Appendix A OTR Certification

Appendix B Project Layout Plan

Appendix C Impact Reports

Technical Memorandum

To:	Shaminga Ferdinadusz	**From:**	Georgia Wilson
Company:	ReEnerge Australia Holdings Pty Ltd	**SLR Consulting Australia Pty Ltd**	
cc:	Simone Fogarty	**Date:**	28 October 2025
		Project No.	655.010687.00001

RE: Ecological Impact Assessment – Initial Memo
Hughes Gap BESS

SLR Consulting Australia Pty Ltd (SLR) have been engaged by ReEnerge Australia Holdings Pty Ltd to undertake an Ecological Impact Assessment for a proposed Battery Energy Storage System (BESS) located at Warnertown SA within Certificate of Title (CT) 5883/929, Parcel ID D20184 A56 (the Site). The below summarises the initial findings following the desktop review and site survey.

1.0 Desktop Review

The desktop review analysed information available through selected databases to help inform field assessment efforts.

An *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) Protected Matters Search Tool (PMST) report was generated to identify Matters of National Environmental Significance (MNES) including threatened flora and fauna species and Threatened Ecological Communities listed as vulnerable, endangered or critically endangered under the EPBC Act that could possibly occur within a five km radius of the Site (herein known as the Search Area).

An online review of *NatureMaps* was conducted to identify historical records of threatened flora and fauna species listed as vulnerable, rare or endangered under the *National Parks and Wildlife Act* 1972 (NP&W Act) identified within the Search Area in the previous 20 years.

1.1 Flora Desktop Results

An EPBC Act PMST identified eight threatened flora species that could occur within the Search Area, as follows:

- *Caladenia tensa* (Greencomb Spider-orchid), EPBC Act Endangered
- *Olearia pannosa subsp. pannosa* (Silver Daisy-bush), EPBC Act Vulnerable
- *Prasophyllum pallidum* (Pale Leek-orchid), EPBC Act Vulnerable
- *Prasophyllum validum* (Sturdy Leek-orchid), EPBC Act Vulnerable
- *Pterostylis xerophila* (Desert Greenhood), EPBC Act Vulnerable
- *Senecio macrocarpus* (Large-fruit Fireweed), EPBC Act Vulnerable
- *Senecio megaglossus* (Superb Groundsel), EPBC Act Vulnerable
- *Swainsona pyrophila* (Yellow Swainson-pea), EPBC Act Vulnerable

A desktop search of *NatureMaps* identified one threatened flora species recorded within the Search Area in the previous 20 years:

- *Thelymitra batesii* (Plump Sun-orchid) NP&W Act Rare

The EPBC Act PMST identified one Threatened Ecological Community that could occur within the Search Area:

- Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia, listed as Critically Endangered

1.2 Fauna Desktop Results

The EPBC Act PMST identified 17 threatened fauna species recorded within the Search Area. The classification of the threatened species included three critically endangered species, four endangered species and 10 vulnerable species. The majority of threatened species identified within the PMST were birds (13 species), with one mammal, and three reptiles species.

It should be noted that as per the PMST Caveat, the species list is generated using a presence category based upon species distributions that 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 using point locations and environmental data layers”. As such, the presence categories do not guarantee the species presence within the Site.

A further 10 migratory species were classified by the EPBC Act PMST as having the potential to occur within the Search Area. Of these, two species are listed as Critically Endangered and two as Vulnerable under the EPBC Act. The remaining six species are not assigned a threatened status. All but two of the nine species are classified as migratory marine or migratory wetland species, which are considered unlikely to occur on the site due to the absence of large waterbodies or suitable aquatic habitat.

The *NatureMaps* fauna search was conducted with a 10 km radius of the Site. The standard five km radius search revealed no records of threatened fauna species, likely due to the highly cleared and disturbed nature of the wider region and general lack of threatened species in the area, however, this may not be representative of the Site. To account for this, the radius was increased to 10 km.

NatureMaps identified six threatened fauna species recorded within the preceding 20 years within the 10 km:

- *Corcorax melanorhamphos* (White-winged Chough), listed as Rare under the NP&W Act
- *Falcunculus frontatus frontatus* (Eastern Shriketit), listed as Rare under the NP&W Act
- *Petroica boodang boodang* (Scarlet Robin), listed as Rare under the NP&W Act
- *Staganopleura guttata* (Diamond Firetail), listed as Vulnerable under the EPBC Act and NP&W Act
- *Turnix varius varius* (Painted Buttonquail), listed as Rare under the NP&W Act
- *Varanus varius* (Lace Monitor), listed as Rare under the NP&W Act

2.0 Field Assessment

The field assessment consisted of a general survey and the identification of growing conditions for threatened flora species. The Site was also surveyed for remnant and regrowth native vegetation and introduced flora species. The Bushland Assessment Methodology was utilised to capture data on vegetation.

Opportunistic fauna presence and habitat suitability for threatened fauna species were surveyed at the same time as the flora assessment. The habitat suitability then determined the likelihood of the threatened species occurring within the Site.

Field surveys, for both flora and fauna, were completed on the 9th October by Associate Consultant, Louise Jaunay (BApSc, Accredited Native Vegetation Consultant) and Senior Project Consultant, Georgia Wilson (BSc).

2.1 Flora Field Assessment Results

Vegetation within the Site was found to be predominately open grazing paddocks with native chenopod regeneration of a limited number of common colonising species and scattered taller shrubs either as individuals or small clumps.

Generally, native vegetation was found to be very limited in diversity and missing many structural components that would be present in intact remnant vegetation. There was a high number of exotic plant species observed across the Site, particularly *Lycium ferocissimum* (African Boxthorn).

It should be noted that not all vegetation will be impacted with the development, and once design layouts are finalised, actual impacts can be quantified.

Assessment of the Site and roadside vegetation was undertaken to account for all areas where development may be required, including proposed access roads. In total, four separate Vegetation Associations have been assessed and mapped:

- Highly degraded chenopod shrubland in paddock
- Highly degraded *Acacia victoriae* shrubland in minor watercourse
- Highly degraded chenopod shrubland with emergent *Acacia victoriae* along roadside
- Highly degraded open tall mixed shrubland of *Acacia salicina* +/- *Acacia victoriae* along roadside

No threatened flora species or Threatened Ecological Communities were found to be present within the Site and are further unlikely to occur undetected given the current vegetation composition and grazing regime of the Site.

Pursuant to the *Native Vegetation Act 1991*, and *Native Vegetation Regulations 2017*, approval must be sought for clearance of Native Vegetation. While a regulation does exist to allow clearance of regrowth vegetation less than five years old, this must be done to maintain the existing use of the land. As the proposed development constitutes a change in land use, approval to clear and an appropriate Significant Environmental Benefit (SEB) must be provided. Indicative SEB costs for each vegetation association are provided within **Table 1**, with a visual representation of the location of the vegetation provided in **Figure 1**. This includes a cost per hectare for vegetation association for ease of comparison, but it should be noted that clearance of some vegetation associations are likely to be smaller than a hectare (e.g. road access).

Table 1: Indicative SEB Costs

Vegetation	SEB Cost	Comments
Vegetation Association 1	$5,769.44/ha	Highly degraded chenopod shrubland in paddock
Vegetation Association 2	$9,230.10/ha	Highly degraded *Acacia victoriae* shrubland in minor watercourse

Vegetation	SEB Cost	Comments
Vegetation Association 3	$19,229.65/ha	Highly degraded chenopod shrubland with emergent *Acacia victoriae*
Vegetation Association 4	$12,790.39/ha	Highly degraded mixed shrubland of *Acacia salicina* +/- *Acacia victoriae*

2.2 Fauna Field Assessment Results

Following the field survey, an assessment of the likelihood of occurrence of listed species identified within the desktop assessment was completed based upon the proximity of recent records, the species known habitat requirements, and available habitat recorded onsite. Aquatic fauna and subspecies with known distribution outside of the region were excluded from the assessment. Only species identified by *NatureMaps* and species listed as 'known to occur' or 'likely to occur' within the EPBC Act PMST report were included in the assessment.

All but one of the threatened species identified in the desktop assessment were considered unlikely to occur within the Site. Of these, the one species considered as possible to occur is:

- *Aphelocephala leucopsis* (Southern Whiteface), listed as Vulnerable under the EPBC Act and NP&W Act

The Southern Whiteface inhabits a broad range of open woodlands and shrublands with understorey of grasses or shrubs, similar to what was observed in areas within the field. If this species were to utilise the vegetation within the Site, it would be within the taller shrubs of *Maireana spp.* and *Acacia victoriae* to move to better quality habitat nearby. This vegetation was found in scattered patches across the Site, particularly within the minor watercourse area and roadside vegetation associations. However, there have been no recordings of the species within the Search Area within the past 20 years, and the species readily moves in response to resource availability. Thus, impact to this species is considered to be low to negligible. Once designs and Site layout are further developed, a more in-depth assessment of the potential impacts will be undertaken.

Weather conditions during the field survey were optimal and common fauna species were opportunistically recorded within the Site, refer **Table 2** for a list of species observed. No threatened fauna species were recorded at the time of the survey.

