SER Decision Statement

Wellington 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 Wellington 330 kV substation (the proposed activity). The proposed activity involves construction of a new access road and upgrades to existing access roads, installation of new 132 kV transmission lines and 330 kV gantry structures, removal of redundant 132 kV transmission lines, 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).

[redacted]

Grant Warnsby
General Counsel/ Corporate
Transgrid
Date: 18/12/25

Transgrid

People. Power. Possibilities.

Summary Environmental Report (SER)

Wellington 330 kV Substation - new synchronous condenser

Part 5 EP&A Act Environmental Impact Assessment

December 2025

Document preparation history

Revision	Reviewed by	Date
0	Neil Standen	18 September 2025
1	Neil Standen	17 November 2025
2	Neil Standen	9 December 2025

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	9 December 2025
Designation	Associate Director
Qualification	BSc (Hons) Environmental Biology MSc Environmental Studies
Organisation	AECOM

Contents

1. Introduction 1

1.1. Proposed activity overview and need 1

1.2. Purpose of the SER 1

2. Proposed activity description 2

2.1. Proposed activity scope 2

2.2. Proposed activity location and property identification 3

2.3. Construction activities 6

2.3.1. Construction methodology 6

2.3.2. Construction material, plant and equipment 9

2.3.3. Construction schedule 9

2.4. Operation and maintenance 10

2.5. Alternative options considered 10

3. Planning context 12

3.1. Approvals pathway 12

3.1.1. Environmental Planning and Assessment Act 1979 12

3.1.2. State Environmental Planning Policy (Transport and Infrastructure) 2021 12

3.1.3. Duty to consider environmental impacts 13

3.2. Other relevant Commonwealth and NSW legislation 13

4. Consultation 16

5. Environmental impact assessment 18

5.1. Land use 18

5.1.1. Existing environment 18

5.1.2. Impact assessment 18

5.2. Geology and soils 20

5.2.1. Existing environment 20

5.2.2. Impact assessment 20

5.3. Hydrology and water quality 23

5.3.1. Existing environment 23

5.3.2. Impact assessment 23

5.4. Ecology 24

5.4.1. Existing environment 25

5.4.2. Impact assessment 26

5.5. Aboriginal heritage 28

5.5.1. Existing environment 28
5.5.2. Impact assessment 32
5.6. Historic heritage 32
5.6.1. Existing environment 32
5.6.2. Impact assessment 33
5.7. Noise and vibration 33
5.7.1. Existing environment 33
5.7.2. Impact assessment 35
5.8. Traffic and access 36
5.8.1. Existing environment 36
5.8.2. Impact assessment 37
5.9. Air quality 38
5.9.1. Existing environment 38
5.9.2. Impact assessment 38
5.10. Hazards and risks 39
5.10.1. Existing environment 39
5.10.2. Impact assessment 40
5.11. Visual amenity 43
5.11.1. Existing environment 43
5.11.2. Impact assessment 43
5.12. Waste 44
5.12.1. Existing environment 44
5.12.2. Impact assessment 44
5.13. Social and economic considerations 44
5.13.1. Existing environment 44
5.13.2. Impact assessment 45
5.14. Cumulative impacts 45
5.14.1. Existing environment 45
5.14.2. Impact assessment 46

6. Consideration of statutory factors 48

6.1. Section 5.5 of the EP&A Act and 7.3 of the *Biodiversity Conservation Act 2016* 48
6.2. Clause 171 of the EP&A Regulation 48
6.3. Matters of National Environmental Significance under the EPBC Act 50
6.4. Consideration of Ecologically Sustainable Development 51

7. Environmental management 52

8. Summary and conclusion 53

9. References 54

Appendix A Map series **56**

Appendix B Mitigation measures **60**

Appendix C Flora and Fauna Assessment **67**

Appendix D Aboriginal Archaeological Due Diligence Assessment **69**

Appendix E Noise and Vibration Impact Assessment **71**

1. Introduction

1.1. Proposed activity overview and need

Transgrid is proposing to install two synchronous condensers (syncons) at the existing Wellington 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 Wellington 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 Wellington 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
- Installation of new 330 kV gantry structures, approximately 800 metres (m) of 132 kV transmission lines (including pole structures), and removal of approximately 1.4 kilometres (km) of redundant 132 kV transmission lines
- Upgrades to the existing access road from Goolma Road, new access road(s) to new substation bench and existing substation, and relocation of the existing access track within the impact area around the construction footprint
- Installation of a new bench (concrete slab, foundations and associated earthworks), with an indicative maximum footprint of around 130 by 150 m, immediately north of the existing Wellington 330 kV substation to house the syncon and associated infrastructure
- 330 kV busbar extension with a new switch bay, which comprises a 330 kV circuit breaker, disconnector, current transformer, capacitive voltage transformer, earth switch, post insulators/busbar supports, and surge arrester
- Installation of the new syncon 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 the 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 Wellington 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 Wellington 330 kV substation site (the substation site) is located off Goolma Road, Wellington within the Dubbo Regional local government area (LGA). The nearest major township is Montefiores, situated around 3 kilometres to the southwest. The substation is located within Lot 1 of DP1226751, which is owned by the Electricity Transmission Ministerial Holding Corporation (ETMHC) and leased and managed by Transgrid. The Wellington 330 kV substation is located within the proposed impact area shown in Figure 2-2.

The proposed impact area is located on land zoned as Infrastructure SP2 and Primary Production RU1. Adjoining land use zones include Primary Production RU1 to the east, south and southwest, an Infrastructure SP2 (Classified Road) to the north and northwest. Land zoned as Large Lot Residential R5 is located around 450 m east of the substation site. The substation site is located in a rural area surrounded by open paddocks. The nearest residential receiver is approximately 515 m northeast 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 incorporates land necessary to facilitate the connection of the proposed syncons. This includes a portion of Lot 32 of DP 622471, owned by Shirley Angophora Pty Ltd, which is required to enable the removal of existing redundant transmission poles and lines, and the installation of new transmission infrastructure. 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 impact area and is shown in Figure 2-2.

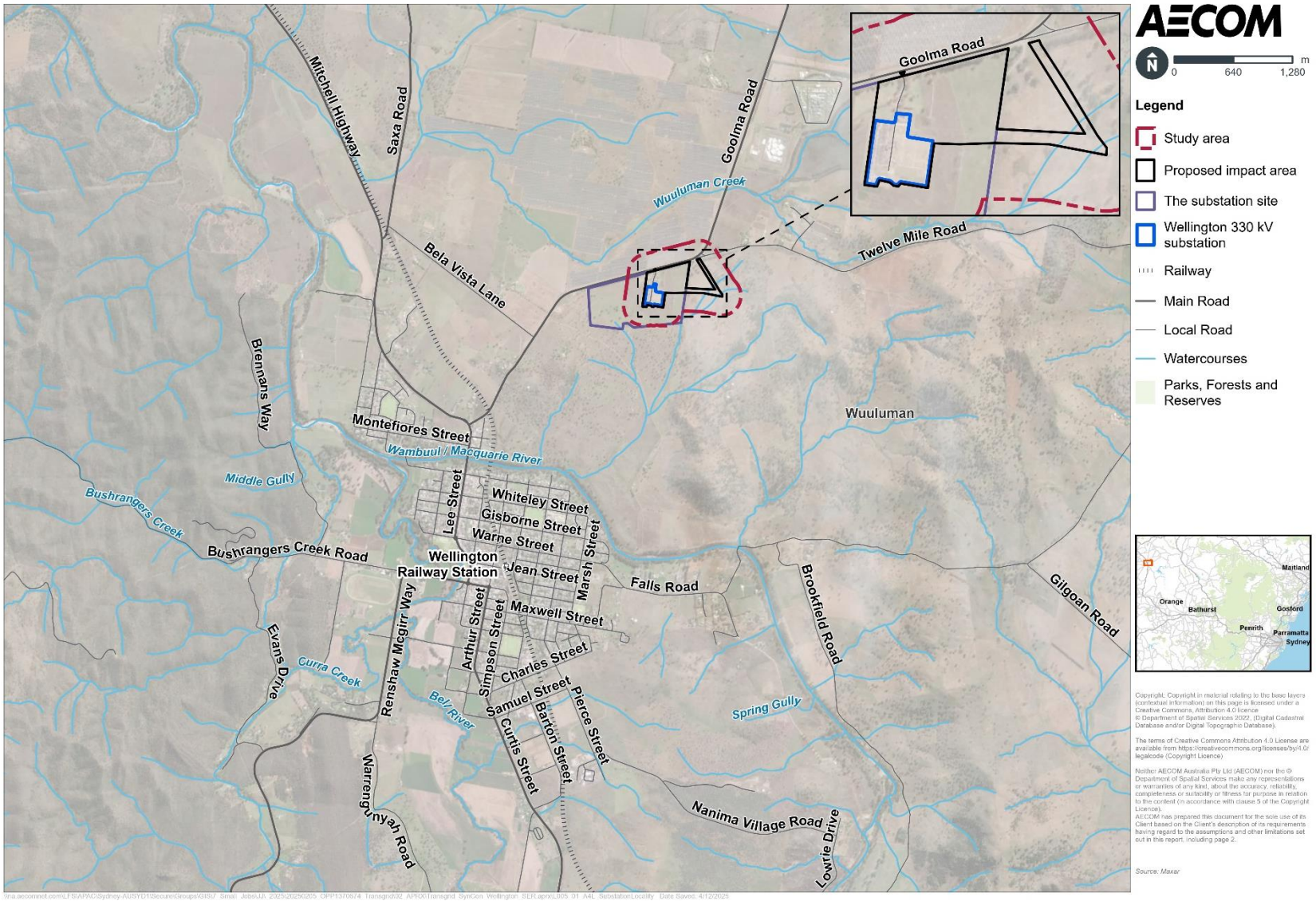


Figure 2-2 Proposed activity location

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	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 Wellington 330 kV substation site within the proposed impact area. The portion of the proposed impact area subject to the proposed bench extension would be cordoned with fencing (or similar measures) during the construction works. The northern and eastern portions of the proposed impact area, which is proposed for the bench extension and new transmission line, 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 accordingly if contamination is found.
Main construction works	Removal of redundant and installation of new transmission lines and poles	A new section 94J transmission line, concrete poles, 30m^2 worksite and access tracks would be constructed, within the proposed impact area, to avoid the syncon work area and crossing other Transgrid assets. The new section of line will connect to the existing 330 kV gantry and span to the west of the syncon, then extend eastward, running parallel with Goolma Road. The new section of 94J transmission line would be cutover and energised prior to decommissioning the redundant 94J line and pole infrastructure, which would be removed and disposed of at an appropriately licensed facility. The entire section of the new 94J transmission line would be owned by Essential Energy, besides the new pole within the existing substation, which would be Transgrid's asset.
	Access road construction and upgrades	The existing access road from Goolma Road would be upgraded, and a new access road constructed to connect the current access road alignment with the proposed substation bench. These works would facilitate the delivery of equipment and materials during the construction and ensure ongoing access for maintenance activities during operation. The existing access track would be relocated around the construction footprint, within the proposed impact area, to avoid interference with the proposed activity.

Stage	Activity	Overview
	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 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 connect 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.
	330 kV busbar extension	There are two options for the syncon 330 kV busbar arrangement. Option 1 would involve constructing 330 kV gantry structures and would have the conductors pass over the 94B 132 kV transmission lines. Concrete pole structures 1 to 4 (94B-1 – 94B-4) on the existing transmission line 94B would be removed and reconstructed in the redundant 94J transmission easement, within the proposed impact area. New conductor would be strung from the substation gantry to 94B-5. Each new concrete pole will require a 30m^2 worksite. Existing access tracks will be utilised where possible for construction and decommissioning activities. Option 1 would require one new access road to be constructed to allow continued access during operation to the existing substation through the syncon site. Option 1 would involve the syncon bench being separate to the existing substation bench and would be enclosed by its own fencing. Option 2 would involve a 330 kV busbar extension via tubular busbars on post insulators and converting line 94B into underground 132 kV cables. The installation of the 132 kV cables would include two 132 kV underground overhead poles, underground pits and conduits . Transmission line 94B structure 1 will be demolished and the underground cables will connect to existing 94B structure 2. The remaining 94B transmission line would remain operation.

Stage	Activity	Overview
	Syncon and associated equipment installation	The syncons and associated equipment would be installed, including: • 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 • Backup diesel generator • Pony motor. 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. 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. 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. Sulfur hexafluoride (SF_6) gas containing equipment (such as the 330 kV circuit breaker and any gas insulated switchgear) would be filled on site.
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, disconnector, 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 Wellington 330 kV substation. The proposed syncon connection would be off the 330 kV busbar extension and would remain disconnected until such time 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 the existing Wellington 330 kV substation

Stage	Activity	Overview
		would be rehabilitated to as close to pre-construction 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
- 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
- Electrical conduit and cables
- 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 approximately 2 years to complete. The proposed activity start date may be altered with the 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 or 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 Wellington 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 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

Three 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	The do-nothing option would be the base case where Transgrid do not progress a syncon at the Wellington 330 kV substation site. 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).	No
Option 1	This option would involve the installation of the new syncons in the southern end of the Wellington 330 kV substation. The scope involves 330 kV busbar extension, new switchbay and filling in of an existing dam, relocating transmission line 947 and upgrading a large section of the existing access track for vehicle access during construction. A large number of 33 kV underground cables belonging to the adjacent Wellington Solar Farm were identified at the southern end of the substation that would potentially be affected by the syncon works. This option was not progressed due to the higher cost estimate of the civil works, transmission line relocation, and risks to the 33 kV cables.	No
Option 2 – Preferred option	This option would involve the construction of the new syncons and associated equipment to the north of the existing Wellington 330 kV substation. This option minimises potential environmental and operational impacts during construction and operation of the proposed activity.	Yes

	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).	

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.

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			
***Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**	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			
***Biodiversity Conservation Act 2016* (BC Act)**	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 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 details of the impacts to ecology.	None required.

Legislation	Potential approval requirements	Relevance to the proposed activity	Permit/ approval/ licence requirement
	the significance of the impact.		
Heritage Act 1977 (Heritage Act)	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. An excavation permit is required under Sections 139(1) and (2) to disturb or excavate any land containing or likely to contain a relic. Section 139(4) provides that exceptions from the approval requirements of Sections 139(1) and (2) can be sought in certain circumstances.	There are no 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 a reasonable expectation that the excavation or disturbance is likely to result in a relic being discovered, exposed, moved, damaged or destroyed (see Section 5.6). Therefore, no permits or approvals are required under the Heritage Act.	None required.
National Parks and Wildlife Act 1974 (NPW Act)	An Aboriginal heritage impact permit (AHIP) under Section 90 of the NPW Act is required to harm or desecrate an Aboriginal heritage object. 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 National Parks and Wildlife Service is required.	An Aboriginal archaeological due diligence assessment for the activity was undertaken (refer to Section 5.5). The assessment identified one Aboriginal site within the impact area. If impacts are unavoidable, an AHIP application would be prepared for the site supported by an Aboriginal Cultural Heritage Assessment Report (ACHAR). The assessment concludes that there is the potential for Aboriginal objects to occur beneath the surface layer within 50 m of the two 1st order watercourses present in the study area. However, provided works are restricted	If impacts to the Aboriginal site are unavoidable, an AHIP under Section 90 is required prior to the commencement of works.

Legislation	Potential approval requirements	Relevance to the proposed activity	Permit/ approval/ licence requirement
		to the disturbance footprints of existing transmission line poles, further impacts should be avoided. If impacts are unavoidable, Aboriginal consultation would be undertaken in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010a).	
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 may require access upgrades within the Goolma Road reserve (classified road).	A section 138 approval is required if works are carried within the road reserve of Goolma Road, which is a classified 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 Dubbo Regional Council was undertaken by Transgrid and NSW Department of Climate Change, Energy, Environment and Water (NSW DCCEEW) on 28 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 8 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 2.45 of the TISEPP, written notice of the intention to carry out the proposed activity was given to Dubbo Regional Council on 16 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. The issues raised by Council on 29 July 2025 and how these are addressed in this SER are summarised in Table 4-1.

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 6773 and 6945 Goolma Road, Montefiores on 16 July 2025 and 25 September 2025 respectively as occupiers of the land adjoining Wellington 330 kV substation, inviting submissions within 21 days from the date on which the notice was given. A submission was received via phone call and follow-up email from 6945 Goolma Road on 29 September, with further correspondence until 24 October 2025. Issues raised and how these have been addressed in this SER are summarised in Table 4-1. No further responses received.

Table 4-1 Issues raised during consultation and how addressed

Stakeholder	Issues raised	How addressed
Dubbo Regional Council – NSW DCCEEW Consultation	**Community perception and expectation** – community sensitivity to renewable projects are heightened due to other projects in the region. Council recommends consulting with the Renewable Energy Benefit Committee and the Wellington Town Committee.	A Community and Stakeholder Engagement Plan (CSEP) has been prepared, covering: • Early and proactive engagement • Communication of environmental management measures and project benefits • Consultation with local community panels/committees and adjacent landowners. The CSEP also outlines a hotline and email contact for community members to ask questions and provide feedback on the proposed activity.
	Transport and logistics – cumulative traffic impacts due to other projects in the region need to be considered. Road works that may affect transport are currently being undertaken by other proponents of projects within the region.	Cumulative impacts have been assessed in Section 5.14 and any impacts would be managed through the implementation of mitigation measures provided in Appendix B. Transgrid will contact Transport for NSW as suggested by Council, to plan OSOM vehicle movements. Consultation with these authorities regarding vehicle movements will be ongoing as necessary.

	Oversize/overmass (OSOM) vehicle deliveries should be coordinated with Transport for NSW. Council will coordinate a meeting of proponents to work through traffic logistics	Ongoing consultation with the Council and any other relevant stakeholders will be in accordance with Transgrid's CSEP and mitigation measures TA1 and TA3 in Appendix B.
	Housing – workforce accommodation arrangements should be considered by coordinating with other renewable energy development proponents and Council.	The relatively small workforce would have a negligible impact on housing in the region, which has been assessed in Section 5.14. Transgrid would also consult with construction contractors to seek local skilled workers in accordance with Transgrid's Procurement Management Framework and the project's Australian Industry Participation Plan.
	Visual impacts – the visual impacts of the development, including building colours and textures, should be considered.	Visual impacts due to the proposed activity have been assessed in Section 5.11. Sensitive receivers have been identified, and mitigation measures VA1 and VA2 in Appendix B, have been outlined to minimise visual impacts from the construction and the operation of the proposed activity on the nearby receivers.
Dubbo Regional Council – Statutory Consultation	Council's Infrastructure Department raised no concerns with regard to the proposed works, noting comments from TfNSW should be sought regarding vehicle access.	Vehicle access and access road works off Goolma Road will be undertaken in consultation with Council and TFNSW, as outlined in Section 5.8, to determine the applicable permit requirements. These works will be documents within the project Construction Environmental Management Plan (CEMP), which would also detail any traffic management methods in accordance with Appendix B.
6945 Goolma Road, Montefiores NSW 2820	Compliance with the NSW regulations regarding noise levels for DA approved subdivided Lots 4 and 5. Lots are subdivided within Lot 2 of DP1136578.	Transgrid has undertaken a detailed Noise and Vibration Impact Assessment (NVIA) in accordance with the Interim Construction Noise Guideline and Noise Policy for Industry, which is summarised in Section 5.7and included as an attachment Appendix E.
	Provision of noise modelling maps showing sound pressure level contours with the syncon in full operation at night.	The finalised NVIA is found in Appendix E.
	Publication of the Environmental Assessment	The SER is published on Transgrid's website: https://www.transgrid.com.au/projects-innovation/meeting-system-strength-requirements-in-nsw/

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 and Primary Production RU1 under the Dubbo 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 largely located across Lot 1 of DP1226751, which is owned by the ETMHC and leased and managed by Transgrid. A portion of the proposed impact area is located on Lot 32 of DP622471, owned by Shirley Angophora Pty Ltd, which is required for the removal of redundant transmission poles and lines.

The substation site is located in a rural area surrounded by open paddocks to the east, south and west, and a solar panel farm to the north. A State road, Goolma Road, lies adjacent to the north of the impact area.

The nearest residential dwelling is located around 515 m northeast 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 removal of redundant poles and lines and installation of new transmission poles and lines, located within a transmission line easement immediately east of Transgrid's existing property boundary. The proposed activity would not impose any new restrictions on land use within the study area although, would require access to an existing transmission line easement located on privately owned land, owned by Shirley Angophora Pty Ltd, immediately east of Transgrid's property boundary. Therefore, only minor land use impacts due to access arrangements between Transgrid and the private landowner, are anticipated during construction.

Operation

Under the Dubbo 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 Dubbo Regional LEP.

As the proposed activity would be located within Transgrid's existing property and within an existing easement for the removal of the redundant 94J and 94B transmission lines and installation of new 94B transmission line, no additional property acquisition would be required. 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.

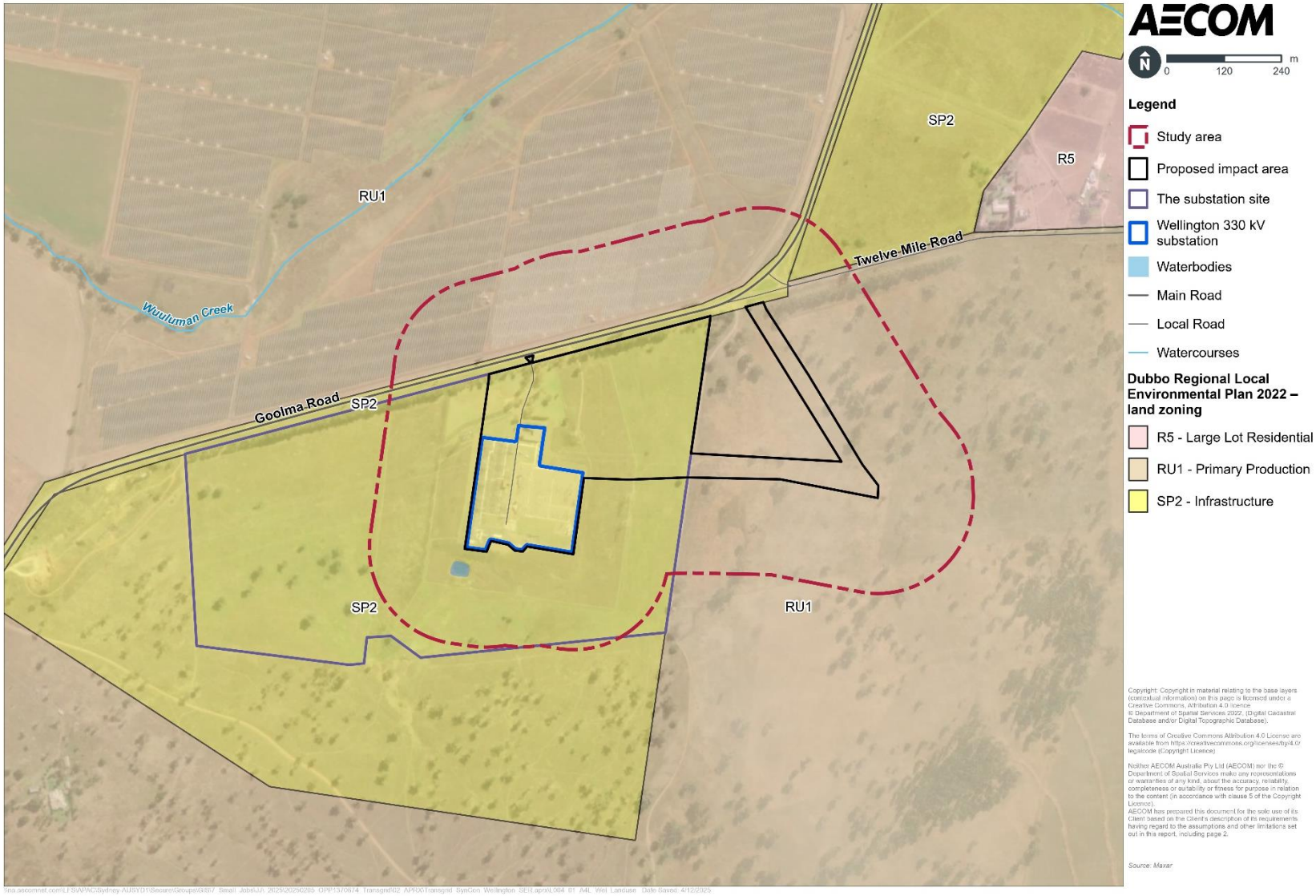


Figure 5-1 Land zoning

5.2. Geology and soils

5.2.1. Existing environment

The topographic landscape of the proposed impact area is gently undulating, with its elevation ranging from 362 m Australian height datum (AHD) in the northeast to 340 m AHD in the southeast, with the landscape sloping towards the Macquarie River in the southwest. The study area is located on sedimentary and igneous rock. The soil type in the study area is ferrosols.

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 9 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 9 September 2025 found that a small portion of the study area is identified as having a low risk of naturally occurring asbestos within mafic rock (refer to Figure 5-2).
Salinity	A review of the NSW Government's SEED map on 9 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
- The potential exposure of naturally occurring asbestos
- 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.

The proposed activity may excavate naturally occurring asbestos from surface level within mafic rock in the southwestern portion of the impact area. However, these rocks are volumetrically small, and the majority of

the area, identified as having a low potential of asbestos, would be avoided. Any risks would be effectively managed through mitigation measures outlined in Appendix B

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 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 the 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.

