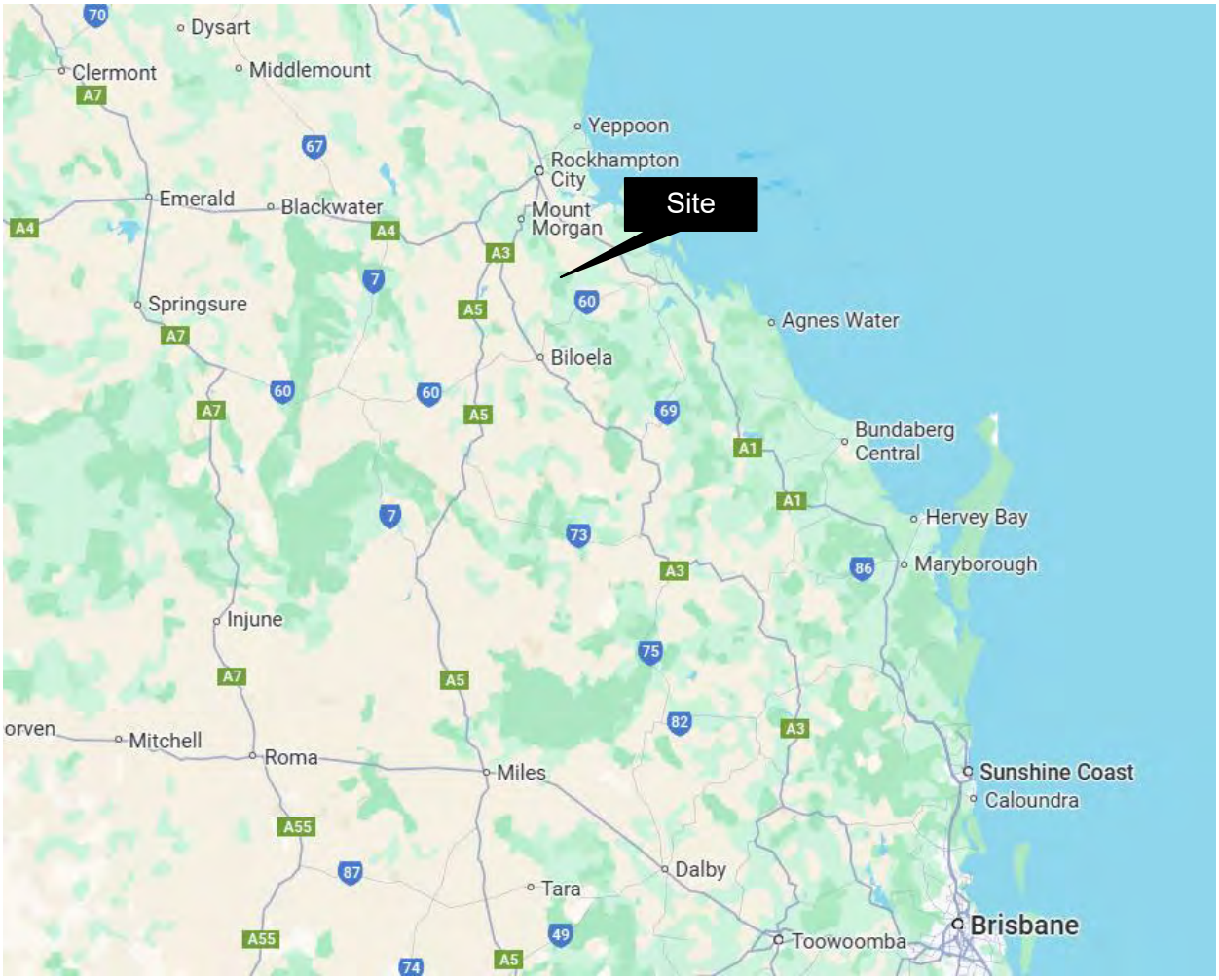


Figure 2-1: Regional Site Location (Google Maps)

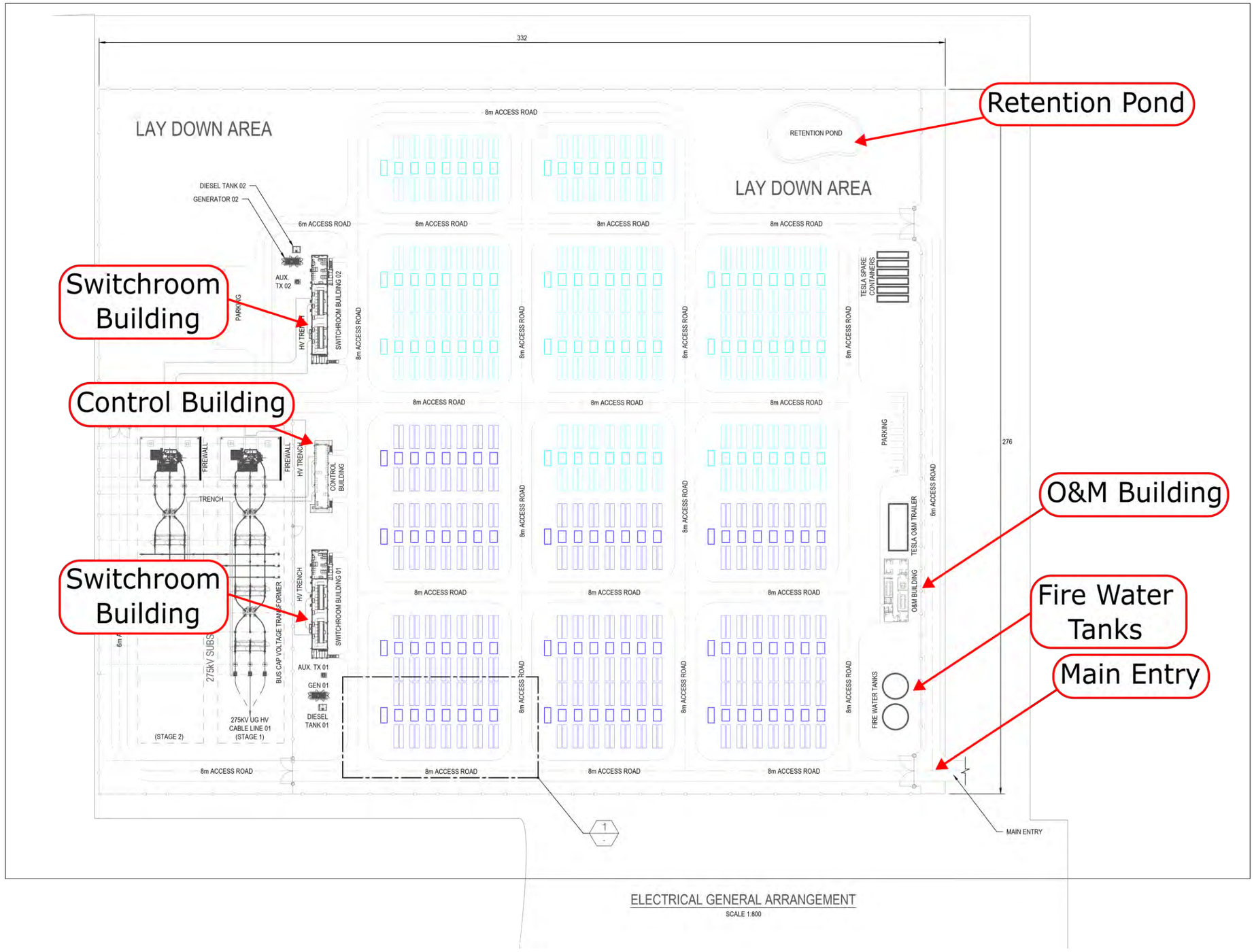


Figure 2-2: Site Layout

2.1 Quantities of Dangerous Goods

The classes and quantities of DGs provided in **Table 2-1**.

Table 2-1: Maximum Quantities of Dangerous Goods Stored & Preliminary Risk Screening

Class	Packing Group	Description	Quantity
2.1	n/a	Spray paint	0.01 T
2.2	n/a	Refrigerant R134A in battery packs (1.5 kg per pack)	0.96 T
3	II	Paints and solvents	0.2 T
8	II	Cleaning products	1 T
9	n/a	Lithium Batteries	722 T*
C1	n/a	Diesel fuel	17 T
C2	n/a	Transformer oils in HV transformers	172 kL
C2	n/a	Transformer oils in MV transformers	541 kL

*Note that this is based on the weight of battery cells contained within the battery packs.

3.0 Site Hazards and Emergency Scenarios

This section delineates potential emergencies and their associated consequences at the Site. **Appendix C** details mitigation measures and procedures aimed at addressing these emergencies. The emergencies encompass:

1. Fire and explosions.
2. Spills of hazardous and dangerous materials.
3. Medical or personal emergencies.
4. Natural events.
5. Bomb threats.
6. Vehicle collisions.
7. Civil disturbances, vandalism and intruder onsite.
8. Evacuation protocols.

3.1 Fire and Explosion

There are several sources where a fire or explosion might occur at the site, including:

- Chemical fires in BESS storage areas (i.e. overheating of equipment, electrical failure resulting in a short circuit and thermal runaway due to battery faults).
- Construction and maintenance activities (e.g. hot work such as welding or grinding).
- O&M Facility fire from electrical faults, sparking, etc.
- Transformer internal arcing, resulting in an oil spill, possible ignition, and bund fire.
- Vehicular accident resulting in a release of fuel as a result of the collision, ignition of released fuels.
- Bushfire/grassfire on adjacent land propagating onsite and igniting transformers, etc.
- Cyberattack and loss of BESS control leading to grid instability and potential off-site fire (i.e., at off-site substation).

The required response procedures for explosions and fires are outlined in **Appendix C ERP-01**.

3.1.1 BESS Fire

In a BESS housing system, an electrical/chemical fire may propagate quickly due to the composition of the batteries stored. Fires may originate from the failure of the batteries, failure of the cooling system resulting in insufficient cooling and subsequent thermal run away, ignition of ancillary electrical components and impact on batteries.

During the construction and operational phases, the site will be staffed during normal working hours Therefore, in the event of a fire, it is likely to be identified by site personnel. Additionally, the BESS units contain a battery management system (BMS) which will detect pre-fire conditions alerting off-site personnel such that emergency services can be contacted in the incipient stages of a fire.

The BESS Fire response has been provided in **Appendix C ERP-02** with the BESS isolation procedure provided in **Appendix E**.

3.1.2 Workshop And Site Office Building Fire

In the workshop and construction site office building, an electrical fire (computers, servers, printers, photocopiers, etc.) may propagate quickly due to fuel in the form of paper, furniture (wood), carpet, etc. During operation, the O&M Facility will be managed by personnel during standard working hours. Therefore, in the event of a fire, it is likely to be identified by either site personnel or via fire detection devices.

3.1.3 Combustible Liquid Fires

Transformers contain oil (combustible liquid) used to cool the units during operation. If arcing occurs within the transformer, there is the potential for pressure buildup, resulting in the rupture of the oil reservoir and spilling into the bund. This, coupled with the heat within the reservoir, may cause ignition and fire within the transformer and bund. In such a scenario, the fire brigade would need to be called, and the fire would be contained within the bunded area encompassing the transformers.

3.1.4 Vehicular Collisions Leading to Fires

The site will have vehicle access for employees and any visitors. If a collision occurred, there is potential for fuel within the vehicles to ignite, resulting in a fire. In such an event, personnel onsite are present to promptly respond with first-attack firefighting measures using extinguishers. In the event these firefighting systems fail to control the fire, the fire brigade will be required.

3.1.5 Bushfire/Grass Fire

The site is surrounded by farmland which would be subject to fast moving grass fires. There are minor areas of sparse vegetation; however, there are no large dense accumulations of bushland in close proximity to the Project site. It is noted that vegetation control around the site within the Asset Protection Zone (APZ) is part of preventative measures to minimize the risk of bushfires.

Activities that may ignite vegetation include hot works (grinding, cutting, welding, etc.), a fire in the BESS or transformers, vehicle exhaust, hot brakes on vehicles.

During operations the site will be supplied with firewater by two (2) fire water tanks. The total capacity of the tanks is to be determined, however will be sized in accordance with AS 2419.1:2021 (Ref. [4]). The location of the water tanks for regular operations is shown in **Figure 2-2**.

During construction, water will be provided via water carts.

The bushfire response procedure is provided in **Appendix C ERP-03**

3.1.6 Construction and Maintenance Hot Work Fire

A Hot Work Permit form must be completed when planning work that includes:

- Welding, brazing, or soldering.
- Abrasive grinding and cutting.
- Use of oxygen/fuel flame cutting or heating equipment.
- Drilling that is likely to generate a significant amount of heat or where a flammable atmosphere may be present.

- Any other activities that have the potential to generate sparks or sufficient heat that could ignite flammable or combustible materials.

A Hot Work Permit form is provided in **Appendix D**. Any of the above activities may result in an ignition of surrounding vegetation.

3.2 Hazardous and Dangerous Material Spills

While there are DGs stored at the site in the form of oil in transformers, these are not readily moved nor interacted with, resulting in a low potential for loss of containment. The oils within transformers are contained within a bunded area. Notwithstanding this, a spill procedure has been developed and is to be utilized.

The BESS are classified as Class 9 DGs which are composed of solid materials and liquid electrolytes. However, the volume of electrolyte used is minimal and contained within each layer of the battery cells. Loss of containment is expected to be in low quantities forming localised spills in the BESS units and are unlikely to impact external to the BESS containers.

The required response to spillage at the site is outlined in procedure **Appendix C ERP-04**.

3.3 Medical Emergency or Personal Injury

Personal injuries may occur due to work-related accidents or illnesses resulting from operations onsite, such as vehicle movements, tool usage, and vegetation management. These activities may pose a risk of personal injury or illness to staff involved in site operations and/or the handling of materials. In the event of a medical emergency requiring evacuation of personnel, Emergency Response Procedures can be found in **Appendix C ERP-05**.

3.4 Natural Events (floods / storm / earthquake)

All permanent facilities onsite are designed and built to provide 300 mm of freeboard above the peak modelled 1% Annual Exceedance Probability (AEP) flood event, ensuring that flooding is not anticipated to cause any impacts. Notwithstanding this, in the event of a major flood event access to the site will be restricted along the contained low-lying drainage areas.

High rain events can often coincide with storm conditions such as high wind and lightning. Tropical cyclones which have passed through Rockhampton have recorded speeds over 100 km/h which can pose a risk to personnel via airborne debris. The National Construction Code (NCC) requires that all structures be designed accounting for wind loading effects as required by AS 1170.2 and indirectly requires that lighting protection be provided via AS 3000 and AS 1768. In the event of a storm, personnel should be able to safely take shelter in suitably designed structures (O&M building).

Whilst the facility shall be constructed using the appropriate earthquake design codes (AS 1170.4 as required by the NCC), in the unlikely event of an earthquake, there is a potential for damage to occur to infrastructure; however, this would be expected to be localised and unlikely to result in escalation. Notwithstanding this, damage to the transformers may result in loss of containment. It is noted that the transformers are bunded making loss of containment beyond the bund even more unlikely due to the need for multiple failures.

Spill clean-up is covered in **Appendix C ERP-06**.

3.5 Bomb Threat

The potential for bomb threat exists at the site. To assist in controlling this hazard, a bomb threat procedure forms part of this plan, the procedure is included in **Appendix C ERP-07**.

3.6 Collision of Vehicles

As the site is small, transport around the site area will be via vehicle. It is noted that the staffing levels will be minimal during the operational phase; hence, the potential for a collision of vehicles is not expected to occur. However, during the construction phase greater vehicle activity is expected hence increasing the risk of collisions. Whilst there are speed limits placed on all vehicles onsite, there is a potential for incidents involving vehicles.

To ensure rapid response to any collision incidents, a procedure has been developed. This can be found in **Appendix C ERP-08**.

3.7 Civil Disturbance, Vandalism or Intruders Onsite

The site is located in a sparsely populated area and intrusion, or civil disturbance is not expected to occur at the site.

Notwithstanding the low potential for civil disturbance, there is a potential for vandalism and intruders onsite. The most likely scenario is an intrusion onsite during normal operations (i.e., an intruder walking into the facility). The site will be fenced with strict access control, however in the event a member of the public attempts to enter the facility the main hazard arises when personnel approach a potential intruder. A procedure for handling civil disturbance, vandalism and/or intruders has been developed as part of the site emergency plan detailed in **Appendix C ERP-09**.

3.8 Evacuation Protocols

In the event of an emergency requiring evacuation, it is imperative that personnel are familiar with designated emergency assembly points. These locations enable fire wardens to identify if all personnel are in attendance or if personnel may be trapped within the facility.

The procedure for managing an evacuation has been developed and is located in **Appendix C ERP-10**.

4.0 Roles of External Agencies and Community

The involvement of state and local government agencies as well as the community in emergency planning is of significant importance to ensure the ERP facilitates an adequate response in the event of an emergency.

4.1 Emergency Services

4.1.1 Queensland Fire Department (QFD)

QFD, which include the former Queensland Fire and Rescue (QFR) and Rural Fire Service Queensland (RFSQ) is the designated Combat Agency (CA) for the Site. In an emergency, it is most likely that personnel from Gladstone will be deployed to assist with Mt Morgan volunteers assisting based on availability.

Under the WHS Regulation (Ref. [3]), QFD are to be consulted during the development of this document with any provided recommendations being adopted into the final version. A record of engagement is provided in **Appendix D** for the purpose of record keeping and quality control.

4.1.2 Queensland Police Service (QPS)

The QPS is the designated agency for law enforcement and evacuation of persons in the surrounding community. QPS would lead the response to security threats and assist with the evacuation of persons under threat as a consequence of a hazardous event at the Project.

4.1.3 Queensland Ambulance Service (QAS)

QAS is the designated agency for pre-hospital care and transport of sick and injured persons as well as coordination of all health systems involved in emergency response. QAS would attend to sick and injured persons during an emergency event.

4.1.4 State Emergency Services

The State Emergency Services (SES) is the designated combat authority dealing with natural disasters (e.g., floods) and assists as required to aforementioned emergency services.

4.2 WorkSafe QLD

WorkSafe QLD will become involved should a workplace injury or illness occur (a WorkSafe notifiable incident) or in the event of a significant dangerous occurrence at the Site.

4.3 Department of Environment, Tourism, Science and Innovation (DETSI)

DETSI is the designated agency for environmental protection during emergency response and recovery. DETSI will be involved in the investigation of any contamination at the site following an incident and the coordination and clean up of land or inland waters affect by a serious incident.

4.4 Community

A fire event at the Project that has the potential to propagate off-site as a bush or grass fire is considered a hazardous event that could have a significant impact on neighbouring properties. The neighbouring properties will be notified in the event of a fire event that has the potential to propagate off-site.

5.0 Roles and Responsibilities of Internal Personnel

It is necessary for personnel to be allocated key emergency response duties. Key positions and duties are listed below. **Appendix B** provides a summary of the roles and responsibilities of key personnel in emergency response positions onsite.

5.1 Criteria for Selection of Emergency Response Personnel

Persons appointed to deal with emergencies will in general:

- Be physically capable and willing to carry out the respective function.
- Have leadership qualities and command authority.
- Have maturity of judgement, good decision-making skills and be capable of remaining calm under pressure.
- Have clear diction and be able to communicate with the majority of persons in their care.

These points shall be considered when selecting personnel for emergency response tasks.

5.2 Chief Warden

The CW and Deputy Warden(s) will be pre-selected by the Site Manager. In the event that the CW is unavailable at the time of the emergency, emergency control will be the responsibility of the Deputy Warden.

The CW will take responsibility for control of onsite emergencies and direct the emergency response until the arrival of CA. The CW will then hand control over to the CA Commander. The CW will brief the CA Commander and remain close to the CA Commander to provide advice onsite-specific issues as required.

5.3 Restoration Team

A restoration team will be established by the Site Manager (or delegate) to firstly establish site operations (based on the scale of the incident). The restoration team shall be responsible for establishing a recovery plan and all further actions required until the resumption of business operations. The restoration team will be headed by the Site Manager.

5.4 Communications

The role of communications will be managed by the CW. It will be their task to monitor communication and facilitate the effective exchange of information between the site and the CA.

The Communications Manager is the only person responsible for relaying information to the media and other public bodies. The contracted Communications Officer and staff will be instructed not to discuss issues with any persons outside the site as this is the role of Neoen Communications Manager only.

When a significant incident occurs, a media statement should be prepared as quickly as possible, and include:

- A description of the nature of the emergency.
- The corrective action taken, and its effectiveness.

- When the emergency is expected to be over.
- The investigative action that is to be taken.
- Any assistance that can be given by the media.

