

SER Decision Statement

Armidale 330 kV substation – new synchronous condenser



Proposed activity summary

Transgrid is the proponent for the installation and operation of two new synchronous condensers (syncons) and associated equipment at the existing Armidale 330 kV substation (the proposed activity). The proposed activity involves construction of a new access road and upgrades to Eathorpe Road, new bench and 330 kV busbar and installation of the new syncon and associated equipment.

The proposed activity is part of Transgrid's broader initiative to ensure sufficient system strength services are available to maintain the stability of the NSW power system and meet system strength requirements established by the Australian Energy Market Operator (AEMO) in their *2022 System Strength Report* (AEMO, 2022). The retirement of NSW's coal generators and the growth in inverter-based resources in the coming decade is driving an urgent need to add new sources of system strength to the power system.

A Summary Environmental Report (SER) was prepared by AECOM (November 2025) to assess the potential impacts of the proposed activity. The SER was prepared in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), clause 171 of the *Environmental Planning and Assessment Regulation 2021* and the NSW Code of Practice for Authorised Network Operators (the Code).

Determination

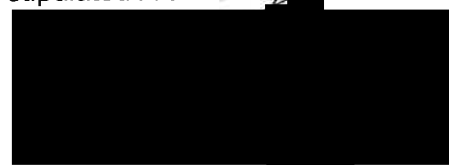
I, GRANT WARNSBY, as an authorised person on behalf of Transgrid, have examined and considered the SER for the installation and operations of two syncons and associated equipment at the existing Newcastle 330 kV substation in accordance with section 5.5 of the EP&A Act.

As per the requirements of section 2.5.1 of the Code, I have not been involved in conducting the assessment.

The proposed activity is not likely to significantly affect the environment, and is not likely to significantly affect threatened species, ecological communities or their habitats and is not to be carried out on a declared area of outstanding biodiversity value.

I determine, on behalf of Transgrid, that an Environmental Impact Statement and Species Impact Statement are not required in respect of the proposed activity. The proposed activity may now proceed subject to the implementation of the mitigation measures in the SER.

This is not a conditional decision and no further conditions are required (other than the mitigation measures stipulated in the SER).



Grant Warnsby
General Counsel/ Legal Governance and Risk
Transgrid

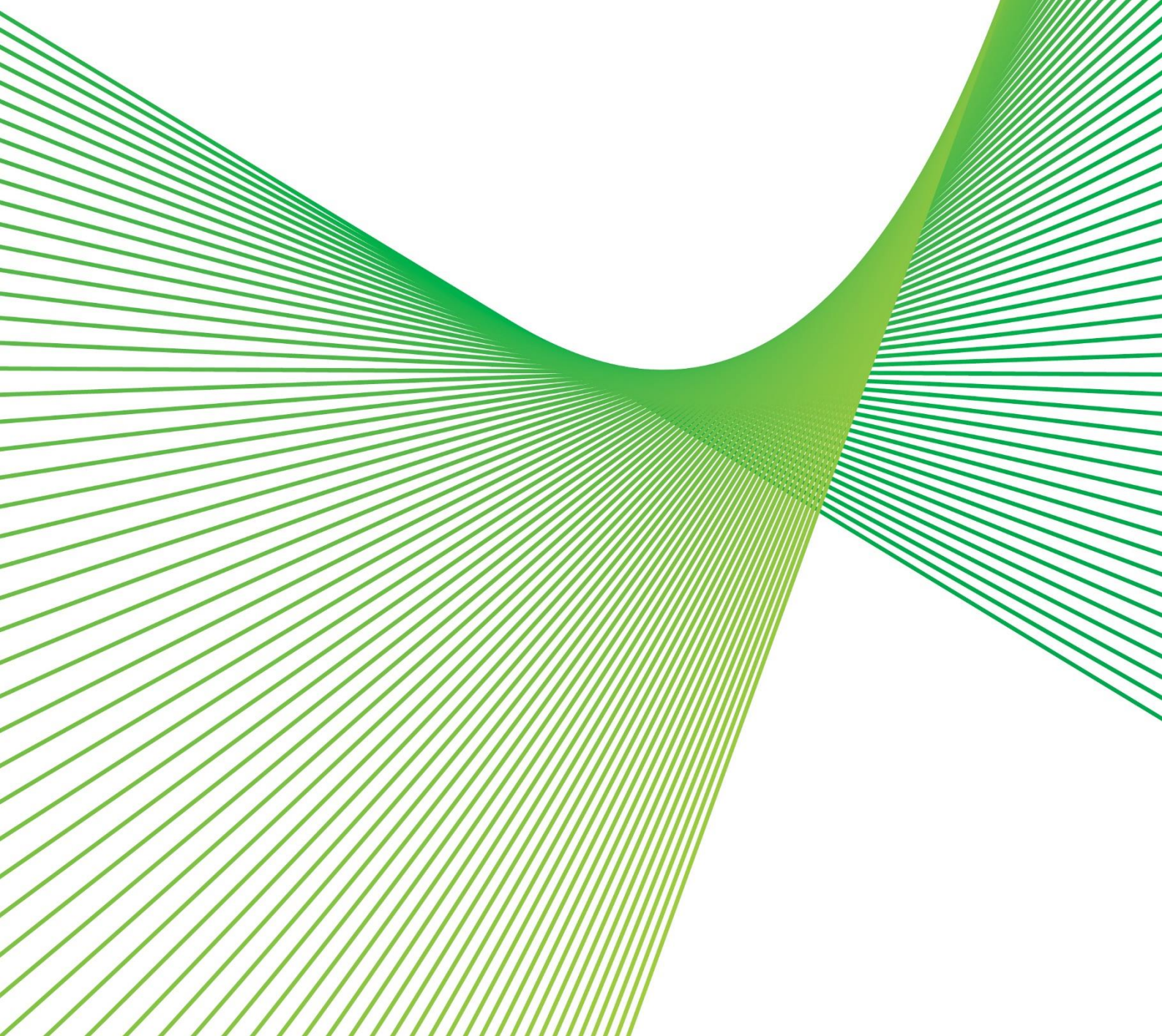
Date: 26/11/25

Summary Environmental Report (SER)

Armidale 330 kV Substation – new synchronous condenser

Part 5 EP&A Act Environmental Impact Assessment

November 2025




Document preparation history

Revision	Reviewed by	Date
0	Neil Standen	11/09/25
1	Neil Standen	13/11/25
2	Neil Standen	25/11/25

Certification

I certify that I have prepared the contents of this SER, and, to the best of my knowledge, it is in accordance with the *NSW Code of Practice for Authorised Network Operators* approved under clause 198 of the *Environmental Planning and Assessment Regulation 2021*, and the information it contains is neither false nor misleading. It addresses, to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the proposed activity. It has been prepared by persons appropriately trained and qualified in accordance with Transgrid's Authorisation to Work Procedure.

Environmental impact assessment prepared by	Neil Standen
Signed	
Date	25/11/25
Designation	Associate Director
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1. Introduction

1.1. Proposed activity overview and need

Transgrid is proposing to install two synchronous condensers (syncons) at the existing Armidale 330 kV substation (the proposed activity). The proposed activity is part of Transgrid's broader initiative to ensure sufficient system strength services are available to maintain the stability of the New South Wales (NSW) power system and meet system strength requirements established by the Australian Energy Market Operator (AEMO) in their *2022 System Strength Report* (AEMO, 2022). The retirement of NSW's coal generators and the growth in inverter-based resources in the coming decade is driving an urgent need to add new sources of system strength to the power system.

The subject of this Summary Environmental Report (SER) is the construction, commissioning and operation of two new syncons and associated infrastructure at the existing Armidale 330 kV substation.

The proposed activity is described in more detail in Section 2.

1.2. Purpose of the SER

NSW Electricity Networks Operations Pty Ltd, as a trustee for NSW Electricity Operations Trust (known as Transgrid), is an authorised network operator and must complete an environmental assessment under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in accordance with the *New South Wales Code of Practice for Authorised Network Operators* (the Code). The appropriate assessment and approvals process for the proposed activity in accordance with the Code is Class 3 – SER.

The purpose of this SER is to determine if the proposed activity would significantly affect the environment and/or significantly affect threatened species, ecological communities or their habitats. This SER documents the proposed activity, assesses the potential environmental impacts and provides environmental management measures to be implemented to minimise the risk of adverse environmental impacts during construction and operation.

2. Proposed activity description

2.1. Proposed activity scope

The proposed activity involves the installation and operation of two syncons and associated infrastructure at the existing Armidale 330 kV substation.

The scope of works would include:

- Site establishment activities, including installation of construction offices and amenities, equipment storage and construction laydown areas and vegetation removal
- Construction of a new access road from Eathorpe Road and upgrades to Eathorpe Road to support the transport of equipment and vehicle movements to and from site
- Demolition of redundant infrastructure, including a storage shed and boundary fencing
- Installation of a new bench (concrete slab, foundations and associated earthworks), with an indicative maximum footprint of around 130 by 150 metres (m), immediately south of the existing Armidale 330 kV substation to house the syncons and associated infrastructure
- 330 kV busbar extension with a new switch bay, which comprises a 330 kV circuit breaker, disconnecter, capacitive voltage transformer, current transformer, earth switch, post insulators/busbar supports and surge arrester
- Installation of the new syncons and associated equipment, including:
 - Power transformer with firewalls
 - Auxiliary transformers
 - Syncon building and gantry crane
 - Oil lubrication and water-cooling systems
 - Control room and battery room
 - Low voltage AC and DC systems
 - Protection and control systems
 - Backup diesel generator
 - Pony motor
- Installation of a new demountable secondary systems building
- Installation of new spill oil tank, secondary containment dam(s), and drainage systems to cater for the new transformers, diesel generator and the syncon oil lubrication system
- Extension of the substation's stormwater drainage system, to cater for the new bench area
- Installation of new lighting protection masts
- Rehabilitation of the site, including:
 - Removal of temporary construction facilities and equipment
 - Excavated material not reused on-site and waste materials would be disposed of at an appropriately licensed waste facility or as directed by Transgrid's environmental business partner in accordance with Transgrid's Waste Management of Spoil Work Instruction
 - Disturbed areas not required for the operation of the syncons or the existing Armidale 330 kV substation will be rehabilitated to as close to pre-construction conditions as possible.

Details of the scope of works for the proposed activity are presented in Section 2.3.

Figure 2-1 shows an example of a building housing two syncons and the associated equipment from another Transgrid project. The exact size of the syncon building would be determined during detailed design.



Figure 2-1 Photograph of a syncon housed within a building (example only)

2.2. Proposed activity location and property identification

The Armidale 330 kV substation site (the substation site) is located off Waterfall Way, Armidale within the Armidale Regional local government area (LGA). The nearest major township is Armidale, situated around 4 kilometres to the west. The substation is within Lots 1 and 2 of DP999496 and Lot 8 of DP112694, which is owned by the Electricity Transmission Ministerial Holding Corporation (ETMHC) and leased and managed by Transgrid. The Armidale 330 kV substation is located within the proposed impact area shown in Figure 2-2.

The substation site is located on land zoned as Infrastructure SP2 for the purposes of an Electricity Substation under the *Armidale Regional Local Environmental Plan 2012* (Armidale Regional LEP). The substation site is located in a rural area surrounded by open paddocks and low-density residential properties. The nearest residential receiver is approximately 245 m south of the proposed impact area.

For the purpose of this SER, the impact area is defined as an indicative maximum footprint in which the construction and operation of the syncons would be carried out (refer to Figure 2-2). The impact area is located within Lot 847 of DP653684, Lot 8 of DP112694, Lot 1 and 2 of DP999496 and Lot 858 of DP755808 (owned by ETMHC) and includes areas required to facilitate connection to the proposed syncons, as well as a portion of Eathorpe Road, which requires upgrades to support the transport of equipment to site. The impact area also comprises a portion of unformed Crown road (refer to Figure A-1 in Appendix A). The impact area may be reduced as the design is further developed, and the site layout is confirmed. The impact area would provide sufficient space for various configurations of syncon infrastructure (including different options for the location/configuration of the syncons, associated infrastructure, asset protection zones and surrounding enclosure). The impact area would also accommodate a site compound and laydown area(s) to support construction.

The study area is defined as a 200 m area surrounding the proposed impact area and is shown in Figure 2-2.



Figure 2-2 Proposed activity locality

2.3. Construction activities

2.3.1. Construction methodology

An overview of the construction methodology and key activities is outlined in Table 2-1. The indicative construction site layout is shown in Figure A-2 in Appendix A.

Table 2-1 Construction methodology and activities

Stage	Activity	Overview
Site establishment	Site area establishment	<p>Prior to main construction works commencing, construction offices and amenities, equipment storage and the main laydown areas would be installed at a suitable location adjacent to the Armidale 330 kV substation, within the proposed impact area.</p> <p>The portion of the impact area subject to the proposed bench extension would be cordoned with fencing (or similar measures) during the construction works.</p> <p>The southwest portion of the proposed impact area, which is proposed for the bench extension, would require existing vegetation to be cleared and would be excavated to match existing substation levels. Excess spoil would be tested for contamination and be stockpiled onsite if suitable for reuse or disposed of at a licensed waste facility capable of receiving the material if contamination is found.</p>
	Access road construction	<p>A new access road, which will connect to Eathorpe Road, would be constructed to facilitate delivery of equipment and materials during construction, and access for ongoing maintenance activities during operation. Upgrade to Eathorpe Road (local road), which provides access to the substation site, would also be carried out in accordance with agreed standards in consultation with Armidale Regional Council's engineering team.</p>
Main construction works	Demolition of redundant infrastructure	<p>An existing storage shed would no longer be required once the syncons are installed and would be demolished and disposed of appropriately.</p>

Stage	Activity	Overview
		Existing boundary fencing would also be demolished and replaced with new boundary fencing.
	Syncon bench installation	New foundations, footings and/or piles would be constructed for the new bench, syncon equipment, power transformer bund and buildings. A new spill oil tank would be installed within the bench to cater for the new transformers, diesel generator and the syncon oil lubrication system. Secondary oil containment dam(s) and drainage systems would be installed within the proposed impact area to cater for the new equipment. The substations stormwater drainage systems would be expanded if required to manage stormwater drainage for the increased impervious surfaces.
	Syncon building construction	The syncon building would be constructed on top of the new bench. The construction of the syncon building would involve the installation of metal frames and structures using mobile cranes. Cladding and roofing would be erected once all structures are complete.
	Miscellaneous civils works including drainage, cable trenches and conduits, and fencing	Sub-surface drainage systems, including pits and pipes, would be constructed. Cable trenches and/or cable pits and conduits would be constructed within the new bench and would be connected to the existing substation. Cables would be connected to the existing control building. New fencing would be constructed around the perimeter of the new bench.
	Syncon and associated equipment installation	<p>The syncons and associated equipment would be installed, including:</p> <ul style="list-style-type: none"> • Power transformer with firewalls • Auxiliary transformers • Gantry crane • Oil lubrication and water-cooling systems • Control room and battery room • Lighting protection masts • Low voltage AC and DC systems • Protection and control systems

Stage	Activity	Overview
		<ul style="list-style-type: none"> • Backup diesel generator • Pony motor. <p>Major plant equipment, such as transformers and demountable secondary systems building(s), would be installed using cranes. Minor plant equipment would be installed using machinery such as cranes, forklifts, telehandlers and elevated work platforms.</p> <p>Low voltage cables would be installed throughout the impact area, and the existing switchyard conduits/cables and trenches would be utilised to install cables to the existing control building.</p> <p>Power transformers would require on site oil filling to the required levels in order to be ready for energisation. The syncon oil lubrication system and water-cooling systems would also require on site filling.</p> <p>Sulfur hexafluoride (SF₆) gas containing equipment (such as the 330 kV circuit breaker and any gas insulated switchgear) would be filled on site.</p>
Works within the existing substation switchyard	Installation of control/protection panels within the existing control room buildings	Works within the existing substation communications and control room. This would not require any ground disturbance works.
	Installation of new conduits/trenches	New trenching within the existing substation yard.
	Switch bay works	New switch bay works, including 330 kV busbar extension comprising a 330 kV circuit breaker, disconnect, current transformer, capacitive voltage transformer, earth switch, post insulators/busbar supports, and surge arrester.
Testing and commissioning	Syncon and associated equipment testing and commissioning	The syncons and associated equipment would undergo a testing phase prior to being commissioned and connected to the Armidale 330 kV substation. The proposed syncon connection would be off the 330 kV busbar extension and would remain disconnected until such time as the syncons are ready for connection to the grid.
Rehabilitation	Demobilisation and rehabilitation of disturbed areas	Following completion of the construction activities, the disturbed areas that are not required for the operation of the syncons or existing Armidale 330 kV substation would be rehabilitated to as close to pre-construction

Stage	Activity	Overview
		conditions as possible. Excavated material not reused on-site and waste materials would be disposed of at an appropriately licensed waste facility or as directed by the environmental business partner in accordance with Transgrid's Waste Management of Spoil Work Instruction. Temporary construction facilities and equipment would be removed.

2.3.2. Construction material, plant and equipment

Typical key plant, vehicles, equipment and materials that would be used during construction include:

- Excavators
- Vacuum truck
- Concrete trucks
- Concrete saw
- Cranes
- Forklift/Telehandler
- Light vehicles
- Heavy vehicles
- Oversize/Overmass vehicles
- Steel and structural supports for new voltage transformers
- Steel and structural supports
- Roller
- Bore piling rig
- Electrical conduit and cables
- Elevated work platforms
- Hiab truck/trucks
- General hand tools (powered and unpowered)
- Welder
- Pumps
- Oil storage and pumping plant
- Erosion and sediment controls
- Diesel storage tanks/generators
- Onsite concrete mixing plant
- Imported fill and aggregate as required
- Concrete
- Pavement laying machine
- Asphalt truck and sprayer.

2.3.3. Construction schedule

Construction is anticipated to commence in Q2 2026 and would take around 2 years to complete. The proposed activity start date may alter with revision of Transgrid's project program, although the duration of the construction activities would remain the same.

Construction activities would be conducted during standard construction hours, in accordance with *Interim Construction Noise Guideline* (DECC, 2009). Standard hours include:

- 7:00 am – 6:00 pm Monday to Friday
- 8:00 am – 1:00 pm Saturdays
- No work on Sundays or Public Holidays.

Work outside normal hours, on Sundays and public holidays would only comprise:

- The delivery of materials outside normal hours requested by police or other authorities for safety reasons
- Emergency work to avoid the loss of lives and/or property
- Work timed to correlate with system planning outages
- Vacuum and oil filling of equipment.

2.4. Operation and maintenance

The proposed activity would result in additional operational and maintenance activities at the Armidale 330 kV substation. The syncons would operate continuously 24/7, as required by the electricity network requirements for minimum fault levels. The syncons would be switched on/off automatically as needed by the control system. Ongoing maintenance for the equipment would include daily and weekly visual inspections, as well as routine planned maintenance for the associated systems.

However, these activities are not expected to result in a significant change to the number of personnel accessing the substation.

An indicative operational site layout is shown in Figure A-3 in Appendix A.

2.5. Alternative options considered

Two options were considered for the proposed activity, as identified in Table 2-2, including the preferred option.

Table 2-2 Alternative options considered and preferred option

Option	Overview and justification	Preferred option
Do nothing	<p>The do-nothing option would be the base case where Transgrid do not progress a syncon at the Armidale substation site.</p> <p>This option would involve Transgrid operating and maintaining the transmission network in a manner that would not meet the system strength requirements published by AEMO (2022).</p>	No
Option 1	<p>This option would involve installing the syncons at the Tamworth 330 kV substation.</p> <p>While this option would meet the projected system strength shortfall in the transmission network and address the system requirements established by AEMO (2022) it was not progressed due to a higher cost estimate and additional transmission line scope that could extend the construction program.</p>	No
Option 2 – Preferred option	<p>Option 2 involves the construction of the new syncons and 330 kV gantries to the south of the existing Armidale 330 kV substation.</p> <p>This option minimises potential environmental and operational impacts during the construction and operation of the proposed activity.</p> <p>This option, as described and presented in the sections above, would meet the projected system strength shortfall in the transmission network and address the system requirements established by AEMO (2022).</p>	Yes

3. Planning context

3.1. Approvals pathway

3.1.1. *Environmental Planning and Assessment Act 1979*

The EP&A Act and the *Environmental Planning and Assessment Regulation 2021* (the EP&A Regulation) provide the framework for development assessment in NSW. The EP&A Act and the Regulation include provisions to ensure that the potential environmental impacts of a development are considered in the decision making process prior to works proceeding.

As described below, the proposed activity would be permitted without development consent from Council in accordance with the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (TISEPP), and the proposed activity is therefore subject to the assessment requirements of Part 5 of the EP&A Act.

Transgrid is an Authorised Network Operator (ANO) under the *Electricity Network Assets (Authorised Transactions) Act 2015*. Transgrid is also a prescribed determining authority under Section 5.6 of the EP&A Act and Clause 3(3) and Schedule 1(4) of the EP&A Regulation, for development for the purposes of an electricity transmission or distribution network that is permitted without consent (within the meaning of the TISEPP) and is operated or to be operated by the ANO. Accordingly, Transgrid is the proponent and determining authority for this proposed activity.

This SER has also been prepared in accordance with the *NSW Code of Practice for Authorised Network Operators* (the Code, September 2015), which sets out the environmental assessment requirements for ANOs.

3.1.2. *State Environmental Planning Policy (Transport and Infrastructure) 2021*

The TISEPP aims to facilitate the delivery of infrastructure across NSW. Section 2.44 of the TISEPP provides that development for the purpose of an electricity transmission or distribution network may be carried out by or on behalf of an electricity supply authority or public authority without development consent on any land.

Section 2.43 of the TISEPP defines ‘*electricity transmission or distribution network*’ as including the following components:

- (a) *above or below ground electricity transmission or distribution lines (including related bridges, cables, conductors, conduits, poles, towers, trenches, tunnels, access structures, access tracks and ventilation structures) and telecommunication facilities that are related to the functioning of the network,*
- (b) *above or below ground electricity switching stations or electricity substations, feeder pillars or transformer housing, substation yards or substation buildings,*
- (c) *systems for electricity storage associated with a component specified in paragraphs (a) and (b).*

As this proposed activity meets the definition of development for the purposes of an electricity transmission or distribution network under Section 2.44 of the TISEPP and would be carried out by Transgrid (an ANO), it is permitted without consent from the Council. Transgrid is the proponent and determining authority for the proposed activity.

3.1.3. Duty to consider environmental impacts

For activities subject to assessment under Part 5, Section 5.5 of the EP&A Act imposes a duty on a determining authority to ‘examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment’ by reason of the proposed activity (refer to Section 6.1). In addition, Clause 171 of the EP&A Regulation identifies factors which must be taken into account when considering the likely impact of an activity on the environment. These factors have been considered in Section 6.2.

3.2. Other relevant Commonwealth and NSW legislation

Other environmental planning instruments and legislation that are directly relevant to the determination and/or assessment of the proposed activity are considered in Table 3-1.

Table 3-1: Relevant Commonwealth and NSW legislation

Legislation	Potential approval requirements	Relevance to the proposed activity	Permit/ approval/ licence requirement
Commonwealth legislation			
<i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>	Under the EPBC Act, matters of national environmental significance (MNES) are considered to assist in determining whether the proposed activity should be referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW).	EPBC Act protected matters have been considered in Section 6.3 (Table 6-3). As no impacts are predicted, an approval under the EPBC Act would not be required.	None required.
NSW legislation			
<i>Biodiversity Conservation Act 2016 (BC Act)</i>	The BC Act lists a number of threatened species, populations, ecological communities and declared areas of outstanding biodiversity value to be considered in deciding whether there is likely to be a significant impact on threatened biota, or their habitats. If any of these could be impacted by the proposed activity, an assessment of significance that addresses the requirements of Section 7.3 of the BC Act must be completed to determine the significance of the impact.	The proposed activity would not impact any threatened species, populations, ecological communities and would not be carried out on a declared area of outstanding biodiversity value listed under the BC Act. Overall, the proposed activity is unlikely to result in a significant impact upon biodiversity values. Therefore, no permits or approvals are required under the BC Act. Section 5.4 provides further details of the impacts to ecology.	None required

Legislation	Potential approval requirements	Relevance to the proposed activity	Permit/ approval/ licence requirement
<i>Heritage Act 1977 (Heritage Act)</i>	<p>Approval under Section 57(1) is required for works to a place, building, work, relic, moveable object, precinct, or land listed on the State Heritage Register. Section 57(2) provides that an exemption from the approval requirements of Section 57(1) can be sought in certain circumstances.</p> <p>An excavation permit is required under Sections 139(1) and (2) to disturb or excavate any land containing or likely to contain a relic.</p> <p>Section 139(4) provides that exceptions from the approval requirements of Sections 139(1) and (2) can be sought in certain circumstances.</p>	<p>There are no State heritage listed items near the proposed activity and the activity would not involve disturbing or excavating land on which a relic is located or where there is reasonable expectation that the excavation or disturbance is likely to result in a relic being discovered, exposed, moved, damaged or destroyed (refer to Section 5.6).</p> <p>Therefore, no permits or approvals are required under the Heritage Act.</p>	None required
<i>National Parks and Wildlife Act 1974 (NPW Act)</i>	<p>An Aboriginal heritage impact permit (AHIP) under Section 90 of the NPW Act is required to harm or desecrate an Aboriginal heritage object.</p> <p>If works are located in land reserved under the NPW Act, approval from the NSW Department of Climate Change, Energy, the Environment and Water's (DCCEEW) National Parks and Wildlife Service (NPWS) is required.</p>	<p>The activity would not impact any registered Aboriginal heritage sites and therefore a permit under Section 90 of the NPW Act is not required.</p> <p>The activity would not impact any land reserved under the NPW Act and therefore would not require approval from the NSW DCCEEW and NPWS.</p>	None required.

Legislation	Potential approval requirements	Relevance to the proposed activity	Permit/ approval/ licence requirement
Roads Act 1993 (Roads Act)	Under section 138 of the Roads Act, a person must not impact or carry out work in, on or over a public road without consent of the appropriate road's authority.	The proposed activity involves carrying out works over an unformed Crown road.	Although the proposed works would normally require approval under Section 138 of the Roads Act, Transgrid intends to acquire the portion of the unmarked Crown road located on its site, in consultation with Crown Lands in the NSW Department of Planning, Housing and Infrastructure. Once acquired, the road will be dissolved, and therefore Section 138 approval will no longer be necessary.
		The proposed activity involves carrying out works on a public local road (Eathorpe Road).	As Transgrid is a network operator under the Electricity Supply Act 1995, approval is not required from council under section 138 of the Roads Act to undertake works in, on or over unclassified roads (local roads) due to the application of Schedule 2, Part 2, Division 1, Section 5 of the Roads Act. Eathorpe Road is an unclassified road in accordance with Transport for New South Wales road network classifications.

4. Consultation

This section provides an overview of the consultation carried out in relation to the proposed activity.

Email consultation with Armidale Regional Council was undertaken by Transgrid and NSW Department of Climate Change, Energy, Environment and Water (NSW DCCEEW) on 31 March 2025 as part of the submission to the NSW Infrastructure Planner for consideration of the syncon project as a Priority Transmission Infrastructure Project (PTIP) by the NSW Minister for Energy. Feedback from Council has been fed into the Community and Stakeholder Engagement Plan prepared by Transgrid in June 2025 and will guide engagement with the broader community. The issues raised by Council on 23 April 2025 and how these are addressed in this SER are summarised in Table 4-1.

In accordance with clause 45 of the *Electricity Supply Act 1995* and Section 2.10 and Section 2.45 of the TISEPP, written notice of the intention to carry out the proposed activity was given to Armidale Regional Council on 7 July 2025. This consultation described the scope of the proposed activity. In accordance with Section 45 of the *Electricity Supply Act 1995*, Council was provided 40 days to provide a response to be considered in the planning and assessment phase. No response to this written notice was received from Council.

Further, in accordance with Section 2.45 of the TISEPP, written notice of the intention to carry out the proposed activity was given to number 89 and 112 Eathorpe Road, Armidale as the landowners/occupiers of the land adjoining the Armidale 330 kV substation, inviting a submission within 21 days from the date on which the notice was given. Comments from the landowner/occupier and how these are addressed in this SER are summarised in Table 4-1. No response from 112 Eathorpe Road was received.

Table 4-1 Issues raised during consultation and how addressed

Stakeholder	Issues raised	How addressed
Armidale Regional Council – NSW DCCEEW Consultation	Community benefits - The project must demonstrate a clear net benefit to the Armidale Region community, in line with the Council's Renewable Energy Community Benefit Framework. The proponent should engage with Council early to negotiate a Voluntary Planning Agreement (VPA), which would outline contributions to the community (e.g., funding, infrastructure improvements).	<p>Since this project is being delivered by Transgrid under Part 5 of the EP&A Act, a formal VPA is not applicable. Notwithstanding, Transgrid will continue to engage with Council regarding community benefits. A Community and Stakeholder Engagement Plan has been prepared to guide the communication of community benefits.</p> <p>Armidale community groups will be able to apply for Transgrid's Community Partnership Program from mid-2026, which offers grants of up to \$5,000 to eligible applicants. More information can be found at Grants - Our Community Partnerships Program Transgrid.</p>

Stakeholder	Issues raised	How addressed
	<p>Cumulative impacts - The proposal will be developed alongside other large-scale renewable projects, so cumulative impacts (e.g., traffic, noise, environmental effects) must be assessed and mitigated. Mitigation strategies should be developed in consultation with the community to address the cumulative impacts</p> <p>Planning review - Council will review the project's REF/EIS during the planning approval process.</p>	<p>Cumulative impacts have been considered in Section 5.14 and mitigation measures have been captured in Appendix B.</p> <p>A Community and Stakeholder Engagement Plan has been prepared to guide the communication of environmental management measures and project benefits.</p> <p>As detailed in Section 1.2, the proposed activity is subject to a SER as opposed to an REF/EIS, which is an assessment under Part 5 of the EP&A Act in accordance with the Code for a proposal expected to have minor impacts and is neither extensive or complex.</p> <p>Notwithstanding, the final SER will be shared with Council for information. Noting that Transgrid does not require development consent from Council in accordance with the TISEPP.</p>
89 Eathorpe Road, Armidale	Resident seeking more information regarding access track works and how they will impact access on Eathorpe Road	<p>Eathorpe Road upgrade works will be undertaken in consultation with Armidale Region Council to minimise impacts to road users, as described in Section 5.8(Traffic and access)</p> <p>Transgrid will continue to provide updates to key stakeholders as the project (including access track works) progresses. Furthermore, Transgrid will share relevant information within the Construction Environment Management Plan, once finalised, with key stakeholders.</p>

5. Environmental impact assessment

This section provides an assessment of the potential environmental impacts from the proposed activity. All mitigation measures required to avoid or minimise the environmental impacts below are consolidated in Appendix B.

5.1. Land use

5.1.1. Existing environment

The proposed activity is located on land zoned as Infrastructure SP2 for the purposes of an Electricity Substation under the Armidale Regional LEP (refer to Figure 5-1). The substation site is currently used for the purpose of electricity transmission as a substation.

The proposed impact area is located within Lot 847 of DP653684, Lots 1 and 2 of DP 999496, Lot 8 of DP 112694 and Lot 858 of DP755808, which is owned by ETMHC and leased and managed by Transgrid. A portion of the proposed impact area includes part of Eathorpe Road, adjacent to the substation site, which is a local road owned by Armidale Regional Council. The southeastern corner of the impact area also comprises a portion of unformed Crown road (refer to Figure A-1 in Appendix A).

The substation site is located in a rural area surrounded by open paddocks and low density residential properties around 550 m to the west.

The nearest residential dwelling is located around 245 m to the south of the proposed impact area.

5.1.2. Impact assessment

Construction

The construction of the proposed activity would be located entirely within Transgrid's existing property boundary, with the exception of the proposed upgrades to Eathorpe Road and construction works on Crown Land. Upgrade works on Eathorpe Road will be undertaken in consultation with Armidale Regional Council. Transgrid is currently in consultation to acquire the portion of Crown Land required for the construction and ongoing operation of the syncons. The proposed activity would not impose any new restrictions on land use within the study area and would not require access to privately owned land. Therefore, no land use impacts are anticipated during construction.

Operation

Under the Armidale Regional LEP, the zoning objectives of SP2 Infrastructure are:

- To provide for infrastructure and related uses
- To prevent development that is not compatible with or that may detract from the provision of infrastructure.

The proposed activity is consistent with the existing land use of the proposed impact area, being a substation, and the zoning objectives of SP2 Infrastructure under the Armidale Regional LEP.

The majority of the proposed impact area is within Transgrid's existing property boundary, with the exception of a portion of Crown Land and Eathorpe Road. Transgrid is currently in consultation to acquire the portion of Crown Land required to allow the construction and ongoing operation of the syncons. No further property acquisitions are required. Upgrade works to Eathorpe Road would be undertaken in consultation with

Armidale Regional Council to allow the ongoing operation of the public road. The proposed activity is consistent with existing site operations, being for the development and operation of an electricity substation and associated transmission purposes. As such, no permanent land use changes are anticipated.

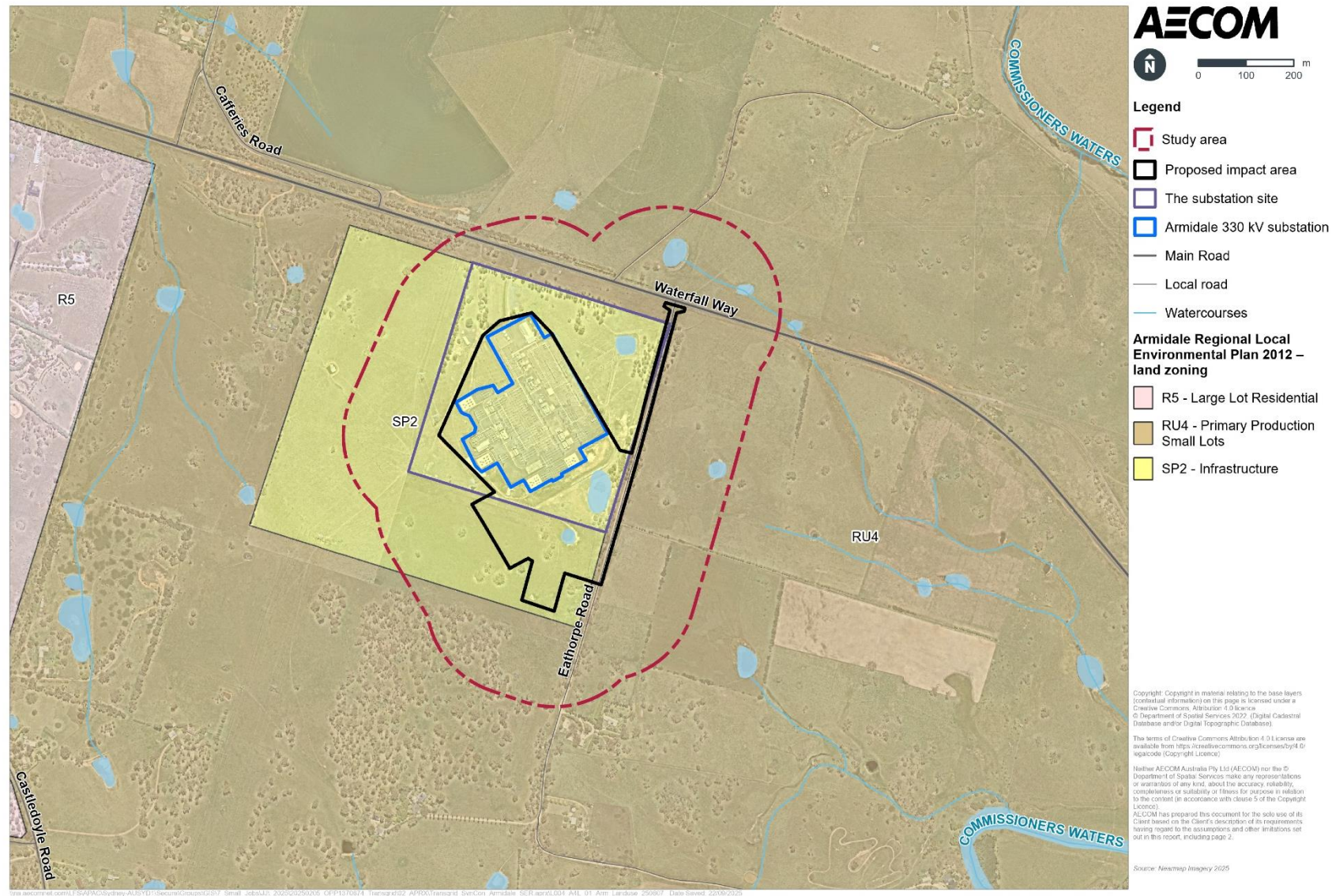


Figure 5-1 Land zoning

5.2. Geology and soils

5.2.1. Existing environment

The topographic landscape of the proposed impact area is typically flat, with an elevation of 980 m Australian height datum (AHD). The broader study area has elevations from 984 to 974 m AHD, with the landscape sloping towards Commissioners Waters to the northeast. The study area is predominantly located on sedimentary rock. The soil type in the study area is kurosols.

A summary of the existing geology and soils environment is provided in Table 5-1.

Table 5-1 Existing geology and soils environment

Geology and soils	Existing environment
Acid sulfate soils	A review of the NSW Government's Central Resource for Sharing and Enabling Environmental Data in NSW (SEED map) on 1 September 2025 found that acid sulfate soils are unlikely to be present in the study area.
Contaminated land	A review of the NSW Environment Protection Authority's (EPA) contaminated land register and list of notified sites on 11 April 2025 found that there is no known contaminated land within the study area. Contamination may be present associated with the historical use of the substation site. However, this would be managed through mitigation measures in Appendix B.
Naturally occurring asbestos	A review of the NSW Government's SEED map on 1 September 2025 found that the study area is not identified as having a risk of naturally occurring asbestos.
Salinity	A review of the NSW Government's SEED map on 1 September 2025 found that the study area is unlikely to present a salinity risk.
Mine subsidence	A review of the NSW Government's Planning Portal Spatial Viewer on 11 April 2025 found that the study area is not located within a mine subsidence district.

5.2.2. Impact assessment

Construction

During construction, the key potential impacts associated with geology and soils relate to:

- The potential erosion of disturbed or excavated soils by surface water flows or wind
- Accidental spills or leaks from construction plant and equipment contaminating the ground
- Unexpected ground conditions.

The proposed activity would result in the disturbance, excavation, handling and storage of soils. The key activities that would disturb soils relate to the excavation of the proposed impact area to existing substation levels, installation/upgrade of oil and stormwater drainage systems, and activities associated with the construction of the bench. If not properly managed, surface water flows and high winds could result in the mobilisation of excavated soils and the erosion of stockpiles, excavations and areas of bare ground. These risks are expected to increase during high wind and rainfall events.

Whilst soil erosion may occur, the potential impacts would be localised to the proposed impact area. Whilst potential erosion impacts would be minor, the mitigation measures presented in Appendix B would be sufficient to avoid and/or mitigate these impacts.

Soil contamination may occur as a result of accidental spills or leaks of fuels, oils or other chemicals from plant, equipment and vehicles used during construction. Spill kits would be required on site during construction, with their use supported by management measures and controls to minimise both the likelihood of spills and the potential consequences should they occur (refer to Appendix B).

Potential contamination may be present associated with the historical use of the substation site. Contaminated soils excavated during construction would be managed in accordance with mitigation measure GS4 in Appendix B. An unexpected finds procedure would be developed as part of the Construction Environmental Management Plan (CEMP) for the proposed activity. This procedure would outline how potential contamination risks, including potentially contaminated soils, would be identified and managed during construction.