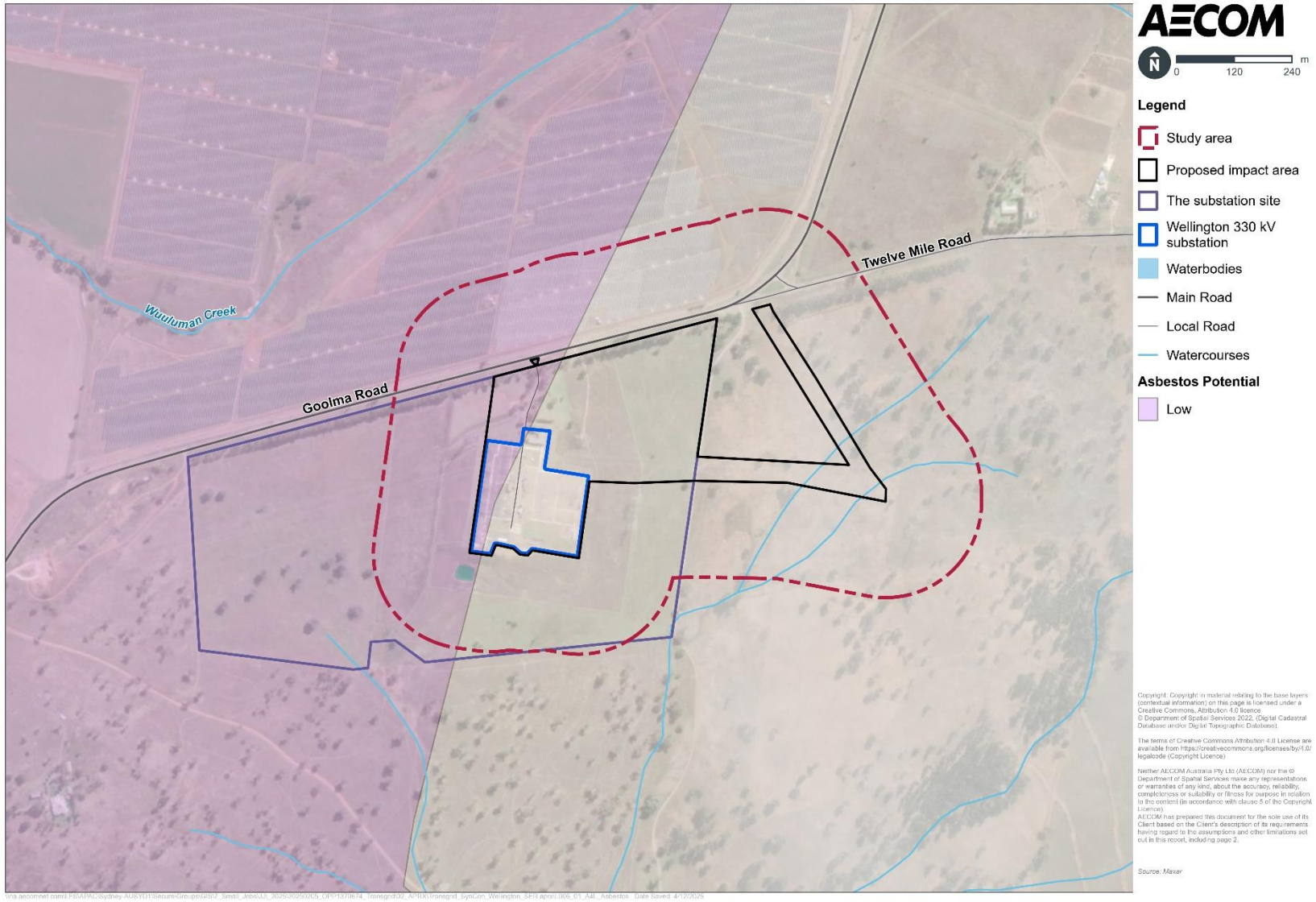


Figure 5-2 Asbestos potential

5.3. Hydrology and water quality

5.3.1. Existing environment

The proposed activity is located within the Macquarie-Bogan River catchment, which covers an area of 74,800 square kilometres and includes an extensive area in the central-west of NSW from the Great Dividing range to the Barwon River near Brewarrina (NSW DCCEEW, 2025).

The study area is located in a sparsely vegetated rural area, surrounded by cleared transmission line easements. A non-perennial unnamed drainage line traverses the study area in the southeast (refer Figure 2-2). The unnamed drainage line converges with two other drainage lines before joining with the Macquarie River around 2.3 km southwest of the substation site. Macquarie River is a ninth-order perennial stream that is mapped as key fish habitat.

The Murray-Darling Basin Authority's 2025 Sustainable Rivers Audit described the Macquarie-Bogan Catchment to have a very good rating for river flows and connectivity; however, it had a moderate to very poor rating for native vegetation and fish habitat (2025).

The study area is located within the Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020.

A search of groundwater bores in the proposed activity area was completed using the NSW Department of Primary Industries and Regional Development's MinView Seamless Geology tool on 9 September 2025. The search found 11 groundwater bores within 2 km of the study area. The status of 10 of the groundwater bores is listed as 'unknown' or 'non-functional', and groundwater depths have not been recorded. The other groundwater bore is listed as 'functioning', and the groundwater depth has been recorded to be 22 m below ground level (bgl) in 2006, located around 350 m northeast of the study area.

Geotechnical investigations conducted by SMEC 17 – 20 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 20 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 channels southeast 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 closest borehole has recorded groundwater depth as 22 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 the implementation of the mitigation measures described in Appendix B, 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 0.58 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 14 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 three plant community types (PCTs) within 1km of the biodiversity impact area. Vegetation in the southeast portion of the biodiversity impact area is mapped as PCT 266 White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion, and PCT 511 Queensland Bluegrass - Redleg Grass - Rats Tail Grass - spear grass - panic grass derived grassland of the Nandewar Bioregion and Brigalow Belt South Bioregion (refer to Figure 5-3). These PCTs are 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. However, upon closer inspection during site surveys, the biodiversity impact area was deemed not to comprise native vegetation and therefore not to contain the TEC, due to heavy infestation of exotic grasses.

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

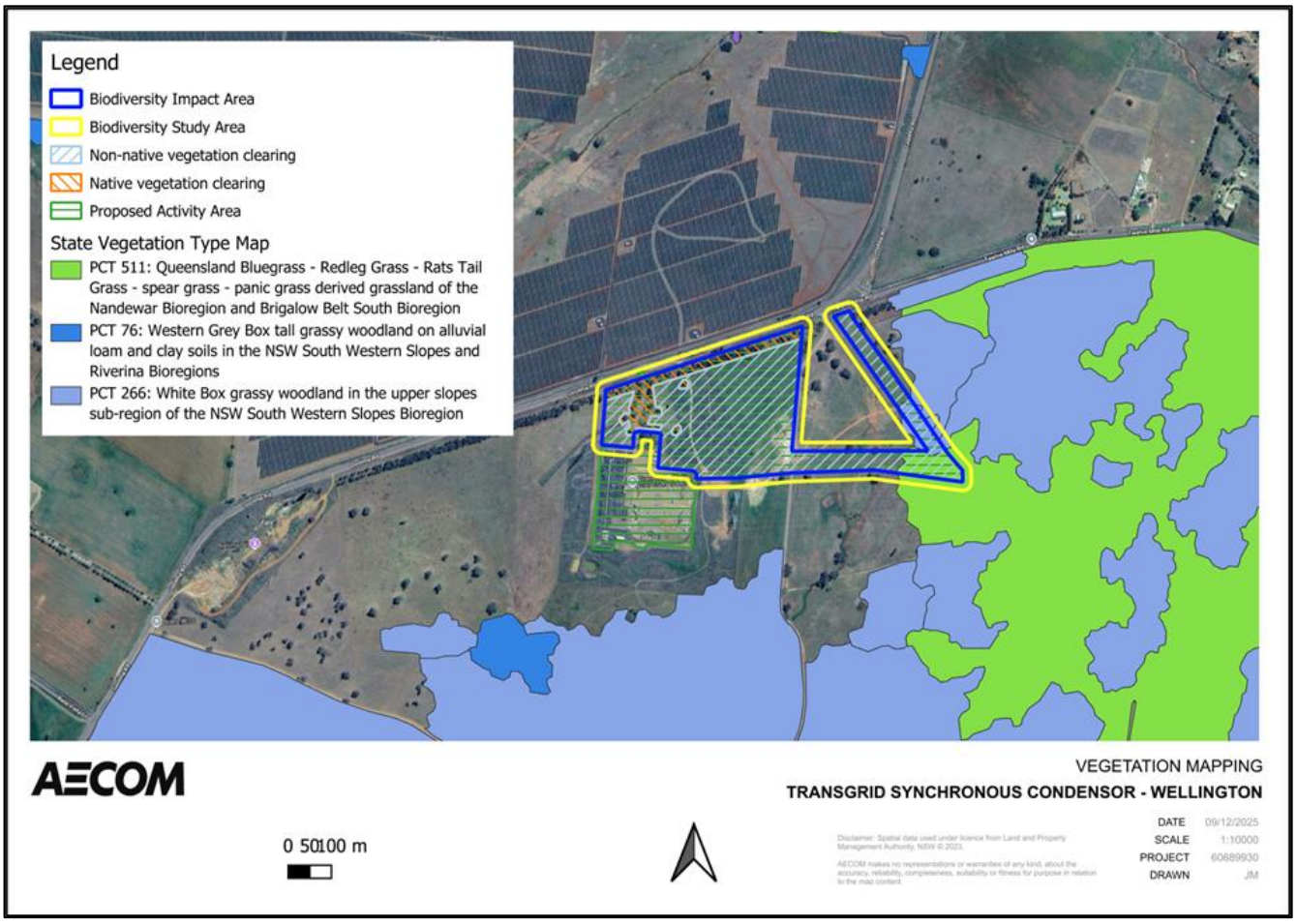


Figure 5-3 Vegetation communities (AECOM, 2025b)

Threatened species and habitat

Desktop searches were undertaken on 18 July 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 Pink-tailed Legless Lizard, Little Eagle and Superb Parrot, identified over 100 m from the biodiversity impact area. None of the fauna species were observed during the field survey. Further, there is limited habitat for these species present due to degradation caused by past agricultural activity.

The nearest threatened flora record to the biodiversity impact area is for *Zieria obcordata*, located around 3 km to the northeast. Targeted searches for this species failed to record it within the biodiversity impact 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 Dubbo Regional LGA, the following species was recorded:

- African Boxthorn (*Lycium ferocissimum*) - Must not be imported into the state, sold, bartered, exchanged or offered for sale.

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 5-3 shows conservative areas of vegetation clearing required to facilitate the construction and operation of the proposed activity. Around 1.90 ha of planted native vegetation would require clearing. An additional 12.31 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 removal of native trees would not result in a significant impact to threatened fauna species given the existing low habitat value within the biodiversity impact area. While these trees may provide nesting habitat for Superb Parrot, these trees are in an already disturbed area (adjacent to the substation), where human presence is likely to discourage habitation.

Given the preferred habitat for Pink-tailed Legless lizard was not identified within the biodiversity impact area, the potential for this species to be present is considered low.

The clearing of vegetation would lead to an inevitable increase in fragmentation in the local area. However, this vegetation would only have a minor impact on habitat connectivity due to the existing poor ecological condition. Disturbed areas not required for the operation of the syncon or the existing Wellington 330 kV substation will be rehabilitated to pre-construction conditions.

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, 2010b). 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 5 x 5 km area surrounding the proposed impact area on 21 February 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 16 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 mostly consisting of a lower slope and flat with a low gradient, and nearby watercourses.

Two watercourses are located within the eastern portion of the proposed impact area. These are first-order non-perennial drainage lines that drain into the Macquarie River located around 2 km southwest of the study area. Native vegetation within the proposed impact area has been extensively modified as a result of historical land use activities, including grazing and the construction of the substation.

Overall, land within the proposed impact area is considered to range from low to highly disturbed across different parts of the area, with the western portion within and around the substation site being highly disturbed, and the eastern portion having only been subject to vegetation clearance. 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 21 February 2025 identified a total of 57 Aboriginal archaeological sites within 2.5 km of the proposed impact area. These sites comprised:

- 50 open artefact sites (i.e., artefact scatters and isolated artefacts)
- Two open artefact sites with an associated area of Potential Archaeological Deposit (PAD)
- Two areas of PAD
- One modified tree
- One burial
- One erroneously registered site labelled as "Not a Site".

No recorded sites are located within the proposed impact area, [redacted]

[redacted] However, it is likely to be a naturally formed item and not of Aboriginal archaeological significance.

One previously unidentified Aboriginal object was identified [redacted] during the site inspection. The site has been designated [redacted]

During the site inspection, land surrounding the two first-order drainage lines within the proposed impact area, with the exception of land directly beneath the existing transmission line poles, was assessed as having moderate archaeological potential.

[This figure has been redacted]

Figure 5-4 AHIMS sites near the proposed impact area

[This figure has been redacted]

Figure 5-5 Aboriginal object [redacted]

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 16 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

One new Aboriginal site, [redacted], which has been assessed as retaining moderate archaeological sensitivity. There is a moderate risk that construction of the proposed activity would impact unknown Aboriginal objects or sites in this area without mitigation measures in place. Further, newly identified Aboriginal site [redacted], would be left in-situ with mitigations implemented as per HE2 in Appendix B, to minimise the likelihood of impact as a result of the proposed activity. Transgrid would also undertake construction works for the 94B transmission line and decommission the existing 94B and 94J lines. All construction activities will be carried out at least 50 metres from identified first-order watercourses, while decommissioning will remain confined to existing pole disturbance footprints, in accordance with mitigation measure HE3 outlined in Appendix B.

There are no known Aboriginal objects or sites within the remainder of the proposed impact area, and the risk of potential impacts to Aboriginal heritage values for that area is considered to be low. The Aboriginal Archaeological Due Diligence Assessment also concluded that the archaeological sensitivity of the majority of the proposed impact area, apart from the land within 50 m of the two 1st order watercourses in the southeast of the study area, is assessed as 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 in this area.

Another isolated artefact site [redacted]; however, it would be avoided during construction.

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 8 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
- Dubbo Regional LEP.

There are no heritage items within the study area. The heritage item “Keston” (ID#I278) at Lots 1 and 2, DP 588075 on the Dubbo Regional LEP is located around 400 m to the northwest of the substation site.

5.6.2. Impact assessment

Construction

As no historic heritage items have been identified within or near the impact area, no direct or indirect 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.

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 have a potential impact on 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 is largely defined by distant road traffic noise from Mitchell Highway and local road traffic noise from Goolma Road.

The closest residential receivers are located around 515 m to the northeast of the proposed impact area. There are no non-residential noise sensitive receivers within 2 km of the proposed activity. A total of 11 residential assessment receivers representative of receivers at a variety of distances away were identified for consideration of potential noise and vibration impacts (refer to Figure 5-6).

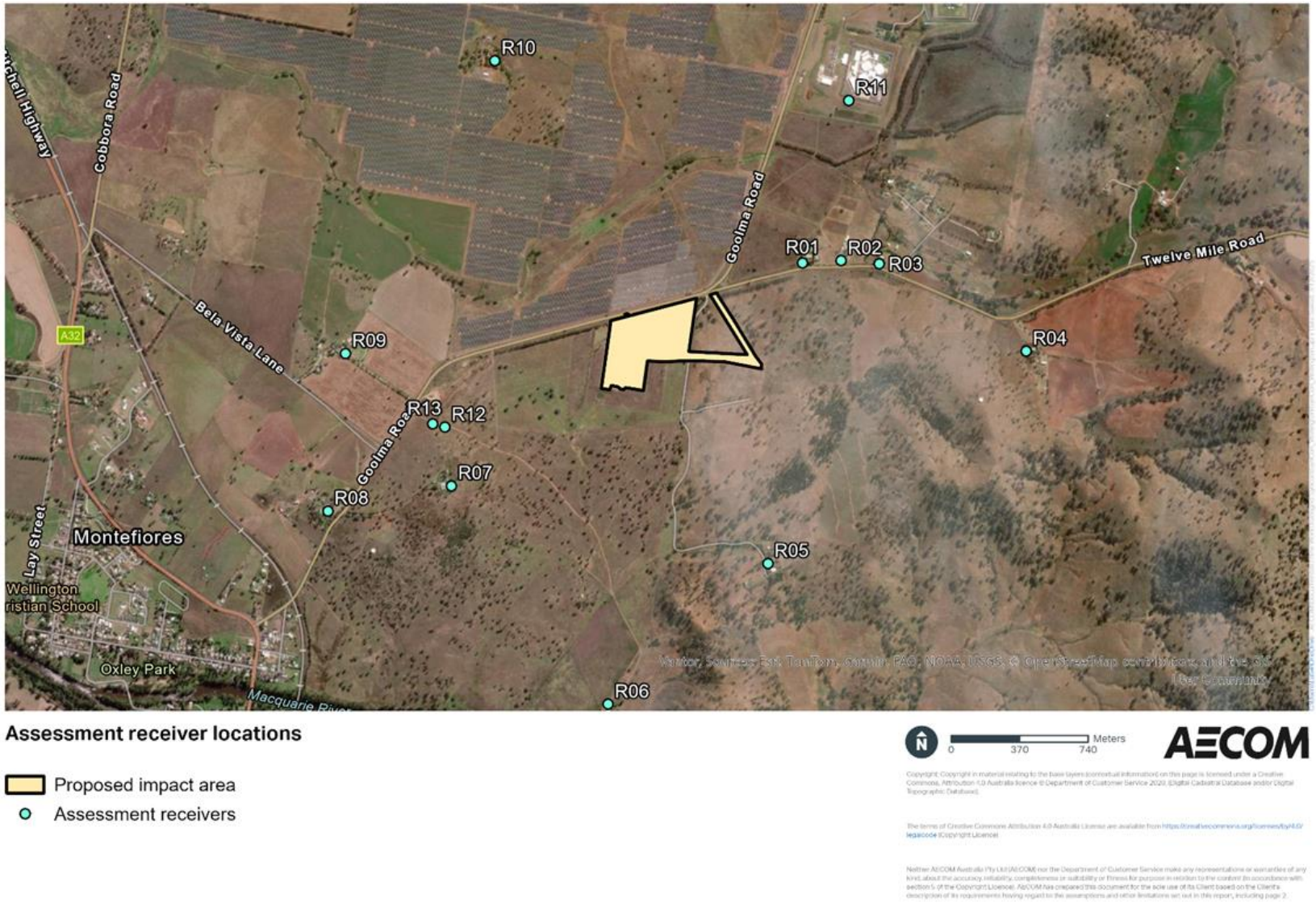


Figure 5-6 Noise assessment receiver locations (AECOM, 2025c)

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 – Access road construction (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) by 5 dB(A) during standard hours for one assessment residential receiver (R01) during site establishment.

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

Construction noise impacts will 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 515 m from the proposed activity. Therefore, potential construction vibration impacts are considered unlikely.

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 15 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 under both meteorological conditions.

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, operational noise levels are predicted to comply with the daytime noise criteria at all assessed receivers under both meteorological conditions.

Predicted noise levels for the night-time scenario are presented in Table 6-7 of Appendix E. In the evening/night-time scenario, operational noise levels are predicted to comply at all assessed receivers under both meteorological conditions.

The predicted operational noise trigger levels in 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 sensitive receivers during operation.

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 Wellington 330 kV substation is provided by an existing driveway off Goolma Road. Goolma Road is a sealed State road with a speed limit of 100 km per hour for the majority of the road, except around the Wellington town centre. Goolma Road connects the A32 Mitchell Highway at Wellington and the B55 Castlereagh Highway at Gulgong, around 55 km east. Both of these highways originate in Sydney and travel towards central-west NSW. Currently, the substation site is accessed by operational personnel, Transgrid employees and periodic contractors for business, maintenance and operational purposes.

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

There are two public bus routes that travel through the study area along Goolma Road, including S110 Umagarlee to Wellington Schools, and S106 Mt Bodangora to Wellington Schools. These bus routes only operate on school days, with one bus departing in the morning and in the afternoon for each route.

5.8.2. Impact assessment

Construction

The existing access road from Goolma Road would be upgraded, and a new access road constructed to connect the current access road alignment with the proposed substation bench. These works would facilitate the delivery of equipment and materials during construction and ensure ongoing access for maintenance activities during operation. The road upgrades and new access road would provide a direct route for the construction vehicles to reach the construction site office and construction laydown area via Goolma Road.

The existing access track to the east of the proposed substation bench will be relocated around the construction footprint to avoid interference with the proposed activity. Option 1 for the 330 kV busbar extension would require a new access road to be constructed to allow continued access during operation to the existing substation through the syncon site.

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. Local roads in the vicinity of the study area that may experience an increase in traffic include Goolma Road and the A32 Mitchell Highway. While the increase in traffic may be noticeable on local roads, 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, such as works on the access road or track, 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 Goolma Road. On the days when there are OSOM vehicles, the number of heavy vehicles will be reduced. Up to 30 OSOM vehicles per day would be required during peak construction periods. On the days when there are OSOM deliveries, the number of other heavy vehicles would be reduced.

The maximum volumes for light, heavy and OSOM vehicles present worst-case scenarios during peak construction periods and therefore 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 Dubbo Regional Council and Transport for NSW. OSOM deliveries would require progressive road closures, which have the 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 the local road network is considered minor.

Operation

During operation, the new syncon would be accessed by a new access road connecting to the existing access road from Goolma Road. This would be similar to the existing access road also from Goolma Road.

The proposed activity would result in additional operational and maintenance activities at the Wellington 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.

5.9. Air quality

5.9.1. Existing environment

The study area is located around 260 km northwest of Sydney in the Central Western Slopes region of NSW. The nearest weather station that provides relevant climate data is Wellington (D&j Rural) (weather station ID: 065034), located around 4 km southwest of the study area (BOM, 2025). The Wellington region experiences the warmest temperatures between November and March, with a mean maximum temperature of 33.0°C in January for years recorded between 1965 and 2025. Cooler temperatures are experienced between May and September, with July being the coldest month on average, recording a mean minimum temperature of 2.2°C between 1965 and 2025. On average, the area receives 620.9 mm of rainfall annually, and the mean number of days receiving more than 1 mm of rain per year is 59.6.

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 Goolma Road) 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 9 September 2025 identified two pollutant sources within 5 km of the study area, including:

- Origin Wellington LPG Terminal – LPG storage and distribution
- Wellington Depot – petroleum storage and wholesaling.

Sensitive receivers to air quality during construction and operation of the proposed activity include residents within and nearby the township of Wellington, located from around 515 m northeast 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 the construction of the bench, access road works, transmission line works 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 from site vehicles, trucks transporting materials and machinery, water carts, diesel generators, and certain onsite machinery, such as excavators. Fuel emissions would be mitigated by conducting regular vehicle and machinery maintenance checks and servicing vehicles and machinery regularly. Vehicles and machinery would be turned off while idle, where it is 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 (SF_6) gas, which is a commonly used insulation gas. SF_6 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, SF_6 is sealed within gastight compartments; however, there is potential for leaks to occur.

In the event of an unplanned release of SF_6 from the equipment, the quantity of SF_6 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 SF_6.

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 is mapped as Category 3 bushfire prone land as identified by the NSW Rural Fire Service (2015). The categorisation of bushfire prone land is as follows:

- Category 1: Highest risk for bushfire. Vegetation category consists of areas of forest, woodlands, heaths (tall and short), forested wetlands and timber plantations
- Category 2: Lower bushfire risk than Category 1 and Category 3, but higher than the excluded areas. Vegetation category consists of rainforests and lower risk vegetation parcels

- Category 3: Medium bushfire risk vegetation (higher than Category 2, and the excluded areas, but lower than Category 1. Vegetation category consists of grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrublands
- Vegetation Buffer: Bushfire prone vegetation buffer polygons.

Figure 5-7 shows Category 3 bushfire prone land in the vicinity of the study area. Around 370 m east of the study area is a small area of Category 1 bushfire prone land.

5.10.2. Impact assessment

Construction

Bushfire

Construction activities could pose risks for onsite ignitions, resulting 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.

Occupational fire risk could also be present during construction. Occupational fire risk is the risk of a bushfire to those working in the proposed impact area. Bushfires can be caused by a variety of factors, including sparks from construction equipment and machinery and electrical incidents such as fallen power lines. There is a moderate risk given that the study area is identified as Category 3 bushfire prone land, but this 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 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 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 in Appendix B, adverse construction and operational hazard and risk impacts as a result of the proposed activity are not considered to be significant.

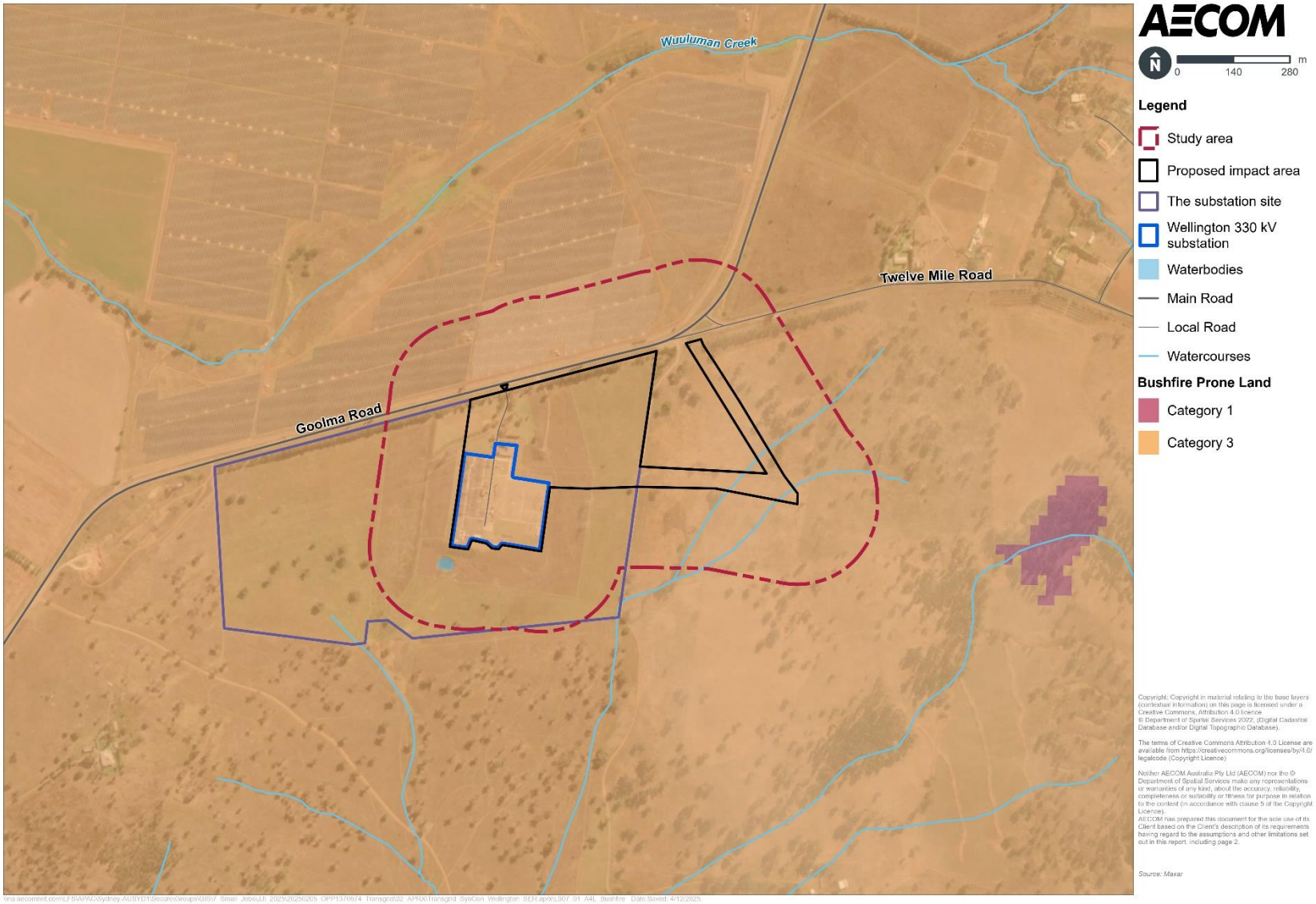


Figure 5-7 Bushfire prone land

5.11. Visual amenity

5.11.1. Existing environment

The study area can be categorised into four 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 along Goolma Road in front of the substation site
- Solar panel infrastructure – This area includes the northern and western side of Goolma Road. The visual amenity is characterised by cleared land with dense rows of solar panels.