Only facts should be stated. Statements as to the cause and effects of the emergency should be avoided until a thorough investigation has been conducted.

5.5 Emergency Response Personnel

Combating emergencies will mainly be the responsibility of the relevant CA. However, initial response to an emergency will be provided by site personnel. The emergency response personnel (Fire Wardens) will operate under the direct control of the CW; it will be the CW's responsibility to co-ordinate first attack response to emergencies.

The CW will direct the emergency response personnel to assist in the following emergency response areas:

5.5.1 Damage Control

Whilst the site is fitted with fire water tanks (during operations) and will utilise water carts (during construction), there will be no requirement for company personnel to operate fire hoses. Firefighting on a scale requiring a fire hose will be the responsibility of QFD.

The Site is fitted with extinguishers during both construction and operations; this equipment will be used in first-attack firefighting by site personnel where safe to do so and within the experience / abilities of personnel. This will aid in controlling the growth of incidents allowing the CA to provide more effective emergency response on their arrival. Selected site staff will be trained in first aid firefighting. Although this equipment and training will be provided, it is up to the discretion of site personnel whether or not to fight a fire. If a fire cannot be effectively controlled by a fire extinguisher, evacuation is recommended as opposed to further firefighting action.

5.5.2 Rescue and First Aid

Selected staff will be trained in first aid. It will be their task to render assistance in removing any injured staff from the emergency area and to provide effective management of injuries until the CA (ambulance) arrives.

5.5.3 Evacuation

Evacuation will be controlled by the CW. The CW will direct staff to evacuate the site should the emergency grow beyond manageable proportions. A site staff member will be delegated to facilitate the evacuation and ensure all staff have left the area to be evacuated. This staff member will report to the CW when evacuation has been completed.

To aid in facilitating evacuation an employee checklist will be used to mark names and ensure all employees working in the affected area have been safely evacuated. (See Procedure **ERP-07** for more details). The emergency egress points are the emergency access gate and the site entrance as shown in **Appendix Figure C-3**.

5.5.4 Traffic Management

The CW will nominate site personnel to direct traffic in the event of an emergency. It will be this person's task to ensure the free flow of traffic in the areas immediately off-site. The task will also involve the removal of any vehicle that may obstruct the free flow of CAs in and out of the site.

On arrival at an emergency incident, it may be difficult for the attending Fire Brigade response crew to locate the source of the fire where the incident is not immediately evident (i.e., smoke cannot be seen). Hence, it would be necessary for a member of the emergency team (typically the nominated traffic management officer) to meet the Fire Brigade response crew at the site entrance and direct the crew to the specific emergency location.

6.0 Emergency Response Structure

Emergency planning shall be coordinated by the CW and Workplace Health and Safety team. Emergency planning shall include establishing and implementing an emergency plan, ensuring that personnel are appointed to all positions in the emergency organisation, arranging for their training, arranging to conduct evacuation exercises and emergency response drills, reviewing the effectiveness of exercises and drills, and arranging for procedural improvements.

The site emergency response structure shown in **Figure 6-1** be implemented in emergency situations. The responsibilities of each role are noted in **Section 6.12** and summarised in **Appendix B**. It is noted that each role may be filled by a solitary person or multiple roles allocated to a solitary person due to the nature of the site being minimally staffed.

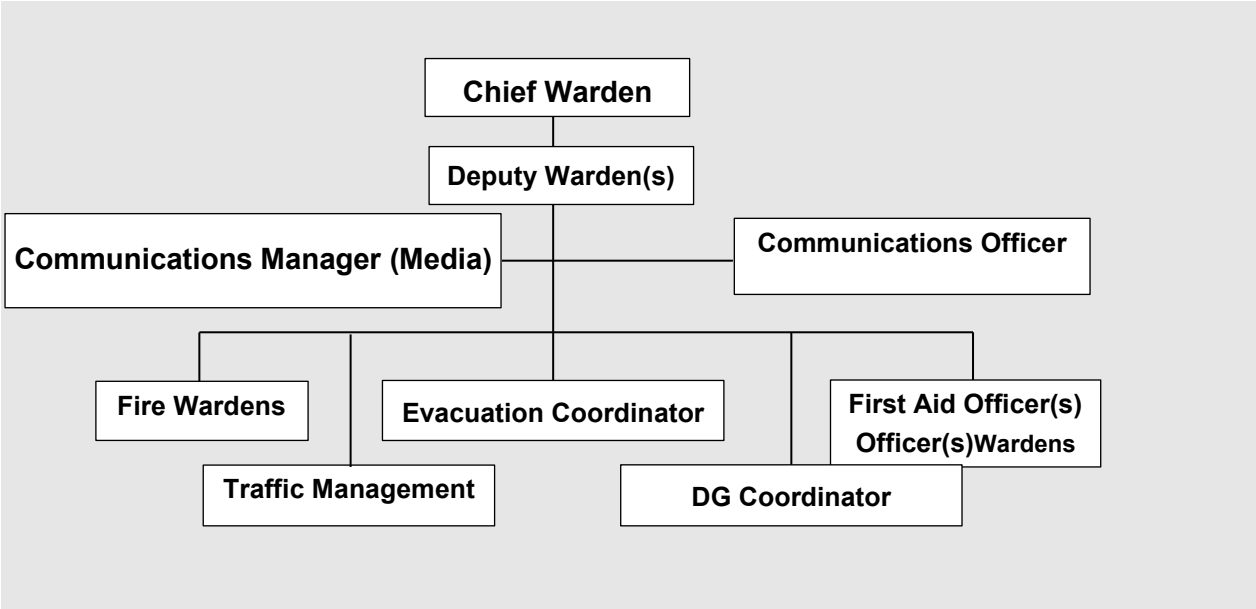


Figure 6-1: Emergency Response Structure

6.1 Emergency Command Structure General Notes

The Queensland Police Service (QPS) is the designated agency for law enforcement and evacuation of persons in the surrounding community. QPS would lead the response to site security threats and assist with the evacuation of persons under threat as a consequence of a hazardous event.

6.1.1 Immediate Response and Alarm Initiation

Any person discovering an emergency situation or a situation, which is likely to give rise to an emergency, shall:

- Consider controlling the situation alone.
- Control it (only if safe to do so).
- Alarm - raise the alarm by contacting the CW who shall decide on the level of alert and details of the emergency.
- Rescue - assist or alert persons in immediate danger.

If in doubt, the alarm shall be activated first and then the doubt will be clarified.

6.2 Site Command Centre

In the event of an emergency, control will be taken by the CW. The CW will be located in the site command centre, which shall be in the O&M Facility at the front of the site. During construction, the site command centre will be the Site office.

6.3 Principles of Emergency Response

All emergency positions will be allocated to specific staff onsite and regular exercises conducted to monitor the effectiveness of the ERP. A list of emergency response roles and contact information is given in **Appendix B**.

The principles of response will be based on prevention, containment, rescue and first aid. These have been summarised below:

Prevention

- Maintenance and testing of all detection and protection equipment on a regular basis (e.g., in accordance with the requirements of AS 1851-2005, Ref. [3]).
- Inspection of all plant and storage facilities on a regular basis.
- Regular emergency response drills to ensure site readiness which may be as frequent as quarterly for responses that a relevant to the site conditions and activities with full emergency drill response occurring within 1 month of opening the site and annually thereafter.

Containment

- Switch off any operating equipment (dock levellers, etc.).
- Isolate electrical supplies at the main switchboard.
- Take any operating equipment (e.g., forklifts) outside.
- Co-ordinate with CW.

Rescue

- Recovery of site personnel if incapacitated in a hazardous location (i.e. in proximity to fire, BESS container, etc.).
- Relocation to a safe area for treatment.

First Aid

- First aid is to be given only by trained first aid officers.

6.4 Evacuation

6.4.1 Evacuation of Personnel Located Onsite

The order to evacuate the site shall be issued by the CW or the responsible CA.

For the operational phase, emergency evacuation plan drawings should be located throughout the site where occupants and visitors are able to view them, include a “YOU ARE HERE” location and be positioned and oriented in accordance with Clause 3.5.3 and Clause 3.5.4 of AS 3745-2010.

During construction, the location of works and certain construction activities are likely to result in the need to alter evacuation routes at times. If/when this occurs, location specific evacuation plans will be provided to contractors (e.g., with manual mark ups to indicate alternate exit paths and the location of any egress obstructions). Furthermore, the Deputy CW will contact personnel, contractors and visitors working remotely from their location via UHF radio on channel X to evacuate should the CW initiate an evacuation. The Deputy CW will sound the air horn at the construction compound they are located and contact the other construction compound via UHF radio and request that the air horn be sounded.

All personnel are to move quickly to emergency assembly areas via the emergency egress points**.** Staff are to warn others as they go.

- Report to the Evacuation Officer (nominated Fire Warden), this person will mark names off the evacuation list.
- Do not move or leave assembly area without permission from Evacuation Officer or responsible CA unless the area is under direct threat.
- Priority that must be observed during a building evacuation are:
    - Those who are able to walk without assistance leave first.
    - Those who require some assistance leave next; and
    - Those who must be carried leave last.

Mobility impaired persons should be assembled in a safe area away from immediate danger.

6.4.2 Evacuation of Personnel Offsite (Adjacent Properties)

While there are no areas directly adjacent to the site with a significant accumulation of people requiring evacuation, a table has been included in this ERP. This table allows for the inclusion of residences or adjacent operations within the area, enabling them to be contacted in the event of an emergency.

The contact numbers for nearby sites are given in **Table 6-1**. This list will be populated before start of construction.

Table 6-1: List of Contacts – Neighbouring Sites

Neighbour	Site Contact	Contact Number

Evacuation procedures are found in **ERP-08** along with exit points at the site which are located on the access road to the site as shown in **Appendix Figure C-3**.

The emergency operations flow chart, shown at **Figure 6-2**, indicates actions to be taken by persons responsible for undertaking actions and how they will be performed.

6.5 Emergency Equipment and Alarms

Equipment will be installed around the site for use in response to emergencies. It shall be maintained and accessible for immediate use, and its location appropriately sign posted. The range of equipment installed at the site includes the following.

6.5.1 Extinguishers

Fire extinguishers will be provided for first-attack firefighting, when safe, by employees trained in their use. Procedures for the use of extinguishers are given in **ERP-01**.

Note that it can be hazardous to use the incorrect extinguisher on some types of fires (e.g., water extinguisher on electrical fires). The location of the extinguisher throughout the site will be finalised during detailed however they will be located around the site in accordance with AS 2444:2001 and maintained in accordance with AS 1851-2005.

6.5.2 First Aid Kits

First aid kits will be provided in the O&M facility and maintenance vehicles during the operation of the project and located in construction compounds (first aid room) and vehicles during construction. First aid kits will be regularly checked and maintained and any components used between review periods will be replaced immediately to ensure equipment in the kit is serviceable and available when required.

6.5.3 Spill Equipment

Safety Data Sheets (SDS) detailing action to be taken to safely control spills of hazardous materials and DGs will be available at O&M Facility. Only trained persons in spill control procedures will engage in spill response. Spill Kits will be located either on plant or nearby, where fluids other than water could be spilled as a result of a fault during construction, and the same during the operation of the project.

6.5.4 Emergency Resources in Construction

During construction, the following protocols and features are implemented onsite:

- Primary Emergency Centre Assembly Point A: Located at the construction compound site office adjacent to the primary site access point. In case of inaccessibility, Emergency Access Point B or C will be used if deemed safe. If these access points are also inaccessible, the emergency response will be coordinated from the main emergency assembly point, or an alternate point as directed by the CW.
- Induction Program: Ensures that all contractors and visitors understand construction site hazards, are aware of their emergency responsibilities, and know evacuation routes and muster points relative to their work location.

- Emergency Alarm System: Consists of air horns at each construction compound to signal evacuation needs. UHF radios are used to communicate ALERT, EVACUATE, and ALL CLEAR messages to personnel, contractors, and visitors located remotely.
- Sign-in Register: Requires all individuals attending the site to provide contact details.
- UHF Radios: All groups working remotely from the construction compound must have a UHF radio switched to channel X for emergency communication.
- Fire Safety Measures: Includes fire extinguishers (dry chemical powder and carbon dioxide) and fire blankets at construction compounds.
- First Aid: Provision of first aid kits at construction compounds, with all vehicles and mobile plant equipped with a dry chemical powder fire extinguisher and first aid kits.
- Chemical Spills: For works where chemical spills are identified as a risk, an appropriate spill kit will be maintained at the works location in work or in maintenance vehicles for the duration of the works.
- Construction vehicles and all plant must be equipped with a dry chemical powder fire extinguisher and first aid kits.
- Hazardous Materials: All hazardous materials will be stored in accordance with relevant standards and guidelines.
- An emergency evacuation diagram will be prepared ahead of the construction phase of the Project to show the locations of site hazards and emergency features including ERP documents, spill kits, emergency assembly areas, firefighting equipment and first aid kits.

6.5.5 Emergency Resources in Operation

During the operation stage, the following protocols and features are subject to the site:

- Primary Emergency Centre Assembly Point: Located at the O&M Facility site office. In case of inaccessibility, secondary emergency assembly points B or C to be used if deemed safe. If these access points are also inaccessible, the emergency response will be coordinated from the main emergency assembly point, or an alternate point as directed by the CW.
- Induction Program: Ensures that all Neoen personnel, contractors, and visitors understand site hazards, are aware of their emergency responsibilities, and know evacuation routes and muster points relative to their work location.
- Emergency Alarm System: Consists of air horns located at the O&M Facility to indicate the need to evacuate. UHF radios are used to communicate ALERT, EVACUATE, and ALL CLEAR messages to personnel, contractors and visitors located remotely from the O&M Facility.
- Sign-in Register: Requires all individuals attending the site to provide contact details.
- UHF Radios: All groups working remotely from the O&M Facility must have a UHF radio.
- Fire Safety Measures: Includes fire extinguishers (dry chemical powder and carbon dioxide) and fire blankets at O&M Facility, substation, inverter stations, site vehicles and intermediate kiosks/feeders if applicable. Fire water supply via fire water tanks (operations) and water carts (construction).
- First Aid: Provision of first aid kits at O&M Facility, all vehicles equipped with first aid kits.

- Chemical spills: Spill kits at the O&M Facility. For maintenance works where chemical spills have been identified as a risk, an appropriate spill kit will be maintained at the works location for the duration of the works.
- Hazardous Materials: All hazardous materials will be stored in accordance with relevant standards and guidelines.
- An emergency evacuation diagram will be prepared ahead of the construction phase of the Project to show the locations of site hazards and emergency features including ERP documents, spill kits, emergency assembly areas, firefighting equipment and first aid kits.

6.6 Notification of Incident

6.6.1 Combat Agency (Police, Ambulance, Fire Brigade, Rural Fire Service etc.)

In the event of an incident, the following is to be instigated with the Combat Agencies:

- Raise vocal alarm and make sure it is acted upon and/or phone 000.
- Advise: Neighbours of the incident and inform of potential evacuation.
- Advise the Combat Agency of the type of emergency including:
  - Casualties
  - Assistance required
  - Hazards
  - Telephone Contact Number
  - Name

6.6.2 Authorities

Contact with authorities in relation to the consequences of the emergency is covered in more detail in the individual ERP sections in **Appendix C**, with **Section 6.8** detailing terminating an emergency.

6.6.3 Adjacent Properties

The surrounding land is mostly agricultural in nature and sparsely populated. The adjacent residents and businesses are to be advised of any incidents. A list of neighbouring sites is displayed in **Table 6-1.**

6.7 Emergency Procedures

In any emergency that arises, clear and explicit communications are essential to maintain control. All staff are expected to maintain a thorough knowledge of emergency procedures. The responses to specific emergencies as listed below in **Table 6-2** and further outlined in **Appendix C**. A general flowchart of an emergency procedure is given in **Figure 6-2**.

Table 6-2: List of Emergency Response Procedures

Procedure	Emergency Procedure Number
Fire (including grass / bush fire) and Explosion	ERP-01
BESS Fire	ERP-02

Procedure	Emergency Procedure Number
Bush Fire	ERP-03
Loss of Containment (Spill)	ERP-04
Medical Emergency/Personal Injury	ERP-05
Natural Events	ERP-06
Bomb Threat	ERP-07
Collision of Road Vehicles	ERP-08
Intruder(s) onsite	ERP-09
Evacuation	ERP-10

6.7.1 Activation of the Emergency Plan

The following sections describe the general procedures for response to emergency situations.

If an emergency situation arises:

- Personnel, contractors, and visitors who have witnessed the event should immediately move to a safe location, directing others as required, and notify the CW and/or Deputy Chief Warden by UHF radio on channel X.
- The CW (or Deputy Chief Warden/nominated delegate in CWs absence) will determine an appropriate action in line with nature of emergency and implement emergency event specific procedures as required (refer to **Appendix C**), including contacting required emergency services.
- In an emergency event that does not require immediate evacuation, the Deputy Chief Warden will contact personnel, contractors, and visitors via UHF radio on channel X and say ALERT, ALERT, ALERT to indicate that an emergency situation has arisen, and the personnel, contractors and visitors are to prepare for evacuation (shutdown plant and equipment if safe to do so) and await further instruction.
- In an emergency event that requires evacuation, the Deputy Chief Warden will commence immediate evacuation and direct personnel and visitors to the Emergency Assembly Point. Given the broad area covered by the Project Area, an evacuation may only be required for a localised works area and can be initiated by the relevant works area supervisor if they are in the best position to make that determination.
- For site wide and localised evacuations, the Warden (or nominated delegate(s)) will, if safe to do so, check that the areas requiring evacuation have been evacuated and report the results of the check to the CW and/or Deputy Chief Warden.
- The Warden will complete a role call at the Emergency Assembly Point to check whether all personnel, contractors and visitors are accounted for and report the results of the check to the CW and/or Deputy Chief Warden. All attempts to respond to an emergency situation should at all times ensure personal safety and only be attempted if within the capabilities of the individual (e.g., using a fire-extinguisher for first-attack firefighting only if appropriately trained).

For emergencies requiring the assistance of emergency service agencies, the initial advice to be provided is detailed within the emergency response procedures contained in **Appendix C**.

6.7.2 Communication Onsite

Communication with onsite personnel, contractors, and visitors in the event of an emergency will be via UHF radio on channel X and mobile phones. In the event of an emergency requiring evacuation, an evacuation alert (EVACUATE EVACUATE EVACUATE) will be made over the radio.

6.7.3 Emergency Contact Numbers

The telephone numbers, which should be used in emergency, as appropriate, are listed in **Appendix A**.

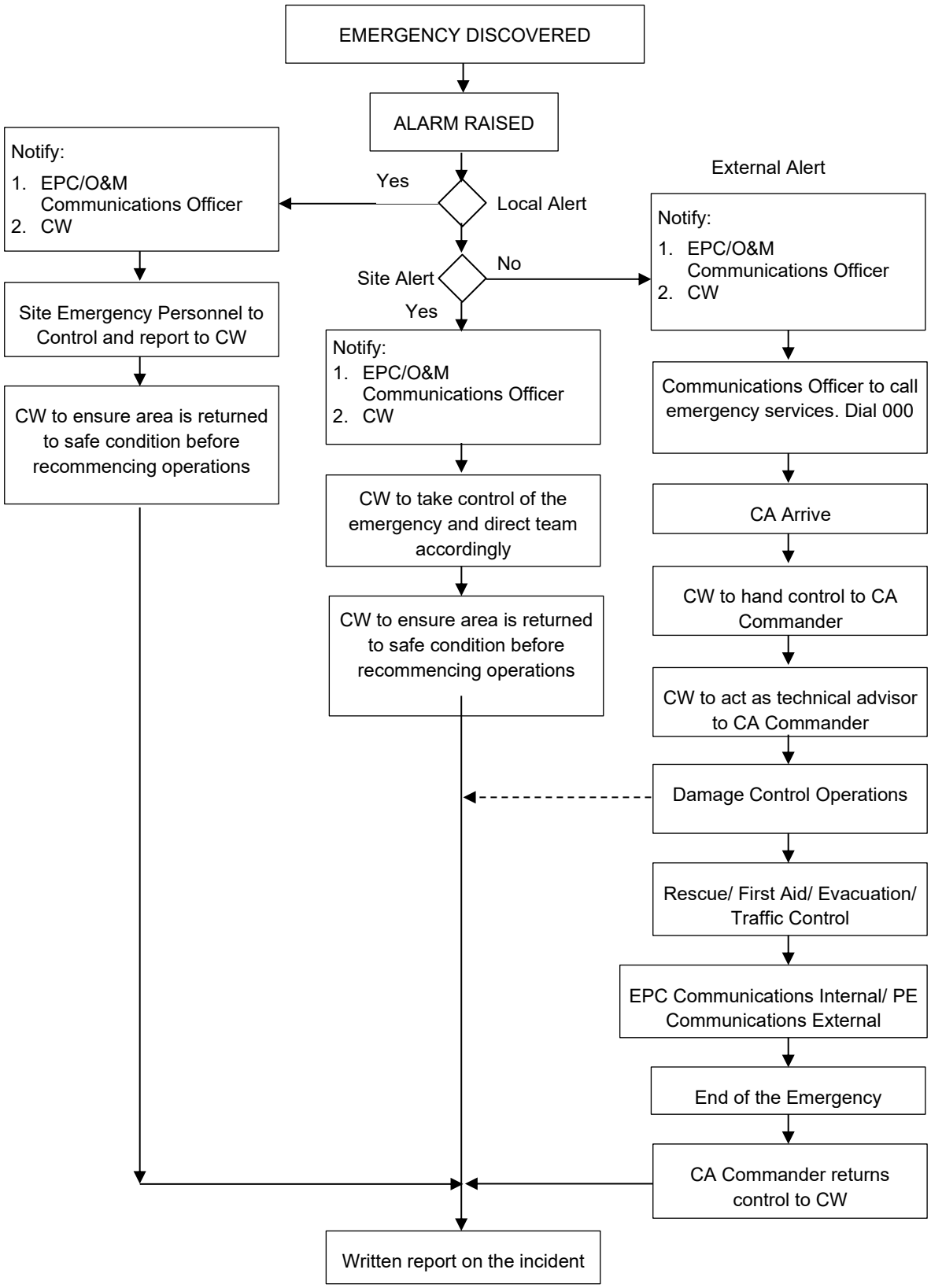


Figure 6-2: Emergency Operations Flow Chart

6.8 Terminating Emergency

When the CA Commander's role is complete, they will hand back control to the CW. The CW should carefully consider the overall situation and review the following:

- Re-organisation of staff.
- Re-construction of damaged equipment.
- Clean-up, safe storage and disposal of all contaminated material.