As described in Section 5.2.1, it is unlikely that acid sulfate soils, salinity risks, and naturally occurring asbestos would be encountered during the construction of the proposed activity.

Operation

The main operational risk to geology and soils would be potential oil contamination from faulty equipment, namely the new power transformer. To mitigate this, a new spill oil tank, drainage system and possible secondary containment dam would be installed to service the new transformers, diesel generator and the syncon oil lubrication system. With these safeguards in place, the operation of the proposed activity is unlikely to result in significant impacts on geology and soils. Notwithstanding, maintenance activities may pose a minor risk of accidental spills of fuels, oils and other chemicals from plant and equipment, which would be managed through standard environmental management procedures.

The risk to underlying geology and soils as part of the ongoing operation of the new syncons is considered to be low with the implementation of mitigation measures outlined in Appendix B.

5.3. Hydrology and water quality

5.3.1. Existing environment

The proposed activity is located within the Macleay River catchment, which covers an area of 11,450 square kilometres and includes extensive areas of the northern tablelands, a sparsely populated escarpment area and a coastal area on the NSW mid-north coast (NSW DCCEEW, 2025).

The study area is located in a sparsely vegetated rural area, surrounded by cleared transmission line easements. An unnamed first order drainage line traverses the study area approximately 100 m northeast from the impact area, on the other side of Waterfall Way (refer to Figure 2-2). This drainage line joins with Commissioners Waters around 1 km southeast of the substation site. Commissioners Waters is a sixth order perennial stream and is mapped as key fish habitat (KFH).

The Armidale Regional Council's *Catchment Water Quality Strategic Plan 2022-2032* described the Commissioners Waters catchment to have had an extremely poor environmental health score in 2016, with elevated levels of phosphorous, nitrogen, turbidity and relative salinity (2022).

The study area is located within the Water Sharing Plan for the Macleay unregulated and alluvial water sources 2016.

A search of groundwater bores in the proposal area was completed using the NSW Department of Primary Industries and Regional Development's Minview Seamless Geology tool on 1 September 2025. The search found 15 groundwater bores within 2 km of the study area. The status of 12 groundwater bores is listed as 'unknown', and groundwater depths have not been recorded. The other three groundwater bores are listed as 'functioning', and the groundwater depths have been recorded to be:

- 4.9 m below ground level (bgl) in 2007, located around 1.2 km west of the study area
- 8.5 m bgl in 1989, located around 1.2 km southeast of the study area
- 18.3 m bgl in 2010, located around 670 m northwest of the study area.

Geotechnical investigations conducted by SMEC 11 – 14 March 2025 to inform the design of the proposed activity found that no groundwater was observed in boreholes installed for the investigation, which were drilled to 21.5 m bgl.

The study area is not located within a drinking water catchment. It is also not in an identified flood prone area.

5.3.2. Impact assessment

Construction

During construction, the key risks to hydrology and water quality primarily relate to stormwater runoff during wet weather events and potential contamination of the receiving environment. Potential impacts may include:

- Discharge of sediment-laden runoff from exposed surfaces and stockpiled materials into receiving waterways, particularly the unnamed drainage channel northeast of the substation site, resulting in increased turbidity and deterioration of water quality
- Elevated concentrations of dissolved nutrients (nitrogen and phosphorous) in runoff which may stimulate nuisance plant, algal, or cyanobacterial growth in downstream watercourses
- Leaks or spills of fuels, oils, petroleum hydrocarbons, heavy metals or other chemicals from machinery or equipment, with potential transport to downstream ecosystems via surface water runoff
- Accidental release of alkaline concrete wash water used to clean concrete off equipment or plant, resulting in localised soil, surface water or groundwater contamination and possible downstream ecological impacts
- Leaching and groundwater migration of contaminants (fuels, oils, petroleum hydrocarbons, heavy metals or chemicals) into downstream waterbodies from accidental leaks/spills.

The risk of surface water contamination during construction could increase in the event of an extreme flood (between 1% AEP and probable maximum flood event), where flood waters may inundate the site and mobilise contaminants into downstream waterways. However, with the implementation of mitigation measures recommended in Appendix B, the probability of contamination occurring in receiving waterways would be low.

The construction of the proposed activity would not alter flood patterns to more than a minor extent. Erosion and sediment controls would be installed and maintained throughout construction to prevent potential degradation of drainage lines and flood-prone areas.

Excavations of up to 20 m deep are unlikely to intercept groundwater, as the geotechnical investigations recorded no groundwater at a depth of 21.5 m bgl. Localised perched water may be encountered during excavation works.

Groundwater quality risks include potential contamination from accidental spills or leaks infiltrating soil and entering groundwater. With implementation of the mitigation measures described in Appendix B, and the likelihood of significant impacts to groundwater quality is considered low.

Groundwater levels may be temporarily affected where inflows are intercepted during excavation. Any accumulated groundwater would be managed in accordance with the CEMP and mitigation measures in Appendix B. Dewatering requirements are expected to remain below three megalitres per year (including construction inflows and managed discharges), which, under advice from the NSW Department of Primary Industries - Water, does not require a licence. Given the short-term nature of dewatering and limited flow volume, no long-term impacts on regional groundwater levels are anticipated.

Operation

The proposed activity would introduce approximately 0.79 ha of newly impervious surface over areas currently grassed or vegetated. Potential impacts during operation of the proposed activity could include:

- Increased surface water runoff due to an increase in impervious area and compacted surfaces
- Changes to flow rates and volumes entering receiving waterways, leading to potential scouring/erosion
- Increase in contaminants and litter in runoff that would discharge to the receiving waterways.

Permanent onsite oil and stormwater drainage systems would be installed/upgraded if required during construction, which would largely mitigate the above potential impacts during operation. As such, potential hydrology and water quality impacts as a result of the proposed activity are considered to be negligible.

5.4. Ecology

A Flora and Fauna Assessment (AECOM, 2025b) was undertaken to assess the potential biodiversity impacts of the proposed activity during construction, commissioning and operation. The Flora and Fauna Assessment is attached in Appendix C.

The Flora and Fauna Assessment was undertaken in the form of desktop research as well as a site visit on 7 May 2025 to verify desktop findings within the area where vegetation removal would be undertaken (biodiversity impact area).

5.4.1. Existing environment

Vegetation communities

Review of the NSW State Vegetation Type Map identified one plant community type (PCT) within 1km of the biodiversity impact area. Approximately 60 m to the south of the biodiversity impact area is a patch of vegetation mapped as PCT: 3359 New England Hills Stringybark Box Woodland (refer to Figure 5-2). This community is equivalent to the White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland threatened ecological community (TEC). This TEC is listed as critically endangered under both the BC Act and EPBC Act.

None of the land in or around the biodiversity impact area is listed as an area of outstanding biodiversity value.

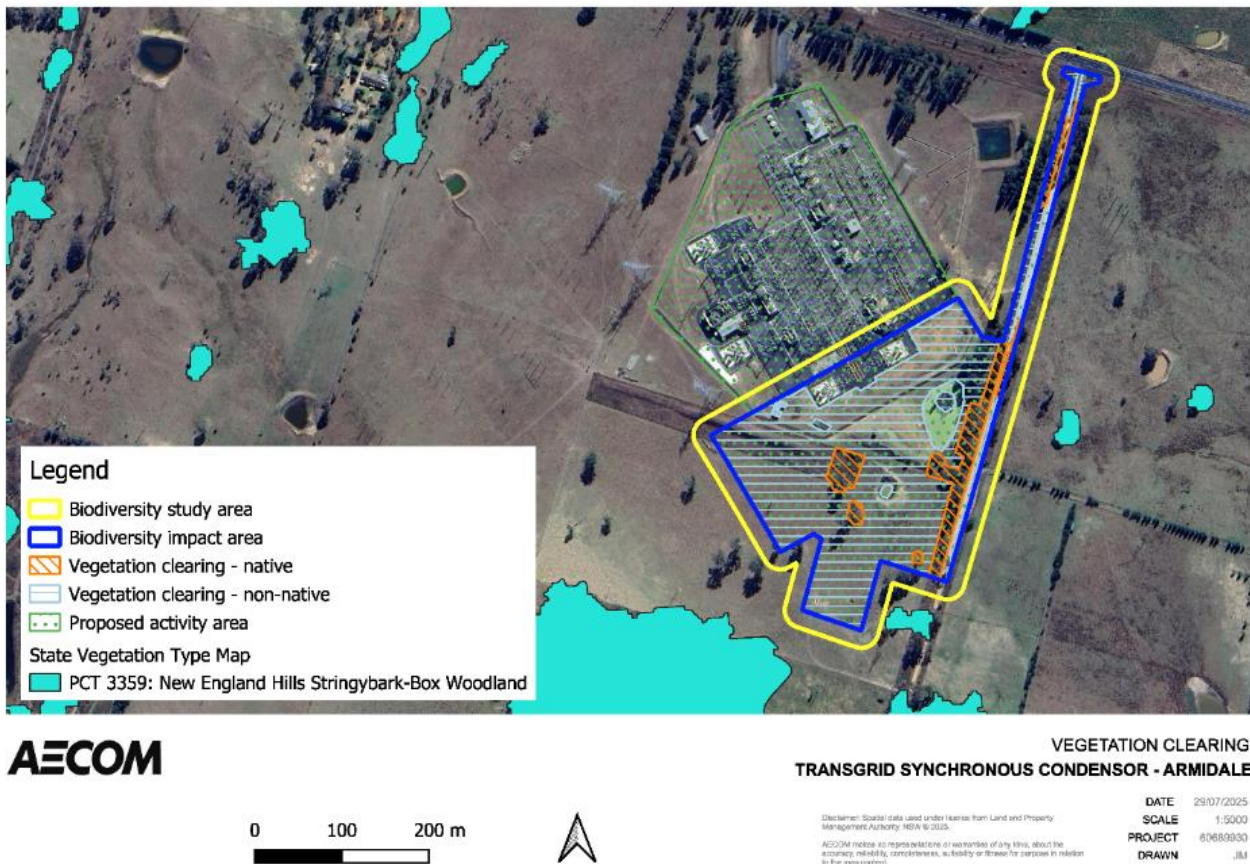


Figure 5-2 Vegetation communities (AECOM, 2025b)

Threatened species and habitat

Desktop searches were undertaken on 6 June 2025 to indicate the potential threatened species that may occur within the biodiversity impact area.

The nearest threatened fauna species records to the biodiversity impact area are the Little Eagle, Large Bent-winged Bat and Koala. None of the fauna species were observed during the field survey. Further, due to the largely cleared land, habitat characteristics required for these species were not observed within the biodiversity impact area.

The nearest threatened plant species to the biodiversity study area are records for Narrow-leaved Black Peppermint (*Eucalyptus nicholii*) (5 km from the biodiversity impact area) and Bluegrass (*Dichanthium setosum*) (1.7 km from the biodiversity impact area). Targeted searches for these species failed to record it within the biodiversity study area.

None of the land in or around the biodiversity impact area is listed as critical habitat for any species.

Priority weeds

Priority weeds are plants classified under the *Biosecurity Act 2015* as presenting a biosecurity risk to the State or a particular region. Of those listed for the Armidale Regional Council LGA, the following species were recorded:

- Blackberry (*Rubus fruticosus aggregate*) - Land managers should mitigate the risk of the plant being introduced to their land. Land managers should mitigate spread of the plant from their land. A person should not buy, sell, move, carry or release the plant into the environment. Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value
- Sweet Briar (*Rosa rubiginosa*) - Land managers should mitigate the risk of the plant being introduced to their land. Land managers should mitigate spread of the plant from their land. A person should not buy, sell, move, carry or release the plant into the environment. Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value.

5.4.2. Impact assessment

Construction

Vegetation communities

The construction of the syncons and its associated infrastructure would result in a direct impact on vegetation due to localised vegetation clearance. Figure 5-2 shows conservative areas of vegetation clearing required to facilitate the construction and operation of the proposed activity. Around 8,417 m² (0.84 ha) of native vegetation would require clearing. An additional 56,647 m² (5.66 ha) of non-native vegetation would require removal. The removal of native and non-native vegetation in this area would not affect any TEC.

Flora

The removal of native and non-native vegetation in the biodiversity impact area would not affect any threatened flora species.

Indirect off-site impacts to potential threatened flora, such as edge effects related to weeds, light penetration, pests and sedimentation, are not considered likely to be significant provided the proposed mitigation measures outlined in Appendix B are implemented.

Fauna

The biodiversity impact area and surrounds have been subject to extensive historic clearing for the purposes of agriculture, and for construction of the substation and associated transmission line easements. As such, the habitat value within the biodiversity impact area is generally low.

The clearing of isolated paddock trees would result in a moderate impact in the context of the extent of historic clearing. This is particularly relevant for the mature trees to the south of the substation, in the adjacent paddock. These trees are likely to play an important role in linking heavily fragmented habitat across the landscape and would be particularly important for roosting and foraging birds, as well as arboreal mammals. The detailed design of the proposed activity should seek to avoid impact on these trees as far as possible, as detailed in EC2 in Appendix B.

The proposed activity area includes two farm dams, with one of these being immediately adjacent to the substation. There is the potential that both dams would provide habitat for native crayfish and/or eastern long-necked turtle. The loss of habitat for these species would not be significant, though a dewatering plan including appropriate protocols for fauna rescue would be implemented if either dam is to be removed and infilled.

Disturbed areas not required for the operation of the syncons or the existing Armidale 330 kV substation will be rehabilitated to as close to pre-construction conditions as possible.

Overall, construction of the proposed activity is not expected to result in any significant impacts upon local fauna or their habitat.

Spread of weeds, pests and pathogens

The proposed activity has the potential to result in the infestation of the biodiversity impact area by new weeds or the spread of existing weeds to locations outside the biodiversity impact area. The movement of vehicles and personnel into and throughout the biodiversity impact area has the potential to facilitate the spread of weeds. However, with the implementation of the mitigation measures outlined in Appendix B, the overall impact of weeds associated with the construction phase of the proposed activity would be low.

The proposed activity is unlikely to alter the occurrence of pest species in and around the biodiversity impact area, either positively or negatively, due to the localised nature of the works. As such, the overall impact in this regard is considered to be negligible.

The proposed activity also has the potential to spread pathogens into the proposed activity area. Assuming that these pathogens are not currently present and that suitable biosecurity hygiene mitigation measures in accordance with Appendix B are implemented, the risk of the introduction of such pathogens is expected to be low.

The proposed activity would be unlikely to significantly affect any threatened species, populations, or ecological communities and would not be carried out on a declared area of outstanding biodiversity value.

Operation

The operation of the proposed activity is not expected to generate substantial noise or air emissions and would include night-time lighting for security purposes, which are not expected to disturb fauna. Further, the proposed activity would include hardstand area which may lead to increased water runoff, which is expected to have no more than more impacts to biodiversity values.

Potential impacts to ecology during operation would be adequately managed with the implementation of the mitigation measures in Appendix B. The proposed activity would be unlikely to significantly affect any threatened species, populations, or ecological communities and would not be carried out on a declared area of outstanding biodiversity value.

5.5. Aboriginal heritage

An Aboriginal Archaeological Due Diligence Assessment (AECOM, 2025a) was undertaken in accordance with Heritage NSW's *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW 2010* (DECCW, 2010). The Aboriginal Archaeological Due Diligence Assessment is attached in Appendix D.

The Aboriginal Archaeological Due Diligence Assessment was undertaken in the form of a desktop assessment and site inspection on 7 May 2025 to identify areas of archaeological sensitivity and previously identified Aboriginal sites within the proposed impact area.

The desktop assessment included the following searches:

- Aboriginal Heritage Information Management System (AHIMS) database for a 2 x 2 km area surrounding the proposed impact area on 6 May 2025
- National Native Title Tribunal's online mapping tool 'Native Title Vision', the National Native Title Register (NNTR) and Register of Native Title Claims (RNTC) relevant to the proposed impact area on 12 June 2025.

5.5.1. Existing environment

Landscape context

The proposed impact area and surrounding region include terrain considered to be indicative of the potential presence of Aboriginal artefacts, such as topography consisting of a lower slope and flat with a low gradient, and a nearby watercourse.

No watercourses are located within the proposed impact area, but the closest watercourse is a first-order tributary located around 100 m to the north. Native vegetation within the proposed impact area has been extensively modified as a result of historical land use activities, particularly due to the construction of the substation.

Overall, all land within the proposed impact area is considered to be moderately disturbed. Vegetation clearance and impacts associated with the construction of the substation have actively disturbed land across the area. This has resulted in a loss of archaeological integrity and substantially reduced the likelihood of the presence of culturally scarred trees.

Recorded sites

A search of the AHIMS database on 6 May 2025 identified a total of six Aboriginal archaeological sites within 1 km of the proposed impact area. All of these sites comprised open artefact sites (i.e., isolated artefacts and artefact scatters).

No recorded sites are located within the proposed impact area, with the closest site, [REDACTED]

During the site inspection, no areas of Aboriginal archaeological sensitivity were identified within the proposed impact area.

Native Title

A search of the National Native Title Tribunal's online mapping tool 'Native Title Vision', the NNTR and RNTC relevant to the proposed impact area was undertaken on 12 June 2025. The search results indicated that there are currently no active native title claims, determinations or relevant Indigenous Land Use Agreements within the proposed impact area.

5.5.2. Impact assessment

Construction

There are no known Aboriginal objects or sites within the proposed impact area, and the risk of potential impacts to Aboriginal heritage values is considered to be low.

The Aboriginal Archaeological Due Diligence Assessment concluded that the archaeological sensitivity of the proposed impact area is also low, based on landform variables and past disturbances. As such, it is considered unlikely that construction of the proposed activity would impact unknown Aboriginal objects or sites.

Impacts to Aboriginal heritage would be adequately managed with the implementation of the mitigation measures in Appendix B, and no further assessment is required.

Operation

The operation of the proposed activity would not result in potential impacts to Aboriginal heritage.

5.6. Historic heritage

5.6.1. Existing environment

A search of the following databases was undertaken on 2 September 2025 to identify items and places of historic heritage recorded within or near the proposed activity area:

- World Heritage List
- National Heritage List
- Commonwealth Heritage List
- NSW Heritage Register and State Heritage Inventory
- Section 170 Register (NSW Government Agencies) on the State Heritage Inventory

There is one archaeological heritage site of local significance within the study area. The Site of Abattoir “Wongalea” (ID#A032) at Lot 1, DP777437 is located approximately 50 m to the northeast of the impact area on Eathorpe Road, adjacent to the northern side of Waterfall Way.

5.6.2. Impact assessment

Construction

As no historic heritage items have been identified within the impact area, no direct impacts to historic heritage are anticipated during construction of the proposed activity. As there are no anticipated direct impacts to historic heritage, a Statement of Heritage Impact is not required.

There may be minor indirect impacts, such as surface runoff and visual amenity impacts, on the ground of the archaeological heritage site (Site of Abattoir “Wongalea”). However, with the implementation of mitigation measures identified in Appendix B, indirect impacts would be unlikely.

It is considered unlikely that items of potential historic heritage would be encountered during the proposed activity. However, in the unlikely event that they are encountered, the mitigation measures in Appendix B would be implemented.

Operation

The operation of the proposed activity would not result in impacts to historic heritage.

5.7. Noise and vibration

A Noise and Vibration Impact Assessment (AECOM, 2025c) was undertaken to support this SER. The Noise and Vibration Impact Assessment is attached in Appendix E.

The Noise and Vibration Impact Assessment considered the potential noise and vibration impacts of the proposed activity on nearby receivers during construction, commissioning and operation of the proposed activity. The existing noise levels have been compared against predicted noise levels during construction, commissioning and operation of the proposed activity.

5.7.1. Existing environment

The existing acoustic environment around the proposed activity is largely defined by local road traffic noise from Waterfall Way and Eathorpe Road.

The closest residential receivers are located around 245 m to the south of the proposed impact area. There are no non-residential noise sensitive receivers within 2 km of the proposed activity. A total of 15 residential receivers representative of residential receivers at a variety of distances away were identified for consideration of potential noise and vibration impacts (refer to Figure 5-3).

5.7.2. Impact assessment

Construction

Based on the construction scenarios defined in Table 2-1 and their associated construction plant/equipment requirements and sound power levels, the following scenarios and their approximate construction timeframe were identified as the noisiest and therefore assessed:

- Scenario 1 – Site establishment (approximate duration 2 months)
- Scenario 2B – Demolition of redundant infrastructure (approximate duration 6 months)
- Scenario 2C – Syncon bench installation (approximate duration 12 months).

All three scenarios were assessed as standard hours construction work. All major construction work is expected to be completed during standard hours only.

The modelling results are presented in Table 5-2 of Appendix E. The results show that construction noise levels are predicted to exceed the noise management level (NML) during standard hours for two assessment residential receivers (R10 and R12) during site establishment and demolition of redundant infrastructure, and for one assessment residential receiver (R12) during syncon bench installation. The exceedances range from 1 to 8 dB(A) during site establishment, 3 to 6 dB(A) during demolition of redundant infrastructure and 1 dB(A) during syncon bench installation.

There are no residential receivers predicted to be 'highly affected' for the three worst-case construction scenarios assessed.

Construction noise impacts would be managed by implementing a Construction Noise and Vibration Management Plan that includes standard mitigation measures, as detailed in Appendix B.

Traffic noise

Based on the predicted construction traffic volumes required for the proposed activity during the peak construction period, it is considered unlikely that this traffic increase would lead to an increase of more than 2 dB(A), which is imperceptible to the human ear.

Vibration

No vibration-intensive equipment is proposed for use in any construction scenario. In addition, the nearest sensitive receiver is located around 245 m from the proposed activity. Therefore, potential construction vibration impacts are considered unlikely.



Assessment receivers

- Assessment receivers
- Proposed impact area



AECOM

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Figure 5-3 Noise assessment receiver locations (AECOM, 2025c)

Operation

The syncon units and some cooling plant will be located within a building. Different acoustic treatments of the building were designed and modelled to determine when operational noise levels would be compliant at assessment receivers. The required acoustic treatments adopted for the proposed activity (which includes a minimum insertion loss of 27 dB to the most affected receiver) are detailed in Appendix B, and have been included in the operational noise modelling and predicted noise levels below.

Predicted noise levels with generator testing

Diesel generator testing will be undertaken once a month. In accordance with the *Noise Policy for Industry* during operations, noise from the diesel generator testing has been treated separately to the operation of other syncon components as it will be a single-event continuous noise for a period of 15 minutes to one hour. Therefore, this testing is given an allowable exceedance of 5 dB(A) of the project noise trigger level during the daytime period.

Predicted operational noise levels at nearby noise sensitive receivers for the daytime scenario with the diesel generator operating for testing purposes under neutral and noise-enhancing meteorological conditions are presented in Table 6-5 of Appendix E. The predicted operational noise emissions from the proposed activity comply with the adjusted daytime noise criteria at all assessed residential receivers when the diesel generator is in operation.

Predicted noise levels without generator testing

Predicted noise levels at nearby noise sensitive receivers for the daytime and evening scenario, without the generator operating, are presented in Table 6-6 of Appendix E. In the daytime scenario, when the diesel generator is not in operation, operational noise levels are predicted to comply with the project noise trigger levels at all receivers under both meteorological conditions.

In the evening scenario, when the diesel generator is not in operation, operational noise levels are predicted to comply with the project noise trigger levels at all receivers under neutral meteorological conditions. Under noise-enhancing meteorological conditions a negligible exceedance of 1 dB(A) at one assessment receiver (R10) is predicted. Exceedances of up to 2 dB(A) are considered negligible as they are not discernible to the average listener, and therefore, would not warrant receiver-based treatments or controls, assuming all feasible and reasonable treatments at source have been implemented.

Predicted noise levels for the night-time scenario are presented in Table 6-7 of Appendix E. The night-time operational noise levels are predicted to comply with the project noise trigger levels at all receivers under both meteorological conditions.

The predicted operational noise levels for all scenarios described above include a +5 dB correction for annoying characteristics due to tonality.

With the implementation of the noise and vibration mitigation measures in Appendix B, the proposed activity is not expected to exceed the project noise trigger levels at most sensitive receivers during operation. Some receivers may experience a negligible exceedance of 1 dB(A) under noise-enhancing meteorological conditions.

Traffic noise

Traffic movements are expected to remain largely unchanged from existing operation and maintenance activities, therefore predicted traffic noise increases of more than 2 dB(A) are considered unlikely to occur.

5.8. Traffic and access

5.8.1. Existing environment

Access to the existing Armidale 330 kV substation is provided by an existing driveway off Waterfall Way. Waterfall Way is a sealed State road with a speed limit of 100 km per hour for the majority of the road, except around the Armidale town centre. Waterfall Way connects the A15 New England Highway at Armidale and the A1 Pacific Highway near Ralieggh, around 120 km east, providing a key link between the Northern Tablelands and the NSW North Coast. Currently, the substation site is accessed by operational personnel, Transgrid employees and periodic contractors for business, maintenance and operational purposes.

Eathorpe Road is adjacent to the substation site along the eastern boundary. It is a local road that is unsealed branching off Waterfall Way.

Existing off-street parking is readily available within the substation site, and internal access roads are located throughout the substation site.

The impact area also comprises a portion of unformed Crown road (refer to Figure A-1 in Appendix A).

There are no public bus routes in the vicinity of the study area.

5.8.2. Impact assessment

Construction

The proposed activity includes upgrades to Eathorpe Road to facilitate delivery of equipment and materials during construction (further described in Section 2). If road or lane closure is required during the upgrade of the road, this will be managed in consultation with Armidale Regional Council to minimise impacts. The works associated with upgrading Eathorpe Road could potentially cause delays to road users, including those accessing a small number of properties accessible via Eathorpe Road only, but manageable with the implementation of mitigation measures in Appendix B.

A new access road within the proposed impact area would be constructed between Eathorpe Road and the existing Armidale 330 kV substation to facilitate delivery of equipment and materials during construction, and access for ongoing maintenance activities during operation. The access road would also provide a direct route for construction vehicles to reach the construction site office and laydown areas.

During construction, it is anticipated that up to 50 workers would be on site at any one time. Up to 55 light vehicles and 70 heavy vehicles are expected per day during construction. Heavy vehicles would be required for the delivery of construction equipment, removal of spoil (if required) and the delivery of the various syncon components. Heavy vehicles would utilise major roads where possible.

During construction, there would be a minor increase in traffic on the surrounding road network associated with the delivery of equipment, machinery and plant, transportation of waste off site and the daily arrival and departure of the construction workers. It is unlikely that local roads in the vicinity of the study area would experience an increase in traffic apart from Eathorpe Road. There are a small number of properties

accessible via Eathorpe Road only. These properties may experience minor delays during construction vehicle movements but continuous through traffic and access to properties would be maintained throughout construction. While there may be a noticeable increase in traffic on the State road, Waterfall Way, it is not anticipated that the vehicles would affect the safety or functioning of the existing road network. Any works that may impact traffic flows on a public road, will be managed through consultation with Council and Transport for NSW where relevant to determine applicable permit requirements and documented within the project CEMP.

In addition to light and heavy vehicles, oversize/overmass (OSOM) vehicles are expected to be required to deliver large or prefabricated elements for the construction of the proposed activity (e.g. transformer and secondary systems building) via Eathorpe Road. Up to 30 OSOM vehicles per day would be required during peak construction periods. On the days when there are OSOM vehicles, the number of heavy vehicles will be reduced.

The maximum volumes for light, heavy and OSOM vehicles present worst-case scenarios during peak construction periods, and therefore, is a conservative approach to the assessment. Actual vehicle movements on some days would be far less.

OSOM deliveries would be conducted in accordance with the relevant permits from Armidale Regional Council and Transport for NSW. OSOM deliveries would require progressive road closures, which have potential to disrupt the local road network. However, OSOM deliveries are likely to be undertaken outside peak traffic hours. As such, the potential disruption to local road network is considered to be minor.

Operation

During operation, the proposed activity would result in additional operational and maintenance activities at the Armidale 330 kV substation. However, these are not expected to result in a significant change to the number of personnel accessing the substation. Therefore, potential traffic and access impacts during operation are expected to be negligible.

The new syncons would be accessed by the new access road from Eathorpe Road. Any upgrades to Eathorpe Road, if required, during construction would have an ongoing benefit for other road users by providing an improved road surface.

5.9. Air quality

5.9.1. Existing environment

The nearest weather stations that provide relevant climate data are Armidale (Tree Group Nursery) (weather station ID: 056037), located around 3.9 km west of the study area, and Armidale Airport (weather station ID: 056238), located around 8.9 km west of the study area (BOM, 2025). The Armidale region experiences the warmest temperatures between December and February, with a mean maximum temperature of 31.6°C in January for years recorded between 1994 and 2025. Cooler temperatures are experienced between May and September, with July being the coldest month on average, recording a mean minimum temperature of 2.8°C between 1994 and 2025. On average, the area receives 767.8 mm of rainfall annually, and the mean number of days receiving more than 1mm of rain per year is 78.7.

Air quality in the vicinity of the study area would be typical for an agricultural, semi-rural landscape. Likely sources of air quality pollution proximate to the study area include hazard reduction burning, dust from unvegetated areas, vehicle emissions (notably from Waterfall Way) and bushfires.

Australian industrial facilities that meet reporting criteria are required under legislation to report annually to the National Pollutant Inventory (NPI), kept and managed by the Commonwealth Department of Climate Change, Energy, the Environment, and Water (Cth DCCEEW, 2025). A search of the NPI undertaken on 3 September 2025 identified no pollutant sources within 5 km of the study area.

Sensitive receivers to air quality during construction and operation of the proposed activity include residents within the township of Armidale, with the closest located around 245 m south of the proposed impact area.

5.9.2. Impact assessment

Construction

Construction works are likely to generate dust emissions from the movement of vehicles, heavy machinery, and ground disturbance works (filling and excavation) for construction of the bench, new access road and potential installation/upgrade of oil and stormwater drainage systems, particularly during dry conditions. To mitigate dust impacts on sensitive receivers, dust suppression activities would include water spraying via water carts.

Other construction impacts include fuel emissions generated from site vehicles, trucks transporting materials and machinery, water carts, diesel generators, and certain machinery used onsite, such as excavators. Fuel emissions would be mitigated by conducting regular vehicle and machinery maintenance checks and having vehicles and machinery serviced regularly. Vehicles and machinery would be turned off while idle, where safe to do so. The impact of the proposed activity on the air quality in the surrounding environment would be negligible with the appropriate implementation of mitigation measures in Appendix B.

Operation

The new 330 kV circuit breaker and gas insulated switchgear would be filled with sulfur hexafluoride (SF₆) gas, which is a commonly used insulation gas. SF₆ has a high global warming potential, meaning its release into the atmosphere, especially in large quantities, can contribute to the greenhouse effect (United States EPA, 2025). Within the high voltage equipment, SF₆ is sealed within gastight compartments, however, there is potential for leaks to occur.

In the event of an unplanned release of SF₆ from the equipment, the quantity of SF₆ that would potentially be emitted into the atmosphere would be minor in nature and would be a negligible contribution to the effects of climate change. Notwithstanding, measures outlined in Appendix B would be implemented to control any release of SF₆.

With the implementation of the mitigation measures in Appendix B, adverse construction and operational impacts to air quality as a result of the proposed activity are not considered to be significant.

5.10. Hazards and risks

5.10.1. Existing environment

Electric and Magnetic Fields

Electric and Magnetic Fields (EMF) are part of the natural environment and EMF is produced wherever electricity or electrical equipment is in use. The higher the voltage, the stronger the electric field. Electric fields are strongest closest to the wires and electrical equipment, and their level reduces quickly with distance. Most materials act as a shield or barrier to electric fields. Magnetic fields are also highest closest

to the wires and electrical equipment, and their level also reduces quickly with distance. Most materials, however, would not act as a shield or barrier to magnetic fields.

Transgrid's design and maintenance process is managed to enable its assets to be built and maintained in accordance with relevant Australian and International standards for EMF. In particular, Transgrid endeavours to comply with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines (2010) for limiting exposure to EMF. The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is a federal agency responsible for protecting human and environmental health from EMF. ARPANSA has adopted the ICNIRP guidelines, which set exposure limits for various types of electrical equipment and the nature of the exposure to that equipment

EMF is currently produced by the busbars, transformers, switchgear and other overhead and underground connections and cables within the substation.

Bushfire prone land

The study area has not been mapped as bushfire prone land as identified by the NSW Rural Fire Service (2015). The closest bushfire prone land is around 1.1 km to the southwest of the study area.

5.10.2. Impact assessment

Construction

Bushfire

Construction activities could pose risks for onsite ignitions that could result in a fire escaping to the surrounding land. These are mainly associated with hot work (activities involving high temperatures), fire risk work (activities involving heat or with the potential to generate sparks), vegetation clearing and management and use of vehicles onsite. Hot work and fire risk work during construction has the potential to cause fire ignition. However, it is unlikely a bushfire would occur, given the land surrounding the study area is not bushfire prone.

Occupational fire risk is also low. Occupational fire risk is the risk of a bushfire to those working in the proposed impact area. Any fire risk would be manageable with the implementation of mitigation measures in Appendix B.

Transgrid's *Hot Works and Fire Risk Procedure* would be adhered to for planning and undertaking all hot works and fire risk works. The implementation of this procedure would reduce the likelihood of construction of the proposed activity resulting in a bushfire.

Operation

Electric and Magnetic Fields

The proposed activity would only result in localised changes to EMF in the immediate vicinity of the new equipment. This level of EMF would be consistent with the existing substation, and it is not considered that the EMF levels would negatively impact the local community. All designs would be in accordance with the ICNIRP Guidelines for limiting exposure to EMF (ARPANSA, 2010).

Bushfire

Hot work and fire risk work associated with ongoing maintenance activities have the potential to cause fire ignition. These works would be managed under Transgrid's *Hot Works and Fire Risk Procedure*, with measures including suspension of activities on days of elevated fire danger.

An uncontrolled bushfire has the potential to impact the operation of the proposed activity. Bushfire has the potential to damage or destroy the proposed syncons and associated equipment. Appropriate space for asset protection zones (APZ) has been accommodated for in the proposed impact area. APZs provide a buffer zone between a bushfire hazard and an asset, reducing the risk of the asset being impacted by bushfire.

With the implementation of the mitigation measures (Appendix B), adverse construction and operational hazards and risks relevant to the proposed activity are not considered to be significant.

5.11. Visual amenity

5.11.1. Existing environment

The study area can be categorised into three separate sections within which the visual amenity varies, as follows:

- Substation infrastructure – This area includes the existing substation site. The visual amenity is characterised by electrical substation infrastructure and hardstand areas
- Transmission infrastructure – Areas include transmission lines and easements surrounding the substation site. The visual amenity is characterised by cleared transmission easements, with sparse vegetation, access tracks and transmission infrastructure (including overhead cables and transmission towers)
- Moderately densely vegetated areas – This area includes a cleared landscape with moderately dense vegetation surrounding the substation site. The visual amenity is characterised by open landscape with groups of trees along Waterfall Way and Eathorpe Road.

The closest residential receivers are located around 245 m to the south of the proposed impact area and are screened by moderately dense vegetation.

5.11.2. Impact assessment

Construction

During construction, there would be minor temporary visual impacts associated with the construction activities. This would include the presence of a construction work site, vehicles, plant and equipment. Moderately dense vegetation between residences and the proposed impact area would provide visual screening. Construction works would be briefly visible for road users travelling along Waterfall Way and Eathorpe Road.

Operation

The proposed activity would result in some cleared vegetation adjacent to the existing Armidale 330 kV substation. The proposed activity includes a new access track and the installation of the syncons and associated infrastructure within the proposed impact area, including a syncon building. The new infrastructure is not anticipated to impact the visual amenity of the study area since it is consistent with the current land use characteristics and views towards the substation.

While some vegetation clearing would be required, moderately dense vegetation would remain between residences and the proposed impact area, acting as screening and reducing visual impacts to residential receivers. Additionally, the new infrastructure would only be briefly viewed by road users along Waterfall Way and Eathorpe Road.

With the implementation of the mitigation measures in Appendix B, adverse construction and operational impacts to visual amenity as a result of the proposed activity are not considered to be significant.

5.12. Waste

5.12.1. Existing environment

Very little waste is generated from the current operation of the Armidale 330 kV substation. Maintenance activities may generate waste associated with components of the substation that require replacement. Vegetation maintenance also generates green waste, in addition to domestic waste generated during inspections.

5.12.2. Impact assessment

Construction

Waste that is likely to be generated during construction works would include:

- General construction waste, such as packaging and excess construction material
- Surplus excavated materials that cannot be reused onsite
- Waste oils, greases and lubricants from the maintenance of plant and equipment
- Domestic and putrescible waste (including food scraps, bottles, cans and paper)
- Green waste from vegetation clearance activities.

All waste produced during construction would be reused where possible or recycled/disposed of at nearby authorised and appropriately licensed waste disposal facilities.

Operation

During operation, the volume and types of waste would remain largely unchanged from the existing Armidale 330 kV substation.

With the implementation of the mitigation measures in Appendix B, adverse construction and operational waste impacts as a result of the proposed activity are not considered to be significant.

5.13. Social and economic considerations

5.13.1. Existing environment

The Armidale 330 kV substation is an important part of the NSW power system.

2021 Census data for the geographical area defined by the Australian Bureau of Statistics (ABS), Statistical Area Level 2 (SA2), Armidale, was reviewed to understand the social and economic environment of the study area (ABS, 2022).

The median age is 36 years old. English is only spoken at home for 78.6% of the population. The five largest employment sectors for people in the Armidale region are: higher education, hospitals (except psychiatric

hospitals), other social assistance services (i.e. not medical services, pathology and diagnostic imaging services, nor allied health services), combined primary and secondary education, and secondary education.

The SA2 land is predominantly for agriculture and residential lots.

There is little key social infrastructure located within 2 km of the proposed impact area. One social infrastructure identified is the New England Model Aircraft Club located around 700 m northwest of the study area.

5.13.2. Impact assessment

Construction

The proposed activity may temporarily affect the local community near the Armidale 330 kV substation due to increases in noise, traffic, air quality emissions and visual amenity impacts. These impacts are considered to be minor and temporary and would be managed through the implementation of the mitigation measures proposed in Appendix B. No negative impacts to emergency services or the key employment sectors of the SA2 are expected.

The proposed activity would have a negligible impact on social infrastructure services in the region, as the proposed activity would only include a relatively small workforce. Negligible positive economic benefits would be derived from the workforce sourcing daily needs and potentially accommodation.

Operation

During operation, the proposed activity would not result in additional adverse social or economic impacts. In the long term, the proposed activity would support the reliability and security of the electricity supply, which would have a positive impact.

With the implementation of the mitigation measures (Appendix B), adverse construction and operational social and economic impacts as a result of the proposed activity are not considered to be significant.

5.14. Cumulative impacts

5.14.1. Existing environment

The assessment of cumulative impacts focused on the proposed activity's interaction with other projects in the vicinity of the Armidale 330kV substation, and where construction and/or operational timeframes are likely to be concurrent.

A review of the NSW Department of Planning, Housing and Infrastructure's major projects assessment website on 3 September 2025 identified three state significant developments within 1 km of the proposed impact area and these are detailed in Table 5-2.