The closest residential receivers are located around 515 m northeast 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 Goolma Road.

Operation

The proposed activity would result in some cleared vegetation adjacent to the existing Wellington 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 and replacement transmission poles. The replacement of the transmission line and poles will be similar in height and material as existing infrastructure. The syncon building and associated infrastructure would be designed generally in accordance with the visual amenity of the existing substation equipment to minimise visual impact on nearby receivers.

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 Goolma 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 Wellington 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
- Redundant transmission poles and lines
- Surplus excavated materials that cannot be reused onsite
- Potential naturally occurring asbestos in excavated soils from the northwest corner of the impact area
- 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 Wellington 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 Wellington 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), Wellington, was reviewed to understand the social and economic environment of the study area (ABS, 2022).

The median age is 41 years old. English is only spoken at home for 78.4% of the population. The five largest employment sectors for people in the Wellington region are: correctional and detention services, aged care residential services, sheep farming (specialised), primary education, and supermarket and grocery stores.

The SA2 land is primarily used for primary production, environmental conservation and residential lots.

There is little key social infrastructure located within 2 km of the proposed impact area. One social infrastructure identified is the Macquarie Correctional Centre located around 880 m northeast of the study area.

5.13.2. Impact assessment

Construction

The proposed activity may temporarily affect the local community near the Wellington 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 and short-term housing 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 in 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 Wellington 330 kV 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 9 September 2025 identified two 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
Wellington South Battery Energy Storage System (BESS) Approved	Around 400 m southeast of the proposed activity, some construction work at the substation may overlap.	Construction timings are unknown and may overlap with the proposed activity. Operations will overlap.	Development of a 500 MW/1,000 MWh BESS and associated infrastructure, including a new transmission line connecting the BESS to Wellington substation.

Project and status	Relative location	Proposed construction timeframe	Project details
Orana Battery Energy Storage System Approved	Around 450 m south of the proposed activity, some construction work at the substation may overlap.	Construction has commenced and is unlikely to overlap with the proposed activity. Operations will overlap.	Development of a 400 MW/1,600 MWh BESS and associated infrastructure, including a new substation/switchyard and a 300 m 330 kV transmission line connecting to Wellington substation

5.14.2. Impact assessment

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

Construction

Potential cumulative construction impacts with the Wellington South BESS are discussed in Table 5-3.

Table 5-3 Potential cumulative construction impacts

Environmental factor	Construction impact
Ecology	The construction of the Wellington South BESS would collectively contribute to the removal of vegetation and subsequent habitat. However, the proposed activity would only have a very minor impact on biodiversity, so its contribution to a cumulative ecological impact is near negligible.
Noise and vibration	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 the Wellington South BESS, then overall construction noise levels could be increased by as much as 3 dB(A) from that project's 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 will likely remain below this level and are temporary. 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 construction of the proposed activity. Vibration intensive works are expected to take place well within minimum working distances; therefore, no cumulative impacts are anticipated.

Environmental factor	Construction impact
Traffic and access	Vehicles travelling along Goolma Road would likely experience cumulative traffic impacts during concurrent construction of the Wellington South BESS, potentially resulting in congestion and delays. This could occur as a result of additional construction traffic and traffic lane closures. These impacts can be mitigated by consultation between different project teams and contractors, consultation with Transport for NSW to plan OSOM movements, scheduling of works, coordination of traffic management, and good communication of changes in road network conditions in advance to the local community.
Visual amenity	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. Road users along Goolma Road would experience fleeting, temporary cumulative impacts due to the construction activity proposed to take place adjacent to the substation site.
Social and economic considerations	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.

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 *Wilderness Act 1987)* 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 on 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.
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

Factor	Potential impact
	existing Wellington 330 KV substation and adjacent transmission line easements.
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 *Biodiversity Conservation Act 2016*).	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 Wellington 330 kV substation and adjacent transmission line easements and would not result in a reduction of beneficial uses of the environment.
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.

Factor	Potential impact
m. any environmental problems associated with the disposal of waste.	Waste would be actively 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
Any impact on the Great Barrier Reef Marine Park?	No
Does the proposed activity involve a nuclear action (including uranium mines)?	No

MNES / Commonwealth land	Potential impact
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 identified in Section 5. The key 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 syncon and the adjacent transmission infrastructure
- 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 syncon 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 to 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 Wellington 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.

9. References

ABS. (2022). *2021 Census of Population and Housing, General Community Profile, New South Wales.* Commonwealth Government. Retrieved 2023, from Australian Bureau of Statistics.

AECOM. (2025a). *Aboriginal Archaeological Due Diligence Assessment – Wellington synchronous condenser.*

AECOM. (2025b). *Wellington synchronous condenser - Flora and Fauna Assessment.*

AECOM. (2025c). *Noise and Vibration Impact Assessment - Wellington Synchronous Condenser.*

AEMO. (2022). *2022 System Strength Report.*

ARPANSA. (2010). *Guidelines for Limiting Exposure to EMF.*

BOM. (2025). *Climate Data Online*. Retrieved from Bureau of Meteorology: http://www.bom.gov.au/climate/data/

Cth DCCEEW. (2025). *National Pollutant Inventory*.

DECC. (2008a). *Managing Urban Stormwater: Soil and Construction Volume 2A – Installation of Services.* Department of Environment and Climate Change.

DECC. (2008b). *Soils and Construction Volume 2C Unsealed Roads.* Department of Environment and Climate Change.

DECC. (2009). *Interim Construction Noise Guideline.* Sydney: Department of Environment and Climate Change NSW.

DECCW. (2010a). *Aboriginal Cultural Heritage Consultation Requirements for Proponents.* Department of Environment, Climate Change and Water.

DECCW. (2010b). *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW 2010.*

International Commission on Non-Ionizing Radiation Protection. (2010). *Guidelines for limiting exposure to time-varying electric and magnetic fields (1Hz – 100kHz).*

Landcom. (2004). Managing Urban Stormwater: Soils and Construction Volume 1. *1*(4). Sydney, NSW, Australia.

Murray-Darling Basin Authority. (2025). *2025 Sustainable Rivers Audit.* Australian Government.

NSW DCCEEW. (2025). *Macquarie-Bogan*. Retrieved from https://water.dpie.nsw.gov.au/about-us/learn-about-water/basins-and-catchments/catchments/macquarie-bogan

NSW EPA. (2014). *Waste Classification Guidelines .*

NSW EPA. (2015). *Guidelines on the Duty to Report Contamination.*

NSW Rural Fire Service. (2015). *Guide for bush fire prone land mapping.*

Office of Environment and Heritage. (2011). *Protocols for Recycling Redundant Utility Poles and Bridge Timbers in New South Wales.* Department of Climate Change, Energy, the Environment and Water.

Transgrid. (2018). *Management System Document – Waste Management of Timber Poles.*

United States EPA. (2025). *Sulfur Hexafluoride (SF6) Basics*. Retrieved from https://www.epa.gov/eps-partnership/sulfur-hexafluoride-sf6-basics

Appendix A Map series

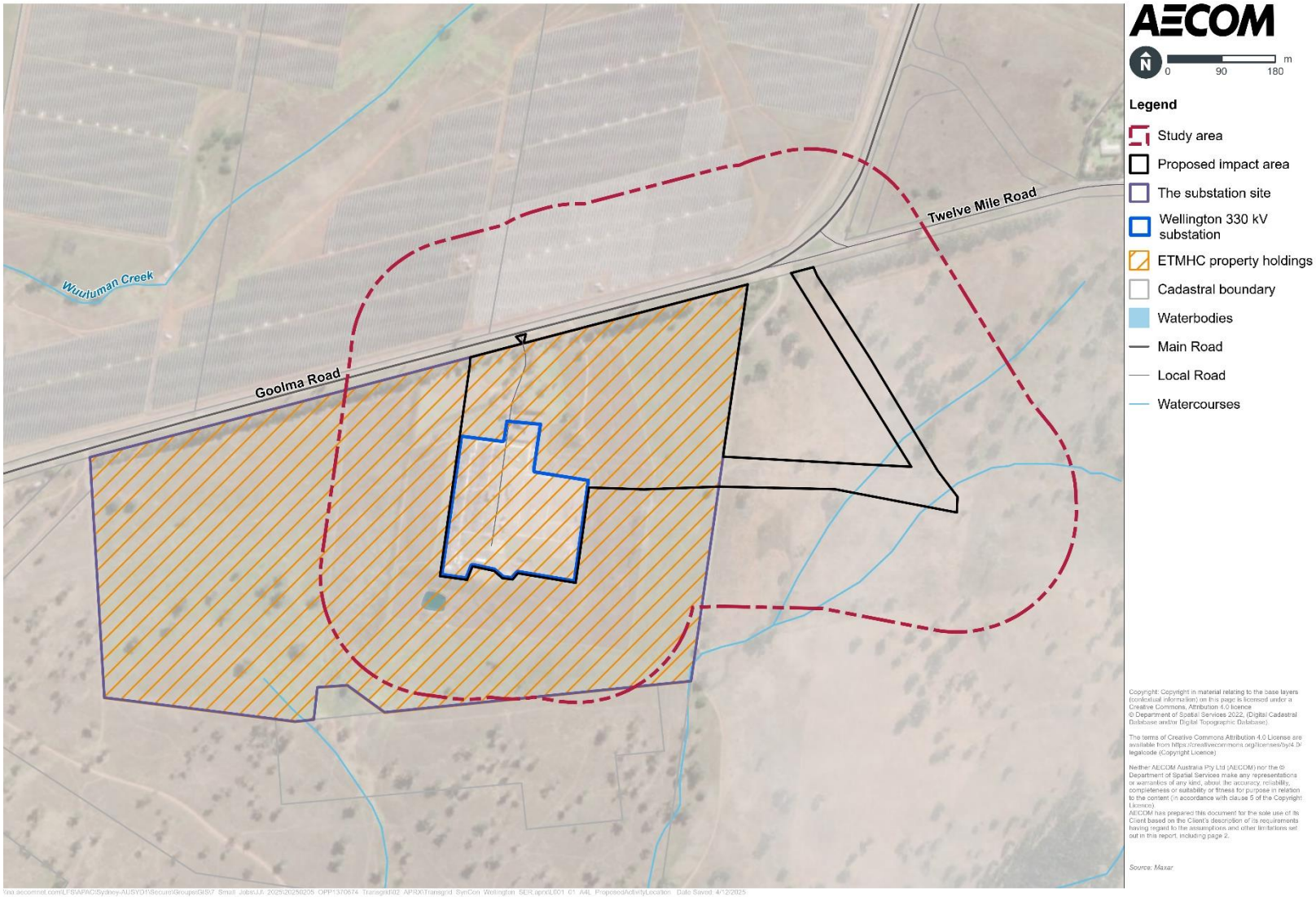


Figure A-1 Proposed activity location

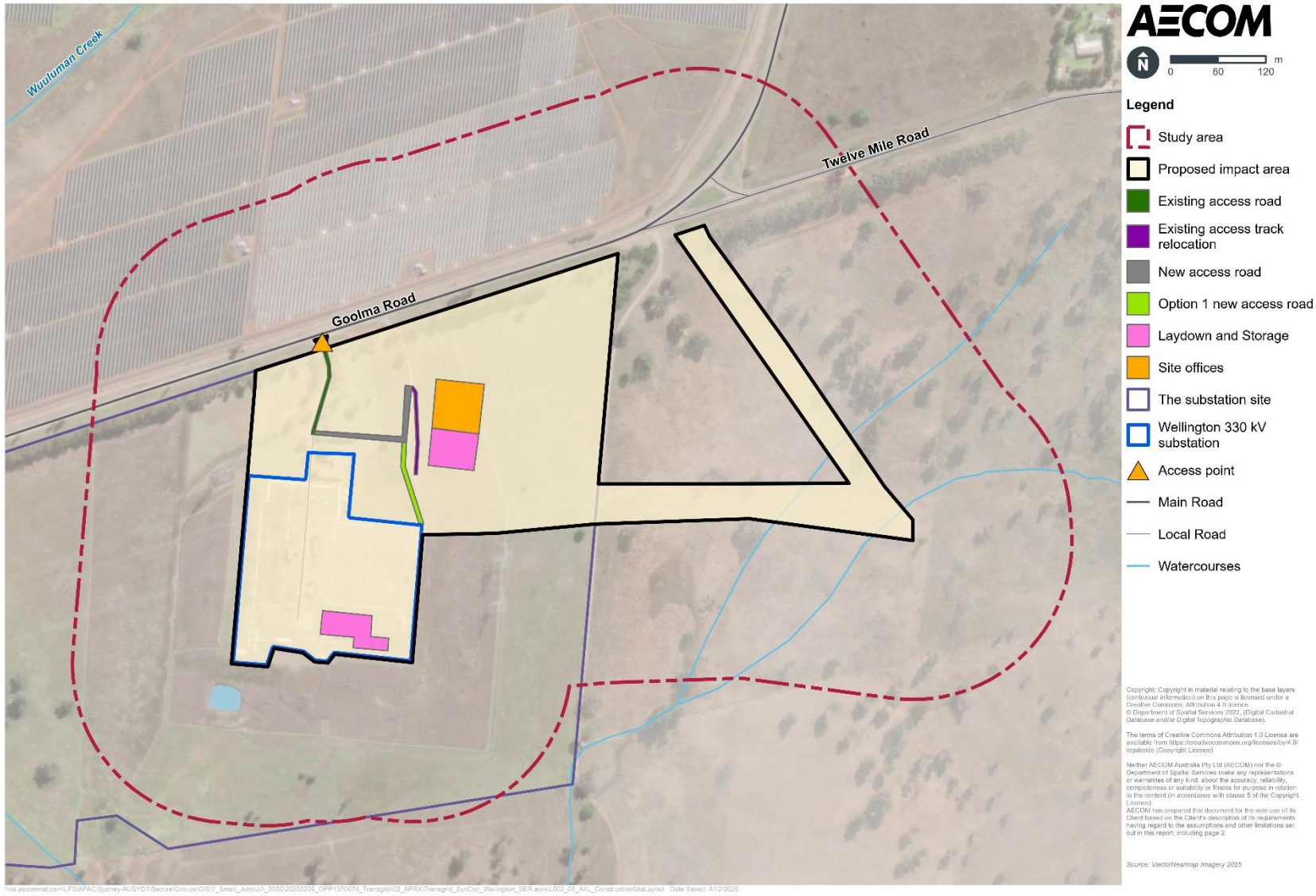


Figure A-2 Indicative construction site layout

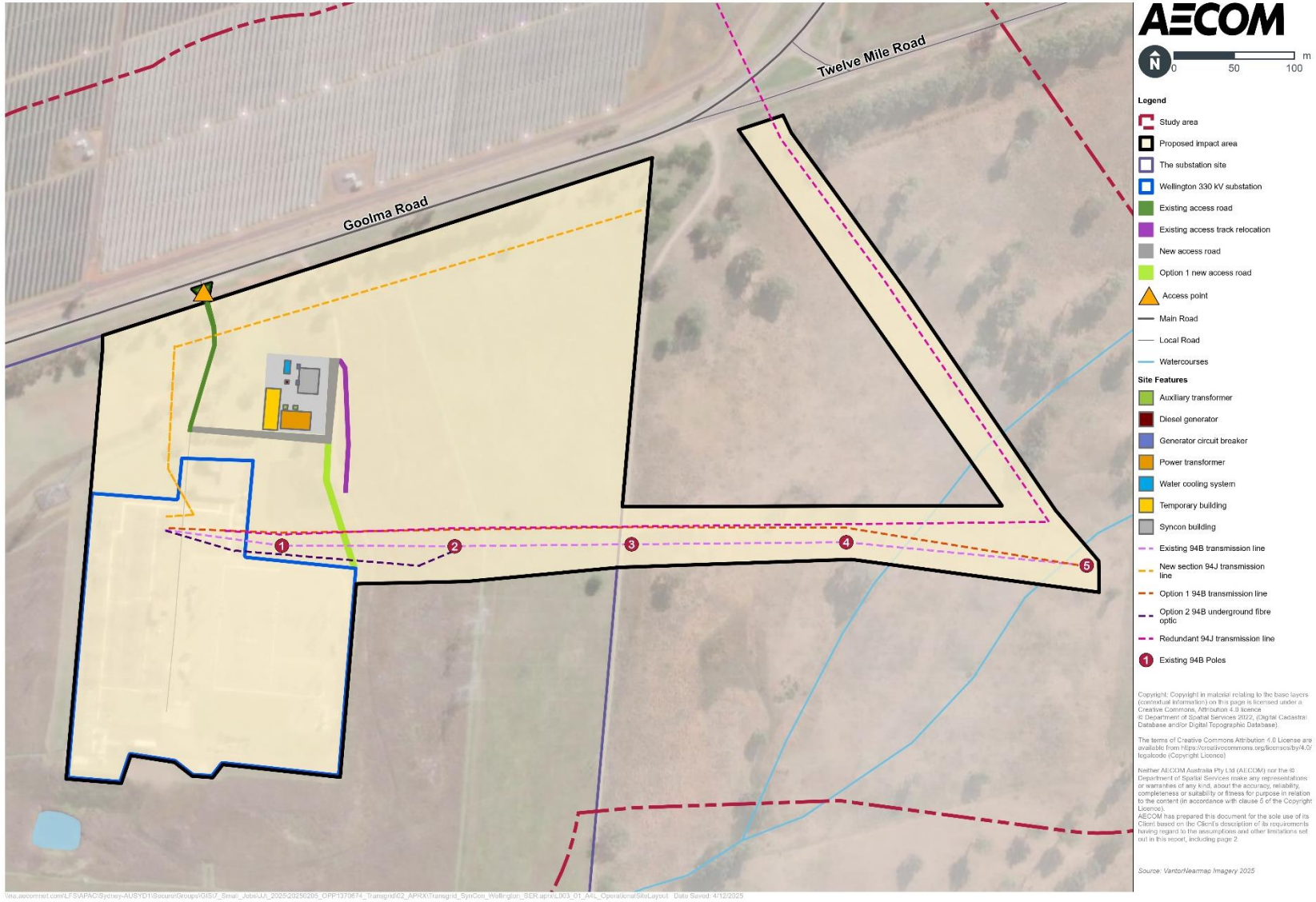


Figure A-3 Indicative operation site layout

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 area(s). Training would be given to the 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	The following additional environmental approvals/licences/permits are required for the activity: • If impacts to Aboriginal site WS-IA1-25 are unavoidable, a Section 90 AHIP would be required to permit harm to the site. • Is works are required within Goolma Road reserve a Section 138 approval is required under the Roads Act.
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 *Protection of the Environment Operations Act 1997* (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.
Land use	
LU1	Landowners would be notified at least seven days prior to the commencement of the proposed activity on their property.

Mitigation measures	
LU2	On completion of the work, disturbed areas would be stabilised and returned to as close to original condition or as otherwise agreed with the landowner.
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 *Managing Urban Stormwater: Soil and Construction Volume 1* (Landcom, 2004) ('the Blue Book) (particularly Section 2.2) and *Managing Urban Stormwater: Soil and Construction Volume 2A – Installation of Services* (DECC, 2008a). The ESCP would be included in the CEMP.
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 *Waste Classification Guidelines* (NSW EPA, 2014), the Guidelines on the Duty to Report Contamination (NSW EPA, 2015) and the *Contaminated Land Management Act 1997*. The procedure would be included in the CEMP.
GS5	An Asbestos Management Plan (AMP) would be prepared, in accordance with relevant WorkCover guidelines, prior to any earthworks or ground disturbance being performed on the site where potential or known Naturally Occurring Asbestos has been identified. The northwestern corner of the impact area has been identified as having a low potential of asbestos.
GS6	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.

Mitigation measures	
HW2	Water management for excavations and on-site would be included and adhered to, in accordance with the CEMP. Controls would include: • 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: • 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 of 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.
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	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: • 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).

Mitigation measures	
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 syncon or the existing Wellington 330 kV substation will be rehabilitated to as close to pre-construction conditions as possible. 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 would be fully removed upon completion of construction, unless required to the operation of the syncon or the existing Wellington 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 *National Parks and Wildlife Act 1974* or *Heritage Act 1977*) 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.
HE2	Impacts to the Aboriginal isolated artefact site [redacted] would be avoided as far as feasible. To prevent inadvertent impacts during construction, temporary fencing will be erected at a radius of approximately 2 m around the artefact. If impacts to [redacted] are unavoidable, a Section 90 AHIP will be required to permit harm to the site. Any AHIP application lodged with Heritage NSW will need to be supported by an Aboriginal Cultural Heritage Assessment Report (ACHAR) and include a process of Aboriginal community consultation carried out accordance with Heritage NSW's *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a). An Aboriginal Cultural Heritage Management Plan would also be prepared for the proposed activity.

Mitigation measures	
HE3	Where works are proposed within 50 m of the 1st order watercourses in the eastern portion of the proposed impact area, they shall be restricted to the disturbance footprints of existing transmission line poles. All construction activities outside existing disturbance footprints are to occur greater than 50 m away from the 1st order watercourses. If works occur outside of the existing disturbance areas within the area of moderate sensitivity, further investigation will be required, including formal archaeological survey and a program of subsurface testing. The results of any further testing would need to be included in an ACHAR. If Aboriginal objects are identified and impacts to these cannot be avoided, an AHIP would be required
Noise and vibration	
NV1	Noise generating works would be in accordance with the *Interim Construction Noise Guideline* (DECC, 2009): • 7:00am – 6:00pm Monday to Friday • 8:00am – 1:00pm 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. 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.
NV2	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.
NV3	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: • 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 7-1 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.

Mitigation measures	
NV4	The following measures would be considered to manage potential operational noise impacts: • 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 15 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 (west, south and east), 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/m^2. • Acoustic absorption is required on at least two adjacent surfaces of the noise wall facing the equipment (east and south). 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.
Traffic and access	
TA1	Transportation and equipment delivery movements on public roads would be in accordance with Transport for NSW and Council requirements.
TA2	Access track works would be constructed in accordance with the *Soils and Construction Volume 2C Unsealed Roads* (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.
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 *International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to EMF* (ARPANSA, 2010).
HR2	Transgrid's *Hot Works and Fire Risk Procedure* 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.
HR3	All SF_6 handling would be undertaken in accordance with Transgrid's *Management of SF_6 Gas – Work Instruction.*

Mitigation measures	
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	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: • 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 *Waste Classification Guidelines* (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.
WA3	Wooden poles, including pole butts, would be disposed of in accordance with the Transgrid document – Waste Management of Timber Poles – Disposal of Redundant Timber Poles (2018) or gifted to landholders in accordance with the *Protocols for Recycling Redundant Utility Poles and Bridge Timbers in New South Wales* (Office of Environment and Heritage, 2011) and Transgrid requirements. If gifted, Transgrid would provide the landholder information on what the pole is treated with, how to appropriately handle treated timber, and what it can and cannot be used for.

