# SER Decision Statement

Kemps Creek 500 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 Kemps Creek 500 kV substation (the proposed activity). The proposed activity would include upgrades to the existing access road between Gurner Avenue, Austral and the substation site, 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/ Legal Governance and Risk
Transgrid
Date: 26/11/25.

Transgrid

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# Summary Environmental Report (SER)

Kemps Creek 500 kV Substation – new synchronous condenser

Part 5 EP&A Act Environmental Impact Assessment

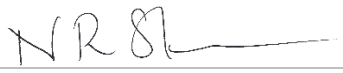
November 2025

## Document preparation history

| Revision | Reviewed by | Date |
|---|---|---|
| **0** | Neil Standen | 28 August 2025 |
| **1** | Neil Standen | 17 October 2025 |
| **1.1** | Neil Standen | 6 November 2025 |
| **2** | Neil Standen | 24 November 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** | 24 November 2025 |
| **Designation** | Associate Director |
| **Qualification** | BSc (Hons) Environmental Biology<br>MSc Environmental Studies |
| **Organisation** | AECOM |

# Contents

# 1. Introduction

## 1.1. Proposed activity overview and need

Transgrid is proposing to install two synchronous condensers (syncons) at the existing Kemps Creek 500 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 are 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 Kemps Creek 500 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 a syncon and associated infrastructure at the existing Kemps Creek 500 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
- Upgrade of the existing access road from Fourth and Gurner Avenue intersection and some sections of access road within the substation site may require upgrading to support the transport of equipment and vehicle movements to and from site
- Demolition of redundant infrastructure associated with the Static Var Compensator (SVC) plant
- Installation of a new bench (concrete slab, foundations and associated earthworks), with an indicative maximum footprint of around 130 by 150 metres, immediately west of the existing Kemps Creek 500 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, current transformer, disconnector, earth switch, capacitive voltage transformer, post insulators/busbar supports and surge arrester
- Installation of two new syncons and associated equipment, including:
  - Power transformer with firewalls
  - Auxiliary transformers
  - Syncon building and gantry crane
  - Oil lubrication and water-cooling systems
  - Control room and battery room
  - Low voltage AC and DC systems
  - Protection and control systems
  - Backup diesel generator
  - Pony motor
- Installation of a new demountable secondary systems building
- Installation of new spill oil tank, secondary containment dam(s), and drainage systems to cater for the new transformers, diesel generator and the syncon oil lubrication system
- Extension of the substation's stormwater drainage system, to cater for the new bench area
- Installation of new lightning protection masts
- Rehabilitation of the site, including:
  - Removal of temporary construction facilities and equipment
  - Excavated material not reused on-site and waste materials would be disposed of at an appropriately licensed waste facility or as directed by Transgrid's environmental business partner in accordance with Transgrid's Waste Management of Spoil Work Instruction
  - Disturbed areas not required for the operation of the syncons or the existing Kemps Creek 500 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.

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

## 2.2. Proposed activity location and property identification

Kemps Creek 500 kV substation site (the substation site) is located off Gurner Avenue, Austral within the Liverpool local government area (LGA). The substation is located within Lot 4 of DP771080, which is owned by the Electricity Transmission Ministerial Holding Corporation (ETMHC) and leased and managed by Transgrid (the substation site). The existing substation access road off Gurner Avenue transects Lot 184 of DP1237400, which is owned by Planning Ministerial Corporation (PMC) The Kemps Creek 500 kV substation is located within the proposed impact area shown in Figure 2-2.

The substation site is located on land zoned as SP2 Infrastructure for the purposes of an Electricity Substation under the *State Environmental Planning Policy (Precincts—Western Parkland City) 2021.* The substation site is in a densely vegetated area, adjoining Kemps Creek Nature Reserve on its northern, eastern and western sides. Kemps Creek lies about 350 metres further to the west of the site. The nearest residential area is approximately 500 m south of the substation site and immediately west of the existing access road.

For the purpose of this SER, the impact area is defined as an indicative maximum footprint in which the construction and operation of the syncon would be carried out (refer to Figure 2-2). The impact area also includes areas required to facilitate connection to the proposed syncon. 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 syncon, 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-metre area surrounding the impact area and is shown in Figure 2-2.

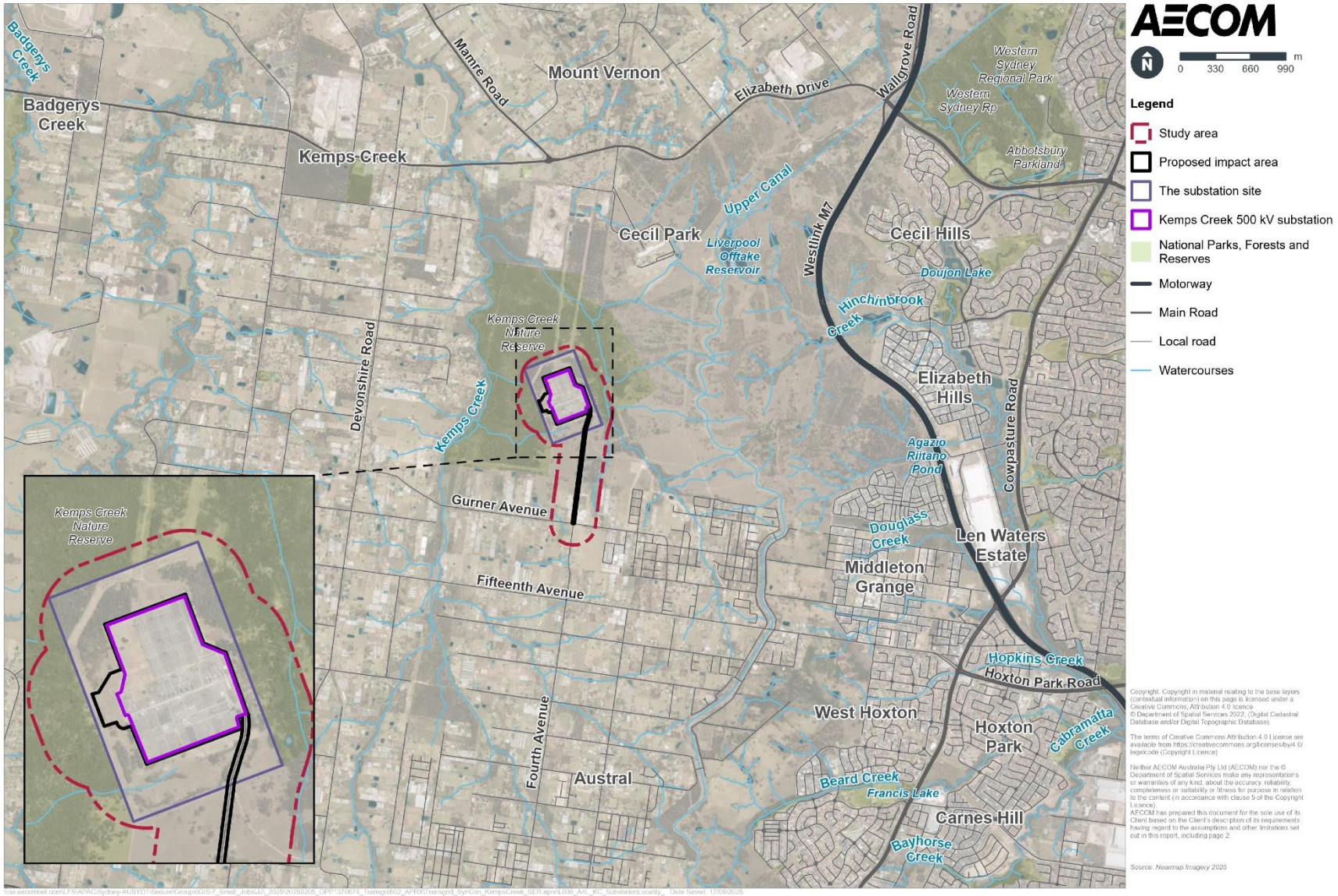


Figure 2-2 Proposed activity locality

## 2.3. Construction activities

### 2.3.1. Construction methodology

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

Table 2-1 Construction methodology and activities

| Stage | Activity | Overview |
|---|---|---|
| **Site establishment** | Site area establishment | Prior to the 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 substation, within the proposed impact area.<br><br>The portion of the impact area subject to the proposed bench extension would be cordoned with fencing (or similar measures) during the construction works.<br><br>The western portion of the proposed impact area, which is proposed for the bench extension, would require existing vegetation to be cleared and would be excavated to match existing substation levels. Excess spoil would be tested for contamination and be stockpiled onsite if suitable for reuse or disposed to a licensed waste facility capable of receiving the material if contamination is found. |
| **Main construction works** | Access road upgrades | The existing access road from Fourth and Gurner Avenue intersection and some sections of access road within the substation site would require upgrading to support the transport of equipment and vehicle movements to and from site. This will include removal of the existing pavement and subgrade, and the installation and compaction of new subgrade material and pavement. |
| | Demolition of redundant infrastructure | Existing infrastructure associated with the SVC plant is redundant and will be demolished and disposed of appropriately.<br><br>Infrastructure to be demolished would include the SVC building, water storage tank, oil power transformer, capacitor banks, outdoor reactor and steel structures, gantry structures, cable trenches, concrete foundations and 330 kV switch bay. Where required, oil would be drained and tested for contaminants and disposed of appropriately. Sample capacitator bank cans would be tested for contaminants and disposed of appropriately. |
| | 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 |

| Stage | Activity | Overview |
|---|---|---|
| | | 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 excess storm water. |
| | Syncon switch bay construction | New foundations, footings and/or piles would be constructed for the new switch bay. The new switch bay would consist of disconnectors, a circuit breaker, an earth switch, busbar post insulators, capacitive voltage transformers, current transformers, surge arresters and gantries. |
| | Syncon building construction | The syncon building would be constructed on top of the new bench. The construction of the syncon building would involve the installation of metal frames and structures using mobile cranes. Cladding and roofing would be erected once all structures are complete. |
| | Miscellaneous civils works including drainage, cable trenches and conduits, and fencing. | Sub-surface drainage systems, including pits and pipes, would be constructed. Cable trenches and/or cable pits and conduits would be constructed within the new bench and would 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. |
| | Syncon and associated equipment installation | The syncon and associated equipment would be installed, including:<br>• Power transformer with firewalls<br>• Auxiliary transformers<br>• Gantry crane<br>• Oil lubrication and water-cooling systems<br>• Control room and battery room<br>• Lightning protection masts<br>• Low voltage AC and DC systems<br>• Protection and control systems<br>• Backup diesel generator<br>• Pony motor.<br>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.<br>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.<br>Power transformers would require on site oil filling to the required levels in order to be ready for |

| Stage | Activity | Overview |
|---|---|---|
| | | energisation. The syncon oil lubrication system and water-cooling systems would also require on site filling.<br>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 existing control room buildings | Works within the existing substation communications and control room.<br>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 Kemps Creek 500 kV substation. The proposed syncon connection would be off the 500 kV busbar extension and would remain disconnected until such time as the syncons are ready for connection to the grid. |
| **Rehabilitation** | Demobilisation and rehabilitation of disturbed areas | Following completion of the construction activities, the disturbed areas that are not required for the operation of the syncon or existing Kemps Creek 500 kV substation would be rehabilitated to as close to pre-construction conditions as possible. Excavated material not used on-site and waste materials would be disposed of offsite to 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
- Electrical conduit and cables
- Elevated work platforms
- Hiab truck/trucks
- General hand tools (powered and unpowered)
- Welder

- Light vehicles
- Heavy vehicles
- Oversize/Overmass vehicles
- Steel and structural supports for new voltage transformers
- Steel and structural supports
- Roller
- Bore piling rig
- Pumps
- Oil storage and pumping plant
- Erosion and sediment controls
- Diesel storage tanks/generators
- Onsite concrete mixing plant
- Imported fill and aggregate as required
- Concrete
- Pavement laying machine
- Asphalt truck and sprayer.

### 2.3.3. Construction schedule

Construction is anticipated to commence in May 2026 and would take around 24-30 months to complete. The proposed activity start date may alter with revision of Transgrid's project program, although the duration of the construction activities would remain the same.

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

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

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

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

## 2.4. Operation and maintenance

The proposed activity would result in additional operational and maintenance activities at the Kemps Creek 500 kV substation. The syncons would operate continuously 24/7, as required by the electricity network requirements for minimum fault levels. The syncons would be switched on/off automatically as needed by the control system. Ongoing maintenance for the equipment would include daily and weekly visual inspections, as well as routine planned maintenance for the associated systems.

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

An indicative operational site layout is shown in Appendix A.

## 2.5. Alternative options considered

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

Table 2-2 Alternative options considered and preferred option

| Option | Overview and justification | Preferred option |
|---|---|---|
| Do nothing | The do nothing option would be the base case where Transgrid do not progress a syncon at the Kemps Creek 500 kV substation site or Sydney West 330 kV substation site (located in the suburb of Eastern Creek) as described in Option 1 below.<br>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 installing the syncons at the Sydney West 330 kV substation.<br>While this option would meet the projected system strength shortfall in the transmission network and address the system requirements established by AEMO (2022), it was not progressed due to cost and property acquisition requirements. | No |
| Option 2 – Preferred option | The preferred option would involve installing the syncons at the Kemps Creek 500 kV substation.<br>Installing the syncons at the Kemps Creek 500 kV substation is considered a feasible option based on cost, program and potential property and environmental impacts, relative to the alternative option considered.<br>This option would meet the projected system strength shortfall in the transmission network and address the system requirements established by AEMO (2022). | Yes |

### 2.5.1. Design refinement to minimise potential impacts

Following identification of Option 2 as the preferred option, the north-western portion of the initial impact area was found to intersect with mapped areas of Cumberland Shale Plains Woodland Plant Community Type (PCT) (#3320). This PCT is associated with Threatened Ecological Communities (TECs) under the *Biodiversity Conservation Act 2016* (BC Act) (NSW) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Cth), including:

- Cumberland Plain Woodland in the Sydney Basin Bioregion, listed as a critically endangered ecological community (CEEC) under the BC Act
- Shale Gravel Transition Forest in the Sydney Basin Bioregion, listed as an endangered ecological community (EEC) under the BC Act
- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest, listed as a CEEC under the EPBC Act.

To minimise potential impacts to these areas, the north-westernmost portion of the initial impact area was removed.

During a field survey conducted on 9 March 2025, the empty shell of a Cumberland Plain Land Snail was identified within the north-western portion of the initial impact area. The Cumberland Plain Land Snail is listed as Endangered under the BC Act. To minimise potential impacts to habitat for the Cumberland Plain Land Snail, the initial impact area was further refined.

Figure 2-3 displays the initial impact area, the biodiversity constraints discussed above, and the resulting proposed impact area to minimise potential biodiversity impacts.

Section 5.4 provides further detail on potential impacts to the Cumberland Shale Plains Woodland PCT and Cumberland Plain Land Snail.

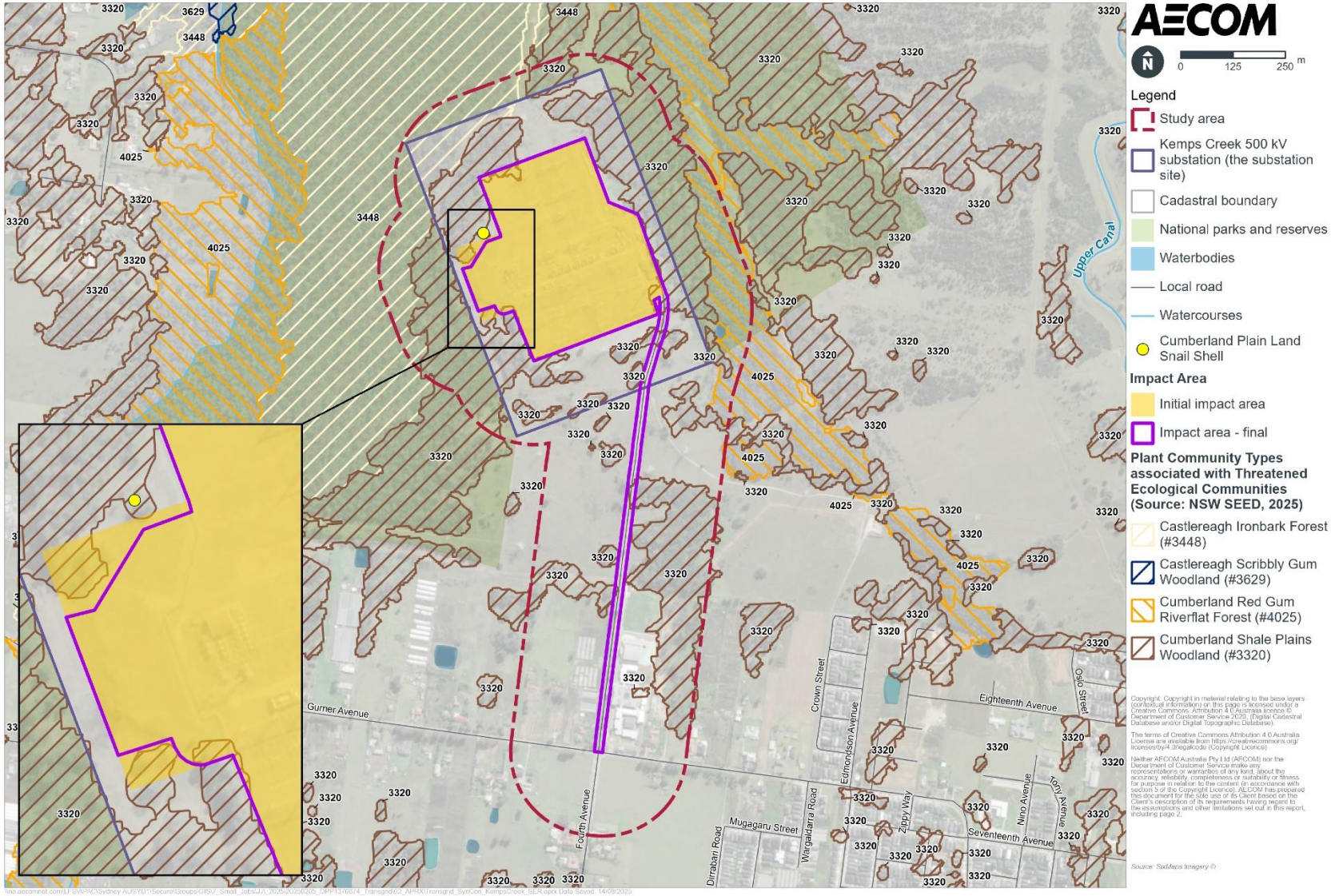


Figure 2-3 Impact area boundary refinement

# 3. Planning context

## 3.1. Approvals pathway

### *3.1.1. Environmental Planning and Assessment Act 1979*

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

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

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

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

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

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

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

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

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

### 3.1.3. Duty to consider environmental impacts

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

## 3.2. Other relevant Commonwealth and NSW legislation

Other environmental planning instruments and legislation that are directly relevant to the determination and/or assessment of the proposed activity are considered in Table 3-1**Error! Reference source not found.**.

Table 3-1: Relevant Commonwealth and NSW legislation

| Legislation | Potential approval requirements | Relevance to the proposed activity | Permit/approval/ licence requirements |
|---|---|---|---|
| **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 significant 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.<br>If any of these could be impacted by the proposed activity, an assessment of significance that addresses the requirements of Section 7.3 of the BC Act must be completed to determine the significance of the impact. | The proposed activity would not impact any threatened species, populations, ecological communities and would not be carried out on a declared area of outstanding biodiversity value listed under the BC Act.<br>Overall, the proposed activity is unlikely to result in a significant impact upon biodiversity values.<br>Therefore, no permits or approvals are required under the BC Act.<br>Section 5.4 provides details of the impacts to ecology. | None required. |

| Legislation | Potential approval requirements | Relevance to the proposed activity | Permit/approval/ licence requirements |
|---|---|---|---|
| ***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.<br>Section 57(2) provides that an exemption from the approval requirements of Section 57(1) can be sought in certain circumstances.<br>An excavation permit is required under Sections 139(1) and (2) to disturb or excavate any land containing or likely to contain a relic.<br>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 State heritage listed items near the proposed activity, and the activity would not involve disturbing or excavating land on which a relic is located or where there is reasonable expectation that the excavation or disturbance is likely to result in a relic being discovered, exposed, moved, damaged or destroyed (see Section 5.6).<br>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.<br>If works are located in land reserved under the NPW Act, approval from the NSW Department of Climate Change, Energy, the Environment and Water's (DCCEEW) National Parks and Wildlife Service (NPWS) is required. | The proposed activity would not impact any registered Aboriginal heritage sites, therefore, a permit under Section 90 of the NPW Act is not required.<br>The Kemps Creek 500 kV substation is located adjacent to land reserved under the NPW Act (Kemps Creek Nature Reserve). However, there would be no direct impact to this land as a result of the project and therefore would not require approval from NSW NPWS.<br>However, consultation with NSW NPWS has occurred throughout the development of this SER (refer to Section 4). | None required. |

# 4. Consultation

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

Early consultation with Liverpool City Council (LCC) was undertaken by Transgrid and NSW Department of Climate Change, Energy, Environment and Water (NSW DCCEEW) on 31 March 2025 as part of the submission to the NSW Infrastructure Planner for consideration of the syncon project as a Priority Transmission Infrastructure Project (PTIP) by the NSW Minister for Energy. Feedback from Council on 9 May 2025 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 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 LCC on 20 June 2025. This consultation described the scope of the proposed activity. In accordance with Section 45 of the *Electricity Supply Act 1995*, Council was provided 40 days to provide a response to be considered in the planning and assessment phase. No response to this written notice was received from Council.

In accordance with Section 2.15(2) of the TISEPP, written notice of the intention to carry out the proposed activity was also given to NSW NPWS on 20 June 2025 due to the proposed activity being adjacent to land reserved under the NPW Act (Kemps Creek Nature Reserve).

Further, in accordance with Section 2.15(2)(h) of the TISEPP, written notice of the intention to carry out the proposed activity was also given to Bradfield Development Authority on 20 June 2025 due to the proposed activity being located within a Western City operational area (as specified under Schedule 2 of the *Western Parkland City Authority Act 2018*) and would have an estimated development cost of more than $30 million.

In accordance with Section 2.15(1)(b) of the TISEPP, NSW NPWS and Bradfield Development Authority were provided 21 days to provide a response to be considered in the planning and assessment phase of the proposed activity. The issues raised by NSW NPWS on 27 June 2025 and how these are addressed in this SER are summarised in Table 4-1. No issues were raised by Bradfield Development Authority in their response on 27 June 2025.

Further, in accordance with Section 2.45 of the TISEPP, written notice of the intention to carry out the proposed activity was given to Hellenic Village Ltd, Planning Ministerial Corporation, Al Faisal College and Endeavour Energy on 17 and 18 September 2025 as the owners of the land adjoining the Kemps Creek 500 kV substation access road, inviting a submission within 21 days from the date on which the notice was given. No issues were raised by Endeavour Energy in their response on 15 October 2025. No further responses were received.

During the preparation of this SER, Transgrid identified a new subdivision at 95 Gurner Avenue, Austral. This subdivision is located on land adjoining the existing access road to the Kemps Creek 500 kV Substation. In accordance with Section 2.45 of the TISEPP, written notice of the proposed activity was issued to LCC and the subdivision's developer (Crownland Developments) on 8 and 13 October 2025, respectively. As the addresses of individual residents were not publicly available, the notice was intended to be forwarded to them by LCC and the developer, inviting submissions within 21 days of the notice date. Furthermore, to ensure effective communication with the community regarding the Kemps Creek 500 kV

substation access road upgrade as part of the proposed activity, Transgrid installed a sign at the access road gate displaying relevant contact details for those seeking further information.

On 13 October 2025, the developer responded via email, acknowledging and agreeing to Transgrid's request. LCC responded on 20 October 2025, but did not acknowledge the request. Issues raised by LCC via email and by one resident via phone call on 21 October 2025 are summarised in Table 4-1, along with Transgrid's responses as documented in this SER.

Table 4-1 Issues raised during consultation and how addressed

| Stakeholder | Issues raised | How addressed |
|---|---|---|
| Liverpool City Council – DCCEEW Consultation | Community opposition and need for engagement – a previous third-party solar battery proposal received negative feedback from residents, and concerns were raised about ensuring early and transparent communication. | Transgrid has prepared a Community and Stakeholder Engagement Plan (CSEP) to ensure early and clear community consultation.<br>The CSEP also outlines a hotline and email contact for communities to ask questions and provide feedback on the proposed activity. |
| National Parks and Wildlife Services | Kemps Creek Nature Reserve – no access or works is permitted within Kemps Creek Nature Reserve without NSW NPWS consent. The *Developments adjacent to National Parks and Wildlife Service lands Guidelines for consent and planning authorities* (NPWS, 2020) are to be followed. | As shown in Appendix A, construction or access would not occur in or through Kemps Creek Nature Reserve. With the implementation of the mitigation measures described in Appendix B, the risk of environmental impacts to the Kemps Creek Nature Reserve would be low. |
| Liverpool City Council | No objection to the proposed activity as long as the following are adhered to:<br>- Obtain a road opening (ROP) and road occupancy permit (ROC) if excavations involve council assets or interference of traffic<br>- Undertake a dial before you dig (DBYD) prior to excavation and if environmentally sensitive land is identified please undertake a Part 5 Review of Environmental Factor (REF)<br>- Please remove any service location marks on council assets. | Any works that impact traffic flow on public roads, such as works along the access road, as outlined in Section 5.8, or involve excavation of Council-owned assets will be managed through consultation with Council and Transport for NSW to determine applicable permit requirements. These activities will be documented within the project CEMP, which would also detail any traffic management methods in accordance with Appendix B.<br><br>The proposed activity would be development permitted without consent from Council in accordance with the TISEPP, and therefore subject to environmental assessment requirements outlined in Part 5 of the EP&A Act. A flora and fauna assessment is available in Appendix C.<br><br>DBYD is part of Transgrid's excavation planning to minimise interaction with buried assets. |

| Stakeholder | Issues raised | How addressed |
|---|---|---|
| 95 Gurner Avenue, Austral – Resident | Resident raised concerns on potential adverse effects on their property as a result of the proposed activity. | Transgrid considers the proposed activity is unlikely to have a significant impact on adjacent landowners and will continue to provide updated to key stakeholders as the project progresses.<br><br>Section 5.7 (Noise and vibration), 5.8 (Traffic and access) and 5.11 (Visual amenity) within this SER address the residents' concerns of adverse impacts on their property as a result of the proposed activity. |

# 5. Environmental impact assessment

This section provides an assessment of the potential environmental impacts of 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 would be located within the Liverpool LGA within the suburb of Austral. The proposed activity is located on land zoned as SP2 Infrastructure for the purposes of an Electricity Substation under the *State Environmental Planning Policy (Precincts—Western Parkland City) 2021* (refer to Figure 5-1). The substation site is currently used for the purpose of electricity transmission as a substation.

The majority of the proposed impact area is located at Lot 4 of DP771080, which is owned by the Electricity Transmission Ministerial Holding Corporation (ETMHC) and leased and managed by Transgrid. The access road from Gurner and Fourth Avenue is located at Lot 184 of DP1237400, which is owned by Planning Ministerial Corporation (PMC) and Lot 1 of DP606317 and DP1306779, which is owned by ETMHC.

The substation site is located in a medium density residential area bordered by the Kemps Creek Nature Reserve to the east, north and west. The existing access road is bordered by moderately dense vegetation to the east and west, a school for primary and high school students to the east and a new residential subdivision to the west. Further out from the study area lies low and medium density residential properties.

The substation site is located within the Western Parkland City, a fast growing region, in terms of both population and industry sectors. This region includes the Western Sydney International Airport, located approximately 5 km west of the substation site, proposed to being operations in late 2026.

It is noted that the future land use immediately south of the substation site is anticipated to include new substations by Transgrid and Endeavour Energy.

The nearest residential dwelling is located approximately 500 m south of the substation site (and immediately west of the existing access road).

### 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 access road upgrade works on PMC property which requires an access and construction licence prior to works commencing. The proposed activity would not impose any new restrictions on land use within the study area and would not require access to privately owned land. Therefore, no land use impacts are anticipated during construction.

#### Operation

Under the *State Environmental Planning Policy (Precincts—Western Parkland City) 2021*, the zoning objectives of SP2 Infrastructure include:

- To provide for infrastructure and related uses

- To prevent development that is not compatible with or that may detract from the provision of infrastructure
- To facilitate development that is in keeping with the special characteristics of the site or its existing or intended use and that minimises adverse impacts on surrounding land

The proposed activity is consistent with the existing land use of the impact area, being a substation, and the zoning objectives of SP2 Infrastructure under the *State Environmental Planning Policy (Precincts—Western Parkland City) 2021*.

No property acquisition would be required for the proposed activity on PMC and Transgrid's existing property. For the access road upgrade works on PMC property, an access and construction licence is required prior to commencing works. The proposed activity is consistent with the existing operations on site, being for the purpose of an electricity substation and for transmission purposes. As such, permanent land use changes as a result of the proposed activity are not anticipated.