Table 2: Fauna Species Observed

Scientific Name	Common Name
Acanthiza chrysorrhoa	Yellow-rumped Thornbill
Anthus australis	Australian Pipit
Artamus cinereus	Black-faced Woodswallow
Chalcites basalis	Horsfield's Bronze Cuckoo
Cincloramphus mathewsi	Rufous Songlark
Corvus coronoides	Australian Raven
Eolophus roseicapilla	Galah
Epthianura albifrons	White-fronted Chat
Falco cenchroides cenchroides	Nankeen Kestrel

Pseudonaja textilis	Eastern Brown Snake
Sturnus vulgaris vulgaris	Common Starling
Taeniopygia guttata castanotis	Zebra Finch

3.0 Summary

The assessment has initially found no ecological constraints to the proposed development. No MNES were identified as being likely to be significantly impacted and therefore a EPBC Act referral is unlikely to be required. Further assessment of this will still be completed in a separate report.

Vegetation within the Site was found to be low quality and predominantly consisting of regrowth chenopod shrubs with few scattered taller *Acacia sp.* shrubs. Clearance of the vegetation will be pursuant to the requirements of the *Native Vegetation Act 1991* and the *Native Vegetation Regulations 2017*, and will require appropriate off-setting. The total of which will be determined once development designs are finalised.

Some roadside vegetation was found to generally be in better condition to that which was found within the Site, however, there are opportunities to lower impacts through placement of the access tracks within lower quality sections and using existing disturbed areas.

4.0 Closure

Thank you for retaining SLR to provide this service. We wish you well and look forward to working with you again. Should you have questions or require additional information, please do not hesitate to contact the below.

Sincerely,

Georgia Wilson, BSc
Senior Project Consultant – Ecology and Biodiversity

Attachment Figure 1

-889,000

-888,000

6,220,000

6,219,000

ReEnerge Australia - Hughes Gap BESS

Native Vegetation Overview

FIGURE 1

LEGEND

- Vegetation Association 1
- Vegetation Association 2
- Vegetation Association 3
- Vegetation Association 4
- Site

Source:

0 50 100 m

Coordinate System:	GDA2020 / MGA zone 54
Scale at A3:	1:5,052
Project Number:	625.010687.00001
Date Drawn:	10/10/2025
Drawn by:	LJ
Reviewed by:	MJ

SLR

Filepath :H:\Projects-SLR\655-NUR\655.010687.00001 ReEnerge Hughes Gap BESS Ecolo\06 SLR Data\01 GIS\GIS\Project Location Map.qgz

Hughes Gap BESS

Draft Environmental Impact Assessment - Noise

17 December 2025
Reference ID: 793-2

echo
Acoustic Consulting

Contents

Figures

Tables

Abbreviations

Assessment	Echo Acoustics *Draft Environmental Impact Assessment - Noise* with Reference ID: 793-2, dated 17 December 2025
BESS	Hughes Gap Battery Energy Storage System including batteries, power control systems, and associated transformer
dB	Decibel
dB(A)	An A-weighted Decibel
EP Act	*Environment Protection Act 1993*
HRE Act	*Hydrogen and Renewable Energy Act 2023*
L_{Aeq}	The A-weighted equivalent time-averaged noise level
MVA	Megavolt Amperes
MW	Mega Watt
MWh	Mega Watt Hour
Noise control measures	Noise control and management strategies to reduce environmental damage as far as reasonably practicable in accordance with the HRE Act
Policy	*Environment Protection (Commercial and Industrial Noise) Policy 2023*
Standard	International Standard ISO 9613-2:2024 *"Acoustics - Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of sound pressure levels outdoors"*
Receptor	Environmental receptors as referenced under the HRE Act, being the surrounding dwellings and vacant land principally allotted for future dwellings as identified in Figure 2 of the assessment

Glossary

A-weighting	A mathematical adjustment to the measured noise levels to represent the human response to sound. An A-weighted noise level is presented as dB(A)
Ambient environment	The environment in the absence of the BESS
Candidate equipment	Candidate batteries, power control systems, and transformer used as an example in an assessment to indicate the ability to comply with legislative requirements
Characteristic	A characteristic determined in accordance with the Policy to be fundamental to the nature and impact of the noise. For example, a noise source is deemed to exhibit a characteristic if it produces distinctive tonal, impulsive, low frequency, intermittent or modulating features
Day	A period defined by the Policy as between 7.00am and 10.00pm
Decibel	The logarithmic unit of measurement to define the magnitude of a fluctuating air pressure wave. Used as the unit for sound or noise level
Equivalent noise level	The A-weighted noise level which is equivalent to a noise level which varies over time. The descriptor is L_{Aeq} and it is the A-weighted source noise level (continuous) referenced in the Policy

Frequency	Represents the number of fluctuating air pressure waves in one second. High frequency sound (high pitch or squeal) will generate many waves and low frequency sound (bass or rumble) will generate a small number of waves. The unit of frequency is Hertz
Indicative noise level	The noise level assigned by the Policy at a location to represent an impact on the acoustic amenity at that location. The indicative noise level is adjusted to derive the noise criteria
Night	A period defined by the Policy as between 10.00pm and 7.00am
Noise	An interchangeable term with sound but which is most often described as unwanted sound
Noise criteria	The noise levels established to objectively assess whether adverse effects on the environment are managed so as to reduce environmental damage as far as reasonably practicable in accordance with the HRE Act
Sound	An activity or operation which generates a fluctuating air pressure wave. The ear drum can perceive both the frequency (pitch) and the magnitude (loudness) of the fluctuations to convert those waves to sound
Sound power level	The amount of sound energy an activity produces for a given operation. The sound power level is a constant value for a given activity. The sound power level is analogous to the power rating on a light globe (which remains constant), whereas the lighting level in a space (sound pressure level in this analogy) will be influenced by the distance from the globe, shielding and different locations within the space
Sound pressure level	The magnitude of sound (or noise) at a position. The sound pressure level can vary according to location relative to the noise source, and operational, meteorological and topographical influences. The terms sound pressure level and noise level are used interchangeably in this assessment

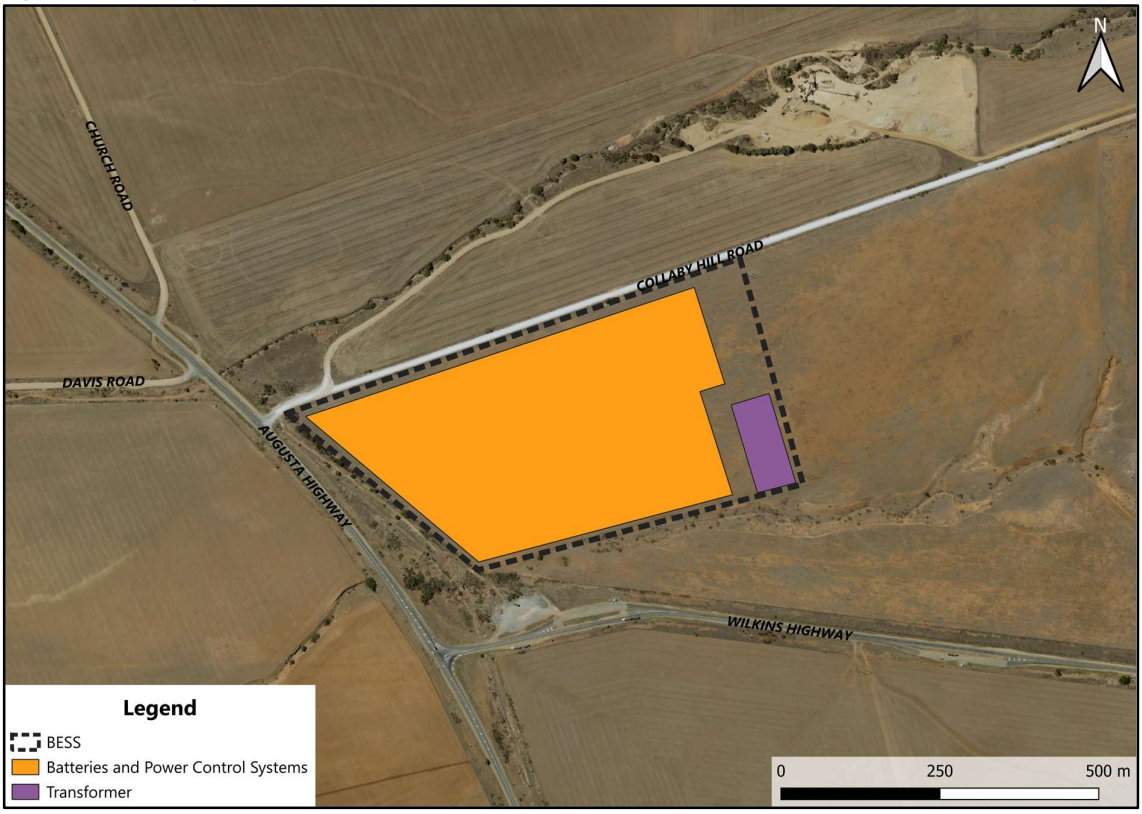
Introduction

ReEnerge is proposing to develop the Hughes Gap Battery Energy Storage System including batteries, power control systems, and an associated transformer (the **BESS**) at Lot 56 Collaby Hill Road, Warnertown, within the Port Pirie Regional Council.