Appendix C Flora and Fauna Assessment

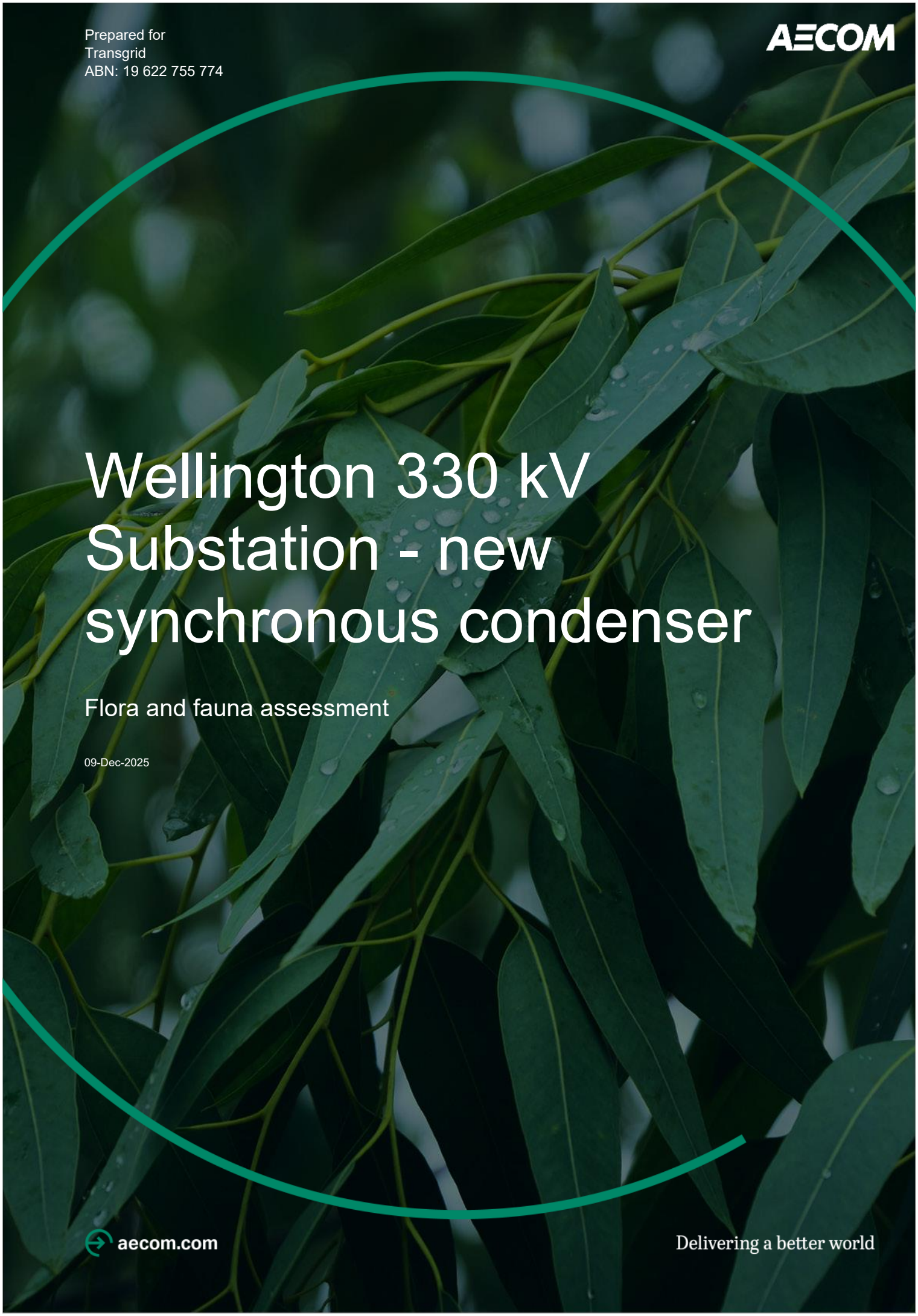
Prepared for
Transgrid
ABN: 19 622 755 774

AECOM

Wellington 330 kV Substation - new synchronous condenser

Flora and fauna assessment

09-Dec-2025



aecom.com

Delivering a better world

Wellington 330 kV Substation - new synchronous condenser

Flora and fauna assessment

Client: Transgrid

ABN: 19 622 755 774

Prepared by

AECOM Australia Pty Ltd
Gadigal Country, Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 1800 868 654 www.aecom.com
ABN 20 093 846 925

09-Dec-2025

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 and ISO45001.

Quality Information

Document Wellington 330 kV Substation - new synchronous condenser

Ref 60585948

Date 09-Dec-2025

Originator Jamie McMahon, Elizabeth Rizzo

Revision History

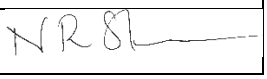
Rev	Revision Date	Details	Approved	
			Name/Position	Signature
0	30-July-2025	First draft for client review	Jamie McMahon Technical Director	JM
1	19-Aug-2025	Final draft for client review	Jamie McMahon Technical Director	JM
1.1	18-Sep-2025	Updated final draft for client review	Neil Standen Associate Director	NS
2	17-Nov-2025	Updated final draft for client review	Neil Standen Associate Director	NS
3	09-Dec-2025	Final	Neil Standen Associate Director	

Table of Contents

1.0 Introduction 1
- 1.1 Proposed activity description 1
- 1.2 Proposed impact area and biodiversity study area 2
  - 1.2.1 Site context 2
- 1.3 Legislative context 4
  - 1.3.1 Environment Protection and Biodiversity Conservation Act 1999 (Cth) 4
  - 1.3.2 Biodiversity Conservation Act 2016 5
  - 1.3.3 Biosecurity Act 2015 5
  - 1.3.4 Fisheries Management Act 1994 5
  - 1.3.5 Coastal Management Act 2016 and *State Environmental Planning Policy (Resilience and Hazards) 2021* 5

2.0 Methodology 6
- 2.1 Overview 6
- 2.2 Assessment objectives 6
- 2.3 Field survey 6
- 2.4 Limitations 7

3.0 Existing environment 8
- 3.1 Overview 8
- 3.2 Desktop searches 8
- 3.3 Vegetation communities, threatened ecological communities and habitat 10
  - 3.3.1 Site photographs 11
- 3.4 Fauna habitat 14
- 3.5 Threatened species 14
- 3.6 Areas of outstanding biodiversity value 16
- 3.7 Critical habitat 16
- 3.8 Priority weeds 16

4.0 Potential impacts 17
- 4.1 Vegetation 17
- 4.2 Fauna habitat 18
- 4.3 Wildlife connectivity and fragmentation 18
- 4.4 Spread of weeds, pests and pathogens 19
- 4.5 Key threatening processes 20
- 4.6 Cumulative impacts 20

5.0 Management measures 22
- 5.1 Avoidance and minimisation 22
- 5.2 Mitigation measures 23

6.0 Conclusion 25

7.0 References 26

Appendix A
- Likelihood of Occurrence A

List of Tables

Table 3-1	Environmental controls and sensitivities	8
Table 3-2	Desktop searches	9
Table 3-3	Plant community types identified near the biodiversity study area	10
Table 3-4	Threatened species with moderate or higher likelihood of occurrence	15
Table 4-1	Projects identified as contributing to potential cumulative impacts	21

List of Figures

Figure 1-1	Proposed impact area and indicative operational site layout	3
Figure 1-2	Biodiversity study area	4
Figure 3-1	Vegetation communities	11
Figure 3-2	Open area of biodiversity impact area	11
Figure 3-3	Vegetation within proposed impact area	12
Figure 3-4	Vegetation around the existing access track	12
Figure 3-5	Blistered Pyrgomorphid (*Monistria pustulifera*) (not listed as a threatened species)	13
Figure 3-6	Red Ironbark tree (*Eucalyptus sideroxylon*) (not listed as a threatened species)	13
Figure 3-7	Eastern Brown Snake *(Pseudonaja textilis)* skin (not listed as a threatened species)	13
Figure 3-8	Threatened species records (Source: NSW BioNet)	16
Figure 4-1	Vegetation clearing	17

1.0 Introduction

Transgrid is proposing to install and operate two synchronous condensers (syncons) at the existing Wellington 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.

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 Wellington 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
- Installation of new 330 kV gantry structures, approximately 800 metres (m) of 132 kV transmission lines (including pole structures), and removal of approximately 1.4 kilometres (km) of redundant 132 kV transmission lines
- Upgrades to the existing access road from Goolma Road, new access road(s) to new substation bench and existing substation, and relocation of the existing access track within the impact area around the construction footprint
- Installation of a new bench (concrete slab, foundations and associated earthworks), with an indicative maximum footprint of around 130 by 150 m, immediately north of the existing Wellington 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, disconnector, current transformer, capacitive voltage 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
- Installation of a new demountable secondary systems building
- Installation of new spill oil tank and drainage systems to cater for the new transformers, diesel generator and the syncon oil lubrication system
- 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 the 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 Wellington 330 kV substation will be rehabilitated to pre-construction conditions.

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 synchronous condenser, as well as a portion of Lot 32 of DP622471, which is required for the removal of redundant poles and lines.

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

- A 'biodiversity impact area'. This comprises a portion of the 'proposed impact area' where construction requiring vegetation removal would be carried for installation of the syncons (north of the existing substation) and where redundant poles and lines would be removed (east of the existing substation). Construction in other parts of the proposed impact area (e.g. within the existing substation footprint) 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 in Figure 1-2.

1.2.1 Site context

The Wellington 330 kV substation is located on Goolma Road, to the north of Wellington, NSW. The substation is within the Dubbo Regional local government area (LGA).

The synchronous condenser is proposed to be located along the northern boundary of the existing substation (as shown in Figure 1-1), generally within the northern extent of the proposed activity area. This area is predominately cleared and maintained as pastureland for sheep grazing. This area would accommodate both the operational infrastructure as well as temporary construction support facilities such as the site compound and laydown areas.

Access to the proposed activity area is via Goolma Road, providing direct access to the substation. A new internal access road would be constructed to facilitate delivery of equipment and materials during construction, and access for ongoing maintenance activities during operation. The existing maintenance access track within the impact area would be relocated around the construction area.

The land around the proposed activity area is comprised of cleared pastureland with few isolated trees dispersed throughout. The terrain is mostly flat with some natural gullies and drainage lines to the east, where the area becomes more undulating.

As described in Section 1.2, the biodiversity study area comprises a buffer of 20 m. This 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.

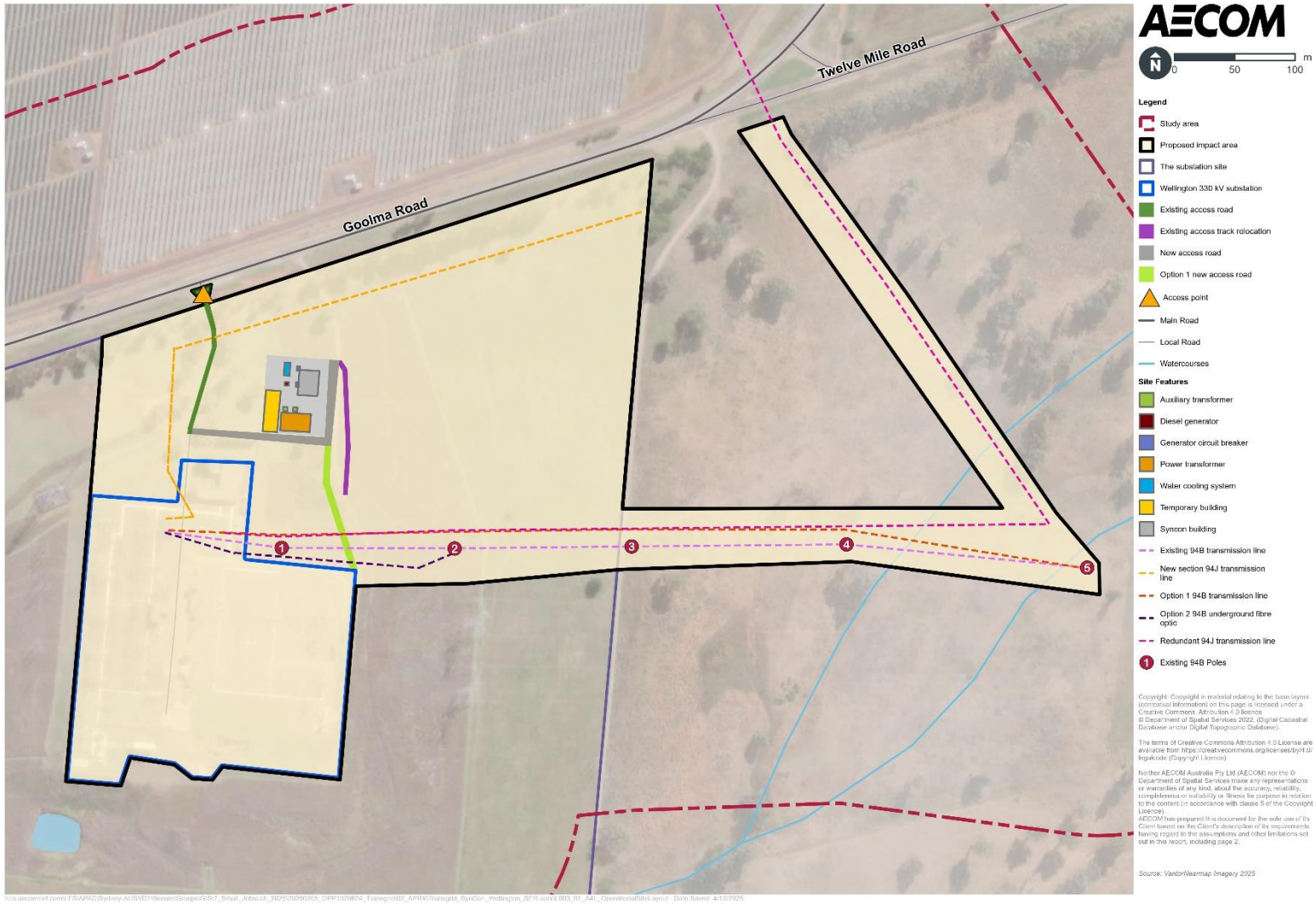


Figure 1-1 Proposed impact area and indicative operational site layout

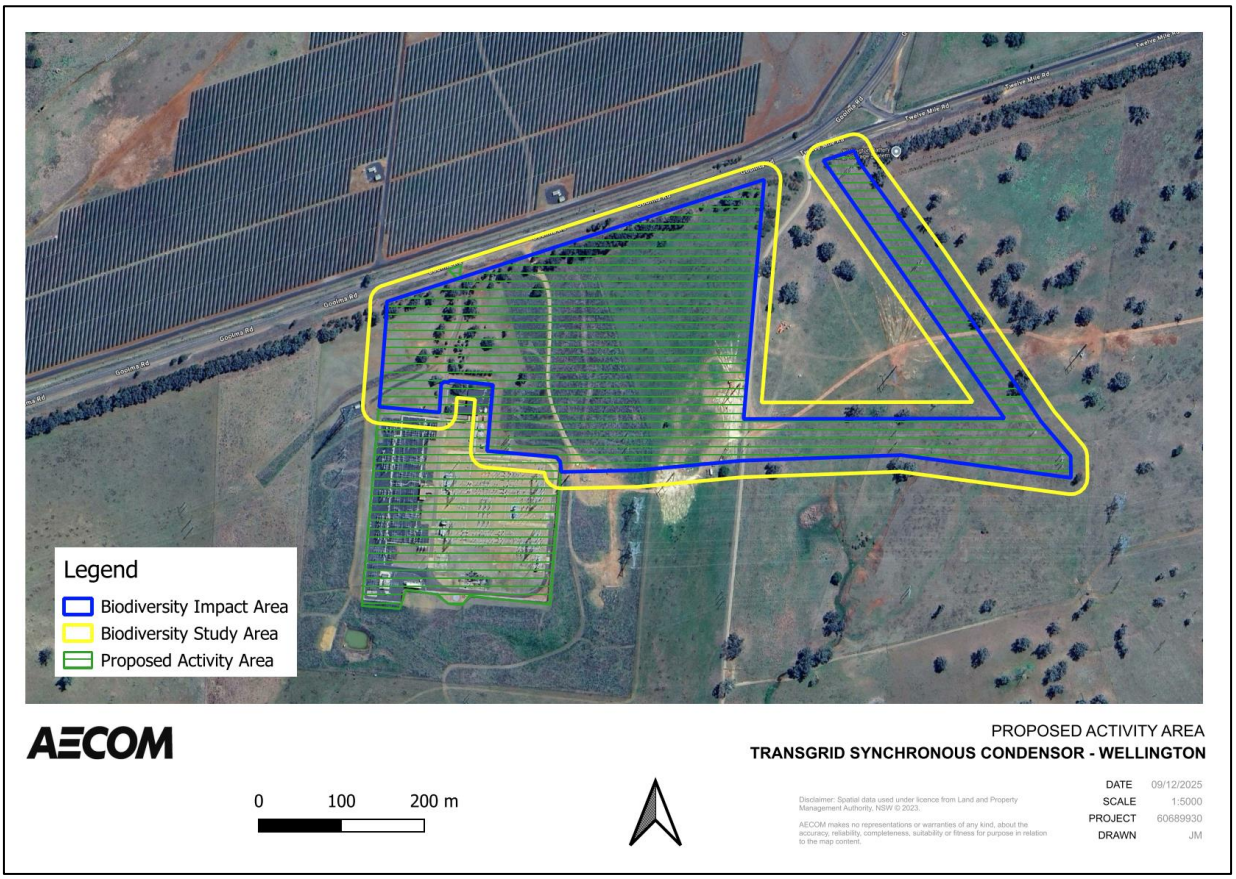


Figure 1-2 Biodiversity study area

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 Dubbo 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 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 3.8 outlines the priority weeds of the Dubbo Regional 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 works, 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 14 May 2025. Conditions during the inspection were cool at 18°C with slight cloud cover and no wind. There had been no rain recorded throughout the week prior to the survey, according to the Wellington automatic weather station (Station ID 065034). No standing water was present within the biodiversity study area.

The full extent of the biodiversity study area was able to be accessed, including the access road to the east of the substation.

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 synchronous condenser 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 bank, 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 site, 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. The nearest KFH (Macquarie River) is located around 2.3 km southwest of the biodiversity impact area.
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 18 July 2025 for threatened 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, 32 threatened fauna species and 10 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 3.5.
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 eradicated priority weeds in the region. Priority weeds are discussed further in Section 3.8.
Bureau of Meteorology Atlas of groundwater dependent ecosystems	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. No GDEs were identified in the biodiversity study area.
NSW Department of Primary Industries key fish habitat	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). The biodiversity study area was reviewed for potential KFH. The nearest waterway, Macquarie River, was identified as KFH. This waterway is located around 2.3 km from the biodiversity impact area.
NSW Department of Primary Industries threatened aquatic species	The DPI report *Fish communities and threatened species distributions of NSW* (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 around 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
266: White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion	**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 **EPBC Act, CE:** White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
511: Queensland Bluegrass - Redleg Grass - Rats Tail Grass - spear grass - panic grass derived grassland of the Nandewar Bioregion and Brigalow Belt South Bioregion	**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 **EPBC Act, CE:** White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland
76: Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	**BC Act**, **E**: Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions **EPBC Act, E:** Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia

Notes:

1. CE = critically endangered, E = endangered.

The biodiversity study area slightly overlaps areas mapped as PCT 511 and PCT 266. Based on survey of the site these areas were deemed not to comprise native vegetation due to the heavy infestation of exotic grasses (greater than 50% coverage). All other areas of the biodiversity study area were also confirmed as being non-native. Given this, none of the biodiversity study area is deemed to meet the threshold for consideration as TEC.

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

- Kurrajong *(Brachychiton populneus)*
- African Boxthorn *(Lycium ferocissimum)**
- Bathurst Burr *(Xanthium spinosum)**
- Saffron Thistle *(Carthamus lanatus)**
- Inland Grey Box *(Eucalyptus microcarpa)*
- Field Bindweed *(Convolvulus arvensis)**
- African Olive *(Olea europaea)**
- White Cedar *(Melia azedarach)*
- Red Ironbark *(Eucalyptus sideroxylon)*

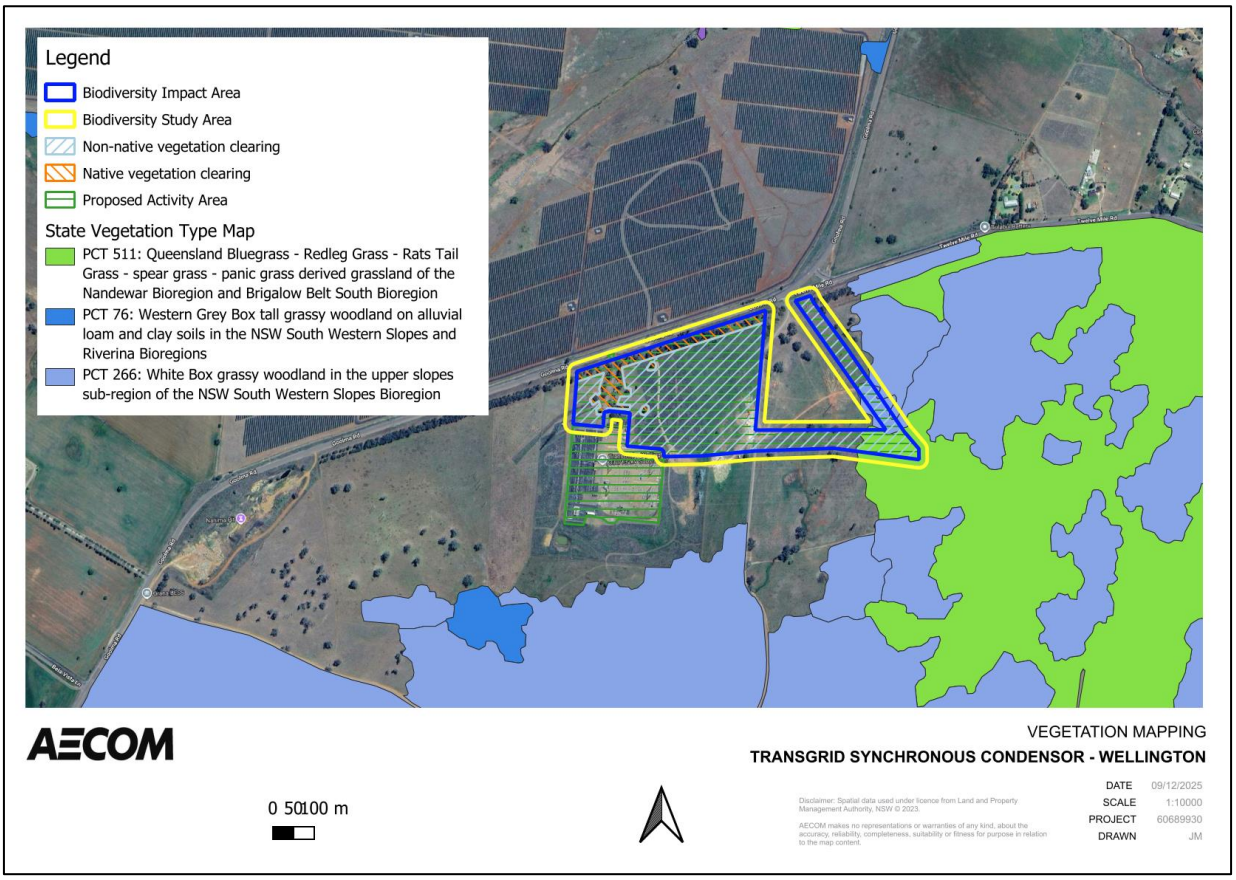


Figure 3-1 Vegetation communities

3.3.1 Site photographs

Figure 3-2 Open area of biodiversity impact area

Figure 3-3 Vegetation within proposed impact area

Figure 3-4 Vegetation around the existing access track

Figure 3-5 Blistered Pyrgomorphid (*Monistria pustulifera*) (not listed as a threatened species)

Figure 3-6 Red Ironbark tree (*Eucalyptus sideroxylon*) (not listed as a threatened species)

Figure 3-7 Eastern Brown Snake *(Pseudonaja textilis)* skin (not listed as a threatened species)

3.4 Fauna habitat

Fauna observed within the biodiversity study area included:

- Noisy Miner (*Manorina melanocephala*)
- Eastern Rosella *(Platycercus eximius)*
- Nankeen Kestrel *(Falco cenchroides)*
- Australian Magpie (*Gymnorhina tibicen*)
- Grey Butcherbird (*Cracticus torquatus*)
- Australian Raven (*Corvus coronoides*).

No evidence of other occupation in the form of scats or tracks was observed during the field survey, though shedded skin from an adult Eastern Brown Snake *(Pseudonaja textilis)* was found. The site would be reasonably expected to accommodate a range of native and exotic species given the degree of micro habitats available. As such, it is likely that the fragmentation of mature canopy and a lack of midstory vegetation would inhibit the ability for arboreal mammals such as microbats, megabats, gliders and Koalas to find habitat and foraging resources. However, this vegetation may provide occasional roosting and foraging opportunities for a variety of additional birds not recorded during the field survey.

The biodiversity study area contained only scattered fallen logs and coarse woody debris, at a low density. These habitat characteristics were observed mainly around the bases of the trees. Bush rock was observed in an area to the east of the proposed activity and flaking bark was present across most mature trees.

The Macquarie River is present to the southwest of the biodiversity study area, around 2.3 km from the biodiversity study area.

Aquatic habitat is generally absent, noting the planted and cleared nature of the biodiversity study area. Small depressions and drainage channels are present throughout the biodiversity study area, though these were dry at the time of the field survey. The most prominent channel is located within the eastern extent of the biodiversity study area, though this was dry during the site inspection and appears to be wholly ephemeral.

The habitat value of the biodiversity study area is heavily reduced compared to its pre-cleared state and is largely devoid of complex habitat characteristics. The predominate land use for sheep grazing has adversely affected the vegetation, contributing to a considerable deterioration of native and non-native grasses within the biodiversity study area.

The limited amount of vegetation present, including native and non-native grasses and shrubs, provides a small degree of habitat resources and foraging opportunities. Species such as reptiles and small mammals have the potential to utilise this vegetation at a low density for foraging refuge.

3.5 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 18 July 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, and relevant records are shown in Figure 3-8.

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

Common name	Scientific name	Status	
		BC Act	EPBC Act
Fauna			
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V	
Spotted Harrier	*Circus assimilis*	V	
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	V	
Grey Falcon	*Falco hypoleucos*	E	
Black Falcon	*Falco subniger*	V	
Little Eagle	*Hieraaetus morphnoides*	V	
Blue-winged Parrot	*Neophema chrysostoma*	V	V
Turquoise Parrot	*Neophema pulchella*	V	
Superb Parrot	*Polytelis swainsonii*	V	V
Speckled Warbler	*Pyrrholaemus sagittatus*	V	
Pink-tailed Legless Lizard	*Aprasia parapulchella*	V	V
Flora			
Granite Zieria	*Zieria obcordata*	E	E

Notes:

1. E = endangered, V = vulnerable.

Targeted searches were undertaken for these species, though none were observed within the biodiversity study area.

The nearest threatened fauna species records to the biodiversity study area are for Pink-tailed Legless Lizard, Little Eagle and Superb Parrot. Habitat for birds of prey (Spotted Harrier, Little Eagle, Grey Flacon and Black Falcon) is limited to foraging habitat, within the significant expanse of nearby habitat and as such is not considered important.

Potential habitat for Pink-tailed Legless Lizard and Superb Parrot, is present within the biodiversity study area, albeit heavily degraded by agricultural activity.

The nearest threatened flora record to the biodiversity study area is for *Zieria obcordata*, located around 3 km to the northeast. Targeted searches for this species failed to record it within the biodiversity study area.