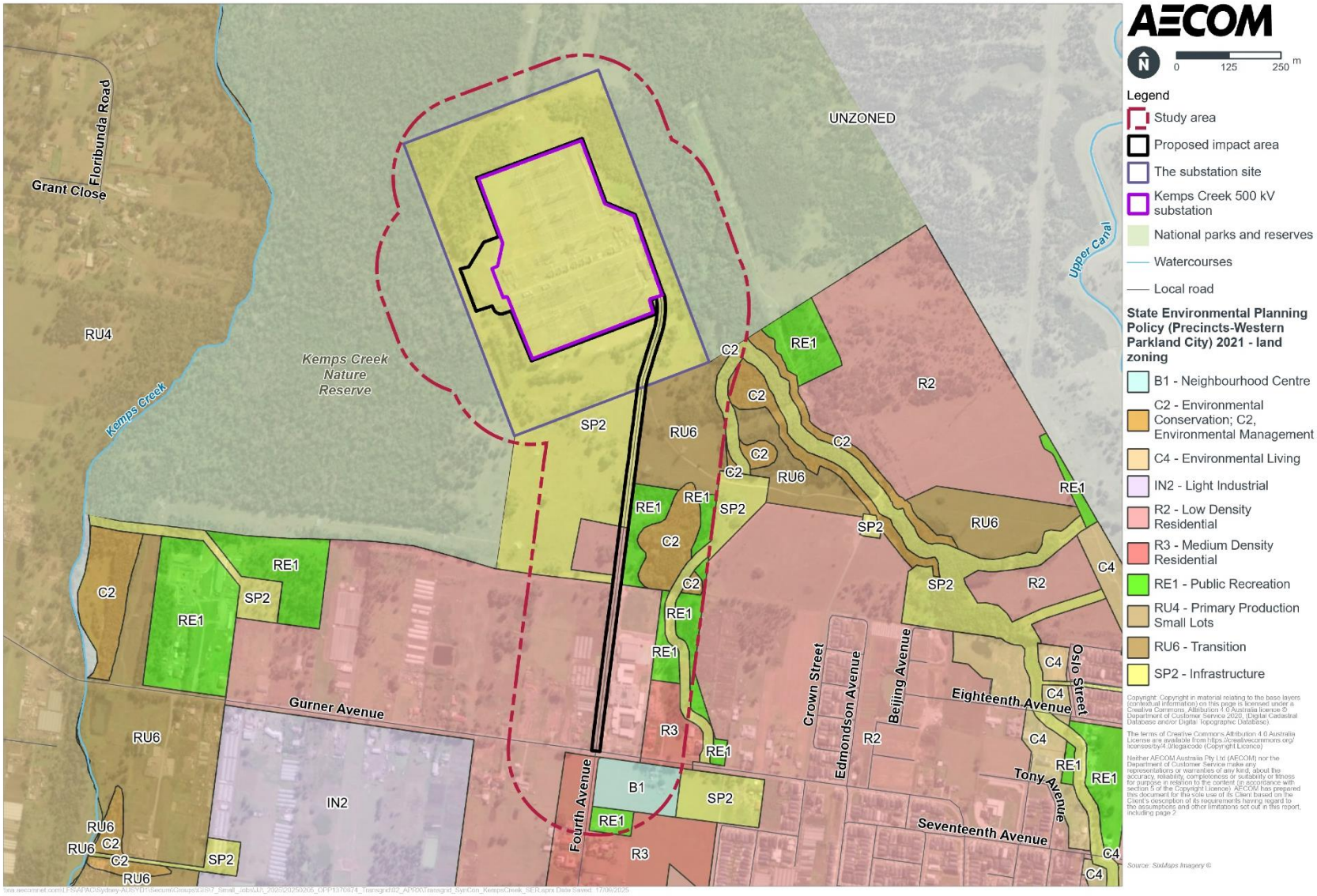


Figure 5-1 Land zoning

## 5.2. Geology and soils

### 5.2.1. Existing environment

The topographic landscape of the impact area is typically flat, with an elevation of 64 to 68 m Australian height datum (AHD). The broader study area generally slopes towards Kemps Creek to the west, which is at an elevation of approximately 50 m AHD. The study area is located within the Blacktown soil landscape and Second Ponds Creek soil landscape. Blacktown soil landscape is located on the eastern half of the study area and is characterised by gently undulating to undulating low hills and rises on Wianamatta Group shales (Ashfield and Bringelly shales) and associated Minchinbury sandstone. Second Ponds Creek soil landscape is located on the western half of the study area and is characterised by gently inclined foot slopes on Wianamatta shale within the Cumberland Plain Physiographic region.

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 2 May 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 2 May 2025 found that there is no known contaminated land within the study area.<br>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 2 May 2025 found that the study area is not identified as having a risk of naturally occurring asbestos. |
| **Salinity** | A review of the NSW Government's SEED map on 11 April 2025 found that the study area may present a moderate salinity risk. |
| **Mine subsidence** | A review of the NSW Government's Planning Portal Spatial Viewer on 11 April 2025 found that study area is not located within a mine subsidence district. |

### 5.2.2. Impact assessment

#### Construction

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

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

The proposed activity would result in the disturbance, excavation, handling and storage of soils. The key activities that would disturb or handle soils relate to the excavation of the impact area to match existing substation levels, installation/upgrade of oil and stormwater drainage systems, and activities associated with the construction of the bench. If not properly managed, surface water flows and high winds could result

in the mobilisation of excavated soils and the erosion of stockpiles, excavations and areas of bare ground. These risks are expected to increase during high wind and rainfall events.

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

Soil contamination may occur due to accidental spills or leaks of fuels, oils and other chemicals from plant, equipment and vehicles used during construction works. Spill kits would be required during the construction works. The use of these kits and other management measures and controls would be implemented to reduce the likelihood of spills or leaks occurring or consequence of these impacts in the unlikely event they occur (refer to Appendix B).

The demolition of the redundant infrastructure could pose potential contamination risks to soil within the impact area. Existing SVC plant that would be demolished is listed below with contamination risks noted in parenthesis:

- SVC building (potential asbestos containing material)
- Water storage tank
- Oil power transformer (potential polychlorinated biphenyls oil)
- Capacitor banks (may contain potential polychlorinated biphenyls oil)
- Outdoor reactor and steel structures
- Gantry structures
- Cable trenches and concrete foundations
- 330 kV switch bay (potential $SF_6$ gas within the circuit breaker).

Prior to demolishing redundant infrastructure, oil would be drained and tested for contaminants and disposed of appropriately. Sample capacitor bank cans would also be tested for contaminants and disposed of appropriately.

As noted above, there is potential for asbestos containing material to be encountered during demolition of the SVC building. Potential contamination risks associated with asbestos containing materials would be mitigated with the implementation of the safeguards provided in Appendix B.

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

Excavation works would occur in areas with a moderate potential for salinity. The disturbance of saline soils would have the potential to impact the receiving environment if not managed appropriately. The erosion and transfer of saline sediments offsite have the potential to alter the water quality of receiving environments, which in turn has the potential to impact upon flora and fauna that are sensitive to elevated levels of salinity. With the implementation of the safeguards outlined in Appendix B, risks associated with

improper management of excavated soils re-use would be mitigated, and impacts from salinity would be unlikely.

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

**Operation**

The main risk to geology and soils during operation would be oil contamination caused by 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 cater for 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 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.

## 5.3. Hydrology and water quality

### 5.3.1. Existing environment

The proposed activity is located within the eastern edge of the Hawkesbury-Nepean catchment, which covers an area of 21,400 square kilometres and consists of over 70% mountainous terrain stretching from the NSW Central Coast to the southwest of Sydney, including Bowral.

Kemps Creek Nature Reserve borders the study area to the west, north and east. There are two named watercourses in the vicinity of the study area. Kemps Creek is located approximately 350 m to the west of the study area, and Upper Canal is located approximately 900 m east of the study area. Kemps Creek is a fourth order perennial stream that is a tributary of South Creek, which flows to the Hawkesbury River. Kemps Creek is mapped as key fish habitat (KFH). Upper Canal is a system of open canals, tunnels and aqueducts that moves water from four dams south of Sydney to Prospect Reservoir. An unnamed creek is located approximately 50 m to the east of the proposed impact area, which is a tributary of Kemps Creek.

Liverpool City Council's Waterway Health Report Card (2025) states that the Kemps Creek catchment has a 'fair' to 'poor' grade for overall water quality in January to March 2025.

The study area is within the Water Sharing Plan (WSP) for the Greater Metropolitan Region Unregulated River Water Sources 2023.

A search of groundwater bores in the proposal area was completed using the NSW Department of Primary Industries and Regional Development's Minview Seamless Geology tool on 20 August 2025. The search found five groundwater bores within 2 km of the study area. The status of four of the groundwater bores is listed as 'unknown', and groundwater depths have not been recorded. One groundwater bore is listed as 'functioning', and the groundwater depth has been recorded as 45 m below ground level in 1997. Geotechnical investigations conducted by SMEC on 4 - 6 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 12 m below ground level.

The study area is not located within a drinking water catchment.

The Wianamatta South Creek Catchment Flood Study 2022 (Infrastructure NSW, 2022) indicates that the east side of the study area outside the substation site is mapped within the 1% Annual Exceedance Probability (AEP) flood extent, reaching a peak flood depth of around 1 m.

### 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 Burkes Creek, 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 and wetlands 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.

Excavation depths of up to 20 m are unlikely to intercept groundwater, as the closest borehole has recorded groundwater depth as 45 m below ground level.

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

In the event that groundwater is encountered, it 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

It is anticipated that the proposed activity would introduce up to around 92.5 $m^2$ of newly impervious surface area across an area that previously comprised grassed and vegetated surfaces.. 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 19 March 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 (SVTM) identified several plant community types (PCTs) within 2 km of the biodiversity impact area (refer to Table 5-2). None of these communities were identified within the biodiversity impact area during the site visit, despite PCT3320 being mapped by the SVTM as being present in the southern portion of the biodiversity impact area.

Table 5-2 Plant community types identified within 2 km of the biodiversity impact area

| PCT | Associated TEC |
|---|---|
| **3320 Cumberland Shale Plains Woodland** | • **BC Act**, **Critically Endangered**: Cumberland Plain Woodland in the Sydney Basin Bioregion<br>• **EPBC Act**, **Critically Endangered**: Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest |
| **4025 Cumberland Red Gum Riverflat Forest** | • **BC Act**, **Critically Endangered**: River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions<br>• **EPBC Act**, **Critically Endangered**: River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria |
| **3448 Castlereagh Ironbark Forest** | • **BC Act**, **Endangered**: Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion<br>• **EPBC Act**, **Critically Endangered**: Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion |

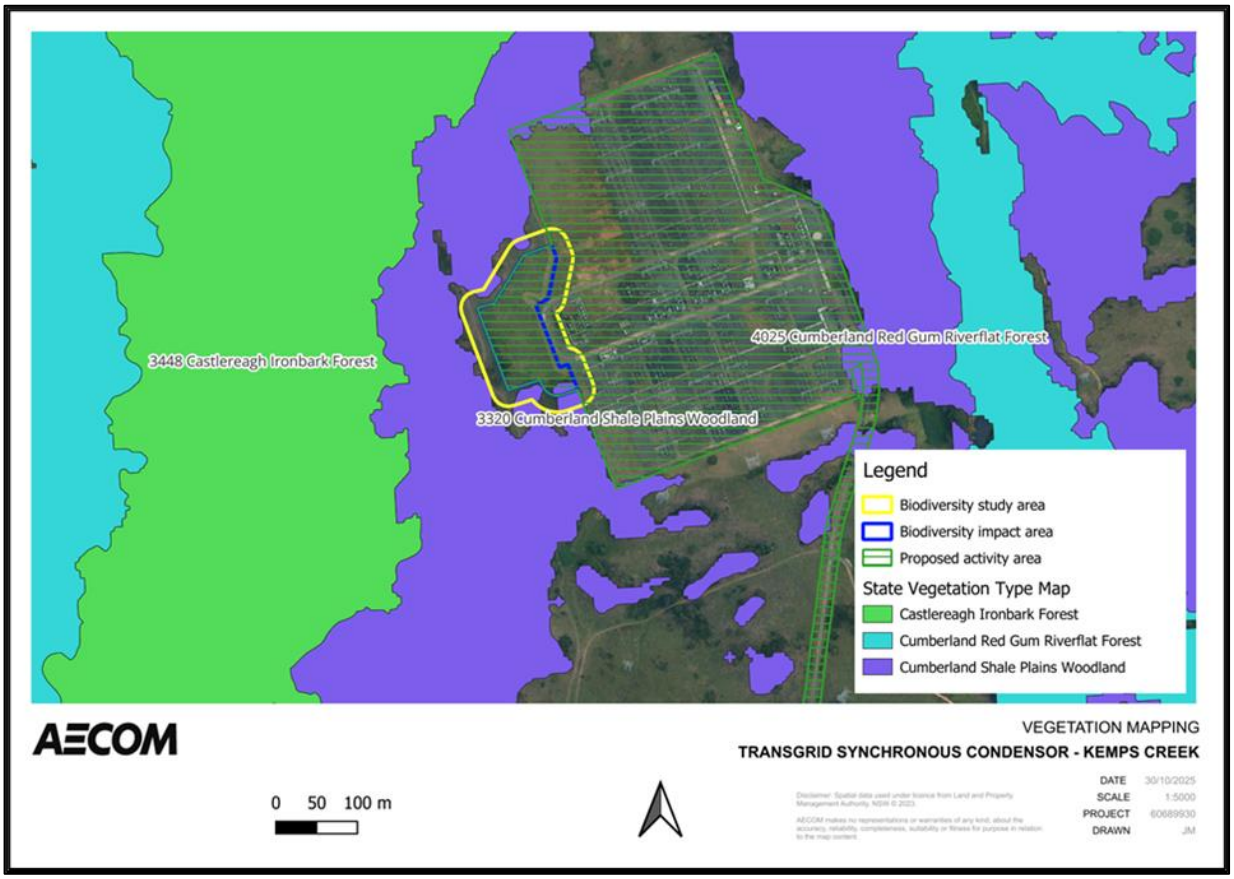


Figure 5-2 Vegetation communities (AECOM, 2025b)

The biodiversity impact area has been historically cleared, likely for asset protection zone purposes, resulting in it being not a recognisable vegetation community. Any vegetation within the biodiversity impact area is primarily comprised of exotic grasses largely restricted to the ground layer. One remnant *Angophora floribunda* was present within the biodiversity impact area along the western fences of the substation.

There is a row of *Eucalyptus maculata* in the southeastern corner of the biodiversity impact area, immediately adjacent to the substation fence. This vegetation is mapped on the SVTM as PCT 3320, however, it is likely that they were planted given this vegetation is not remnant and the lack of other substantial canopy or midstorey vegetation in the location. Therefore, this vegetation is not considered to comprise PCT 3320.

However, remnant and regrowth native vegetation is located adjacent to the substation site along the eastern, southwestern and northwestern boundaries.

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

### Threatened species and habitat

Desktop searches were undertaken on 4 June 2025 to indicate the potential threatened species that may occur within the biodiversity impact area.

The nearest threatened fauna species records to the biodiversity impact area are the Cumberland Plain Land Snail, Grey-headed flying fox, Greater Broad-nosed Bat, Flame Robin and Varied Sitella. Habitat for these species is present predominantly adjacent to the biodiversity impact area, rather than within. The cleared nature of the biodiversity impact area (and the substation itself) is likely to present some degree of aerial foraging habitat for bats and other threatened birds, though this is not expected to be significant.

The nearest threatened plant species to the biodiversity impact area is a record for *Dillwynia tenuifolia* from 2004, located approximately 115 m northwest of the biodiversity impact area and within the adjacent remnant woodland.

Targeted searches were undertaken for these species; however, none were observed within the biodiversity impact area. An empty shell of a Cumberland Plain Land Snail was recorded adjacent to the biodiversity buffer area to the north of the site (refer to Figure 2-3).

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 Liverpool City Council LGA, the following species were recorded:

- Blackberry (*Rubus fruticosus species aggregate*) - Prohibition on certain dealings. Must not be imported into the state, sold, bartered, exchanged or offered for sale
- Fireweed (*Senecio madagascariensis*) - Prohibition on certain dealings. Must not be imported into the state, sold, bartered, exchanged or offered for sale.

Kemps Creek 500 kV substation is also mapped as a biosecurity risk due to the known presence of *Phytophthora personii* within the surrounding Kemps Creek Nature Reserve. With the implementation of the mitigation measures outlined in Appendix B the overall impact of weeds, pests and pathogens associated with the construction phase of the proposed activity would be low.

### 5.4.2. Impact assessment

**Construction**

***Vegetation communities***

The construction of the syncons and their associated infrastructure would result in a direct impact on vegetation due to localised vegetation clearance. Figure 5-3 shows a conservative area of vegetation clearing required to facilitate construction and operation of the proposed activity, including areas of predominantly non-native vegetation. The conservative clearing of native vegetation for the proposed activity would be limited to 422 $m^2$ (0.042 ha). The majority of this, made up of 384 $m^2$ of *Corymbia maculata* to the south of the biodiversity impact area, is likely to be planted and not considered to comprise PCT 3320. In addition to this, an area of 10,895 $m^2$ (1.09 ha) of non-native vegetation is proposed to be cleared. This vegetation is primarily made up of grassland dominated by exotic Rhodes Grass (*Chloris gayana*).

The vegetation clearing would constitute a minor biodiversity impact, especially given the high-quality habitat available on the Kemps Creek Nature Reserve to the west.

The removal of native and non-native vegetation in the biodiversity impact 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.

The potential of indirect off-site impacts to 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 the substation and associated activities. As such, the habitat value within the biodiversity impact area is considerably lower than the remnant bushland to the west (within the Kemps Creek Nature Reserve).

Two threatened forest-dwelling microbat species (*Miniopterus australis*, and *Micronomus norfolkensis*) have been previously recorded approximately 2 km east of the biodiversity impact area. The removal of native trees, such as the single *Angophora floribunda* and several *Corymbia maculata*, would reduce foraging and potentially roosting habitat for these bats. Clearing of these trees should be avoided as far as possible, as detailed in mitigation measures in Appendix B. Disturbed areas not required for the operation of the syncons or the existing Kemps Creek 500 kV substation will be rehabilitated to as close to pre-construction conditions as possible.

Noting the detection of Cumberland Plain Land Snail near the biodiversity impact area, and the numerous records nearby, there is a potential for impacts to this species during construction of the proposed activity. This is due to the known potential for this species to occupy areas of open grassland adjacent to core habitat. However, this extension of the species habitat is generally quite limited, being in the range of 10-15 m. The remnant patch of habitat within which the individual was recorded is located approximately 10 m to the north of the biodiversity impact area, and partially within the biodiversity impact area. However, it is recognised that this patch is slightly isolated from similar vegetation nearby. On this basis, the construction of the syncons within this potential foraging zone is not considered to constitute a significant impact on this species.

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, such as *Phytophthora Personii,* into the proposed activity area. Assuming 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.


Figure 5-3 Vegetation clearing

### 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 a hardstand area which may lead to increased water runoff, which is expected to have no more than minor impacts to biodiversity values.

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

## 5.5. Aboriginal heritage

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

The Aboriginal Archaeological Due Diligence Assessment was undertaken in the form of a desktop assessment and site inspection to identify areas of archaeological sensitivity and previously identified Aboriginal sites within the proposed impact area on 19 March 2025.

The desktop assessment included the following searches:

- Aboriginal Heritage Information Management System (AHIMS) database for a 3 x 3 km area surrounding the proposed impact area on 18 March 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 25 March 2025.

### 5.5.1. Existing environment

***Landscape context***

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

No watercourses are located within the proposed impact area, but the closest watercourse is a first-order tributary located around 50 m to the southeast. Native vegetation within the proposed impact area has been extensively modified as a result of historical land use activities, particularly due to the construction of the substation.

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

***Recorded sites***

A search of the AHIMS database identified a total of 31 Aboriginal archaeological sites within 1.5 km of the proposed impact area. These sites comprised:

- 27 open artefact sites (i.e., isolated artefacts and artefact scatters)
  - Six of the open artefact sites have associated areas of Potential Archaeological Deposit (PAD)
- Three standalone areas of PAD
- One rockshelter.

No recorded sites are located within the proposed impact area with the closest site, [redacted] (refer to Figure 5-4). [redacted].

In addition to the above, AHIMS data held by Transgrid dated 2022 for the area identified a previously registered AHIMS site [redacted]. However, this site does not appear in the current search results from 2025, suggesting it may have been removed from the AHIMS register.

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

***Native Title***

A search of the National Native Title Tribunal's online mapping tool 'Native Title Vision', the National Native Title Register (NNTR) and Register of Native Title Claims (RNTC) relevant to the proposed impact area was undertaken on 25 March 2025. The search results indicated that there are currently no active native title claims, determinations or relevant Indigenous Land Use Agreements within the proposed impact area.

### 5.5.2. Impact assessment

#### Construction

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

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

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

#### Operation

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

**[This figure has been redacted]**

Figure 5-4 AHIMS sites near the proposed impact area (AECOM, 2025a)

## 5.6. Historic heritage

### 5.6.1. Existing environment

A search of the following databases was undertaken on 21 August 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
- State Environmental Planning Policy (Precincts—Western Parkland City) 2021.

There is one landscape heritage site of local significance within the study area. The Kemps Creek Forest (ID#1) at Lot 11, DP806494 is located adjacent to the west and northwest of the substation site boundary. It is also known as Kemps Creek Nature Reserve. This site is notable for its biodiversity and Aboriginal cultural and historic heritage.

### 5.6.2. Impact assessment

#### Construction

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

There may be minor indirect impacts, such as surface runoff and biodiversity impacts, to the vegetation surrounding the substation site. However, with the implementation of mitigation measures identified in Appendix B, indirect impacts would be unlikely.

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

#### Operation

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

## 5.7. Noise and vibration

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

This 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 the Westlink M7 Motorway located about 2.3 km east of the proposed impact area, Elizabeth Drive located about 1.7 km north and local road traffic noise on Devonshire Road and Fifteenth Avenue. A potential future noise source is from aircrafts travelling to and from the Western Sydney International Airport which is proposed to be operational from late 2026 with 24/7 operations. The potential aircraft noise has not been assessed for as it would only be intermittently experienced within the existing environment.

The closest residential receivers are located around 500 m to the south of the substation site (and immediately to the west of the existing access road) (refer to Figure 5-5). There is a sensitive non-residential receiver, Al-Faisal College (labelled E1 in Figure 5-5) (being a combined primary and high school), located approximately 700 m south of the substation site and adjacent to the existing access road. In addition, residential subdivisions are planned and approved adjacent to the existing access road, opposite Al-Faisal College. Approval for the construction of individual dwellings has been granted with construction planned to commence in 2026.

Two noise catchment areas (NCAs) have been defined within the noise and vibration impact assessment study area (refer to Figure 5-6). NCA1 represents the noise environment for residential receivers at Kemps Creek, Rossmore and Austral and an educational receiver at Austral. NCA2 represents the noise environment for residential receivers at Kemps Creek and an educational receiver north of Kemps Creek Nature Reserve. Appropriate construction noise management levels have been defined for each NCA.

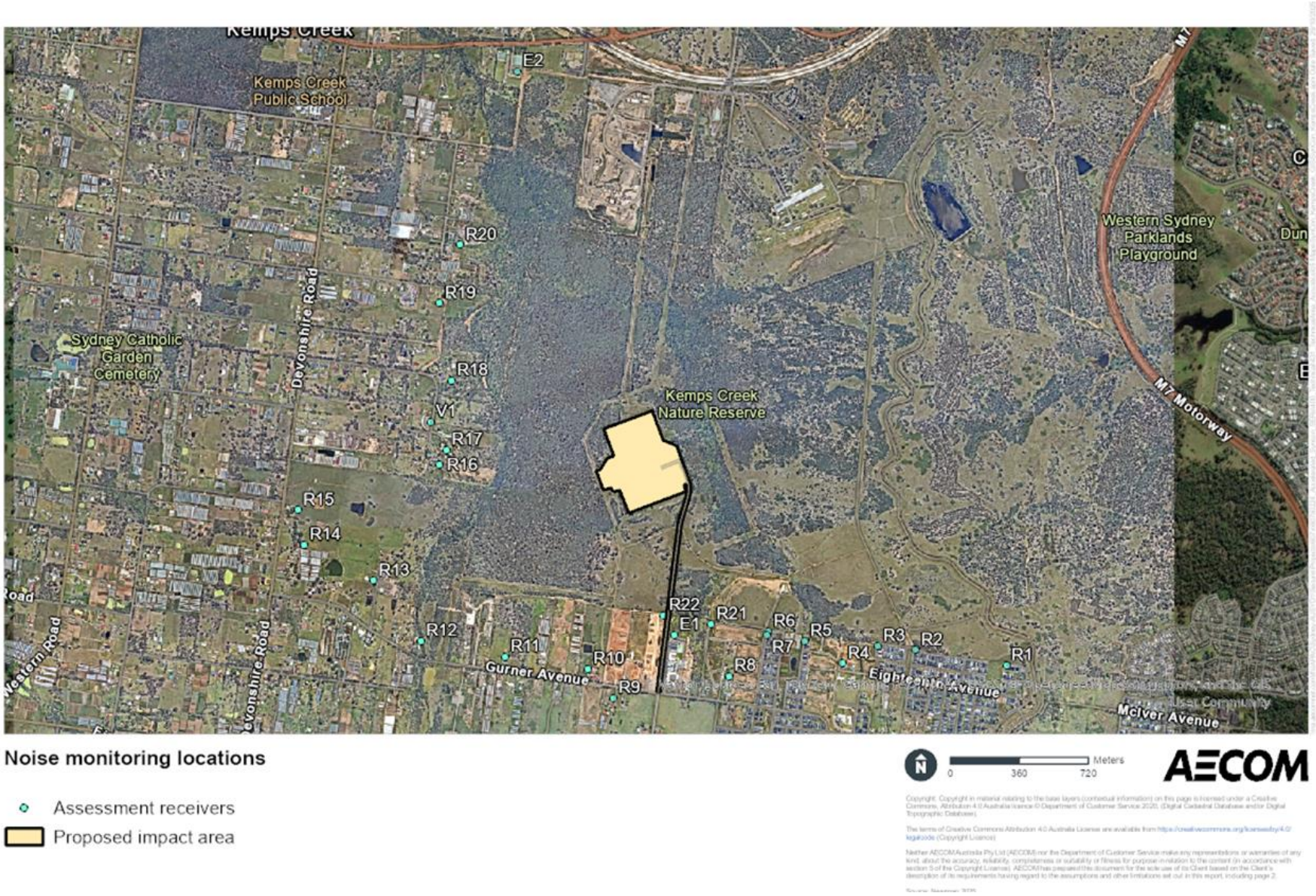


Figure 5-5 Noise assessment receiver location (AECOM, 2025d)

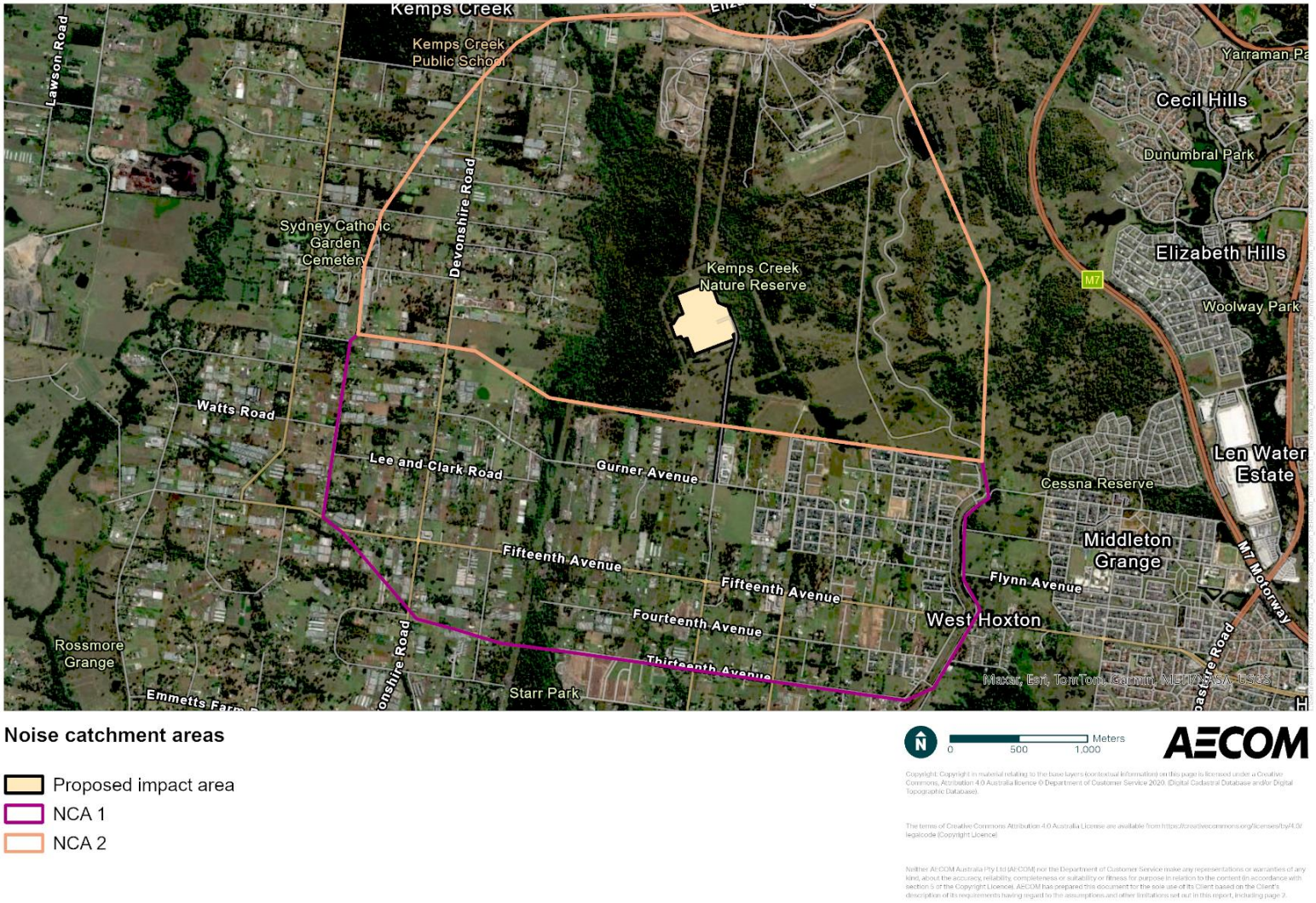


Figure 5-6 Noise catchment areas (AECOM, 2025d)

### 5.7.2. Impact assessment

#### Construction

***Predicted noise levels***

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

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

The modelling results are presented in Table 5-2 of Appendix E. The results show that construction noise levels are predicted to exceed the noise management level (NML) during standard hours for 15 residential receivers in NCA 1 during the demolition of redundant infrastructure. The exceedances range from 1 to 10 dB(A). No assessment residential receivers in NCA 2 are predicted to experience NML exceedances during the demolition of redundant infrastructure.