The BESS is proposed to comprise the following and is shown in Figure 1:

- batteries and power control systems with a capacity of 300 Mega Watt (**MW**) / 1200 Mega Watt Hour (**MWh**)
- a 450 Megavolt Ampere (**MVA**) transformer.

Figure 1 BESS Layout



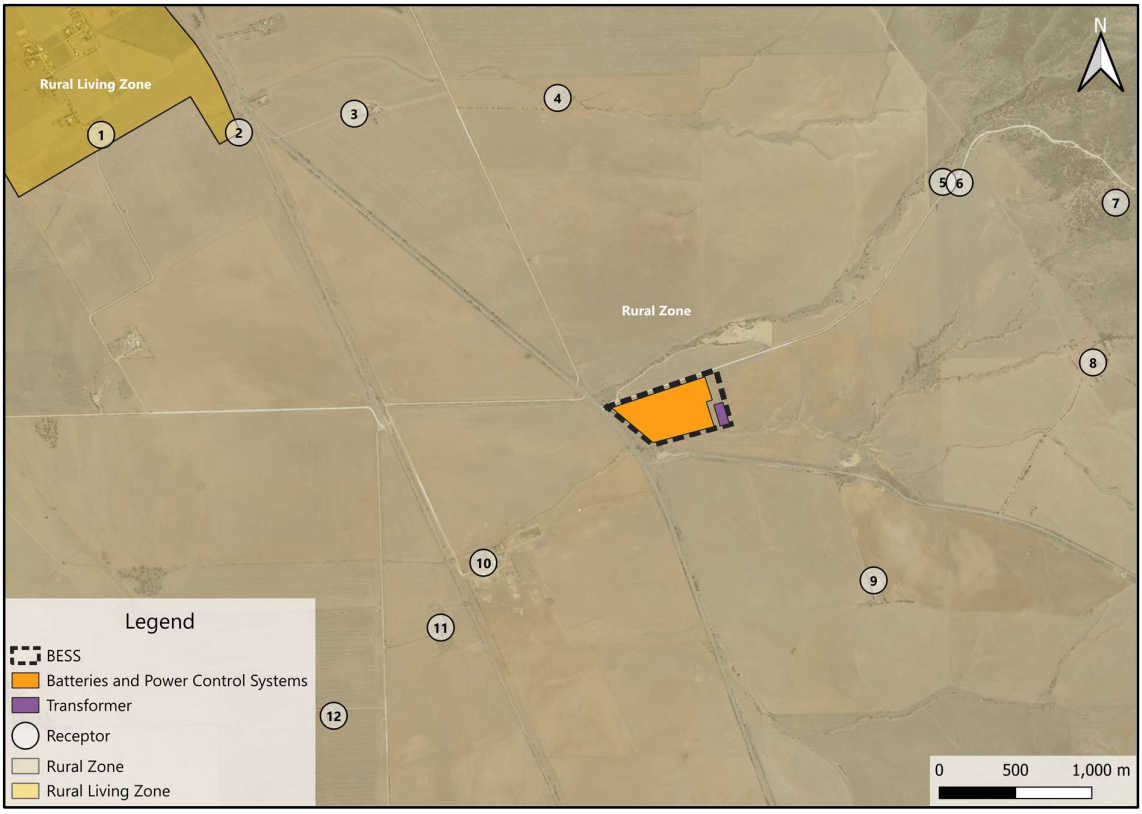
Source Plan SA – SA Property & Planning Atlas

This environmental impact assessment (the **assessment**) has been prepared to consider the operational noise from the BESS in accordance with the assessment pathway established by the *Hydrogen and Renewable Energy Act 2023* (the **HRE Act**). The assessment:

- identifies noise levels to objectively assess whether adverse effects on the environment are managed so as to reduce environmental damage as far as reasonably practicable (the **noise criteria**)
- identifies the potential environmental receptors, being the existing dwellings and vacant land principally allotted for future dwellings (the **receptors**)
- predicts the noise levels associated with the operation of batteries, power control systems, and transformer which might be procured for the BESS (**candidate equipment**)
- develops noise control and management strategies (**noise control measures**) to achieve the noise criteria.

The BESS is well located from an acoustic perspective in a Rural Zone of the *Planning and Design Code,* with a separation distance of more than 1300m to the nearest receptor. Figure 2 provides the locality plan showing the BESS layout and receptors, noting receptor 2 represents the closest vacant land principally allotted for future dwellings in a Rural Living Zone.

Figure 2 Locality Plan



Source Plan SA – SA Property & Planning Atlas

Assessment Criteria

Hydrogen and Renewable Energy Act 2023

The *Hydrogen and Renewable Energy Act 2023* (the **HRE Act**) requires that adverse effects on the environment are managed so as to reduce environmental damage as far as reasonably practicable and that an environmental impact assessment be prepared to:

- take into account the environment
- take into account risks inherent to the health and safety of the public
- contain sufficient information to make possible an informed assessment of the likely impact on the environment
- include comparison against environmental impact assessment criteria.

The HRE Act and the *Hydrogen and Renewable Energy Regulations 2024* do not include objective noise impact assessment criteria.

Environment Protection (Commercial and Industrial Noise) Policy 2023

Reference is made to the *Environment Protection (Commercial and Industrial Noise) Policy 2023* (the **Policy**) to provide objective noise impact assessment criteria.

The Policy is an objective instrument under the *Environment Protection Act 1993* (the **EP Act**). The General Environmental Duty under the EP Act requires that a *person must not undertake an activity that pollutes, or might pollute, the environment unless the person takes all reasonable and practicable measures to prevent or minimise any resulting environmental harm.*

The Policy provides an objective approach to satisfy the general environmental duty of the EP Act with reference to the land uses promoted by the *Planning and Design Code*.

With the objectives of the HRE Act being aligned with the EP Act, it is considered that by achieving the environmental impact assessment criteria established by the Policy at receptors, adverse effects on the environment will be managed to reduce environmental damage as far as reasonably practicable.

Noise Criteria

The Policy establishes indicative noise levels that apply at receptors for both the day (7.00am to 10.00pm) and night (10.00pm to 7.00am the following day).

For a new development, the equivalent noise levels (L_{Aeq}) which apply at:

- vacant land principally allotted for future dwellings are the indicative noise levels of the Policy
- existing dwellings are the indicative noise levels of the Policy minus 5 dB(A), in recognition of the increased sensitivity to a new noise source in the ambient environment.

In this circumstance, the Policy assigns the noise levels in Table 1 at the receptors identified in Figure 2 (the **noise criteria**) when assessing the operating noise from the BESS.

The noise criteria account for the following as it relates to the *Planning and Design Code Version 2024.21 dated 4 December 2025*:

- the BESS being located in a Rural Zone
- receptor 1 being an existing dwelling in a Rural Living Zone
- receptor 2 being the closest vacant land principally allotted for a future dwelling in a Rural Living Zone
- receptors 3 to 12 (inclusive) being existing dwellings in a Rural Zone.

Table 1 Noise Criteria

Receptor	Equivalent Noise Level (L_{Aeq})	
	Day	Night
1	47 dB(A)	40 dB(A)
2	52 dB(A)	45 dB(A)
3 to 12	52 dB(A)	45 dB(A)

The noise criteria apply over a default assessment period of 15 minutes.

For a noise source that operates during the day and night, the more onerous noise level during the night is often the most relevant to the assessment, however the day noise level can also be important if the operational noise from the BESS varies[1] at different times during the day and night.

When predicting noise levels for comparison to the Policy, the predicted equivalent noise levels are to be adjusted (increased) where the BESS exhibits "annoying" characteristics (dominant tonal, impulsive, low frequency content, intermittent or modulation characteristics) in comparison to the ambient environment.

[1] The operational noise can vary at different times during the day and night due to the discharge rate of the batteries and the ambient temperatures experienced at the BESS

Assessment

Noise Model

A three-dimensional noise model of the BESS has been developed based on the algorithm provided by the International Standard ISO 9613-2:2024 *"Acoustics - Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of sound pressure levels outdoors"* (the **Standard**).

The Standard specifies a method for predicting noise levels at a distance from a source under meteorological conditions favourable to noise propagation, being downwind (wind blowing from the BESS to receptors) or temperature inversion conditions.

The noise model incorporates the following:

- the location of the BESS as detailed in Figure 2
- the locations of receptors as detailed in Figure 2.
- topographical ground contours
- favourable propagation conditions between the BESS and all receptors
- noise modelling inputs detailed below:
    - the candidate equipment comprising batteries and power control systems with a capacity of 300MW / 1200 MWh, and one 450 MVA transformer
    - 10°C temperature
    - 70% relative humidity
    - 50% acoustically hard ground and 50% acoustically soft ground.

Sound Power Levels

The noise from a BESS is predominantly associated with the systems used to control the temperature of the batteries and power control systems.

The noise from the batteries and power control systems will vary depending on battery discharge and temperature control requirements, and the implementation of noise control measures.

The final equipment for the BESS is yet to be determined and will be confirmed during the detailed design and procurement stages.