Table 5-2 Major projects identified near the proposed impact area

Project and status	Relative location	Proposed construction timeframe	Project details
Armidale Battery Energy Storage System (BESS) Under assessment – further information required	Around 30 m east of the proposed activity.	Construction is estimated to take approximately 24 months and would commence in late 2025. Construction may overlap with construction of the proposed activity. Operations would overlap.	Development of a 150 MW/300 MWh BESS and associated infrastructure, including a new substation.
Wongalea Battery Energy Storage System Prepare EIS	Around 120 m northeast of the proposed activity.	Construction is estimated to take approximately 24-28 months and would commence in late 2026. Construction may overlap with construction of the proposed activity. Operations would overlap.	Development of a 300 MW/1200 MWh BESS and a 132 kV transmission connection to the Armidale 330 kV Substation.
Kooyong Battery Energy Storage System Prepare EIS	Around 100 m southwest of the proposed activity.	Pending approval, construction is expected to take place over a 12-month period, commencing in 2028/29, construction is unlikely to overlap with the proposed activity. Operations are anticipated to start in 2029/30 and would overlap with the proposed activity.	Development of a 200 MW/800 MWh BESS and associated infrastructure, including a new substation

5.14.2. Impact assessment

Construction

Potential cumulative construction impacts are discussed in Table 5-3.

Table 5-3 Potential cumulative construction impacts

Environmental factor	Construction impact
Ecology	<p>The collective amount of native vegetation that has the potential to be cleared is 21.5 ha, with at least 2.39 ha of this being TEC. Part of the native vegetation proposed to be removed for the Kooyong BESS would include a substantial amount required for the proposed activity. As such, if the Kooyong BESS proceeds first, the amount of native vegetation clearing required for the proposed activity would be reduced to 0.66 ha, with none of that comprising TEC.</p> <p>The vegetation clearing would still contribute to the collective loss of native vegetation in this location, as well as the ongoing reduction in available habitat and resources available for native species generally. Despite this, the cumulative impact from the proposed activity is not considered to be significant., Areas used for construction only would be rehabilitated upon completion. The operational area of the project would be located within a non-native vegetation area.</p>

Environmental factor	Construction impact
Noise and vibration	<p>Construction noise from each project occurring concurrently could result in increased noise levels at any receiver by 3 dB(A). If the proposed activity is the dominant source of construction noise, the noise level would increase on the levels predicted for the proposed activity. Where receivers are impacted to a greater extent by other construction projects, then overall construction noise levels could be increased by as much as 3 dB(A) from those projects' noise levels.</p> <p>The proposed activity construction noise levels at all receivers for all construction scenarios are predicted to be well below the 'highly noise affected' level of 75 dB(A). Any cumulative impacts experienced by surrounding receivers are likely to remain below this level and would be temporary in nature. Nonetheless, the cumulative construction noise impacts of nearby major projects would be further considered by the construction contractor when a detailed construction schedule become available for the proposed activity.</p> <p>Vibration intensive works are expected to take place well within minimum working distances; therefore, no cumulative impacts are anticipated.</p>
Traffic and access	<p>Vehicles travelling along Waterfall Way would likely experience cumulative traffic impacts during concurrent construction of the various projects, potentially resulting in congestion and delays. This could occur as a result of additional construction traffic and traffic lane closures.</p> <p>These impacts can be mitigated by consultation between different project teams and contractors, scheduling of works, coordination of traffic management, and good communication of changes in road network conditions in advance to the local community.</p>
Visual amenity	<p>Residential receivers nearest to the substation site would be unlikely to have a view of construction works for any other proposed projects due to the moderately dense vegetation screening the view.</p> <p>Road users along Waterfall Way and Eathorpe Road would experience fleeting temporary cumulative impacts due to the construction activity proposed to take place on both sides of the roads.</p>
Social and economic considerations	<p>Concurrent construction of the projects could increase pressure on the local workforce and housing. However, the proposed activity would only include a relatively small workforce, and Transgrid would consult with construction contractors to seek local skilled workers.</p>

With the application of mitigation measures in Appendix B, the potential adverse residual impacts associated with the proposed activity are likely to be negligible. Some minor traffic and noise impacts may occur, but these would be temporary for each work site, minor in nature and have a small impact area. Given the minor nature of the residual impacts, it is unlikely that these impacts would significantly contribute to wider potential cumulative impacts during the construction phase. As such, no significant cumulative impacts are likely during construction of the proposed activity.

Operation

The proposed activity would not generate ongoing cumulative impacts during operation. The environmental impact assessment has not identified any significant operational impacts; therefore, cumulative impacts are unlikely to occur.

6. Consideration of statutory factors

6.1. Section 5.5 of the EP&A Act and 7.3 of the *Biodiversity Conservation Act 2016*

Under Section 5.5 of the EP&A Act, the determining authority (being Transgrid), has a duty to consider the effect of the proposed activity on the environment and the effects on any wilderness areas. Table 6-1 provides a summary of how each of the factors has been considered.

Table 6-1: Consideration of Section 5.5 of the EP&A Act. Duty to consider environmental impact

Factor	Comment
5.5(1). Examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.	All potential environmental impacts have been considered and assessed in Section 5. The proposed activity is not likely to result in significant environmental impacts.
5.5(3). Consider the effect of an activity on any wilderness area (within the meaning of the <i>Wilderness Act 1987</i>) in the locality in which the activity is intended to be carried on.	The proposed activity would not affect any wilderness areas.

Under Section 7.3 of the BC Act, the determining authority (being Transgrid) has a duty to take into account whether there is likely to be a significant effect on threatened species, ecological communities, or their habitats or whether the activity is to be carried out on a declared area of outstanding biodiversity value.

As detailed in Section 5.4, no threatened species, ecological communities, or their habitats would be significantly affected by the proposed activity, and the proposed activity would not be carried out on a declared area of outstanding biodiversity value.

It is unlikely that there would be any significant effect on threatened species, ecological communities, or their habitats.

6.2. Clause 171 of the EP&A Regulation

Clause 171(2) of the EP&A Regulation details those factors that must be taken into account when consideration is given to the likely impact of any activity on the environment, for the purposes of Part 5 of the EP&A Act. Table 6-2 provides a summary of how each of the Clause 171 factors has been considered.

Table 6-2: Consideration of Clause 171 factors

Factor	Potential impact
a. any environmental impact on a community.	As detailed in Section 5, the proposed activity would not result in significant adverse environmental impacts. Impacts from construction on the surrounding community are expected to be minor and temporary and would be appropriately managed with the implementation of the mitigation measures provided in this SER.

Factor	Potential impact
b. any transformation of a locality.	The proposed activity would not transform the locality it is in, as works would be carried out within the proposed impact area, on Transgrid's existing Armidale 330 kV substation and on the local road adjacent to the substation site.
c. any environmental impact on the ecosystems of the locality.	The proposed activity would not have a significant impact on the ecosystems of the locality (refer to Section 5.4).
d. any reduction of the aesthetic, recreational, scientific or other environmental quality.	The proposed activity would result in a minor change to the visual landscape through the introduction of the syncon and associated infrastructure and vegetation clearing (refer to Section 5.11).
e. any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.	Based on known sites and available information, it is unlikely that the proposed activity would have an adverse effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.
f. any impact on the habitat of protected animals (within the meaning of the <i>Biodiversity Conservation Act 2016</i>).	The proposed activity is unlikely to impact the habitat of protected animals, and any impacts would be appropriately managed with the implementation of the mitigation measures provided in Appendix B of this SER (refer to Section 5.4.2).
g. any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air.	The proposed activity would not endanger flora or fauna. Impacts to ecology are discussed further in Section 5.4.2.
h. any long-term effects on the environment.	The proposed activity would not have long-term effects on the environment.
i. any degradation of the quality of the environment.	The proposed activity would cause minor disturbance to some areas during construction, particularly due to vegetation clearing. However, this is not expected to be significant.
j. any risk to the safety of the environment.	Provided the mitigation measures identified in Appendix B are implemented, there is not expected to be any risk to the safety of the environment.
k. any reduction in the range of beneficial uses of the environment.	The proposed activity would be carried out within the proposed impact area, on Transgrid's existing Armidale 330 kV substation and adjacent local road and would not result in a reduction of beneficial uses of the environment.

Factor	Potential impact
l. any pollution of the environment.	The proposed activity has the potential to result in pollution to the environment; however, the impacts would be appropriately managed through the mitigation measures provided in this SER.
m. any environmental problems associated with the disposal of waste.	Waste would be disposed of at appropriately licensed waste disposal facilities (refer to Section 5.12) and as such, would not result in environmental problems.
n. any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply.	There would be no increase in demand on resources that are, or are likely to become, in short supply, as a result of the proposed activity.
o. any cumulative environmental effect with other existing or likely future activities.	The proposed activity would not contribute to significant cumulative impacts when considered in conjunction with current or likely future activities (refer to Section 5.14).
p. any impact on coastal processes and coastal hazards, including those under projected climate change conditions.	The proposed activity is not being carried out near coastal environments and would not affect any coastal processes or coastal hazards.
q. applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1.	The proposed activity is not expected to conflict with the goals of the applicable local, regional and district strategic plans.
r. other relevant environmental factors.	The proposed activity is not expected to have a significant impact on any other environmental factors not discussed in this SER.

6.3. Matters of National Environmental Significance under the EPBC Act

Under the EPBC Act, Transgrid is required to consider matters of national environmental significance (MNES), to assist in determining whether the proposed activity should be referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water. Table 6-3 provides a summary of how MNES have been considered.

Table 6-3: MNES under EPBC Act

MNES / Commonwealth land	Potential impact
Any impact on a World heritage property?	No, refer to Sections 5.5 and 5.6
Any impact on a National heritage place?	No, refer to Sections 5.5 and 5.6
Any impact on any wetlands of international importance?	No
Any impact on a Commonwealth listed threatened species or ecological communities?	No, refer to Section 5.4
Any impacts on a Commonwealth listed migratory species?	No, refer to Section 5.4
Any impact on a Commonwealth marine area?	No

MNES / Commonwealth land	Potential impact
Any impact on the Great Barrier Reef Marine Park?	No
Does the proposed activity involve a nuclear action (including uranium mines)?	No
Does the proposed activity involve a water resource, in relation to coal seam gas development and large coal mining development?	No
Is the proposed activity likely to have a significant impact on the environment on Commonwealth land?	No

6.4. Consideration of Ecologically Sustainable Development

Obligations under the EP&A Act require that Transgrid protects the environment by conducting its operations in compliance with the principles of ecologically sustainable development (ESD), namely:

- The precautionary principle
- Intergenerational equity
- Conservation of biological diversity and ecological integrity
- Improved valuation, pricing and incentive mechanisms.

The principles of ESD have been applied during the proposed activity design and assessment. Mitigation measures (Appendix B) would be applied to avoid or minimise impacts.

7. Environmental management

Transgrid is committed to conducting its activities and services, including the current proposed activity, in a manner that minimises pollution, environmental impacts, and complies with relevant legislation, industry standards and codes of practice. To achieve this, Transgrid maintains an Environmental Management System that is certified under the international standard ISO 14001. All works undertaken for the activity would be consistent with the Environmental Management System.

The proposed activity as currently described in Section 2 is not likely to significantly affect the environment. As a result of the detailed environmental assessment undertaken in this SER, environmental management mitigation measures have been included in Appendix B.

Where the mitigation measures in technical reports differ from those listed in Appendix B, the mitigation measures contained in Appendix B take precedence.

A CEMP shall be prepared and submitted to an Environment Business Partner/ Delivery for review and endorsement four weeks prior to the commencement of works, including site establishment. The CEMP shall be prepared in accordance with Transgrid's Preparation of a Construction Environmental Management Plan Procedure.

In addition to the Contractor's Environmental Supervisor, Transgrid shall appoint an Environmental Inspector to regularly check that the proposed activity is being carried out in compliance with all environmental approval and legislative conditions.

The operation of the activity would be managed in accordance with Transgrid's certified Environmental Management System, which includes detailed maintenance procedures to minimise potential environmental impacts. Due diligence environmental checks, including environmental information generated from GIS where relevant, are undertaken before any maintenance works are carried out.

8. Summary and conclusion

The proposed activity has been assessed under Part 5 of the EP&A Act, and this SER has been prepared in accordance with relevant legislation, including but not limited to Section 5.5 of the EP&A Act, Clause 171 of the EP&A Regulation and the Commonwealth EPBC Act. An assessment of potential impacts is presented in Section 5. The key potential impacts associated with the proposed activity include:

- Minor erosion and sedimentation impacts from excavation activities during construction
- Minor noise impacts generated from construction plant, vehicles and the ongoing operation of the syncon
- Minor temporary impacts to traffic during the construction of syncons and the road upgrade on Eathorpe Road
- Minor temporary air quality impacts generated from excavation activities, construction plant and vehicles
- Permanent minor visual impacts from the clearing of vegetation and the installation of the syncons and associated infrastructure.

All other impacts were assessed as negligible.

Actions to mitigate (prevent, minimise, or offset) potential and likely impacts have been prescribed in Appendix B. These measures shall be implemented in undertaking the activity. Considering the assessment undertaken within this SER, it is considered that the environmental risk from potential impacts is low.

This SER provides a true and fair review of the activity in relation to its potential effects on the environment. It addresses, to the fullest extent possible, all matters affecting or likely to affect the environment as a result of the activity.

Considering the assessment of the impacts detailed in this SER, it is concluded that the activity **is not likely to significantly affect the environment** and therefore an Environmental Impact Statement is not required.

In addition, it is concluded that the activity is not likely to significantly affect threatened species, ecological communities or their habitats and would not be carried out on a declared area of outstanding biodiversity value, therefore a Species Impact Statement is not required. No formal biodiversity offsets are proposed for the proposed activity, though disturbed areas not required for the operation of the syncons or the existing Armidale 330 kV substation will be rehabilitated to as close to pre-construction conditions as possible.

This conclusion has been based on the assessment undertaken within this SER.

This SER is limited to the assessment of the activity described in Section 2. Supplementary assessment and determination in accordance with the EP&A Act would be required for:

- Works outside of the scope of work assessed in this environmental impact assessment, for which the environmental impact has not been considered; or
- Modifications to the activity scope, methodology or recommended mitigation measures, that alter the environmental impact assessed in this SER.

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Appendix A Map series

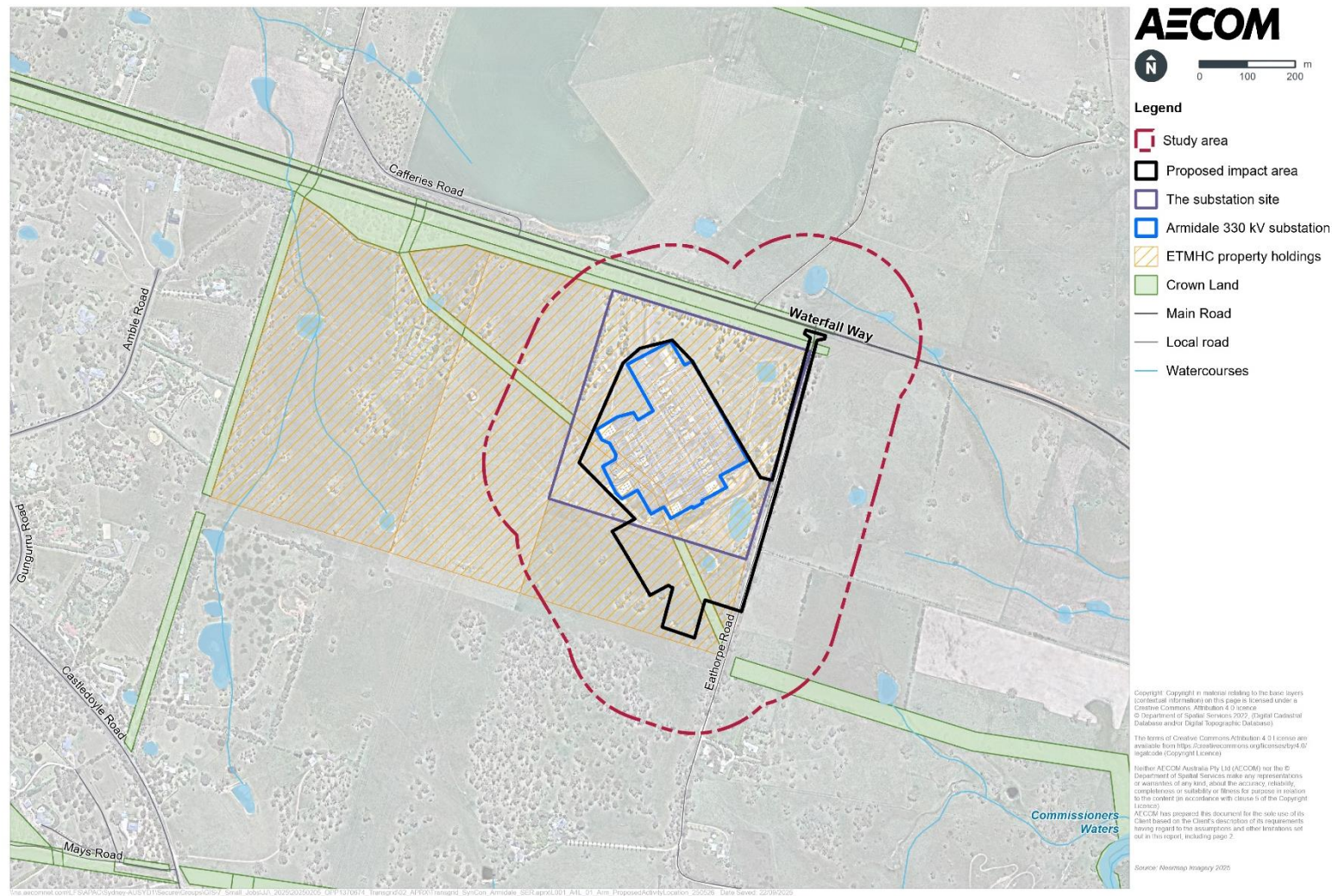


Figure A-1 Proposed activity location

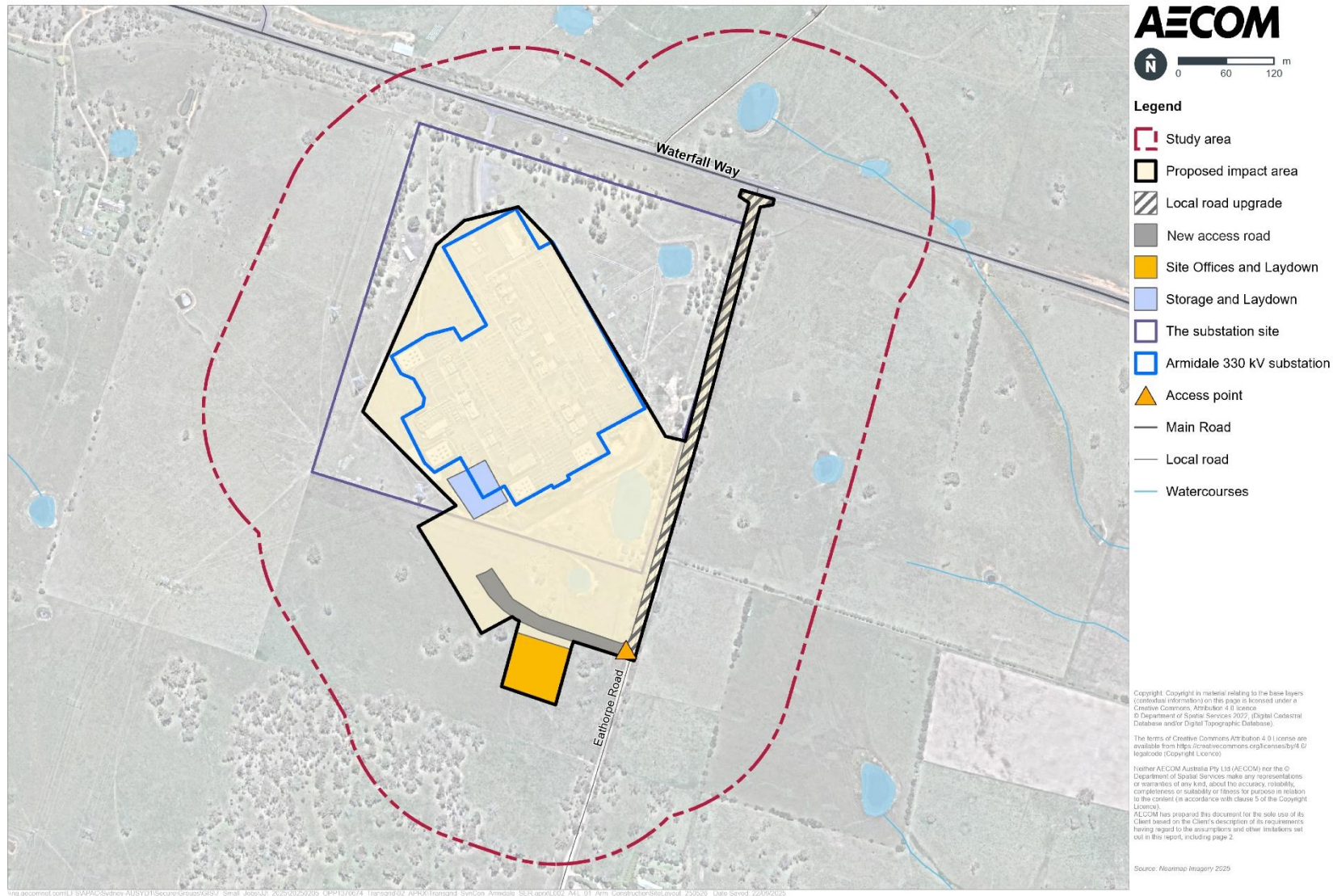


Figure A-2 Indicative construction site layout

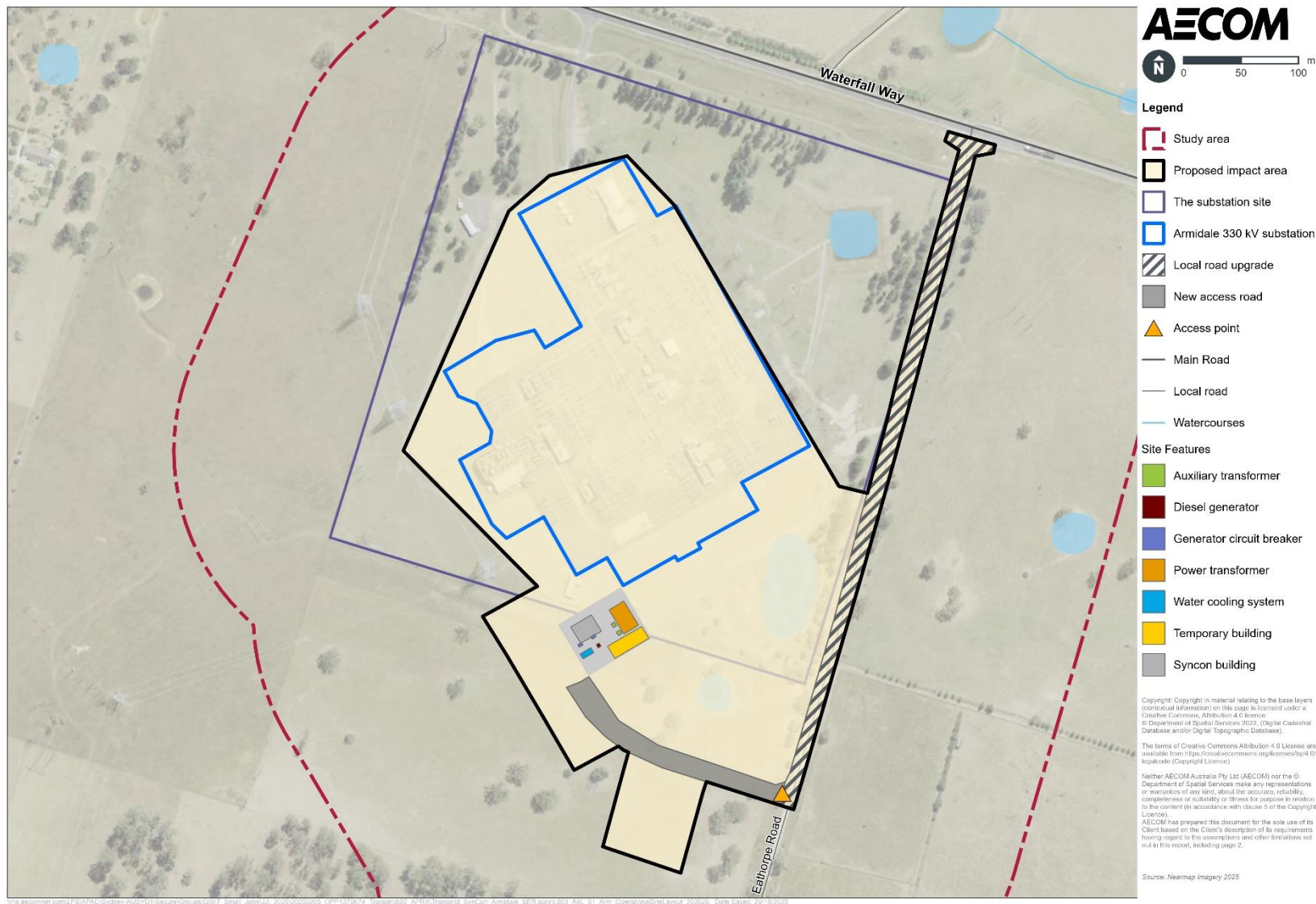


Figure A-3 Indicative operation site layout

Appendix B Mitigation measures

Mitigation measures	
Environmental management and incident response	
EM1	A Construction Environmental Management Plan (CEMP) would be prepared and submitted to Environment Business Partner/Delivery for review and endorsement four weeks prior to the commencement of works, including site establishment. The CEMP would be prepared in accordance with Transgrid's Preparation of a Construction Environmental Management Plan Procedure.
EM2	All workers would be inducted onto the CEMP, which would include relevant environmental mitigation measures and sensitive environment area(s). Training would be given to site personal as appropriate. Records would be kept of this induction and training.
EM3	An Environmental Supervisor would be included as part of the construction staff to oversee implementation of the CEMP and to ensure that all mitigation measures are being effectively applied. In addition to the Contractor's Environmental Supervisor, Transgrid would appoint an Environmental Inspector to regularly audit and check that the work is being carried out in compliance with all environmental approval and legislative conditions.
EM4	Prior to commencement of works on Eathorpe Road, Transgrid would contact Armidale Regional Council's Engineering team to determine the standards required, and with Council's Quality and Surveillance team to determine any notification and inspection processes.
EM5	All environmental incidents and near misses must be reported to Transgrid. All pollution incidents that threaten or harms the environment must be reported immediately to relevant authorities, in accordance with the <i>Protection of the Environment Operations Act 1997</i> (POEO Act).
EM6	Environmental spill kits containing spill response materials suitable for the works being undertaken would be kept on site at all times and be used in the event of a spill. Any spills would be contained, cleaned up promptly and immediately reported to the Transgrid site representative.
EM7	All chemicals or other hazardous substances would be stored in a bunded area and away from any drainage lines/pits. The capacity of the bunded area would be at least 130% of the largest chemical volume contained within the bunded area. The location of the bunded enclosure/s would be shown on the Site Plans. All refuelling activities would be undertaken in designated refuelling zones that are bunded and impervious. The location of the refuelling zones would be shown on the Site Plans. Spill kits would be readily available for these zones.
EM8	Any environmentally sensitive areas would be clearly delineated and shown on Site Plans.
Geology and soils	
GS1	An Erosion and Sediment Control Plan (ESCP) would be prepared by a suitably qualified professional. All erosion and sediment control measures would be designed, implemented and maintained in accordance with relevant sections of <i>Managing Urban Stormwater: Soil and Construction Volume 1</i> (Landcom, 2004) ('the Blue Book') (particularly Section 2.2) and <i>Managing Urban Stormwater: Soil and Construction Volume 2A – Installation of Services</i> (DECC, 2008a). The ESCP would be included in the CEMP.

Mitigation measures	
GS2	Vehicles and equipment would remain on existing roads and nominated site access. Vehicles and equipment would be free of mud, soil or vegetated matter prior to access onto public roads.
GS3	Any imported fill would be certified at source location (e.g. Quarrymaster or property owner) as pathogen and weed free Excavated Natural Material (ENM) or Virgin Excavated Natural Material (VENM) in accordance with the POEO Act and the Waste Regulation.
GS4	Any excavated material suspected of showing evidence of contamination would be sampled and analysed by a NATA Registered laboratory and managed in accordance with the <i>Waste Classification Guidelines</i> (NSW EPA, 2014), the Guidelines on the Duty to Report Contamination (NSW EPA, 2015) and the <i>Contaminated Land Management Act 1997</i> . The procedure would be included in the CEMP
GS5	All oil handling would be undertaken in accordance with Transgrid's Oil Management Procedure.
Hydrology and water quality	
HW1	No refuelling or bulk herbicide preparation would occur within 40 metres of drainage lines/pits.
HW2	Water management for excavations and on-site would be included and adhered to, in accordance with the CEMP. Controls would include at a minimum: <ul style="list-style-type: none"> • Use of dish drains (or similar), coir logs, hay bales and/or sediment fence to reduce water flow into excavations and off-site • Separate clean and dirty water where possible • Record dewatering volumes if large amounts of ground water is encountered. (ensuring no water licence is required) • Identifying management methods for intercepted/collected water e.g. regular monitoring, treatment and discharge • Water quality testing will be required if suspected contamination is encountered (odour, sheen, visual contaminants) to inform disposal and/or discharge requirements • Temporary dewatering structures are required to manage sediment laden water prior to drainage off-site • Reporting frequency and requirements.
Ecology	
EC1	Where biosecurity issues are identified, mitigation and management strategies must be documented in the CEMP. This may include: <ul style="list-style-type: none"> • Wash down procedures to reduce the spread of weeds via vehicles and machinery. • Cleaning of vehicle tyres, undersides and radiator grills before leaving a property, cleaning of footwear and minimising soil movement between locations. • Undertaking a vehicle hygiene inspection checklist or log. • Establishing plant and vehicle washdown stations with appropriate signage and disposal for waste where appropriate. • Undertaking a vehicle hygiene inspection checklist or log • Imported material must be weed and pathogen free. • Working from clean areas towards weedy/pathogen effected areas to reduce the spread of weeds/soil pathogens. • All herbicide selection and use would be in accordance with Transgrid requirements.

Mitigation measures	
EC2	The clearing of native vegetation would be minimised as far as possible, with the minimisation of impacts to native vegetation within the biodiversity impact area being a priority. The limits of clearing would be agreed with the Transgrid environmental representative prior to works commencing, with areas not subject to clearing demarcated or fenced off to prevent movement of construction vehicles and workers into these areas.
EC3	<p>All workers would be provided with an environmental induction prior to commencing work. This induction would include information on the protection measures to be implemented to protect vegetation, penalties for breaches and locations of areas of sensitivity. Key points would include:</p> <ul style="list-style-type: none"> • Maintaining all construction activities within the designated and demarcated or fenced off boundaries • Identification of weeds and biosecurity threats on site and appropriate actions to prevent their spread (see detail below) • Identification of threatened plants and animals, and what to do in case of encountering these (see detail below).
EC4	If native fauna is encountered it would be allowed to move off site of its own accord, as far as it is safe to do so. If the animal does not move works are to stop in that area and a person qualified in wildlife handling must be called in to safely relocate the animal.
EC5	If any threatened flora is located within the clearing footprint works are to stop in that area and a Transgrid environmental representative contacted for further advice.
EC6	Lighting of the proposed activity would be designed in accordance with relevant standards and directed inwards, and away from adjacent vegetated areas as far as practicable.
EC7	Disturbed areas not required for the operation of the syncons or the existing Armidale 330 kV substation will be rehabilitated to as close to pre-construction conditions as possible upon completion of construction. This would include soil stabilisation and revegetation using a native seed mix approved by the Transgrid environmental representative.
EC8	Any external material (such as crushed sandstone or similar) brought in for the purposes of constructing and stabilising the biodiversity impact area is to be fully removed upon completion of construction, unless required for the operation of the syncons or the existing Armidale 330 kV substation.
EC9	Should the detailed design or onsite works determine the need to remove or trim any additional vegetation that has not been identified in this report, additional approval from Transgrid's environmental team would be required.
Heritage	
HE1	In the event that a site or artefact (as defined by the <i>National Parks and Wildlife Act 1974</i> or <i>Heritage Act 1977</i>) is identified during construction works, works must cease at the location and no further harm to the object shall occur. The find must be immediately reported to Transgrid, and the regulator in accordance with legislation. No work must commence in the vicinity of the find until any required approvals have been given by the regulator. In the event that skeletal remains are encountered during the activity, works must stop immediately, the area secured to prevent unauthorised access and NSW Police, DPE and Transgrid contacted.

Mitigation measures	
Noise and vibration	
NV1	<p>Noise generating works would be in accordance with the <i>Interim Construction Noise Guideline</i> (DECC, 2009):</p> <ul style="list-style-type: none"> • 7:00am – 6:00pm Monday to Friday • 8:00am – 1:00pm Saturdays • No work on Sundays or Public Holidays. <p>Work outside normal hours, on Sundays and public holidays would only comprise:</p> <ul style="list-style-type: none"> • The delivery of materials outside normal hours requested by police or other authorities for safety reasons • Emergency work to avoid the loss of lives and/or property • Work timed to correlate with system planning outages • Vacuum and oil filling of equipment. <p>Other noise generating works outside of the standard construction hours would require the prior formal written consent of the Environmental Business Partner/Delivery and require justification in accordance with the Guideline.</p>
NV2	<p>Noise affected neighbouring properties would be notified as to the timing and duration of the construction works at least seven days prior to commencing work.</p>
NV3	<p>A Construction Noise and Vibration Management Plan (CNVMP) would be developed and implemented for the proposed activity. The CNVMP would include, as a minimum, the following:</p> <ul style="list-style-type: none"> • Identification of nearby residences and other sensitive land uses • Description of approved hours of work • Description and identification of all construction activities, including work areas, equipment, and duration • Description of what work practices (generic and specific) would be applied to minimise noise and vibration • A complaints handling process with a dedicated contact included for 24 hours a day • Noise and vibration monitoring procedures • Overview of community consultation required for identified high impact work. <p>Construction work should be planned and carried out during standard construction hours wherever possible. Table 8-1 in Appendix E presents a summary of the standard mitigation measures which should be considered as mitigation measures within the CNVMP where feasible and reasonable.</p>

Mitigation measures	
NV4	<p>The following measures would be considered to manage potential operational noise impacts:</p> <ul style="list-style-type: none"> • Housing the syncon units inside a building to provide attenuation. This may also provide screening for other noise sources. The building should provide a minimum insertion loss of 27 dB to the most affected receiver, this is inclusive of doors and any ventilation openings. Where feasible, ventilation openings should be directed away from noise sensitive receivers and acoustic louvres used to reduce noise emissions, if necessary. • Construction of a noise wall on three sides of the syncon cooling system (northwest, southwest and southeast, noting that the proposed sycon building may serve as the northwest wall), the height should extend around 1.0 m beyond the top of the cooling system. The wall must have no gaps and a minimum surface density of 5 kg/m². • Acoustic absorption is required on at least two adjacent surfaces of the noise wall facing the equipment (northwest and southwest walls). The acoustic absorption must have a minimum noise reduction coefficient (NRC) of 0.8. • Regular maintenance of mechanical equipment (e.g. fans, motors, air conditioning units and pumps) to minimise noise from wear, loose components, or deteriorated insulation. • During detailed design it is recommended that final site layout, equipment selections and building construction details (dimensions, materials, openings and location) are reviewed to confirm compliance with the project noise trigger levels. • Noise monitoring shall be undertaken post construction to ensure operational noise has reduced to a level that does not result in adverse impacts to nearby sensitive receivers.
Traffic and access	
TA1	Transportation and equipment delivery movements on public roads would be in accordance with RMS and Council requirements.
TA2	Access track works would be constructed in accordance with the <i>Soils and Construction Volume 2C Unsealed Roads</i> (DECC, 2008b).
TA3	Traffic, transportation and access mitigation and management strategies would be documented and implemented in accordance with Council and Transport for NSW requirements and documented within the CEMP and updated as required. This will include measures to maintain access to properties on Eathorpe Road.
Air quality	
AQ1	If necessary, dust suppression techniques would be implemented, and incorporated into the CEMP, as per the techniques outlined in the Blue Book, such as water spraying of surfaces, covering stockpiles and covering surplus soils and materials during transportation.
AQ2	Air quality mitigation and management strategies would be documented and implemented in accordance with the CEMP.
Hazards and risk	
HR1	All designs would be in accordance with the <i>International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to EMF</i> (ARPANSA, 2010).
HR2	Transgrid's <i>Hot Works and Fire Risk Procedure</i> would be adhered to for planning and undertaking all hot and fire risk works. This process would be documented and implemented in accordance with the CEMP.

Mitigation measures	
HR3	All SF ₆ handling would be undertaken in accordance with Transgrid's <i>Management of SF₆ Gas – Work Instruction</i> .
Visual amenity	
VA1	All construction plant, equipment, waste and excess materials would be contained within the designated boundaries of the work site and shall be removed from the site following the completion of construction.
VA2	The syncon building and associated equipment would be designed generally in accordance with the visual amenity of the existing substation equipment.
Waste	
WA1	<p>Waste mitigation and management strategies would be documented in the CEMP and be in accordance with Transgrid's Waste Management Procedures and associated Work Instructions. The CEMP shall include the following:</p> <ul style="list-style-type: none"> • All waste streams and how they will be managed (e.g. segregation and storage on site and reuse/ recycling opportunities taking into account where waste will be generated and the location of recycling/reuse facilities) shall be identified prior to construction commencing and included in the CEMP or separate Waste Management Plan. • All waste, including surplus soils, which cannot be reused would be classified in accordance with the <i>Waste Classification Guidelines</i> (NSW EPA, 2014), removed from the site and disposed of at a facility that can lawfully accept the waste in accordance with the POEO Act and POEO Waste Regulation. • All waste generated during construction would be maintained, tracked and recorded in a waste register in accordance with Transgrid's Waste Management Procedure and entered into Transgrid's Compliance, Audit, Risk and Safety Management System (CAMMS) • Any waste that requires tracking under State or Commonwealth legislation would be authorised in Transgrid's CAMMS waste management system, prior to waste being transported and leaving the site.
WA2	Concrete trucks would be permitted to flick wet wipe their discharge chutes with the effluent discharged into prepared bored holes, prepared excavations/formwork or a watertight receptacle for recycling or disposal. No concrete washout or agitators is permitted.

Appendix C Flora and Fauna Assessment

Armidale 330 kV Substation - new synchronous condenser

Flora and fauna assessment

25-Nov-2025

Armidale 330 kV Substation - new synchronous condenser

Flora and fauna assessment

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Quality Information

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Originator Jamie McMahon, Elizabeth Rizzo

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2	11-Sep-2025	Updated final draft for client review	Neil Standen Associate Director	NS
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1.0 Introduction

Transgrid is proposing to install and operate two synchronous condensers (syncons) at the existing Armidale 330 kV substation site (the proposed activity). The proposed activity is part of Transgrid's broader initiative to ensure sufficient system strength services are available to maintain the stability of the New South Wales (NSW) power system and meet system strength requirements established by the Australian Energy Market Operator (AEMO) in their *2022 System Strength Report* (AEMO, 2022). The retirement of NSW's coal generators and the growth in inverter-based resources in the coming decade is driving an urgent need to add new sources of system strength to the power system.

AECOM Australia Pty Ltd (AECOM) has been engaged by Transgrid to prepare a Summary Environmental Report (SER) to assess potential impacts from the proposed activity at the existing Armidale 330 kV substation. This flora and fauna assessment considers the impacts of the proposed activity on biodiversity values and will be used to support the SER. This report considers both the construction and operation of the proposed activity, and includes recommendations for avoidance and mitigation of potential biodiversity impacts, as relevant.