There are no residential receivers predicted to experience NML exceedances during the site establishment and syncon bench installation scenarios across both NCAs. There are also no residential receivers predicted to be 'highly affected' for the three construction scenarios assessed.

No sensitive non-residential receivers are predicted to experience NML exceedances during their operational hours during the three assessed construction scenarios. Construction noise impacts will be managed in accordance with mitigation measures 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 to be used for any construction scenario. In addition, the nearest sensitive receiver is located around 500 m from the substation site and immediately to the west of the existing access road. 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 the assessment receivers. The required acoustic treatments adopted for the project (which includes a minimum insertion loss of 18 dB to the most affected receiver) as 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 6-6 of Appendix E. Under both meteorological conditions, the predicted operational noise emissions from the proposed activity comply with the adjusted daytime noise criteria at all assessed residential receivers when the diesel generator is in operation.

***Predicted noise levels without generator testing***

Predicted operational noise levels at nearby noise sensitive receivers for the daytime and evening scenario, without the generator operating, are presented in Table 6-7 of Appendix E. In the daytime/evening scenario, operational noise levels are predicted to comply at all receivers under both neutral and noise-enhancing meteorological conditions.

Predicted noise levels for the night-time scenario are presented in Table 6-8 of Appendix E. The night-time operational scenario predicted negligible exceedances of up to 2 dB(A) at two receivers (R4 and R18) under neutral meteorological conditions. Under noise-enhancing meteorological conditions, exceedances of up to 3-4 dB(A) are predicted at two receivers (R21 and R22), and negligible exceedances of up to 2 dB(A) at two receivers (R6 and R7). Exceedances of up to 2 dB(A) are considered negligible as they are not discernible to the average listener and therefore would not warrant receiver-based treatments or controls, assuming all feasible and reasonable treatments at source have been implemented.

The predicted operational noise levels 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 with the exception of two minor exceedances of up to 2 dB(A) and two negligible exceedances of up to 2 dB(A) during the night-time period under noise-enhancing conditions. This is as a result of existing equipment, and it is considered that all feasible and reasonable mitigation measures have been recommended for the proposed new equipment.

***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 Kemps Creek 500 kV substation is provided by an existing driveway on Fourth Avenue at the intersection with Gurner Avenue. Fourth Avenue is a local road that traverses around 4.3 km

through the suburb of Austral from Gurner Avenue in the north to Bringelly Road in the south. It has a speed limit of 60 km per hour except for the following school zones where the speed limit is 40 km per hour between 8:00-9:30 AM and 2:30-4:00 PM:

- Near Unity Grammar, between Fifth Avenue and Sawdust Street,
- Near St Anthony of Padua Catholic College, between Tenth Avenue and Eleventh Avenue, and
- Near Al-Faisal College, at the intersection with Gurner Avenue.

Fourth Avenue is sealed with one lane of traffic in each direction. It is owned by Liverpool City Council. Currently, the substation is accessed by operational personnel, Transgrid employees and periodic contractors for business, maintenance and operational purposes.

Other local roads that are in the vicinity of the study area (and are likely used on approach to the substation site) include Fifteenth Avenue, Gurner Avenue, Craik Avenue, Bringelly Road and Hoxton Park Road.

Elizabeth Drive runs in an east-west direction around 1.7 km to the north of the proposed impact area. The Westlink M7 Motorway runs in a north-south direction around 2.3 km to the east of the proposed impact area. These are two key State roads connecting western Sydney and northern and southern Sydney.

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

There is one public bus stop in the vicinity of the study area, in front of Al-Faisal College on Gurner Avenue. Route 2048 Unity Grammar College to Hume Hwy after Graham Avenue departs from this stop and travels south along Fourth Avenue. Another bus route, route 2033 Austral PS to Gurner Avenue, passes through Gurner Avenue and Fifteenth Avenue.

### 5.8.2. Impact assessment

#### Construction

During construction, it is anticipated that up to 50 workers would be on site at any one time. Up to 55 light and 70 heavy vehicles are expected daily during construction. Heavy vehicles would be required to deliver construction equipment, remove spoil (if required) and deliver the various syncon components. Heavy vehicles will 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 Fourth Avenue, Fifteenth Avenue, Gurner Avenue, Craik Avenue, Bringelly Road and Hoxton Park Road. 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, 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. 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 Liverpool City 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 to be minor.

There would be limited disturbance to bus operations. Bus routes would be temporarily impacted during construction works by temporary increases in construction vehicles using the same roads as the bus route, such as Gurner Avenue, Fourth Avenue and Fifteenth Avenue.

**Operation**

During operation, the proposed activity would result in additional operational and maintenance activities at the Kemps Creek 500 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 in the Western Sydney region of NSW. The nearest weather stations that provide relevant climate data are Badgerys Creek (weather station ID: 067108), located around 6.9 km west of the study area, and Horsely Park Equestrian Centre (weather station ID: 067119), located around 7.1 km northeast of the study area (BOM, 2025). The Kemps Creek region experiences the warmest temperatures between November and March, with a mean maximum temperature of 34.0°C in January for years recorded between 1995 and 2025. Cooler temperatures are experienced between May and August, with July being the coldest month on average, recording a mean minimum temperature of 16.4°C between 1995 and 2025. On average, the area receives 762.8 mm of rainfall annually, and the mean number of days receiving more than 1 mm of rain per year is 67.9.

Air quality in the vicinity of the study would be typical of an urban, moderate density landscape. Likely sources of air quality pollution proximate to the study area include vehicle emissions (notably, from the Westlink M7 Motorway), dust from unvegetated areas and industry, hazard reduction burning and bushfires. From the end of 2026, another potential source of air pollution, would be flight emissions once the Western Sydney International Airport starts operation.

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 22 August 2025 identified five pollutant sources within 5 km of the study area, including:

- Austral Main Line Valve – Gas supply
- PGH Bricks and Pavers Cecil Park - Manufacture of clay bricks and pavers

- Air BP Hoxton Park - Bulk petroleum storage
- Inghams Hoxton Park Processing Plant - Poultry processing
- Inghams Badgerys Creek Protein Recovery Unit - Poultry processing

Sensitive receivers to air quality during construction and operation of the proposed activity include residents within the suburb of Austral, located from around 500 m to the south of the substation (and immediately to the west of the existing access road). There is a sensitive non-residential receiver, Al-Faisal College, located approximately 700 m south of the substation site and adjacent to the existing access road.

### 5.9.2. Impact assessment

#### Construction

Construction works are likely to generate dust emissions from the movement of vehicles, heavy machinery, demolition of the redundant infrastructure and ground disturbance works (filling and excavation) for construction of the bench 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.

The demolition of the existing 330 kV switch bay has the potential to release sulfur hexafluoride ($SF_6$) gas from the circuit breaker. $SF_6$ is a commonly used insulation gas with 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).

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 $SF_6$.

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

#### Operation

The new 330 kV circuit breaker and gas insulated switchgear would be filled with $SF_6$ gas. 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 (EMF)***

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***

Parts of the study area are mapped as Vegetation Buffer, Category 1, Category 2 and 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 bushfire prone land in the vicinity of the study area. The proposed impact area largely comprises Vegetation Buffer land near the substation site. The western side of the proposed impact area and the access track along Fourth Avenue is mapped as Category 3 bushfire prone land.

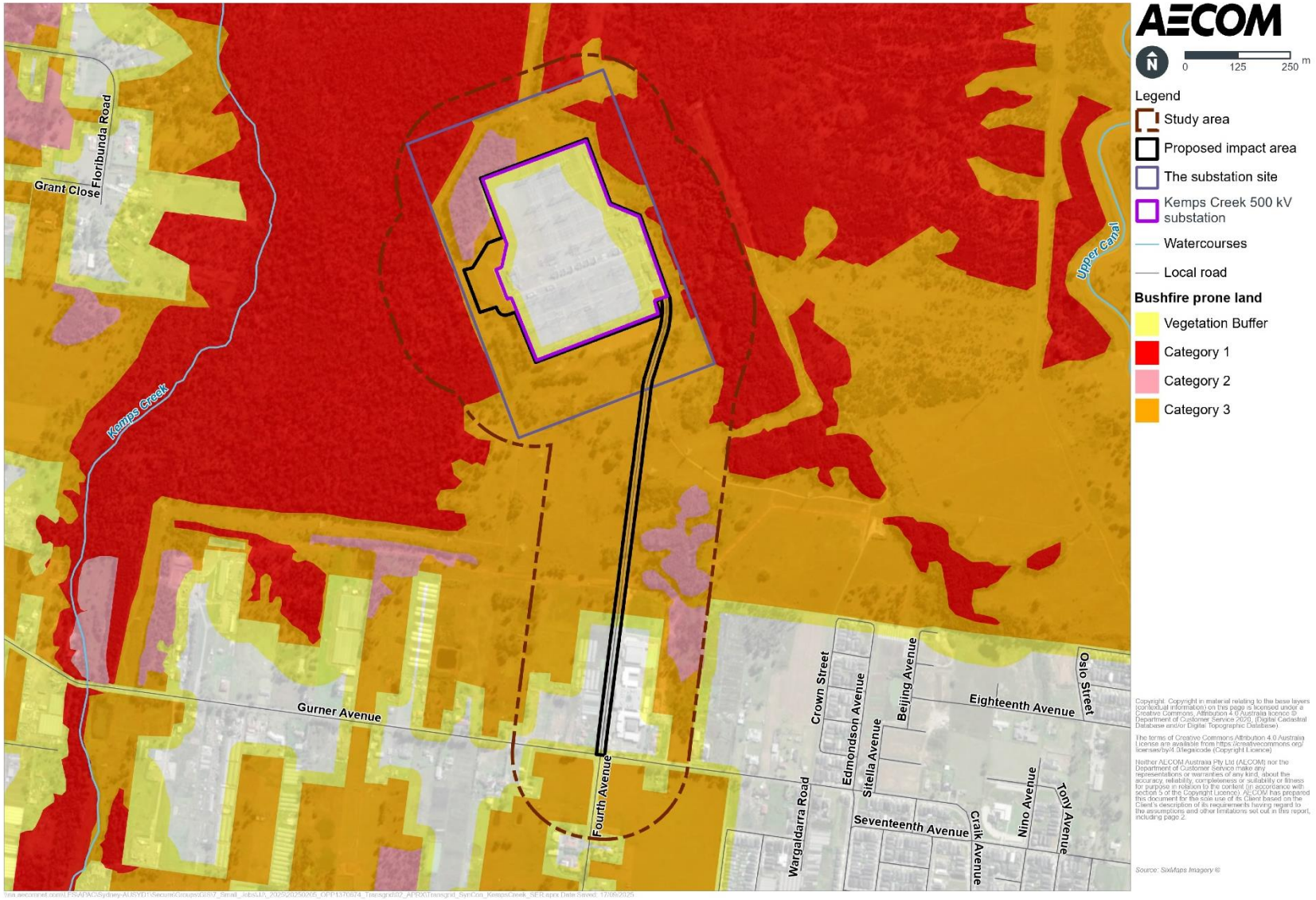


Figure 5-7 Bushfire prone land

### 5.10.2. Impact assessment

#### Construction

***Bushfire***

Construction activities could pose risks for onsite ignitions that could result in a fire escaping to the surrounding land. These are mainly associated with hot work (activities involving high temperatures), fire risk work (activities involving heat or with the potential to generate sparks), vegetation clearing and management and use of vehicles onsite. Hot work and fire risk work during construction has the potential to cause fire ignition.

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. The overall risk is low, given that the majority of the proposed impact area is unvegetated or is Vegetation Buffer land. There is a higher risk for the western portion of the proposed impact area and along the existing access track mapped 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 syncon and associated equipment. Appropriate space for asset protection zones (APZ) has been accommodated for in the proposed impact area. APZs provide a buffer zone between a bushfire hazard and an asset, reducing the risk of the asset being impacted by bushfire.

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

## 5.11. Visual amenity

### 5.11.1. Existing environment

The study area can be categorised into 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)
- Densely vegetated areas – This area includes densely vegetated areas surrounding the substation site. The visual amenity is characterised by dense mature vegetation and watercourses
- Low density infrastructure – The area surrounding the existing access road includes open grassland, a row of residential dwellings (under construction) and a school.

The substation site is isolated from public view as it is located around 500 m north from the Gurner Avenue access point and screened by moderately dense vegetation.

### 5.11.2. Impact assessment

#### Construction

During construction, minor temporary visual impacts are anticipated, mainly from construction vehicles accessing the site via the Gurner Avenue access point. This would be briefly visible to residents and road users near the Gurner Avenue and Fourth Avenue intersection. However, the distance from to the substation site and intervening vegetation would limit overall visual impacts.

#### Operation

During operation, the substation including additional elements associated with the proposed activity such as the new syncon and secondary systems buildings and switchbay would continue to be screened by vegetation. Further, it is not expected that a significant change to the number of personnel accessing the substation would occur. Therefore, potential visual amenity impacts during operation are expected to be negligible and consistent with the existing substation.

## 5.12. Waste

### 5.12.1. Existing environment

Very little waste is generated from the current operation of the Kemps Creek 500 kV substation. Maintenance activities may generate waste associated with components of the substation that require replacement. Vegetation maintenance also generates green waste, in addition to domestic waste generated during inspections.

### 5.12.2. Impact assessment

#### Construction

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

- General construction waste such as packaging and excess construction material
- Surplus excavated materials that cannot be reused onsite
- Waste oils, greases and lubricants from the maintenance of plant and equipment
- Potentially contaminated demolition waste, including the SVC plant, oil power transformer and capacitator banks (refer to Section 5.2.2 for the list of materials)
- 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. As noted in Section 5.2.2, contamination risks from the demolition waste would be mitigated with the implementation of the safeguards provided in Appendix B.

**Operation**

During operation, the volume and types of waste would remain largely unchanged from the existing Kemps Creek 500 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 Kemps Creek 500 kV substation is an important part of the NSW power system.

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

The median age is 34 years old. English is only spoken at home for 46.3% of the population. The five largest employment sectors for people in the Austral region are: hospitals (except psychiatric hospitals), road freight transport, supermarket and grocery stores, vegetable growing (outdoors), and primary education.

The SA2 land is predominantly for residential, primary production, environmental conservation and recreation, with some industrial activity such as electricity transmission.

Key social infrastructure located within around 2 km of the proposed impact area includes:

- Educational facilities
  - Al-Faisal College
  - Arrahman College
  - MindChamps Early Learning & Preschool Kemps Creek
- Health, medical and emergency facilities:
  - NSW RFS Kemps Creek Training Centre
  - West Hoxton Medical Centre

- Sporting and recreational facilities
  - Kemps Creek Nature Reserve
  - Wylde MTB & BMX
  - Cecil Park Clay Target Club
  - Cecil Park Model Flying Club
- Community groups and facilities
  - Czechoslovakian Country Club Sydney.

Al-Faisal College and Kemps Creek Nature Reserve are adjacent to the proposed impact area and the remaining key social infrastructure items are located over 1 km from the proposed impact area.

Further away, Western Sydney International Airport and Western Sydney Parklands City are likely to have an influence on the social and economic environment of the study area, with regionally significant facilities for purposes such as recreation, commerce, education and medical.

### 5.13.2. Impact assessment

**Construction**

The proposed activity may temporarily affect the local community near the Kemps Creek 500 kV substation due to increases in noise, traffic, air quality emissions and visual amenity impacts. These impacts are considered to be minor and temporary and would be managed through the implementation of the mitigation measures proposed in Appendix B. No negative impacts to emergency services or the key employment sectors of the SA2 are expected.

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

**Operation**

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

With the implementation of the mitigation measures in Appendix BAppendix 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 Kemps Creek 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 8 August 2025 did not identify approved or proposed major developments within 1 km of the proposed impact area.

A Transport for NSW project has been identified approximately 1.1 km south of the Gurner Avenue site access point. The project involves upgrading Fifteenth Avenue between Cowpasture Road and Devonshire Road from a single lane to two lanes in each direction. Major construction works are expected to commence in 2027 and may overlap with the proposed activity's construction period by up to 23 months. Operational phases of both projects would overlap.

Transgrid is also proposing a separate project to construct a new 330 kV substation to the south of the existing Kemps Creek substation site. Construction of the new substation is expected to overlap with the proposed activity by five to 11 months, with operational phases also overlapping.

Minor construction projects may occur in proximity to the study area. This may include the construction of residential dwellings, including lots adjacent to the existing access track, small renovation projects and demolition works approved by the local Council.

Regionally significant infrastructure projects have also been identified, as summarised in Table 5-3. The scale of impact from these projects are of far greater scale than the proposed activity, operate at a regional impact footprint, and their environmental effects are addressed in their own comprehensive assessment processes. As their environmental effects are assessed at a regional scale and no meaningful spatial or temporal interaction is anticipated with the proposed activity, cumulative impacts with these projects have not been further considered.

Table 5-3 Regionally significant infrastructure projects

| Project and status | Relative location | Proposed construction timeframe | Project details |
|---|---|---|---|
| Western Sydney International Airport – Under construction | Approximately 5 km west of the substation site. | Construction has commenced and is estimated to be completed late 2026. Operations would overlap. | Development of an airport open 24 hours, 7 days a week. |
| Sydney Metro – Western Sydney Airport - Under construction | Approximately 6.5 km northwest and southwest of the substation site. | Construction has commenced and is estimated to be completed mid-2027. Operations would overlap. | A new metro railway line approximately 23 km in length between St Marys in the north and Bradfield in the south. |
| Sydney Metro – Bradfield to Leppington/Glenfield – business case under development | Approximately 5 km south of the substation site. | Construction is unlikely to overlap. Operations would overlap. | An expansion of the Sydney Metro – Western Sydney Airport project. |

### 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 are discussed in Table 5-4. The new Kemps Creek 330 kV substation project and the Fifteenth Avenue road upgrade have not been assessed for cumulative ecological impacts due to insufficient available information. Any cumulative ecological impacts would be captured in these projects' environmental assessments.

Table 5-4 Potential cumulative construction impacts

| Environmental factor | Construction impact |
|---|---|
| **Noise and vibration** | Construction noise from each project occurring concurrently could result in increased noise levels at any receiver by 3 dB(A) from those projects' noise levels. If the proposed activity is the dominant source of construction noise, the noise level would increase on the levels predicted for the proposed activity. Where receivers are impacted to a greater extent by other construction projects, then overall construction noise levels could be increased by as much as 3 dB(A) from those projects' noise levels.<br><br>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 becomes available for construction of the proposed activity.<br><br>Vibration intensive works are expected to take place well outside minimum working distances, therefore no cumulative impacts are anticipated. |
| **Traffic and access** | Vehicles travelling along Gurner, Fourth and Fifteenth Avenues would likely experience concurrent cumulative traffic impacts during construction of the various projects, potentially resulting in congestion and delays. This could occur as a result of additional construction traffic and traffic lane closures.<br><br>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 experience cumulative impacts of construction works of the new Kemps Creek 330 kV substation project due to the moderately dense vegetation screening the view to the substation site.<br><br>Road users and residential receivers along Gurner, Fourth and Fifteenth Avenues would experience fleeting temporary cumulative impacts due to the construction vehicles accessing the impact area. |
| **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.

#### 5.14.2.1. 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.<br>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 of how each of the Clause 171 factors has been considered.

Table 6-2: Consideration of Clause 171 factors

| Factor | Potential impact |
|---|---|
| **a. any environmental impact on a community.** | As detailed in Section 5, the proposed activity would not result in significant adverse environmental impacts. Impacts from construction on the surrounding community are expected to be minor and temporary and would be appropriately managed with the implementation of the mitigation measures provided in this SER. |
| **b. any transformation of a locality.** | The proposed activity would not transform the locality it is in, as works would be carried out |

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| | within the proposed impact area on Transgrid's existing Kemps Creek 500 kV substation and on the access road to the substation site. |
| **c. any environmental impact on the ecosystems of the locality.** | The proposed activity would not have a significant impact on the ecosystems of the locality (refer to Section 5.4). |
| **d. any reduction of the aesthetic, recreational, scientific or other environmental quality.** | The proposed activity would result in a negligible 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 may impact the habitat of protected animals, however, this impact is not expected to be significant and 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. |
| **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 Kemps Creek 500 kV substation and access road to the substation site 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. |

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| **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 |

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|---|---|
| **Does the proposed activity involve a nuclear action (including uranium mines)?** | No |
| **Does the proposed activity involve a water resource, in relation to coal seam gas development and large coal mining development?** | No |
| **Is the proposed activity likely to have a significant impact on the environment on Commonwealth land?** | No |

## 6.4. Consideration of Ecologically Sustainable Development

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

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

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

# 7. Environmental management

Transgrid is committed to conducting its activities and services, including the current proposed activity, in a manner that minimises pollution and 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 0, 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 impacts to the habitat of protected species (*Miniopterus australis*, *Micronomus norfolkensis* and Cumberland Plain Land Snail) due to clearing of a small amount of native vegetation
- Minor erosion and sedimentation impacts from excavation activities during construction
- Contamination risks to soil due to demolition of redundant infrastructure
- Minor noise impacts generated from construction plant, vehicles and the ongoing operation of the syncon
- Minor temporary impacts to traffic during construction of syncon and access road upgrades
- Minor temporary air quality impacts generated from excavation activities, construction plant and vehicles.

All other impacts were assessed as negligible.

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

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

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

In addition, it is concluded that the activity is not likely to significantly affect threatened species, ecological communities or their habitats and would not be carried out on a declared area of outstanding biodiversity value, therefore, a Species Impact Statement is not required. No formal biodiversity offsets are proposed for the proposed activity, though disturbed areas not required for the operation of the syncons or the existing Kemps Creek 500 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 0. Supplementary assessment and determination in accordance with the EP&A Act would be required for:

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

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# Appendix A Map series

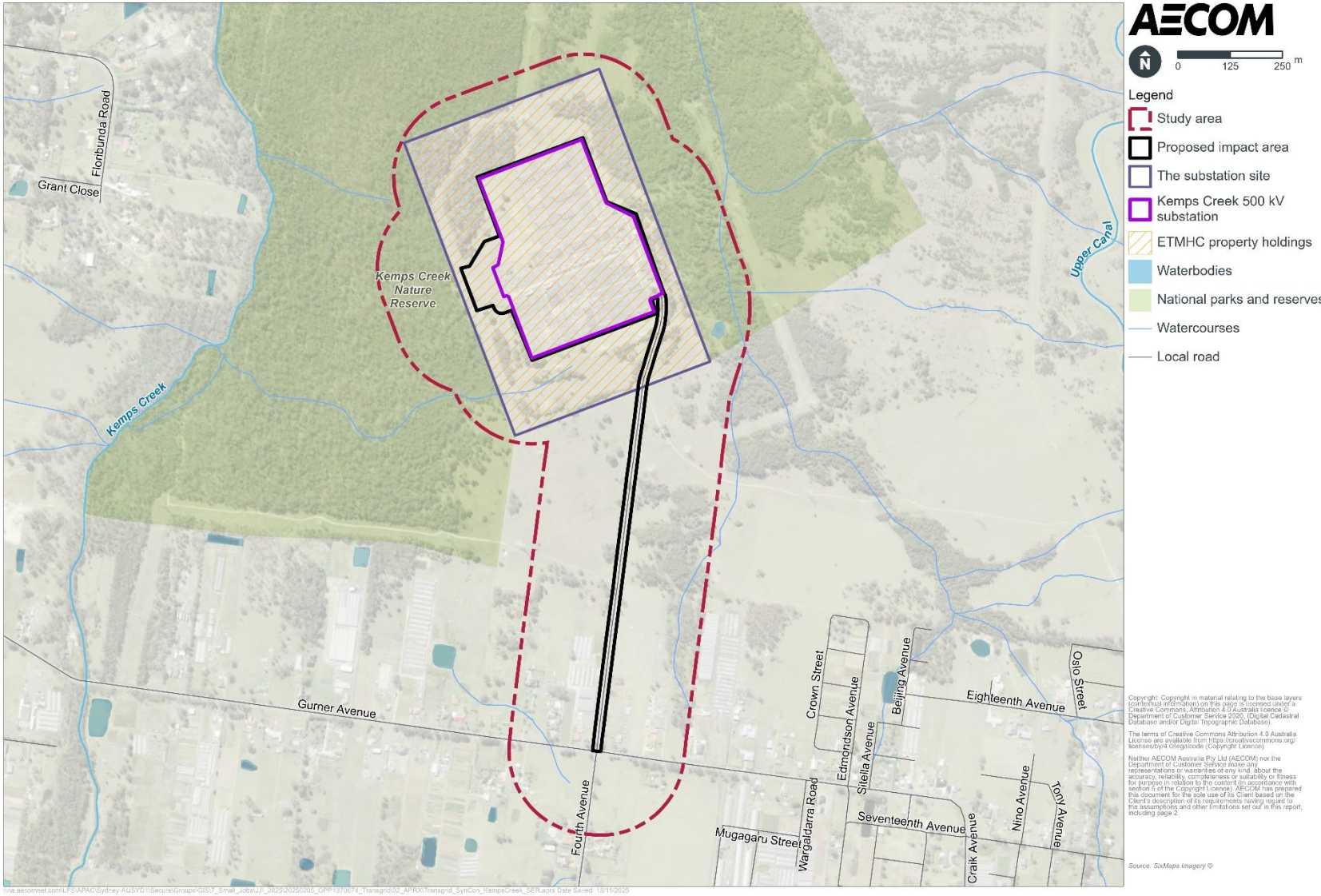


Figure A-1 Proposed activity location

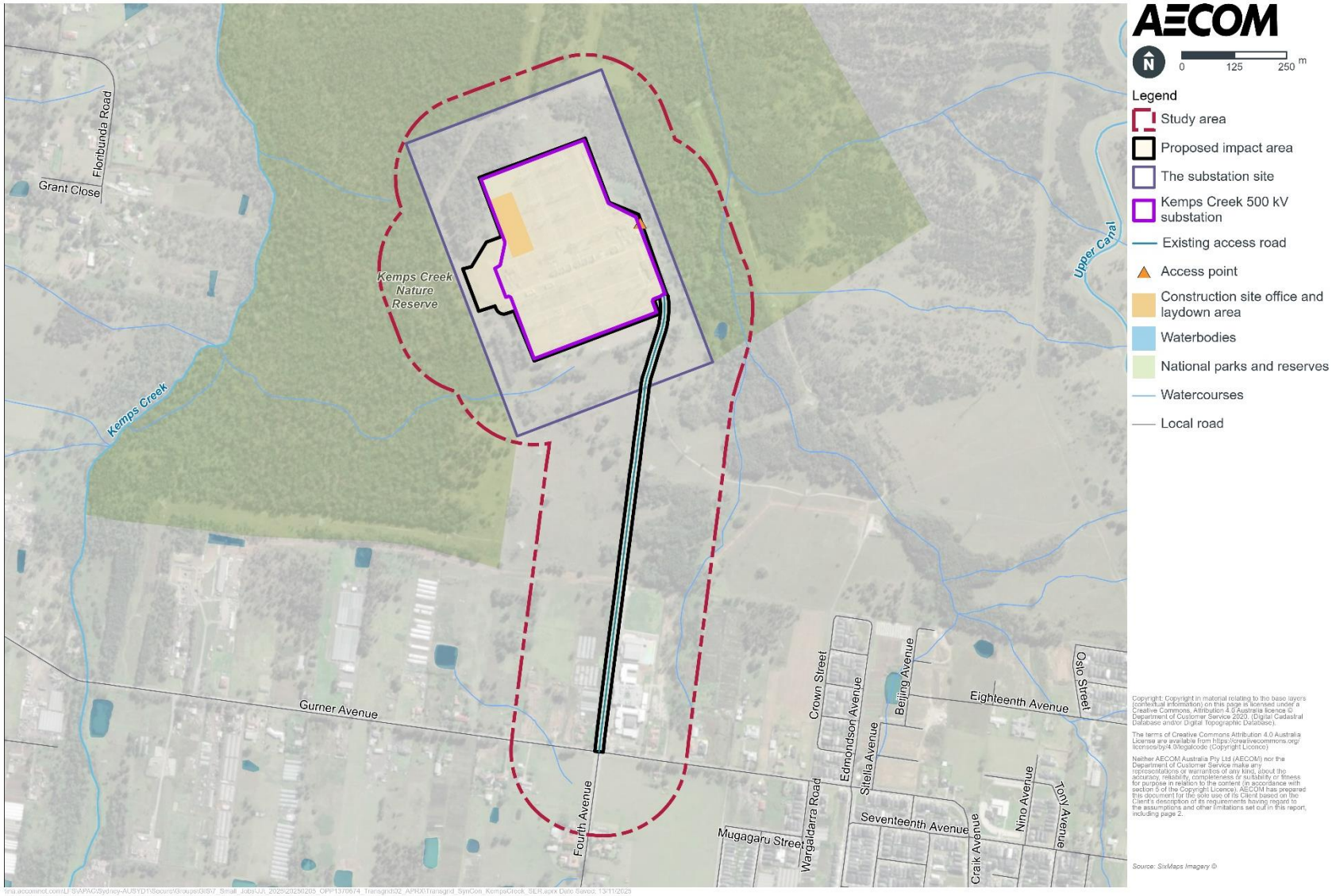


Figure A-2 Indicative construction site layout


Figure A-3 Indicative operation site layout

# Appendix B Mitigation measures

| Mitigation measures | |
|---|---|
| **Environmental management and incident response** | |
| **EM1** | A Construction Environmental Management Plan (CEMP) would be prepared and submitted to Environment Business Partner/Delivery for review and endorsement four weeks prior to the commencement of works, including site establishment. The CEMP would be prepared in accordance with Transgrid's Preparation of a Construction Environmental Management Plan Procedure. |
| **EM2** | All workers would be inducted onto the CEMP, which would include relevant environmental mitigation measures and sensitive environmental area(s). Training would be given to site personal as appropriate. Records would be kept of this induction and training. |
| **EM3** | An Environmental Supervisor would be included as part of the construction staff to oversee implementation of the CEMP and to ensure that all mitigation measures are being effectively applied.<br>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** | All environmental incidents and near misses must be reported to Transgrid. All pollution incidents that threatens or harms the environment must be reported immediately to relevant authorities, in accordance with the *Protection of the Environment Operations Act 1997* (POEO Act). |
| **EM5** | 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. |
| **EM6** | 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.<br>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. |
| **EM7** | 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. |
| **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*.<br>The procedure would be included in the CEMP. |
| **GS5** | All oil handling would be undertaken in accordance with Transgrid's Oil Management Procedure. |
| **Hydrology and water quality** | |
| **HW1** | No refuelling or bulk herbicide preparation would occur within 40 metres of drainage lines/pits. |
| **HW2** | Water management for excavations would be included and adhered to, in accordance with the CEMP. Controls would include:<br>• Use of dish drains (or similar), coir logs, hay bales and/or sediment fence to reduce water flow into excavations and off-site<br>• Separate clean and dirty water where possible<br>• Record dewatering volumes if large amounts of ground water is encountered. (ensuring no water licence is required)<br>• Identifying management methods for intercepted/collected water e.g. regular monitoring, treatment and discharge<br>• Water quality testing will be required if suspected contamination is encountered (odour, sheen, visual contaminants) to inform disposal and/or discharge requirements.<br>• Temporary dewatering structures are required to manage sediment laden water prior to drainage off-site<br>• Reporting frequency and requirements. |

| Ecology | |
|---|---|
| **EC1** | Biosecurity issues have been identified for Kemps Creek 500 kV substation. Mitigation and management strategies must be documented in the CEMP. This may include:<br>• Wash down procedures to reduce the spread of weeds via vehicles and machinery.<br>• Cleaning of vehicle tyres, undersides and radiator grills before leaving a property, cleaning of footwear and minimising soil movement between locations.<br>• Establishing plant and vehicle washdown stations with appropriate signage and disposal for waste where appropriate.<br>• Undertaking a vehicle hygiene inspection checklist or log<br>• Imported material must be weed and pathogen free.<br>• Working from clean areas towards weedy/pathogen effected areas to reduce the spread of weeds/soil pathogens.<br>• 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:<br>• Maintaining all construction activities within the designated and demarcated or fenced off boundaries<br>• Identification of weeds and biosecurity threats (e.g. soilborne pathogens) on site and appropriate actions to prevent their spread (see detail below)<br>• Identification of threatened plants and animals, and what to do in case of encountering these (see detail below) |
| **EC4** | If native fauna is encountered it would be allowed to move off site of its own accord, as far as it is safe to do so. If the animal does not move, works are to stop in that area and a person qualified in wildlife handling must be called in to safely relocate the animal |
| **EC5** | If any threatened flora is located within the clearing footprint, works are to stop in that area and a Transgrid environmental representative contacted for further advice. |
| **EC6** | Lighting of the proposed activity would be designed in accordance with relevant standards and directed inwards, and away from adjacent vegetated areas as far as practicable. |
| **EC7** | Disturbed areas not required for the operation of the syncons or the existing Kemps Creek 500 kV substation will be rehabilitated to as close to pre-construction conditions as possible upon completion of construction. This would include soil stabilisation and revegetation using a native seed mix approved by the Transgrid environmental representative. |
| **EC8** | Any external material (such as crushed sandstone or similar) brought in for the purposes of constructing and stabilising the biodiversity impact area is to be fully removed upon completion of construction, unless required for the operation of the syncon or the existing Kemps Creek 500 kV substation. |