Batteries and Power Control Systems

The following candidate equipment have been used as the basis of this assessment of noise from the batteries and power control systems:

- 260 Sungrow batteries (ST5015UX_4H-UD), each with a sound power level of 106 dB(A)[2]
- 65 Sungrow power control systems (SC-6900UD-MV), each with a sound power level of 100 dB(A)[3].

[2] Sungrow PowerTitan 2.0 (4H-UD) Noise Test Report, dated 21 March 2024, based on 100% operating power

[3] Sungrow SC3450UD Noise Test Report, based on 100% rated power

The above sound power levels are conservative as they represent 100% operating capacity without noise control measures. In practice, the temperature control systems will operate at reduced operating capacity (especially during the night) and there are batteries and power control systems which include noise control measures to their temperature control.

Transformer

The noise predictions have been based on one 450 MVA rated transformer with a sound power level of 103 dB(A) based on an indicative selection and as derived by *Australian Standard AS 60076.10:2009 Power transformers – Part 10: Determination of sound levels*.

Predicted Noise Levels

Noise level predictions have been made using the noise model, inputs and assumptions detailed above for comparison with the noise criteria.

The predicted noise level at each receptor is provided in Table 2 for the candidate equipment at 100% operating capacity and without noise control measures.

The noise levels in Table 2 include an adjustment (increase) of 5 dB(A) as the predictions indicate that a tonality noise characteristic will be present at the receptors for the candidate equipment without noise control measures and/or reduction in operating capacity.

Table 2 Noise Predictions – Without Noise Control Measures

Receptor	Predicted L_{Aeq} (dB(A))	
	Day	Night
Noise Criteria	47	40
1	42	
Noise Criteria	52	45
2	46	
Noise Criteria	52	45
3	48	
4	52	
5	51	
6	51	
7	46	
8	49	
9	55	
10	56	
11	53	
12	48	

The predicted noise levels indicate the noise criteria will be exceeded without noise control measures and/or reduction in operating capacity.

Noise Control Measures

The candidate equipment can reasonably include the following noise control measures available as standard equipment selections from the manufacturer:

- 260 Sungrow batteries with noise reduction (ST5015UX-S-4H-LN), each with a sound power level of 79 dB(A)[4]
- 65 Sungrow power control systems with noise reduction (SC-6900UD-MV), each with a sound power level of 86 dB(A)[5].

The predicted noise level at each receptor is provided in Table 3 for the candidate equipment with noise control measures incorporated.

The noise levels in Table 3 do not include an adjustment for noise characteristics as the predictions indicate that tonality will not be a feature of the candidate equipment with noise control measures.

Table 3 Noise Predictions – With Noise Control Measures

Receptor	Predicted L_{Aeq} (dB(A))	
	Day	Night
Noise Criteria	47	40
1	18	
Noise Criteria	52	45
2	20	
Noise Criteria	52	45
3	22	
4	25	
5	25	
6	25	
7	22	
8	23	
9	29	
10	29	
11	26	
12	22	

The predicted noise levels indicate the noise criteria can be achieved by the candidate equipment at all receptors with reasonable and practicable noise control measures incorporated.

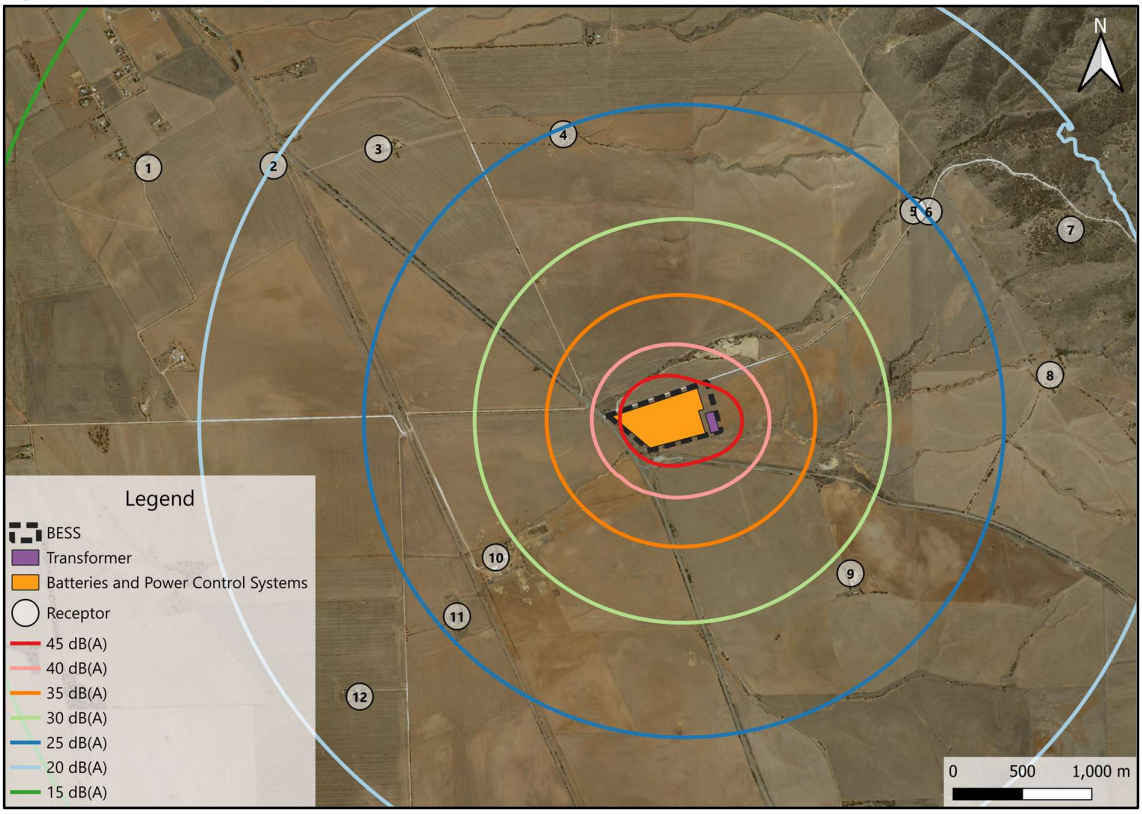
[4] TÜV Rheinland Test Report CN25NB3B 001 dated 17 February 2025, based on power set at 100% and 74% fan duty cycle

[5] Sungrow SC3450UD Noise Test Report - Australian Noise Reduction Version (V1), dated 05 September 2025, based on 85% operating power

Where the noise criteria are achieved, then it is considered that adverse effects on the environment from the BESS are managed so as to reduce environmental damage as far as reasonably practicable in accordance with the HRE Act.

Noise prediction contours for the candidate equipment with noise control measures are provided in Figure 3.

Figure 3 Noise Prediction Contours



Source Plan SA – SA Property & Planning Atlas, and the Plans Project Concept Design

Uncertainty

The three-dimensional noise model of the BESS has been developed based on the algorithm provided by the Standard. The Standard states an estimated accuracy (uncertainty) of ±3dB(A) at distances of 1000m under meteorological conditions favourable for noise propagation. There will also be inherent uncertainty in the candidate's equipment noise data.

The assessment reduces uncertainty by using noise data that is representative of the highest expected operating noise levels in combination with the input assumption of 50% acoustically hard ground and 50% acoustically soft ground (which is a conservative assumption for a rural environment particularly over the large separation distances involved for the BESS).

The conservative inputs result in predicted noise levels that are at the upper end of what is expected to occur in practice.

Statement of Environmental Objectives

The environmental objective established by this assessment is to achieve the environmental impact assessment criteria established by the Policy at receptors, and in so doing, to ensure adverse effects on the environment will be managed to reduce environmental damage as far as reasonably practicable.

The Policy establishes noise criteria to be achieved when accounting for the presence of characteristics (dominant tonal, impulsive, low frequency content, intermittent or modulation characteristics) in comparison to the ambient environment.

This assessment indicates that compliance with the Policy can be achieved at all receptors subject to the BESS incorporating reasonable and practicable noise control measures available from the manufacturer for the candidate equipment.

A final noise assessment which accounts for the final layout, final BESS equipment, final noise control measures incorporated by the manufacturers of the equipment, actual cooling system requirements tailored to the discharge and temperature profiles during the day and night, and any adjustment for tonality, will ensure the BESS satisfies the noise criteria and the environmental objectives.

Conclusion

This assessment has been made to consider the noise from the BESS proposed at Lot 56 Collaby Hill Road, Warnertown.

The environmental objective of the assessment is to achieve the environmental impact assessment criteria established by the *Environment Protection (Commercial and Industrial Noise) Policy 2023* at receptors, and in so doing, to ensure adverse effects on the environment will be managed to reduce environmental damage as far as reasonably practicable.

The assessment determines the operational noise from the BESS can achieve the requirements of the *Environment Protection (Commercial and Industrial Noise) Policy 2023* and the *Hydrogen and Renewable Energy Act 2023* at all receptors subject to the incorporation of reasonable and practicable noise control measures to candidate equipment.