1.1 Proposed activity description

The scope of works for the proposed activity would include:

- Site establishment activities, including installation of construction offices and amenities, equipment storage and construction laydown areas and vegetation removal
- Construction of a new access road from Eathorpe Road and upgrades to Eathorpe Road to support the transport of equipment and vehicle movements to and from site
- Demolition of redundant infrastructure including a storage shed and boundary fencing
- Installation of a new bench (concrete slab, foundations and associated earthworks), with an indicative maximum footprint of around 130 by 150 metres (m), immediately south of the existing Armidale 330 kV substation to house the syncons and associated infrastructure
- 330 kV busbar extension with a new switch bay, which comprises a 330 kV circuit breaker, disconnect, capacitive voltage transformer, current transformer, earth switch, post insulators/busbar supports and surge arrester
- Installation of the new syncons and associated equipment, including:
 - Power transformer with firewalls
 - Auxiliary transformers
 - Syncon building and gantry crane
 - Oil lubrication and water-cooling systems
 - Control room and battery room
 - Low voltage AC and DC systems
 - Protection and control systems
 - Backup diesel generator
 - Pony motor
- Installation of a new demountable secondary systems building
- Installation of new spill oil tank, secondary containment dam(s), and drainage systems to cater for the new transformers, diesel generator and the syncon oil lubrication system
- Extension of the substation's stormwater drainage system, to cater for the new bench area
- Installation of new lighting protection masts
- Rehabilitation of the site including:

- Removal of temporary construction facilities and equipment
- Excavated material not reused on-site and waste materials would be disposed of at an appropriately licensed waste facility or as directed by Transgrid's environmental business partner in accordance with Transgrid's Waste Management of Spoil Work Instruction
- Disturbed areas not required for the operation of the syncons or the existing Armidale 330 kV substation will be rehabilitated to as close to pre-construction conditions as possible.

Further details of the scope of works for the proposed activity are presented in Section 2 of the SER (AECOM, 2025).

1.2 Proposed impact area and biodiversity study area

The area where ground surface impacts are required as part of the proposed activity is referred to as the 'proposed impact area'. The proposed impact area is shown in Figure 1-1 and is an indicative maximum footprint in which the construction and operation of the syncons would be carried out. The proposed impact area also includes areas within the substation boundary that are required to facilitate connection to the proposed syncons, as well as a portion of Eathorpe Road, which requires upgrades to support the transport of equipment to the site, such as transformers.

This assessment has adopted a 'biodiversity study area' which includes the following:

- The 'biodiversity impact area'. This comprises a portion of the 'proposed impact area' located to the south of the existing substation, where the syncons would be situated, and where construction requiring vegetation removal would be carried out. Construction in other parts of the proposed impact area (e.g. within the existing substation footprint and upgrade works on Eathorpe Road) are not expected to involve removal of sensitive vegetation
- A 20 m buffer around the biodiversity impact area.

The biodiversity study area is shown in Figure 1-1.

1.2.1 Site context

The Armidale 330 kV substation is located on Waterfall Way, in the suburb of Armidale and within the Armidale Regional Council Local Government Area (LGA), NSW.

The syncons are proposed to be located along the southern boundary of the existing substation (as shown in Figure 1-2). The area adjacent to the southern boundary of the substation is comprised of cleared and maintained grassland. This general area would also be used for the site offices and laydown areas (as shown in Figure 1-3).

Access to the proposed impact area is along Eathorpe Road, providing direct access to the substation. Eathorpe Road is unsealed as it passes to the south of the substation.

The land around the proposed impact area is occupied by cleared pastureland, with fragmented and isolated vegetation scattered throughout. The terrain is generally flat, with a general incline towards the southwest and drainage lines falling to the northeast. The proposed impact area drains to the southeast into Commissioners Waters, approximately 1.18 km from the substation.

As described in Section 1.2, the biodiversity study area comprises a buffer of 20 m. The 20 m buffer has been applied so that desktop searches provide a representative overview of species that have potential to be present within the biodiversity impact area.

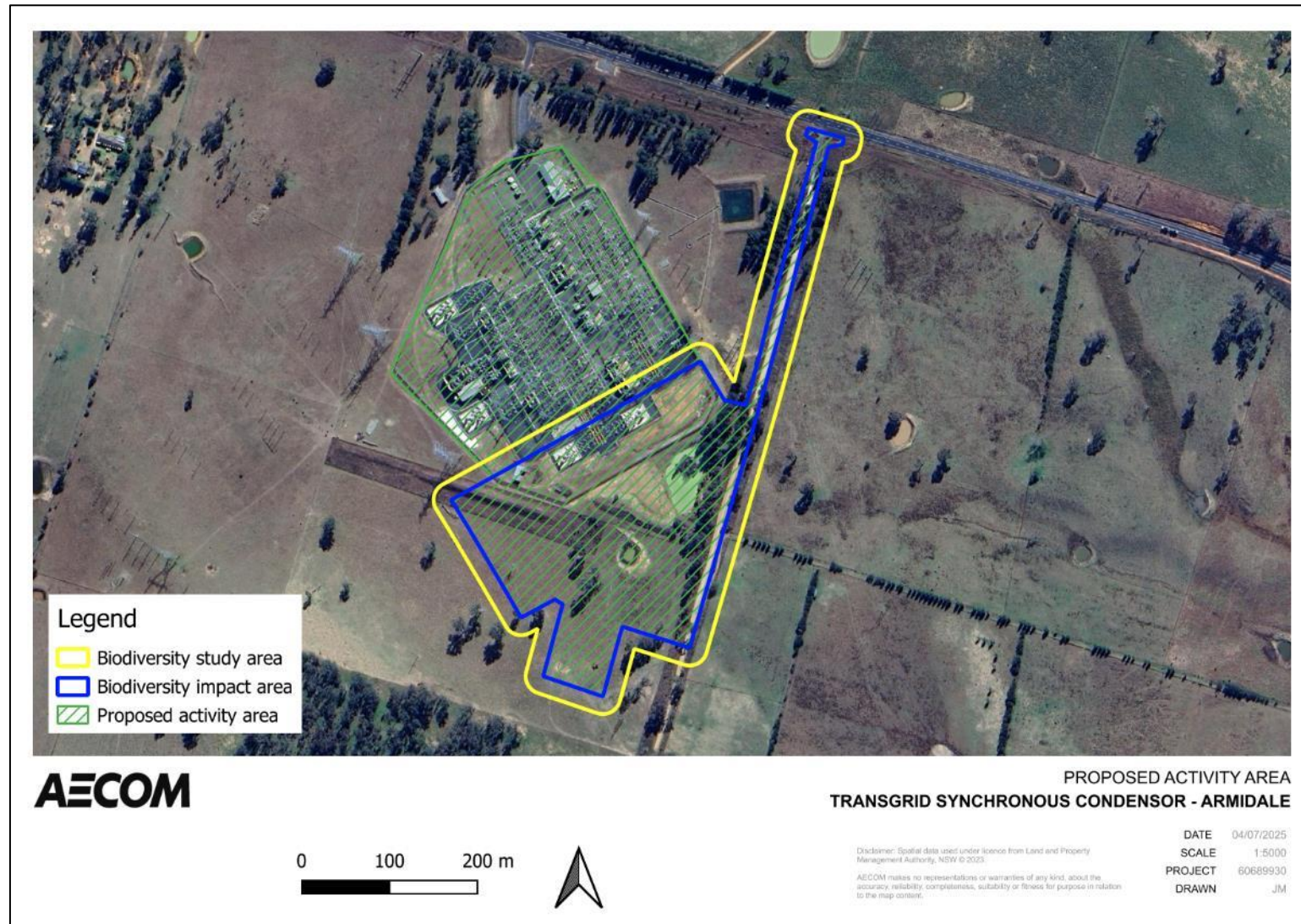


Figure 1-1 Proposed impact area and biodiversity study area

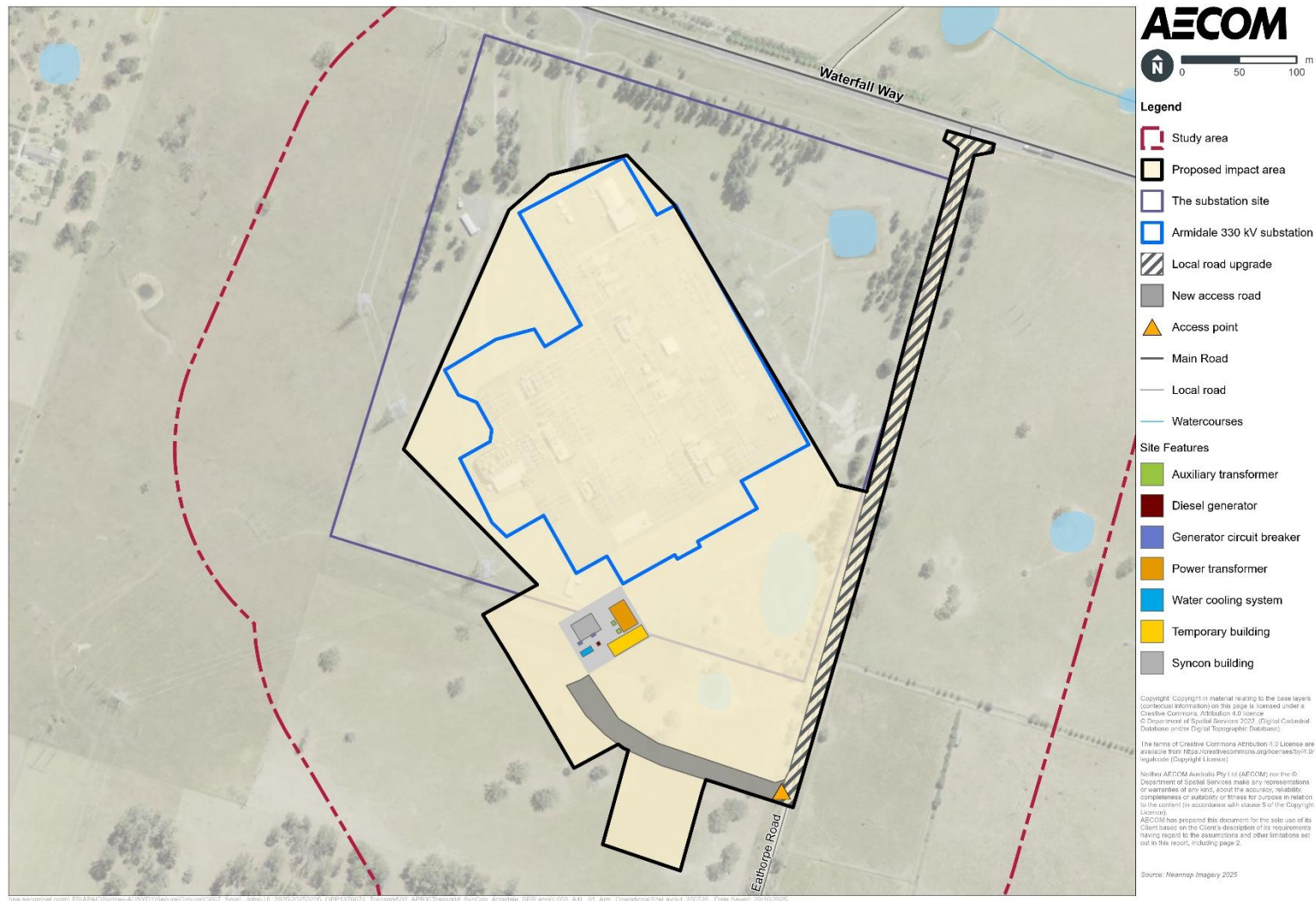


Figure 1-2 Proposed impact area and indicative operational site layout



Figure 1-3 Proposed impact area and indicative construction site layout

1.3 Legislative context

As directed by *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP) the proposed activity would be permissible without development consent under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). As such development consent would not be required from Armidale Regional Council, nor would local council vegetation protection measures such as tree protection orders apply. Further detail on the legislative context and permissibility of the proposed activity is included in Section 3 of the SER.

1.3.1 Environment Protection and Biodiversity Conservation Act 1999 (Cth)

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires that Commonwealth approval be obtained for certain actions, and establishes an assessment and approvals system for actions that have, or are likely to have, a significant impact on Matters of National Environmental Significance (MNES). Under the EPBC Act, impacts upon MNES are considered to assist in determining whether the proposed activity should be referred to the Australian Government Minister for the Environment and Water. The Minister may deem the action a 'controlled action' which may require more detailed assessment. Alternatively, if deemed 'not a controlled action' no more detailed assessment is required.

Potential impacts as a result of the proposed activity are discussed in Section 4.0. The proposed activity is not anticipated to result in a significant impact on any MNES, and as such a referral under the EPBC Act is not required.

1.3.2 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) lists a number of threatened species, populations, ecological communities and declared areas of outstanding biodiversity value to be considered in deciding whether there is likely to be a significant impact on threatened biota, or their habitats.

Where any of these could be impacted by the proposed activity, an assessment of significance that addresses the requirements of Section 7.3 of the BC Act must be completed to determine the significance of the impact.

Potential impacts as a result of the proposed activity are discussed in Section 4.0. The proposed activity is not anticipated to result in a significant impact, and as such neither a species impact statement nor a biodiversity development assessment report is required.

1.3.3 Biosecurity Act 2015

The *Biosecurity Act 2015* (Biosecurity Act) provides a framework to manage biosecurity risks from animal and plant pests and diseases, weeds and contaminants and outlines the responsibilities of government, councils, private landholders and public authorities in the management of biosecurity matters.

Priority weeds are plants classified under the Biosecurity Act as presenting a biosecurity risk to the State or a particular region. If present, priority weeds need to be assessed and controlled to fulfil the General Biosecurity Duty and minimise biosecurity risks. Section 3.9 outlines the priority weeds of the Armidale Regional Council LGA recorded during the field assessment.

1.3.4 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) protects threatened species, populations and ecological communities of fish and marine vegetation, and other living resources of NSW waters. Impacts to threatened species listed under this act are considered alongside those of the BC and EPBC Acts.

Section 199 of the FM Act requires a public authority provide the Minister for Primary Industries 21 days' notice dredging or reclamation works, though clause 227 of the *Fisheries Management (General) Regulations 2019* provides an exemption from this requirement if the works are carried out in accordance with the Code of Practice for Minor Works in NSW Waterways. The proposed activity does not involve dredging or reclamation, or works within Key Fish Habitat (KFH).

1.3.5 Coastal Management Act 2016 and *State Environmental Planning Policy (Resilience and Hazards) 2021*

The *Coastal Management Act 2016* (Coastal Management Act) and Chapter 2 of *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP) provide a framework for considering impacts arising from development proposed within coastal areas of NSW. The Coastal Management Act and Resilience and Hazards SEPP define certain areas, including the coastal zone, coastal use area and the coastal environment area.

A key consideration for activities assessed under Part 5 of the EP&A Act is whether the proposed activity extends into areas mapped as Coastal Wetlands and Littoral Rainforests. In such cases, the proposed activity becomes development permitted with consent, as well as designated development. This planning pathway requires additional assessment and consultation, with the consent authority generally becoming the local council.

The proposed activity is not within an area mapped as coastal wetlands or littoral rainforests under these policies and therefore assessment under Part 5 of the EP&A Act can be undertaken.

Further clauses under Chapter 2 of the SEPP apply only to development with consent and hence do not apply to this assessment.

2.0 Methodology

2.1 Overview

The assessment involved:

- A desktop review of relevant databases and resources (refer to Section 3.2), including:
 - NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) BioNet Wildlife Atlas
 - NSW State Vegetation Type Map via the NSW Government's central resource for Sharing and Enabling Environmental Data (SEED) portal
 - Commonwealth DCCEEW Protected Matters Database
 - NSW Department of Primary Industries WeedWise List
 - Bureau of Meteorology Atlas of groundwater dependent ecosystems
 - NSW Department of Primary Industries (DPI) key fish habitat
 - NSW DPI threatened aquatic species.
- A field survey (refer to Section 2.3), comprising an assessment of vegetation present, and opportunistic fauna sightings
- Assessment of the potential biodiversity impacts of the proposed activity (refer to Section 4.0), including
 - The approximate amount and significance of vegetation and/or threatened species likely to be affected by the proposed activity
 - Impacts to fauna habitat connectivity
 - The potential for the proposed activity to introduce or spread weeds (including priority or environmental weeds), pests or other pathogens
 - The potential for the proposed activity to contribute to key threatening processes.
- Identification of measures to avoid and/or minimise potential ecological impacts (refer to Section 5.0).

2.2 Assessment objectives

The overarching objectives of this flora and fauna assessment are:

- To identify the ecological values of the biodiversity impact area using a combination of desktop research and field inspection
- To provide Transgrid with information that would allow the proposed activity, where feasible, to be constructed and operated in a manner that avoids impacts to known and potential ecological values
- To provide appropriate measures to mitigate impacts to identified ecological values that cannot be avoided.

2.3 Field survey

An inspection of the biodiversity study area was undertaken in the morning of 7 May 2025. Conditions during the inspection were cool, approximately 16°C with clear skies and no wind. There had been 5.8 mm of rain throughout the week prior to the survey, according to the Armidale (Tree Group Nursery) weather station (Station ID 056037). No rainfall was recorded on the day of survey. No standing water was present within the biodiversity study area, though water within the on-site dam was at capacity.

The majority of the biodiversity study area was able to be accessed, including the location of the proposed site offices. The location of the proposed laydown area was separated by barbed wire farm fencing and cattle were observed within this area. The field assessment did not transverse this area due to safety risks from the livestock, however, visual observations were able to be undertaken whilst remaining outside the boundary.

The survey included assessment of vegetation present, as well as opportunistic fauna sightings. No detailed fauna survey was undertaken, though an assessment of fauna habitat present within the biodiversity study area was carried out.

2.4 Limitations

The survey focused on particular areas where ecological risks were deemed to be greater. This included areas of existing vegetation in which the syncon infrastructure is proposed to be placed, as well as locations within the biodiversity study area that were deemed to be more sensitive to potential off-site impacts.

While a fauna habitat assessment was undertaken, this technique is not an adequate substitute for full fauna surveys. Fauna are capable of inhabiting sub-optimal habitat, and fragmentation, isolation or species density can all influence the presence and distribution of a particular species. Species likelihood of occurrence was informed by considering habitat characteristics and opportunistic sightings, and is summarised in Appendix A.

No in-stream aquatic survey was undertaken though aquatic conditions were noted from the dam where relevant.

Detailed Biodiversity Assessment Method plot assessments were not undertaken, though relevant vegetation was inspected and recorded throughout the biodiversity study area.

3.0 Existing environment

3.1 Overview

Table 3-1 provides an overview of the biodiversity study area, including relevant environmental controls and sensitivities. Photographs of the site are included in Section 3.3.1.

Table 3-1 Environmental controls and sensitivities

Environmental considerations	In the biodiversity study area?
Does the biodiversity study area overlap a National Park?	No
Does the biodiversity study area include any land reserved or dedicated for preservation of other environmental protection purposes?	No
Does the biodiversity study area overlap a World Heritage Area?	No
Does the biodiversity study area overlap an Environmental Protection Zone under an environmental planning instrument?	No
Does the biodiversity study area include any land identified as a wilderness area?	No
Does the biodiversity study area overlap a wetland area dedicated under the Ramsar Wetlands Convention?	No
Does the biodiversity study area contain critical habitat?	No
Does the biodiversity study area contain Key Fish Habitat?	No
Is the biodiversity study area mapped on the Biodiversity Values map?	No
Is the biodiversity study area mapped on the Native Vegetation regulatory map?	No (excluded)

3.2 Desktop searches

Desktop research was undertaken prior to the commencement of the field survey. This included database searches to determine if targeted surveys for specific species were required. Additionally, these searches helped to identify threatened biota known or likely to occur within the biodiversity study area.

A description of the databases and resources that were investigated is provided in Table 3-2.

Table 3-2 Desktop searches

Database / resource	Desktop search results
NSW DCCEEW BioNet Wildlife Atlas – Threatened Flora and Fauna Records and Exotic Species	The NSW DCCEEW BioNet Wildlife Atlas was searched on 6 June 2025 for threatened and exotic flora and fauna records. This search was undertaken using a 10 km x 10 km area centred on the biodiversity study area. This search returned 3 threatened ecological communities (TECs), 31 threatened fauna species and 3 threatened flora species listed under the BC Act and/or EPBC Act. Threatened flora and fauna in the biodiversity study area are discussed further in Section 3.6.
NSW State Vegetation Type Map	The State Vegetation Type Map was accessed via the SEED map to identify plant community types (PCT), vegetation class and vegetation formation within the biodiversity study area. Vegetation types and communities are discussed further in Section 3.3.
Commonwealth DCCEEW – Protected Matters Database	The Commonwealth DCCEEW Protected Matters Database was searched for MNES and other matters protected by the EPBC Act. This search utilised a 5 km radius search area of the biodiversity study area. MNES are discussed further in Section 3.3.
NSW Department of Primary Industries WeedWise List	Priority weeds are plants that pose a potentially serious threat to primary production or the natural environment. Under the Biosecurity Act public authorities have a responsibility to prevent, manage, control or eradicate priority weeds in the region. Priority weeds are discussed further in Section 3.9.
Bureau of Meteorology Atlas of groundwater dependent ecosystems	<p>The Bureau of Meteorology Atlas of groundwater dependent ecosystems (GDEs) was reviewed to understand if vegetation within or near the biodiversity study area potentially relies on groundwater, noting the potential that the proposed activity may alter groundwater flows to a minor extent.</p> <p>No GDEs were identified in the biodiversity study area.</p>
NSW Department of Primary Industries key fish habitat	<p>The DPI KFH mapping includes all marine and estuarine habitats up to highest astronomical tide level (that reached by 'king' tides) and most permanent and semi-permanent freshwater habitats including rivers, creeks, lakes, lagoons, billabongs, weir pools and impoundments up to the top of the bank (DPI 2011a).</p> <p>The biodiversity study area was reviewed for potential KFH. The nearest waterway, Commissioners Waters, was identified as KFH. This waterway is located around 1.18 km from the biodiversity impact area.</p>
NSW Department of Primary Industries threatened aquatic species	The DPI report <i>Fish communities and threatened species distributions of NSW</i> (DPI 2016) was reviewed for the purposes of establishing threatened fish species likely to be present and/or affected by the proposed activity. No listed threatened fish species were deemed likely to occur within the biodiversity study area.

3.3 Vegetation communities, threatened ecological communities and habitat

The NSW State Vegetation Type Map was accessed to identify PCTs in the vicinity of the biodiversity study area. PCTs and associated TECs identified within approximately 1 km of the biodiversity study area are provided in Table 3-3 and shown in Figure 3-1.

Table 3-3 Plant community types identified near the biodiversity study area

PCT	Associated TEC
3359 New England Hills Stringybark Box Woodland	<p>BC Act, CE: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions</p> <p>BC Act, CE: White box - yellow box - Blakely's red gum grassy woodlands and derived native grasslands</p>

Notes:

1. CE = critically endangered.

Species identified during the field survey as being present within the biodiversity study area included the following (exotic species marked with an asterisk):

- Parramatta Wattle (*Acacia parramattensis*)
- New England Peppermint (*Eucalyptus nova-anglica*)
- White cypress-pine (*Callitris columellaris*)
- Bailey's Wattle (*Acacia baileyana*)
- *Acacia floribunda*
- Hawthorn (*Crataegus* sp.)
- Rough-Barked Apple (*Angophora floribunda*)
- Red Box (*Eucalyptus polyanthemos*)
- Blakely's Red Gum (*Eucalyptus blakelyi*)
- *Cyperus* sp.
- Sweet Briar (*Rosa rubiginosa*)*
- Scotch Thistle (*Onopordum acanthium*)*
- Radiata Pine (*Pinus radiata*)*
- Atlas Cedar (*Cedrus atlantica*)*
- White Poplar (*Populus alba*)*
- Wild Carrot (*Daucus carota*)*
- Dock Weed (*Rumex obtusifolius*)*
- Dandelion (*Taraxacum officinale*)*
- Blackberry (*Rubus fruticosus aggregate*)*
- Large-leaved privet (*Ligustrum lucidum*)*
- Creeping Woodsorrel (*Oxalis corniculata*)*
- *Paspalum* sp.*

Approximately 60 m to the south of the biodiversity impact area is a patch of vegetation mapped as PCT: 3359 New England Hills Stringybark Box Woodland. This community is equivalent to the White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC. This TEC is listed as critically endangered under both the BC Act and EPBC Act.

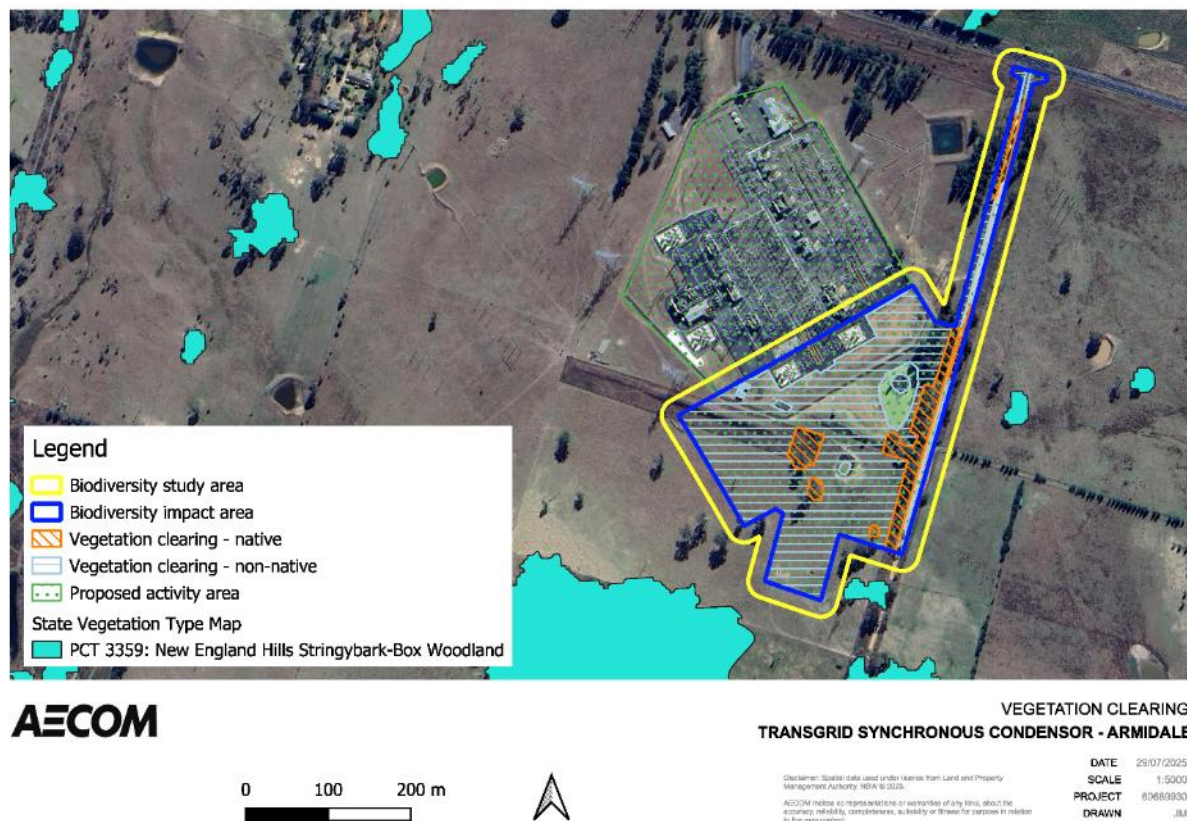


Figure 3-1 Vegetation communities

3.3.1 Site photographs



Figure 3-2 View along Eathorpe Road



Figure 3-3 Planted Radiata pines between the substation and Eathorpe Road



Figure 3-4 Atlas Cedar adjacent to Eathorpe Road



Figure 3-5 Proposed site offices and laydown area to the south of the substation



Figure 3-6 Area of historic fill to the south of the substation



Figure 3-7 Farm dam in property adjacent to the substation



Figure 3-8 Regenerating area adjacent to the substation property boundary



Figure 3-9 Farm dam adjacent to substation

3.4 Fauna habitat

Fauna observed within the biodiversity study area included:

- Magpie-lark (*Grallina cyanoleuca*)
- Australian Raven (*Corvus coronoides*)
- Little grebe (*Tachybaptus ruficollis*)
- Straw-necked ibis (*Threskiornis spinicollis*)
- Eastern Rosella (*Platycercus eximius*)
- Crested Pigeon (*Ocyphaps lophotes*).

No evidence of other occupation in the form of scats or tracks was observed during the field survey, though the site would be reasonably expected to accommodate a limited range of native and exotic species given the regular water source available. The vegetation is also likely to provide occasional roosting and foraging opportunities for a variety of additional birds not recorded during the field survey.

The biodiversity study area contained little evidence of fallen logs, coarse woody debris or bush rock. Flaking bark was however present across some trees, with leaf litter present across parts of biodiversity study area near mature trees.

No tree hollows were observed within the biodiversity study area, though there are a small number of mature trees that would provide roosting and foraging habitat in addition to the younger regrowth.

The waterway of Commissioner's Waters is present to the south-east of the biodiversity study area, approximately 1.18 km from the limits of the biodiversity study area.

Aquatic habitat was observed in and around the two farms dams. An island was also present in the middle of the dam immediately southeast of the substation. This small island has a dense vegetative cover of predominately White poplar (*Populus alba*) and Large-leaved privet (*Ligustrum lucidum*). Small depressions and drainage channels are present leading from this dam through the southeastern portion of biodiversity study area, though these were dry at the time of the field survey.

The habitat value of the biodiversity study area is heavily reduced compared to its pre-cleared state. At present, this site provides low to moderate habitat value, noting the remaining elements of leaf litter and aquatic habitat.

3.5 Aquatic habitat

The proposed activity area includes two farm dams, with one of these being immediately adjacent to the substation. This latter dam was inspected visually during the field visit and found to have very high levels of turbidity – much greater than the other dam in the adjacent property. Noting the catchment of the dam, it is not clear what has contributed to this turbidity, though it is noted that a large area of grass-covered fill is present immediately upstream of the dam.

Aquatic vegetation around the dam was limited to native sedges (*Juncus* sp and *Cyperus* sp) as well as a dense covering of White poplar (*Populus alba*) and Large-leaved privet (*Ligustrum lucidum*) on the island.

It was not clear to what degree the farm dams were inhabited by aquatic fauna, though Little grebes were noted on the dam near the substation. It is possible that both dams would support native freshwater crayfish and eastern long necked turtle, both of which are known to be tolerant of elevated turbidity levels.

3.6 Threatened species

A desktop assessment was undertaken prior to the field survey to indicate the potential threatened species that may occur within the biodiversity study area. This included consideration of the threatened species returned by the BioNet and PMST searches undertaken on 6 June 2025. Of these species, an assessment of the likelihood of occurrence of each was undertaken. Species with a likelihood of occurrence of moderate or above were targeted during the field survey. These species are listed in Table 3-4.

Table 3-4 Threatened species with moderate or higher likelihood of occurrence

Common name	Scientific name	Status	
		BC Act	EPBC Act
Fauna			
Yellow-spotted Tree frog	<i>Litoria castanea</i>	V	
Square-tailed Kite	<i>Lophoictinia isura</i>	V	
Barking Owl	<i>Ninox connivens</i>	V	
Masked Owl	<i>Tyto novaehollandiae</i>	CE	CE
Regent Honeyeater	<i>Anthochaera phrygia</i>	V	
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	E	
Grey Falcon	<i>Falco hypoleucos</i>	V	
Black Falcon	<i>Falco subniger</i>	V	V
Painted Honeyeater	<i>Grantiella picta</i>	V	
Little Eagle	<i>Hieraaetus morphnoides</i>		M
White-throated Needletail	<i>Hirundapus caudacutus</i>	V	
Black-chinned Honeyeater	<i>Melithreptus gularis gularis</i>	V	
Little Lorikeet	<i>Parvipsitta pusilla</i>	V	
Diamond Firetail	<i>Stagonopleura guttata</i>	V	
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	V	

3.7 Areas of outstanding biodiversity value

None of the land in or around the biodiversity study area is listed as an area of outstanding biodiversity value.

3.8 Critical habitat

None of the land in or around the biodiversity study area is listed as critical habitat for any species.

3.9 Priority weeds

Priority weeds are plants classified under the Biosecurity Act as presenting a biosecurity risk to the State or a particular region. Of those listed for the Armidale Regional Council LGA the following species were recorded:

- Blackberry (*Rubus fruticosus aggregate*) - Land managers should mitigate the risk of the plant being introduced to their land. Land managers should mitigate spread of the plant from their land. A person should not buy, sell, move, carry or release the plant into the environment. Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value
- Sweet Briar (*Rosa rubiginosa*) - Land managers should mitigate the risk of the plant being introduced to their land. Land managers should mitigate spread of the plant from their land. A person should not buy, sell, move, carry or release the plant into the environment. Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value.

With respect to other exotic species present within the biodiversity study area, these are subject to the 'general biosecurity duty' within NSW. This obligates landowners to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

4.0 Potential impacts

Potential biodiversity impacts associated with the proposed activity are detailed in the following sections and have been assessed on the basis of consideration of both direct and indirect effects, and the resulting change to the biophysical and ecological processes that establish and support the biodiversity values of the biodiversity impact area. For the proposed activity, these direct and indirect impacts are a result of changes to the biophysical environment that ultimately result in changes to biodiversity, i.e. vegetation, landform and soils.

The potential impacts identified in this section consider:

- Direct and indirect impacts to biodiversity
- The scale (local and regional), timing, frequency and duration of activities that may result in impacts during construction and operational phases of the proposed activity
- The significance of the impact, including any reasoning from assessments of significance
- Other anthropogenic activities that influence cumulative impacts to biodiversity in the area.

4.1 Vegetation

The construction of the syncons and their associated infrastructure would require minimal localised vegetation clearance. Figure 4-1 shows a conservative extent of clearing required to facilitate construction and operation of the proposed activity, including areas of predominantly native and non-native vegetation.

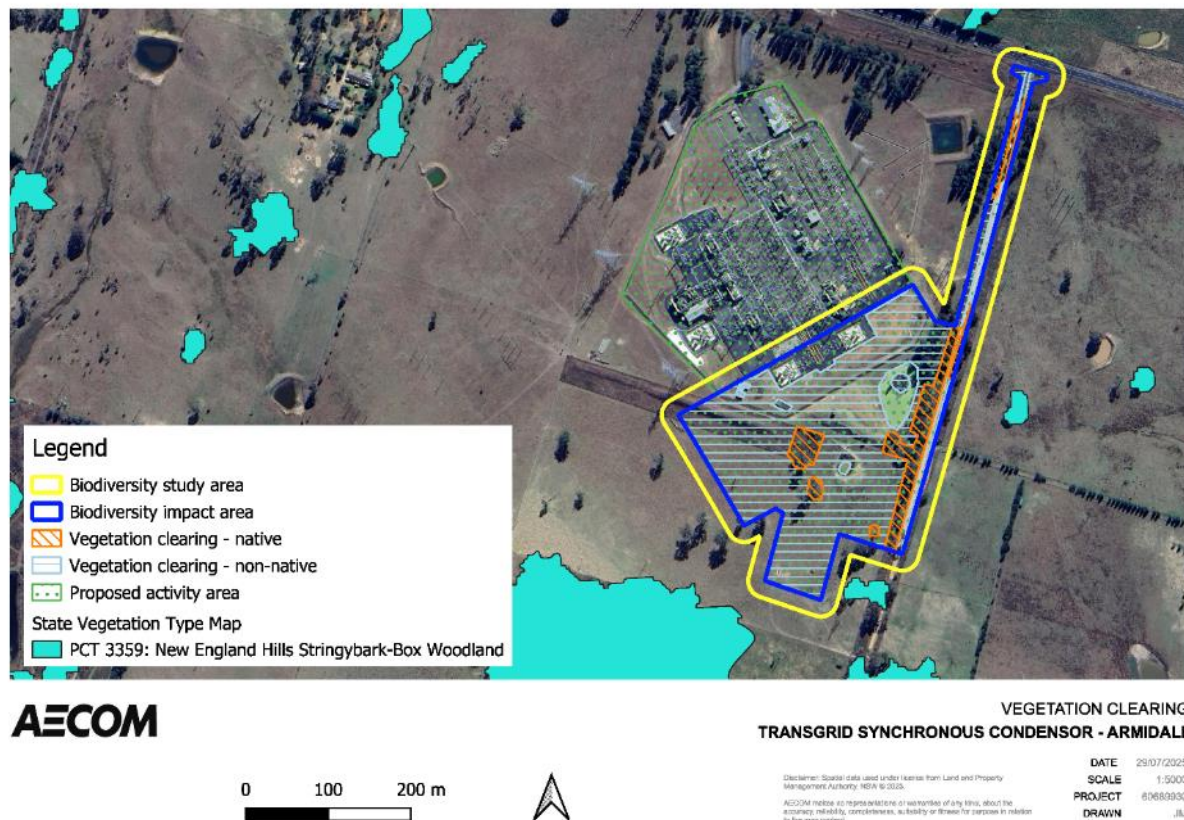


Figure 4-1 Vegetation clearing

The clearing of native vegetation within the biodiversity impact area would comprise of approximately 8,417 m² (0.84 ha). An additional 56,647 m² (5.66 ha) of predominantly mature non-native vegetation was observed within the biodiversity impact area and is assumed to require removal. The removal of native and non-native vegetation in this area would not affect any threatened flora species or TEC.

Indirect off-site impacts to threatened flora are not considered likely to be significant providing the proposed mitigation measures are implemented.

The proposed activity has the potential to result in the infestation of the biodiversity impact area by new weeds, or the spread of existing weeds to locations outside the biodiversity impact area. Providing the mitigation measures (Section 5.2) and the management actions outlined for the priority weeds (Section 3.9) are implemented, this impact is not expected to be significant.

4.2 Fauna habitat

As outlined above, the biodiversity impact area and surrounds have been subject to extensive historic clearing for the purposes of agriculture, and for construction of the substation and associated transmission line easements. As such, the habitat value within the biodiversity study area is generally low.

The clearing of isolated paddock trees would result in a moderate impact in the context of the extent of historic clearing. This is particularly relevant for the mature trees to the south of the substation, in the adjacent paddock. These trees are likely to play an important role in linking heavily fragmented habitat across the landscape and would be particularly important for roosting and foraging birds, as well as arboreal mammals. The detailed design of the proposed activity should seek to avoid impact to these trees as far as possible.

Construction of the syncons would disturb soils and may lead to localised erosion and sedimentation in on-site and nearby dams and waterways if not managed appropriately. This impact may be managed through the application of appropriate sediment controls and is not expected to be significant, noting the relatively flat topography of the biodiversity impact area.

The operation of machinery including chainsaws during construction has the potential to directly disturb native fauna through noise impacts. While these impacts are inevitable and largely unable to be mitigated, they would be temporary and are therefore not considered to be significant.

The operation of the proposed activity is not expected to generate substantial noise or air emissions. The proposed activity would include night time lighting for security purposes. Providing suitable mitigation measures are implemented, the potential for these factors to directly disturb fauna would be minor.

The proposed activity would include new hardstand areas, which may lead to increased runoff, though with suitable mitigation (erosion and sediment controls) the impact of this on biodiversity values is expected to be negligible.

Overall, the construction and operation of the proposed activity is not expected to result in a significant impact upon threatened or non-threatened fauna or their habitat

4.3 Wildlife connectivity and fragmentation

The removal of vegetation for the construction of the proposed activity would require clearing of native and exotic vegetation.