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| **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. |
| **Noise and vibration** | |
| **NV1** | Noise generating works would be in accordance with the *Interim Construction Noise Guideline* (DECC, 2009):<br>• 7:00am – 6:00pm Monday to Friday<br>• 8:00am – 1:00pm Saturdays<br>• No work on Sundays or Public Holidays.<br>Work outside normal hours, on Sundays and public holidays would only comprise:<br>• The delivery of materials outside normal hours requested by police or other authorities for safety reasons<br>• Emergency work to avoid the loss of lives and/or property<br>• Work timed to correlate with system planning outages<br>• Vacuum and oil filling of equipment.<br>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 should include, as a minimum, the following:<br>• Identification of nearby residences and other sensitive land uses<br>• Description of approved hours of work<br>• Description and identification of all construction activities, including work areas, equipment, and duration<br>• Description of what work practices (generic and specific) would be applied to minimise noise and vibration<br>• A complaints handling process with a dedicated contact included for 24 hours a day<br>• Noise and vibration monitoring procedures<br>• Overview of community consultation required for identified high impact work.<br>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. |

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| **NV4** | The following measures would be considered to manage potential operational noise impacts:<br>• Housing the syncon unit inside a building to provide attenuation. This which may also provide screening for other noise sources such as existing transformers and capacitors. The shed should provide a minimum insertion loss of 18 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 or acoustic louvres used to reduce noise emissions, if necessary. Refer to Section 5.7.2 for noise level criteria.<br>• Construction of a noise wall on up to three sides of the syncons' external cooling system, 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/$m^2$.<br>• Acoustic absorption is required on at least two adjacent surfaces of the noise wall facing the equipment. 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<br>• During detailed design it is recommended that the final site layout, equipment selections and shed construction details (dimensions, materials, openings and location) are reviewed to confirm compliance with the project noise trigger levels.<br>• Noise monitoring shall be undertaken post construction to ensure operation 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.* |

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| **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. The design of the syncon shed and associated equipment would be 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:<br>• 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.<br>• 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.<br>• All waste generated during construction would be maintained 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).<br>• Any waste that requires tracking under State or Commonwealth legislation would be authorised in Transgrid's CAMMS waste management system, prior to waste being transported and leaving the site. |
| **WA2** | Concrete trucks would be permitted to flick wet wipe their discharge chutes with the effluent discharged into prepared bored holes, prepared excavations/formwork or a watertight receptacle for recycling or disposal. No concrete washout or agitators is permitted. |

# Appendix C Flora and Fauna Assessment

Prepared for
Transgrid
ABN: 19 622 755 774

AECOM

# Kemps Creek 330 kV Substation - new synchronous condenser

## Flora and fauna assessment

24-Nov-2025

aecom.com

Delivering a better world

# Kemps Creek 330 kV Substation - new synchronous condenser

Flora and fauna assessment

Client: Transgrid

ABN: 19 622 755 774

Prepared by

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ABN 20 093 846 925

24-Nov-2025

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

# Quality Information

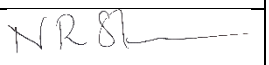
Document Kemps Creek 330 kV Substation - new synchronous condenser

Ref 60750224

Date 24-Nov-2025

Originator Jamie McMahon, Elizabeth Rizzo

**Revision History**

| Rev | Revision Date | Details | Approved | |
|---|---|---|---|---|
| | | | Name/Position | Signature |
| 0 | 06-June-2025 | First draft for client review | Jamie McMahon Technical Director | JM |
| 1 | 09-July-2025 | Final draft for client review | Jamie McMahon Technical Director | JM |
| 2 | 01-Sep-2025 | Final draft for client review | Neil Standen Associate Director | NS |
| 3 | 29-Sep-2025 | Updated final draft for client review | Neil Standen Associate Director | NS |
| 4 | 05-Nov-2025 | Updated final draft for client review | Neil Standen Associate Director | NS |
| 5 | 24-Nov-2025 | Final | Neil Standen Associate Director |  |

# Table of Contents

## List of Tables



## List of Figures

# 1.0 Introduction

Transgrid is proposing to install and operate two synchronous condensers (syncons) at the existing Kemps Creek 500 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 Kemps Creek 500 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
- Upgrade of the existing access road from Fourth and Gurner Avenue intersection and some sections of access road within the substation site may require upgrading to support the transport of equipment and vehicle movements to and from site
- Demolition of redundant infrastructure associated with the Static Var Compensator (SVC) plant
- Installation of a new bench (concrete slab, foundations and associated earthworks), with an indicative maximum footprint of around 130 by 150 metres (m), immediately west of the existing Kemps Creek 500 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, current transformer, disconnector, earth switch, capacitive voltage transformer, post insulators/busbar supports, and surge arrester
- Installation of the two new syncons and associated equipment, including:
    - Power transformer with firewalls
    - Auxiliary transformers
    - Syncon building and gantry crane
    - Oil lubrication and water-cooling systems
    - Control room and battery room
    - Low voltage AC and DC systems
    - Protection and control systems
    - Backup diesel generator
    - Pony motor
- Installation of a new demountable secondary systems building
- Installation of new spill oil tank, secondary containment dams, 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 lightning protection masts

- Rehabilitation of the site including:
  - Removal of temporary construction facilities and equipment
  - Excavated material not reused on-site and waste materials would be disposed of at an appropriately licensed waste facility or as directed by Transgrid's environmental business partner in accordance with Transgrid's Waste Management of Spoil Work Instruction
  - Disturbed areas not required for the operation of the syncons or the existing Kemps Creek 500 kV substation will be rehabilitated to as close to pre-construction conditions as possible.

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

## 1.2 Proposed impact area and biodiversity study area

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

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

The biodiversity study area is shown in Figure 1-3.

### 1.2.1 Site context

The Kemps Creek 500 kV substation is located on Fourth Avenue, in the suburb of Austral and the City of Liverpool Local Government Area (LGA), NSW.

The syncons are proposed to be located along the western boundary of the existing substation (as shown in Figure 1-2). This area adjacent to the western boundary of the substation is partially cleared and maintained as mowed grass. This general area would also be used for the site compound and laydown areas. Beyond this is a large area of contiguous remnant vegetation comprising the Kemps Creek Nature Reserve.

Access to the proposed impact area is along Fourth Avenue, which is gated near the intersection with Gurner Avenue. This road provides direct access to the substation. Fourth Avenue is unsealed between the gate and the substation gates.

The area around the proposed impact area is occupied by dense remnant bushland, intersected by transmission line easements to the north and south. The terrain is generally flat, with a slight downward slope towards Kemps Creek to the west. The proposed impact area drains to the west into Kemps Creek, which flows into South Creek at Twin Creeks.

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

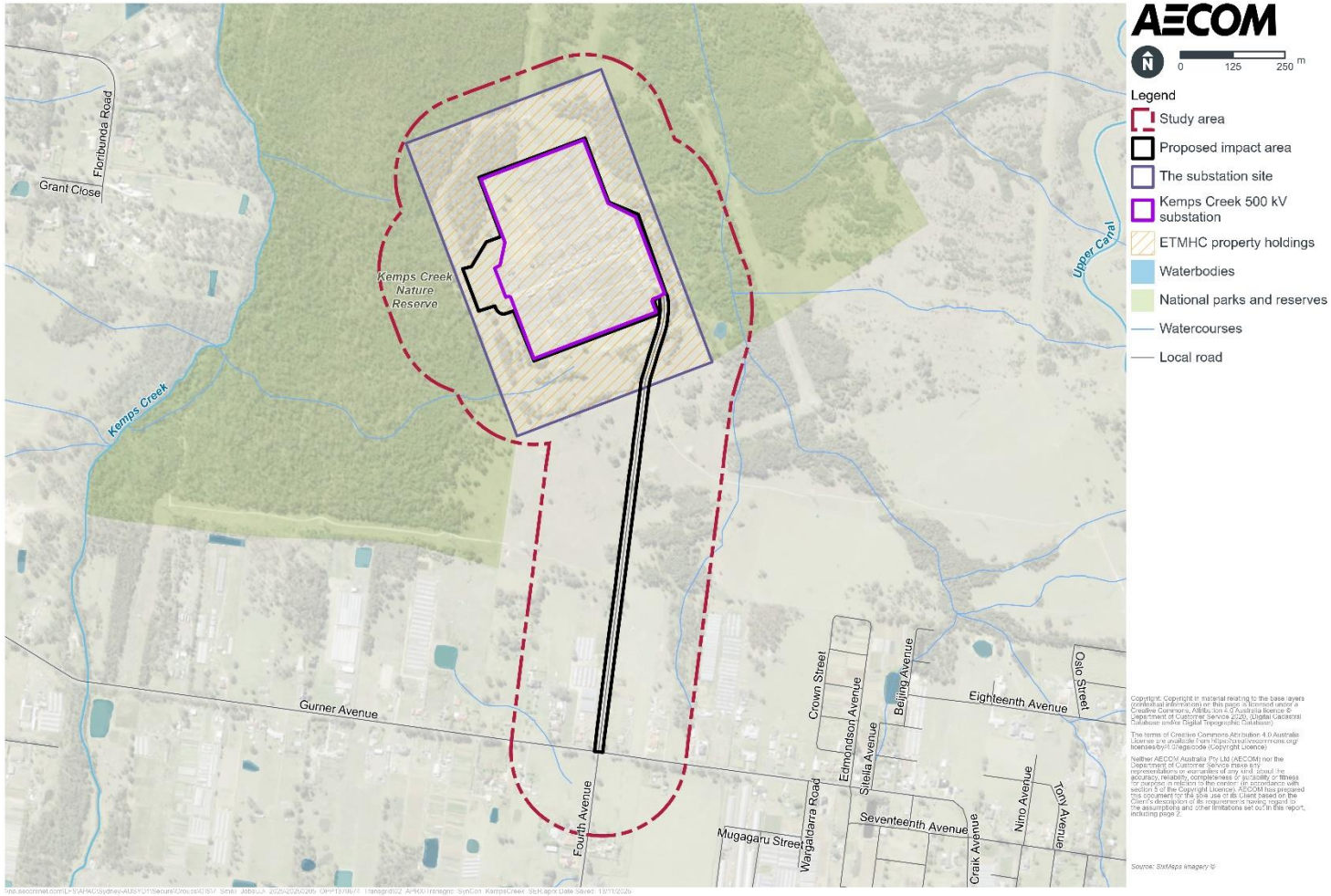



**Figure 1-1 Proposed impact area**

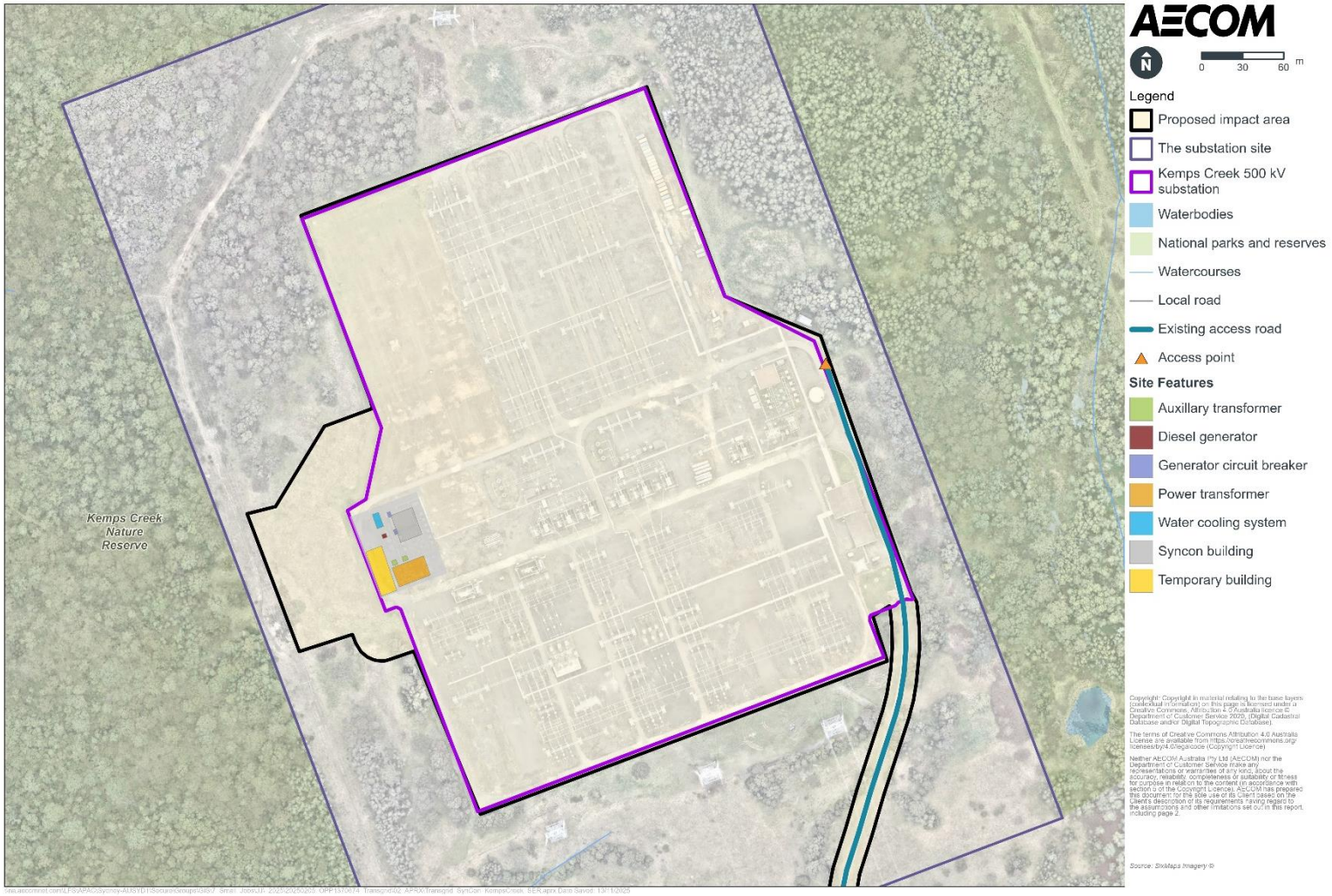



**Figure 1-2 Indicative operational site layout**

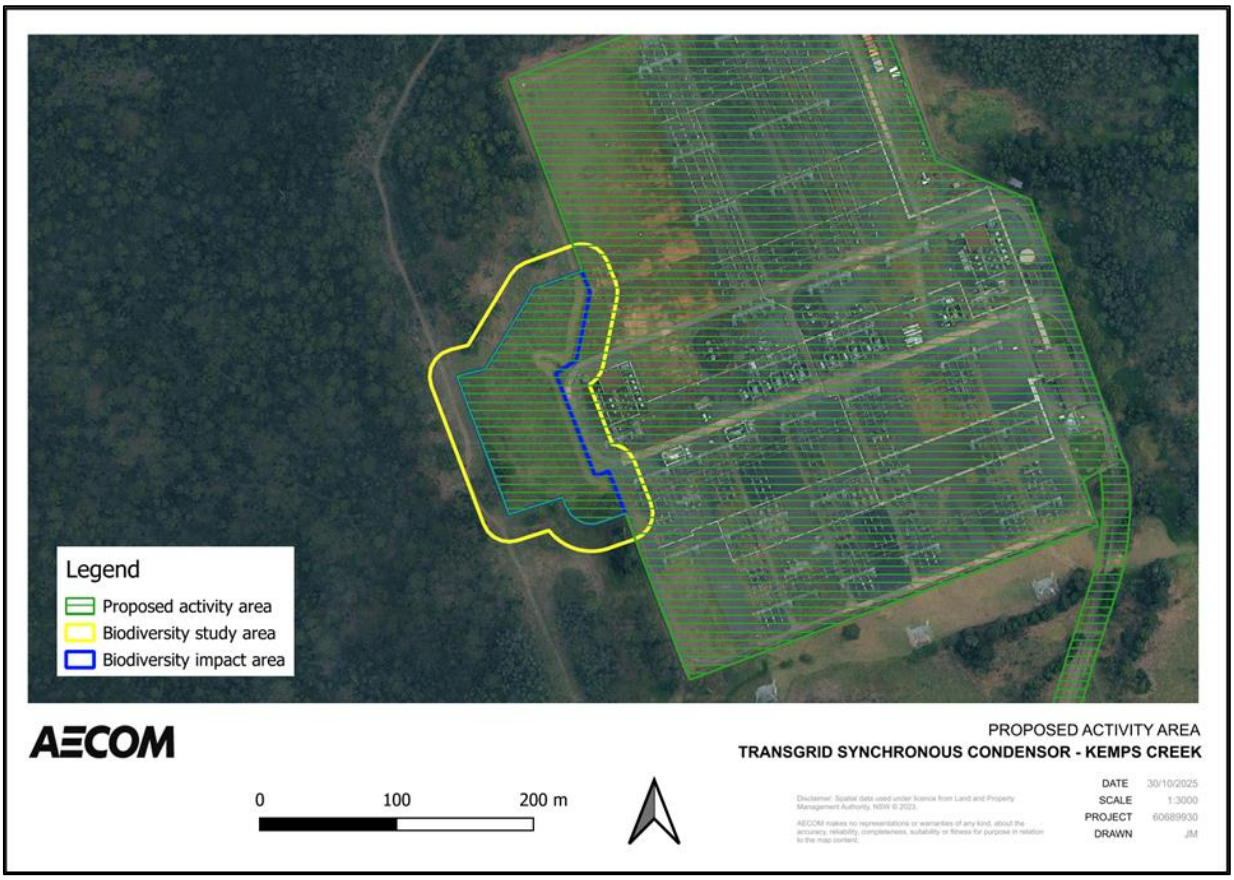



**Figure 1-3 Biodiversity study area**

## 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 Liverpool City 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 to 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 significantly impacted by the proposed activity, an assessment of significance that addresses the requirements of Section 7.3 of the BC Act must be completed to determine the significance of the impact.

The exception to the above is where development is proposed on land that is biodiversity certified under Part 8 of the BC Act, as is the case for the substation site. Section 8.4(4) outlines that Part 5 development on biodiversity certified land is taken to be an activity that is not likely to significantly affect any threatened species or ecological community, in relation to that land. That is, it is not possible for such activities to result in a significant impact on threatened species or ecological communities within the land that is biodiversity certified. This does not however preclude the potential for a significant impact to occur in adjacent land that is not subject to biodiversity certification.

Acknowledging that the assessment of the potential for an activity to result in a significant impact on biodiversity values within biodiversity certified land is not required, it remains important to understand the potential for:

- A significant impact on a threatened species or ecological community on adjacent non-certified land, and/or
- Biodiversity impacts within certified land that are below the level of being 'significant'

As such, this report has been prepared to consider these impacts, with view to avoiding or minimising these as far as practical. These are discussed in Section 4.0.

A test of significance has been prepared as a precautionary measure for the Cumberland Plain Land Snail (refer to Appendix B).

Based on the detail above and the results of the assessment, the proposed activity is not anticipated to result in a significant impact on threatened species or ecological communities, 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, as well as diseases, weeds and contaminants. The policy outlines the responsibilities of government, councils, private landholders and public authorities in the management of these 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 Liverpool 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 the FM 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 for proposed dredging or reclamation works, though clause 227 of the *Fisheries Management (General) Regulation 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 19 March 2025. Conditions during the inspection were warm, approximately 24°C with scattered cloud and no wind. There had been 4.2 mm of rain throughout the week prior to the survey, according to the Horsely Park automatic weather station (Station ID 067119). No rainfall was recorded on the day of survey. 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 proposed site compound and laydown area.

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

## 2.4 Limitations

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

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

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

# 3.0 Existing environment

## 3.1 Overview

Table 3-1 provides an overview of the biodiversity study area, including relevant environmental controls and sensitivities. Photographs of the biodiversity study area 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 any NPWS estate? | No. The nearest NPWS estate is the Kemps Creek Nature Reserve, which is immediately adjacent to the west of the proposed impact area. |
| Does the biodiversity study area include any land reserved or dedicated for preservation of other environmental protection purposes? | No, though the biodiversity study area immediately abuts the boundary of the Kemps Creek Nature Reserve located immediately to the west. |
| 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, though the biodiversity study area immediately abuts the boundary of the Kemps Creek Nature Reserve located to the west. The nature reserve is not zoned under an EPI. |
| 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 or an Area of Outstanding Biodiversity Value? | No |
| Does the biodiversity study area contain Key Fish Habitat? | No. The nearest KFH (Kemps Creek) is located approximately 430 m west of the biodiversity study area. |
| Is the biodiversity study area mapped on the Biodiversity Values map? | No, though the biodiversity study area immediately abuts the boundary of the Kemps Creek Nature Reserve located immediately to the west, which is identified on the Biodiversity Values Map. |
| 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 4 June 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 28 threatened ecological communities, 55 threatened fauna species and 30 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 eradicate 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.<br>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).<br>The biodiversity study area was reviewed for potential KFH. The nearest waterway, Kemps Creek, was identified as KFH. Kemps Creek is located around 430 m west of the biodiversity study 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 (SVTM) was accessed to identify PCTs in the vicinity of the biodiversity study area. PCTs and associated TECs identified within approximately 2 km of the biodiversity study area are provided in Table 3-3. Note that none of these communities were identified within the biodiversity impact area, despite PCT3320 being mapped by the SVTM as being present in the southern portion of the biodiversity impact area.

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

| PCT | Associated TEC |
|---|---|
| 3320 Cumberland Shale Plains Woodland | • **BC Act, CE:** Cumberland Plain Woodland in the Sydney Basin Bioregion<br>• **EPBC Act, CE:** Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest |
| 4025 Cumberland Red Gum Riverflat Forest | • **BC Act, CE:** River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions<br>• **EPBC Act, CE:** River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria |
| 3448 Castlereagh Ironbark Forest | • **BC Act, E:** Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion<br>• **EPBC Act, CE:** Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion |

Notes:

1. CE = critically endangered, E = endangered.

The biodiversity impact area is generally devoid of any recognisable vegetation community, having been historically cleared. Vegetation within the biodiversity impact area is primarily comprised of exotic grasses and retains little in the way of functional structure, being largely restricted to a ground layer only.

The biodiversity impact area is likely to have been cleared for asset protection zone (APZ) purposes and is maintained as such. The cleared zone around the substation extends for approximately 50 m to the west of the substation, at the biodiversity impact area. However, it is noted that remnant and regrowth native vegetation is located almost immediately adjacent to the substation along the eastern, southwestern and northwestern boundaries. One remnant *Angophora floribunda* was present within the biodiversity impact area along the western fences of the substation, though this individual had been heavily trimmed.

A row of *Eucalyptus maculata* was present in the southeastern corner of the biodiversity impact area, immediately adjacent to the substation fence. This vegetation was located on the steep embankment created by the historic filling of the land for the substation. This vegetation is mapped on the SVTM as PCT 3320, however noting that this vegetation is not remanent, as well as the lack of other substantial native canopy or midstorey vegetation, it is highly likely that these individuals were planted. Whilst planted vegetation can, under certain circumstances, be considered a PCT, in this case there is a near complete lack of diagnostic midstorey and groundcover species and as such this vegetation is not considered to comprise PCT 3320.

Within the northern section of the biodiversity study area, and outside the biodiversity impact area, are fragmented areas of remnant woodland. These patches are dominated by a canopy of *Eucalyptus moluccana,* with a sparse midstory including *Leucopogon juniperinus* and several weed species: Trumpet vine (*Campsis radicans*), African boxthorn (*Lycium ferocissimum*), Fleabane (*Conyza bonariensis*), Purple top (*Verbena rigida*), and Blackberry (*Rubus fruticosus* aggregate).

To the west of the biodiversity impact area are several Box Alder (*Acer negundo*), African Boxthorn and a large Sweet Briar (*Rosa rubiginosa*).

The biodiversity impact area is generally cleared of remnant vegetation around the perimeter of the substation. This area is located on fill, being around 4-5 m higher than the surrounding natural landform to the west. The land in this location is likely to have been and filled during the original construction of the substation. No revegetation has been undertaken on this fill, with the site seemingly being maintained as mowed grass only.

Most of the biodiversity impact area (and biodiversity study area) is cleared of all vegetation at the midstorey and canopy layers, potentially for the purposes of maintaining an APZ around the substation (refer to Figure 3-1). It is noted however that vegetation in the southern extent of the biodiversity study area is located almost immediately adjacent to the substation, within the likely APZ. This vegetation appears to have been planted, being made up of a row of similar aged *Corymbia maculata*.