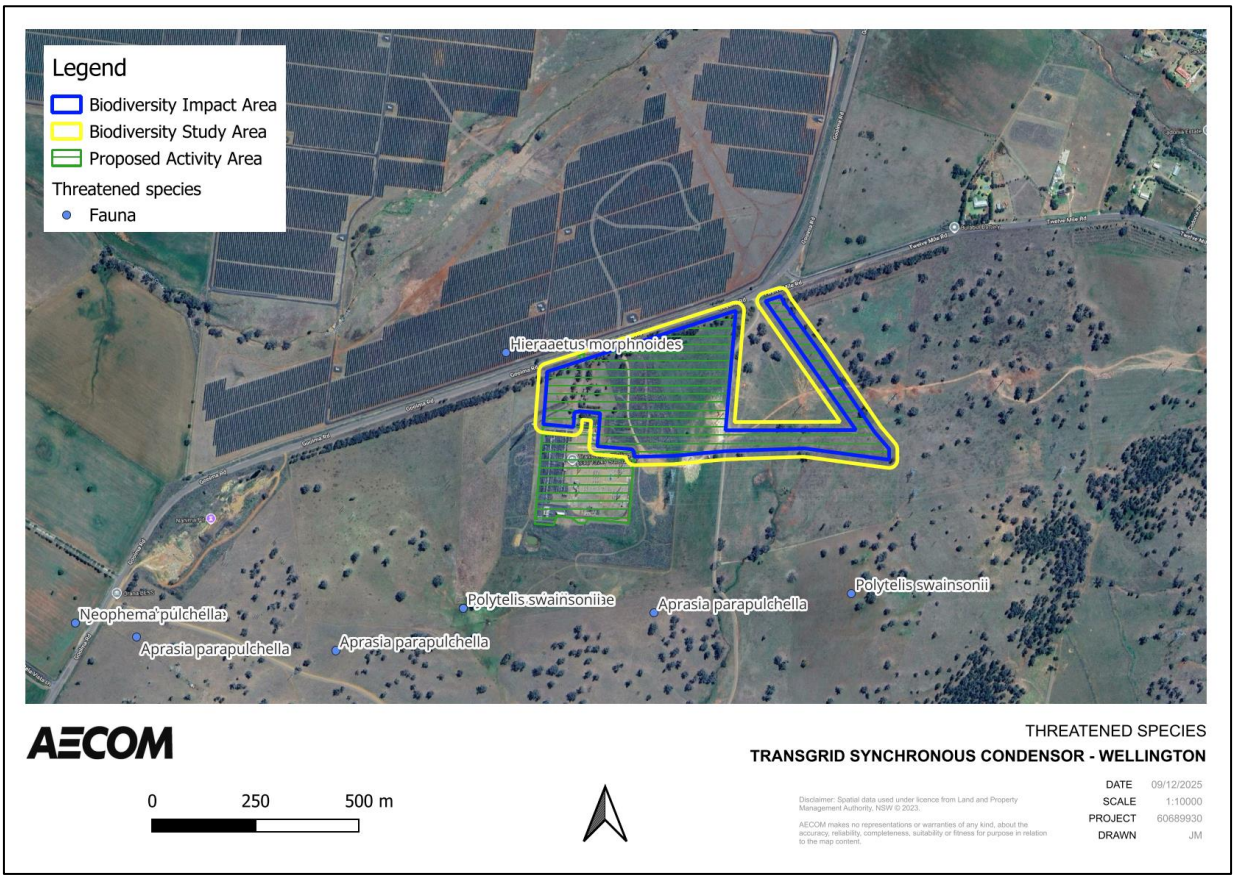


Figure 3-8 Threatened species records (Source: NSW BioNet)

3.6 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.

3.7 Critical habitat

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

3.8 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 Dubbo Regional LGA, the following species was recorded during the field survey:

- African Boxthorn (*Lycium ferocissimum) - Must not be imported into the state, sold, bartered, exchanged or offered for sale.*

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 syncon and its associated infrastructure would require localised vegetation clearance. This clearing would comprise 1.90 ha of planted native vegetation and 12.31 ha of non-native vegetation, heavily dominated by open grazing land covered by exotic grasses. The trees located on the eastern edge of the biodiversity impact area will not be remove, as the works in this location involve removal of redundant infrastructure only.

Figure 4-1 shows the conservative extent of clearing required to facilitate construction and operation of the proposed activity.

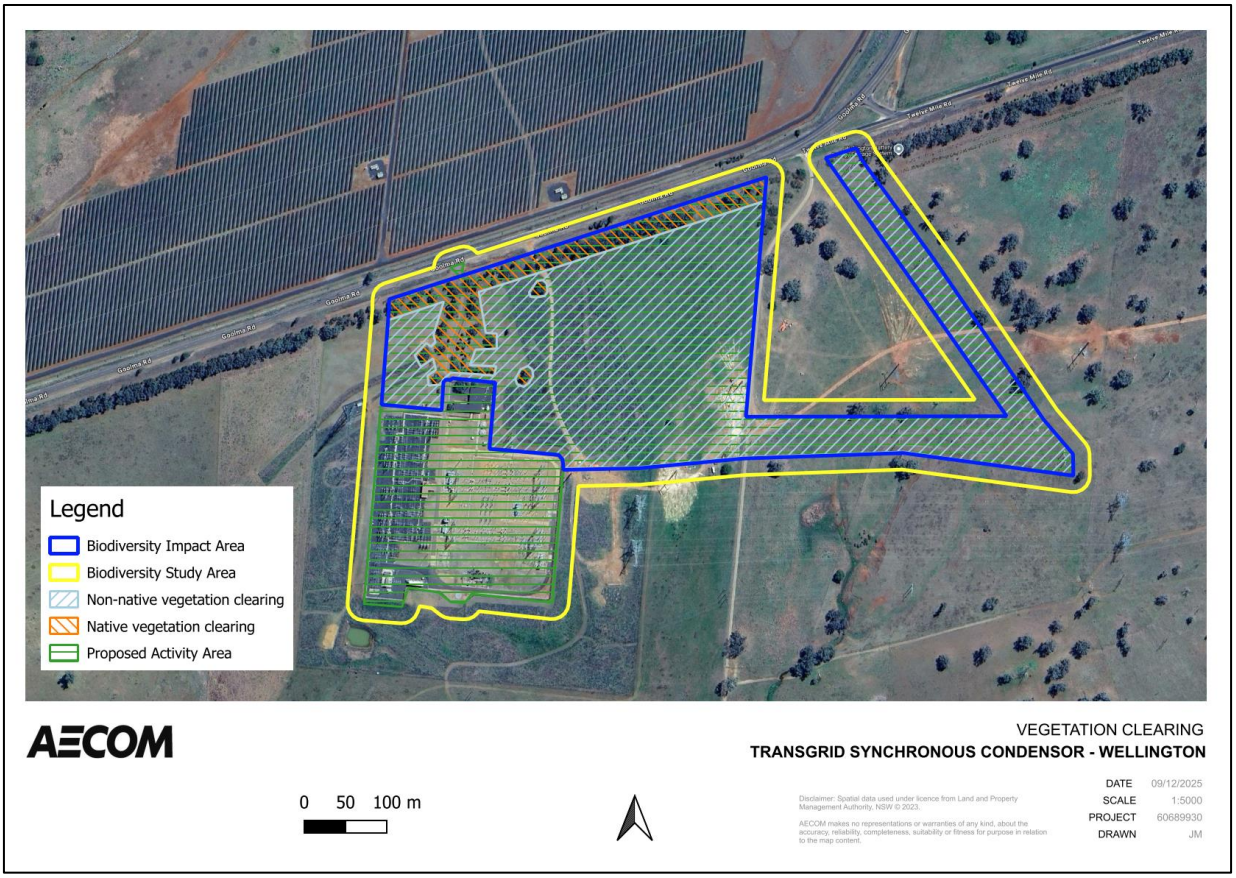


Figure 4-1 Vegetation clearing

The area indicated for clearing would include all construction and operational requirements for the proposed activity. This includes construction site offices, laydown and storage areas and construction access roads, as well as the operational footprint of the syncons.

The removal of native and non-native vegetation in this area would not affect any threatened flora species or threatened ecological community.

Indirect off-site impacts to potential 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 3.8) 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 the substation and associated activities, including establishment of transmission line easements. This is in addition to the extensive agricultural disturbance of the area, which appears to have been heavily grazed for an extended period. As such, the habitat value within the biodiversity study area is substantially reduced compared to the pre-clearing state of surrounding areas.

As outlined in Section 3.5, habitat is present within the biodiversity study area for Superb Parot and Pink-tailed Legless lizard. Habitat for Superb Parrot would be limited to potential nesting habitat within mature and semi-mature native trees proposed to be cleared. Noting the limited scale of this impact and that most of these trees are in an already disturbed area (adjacent to the substation), where human presence is likely to discourage habitation, any impact upon this species is highly unlikely to be significant.

The preferred habitat for Pink-tailed Legless lizard is open *Themeda* grassland areas with scattered partially embedded rock. Noting that *Themeda* was not recorded, surface rock was generally absent across most of the biodiversity study area, and the general predominance of non-native grasses, the potential for this species to be present is considered to be low.

Construction of the syncons would disturb soils and may lead to localised erosion and sedimentation in nearby 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 and the distance of the biodiversity impact area to the nearest waterway, the Macquarie River.

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 nighttime 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 any significant impacts 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 small-scale 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, as well as other nearby projects including Wellington Solar Farm, the Wellington South Battery Energy Storage System (BESS), Orana BESS, and historic surrounding agricultural activities, which is collectively substantial (refer to Section 4.6). This clearing currently results in disruptions in connectivity in all directions, with the most substantial being Goolma Road and the solar farm to the north.

Due to this historic disturbance, the connectivity of habitat for ground-dwelling fauna has been substantially disrupted. Connectivity for mobile aerial species such as birds and arboreal mammals however is largely maintained, though may be reduced for more cryptic species. Despite this, the contribution of the proposed activity to the cumulative loss of habitat and connectivity across the region would be very minor, particularly noting the generally poor ecological condition of most of the proposed impact area.

The primary impact of the proposed activity in terms of connectivity would be the removal of vegetation to enable construction to be carried out. Vegetation clearing would primarily affect scattered planted native vegetation in varying 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 areas would be rehabilitated upon completion.

Noting the presence of scattered native woodlands to the south of the biodiversity impact area, and the commitment to rehabilitate areas used for construction, 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 Western Plains region.

This impact is not considered to be significant given the mobile nature of native fauna likely to be present in the area, the relative 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 of this habitat is implemented).

4.4 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.

One priority weed listed under the Biosecurity Act for the Dubbo Regional LGA was recorded on site. This species and its required management actions are listed in Section 3.8.

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 of 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.

4.5 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. 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 dendrobatids*. 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 and the preferential avoidance of areas of higher vegetation quality. 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.

4.6 Cumulative impacts

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 identified as contributing to potential cumulative impacts with the proposed activity are presented in Table 4-1. The Wellington Solar Farm was considered as part of the baseline environment as this project has been completed.

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

Project and status	Relative location
Wellington South Battery Energy Storage System Development of a 500 MW/1,000 MWh BESS and associated infrastructure including a new transmission line connecting the BESS to Wellington Substation Approved	Around 400 m southeast of the proposed activity, with some overlap of the proposed impact area
Orana Battery Energy Storage System Development of a 400 MW/1,600 MWh BESS and associated infrastructure including a new substation/switchyard and a 300 m 330 kV transmission line connecting to Wellington Substation Approved	Around 450 m south of the proposed activity, some construction work at the substation may overlap

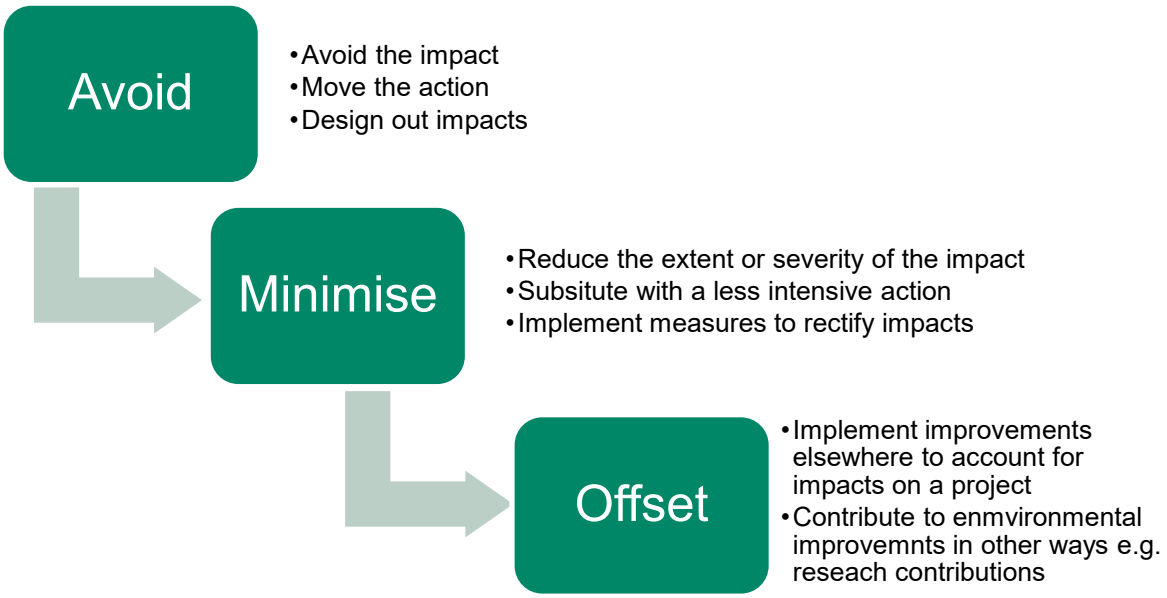
The removal of vegetation, and subsequent habitat, associated with the proposed activity would contribute to the overall and ongoing reduction in available habitat and resources available for native species generally. This is of particular note at this site where the clearing of native vegetation for the purpose of utilising the surrounding land for agriculture has resulted in significant fragmentation of the local landscape and habitat. The proposed activity would not increase this fragmentation directly, though it would increase the size of the area already cleared around the substation and contribute to the ongoing loss of native habitat within the Western Plains region.

Despite this, the impact of the proposed activity in its own right is very minor and as such it's contribution to a cumulative ecological impact is near negligible. Therefore, the potential impact is not considered to be significant in a cumulative sense, particularly noting that the areas within the conservative proposed impact area that would not be required for operation of the synchronous condenser would be rehabilitated upon completion, likely to an improved standard compared to the existing condition.

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 possible and 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 or regenerating 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. 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
- 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:
  - 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)
- 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
- 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
- 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 Wellington 330 kV substation will be rehabilitated to as close to pre-construction conditions as possible. 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/or stabilising the biodiversity impact area would be fully removed upon completion of construction, unless required for the operation of the syncons or the existing Wellington 330 kV substation
- 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
- 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
- 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 partially subject to historic 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 generally degraded nature of the biodiversity study area, and the limited impact to native vegetation (mostly planted landscaping within the substation area).

None of the biodiversity study area was deemed to meet the threshold for consideration as threatened ecological community and hence no significant impacts upon threatened ecological communities is expected.

No threatened flora or fauna species were recorded on site and habitat for threatened fauna was deemed to be of poor quality, mainly due to the predominance of disturbed exotic vegetation. On this basis no significant impacts to threatened species is expected. 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)

Department of Climate Change, Energy, the Environment and Water (DCCEEW), 2025, Protected Matters Search Tool

NSW Department of Primary Industries - Fisheries, 2013, Policy and guidelines for fish habitat conservation and management.

NSW Department of Primary Industries - Fisheries, 2016, Fish communities and threatened species distributions of NSW

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

Central Resource for Sharing and Enabling Environmental Data in NSW (SEED): SEED Map

Appendix A

Likelihood of Occurrence

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Sloane's Froglet	*Crinia sloanei*	V		Typically associated with periodically inundated areas in grassland, woodland and disturbed habitats.	Low
Regent Honeyeater	*Anthochaera phrygia*	CE	CE	Inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. In NSW the distribution is very patchy and mainly confined to the two main breeding areas at Capertee Valley and the Bundarra-Barraba region and surrounding fragmented woodlands. Birds are also found in drier coastal woodlands and forests. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-oak. These habitats have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Nectar and fruit from the mistletoes are also eaten during the breeding season.	Low
Southern Whiteface	*Aphelocephala leucopsis*	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
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V		The Dusky Woodswallow is found in open forests and woodlands, and may be seen along roadsides and on golf courses	Moderate
Australasian Bittern	*Botaurus poiciloptilus*	E	E	Inhabits temperate freshwater wetlands and occasionally estuarine reedbeds, with a preference for permanent waterbodies with tall dense vegetation. The species prefers wetlands with dense vegetation, including sedges, rushes and reeds. Freshwater is generally preferred, although dense saltmarsh vegetation in estuaries and flooded grasslands are also used by the species.	Low
Sharp-tailed Sandpiper	*Calidris acuminata*		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

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Curlew Sandpiper	*Calidris ferruginea*	E	CE, M	Coastal migratory species with a NSW distribution from Hastings Point to Shoalhaven Heads. Found in open, sandy beaches with exposed sand bars and rocky outcrops. Rare use of near-coastal wetlands.	Low
Gang-gang Cockatoo	*Callocephalon fimbriatum*	V	E	Occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests in winter and open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas in summer.	Low
Glossy Black-Cockatoo	*Calyptorhynchus lathami lathami*	V	V	Occupy coastal woodlands and drier forest areas, open inland woodlands or timbered watercourses where Casuarina and Allocasuarina species are present. This species is dependent on large hollow-bearing eucalypts for nesting.	Low
Spotted Harrier	*Circus assimilis*	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.	Moderate
Brown Treecreeper (eastern subspecies)	*Climacteris picumnus victoriae*	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 (Eucalyptus camaldulensis) 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.	Moderate

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Grey Falcon	*Falco hypoleucos*	E		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.	Moderate
Black Falcon	*Falco subniger*	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 i arid regions	Moderate
Latham's Snipe	*Gallinago hardwickii*		M	Soft wet ground, shallow water with tussocks, inundated parts of paddocks, seepage below dams, saltmarsh and mangrove fringes	Low
Painted Honeyeater	*Grantiella picta*	V	V	Occurs in Eucalyptus woodland and forests, with a preference for mistletoe (Amyema spp.). Can also occur along watercourses and in farmland. Nests from spring to autumn in outer canopy of eucalypts, she-oak, paperbark and mistletoe branches.	Low
Little Eagle	*Hieraaetus morphnoides*	V		Occupies habitats rich in prey (birds, reptiles and mammals) within open eucalypt forest, woodland or open woodland. Requires tall living trees for building a large stick nest and preys on birds, reptiles and mammals and occasionally carrion.	Moderate
White-throated Needletail	*Hirundapus caudacutus*		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.	Low

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Swift Parrot	*Lathamus discolor*	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 (Eucalyptus robusta), Spotted Gum (Corymbia maculata), Red Bloodwood (C. gummifera), Mugga Ironbark (E. sideroxylon), and White Box (E. albens).	Low
Malleefowl	*Leipoa ocellata*	E	V	Predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species. Prefers areas of light sandy to sandy loam soils and habitats with a dense but discontinuous canopy and dense and diverse shrub and herb layers. Although Malleefowl will occupy areas within 5 years of fire, they prefer older age classes, with little breeding in areas less than 20 years after fire, and in one study the highest densities recorded in long unburnt mallee (60 to 80 years post fire). A pair may occupy a range of between 50 and 500 ha, overlapping with those of their neighbours. Mainly forage in open areas on seeds of Acacias and other native shrubs (Cassia, Beyeria, Bossiaea), buds, flowers and fruits of herbs and various shrubs, insects (cockroaches, ants, soil invertebrates), and cereals if available. Incubate eggs in large mounds that contain considerable volumes of sandy soil. The litter within the mounds must be dampened for it to decompose and provide heat for incubation of eggs. Up to 34 eggs may be laid in a single season, though usually between 15 and 24 (and clutches smaller in dry years). The male monitors the temperature within the egg chamber using its bill, and regularly works the mound during the breeding season to maintain a constant temperature around 34 degrees. The chicks hatch after between 49 and 96 days (average around 60) and can walk as soon as they emerge from the mound, can run quickly within 2 hours and can fly within 24 hours.	Low

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Eastern Major Mitchell's Cockatoo	*Lophochroa leadbeateri leadbeateri*	V	E	Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres.	Low
Hooded Robin (south-eastern form)	*Melanodryas cucullata cucullata*	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.	Low
Blue-winged Parrot	*Neophema chrysostoma*	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	Moderate
Turquoise Parrot	*Neophema pulchella*	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.	Moderate

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Little Lorikeet	*Parvipsitta pusilla*	V		Mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. Nest in small hollows (entrance approx. 3 cm) of Eucalyptus spp. between 2 - 15 m above the ground.	Low
Plains-wanderer	*Pedionomus torquatus*	E	CE	Plains-wanderers live in semi-arid, lowland native grasslands that typically occur on hard red-brown soils. These grasslands support a high diversity of plant species, including a number of state and nationally threatened species. Preferred habitat of the Plains-wanderer typically comprises 50% bare ground, 10% fallen litter, and 40% herbs, forbs and grasses. Most of the grassland habitat of the Plains-wanderer is <5 cm high, but some vegetation up to a maximum of 30 cm is important for concealment, as long as grass tussocks are spaced 10-20 cm apart. The average home range of a single bird is about 12 ha. Breeding pairs have overlapping home ranges that total approximately 18 ha.	Low
Superb Parrot	*Polytelis swainsonii*	V	V	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Nest in small colonies, often with more than one nest in a single tree. Breed between September and January. May forage up to 10 km from nesting sites, primarily in grassy box woodland. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain.	Moderate

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Grey-crowned Babbler (eastern subspecies)	*Pomatostomus temporalis temporalis*	V		Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Flight is laborious so birds prefer to hop to the top of a tree and glide down to the next one. Birds are generally unable to cross large open areas. Live in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to fifteen birds. All members of the family group remain close to each other when foraging. A soft chuckle call is made by all birds as a way of keeping in contact with other group members. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses. Build and maintain several conspicuous, dome-shaped stick nests about the size of a football. A nest is used as a dormitory for roosting each night. Nests are usually located in shrubs or sapling eucalypts, although they may be built in the outermost leaves of low branches of large eucalypts. Nests are maintained year round, and old nests are often dismantled to build new ones. Breed between July and February. Usually two to three eggs are laid and incubated by the female. During incubation, the adult male and several helpers in the group may feed the female as she sits on the nest. Young birds are fed by all other members of the group. Territories range from one to fifty hectares (usually around ten hectares) and are defended all year. Territorial disputes with neighbouring groups are frequent and may last up to several hours, with much calling, chasing and occasional fighting.	Low
Speckled Warbler	*Pyrrholaemus sagittatus*	V		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.	Moderate
Painted Snipe (Australian subspecies)	*Rostratula australis*	E	E, M	Inhabits shallow inland wetlands, either freshwater or brackish water bodies. Nests on the ground amongst tall reed-like vegetation near water, and feeds near the water's edge and on mudflats.	Low

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Diamond Firetail	*Stagonopleura guttata*	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.	Low
Masked Owl	*Tyto novaehollandiae*	V		Occurs throughout NSW, roosting and nesting in heavy forest. Hunts over open woodland and farmland, with a home range of 500 - 1000 ha. The main requirements are tall trees with suitable large hollows for nesting and roosting and adjacent areas for foraging. Feeds on small mammals.	Low
Silver Perch	*Bidyanus bidyanus*		CE	Silver perch seem to prefer fast-flowing, open waters, especially where there are rapids and races.	Low
Flathead Galaxias	*Galaxias rostratus*		CE	Flathead Galaxias are found in still or slow moving water bodies such as wetlands and lowland streams. The species has been recorded forming shoals. They have been associated with a range of habitats including rock and sandy bottoms and aquatic vegetation. Flathead Galaxias spawn in spring and lay slightly adhesive demersal eggs.	Low
Trout Cod	*Maccullochella macquariensis*	E	E	Trout Cod are often found in faster flowing water with rocky and gravel bottoms, but can also be found in some slower flowing, lowland rivers. Large woody snags are very important for the species as they provide complex habitats for each stage of the species' life cycle.	Low

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Murray Cod	*Maccullochella peelii*		V	The Murray Cod utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW (including the ACT), to slow-flowing, turbid lowland rivers and billabongs. Preferred microhabitat consists of complex structural features in streams such as large rocks, snags (pieces of large submerged woody debris), overhanging stream banks and vegetation, tree stumps, logs, branches and other woody structures.	Low
Macquarie Perch	*Macquaria australasica*		E	Found in both river and lake habitats, especially the upper reaches of rivers and their tributaries.	Low
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	V	Roosts in disused mine shafts, caves, overhangs and disused Fairy Martin nests for shelter and to raise young. Also potentially roost in tree hollows. Occurs in low to mid-elevation dry open forest and woodlands, preferably with extensive cliffs, caves or gullies. Pied Bat is largely restricted to the interface of sandstone escarpment (for roost habitat) and relatively fertile valleys (for foraging habitat).	Low
Spotted-tail Quoll (southeastern mainland population)	*Dasyurus maculatus maculatus*	V	E	Utilises a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites.	Low
Corben's Long-eared Bat	*Nyctophilus corbeni*	V	V	Inhabits a variety of vegetation types, including mallee, bulloke Allocasuarina leuhmanni and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark	Low

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Squirrel Glider	*Petaurus norfolcensis*	V		The Squirrel Glider inhabits dry sclerophyll forest and woodland. In NSW, potential habitat includes Box-Ironbark forests and woodlands in the west, the River Red Gum forests of the Murray Valley and the eucalypt forests of the northeast. Individuals have also been recorded in a diverse range of vegetation communities, including Blackbutt, Forest Red Gum and Red Bloodwood forests, Coastal Banksia heathland and Grey Gum/Spotted Gum/Grey Ironbark dry hardwood forests of the Central NSW Coast. The Squirrel Glider is nocturnal and shelters in tree hollows. This species is capable of gliding up to 50m.	Low
Koala	*Phascolarctos cinereus*	V	V	Inhabits a range of eucalypt forest and woodland communities. Adequate floristic diversity, availability of feed trees (primarily Eucalyptus tereticornis and E. viminalis) and presence of mature trees very important. Preferred food tree species vary with locality and there are quite distinct regional preferences. They are able to persist in fragmented habitats, and even survive in isolated trees across a predominantly agricultural landscape.	Low
Grey-headed Flying-fox	*Pteropus poliocephalus*	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 commonly found in gullies, close to water, in vegetation with a dense canopy. They travel up to 50 km to forage, on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines.	Low
Pink-tailed Legless Lizard	*Aprasia parapulchella*	V	V	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (Themeda australis). 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.	Moderate