The clearing of vegetation associated with the proposed activity would lead to an inevitable increase in fragmentation in the local area. This fragmentation would be in addition to that already incurred by the construction and operation of the substation and the associated transmission lines and surrounding agricultural activities, which is substantial. This clearing currently results in disruptions in connectivity both north-east and south-west across the broader locality.

As outlined above, the clearing of isolated paddock trees would result in a moderate impact in the context of the extent of this historic clearing. This is particularly relevant for the mature trees to the south of the substation, in the adjacent paddock. These trees are likely to play an important role in linking heavily fragmented habitat across the landscape and would be particularly important for roosting

and foraging birds, as well as arboreal mammals. The detailed design of the proposed activity should seek to avoid impact to these trees as far as possible.

Due to this historic disturbance, the connectivity of habitat for ground-dwelling fauna in both the north and east directions has been substantially disrupted. Connectivity for mobile aerial species such as birds and arboreal mammals however is still maintained, though may be reduced for more cryptic species.

The primary impact of the proposed activity in terms of connectivity would be the removal of vegetation to enable construction of the syncons. Vegetation clearing would affect both native and non-native vegetation in poor to moderate condition. Based on the indicative operational site layout, it is anticipated that much of the clearing would be required for construction support only and would not be required for the operation of the syncons. These non-operational areas would be rehabilitated to as close to pre-construction conditions as possible upon completion of construction.

Noting the heavy degree of historic clearing for agriculture in the region, and the commitment to rehabilitate portions of the biodiversity impact area, this loss of connectivity would be a minor impact within this area. On a regional scale the impact would be negligible, though it would contribute cumulatively to the ongoing fragmentation of native vegetation and habitat within the Armidale region.

This impact is not considered to be significant given the mobile nature of native fauna likely to be present in the area, the relatively small scale of the clearing and the moderate duration of the impact (expected to be around 6-10 years until regrowth reconnects habitat, providing active regeneration or revegetation of this area is implemented).

4.4 Aquatic impacts

The proposed activity area includes two farm dams, with one of these being immediately adjacent to the substation. It is likely that this dam would need to be partially or fully infilled to facilitate construction of the syncons.

Aquatic vegetation impacts associated with the removal of one or both dams would be limited, noting the limited degree of aquatic vegetation present. This is likely to be a function of grazing, noting that the island in the middle of the dam near the substation is heavily vegetated (albeit by weeds), presumably due to being inaccessible by grazing animals.

There is the potential that both dams would provide habitat for native crayfish and/or eastern long-necked turtle. The loss of habitat for these species would not be significant, though a dewatering plan including appropriate protocols for fauna rescue would be implemented if either dam is to be removed and infilled.

4.5 Spread of weeds, pests and pathogens

The movement of vehicles and personnel into and throughout the biodiversity impact area has the potential to facilitate the spread of weeds. However, with the implementation of the mitigation measures outlined in Section 5.2 the overall impact of weeds associated with the construction phase of the proposed activity would be low.

The operation of the proposed activity would not present any additional or ongoing risk in terms of the spread of weeds.

The biodiversity impact area is likely to be utilised by a range of vertebrate pest species. Impacts from pest species are likely to include ongoing grazing and predation on small to medium native fauna. The proposed activity is unlikely to alter the occurrence of pest species in and around the biodiversity impact area, either positively or negatively, due to the localised nature of the works. As such the overall impact in this regard is considered to be neutral with respect to the baseline scenario.

The proposed activity also has the potential to spread pathogens into the proposed activity area. This may include plant diseases such as myrtle rust and phytophthora fungus, or animal disease such as chytrid fungus, which affects amphibians.

The scope of the field survey was not broad enough to be able to identify the presence of any plant pathogens in the biodiversity study area, though no immediate signs of poor plant health or dieback

were observed. Similarly, no fauna survey was undertaken so the presence of chytrid could not be confirmed. Assuming that these pathogens are not currently present, and providing suitable hygiene measures are implemented as per the measures outlined in Section 5.2, the risk of the introduction of such pathogens is expected to be low.

4.6 Key threatening processes

BC Act

The following key threatening processes listed under the BC Act are considered relevant to the proposed activity:

- *Clearing of native vegetation*

The proposed activity would result in the clearing of a small amount of native vegetation to facilitate the construction of the syncons. The vegetation to be cleared is in a fragmented state and as such, is in generally poor condition. Management measures aimed at reducing the amount of vegetation clearing are provided in Section 5.2.

- *Invasion of native plant communities by exotic perennial grasses*

Exotic perennial grasses and other environmental weeds exist within the biodiversity study area and can benefit from disturbance to natural vegetation. Weed management at the site would help prevent these species from spreading within or between sites.

- *Infection of frogs by amphibian chytrid causing the disease chytridiomycosis*

Chytridiomycosis is a fatal disease of amphibians and is caused by the chytrid *Batrachochytrium dendrobatidis*. Management measures are recommended to address contributing to this key threatening process.

EPBC Act

Relevant key threatening processes listed under the EPBC Act are:

- Land clearance
- Novel biota and their impact on biodiversity
- Infection of amphibians with chytrid fungus resulting in chytridiomycosis.

The impact of clearing of vegetation is outlined within this document. The scale of the proposed clearing is considered minor relative to the surrounding habitat in the region. It is expected that further opportunities would be investigated during subsequent stages of development to reduce the degree of vegetation clearing required.

The other two key threatening processes are considered minor based on the limited physical scale of the proposed activity and would be managed during construction and operation through the application of relevant mitigation measures.

4.7 Cumulative impacts

Three other similar infrastructure or large scale development projects are known to be planned for this area (refer to Table 4-1).

Table 4-1 Projects identified as contributing to potential cumulative impacts

Project and status	Relative location	Proposed construction timeframe	Project details
Armidale Battery Energy Storage System Under assessment - more	Approximately 30 m east of the proposed activity.	Construction is estimated to take approximately 24 months and would commence in late 2025. Construction may overlap with construction of the proposed activity. Operations would overlap.	Development of a 150 MW/300 MWh BESS and associated infrastructure, including a new substation.

Project and status information required	Relative location	Proposed construction timeframe	Project details
Wongalea Battery Energy Storage System Prepare EIS	Approximately 120 m northeast of the proposed activity.	Construction is estimated to take approximately 24-28 months and would commence in late 2026. Construction may overlap with construction of the proposed activity. Operations would overlap.	Development of a 300 MW/1200 MWh BESS and a 132 kV transmission connection to the Armidale 330 kV Substation.
Kooyong Battery Energy Storage System Prepare EIS	Approximately 100 m southwest of the proposed activity.	Pending approval, construction is expected to take place over a 12-month period, commencing in 2028/29, construction is unlikely to overlap with the proposed activity. Operations are anticipated to start in 2029/30 and would overlap with the proposed activity.	Development of a 200 MW/800 MWh BESS and associated infrastructure, including a new substation.

Vegetation impacts of the above projects, based on their EIS or scoping reports, are:

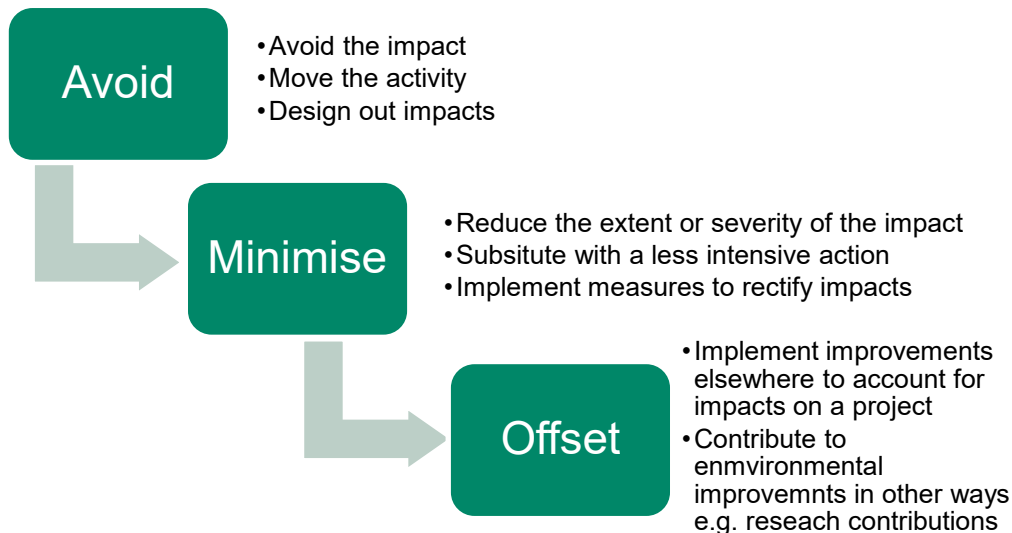
- Armidale Battery Energy Storage System – removal of four *Eucalyptus blakelyi* and one *Eucalyptus viminalis*.
- Wongalea Battery Energy Storage System – potential for clearing up to 4.35 ha of native vegetation, some of which may comprise TEC (to be confirmed as part of the EIS)
- Kooyong Battery Energy Storage System – clearing of up to 2.39 ha of box gum grassy woodland TEC, with further clearing of up to 16.78 ha of native woodland vegetation.

Collectively, the above projects have the potential to clear up to approximately 21.5 ha of native vegetation, with at least 2.39 ha of this being TEC. It should be noted that the clearing proposed for the Kooyong BESS would include a substantial amount required for the proposed activity. As such, if the Kooyong BESS proceeds first, the amount of native vegetation clearing required for the proposed activity would be reduced to 0.66 ha, with none of that comprising TEC. This would still contribute to the collective loss of native vegetation in this location, as well as the ongoing reduction in available habitat and resources for native species generally. This is of particular note at this site, where the historic clearing of surrounding native vegetation for agricultural purposes has resulted in significant fragmentation of the local landscape and habitat. The proposed activity would increase this fragmentation directly, albeit to a minor degree, contributing to the ongoing loss of native habitat within the Armidale region. Despite this, the impact of the proposed activity is not considered to be significant in a cumulative sense, noting that areas used for construction only are recommended to be rehabilitated to as close to pre-construction conditions as possible upon completion, and that the operational project would be located within a non-native vegetation area.

5.0 Management measures

5.1 Avoidance and minimisation

Management of environmental impacts associated with the proposed activity would be implemented in accordance with the following management hierarchy:



The following section outlines how these principles have been implemented as part of the proposed activity to date.

1. Avoid:

- The proposed activity has been designed to avoid impacts to native vegetation where feasible. This includes preference for a design that is largely based within the historically cleared area adjacent to the existing substation, with small sections located in remnant areas of native vegetation
- The selected design solution is relatively modest, being at the lower end of potential engineering designs to address the issue. The indicative design represents an appropriate balancing of several factors including environmental and amenity impact, cost, constructability and disruption to service. These factors would continue to be considered as part of detailed design development.

2. Minimise:

- The design has sought to minimise the amount of vegetation removal while still safely constructing the proposed activity
- The proposed activity has been designed to minimise the construction duration to minimise fauna impacts, as well as to minimise the amenity impacts to local residents and businesses.

3. Offset:

- No formal offsets are proposed for the proposed activity, though rehabilitation of non-operational disturbed land would take place.

5.2 Mitigation measures

The following mitigation measures are recommended for the proposed activity:

- The clearing of native vegetation would be minimised as far as possible, with the approximate area of impact being 1 ha. This is made up on 0.69 ha of predominantly native vegetation and 0.31 ha of predominantly non-native vegetation. The limits of clearing would be agreed with the Transgrid environmental representative prior to works commencing, with areas not subject to clearing demarcated or fenced off to prevent movement of construction vehicles and/or workers into these areas
- All workers would be provided with an environmental induction prior to commencing work. This induction would include information on measures to be implemented to protect native vegetation and fauna habitat, penalties for breaches and locations of areas of sensitivity. Key points would include:
 - Maintaining all construction activities within the designated and demarcated or fenced off boundaries
 - Identification of weeds and biodiversity threats on site and appropriate actions to prevent their spread (see detail below)
 - Identification of threatened plants and animals, and what to do in case of encountering these (see detail below).
- All vehicles and machinery entering and leaving the site would be inspected for weeds and/or weed seed. If detected these would be removed prior to entering or leaving the site and suitably contained and disposed of to prevent new infestations and/or further spread
- Weed control measures would be developed and implemented as part of the CEMP to manage the potential dispersal and establishment of weeds during the construction phase of the proposed activity. This would include the management and disposal of weeds (and particularly priority weeds) in accordance with the Biosecurity Act
- During construction and rehabilitation priority weeds would be managed according to their specific biosecurity obligations under the Biosecurity Act
- Sediment controls would be installed at the downstream side of all areas of soil subject to disturbance to prevent impacts to local waterways and other aquatic habitats. These must be monitored and maintained on a daily basis throughout construction and reinstated as necessary to ensure their ongoing effectiveness
- Soils within the biodiversity impact area would be stabilised upon completion of construction to minimise the potential for ongoing sedimentation of nearby waterways. This would include the use of stabilising materials such as coir rolls or similar steeper areas
- Disturbed areas not required for the operation of the syncons or the existing Armidale 330 kV substation will be rehabilitated to as close to pre-construction conditions as possible upon completion of construction. This would include soil stabilisation and revegetation using a native seed mix approved by the Transgrid environmental representative
- Any external material (such as crushed sandstone or similar) brought in for the purposes of constructing and stabilising the biodiversity impact area would be fully removed upon completion of construction, unless required for the operation of the syncons or the existing Armidale 330 kV substation
- If native fauna is encountered it must be allowed to move off site of its own accord, as far as it is safe to do so. If the animal does not move works are to stop in that area and a person qualified in wildlife handling must be called in to safely relocate the animal
- If any threatened flora is located within the clearing footprint works are to stop in that area and a Transgrid environmental representative contacted for further advice

- All construction material, fluids, fuel etc would be stored in appropriately bunded and/or contained areas to reduce the potential for spills entering local waterways if spilled. All refuelling should be undertaken within designated laydown areas only
- If the farm dams are to be reclaimed a dewatering plan must be developed and implemented. This is to include protocols for the rescue of native aquatic fauna as the water is removed, including a plan for its relocation
- Lighting of the proposed activity would be designed in accordance with relevant standards and directed inwards, and away from adjacent vegetated areas as far as practicable
- Should the detailed design or onsite works determine the need to remove or trim any additional vegetation that has not been identified in this report, additional approval from Transgrid's environmental team would be required.

6.0 Conclusion

The proposed activity has the potential to result in localised impacts upon existing native and non-native vegetation, as well as minor impacts to fauna habitat. The vegetation, habitat and species that would be affected are generally comprised of common native and exotic species located within land subject to historic agricultural disturbance.

The main impacts of the proposed activity upon flora would be through the direct clearing of vegetation for the installation of the syncons and construction support areas. Vegetation impacts associated with these actions were assessed as not being significant due to the relatively small footprint.

No threatened species or ecological communities were identified within or near the biodiversity impact area. The proposed activity is not anticipated to result in a significant impact to MNES, and a referral under the EPBC Act is not required.

Habitat impacts associated with the works would be localised and generally temporary, though it is noted that vegetation cover within the construction support area may take several years to fully recover. Despite this, the overall impact on habitat for known threatened fauna species is not considered to be significant.

On the basis of the above, and providing the mitigation measures provided are properly implemented, the proposed activity is not considered likely to result in a significant impact upon biodiversity values, including threatened species or ecological communities.

7.0 References

Bureau of Meteorology Atlas of Groundwater Dependent Ecosystems (GDE):

<http://www.bom.gov.au/water/groundwater/gde/map.shtml>. (BoM 2024)

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NSW Department of Primary Industries (DPI) - Fisheries, 2025a. Profiles for species, populations and ecological communities

NSW Department of Primary Industries WeedWise Priority Weeds List (DPI 2025b)

NSW Department of Primary Industries database for threatened species and aquatic TECs:

<https://www.dpi.nsw.gov.au/fishing/species-protection/what-current> (DPI 2025c)

NSW Department of Environment and Conservation (DEC) *Threatened Species Survey and Assessment: Guidelines for developments and activities* (working draft) (2004)

NSW Environment, Energy and Science Group (EES), 2025a, BioNet database

NSW Environment, Energy and Science Group, 2025b, Vegetation Types Database and Threatened Species Profile Database

NSW The Central Resource for Sharing and Enabling Environmental Data (SEED): [SEED Map](#)

Appendix A

Likelihood of Occurrence

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Litoria castanea</i>	Yellow-spotted Tree frog		CE	E	Require large permanent ponds or slow flowing 'chain-of-ponds' streams with abundant emergent vegetation such as bulrushes and aquatic vegetation. Adults are active during spring and summer and bask on sunny days. Move and forage at night on grassy banks or float on the water's surface. Males call at night from the open water and breeding generally occurs during or following rain. Eggs are laid amongst aquatic vegetation. Shelter during autumn and winter under fallen timber, rocks, other debris or thick vegetation.	Moderate
<i>Litoria piperata</i>	Peppered Frog		CE	V	Found in streamside vegetation and under rocks and fallen timber along rocky streams flowing eastward from the Tablelands.	Low
<i>Litoria subglandulosa</i>	Glandular Frog		V		Glandular Frogs may be found along streams in rainforest, moist and dry eucalypt forest or in subalpine swamps. Breeding occurs in summer, and possibly in spring.	Low
<i>Lophoictinia isura</i>	Square-tailed Kite		V		Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to occupy large hunting ranges of more than 100km ² . Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.	Moderate
<i>Neophema pulchella</i>	Turquoise Parrot		V		Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Usually seen in pairs or small, possibly family, groups and have also been reported in flocks of up to thirty individuals. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. Forages quietly and may be quite tolerant of disturbance. However, if flushed it will fly to a nearby tree and then return to the ground to browse as soon as the danger has passed. Nests in tree hollows, logs or posts, from August to December. It lays four or five white, rounded eggs on a nest of decayed wood dust.	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Ninox connivens</i>	Barking Owl		V		Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. Preferentially hunts small arboreal mammals such as Squirrel Gliders and Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Can catch bats and moths on the wing, but typically hunts by sallying from a tall perch. Requires very large permanent territories in most habitats due to sparse prey densities. Monogamous pairs hunt over as much as 6000 hectares, with 2000 hectares being more typical in NSW habitats. Two or three eggs are laid in hollows of large, old trees. Living eucalypts are preferred though dead trees are also used. Nest sites are used repeatedly over years by a pair, but they may switch sites if disturbed by predators (e.g. goannas). Nesting occurs during mid-winter and spring but is variable between pairs and among years. As a rule of thumb, laying occurs during August and fledging in November. The female incubates for 5 weeks, roosts outside the hollow when chicks are 4 weeks old, then fledging occurs 2-3 weeks later. Young are dependent for several months. Territorial pairs respond strongly to recordings of Barking Owl calls from up to 6 km away, though humans rarely hear this response farther than 1.5 km. Because disturbance reduces the pair's foraging time, and can pull the female off her eggs even on cold nights, recordings should not be broadcast unnecessarily nor during the nesting season.	Moderate

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Ninox strenua</i>	Powerful Owl		V		The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine <i>Syncarpia glomulifera</i> , Black She-oak <i>Allocasuarina littoralis</i> , Blackwood <i>Acacia melanoxylon</i> , Rough-barked Apple <i>Angophora floribunda</i> , Cherry Ballart <i>Exocarpus cupressiformis</i> and a number of eucalypt species. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls. For example in southern NSW, Ringtail Possum make up the bulk of prey in the lowland or coastal habitat. At higher elevations, such as the tableland forests, the Greater Glider may constitute almost all of the prey for a pair of Powerful Owls. Flying foxes are important prey in some areas; birds comprise about 10-50% of the diet depending on the availability of preferred mammals. As most prey species require hollows and a shrub layer, these are important habitat components for the owl. Pairs of Powerful Owls demonstrate high fidelity to a large territory, the size of which varies with habitat quality and thus prey densities. In good habitats a mere 400 can support a pair; where hollow trees and prey have been depleted the owls need up to 4000 ha. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense grove of trees that provide concealment from other birds that harass him. Powerful Owls are monogamous and mate for life. Nesting occurs from late autumn to mid-winter, but is slightly earlier in north-eastern NSW (late summer - mid autumn). Clutches consist of two dull white eggs and incubation lasts approximately 38 days.	Low
<i>Tyto novaehollandiae</i>	Masked Owl		V		Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	Moderate

<i>Anthochaera phrygia</i>	Regent Honeyeater		CE	CE	<p>The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast. In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important. For example the Lower Hunter Spotted Gum forests have recently been demonstrated to support regular breeding events. Flowering of associated species such as Thin-leaved Stringybark Eucalyptus eugenioides and other Stringybark species, and Broad-leaved Ironbark E. fibrosa can also contribute important nectar flows at times. Nectar and fruit from the mistletoes Amyema miquelii, A. pendula and A. cambagei are also utilised. When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings. Colour-banding of Regent Honeyeater has shown that the species can undertake large-scale nomadic movements in the order of hundreds of kilometres. However, the exact nature of these movements is still poorly understood. It is likely that movements are dependent on spatial and temporal flowering and other resource patterns. To successfully manage the recovery of this species a full understanding of the habitats used in the non-breeding season is critical. There are three known key breeding areas, two of them in NSW - Capertee Valley and Bundarra-Barraba regions. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria. An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female. Two or three eggs are laid and incubated by the female for 14 days. Nestlings are brooded and fed by both</p>	Moderate
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Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Calyptrorhynchus lathamii lathamii</i>	Glossy Black-Cockatoo		V	V	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (<i>Allocasuarina littoralis</i>) and Forest Sheoak (<i>A. torulosa</i>) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, <i>Allocasuarina diminuta</i> , and <i>A. gymnathera</i> . Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (<i>Casuarina cristata</i>). Feeds almost exclusively on the seeds of several species of she-oak (<i>Casuarina</i> and <i>Allocasuarina</i> species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May.	Low
<i>Aphelocephala leucopsis</i>	Southern Whiteface		V	V	Dry open forests and woodland and inland scrubs of mallee, mulga and saltbush are the preferred habitat of Southern Whiteface, especially areas with fallen timber or dead trees and stumps.	Low
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow		V		The Dusky Woodswallow is found in open forests and woodlands, and may be seen along roadsides and on golf courses	Moderate
<i>Botaurus poiciloptilus</i>	Australasian Bittern		E	E	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (<i>Typha</i> spp.) and spikerushes (<i>Eleocharis</i> spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch.	Low
<i>Burhinus grallarius</i>	Bush Stone-curlew		E		Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch. Two eggs are laid in spring and early summer.	Low
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper			M	Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation.	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Calidris ferruginea</i>	Curlew Sandpiper		E	CE, M	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Curlew Sandpipers are omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds. Birds breed at 2 years of age and the oldest recorded bird is 19 years old. Most birds caught in Australia are between 3 and 5 years old.	Low
<i>Circus assimilis</i>	Spotted Harrier		V		Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. Preys on terrestrial mammals (e.g. bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion.	Low
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)		V		Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (<i>Eucalyptus camaldulensis</i>) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)		V		Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (<i>Eucalyptus camaldulensis</i>) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	Low
<i>Cuculus optatus</i>	Oriental Cuckoo			M	Mainly inhabits forests, occurring in coniferous, deciduous and mixed forest.	Low
<i>Daphoenositta chrysoptera</i>	Varied Sittella		V		Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticated bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years. Generation length is estimated to be 5 years.	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Erythroriorchis radiatus</i>	Red Goshawk		CE	V	<p>Red Goshawks inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands.</p> <p>In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers. Adults appear to occupy territories throughout the year and breeding territories are traditionally used from year to year. Adults have large home-ranges, estimated in the Northern Territory to be as great as about 120 km² for females and 200 km² for males. Red Goshawks mainly eat medium to large birds, including species as large as Australian Brush-turkeys, Kookaburras, Tawny Frogmouths, Sulphur-crested Cockatoos and Rainbow Lorikeets, but they also take mammals, reptiles and insects. Red Goshawks usually hunt from concealed or, less often, exposed perches, but also fly close above or through forest or woodland searching for prey. They often hunt from perches early in the morning and late in the day and tend to hunt more on the wing at other times of the day. The breeding behaviour of Red Goshawks is not well known. Breeding is likely to be in spring and summer in southern Queensland and NSW. The birds lay clutches of 1-2 eggs between July and September, in a stick nest in a tall tree (>20 m tall) within 1 km of a watercourse or wetland. Young fledge around November and December.</p> <p>In winter in eastern Australia, the birds appear to move from nesting sites in the ranges to coastal plains, where they are associated with permanent wetlands. The age at which Red Goshawks first breed is not known, nor is the life expectancy. Young remain with their parents for at least 70-80 days after they leave the nest and may remain with their parents for 4-5 months.</p>	Low
<i>Falco hypoleucos</i>	Grey Falcon		E		<p>Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid.</p>	Moderate

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Falco subniger</i>	Black Falcon		V		Core habitat is semi-arid and arid interior; uses tree-lined watercourses, isolated stands of trees and hunts over low vegetation of surrounding plains, grasslands, saltbush and blue-bus. Also hunts over wetlands and temporary waters or bore drains in arid regions	Moderate
<i>Gallinago hardwickii</i>	Latham's Snipe			M	Soft wet ground, shallow water with tussocks, inundated parts of paddocks, seepage below dams, saltmarsh and mangrove fringes	Low
<i>Grantiella picta</i>	Painted Honeyeater		V	V	Inhabits Boree/ Weeping Myall (<i>Acacia pendula</i>), Brigalow (<i>A. harpophylla</i>) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus <i>Amyema</i> . Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	Moderate
<i>Hieraaetus morphnoides</i>	Little Eagle		V		Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	Moderate
<i>Hirundapus caudacutus</i>	White-throated Needletail			M	Aerial space over a variety of habitat types, but prefers to forage over treed habitats as these would provide a greater abundance of insect prey; often forage on the edge of low pressure systems and may follow these systems ; breeds in Asia.	Moderate
<i>Lathamus discolor</i>	Swift Parrot		E	CE	In NSW mostly occurs on the coast and south west slopes, occurring in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany (<i>Eucalyptus robusta</i>), Spotted Gum (<i>Corymbia maculata</i>), Red Bloodwood (<i>C. gummifera</i>), Mugga Ironbark (<i>E. sideroxylon</i>), and White Box (<i>E. albens</i>).	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)		V		Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season. May breed any time between July and November, often rearing several broods. The nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1 m to 5 m above the ground. The nest is defended by both sexes with displays of injury-feigning, tumbling across the ground. A clutch of two to three is laid and incubated for fourteen days by the female. Two females often cooperate in brooding.	Low
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)		V		Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (<i>Eucalyptus sideroxylon</i>), White Box (<i>E. albens</i>), Inland Grey Box (<i>E. microcarpa</i>), Yellow Box (<i>E. melliodora</i>), Blakely's Red Gum (<i>E. blakelyi</i>) and Forest Red Gum (<i>E. tereticornis</i>). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. A gregarious species usually seen in pairs and small groups of up to 12 birds. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares. Moves quickly from tree to tree, foraging rapidly along outer twigs, underside of branches and trunks, probing for insects. Nectar is taken from flowers, and honeydew is gleaned from foliage. Breeds solitarily or co-operatively, with up to five or six adults, from June to December. The nest is placed high in the crown of a tree, in the uppermost lateral branches, hidden by foliage. It is a compact, suspended, cup-shaped nest. Two or three eggs are laid and both parents and occasionally helpers feed the young.	Moderate

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Neophema chrysostoma</i>	Blue-winged Parrot		V	V	Blue-winged parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zone. The species can also be seen in altered environments such as airfields, golf-courses and paddocks. Pairs or small parties of blue-winged parrots forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs	Low
<i>Parvipsitta pusilla</i>	Little Lorikeet		V		Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards. Gregarious, travelling and feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed and may have been the norm in past centuries. Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2-15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like Allocasuarina. Nesting season extends from May to September. In years when flowering is prolific, Little Lorikeet pairs can breed twice, producing 3-4 young per attempt. However, the survival rate of fledglings is unknown.	Moderate

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Pyrrholaemus sagittatus</i>	Speckled Warbler		V		The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. A side entrance allows the bird to walk directly inside. A clutch of 3-4 eggs is laid, between August and January, and both parents feed the nestlings. The eggs are a glossy red-brown, giving rise to the unusual folk names Blood Tit and Chocolate bird. Some cooperative breeding occurs. The species may act as host to the Black-eared Cuckoo. Speckled Warblers often join mixed species feeding flocks in winter, with other species such as Yellow-rumped, Buff-rumped, Brown and Striated Thornbills.	Low
<i>Rostratula australis</i>	Painted Snipe (Australian subspecies)		E	E, M	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally occurs from September to December. Incubation and care of young is all undertaken by the male only. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Stagonopleura guttata</i>	Diamond Firetail		V		Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). Usually encountered in flocks of between 5 to 40 birds, occasionally more. Groups separate into small colonies to breed, between August and January. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting. Appears to be sedentary, though some populations move locally, especially those in the south. Has been recorded in some towns and near farm houses.	Moderate
<i>Tringa nebularia</i>	Common Greenshank			M	Mudflats, estuaries, saltmarsh, margins of wetlands	Low
<i>Euastacus simplex</i>	Simple Crayfish			E	The simple crayfish may occupy burrows along the stream edge at or below water level, but also occupies temporary refuges such as under logs or rocks. The species has been collected from a range of streams (small and medium sized), both in vegetated (dry sclerophyll forest and heath) and areas cleared for pasture. It is unclear if the species requires permanent water, but it reportedly occupies waterlogged, seepage areas.	Low
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat		V	V	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (<i>Petrochelidon ariel</i>), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy. Likely to hibernate through the coolest months. It is uncertain whether mating occurs early in winter or in spring.	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Dasyurus maculatus maculatus</i> (SE mainland population)	Spotted-tailed Quoll		V	E	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites. Mostly nocturnal, although will hunt during the day; spend most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds.	Low
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle		V		Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. Hibernates in winter. Females are pregnant in late spring to early summer.	Low
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat		V		Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Hunt in forested areas, catching moths and other flying insects above the tree tops.	Moderate
<i>Petaurus australis australis</i>	Yellow-bellied Glider		V	V	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive V-shaped scar. Live in small family groups of two - six individuals and are nocturnal. Den, often in family groups, in hollows of large trees. Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources.	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Petaurus norfolcensis</i>	Squirrel Glider		V		Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Live in family groups of a single adult male one or more adult females and offspring. Require abundant tree hollows for refuge and nest sites. Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.	Low
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby		E	V	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night. Highly territorial and have strong site fidelity with an average home range size of about 15 ha. Live in family groups of 2 to 5 adults and usually one or two juvenile and sub-adult individuals. Dominant males associate and breed with up to four females. Breeding is likely to be continuous, at least in the southern populations, with no apparent seasonal trends in births.	Low
<i>Phascolarctos cinereus</i> (combined populations of Qld, NSW and the ACT)	Koala		E	E	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Females breed at two years of age and produce one young per year.	Low
<i>Pseudomys novaehollandiae</i>	New Holland Mouse			V	Inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. Nest in burrows and have a preference for deeper top soils and softer substrates to aid digging. Spends considerable time foraging above-ground for food in areas of high floristic diversity.	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox		V	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. Feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops.	Low
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat		V		Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.	Low
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard		V	V	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (<i>Themeda australis</i>). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites. Feeds on the larvae and eggs of the ants with which it shares its burrows. It is thought that this species lays 2 eggs inside the ant nests during summer; the young first appear in March.	Low
<i>Saltuarius moritzi</i>	Leaf-Tailed Gecko				Occurs in rainforest, wet sclerophyll forest, gorges and along wetter drainage lines in dry sclerophyll forests. Occasionally uses rock outcrops and boulders to forage but is most frequently observed on larger trees and fallen logs that contain crevices and hollows in which it	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Arthraxon hispidus</i>	Hairy Jointgrass		V	V	Moisture and shade-loving grass, found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps.	Low
<i>Bertya</i> sp. Clouds Creek (M.Fatemi 4)	Clouds Creek Bertya		E		The species typically occurs within heath or low shrubland vegetation surrounded by stunted eucalypts at altitudes from 300-1000 m above sea level. Grows on steep, rocky slopes in shallow soil. The parent material is either granitic or metasedimentary. Flowers slightly later than Bertya opposens (after August) and are still in seed-set around January and February. The Gibraltar Range habitat is recorded as a ridge crest immediately above the cliff, with Eucalyptus campanulata, Eucalyptus notabilis and Allocasuarina littoralis woodland.	Low
<i>Callistemon pungens</i>	Prickly Bottlebrush				Habitats range from riparian areas dominated by Casuarina cunninghamiana subsp. cunninghamiana to woodland and rocky shrubland. Often in rocky watercourses, usually with sandy granite (occasionally basalt) creek beds. Flowers over spring and summer, mostly in November.	Moderate
<i>Dichanthium setosum</i>	Bluegrass		V	V	Flowering time is mostly in summer. Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched). It is open to question whether the species tolerates or is promoted by a certain amount of disturbance, or whether this is indicative of the threatening processes behind its depleted habitat. Associated species include Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa, Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchus squamatus, Lomandra aff. longifolia, Ajuga australis, Calotis hispidula and Austrodanthonia, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia and Psoralea species. Locally common or found as scattered clumps in broader populations. The extensive distribution and wide environmental tolerances make predictions about suitable habitat difficult.	Moderate
<i>Diuris eborensis</i>	Ebor Goat Orchid		E		Grassy woodland. Damp grassland. Sedge-swamp of the tablelands	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Eucalyptus mckieana</i>	McKie's Stringybark		V	V	Flowers are white, with a flowering period of March to May. The species is remarkable for its very narrow and numerous sucker leaves, the narrowest of all the stringybarks and which persist to a height of 2 to 4 m. <i>Eucalyptus mckieana</i> is found in grassy open forest or woodland on poor sandy loams, most commonly on gently sloping or flat sites. Associated species at Northern Tablelands sites include <i>Angophora floribunda</i> , <i>Eucalyptus amplifolia</i> , <i>Eucalyptus andrewsii</i> , <i>Eucalyptus bridgesiana</i> , <i>Eucalyptus youmanii</i> , <i>Eucalyptus nicholii</i> , <i>Eucalyptus blakelyi</i> and <i>Eucalyptus conica</i> , and at North Western Slopes sites <i>Eucalyptus andrewsii</i> , <i>Eucalyptus stannicola</i> , <i>Eucalyptus prava</i> and <i>Angophora floribunda</i> . Resprouts from epicormic buds after fire. McKie's Stringybark is locally abundant, forming in places a moderately dense forest in association with other local trees. A single population of 33 plants is known from Torrington State Conservation Area. Plants have also been recorded in populations with abundances of locally common to locally abundant	Moderate
<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint		V	V	Typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock. Seedling recruitment is common, even in disturbed soils, if protected from grazing and fire. Tends to grow on lower slopes in the landscape.	Moderate
<i>Eucalyptus rubida</i> subsp. <i>barbigerorum</i>	Blackbutt Candlebark		V	V	Grassy woodland on medium or high fertility soils. Often on cold flats.	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Euphrasia arguta</i>	Eyebright		CE	CE	Historic records of the species noted the following habitats: 'in the open forest country around Bathurst in sub humid places', 'on the grassy country near Bathurst', and 'in meadows near rivers'. Plants from the Nundle area have been reported from eucalypt forest with a mixed grass and shrub understorey; here, plants were most dense in an open disturbed area and along the roadside, indicating the species had regenerated following disturbance. The number of plants at a given site may vary over time depending on the season and disturbance history. Near Nundle, local populations had apparently declined at sites that had been disturbed twice within three years, in contrast with sites that were disturbed only once. <i>Euphrasia arguta</i> has an annual habit and has been observed to die off over the winter months, with active growth and flowering occurring between January and April. As with other species of <i>Euphrasia</i> , this species is semi-parasitic and attaches to the roots of other associated plants.	Low
<i>Haloragis exalata</i> subsp. <i>velutina</i>	Tall Velvet Sea-berry		V	V	Grows in damp places near watercourses. This subspecies also occurs in woodland on the steep rocky slopes of gorges.	Low
<i>Lepidium hyssopifolium</i>	Aromatic Peppergrass		E	E	The species occurs in a variety of habitats including woodland with a grassy understorey and grassland. Appears to respond to disturbance, having appeared after soil disturbance at one site. Its cryptic and non-descript nature (appearing like several weed species) makes it hard to detect.	Moderate
<i>Picris evae</i>	Hawkweed		V	V	Where collected, the species abundance has been rare, locally occasional and locally frequent. All recent collections appear to come from modified habitats such as weedy roadside vegetation and paddocks. Its main habitat is open Eucalypt forest including a canopy of <i>Eucalyptus melliodora</i> , <i>E. crebra</i> , <i>E. populnea</i> , <i>E. albens</i> , <i>Angophora subvelutina</i> , <i>Allocasuarina torulosa</i> , and/or <i>Casuarina cunninghamiana</i> with a <i>Dichanthium</i> grassy understorey. Soils are black, dark grey or red-brown (specified as shallow, stony soil over basalt for one collection) and reddish clay-loam or medium clay soils. The flowering and fruiting period is mainly October to January, with a few plants collected in flower or fruit until May.	Low
<i>Pterostylis metcalfei</i>	Metcalfe's Greenhood		E		Grows in gently sloping, moist depressions or gullies in tall eucalypt forest, often with a shrubby or Snowgrass understorey, on rich loam soils on basalt or granite. Climate is cool and wet.	Low

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat	Likelihood of occurrence
<i>Thesium australe</i>	Austral Toadflax		V	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (<i>Themeda australis</i>). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.	Low

Notes:

1. CE = Critically Endangered, E = Endangered, V = Vulnerable, M = Migratory

Appendix D Aboriginal Archaeological Due Diligence Assessment

25 November 2025

Jake Ingle
Environmental Planner
Transgrid
180 Thomas Street,
Sydney,
NSW, 2000

Dear Jake,

Re: Aboriginal Archaeological Due Diligence Assessment – Armidale synchronous condenser

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) has been engaged by Transgrid to undertake an Aboriginal archaeological due diligence assessment for the proposed installation and operation of two synchronous condensers (syncons) at Transgrid's existing Armidale 330 kV substation (hereafter the 'proposed activity') (refer to Figure 1). The Armidale 330 kV substation is located off Waterfall Way, in the suburb of Armidale and the Armidale Region Local Government Area (LGA), New South Wales (NSW).

The purpose of this assessment is to identify potential impacts to Aboriginal heritage values as a result of the proposed activity and to provide Transgrid with appropriate management advice. This assessment will be used to support the Summary Environmental Report (SER) being prepared for the proposed activity. The contents of this letter report have been compiled with reference to Heritage NSW's *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW 2010* (DECCW, 2010a).

1.1 Proposed activity

The proposed activity involves the installation and operation of two syncons and associated infrastructure at the existing Armidale 330 kV substation.

The scope of works would include:

- Site establishment activities, including installation of construction offices and amenities, equipment storage and construction laydown areas and vegetation removal
- Construction of a new access road from Eathorpe Road and upgrades to Eathorpe Road to support the transport of equipment and vehicle movements to and from site
- Demolition of redundant infrastructure including a storage shed and boundary fencing
- Installation of a new bench (concrete slab, foundations and associated earthworks), with an indicative maximum footprint of around 130 by 150 metres, immediately south of the existing Armidale 330 kV substation to house the syncons and associated infrastructure
- 330 kV busbar extension with a new switch bay, which comprises a 330 kV circuit breaker, disconnecter, capacitive voltage transformer, current transformer, earth switch, post insulators/busbar supports and surge arrester
- Installation of the new syncons and associated equipment, including:
 - Power transformer with firewalls
 - Auxiliary transformers
 - Syncon building and gantry crane
 - Oil lubrication and water-cooling systems
 - Control room and battery room
 - Low voltage AC and DC systems

- Protection and control systems
- Backup diesel generator
- Pony motor
- Installation of a new demountable secondary systems building
- Installation of new spill oil tank, secondary containment dam(s), and drainage systems to cater for the new transformers, diesel generator and the syncon oil lubrication system
- Extension of the substation's stormwater drainage system, to cater for the new bench area
- Installation of new lighting protection masts
- Rehabilitation of the site including:
 - Removal of temporary construction facilities and equipment
 - Excavated material not reused on-site and waste materials would be disposed of at an appropriately licensed waste facility or as directed by Transgrid's environmental business partner in accordance with Transgrid's Waste Management of Spoil Work Instruction
 - Disturbed areas not required for the operation of the syncons or the existing Armidale 330 kV substation will be rehabilitated to as close to pre-construction conditions as possible.