Whilst the assessment indicates that compliance can be reasonably achieved at all receptors, it will be subject to detailed design and procurement, and so it is recommended that a final noise assessment be made to ensure the BESS satisfies the noise criteria and the environmental objectives when accounting for the final layout, final BESS equipment, final noise control measures incorporated by the manufacturers of the equipment, actual cooling system requirements tailored to the discharge and temperature profiles during the day and night, and any adjustment for tonality.

References

Australian Standard AS 60076.10:2009 Power transformers – Part 10: Determination of sound levels

Environment Protection Act 1993, Government of South Australia

Environment Protection (Commercial and Industrial Noise) Policy 2023, South Australian Environment Protection Authority

Guidelines For the Use of the Environment Protection (Commercial and Industrial Noise) Policy 2023, South Australian Environment Protection Authority

Hydrogen and Renewable Energy Act 2023, Government of South Australia

Hydrogen and Renewable Energy Regulations 2024, Government of South Australia

International Standard ISO 9613-2:2024 *"Acoustics - Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of sound pressure levels outdoors"*

Planning and Design Code Version 2024.21 dated 4 December 2025, PlanSA

Sungrow PowerTitan 2.0 (2H-UD) Noise Test Report (V1), dated 21 March 2021

Sungrow SC3450UD Noise Test Report

Sungrow SC3450UD Noise Test Report - Australian Noise Reduction Version (V1), dated 05 September 2025

TÜV Rheinland Test Report CN25NB3B 001 dated 17 February 2025

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Author Details:

Author	Mathew Ward
Mobile	0413 018 332
Email	MathewWard@echoacoustics.com.au

echo
Acoustic Consulting

80 Grote Street
Adelaide SA 5000

enquiry@southfront.com.au
Phone (08) 8172 1088

southfront.com.au
ABN 96 007 344 191

Our Ref: 25093-2A/DJ/DJ

Hughes Gap BESS High Level Stormwater Assessment

10 November 2025

Chris Dunn
Technical Director
BE Engineering Solutions
19 Young Street
ADELAIDE SA 5000

Dear Chris

Southfront has undertaken a high-level assessment of the stormwater management considerations associated with the proposed Hughes Gap Battery Energy Storage System (BESS) project. This assessment focuses on potential implications for stormwater management relevant to the selection and development of Sites A, B, and C.

Scope

- Compilation of available topographic information
- Assess stormwater management implications for selection of sites A, B and C
- Identify, at a qualitative level, the likely stormwater management approach to development within each area
- Prepare a brief memo summarising advantages and disadvantages of each site.

Background

ReEnerge are proposing to develop a renewable energy project in an area to the north of Crystal Brook and will include a BESS and wind technology. The Hughes Gap BESS project, located on land adjacent to the intersection of the Augusta Highway and Wilkins Highway, represents the first stage. This first stage is the development of a 300MW X 4 hr BESS covering an area of approximately 200m x 200m.

In addition to the BESS, the area will need to include land used for:

- connection to the existing line;
- supporting infrastructure e.g. access, stormwater management
- all temporary construction facilities (eg offices, laydown, parking, storage, stockpiles, supporting infrastructure)

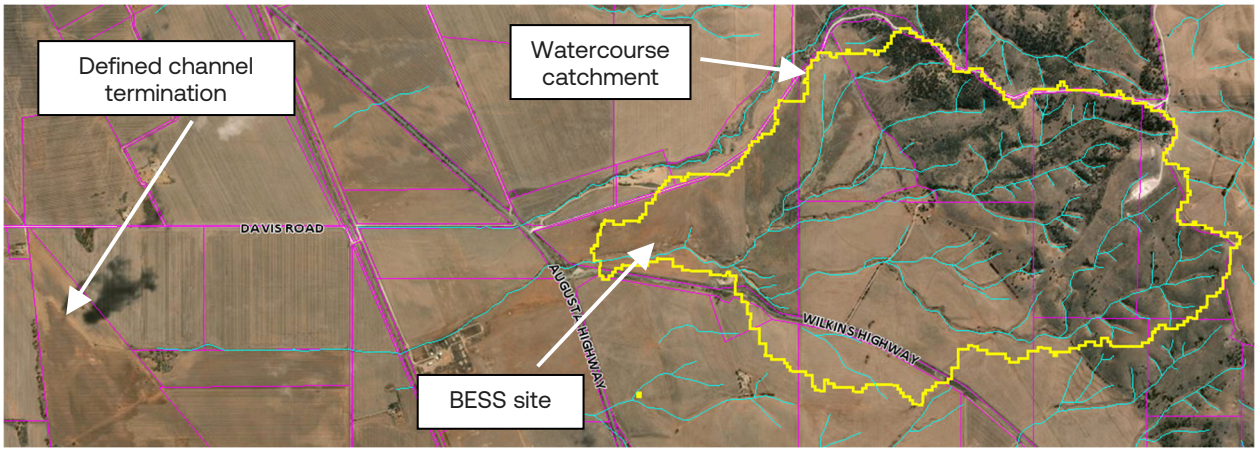
Sites A and B have been identified as primary candidate locations for the BESS platform, with Site C as an optional or overflow area.

General Location Plan

Site Features

The project area is situated on the western escarpment of the Flinders Ranges, where regional land gradients direct runoff westward toward Spencer Gulf.

A watercourse draining a 9.2 km² catchment from the Flinders Ranges traverses the site. The defined channel extends downstream for approximately 4.5 km, after which it loses form due to flatter terrain and potentially infrequent flow events.

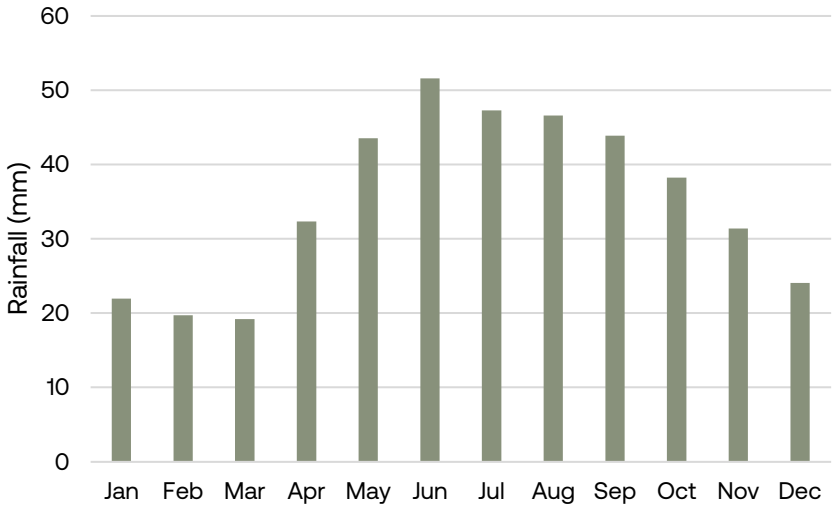


Watercourse, Catchment Plan

Available topography suggests that each of Sites A, B, and C generally fall towards the central watercourse. Detailed survey data is not yet available but should be acquired to support further site selection and detailed design.

Local Climate

Long term rainfall statistics indicate that the site experiences an annual average rainfall of 419mm. The region exhibits a Mediterranean rainfall pattern, with the majority of precipitation occurring during winter months.



Local Average Rainfall

General Stormwater Management Requirements

In addition to standard best-practice stormwater design, the following requirements are recommended:

- **Peak Flow Mitigation**: Stormwater discharges from the site to be detained such that peak 1% AEP post-development peak flow is mitigated to the pre-development peak 1% AEP peak flow.
- **Water Quality Management**: Water quality improvement measures be incorporated to collect coarse sediment from stormwater runoff that might reasonably be expected to be produced from unsealed rubble hardstand and access track surfaces
- **Stormwater Harvesting and Reuse**: Consideration of opportunities for harvesting of stormwater runoff, for both beneficial reuse and to reduce frequency of discharge to the watercourse. Opportunities for beneficial reuse on this site could include utilisation of water for site dust suppression, and irrigation of vegetated buffer areas.