To facilitate immediate removal off site of contaminated liquids (e.g., firewater) contact:

Company Name: TBC

Phone Number: TBC

The CW will notify the Deputy CW and Warden to have personnel, contractors and visitors return to the site. The CW will also:

- Organise a debrief with Deputy CW and, where appropriate, works area supervisors and emergency services personnel and site personnel.
- Compile a report of the emergency event.

The emergency event report will then be reviewed and any changes to the emergency preparedness and response measures (in conjunction with the CW) required based on the findings of the emergency event report will be implemented.

6.9 Training, Drills and Exercises

A general training in emergency preparedness shall be provided to all Employees on the following subjects as a minimum:

- Definition and types of emergencies.
- Emergency facilities, their function, location and how to use them.
- Means of communication and the location of communication facilities.
- Actions in case of emergency.
- Evacuation procedures.
- Different alarm types which may sound at the site.

The training shall be provided to all new employees at the start of their employment. The training of each employee shall be recorded, and the records of training shall be kept in personnel files. Specific training shall be provided to the appropriate staff as listed in the following subsections.

This ERP shall be evaluated by simulated emergencies. The simulated emergencies and drills involving all emergency functions and all employees shall be performed biannually, proposed to be in March and September.

6.10 Initial Testing

All emergency response procedures are to be tested within the first month of construction and annually thereafter. The first emergency response exercise shall be a full Project Area evacuation.

Local emergency services personnel will be invited to participate in the emergency response exercise subject to their availability.

6.11 Ongoing Programming

Emergency response exercises will be undertaken involving all emergency functions and all employees shall participate quarterly for relevant for site activities and conditions with a full evacuation conducted annually. The emergency response exercises will involve the simulation of one of the identified potential emergency events listed in **Appendix C**. Local emergency services personnel will be invited to participate in an emergency response exercise. The CW, Deputy Chief Warden or nominated delegate shall act as an observer during the emergency response exercise and be prepared with a checklist specific to the planned emergency event to be simulated. The checklist will provide the basis for discussion of emergency response performance at a post-exercise debriefing. The Deputy Chief Warden, observer and other key participants shall attend a debriefing session conducted by the CW immediately after an emergency response exercise. Any deficiencies identified during the debriefing session will be recorded and implemented as updated to the ERP as needed.

6.12 An Emergency During the Emergency Response Drill

The phrase ‘EMERGENCY, EMERGENCY, EMERGENCY’ shall be used over UHF radio on channel X when an actual emergency occurs during an emergency response exercise. The ‘EMERGENCY, EMERGENCY, EMERGENCY’ signifies that the emergency response exercise has been terminated and the personnel, contractors and visitors are to stand by for further instruction from the Deputy Chief Warden. This phrase will be defined in all personnel/contractor and visitor inductions.

6.12.1 Chief Warden, Deputy Chief Warden

The CW and Deputy Chief Warden will be provided with appropriate training to develop the skills and knowledge necessary to undertake their duties outlined in **Appendix B**. The training shall include:

- their duties and responsibilities (pre-emergency, during emergency and post-emergency) as described in this ERP.
- procedures for identified potential emergency events
- responding to alerts and reports of emergency events.
- reporting emergencies and initiating emergency warning equipment
- communication during emergencies
- human behaviour during emergencies
- the use of emergency response and communication equipment
- decision making, command and control
- liaison with emergency services
- emergency response coordination including coordination of evacuation activities
- implementation of post-emergency activities

- record keeping.

6.12.2 Personnel, Contractors and Visitors

The site induction (personnel/contractor induction and visitor induction) will include training in relevant aspects of the ERP including identified potential emergency events, personnel, contractor and visitor responsibilities in an emergency event, emergency communication procedures and evacuation procedures.

6.12.3 First Attack Firefighting

The first attack firefighting training will include:

- preparing for site-specific fires (i.e., bush or grass fire, electrical, combustible, or flammable liquid)
- reporting fires
- evacuating from endangered areas
- identifying, correcting, and reporting unsafe conditions (e.g., combustible materials located too close to flammable liquid storage)
- identifying the classes of fire (i.e., solid, liquid, gas, involving live electrical equipment) and selecting the correct first-attack firefighting equipment for each class of fire
- safe operating procedures for first-attack firefighting equipment
- procedures to be followed after the first-attack firefighting equipment.

6.12.4 First Aid

As the Workplace first Aid Code of Practice 2021, one first aider for every 10 workers (due to the remoteness of the site) are to be trained in occupational first aid by a nationally accredited registered training organisation.

6.12.5 Skill Retention

An Emergency Coordination Organisation will be established which will be composed of wardens which will meet to periodically discuss any issues that have arisen at the site. Discussion points within the meetings may include

- Addressing the specific requirements of the Site and this ERP.
- Include a review of roles and responsibilities.
- Include instruction in emergency communication equipment.

6.12.6 Emergency Services Site Familiarisation

At commencement of construction and prior to commissioning and annually thereafter, local emergency services personnel will be provided with the opportunity to attend a Project Area familiarisation inspection.

7.0 Communication and Reporting

7.1.1 Incident Reports

As soon as possible after the emergency a full written report on the incident must be compiled. This will be reviewed by the Site Manager and passed to the appropriate authorities within 7 days of the incident.

The report must cover in detail the following items:

- Relevant aspects of the ERP report
- Summary
- Conclusions
- Recommendations
- Remedial Action Report

7.1.2 Incident Follow-Up

A review will be conducted within 7 days of the emergency in relation to the effectiveness of the ERP. Areas of ineffectiveness or inefficiency will be noted, and the ERP modified to reflect the required actions. The modifications will be tested at the ensuing drills.

7.1.3 Statutory Investigation

There may be a statutory investigation into any emergency depending on the requirements in the various regulations.

A coronial inquiry may be held in the case of fire resulting in fatality(ies):

- Investigating authorities may be:
  - QPS
  - QFD
  - WorkSafe QLD
  - DETSI
- The CW is to ensure no movement of any evidence apart from that necessary to control the emergency.
- The CA will nominate a senior police officer to take charge of any situation which may later become subject to a coronial inquiry.

8.0 Plan Implementation and Distribution

Hard copies of the most recent version of the ERP will be:

- In weatherproof cases just inside the primary site access and two emergency site access points.
- Available in the construction compound site offices and lunchrooms.
- Available in the O&M Facility site office.
- Available in the O&M facility lunchroom.
- Site inductions (personnel/contractor induction and visitor induction) include training in relevant aspects of the ERP including identified potential emergency events, emergency communication procedures and evacuation procedures. Updates to the ERP will be communicated to personnel, contractors and visitors at toolbox meetings and onsite safety notice boards as required. A hard copy of the site ERP will be located at a prominent position at the site entry.

9.0 Review

In addition to review and revision arising from real emergency situations and training exercises, the ERP shall be subjected to a periodical review. This review shall be carried out annually to ensure that the Plan is up-to-date, effective and in line with changing community standards.

The amendments to the Plan shall be made by the CW and HSE team and approved by the Site Manager.

The ERP shall be audited annually by the Site Manager and HSE Team.

Commencing an update, all previously distributed versions of the ERP shall be collected, accounted for and replaced with the updated version.

The Fire Management and Emergency Response Plan shall be evaluated by simulated emergencies. The simulated emergencies and drills involving all emergency functions and all employees shall be performed bi-annually.

10.0 References

[1] Department of Planning, Housing, and Infrastructure, “Hazardous Industry Planning Advisory Paper No. 1 - Industry Emergency Planning,” Department of Planning, Housing, and Infrastructure, Sydney, 2011.

[2] Queensland State Government, “Work Health and Safety Regulation 2011,” Queensland State Government, Brisbane, 2011.

[3] Standards Australia, “AS 1851-2012 - Routine service of fire protection systems and equipment,” Standards Australia, Sydney, 2012.

Appendix A
Emergency Contact Numbers

Appendix A

A1. Emergency Contact Numbers

List of Contacts

A list of roles, personnel in those roles and contact information is provided in **Appendix B.** This list will be populated before start of construction.

The list of contacts shall be located in the Emergency Services Information Package (ESIP). This package shall be located in the following areas:

- Office
- Site Emergency Box

Position	Name	Contact Number
Chief Warden		
Deputy Warden		
Fire Warden		
First Aid		
DG Coordinator		
Communications		
Traffic Management		
Waste Management		

Neighbouring Sites

Neighbour	Site Contact	Contact Number

Appendix B
Summary of Emergency Response Roles

Appendix B

B1. Summary of Emergency Personnel Roles and Responsibilities

1) Site Managers (Construction and Operational)

The Site Manager is to select the CW and DW and is responsible for preparing, distributing, and updating the ERP.

2) Chief Warden (CW)

The CW will be the controller of the hazard/emergency response. They will control all response actions and delegate authority as required by the specific situation. They will control the hazard/emergency response from the site control centre and will be assisted by the other members of the emergency response team as required.

The CW will also be the liaison between the site emergency response team and the CA. In the event of an emergency requiring attendance at the site of the CA, the CW will relinquish control to the CA Commander and assist the CA Commander as required.

The CW will be the control authority for update of the site ERP. They will co-ordinate review and update annually.

The CW will also be responsible for arranging emergency drills and exercises throughout the year. These will consist of desktop exercises and a full emergency exercise/evacuation quarterly for relevant site activities and conditions with a full evacuation occurring within the first month and annually thereafter.

3) Deputy warden (DW)

The deputy warden is to assist the CW and step in when the CW is unavailable to conduct their duties.

4) Communications Officer

The Communications Officer will assist the CW as required. They will assist in the emergency command centre and field communications (e.g., phones, radios, etc.) as required.

5) First Aid

The site first aid officer (for emergency response) will be responsible for attending any emergency where personnel are injured. They will be directed by the site emergency commander as required.

The site emergency first aid officer will also be responsible for ensuring the emergency response first aid kit is well stocked and any items with “use-by” dates are regularly replenished as required.

The site first aid officer will also be responsible for ensuring their first aid qualifications and certification are valid at all times. This will involve regular refresher training as required.

6) Fire Wardens

An overarching category for emergency response personnel. They are the primary emergency team which encompasses the following.

- Traffic management.
- Evacuation Control/Co-ordination
- Emergency Response Co-ordinator

Fire Wardens will be allocated duties (i.e., traffic management, evacuation control, etc.) by the CW as required during the emergency situation.

7) Traffic Management

The site is located in an agricultural / rural area. On arrival at an emergency incident, it may be difficult for the attending fire services to locate the exact source of the incident, where the incident is not immediately evident (i.e., smoke cannot be seen). Hence, it would be necessary for a member of the emergency team to meet fire services at the site entrance and direct the crew to the specific emergency location.

Notwithstanding this, the emergency response traffic management officer shall not commence any traffic management operations without the express direction of the CW.

In the event of an incident onsite it will be necessary to ensure a clear traffic path is available for CA vehicles to approach the site. It will be the responsibility of the traffic management emergency response officer to clear the path of vehicles that may block the way into the Site.

It will also be the responsibility of the emergency response traffic management officer to direct traffic at the front of the site. This may require the establishment of a traffic zone at the front of the site. The emergency response traffic management officer is to wear highly visible clothing at all times during the emergency to ensure they is clearly seen, limiting the potential for accident and vehicle impact to the officer.

8) Evacuation Control/Co-ordination

The evacuation control/co-ordinator will be responsible for ensuring all personnel are safely evacuated off-site to one of the assembly points. This position requires the incumbent to be familiar with the main and alternate assembly points and to arrange for communication of the evacuation order under the direction of the CW. The evacuation co-ordinator shall not instigate an evacuation without the express permission of the CW.

The evacuation control/co-ordinator will be responsible for obtaining the employees/visitors list of names and marking these names off at the assembly point. Where any person’s whereabouts cannot be verified, details shall be passed to the Site Emergency Commander for action.

9) Emergency Response Co-ordinator

Whilst the CW is located in the site emergency centre, it will be necessary for physical response to the emergency to be actioned. This will be the responsibility of the Emergency Response Co-ordinator (ERC).

In the event an emergency occurs, the ERC will immediately contact the CW for direction on how to respond to the specific emergency. The ERC shall be fully conversant with the emergency response equipment onsite. The ERC shall have first attack firefighting equipment, spill response training, hazardous materials knowledge/training and cursory first aid training.

The ERC will control the emergency response personnel allocated as part of this plan.

10) Emergency Response Personnel (DG Co-ordinators)

The emergency response personnel will be under the control of the ERC. They will take direction from the ERC as required, specific to the type of emergency at hand. These personnel must be fully conversant with the emergency response equipment onsite and shall have (as a minimum) the following training:

- First Attack Fire Fighting
- Spill Response
- Hazmat Knowledge

11) Equipment Officer

The Equipment Officer or delegate will undertake the maintenance and checks of key site equipment and systems. The role will also involve the maintenance of the APZ and other associated protections against bushfire impacts.

Appendix C
Emergency Response Procedures

Appendix C

C1. ERP-01 Fire and Explosion

1. General

Activities that may ignite vegetation include hot works (grinding, cutting, welding, etc.), a fire in the BESS or transformers, vehicle exhaust, hot brakes on vehicles.

It is imperative that for all fires and explosions, the alarm is raised as early as possible. In the event a fire is discovered, or an explosion is identified (i.e., heard), the person detecting the incident shall raise the alarm by immediately notifying others in the immediate vicinity and then contacting the CW. The CW will then make further decisions regarding fire response. Where the CW cannot be immediately located, the site Manager shall be contacted, and the location of the CW identified so that the incident details can be relayed.

Any alarm given for a minor fire (e.g., a small fire in a rubbish bin in a non-hazardous area and not in danger of spreading) that is extinguished by the person on the spot should be “Terminated” as in **Section 6.8** and the Fire Brigade immediately notified, whilst the Brigade will still attend the site, to ensure there will be no re-ignition, there will be less urgency on the brigade's behalf. It is noted that this only applies to the operational phase as such equipment is not active during construction.

In any fire situation, the first minutes are most critical and the initial decision to fight or to report can only be based on the estimate by the individual of their capacity to extinguish the fire with what equipment they have immediately on hand.

All explosions should be carefully assessed to determine whether they should be treated as a serious and major incident. Where small explosions occur (i.e., localised around small packages, etc.), it may be possible to respond and rectify the problem with onsite resources. However, in the unlikely event that a major explosion occurs and significant damage results, external assistance will be required. The CW must be contacted in the event of any explosion (or fire). They will decide on the appropriate action.

If in doubt – Summon Assistance.

Incidents occurring outside site hours would initiate site detection systems and alarms, however, no personnel will be onsite to attend to the incident. In this case, the alarm will be raised Neoen’s Operations Control Centre who will relay the alarm to the Fire Brigade and then to the CW (or deputy). The site will then be attended by the Fire Brigade and the CW (or deputy). The ERP and emergency procedures will be located at the site entrance emergency box. The Fire Brigade will have access to the site emergency box on entry to the facility. The CW (or deputy) will attend the site and assist the CA as required. It is noted that this only applies to the operational phase as such equipment is not active during construction.

2. Procedure

1. Fire

All Employees

a) Warn personnel close by or those who may be in immediate danger.

b) Immediately notify the CW. If the CW cannot be located, notify their deputy.

c) If appropriate, the CW will notify the Fire Brigade (000).

d) The CW will direct CA to commence evacuation if required.

e) Emergency Team (Fire Wardens) shall attempt to extinguish the fire if it is feasible and rescue personnel casualties if involved in fire area, but only where a rescue can be accomplished without undue risk to the rescuer. Use fire extinguishers or hose reels as required. Take care to select the correct firefighting medium based on the fire type (i.e., care must be taken with electrical fires and water).

f) The CW will direct emergency response personnel (e.g., Fire Wardens) to ensure clear access for Fire Brigade (i.e. remove trucks off site).

g) The CW will advise the Fire Brigade of the situation and be prepared to assist as required.

h) Secure records and make visitors book available.

i) Staff are expected to be familiar with and be prepared to carry out the following Action Plan.

2. CW

Take charge of the emergency until the Fire Brigade arrives, then provide support to local authorities. Take a mobile phone, if available.

Turn off power at main switchboard. If nighttime, light circuits should be left on in the offices.

Drivers: Stop operations. If possible, move vehicles to a safe area. Assemble at the emergency evacuation assembly point(s).

Staff: On the instruction by the CW, proceed to “Safe Assembly Areas”. Ensure free access to roadway for vehicles leaving site. Prevent entry of vehicles other than the Fire Brigade, Ambulance, etc.

3. Explosion

All Employees

Notify the CW and the O&M Manager of the emergency and its location.

a) If appropriate, the CW will notify the Fire Brigade.

b) Ensure clear access for Fire Brigade (i.e., remove trucks off site).

c) The CW will advise Fire Brigade of situation and be prepared to assist.

4. Total Fire Ban

During a Total Fire Ban (TFB), certain activities are prohibited to prevent the outbreak of bushfires. A TFB is declared when the fire danger is extreme to catastrophic (due to favourable conditions for a bushfire), and the risk of fire starting and spreading rapidly is extreme. Provided below is a list of works and activities that should not be carried out during a TFB:

- Lighting fires. No fires are to be lit in the open.
- Use of outdoor cookers. Barbecues are prohibited.
- Hot work activities. These include welding, grinding, soldering, gas cutting and any other activity that generates sparks or heat unless exemption from RFS has been obtained or certain conditions are met, such as a risk assessment or appropriate fire extinguishing equipment.
- Unnecessary use of operational plant and machinery such as lawn mowers, tractors and chainsaws are restricted.
- Burning off (e.g., hazard reduction, pile burning, agricultural burns) are suspended.

- Trenching and land clearing.

5. Hazards

Hazards that are present at the site have been identified in **Appendix Figure C-1**.



Appendix Figure C-1: Site Hazards

6. Telephone Numbers

See Emergency Contact List - **Appendix A**

Note: After an explosion occurs, do not approach the explosion area until the CW has assessed the situation. Where safe to do so, rescue injured people but do not attempt to investigate the explosion area without appropriate authority.

C2. ERP-02 BESS Fire

1. General

In the event of a BESS fire the underlying response will be similar to a generalised fire scenario. However, there are some deviations which are best outlined in a separate response.

2. Procedure

1. Fire

All Employees

a) Warn personnel close by or those who may be in immediate danger.

b) Immediately notify the CW. If the CW cannot be located, notify their deputy.

c) If appropriate, the CW will notify the Fire Brigade (000).

d) The CW will direct CA to commence evacuation (per ERP-10) if required.

e) Electrically isolate the BESS (Per **Appendix E**) from other infrastructure if safe to do so / and or experienced staff capable of undertaking this activity are present.

f) **Extinguishing the BESS fire shall not be undertaken**. Application of water to the BESS may exacerbate the formation of by-products (i.e. hydrogen fluoride gases). The fire cannot be extinguished and will continue until the stored energy has dissipated. The evacuation point shall be selected considering the wind direction to prevent personnel from being exposed.

g) The CW will direct emergency response personnel (e.g., Fire Wardens) to ensure clear access for Fire Brigade (i.e. remove trucks off site).

h) The CW will advise the Fire Brigade of the situation and be prepared to assist as required.

i) Secure records and make visitors book available.

j) Staff are expected to be familiar with and be prepared to carry out the following Action Plan.