The area where ground surface impacts are required as part of the proposed activity are referred to as the 'proposed impact area' (refer to Figure 1) with this area forming the focus of this Aboriginal archaeological due diligence assessment.

The proposed impact area is an indicative maximum footprint in which the construction and operation of the syncons would be carried out. The impact area also includes areas within the substation boundary that are required to facilitate connection to the proposed syncons, as well as a portion of Eathorpe Road which requires upgrades to support the transport of equipment to site.

Further details of the scope of works for the proposed activity are presented in Section 2 of the SER (AECOM, 2025).

2.0 Methodology

2.1 Assessment objectives

The overarching objectives of this Aboriginal archaeological due diligence assessment are to:

- Identify the Aboriginal cultural heritage values of the proposed impact area using a combination of desktop research and site inspection
- Provide Transgrid with information that would allow the proposed activity, where possible, to avoid impacts to known and potential Aboriginal cultural values
- Provide appropriate management strategies for the identified Aboriginal heritage values of the proposed impact area that cannot be avoided, as appropriate.

2.2 Methodology overview

This Aboriginal archaeological due diligence assessment was completed with reference to Heritage NSW's *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW 2010* (DECCW, 2010a).

Accordingly, the following key steps were undertaken for the assessment:

- Completion of a desktop-based landscape review of the proposed impact area, assessing landscape variables (e.g. landform, stream order, slope and disturbance) to determine archaeological sensitivity
- Review of existing Aboriginal Heritage Information Management System (AHIMS) data for land within and surrounding the proposed impact area, obtained from Heritage NSW on 6 May 2025
- Review of the findings of past Aboriginal heritage investigations relevant to the Armidale 330 kV substation

- Completion of a visual inspection of the proposed impact area
- Provision of appropriate management advice to Transgrid in the form of this letter report.

2.3 Assessment limitations

This Aboriginal archaeological due diligence assessment has the following limitations:

- Previously recorded Aboriginal sites within the region of the proposed impact area have been identified and reviewed in this assessment. AECOM has relied on the reports from second parties to complete reviews and has not sought to independently verify the results and interpretations in these reports
- Predictions have been made about the probability of subsurface archaeological materials occurring within the proposed impact area, based on surface indications and environmental contexts. However, it is possible that materials may occur in any landscape context

3.0 Relevant legislation and policy

3.1 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act), administered by Heritage NSW, is the primary legislation for the protection of Aboriginal cultural heritage in NSW. The NPW Act gives the Secretary of the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) responsibility for the proper care, preservation and protection of 'Aboriginal objects' and 'Aboriginal places', defined under the NPW Act as follows:

- An *Aboriginal object* is any deposit, object or material evidence (that is not a handicraft made for sale) relating to the Aboriginal habitation of NSW, before or during the occupation of that area by persons of non-Aboriginal extraction (and includes Aboriginal remains)
- An *Aboriginal place* is a place declared so by the Minister administering the NPW Act because the place is or was of special significance to Aboriginal culture. It may or may not contain Aboriginal objects.

Part 6 of the NPW Act provides specific protection for Aboriginal objects and places by making it an offence to harm them and includes a 'strict liability offence' for such harm. A 'strict liability offence' does not require someone to know that it is an Aboriginal object or place they are causing harm to in order to be prosecuted. Defences against the 'strict liability offence' in the NPW Act include the carrying out of certain 'Low Impact Activities', prescribed in Clause 80B of the *National Parks and Wildlife Amendment Regulation 2010* (NPW Regulation), and the demonstration of due diligence.

An Aboriginal Heritage Impact Permit (AHIP) issued under Section 90 of the NPW Act is required if impacts to Aboriginal objects and/or places cannot be avoided. An AHIP is a defence to prosecution for harming Aboriginal objects and places if the harm was authorised by the AHIP and the conditions of that AHIP were not contravened.

Applications for an AHIP must be accompanied by assessment reports compiled in accordance with the *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010b). Applications must also provide evidence of consultation with Registered Aboriginal Parties (RAPs). Consultation is required under Part 8A of the NPW Regulation and is to be conducted in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010c). AHIPs may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or persons.

Section 89A of the NPW Act requires notification of the location of Aboriginal sites within a reasonable time, with penalties for non-notification. Section 89A is binding in all instances. An AHIP is only required if impacts will occur to Aboriginal objects and/or place.

3.2 Native Title

A search of the National Native Title Tribunal's online mapping tool 'Native Title Vision', the National Native Title Register and Register of Native Title Claims relevant to the proposed activity was

undertaken on 12 June 2025. These searches returned no registered native title claims, determinations or relevant Indigenous Land Use Agreements with the proposed impact area.

Figure 1 Proposed impact area



4.0 Landscape context

Consideration of the landscape context of the proposed impact area is predicated on the well-established proposition that the nature and distribution of Aboriginal archaeological materials are closely connected to the environments in which they occur. Environmental variables such as topography, geology, hydrology and the composition of local floral and faunal communities will have played an important role in influencing how Aboriginal people moved within and utilised their respective Country. Amongst other things, these variables will have affected the availability of suitable campsites, drinking water, economic¹ plant and animal resources, and raw materials for the production of stone and organic implements. At the same time, an assessment of historical and contemporary land use activities, as well as geomorphic processes such as soil erosion and aggradation, is critical to understanding the formation and integrity of archaeological deposits, as well as any assessments of subsurface archaeological potential.

The proposed impact area's landscape context information is provided in Table 1.

Table 1 Review of landscape context of the proposed impact area

Environmental variable	Key observations
Topography	<p>Topographically, the proposed impact area falls within the New England Tablelands physiographic region, as defined by King's (2009). This region is characterised by an elevated plateau dissected by valleys and drainage lines, with undulating to hilly terrain</p> <p>Specifically, the proposed impact area consists of a lower slope and valley flat associated with a series of low hills and ridges located to the south and east of the proposed impact area. Elevations within the proposed impact area range from 974 m Australian High Datum (AHD) in the northeast, near Waterfall Way, to 984 m AHD in the south, associated with the ridgeline's lower slope providing a total relief of 10 m across the proposed impact area. Slope/gradient varies from level (0-1%), very gently inclined (1-3%) to gently inclined (3-10%).</p>
Hydrology	<p>The proposed impact area is located within the Macdonald River catchment, which is part of the Namoi River system. No watercourses are mapped directly within the proposed impact area, with the closest watercourse, a 1st order tributary of Commissioners Waters, located approximately 100 m to the north. Commissioners Waters rises at the confluence of Dumaresq Creek and Tilbuster Ponds, approximately 4 km east of Armidale and flows southeast for approximately 19 km before merging with the Gara River.</p> <p>Existing archaeological survey data for eastern Australia indicate a strong trend for the presence of open artefact sites along watercourses, specifically, on creek banks and 'flats' (i.e., flood/drainage plains), terraces and bordering lower slopes (Kohen 1986). Although this distribution pattern can be attributed in part to geomorphic dynamics and archaeological sampling bias, with extensive fluvial erosion activity along watercourses resulting in higher levels of surface visibility and, by extension, concentrated survey effort, an occupational emphasis on watercourses is supported by the results of numerous subsurface investigations (e.g., AECOM 2013b, 2015; AMBS 2000; Craib et al. 1999; GML 2012; Jo McDonald CHM 2001, 2003, 2005a, 2006a, 2006b, 2007, 2009a, 2009b). Collectively, these investigations have demonstrated that assemblage size and complexity tend to vary significantly in relation to stream order and landform, with larger, more complex assemblages concentrated on elevated, low gradient landform elements adjacent to higher order watercourses (≥3rd order). Outside of these contexts, surface and subsurface artefact distributions have typically been found to be sparse and discontinuous and are often referred to as 'background scatter'.</p>

Environmental variable	Key observations
Geology	Reference to the 1:250,000 Dorrigo – Coffs Harbour Geological Map Sheet (SH 56-10) indicates that the near surface geology within the proposed impact area consists of Permian aged Sandon Beds comprising greywacke, argillite, chert, jasper and basic volcanics.
Soils	Soils within the proposed impact area have been mapped by King (2009) as belonging to the erosional Middle Earth (me) Soil Landscape. Soils of the Middle Earth soil landscape are formed on Sandon Beds geologies, with dominant soil materials comprising dull yellowish brown sandy clay loam A horizons. B horizons consist of mottled ferromanganiferous medium clay. A horizon pH levels range from moderately acid (pH 5.5) to neutral (pH 7.0), depending on slope position and vegetation cover.
Flora	Native vegetation within the proposed impact area has been extensively modified due to historical land use activities, particularly the construction of the substation. With the exception of a planted tree screen along Waterfall Way and Eathorpe Road, and a few isolated paddock trees, most vegetation was cleared from the site prior to 1956 for agricultural purposes. The area now consists of regrowth vegetation and a mixture of native and non-native grasses, along with exotic weeds
Land disturbance	Known past land use disturbances within the proposed impact area have included native vegetation clearance, levelling for constructing the substation, access track and road construction, erosion, and localised earthworks. Section 5.0 provides detail on historical land disturbances within the proposed impact area.

5.0 Historical land use

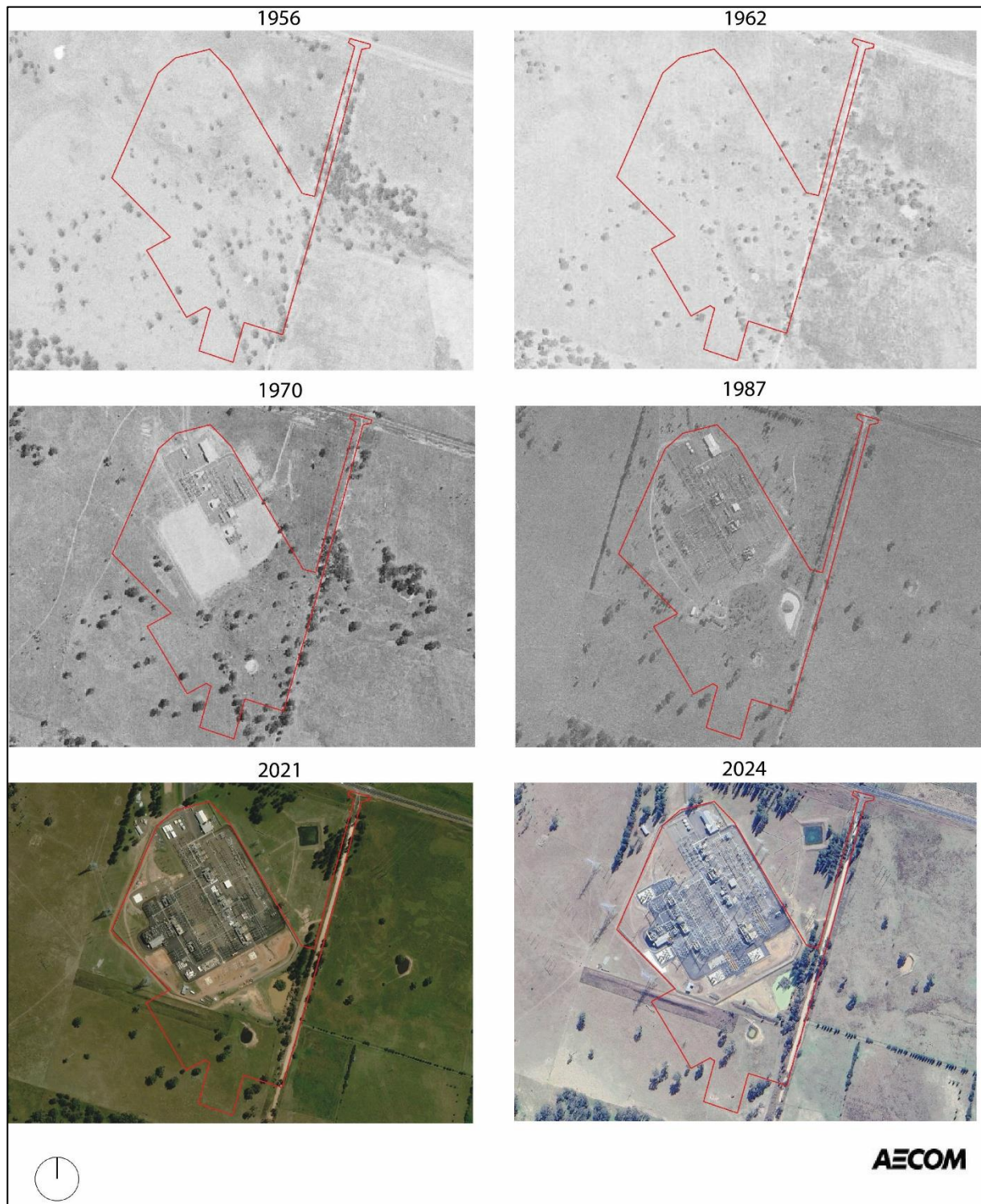
A review of historic aerials for the proposed impact area dated to 1956, 1962, 1970, 1987 and 2021 (refer to Figure 2) indicate a range of activities and associated ground surface impacts within and surrounding the proposed impact area. These include:

- Near complete vegetation of the proposed impact area site prior to 1956
- Grazing, fencing and dam construction prior to 1962
- Additional clearing and levelling bulk earthworks associated with the construction of the substation in 1970 and various access tracks
- Planting of tree screens in the 1980s along Waterfall Way and Eathorpe Road
- Construction of access tracks and roads
- Ground disturbances associated with the construction of new capacitor banks in 2021.

To varying degrees, all of the above-cited land use activities and associated ground surface impacts are relevant to the survival, integrity and identification of Aboriginal archaeological evidence within the proposed impact area. Overall, all land within the proposed impact area is considered to be moderately disturbed. Vegetation clearance and impacts associated with construction of the substation have actively disturbed land across the proposed impact area.

Key implications for the current assessment include the disturbance of pre-existing archaeological deposits (if present), both surface and subsurface, through direct (e.g., earthworks) and indirect means, resulting in a loss of archaeological integrity and a significantly reduced likelihood for the presence of culturally scarred trees.

Figure 2 Historical aerial photographs of the proposed impact area in red (Source: NSW Spatial Collaboration Portal 2025)



6.0 AHIMS Database

The AHIMS database, administered by Heritage NSW, contains records of all Aboriginal objects reported to the Director General of the Department of Premier and Cabinet in accordance with Section 89A of the NPW Act. It also contains information about Aboriginal places, which have been declared by the Minister to have special significance with respect to Aboriginal culture. Previously recorded Aboriginal objects and declared Aboriginal places are known as 'Aboriginal sites'.

A search of the AHIMS database for a 2 x 2 km area surrounding the proposed impact area (i.e., the 'search area') was undertaken on 6 May 2025. A total of six Aboriginal archaeological sites were identified within the search area, all of which comprised open artefact sites (i.e., isolated artefacts and artefact scatters). Consideration of the location of previously recorded sites indicates that no sites are located within the proposed impact area with the closest site, [REDACTED]

7.0 Previous Aboriginal heritage investigations

The Aboriginal archaeology of the Armidale LGA is well researched, having been the subject of numerous Aboriginal archaeological investigations since the 1980s. Notable investigations to date have included surveys by Apex Archaeology (2018), Appleton (1990a, 1990b, 1991, 1995, 2009), Appleton & Beck (1990), Fife (1995), OzArk Environmental & Heritage Pty Ltd (2023), Piper (1989), Remnant Archaeology (2017, 2019b, 2019a, 2016) and Sutton (1988).

Key observations drawn from a review of the local and regional archaeological context of the proposed impact area are as follows:

- Artefact scatters and isolated finds – collectively referred to as open artefact sites – are the most common site types within the region. Recorded stone artefact assemblages consist principally of flake and non-flake debitage (i.e., flakes [complete and broken], flake shatter fragments and flaked pieces), with cores, retouched tools and groundstone implements comparatively poorly represented
- Existing archaeological survey data for the area indicate a strong trend for the presence of open artefact sites along watercourses, specifically, on creek banks and 'flats' (i.e., flood/drainage plains), terraces and bordering lower slopes
- Silcrete and quartz were the dominant raw materials for flaked stone artefact production, with silcrete artefacts typically exhibiting evidence of deliberate thermal alteration
- Modified trees (carved or scarred), are the second most common site type in the local area
- Other, comparatively rare site types include ceremonial rings, quarries (stone and ochre), stone arrangements and waterholes
- Stone artefacts can occur within any landform element, both in surface and subsurface contexts, with larger and more complex deposits occurring in association with higher order creeklines and estuarine environments
- No Aboriginal archaeological sites have been previously identified within or directly adjacent to the proposed impact area.

8.0 Results

In accordance with the methodology presented in Section 2.0, a desktop assessment was initially undertaken by AECOM to identify potential areas of archaeological sensitivity and previously identified Aboriginal sites within the proposed impact area. On the basis of available desktop data, AECOM recommended that a site inspection be undertaken due to the presence of a landscape feature of potential Aboriginal archaeologically sensitivity – the unnamed tributary of Commissioners Waters – within 200 m of the proposed impact area (refer to watercourse in Figure 1).

A visual inspection of the proposed impact area was completed on 7 May 2025 by AECOM Principal Heritage Specialist Geordie Oakes. The purpose of this inspection was to help establish whether the proposed works will, or are likely to, harm any Aboriginal objects/sites. During the visual inspection notes were taken regarding Ground Surface Visibility (GSV), Ground Integrity (GI, i.e., land condition), archaeological sensitivity and impact risk. Impact risk was determined based on archaeological sensitivity, as well as the nature of proposed activity-related impacts. Results of the inspection included the following:

- No Aboriginal objects, sites or places were identified within the proposed impact area during the inspection
- GSV across the proposed impact area was, in general, poor due to the presence of vegetation (grass) cover. Areas of enhanced visibility were associated with clearing, disturbance, access tracks and erosion
- Consistent with the examined aerial imagery, the visual inspection indicated that much of the land within the proposed impact area has been variously disturbed by historical land uses. Areas of high disturbance were noted directly adjacent to the substation and on access tracks and were assessed as having low GI, while the cleared grazing paddocks to the south of the substation were assessed as having moderate GI
- No areas of Aboriginal archaeological sensitivity or Potential Archaeological Deposit were identified within the proposed impact area.

9.0 Key findings

The key findings of this Aboriginal archaeological due diligence assessment are as follows:

- There are no AHIMS sites located within the proposed impact area
- No new Aboriginal objects/sites were identified during the site inspection
- The archaeological sensitivity of the proposed impact area was assessed as low based on landform variables and past disturbances
- The likelihood that the proposed activity would harm any Aboriginal objects/sites is considered low.

10.0 Recommendations

- On the basis of the above, Aboriginal heritage works or assessment are considered warranted for the proposed activity
- In the event that an Aboriginal site or object (artefact) (as defined by the NPW Act or *Heritage Act 1977*) is identified during the proposed activity, the works must cease at the location and no further harm to the object/site shall occur. The find must be immediately reported to Transgrid, and the regulator in accordance with legislation. No work must commence in the vicinity of the find until any required approvals have been given by the regulator. In the event that skeletal remains are encountered during the activity, works must stop immediately, the area secured to prevent unauthorised access, and NSW Police, Heritage NSW and Transgrid contacted.

Yours faithfully,



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Appendix A – AHIMS Search Results (Redacted)

Appendix E Noise and Vibration Impact Assessment

Armidale 330 kV Substation - new synchronous condenser

Noise and Vibration Impact Assessment

25-Nov-2025
Doc No. 60750224-RPNV-03_A

Armidale 330 kV Substation - new synchronous condenser

Noise and Vibration Impact Assessment

Client: Transgrid

ABN: 70 250 995 390

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Glossary of terms and abbreviations

Term	Definition																						
Sound power level	The total sound emitted by a source.																						
Sound pressure level	The amount of sound at a specified point.																						
Decibel [dB]	The measurement unit of sound.																						
A Weighted decibels [dB(A)]	The A weighting is a frequency filter applied to measured noise levels to represent how humans hear sounds. The A-weighting filter emphasises frequencies in the speech range (between 1 kHz and 4 kHz) which the human ear is most sensitive to, and places less emphasis on low frequencies at which the human ear is not so sensitive. When an overall sound level is A-weighted it is expressed in units of dB(A).																						
Decibel scale	<p>The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. A 3 dB(A) increase in the sound pressure level corresponds to a doubling in the sound energy. A 10 dB(A) increase in the sound pressure level corresponds to a perceived doubling in volume. Examples of decibel levels of common sounds are as follows:</p> <table> <tr><td>0 dB(A)</td><td>Threshold of human hearing</td></tr> <tr><td>30 dB(A)</td><td>A quiet country park</td></tr> <tr><td>40 dB(A)</td><td>Whisper in a library</td></tr> <tr><td>50 dB(A)</td><td>Open office space</td></tr> <tr><td>70 dB(A)</td><td>Inside a car on a freeway</td></tr> <tr><td>80 dB(A)</td><td>Outboard motor</td></tr> <tr><td>90 dB(A)</td><td>Heavy truck pass-by</td></tr> <tr><td>100 dB(A)</td><td>Jack hammer / subway train</td></tr> <tr><td>110 dB(A)</td><td>Rock concert</td></tr> <tr><td>115 dB(A)</td><td>Limit of sound permitted in industry</td></tr> <tr><td>120 dB(A)</td><td>747 take off at 250 metres.</td></tr> </table>	0 dB(A)	Threshold of human hearing	30 dB(A)	A quiet country park	40 dB(A)	Whisper in a library	50 dB(A)	Open office space	70 dB(A)	Inside a car on a freeway	80 dB(A)	Outboard motor	90 dB(A)	Heavy truck pass-by	100 dB(A)	Jack hammer / subway train	110 dB(A)	Rock concert	115 dB(A)	Limit of sound permitted in industry	120 dB(A)	747 take off at 250 metres.
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115 dB(A)	Limit of sound permitted in industry																						
120 dB(A)	747 take off at 250 metres.																						
Frequency [f]	The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high-pitched sound and a low frequency to a low pitched sound.																						
Equivalent continuous sound level [L _{eq}]	The constant sound level which, when occurring over the same period of time, would result in the receiver experiencing the same amount of sound energy.																						
Insertion loss	Difference in noise level at the receiver location before and after the installation of the noise-control treatment (e.g. barrier or enclosure).																						
L _{max}	The maximum sound pressure level measured over the measurement period.																						
L _{min}	The minimum sound pressure level measured over the measurement period.																						
L ₁₀	The sound pressure level exceeded for 10% of the measurement period. For 10% of the measurement period it was louder than the L ₁₀ .																						
L ₉₀	The sound pressure level exceeded for 90% of the measurement period. For 90% of the measurement period it was louder than the L ₉₀ .																						
Ambient noise	The all-encompassing noise at a point composed of sound from all sources near and far.																						

Term	Definition
Background noise	The underlying level of noise present in the ambient noise when extraneous noise (such as transient traffic and dogs barking) is removed. The L_{90} sound pressure level is used to quantify background noise.
Traffic noise	The total noise resulting from road traffic. The L_{eq} sound pressure level is used to quantify traffic noise.
Day	Construction noise: The period from 0700 to 1800 h Monday to Saturday and 0800 to 1800 h Sundays and Public Holidays. Road traffic noise: The period from 0700 to 2200 h every day of the week.
Evening	Construction noise: The period from 1800 to 2200 h Monday to Sunday and Public Holidays. Road traffic noise: Not applicable.
Night	Construction noise: The period from 2200 to 0700 h Monday to Saturday and 2200 to 0800 h Sundays and Public Holidays. Road traffic noise: The period from 2200 to 0700 h every day of the week.
Noise reduction coefficient (NRC)	NRC values are calculated from the average sound absorption coefficients measured at four frequencies: 250, 500, 1,000 and 2,000 Hz.
Standard construction hours	Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays and public holidays
Assessment background level [ABL]	The overall background level for each day, evening and night period for each day of the noise monitoring.
Rating background level [RBL]	The overall background level for each day, evening and night period for the entire length of noise monitoring.
Noise management level [NML]	The level which represents the point above which there may be some community reaction to noise.

1.0 Introduction

Transgrid is proposing to install two synchronous condensers (syncons) at the existing Armidale 330 kV substation site (the proposed activity). The proposed activity is part of Transgrid's broader initiative to ensure sufficient system strength services are available to maintain the stability of the New South Wales (NSW) power system and meet system strength requirements established by the Australian Energy Market Operator (AEMO) in their *2022 System Strength Report* (AEMO, 2022). The retirement of NSW's coal generators and the growth in inverter-based resources in the coming decade is driving an urgent need to add new sources of system strength to the power system.

AECOM Australia Pty Ltd (AECOM) has been commissioned by Transgrid to prepare a Summary Environmental Report (SER) to assess potential impacts from the proposed activity at the existing Armidale 330 kV substation. This noise and vibration impact assessment considers the potential noise and vibration impacts of the proposed activity on nearby receivers and will be used to support the SER. This report considers the construction, commissioning and operation of the proposed activity, and includes recommendations for managing potential noise and vibration impacts.

1.1 Proposed activity description

The proposed activity involves the installation and operation of two syncons and associated infrastructure at the existing Armidale 330 kV substation.

The scope of works would include:

- Site establishment activities, including installation of construction offices and amenities, equipment storage and construction laydown areas and vegetation removal
- Construction of a new access road and upgrades to Eathorpe Road to support the transport of equipment and vehicle movements to and from site
- Demolition of redundant infrastructure including a storage shed and boundary fencing
- Installation of a new bench (concrete slab, foundations and associated earthworks), with an indicative maximum footprint of around 130 by 150 metres (m), immediately south of the existing Armidale 330 kV substation to house the syncons and associated infrastructure
- 330 kV busbar extension with a new switch bay, which comprises a 330 kV circuit breaker, disconnecter, capacitive voltage transformer, current transformer, earth switch, post insulators/busbar supports and surge arrester
- Installation of the two new syncons and associated equipment, including:
 - Power transformer with firewalls
 - Auxiliary transformers
 - Syncon building and gantry crane
 - Oil lubrication and water-cooling systems
 - Control room and battery room
 - Low voltage AC and DC systems
 - Protection and control systems
 - Backup diesel generator
 - Pony motor
- Installation of a new demountable secondary systems building
- Installation of new spill oil tank, secondary containment dam(s) and drainage systems to cater for the new transformers, diesel generator and the syncon oil lubrication system
- Extension of the substation's stormwater drainage system, to cater for the new bench area

- Installation of new lighting protection masts
- Extension of the substation's stormwater drainage system, to cater for the new bench area
- Rehabilitation of the site including:
 - Removal of temporary construction facilities and equipment
 - Excavated material not reused on-site and waste materials would be disposed of at an appropriately licensed waste facility or as directed by Transgrid's environmental business partner in accordance with Transgrid's Waste Management of Spoil Work Instruction
 - Disturbed areas not required for the operation of the syncons or the existing Armidale 330 kV substation will be rehabilitated to as close to pre-construction conditions as possible.

Further details of the scope of works for the proposed activity are presented in Section 2 of the SER (AECOM, 2025).

1.2 Site description

The Armidale 330 kV substation is located within the Armidale Regional local government area (LGA) with the nearest major township being Armidale, situated around 4 kilometres (km) to the west. The substation is within Lots 1 and 2 of DP999496 and Lot 8 of DP112694, which is owned by the Electricity Transmission Ministerial Holding Corporation (ETMHC) and leased and managed by Transgrid (the substation site).

The substation site is located on land zoned as Infrastructure SP2. The substation is surrounded by land zoned as Primary Production Small Lots RU4. Land zoned as R2 Low Density Residential is located around 400 metres west of the substation site. The substation site is located in rural area surrounded by open paddocks. The closest residential receivers are located approximately 245 m to the south of the site as shown in Figure 2-1.

The proposed impact area is the maximum footprint in which the construction and operation of the syncons would be carried out, as defined in Section 2 of the SER. The study area for the noise and vibration impact assessment is defined as the proposed impact area (refer to Figure 1-1) with a 2 km buffer applied.

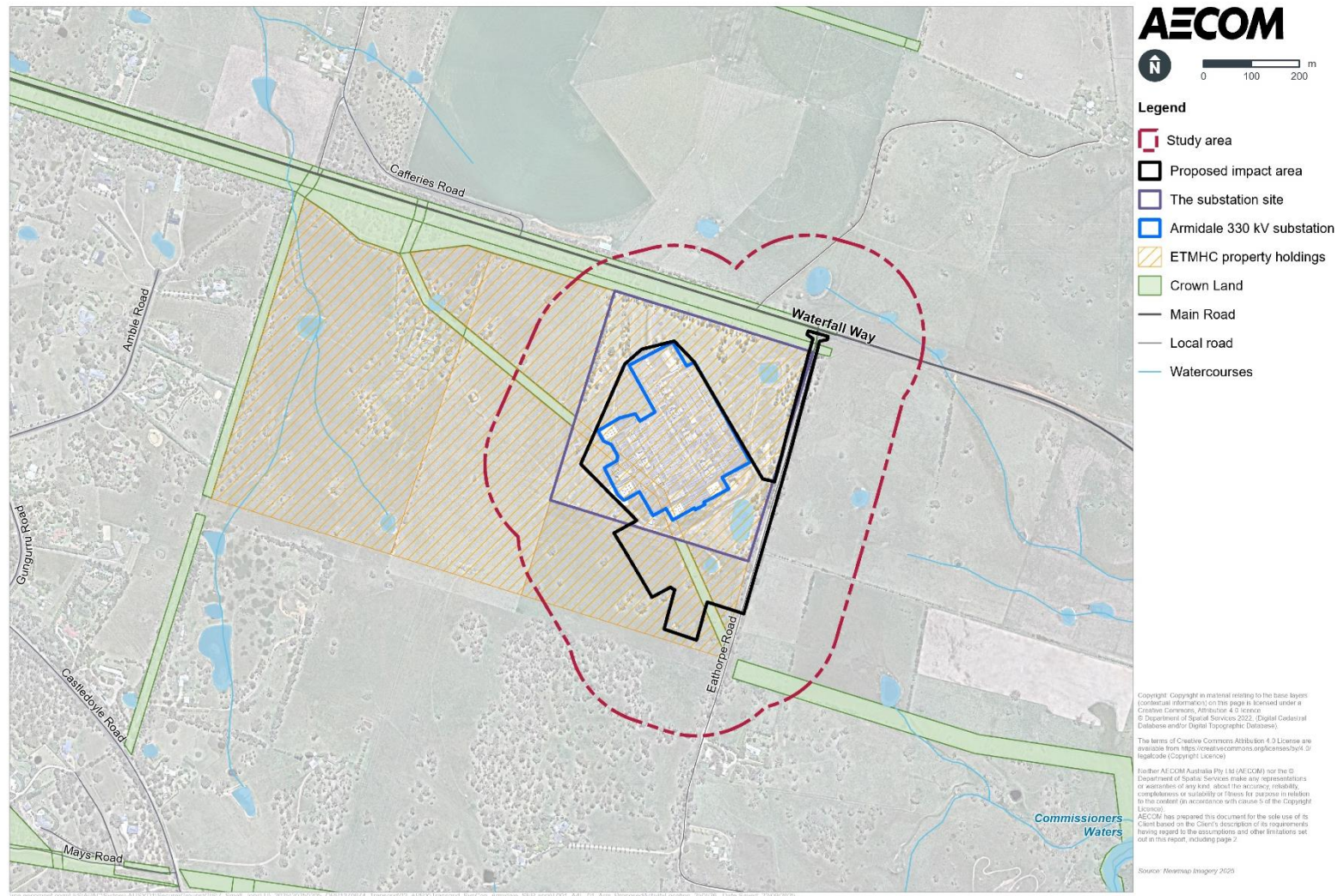


Figure 1-1 Proposed impact area and location

1.3 Purpose of this report

1.3.1 Assessment objectives

The objectives of this noise and vibration impact assessment are to:

- Identify nearby noise-sensitive receivers potentially impacted by the construction and operation of the proposed activity
- Conduct site work (including noise monitoring) to determine the relevant construction noise management levels and operational noise criteria for identified sensitive receivers
- Identify potential noise and vibration impacts from the construction and operation of the proposed activity
- Outline mitigation measures, if required, relating to noise and vibration during construction and operational phases of the proposed activity.

1.3.2 Report structure

This report is structured as follows:

- Section 1.0 introduces the proposed activity and the purpose of this noise and vibration impact assessment
- Section 2.0 provides a summary of the existing acoustic environment
- Section 3.0 presents the relevant construction management levels and vibration objectives
- Section 4.0 presents the operational noise criteria
- Section 5.0 details the assessment for construction noise impacts
- Section 6.0 details the assessment for operational noise impacts
- Section 7.0 describes the management measures identified to mitigate potential proposed activity impacts.

1.4 Relevant guidelines

This assessment has been undertaken in accordance with the following guidelines.

Construction

- *Interim Construction Noise Guideline*, Department of Environment and Climate Change, NSW (DECC 2009)
- *Assessing Vibration: a technical guideline*, Department of Environment and Conservation (DEC 2006)
- *Construction Noise and Vibration Guideline (Public Transport Infrastructure)*, Transport for NSW (TfNSW 2023)
- *NSW Road Noise Policy*, Department of Environment, Climate Change and Water NSW (DECCW 2011).

Operation

- *NSW Protection of the Environment Operations Act 1997* (POEO Act 1997)
- *NSW Noise Policy for Industry*, NSW Environment Protection Authority (EPA 2017)
- *NSW Road Noise Policy*, Department of Environment, Climate Change and Water NSW (DECCW, 2011).

2.0 Existing acoustic environment

2.1 Assessment receivers

The existing acoustic environment is largely defined by local road traffic noise from Waterfall Way and Eathorpe Road.

Figure 2-1 shows nearby noise sensitive receivers which could potentially be affected by the proposed activity and have been assessed within this report. The closest residential receivers are located approximately 245 m to the south of the site. There are no non-residential noise sensitive receivers within 2 km of the proposed activity.

The assessment receivers identified for construction and operational modelling consist of residential dwellings representative of receivers at a variety of distances away. The assessment receiver locations, along with the land use classification of each receiver (as defined in the *Noise Policy for Industry*), are presented in Table 2-1 and shown in Figure 2-1.

Compliance with the relevant criteria at the nearest assessment receivers outlined in Table 2-1 means compliance at other residential and non-residential receivers located further away.

Table 2-1 Construction and operational assessment receiver locations

Receiver	Address	Land use classification
R1	205 Castledoyale Road, Armidale	Residential
R2	207 Castledoyale Road, Armidale	Residential
R3	14 Gungurru Road, Armidale	Residential
R4	22 Amble Road, Armidale	Residential
R5	30 Amble Road, Armidale	Residential
R6	225 Castledoyale Road, Armidale	Residential
R7	50 Amble Road, Armidale	Residential
R8	19 Cafferries Road, Armidale	Residential
R9	249 Castledoyale Road, Armidale	Residential
R10	402 Grafton Road, Armidale	Residential
R11	112 Eathorpe Road, Armidale	Residential
R12	89 Eathorpe Road, Armidale	Residential
R13	475 Grafton Road, Armidale	Residential
R14	138 Eathorpe, Armidale	Residential
R15	650 Grafton Road, Armidale	Residential



Assessment receivers

- Assessment receivers
- Proposed impact area



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Figure 2-1 Assessment receiver locations

2.2 Noise measurements

Short-term attended measurements and long-term unattended monitoring were undertaken by AECOM in June 2012 and July 2012 respectively as part of the *Armidale Substation Noise Impact Assessment* report, dated 8 May 2013, to establish the existing ambient and background noise environment at potentially affected receivers. The data collected by AECOM in 2012 is considered to be conservative as it is likely that background noise levels in the area have increased since 2012 (but not significantly). Therefore, this data is considered representative of the current noise environment. A summary of the measurement results is presented below.

2.2.1 Unattended noise measurement results

The unattended noise monitoring locations are presented in Figure 2-2.

Table 2-2 presents the existing overall representative L_{Aeq} ambient noise level and the background L_{A90} noise levels for the day, evening and night-time periods.

Table 2-2 Existing background (L_{A90}) and ambient (L_{Aeq}) noise levels

Noise logger ID	Location	L_{A90} background rating noise level, dB(A) ¹			Log average noise (ambient) L_{Aeq} levels dB(A)		
		Day	Evening	Night		Evening	Night
Logger 1	84 Castledoyale Road, Armidale	37	30 ²	30 ²	50	49	40
Logger 2	13 Inces Road, Armidale	38	30 ²	30 ²	51	48	43

Notes:

1. Day is defined as 7:00 am to 6:00 pm, Monday to Saturday and 8:00 am to 6:00 pm Sundays & Public Holidays. Evening is defined as 6:00 pm to 10:00 pm, Monday to Sunday & Public Holidays. Night is defined as 10:00 pm to 7:00 am, Monday to Saturday and 10:00 pm to 8:00 am Sundays & Public Holidays.
2. In accordance with the NPfl, the RBLs for evening and night were set to 30 dB(A) as the measured RBLs were calculated to be less than 30 dB(A).



2.2.2 Attended noise measurement results

The results of the attended noise measurements are presented in Table 2-3. The night-time measurements indicated that residential receivers are generally affected by local traffic noise, with substation noise audible as a background ‘hum’ at receivers on Grafton Road and Eathorpe Road.

Table 2-3 Attended noise measurements (2012)

Receiver	Location	Date and time	L _{Aeq,15min} dB(A)	L _{A90} dB(A)	Comments
R13	475 Grafton Road, Armidale	22:07 20/06/2012	39	35	Substation audible as background ‘hum’. Passing traffic along Grafton Road influenced noise environment significantly.
R8	19 Cafferries Road, Armidale	23:19 20/06/2012	32	25	Substation barely audible. Passing traffic along Grafton Road and insects noted.
R10	402 Grafton Road, Armidale	22:48 20/06/2012	34	29	Substation audible as background ‘hum’. Traffic also noted intermittently in distance.
R12	89 Eathorpe Road, Armidale	22:06 19/06/2012	32	25	Substation audible as background ‘hum’. Dogs, cows and traffic also noted intermittently in distance.

Notes:

1. Monitoring location was chosen to be at the top of an exposed ridge on the property as it was more exposed to substation noise and would provide better validation data.

2.3 Noise catchment area

Noise catchment areas (NCAs) are used to group residential receivers within a similar noise environment and define appropriate construction noise management levels (NMLs). Generally, NCAs are defined based on the unattended noise monitoring locations. The NCA for this assessment is defined in Table 2-4.

Table 2-4 Noise catchment area

NCA	Description of NCA	L _{A90} background rating noise levels used
1	Residential receivers north and south of Grafton Road, Armidale	Measured L _{A90} noise levels for Logger 1

Refer to Figure 2-3 below for the NCA.