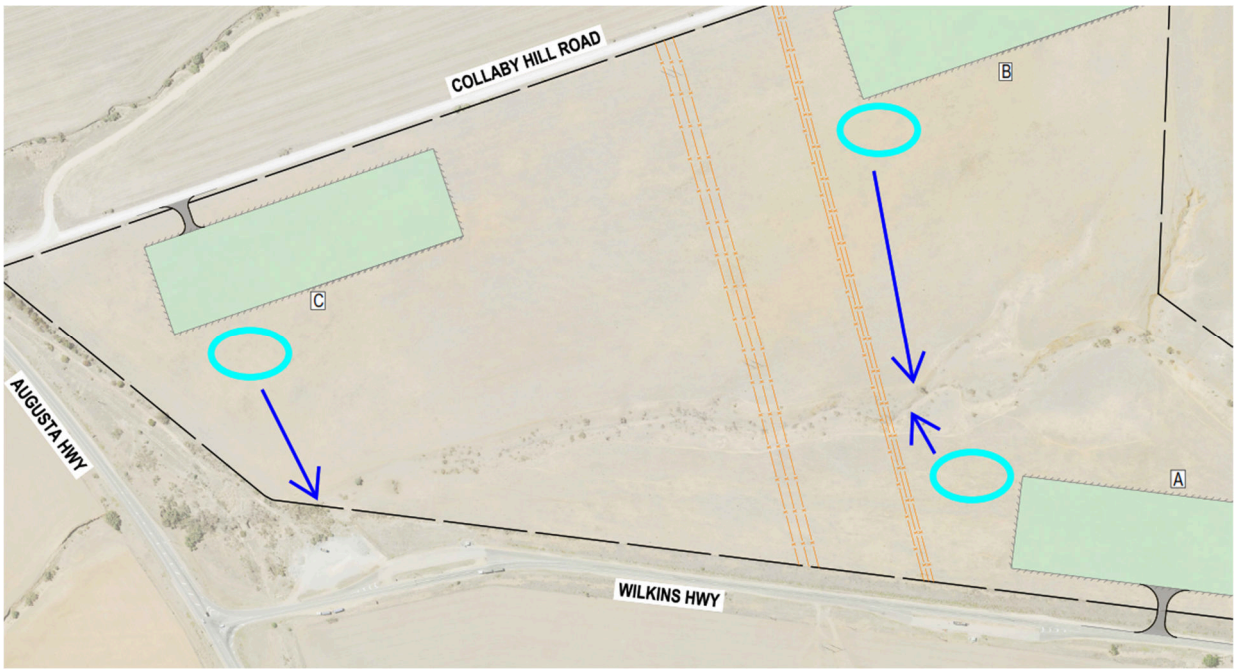
Stormwater Management High Level Concepts, Sites A-C

An initial appraisal of the likely stormwater management approach has been considered for each of the three sites. Stormwater management at each of the sites is expected to share the following characteristics:

- A combination of underground drainage and surface drainage to drain the bench platform
- Bench platform drainage to be directed to a stormwater basin, located on the respective low corner of each bench
- The basin (shown diagrammatically only on the concept plan, and not shown to scale) is to provide detention storage, sediment capture and some temporary permanent storage if required.
- An overflow from the basin to the watercourse. This overflow is likely to be provided in the form of an underground drain, with the outfall into the watercourse to be stabilised with erosion protection.

At this initial level, there is little to distinguish “advantages and disadvantages” when comparing each of the sites, other than the required length of outfall drains – on which basis Site A is favoured, followed by C and B.

Survey of the site is required to inform further comment in this regard.



Stormwater Management High Level Concepts, Sites A-C

Flood Risk

While a flood risk assessment has not been undertaken at this time, the watercourse through the site is noted to give rise to flood hazard for development on this site.

In general terms, siting of the BESS bench platform well away and above the level of the creek channel - as is depicted in the high level concepts for the siting of the BESS on Sites A, B and C – should provide a sound basis for managing flood risk.

Any proposal to establish a vehicular crossing of the watercourse will require consideration of flood levels and management of channel scour.

A detailed flood risk assessment, including hydrologic and hydraulic modelling, is recommended to support detailed design. This should include mapping of 1% AEP flood extents and definition of minimum platform levels to maintain flood immunity.

Please contact this office should you require any further assistance with this matter.

Kind regards,

Drew Jacobi BEng (Hons) FIEAust CPEng NER RPEQ
Director

Be Engineering Solutions Pty Ltd
19 Young Street, Adelaide, SA 5000
www.be-engsolutions.com.au

PROPOSED BESS – WILKINS HIGHWAY/COLLABY HILL ROAD, HUGHES GAP HIGH LEVEL TRAFFIC ASSESSMENT

1. BACKGROUND

Be Engineering Solutions (BEES) has been engaged by ReEnerge to undertake a high-level traffic assessment for a proposed BESS at Hughes Gap in the vicinity of the Wilkins Highway/Colby Hill/Augusta Highway intersection, Warnertown.

ReEnerge are proposing to develop a renewable energy project in an area to the north of Crystal Brook and will include a Battery Energy Storage System (BESS) and wind technology. This first stage is the development of a 300MW x 4hr BESS covering an area of approximately 200mx200m at Hughes Gap. In addition to the BESS, the Licence area will need to include land used for:

- connection to the existing line.

- supporting infrastructure e.g. access, stormwater management.

- all temporary construction facilities (eg offices, laydown, parking, storage, stockpiles, supporting infrastructure).

The investigations discussed in this report are a high-level traffic assessment to determine the best location for the site based on an on-site inspection (15 October 2025), liaison with ReEnerge on their requirements, discussions and feedback from DIT and Port Pirie Regional Council. The locations have considered predicted traffic numbers through all stages of development from civil works, construction, commissioning and 'day to day' operation. Options A, B or C are currently under consideration for the proposed BESS site. A location plan showing the area under consideration and proposed site accesses is shown in Figure 1.

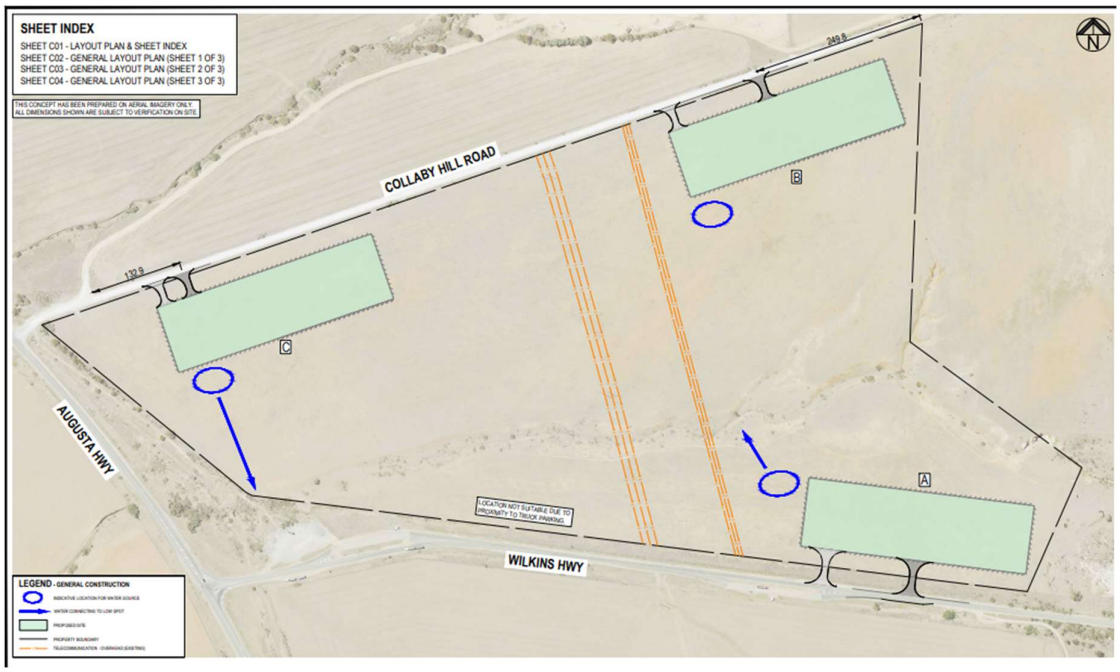


Figure 1 – Location plan for BESS site considerations, Warnertown

We acknowledge and pay our respects to the Kaurna people, the traditional custodians whose ancestral lands we gather on. We pay our respects to the Elders of the past, present and future.

This assessment is a high-level traffic assessment only including the following considerations:

- Access point requirements off Collaby Hill Road, Augusta Highway and Wilkins Highway based on predicted traffic volumes to the site during all stages of development.
- Any road infrastructure upgrades to accommodate for the proposed development.

The information contained in this document will help guide ReEnerge to selecting a preferred location for their proposed BESS. A further, more detailed traffic assessment will be required once the preferred site has been selected.

It is understood that the site and required facilities will be of similar dimensions to that of the recently completed BESS located in Blyth (including stormwater provisions, battery array office, parking, power station and access requirements) as shown in Figure 2 below.

Figure 2 – Typical BESS compound (Blythe)

2. EXISTING CONDITIONS

The existing site under consideration for the proposed BESS is located between Collaby Hill Road (unsealed local access road) and Wilkins Highway (DIT collector road) which are both accessed via the Augusta Highway (DIT Major Traffic Route (Source: A Functional Hierarchy for South Australia's Land Transport Network)), Warnertown. Wilkins Highway has two truck parking areas (on opposite sides of the road) located in close proximity of the proposed development. A crest also exists east of the site, approximately 500m from the existing truck parking bay located on the southern side of Wilkins Highway. It is also understood that another development with access from the southern side of Wilkins Highway is under consideration. This proposed access point from the adjacent development and the existing truck parking areas have been taken into account when assessing suitable access locations for Wilkins Highway for this development. There is an active quarry from Collaby Hill Road with access located approximately 100m from Augusta Highway.

The subject site itself has a number of constraints associated with the terrain, a watercourse and existing overhead wires at two locations crossing through the site. A location plan showing the existing truck parking areas, existing constraints and adjacent development is shown in Figure 3.