Species identified during the field survey as being present within the biodiversity study area included the following:

| Common Name | Scientific Name |
|---|---|
| Spotted Gum | *Corymbia maculata* |
| Sweet Bursaria | *Bursaria spinosa* |
| Forest Red Gum | *Eucalyptus tereticornis* |
| Rough-barked Apple | *Angophora floribunda* |
| Rhodes Grass | *Chloris gayana* |
| Purple Top | *Verbena bonariensis* |
| Kangaroo Grass | *Themeda australis* |
| Blackberry | Rubus fruticosus agg. |
| Scotch Thistle | *Onopordum acanthium* |
| Paterson's Curse | *Echium plantagineum* |
| Tubular Verbena | *Verbena rigida* |
| Swan Plant | *Gomphocarpus fruticosus* |
| Cotoneaster | *Cotoneaster spp.* |
| African Boxthorn | *Lycium ferocissimum* |
| Fireweed | *Senecio madagascariensis* |
| Paddy's Lucerne | *Sida rhombifolia* |
| Moth Vine | *Araujia sericifera* |
| Mountain Clematis | *Clematis aristata* |
| Grey Box | *Eucalyptus moluccana* |
| Prickly Beard-heath | *Leucopogon juniperinus* |
| Wisteria | Wisteria sinensis / floribunda |
| Bridal Creeper | *Asparagus asparagoides* |
| Blackberry Nightshade | *Solanum nigrum* |
| Climbing Saltbush | *Einadia nutans* |
| Cobblers Pegs | *Bidens pilosa* |

| Common Name | Scientific Name |
|---|---|
| Crepe Myrtle | *Lagerstroemia indica* |
| Box Elder | *Acer negundo* |
| Fleabane | *Conyza spp.* |

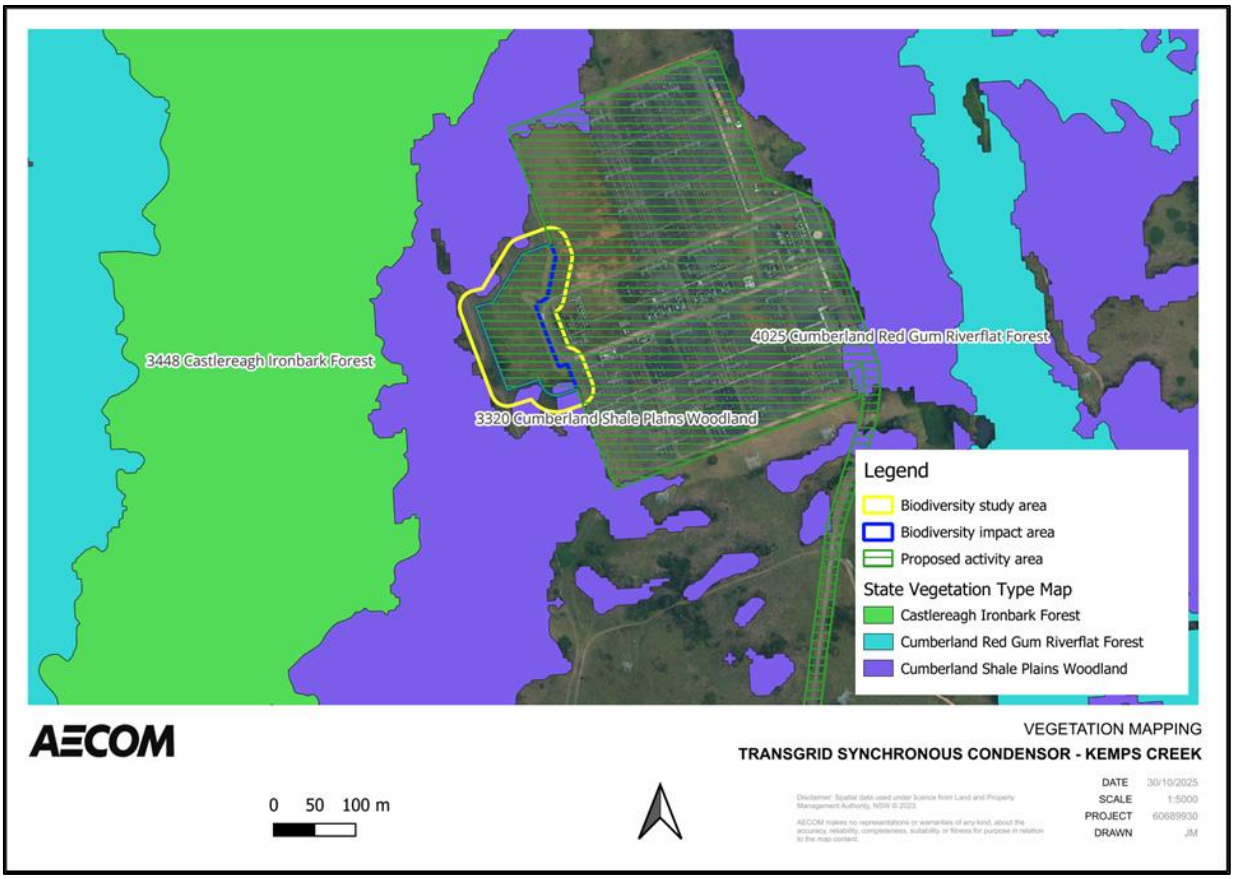



**Figure 3-1 Mapped vegetation communities**

### 3.3.1 Site photographs


**Figure 3-2 Proposed impact area from southern boundary of biodiversity impact area, looking north**


**Figure 3-3 Proposed impact area looking southeast from northern boundary of biodiversity impact area**


**Figure 3-4 Remnant Cumberland Plain Woodland vegetation to the north, outside of boundary of the biodiversity impact area**


**Figure 3-5 Remnant Cumberland Plain Woodland vegetation to the north of the proposed impact area where Cumberland Plain Land Snail shell recorded (outside of boundary of the biodiversity impact area)**

**Figure 3-6 Cumberland Plain Land Snail shell recorded north of biodiversity study area**

## 3.4 Fauna habitat

Fauna observed within the biodiversity study area included:

- Eastern Grey Kangaroo (*Macropus giganteus*)
- Eastern Rosella (*Platycercus eximius*)
- Noisy Miner (*Manorina melanocephala*)
- Willie Wagtail (*Rhipidura leucophrys*)
- Magpie-lark (*Grallina cyanoleuca*)
- Australian Magpie (*Gymnorhina tibicen*)
- Australian Raven (*Corvus coronoides*).

No evidence of occupation by other species in the form of scats or tracks was observed during the field survey, though the site would be reasonably expected to accommodate a range of native and exotic species given the proximity of the good quality vegetation in the Kemps Creek Nature Reserve. As such, it is likely that nearby mature canopy and midstorey vegetation (both within and outside the boundaries of the nature reserve) would provide habitat and foraging resources for arboreal mammals such as microbats, megabats, gliders and possums. This vegetation is also likely to provide occasional roosting and foraging opportunities for a variety of additional birds not recorded during the field survey.

The broader biodiversity study area (though not the biodiversity impact area) contained numerous fallen logs, coarse woody debris and bushrock. Flaking bark was present on *Eucalyptus tereticornis* individuals present in the remnant patches adjacent to the biodiversity impact area. The bark of *Eucalyptus moluccana* and *Corymbia maculata*, the two other canopy species present, does not flake in

a manner that provides substantial habitat value, which was the case here. Leaf litter was also present in the remnant vegetation patches.

The nearest waterway is Kemps Creek, which is located around 430 m to the west of the limits of the biodiversity impact area. Aquatic habitat is absent from the biodiversity impact area, owing to its elevated nature in relation to the surrounding land.

The biodiversity impact area is generally devoid of any complex habitat, though is likely to provide a foraging area for certain species e.g. Australian Magpie, some reptiles. One mature tree was identified, being an *Angophora floribunda*.

No tree hollows were observed within the biodiversity study area.

Overall, the habitat value of the biodiversity impact area is heavily reduced compared to its pre-clearing state. This is primarily related to the clearing and filling that has taken place historically, as well as the ongoing maintenance as mowed grassland.

## 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 4 June 2025. Of these species, an assessment of the likelihood of occurrence of each was undertaken. Species with a likelihood of occurrence of moderate or above were targeted during the field survey. These species are listed in Table 3-4.

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

| Common name | Scientific name | Status | |
|---|---|---|---|
| | | BC Act | EPBC Act |
| **Fauna** | | | |
| Cumberland Plain Land Snail | *Meridolum corneovirens* | E | E |
| Greater Broad-nosed Bat | *Scoteanax rueppellii* | V | |
| White-bellied Sea-Eagle | *Haliaeetus leucogaster* | V | M |
| Little Lorikeet | *Parvipsitta pusilla* | V | |
| Masked Owl | *Tyto novaehollandiae* | V | |
| Grey-headed Flying-fox | *Pteropus poliocephalus* | V | V |
| Eastern Freetail-bat | *Micronomus norfolkensis* | V | |
| Little Eagle | *Hieraaetus morphnoides* | V | |
| Varied Sittella | *Daphoenositta chrysoptera* | V | |
| Flame Robin | *Petroica phoenicea* | V | |
| **Flora** | | | |
| Native Pear | Marsdenia viridiflora subsp. viridiflora | E | |
| | *Dillwynia tenuifolia* | V | |
| Camden White Gum | *Eucalyptus benthamii* | V | V |
| Spiked Rice-flower | *Pimelea spicata* | E | E |
| Nodding Geebung | *Persoonia nutans* | E | E |
| | *Pultenaea parviflora* | E | V |
| Downy Wattle | *Acacia pubescens* | V | V |
| Juniper-leaved Grevillea | Grevillea juniperina subsp. juniperina | V | V |

Notes:

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

Targeted searches were undertaken for these species, though none were observed within the biodiversity study area. An empty shell of a Cumberland Plain Land Snail was recorded adjacent to the biodiversity buffer area to the north of the site (see Figure 3-7). This record was confirmed by expert analysis by the Australian Museum.

The nearest threatened fauna species records to the biodiversity study area are for Cumberland Plain Land Snail (*Meridolum corneovirens*), Grey-headed flying fox (*Pteropus poliocephalus*), Greater Broad-nosed Bat (*Scoteanax rueppellii*), Flame Robin (*Petroica phoenicea*) and Varied Sitella (*Daphoenositta chrysoptera*). Habitat for these species is present adjacent to the biodiversity study area, though is largely absent within the biodiversity study area. The cleared nature of the biodiversity impact area (and the substation itself) is likely to present some degree of aerial foraging habitat for bats and other threatened birds, though this is not expected to be significant.

The nearest threatened plant species to the biodiversity study area is a record for *Dillwynia tenuifolia* from 2004, located approximately 115 m to the northwest of the biodiversity impact area and within the adjacent remnant woodland. Targeted searches for this species failed to record it within the biodiversity study area. Other threatened flora species with higher potential to occur within the biodiversity study area included *Acacia pubescens and Grevillea juniperina* subsp*. juniperina*, though neither were detected.


**Figure 3-7 Threatened species records (Source: NSW BioNet Wildlife Atlas)**

## 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 Liverpool City Council LGA the following species were recorded:

- Blackberry (*Rubus fruticosus species aggregate*) - Prohibition on certain dealings. Must not be imported into the state, sold, bartered, exchanged or offered for sale
- Fireweed (*Senecio madagascariensis*) - Prohibition on certain dealings. 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 syncons and its associated infrastructure would require minimal localised vegetation clearance of generally cleared and maintained vegetation with two small areas of native vegetation clearing required. Figure 4-1 shows a conservative extent of clearing required to facilitate construction and operation of the proposed activity, including areas of predominantly native non-native vegetation.


**Figure 4-1 Vegetation clearing**

The conservative clearing of native vegetation for the proposed activity would be limited to 422 $m^2$ (0.042 ha) of native vegetation. The majority of this, made up of 384 $m^2$ of *Corymbia maculata* to the

south of the biodiversity impact area, is likely to be planted and therefore, is not considered to comprise PCT 3320 and therefore is not associated with a TEC. In addition to this, an area of 10,895 $m^2$ (1.09 ha) of non-native vegetation is proposed to be cleared. This vegetation is primarily comprised of grassland dominated by exotic Rhodes Grass (*Chloris gayana*).

The area required for clearing would include all construction and operational requirements. This includes construction compounds, laydown areas and construction access roads, as well as the operational footprint of the syncons.

The loss of this vegetation would constitute a minor biodiversity impact, particularly in light of the substantial amount of high-quality habitat available in the Kemps Creek Nature Reserve to the west.

It should also be noted that the native vegetation potentially subject to clearing is within 50 m of the substation fence line and may be subject to clearing for APZ purposes in any case.

The biodiversity impact of the loss of the non-native vegetation would be minor, noting the near total lack of habitat value of this grassland area.

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

The potential or indirect off-site impacts to threatened flora are unlikely to be significant providing the proposed mitigation measures are implemented (refer to Section 5.0).

## 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. As such, the habitat value within the biodiversity study area is considerably lower than the remnant bushland to the west (within the Kemps Creek Nature Reserve).

It is noted that two threatened microbat species have been previously recorded approximately 2 km east of the biodiversity study area. Both of these species, *Miniopterus australis*, and *Micronomus norfolkensis*, are forest-dwelling bats. These forest-dwelling bats would be subject to loss of foraging and potentially roosting habitat in this location, due to the clearing of the native tress within the biodiversity impact area. Within this area, the most sensitive habitat feature for these species (and many others) is the large mature trees, being a single *Angophora floribunda* and several *Corymbia maculata*. Clearing of these trees should be avoided as far as possible.

The proposed activity would not alter or remove any existing caves, crevices or other masonry elements that may constitute habitat for cave-dwelling bats, including any parts of the substation itself. As such the impact to roosting habitat for cave dwelling bats would be negligible, though foraging habitat would still be affected.

Noting the detection of Cumberland Plain Land Snail near the biodiversity study area, and the numerous records nearby, there is a potential for impacts to this species during construction of the proposed activity. This is due to the known potential for this species to occupy areas of open grassland adjacent to core habitat. However, this extension of the species habitat is generally quite limited, being in the range of 10-15 m maximum. The remnant patch of habitat within which the individual was recorded is located approximately 10 m to the north of the biodiversity impact area, and partially within the biodiversity study area. However, it is recognised that this patch is slightly isolated from similar vegetation nearby. On this basis the construction of the syncons within this potential foraging zone is not considered to constitute a significant impact on this species.

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.

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

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

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

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

## 4.3 Wildlife connectivity and fragmentation

The construction of the proposed activity would require the clearing of areas of planted native vegetation, as well as a larger area of non-native vegetation. This would lead to a very minor 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, which is substantial.

The Cumberland Plain, in which the proposed activity is located, has been subject to highly significant clearing and fragmentation, with over 96% cleared. Due to this historic disturbance, the connectivity of habitat for ground-dwelling fauna, particularly in the north east-west direction has been significantly disrupted. Connectivity for mobile aerial species such as birds and arboreal mammals however is still maintained, though may be reduced for more cryptic species.

The primary impact of the proposed activity in terms of connectivity would be the removal of vegetation to enable construction work to be carried out. Vegetation clearing would primarily affect non-native vegetation and planted native vegetation at the southern extent of the biodiversity impact area, noted to be in good condition.

Noting the presence of substantial amounts of equivalent contiguous habitat in most directions from the biodiversity impact area, this loss of connectivity would result in a minor impact to biodiversity. 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 Cumberland Plain.

This impact is not considered to be significant given the mobile nature of native fauna likely to be present in the area, the very small scale of the clearing and the fact that the impact would be generally limited to planted vegetation.

## 4.4 Spread of weeds, pests and pathogens

Two priority weeds listed under the Biosecurity Act for the Liverpool City Council LGA were recorded on within the biodiversity impact area. These species and their required management actions are listed in Section 3.8.

The proposed activity has the potential to result in the infestation of the biodiversity impact area by new priority weeds, or the spread of existing priority 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.

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

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

The biodiversity impact area is likely to be utilised by a range of vertebrate pest species. Impacts from pest species are likely to include ongoing grazing and predation on small to medium native fauna. The proposed activity is unlikely to alter the occurrence of pest species in and around the biodiversity impact

area, either positively or negatively, due to the localised nature of the works. As such the overall impact in this regard is considered to be neutral with respect to the baseline scenario.

The proposed activity also has the potential to spread pathogens, such as *Phytophthora personii*, 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. Minor weed invasion is present in this location. 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.

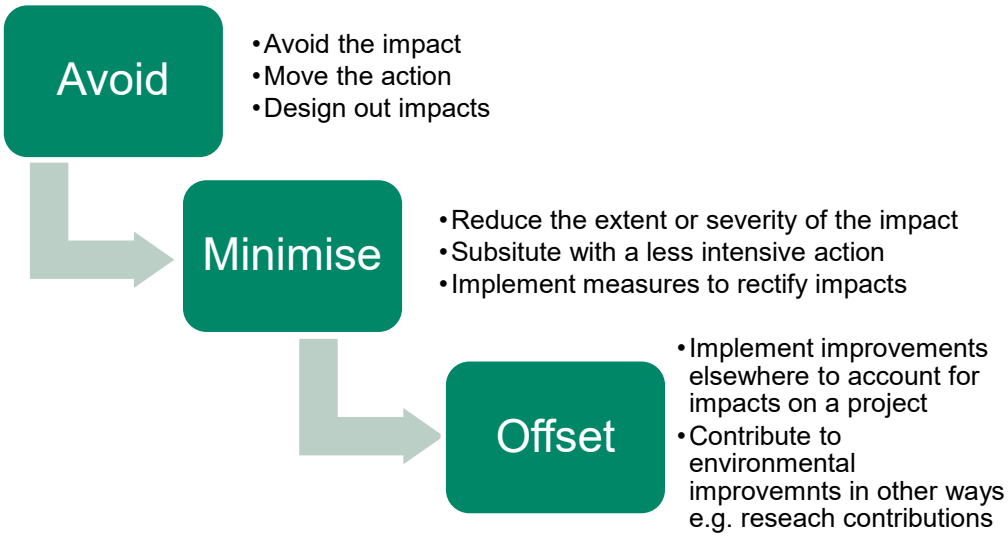
## 4.6 Cumulative impacts

As outlined above the Cumberland Plain has been subject to significant historic clearing, being approximately 96% cleared from its 1750 distribution. A substantial part of this is clearing for new housing or agriculture, both of which are ongoing in the surrounding area, which is part of the South West Growth Area. Whilst the potential for cumulative impact in this regard is high, the near negligible clearing associated with the proposed activity means that a significant cumulative impact to vegetation or fauna habitat is unlikely.

# 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 areas of planted 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
   - During the early stages of the SER development, the north-western portion of the initial impact area was found to intersect with mapped areas of Cumberland Shale Plains Woodland PCT. As noted in Section 3.3, this PCT is associated with TECs under the BC Act and EPBC Act. To minimise potential impacts to these areas, the north-western most portion of the initial impact area was removed (refer to Figure 2-3 of the SER)
   - As noted in Section 3.5, the empty shell of a Cumberland Plain Land Snail (endangered under the BC Act) was identified within the north-western portion of the initial impact area. To minimise potential impacts to habitat for the Cumberland Plain Land Snail, the initial impact area was further refined (refer to Figure 2-3 of the SER).
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 large mature trees within the biodiversity study area including the single *Angophora floribunda* and several *Corymbia maculata* should be retained as far as possible
- 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
- 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 (e.g. soilborne pathogens) 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 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. Sensor security lighting that only turns on when a person is detected is preferred where practical
- 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 regular 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 Kemps Creek 500 kV substation will be rehabilitated to as close to pre-construction conditions as possible upon completion of construction. This would include soil stabilisation and revegetation using a native seed mix approved by the Transgrid environmental representative.
- Any external material (such as crushed sandstone or similar) brought in for the purposes of constructing and stabilising the biodiversity impact area is to be fully removed upon completion of construction

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

The main impacts of the proposed activity upon flora would be through the direct clearing of vegetation for the installation of the syncons. Vegetation impacts associated with these actions were assessed as not being significant due to the small footprint and abundance of residual connectivity and contiguous vegetation in the area.

No threatened species or ecological communities were identified within the biodiversity impact area, though one species, Cumberland Plain Land Snail, was identified in close proximity. Other threatened species are known to utilise the area and threatened ecological communities are present to the west. The proposed activity would not result in any significant impacts to these, providing the proposed mitigation measures are implemented. 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. As such, the overall impact on habitat for known threatened fauna species is not considered to be significant.

Based on 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

Sydney Trains Biodiversity System Procedure (EMS-09-PR-0003)

Sydney Trains Biodiversity Offsets Calculator (EMS-09-WI-0177)

# Appendix A

## Likelihood of Occurrence

| Scientific name | Common name | FM Act | BC Act | EPBC Act | Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| *Heleioporus australiacus* | Giant Burrowing Frog | | V | V | Distributed through the Sydney Basin sandstone country in woodland, open woodland and heath vegetation, breeding habitat is generally soaks or pools within first or second order streams, but also 'hanging swamp' seepage lines and where small pools form from the collected water. Spend the majority of time in non-breeding habitat up to 300 m away and burrows in soil surface or leaf litter. | Low |
| *Litoria aurea* | Green and Golden Bell Frog | | E | V | Large populations in NSW are located around coastal and near coastal areas of the metropolitan areas of Sydney, Shoalhaven and mid north coast. It Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (Typha spp.) or spikerushes (Eleocharis spp.) | Low |
| *Lathamus discolor* | Swift Parrot | | E | CE | In NSW mostly occurs on the coast and south west slopes, occurring in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany (Eucalyptus robusta), Spotted Gum (Corymbia maculata), Red Bloodwood (C. gummifera), Mugga Ironbark (E. sideroxylon), and White Box (E. albens). | Low |
| *Calidris ferruginea* | Curlew Sandpiper | | E | CE, M | Coastal migratory species with an NSW distribution from Hastings Point to Shoalhavn Heads. Found in open, sandy beaches with exposed sand bars and rocky outcrops. Rare use of near-coastal wetlands. | Low |
| *Anthochaera phrygia* | Regent Honeyeater | | CE | CE | Inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. 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 |

| Scientific name | Common name | FM Act | BC Act | EPBC Act | Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| *Numenius madagascariensis* | Eastern Curlew | | | CE, M | Estuaries, tidal mudflats, sandspits, saltmarsh, mangroves | Low |
| *Callocephalon fimbriatum* | Gang-gang Cockatoo | | 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 |
| *Melanodryas cucullata cucullata* | Hooded Robin (south-eastern form) | | V | | Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. | Low |
| *Tringa nebularia* | Common Greenshank | | | M | Mudflats, estuaries, saltmarsh, margins of wetlands | Low |
| *Botaurus poiciloptilus* | Australasian Bittern | | 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 |
| *Erythrotriorchis radiatus* | Red Goshawk | | CE | V | Occurs in coastal and sub-coastal areas in woodland and forests, including riverine forests. Favours intermediate density forests to aid hunting of birds. Nest in tall trees, often beside permanent water sources. | Low |
| *Rostratula australis* | Painted Snipe (Australian subspecies) | | 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 |
| *Aphelocephala leucopsis* | Southern Whiteface | | V | V | Dry open forests and woodland and inland scrubs of mallee, mulga and saltbush are the preferred habitat of Southern Whiteface, especially areas with fallen timber or dead trees and stumps. | Low |
| *Calidris acuminata* | Sharp-tailed Sandpiper | | | M | Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. | Low |
| *Pycnoptilus floccosus* | Pilotbird | | | V | Pilotbirds are strictly terrestrial, living on the ground in dense forests with heavy undergrowth | Low |

| Scientific name | Common name | FM Act | BC Act | EPBC Act | Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| *Neophema chrysostoma* | Blue-winged Parrot | | V | V | Blue-winged parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zone. The species can also be seen in altered environments such as airfields, golf-courses and paddocks. Pairs or small parties of blue-winged parrots forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs | Low |
| *Hirundapus caudacutus* | White-throated Needletail | | | M | Aerial space over a variety of habitat types, but prefers to forage over treed habitats as these would provide a greater abundance of insect prey; often forage on the edge of low pressure systems and may follow these systems ; breeds in Asia. | Low |
| *Gallinago hardwickii* | Latham's Snipe | | | M | Soft wet ground, shallow water with tussocks, inundated parts of paddocks, seepage below dams, saltmarsh and mangrove fringes | Low |
| *Calyptorhynchus lathami lathami* | Glossy Black-Cockatoo | | 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 |
| *Falco hypoleucos* | Grey Falcon | | 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. | Low |
| *Grantiella picta* | Painted Honeyeater | | 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 |
| *Stagonopleura guttata* | Diamond Firetail | | V | | Found in grassy eucalypt woodlands, open forest, mallee, grassland and riparian areas. | Low |

| Scientific name | Common name | FM Act | BC Act | EPBC Act | Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| *Climacteris picumnus victoriae* | Brown Treecreeper (eastern subspecies) | | V | | Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (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. | Low |
| *Circus assimilis* | Spotted Harrier | | V | | Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. | Low |
| *Haliaeetus leucogaster* | White-bellied Sea-Eagle | | V | M | Coastlines, estuaries, large rivers and lakes; occasionally over adjacent habitats; builds a large stick nest in a tall tree, rarely on artificial structures | Moderate |
| *Hieraaetus morphnoides* | Little Eagle | | 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. | Low |
| *Lophoictinia isura* | Square-tailed Kite | | V | | Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. | Low |
| *Falco subniger* | Black Falcon | | V | | Core habitat is semi-arid and arid interior; uses tree-lined watercourses, isolated stands of trees and hunts over low vegetation of surrounding plains, grasslands, saltubush and blue-bus. Also hunts over wetlands and temporary waters or bore drains i arid regions | Low |
| *Burhinus grallarius* | Bush Stone-curlew | | E | | Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. | Low |
| *Parvipsitta pusilla* | Little Lorikeet | | 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 | Moderate |

| Scientific name | Common name | FM Act | BC Act | EPBC Act | Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| | | | | | western slopes. Nest in small hollows (entrance approx. 3 cm) of Eucalyptus spp. between 2 - 15 m above the ground. | |
| *Tyto novaehollandiae* | Masked Owl | | 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. | Moderate |
| *Pyrrholaemus sagittatus* | Speckled Warbler | | 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. | Low |
| *Daphoenositta chrysoptera* | Varied Sittella | | V | | Inhabits most of mainland Australia except the treeless deserts and open grasslands. It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. | Moderate |
| *Artamus cyanopterus cyanopterus* | Dusky Woodswallow | | V | | The Dusky Woodswallow is found in open forests and woodlands, and may be seen along roadsides and on golf courses | Low |
| *Petroica phoenicea* | Flame Robin | | V | | Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). | Low |
| *Macquaria australasica* | Macquarie Perch | E | | E | Found in both river and lake habitats, especially the upper reaches of rivers and their tributaries. | Low |
| *Prototroctes maraena* | Australian Grayling | | | V | Occur in freshwater streams and rivers, especially clear gravelly streams with a moderate flow, as well as estuarine areas. | Low |
| *Meridolum corneovirens* | Cumberland Plain Land Snail | | E | | Primarily inhabits Cumberland Plain Woodland. Lives under litter of bark, leaves and logs, or shelters in loose soil around grass clumps. Occasionally shelters under rubbish. Can dig several centimetres into soil to escape drought. | High |

| Scientific name | Common name | FM Act | BC Act | EPBC Act | Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| *Dasyurus maculatus maculatus* | Spotted-tail Quoll (southeastern mainland population) | | 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 |
| *Petauroides volans* | Greater Glider | | | V | The greater glider is an arboreal marsupial, largely restricted to eucalypt forests and woodlands. It is found in highest abundance typically in taller, montane, moist eucalypt forests, with relatively old trees and abundant hollows. The greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species. During the day it shelters in tree hollows, with a particular selection for large hollows in large, old trees. | Low |
| *Phascolarctos cinereus* | Koala | | 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 |
| *Chalinolobus dwyeri* | Large-eared Pied Bat | | 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 |
| *Notamacropus parma* | Parma Wallaby | | V | V | Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. | Low |
| *Pteropus poliocephalus* | Grey-headed Flying-fox | | V | V | Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are 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. | Moderate |

| Scientific name | Common name | FM Act | BC Act | EPBC Act | Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| *Petaurus australis australis* | Yellow-bellied Glider | | V | V | Typically occurs in tall, mature eucalypt forest in regions of high rainfall, but is also known to occur in drier areas. Preference for resource rich forests where mature trees provide nesting hollows and tree species composition with adequate food resources, including winter-flowering Eucalypts and sap-rich trees. | Low |
| *Petrogale penicillata* | Brush-tailed Rock-wallaby | | E | V | This species prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges, isolated rock stacks and tree limbs. Preference for north-facing slopes and cliff lines. A range of vegetation types are associated with Brush-tailed Rock-wallaby habitat, including dense rainforest, wet sclerophyll forest, vine thicket, dry sclerophyll forest, and open forest. | Low |
| *Pseudomys novaehollandiae* | New Holland Mouse | | | V | Inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. Nest in burrows and have a preference for deeper top soils and softer substrates to aid digging. Spends considerable time foraging above-ground for food in areas of high floristic diversity. | Low |
| *Saccolaimus flaviventris* | Yellow-bellied Sheathtail-bat | | V | | Inhabits eucalypt rainforest, sclerophyll forest and open woodland vegetation. Availability of tree hollows is important for access to roosting sites. | Low |
| *Micronomus norfolkensis* | Eastern Freetail-bat | | V | | Habitats preference includes dry eucalypt forest and coastal woodlands but also include riparian zones in rainforest and wet sclerophyll forest. Forages above forest canopy or forest edge and requires roosts including tree hollows. | Moderate |
| *Falsistrellus tasmaniensis* | Eastern False Pipistrelle | | V | | This species occupies tall, mature, wet forest and the species have been recorded roosting in stem holes in Eucalyptus and in buildings. Prefers moist habitats, with trees taller than 20 m. Generally, roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. | Low |
| *Myotis macropus* | Southern Myotis | | V | | This species generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. They forage over streams and pools catching insects and small fish by raking their feet across the water surface. | Low |

| Scientific name | Common name | FM Act | BC Act | EPBC Act | Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| *Scoteanax rueppellii* | Greater Broad-nosed Bat | | V | | Occurs in a variety of habitats including rainforest, dry and wet sclerophyll forest and eucalypt woodland. Large hollow bearing trees required for roosting. | High |
| *Miniopterus australis* | Little Bentwing-bat | | V | | This species occurs in moist eucalypt forest, rainforest or dense coastal banksia scrub. Little Bent-wing Bats roost in caves, tunnels and sometimes tree hollows during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. | Low |
| *Miniopterus orianae oceanensis* | Large Bent-winged Bat | | V | | Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the tree tops. | Low |
| *Aprasia parapulchella* | Pink-tailed Legless Lizard | | 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. | Low |
| *Eucalyptus benthamii* | Camden White Gum | | V | V | Occurs on the alluvial flats of the Nepean River and its tributaries. Requires a combination of deep alluvial sands and a flooding regime that permits seedling establishment. | Moderate |
| *Rhodamnia rubescens* | Scrub Turpentine | | CE | | Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.<br>This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts | Low |