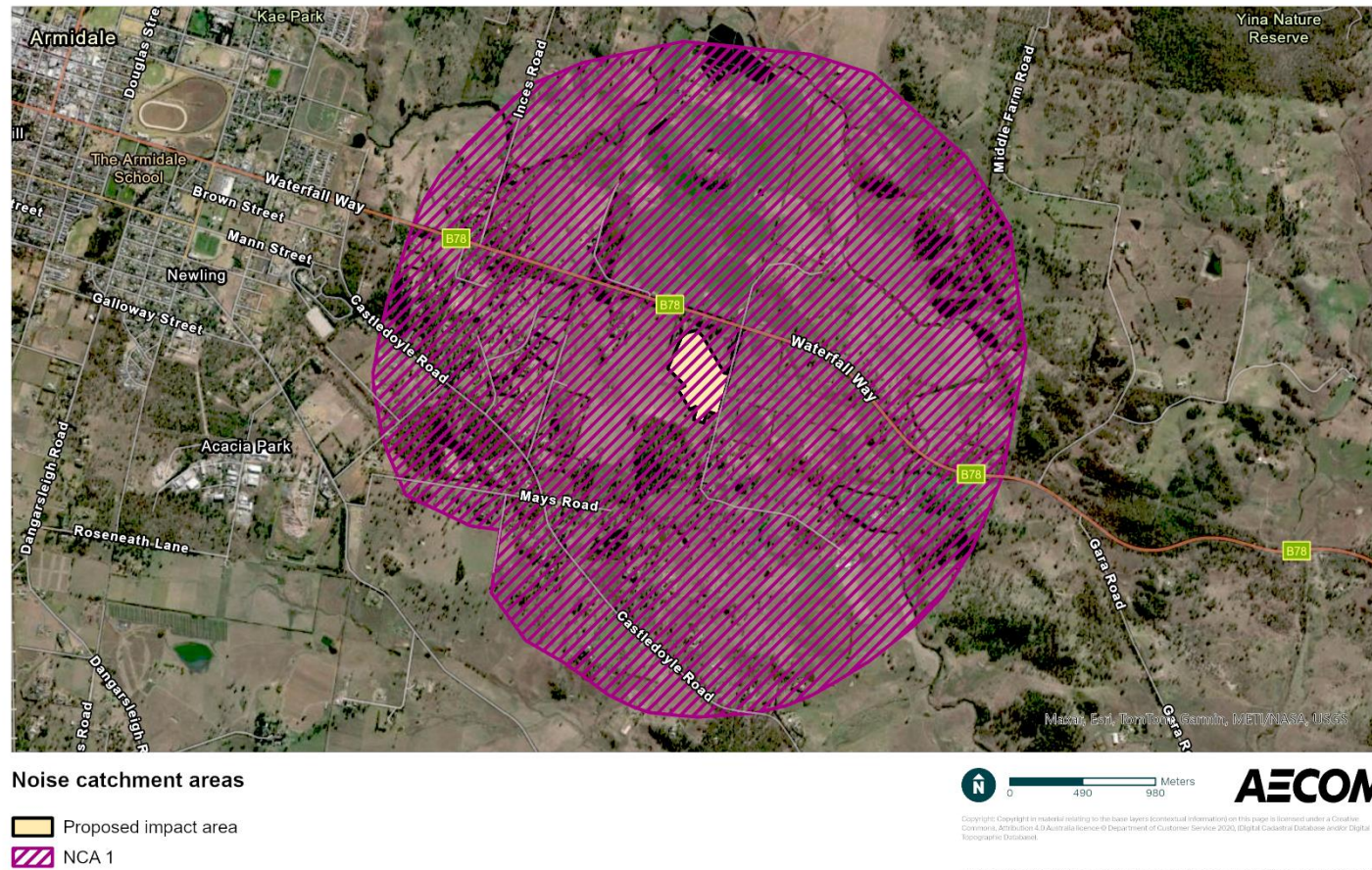


Figure 2-3 Noise catchment area

3.0 Construction noise criteria

3.1 Construction noise

The *Interim Construction Noise Guideline* is a NSW Government document that sets out ways to deal with the impacts of construction noise on residences and other sensitive land uses. It presents assessment approaches tailored to the scale of construction projects and identifies practices to minimise noise impacts. As the proposed works are expected to continue for a period of more than three weeks, a quantitative assessment, based on worst-case construction scenarios, has been carried out for construction works.

Noise levels resulting from construction activities that are predicted at noise sensitive receivers (e.g. residences, schools, hospitals, places of worship, and active recreation areas) are compared to the NMLs determined in accordance with the *Interim Construction Noise Guideline*. Where an exceedance of the NMLs is predicted, the *Interim Construction Noise Guideline* advises that receivers can be considered 'noise affected' and the proponent should apply all feasible and reasonable work practices to minimise the noise impact. The proponent should also inform all potentially affected residents of the nature of the works to be carried out, the expected noise level and duration, as well as contact details should they wish to make a complaint.

If construction noise levels at the receiver reach 75 dB(A), residential receivers are considered to be 'highly noise affected' and the proponent should, in consultation with the community, consider restrictions to the hours of construction to provide respite periods.

The *Interim Construction Noise Guideline* defines what is feasible and reasonable as follows:

- Feasible – a work practice or abatement measure is feasible if it is capable of being put into practice and is practical to build given project constraints such as safety and maintenance requirements
- Reasonable – selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall noise benefits outweigh the overall adverse social, economic, and environmental effects, including the cost of the measure.

The construction NMLs for residential land uses are detailed in Section 3.1.1. These NMLs will be used to guide the management of construction noise throughout construction.

3.1.1 Residential receivers

Guidance for setting construction NMLs for residential receivers is summarised in Table 3-1.

Table 3-1 *Interim Construction Noise Guideline* residential NMLs

Time of day	NML, $L_{Aeq,15min}$, dB(A) ¹	How to apply
Recommended standard hours: Monday to Friday 7 am to 6 pm	'Noise affected' level RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise: Where the predicted or measured $L_{Aeq,15min}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level The proponent should also inform all potentially impacted residents of the nature of work, the expected noise levels and duration, as well as contact details.
Saturday 8 am to 1 pm No work on Sundays or public holidays	'Highly noise Affected' level 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise: Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account:

Time of day	NML, $L_{Aeq,15min}$, dB(A) ¹	How to apply
		Times identified by the community when they are less sensitive to noise (such as before and after school for work near schools, or mid-morning or mid-afternoon for work near residences) If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	'Noise affected' level RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours The proponent should apply all feasible and reasonable work practices to meet the noise affected level Where all feasible and reasonable practices have been applied and noise is still more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community The <i>Interim Construction Noise Guideline</i> provides guidance on negotiating agreements.

Notes:

1. Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 metres above ground level. If the property boundary is more than 30 metres from the residence, the location for measuring or predicted noise levels is at the most noise-affected point within 30 metres of the residence.

Table 3-2 presents the NMLs applicable to residential receivers nearby to the proposed activity.

Table 3-2 Residential receiver construction noise management levels, $L_{Aeq,15min}$, dB(A)

Noise catchment area	Standard hours (RBL + 10)	Outside standard hours (RBL + 5)		Highly noise affected level
	Day	Evening	Night	
NCA 1	47	35	35	75

The *Construction Noise and Vibration Guideline (Public Transport Infrastructure)* sets out community perceptions of construction noise dependent upon the level of exceedance of the RBLs and NMLs. These are presented in Table 3-3.

Table 3-3 Community perception of construction noise

Perception	dB(A) above RBL	dB(A) above NML – Standard hours	dB(A) above NML – Out of hours
Noticeable	5 – 10	0	0 - 5
Clearly audible	10 – 20	0 - 10	6 – 15
Moderately intrusive	21 – 30	11 – 20	16 – 25
Highly intrusive	> 30	> 20	> 25

3.1.2 Construction road traffic

Noise from construction traffic on public roads is not covered by the *Interim Construction Noise Guideline*. However, the *Interim Construction Noise Guideline* does refer to the *Road Noise Policy* for the assessment of noise arising from traffic on public roads.

In accordance with the *Road Noise Policy*, to assess noise impacts from construction traffic, an initial screening test should be undertaken by evaluating whether existing road traffic noise levels would increase by more than 2 dB(A). Where the predicted noise increase is 2 dB(A) or less, then no further assessment is required. Where the predicted noise level increase is greater than 2 dB(A), and the predicted road traffic noise level exceeds the road category specific criteria, then noise mitigation should be considered for those receivers affected. The road category specific criteria are presented in Table 3-4 below. The *Road Noise Policy* does not require assessment of construction road traffic noise impacts to commercial or industrial receivers.

Table 3-4 Road traffic noise assessment criteria

Road category	Type of land use	Assessment criteria, dB(A)	
		Day (7am – 10pm)	Night (10pm – 7am)
Freeway/arterial/sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	L _{Aeq,15hr} 60 dB(A)	L _{Aeq,9hr} 55 dB(A)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	L _{Aeq,1hr} 55 dB(A)	L _{Aeq,1hr} 50 dB(A)

4.0 Operational noise criteria

4.1 Environment Protection Authority – NSW Noise Policy for Industry

Industrial noise has the potential to affect nearby noise sensitive receivers. The *Noise Policy for Industry* sets out a procedure to determine project noise trigger levels relevant to a development. If it is predicted that the development is likely to result in noise levels which exceed the project noise trigger levels at existing noise sensitive receivers, then mitigation measures need to be considered to reduce the predicted noise level.

The assessment procedure for industrial noise sources has two components that must be satisfied:

- Controlling intrusive noise impacts in the short term for residences
- Maintaining noise level amenity for residences and other land uses.

Both components are assessed at the most affected point on or within the property boundary of the noise sensitive receiver site. These criteria apply to environmental noise emissions from any plant installed as part of the proposed activity, and for residential receivers, represent the lower of the intrusive or amenity criteria.

4.1.1 Intrusive noise impacts

The *Noise Policy for Industry* states that the intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (L_{Aeq} level), measured over a 15-minute period, does not exceed the background noise level measured by more than 5 dB. The RBL is the background noise level to be used for assessment purposes and is determined by the methods given in Section 3.1 of the *Noise Policy for Industry*.

The intrusive noise criteria are shown in Table 4-1 (based on unattended noise measurements conducted at the Logger 1 location).

Table 4-1 Recommended $L_{Aeq,15min}$ intrusive noise criteria levels from industrial noise sources

Time of day ¹	RBL, $L_{A90,15min}$, dB(A)	Intrusive criterion RBL + 5, $L_{Aeq,15min}$, dB(A)
Day	37	42
Evening	30	35
Night	30	35

Notes:

1. Day is defined as 7:00 am to 6:00 pm, Monday to Saturday and 8:00 am to 6:00 pm Sundays and Public Holidays. Evening is defined as 6:00 pm to 10:00 pm, Monday to Sunday and Public Holidays. Night is defined as 10:00 pm to 7:00 am, Monday to Saturday and 10:00 pm to 8:00 am Sundays and Public Holidays.

4.1.2 Protecting noise amenity

To limit continuing increases in noise levels from the application of the intrusiveness level alone, the maximum ambient noise level resulting from industrial noise sources should not normally exceed the recommended amenity noise levels specified in Table 2.2 of the *Noise Policy for Industry*.

The relevant amenity criteria are shown in Table 4-2.

Table 4-2 Recommended L_{Aeq} amenity noise levels from industrial noise sources

Type of receiver	Time of day	Recommended $L_{Aeq,period}$ noise level dB(A)
Residence - Rural	Day	50

Type of receiver	Time of day	Recommended $L_{Aeq,period}$ noise level dB(A)
	Evening	45
	Night	40

When there is existing industrial noise in an area the amenity level for a project is usually set to the recommended amenity level minus 5 dB. This correction ensures that industrial noise levels, from both existing and new sources, remain within the recommended noise levels for an area. As per the *Noise Policy for Industry*, the project amenity levels for residential receivers for each period are converted to a 15-minute period by adding 3 dB(A).

4.1.3 Proposed activity specific noise criteria

A summary of the residential noise criteria for the operation of the proposed activity is presented in Table 4-3.

Table 4-3 Proposed activity specific noise levels

Receiver	Period ¹	Intrusive criterion ($L_{Aeq,15min}$)	Amenity criterion ($L_{Aeq,15min}$)	Project specific noise criteria, ($L_{Aeq,15min}$) ²
Residential	Day	42	48	42
	Evening	35	43	35
	Night	35	38	35

Notes:

1. Day is defined as 7:00 am to 6:00 pm, Monday to Saturday and 8:00 am to 6:00 pm Sundays and Public Holidays. Evening is defined as 6:00 pm to 10:00 pm, Monday to Sunday and Public Holidays. Night is defined as 10:00 pm to 7:00 am, Monday to Saturday and 10:00 pm to 8:00 am Sundays and Public Holidays.
2. Project specific noise levels determined as the lowest of the intrusive and amenity criteria.

4.1.4 Applying the Noise Policy for Industry to existing sites

Section 6.1 of the *Noise Policy for Industry* acknowledges that many existing industrial sites were designed for higher noise emission levels than the proposed activity noise trigger levels noted in Table 4-3. Industrial sites may have existed before any noise-sensitive developments occurred in the area, or may have been designed before noise control legislation was introduced.

The *Noise Policy for Industry* notes there is no 'one-size-fits-all' approach to determine noise impacts from existing industry. However, it notes that the following governing principles should be applied when determining the project noise trigger levels and/or assessment requirements for existing industry:

"The project noise trigger levels should not be applied as mandatory noise limits. The project noise trigger level is the level used to assess noise impact and drive the process of assessing all feasible and reasonable control measures.

Where an existing industry has been in operation for more than 10 years and existing site operations exceed the project amenity noise level, the project amenity noise level may be adopted as the project noise trigger level to assess existing, and existing plus proposed site operations, as relevant.

Where a development proposal involves a discrete process, and premises-wide mitigation has or is to be considered outside of the development proposal, a project noise trigger level for noise from new/modified components (not the whole site) of the operation may be set at 10 dB(A) or more below existing site noise levels or requirements. This approach means that the increase in noise from the whole site is minimised and provides scope for existing components to achieve noise reductions over time"

4.1.5 Tonality and Noise Policy for Industry modifying factors

Where a noise source contains certain characteristics, such as tonality, intermittency, irregularity or dominant low-frequency content, there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level.

Fact Sheet C in the *Noise Policy for Industry* sets out corrections for annoying characteristics. The corrections are to be applied having regard to:

- The contribution noise level from the premises when assessed/measured at a receiver location
- The nature of the noise sources and its characteristics.

Table 4-4 presents the annoying characteristic corrections potentially applicable to the proposed activity.

Table 4-4 Modifying factor corrections (*Noise Policy for Industry* Factsheet C, Table C1)

Factor	Assessment/measurements	When to apply	Correction ₁	Comments
Tonal	One-third octave band analysis using the objective method for assessing the audibility of tones in noise – simplified method (ISO1996.2:2007 – Annex D).	Level of one-third octave band exceeds the level of the adjacent bands on both sides by: 5 dB or more if the centre frequency of the band containing the tone is in the range 500-10,000 Hz 8 dB or more if the centre frequency of the band containing the tone is in the range 160-400 Hz 15 dB or more if the centre frequency of the band containing the tone is in the range 25-125 Hz	5 dB ^{2,3}	Third octave measurements should be undertaken using unweighted or Z-weighted measurements. Note: Narrow-band analysis using the reference method in ISO1996-2:2007, Annex C may be required by the consent/regulatory authority where it appears that a tone is not being adequately identified, e.g. where it appears that the tonal energy is at or close to the third octave band limits of contiguous bands.
Low - frequency noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements in the range 10-160 Hz	Measure/assess source contribution C- and A-weighted $L_{eq,T}$ levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and: where any of the one-third octave noise levels in Table C2 are exceeded by up to and including 5 dB and cannot be mitigated, a 2 dB positive adjustment to measured/predicted A-weighted levels applies for the evening/night period where any of the one-third octave noise levels in Table C2 are exceeded by more than 5 dB and cannot be mitigated, a 5 dB(A) positive adjustment to	2 or 5 dB ²	A difference of 15 dB or more between C- and A-weighted measurements identifies the potential for an unbalance spectrum and potential increased annoyance. The values in Table C2 are derived from Moorhouse (2011) for the UK Department for Environment, Food & Rural Affairs (DEFRA) fluctuating low-frequency noise criteria with corrections to reflect external assessment locations.

Factor	Assessment/ measurements	When to apply	Correction ¹	Comments
		measured/predicted A-weighted levels applies for the evening/night period and a 2 dB(A) positive adjustment applies for the daytime period.		

Notes:

1. Corrections to be added to the measured or predicted levels, except in the case of duration where the adjustment is to be made to the criterion.
2. Where a source emits tonal and low-frequency noise, only one 5-dB correction should be applied if the tone is in the low-frequency range, that is, at or below 160 Hz.
3. Where narrow-band analysis using the reference method is required, as outlined in column 5, the correction will be determined by the ISO1996-2:2007 standard.

Table 4-5 presents the low frequency noise thresholds from the *Noise Policy for Industry*.

Table 4-5 One-third octave low-frequency noise thresholds (*Noise Policy for Industry* Factsheet C Table C2)

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

4.1.6 Maximum noise level assessment

The *Noise Policy for Industry* requires the potential for sleep disturbance to be assessed by considering maximum noise levels events during the night-time period.

Where the subject development/premises night-time noise levels at a residential location exceed the following screening levels, a detailed maximum noise level event assessment should be undertaken:

- $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB(A), whichever is the greater, and/or
- $L_{AF,max}$ 52 dB(A) or the prevailing RBL plus 15 dB(A), whichever is the greater.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

Based on the measured background noise levels during the night, the sleep disturbance criteria required for compliance for the nearest noise sensitive residential receivers are presented in Table 4-6.

Table 4-6 Night-time sleep disturbance screening levels

Location	Measured night-time RBL, $L_{A90,15min}$ dB(A)	Sleep disturbance screening levels for compliance, dB(A)	
		$L_{Aeq,15min}$	$L_{AF,max}$
Residential receivers	30	40	52

The proposed activity may operate during all periods of the day. Noise from the syncons and other equipment on-site is predicted to be steady-state and non-impulsive and therefore $L_{AF,max}$ noise levels are likely to be very similar to the $L_{Aeq,15min}$ noise levels. Given this, compliance to the EPA's project noise trigger levels will imply compliance to sleep disturbance criteria for these steady-state noise sources.

4.2 Operational road traffic noise criteria

To assess noise impacts from increases in operational traffic, an initial screening test should be undertaken by evaluating whether existing road traffic noise levels will increase by more than 2 dB(A). Where the predicted noise increase is 2 dB(A) or less, then no further assessment is required. Where

the predicted noise level increase is greater than 2 dB(A), and the predicted road traffic noise level exceeds the road category specific criterion then noise mitigation should be considered for those receivers affected. The *Road Noise Policy* does not require assessment of noise impact to commercial or industrial receivers.

4.3 Operational vibration

Operational vibration is not expected to be an issue as a result of the proposed activity as the operational activities would not involve vibration-generating activities that would create significant vibration levels at nearby sensitive receivers. Therefore, an assessment of the operational vibration impacts is not required.

5.0 Construction noise assessment

5.1 Construction noise modelling scenarios

Table 5-1 provides a summary of the scenarios associated with the construction of the proposed activity, including indicative construction plant/equipment for each scenario and their associated sound power levels. The three noisiest construction scenarios which have been assessed are as follows:

- Scenario 1 – Site establishment
- Scenario 2B – Demolition of redundant infrastructure
- Scenario 2C – Syncon bench installation.

All three scenarios were assessed as standard hours construction work. All major construction work is expected to be completed during standard hours only.

Table 5-1 Construction assessment scenarios

Scenario ID	Scenario	Construction activity	Equipment	SWL per unit, dB(A)
1	Site establishment	Site area establishment	Backhoe	96
			Excavator	98
			Grader	114
			Chainsaw	115
			Mulcher	116 ¹
			Dump truck	108
			Compactor	106
			Truck	108
2A	Main construction works	Access road construction	Pavement laying machine	105
			Dump truck	108
			Asphalt truck and sprayer	105
			Concrete truck	106
			Roller	105
			Concrete saw	115 ²
			Truck	108
		2B	Demolition of redundant infrastructure	Excavator
Jackhammer				118 ^{1,2}
Dump truck				108
Hand tools				98
Front end loader				104
2C		Syncon bench installation	Concrete truck	106
			Concrete pump	106
			Bored piling rig	111 ¹
			Mobile crane	103
			Truck	108
2D		Syncon building construction	Concrete truck	106
			Concrete pump	106

Scenario ID	Scenario	Construction activity	Equipment	SWL per unit, dB(A)
2E			Agitator	109
			Mobile crane	103
			Truck	108
		Miscellaneous civil works including drainage, cable trenches and conduits, and fencing	Backhoe	96
			Front end loader	104
			Excavator	98
			Truck	108
2F		Syncon and associated equipment installation	Mobile crane	103
			Elevated work platform	87
			Hand tools	98
			Truck	108
3	Testing and commissioning	Syncon and associated equipment testing and commissioning	Hand tools	98
			Truck	108
			Light vehicles	90
4	Rehabilitation	Demobilisation and rehabilitation of disturbed areas	Excavator	98
			Backhoe	96
			Bobcat	104
			Mobile crane	103
			Truck	108

Notes:

1. For modelling purposes, the SWL of the loudest piece of equipment in each scenario will represent the overall SWL of the scenario/activity.
2. Equipment with special audible characteristics, likely to cause annoyance due to tonality, low frequency noise, impulsive or intermittent noise events. Penalty of +5 dB included in the sound power level.

5.2 Noise modelling methodology

Noise levels due to the construction activities shown in Section 5.1 have been predicted at nearby noise sensitive receivers using SoundPLAN 8.2 noise modelling software. The noise model was created to represent 'reasonable' worst-case periods of construction works. The following features were included in the noise model:

- Ground topography
- Ground absorption and reflection
- Receivers
- Construction noise sources.

It is noted that there may be differences between predicted and measured noise levels due to variations in instantaneous operating conditions, plant/equipment in operation during the measurement and also the location of the plant/equipment. The acoustic shielding calculated in the model due to fixed building structures would also vary as the construction plant/equipment moves around the site.

5.2.1 Construction modelling assumptions

The following assumptions have been made in modelling all construction noise scenarios:

- For each construction scenario, the overall SWL of the scenario is represented by the SWL of the loudest piece of equipment proposed
- Plant/equipment is assumed to be operating at the proposed activity boundary at the closest point to each receiver, in order to present the worst-case scenario for each receiver. In reality, the plant/equipment would only be at the closest point to each receiver for limited periods
- Neutral atmospheric conditions, i.e. relatively calm, no wind.

5.3 Predicted construction noise levels

The identified residential receivers have been assessed against the standard hours NML. The level of impact may change depending on the final construction methodology and further assessment would be undertaken if required.

Construction noise contours calculated at 1.5 m above ground level are presented in Appendix A.

Table 5-2 presents the construction noise modelling results for the assessed residential receivers. Receivers where the construction NML is likely to be exceeded during standard hours are formatted in bold text.

Table 5-2 Predicted construction noise levels – standard hours

Receiver	Distance from proposed impact area, metres	Standard hours noise management level, dB(A)	Highly affected level, dB(A)	Construction scenario		
				Site establishment	Demolition of redundant infrastructure	Syncon bench installation
R1	1,107	47	75	39	39	34
R2	1,053	47	75	40	39	35
R3	972	47	75	40	41	36
R4	932	47	75	40	38	36
R5	888	47	75	40	38	36
R6	932	47	75	40	37	37
R7	826	47	75	41	43	37
R8	857	47	75	35	35	33
R9	736	47	75	32	33	28
R10	378	47	75	48	50	44
R11	452	47	75	41	36	33
R12	245	47	75	55	53	48
R13	712	47	75	27	27	22
R14	940	47	75	41	41	35
R15	1,291	47	75	41	41	35

The results show that construction noise levels are predicted to exceed the NML during standard hours for two residential receivers (R10 and R12) during site establishment and demolition of redundant infrastructure, and for one residential receiver (R12) during syncon bench installation. The receivers predicted to experience NML exceedances are 402 Grafton Road and 89 Eathorpe Road in Armidale. The exceedances range from 1 to 8 dB(A).

There are no residential receivers predicted to be 'highly affected' for the three worst-case construction scenarios assessed.

5.4 Construction traffic assessment

The maximum construction traffic volumes required for the proposed activity during the peak construction period include the following:

- Maximum of 110 light vehicles movements per day (55 vehicles entering and leaving the site)
- Maximum of 140 heavy vehicle movements per day (70 vehicles entering and leaving the site) or maximum of 60 oversize and/or overmass (OSOM) vehicle movements per day (30 vehicles entering and leaving the site).

OSOM vehicles exceed the standard width, height or length limits and/or exceed the legal weight limits and are used to transport large machinery or equipment. Noise from OSOM vehicles is assumed to be just louder than two heavy vehicles. On the days when there are OSOM vehicle movements the number of heavy vehicle movements will be reduced.

These maximum volumes present a worst-case scenario and therefore conservative approach to the assessment, and it is likely that actual movements would be far less on some days.

Using traffic volume data from the *Transport for NSW Traffic Volume Viewer* (2012 volumes), the traffic volume on Waterfall Way for the daytime period was estimated to be 1,264 with a heavy vehicle percentage of 8.5%. The resultant noise level change on Waterfall Way from additional construction traffic volumes is presented in Table 5-3 and was found to be no more than 2 dB(A).

Table 5-3 Resultant noise level change due to additional construction traffic during daytime period

Road	Existing $L_{Aeq,15hr}$ noise level, dB(A)	Predicted $L_{Aeq,15hr}$ noise level, dB(A)	Change in $L_{Aeq,15hr}$ noise level, dB(A)	Change in $L_{Aeq,15hr}$ noise level greater than 2 dB(A)?
Waterfall Way	57.2	59.1	2.0	No

Whilst traffic counts for Eathorpe Road are not available, there are no residential receivers on the portion of Eathorpe Road that will be used by construction traffic. Therefore, it is likely that the additional construction traffic numbers detailed above would not lead to an increase of more than 2 dB(A) at residential receivers on Eathorpe Road.

5.5 Construction vibration assessment

From the indicative construction equipment listed in Table 5-1, there is no vibration-intensive equipment proposed to be used for any construction scenario. In addition, the nearest sensitive receiver is located approximately 245 m from the proposed impact area. Therefore, a construction vibration assessment is not deemed necessary and has not been considered further in this report.

6.0 Operational noise assessment

The operational noise sources that have the potential to affect nearby residential receivers include the syncons, syncon cooling systems, transformers and a diesel generator.

6.1 Modelling methodology

6.1.1 General modelling assumptions

Noise levels due to operation of the proposed activity were predicted for nearby noise sensitive receivers using SoundPLAN version 8.2 (industry standard) noise modelling software. The operational noise levels were predicted using an implementation of the CONCAWE propagation algorithm under both neutral and noise-enhancing meteorological conditions.

6.1.2 Modelling conditions

The noise modelling includes:

- Neutral and noise-enhancing meteorological conditions
- Ground topography
- Buildings and structures
- Operational equipment behaving as point sources
- Ground absorption.

The noise model considers significant noise sources and locations, screening effects, receiver locations, ground topography and noise attenuation due to geometrical spreading, air absorption, ground absorption and the effects of the prevailing weather conditions.

All predicted noise levels are at the reasonably most-affected point on or with the residential boundary, 1.5 m above ground level.

6.2 Modelled operational scenarios

The location, quantity, and specification of equipment is subject to change during the detailed design stage. This operational noise assessment should be treated as a proof of concept for the overall noise levels generated by the proposed activity, and the type of equipment to be installed.

6.2.1 Existing operational scenario

Noise from the existing substation was noted during measurements conducted at the boundary of the substation, as reported in AECOM's *Armidale Substation Noise Impact Assessment* (2013). AECOM also reported that substation noise was audible at three nearby residences where attended measurements were undertaken. All attended measurements at the substation boundary and residences were affected intermittently by traffic noise.

Measured sound power levels from the existing substation equipment were extracted from both the *Armidale Substation Noise Impact Assessment* (2013) report and the *Armidale 330kV Substation – QNI Project Noise Impact Assessment Report* prepared by ERM, dated 17 October 2019. The existing equipment SWLs are presented in Table 6-1 below.

Table 6-1 Existing plant items sound power levels

Plant item/operation	Sound power level, L_{Aeq} , dB(A)
Reactor 1	85
Reactor 3	82
Reactor 4	85
Reactor 6	85
Static VAR Compensator (SVC) Yard	95
SVC Transformer	81
SVC Cooling Station	87
Transformer 1	78
Transformer 2	78
Transformer 3	96
Transformer 4	92
Transformer 6	99
Capacitor Bank 1	86
Capacitor Bank 2	75
Capacitor Bank 3	85
Capacitor Bank 4	85
Capacitor Bank 5	88
Capacitor Bank 6	88

6.2.2 Future operational scenarios

To assess a reasonable worst-case operational scenario, modelling assumes that all of the proposed equipment within the site would operate at full capacity, 24 hours per day, seven days per week. This is a conservative assumption as time periods where equipment would generate the highest noise levels are not known and therefore this methodology ensures that operational noise impacts are not underpredicted.

Compliance with the night-time project noise trigger level would demonstrate compliance for all residential receivers during the evening.

The operational equipment is generally categorised as steady-state or quasi steady-state noise sources which typically produce continuous and consistent noise levels.

It is expected that the operational equipment would be required for the proposed activity in the following numbers:

- 2 x syncon units
- 2 x syncon cooling systems
- 1 x power transformer
- 2 x auxiliary transformers
- 1 x diesel generator.

The diesel generator has been assumed to only operate during an emergency situation, and would be tested once a month for up to one hour in duration during the daytime only. According to the *Noise Policy for Industry*, a single-event continuous noise for a period of 15 minutes to one hour is given an allowable exceedance of 5 dB(A) of the project noise trigger level during the daytime period.

The sound power levels for the operational equipment were provided by Transgrid and have been used to model the noise emission from the site. The indicative location of proposed equipment is shown in Figure 6-1. The syncon units and some cooling plant will be located within a building, as shown in Figure 6-1. The required acoustic parameters of the building have been determined through an iterative design process. The iterative design process comprised modelling the future operational scenarios assuming various building construction and acoustic parameters to determine when compliance at receivers was achieved. Only the predicted noise levels with the final minimum acoustic insertion loss and acoustic treatments adopted for the project have been presented in Section 6.4 (noise assessment with mitigation measures). A noise wall is also proposed around the outdoor cooling system to mitigate acoustic impacts.

The required acoustic treatment to ensure compliance at the receivers are detailed in Section 8.2.

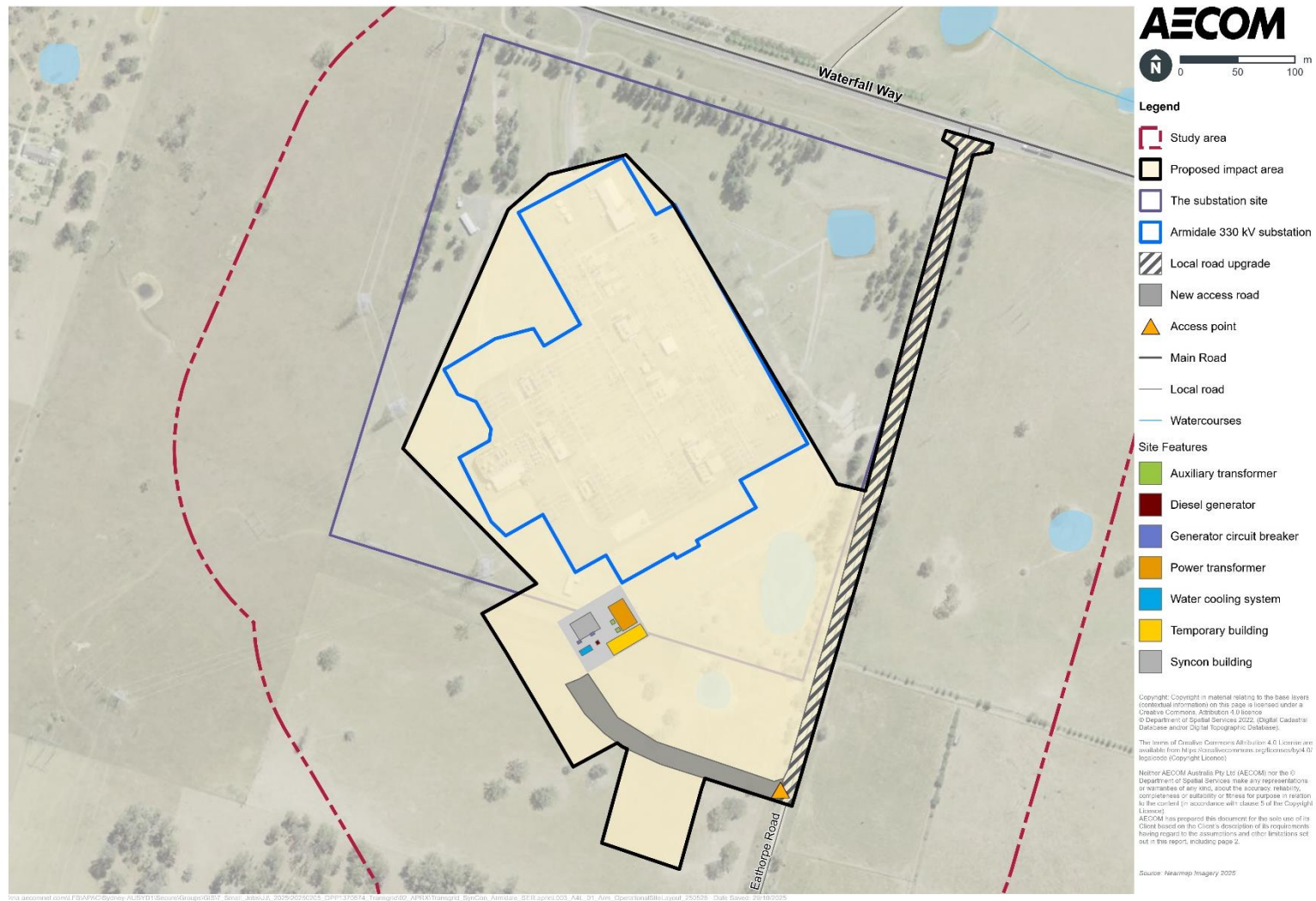


Figure 6-1 Indicative operational site layout

The sound power level inputs presented in Table 6-2 used in the noise modelling were assumed to be operating continuously for an entire 15-minute assessment period.

Table 6-2 Plant items sound power levels

Plant item/operation	Number of items	Sound power level, L_{Aeq} , dB(A)
Syncon & pony motor – inside building	2	115
Syncon cooling plant – inside building	2	95
Syncon cooling plant – outside building	2	100
Auxiliary transformer	2	75
Diesel generator	1	107

6.2.3 Maximum noise levels

In AECOM's experience, L_{Amax} sound power levels of electrical equipment are typically not greater than 5 dB above L_{Aeq} sound power levels. Given that the sleep disturbance criterion is 10 dB less stringent than the project noise trigger level, compliance with the project noise trigger level would result in compliance with the sleep disturbance criteria. Therefore, no further consideration has been given to the sleep disturbance assessment.

6.3 Existing operational noise levels

Section 6.1 of the *Noise Policy for Industry* details the approach for applying the policy to existing industrial premises. Existing operational noise levels were predicted at nearby sensitive receivers using the methodology outlined in Section 1.1, and the inputs from Section 6.2.1 under noise enhancing conditions. The SoundPLAN model was validated through a comparison of modelled results with measured levels at the substation boundary at measurement locations SB1 and SB5 from the AECOM *Armidale Substation Noise Impact Assessment* (2013) report. These locations were chosen for model validation as they are the closest to the nearest residential receivers, R10 and R12, respectively. The results are presented in Table 6-3.

Table 6-3 Comparison of measured and modelled existing substation noise levels

Location	Measured L_{A90} level, dB(A) (AECOM, 2013) ¹	Modelled L_{Aeq} level, dB(A)
SB1	51.0	52.7
SB5	51.0	51.1

Notes:

1. The measured L_{A90} level best represents the existing steady state noise from the substation, as it excludes erroneous noise such as birdsong and traffic.

Comparison of the modelled levels presented in Table 6-3 indicate that the SoundPLAN model is predicting accurately.

The modelled noise levels for the existing scenario have been assessed against the night-time project amenity noise levels (most stringent) shown in Section 4.1.2 in accordance with Section 4.1.3 to determine the suitability of using the project noise trigger levels for future compliance.

The one third octave noise levels at the worst affected residential receiver were assessed against the modifying factor criteria in Table 4-4 and were found to contain tonal components. Therefore, a 5 dB(A) correction was added to the predicted noise levels for all assessed receivers.

Table 6-4 Existing operational noise levels – Night-time – Noise-enhancing meteorological conditions

Receiver	Project amenity noise levels, $L_{Aeq,15min}$, dB(A)	Predicted noise levels, dB(A) ¹	Exceedance, dB(A)	Compliance
R1	38	27	-	Yes
R2		28	-	Yes
R3		29	-	Yes
R4		29	-	Yes
R5		29	-	Yes
R6		28	-	Yes
R7		31	-	Yes
R8		26	-	Yes
R9		30	-	Yes
R10		39	1	Marginal ²
R11		25	-	Yes
R12		37	-	Yes
R13		25	-	Yes
R14		29	-	Yes
R15		29	-	Yes

Notes:

1. Predicted results include a +5 dB(A) correction to account for tonality.
2. In accordance with the Noise Policy for Industry, exceedances of up to 2 dB(A) are considered negligible. They would not be discernible to the average listener. Noise levels at this receiver are compliant during the daytime and evening and marginally compliant during the night-time period.

Results in Table 6-4 indicate that existing noise emissions from the substation are currently compliant with the project amenity noise levels during the daytime and evening, although there is one marginal exceedance during the night-time. As a result, the future operation of the project should be assessed against the project noise trigger levels in accordance with Section 6.1 of the *Noise Policy for Industry* for the daytime and evening periods and against the night-time amenity level during the night-time period.

6.4 Predicted operational noise levels

Predicted operational noise levels are presented in the following sections.

In order to assess tonality, the one third octave noise levels at the worst affected residential receiver were assessed against the modifying factor criteria in Table 4-4 to check for tonal or low frequency components for each operational scenario.

Operational noise contours calculated at 1.5 m above ground are provided in Appendix B. These contours are indicative only and should not be referred to for noise levels at specific receiver locations. Operational noise levels and contours presented in this report have been calculated under neutral and noise enhancing meteorological conditions.

6.4.1 Daytime operation with generator testing

Predicted noise levels at nearby noise sensitive receivers for the daytime scenario with the generator operating for testing purposes are presented in Table 6-5.

Table 6-5 Predicted operational noise levels – Daytime (with generator)

Receiver	Project noise trigger levels, $L_{Aeq,15min}$, dB(A) ¹	Neutral meteorological conditions			Noise-enhancing meteorological conditions		
		Predicted L_{Aeq} noise levels, dB(A)	Exceedance dB(A)	Compliance	Predicted L_{Aeq} noise levels, dB(A)	Exceedance dB(A)	Compliance
R1	47	23	-	Yes	26	-	Yes
R2		24	-	Yes	27	-	Yes
R3		25	-	Yes	27	-	Yes
R4		25	-	Yes	28	-	Yes
R5		25	-	Yes	28	-	Yes
R6		24	-	Yes	27	-	Yes
R7		27	-	Yes	30	-	Yes
R8		22	-	Yes	25	-	Yes
R9		22	-	Yes	30 ²	-	Yes
R10		34	-	Yes	37	-	Yes
R11		21	-	Yes	29	-	Yes
R12		43	-	Yes	46	-	Yes
R13		19	-	Yes	22	-	Yes
R14		29	-	Yes	32	-	Yes
R15		24	-	Yes	32 ²	-	Yes

Notes:

- +5 dB(A) is applied to the daytime project noise trigger level due to the diesel generator being a single-event noise source of 15 minute – 1 hour duration, in accordance with the Noise Policy for Industry
- Predicted results include a +5 dB(A) correction to account for tonality.