Figure 3 – Location plan – subject site (shown in red) including existing constraints

It should be noted that the intersection of Augusta Highway and Wilkins Highway has a right turn facility (and a left turn deceleration lane) designed to provide for the storage of vehicles from Augusta Highway to Wilkins Highway. There are no right turn storage facilities (but does have a left turn deceleration lane into Collaby Hill Road) at the intersection of Collaby Hill Road and Augusta Highway as shown in Figure 4. Augusta Highway and Wilkins Highway have a speed limit of 110 km/hr. Collaby Hill Road is not signposted (and is unable to be signposted since it is an unsealed road and the conditions vary depending on the weather conditions) and hence the general rural speed limit of 100km/hr applies.

Figure 4 – Existing intersection traffic management arrangements – Augusta Highway

A summary of known and anticipated traffic volumes of the road network adjacent the subject site is provided in Table 1.

Road	Traffic volumes (year)	Comment
Wilkins Highway	1300 vehs/day (2023)	21% heavy vehicles
Augusta Highway	5700 vehs/day (2023)	25% heavy vehicles
Collaby Hill Road	Less than 500 vehs/day	Approximate only as actual volumes are not available. Council road, unsealed and provides local access only.

Table 1 – Approximate traffic volumes on roads in vicinity of the subject site (source: LocationSA Map Viewer)

Augusta Highway is an important link between Port Wakefield (and Adelaide) and Port Augusta (and further north and west). Wilkins Highway links the Augusta Highway to rural towns Gladstone, Jamestown and Peterborough.

2.1. CRASH HISTORY

A review of reported crash history over the last 5 years (from 2020-2024) in the vicinity of the subject site has been assessed and is summarised in Table 2.

Location	Number of crashes (and type)
Augusta Highway/Wilkins Highway	2 Property Damage Only (PDO) /1 Personal Injury (PI) (Right angle) 1 PI (Rear End)
Wilkins Highway (east of Augusta Highway)	1 PI (Head on)

Table 2 – Reported crashes in vicinity of the subject site (source: LocationSA Map Viewer)

The reported crash history in the vicinity identifies potential issues with right turning motorists into/out of Wilkins Highway off Augusta Highway with the 'rear end' incident likely to be the cause of a motorist either turning left onto Augusta Highway or being hit slowing down to enter the right lane into Wilkins Highway. There are no reported crashes at the intersection of Collaby Hill Road and Augusta Highway which suggests that the number of motorists turning right at this intersection is low which is reflected with the lack of a protected right turn facility.

3. PROPOSED DEVELOPMENT

The proposed BESS development at the subject site will generate a number and different type of vehicles during all cycles of development as provided in Table 3.

It is understood that the 'Civil Works' required to level the site to accommodate the battery and inverters will occur for approximately 2-3 months. The batteries, inverters and the power station will be constructed/installed during the 'Construction' stage (anticipated 6-8 months) and during the commissioning stage (approximately 3 months) the site will be completed ready for operation. The operation stage once the site has been constructed and commissioned will only require minimal vehicles for the 'day to day' operations.

Vehicle Type	Vehicle Trips per day			
	Civil Works	Construction	Commissioning	Operation
Light Vehicles	200	300	50	2
Trucks (up to 19m Semi)	20	120	2	0
Trucks (up to 26m B-Double)	4	180	0	0
OS/OM	0	2	0	0
Total	224	602	52	2

Table 3 – Predicted Traffic Generation Estimates – Hughes Gap BESS (300MW/4hr)

3.1. OPTIONS FOR ACCESS TO SITE

It is understood that the majority of traffic to and from the site will be via Adelaide which will likely mean that most of the traffic will enter from Augusta Highway and turn into either Wilkins Highway (site A) or Collaby Hill Road (site B or C). To understand DIT's and Councils requirements for access of their respective roads, they were both consulted on preferences and requirements to accommodate the predicted traffic volumes likely to be generated by the proposed development.

3.1.1. Augusta Highway

DIT have provided the following advice in regard to access requirements from Augusta Highway to/from Collaby Hill Road:

'To ensure safe and efficient movements of traffic on Augusta Highway, treatment such as a protected right treatment (i.e. CHR(s)) would need to be considered to accommodate the peak construction traffic, as a temporary measure. The CHR(s) is to be decommissioned post construction period. The traffic volume on Augusta Highway for the section between Port Pirie and Crystal Brook is the highest compared to any other section having AADT 5700 (CV 24.5%).

When queried further on the requirement to decommission the proposed right turn lane following commissioning, the following advice was provided:

'The CHR(s) requires a design departure, ok for short term use. A CHR would be more appropriate as a permanent treatment. Would the project consider the CHR as design? DIT has no objection for the acceleration lane for traffic leaving Colby Hill Road however the design may be limited due to the close proximity of turn out to Wilkins Highway. Traditionally DIT discourages a short turn out lane that require vehicle to check the rear mirror prior to merge.'

Accordingly, based on the above advice if ReEnerge were to consider the provision of access from Collaby Hill Road then a 'CHR type' right turn treatment to provide right turn storage from Augusta Highway (similar to that provided already for Wilkins Highway) would need to be installed (and possibly decommissioned following construction, subject to further discussions with DIT). A typical CHR type treatment (Austroads) is provided in Figure 5. It should be noted that this type of treatment involves line marking only but will require an extension of the road footprint to accommodate. This treatment will require a design to DIT's satisfaction and then constructed using DIT's preferred contractors. The design/construction process is anticipated to take approximately 6 months and likely to be in the order of $500k to accommodate. DIT have also provided the following advice in regard to the exit/entry from/to Collaby Hill Road:

'Colby Hill Road is an unsealed road in nature with sheeted material, under the care, control and maintenance of Port Pirie Regional Council. The existing seal extent (is) to approximately 25m from the continuity line of the Augusta Highway. Based on the construction traffic generated, it is in Council and project benefits to have an all-weather access to the BESS site hence DIT's position for the project to preserve the integrity of the existing pavement.'

Council have provided the following feedback (from the Acting Director Infrastructure) regarding the proposed site locations:

'Both Council's Manager Operations and I had a look at the proposed sites and agree site C is the preferred location as there will be less impact on the road.

Also, after reviewing the concept plans below, we have no issue with the location of the stormwater detention basin and runoff.'

Further discussions will need to be held with DIT and Council as exact requirements are currently unclear at this time, although this advice could be interpreted that a sealed access may be required from Augusta Highway along Collaby Hill Road to the proposed BESS site, although Council (who own and maintain the road) have been silent on this requirement (who have preferred access via Site C and have not indicated that Collaby Hill Road will require any upgrade) and inconsistent for another similar BESS site recently commissioned (Blythe, noting that it is in a different area) where existing unsealed roads have been retained and deemed as suitable for use.

Figure 7.3: Channelised right turn (CHR) on a two-lane rural road

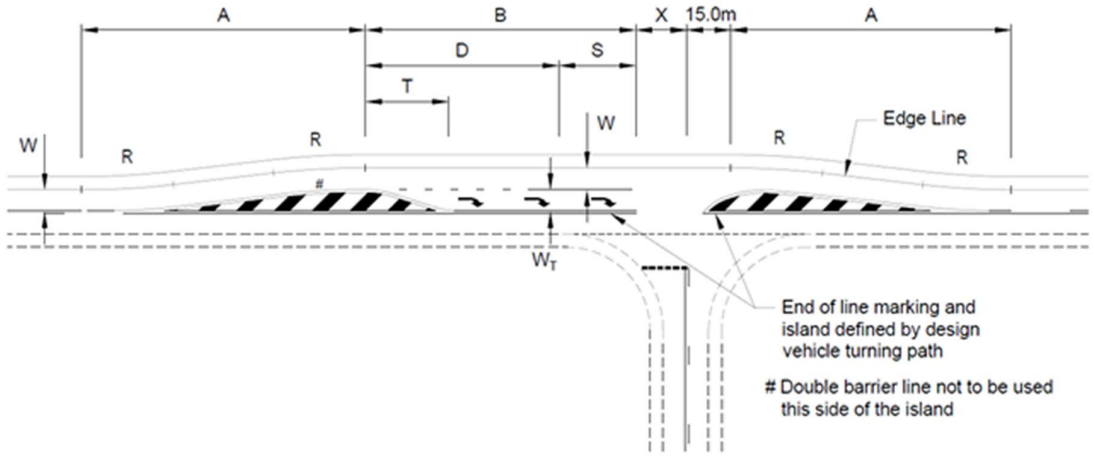


Figure 5 – Typical CHR right turn treatment (source: Austroads)

If access is to be provided off Wilkins Highway from Augusta Highway then the existing right turn facility may be adequate (subject to further DIT approval as they may require an extension of the storage for the right turn lane) as a result of the predicted increase in traffic volumes and the fact that the current right turn lane design is sub-standard (in accordance with Austroads Part 4A) in regards to the overall length of the right turn lane.

3.1.2. Wilkins Highway

If access is to be provided off Wilkins Highway (DIT road) which is required for Site A only, then DIT have provided the following advice in regard to the left turn treatment into the proposed development:

'Access to site A may need to consider Austroads prescribed treatment such as CHL or AUL'.

Further information is required from the developer during the next stage of access considerations about the requirements for right turn entry (BAR type treatment) into the site (as right turn requirements into the site may be negligible as the majority of movements are predicted to/from Augusta Highway) and would need to consider whether this would have an impact on the parking bay at this location.