| Scientific name | Common name | FM Act | BC Act | EPBC Act | Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| *Pimelea spicata* | Spiked Rice-flower | | E | E | Occurs on an undulating topography on well-structured clay soils. On the Cumberland Plain sites, it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. | Moderate |
| *Rhizanthella slateri* | Eastern Australian Underground Orchid | | V | E | Habitat requirements are poorly understood, and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Flowers September to November. | Low |
| *Allocasuarina glareicola* | | | E | E | Occurs in Castlereagh woodland on lateritic soil. Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. | Low |
| *Persoonia nutans* | Nodding Geebung | | E | E | Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. The species has a disjunct distribution, with the majority of populations (and 99% of individuals) occurring in the north of the species range in the Agnes Banks, Londonderry, Castlereagh, Berkshire Park and Windsor Downs areas. Northern populations are confined to aeolian and alluvial sediments and occur in a range of sclerophyll forest and woodland vegetation communities. The southern and northern populations have distinct habitat differences. | Moderate |
| *Pterostylis saxicola* | Sydney Plains Greenhood | | E | E | Restricted to western Sydney between Freemans Reach in the north and Picton in the south. Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. | Low |
| *Pterostylis gibbosa* | Illawarra Greenhood | | E | E | All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. In the Illawarra region, the species grows in woodland dominated by Forest Red Gum Eucalyptus tereticornis, Woollybutt E. longifolia and White Feather Honey-myrtle Melaleuca decora. Near Nowra, the species grows in an open forest of Spotted Gum Corymbia maculata, Forest Red Gum and Grey Ironbark E. paniculata. In the Hunter region, the species grows in open woodland dominated by Narrow-leaved Ironbark E. crebra, Forest Red Gum and Black Cypress Pine Callitris endlicheri. | Low |
| *Cynanchum elegans* | White-flowered Wax Plant | | E | E | The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree Leptospermum laevigatum – Coastal Banksia Banksia | Low |

| Scientific name | Common name | FM Act | BC Act | EPBC Act | Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| | | | | | integrifolia subsp. integrifolia coastal scrub; Forest Red Gum Eucalyptus tereticornis aligned open forest and woodland; Spotted Gum Corymbia maculata aligned open forest and woodland; and Bracelet Honeymyrtle Melaleuca armillaris scrub to open scrub. | |
| *Genoplesium baueri* | Bauer's Midge Orchid | | E | E | Occurs in coastal areas. Habitats include heathland, open forest, shrubby forest, heathy forest and woodland with sandy/sandy loam and well-draining soils. | Low |
| *Haloragis exalata subsp. exalata* | Square Raspwort | | V | V | Square Raspwort occurs in 4 widely scattered localities in eastern NSW. It is disjunctly distributed in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. Square Raspwort appears to require protected and shaded damp situations in riparian habitats. | Low |
| *Cryptostylis hunteriana* | Leafless Tongue Orchid | | V | V | Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (Eucalyptus sclerophylla), Silvertop Ash (E. sieberi), Red Bloodwood (Corymbia gummifera) and Black Sheoak (Allocasuarina littoralis); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (C. subulata) and the Tartan Tongue Orchid (C. erecta). | Low |
| *Pimelea curviflora var. curviflora* | | | V | V | Confined to the coastal area of the Sydney and Illawarra regions. Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Also recorded in Illawarra Lowland Grassy Woodland habitat at Albion Park on the Illawaraa coastal plain. | Low |
| *Grevillea parviflora subsp. parviflora* | Small-flower Grevillea | | V | V | Occurs in a range of vegetation types from heath and shrubby woodland to open forest. Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests. Hunter occurrences are usually 30-70m ASL, while the southern Sydney occurrences are typically at 200-300m ASL. Often occurs in open, slightly disturbed sites such as along tracks. | Low |
| *Persicaria elatior* | Tall Knotweed | | V | V | | Low |

| Scientific name | Common name | FM Act | BC Act | EPBC Act | Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| *Pomaderris brunnea* | Brown Pomaderris | | E | V | Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines. | Low |
| *Thesium australe* | Austral Toadflax | | V | V | Suitable habitat for this species includes grassland and grassy woodland, often in damp sites. | Low |
| *Syzygium paniculatum* | Magenta Lilly Pilly | | E | V | Grows in subtropical and littoral rainforest on sandy soils or stabilized dunes near the sea. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. | Low |
| *Pultenaea parviflora* | | | E | V | Endemic to the Cumberland Plain. Core distribution is from Windsor to Penrith and east to Dean Park. May be locally abundant, particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. | Moderate |
| *Melaleuca deanei* | Deane's Paperbark | | V | V | Endemic to Sydney Basin region and grows in heath on sandstone or flat broad ridge tops. Strongly associated with sandy loam soils that are low in nutrients, sometimes with ironstone present | Low |
| *Acacia bynoeana* | Bynoe's Wattle | | E | V | Occurs mainly in heath and dry sclerophyll forest, open woodland with dense to sparse heath understorey; open woodlands with a sparse shrub cover and a grass/sedge ground cover; and heathlands with sparse overstorey. With sand or sandy clay substrate, often with ironstone gravel and usually well drained, infertile soil. | Low |
| *Acacia pubescens* | Downy Wattle | | V | V | Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Concentrated around the Bankstown-Fairfield-Rookwood area and the Pitt Town area. | Moderate |
| *Marsdenia viridiflora subsp. viridiflora* | Native Pear | | E | | Grows in vine thickets and open shale woodland. | High |
| *Dillwynia tenuifolia* | | | V | | In western Sydney, may be locally abundant particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition | High |

| Scientific name | Common name | FM Act | BC Act | EPBC Act | Habitat | Likelihood of Occurrence |
|---|---|---|---|---|---|---|
| | | | | | Forest on tertiary alluvium or laterised clays. May also be common in transitional areas where these communities adjoin Castlereagh Scribbly Gum Woodland. | |
| *Pultenaea pedunculata* | Matted Bush-pea | | E | | NSW populations are generally among woodland vegetation, but plants have also been found on road batters and coastal cliffs. It is largely confined to loamy soils in dry gullies in populations in the Windellama area. In the Cumberland Plain the species favours sites in clay or sandy-clay soils (Blacktown Soil Landscape) on Wianamatta Shale-derived soils, usually close to patches of Tertiary Alluvium (Liverpool area) or at or near the Shale-Sandstone interface (Appin). All sites have a lateritic influence with ironstone gravel (nodules) present. In the Liverpool - Fairfield area the majority of occurrences are in lower-lying areas and often close to creek lines. Soils are moderately to poorly drained. By contrast, the Appin sites are on a plateau above the Nepean River, on soils that are not usually poorly drained. | Low |
| *Callistemon linearifolius* | Netted Bottle Brush | | V | | Inhabits dry sclerophyll forest on the coast and adjacent ranges. | Low |
| *Grevillea juniperina subsp. juniperina* | Juniper-leaved Grevillea | | V | | Grows on reddish clay to sandy soils derived from Wianamatta Shale and Tertiary alluvium (often with shale influence), typically containing lateritic gravels. | Moderate |

Notes:

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

# Appendix B

## Tests of Significance

# BC Act Tests of Significance

Under the *Biodiversity Conservation Act 2016*, the threatened species 'test of significance' is used to determine if a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. It is sometimes also referred to as the 'five-part test'. Such a test was carried out for the purposes of this assessment on the following:

- ***Cumberland Plain Land Snail (Meridolum corneovirens)* – endangered**

| **(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction** |
|---|
| This species was recorded during surveys as an empty shell located adjacent to the biodiversity study area. The habitat in which the shell was found was typical of Cumberland Plain Woodland habitat generally, being dominated by *Eucalyptus moluccana* and several saplings, and with an understorey dense with a mix of native and exotic groundcovers. It is also recognised that numerous records of this species exist in and around Kemps Creek Nature Reserve, located to the west and north of the proposed activity area. As such, the individual recorded is likely to comprise part of a viable local population.<br><br>The proposed activity would result in the construction and operation of a synchronous condenser adjacent to the existing Kemps Creek substation. This is proposed within land that is currently open exotic grassland, with very little native vegetation. Whilst this species is known to use such habitat, this is typically only in close proximity to its core habitat of Cumberland Plain Woodland. The remnant patch of habitat within which the individual was recorded is located approximately 10 m to the north of the biodiversity impact area, and partially within the biodiversity buffer area. However, it is recognised that this patch is slightly isolated from similar vegetation nearby. Given these factors it is unlikely that the proposed footprint of the proposed activity would constitute habitat of a level of importance that the local population of this species would be placed at risk of extinction. |
| **b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:**<br>**i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**<br>**ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.** |
| i. N/A<br>ii. N/A |
| **c) in relation to the habitat of a threatened species or ecological community:**<br>**i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**<br>**ii. whether an area of habitat is likely to become fragmented or isolated from other areas as a result of the proposed development or activity, and**<br>**iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality** |
| i. The proposed activity would affect secondary habitat for this species only. No direct impacts to primary habitat (patches of Cumberland Plain Woodland) would occur, with indirect impacts being suitably managed to avoid substantial harm.<br>ii. The proposed activity would require the removal of open exotic grassland adjacent to the existing substation. This would not fragment or isolate any of the local population, which is primarily located within the adjacent Kemps Creek Nature Reserve. This population is already isolated from other populations in the region by historic urban and |

agricultural development. The proposed activity would not increase fragmentation in the context of this past clearing.

iii. All areas of Cumberland Plain Woodland within this part of Westen Sydney would be important to the long-term survival of this species. The proposed activity would not directly clear any established Cumberland Plain Woodland and has taken specific measures to avoid impacts to this species.

**d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either direct of indirectly)**

The proposed activity would not affect any Area of Outstanding Biodiversity Value.

**e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process**

As outlined in section 4.5, the proposed activity may contribute to the following KTPs:

- Clearing of native vegetation
- Invasion of native plant communities by exotic perennial grasses
- Infection of frogs by amphibian chytrid causing the disease chytridiomycosis.

Mitigation measures are proposed to control each of these KTPs. Provided these are adequately implemented the effect of these KTPs is not expected to be significant.

**Conclusion**

The proposed activity has been specifically realigned to avoid impacts to this species, including the application of a buffer distance between the species' habitat and the construction/operational footprint of the synchronous condenser. This separation, alongside the mitigation measure proposed in this report, would suitably manage the potential for direct or indirect impacts to this population such that it the proposed activity would not be likely to result in a significant impact to this species.

# Appendix D Aboriginal Archaeological Due Diligence Assessment

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24 November 2025

Jake Ingle
Environmental Planner
Transgrid
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Dear Jake,

**Re: Aboriginal Archaeological Due Diligence Assessment – Kemps Creek 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 Kemps Creek 500 kV substation (hereafter the 'proposed activity') (refer to Figure 1). The Kemps Creek 500 kV substation is located off Gurner Avenue, in the Sydney suburb of Austral and the City of Liverpool 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* (NSW Department of Environment Climate Change & Water (DECCW), 2010).

## 1.1 Proposed activity

The proposed activity involves the installation and operation of two syncons and associated infrastructure at the existing Kemps Creek 500 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
- Upgrade of the existing access road from Fourth and Gurner Avenue intersection and some sections of access road within the substation site may require upgrading to support the transport of equipment and vehicle movements to and from site
- Demolition of redundant infrastructure associated with the Static Var Compensator (SVC) plant
- Installation of a new bench (concrete slab, foundations and associated earthworks), with an indicative maximum footprint of around 130 by 150 metres (m), immediately west of the existing Kemps Creek 500 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, current transformer, disconnector, earth switch, 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 lightning protection masts
- Rehabilitation of the site including:
  - Removal of temporary construction facilities and equipment
  - Excavated material not reused on-site and waste materials would be disposed of at an appropriately licensed waste facility or as directed by Transgrid's environmental business partner in accordance with Transgrid's Waste Management of Spoil Work Instruction
  - Disturbed areas not required for the operation of the syncons or the existing Kemps Creek 500 kV substation will be rehabilitated to pre-construction conditions.

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 syncon, as well as the existing access road which requires upgrading to support the transport of equipment to site.

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

## 2.0 Methodology

### 2.1 Assessment objectives

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

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

### 2.2 Methodology overview

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

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

- Completion of a desktop-based landscape review of the proposed impact area, assessing landscape variables (e.g. landform, stream order, slope and disturbance) to determine archaeological sensitivity
- Review of existing Aboriginal Heritage Information Management System (AHIMS) data for land within and surrounding the proposed impact area, obtained from Heritage NSW on 18 March 2025
- Review of the findings of past Aboriginal heritage investigations relevant to the Kemps Creek 500 kV substation
- Completion of visual inspections 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* (NSW Office of Environment & Heritage, 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, 2010a). AHIPs may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or persons.

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

### 3.2 Native Title

A search of the National Native Title Tribunal's online mapping tool 'Native Title Vision', the National Native Title Register and Register of Native Title Claims relevant to the proposed activity was undertaken on 25 March 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**

**[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 topography of the proposed impact area prior to impacts associated with construction of the substation would have been typical of Bannerman and Hazelton's (2011) Cumberland Lowlands physiographic region and would be broadly described as gently undulating. It currently comprises highly modified landforms, consisting of artificial flats and slopes on which the substation and associated access tracks are situated. Elevations within the proposed impact area range from 64 m Australian Height Datum (AHD) at the base of the substation to 78 m AHD in the south near Gurner Avenue, providing a total relief of 14 m across the proposed impact area. Slope gradients vary from level to gently inclined (0–10%) within the substation and along parts of the access track, to moderately inclined (10–32%) and steep (32–56%) in the west, where the artificial substation platform tapers off. |
| Hydrology | Kemps Creek is the principal watercourse in the local area and is located approximately 500 m west of the proposed impact area. No watercourses are located within the proposed impact area. The closest watercourse to the proposed impact area is a first-order tributary located approximately 50 m to the southeast.<br><br>Existing archaeological survey data for eastern Australia indicate a strong trend for the presence of open artefact sites along watercourses, specifically, on creek banks and 'flats' (i.e., flood/drainage plains), terraces and bordering lower slopes (Kohen 1986). Although this distribution pattern can be attributed in part to geomorphic dynamics and archaeological sampling bias, with extensive fluvial erosion activity along watercourses resulting in higher levels of surface visibility and, by extension, concentrated survey effort, an occupational emphasis on watercourses is supported by the results of numerous subsurface investigations (e.g., AECOM 2013b, 2015; AMBS 2000; Craib et al. 1999; GML 2012; Jo McDonald CHM 2001, 2003, 2005a, 2006a, 2006b, 2007, 2009a, 2009b). Collectively, these investigations have demonstrated that assemblage size and complexity tend to vary significantly in relation to stream order and landform, with larger, more complex assemblages concentrated on elevated, low gradient landform elements adjacent to higher order watercourses (≥3rd order). Outside of these contexts, surface and subsurface artefact distributions have typically been found to be sparse and discontinuous and are often referred to as 'background scatter'. |
| Geology | Reference to the Penrith 1:100,000 Geological Mapsheet (9030) indicates that the surface geology within the proposed impact area consists of Bringelly Shale—the uppermost unit of the Wianamatta Group—comprising variously shale, claystone, coal, tuff, and sandstone. |

| Environmental variable | Key observations |
|---|---|
| Soils | Soils within the proposed impact area are mapped by Bannerman & Hazelton (1990) as belonging to the Blacktown Soil Landscape. Blacktown soils are shallow to moderately deep (<100 cm), hard-setting, mottled, texture-contrast red and brown podzolic soils on crests, and yellow podzolic soils on lower slopes and drainage lines (Bannerman & Hazelton, 1990). Blacktown soils are considered to undergo varying levels of erosion and movement, making them, in places, unlikely to contain in-situ subsurface archaeological deposits. |
| Flora | Extant vegetation in the proposed impact area has been historically cleared, with contemporary vegetation consisting of a few isolated trees and a mix of native and exotic grasses. Prior to European settlement, the vegetation of the proposed impact area is likely to have been derived from Shale Plains Woodland (Tozer, 2003). |
| Land disturbance | Known past land use disturbances within the proposed impact area have included large-scale cut and fill works, levelling for constructing the substation, access track and road construction. Section 5.0 provides detail on historical land disturbances within the proposed impact area. |

## 5.0 Historical land use

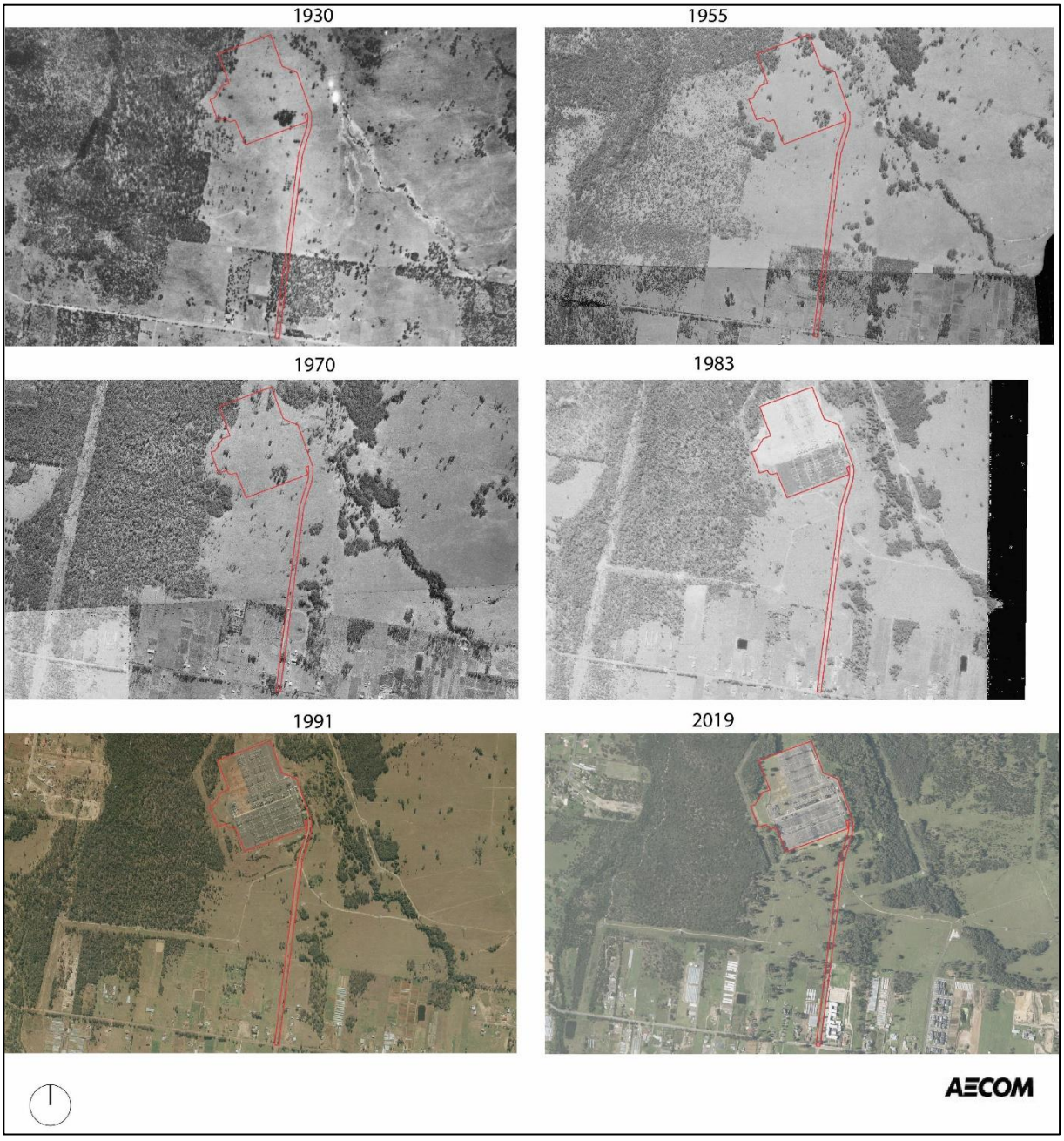
A review of historic aerials for the proposed impact area dated 1930, 1955, 1970, 1991 and 2019 (Figure 2) indicate a range of activities and associated ground surface impacts within and surrounding the proposed impact area. These include:

- Large-scale vegetation clearance across the area prior to 1930
- Agricultural activities across the area prior to 1930 until the 1980s
- Large-scale cut and fill bulk earthworks associated with the construction of the Kemps Creek 500 kV substation and access tracks around 1983.

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

Key implications for the current assessment include the disturbance of pre-existing archaeological deposits (if present), both surface and subsurface, through direct (e.g., earthworks) and indirect means (e.g., erosion), resulting in a loss of archaeological integrity and a significantly reduced likelihood of 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 3 × 3 km area surrounding the proposed impact area (i.e., the 'search area') was undertaken on 18 March 2025 (Appendix A). A total of 31 Aboriginal archaeological sites were identified within the search area, comprising 27 open artefact sites (i.e., isolated artefacts and artefact scatters), six with associated areas of Potential Archaeological Deposit (PAD), three standalone areas of PAD, and one rockshelter (Table 2). Consideration of the location of previously recorded sites indicates that no sites are located within the proposed impact area with the closest site,

[redacted] (Figure 1). [redacted].

In addition to the above, AHIMS data held by Transgrid dated 2022 for the area identified a previously registered AHIMS site located [redacted] However, this site does not appear in the current search results from 2025 (Table 2 and Appendix A), suggesting it may have been removed from the register.

Originally recorded in 2016 by Archaeology Heritage Management Services, the site card notes that the single artefact was identified by an Aboriginal community representative within an area of introduced fill, and that it may not be Aboriginal in origin. The site card further notes that there was some confusion regarding the artefact's exact location with several unsuccessful attempts to locate it. Moreover, the site card indicates that the artefact was collected during the original assessment.

On the basis of the above, it is assessed that this site, or potential site, does not represent a risk for the proposed activity.

**Table 2 AHIMS search results**

| Site type | Site count | % |
|---|---|---|
| Open artefact site | 21 | 67.7 |
| Open artefact site + PAD | 6 | 19.4 |
| PAD | 3 | 9.7 |
| Rockshelter | 1 | 3.2 |
| **TOTAL** | **31** | **100** |

## 7.0 Previous Aboriginal heritage investigations

The Aboriginal archaeology of the Austral area is well researched, having been the subject of numerous Aboriginal archaeological investigations incorporating survey and/or excavation over the past 20 years. Notable investigations to date have included surveys by Australian Museum Business Services (2011), Heritage Concepts (2008), and Kelleher Nightingale Consulting (2010), as well as test excavation programs by (AECOM Australia Pty Ltd, 2016; GML Heritage Pty Ltd, 2012; Kelleher Nightingale Consulting Pty Ltd, 2016).

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

- Available radiometric dates indicate that Aboriginal people have occupied the Sydney region for at least 36,000 years. Compared with the limited evidence available for the Late Pleistocene and early Holocene, evidence for mid- to late Holocene Aboriginal occupation of the Sydney region is abundant, with the majority of previously recorded sites and deposits likely dating to these periods
- Existing archaeological data for the Sydney region indicates that assemblage size and complexity vary significantly in relation to stream order and landform, with larger, more complex assemblages concentrated on elevated, low-gradient landform elements adjacent to higher-order watercourses. Outside of these contexts, surface and subsurface artefact distributions are typically sparse and discontinuous, and are often referred to as 'background scatter'
- Most surface sites occur on landform elements within 200 m of watercourses, with larger, more complex artefact assemblages associated with higher-order streams
- Existing AHIMS data for the Austral area suggest that artefact scatters and isolated artefacts are the predominant site types in the area
- Local stone artefact assemblages attest to an emphasis on the procurement and reduction of silcrete. Other, less commonly exploited raw materials include silicified tuff, fine-grained siliceous (FGS) stone, quartz, quartzite, petrified wood, and volcanic stone
- Flake and non-flake debitage items dominate recorded site assemblages

- Inter-site variation in the composition of stone artefact assemblages across the greater Austral area can be attributed to factors such as the frequency, intensity, and duration of settlement events; distance to lithic raw material sources; and differing reduction strategies (e.g., specialised versus non-specialised manufacture)
- No Aboriginal archaeological sites have been previously identified within or directly adjacent to the proposed impact area.

## 8.0 Results

In accordance with the methodology presented in Section 2.0, a desktop assessment was initially undertaken by AECOM to identify 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 presence of a 1st order watercourse within 50 m of the proposed impact area.

A visual inspection of the proposed impact area was completed on 19 March 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 or sites. During the 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 the proposed activity-related impacts. The results of the inspection included the following:

- No Aboriginal objects, sites, or places were identified within the proposed impact area during the inspection
- GSV across the proposed impact area was generally poor due to vegetation (grass) cover. Areas of enhanced visibility were associated with clearing, disturbance, access tracks, and erosion
- Consistent with the examined aerial imagery, the inspection indicated that land within the proposed impact area has been variously disturbed by historic land uses—particularly the construction of the substation. On this basis, land within the proposed impact area was assessed as having low ground integrity (GI)
- No areas of Aboriginal archaeological sensitivity were identified within the proposed impact area.

## 9.0 Key findings

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

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

## 10.0 Recommendations

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

Yours faithfully,

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AECOM

## Appendix A – AHIMS Search Results (Redacted)

# Appendix E Noise and Vibration Impact Assessment

Prepared for
Transgrid
ABN: 70 250 995 390

AECOM

# Kemps Creek 500 kV Substation - new synchronous condenser

## Noise and Vibration Impact Assessment

24-Nov-2025

aecom.com

Solar Farm, Darling Point, Australia

Delivering a better world

# Kemps Creek 500 kV Substation - new synchronous condenser

Noise and Vibration Impact Assessment

Client: Transgrid

ABN: 70 250 995 390

Prepared by

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24-Nov-2025

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

# Quality Information

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| | | | Name/Position | Signature |
| 0 | 6-Jun-2025 | Draft for client review | Neil Standen<br>Project Manager | NS |
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| 4 | 24-Nov-2025 | Final | Neil Standen<br>Project Manager |  |

# Table of Contents

# 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:<br>0 dB(A) Threshold of human hearing<br>30 dB(A) A quiet country park<br>40 dB(A) Whisper in a library<br>50 dB(A) Open office space<br>70 dB(A) Inside a car on a freeway<br>80 dB(A) Outboard motor<br>90 dB(A) Heavy truck pass-by<br>100 dB(A) Jack hammer / subway train<br>110 dB(A) Rock concert<br>115 dB(A) Limit of sound permitted in industry<br>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:<br>The period from 0700 to 1800 h Monday to Saturday and 0800 to 1800 h Sundays and Public Holidays.<br>Road traffic noise:<br>The period from 0700 to 2200 h every day of the week. |
| Evening | Construction noise:<br>The period from 1800 to 2200 h Monday to Sunday and Public Holidays.<br>Road traffic noise:<br>Not applicable. |
| Night | Construction noise:<br>The period from 2200 to 0700 h Monday to Saturday and 2200 to 0800 h Sundays and Public Holidays.<br>Road traffic noise:<br>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<br>Saturday 8am to 1pm<br>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 and operate two synchronous condensers (syncon) at the existing Kemps Creek 500 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 commissioned by Transgrid to prepare a Summary Environmental Report (SER) to assess potential impacts from the proposed activity at the existing Kemps Creek 500 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.

Transgrid is also proposing to construct a new bulk supply point (BSP), known as the Kemps Creek 330 kV substation, next to the existing Kemps Creek 500 kV substation. A noise and vibration impact assessment, *Kemps Creek 330 kV Substation REF Western Sydney Priority Growth Substation Noise Assessments,* was prepared as part of the Review of Environmental Factors (REF) by WSP, Report PS220412-REP-KempsCreek330kV_Rev0*,* dated February 2025. The unattended and attended noise measurements undertaken for assessment of the proposed BSP have been used to set project noise trigger levels for the operation of the proposed activity and noise management levels for construction noise.

In addition, Renzo Tonin & Associates completed an assessment of the environmental noise emission from the Kemps Creek substation in 2007, *Kemps Creek Substation Noise Investigation*, TD459-01F02 (REV) KEMPS CREEK SUBSTATION.DOC, dated April 2007. This report provides details of sound power levels of existing equipment at the substation and an attended noise measurement at a residential receiver, 125 Floribunda Avenue, Kemps Creek, where substation noise was noted as being audible.

## 1.1 Proposed activity description

The proposed activity involves the installation and operation of two syncons and associated infrastructure at the existing Kemps Creek 500 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
- Upgrades to the existing access road
- Demolition of redundant infrastructure associated with the Static Var Compensator (SVC) plant
- Installation of a new bench (concrete slab, foundations and associated earthworks), with an indicative maximum footprint of around 130 by 150 metres (m), immediately west of the existing Kemps Creek 500 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, current transformer, disconnector, earth switch, capacitive voltage transformer, post insulators/busbar supports and surge arrester
- Installation of the two new syncons and associated equipment, including:
    - Power transformer with firewalls
    - Auxiliary transformers
    - Syncon building and gantry crane

  - Oil lubrication and water-cooling systems
  - Control room and battery room
  - Low voltage AC and DC systems
  - Protection and control systems
  - Backup diesel generator
  - Pony motor
- Installation of a new demountable secondary systems building
- Installation of new spill oil tank, secondary containment dams, 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 lightning protection masts
- Rehabilitation of the site including:
  - Removal of temporary construction facilities and equipment
  - Excavated material not reused on-site and waste materials would be disposed of at an appropriately licensed waste facility or as directed by Transgrid's environmental business partner in accordance with Transgrid's Waste Management of Spoil Work Instruction
  - Disturbed areas not required for the operation of the syncons or the existing Kemps Creek 500 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

Kemps Creek 500 kV substation is located within the Liverpool local government area (LGA) in the suburb of Austral. The substation is situated within Lot 4 of DP771080, which is owned by the Electricity Transmission Ministerial Holding Corporation (ETMHC) and leased and managed by Transgrid (the substation site). The Kemps Creek 500 kV substation is located within the proposed impact area shown in Figure 1-1.

The substation site is located on land zoned as SP2 Infrastructure for the purposes of an Electricity Substation under the *State Environmental Planning Policy (Precincts—Western Parkland City) 2021.* The proposed activity would be consistent with the zoning objectives of SP2 Infrastructure. Adjoining land use zones include R2 Low Density Residential to the south, RU6 Transition to the southeast, and unzoned land to the north, east and west. The substation site is located in a vegetated area surrounded by Kemps Creek Nature Reserve to the north, east and west, with Kemps Creek located around 500 m to the west of the substation site.

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 proposed impact area would also accommodate a site compound and laydown area(s) to support construction. 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 kilometre (km) buffer applied.