2. CW

Take charge of the emergency until the Fire Brigade arrives, then provide support to local authorities. Take a mobile phone, if available.

Turn off power at main switchboard. If nighttime, light circuits should be left on in the offices.

Staff: On the instruction by the CW, proceed to “Safe Assembly Areas”. Ensure free access to roadway for vehicles leaving site. Prevent entry of vehicles other than the Fire Brigade, Ambulance, etc.

3. Explosion

An explosion is not expected to occur due to the protection systems present within the BESS containers (i.e. ventilation system, explosion venting), etc. Nonetheless, in the unlikely event of an explosion, the following procedure is to be followed.

All Employees

Notify the CW and the Site Manager of the emergency and its location.

If an incident occurs after hours (explosion raising an alarm), the Neoen’s Operations Control Centre are the to first notify fire services and then the CW of an incident. The CW will then attend site to assist the Fire Brigade as required.

a) If appropriate, the CW will notify the Fire Brigade.

b) Ensure clear access for Fire Brigade (i.e., remove trucks off site).

c) The CW will advise Fire Brigade of situation and be prepared to assist.

3. Total Fire Ban

During a TFB, certain activities are prohibited to prevent the outbreak of bushfires. A TFB is declared when the fire danger is extreme to catastrophic (due to favourable conditions for a bushfire), and the risk of fire starting and spreading rapidly is extreme. Provided below is a list of works and activities that should not be carried out during a TFB:

- Lighting fires. No fires are to be lit in the open.
- Use of outdoor cookers. Barbecues are prohibited.
- Hot work activities. These include welding, grinding, soldering, gas cutting and any other activity that generates sparks or heat unless exemption from RFS has been obtained or certain conditions are met, such as a risk assessment or appropriate fire extinguishing equipment.
- Unnecessary use of operational plant and machinery such as lawn mowers, tractors and chainsaws are restricted.
- Burning off (e.g., hazard reduction, pile burning, agricultural burns) are suspended.
- Trenching and land clearing.

4. Hazards

Hazards that are present at the site have been identified in **Appendix Figure C-1** in **ERP-01**.

5. Telephone Numbers

See Emergency Contact List - **Appendix A**

Note: After an explosion occurs, do not approach the explosion area until the CW has assessed the situation. Where possible rescue injured people but do not attempt to investigate the explosion area without appropriate authority.

C3. ERP-03 Bushfire Response Procedure

1. Fire Suppression

During regular operation, fire water is provided in two (2) tanks with capacity in accordance with the requirements of AS 2419.1:2021 (Ref. [4]). Fire water during construction will be provided via water carts). Fire safety equipment (fire extinguishers and fire blankets) will be installed in accordance (and maintained) with relevant codes and standards (as applicable) at the O&M Facility. All site vehicles and mobile plants will be equipped with a dry chemical powder fire extinguisher and first aid kit.

2. Bush Fire Procedure

First Responder

a) If you discover a fire onsite follow the Onsite Fire Response Procedure (i.e. Fire response above).
b) If you become aware of a bushfire in the vicinity of the site, immediately notify the CW and or DCW.
c) If the bushfire is approaching, the CW or DCW are to contact emergency services on 000 and provide the following information:
    i. Your name
    ii. The type of incident – Bushfire
    iii. The company name, address, and nearest cross street
    iv. Any other information you believe is relevant to the bushfire situation (e.g., directions of fire relative to the site, bushfire is restricting egress etc.)
d) Notify the Chief Warden and/or Deputy Chief Warden (via UHF radio on channel X, mobile phone or in person) of the bushfire situation by providing the following information:
    i. If you have contacted emergency services.
    ii. The location of the bushfire relative to site
    iii. If there is an immediate risk to your safety.
    iv. If the area has been evacuated.
    v. If egress from the area is restricted.
e) Electrically isolate the BESS from other infrastructure if safe to do so / and or experienced staff capable of undertaking this activity are present.

Chief Warden, Deputy Chief Warden, and Warden Response

a) If a bushfire is in the vicinity of the site, assess the extent of the emergency and establish direct contact with QFD and coordinate/manage the site and actions in accordance with relevant advice from emergency personnel at the time.
b) If the bushfire is approaching the site, alert emergency services (call 000) and Initiate the Emergency Evacuation Procedure. Provide emergency services with the following information:
    i. Your name

ii. The type of incident – Bushfire
iii. The company name, address, and nearest cross street
iv. Any other information you believe is relevant to the bushfire situation (e.g., directions of fire relative to the site, bushfire is restricting egress etc.)

c) If the bushfire front impacts the site, Initiate the Emergency Evacuation Procedure, and alert emergency services (call 000) providing the information listed in Step 2.
d) The Chief Warden will liaise with emergency services to determine when it is safe to return to the site. All employees and visitors are to remain at the Emergency Assembly Point until instructed that is safe to re-enter the site or leave in the event that it is unsafe to re-enter the development area.
e) When an emergency event is rendered safe or emergency services relinquish control of the development area, the Chief Warden will notify the Deputy Chief Warden and Warden to have personnel return to the development area. The Chief Warden will also:
    i. Organise a debrief with Deputy Chief Warden and, where appropriate, works area supervisors and emergency services personnel
    ii. Compile a report of the emergency event for the HSE team
f) The HSE team will review the emergency event report and initiate the implementation of any changes to the Bushfire Response Procedure and response required based on the findings of the emergency event report.

3. Operational Phase

Outside of Bushfire Season

a. Maintenance

The CW and all staff are to ensure all APZs are to be maintained as specified and access tracks, water supply and firefighting equipment are to be maintained at all times.

b. Training and Awareness

Bushfire response drills are to be undertaken alongside drills outlined in **Section 6.9**.

c. Recording and Reporting

The CW and DW are to review, record and maintain bushfire management measures. The recording will include:

a) Date.
b) name of the recorder.
c) Confirm that bushfire management measures have been checked and are in place.
d) any maintenance works undertaken.
e) any further action required and responsible personnel.

Bushfire season

a. Preparation

The CW and DW are to review and address outstanding requirements in preparation for the bushfire season. Bush fire management measures and maintenance are to continue.

4. Total Fire Ban

During a TFB, certain activities are prohibited to prevent the outbreak of bushfires. A TFB is declared when the fire danger is extreme to catastrophic (due to favourable conditions for a bushfire), and the risk of fire starting and spreading rapidly is extreme. Provided below is a list of works and activities that should not be carried out during a TFB:

- Lighting fires. No fires are to be lit in the open.
- Use of outdoor cookers. Barbecues are prohibited.
- Hot work activities. These include welding, grinding, soldering, gas cutting and any other activity that generates sparks or heat unless exemption from RFS has been obtained or certain conditions are met, such as a risk assessment or appropriate fire extinguishing equipment.
- Unnecessary use of operational plant and machinery such as lawn mowers, tractors and chainsaws are restricted.
- Burning off (e.g., hazard reduction, pile burning, agricultural burns) are suspended.
- Trenching and land clearing.

5. Hazards

Hazards that are present at the site have been identified in **Appendix Figure C-1** in **ERP-01**.

C4. ERP-04 Loss of Containment

1. Product Spills Onsite (i.e. Transformers, BESS)

1. General

While spills are not expected to occur at the site, in the event of spill, the following procedure should be followed.

2. Procedures

1.2.1. Person Discovering the Spill

a) Warn any personnel in immediate danger.

b) Report the spill to the CW.

c) If safe, protected (i.e., PPE) and trained (e.g. Fire Wardens), contain the spill using the site spill kits.

d) If not trained or competent in spill clean-up, evacuate the area and contact the CW.

Note: Do not use water to wash down spills

1.2.2. Communications Officer

a) Alert the CW.

b) If instructed by the CW call the Fire Brigade (Call 000).

c) Notify site emergency response personnel (Fire Wardens) of the incident by phone or message (e.g., via runners).

1.2.3. Site Emergency Response Personnel

a) Evacuate areas if required, or under the direction of the CW.

b) Conduct personnel count and account for all personnel onsite.

c) Perform duties as required by CW.

1.2.4. CW

a) Assess the incident and formulate response.

b) Ensure CA are called as required (Call 000).

c) Co-ordinate emergency actions.

d) Contact tenants on adjacent sites if required and notify of potential evacuation (per ERP-10) if required.

e) Arrange for evacuation of onsite personnel and offsite facilities if required.

f) Provide advice to CA as required and liaise with CA commanders.

2. Product Spills Outside of Site

1. General

Spills off-site constitute a serious incident and must be responded to immediately. An off-site spill would be classified as an external alert requiring the response of CA.

In the event of spill, the following procedure should be followed.

2. Procedures

2.2.1. Person Discovering the Spill

a) Warn any personnel in immediate danger.

b) Contact the CW (or their deputy of they cannot be located). If an incident occurs after hours, Neoen's Operations Control Centre are to notify the CW of the incident.

c) If safe (i.e., trained to do so, e.g. Fire Wardens) attempt to contain the spill from spreading further using the spill containment kits onsite.

Note: Do not use water to wash down spills

2.2.2. Communications Officer

a) Alert the CW.

b) Call the Fire Brigade (Call 000).

c) Notify site emergency response personnel of the incident by phone or message (via runners).

2.2.3. Site Emergency Response Personnel

a) Evacuate areas if required, or under the direction of the CW.

b) Conduct personnel count and account for all personnel onsite.

c) Perform duties as required by CW.

2.2.4. CW

a) Ensure CA are called immediately (Call 000).

b) Assess the incident and formulate a first attack response (i.e., containment).

c) Co-ordinate emergency actions.

d) Contact landowners on adjacent sites if required and notify of potential evacuation (per ERP-10) if required.

e) Arrange for evacuation of onsite personnel and offsite facilities if required.

f) Provide advice to emergency services as required and liaise with CA commanders.

3. Notification

For any suspected breach of the environmental protection regulations, notification to DETSI or other environmental may be required. This should be completed ASAP once the details of the release are known.

C5. ERP-05 Personal Injuries

1. Equipment location

First Aid Kits are located in the O&M facility office areas during operation and construction compounds. First aid kits are located in all vehicles onsite.

2. Procedures

If injured, seek first aid/medical treatment immediately. If a person is severely injured, has collapsed or is in distress, do not panic. The following procedure shall be carried out:

- The person discovering the casualty shall:
  a) Advise the supervisor of the injured person.
  b) Contact the O&M Manager and advise of the casualty.
  c) If qualified, apply first aid, if not qualified await arrival of first aid officer or qualified first aid person.
  d) Prevent unqualified persons from attempting to assist or treat the casualty.
- Communications Officer:
  a) Alert the duty first aiders and notify of the casualty location.
  b) Notify the CW and, under their direction call the ambulance (call 000).
    - Describe the nature of the emergency
    - Say how many are injured, if known
    - Give your name and where you are telephoning from
- CW
  a) Assess the injury and call assistance from ambulance service as required.
  b) Assist onsite response (first aiders) as required.
  c) Arrange for guidance of the ambulance to the scene of the casualty.
  d) Arrange for the accident/incident investigation and completion of the appropriate forms.
- First Aiders
  a) Treat the casualty as required

Notes:

1) Where an accident occurs involving loss of life or serious personal injury, or is an accident involving plant and equipment, written notice of this accident is to be forwarded to the relevant Government Authorities, which include WorkSafe QLD, HSE and Police.
2) Where an accident or incident occurs with actual or potential significant off-site impacts on people or the biophysical environment, a report may need to be submitted to DETSI. Notification should be completed ASAP and a further detailed report shall be submitted following investigation of the causes and identification of necessary additional preventative measures.

C6. ERP-06 Natural Events (Flood / Storm / Earthquake)

A key preventative measure for emergency planning for natural events is preparedness and availability of information prior to the event. For severe storm events, the CW or DW should monitor available weather warning systems such as the Bureau of Meteorology (BoM) website or the Rockhampton emergency planning dashboard.

1. Flood Response Procedure

In the event of a flood:

1) If high and/or prolonged rainfall is expected, the CW or DW should monitor warnings. The CW or DW should also be registered to receive mobile alerts via the location-based Early Warning Network (EWN) that tracks potentially dangerous weather systems.
2) If the forecast and warnings indicate that localised flooding at the Development Site is likely, the CW or DW is to liaise with works area supervisors (during construction) and/or directly with personnel, contractors, and visitors to ensure:
    a. All equipment and materials are moved to areas of the site that are not subject to concentrated flows and/or inundation.
    b. All personnel, contractors and visitors vacate works areas subject to localised flooding prior to the onset of the storm event.
    c. Remind all personnel, contractors, and visitors of the dangers of driving or walking through flood waters.
3) If the forecast and warnings indicate that regional flooding at the Site is likely, the CW or DW is to liaise with works area supervisors (during construction) and/or directly with personnel, contractors, and visitors to:
    a. Ensure all personnel, contractors and visitors have a safe route home (or elsewhere) from the Development area. The website https://www.livetraffic.com/desktop.html can be accessed to identify road closures along an employee's typical route from site.
    b. Should regional flooding prevent an individual from travelling home (or elsewhere), the CW or DW are to ensure that alternate accessible overnight accommodation is available/arranged for the individual.
    c. Remind all personnel, contractors, and visitors of the dangers of driving or walking through flood waters.

2. Storm Response Procedure

In the event of a severe storm:

2) If you are inside:
    i. stay there and keep clear of windows.
    ii. stay inside until the storm has passed and when the CW or DW indicates that it is safe to move to a different location or return to work.
3) If you are outside:
    i. move inside, stay there, and keep clear of windows.
    ii. if remote from site buildings, move inside a vehicle if possible and only drive back to the construction compounds or O&M Facility of it is safe to do so.

iii. stay inside until the storm has passed and when the CW or DW indicates that it is safe to move to a different location or return to work.

4) The DW and/or nominated delegates will undertake a site inspection to ascertain whether any unsafe conditions have developed because of the storm and direct personnel, contractors, and visitors appropriate.

C7. ERP-07 Bomb Threat

1. General

Threats of this nature are usually made:

1) By telephone to a location.

2) By telephone through the local police, who may have received the message direct, or who may be repeating a communication to the press, radio, television or authorities.

3) By anonymous letter.

Letters received containing information on the alleged placing of a bomb should be handed to the police for any action they consider desirable. They should be handled as little as possible and by a minimum number of persons.

2. General Planning

The objectives of the guidelines, which follow, are:

1) To ensure maximum safety of personnel.

2) To protect Company property.

3) To minimise interference with normal production, business etc.

4) To enable an early appreciation of the situation to be made and to arrive at the correct decisions without anxiety and confusion.

Bomb threat cards will be located adjacent to each phone and a search procedure has been developed to facilitate rapid location of potential explosive devices in areas allocated as assembly points. Detailed bomb searches will be conducted by Police or other combat agencies.

3. Procedures

1. Initial Response

Threats by mail or other published media should be passed immediately to the supervisor and then to the CW. Staff receiving phone threats should:

a) Remain calm (or appear to be) and do not hang up; let the caller finish message.

b) Obtain information and record on the nearest paper; wording is a priority. Keep answers to one or two words.

c) Warn others if possible.

d) Listen to background noises and voice mannerisms.

e) When caller hangs up, complete checklist.

f) Inform Supervisor or site emergency response personnel.

g) Await interview by Site Emergency Commander.

A bomb threat checklist is provided in **Appendix Figure C-2**.

2. Site Emergency Response Personnel

a) Notify the CW of the incident.

b) Act under instructions from the CW as directed.

3. CW

a) The CW shall notify police of details, ask them for their recommendation for immediate action, and ask them to attend site to assess further required actions with management input.

b) On Police advice, take action to safeguard personnel (i.e., possible evacuation).

c) Consult with the site management and provide advice to the Police onsite-specific issues.

d) If appropriate, and in consultation with the police, form a bomb search team and brief them on their duties. Arrange for temporary relocation of any evacuated person.

e) In consultation with the Police, advise neighbouring properties of the situation, if required.

f) If any suspicious device is located, do not touch it, and hand over disposal operations to the police.

Note: You should also familiarize yourself with the bomb threat call sheet and other instructions in this section.

4. Search Procedures

A search team shall be established under the direction of the CW. The following general procedures will apply:

The CW shall nominate and search a safe area to be used for evacuation (per ERP-10). A search procedure is given at **Section 4.3.7** below:

a) Search of area(s) for bomb; the search to be organised by the police if they deem it necessary with management advice. All personal effects must be removed before search.

b) If a potential bomb is found by an employee, it should be reported to the CW. The device/object shall not be handled or disturbed. The CW shall notify police and bomb squad.

5. Evacuation

a) If evacuation (per ERP-10) is required, leave all windows and doors open as you leave to reduce damage if bomb explodes.

b) Where a bomb is identified in other areas of the site, the area is to be evacuated immediately. It is noted that explosions in open air have less impact than when enclosed. If an explosion does occur, exposed persons away from the immediate area will be impacted by an overpressure wave with damage a function of distance from the bomb source. The emergency assembly point providing the greatest distance from the bomb shall be selected.

c) On instruction to evacuate, evacuate the nominated area of all personnel not required for the safe running of the facility, to the site assembly point(s). Those remaining shall bring the facility to a safe condition and then immediately evacuate to the safe area.

d) The evacuation time shall be for a period instructed by the police or CW.

6. All Clear

The police shall declare when the bomb threat no longer exists to the CW, or his representative who shall declare it to all personnel.

4. Bomb Threat Assessment and Checklist

1. Preamble to Bomb Threat and Search Checklists

This section is designed to give information on how to respond to bomb threats.

Bomb threats, and other similar types of threats, may arise from a number of causes.

They may simply be made for harassment purposes, as a diversion, or as a ‘party prank’.

Alternatively, they may be a part of an extortion attempt (with or without an actual explosive device), part of the operations of a terrorist group, or an individual’s malicious attempt to inflict injury or damage.

The threat may be specific or non-specific. In a specific threat the caller is prepared to give detailed information about the bomb; why it has been placed, when it will explode etc. Non-specific threats are more common, and typically consist of the caller simply stating a bomb has been placed and hanging up.

Most threats are hoaxes, but this is of little consolation when you are faced with deciding how you will respond to one. It may appear that evacuation of people is the best response, but there are really a number of options open to you, and you have to decide which, in these circumstances, will be the safest. For example, if an explosive device has been set in a car park you would be placing people at greater risk by evacuating them to or through such an area. However, if the location of the bomb is given, or the bomber is thought to be genuinely motivated, evacuation of the known danger area may be the best response.

A check of the evacuation route and the assembly area should be made prior to the evacuation. Note: Do not use the fire assembly area in a bomb threat situation if there is the likelihood that the area may be a target. Direct people to the nearest alternative emergency assembly point.

In some cases, it may be best to tell people the reason for the evacuation and ask them to check their area for any suspicious objects and report, but do not touch them as they leave. In other circumstances it may be possible to safely conduct a discrete search while the building is still occupied, or the building may be evacuated as a ‘fire drill’ and then discretely search.

The point is, there is no standard response to a bomb threat which will give the best (safest) result in every situation. Each threat has to be individually evaluated.

2. Things to Consider when Assessing a Threat

- How did the threat sound? Was the caller familiar with the premises? Were they familiar with the nature and location of the alleged explosive device?
- Was the tone of the call consistent with a genuine threat? Was the call related to a current bomb threat climate? (Company pursuing a controversial policy, significant visitors onsite, recent sacking etc.)
- How much time you have. When is the device set to go off?
- What options do you have open to you? Is a specific area under threat, or the whole site? What is the best way of safely and quickly conducting a search?
- What is the safest place for people on the site; where they are, in standard evacuation areas, or in some other area? Are your actions likely to encourage other threats?

The basic rule is to look at the threat and, given the known details, decide what should be done that will minimize the risk to human life.

The police must always be advised of any threat, and their advice considered in working out your response. As they are unfamiliar with your site, the job of searching for an explosive device may

fall largely to Company personnel. Guidelines on bomb searches are given in this section of the manual.

If an evacuation is implemented, ask occupants to take personal effects with them and report any suspicious objects noticed.

If a suspicious device is found, it should not be touched or interfered with in any way. It shall be immediately reported to the police who will take charge of disposal operations.