DIT have also provided the following advice:

'We would need more details how the pavement treatment to be adopted on the BAR and may even consider a Road Safety Audit (RSA) to be carried out to understand the safe movements of traffic in this area. Please also note DIT will not be supporting any speed reduction on the highway during the internal construction activities where there is no roadwork on the highway. Hence, the access to Site A should also consider any delay to through traffic and eliminate crash/reduce severity of probable crashes that may occur.'

A typical CHL/AUL and BAR treatment is provided in Figure 6 and 7. These treatments are basic left turn deceleration lanes and right turn lanes so that motorists can exit the proposed BESS site without too much of an impact on passing traffic and their design is based on predicted traffic movements into/out of the proposed BESS site and DIT's requirements.

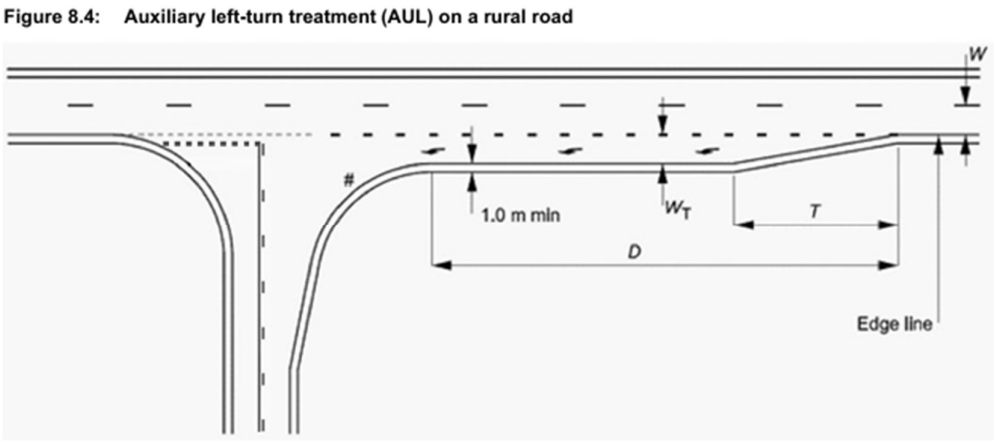


Figure 6 – Typical AUL left turn treatment (source: Austroads)

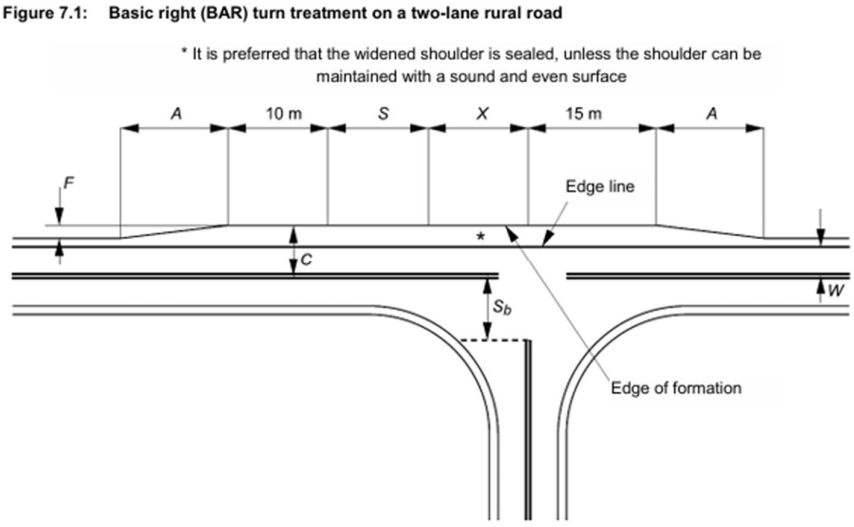


Figure 7 – Typical BAR right turn treatment (source: Austroads)

DIT have also provided the following advice should access be provided off Wilkins Highway:

'If the nearby quarry would be utilised, an internal route needs to be created so quarry trucks would not be using the highway when delivering material.'

3.1.3. Collaby Hill Road

Should access be provided off Collaby Hill Road (Site B or C), then the road may be required to be sealed to the BESS access point, although this requirement is currently unclear based on conflicting advice from DIT and Council on this matter. The access point to/from the proposed development from Collaby Hill Road would need to be located far enough away from the existing quarry access point (5 seconds of travel time suggested in accordance with the necessary Austroads requirements) which would require an offset distance of 140m metres for a 100km/hr road). No further treatment of Collaby Hill Road is likely to be required due to the very low traffic volumes. ReEnerge have indicated that they are likely to seal the access point off Collaby Hill Road (although this may not be necessary given the precedent set for other BESS sites and the fact that there will be little operation vehicle use post commissioning). It should be noted that Collaby Hill Road may be required to be graded following/during commissioning if left unsealed.

3.2. DISCUSSION

ReEnerge are considering access to/from their proposed BESS via either Wilkins Highway (Site A) or Collaby Hill Road (Site B or C). It is understood that two separate access points may be required for each site consideration (i.e. separate in/out movements)

To accommodate access off Collaby Hill Road (Site B or C) will require the following:

- Widening (protected right turn lane (CHR treatment) and possibly a left turn acceleration lane) on Augusta Highway at the Collaby Hill Road intersection to DIT requirements (DIT may require the removal of this treatment following commissioning).

- Possibly seal of Collaby Hill Road from Augusta Highway to the proposed BESS access point (to be confirmed as conflicting advice has been provided from Council and DIT).

- Located at a distance far enough away to not impact the existing quarry access point.

To accommodate access off Wilkins Highway (Site A) via Augusta Highway will require the following:

- Possible lengthening of the right turn lane from Augusta Highway into Wilkins Road to accommodate for the increased number of right turn movements generated from the proposed development.

- Possible widening of the access point to the proposed BESS site (minimum left turn deceleration lane into the site) from Wilkins Highway.

- The location of the access point needs to be mindful of the existing crest located east of the proposed site A and be located far enough away from the crest to not impact sight distance requirements for motorists wanting to exit from the site. The access point will also need to cognisant of the existing truck parking bay located approximately opposite Site A.

It is noted the footprint shown in Figure 1 (reproduced as Figure 8) will need to be expanded to accommodate a 5 hectare BESS facility and proposed switchyard.

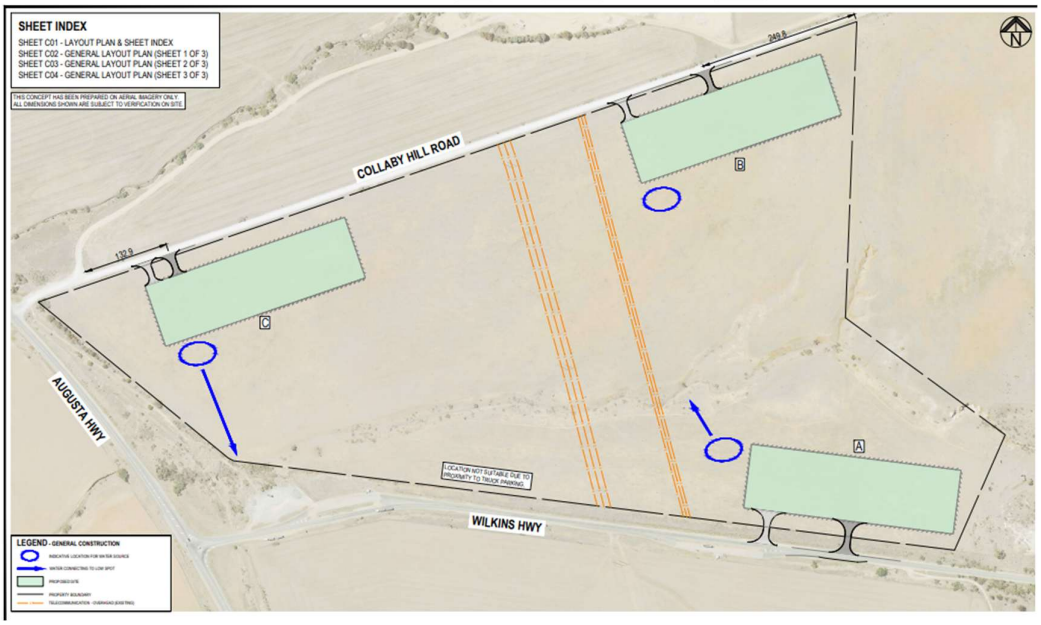


Figure 8 – Site plan of the subject site

4. CONCLUSION AND NEXT STEPS

DIT and Council have a number of requirements that need to met for access to the proposed BESS development which are described in the body of the report with access either off Collaby Hill Road or Wilkins Highway. The exact requirements are not entirely clear but are described above and should provide adequate information to allow ReEnerge enough information to make an informed decision about their preferred access point. Following selection of the preferred site, a more detailed traffic investigation will be required and further engagement with Council and DIT to confirm their requirements for their respective road network to the site.

Please do not hesitate to call me on 0400 290 233 or via email on cdunn@be-engsolutions.com.au below to discuss any of the above further.

Yours Sincerely,

Chris Dunn
Technical Director
Be Engineering Solutions Pty Ltd