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Prostrate Shrub	*Androcalva procumbens*	V	V	Endemic to NSW, mainly confined to the Dubbo-Mendooran-Gilgandra region, but also known in the Pilliga, Mount Kaputar National Park, north east of Gulgong and near Denmen. Grows in sandy sites, often along roadsides.	Low
Spear-grass	*Austrostipa wakoolica*	E	E	Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise. Associated species include Callitris glaucophylla, Eucalyptus microcarpa, E. populnea, Austrostipa eremophila, A. drummondii, Austrodanthonia eriantha and Einadia nutans. Flowers from October to December, mainly in response to rain. Seed dispersal is mainly by wind, rain and flood events; the awn and sharp point of the floret appear to be an adaptation for burying the seed into the soil; grass seed is traditionally believed to be viable for three to five years, so a long-lived seed bank is considered unlikely for this species. Recorded as common in the Mairjimmy State Forest population.	Low

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Bluegrass	*Dichanthium setosum*	V	V	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, Leptorhynchos 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.	Low
Eyebright	*Euphrasia arguta*	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. As with other species of Euphrasia, this species is semi-parasitic and attaches to the roots of other associated plants.	Low

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Spiny Peppercress	*Lepidium aschersonii*	V	V	Found on ridges of gilgai clays dominated by Brigalow (Acacia harpophylla), Belah (Casuarina cristata), Buloke (Allocasuarina luehmanii) and Grey Box (Eucalyptus microcarpa). In the south has been recorded growing in Bull Mallee (Eucalyptus behriana). Often the understorey is dominated by introduced plants. The species grows as a component of the ground flora, in grey loamy clays. Vegetation structure varies from open to dense, with sparse grassy understorey and occasional heavy litter. Flowers from spring to autumn. Plants in the Narrabri population have been observed producing abundant seed, and as the species is believed to be short-lived and large numbers of plants were present at the site, Lepidium aschersonii appears to be successfully reproducing. Populations have been known to immediately disappear following inundation by flooding, reappearing several seasons later. An apparent increase in numbers during drought conditions has also been observed. The species is reported to be salt tolerant and also grows well under dry conditions. Recorded population sizes vary from 18 to 5000+ plants. Plant numbers decrease with increasing overstorey density, and plants were not found where the Brigalow canopy cover exceeded about 60%. The species is often described as a weed where it dominates paddocks.	Low

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Tarengo Leek Orchid	*Prasophyllum petilum*	E	E	Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. Also grows in grassy woodland in association with River Tussock Poa labillardieri, Black Gum Eucalyptus aggregata and tea-trees Leptospermum spp. at Captains Flat and within the grassy groundlayer dominated by Kanagroo Grass under Box-Gum Woodland at Ilford (and Hall, ACT). Apparently highly susceptible to grazing, being retained only at little-grazed travelling stock reserves (Boorowa & Delegate) and in cemeteries (Captains Flat, Ilford and Hall). Flowers in October at Boorowa and Ilford, and December at Captains Flat and Delegate. Population density at the Boorowa site is higher in the open grassland dominated by wallaby grasses Austrodanthonia spp., compared to that within the denser stands of Kangaroo Grass Themeda australis. Highly colonial, with very large numbers present and very conspicuous at the Boorowa site, but cryptic at the Captains Flat, Ilford and Delegate sites where low numbers are recorded. The population near Muswellbrook is also small. Flowers are followed by fleshy seed capsules in summer. Plants retreat into subterranean tubers after fruiting, so are not visible above-ground.	Low
Leek-Orchid	*Prasophyllum sp. Wybong*		CE	Endemic to NSW, it is known from near Ilford, Premer, Muswellbrook, Wybong, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga area. Most populations are small, although the Wybong population contains by far the largest number of individuals. Known to occur in open eucalypt woodland and grassland	Low

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Slender Darling Pea	*Swainsona murrayana*	V	V	The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated. Plants produce winter-spring growth, flower in spring to early summer and then die back after flowering. They re-shoot readily and often carpet the landscape after good cool-season rains. The species may require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated. Swainsona species contain a poisoning principle, swainsonine, which affects the nervous system and is toxic to stock.	Low
Mountain Swainson-pea	*Swainsona recta*	E	E	Before European settlement Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum Eucalyptus blakelyi, Yellow Box E. melliodora, Candlebark Gum E. rubida and Long-leaf Box E. goniocalyx. Grows in association with understorey dominants that include Kangaroo Grass Themeda australis, poa tussocks Poa spp. and spear-grasses Austrostipa spp. Plants die back in summer, surviving as a rootstocks until they shoot again in autumn. Flowers throughout spring, with a peak in October. Seeds ripen at the end of the year. Individual plants have been known to live for up to 20 years. Generally tolerant of fire, which also enhances germination by breaking the seed coat and reduces competition from other species.	Low
Silky Swainson-pea	*Swainsona sericea*	V		Found in Natural Temperate Grassland and Snow Gum Eucalyptus pauciflora Woodland on the Monaro. Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes. Sometimes found in association with cypress-pines Callitris spp. Habitat on plains unknown. Regenerates from seed after fire.	Low

Common name	Scientific name	BC Act	EPBC Act	Habitat	Likelihood of occurrence
Austral Toadflax	*Thesium australe*	V	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (Themeda australis). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.	Low
Dog Strangling Vine	*Vincetoxicum forsteri*		E	The species is known from the Dubbo and Barraba areas of New South Wales and Glenmorgan in Queensland, where it grows in open forest, woodlands and dry scrub,	Low
Granite Zieria	Zieria obcordata	E	E	Grows in eucalypt woodland or shrubland dominated by species of Acacia on rocky hillsides. Also occurs in Eucalyptus and Callitris dominated woodland with an open, low shrub understorey, on moderately steep, mainly west to north-facing slopes in sandy loam amongst granite boulders. The altitude range of sites is 500 to 830 metres. Associated vegetation includes Eucalyptus blakelyi, Brachychiton populneus and Acacia implexa woodland with pockets of low shrub understorey. Also in E. goniocalyx, E. blakelyi, E. macrorhyncha, A. doratoxylon, A. vestita and Callitris glaucophylla woodland with a shrubby understorey. Understorey species include Pandorea pandorana, Isotoma axillaris, Westringia eremicola, Leucopogon attenuatus, Dillwynia sericea, Olearia ramulosa, Stypandra glauca, Stellaria pungens, Acacia vestita, Melichrus urceolatus, Cryptandra amara, Lepidosperma, Styphelia, Kunzea, Haloragis and Cheilanthes species. Main flowering period is in spring (September-October), but plants tend to have flowers present throughout the year. In wild populations, plants tend to grow in crevices between granite boulders. The species has proved to be very difficult to cultivate. Best growth has been achieved with plants in a very sandy well-drained soil. Wild plants have strongly aromatic leaves. Zieria obcordata is extremely sensitive to grazing and browsing disturbances by domestic stock and native herbivores. Heavily browsed plants and vigorous regrowth (following severe browsing by wallabies) have been recorded at sites.	Moderate

Notes:

1. CE = critically endangered, E = endangered, V = vulnerable, M = migratory.

Appendix D Aboriginal Archaeological Due Diligence Assessment

AECOM Australia Pty Ltd
Gadigal Country
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8008 1700 tel

ABN 20 093 846 925

09 December 2025

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

Dear Jake,

Re: Aboriginal Archaeological Due Diligence Assessment – Wellington substation 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 Wellington 330 kV substation (hereafter the 'proposed activity') (refer to Figure 1). The Wellington 330 kV substation is located off Goolma Road, in the suburb of Wellington and the Dubbo 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 Wellington 330 kV substation. 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.

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
- Installation of new 330 kV gantry structures, approximately 800 metres (m) of 132 kV transmission lines (including pole structures), and removal of approximately 1.4 kilometres (km) of redundant 132 kV transmission lines
- Upgrades to the existing access road from Goolma Road, new access road(s) to new substation bench and existing substation, and relocation of the existing access track within the impact area around the construction footprint
- Installation of a new bench (concrete slab, foundations and associated earthworks), with an indicative maximum footprint of around 130 by 150 m, immediately north of the existing Wellington 330 kV substation to house the syncon and associated infrastructure
- 330 kV busbar extension with a new switch bay, which comprises a 330 kV circuit breaker, disconnector, current transformer, capacitive voltage 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 the 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 Wellington 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 Lot 32 of DP622471, which is required for the removal of redundant poles and lines.

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 21 February 2025
- Review of the findings of past Aboriginal heritage investigations relevant to the Wellington 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' was undertaken on 16 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 and AHIMS sites

[This figure has been redacted]

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, economic[1] 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	The proposed impact area is located is located within the Central Western Slopes region of NSW, approximately 2 km northeast of the town of Wellington. Specifically, the proposed impact area is situated on gently undulating terrain. The site transitions from level to very gently inclined land in the west, to gently to moderately inclined slopes toward the east. Elevations within the proposed impact area range from 340 m Australian Height Datum (AHD) in the southeast portion of the substation to 362 m AHD in the northeast, resulting in a total relief of 22 m across the proposed impact area. Slope/gradient across the proposed impact area varies from level (0–1%) to very gently inclined (1–3%) within the substation to gently inclined (3–10%) and moderately inclined (10-32%) in the east associated with two drainage lines.
Hydrology	The proposed impact area is located within the broader Macquarie River catchment, with the river itself situated approximately 2 km to the southwest. Two watercourses are mapped within the eastern portion of the proposed impact area, both of which consist of moderately incised 1st order ephemeral drainage lines. Flowing in a southeasterly direction, these converge approximately 250 m south of the impact area before joining several other channels that ultimately drain into the Macquarie River.
Geology	Reference to the 1:100,000 Geological Series Mapsheet for Wellington (8632) indicates that the surface geology of the proposed impact area comprises a combination of Ordovician-aged Oakdale Formation (Oco) lithologies in the west, and Silurian-aged Wylinga Member (Smdw) and Dripstone Formation (Smd) lithologies in the east. The Oakdale Formation includes mafic volcanic rocks, volcaniclastic sandstones and siltstones, black shales and cherts, breccias and conglomerates, as well as limestones. The Wylinga Member consists of thinly bedded limestone, andesitic volcanic rocks and calcareous sediments, while the Dripstone Formation consists of volcaniclastic sandstones and siltstones, andesitic volcanic rocks, and calcareous sediments.
Soils	Soils within the proposed impact area have been mapped by Murphy and Lawrie (1998) as belonging to the Bodangora landscape in the west and Nanima soil Landscape in the east. Soils of the Bodangora soil landscape have been characterised by Murphy and Lawrie (1998) as shallow to moderately deep stony soils on rolling to steep hills formed on acid volcanics. Lithosols and shallow stony gradational soils typically occur on upper slopes and crests, grading to moderately deep red gradational soils and structured clay loams on lower slopes. Dominant 'A' horizon soils comprise thin, stony loams with pH levels generally ranging from slightly acidic (pH 6.0) to moderately acidic (pH 5.0).

Environmental variable	Key observations
	Soils of the Nanima soil landscape have been characterised by Murphy and Lawrie (1998) as deep red and brown gradational soils and structured clays developed on basalt. Deep red gradational and structured clay soils dominate crests and slopes, with black earths and grey clays present in drainage depressions and lower slopes. Dominant 'A' horizon soils comprise friable clay loams to light clays, with pH levels generally ranging from neutral (pH 7.0) to moderately alkaline (pH 8.0).
Flora	Native vegetation within the proposed impact area has been extensively modified as a result of historical land use activities, from both grazing and construction of the substation. With the exception of a planted tree screen along Gulgong Road, all vegetation was cleared from the site by 1988 and now comprises a mixture of native and non-native grasses and exotic weeds as well as planted trees.
Land disturbance	Known past land use disturbances within the proposed impact area have included native vegetation clearance, levelling for constructing the substation and transmission lines, 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

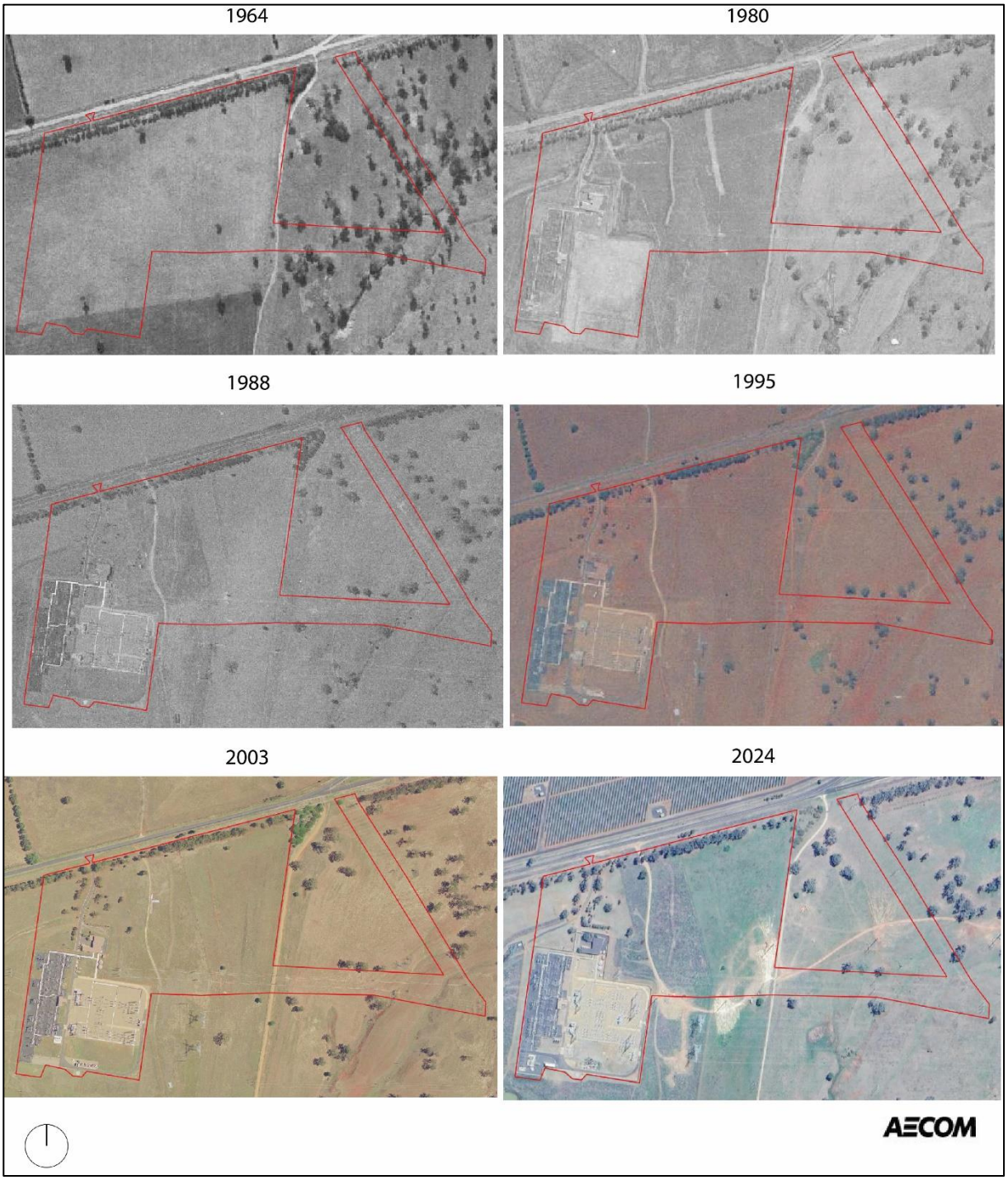
A review of historic aerials for the proposed impact area dated to 1964, 1980, 1988, 1995, 2003 and 2024 (Figure 2) indicate a range of activities and associated ground surface impacts within and surrounding the proposed impact area. These include:

- Near-complete vegetation clearance in the western part of the proposed impact area occupied by the substation, with only partial clearance of the eastern portion prior to 1964
- Grazing, fencing and access road construction prior to 1964
- Additional vegetation clearing across the entire proposed impact area up to 1988
- Levelling and bulk earthworks associated with the construction of the substation around 1980, including access tracks
- Tree planting around 1988.

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. Land within the proposed impact area is considered to range from low to highly disturbed across different parts of the area, with the western portion within and around the substation being highly disturbed, and the eastern portion having only been subject to vegetation clearance.

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 5 x 5 km area surrounding the proposed impact area (i.e., the 'search area') was undertaken on 21 February 2025. A total of 57 Aboriginal archaeological sites were identified within the search area comprising 52 open artefact sites (i.e., artefact scatters or isolated artefacts) two with an associated area of Potential Archaeological Deposit (PAD), two areas of PAD, one modified tree, one burial and one erroneously registered site labelled as "Not a Site" (Table 2, Figure 1).

Consideration of the location of registered AHIMS site indicates that no 'valid' sites are located directly within the proposed impact area. While open artefact site "Wellington Nth SF Additional Area IF3" (36-4-0201) is mapped within the proposed impact area, the site is listed as "Not a Site" under Site Status indicating it has been erroneously recorded at this location and essentially removed from the database.

The next closest site is [redacted] The site was visited as part of this assessment, and the recorded artefact was noted to be outside the proposed impact area. It was further noted that the recorded artefact is likely to be natural, with no evidence of Aboriginal use. It consists of volcanic material, likely lateritic ironstone, which is commonly found on the surface of the area and is largely unsuitable for knapping.

Table 2 AHIMS search results

Site Type	Count	%
Open artefact site (i.e., isolated artefacts and artefact scatters)	50	87.7
Open artefact site + PAD	2	3.5
PAD	2	3.5
Modified tree	1	1.8
Burial	1	1.8
Not a Site	1	1.8
Total	**57**	**100**

7.0 Previous Aboriginal heritage investigations

The Aboriginal archaeology of the greater Wellington area is well researched, having been the subject of numerous Aboriginal archaeological investigations since the 1980s Notable investigations to date have included surveys by AMBS (2008), Bowdler (1982), Kelton (1999), Lance (1985), ngh Environmental (2017, 2018), NSW Archaeology Pty Ltd (2020) and Pardoe (2010).

Key observations drawn from a review of the local 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 , 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
- Quartz is the dominant raw material for flaked stone artefact production, with silcrete the next most common and 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
- No valid Aboriginal archaeological sites have been previously identified within the proposed impact area [redacted].

8.0 Results

In accordance with the methodology presented in Section 2.0, a desktop assessment was initially undertaken by AECOM to identify 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 Aboriginal archaeologically sensitivity – the two 1st order drainage lines – within 200 m of the proposed impact area.

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:

- [redacted]
- [redacted] AECOM assessed that the object was likely natural, with no evidence of Aboriginal use or modification
- 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 aerials, the visual inspection indicated that land immediately surrounding the existing substation has been highly disturbed by historic land uses and has low GI. However, land in the eastern part of the proposed impact area, near the two first-order drainage channels and not previously impacted by the installation of transmission line poles, was assessed as having moderate GI
- Land surrounding the two first-order drainage lines within the proposed impact area, with the exception of land directly beneath the existing transmission line poles, was assessed as having moderate archaeological potential.

[redacted] With the exception of the existing transmission line pole footings, which are highly disturbed, the creek banks are considered to have moderate archaeological potential, that is, subsurface artefacts are considered to be present in low densities up to approximately 50 m of the channels.

[This figure has been redacted]	[This figure has been redacted]
Figure 3 View of artefact	**Figure 4 View east of artefact location**

Figure 5 [redacted] site location

[This figure has been redacted]

9.0 Key findings

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

- There are no valid AHIMS sites located directly within the proposed impact area. However, AHIMS isolated artefact site [redacted]
- One new Aboriginal site, [redacted] has been identified [redacted]
- The archaeological sensitivity of the majority of the proposed impact area is assessed as low, based on landform variables and past disturbances. However, land within 50 m of the two 1st order watercourses present within this area is assessed as retaining moderate archaeological sensitivity.

10.0 Recommendations

1. Impacts to [redacted] should be avoided as far as feasible. To prevent inadvertent impacts during construction, temporary fencing should be erected at a radius of approximately 2 m around the artefact
2. If impacts to [redacted] are unavoidable a Section 90 AHIP would be required to permit harm to the site. Any AHIP application lodged with Heritage NSW will need to be supported by an Aboriginal Cultural Heritage Assessment Report (ACHAR) and include a process of Aboriginal community consultation carried out accordance with Heritage NSW's *Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010a)*
3. Where works are proposed within 50 m of the 1st order watercourses in the eastern portion of the proposed impact area, they should be restricted to the disturbance footprints of existing transmission line poles. Where works are proposed outside of existing disturbance areas within the area of moderate sensitivity, further investigation will be required, including formal archaeological survey and a program of subsurface testing. The results of any further testing would need to be included in an ACHAR. If Aboriginal objects are identified and impacts to these cannot be avoided, an AHIP would be required
4. All relevant Transgrid personnel and contractors should be made aware of the nature and location of Aboriginal sites/objects within the vicinity of the proposed impact area. They should also be aware of recommendation 3. Transgrid's legal responsibilities under the NP&W Act 1974 should also be outlined as should the need to avoid any physical impacts to Aboriginal objects
5. 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,

Geordie Oakes
Principal Heritage Specialist
geordie.oakes@aecom.com

Direct Dial: +64 2 89340610
Direct Fax: +64 2 89340001

11.0 References cited

AMBS. (2008). *Wellington Gas Pipeline, Power Station \& Compressor Station Heritage Assessment*.

Bowdler, S. (1982). *Five sites on the proposed transmission line route between Wellington and Wallerawang: an assessment.* A report on behalf of the National Parks and Wildlife Service of NSW on behalf of the ELectricity Commission of NSW.

Kelton, J. (1999). *An Archaeological Study of the Proposed Upgrading of the Wellington Sewage Treatment Plant, Wellington, NSW*.

Kohen, J. (1986). *Prehistoric Settlement in the Western Cumberland Plain: Resources, Environment and Technology*. Macquarie University.

Lance, A. (1985). *An Archaeological Survey of the Proposed Wellington to Forbes Transmission Line*. Unpublished report for Electricity Commission of NSW.

Murphy, B. W., & Lawrie, J. W. (1998). *Soil Landscapes of the Dubbo 1:250 000 Sheet*. Department of Land and Water Conservation of NSW.

New South Wales Archaeology Pty Ltd. (2020). *Uungula Wind Farm Appendix Aboriginal Cultural Heritage Assessment* (Issue May). Unpublished report for CWP Renewables Pty Ltd.

ngh Environmental. (2017). *Aboriginal Cultural Heritage Assessment Wellington Solar Farm*. Unpublished report for First Solar Pty Ltd.

ngh Environmental. (2018). *Aboriginal Cultural Heritage Assessment Wellington North Solar Plant*. Unpublished report.

Pardoe, C. (2010). *ERM Power Pty Ltd Young to Wellington Gas Pipeline: Cultural Heritage Assessment and Consultation*.

Quirk, K., & Archaeology, A. S. for H. (2004). Missionaries in Paradise: Methodism on the Australian frontier. *ASHA Conference: Gold, Wars and Whaling - Trans-Tasman Connections* .

Appendix A – AHIMS Search Results (redacted)

Appendix E Noise and Vibration Impact Assessment

Prepared for
Transgrid
ABN: 70 250 995 390

AECOM

Wellington 330 kV Substation - new synchronous condenser

09-Dec-2025
Noise and Vibration Impact Assessment
Doc No. 60750224-RPNV-04_A

aecom.com

Solar Farm, Darling Point, Australia

Delivering a better world

Wellington 330 kV Substation - new synchronous condenser

Client: Transgrid

ABN: 70 250 995 390

Prepared by

AECOM Australia Pty Ltd
Gadigal Country, Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 1800 868 654 www.aecom.com
ABN 20 093 846 925

09-Dec-2025

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 and ISO45001.

Quality Information

Document	Wellington 330 kV Substation - new synchronous condenser
Ref	60750224
Date	09-Dec-2025
Originator	Sarah Lu
Checker/s	Gayle Greer
Verifier/s	Neil Standen

Revision History

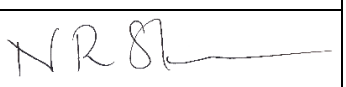
Rev	Revision Date	Details	Approved	
			Name/Position	Signature
0	25-July-2025	First draft for client review	Alice Thurgood	AT
1	04-Sep-2025	Final draft for Transgrid review	Neil Standen Associate Director	NS
1.1	18-Sep-2025	Updated final draft for Transgrid review	Neil Standen Associate Director	NS
2	18-Nov-2025	Updated final draft for Transgrid review	Neil Standen Associate Director	NS
3	09-Dec-2025	Final	Neil Standen Associate Director	

Table of Contents

Glossary of terms and abbreviations i
1.0 Introduction 1
1.1 Proposed activity description 1
1.2 Site description 2
1.3 Purpose of this report 4
1.3.1 Assessment objectives 4
1.3.2 Report structure 4
1.4 Relevant guidelines 4
2.0 Existing acoustic environment 5
2.1 Assessment receivers 5
2.2 Noise measurements 7
2.2.1 Unattended noise measurement results 7
2.3 Noise catchment area 9
3.0 Construction noise criteria 11
3.1 Construction noise 11
3.1.1 Residential receivers 11
3.1.2 Construction road traffic 13
4.0 Operational noise criteria 14
4.1 Environment Protection Authority – NSW Noise Policy for Industry 14
4.1.1 Intrusive noise impacts 14
4.1.2 Protecting noise amenity 14
4.1.3 Proposed activity specific noise criteria 15
4.1.4 Applying the *Noise Policy for Industry* to existing sites 15
4.1.5 Tonality and *Noise Policy for Industry* modifying factors 16
4.1.6 Maximum noise level assessment 17
4.2 Operational road traffic noise criteria 18
4.3 Operational vibration 18
5.0 Construction noise assessment 19
5.1 Construction noise modelling scenarios 19
5.2 Noise modelling methodology 20
5.2.1 Construction modelling assumptions 20
5.3 Predicted construction noise levels 21
5.4 Construction traffic assessment 23
5.5 Construction vibration assessment 23
6.0 Operational noise assessment 24
6.1 Modelling methodology 24
6.1.1 General modelling assumptions 24
6.1.2 Modelling conditions 24
6.2 Modelled operational scenario 24
6.2.1 Existing operational scenario 24
6.2.2 Future operational scenarios 25
6.2.3 Maximum noise levels 27
6.3 Existing operational noise levels 27
6.4 Predicted operational noise levels 28
6.4.1 Daytime operation with generator testing 28
6.4.2 Typical daytime operation 29
6.4.3 Typical evening and night-time operation 30
6.4.4 Operational noise discussion 31
6.4.5 Operational road traffic noise 31
7.0 Cumulative impacts 32
7.1 Nearby projects 32
7.2 Cumulative construction noise impacts 32
7.3 Construction fatigue 33
7.4 Cumulative operational noise impacts 33
8.0 Mitigation measures 34

8.1 Construction noise and vibration mitigation measures 34
8.1.1 Construction Noise and Vibration Management Plan 34
8.1.2 Community consultation and complaints handling 36
8.2 Operational noise mitigation measures 36
9.0 Conclusion 38

Appendix A
Construction Noise Contour Maps A

Appendix B
Operational Noise Contour Maps B

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	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: 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.
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 (eg 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 Wellington 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 Wellington 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 Wellington 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
- Installation of new 330kV gantry structures, approximately 800 metres (m) of 132 kV transmission lines (including pole structures), and removal of approximately 1.4 kilometres (km) of redundant 132 kV transmission lines
- Upgrades to the existing access road from Goolma Road, new access road(s) to new substation bench and existing substation, and relocation of the existing access track within the impact area around the construction footprint
- Installation of a new bench (concrete slab, foundations and associated earthworks), with an indicative maximum footprint of around 130 by 150 m, immediately north of the existing Wellington 330 kV substation to house the syncon and associated infrastructure
- 330 kV busbar extension with a new switch bay, which comprises a 330 kV circuit breaker, disconnector, 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 motors
- 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 the 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 Wellington 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 Wellington 330 kV substation is located within the Dubbo Regional local government area (LGA). The nearest major township is Montefiores, situated around 3 kilometres (km) to the southwest. The substation is located within Lot 1 of DP1226751, which is owned by the Electricity Transmission Ministerial Holding Corporation and leased and managed by Transgrid (the substation site). The Wellington 330 kV substation is located within the proposed impact area shown in Figure 1-1.