If it appears that the threat is a hoax, a decision must be made about re-occupation of the area. People will need reassurance that there is no further danger, and a reasonable criterion is how comfortable you personally feel about going back in the area. In some circumstances, re-occupation may be better left to the next day, or shift.

3. Explanation of Bomb/Extortion Threat Call Sheet

Copies of the call sheet should be kept out of sight, but readily available to O&M Manager and other persons likely to receive such calls. The purpose of the call sheet is to enable the call recipient to extract as much information as possible from the caller, so that the safest response to the threat can be worked out. To this end, the layout follows the logical sequence of such a call.

4.3.1. The Instructions

The Instructions are in a brief form at the top of the sheet to remind the recipient what to do, rather than give any detailed explanation.

4.3.2. Call Tracing

Some call tracing may be possible, even if one of the parties have already hung up, hence Instruction 3 not to hang up. The police will action this if appropriate.

4.3.3. Exact Wording of Threat

Here the exact wording of the threat should be recorded. The time and date may be added later.

4.3.4. Questions to Ask

If the caller has not already given these details, ask specifically the questions listed. If the call is genuine, they will probably give straight answers to them. Extensive hesitation may tend to indicate a hoax. In Point 7 on the bomb threat check list is the question, “Why are you doing this?” this question gives some scope for delaying tactics and for narrowing down the psychological make-up and identity of the caller. Following this is a request for the caller to give his/ her name and address. These are unlikely to be given, even if the call is a sympathetic warning. Leave these questions till last, as they may well cause the caller to hang up.

4.3.5. Notification of Call

As soon as possible, the CW should be advised of the threat. If another person can do this while the call is in progress, well and good. If not, do it immediately the caller has hung up.

4.3.6. Analysis of Call

Tick the appropriate squares. Add any details as necessary.

4.3.7. Search of the Areas.

If it has been established that a bomb may have been placed onsite, a search should be conducted whenever it is considered that it is safe. The search team will consist of responsible people who normally work in the area, and will therefore be familiar with what is, and is not, out of place. As the

police will not have this familiarity, they will need this assistance in the search. As a general rule it is advisable to secure the co-operation of potential searchers in advance of a threat being received.

1) Organise a search team/s

- Select responsible volunteers to carry out the search.
- Determine the exact area to be searched by the team/s.
- Determine a deadline for completing the search, including a safe margin before the threatened detonation time, if given.

2) Brief the Searchers

- Advise the type of explosive device, if known; and any other details given by the caller, which may be relevant.
- Tell them to look for out-of-place items in the open, or in hidden, but accessible spots. Tell them to search in a methodical manner (See attached sheets).
- Tell them not to touch or tamper with any suspicious device.
- If there is the possibility of a booby-trap device, tell them to avoid any action which might trigger it. These may include opening doors, cupboards or hatches, or operating equipment or light switches in some circumstances.
- Tell them to immediately report any suspicious devices found.

3) Carry out Search

- Conduct the search in accordance with the briefing and in co-operation with the police. (In some cases, the Police may provide specialist assistance, e.g., sniffer dogs etc.)
- If a suspicious device is found, withdraw from the area and allow Police/ Military Bomb disposal units to handle the situation. If a suspicious device is not found, a decision on re-occupying the building should be made. When people are permitted to re-enter the area, they should be briefed so as to reassure them that no further danger exists and be accompanied back into the area by management personnel.

Note: When people have been evacuated from an area due to a bomb threat, they should be kept well clear of the danger area, and only the minimum number of people required for the purpose should be in the area during the search.

NEOEN

Bomb Threat Check List

Instructions: Use this sheet while receiving the call, complete as soon as possible
Obtain as much information as possible, ask questions
Do not hang up at the end of the call

Questions to Ask:	Caller's Voice ☑	
When is the bomb going to explode? ..... Where is the bomb right now? ..... What does the bomb look like? ..... What kind of bomb is it? ..... What will cause the bomb to explode? ..... Did you place the bomb? ..... Why did you place the bomb? ..... What is your name? ..... What is your address?	☐ Man ☐ Child ☐ Calm ☐ Excited ☐ Talking Slow ☐ Soft ☐ High ☐ Clear ☐ Nasal ☐ Lisp ☐ Ragged ☐ Laughing ☐ Deep Breathing ☐ Distinct ☐ Foreign	☐ Woman Age:..... ☐ Angry ☐ Uneducated ☐ Talking Fast ☐ Loud ☐ Deep ☐ Clearing Throat ☐ Stuttering ☐ Raspy ☐ Slurred ☐ Crying ☐ Drunk ☐ Disguised ☐ Familiar
	Whom does it sound like? (someone you know/movie star/radio personality)	

☐ Well spoken ☐ Foul ☐ Irrational	☐ Taped ☐ Incoherent ☐ Message Read
TELEPHONE CALL	
☐ Local ☐ Trunk/Toll ☐ STD ☐ Mobile	☐ Private ☐ Extension ☐ Public Phone

BACKGROUND NOISES	
☐ Street Sounds ☐ Crockery/Plates ☐ Other voices ☐ Static ☐ Short echoes ☐ Traffic ☐ Office Sounds ☐ Boat Sounds	☐ Factory/Machines ☐ Animal Noises ☐ PA System ☐ House Noises ☐ Long Echoes ☐ Aeroplanes ☐ Train Sounds ☐ Music (type) .....

REPORT THE CALL IMMEDIATELY TO YOUR SUPERVISOR OR CHIEF WARDEN

Did the caller appear familiar with plant/buildings by their description of the bomb location?

☐ Yes ☐ No

Call Recipients details:

Name - ..... Location - ..... Phone - .....

Date - ..... Time - .....

Appendix Figure C-2: Bomb Threat Checklist

C8. ERP-08 Collision of Road Vehicles

1. Objectives

It is unlikely that a serious accident involving a transport vehicle will occur in the immediate vicinity of the facility due to speed limits at the site which are graded depending on the operational area. It Is noted that the speed limits have been set depending on the potential risk posed by a collision to site assets. However, a minor collision resulting in product spillage and fire may occur on the roads within the facility and outside the facility. Notwithstanding the nature of the incident, the immediate objectives after a vehicle incident are to:

- Protect life and property.
- Control and prevent any spillage from spreading.
- Extinguish any fire if safe and possible.
- Remove ignition source (to prevent any fuel spills from igniting).
- Prevent spilt product from entering drains.
- Contain spilt product for subsequent removal.
- Prevent or minimise further spillage.

If the accident is serious enough to call the CA (Police, Fire Brigade, etc.) allow the Emergency Service Commander to assume traffic control on their arrival. Make all efforts to stop or divert approaching vehicles, depending on the risk and circumstances. Warn people to remain at a safe distance, taking into consideration the type and likely flow of liquid and vapour (e.g., Fuel, acid, liquefied gas) and prevailing climatic conditions. Vehicle safety triangles are to be used where available.

2. Protecting Watercourses

Make every effort to prevent spilt product from entering drains or watercourses.

The priority actions are:

- Contain.
- Minimise spread of the product and prevent water usage, particularly in toxic/bioactive chemical spills.

Avoid hosing down, but the responder must use their discretion. The responder's prime concern is for public safety, so they must evaluate the potential risks involved in alternative courses of action. If flammable or combustible liquid is spilled and cannot be prevented from entering drains, foam can be applied to minimise flammable vapour generation.

Block inlets to drains by using drain covers, dirt, sand, paper, rags, old clothing or similar material.

3. Incident Location Restoration

After an accident any contamination of the incident location is to be restored as soon as possible (in consultation with Management).

Make good damage to the road surface, surroundings or drainage systems. Co-operate with the local authorities. Clean the road surface of spilled materials or oil to prevent subsequent accidents from vehicles skidding or sliding on the chemical residue or oil. Notify public utilities, such as telecommunications authority, electricity supply authority, water board, etc if their property has

been damaged so that they can affect the necessary repairs. Similarly, damage to any signs, notices or hoardings should be made good or those responsible for them notified of the need for repair.

Assure owners of damaged private property such as houses, fences, gardens, motor cars, boats, etc. that their claims for compensation or repair will be promptly and sympathetically handled but no acknowledgment of liability should be made. Any employees on the scene should ensure that the company does, in fact, take appropriate follow-up action promptly.

If land has been polluted by chemicals, flammable/combustible liquids or vehicle oil, it may be necessary to remove soil and replace it with fresh material to restore the area to its original condition. Consult Management.

4. Fire Fighting

If a fire has started (e.g., as a result of ignition of combustible materials (no flammable materials stored at site), extinguish it (if safe and practicable) using the portable extinguishers (dry powder) from the vehicle or site. Try to limit the use of water until drains have been effectively covered and spill control is in place. See Procedure **ERP-01**.

C9. ERP-09 Intruders Onsite (Vandalism, Armed Hold-Up, Assault)

1. Preamble

The infrastructure onsite may be attractive items and can draw particular attention from certain elements of the community. Whilst the entrance to the site is by secure access only, there may be times when intruders could access the site (although it is noted that the site undertakes CCTV monitoring and a security perimeter fence constructed) and, hence, the products may draw unwanted attention. Site staff should be on the lookout for any suspicious activity by persons or vehicles onsite.

Note the description and registration number of suspicious vehicles and/ or persons. Inform the site management personnel and Police immediately. Action can then be taken before a crime is committed.

2. Objectives

The objective of this procedure is to minimise the contact between site staff and intruders and to ensure intruders are apprehended with the minimum impact on the site.

3. Procedure

1. Armed Hold-Up - Staff involved directly in the incident.

- During an armed hold-up co-operation is more important than intervention. Remember: No amount of money is worth a human life, don't be heroic.
- Try to remain calm, control your emotions and avoid any action which may incite violence.
- Obey the intruder's instructions, do precisely as they say, and nothing more.
- Tell the intruders what you're doing, make no sudden movements.
- Observe as much as possible as to the description of the intruders, including clothing and other distinguishing features (i.e., voice, accent, movements). Do not stare at the intruders.
- Do not touch anything which may be handled by the intruders.

2. After the Armed Hold-up, as soon as it is safe to do so.

- Call for assistance or activate an alarm – Notify the CW of the incident.
- Give details to the CW of the incident (CW to use components of the list below to gather details)

3. CW to do the following:

- Telephone Police (000) and say "Mt Hopeful BESS on S Ulam Rd in Bajool".
- Give your name, telephone number, exact location of the incident, and description of any person(s) and vehicle(s) involved.
- State clearly if the person(s) were armed and the type of weapon.
- Close the premises completely and do not allow unauthorised people to enter.
- Do not allow any person into the area accessed by the intruders and do not let any personnel handle objects touched by the intruders.
- Ask any employee witnesses to remain until interviewed by Police or if they insist on leaving ask for their permission for Police to interview them either at home or a later date.

- Do not discuss with any persons outside the business the goods or valuable stolen.
- Ensure staff or witnesses are provided with any trauma counselling if required.

4. Identification of Intruders onsite

- Where intruders are identified onsite, be it identification of an armed hold up in progress, identification of an unfamiliar person wandering around the site (i.e., person without a temporary identification badge that should have been obtained from O&M office), or identification of vandals, the following procedure should be followed:
- Immediately notify the Site Manager and ascertain whether the possible intruder is a visitor or is authorised onsite, if this cannot be verified, notify the CW or a member of the site emergency team (who will locate and notify the CW).
- The CW will decide on the action to be taken; however, it is not recommended that the intruder(s) be approached, the recommended action is to immediately notify the Police (external line - 000).
- Lock all entry and exit gates.
- Attempt to keep intruders in view from a safe distance.
- Write down description of intruders (use the personal description form **ERP-09**)

Note: Do not at any time attempt to confront or arrest intruders. This is not your job.

4. Civil Disorder

1. Preamble

It is unlikely that civil disorders (like bomb threats or large protesting crowds) will occur due to the reasonably remote location from residential, sporting or commercial (shops) outlets. Notwithstanding this, disruptive crowds can cause severe damage and major disruption to the RCB operations, both directly to the facility and to the infrastructure immediately surrounding the site. It is therefore essential that the site emergency response contains procedures for coping with civil disturbance.

Examples of civil disturbance include:

- Industrial disputes.
- Unpopular political decisions.
- Emotional international situations.
- Demonstrations and marches that get out of control.

The procedure below is designed to minimise the danger to personnel and the risk of damage to assets.

2. Procedure

1) As soon as the CW is aware of a civil disorder occurring:

- on the site
- in the vicinity of the site
- such that the event is imminent of unauthorised entry to the site by a disaffected person or group.

The following action should be taken:

- Alert members of the CA
- Initiate action to restrict entry to the buildings onsite.
- Prevent contact between demonstrators and the site occupants (employees)
- Notify the Police of the incident and request assistance.
- Notify nominated Managers.

1) Restrict entry to the site – site emergency personnel, under direction from the CW, should check security in their area and ensure all external gates and entry points to the site are locked.
2) The CW shall restrict contact between the site personnel and the demonstrators.
3) The CW shall contribute in a practical manner by:

- Withdrawal of staff where necessary
- Supervising the locking up of offices
- Securing all records, files, cash, and other valuables
- Promoting an air of confidence and calmness.

5. Personal Description Form

- Separate form required for each person.
- To be completed immediately after incident by each staff member, also, passers-by if possible.
- Place tick in the box applicable □, if answer is unknown draw a dash "-".
- Do not consult others during the completion of the form.
- Site Communications Officer to collect the forms, copy and hand to Police.

NEOEN

Name/Nickname Used:			Sex: Male ☐ Female ☐		
Approximate Age:			Nationality:		
Height (feet or metres):			Weight:		
Complexion	☐ Fair	☐ Dark	☐ Pale	☐ Fresh	☐ Pimply
	☐ Ruddy	☐ Suntanned	☐ Dirty		
Build	☐ Thin	☐ Medium	☐ Stout	☐ Nuggetty	
Voice	☐ Clear	☐ Loud	☐ Quiet		
Accent:			Eyeglasses (Colour/shape):		
Stature	☐ Straight	☐ Stooped	☐ Slouchy		
Walk	☐ Quick	☐ Slow	☐ Limp	☐ Springy	☐ Pigeon toed
Disguise:					
Moustache/Beard (Colour/type):					
Hands	☐ Soft	☐ Hairy	☐ Calloused		
Nails:					
Hair (Colour):					
Hair Style	☐ Straight	☐ Bald	☐ Curly	☐ Thick	☐ Thin
	☐ Wavy	☐ Long	☐ Cut		
Eyes (Colour):					
Size	☐ Large	☐ Little/Piggy	☐ Squint	☐ Staring	☐ Sore/irritated
Gloves (type/Colour):					
Scars or Marks					
Ears (Size/Shape)					
Nose (Size Shape)					
Teeth	☐ Good	☐ Bad	☐ Spaced	☐ Blackened	☐ Protruding
	☐ Uneven	☐ Missing			
Weapon					
Other distinguishing features (clothing, hat, tie, coat, shirt, etc.):					
Method and direction of escape (car model, registration, on foot, etc.):					
Method of operation (what did the intruder do, say, touch, take, etc.):					

C10. ERP-10 Evacuation as Part of an Emergency

1. Evacuation Procedure and Emergency Assembly Areas

On the instruction to evacuate, all personnel will assemble in the Primary Emergency Assembly Point located near the main site entrance. This assembly point will be used by all site personnel for all emergency situations onsite.

In the event the main assembly point is affected by the incident, an several alternative assembly points are designated. Personnel will be informed to assemble at the Secondary Emergency Assembly Points A, B or C depending on the access and suitability of the location due to the situation at hand.

2. Emergency Control Centre

The emergency control centre will be at the Primary Emergency Assembly Point. If this area is affected by the emergency, the emergency control centre will be at the Secondary Assembly Points A, B, or C.

3. Alarms

Alarm is raised manually by personnel physically identifying an incident. Personnel will then notify the CW, who will initiate the site emergency evacuation as necessary. Notice to evacuate will be relayed by voice to all staff onsite.

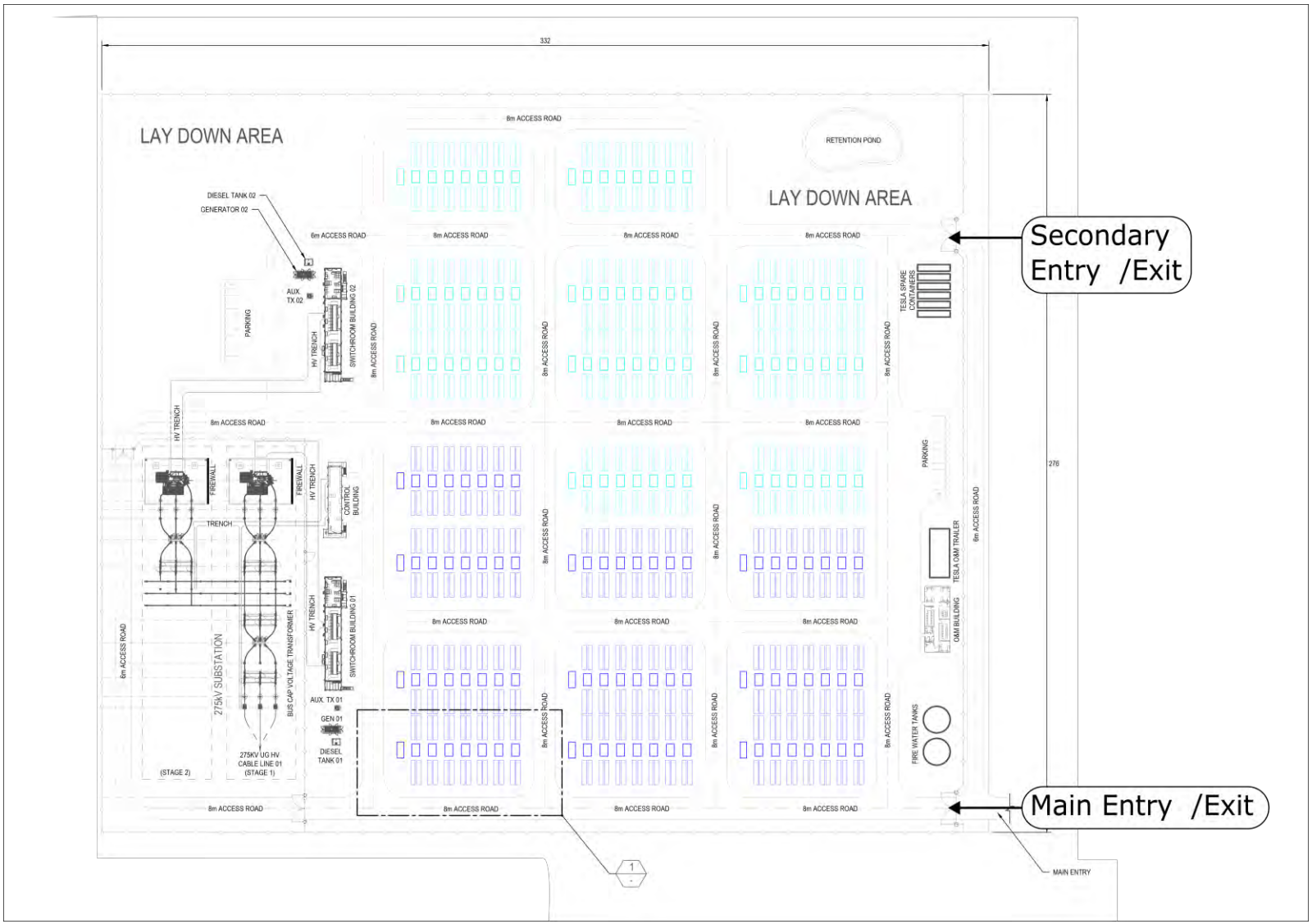
4. Procedure

On the instruction to evacuate given by the CW or their Deputy, all personnel, including contractors' personnel, shall proceed to the Primary Emergency Assembly Point. This assembly area will be used for all staff and contractors onsite. The CW will arrange for the mark off of names to ensure all staff have evacuated safely. At the assembly point, staff and contactors will be given instructions onsite evacuation or return to work as stipulated by the emergency condition.

In the event that the primary evacuation point is not available (i.e., the emergency is affecting the location), the alternate assembly point (Secondary Emergency Assembly Points A, B or C) will be used.

5. Emergency Exits

Should an evacuation from the site be required, the emergency exits are provided in **Appendix Figure C-3**.