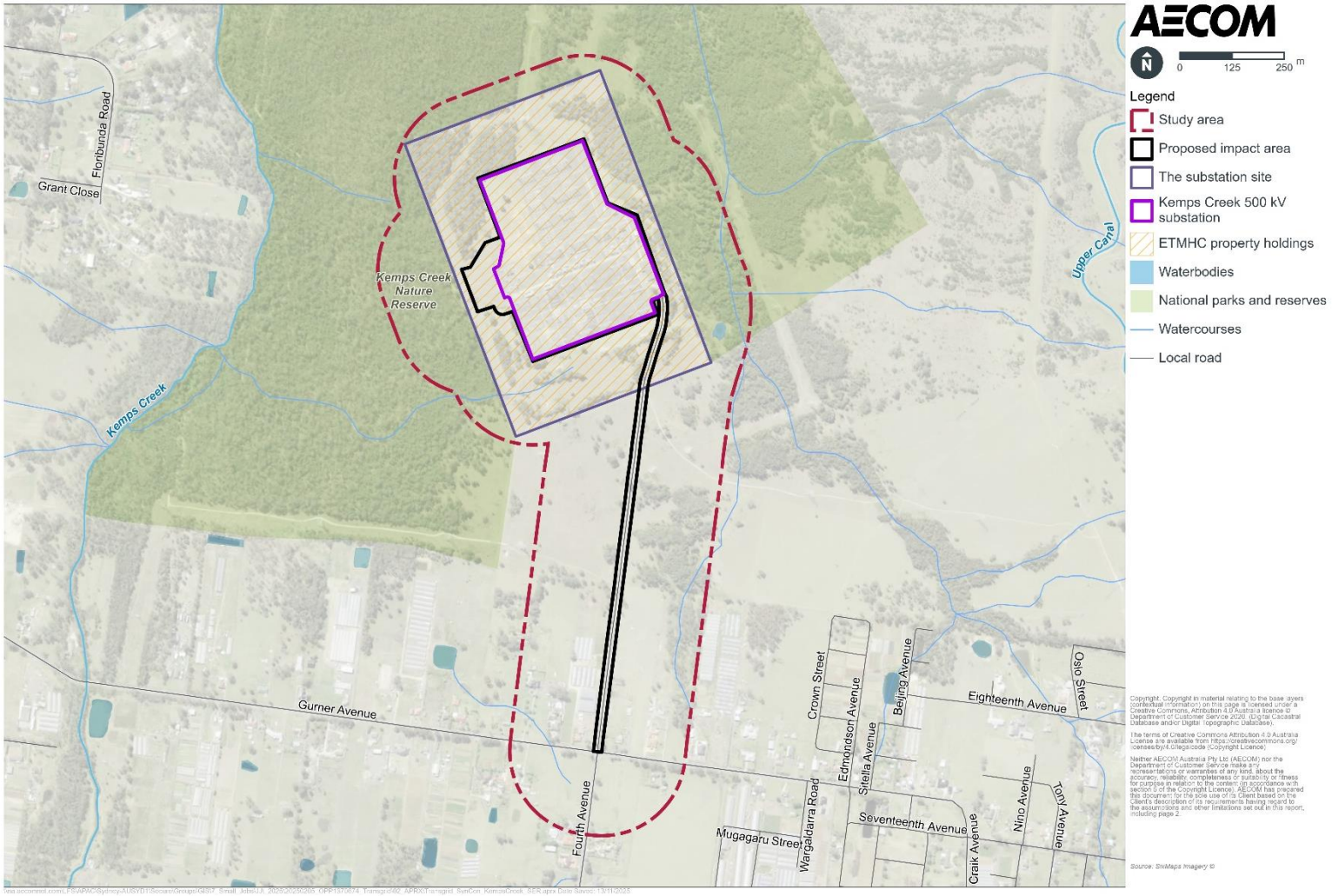



**Figure 1-1 Proposed impact area and location**

## 1.3 Purpose of this report

### 1.3.1 Assessment objectives

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

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

### 1.3.2 Report structure

This report is structured as follows:

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

## 1.4 Relevant guidelines

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

**Construction**

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

**Operation**

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

# 2.0 Existing acoustic environment

## 2.1 Assessment receivers

The existing acoustic environment is largely defined by distant road traffic noise from the Westlink M7 Motorway, about 2.3 km east of the proposed impact area and Elizabeth Drive, about 1.7 km north. Local road traffic noise on Devonshire Road and Fifteenth Avenue also contribute. A potential future noise source is from aircrafts travelling to and from the Western Sydney International Airport which is proposed to be operational from late 2026 with 24/7 operations. The potential aircraft noise has not been assessed for as it would only be intermittently experienced within the existing environment.

Figure 1-1 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 500 m to the south of the substation site (and immediately to the west of the existing access road). There is a sensitive non-residential receiver – Al-Faisal College (an educational facility) – located approximately 700 m south of the substation site, which is adjacent to the existing access road. In addition, residential subdivisions are planned and approved, it is understood that a number of these individual dwellings have received approval at the time of this assessment, whilst others are not yet approved (represented by assessment residential receiver R22 in Figure 2-1).

The assessment receivers identified for operational modelling consist of residential dwellings and educational buildings, representative of receivers a variety of distances away. The assessment receiver locations, along with the land use classification of each receiver (as defined in the *Noise Policy for Industry*), are presented in Table 2-1 and shown in Figure 2-1. For the construction assessment, representative receivers within a 2 km buffer from the proposed impact area were considered.

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 | 7 Seoul Avenue, Austral | Residential |
| R2 | 2 King Rock Road, Austral | Residential |
| R3 | 17 Oslo Street, Austral | Residential |
| R4 | 125 Eighteenth Avenue, Austral | Residential |
| R5 | 29 Beijing Avenue, Austral | Residential |
| R6 | 43 Crown Street, Austral | Residential |
| R7 | 41 Crown Street, Austral | Residential |
| R8 | 55A Gurner Avenue, Austral | Residential |
| R9 | 124 Gurner Avenue, Austral | Residential |
| R10 | 139 Gurner Avenue, Austral | Residential |
| R11 | 185 Gurner Avenue, Austral | Residential |
| R12 | 225 Gurner Avenue, Austral | Residential |
| R13 | 385 Gurner Avenue, Kemps Creek | Residential |
| R14 | 335 Devonshire Road, Kemps Creek | Residential |
| R15 | 355 Devonshire Road, Kemps Creek | Residential |
| R16 | 154 Floribunda Road, Kemps Creek | Residential |
| R17 | 140 Floribunda Road, Kemps Creek | Residential |
| R18 | 90 Floribunda Road, Kemps Creek | Residential |

| Receiver | Address | Land use classification |
|---|---|---|
| R19 | 165 Exeter Road, Kemps Creek | Residential |
| R20 | 70 Pratten Street, Kemps Creek | Residential |
| R21 | 85 Swamphen Street, Austral | Residential |
| R22 | 73-75 Butcherbird Lane, Austral | Residential |
| E1 | Al-Faisal College, 121 Gurner Avenue, Austral | Education |
| E2 | Science of the Soul Study Centre, 1530 Elizabeth Drive, Cecil Park | Education |
| V1 | 125 Floribunda Avenue, Kemps Creek | Residential/Validation location |


**Figure 2-1 Assessment receiver locations**

## 2.2 Noise measurements

Long term unattended and short term attended measurements were undertaken by WSP in December 2024 as part of the *Western Sydney Priority Growth Substation Noise Assessments* to establish the existing ambient and background noise environment at potentially affected receivers. 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. The location of the noise loggers is shown in Figure 2-2.

**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 |
| NM1 | 125 Gurner Avenue, Austral | 36 | 36 | 36 | 56 | 54 | 51 |
| NM2 | 39 Pratten Street, Kemps Creek | 42 | 39 | 35 | 53 | 52 | 47 |

*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.*

### 2.2.2 Attended noise measurements

The results of the attended noise monitoring undertaken by WSP are presented in Table 2-3. The daytime measurements indicated that residential receivers are generally affected by local traffic noise.

**Table 2-3 2024 Attended noise measurements**

| Location | Date and time | $L_{Aeq}$ dB(A) | $L_{A90}$ dB(A) | Comments |
|---|---|---|---|---|
| 125 Gurner Avenue, Austral | 2/12/2024 11:31am | 54 | 45 | Noise environment primarily consists of local road traffic, occasional aircraft noise, and wildlife (birds, insects, and dogs). Existing Kemps Creek 500 kV substation not audible |
| 39 Pratten Street, Kemps Creek | 2/12/2024 12:24pm | 55 | 37 | Noise environment includes local traffic noise, M12 construction noise, aircraft noise, and wildlife (birds, insects, and dogs). Existing Kemps Creek 500 kV substation not audible |

As mentioned in Section 1.1 an attended measurement was conducted in 2007 as part of *Kemps Creek Substation Noise Investigation*. Table 2-4 presents the measured noise levels.

**Table 2-4 2007 Attended noise measurements**

| Location | Date and time | $L_{Aeq}$ dB(A) | $L_{A90}$ dB(A) | Comments |
|---|---|---|---|---|
| 125 Floribunda Avenue, Kemps Creek | 14/02/2007 1:11am | 44 | 37 | Substation clearly audible, dogs barking, distant traffic and crickets. |

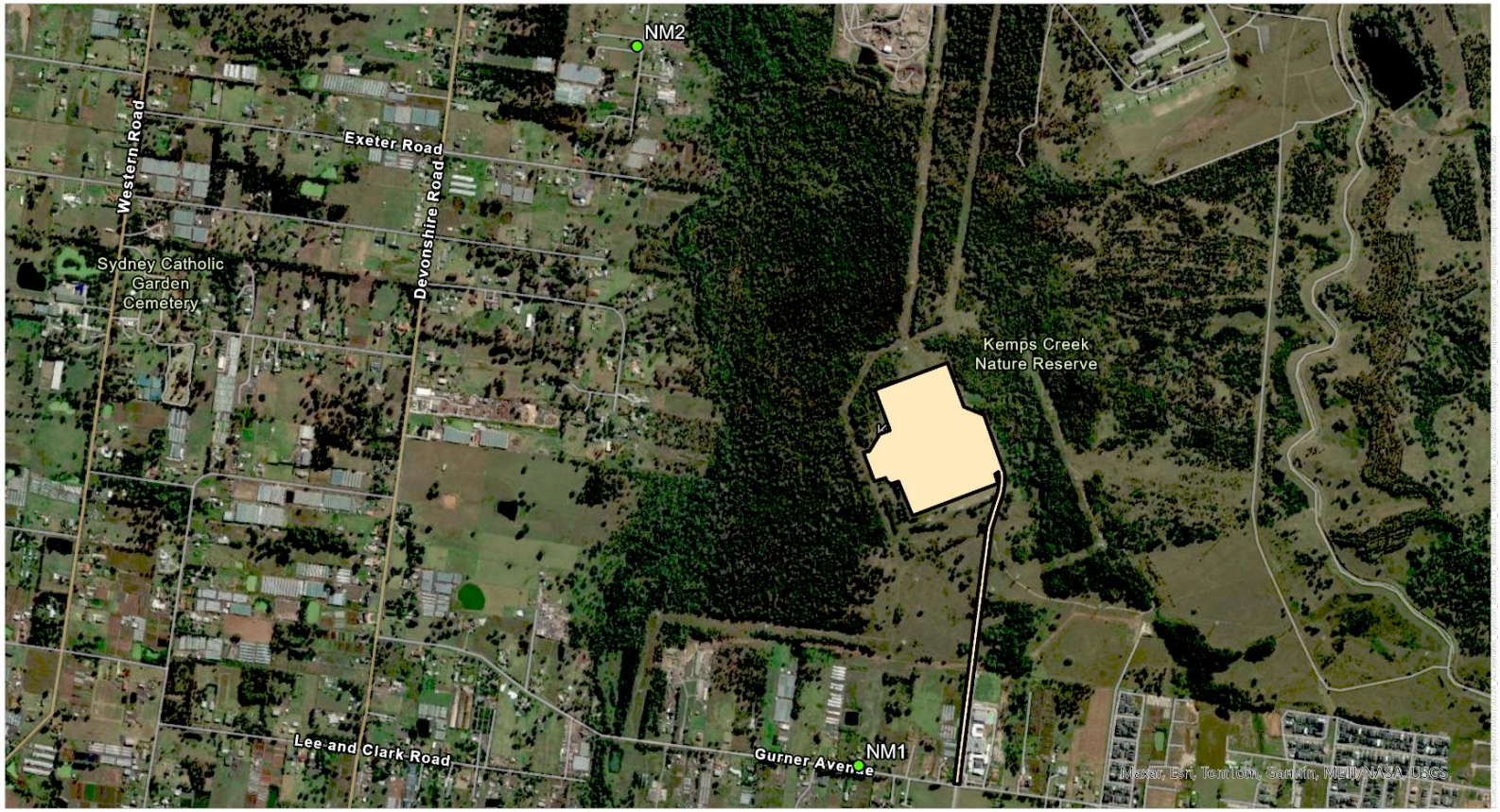





**Figure 2-2 Noise monitoring locations**

## 2.3 Noise catchment areas

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 unattended noise monitoring completed in December 2024 by WSP are considered to be representative of the noise environments within NCA 1 and NCA 2, as presented in Figure 2-3.

**Table 2-5 Noise catchment areas**

| NCA | Description of NCA | $L_{A90}$ background rating noise levels used |
|---|---|---|
| 1 | Residential receivers at Kemps Creek, Rossmore and Austral and an educational receiver at Austral | Measured $L_{A90}$ noise levels for NM1 |
| 2 | Residential receivers at Kemps Creek and an educational receiver north of Kemps Creek Nature Reserve | Measured $L_{A90}$ noise levels for NM2 |

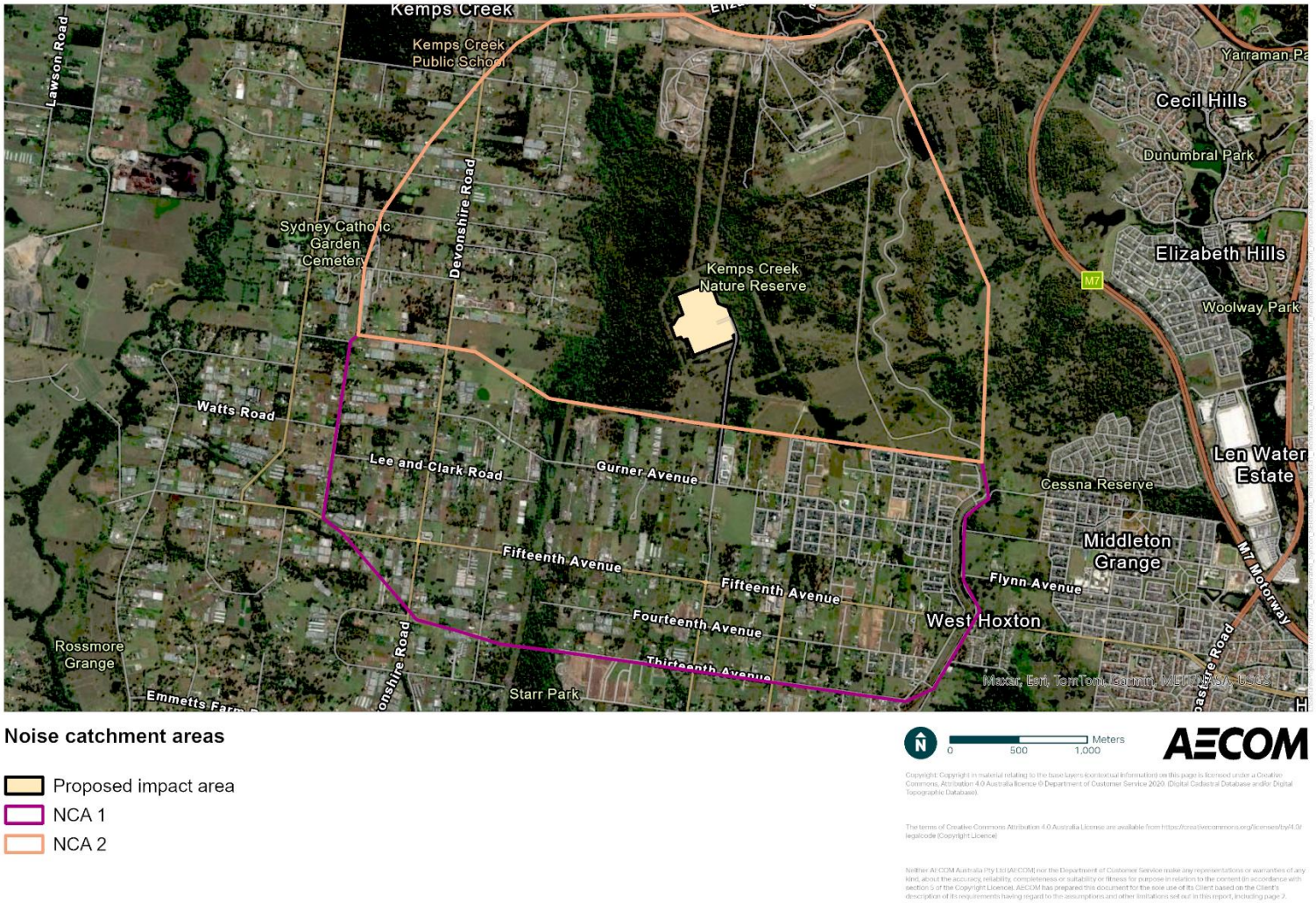





**Figure 2-3 Noise catchment areas**

# 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 and other sensitive land uses are detailed in Section 3.1.1 and 3.1.2 below. 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:**<br>Monday to Friday<br>7 am to 6 pm<br><br>Saturday<br>8 am to 1 pm<br>No work on Sundays or<br>public holidays | 'Noise affected' level<br>RBL + 10 dB | The noise affected level represents the point above which there may be some community reaction to noise:<br>• 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<br>• 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<br>75 dB(A) | The highly noise affected level represents the point above which there may be strong community reaction to noise:<br>• 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:<br>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)<br>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<br>RBL + 5 dB | • A strong justification would typically be required for works outside the recommended standard hours<br>• The proponent should apply all feasible and reasonable work practices to meet the noise affected level<br>• 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<br>• 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 Construction NMLs - Residential receivers**

| Noise catchment area | Construction NML $L_{Aeq,15min}$, dB(A) | | | |
|---|---|---|---|---|
| | Standard hours (RBL + 10) | Outside standard hours (RBL + 5) | | Highly noise affected level |
| | Day | Evening | Night | |
| NCA 1 | 46 | 41 | 41 | 75 |
| NCA 2 | 52 | 46 | 40 | 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 Non-residential receivers

Construction NMLs recommended by the *Interim Construction Noise Guideline* for non-residential sensitive land uses, such as schools, community centres or places of worship, are provided in Table 3-4. Construction NMLs for commercial and industrial premises are provided in Table 3-5.

**Table 3-4 Construction noise management levels - Non-residential sensitive land uses**

| Land use | Construction NML, $L_{Aeq,15min}$ |
|---|---|
| Education (classrooms at schools and other educational institutions and childcare centres) | External noise level 55 dB(A)[1] |
| Places of worship | External noise level 55 dB(A)[1] |
| Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion) | External noise level 65 dB(A) |
| Community centres | External noise level 55 dB(A)[2] |

*Notes:*

1. *Based on an internal noise level of 45 dB outlined in the Interim Construction Noise Guideline, where a conservative estimate of 10 dB has been assumed between internal and external noise levels.*
2. *Based on the design sound level for "Municipal buildings – Function spaces" from AS/NZS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors. A conservative estimate of 10 dB has been assumed between internal and external noise levels.*

**Table 3-5 Construction noise management levels - Industrial and commercial land uses**

| Land use | Construction NML, $L_{Aeq,15min}$ |
|---|---|
| Industrial premises | External noise level 75 dB(A) |
| Commercial premises (offices, retail outlets) | External noise level 70 dB(A) |

### 3.1.3 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 3-6 below. The *Road Noise Policy* does not require assessment of construction road traffic noise impacts to commercial or industrial receivers.

**Table 3-6 Road traffic noise assessment criteria**

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

# 4.0 Operational noise criteria

## 4.1 Environment Protection Authority – NSW Noise Policy for Industry

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

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

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

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

### 4.1.1 Intrusive noise impacts

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

The intrusive noise criteria are shown in Table 4-1 (based on unattended noise measurements conducted at the NM1 location).

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

| Time of day[1] | RBL, $L_{A90,15min}$ dB(A) | Intrusive criterion RBL + 5, $L_{Aeq,15min}$ dB(A) |
|---|---|---|
| **NCA 1** | | |
| Day | 36 | 41 |
| Evening | 36 | 41 |
| Night | 36 | 41 |
| **NCA 2** | | |
| Day | 42 | 47 |
| Evening | 39 | 44 |
| Night | 35 | 40 |

*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*.

Where 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.

This ‘minus 5 dB’ correction has been applied to the amenity levels for the receivers in NCA 1 and 2. The project amenity levels for each period (day, evening and night-time) are then converted to project amenity levels for a 15 minute period by adding 3 dB(A). The 15 minute project amenity noise levels applicable to the proposed activity are provided in Table 4-2.

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

| Type of receiver | Time of day | Recommended $L_{Aeq,period}$ noise level dB(A) |
|---|---|---|
| Residence - Suburban | Day | 55 |
| | Evening | 45 |
| | Night | 40 |
| School classroom - Internal | Noisiest 1-hour period when in use | 40[1] |
| School classroom - External | Noisiest 1-hour period when in use | 50[1] |

*Notes:*

1. *In the case where existing schools are affected by noise from existing industrial noise sources, the acceptable $L_{Aeq}$ noise level may be increased to 40 dB $L_{Aeq,1hr}$.*
2. *Based on a conservative estimate of 10 dB between internal and external noise levels.*

As per the *Noise Policy for Industry*, the project amenity level for residential and non-residential receivers is converted to a 15-minute period by adding 3 dB(A).

### 4.1.3 Proposed activity project noise trigger levels

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, $L_{Aeq,15min}$ dB(A) | Amenity criterion, $L_{Aeq,15min}$ dB(A) | Project noise trigger levels, $L_{Aeq,15min}$[2] dB(A) |
|---|---|---|---|---|
| **NCA 1** | | | | |
| Residential | Day | 41 | 53 | 41 |
| | Evening | 41 | 43 | 41 |
| | Night | 41 | 38 | 38 |
| **NCA 2** | | | | |
| Residential | Day | 47 | 53 | 47 |
| | Evening | 44 | 43 | 43 |
| | Night | 40 | 38 | 38 |
| Educational | When in use | - | 48 | 48 |

*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 project 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:<br>• 5 dB or more if the centre frequency of the band containing the tone is in the range 500-10,000 Hz<br>• 8 dB or more if the centre frequency of the band containing the tone is in the range 160-400 Hz<br>• 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:<br>• 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<br>• 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. | 2 or 5 dB[2] | A difference of 15 dB or more between C- and A-weighted measurements identifies the potential for an unbalance spectrum and potential increased annoyance. The values in Table C2 are derived from Moorhouse (2011) for the UK Department for Environment, Food & Rural Affairs (DEFRA) fluctuating low-frequency noise criteria with corrections to reflect external assessment locations. |

*Notes:*

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

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

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

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

### 4.1.6 Maximum noise level assessment

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

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

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

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

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

**Table 4-6 Night-time sleep disturbance screening levels**

| Location | Measured night-time RBL, $L_{A90,15min}$ dB(A) | Sleep disturbance screening levels for compliance, dB(A) | |
|---|---|---|---|
| | | $L_{Aeq,15min}$ | $L_{AF,max}$ |
| Residential receivers NCA 1 | 36 | 41 | 52 |
| Residential receivers NCA 2 | 35 | 40 | 52 |

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

## 4.2 Operational road traffic noise criteria

To assess noise impacts from increases in operational traffic, an initial screening test should be undertaken by evaluating whether existing road traffic noise levels will increase by more than 2 dB(A). Where the predicted noise increase is 2 dB(A) or less, then no further assessment is required. Where the predicted noise level increase is greater than 2 dB(A), and the predicted road traffic noise level exceeds the road category specific criterion then noise mitigation should be considered for those receivers affected. The *Road Noise Policy* does not require assessment of noise impact to commercial or industrial receivers.

## 4.3 Operational vibration

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

# 5.0 Construction noise assessment

## 5.1 Construction noise modelling scenarios

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

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

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

**Table 5-1 Construction assessment scenarios**

| Scenario ID | Scenario | Construction activity | Equipment | SWL per unit, dB(A) |
|---|---|---|---|---|
| 1 | Site establishment | Site area establishment | Backhoe | 96 |
| | | | Excavator | 98 |
| | | | Grader | 114[1] |
| | | | Dump truck | 108 |
| | | | Compactor | 106 |
| | | | Truck | 108 |
| 2A | Main construction works | Access road upgrades | Pavement laying machine | 105 |
| | | | Dump truck | 108 |
| | | | Asphalt truck and sprayer | 105 |
| | | | Concrete truck | 106 |
| | | | Roller | 105 |
| | | | Concrete saw | 115[2] |
| | | | Truck | 108 |
| 2B | | Demolition of redundant infrastructure | Excavator | 98 |
| | | | Excavator with hydraulic hammer | 122[1,2] |
| | | | Front end loader | 104 |
| | | | Dump truck | 108 |
| 2C | | Syncon bench installation | Concrete truck | 106 |
| | | | Concrete pump | 106 |
| | | | Bored piling rig | 111[1] |
| | | | Mobile crane | 103 |
| | | | Truck | 108 |
| 2D | | Syncon switchbay construction | Concrete truck | 106 |
| | | | Concrete pump | 106 |

| Scenario ID | Scenario | Construction activity | Equipment | SWL per unit, dB(A) |
|---|---|---|---|---|
| | | | Agitator | 109 |
| | | | Mobile crane | 103 |
| | | | Truck | 108 |
| 2E | | Syncon building construction | Concrete truck | 106 |
| | | | Concrete pump | 106 |
| | | | Agitator | 109 |
| | | | Mobile crane | 103 |
| | | | Truck | 108 |
| 2F | | Miscellaneous civils works including drainage, cable trenches, conduits and fencings | Backhoe | 96 |
| | | | Front end loader | 104 |
| | | | Excavator | 98 |
| | | | Truck | 108 |
| 2G | | Syncon and associated equipment installation | Mobile crane | 103 |
| | | | Elevated work platform | 87 |
| | | | Handtools | 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

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 residential receivers.

**Table 5-2 Predicted number of construction exceedances for residential receivers – standard hours**

| Construction scenario | NCA | |
|---|---|---|
| | NCA 1 | NCA 2 |
| Scenario 1 – Site establishment | 0 | 0 |
| Scenario 2B – Demolition of redundant infrastructure | 15 | 0 |
| Scenario 2C – Syncon bench installation | 0 | 0 |

The results show that construction noise levels are predicted to exceed the NML during standard hours for 15 assessment residential receivers in NCA 1 during the demolition of redundant infrastructure. The exceedances range from 1 to 10 dB. There are no residential receivers predicted to experience NML exceedances during the site establishment and syncon bench installation scenarios across both NCAs. There are also no residential receivers predicted to be ‘highly affected’ for the three construction scenarios assessed.

No sensitive non-residential receivers are predicted to experience NML exceedances during their hours of use during the three assessed construction scenarios.

## 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.

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

A traffic impact assessment report, *Traffic Report for Proposed Shopping Centre Development, 495 Fourth Avenue, Austral,* was prepared by Colston Budd Rogers & Kafes Pty Ltd, Report Ref 12301/2, dated June 2024. The report presents peak hour traffic counts made on Fourth Avenue and Gurner Avenue. These volumes are presented in Table 5-3.

**Table 5-3 Existing peak hour traffic flows**

| Road | Location | Two-way traffic flow | | |
|---|---|---|---|---|
| | | Weekday morning peak hour (two way) | Weekday afternoon peak hour | Estimated AADT[1] |
| Fourth Avenue | South of Gurner Avenue | 680 | 444 | 8,400 |
| Gurner Avenue | East of Fourth Avenue | 910 | 503 | >7,000 |

*Notes:*

1. *Based on peak hour and AADT traffic flows presented in 'Austral and Leppington North Precincts Transport Assessment Post-Exhibition Traffic Report (Addendum), prepared by AECOM, dated July 2012.*

Whilst traffic counts for Fifteenth Avenue, and Bringelly Road are not available they would be significantly higher than Fourth Avenue.

Considering the existing traffic flows on roads proposed for use by construction traffic the additional construction traffic numbers detailed above would not lead to an increase of more than 2 dB(A) on any 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 500 m from the proposed activity. 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

Existing operational equipment data was extracted from the *Kemps Creek Substation Noise Investigation* report prepared by Renzo Tonin & Associates, dated 11 April 2007. The existing equipment SWLs are presented in Table 6-1 and the third-octave spectrum data for each plant item are presented in Table 6-2. All measurements of substation noise emissions carried out by Renzo Tonin & Associates were conducted with all transformers and SVCs in operation, and the transformer cooling fans switched off.