Table 6-5 demonstrates that the predicted operational noise emissions from the proposed activity comply with the adjusted daytime noise criteria at all assessed residential receivers when the diesel generator is in operation.

6.4.2 Typical daytime and evening operation

Predicted noise levels at nearby noise sensitive receivers for the daytime and evening scenario, without the generator operating, are presented in Table 6-6.

Table 6-6 Predicted operational noise levels – Daytime and evening typical operation

Receiver	Project noise trigger levels, $L_{Aeq,15min}$, dB(A)	Neutral meteorological conditions			Noise-enhancing meteorological conditions		
		Predicted L_{Aeq} noise levels, dB(A)	Exceedance, dB(A)	Compliance	Predicted L_{Aeq} noise levels, dB(A)	Exceedance, dB(A)	Compliance
R1	Day: 42 Eve: 35	23	-	Yes	26	-	Yes
R2		24	-	Yes	27	-	Yes
R3		25	-	Yes	27	-	Yes
R4		25	-	Yes	28	-	Yes
R5		25	-	Yes	28	-	Yes

Receiver	Project noise trigger levels, $L_{Aeq,15min}$, dB(A)	Neutral meteorological conditions			Noise-enhancing meteorological conditions		
		Predicted L_{Aeq} noise levels, dB(A)	Exceedance, dB(A)	Compliance	Predicted L_{Aeq} noise levels, dB(A)	Exceedance, dB(A)	Compliance
R6		24	-	Yes	27	-	Yes
R7		27	-	Yes	30	-	Yes
R8		22	-	Yes	24	-	Yes
R9		22	-	Yes	30 ¹	-	Yes
R10		34	-	Yes	36	1 - evening	Marginal ²
R11		21	-	Yes	23	-	Yes
R12		33	-	Yes	35	-	Yes
R13		19	-	Yes	22	-	Yes
R14		23	-	Yes	26	-	Yes
R15		22	-	Yes	30 ¹	-	Yes

Notes:

1. Predicted results include a +5 dB(A) correction to account for tonality.
2. In accordance with the Noise Policy for Industry, exceedances of up to 2 dB(A) are considered negligible. They would not be discernible to the average listener. Noise levels at this receiver are compliant during the daytime and marginally compliant during the evening period.

In the daytime scenario when the diesel generator is not in operation, operational noise levels are predicted to comply with the project noise trigger levels at all receivers under both meteorological conditions.

In the evening scenario when the diesel generator is not in operation, operational noise levels are predicted to comply with the project noise trigger levels at all receivers under neutral meteorological conditions. Under noise-enhancing meteorological conditions a minor exceedance of 1 dB(A) at one receiver is predicted. Exceedances of up to 2 dB(A) are considered negligible as they are not discernible to the average listener and therefore would not warrant receiver-based treatments or controls, assuming all feasible and reasonable treatments at source have been implemented. Given that compliance is achieved under neutral meteorological conditions and noise levels at R10 are decreasing slightly from the existing scenario (Table 6-4) no further mitigation has been considered.

6.4.3 Typical night-time operation

Predicted noise levels for the night-time scenario are presented in Table 6-7.

Table 6-7 Predicted operational noise levels – Night-time

Receiver	Project noise trigger levels, $L_{Aeq,15min}$, dB(A)	Neutral meteorological conditions			Noise-enhancing meteorological conditions		
		Predicted L_{Aeq} noise levels, dB(A)	Exceedance dB(A)	Compliance	Predicted L_{Aeq} noise levels, dB(A)	Exceedance, dB(A)	Compliance
R1	38	23	-	Yes	26	-	Yes
R2		24	-	Yes	27	-	Yes
R3		25	-	Yes	27	-	Yes
R4		25	-	Yes	28	-	Yes
R5		25	-	Yes	28	-	Yes

Receiver	Project noise trigger levels, $L_{Aeq,15min}$, dB(A)	Neutral meteorological conditions			Noise-enhancing meteorological conditions		
		Predicted L_{Aeq} noise levels, dB(A)	Exceedance dB(A)	Compliance	Predicted L_{Aeq} noise levels, dB(A)	Exceedance , dB(A)	Compliance
R6		24	-	Yes	27	-	Yes
R7		27	-	Yes	30	-	Yes
R8		22	-	Yes	24	-	Yes
R9		22	-	Yes	30 ¹	-	Yes
R10		34	-	Yes	36	-	Yes
R11		21	-	Yes	23	-	Yes
R12		33	-	Yes	35	-	Yes
R13		19	-	Yes	22	-	Yes
R14		23	-	Yes	26	-	Yes
R15		22	-	Yes	30 ¹	-	Yes

Notes:

1. Predicted results include a +5 dB(A) correction to account for tonality.

In the night-time scenario when the diesel generator is not in operation, operational noise levels are predicted to comply with the project noise trigger levels at all receivers under both meteorological conditions.

6.4.4 Operational noise discussion

Feasible and reasonable operational mitigation measures assumed in the assessment to achieve compliance with project noise trigger levels are discussed in Section 8.2.

6.5 Operational road traffic noise

Ongoing maintenance for the syncons and associated equipment would include daily and weekly visual inspections, as well as routine planned maintenance. For the most part the site will not be occupied permanently by staff. Minimal traffic movement generation is expected as a result of the operation of the syncons. Therefore, noise impacts arising from operational traffic need not be considered any further as an increase of more than 2 dB(A) would not occur. An increase of up to 2 dB(A) represents a minor impact that is considered barely perceptible.

7.0 Cumulative impacts

7.1 Nearby projects

Cumulative impacts have the potential to occur when benefits or impacts from a project overlap or interact with those of other projects, potentially resulting in a larger overall effect (positive or negative) on the environment or local communities. Cumulative impacts may occur when projects are constructed or operated concurrently or consecutively.

Projects were reviewed against the following screening criteria for this cumulative impact assessment:

- Spatially relevant (i.e. the development or activity overlaps with, is adjacent to or within two kilometres of the proposed activity)
- Scale (i.e. large-scale major development or infrastructure projects that have the potential to result in cumulative impacts with the proposed modification, as listed on the NSW Government Major Projects website and on the relevant council websites)
- Timing (i.e. the expected timing of its construction and/or operation overlaps or occurs consecutively to construction and/or operation of the proposed modification)
- Status (i.e., projects in development with sufficient publicly available information to inform this noise impact assessment, with an adequate level of detail to assess the potential cumulative impacts).

Projects identified as contributing to potential cumulative impacts are presented in Table 7-1.

Table 7-1 Projects identified as contributing to potential cumulative impacts

Project and status	Relative location	Proposed construction timeframe	Project details
Armidale Battery Energy Storage System Under assessment – further information required	Approximately 30 m east of the proposed activity	Construction is estimated to take approximately 24 months and would commence in late 2025. Construction may overlap with construction of the proposed activity. Operations would overlap.	Development of a 150 MW/300 MWh BESS and associated infrastructure including a new substation.
Wongalea Battery Energy Storage System Prepare EIS	Approximately 120 m northeast of the proposed activity.	Construction is estimated to take approximately 24-28 months and would commence in late 2026. Construction may overlap with construction of the proposed activity. Operations would overlap.	Development of a 300 MW/1200 MWh BESS and a 132 kV transmission connection to the Armidale 330 kV Substation.
Kooyong Battery Energy Storage System Prepare EIS	Approximately 100 m southwest of the proposed activity.	Pending approval, construction is expected to take place over a 12-month period, commencing in 2028/29, construction is unlikely to overlap with the proposed activity. Operations are anticipated to start in 2029/30 and would overlap with the proposed activity.	Development of a 200 MW/800 MWh BESS and associated infrastructure including a new substation.

7.2 Cumulative construction noise impacts

A qualitative cumulative noise impact assessment has been undertaken for construction, which assumes that the noisiest construction stage for any other construction project coincides with the construction of the proposed activity.

Under this assumed scenario, the greatest increase in noise levels from either project would be a maximum of 3 dB(A) on the levels presented in this assessment, where construction of the proposed activity is the dominant source of construction noise. Where receivers are impacted to a greater extent by other construction projects, then overall construction noise levels at any receiver could be increased by as much as 3 dB(A) from those projects' noise levels.

The proposed activity construction noise levels at all receivers for all construction scenarios are predicted to be well below the 'highly noise affected' level of 75 dB(A). Any cumulative impacts experienced by surrounding receivers are likely to remain below this level, and additionally are considered to be temporary in nature. Nonetheless, the cumulative noise impacts of nearby major projects would be further considered by the construction contractor when a detailed construction schedule become available for construction of the proposed activity.

In the case of construction traffic noise, where major roads are in use by construction traffic from several sites cumulative increases are unlikely to increase by more than 2 dB(A) due to the existing high volumes of traffic on these roads. An increase in noise levels of around 2 dB(A) is not perceptible to the average listener.

Feasible and reasonable mitigation measures would be detailed in the Construction Noise and Vibration Management Plan.

Vibration intensive works are expected to take place well within minimum working distances, therefore no cumulative impacts are anticipated.

7.3 Cumulative operational noise impacts

The amenity project noise trigger level determined in accordance with the *Noise Policy for Industry* seeks to protect against cumulative noise impacts from industry. The amenity project noise trigger level is reduced if other industry is existing or is planned for the area; this was completed for the proposed activity. Applying the most stringent requirement as the project noise trigger level ensures that both intrusive noise is limited and amenity is protected, with no single industry unacceptably changing the noise level of an area.

7.4 Construction fatigue

Although there would be minimum impact from cumulative impacts from the overlapping staging of the construction of the proposed projects listed in Table 7-1, there is the potential for construction noise fatigue at nearby receivers due to the increased duration of the construction period.

Construction fatigue would predominantly be managed through discussions with the affected community. Where practicable respite would be provided and the total duration of works would be minimised as far as practicable.

8.0 Mitigation measures

8.1 Construction noise and vibration mitigation measures

8.1.1 Construction Noise and Vibration Management Plan

A construction noise and vibration management plan (CNVMP) would be developed and implemented for the proposed activity. The CNVMP would include feasible and reasonable safeguards to manage noise emissions from the proposed activity and complaints received in relation to construction noise or vibration. The CNVMP should include, as a minimum, the following:

- identification of nearby residences and other sensitive land uses
- description of approved hours of work
- description and identification of all construction activities, including work areas, equipment, and duration
- description of what work practices (generic and specific) would be applied to minimise noise and vibration
- a complaints handling process with a dedicated contact included for 24 hours a day
- noise and vibration monitoring procedures
- overview of community consultation required for identified high impact work.

Construction work should be planned and carried out during standard construction hours wherever possible. Table 8-1 presents a summary of the standard mitigation measures which should be considered as mitigation measures within the CNVMP where feasible and reasonable.

Table 8-1 Transport Construction Noise and Vibration Guideline (Public Transport Infrastructure) standard mitigation measures

Action required	Safeguard details
Management measures	
Implement stakeholder consultation measures	Periodic notification (monthly letterbox drop and website notification) detailing any night-time works at least seven days prior to the commencement of works Maintain a register for any noise complaints received The worksite must have signage with a 24 hour contact number.
Site inductions	All employees, contractors and subcontractors would receive an environmental induction.
Behavioural practices	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items and slamming of doors No excessive revving of plant and vehicle engines Plant and vehicles to be turned off when not in use.
Source controls	
Construction hours and scheduling	Where feasible and reasonable, construction would be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels would be scheduled during less sensitive time periods as far as practicable. This would include the use of demolition saws, coring machines, grinders, impact drills and jackhammers.

Action required	Safeguard details
Construction respite period	Noise with special audible characteristics and vibration generating activities (including concrete sawing) would only be carried out in continuous blocks, not exceeding 3 hours each, with a minimum respite period of one hour between each block. 'Continuous' includes any period during which there is less than a 1-hour respite between ceasing and recommencing any of the work. No more than two consecutive nights of noise with special audible characteristics and/or vibration generating work would be undertaken in the same NCA over any 7-day period, unless otherwise approved by the relevant authority.
Equipment selection	Quieter and less vibration emitting construction methods should be used where feasible and reasonable (e.g. rubber wheeled instead of steel tracked plant). Equipment would be regularly inspected and maintained to ensure it is in good working order.
Maximum noise levels	The noise levels of plant and equipment would have operating sound power or sound pressure levels that would meet the predicted noise levels.
Rental plant and equipment	Noise emissions would be considered as part of the selection process.
Use and siting of plant	Simultaneous operation of noisy plant within discernible range of a sensitive receiver would be avoided. The offset distance between noisy plant and adjacent sensitive receivers would be maximised. Plant used intermittently would be throttled down or shut down. Plant and vehicles would be turned off when not in use. Noise-emitting plant would be directed away from sensitive receivers where reasonable and feasible.
Plan work site and activities to minimise noise and vibration	Traffic flow, parking and loading/unloading areas would be planned to minimise reversing movements within the site. Truck drivers would be advised of designated vehicle routes, parking locations, acceptable delivery hours or other relevant practices (i.e. minimising the use of engine brakes, and no extended periods of engine idling).
Non-tonal reversing alarms	Non-tonal reversing beepers (or an equivalent mechanism) would be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out-of-hours work.
Minimise disturbance arising from delivery of goods to construction sites	Loading and unloading of materials/deliveries would occur as far as possible from sensitive receivers or alternately planned during a work period that minimises the risk of noise exceedances. Dedicated loading/unloading areas would be shielded if close to sensitive receivers. Delivery vehicles would be fitted with straps rather than chains for unloading, wherever possible.
Silencers on mobile plant	Where possible, noise from mobile plant would be reduced through additional fittings including: residential grade mufflers silencing air parking brake engagement.
Construction related traffic	Vehicle movements would be routed away from sensitive receivers and scheduled during less sensitive times where possible. The speed of vehicles would be limited and the use of engine compression brakes would be minimised. On-site storage capacity would be maximised to reduce the need for truck movements during sensitive times.

Action required	Safeguard details
Path controls	
Shield stationary noise sources such as pumps, compressors, fans etc.	Stationary noise sources would be enclosed or shielded to the greatest extent possible whilst ensuring that the occupational health and safety of workers is maintained.
Shield sensitive receivers from noisy activities	Structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing.

8.1.2 Community consultation and complaints handling

Residents impacted by noise levels from the proposed activity during construction activities, should be notified prior to the commencement.

The information provided to the residents would include:

- programmed times and locations of construction work
- the hours of proposed work
- construction noise and vibration impact predictions
- construction noise and vibration mitigation measures being implemented on site.

Community consultation regarding construction noise and vibration would be detailed in a Community Action Plan for the construction of the proposed activity and would include a 24-hour hotline and complaints management process.

8.2 Operational noise mitigation measures

Noise mitigation measures to be implemented in order for the operation of the proposed activity to comply with the project noise trigger levels at sensitive receivers include the following:

- Housing the syncon units inside a building to provide attenuation. This may also provide screening for other existing noise sources. The building should provide a minimum insertion loss of 27 dB to the most affected receiver, this is inclusive of doors and any ventilation openings.
- If feasible, ventilation openings should be directed away from noise sensitive receivers and acoustic louvres used to reduce noise emissions, if necessary.
- Construction of a noise wall on three sides of the syncons' cooling system (northwest, southwest and southeast, noting that the proposed sycon building may serve as the northwest wall), the height should extend around 1.0 m beyond the top of the cooling system. The wall must have no gaps and a minimum surface density of 5 kg/m².
- Acoustic absorption is required on at least two adjacent surfaces of the noise wall facing the equipment (northwest and southwest walls). The acoustic absorption must have a minimum noise reduction coefficient (NRC) of 0.8.
- Regular maintenance of mechanical equipment (e.g. fans, motors, air conditioning units and pumps) to minimise noise from wear, loose components, or deteriorated insulation.
- During detailed design it is recommended that the final site layout, equipment selections and building construction details (dimensions, materials, openings and location) are reviewed to confirm compliance with the project noise trigger levels.
- Noise monitoring shall be undertaken post construction to ensure operational noise has reduced to a level that does not result in adverse impacts to nearby sensitive receivers.

9.0 Conclusion

A construction and operational noise and vibration impact assessment has been completed for the proposed syncons at the existing Transgrid Armidale 330 kV substation site (the proposed activity).

Nearby noise sensitive residential receivers were identified, with the closest being approximately 245 m south of the substation site; no non-residential receivers are located close to the proposed activity. Attended and unattended noise measurements were previously completed by AECOM to characterise the existing noise environment. The measured noise levels were used to establish construction NMLs and operational project noise trigger levels.

Construction noise impacts were assessed at nearby representative residential receivers for the three most noise critical construction scenarios – site establishment, demolition of redundant infrastructure and syncon bench installation. Predicted construction noise levels were exceeded at two residential receivers during site establishment and demolition of redundant infrastructure, and at one residential receiver during syncon bench installation. No residential receivers were predicted to be highly noise affected for the construction scenarios. The use of vibration intensive equipment was not proposed.

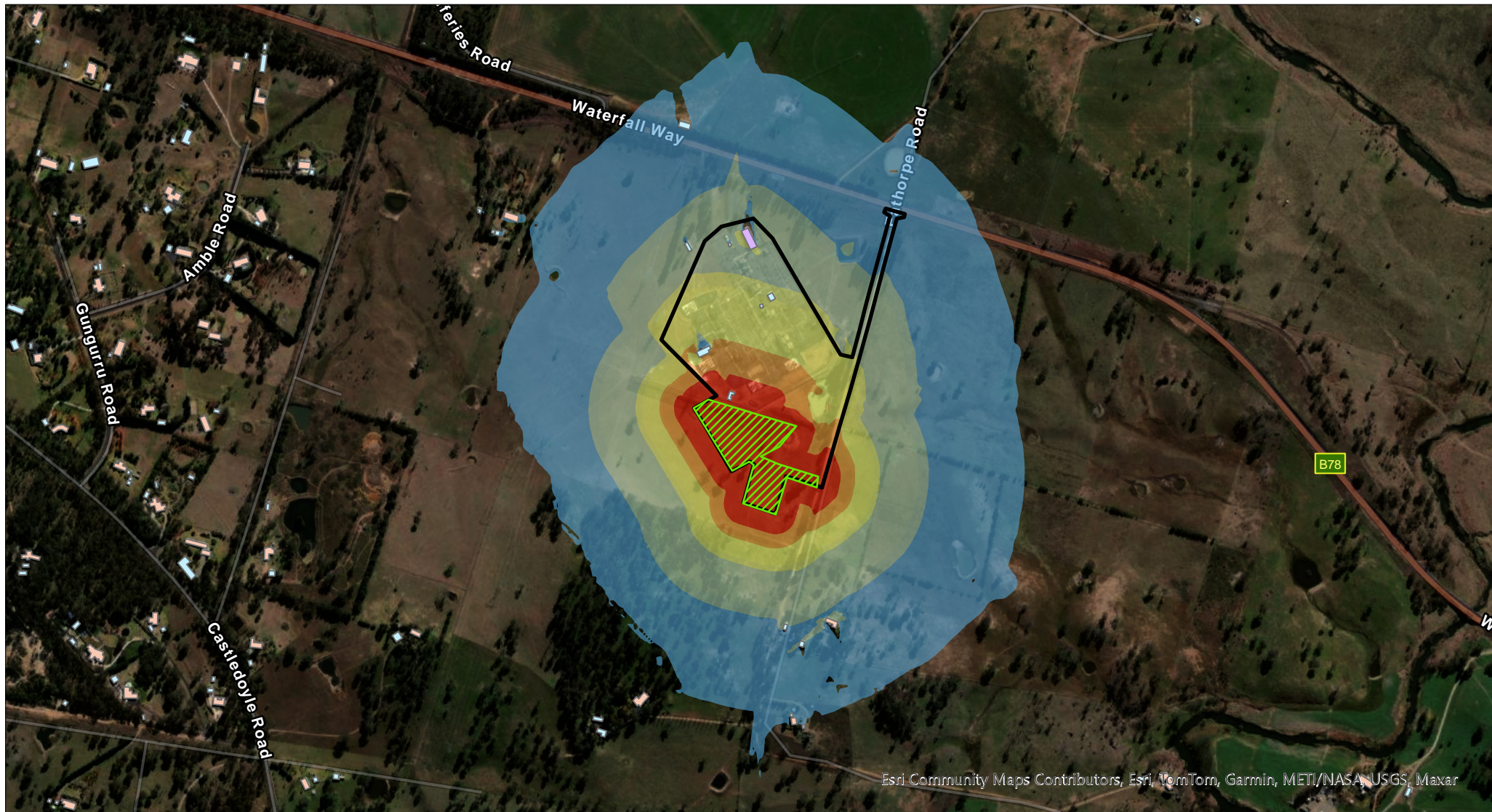
A CNVMP would be developed for the proposed activity and implemented prior to commencement of construction activities. The CNVMP would include all reasonable and feasible safeguards to manage the noise emissions from the proposed activity and any complaints which may occur due to construction noise. Implementation of specific mitigation measures outlined within the CNVMP would aim to minimise and manage noise impacts where possible.

Significant noise sources for the proposed activity include the syncons and associated equipment, such as transformers, a diesel generator, and a cooling system. Predicted operational noise from the proposed activity was modelled and compared against established project noise trigger levels. Results of the noise modelling showed that the operation of the syncons including generator testing results in no exceedances over the established project noise trigger levels during the daytime under both meteorological conditions. Predicted operational noise levels with no diesel generator testing exceed the project noise trigger levels by 1 dB(A) at R10 during the evening scenario under noise-enhancing meteorological conditions and comply during the night-time under both meteorological conditions.

Mitigation measures to minimise and manage noise from the operation of the syncons have been provided and would include housing the syncon units inside a building to provide attenuation and the construction of a noise wall around external cooling plant.

Appendix A

Construction Noise Contour Maps



Armidale Accelerated Synchronous Condenser Construction Contours - Scenario 1 - Site Establishment

Noise contours are shown 1.5 meters above ground level

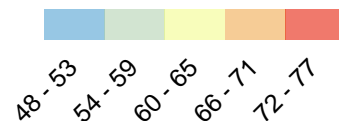
Proposed impact area

Scenario 1

Usage

Commercial
 Residential
 Shed

Predicted noise level $L_{Aeq,15min}$ dB(A)

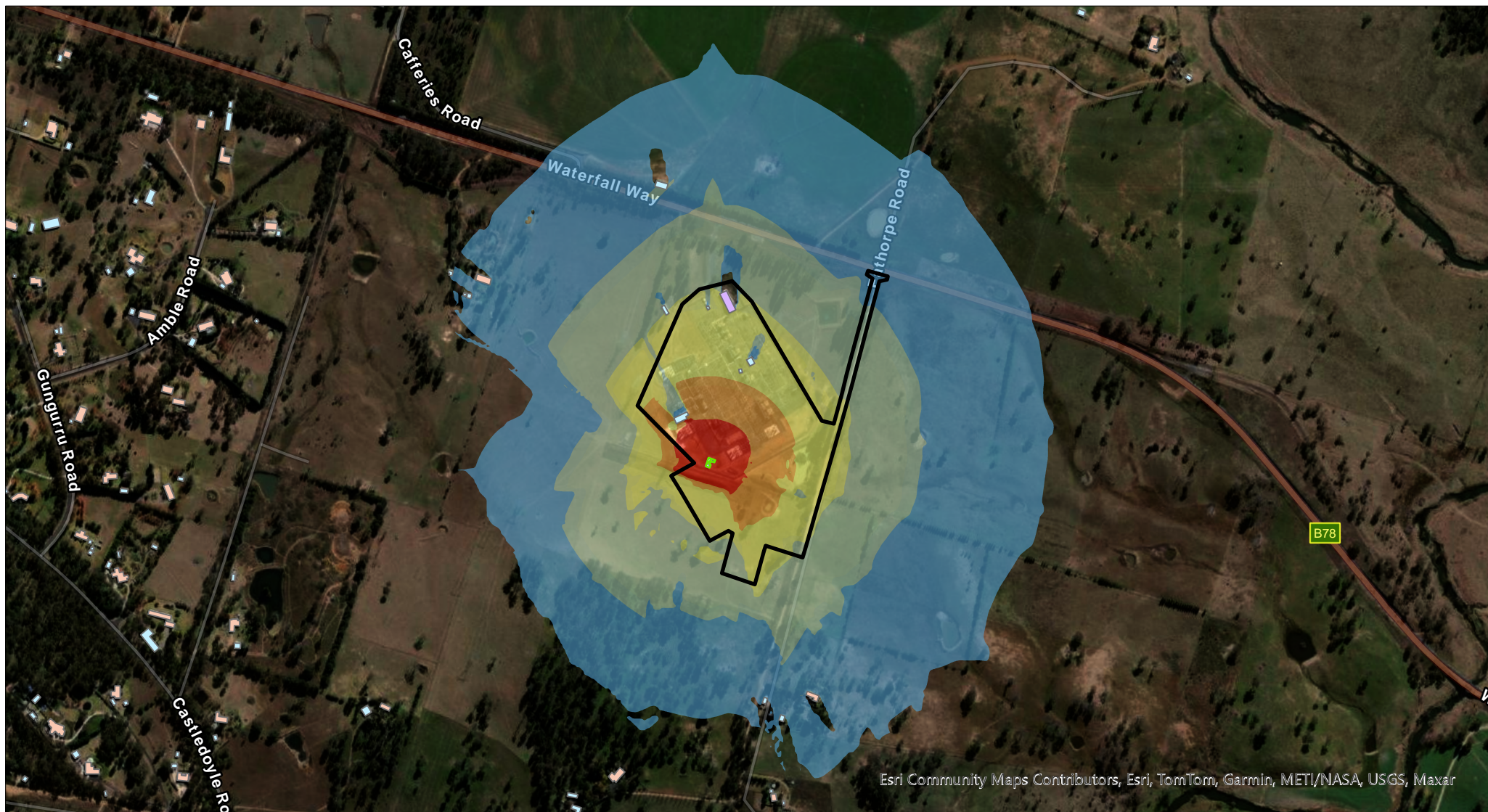


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Armidale Accelerated Synchronous Condenser Construction Contours - Scenario 2 - Demolition of Redundant Infrastructure

Noise contours are shown 1.5 meters above ground level

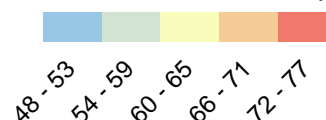
Proposed impact area

Scenario 2

Usage

Commercial
 Residential
 Shed

Predicted noise level $L_{Aeq,15min}$ dB(A)

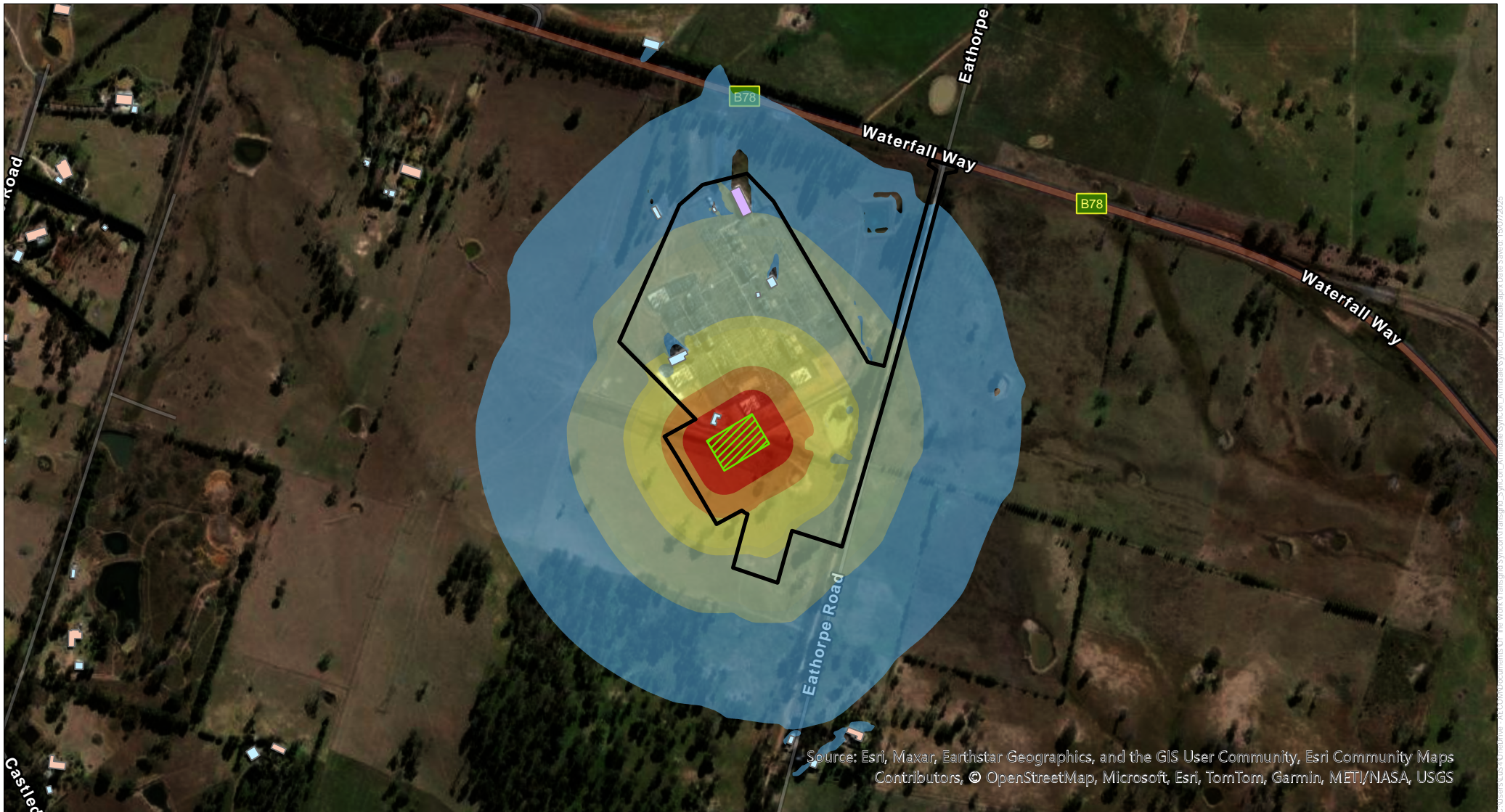


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Armidale Accelerated Synchronous Condenser Construction Contours - Scenario 3 - Syncon Bench Installation

Noise contours are shown 1.5 meters above ground level

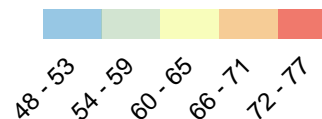
Proposed impact area

Scenario 3

Usage

Commercial
 Residential
 Shed

Predicted noise level $L_{Aeq,15min}$ dB(A)



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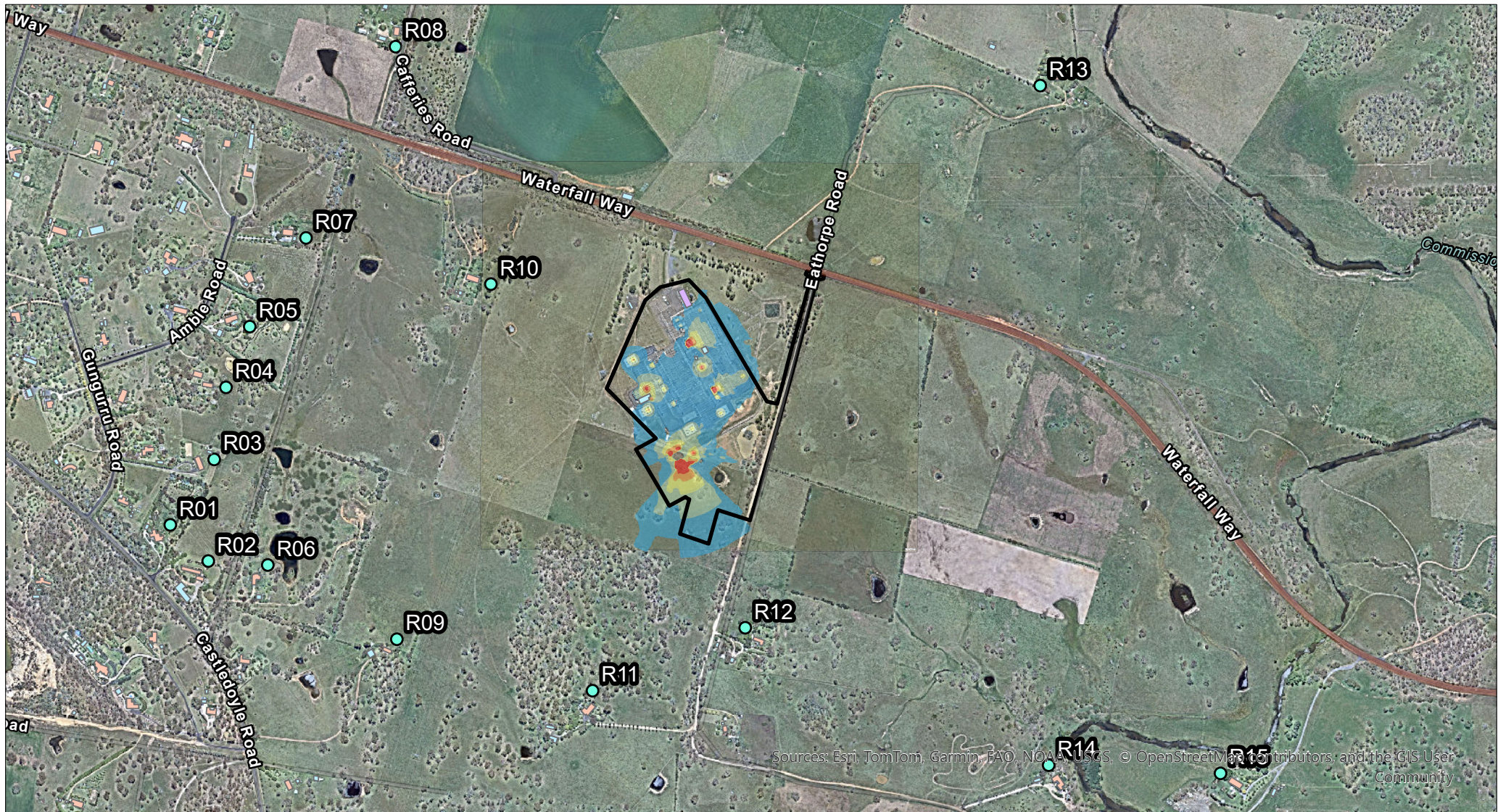
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Appendix B

Operational Noise Contour Maps



Armidale Accelerated Synchronous Condenser Operational Contours - Daytime (with generator)

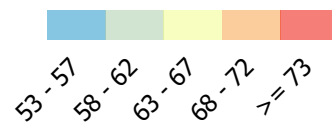
Noise contours are shown 1.5 metres above ground level

- Proposed impact area
- Assessment receivers

Usage

- Commercial
- Industrial
- Residential
- Shed

Predicted noise level $L_{Aeq,15min}$ dB(A)



Note: Contours have been calculated under noise-enhancing meteorological conditions



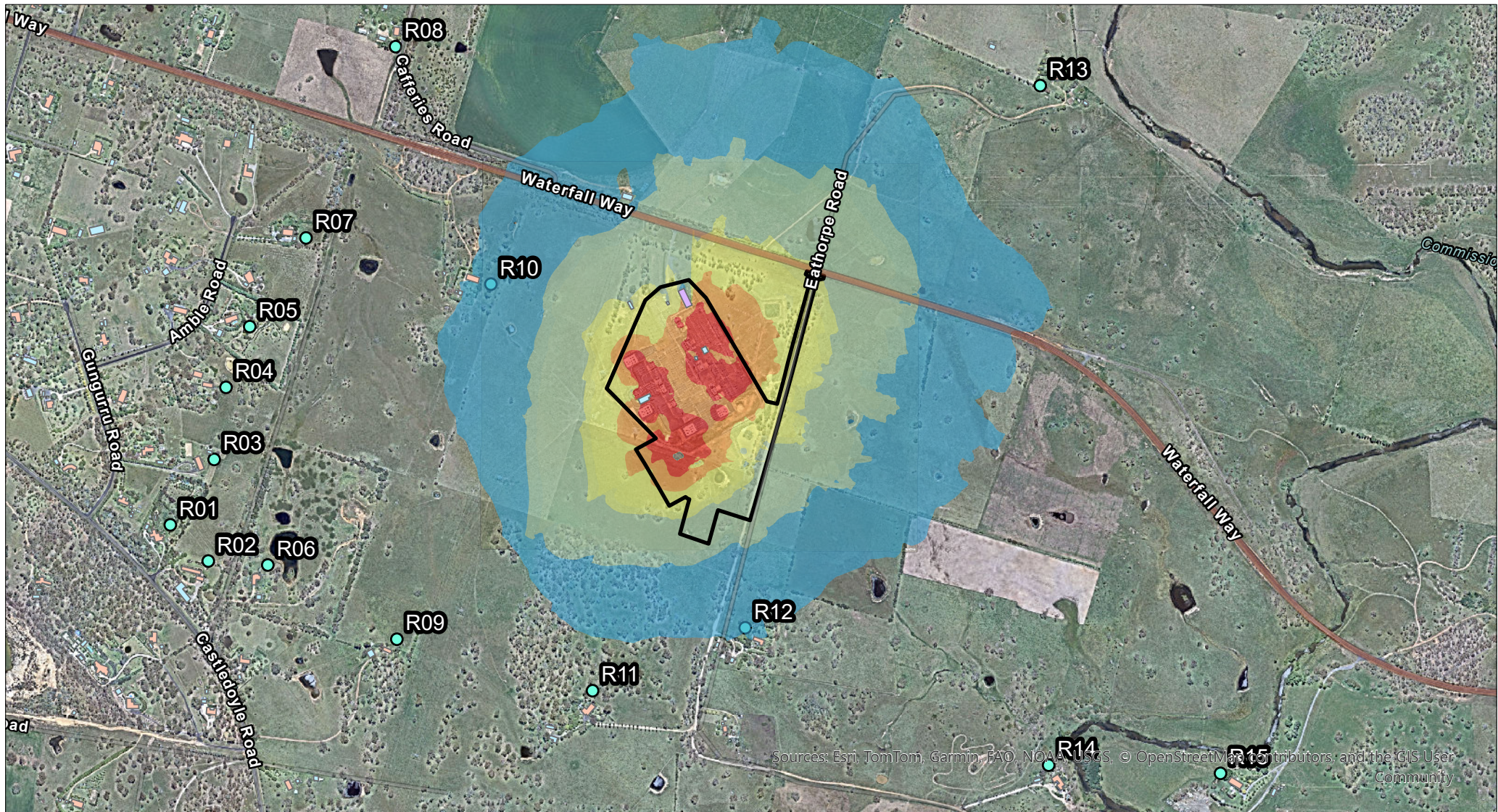
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Source: Nearmap 2025



Armidale Accelerated Synchronous Condenser Operational Contours - Daytime, evening or night (Typical operation)

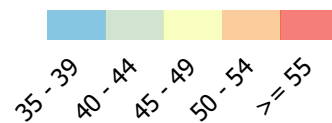
Noise contours are shown 1.5 metres above ground level

- Proposed impact area
- Assessment receivers

Usage

- Commercial
- Industrial
- Residential
- Shed

Predicted noise level $L_{Aeq,15min}$ dB(A)



Note: Contours have been calculated under noise-enhancing meteorological conditions



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Source: Nearmap 2025