Appendix Figure C-3: Emergency Exit

Appendix D
QFD Consultation

NEOEN

QFD Consultation Table

Comment No.	Date	Raised by (Affiliation)	Section - Comment	Action Taken	Date

Appendix L

Searches



ROCKHAMPTON REGION PLANNING SCHEME 2015

PROPERTY REPORT

Effective Date: 28/03/2025

Status: Current

Property Details

Address	1682 South Ulam Road Bajool QLD 4699
Property Size	9,044,277 m^2
Lot and Plan	100SP289441 100SP289441 100SP289441



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ROCKHAMPTON REGION PLANNING SCHEME 2015

PROPERTY REPORT

Effective Date: 28/03/2025

Status: Current



Zones

Rural

Overlay - Biodiversity

Biodiversity Areas – Matters of State Environmental Significance (MSES)

Corridors and Wildlife Habitats – Matters of State Environmental Significance (MSES) – Wildlife Habitats

Waterways

Overlay - Bushfire Hazard

Bushfire Hazard Classification - High

Bushfire Hazard Classification - Medium

Bushfire Hazard Classification - Very High

Bushfire Hazard Classification - Buffer

Information Overlay - Regional Infrastructure Corridors

ElectricityTransmission Network (Above 132kV)

Information Overlay - Road Hierarchy

Road Hierarchy - Rural Access

Overlay - Steep Land

Steep Land 15-20%

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ROCKHAMPTON REGION PLANNING SCHEME 2015

PROPERTY REPORT

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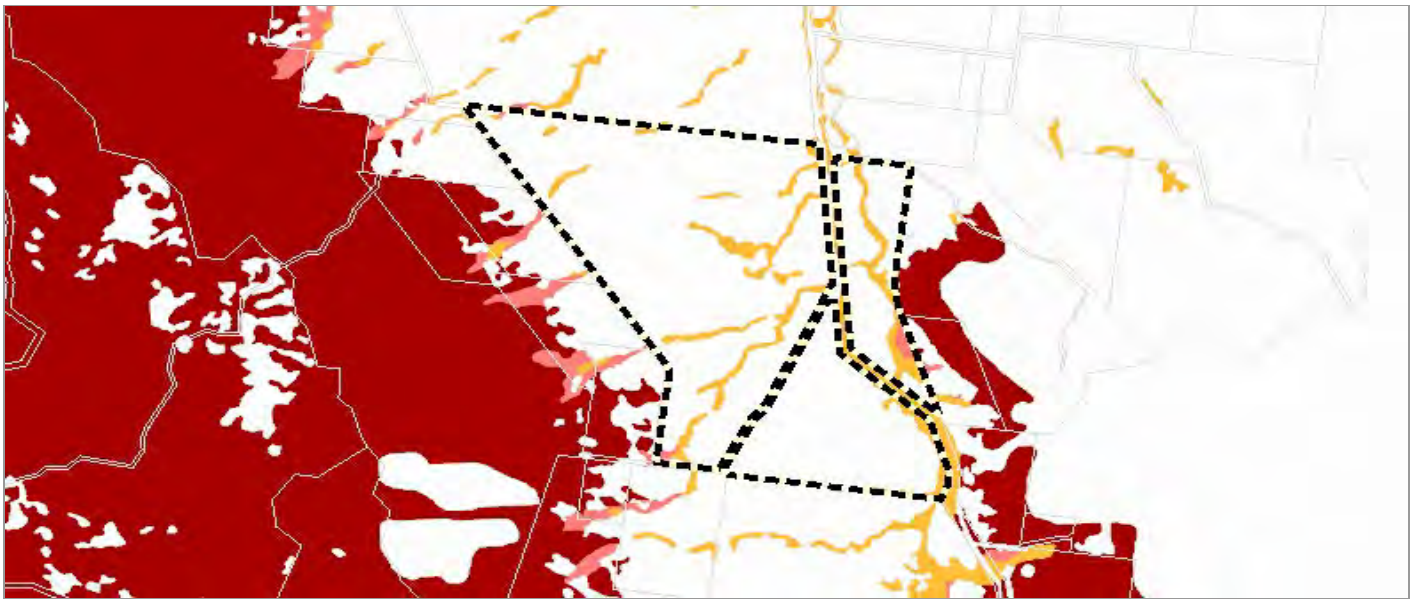
Status: Current

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ZONES AND PRECINCTS

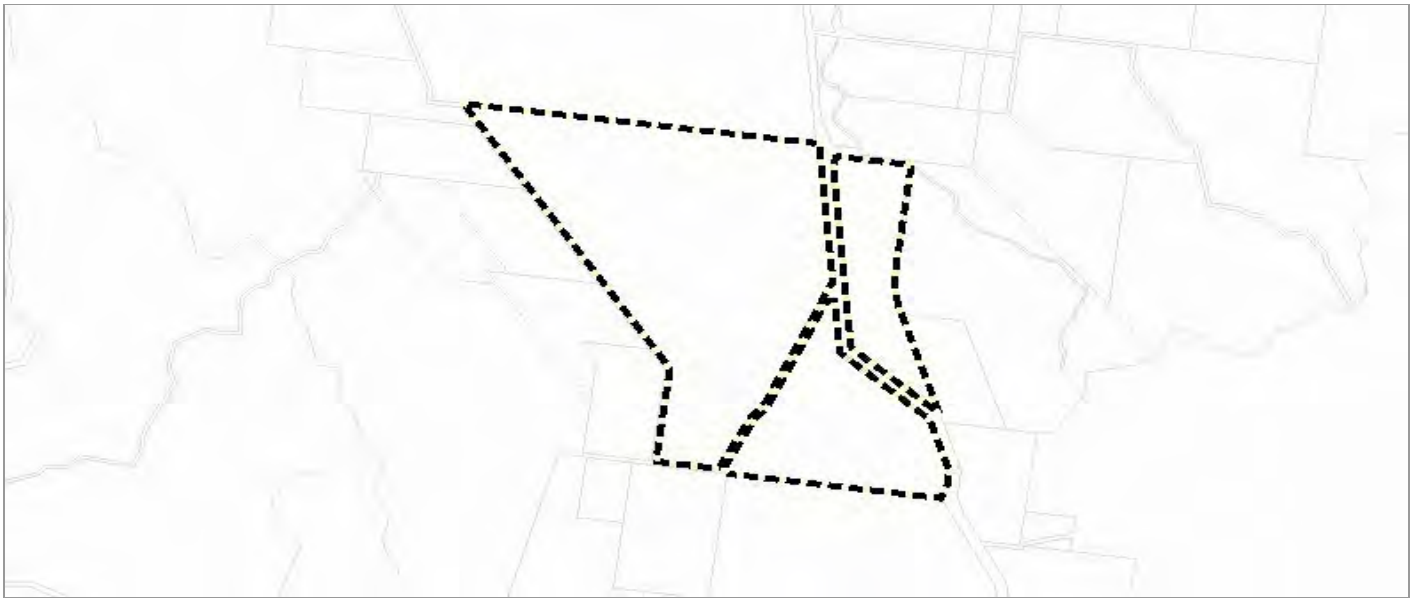


BUSHFIRE HAZARD OVERLAY

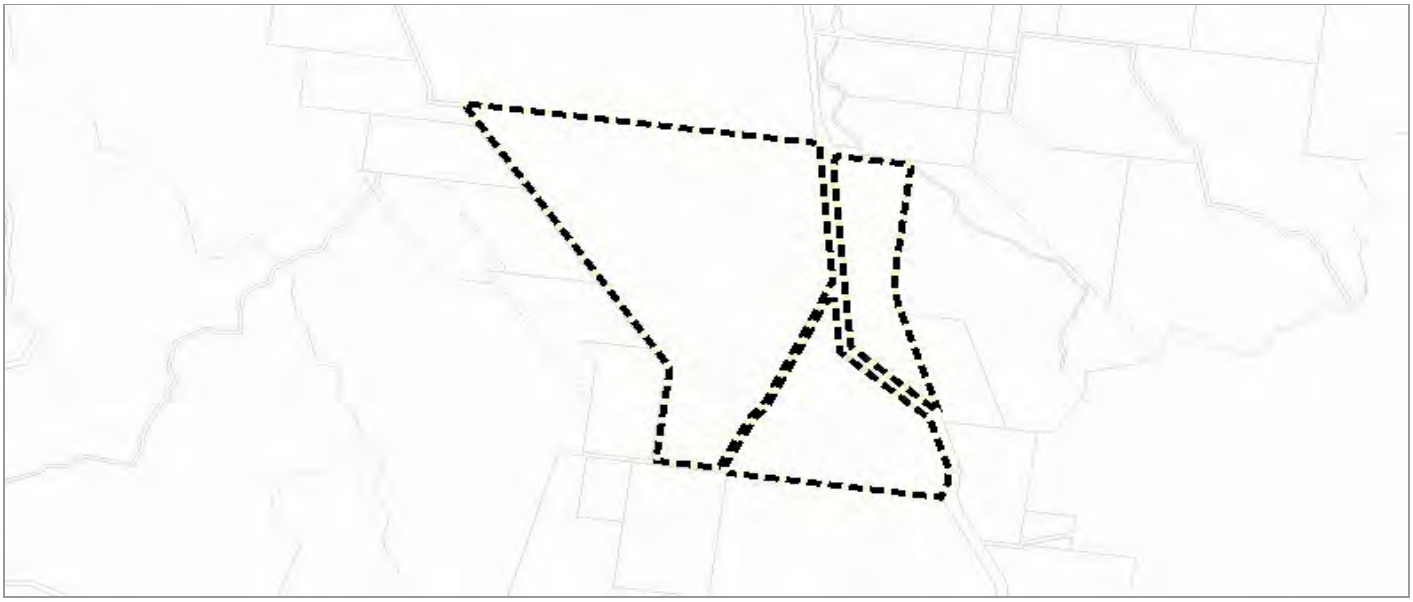


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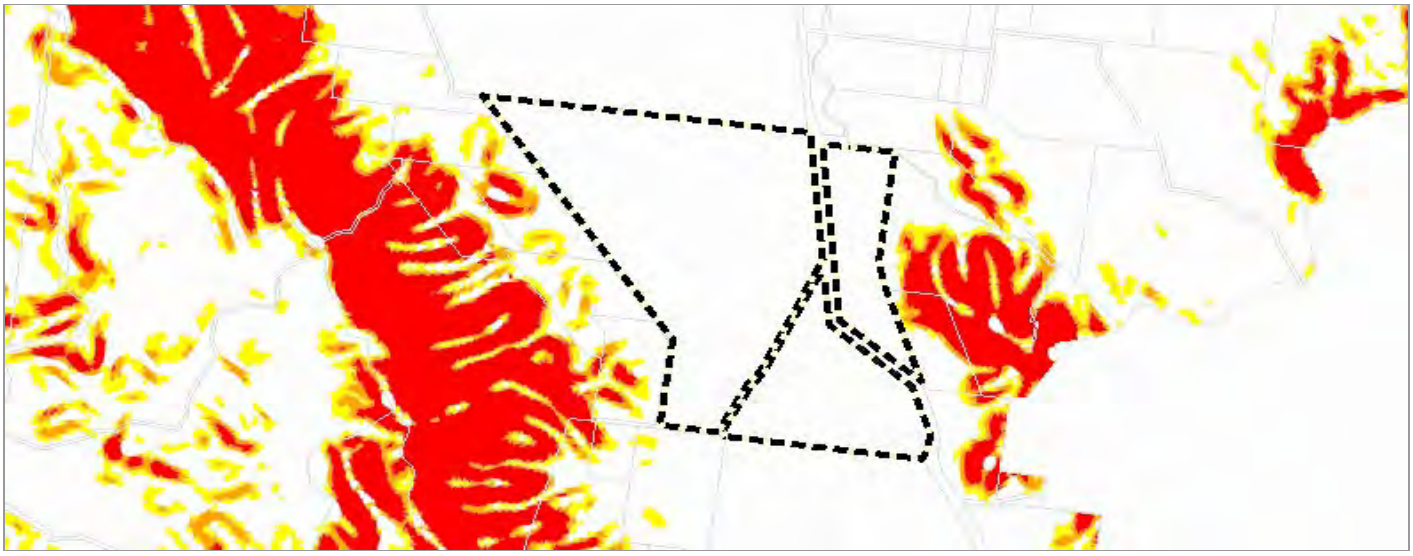


FLOOD HAZARD OVERLAY

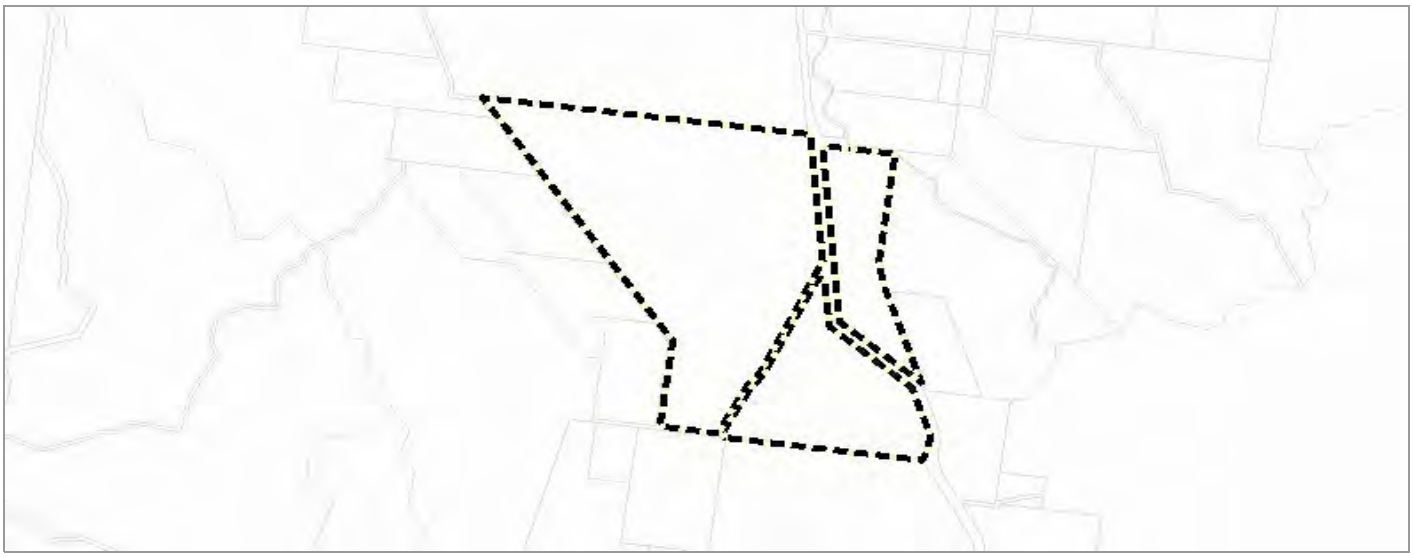


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STEEP LAND OVERLAY



SPECIAL MANAGEMENT AREA OVERLAY



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ROCKHAMPTON REGION PLANNING SCHEME 2015

PROPERTY REPORT

Effective Date: 28/03/2025

Status: Current

Property Details

Address	1682 South Ulam Road Bajool QLD 4699
Property Size	664,722 m^2
Lot and Plan	33DT40123



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Print Date: 04/09/2025

ROCKHAMPTON REGION PLANNING SCHEME 2015

PROPERTY REPORT

Effective Date: 28/03/2025

Status: Current



Zones

Rural

Overlay - Biodiversity

Biodiversity Areas – Matters of State Environmental Significance (MSES)

Waterways

Waterways - Matters of State Environmental Significance (MSES)

Overlay - Bushfire Hazard

Bushfire Hazard Classification - High

Bushfire Hazard Classification - Medium

Bushfire Hazard Classification - Very High

Bushfire Hazard Classification - Buffer

Overlay - Steep Land

Steep Land 15-20%

Steep Land 20-25%

Steep Land 25%+

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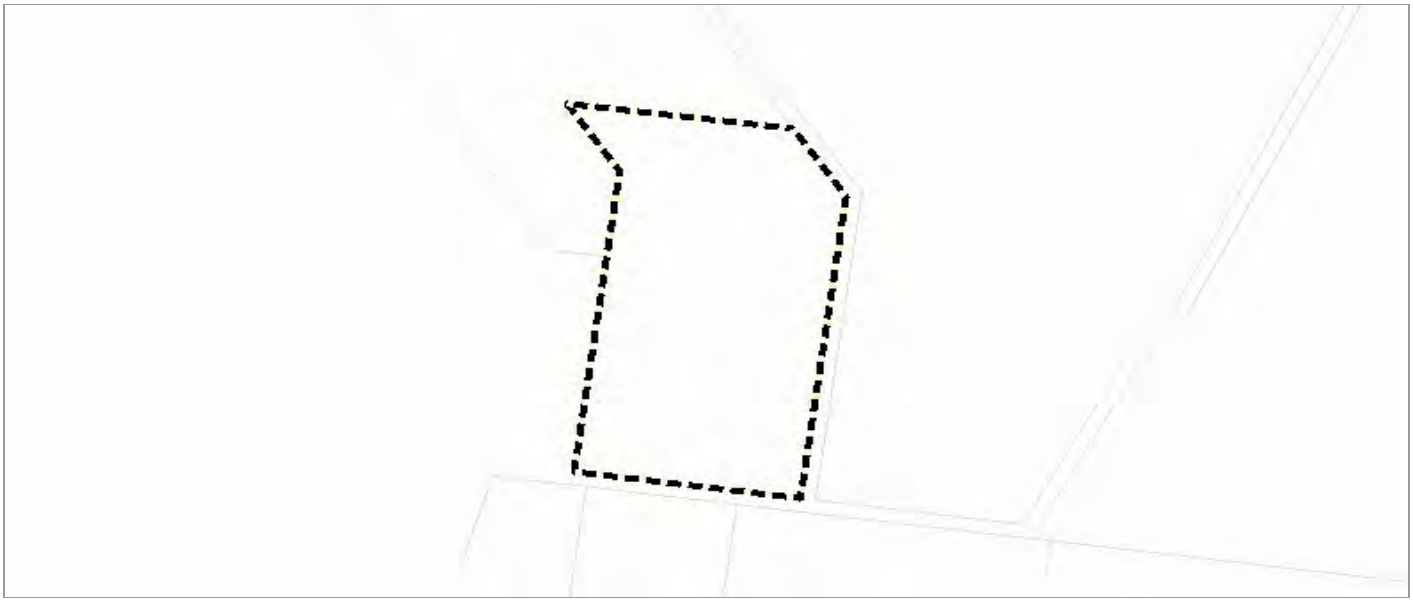