The proposed impact area is located on land zoned as Infrastructure SP2 and Primary Production RU1. Adjoining land use zones include Primary Production RU1 to the east, south and southwest, and Infrastructure SP2 (Classified Road) to the north and northwest. Land zoned as Large Lot Residential R5 is located around 450 metres east of the substation site. The substation site is located in a rural area surrounded by open paddocks. The closest residential receivers are located approximately 515 m to the northeast of the proposed impact area.

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.

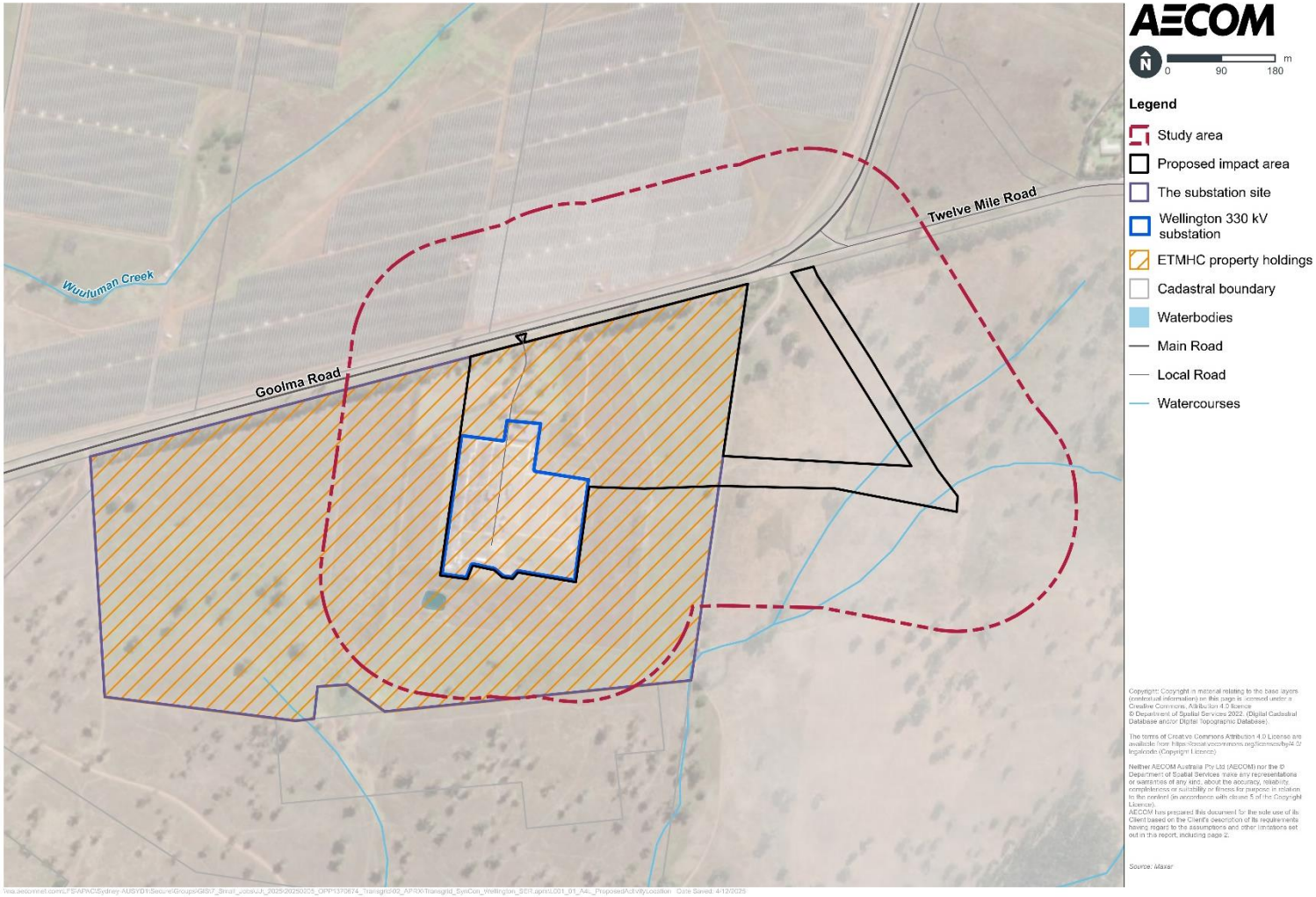


Figure 1-1 Proposed impact area and location

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
- 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 distant road traffic noise from Mitchell Highway and local road traffic noise from Goolma 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 515 m to the northeast of the proposed impact area. Macquarie Correctional Centre is located within 1.3 km of the proposed activity and is treated as a residential receiver for the purposes of this assessment.

The assessment receivers identified for construction and operational modelling consist of residential dwellings. 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 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	59 Twelve Mile Road, Wuuluman	Residential (Validation location)
R2	79 Twelve Mile Road, Wuuluman	Residential
R3	7 Cadonia Drive, Wuuluman	Residential
R4	174 Twelve Mile Road, Wuuluman	Residential
R5	6773 Goolma Road, Wuuluman	Residential
R6	6945 Goolma Road, Wuuluman	Residential
R7	7009 Goolma Road, Montefiores	Residential
R8	7024 Goolma Road, Montefiores	Residential
R9	6938 Goolma Road, Montefiores	Residential
R10	6916 Goolma Road, Wuuluman	Residential
R11	Macquarie Correctional Centre, Wuuluman	Correctional centre (treated as Residential)
R12	6945 Goolma Road, Wuuluman	Residential
R13	6945 Goolma Road, Wuuluman	Residential

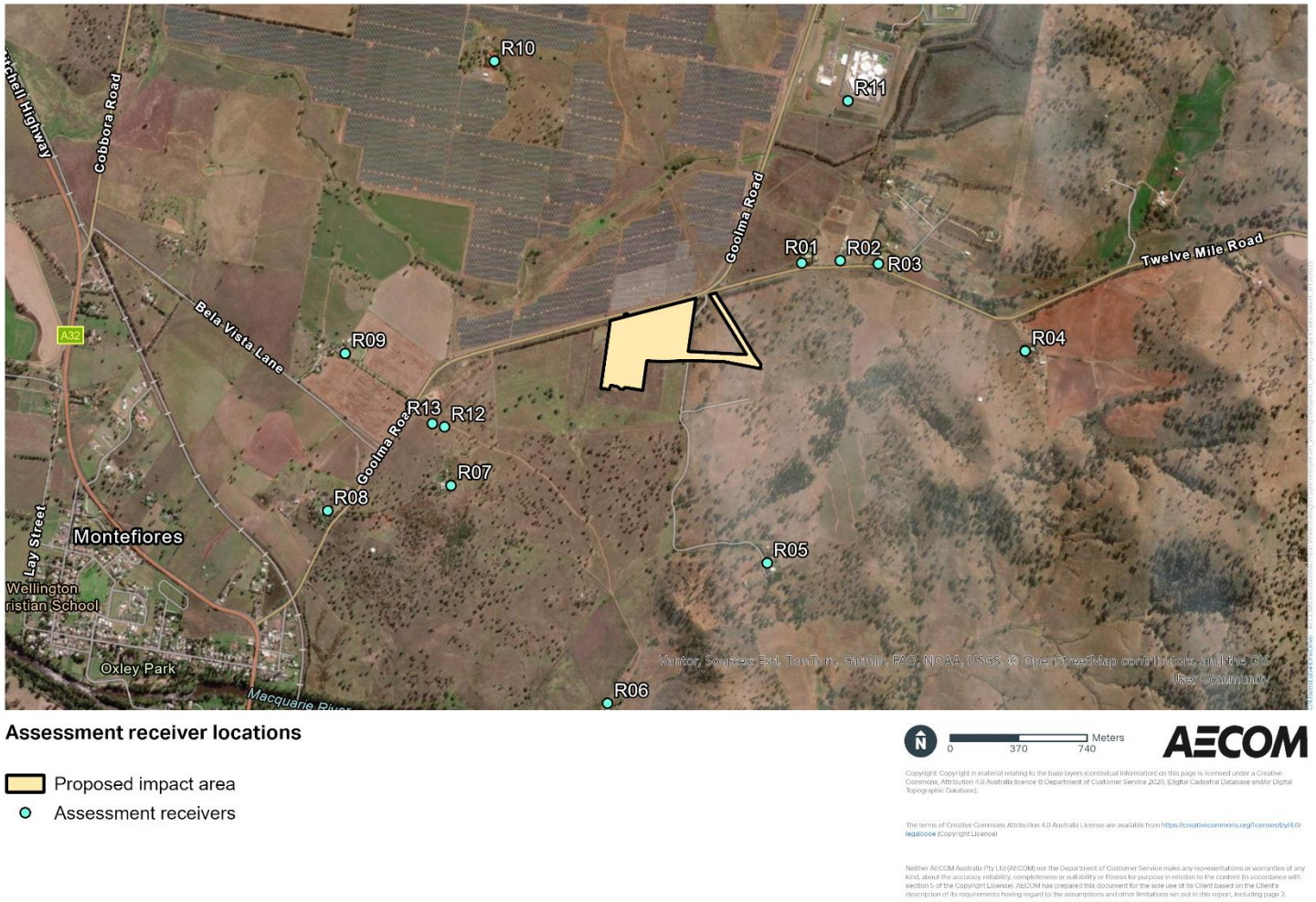


Figure 2-1 Assessment receiver locations

2.2 Noise measurements

Long-term unattended monitoring was undertaken by Renzo Tonin and Associates in July 2017 as part of the *Wellington Solar Farm Construction and Operational Noise and Vibration Assessment* report, dated 24 November 2017, to establish the existing ambient and background noise environment at potentially affected receivers. The data collected by in 2017 is considered to be conservative as it's likely that background noise levels in the area have increased since then, 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

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	Day	Evening	Night
L1	104 Cobbora Road, Maryvale	35[2] (25)	30[2] (29)	30[2] (13)	41	42	37

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 Table 2.1 in the NPfI, where the RBLs are less than the minimum assumed RBLs (35 dB(A) for day, 30 dB(A) for evening and night), the minimum assumed RBLs are adopted instead. Measured RBLs provided in brackets.*

The unattended noise monitoring location is presented in Figure 2-2.

Figure 2-2 Noise monitoring location

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 minimum assumed RBLs from the *Noise Policy for Industry* have been adopted for the NCA 1 noise environment, based on the unattended noise monitoring results from Renzo Tonin and Associates.

Table 2-3 Noise catchment area

NCA	Description of NCA	L_{A90} background rating noise levels used
1	Residential receivers north and south of Goolma Road; Macquarie and Githabul Wellington Correctional Centres.	Minimum assumed RBLs from Table 2.1 in the NPfI

Refer to Figure 2-3 below for the NCA.

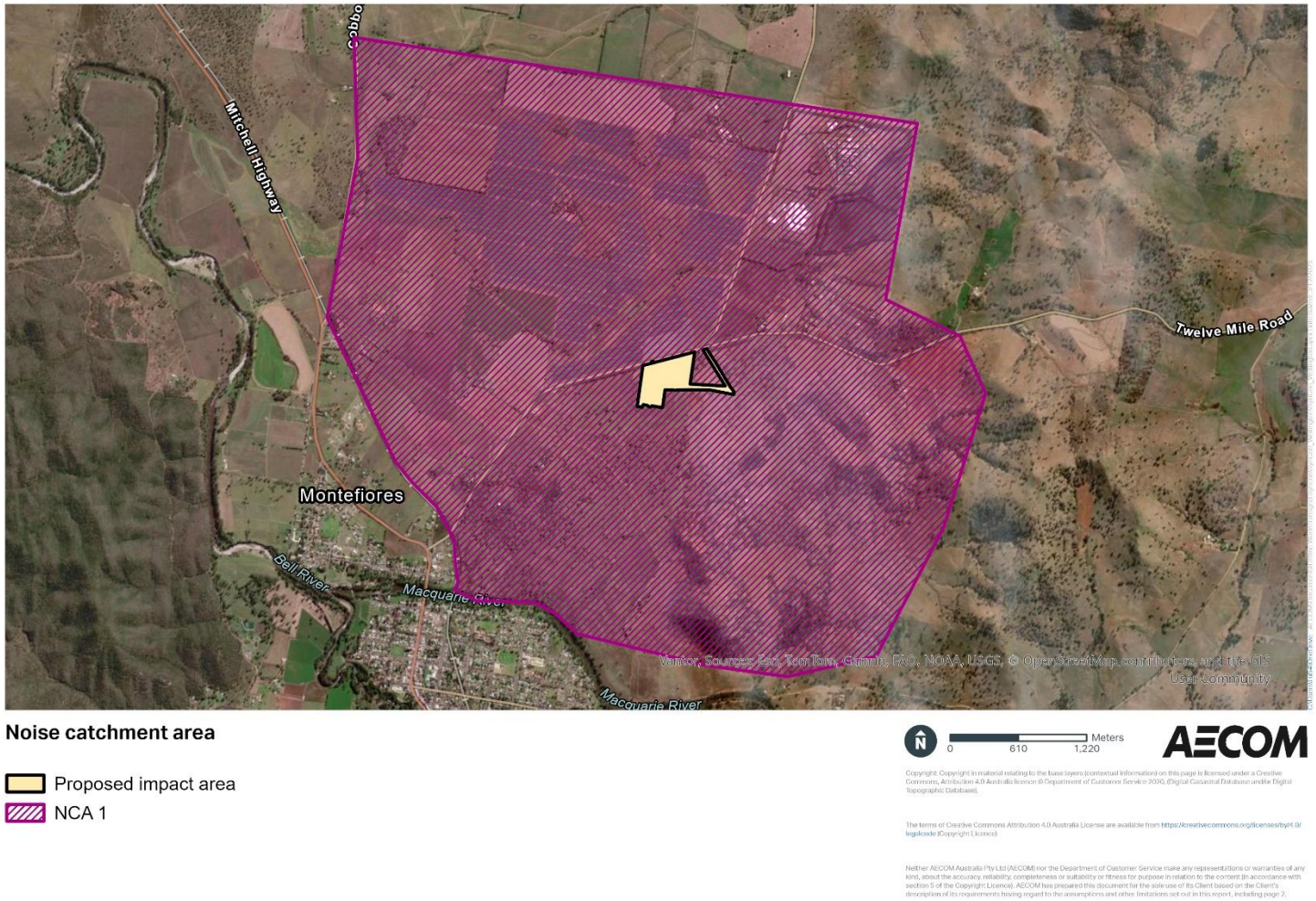


Figure 2-3 Noise catchment area

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 Saturday 8 am to 1 pm No work on Sundays or public holidays	'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 $L_{Aeq,15\ min}$ 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.
	'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: 1. 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) 2. 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 *Interim Construction Noise Guideline* 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	45	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.

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

Time of day[1]	RBL ($L_{A90,15min}$)	Intrusive criterion RBL + 5 ($L_{Aeq,15min}$)
NCA 1		
Day	35	40
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} Noise Level dB(A)
Residence - Rural	Day	50
	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]
NCA 1				
Residential	Day	40	48	40
	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	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

Factor	Assessment/measurements	When to apply	Correction[1]	Comments
		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 measured/predicted A-weighted levels applies for the evening/night period and a 2 dB(A) positive adjustment applies for the daytime period.		(DEFRA) fluctuating low-frequency noise criteria with corrections to reflect external assessment locations.

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_{AFmax} 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	Night-time RBL, $L_{A90,15min}$ dB(A)	Sleep disturbance screening levels for compliance, dB(A)	
		$L_{Aeq,15min}$	$L_{AF,max}$
Residential receivers (NCA 1)	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 – Access road construction
- 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	Removal of redundant and installation of new transmission lines and poles	Mobile crane	103
			Excavator	98
			Hand tools	98
2B		Access road construction	Pavement laying machine	105
			Dump truck	108
			Asphalt truck and sprayer	105
			Concrete truck	106
			Roller	105
			Concrete saw	115[1,2]
			Truck	108
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
			Agitator	109
			Mobile crane	103

Scenario ID	Scenario	Construction activity	Equipment	SWL per unit, dB(A)
			Truck	108
2E		Miscellaneous civil works including drainage, cable trenches, conduits and fencing	Backhoe	96
			Front end loader	104
			Excavator	98
			Truck	108
2F		330 kV busbar extension	Mobile crane	103
2G		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.

The results show that construction noise levels are predicted to exceed the NML during standard hours for one residential receiver (R01) during site establishment. The receiver predicted to experience an NML exceedance of 5 dB(A) is 59 Twelve Mile Road, Wuuluman.

There are no residential receivers where noise levels are predicted to exceed the standard hours NML during access road construction and syncon bench installation. There are also no residential receivers predicted to be ‘highly affected’ for the three worst-case construction scenarios assessed.

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	Access road construction	Syncon bench installation
R1	515	45	75	**50**	44	41
R2	696	45	75	44	40	37
R3	856	45	75	42	38	35
R4	1,465	45	75	35	32	28
R5	1,075	45	75	40	35	33
R6	1,731	45	75	35	33	30
R7	991	45	75	40	38	35
R8	1,648	45	75	34	33	29
R9	1,424	45	75	39	39	33
R10	1,568	45	75	41	38	34
R11	1,315	45	75	38	37	33
R12	871	45	75	40	39	35
R13	930	45	75	40	38	35

5.4 Construction traffic assessment

The predicted 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.

Using traffic volume data from the *Transport for NSW Traffic Volume Viewer* (2025 volumes), the traffic volume on Mitchell Highway for the daytime period (7:00am to 6:00pm) was estimated to be 1,969 with a heavy vehicle percentage of 29%. The resultant noise level change on Mitchell Highway from additional construction traffic volumes is presented in Table 5-3 and was found to be no more than 2 dB(A).

A traffic impact assessment report, *Orana Battery Energy Storage System 6945 Goolma Road, Montefiores – Traffic Impact Assessment,* was prepared by Amber, Report Ref 370 rep 230331 final, dated March 2023. The report presents traffic counts made on Goolma Road, just north of Bela Vista Lane in September 2022. The traffic volume on Goolma Road for the daytime period (7:00am to 6:00pm) was 1,801 with a heavy vehicle percentage of 16%. The resultant noise level change on Goolma Road 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 noise level, dB(A)	Predicted noise level, dB(A)	Change in noise level, dB(A)	Change in noise level greater than 2 dB(A)?
Mitchell Highway	63.7	64.5	0.8	No
Goolma Road	56.5	57.7	1.2	No

Whilst traffic counts for Twelve Mile Road are not available, they are likely to be similar to Goolma Road and 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 along this 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 515 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 scenario

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

Sound power levels from the existing substation equipment were extracted from the *Wellington 330kV Substation Noise Impact Assessment Report* prepared by ERM, dated 15 May 2020. 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 2	85
Reactor 3	85
Transformer 1	96
Transformer 2	96
Transformer 3	87
Auxiliary Transformer 1	74
Auxiliary Transformer 2	74
Capacitor Bank 1	81
Capacitor Bank 3	81

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.

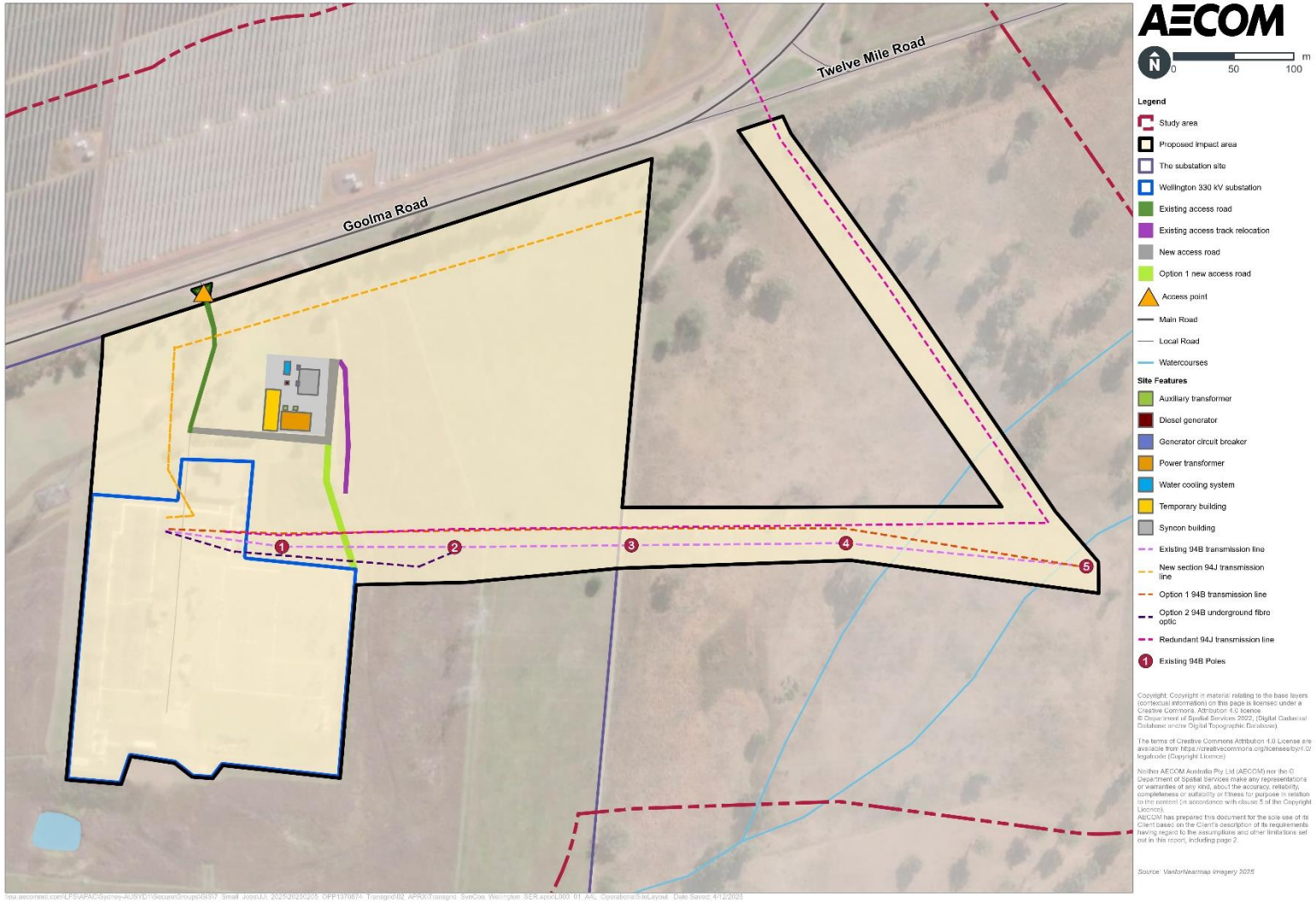


Figure 6-1 Indicative operational site layout

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
Power transformer	1	92
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 **Error! Reference source not found.**, and the inputs from Section REF _Ref159242611 \n \h 6.2.1 under noise enhancing conditions. The SoundPLAN model was validated through a comparison of predicted results at R01 from the ERM *Wellington 330kV Substation Noise Impact Assessment Report* (2020) report. This location was chosen for model validation as it is the closest residential receiver to the site. The results are presented in Table 6-3.

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

Location	Modelled L_{Aeq} level, dB(A) (ERM, 2020)	Modelled L_{Aeq} level, dB(A)
R01	29.0	27.6

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 and low frequency components. A correction for low frequency was not applied to predicted levels as none of the one third octave noise levels exceeded the low frequency thresholds presented in Table 4-5. Therefore, only a 5 dB(A) correction for tonality 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, $L_{Aeq,15minute}$, dB(A)	Predicted noise levels, dB(A)[1]	Exceedance, dB(A)	Compliance
R1	38	34	-	Yes
R2		31	-	Yes
R3		29	-	Yes
R4		23	-	Yes
R5		30	-	Yes
R6		26	-	Yes
R7		32	-	Yes
R8		25	-	Yes
R9		27	-	Yes
R10		30	-	Yes
R11		28	-	Yes
R12		31	-	Yes
R13		30	-	Yes

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

Results in Table 6-4 indicate that existing noise emissions from the substation are currently compliant with the project amenity noise levels. 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*.