BUSHFIRE HAZARD OVERLAY

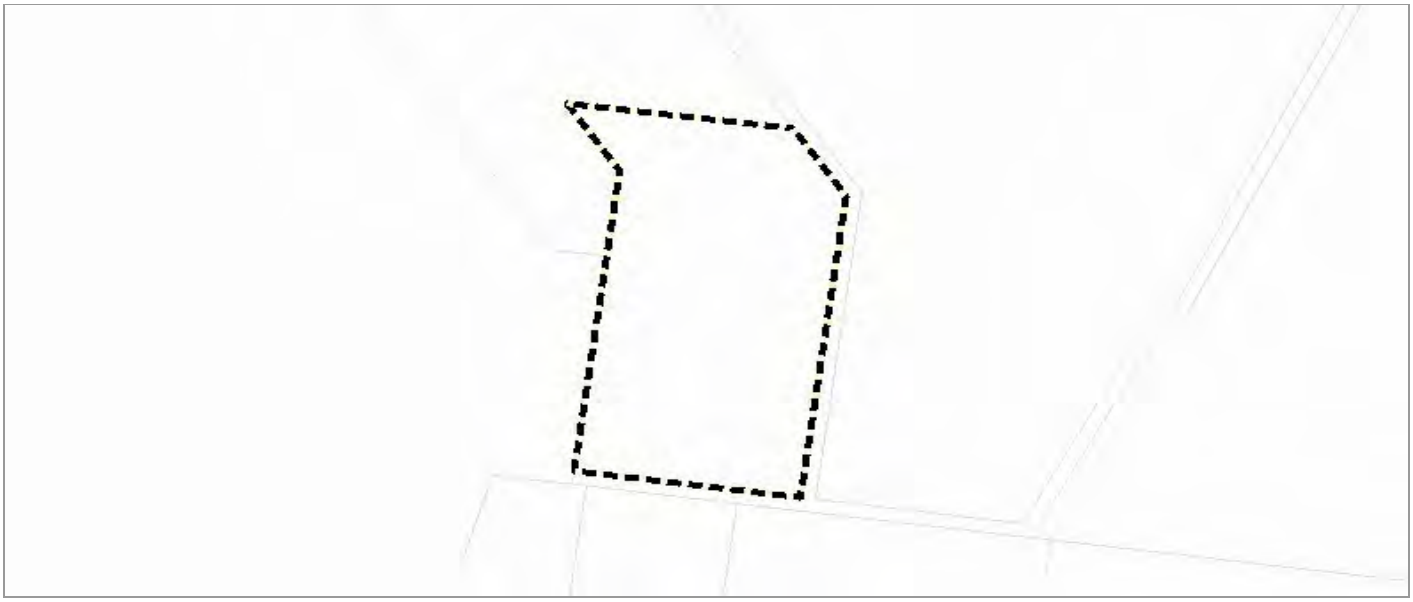


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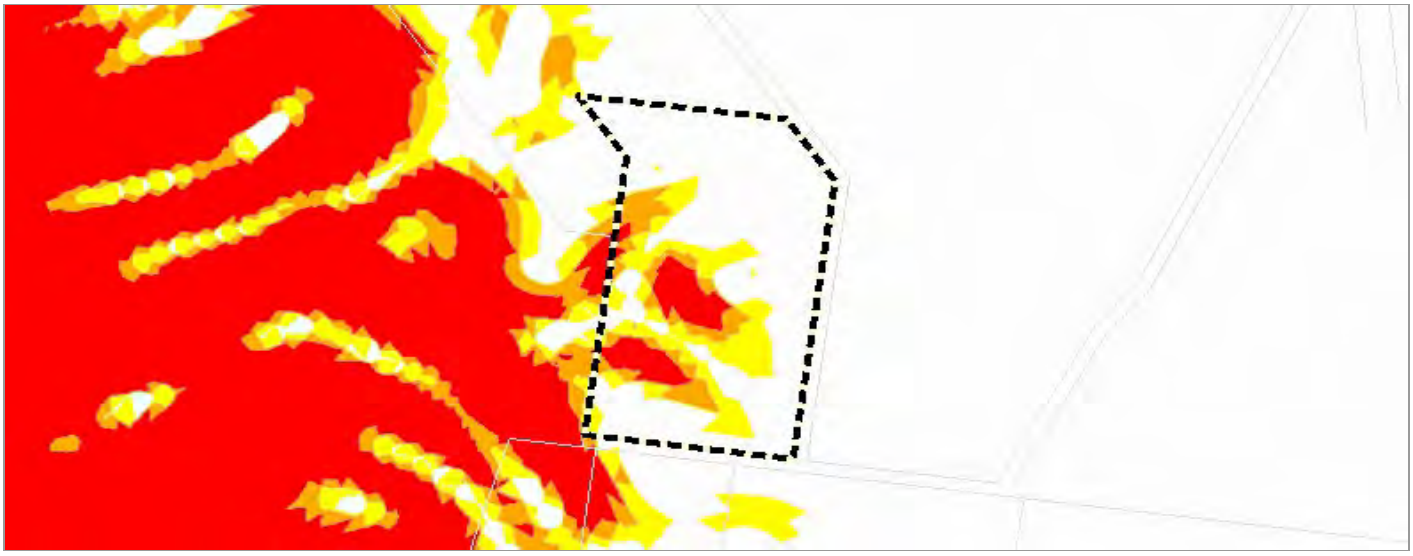


FLOOD HAZARD OVERLAY

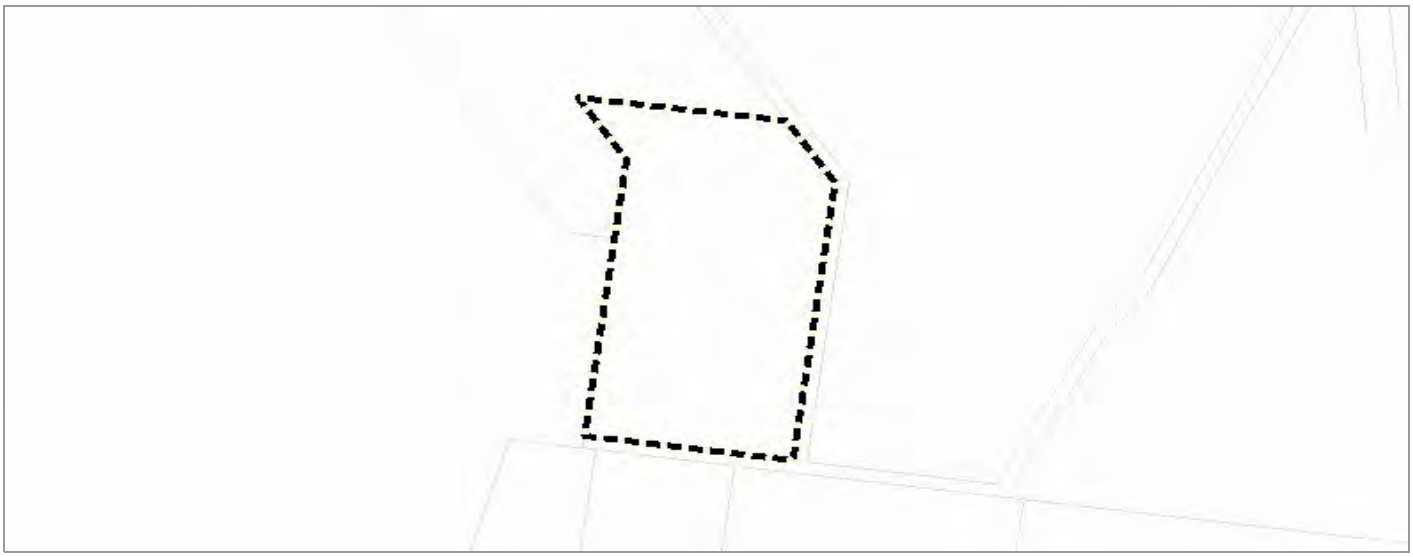


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STEEP LAND OVERLAY



SPECIAL MANAGEMENT AREA OVERLAY



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- By phone on **07 4932 9000**
- By email to enquiries@rrc.qld.gov.au

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ROCKHAMPTON REGION PLANNING SCHEME 2015

PROPERTY REPORT

Effective Date: 28/03/2025

Status: Current

Property Details

Address	1682 South Ulam Road Bajool QLD 4699
Property Size	715,023 m^2
Lot and Plan	38DT40131



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ROCKHAMPTON REGION PLANNING SCHEME 2015

PROPERTY REPORT

Effective Date: 28/03/2025

Status: Current



Zones

Rural

Overlay - Biodiversity

Biodiversity Areas – Matters of Local Environmental Significance (MLES) – General

Biodiversity Areas – Matters of State Environmental Significance (MSES)

Waterways

Waterways - Matters of State Environmental Significance (MSES)

Overlay - Bushfire Hazard

Bushfire Hazard Classification - High

Bushfire Hazard Classification - Medium

Bushfire Hazard Classification - Very High

Bushfire Hazard Classification - Buffer

Overlay - Steep Land

Steep Land 15-20%

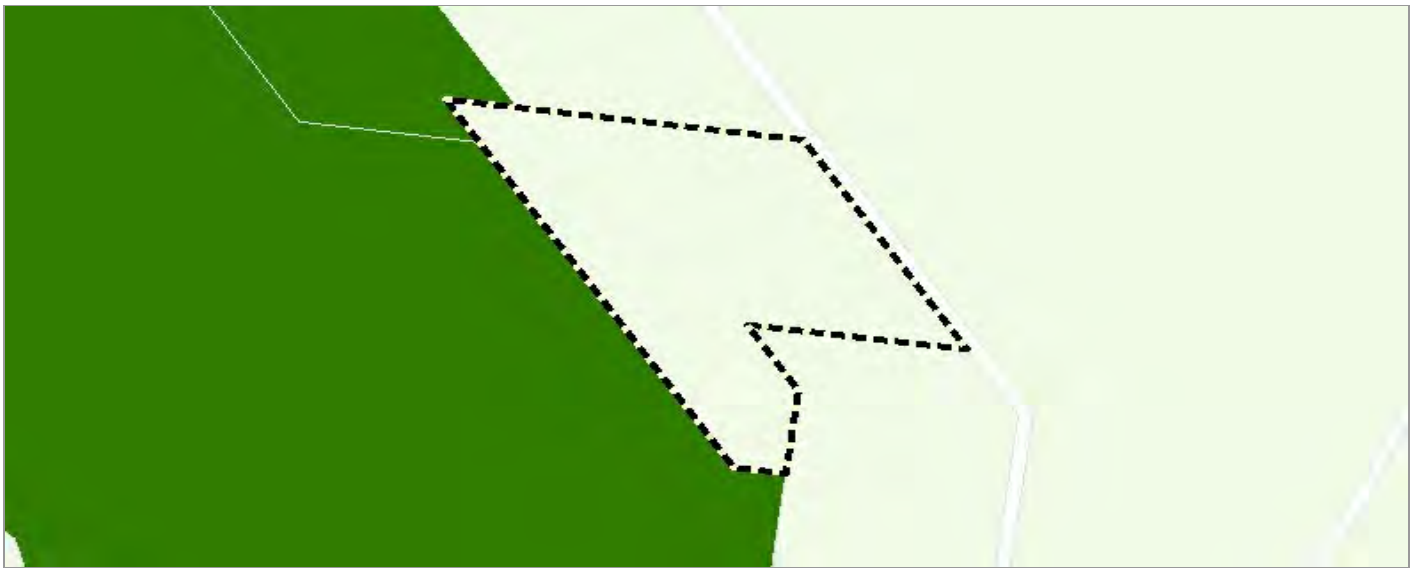
Steep Land 20-25%

Steep Land 25%+

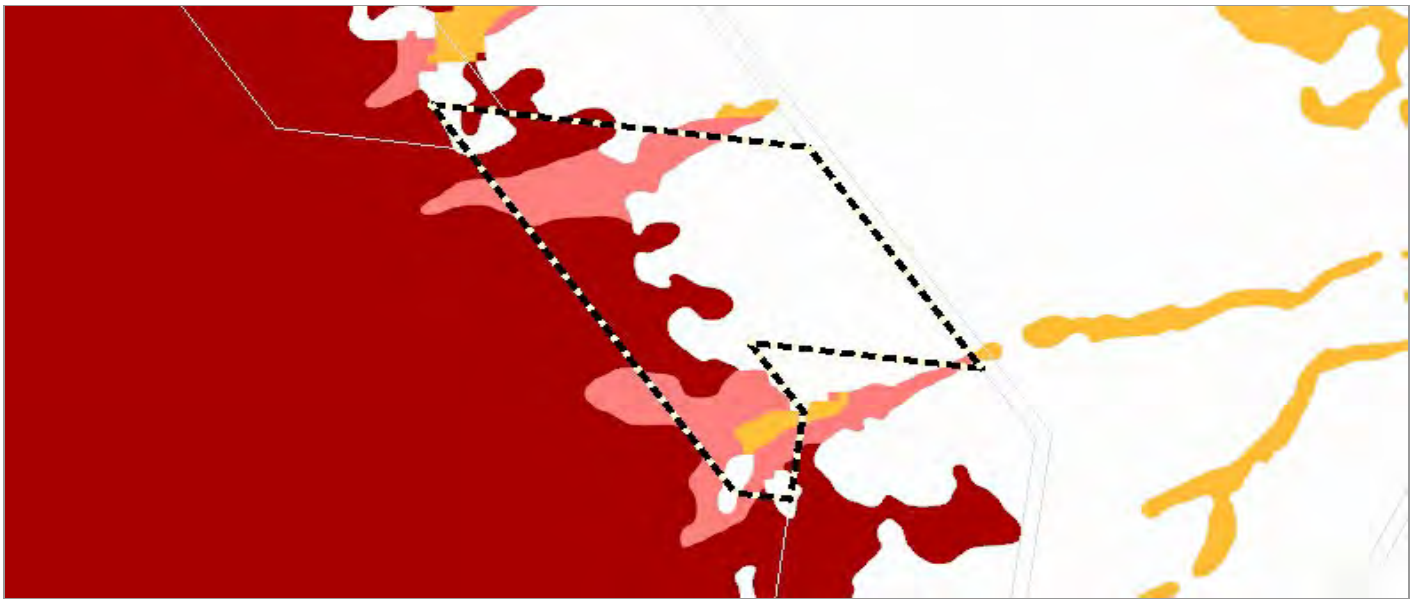
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The maps below represent only a selection of the overlays that may apply to this property. To view the complete list of applicable overlays, refer to the full list provided at the beginning of this report.

ZONES AND PRECINCTS

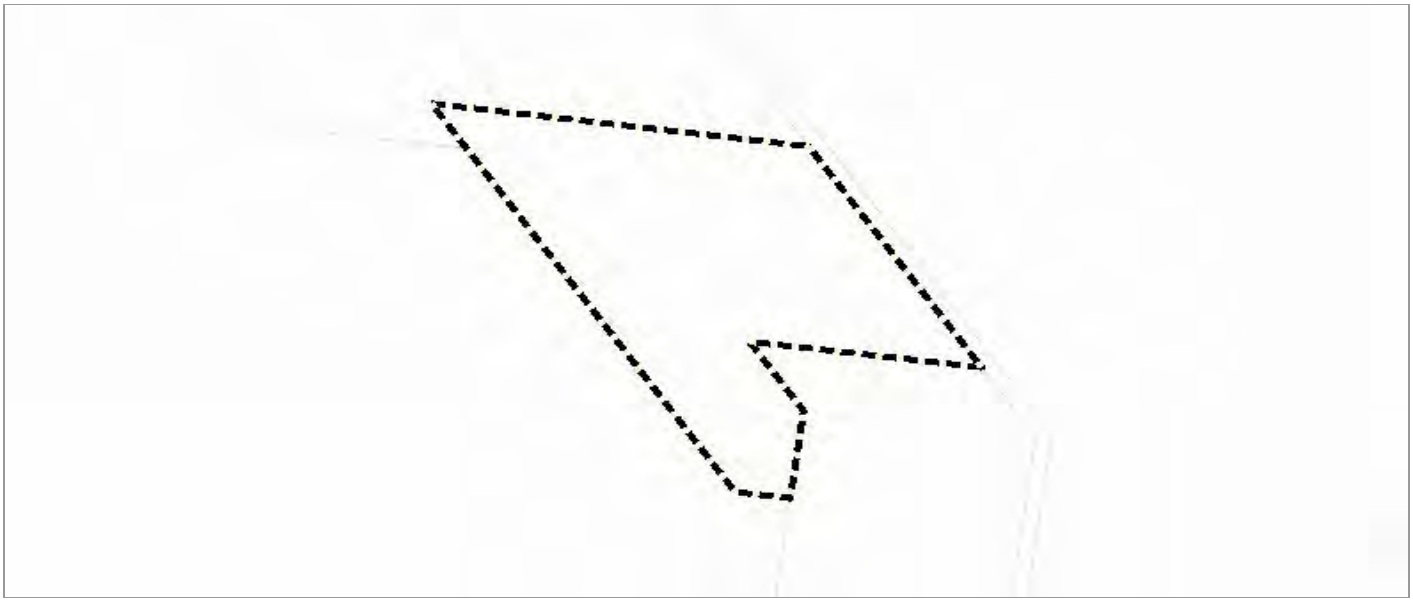


BUSHFIRE HAZARD OVERLAY

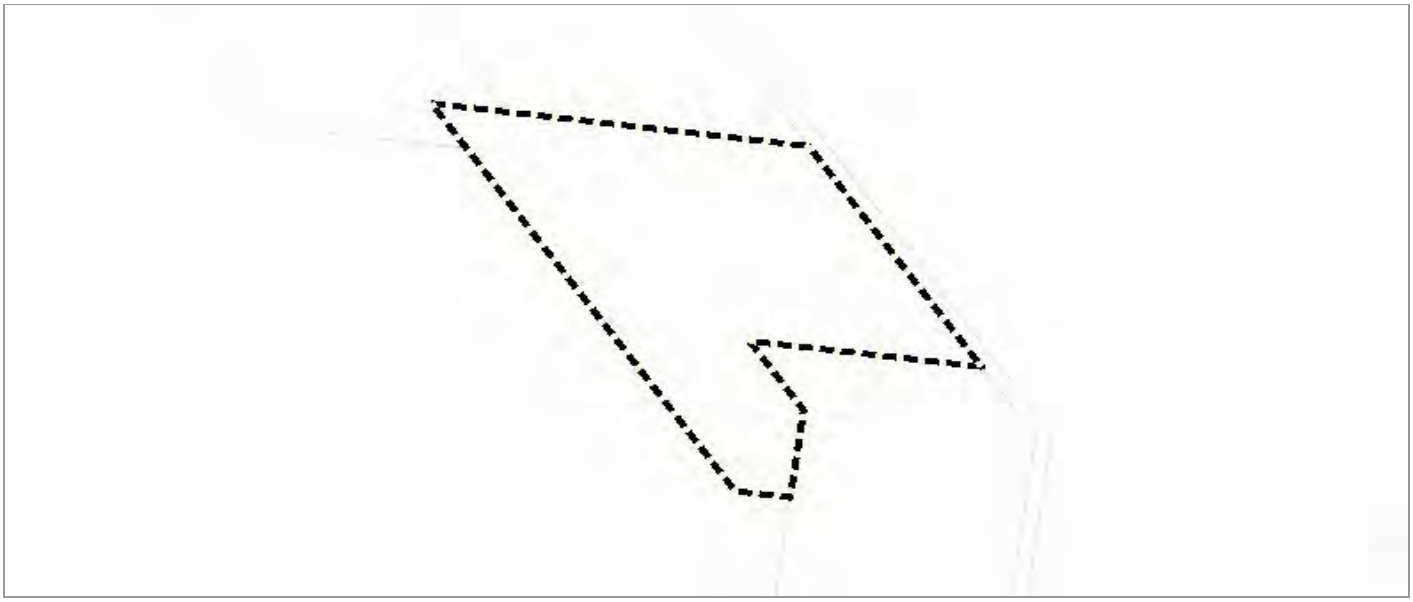


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CHARACTER OVERLAY

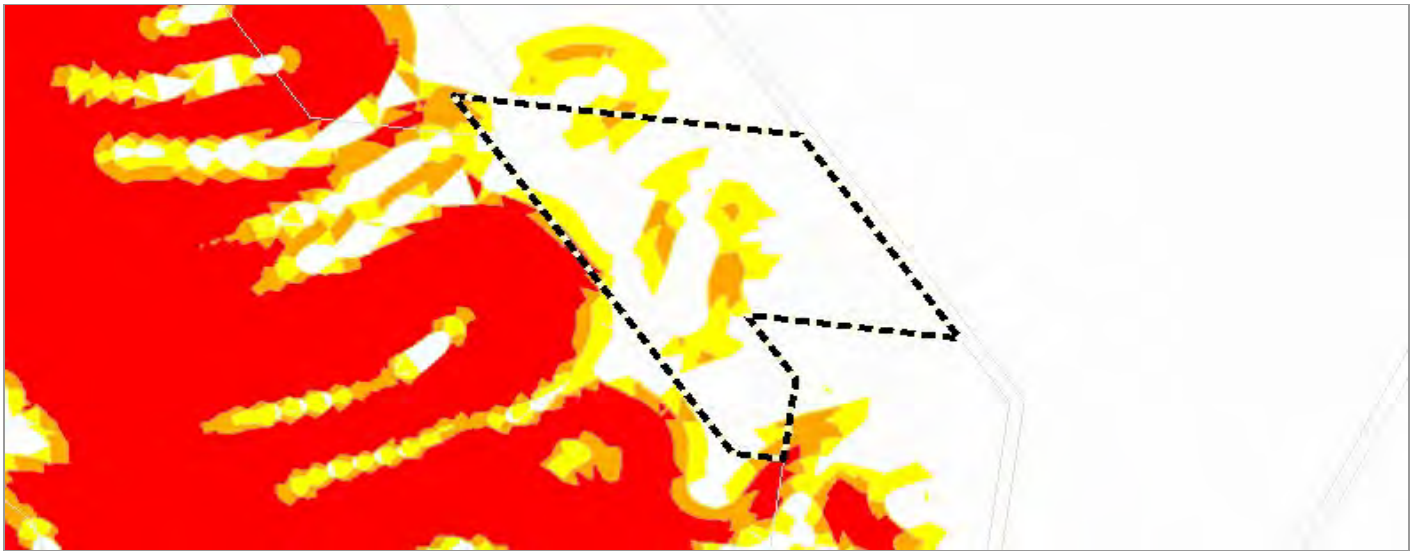


FLOOD HAZARD OVERLAY

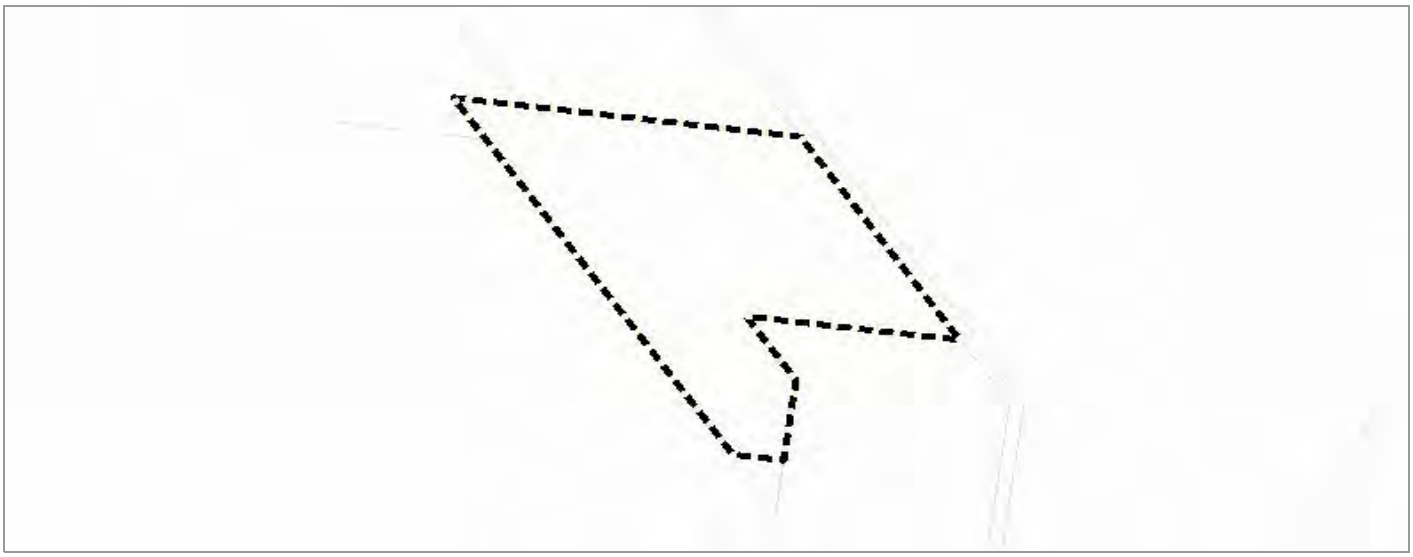


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STEEP LAND OVERLAY



SPECIAL MANAGEMENT AREA OVERLAY



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Contact Council

For further information, contact Rockhampton Regional Council:

- By phone on **07 4932 9000**
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Appendix M

Pre-lodgement Meeting Minutes



PRELODGEMENT

MEETING ADVICE

MEETING DETAILS

Date of Meeting: Tuesday, 3 June 2025 starting approx. 11am

Council Attendees:	**Applicant Attendees:**
• Sophie Muggeridge - Planning Officer, Development Assessment • Rod Lindsay – Development Engineer, Community Services • Emma-Leigh Castley – Environmental Health Officer, Community Services • Amanda Hinton – Senior Advisor Economic Development, Advanced Rockhampton	• [redacted] Project Manager, Neoen • [redacted] Lead Project Manager, Neoen • [redacted]: QLD Ecology Manager, Umwelt • [redacted]: Principal Environmental Planner, Umwelt • [redacted]: Senior Environmental Planner, Umwelt

PROPOSAL:

Address: [redacted] South Ulam Road, Bajool

Real Property Description: Lot 38 on DT40131, Lot 100 on SP289441, Lot 33 on DT40123

Details of Proposal: Mount Hopeful BESS

The Project involves the development of a BESS and associated infrastructure, including:

- substation
- switchyard
- synchronous condenser
- transformers
- inverters
- earthing
- lightning protection poles
- laydown area

The BESS will have a capacity to deliver up to 600 megawatts (MW) of power for up to 4 hours that can be dispatched to the NEM as required. The Project will be enclosed by chain mesh security fencing and include control boxes and access/circulation around the BESS for maintenance. The Project will be mounted on a bench to accommodate the BESS and associated infrastructure and ensure potential risks and hazards to environmental pathways can be adequately managed. Overhead and underground cables will connect the BESS to the substation and then into the NEM.

Detailed design and layout of the Project will be required to meet a range of technical access and safety requirements, as well as comply with a Queensland Fire Department (QFD) endorsed Fire Safety Strategy, emergency management procedures, and the relevant Australian Standards.

Issues identified by the Applicant for discussion:

Clarification of the following key matters is sought from the pre-lodgement meeting, to assist in the timely

preparation and lodgement of required documentation to progress with the approval and construction of the Project:

- Confirm the degree to which the existing SARA approval and associated reporting for the BESS can be considered in the assessment of the development application.
- Confirm the requirements for an Ecological Assessment Report (EAR), including if any significant residual impact (SRI) assessments are required for Matters of Local Environmental Significance (MLES).
- Confirm if associated infrastructure, such as the synchronous condenser, would fall under the planning scheme definition of 'Major Electricity Infrastructure' and require approval as a stand-alone use.
- Confirm technical reporting required to support the development application and the expected level of detail required. Please also reference the policies or guidelines the assessments must address.
- Confirm the level of assessment and relevant planning scheme assessment benchmarks to be addressed in the development application.
- Confirm the relevant fees for the lodgement of the development application.
- Advise on any relevant and recent learnings from comparable projects to ensure a timely and efficient assessment.
- Advise on expectations for public notification and any recommended stakeholders to engage with.
- Provide any additional concerns that RRC would like to raise pertaining to the Project (social, environmental, siting, etc).

Supporting information/documentation provided by Applicant:

- Prelodgement request meeting letter
- Powerpoint presentation;

ADVICE

PLANNING ASSESSMENT:

Defined Use: Undefined Use (Battery Energy Storage System)

"Means the use of a premises to store energy from a transmission grid or supply network into a commercial battery storage system"

Planning Area/Zone: Rural Zone

Type of Application Required: Material Change of Use

Level of Assessment: Impact Assessment

DEVELOPMENT ASSESSMENT:

Proposed land use:

- The proposed land use is to be defined as an undefines use (battery storage system) and triggers an impact assessable development application. It would need to be demonstrated in the application material that the synchronous condenser is ancillary to the BESS or requires a combined Material Change of Use for Undefined Land Use & Major Electricity Infrastructure.
- Due to the conflict with the Rural Zone Code and Strategic Framework, the applicant would need to demonstrate what relevant matters would apply in support of the proposal and why, on balance the proposal should be supported by Council despite conflicts with the assessment benchmarks.
- Due to the application requiring public notification, it is recommended that the application material

provides detail and consideration around the noise and amenity mitigation methods to be used throughout the duration of the land use activity on the site, including both the construction and operations stage. The application should also describe how the land will be rehabilitated once the use ceases operation.

- The minimum requirements for public notification are in accordance with the Development Assessment Rules and Planning Act 2016, however it is councils' suggestion that early community consultation is completed prior to formal public notification. The location of signage during public notification stage can be discussed during the application process.
- Due to the current approval incorporating both the BESS and Windfarm component, it would need to be determined that the reporting provided for the SARA application can demonstrate the impacts and mitigation methos for the BESS as its own use rather than an ancillary use.
- Council recommends that extensive information around onsite operations during both he construction and operational stage are provided within the application material along with the below mentioned technical reporting.

Planning Scheme Information:

The sites are subject to the following overlays:

- Biodiversity Areas Overlay - MLES general
- Biodiversity Areas Overlay - MSES
- Biodiversity MSES Waterway Overlay
- Biodiversity Waterways Overlay
- Bushfire Hazard Overlay - Bushfire Hazard Buffer
- Bushfire Hazard Overlay - High Hazard
- Bushfire Hazard Overlay - Medium Hazard
- Bushfire Hazard Overlay - Very High Hazard
- Steep Land Overlay - 15-20% slope
- Steep Land Overlay - 20-25% slope
- Steep Land Overlay - 25%+ slope

The following Codes and Benchmarks will need to be assessed as part of the application:

- Strategic Framework
- Rural Zone Code
- Biodiversity Areas Overlay Code
- Bushfire Hazard Overlay Code
- Steep Land Overlay Code
- Access, Parking and Transport Code
- Landscape Code (rural requirements)
- Stormwater management code (rural requirements)
- Waste Management Code (rural requirements)
- Water and Sewer Code (rural requirements)

Reports:

Council recommends the following reports, plans and documents to accompany the development application:

- Bushfire Risk Assessment – Include an assessment of the credible hazards and risks present for the battery storage facility and access, including fire scenarios (internal and external);
- Ecological Assessment – Taking into account the impacts of the facility to flora, fauna and nearby watercourse (leeching impacts) including significant residual impact (SRI) assessments for Matters of Local Environmental Significance (MLES).
- Emergency Management Plan – The plan must be specific to the property and include strategies for hazard management of a Battery Storage Facility;
- Stormwater Management Plan (refer to engineering comments);
- Erosion and Sediment Control Plan (refer to engineering comments); and
- Acoustic Assessment report (refer to environmental health comments).

Referrals

The development application to council will also require referral to additional entities:

- Powerlink is an advice agency and will require referral due to the site being subject to an electricity easement;

General

The application fee will be calculated in accordance with councils fees and charges policy (subject to change 1st July 2025):

- $2,357.00 + $4,330.00 (subject to change based on application material) + $1,040 (impact assessment fee) = $7,727.00

DEVELOPMENT ENGINEERING UNIT:

Stormwater and Flooding:

A Site-based Stormwater Management Plan (SSMP) should be submitted for the development. The SSMP should include, but is not limited to:

- Concept stormwater layout;
- Demonstration that the proposal will not adversely affect downstream properties or infrastructure from increases or concentration of runoff; and
- Demonstration of how the existing overland flowpaths through the site are going to be managed (where applicable – if the BESS units are located within areas of the site subject to inundation).

Traffic:

A Traffic Impact Assessment (TIA) should be submitted with the application. The TIA should detail:

- Type and size of delivery vehicle(s) during construction;
- Expected traffic volumes during construction and operational phases;
- Construction period; and
- Turn Warrant Assessment to determine any required intersection works (Project access and South Ulam Road).

Depending on the type of vehicles and volumes expected, there may be a requirement to rectify any damage caused to South Ulam Road once construction has been completed.

Water and Sewer:

- The proposed development is located outside the Water Supply and Sewerage area of council.

Adequate onsite water storage (Domestic and Firefighting) will be required.

- Information is to be provided about how the fire-fighting requirement will be provided for the use;

Erosion:

- An Erosion and Sediment control plan will be required that complies with the state planning policy 2017.

Infrastructure Charges (not including actual charges)

The Adopted Infrastructure Charges are available to view on Council's Website. These are located in the Fees and Charges Section. Please see the link below.

http://www.rockhamptonregion.qld.gov.au/Planning-and-Building/Infrastructure-Charges

PUBLIC AND ENVIRONMENTAL HEALTH:

- A detailed noise impact assessment will be required that outlines the noise generated from the development and the equipment being used along with any proposed mitigation measures if required. Basic short term background noise monitoring is recommended.

The applicant can expect the following standard conditions to be placed on an approval regarding:

- External lighting complying with *Australian Standard AS4282 "Control of the obtrusive effects of outdoor lighting"*;
- Must not create an environmental nuisance with noise, light etc;
- If genuine noise nuisance complaints are received Council will request applicant to conduct monitoring and submit a report that details the monitoring undertaken and any proposed mitigation measures to Council.

OUTCOME SUMMARY:

As the proposal requires impact assessment., public notification will be required for the proposed development application in accordance with the Planning Act 2016 and the Development Assessment Rules. Due to the nature of the development as n undefined use and requirements for public notification, it is likely that the application will need to be decided at an Ordinary Council Meeting.

ADVISORY NOTE:

These notes have been provided as informal and non-binding comments and are intended for use as a guide only in providing feedback on the proposal presented to the Unit. These discussions do not bind or fetter the Council in any way in exercising its statutory responsibilities in assessing any development application which might be made to the Council.

Link to DA Forms

https://planning.dsdmip.qld.gov.au/planning/better-development/application-forms-and-templates

Link to Planning Schemes

http://www.rockhamptonregion.qld.gov.au/Planning-and-Building/Planning-Schemes-and-Studies

Link to Development Assessment Fees

http://www.rockhamptonregion.qld.gov.au/About-Council/Finance-Rates-and-Budget/Fees-and-Charges

PRELODGEMENT MEETING ADVICE

MEETING DETAILS

Date of Meeting: Tuesday, 12 August 2025 starting approx. 10:30am

Council Attendees:	**Applicant Attendees:**
• Aidan Murray – Senior Planning Officer • Sophie Muggeridge - Planning Officer • Rod Lindsay – Development Engineer • Stacey Joyner – Senior Environmental Health Officer • Emma-Leigh Castley – Senior Environmental Health Officer • Cameron Wyatt – Coordinator Strategic Planning	• [redacted]: Project Manager, Neoen • [redacted]: Lead Project Manager, Neoen • [redacted] – QLD State Lead, Neoen • [redacted] – QLD Ecology Manager, Umwelt • [redacted] – Principal Environmental Planner, Umwelt • [redacted] – Senior Environmental Planner, Umwelt

PROPOSAL:

Address: [redacted] South Ulam Road, Bajool

Real Property Description: Lot 38 on DT40131, Lot 100 on SP289441, Lot 33 on DT40123

Details of Proposal:

Umwelt on behalf of Neoen Australia Pty Ltd (Neoen) request a following up pre-lodgement meeting with Rockhampton Regional Council (RRC) to discuss the draft Temporary Local Planning Instrument (TLPI) for Battery Storage Facilities and re-confirm the development application requirements for the Mount Hopeful Battery Energy Storage System (BESS) Project (the Project).

This request is provided subsequent to the pre-lodgement meeting held with RRC on 3 June 2025 and the associated pre-lodgement meeting minutes received on 11 June 2025. The following agenda outlines the key matters for discussion to assist in the timely preparation and lodgement of the development application for the Project.

Issues identified by the Applicant for discussion:

Draft TLPI - General

1. Confirm the extent to which RRC planning officers will have regard to the provisions stated in the draft TLPI for new development applications.
2. Confirm the effect of the TLPI (once adopted) on unapproved development applications that have been properly made and are under assessment.
3. Confirm if the TLPI (once adopted) can be retrospectively applied to approved development applications.
4. Indicate the likely timeline for public consultation and state interest review of the draft TLPI.

Draft TLPI - Development Code Provisions

Facility location (PO2):

5. Clarify the level of detail required to demonstrate compliance with this PO (noting that it is stated that a technical assessment report and plans may be required). In this scenario, is a Connection Enquiry response from Powerlink sufficient?

Amenity (PO3-PO5):

6. Re-confirm the previous advice that a landscape and visual impact assessment (LVIA) is not required to support the development application for the Project, noting the remote location, central siting within the property and limited potential for visual impacts of the proposed BESS.

Acoustic assessment measures (PO6):

7. AO6.1 and AO6.2 of the draft TLPI currently includes noise criteria developed specifically for wind farms in State Code 23: Wind Farm Development of the *State Development Assessment Provisions* (SDAP). AO6.2 notably refers to wind turbines making its application to battery projects unclear. It is noted that the planning scheme and previous pre-lodgement advice from RRC points to the Acoustic Quality Objectives (AQO) under the Environment Protection (Noise) Policy 2019 (EPP Noise) as the applicable noise criteria. As such, could RRC please confirm the following:
    a. What noise criteria should be applied to BESS development applications under the draft TLPI.
    b. What criteria will be applied to operational BESS developments where a nuisance complaint is received.

    Overall, it is considered that the AQO is the more appropriate criteria for BESS developments, noting its application in the recent State Code 26: Solar Farm Development of the SDAP.

Public safety (PO7):

8. Confirm the level of detail required to demonstrate compliance with the PO, noting the location and siting of the Project.

Hazards and Risk Mitigation (PO10):

9. Does compliance with CFA guidelines need to be demonstrated specifically to meet PO10?

Emergency Management (PO11):

10. Does compliance with AS.3745 need to be demonstrated specifically to meet PO11?

Decommissioning and rehabilitation (PO13):

11. Confirm the level of detail required to demonstrate compliance with this PO. It is proposed that the development application includes suitable commitments for decommissioning acknowledging that a condition of approval may be included requiring the preparation of a decommissioning management plan prior to the cessation of the use.

Mount Hopeful BESS Development Application

12. Re-confirm technical reporting required to support the development application and the expected level of detail. Please also reference the policies and/or guidelines the assessments must address.
13. Confirm the requirements to stage the approval and the discharge of conditions, noting the BESS is proposed to be constructed and operated in two distinct stages.

Supporting information/documentation provided by Applicant:

- Pre-Lodgement Meeting #2 Agenda – Mount Hopeful BESS

ADVICE

PLANNING ASSESSMENT:

Defined Use: Undefined Use (Battery Energy Storage System)

"Means the use of a premises to store energy from a transmission grid or supply network into a commercial battery storage system"

Planning Area/Zone: Rural Zone

Type of Application Required: Material Change of Use

Level of Assessment: Impact Assessment

DEVELOPMENT ASSESSMENT:

- Council officers may have some regard to the draft Temporary Local Planning Instrument (TLPI), however it should be noted that it is a draft document that will be subject to change. Any relevant provisions in the draft TLPI would be used to inform and guide on potential solutions on relevant matters rather than prescribes particular outcomes.
- As discussed, the Draft TLPI has been made available for public consultation and is undergoing state interest review. It can't currently be confirmed on when a TLPI would or might be adopted as there are significant number of unknown factors, including consideration of state interests and potential unconfirmed legislative amendments from the state government department.
- A referral agency response and/or connection enquiry response from Powerlink would be deemed as a relevant and reasonable justification towards demonstrating the suitability of the proposed (Battery Energy Storage System) BESS location in relation to electricity grid infrastructure.
- A formalised Landscape and Visual Impact Assessment (LVIA) is not expected to be necessary based on the remote location. It is however recommended that commentary be provided within the application material addressing and highlighting the remote location, siting of the facility, distance from the nearest sensitive receptors and any mitigation measures proposed to be undertaken if necessary.
- Community concerns and interests are strongly based on fire hazards in relation to both bushfire and fire within the facility itself. Therefore, it is highly recommended that significant attention be given to these matters within the application material. It would be highly beneficial if the application can demonstrate CFA guidelines
- An Emergency Management Plan can be provided at application stage or conditioned to be provided to Council at a later time. The Emergency Management Plan should address AS 3745 "Planning for Emergencies in Facilities" and any other relevant Australian Standards.
- Conditions detailing the timing and methodology for decommissioning of the facility would be applied to any approval granted. Recommended that a Remediation and Decommission Strategy be prepared, potentially at Operational Works stage. The site will need to be returned to pre-development condition and Council sufficiently notified with a more detailed Rehabilitation and Decommission Plan prepared prior to cessation of the use.

DEVELOPMENT ENGINEERING UNIT:

- The engineering-related Technical Reports will need to be provided with the MCU application however depending on the proposed staging details, we can separate out specific conditions relating to the required works for that particular stage as necessary. It would be advisable to look at the traffic, stormwater / flooding, and erosion and sediment control aspects as part of Stage 1 as increasing the size or any infrastructure or adding extra provisions for Stage 2 may not be practical or cost-effective. Council's Development Engineering Unit (DEU) can provide more feedback on the required timing of the engineering provisions once a proposed staging plan has been provided.

Infrastructure Charges (not including actual charges)

The Adopted Infrastructure Charges are available to view on Council's Website. These are located in the Fees and Charges Section. Please see the link below.

http://www.rockhamptonregion.qld.gov.au/Planning-and-Building/Infrastructure-Charges

PUBLIC AND ENVIRONMENTAL HEALTH:

- As discussed, the planning scheme and previous pre-lodgement advice from RRC points to the Acoustic Quality Objectives (AQO) under the Environment Protection (Noise) Policy 2019 (EPP Noise) as the applicable noise criteria. Council officers agree that the AQO is considered appropriate criteria for the proposed BESS development.

OUTCOME SUMMARY:

As the proposal requires impact assessment, public notification will be required for the proposed development application in accordance with the Planning Act 2016 and the Development Assessment Rules. Due to the nature of the development as an undefined use and requirements for public notification, it is likely that the application will need to be decided at an Ordinary Council Meeting.

ADVISORY NOTE:

These notes have been provided as informal and non-binding comments and are intended for use as a guide only in providing feedback on the proposal presented to the Unit. These discussions do not bind or fetter the Council in any way in exercising its statutory responsibilities in assessing any development application which might be made to the Council.

Link to DA Forms
https://planning.dsdmip.qld.gov.au/planning/better-development/application-forms-and-templates
Link to Planning Schemes
http://www.rockhamptonregion.qld.gov.au/Planning-and-Building/Planning-Schemes-and-Studies
Link to Development Assessment Fees
http://www.rockhamptonregion.qld.gov.au/About-Council/Finance-Rates-and-Budget/Fees-and-Charges

umwelt

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