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	45	27	-	Yes	35[2]	-	Yes

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
R2		29[2]	-	Yes	32[2]	-	Yes
R3		27[2]	-	Yes	30[2]	-	Yes
R4		20[2]	-	Yes	23[2]	-	Yes
R5		28[2]	-	Yes	31[2]	-	Yes
R6		24[2]	-	Yes	27[2]	-	Yes
R7		32[2]	-	Yes	34[2]	-	Yes
R8		24[2]	-	Yes	27[2]	-	Yes
R9		26	-	Yes	34[2]	-	Yes
R10		29[2]	-	Yes	32[2]	-	Yes
R11		21	-	Yes	29[2]	-	Yes
R12		30[2]	-	Yes	34[2]	-	Yes
R13		29[2]	-	Yes	32[2]	-	Yes

Notes:

1. *+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*
2. *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 under both meteorological conditions.

6.4.2 Typical daytime operation

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

Table 6-6 Predicted operational noise levels – Daytime 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	40	27	-	Yes	35[1]	-	Yes
R2		29[1]	-	Yes	32[1]	-	Yes
R3		27[1]	-	Yes	30[1]	-	Yes
R4		20[1]	-	Yes	23[1]	-	Yes
R5		28[1]	-	Yes	31[1]	-	Yes
R6		24[1]	-	Yes	27[1]	-	Yes
R7		31[1]	-	Yes	34[1]	-	Yes
R8		24[1]	-	Yes	27[1]	-	Yes
R9		26[1]	-	Yes	29[1]	-	Yes
R10		26[1]	-	Yes	29[1]	-	Yes
R11		21	-	Yes	29[1]	-	Yes
R12		30[1]	-	Yes	33[1]	-	Yes
R13		29[1]	-	Yes	32[1]	-	Yes

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

In the daytime scenario when the diesel generator is not in operation, operational noise levels from the proposed activity comply with the daytime noise criteria at all assessed receivers under both meteorological conditions.

6.4.3 Typical evening and night-time operation

Predicted noise levels for the night-time scenario are presented in Table 6-7. The project noise trigger level for both evening and night-time is 35 dB(A).

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)[1]	Exceedance, dB(A)	Compliance	Predicted L_{Aeq} noise levels, dB(A)[1]	Exceedance, dB(A)	Compliance
R1	35	27	-	Yes	35[1]	-	Yes
R2		29[1]	-	Yes	32[1]	-	Yes
R3		27[1]	-	Yes	30[1]	-	Yes
R4		20[1]	-	Yes	23[1]	-	Yes
R5		28[1]	-	Yes	31[1]	-	Yes
R6		24[1]	-	Yes	27[1]	-	Yes
R7		31[1]	-	Yes	34[1]	-	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)[1]	Exceedance, dB(A)	Compliance	Predicted L_{Aeq} noise levels, dB(A)[1]	Exceedance, dB(A)	Compliance
R8		24[1]	-	Yes	27[1]	-	Yes
R9		26[1]	-	Yes	29[1]	-	Yes
R10		26[1]	-	Yes	29[1]	-	Yes
R11		21	-	Yes	29[1]	-	Yes
R12		30[1]	-	Yes	33[1]	-	Yes
R13		29[1]	-	Yes	32[1]	-	Yes

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

The evening/night-time operational scenario from the proposed activity comply with the evening/night-time noise criteria at all assessed 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.

6.4.5 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 2 km 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
Wellington South Battery Energy Storage System Approved	Approximately 400 m southeast of the proposed activity, some construction work at the substation may overlap	Construction timings are unknown, and may overlap with the proposed activity. Operations will overlap.	Development of a 500 MW/1,000 MWh Battery Energy Storage System (BESS) and associated infrastructure including a new transmission line connecting the BESS to Wellington substation
Orana Battery Energy Storage System Approved	Approximately 450 m south of the proposed activity, some construction work at the substation may overlap	Construction has commenced and is unlikely to overlap with the proposed activity. Operations will overlap.	Development of a 400 MW/1,600 MWh BESS and associated infrastructure including a new substation/switchyard and a 300 m 330 kV transmission line connecting to Wellington 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 (CNVMP).

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

7.3 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 consultation with the affected community. Where practicable respite would be provided and the total duration of works would be minimised as far as practicable.

7.4 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.

8.0 Mitigation measures

8.1 Construction noise and vibration mitigation measures

8.1.1 Construction Noise and Vibration Management Plan

A 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
- 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.

Action required	Safeguard details
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.
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.

Action required	Safeguard details
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.
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 that may 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 15 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 syncon cooling system (west, south and east), 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/m^2.
- Acoustic absorption is required on at least two adjacent surfaces of the noise wall facing the equipment (east and south). 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 Wellington 330 kV substation site (the proposed activity).

Nearby noise sensitive residential receivers were identified; no non-residential receivers are located close to the proposed activity. Unattended noise measurements were previously completed by Renzo Tonin and Associates to characterise the existing noise environment. The measured noise levels were below the minimum assumed background levels in *Noise Policy for Industry*, therefore minimum assumed background 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, access road construction and syncon bench installation. Predicted construction noise levels were exceeded at one residential receiver during site establishment. Noise levels were not predicted to exceed NMLs during access road construction and syncon bench installation, and no residential receivers were predicted to be highly noise affected for the construction scenarios. The use of vibration intensive equipment was not proposed.

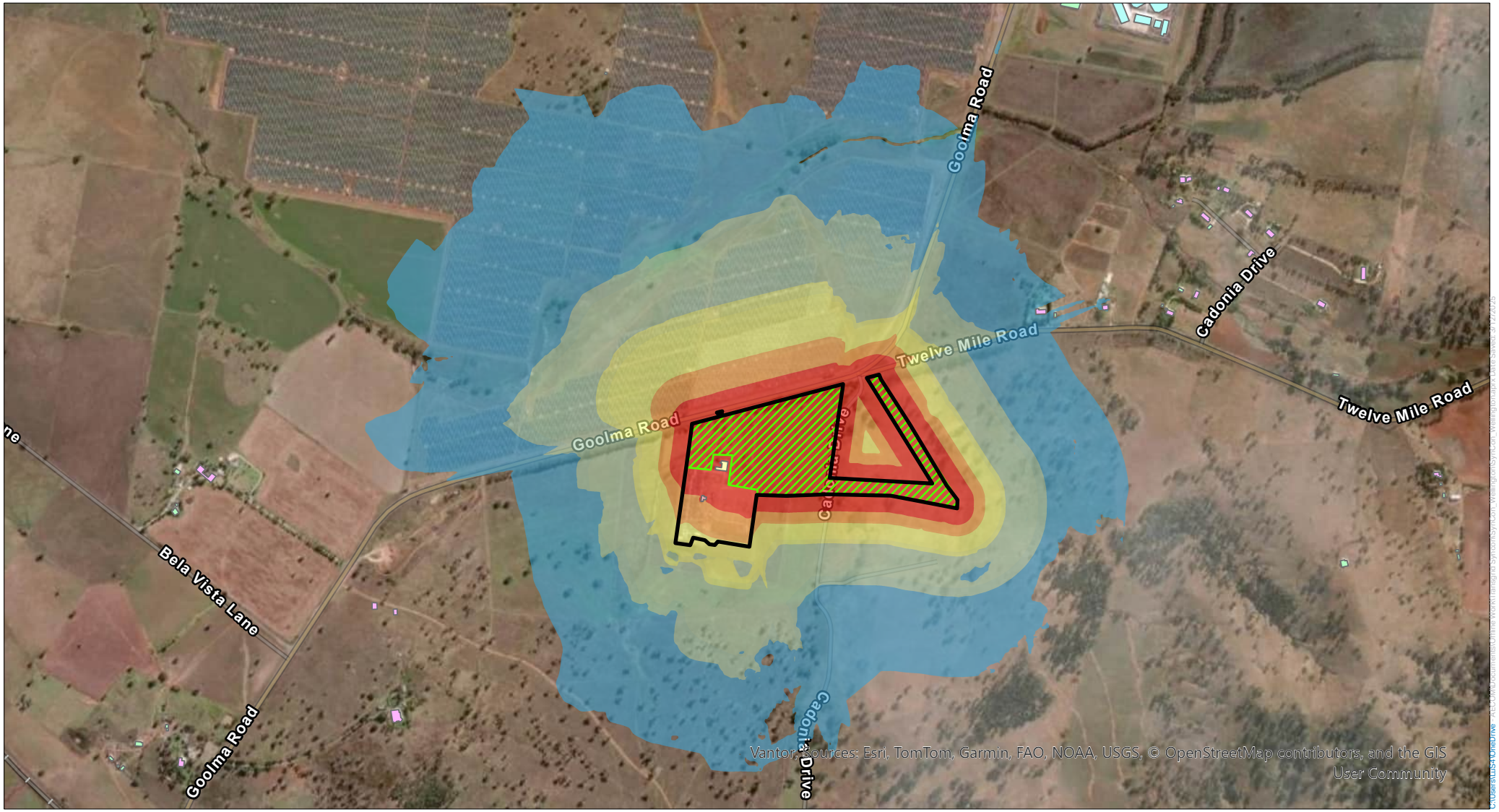
A CNVMP would be developed for the proposed activity and implemented prior to commencement of construction activities. The CNVMP would include all reasonable and feasible safeguards to manage the noise emissions from the proposed activity and any complaints which may occur due to construction noise. 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 cooling systems. 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. Predicted operational noise levels with no diesel generator testing comply with the project noise trigger levels during all periods of the day 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 syncons unit inside a building to provide attenuation and the construction of a noise wall around the external cooling systems.

Appendix A

Construction Noise Contour Maps



Wellington 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
Industrial
Mixed Use
Residential
Shed

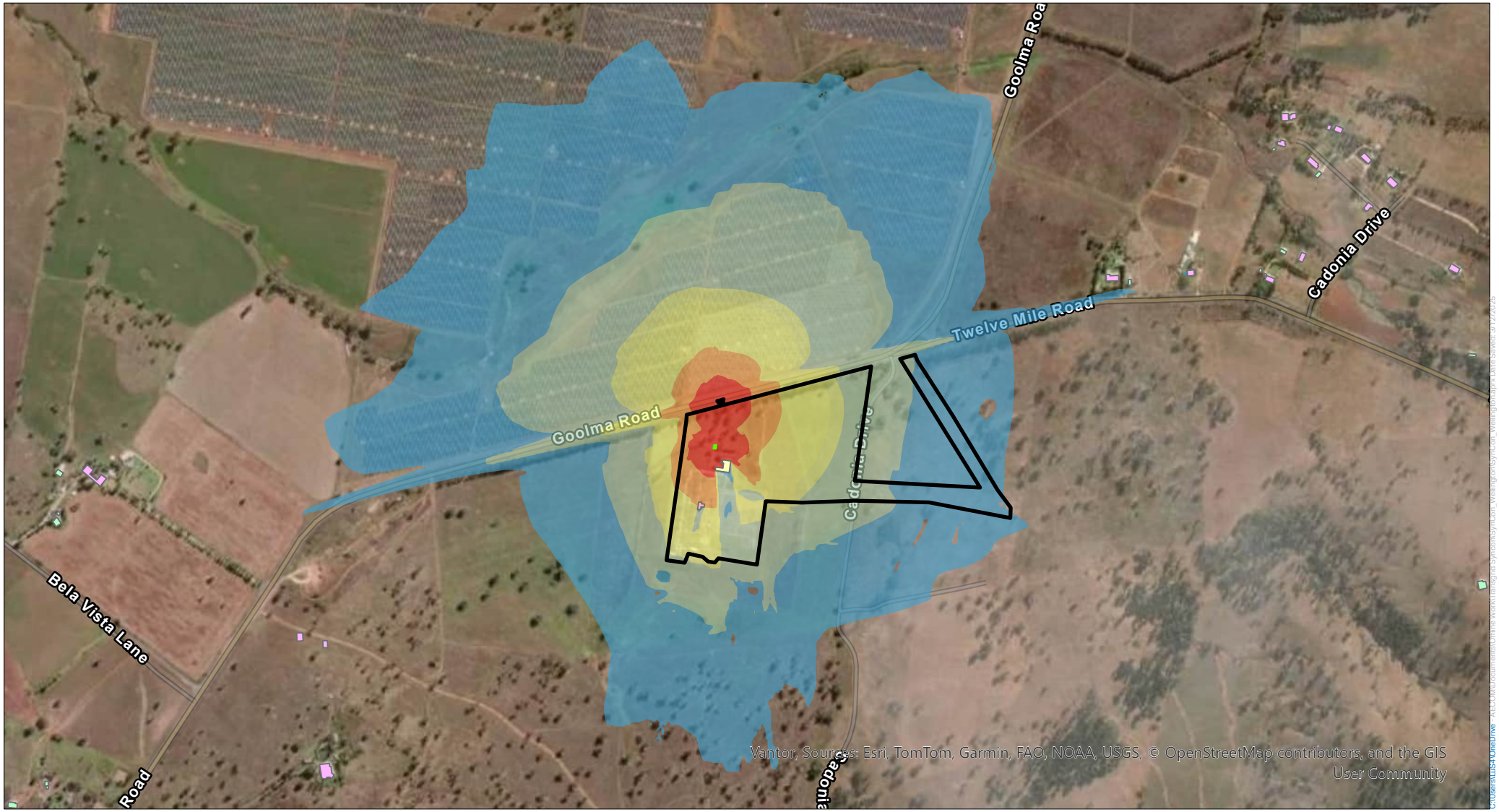
Predicted noise level $L_{Aeq,15min}$ dB(A)

46 - 51
52 - 57
58 - 63
64 - 69
70 - 75

N

0 240 480 Meters

AECOM



Wellington Accelerated Synchronous Condenser
Construction Contours - Scenario 2 - Access Road Construction

Noise contours are shown 1.5 meters above ground level

Proposed impact area

Scenario 2

Usage

- Commercial
- Industrial
- Residential
- Shed

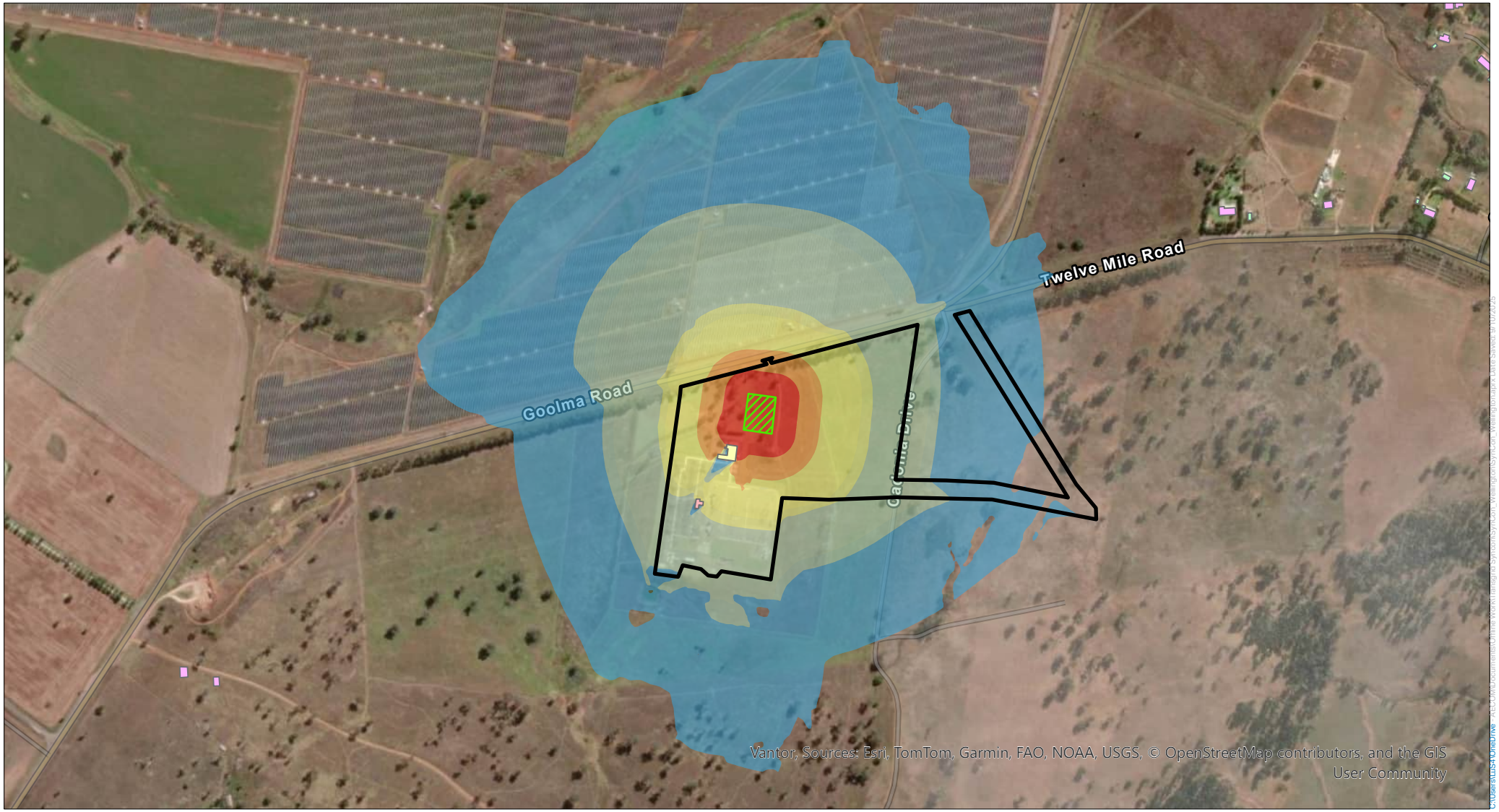
Predicted noise level $L_{Aeq,15min}$ dB(A)

46 - 51 | 52 - 57 | 58 - 63 | 64 - 69 | 70 - 75

N

0 190 380 Meters

AECOM



Wellington 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

Industrial

Residential

Shed

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

46 - 51

52 - 57

58 - 63

64 - 69

70 - 75

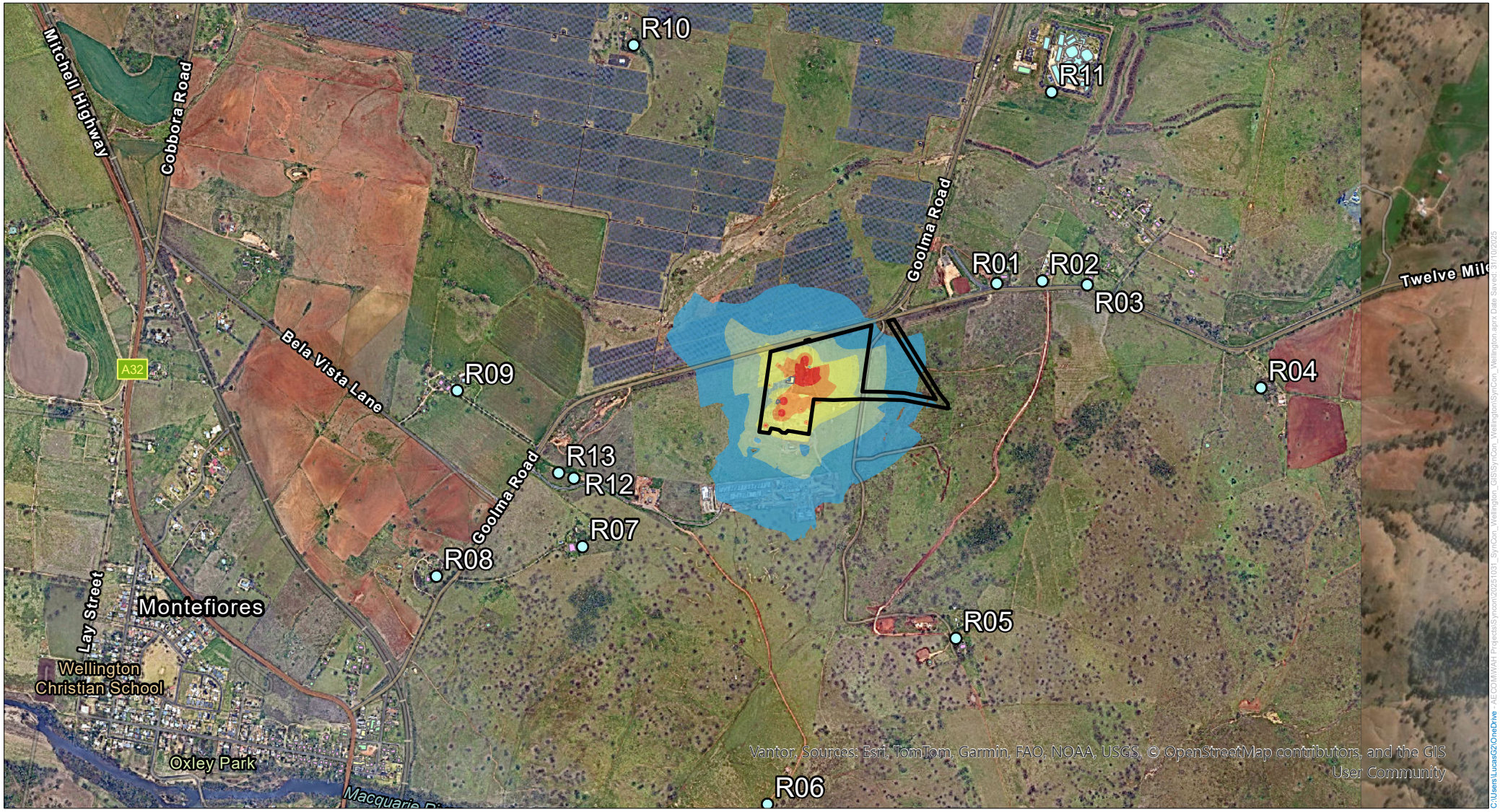
N

0 150 300 Meters

AECOM

Appendix B

Operational Noise Contour Maps



Wellington Accelerated Synchronous Condenser Operational Contours - Day (with generator)

Noise contours are shown 1.5 meters above ground level

Proposed impact area

Assessment receivers

Usage

- Commercial
- Industrial
- Mixed Use
- Residential
- Shed

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

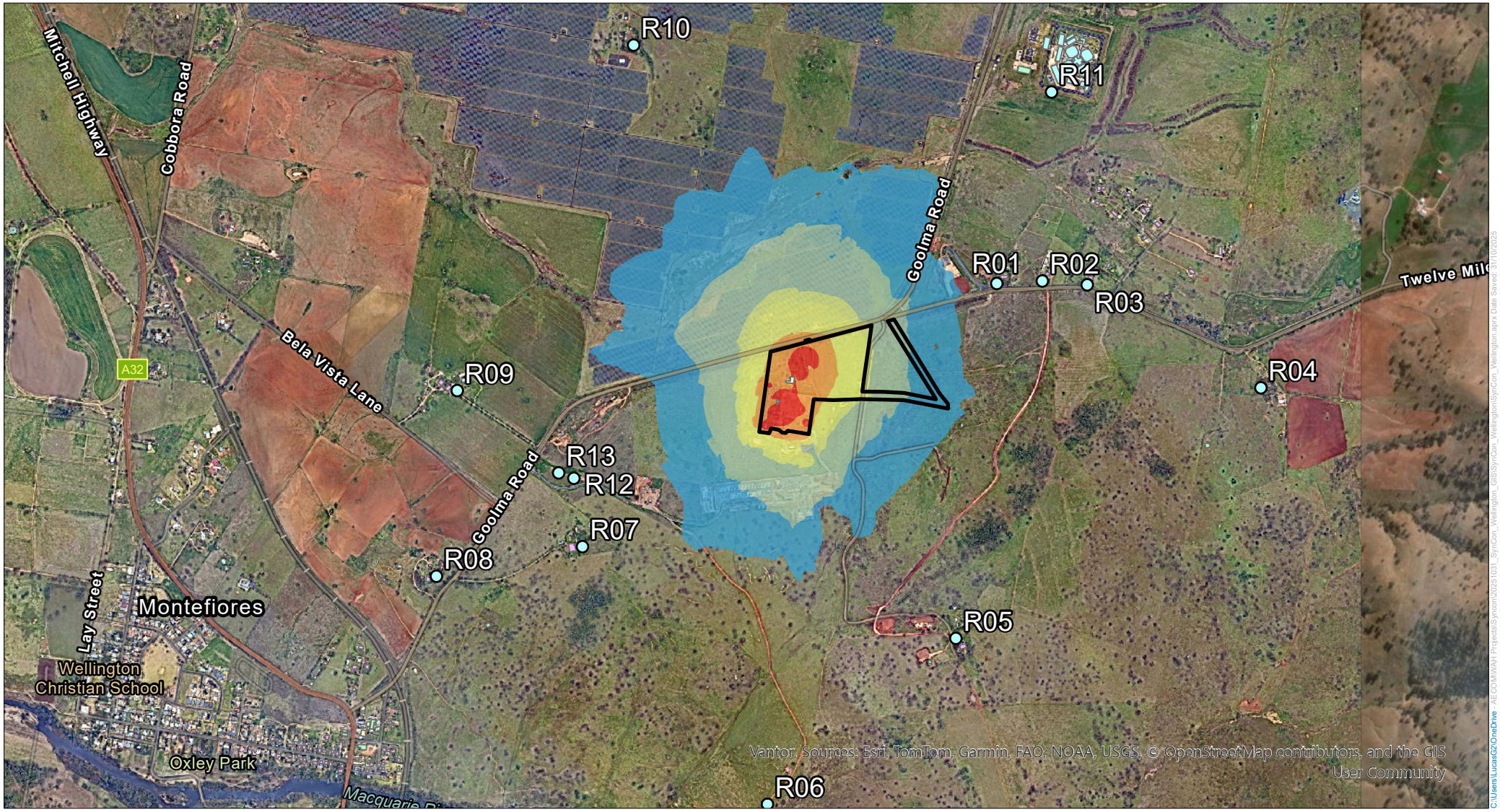
45 - 49 | 50 - 54 | 55 - 59 | 60 - 64 | >= 65

N

0 360 720 Meters

AECOM

Note: Contours have been calculated under adverse weather conditions



Wellington Accelerated Synchronous Condenser
Operational Contours - Day, Evening and Night (Typical operation)

Noise contours are shown 1.5 meters above ground level

Proposed impact area

Assessment receivers

Usage

- Commercial
- Industrial
- Mixed Use
- Residential
- Shed

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

35 - 39 | 40 - 44 | 45 - 49 | 50 - 54 | >= 55

N

0 360 720 Meters

AECOM

Note: Contours have been calculated under adverse weather conditions