**Table 6-1 Existing plant items sound power levels**

| Plant item/operation | Sound power level, $L_{Aeq}$, dB(A) |
|---|---|
| Transformer #2 (left) | 91 |
| Transformer #2 (middle) | 91 |
| Transformer #2 (right) | 91 |
| Transformer #3 (left) | 98 |
| Transformer #3 (middle) | 96 |
| Transformer #3 (right) | 97 |
| Transformer cooling fans (1 set) | 99 |

| Plant item/operation | Sound power level, $L_{Aeq}$, dB(A) |
|---|---|
| Reactor #5 | 86 |
| Reactor #6 | 90 |
| SVC #1 transformer | 90 |
| SVC #2 transformer | 90[1] |
| SVC #1 transformer fans | 88[2] |
| SVC #2 transformer fans | 88 |
| SVC Yard #2 (neutral) | 80 |
| SVC Yard #2 (+108 Mvar) | 85 |
| SVC Yard #2 (-99 Mvar) | 101 |
| SVC Yard #2 Dry air cooler | 102 |
| Reactor #2 (Capacitor bank) | 101 |
| Reactor #3 (Capacitor bank) | 105 |

**Table 6-2 Third octave spectrum data for existing plant items**

| Frequency, Hz | Transformer #2 Left | Transformer #2 Middle | Transformer #2 Right | Transformer #3 Left | Transformer #3 Left (fans) | Transformer #3 Middle | Transformer #3 Middle (fans) | Transformer #3 Right | Transformer #3 Right (fans) | Reactor #5 | Reactor #6 | SVC Transformer #2 | SVC Transformer #1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 68 | 70 | 72 | 69 | 87 | 69 | 86 | 72 | 87 | 72 | 81 | 66 | 78 |
| 63 | 67 | 67 | 69 | 68 | 92 | 66 | 91 | 73 | 92 | 66 | 69 | 64 | 73 |
| 80 | 80 | 82 | 82 | 81 | 86 | 82 | 86 | 83 | 86 | 80 | 79 | 71 | 83 |
| 100 | 104 | 105 | 106 | 105 | 90 | 106 | 91 | 104 | 91 | 104 | 104 | 94 | 77 |
| 125 | 87 | 88 | 89 | 88 | 91 | 90 | 93 | 87 | 93 | 87 | 87 | 78 | 83 |
| 160 | 77 | 74 | 78 | 83 | 90 | 84 | 92 | 76 | 92 | 76 | 78 | 69 | 83 |
| 200 | 89 | 85 | 86 | 88 | 91 | 90 | 93 | 82 | 93 | 89 | 96 | 91 | 81 |
| 250 | 78 | 78 | 77 | 87 | 91 | 83 | 94 | 83 | 94 | 74 | 80 | 76 | 81 |
| 315 | 89 | 89 | 88 | 93 | 95 | 94 | 96 | 94 | 96 | 80 | 86 | 84 | 81 |
| 400 | 90 | 86 | 86 | 95 | 96 | 92 | 97 | 93 | 97 | 78 | 85 | 84 | 82 |
| 500 | 88 | 88 | 88 | 98 | 92 | 96 | 93 | 97 | 93 | 68 | 81 | 90 | 82 |
| 630 | 85 | 85 | 84 | 90 | 92 | 89 | 93 | 92 | 93 | 65 | 78 | 81 | 80 |
| 800 | 75 | 74 | 74 | 81 | 90 | 80 | 91 | 80 | 91 | 62 | 74 | 76 | 79 |
| 1,000 | 65 | 65 | 63 | 73 | 88 | 72 | 89 | 71 | 89 | 61 | 68 | 74 | 78 |
| 1,250 | 61 | 61 | 60 | 67 | 86 | 67 | 87 | 67 | 87 | 59 | 65 | 71 | 77 |
| 1,600 | 55 | 55 | 56 | 61 | 84 | 59 | 85 | 60 | 85 | 58 | 61 | 71 | 77 |
| 2,000 | 52 | 51 | 53 | 57 | 81 | 56 | 82 | 58 | 82 | 59 | 57 | 64 | 74 |
| 2,500 | 46 | 48 | 49 | 53 | 78 | 53 | 79 | 55 | 79 | 56 | 55 | 58 | 74 |
| 3,150 | 47 | 43 | 48 | 51 | 75 | 55 | 76 | 56 | 76 | 54 | 50 | 58 | 71 |

| Frequency, Hz | Transformer #2 Left | Transformer #2 Middle | Transformer #2 Right | Transformer #3 Left | Transformer #3 Left (fans) | Transformer #3 Middle | Transformer #3 Middle (fans) | Transformer #3 Right | Transformer #3 Right (fans) | Reactor #5 | Reactor #6 | SVC Transformer #2 | SVC Transformer #1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,000 | 45 | 41 | 47 | 49 | 72 | 55 | 75 | 55 | 73 | 51 | 48 | 58 | 69 |
| 5,000 | 41 | 38 | 43 | 47 | 69 | 53 | 72 | 54 | 71 | 49 | 49 | 55 | 67 |
| 6,300 | 35 | 35 | 36 | 42 | 66 | 45 | 68 | 47 | 67 | 49 | 48 | 46 | 64 |
| 8,000 | 34 | 35 | 35 | 39 | 64 | 43 | 66 | 44 | 65 | 49 | 48 | 41 | 62 |
| 10,000 | 32 | 33 | 34 | 35 | 62 | 37 | 64 | 38 | 63 | 49 | 46 | 41 | 60 |
| $L_{Zeq}$, dB(Z) | 104 | 105 | 107 | 107 | 103 | 107 | 104 | 106 | 104 | 104 | 105 | 98 | 93 |
| $L_{Aeq}$, dB(A) | 91 | 91 | 91 | 98 | 98 | 96 | 99 | 97 | 99 | 86 | 90 | 90 | 88 |

### 6.2.2 Future operational scenarios

To assess a reasonable worst-case operational scenario, modelling assumes that all of the proposed equipment associated with the proposed activity 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 syncons
- 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 proposed activity. 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 the operational modelling and predicted noise levels seen below 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 mitigation measures to achieve compliance at the receivers are detailed in Section 8.2

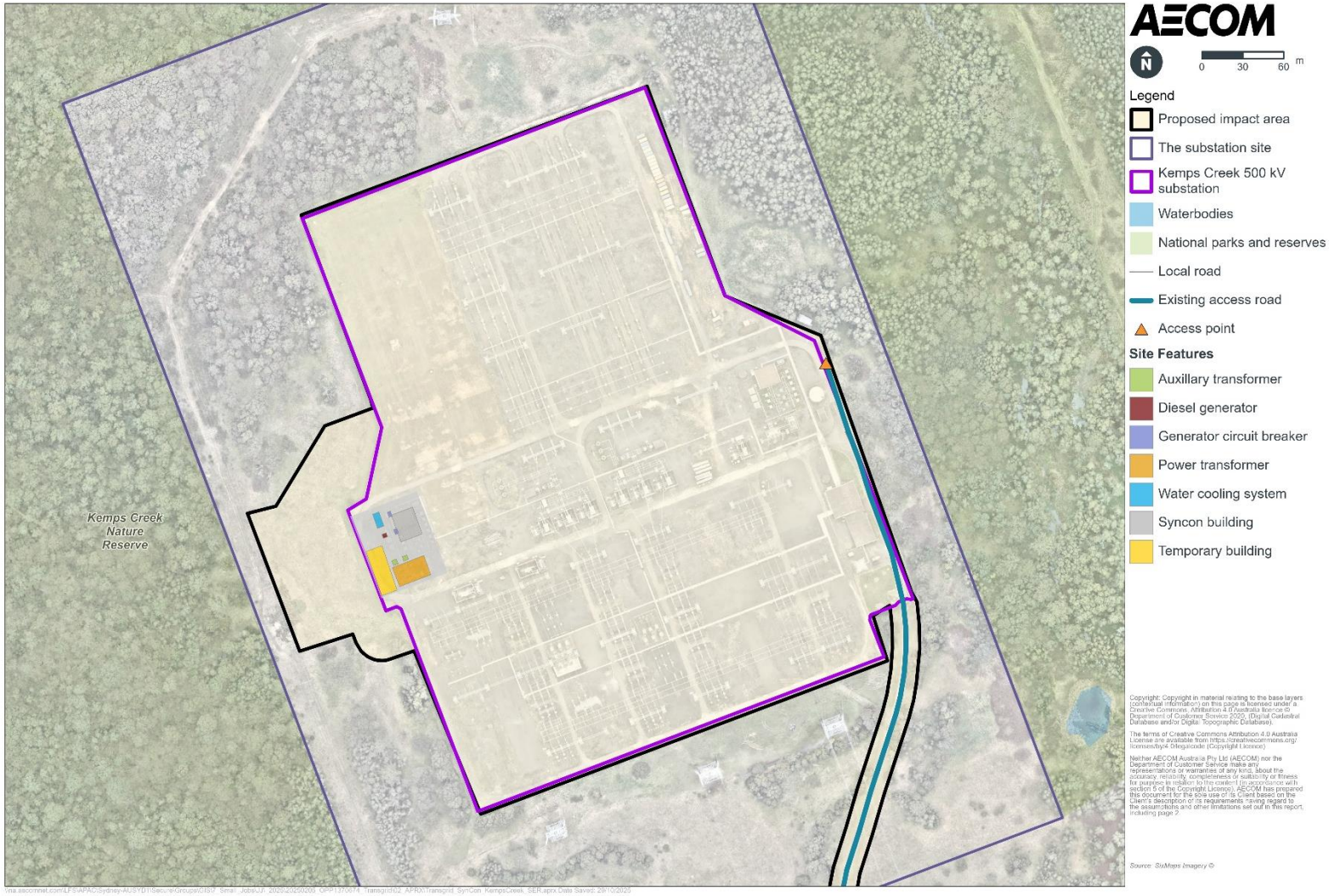



**Figure 6-1 Indicative operational site layout**

The sound power level inputs presented in Table 6-3 used in the noise modelling were assumed to be operating continuously for an entire 15-minute assessment period.

**Table 6-3 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 and at the attended measurement location at 125 Floribunda Avenue, Kemps Creek, using the methodology outlined in Section 6.1, and the inputs from Section 6.2.1 under noise enhancing conditions.

**Table 6-4 Comparison of measured and modelled existing substation noise levels**

| Location | Measured $L_{A90}$ level, dB(A)[1] | Modelled $L_{Aeq}$ level, dB(A) |
|---|---|---|
| Attended measurement location on substation southwest boundary | 37 | 35 |

*Notes:*

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

It is noted that whilst a low frequency hum was heard at the measurement location the attended measurement was not found to be 'tonal' as defined in the *Noise Policy for Industry*. Comparison of the modelled and measured levels presented in Table 6-4 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 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 not found to contain significant tonal components or low frequency components.

**Table 6-5 Existing operational noise levels – noise enhancing meteorological conditions**

| Receiver | Project amenity noise levels, $L_{Aeq,15min}$, dB(A) | | | Predicted noise levels[1], dB(A) | Exceedance, dB(A) | Compliance |
|---|---|---|---|---|---|---|
| | Day | Evening | Night | | | |
| R1 | 53 | 43 | 38 | 29 | - | Yes |
| R2 | 53 | 43 | 38 | 34 | - | Yes |
| R3 | 53 | 43 | 38 | 36 | - | Yes |
| R4 | 53 | 43 | 38 | 35 | - | Yes |
| R5 | 53 | 43 | 38 | 29 | - | Yes |
| R6 | 53 | 43 | 38 | 39 | 1 | Marginal[2] |
| R7 | 53 | 43 | 38 | 40 | 2 | Marginal[2] |
| R8 | 53 | 43 | 38 | 37 | - | Yes |
| R9 | 53 | 43 | 38 | 37 | - | Yes |
| R10 | 53 | 43 | 38 | 38 | - | Yes |
| R11 | 53 | 43 | 38 | 36 | - | Yes |
| R12 | 53 | 43 | 38 | 32 | - | Yes |
| R13 | 53 | 43 | 38 | 32 | - | Yes |
| R14 | 53 | 43 | 38 | 30 | - | Yes |
| R15 | 53 | 43 | 38 | 30 | - | Yes |
| R16 | 53 | 43 | 38 | 36 | - | Yes |
| R17 | 53 | 43 | 38 | 38 | - | Yes |
| R18 | 53 | 43 | 38 | 35 | - | Yes |
| R19 | 53 | 43 | 38 | 32 | - | Yes |
| R20 | 53 | 43 | 38 | 31 | - | Yes |
| R21 | 53 | 43 | 38 | 41 | 3 | No[3] |
| R22 | 53 | 43 | 38 | 42 | 4 | No[3] |
| E1 | 48 | N/A | N/A | 42 | - | Yes |
| E2 | 48 | N/A | N/A | 27 | - | Yes |

*Notes:*

1. *Predicted noise levels are the same for daytime, evening and night-time periods.*
2. *Noise levels at these receivers are compliant during the daytime and evening and marginally compliant during the night-time period.*
3. *Noise levels at these receivers are compliant during daytime and evening and exceed the project amenity levels during the night-time period.*

Results in Table 6-5 indicate that existing noise emissions from the substation are currently compliant with the project amenity noise levels during the daytime and evening and result in exceedances (1-4 dB) at four receivers during the night-time. As a result, the future operation of the project should be assessed against the project noise trigger levels in accordance with Section 6.1 of the *Noise Policy for Industry for the daytime and evening periods and against the night-time amenity level during the night-*

*time period. However, it is noted that the night-time amenity level is the project noise trigger level in this case.*

## 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 6-6.

**Table 6-6 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 | 52 | 27 | - | Yes | 30 | - | Yes |
| R2 | 52 | 31 | - | Yes | 34 | - | Yes |
| R3 | 52 | 34 | - | Yes | 37 | - | Yes |
| R4 | 52 | 33 | - | Yes | 36 | - | Yes |
| R5 | 52 | 27 | - | Yes | 30 | - | Yes |
| R6 | 52 | 36 | - | Yes | 39 | - | Yes |
| R7 | 52 | 37 | - | Yes | 40 | - | Yes |
| R8 | 52 | 34 | - | Yes | 38 | - | Yes |
| R9 | 52 | 34 | - | Yes | 37 | - | Yes |
| R10 | 52 | 35 | - | Yes | 38 | - | Yes |
| R11 | 52 | 34 | - | Yes | 37 | - | Yes |
| R12 | 52 | 31 | - | Yes | 34 | - | Yes |
| R13 | 52 | 32 | - | Yes | 35 | - | Yes |
| R14 | 52 | 30 | - | Yes | 33 | - | Yes |
| R15 | 52 | 30 | - | Yes | 33 | - | Yes |
| R16 | 46 | 37 | - | Yes | 40 | - | Yes |
| R17 | 46 | 39 | - | Yes | 42 | - | Yes |
| R18 | 46 | 34 | - | Yes | 37 | - | Yes |
| R19 | 46 | 32 | - | Yes | 34 | - | 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 |
| R20 | 46 | 30 | - | Yes | 33 | - | Yes |
| R21 | 52 | 39 | - | Yes | 41 | - | Yes |
| R22 | 52 | 40 | - | Yes | 42 | - | Yes |
| E1 | 48 | 39 | - | Yes | 42 | - | Yes |
| E2 | 48 | 25 | - | Yes | 28 | - | 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.*

Table 6-6 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. It is noted that the project noise trigger levels are slightly higher when the generator is being tested as this is only undertaken for one hour per month.

### 6.4.2 Typical daytime and evening operation

Predicted noise levels at nearby noise sensitive receivers for the daytime and evening scenario, without the generator operating, are presented in Table 6-7. It is noted that only the evening project noise trigger level has been shown as it is the most stringent, as identified in Section 4.1.3, with the exception of the two educational receivers, E1 and E2. The two educational receivers have used the recommended external amenity noise levels for the noisiest 1-hour period when in use at any time of the day, as identified in Section 4.1.2.

**Table 6-7 Predicted operational noise levels – Daytime and evening typical operation**

| 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 | 43 | 27 | - | Yes | 30 | - | Yes |
| R2 | 43 | 31 | - | Yes | 34 | - | Yes |
| R3 | 43 | 34 | - | Yes | 37 | - | Yes |
| R4 | 43 | 33 | - | Yes | 36 | - | Yes |
| R5 | 43 | 27 | - | Yes | 30 | - | Yes |
| R6 | 43 | 36 | - | Yes | 39 | - | Yes |
| R7 | 43 | 37 | - | Yes | 40 | - | Yes |
| R8 | 43 | 34 | - | Yes | 38 | - | Yes |
| R9 | 43 | 34 | - | Yes | 37 | - | Yes |
| R10 | 43 | 35 | - | Yes | 38 | - | Yes |
| R11 | 43 | 34 | - | Yes | 36 | - | 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 |
| R12 | 43 | 30 | - | Yes | 32 | - | Yes |
| R13 | 43 | 29 | - | Yes | 32 | - | Yes |
| R14 | 43 | 28 | - | Yes | 30 | - | Yes |
| R15 | 43 | 27 | - | Yes | 30 | - | Yes |
| R16 | 41 | 34 | - | Yes | 36 | - | Yes |
| R17 | 41 | 36 | - | Yes | 38 | - | Yes |
| R18 | 41 | 31 | - | Yes | 34 | - | Yes |
| R19 | 41 | 30 | - | Yes | 32 | - | Yes |
| R20 | 41 | 28 | - | Yes | 31 | - | Yes |
| R21 | 43 | 39 | - | Yes | 41 | - | Yes |
| R22 | 43 | 40 | - | Yes | 42 | - | Yes |
| E1 | 50 | 39 | - | Yes | 42 | - | Yes |
| E2 | 50 | 25 | - | Yes | 28 | - | Yes |

*Notes:*
1. *Evening project noise trigger levels have been presented as these are most stringent for NCA 2 and identical to daytime project noise trigger levels for NCA 1.*

In the daytime/evening scenarios when the diesel generator is not in operation, operational noise levels are predicted to comply at all receivers under both neutral and noise-enhancing meteorological conditions.

### 6.4.3 Typical night-time operation

Predicted noise levels for the night-time scenario are presented in Table 6-8. The night-time project noise trigger levels have been identified in Section 4.1.3.

**Table 6-8 Predicted operational noise levels – Night-time**

| Receiver | Project noise trigger levels, $L_{Aeq,15min}$, dB(A) | Neutral meteorological conditions | | | Noise-enhancing meteorological conditions | | |
|---|---|---|---|---|---|---|---|
| | | Predicted $L_{Aeq}$ noise levels, dB(A) | Exceedance, dB(A) | Compliance | Predicted $L_{Aeq}$ noise levels, dB(A) | Exceedance, dB(A) | Compliance |
| R1 | 38 | 27 | - | Yes | 30 | - | Yes |
| R2 | 38 | 31 | - | Yes | 34 | - | Yes |
| R3 | 38 | 34 | - | Yes | 37 | - | Yes |
| R4 | 38 | 33 | - | Yes | 36 | - | Yes |
| R5 | 38 | 27 | - | Yes | 30 | - | Yes |
| R6 | 38 | 36 | - | Yes | 39 | 1 | Yes[1] |

| 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 |
| R7 | 38 | 37 | - | Yes | 40 | 2 | Yes[1] |
| R8 | 38 | 34 | - | Yes | 38 | - | Yes |
| R9 | 38 | 34 | - | Yes | 37 | - | Yes |
| R10 | 38 | 35 | - | Yes | 38 | - | Yes |
| R11 | 38 | 34 | - | Yes | 36 | - | Yes |
| R12 | 38 | 30 | - | Yes | 32 | - | Yes |
| R13 | 38 | 29 | - | Yes | 32 | - | Yes |
| R14 | 38 | 28 | - | Yes | 30 | - | Yes |
| R15 | 38 | 27 | - | Yes | 30 | - | Yes |
| R16 | 38 | 34 | - | Yes | 36 | - | Yes |
| R17 | 38 | 36 | - | Yes | 38 | - | Yes |
| R18 | 38 | 31 | - | Yes | 34 | - | Yes |
| R19 | 38 | 30 | - | Yes | 32 | - | Yes |
| R20 | 38 | 28 | - | Yes | 31 | - | Yes |
| R21 | 38 | 39 | 1 | Yes[1] | 41 | 3 | No |
| R22 | 38 | 40 | 2 | Yes[1] | 42 | 4 | No |

*Notes:*

1. *In accordance with the Noise Policy for Industry, exceedances of up to 2 dB(A) are considered negligible. They would not be discernible to the average listener and therefore would not warrant receiver-based treatments or controls, given feasible and reasonable noise control has been proposed.*

The night-time operational scenario predicted minor exceedances of up to 2 dB at two receivers (R21 and R22) under neutral meteorological conditions. Under noise-enhancing meteorological conditions exceedances of up to 3-4 dB(A) are predicted at two receivers (R21 and R22) and minor exceedances of up to 2 dB(A) at two receivers (R6 and R7).

### 6.4.4 Operational noise discussion

Noise levels are predicted to result in exceedances of the project noise trigger levels at four receivers during the night-time period. It is noted that the noise levels at these receivers are not increasing as a result of the proposed activity as shown in Table 6-5.

It is noted that a reasonable worst-case operational scenario has been assessed. The modelling assumes that all of the proposed equipment associated with the proposed activity would operate at full capacity, 24 hours per day, seven days per week.

Noise from new sources will be effectively controlled by the proposed building and noise wall. The main sources contributing to the exceedances during the future night-time scenario are capacitors, SVC and Transformer 3 in the existing substation.

Further details of the required building and noise wall construction are discussed in Section 8.2. These measures are considered to be feasible and reasonable given that noise levels are not increasing as a result of the proposed activity and the level of exceedance predicted.

## 6.5 Operational road traffic noise

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

# 7.0 Cumulative impacts

## 7.1 Nearby projects

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

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

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

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

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

| Project and status | Relative location | Proposed construction timeframe | Project details |
|---|---|---|---|
| Kemps Creek 330 kV Substation Under preparation | Approximately 300 m south of the proposed syncon building location. | Construction is estimated to take approximately 12 months and would commence in 2028. Construction may overlap by five to 11 months with construction of the proposed activity. Operations would overlap. | Development of a 330 kV Substation, including two transformers, firewalls, associated auxiliary equipment and construction/relocation of transmission lines. |
| Fifteenth Avenue road upgrade Early-works commenced | Approximately 1.8 km south of the proposed syncon building location. | Construction is estimated to commence in 2027 and continue until 2031. Construction may overlap by up to 23 months with construction of the proposed activity. Operations would overlap. | Upgrade of Fifteenth Avenue between Cowpasture Road and Devonshire Road from one lane to two lanes in each direction. |

Further, regionally significant infrastructure projects have been identified, as summarised in Table 7-2. The scale of impact from these projects are of far greater scale than the proposed activity, operate at a regional impact footprint, and their environmental effects are addressed in their own comprehensive assessment processes. As their environmental effects are assessed at a regional scale and no meaningful spatial or temporal interaction is anticipated with the proposed activity, cumulative impacts with these projects have not been further considered..

**Table 7-2 Regionally significant infrastructure projects**

| Project and status | Relative location | Proposed construction timeframe | Project details |
|---|---|---|---|
| Western Sydney International Airport<br>Under construction | Approximately 5 km west of the substation site. | Construction has commenced and is estimated to be completed late 2026. Operations would overlap. | Development of an airport open 24 hours, 7 days a week. |
| Sydney Metro – Western Sydney Airport<br>Under construction | Approximately 6.5 km northwest and southwest of the substation site. | Construction has commenced and is estimated to be completed mid 2027. Operations would overlap. | A new metro railway line approximately 23 km in length between St Marys in the north and Bradfield in the south. |
| Sydney Metro – Bradfield to Leppington/Glenfield<br>Business case under development | Approximately 5 km south of the substation site. | Construction is unlikely to overlap. Operations would overlap. | An expansion of the Sydney Metro – Western Sydney Airport project. |

## 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 outside minimum working distances, therefore no cumulative impacts are anticipated.

## 7.3 Cumulative operational noise impacts

The amenity project noise trigger level determined in accordance with the *Noise Policy for Industry* seeks to protect against cumulative noise impacts from industry. The amenity project noise trigger level is reduced if other industry is existing or is planned for the area, this was completed for the proposed activity. Applying the most stringent requirement as the project noise trigger level ensures that both

intrusive noise is limited and amenity is protected, with no single industry unacceptably changing the noise level of an area.

## 7.4 Construction fatigue

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

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

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

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

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

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

| Action required | Safeguard details |
|---|---|
| **Management measures** | |
| Implement stakeholder consultation measures | • Periodic notification (monthly letterbox drop and website notification) detailing any night-time works at least seven days prior to the commencement of works<br>• Maintain a register for any noise complaints received<br>• 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.<br>• No excessive revving of plant and vehicle engines<br>• 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.<br>'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).<br>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.<br>The offset distance between noisy plant and adjacent sensitive receivers would be maximised.<br>Plant used intermittently would be throttled down or shut down.<br>Plant and vehicles would be turned off when not in use.<br>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.<br>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.<br><br>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:<br>• residential grade mufflers<br>• 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.<br><br>The speed of vehicles would be limited and the use of engine compression brakes would be minimised.<br><br>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 to be implemented in order for the operation of the proposed activity to comply with the project noise trigger levels at sensitive receivers include the following:

- Housing the syncons inside a building to provide attenuation. This may also provide screening for other noise sources such as existing transformers and capacitors. The building should provide a minimum insertion loss of 18 dB to the most affected receiver, this is inclusive of doors and any ventilation openings.
- If feasible, ventilation openings should be directed away from noise sensitive receivers and acoustic louvres used to reduce noise emissions, if necessary.
- Construction of a noise wall on three sides of the syncons' external 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 (east and south) of the noise wall facing the equipment. 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

The proposed activity involves the installation and operation of two syncons and associated infrastructure at the existing Kemps Creek 500 kV substation (the proposed activity).

Nearby noise sensitive residential receivers were identified, including two schools close to the proposed activity. Attended and unattended noise measurements were previously completed by WSP to characterise the existing noise environment. The measured noise levels were used to establish construction NMLs and operational project noise trigger levels.

Construction noise impacts were assessed at nearby representative residential receivers for the three most noise critical construction scenarios – site establishment, demolition of redundant infrastructure and syncon bench installation. Predicted construction noise levels were exceeded at 15 residential receivers during the demolition of redundant infrastructure. No receivers were predicted to experience exceedances of the NML during the site establishment or syncon bench installation, and no residential receivers were predicted to be highly noise affected for the construction scenarios. The use of vibration intensive equipment is 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 at all noise sensitive receivers for the daytime under both neutral and noise-enhancing meteorological conditions.

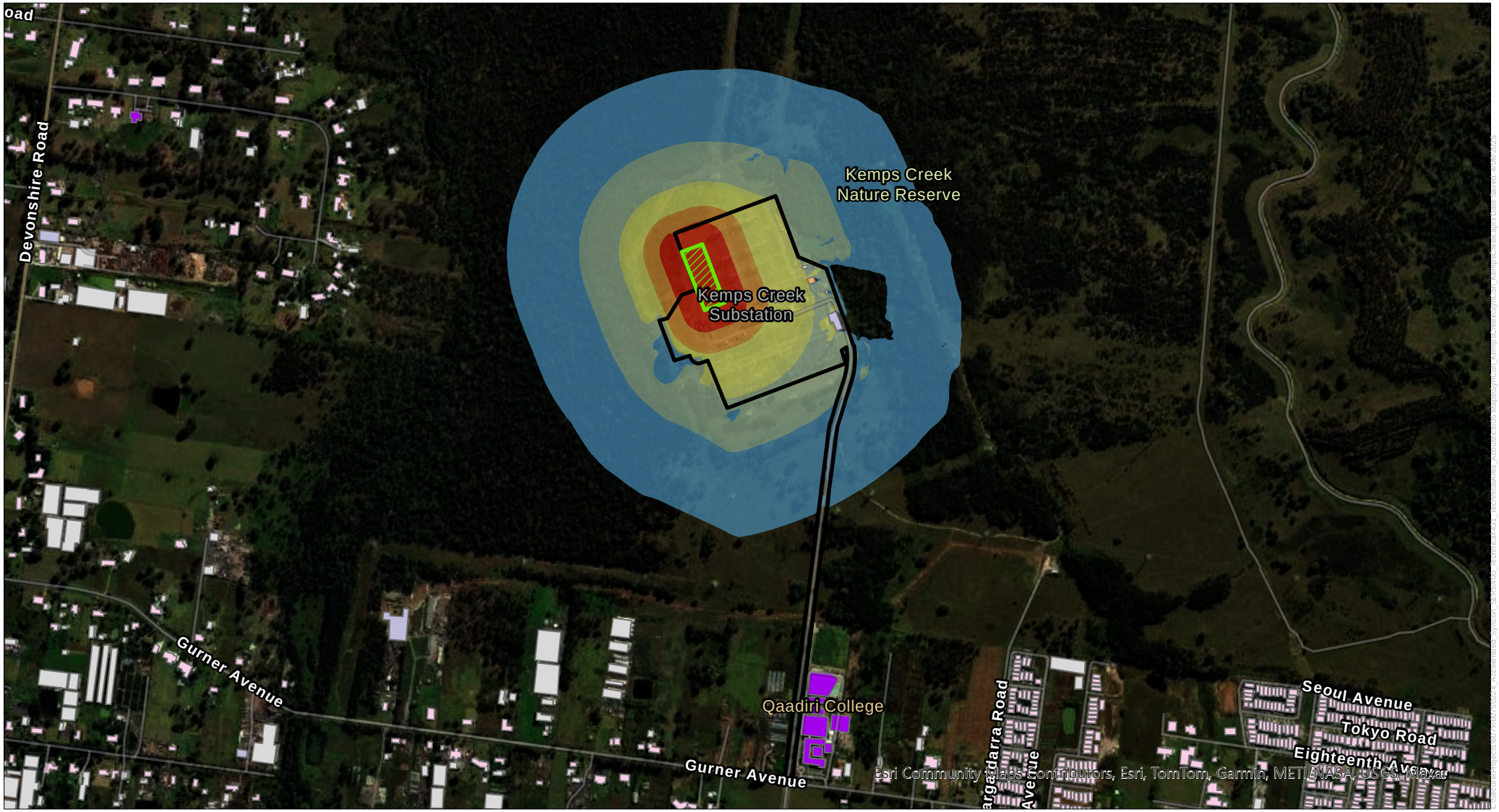
Predicted operational noise levels during the daytime/evening scenario without diesel generator testing comply with project noise trigger levels at all receivers under both neutral and noise-enhancing meteorological conditions.

Predicted operational noise levels during the night-time may results in minor exceedances of up to 2 dB at two receivers (R21and R22) under neutral meteorological conditions. Under noise-enhancing meteorological conditions exceedances of up to 3-4 dB(A) are predicted at two receivers (R21 and R22) and minor exceedances of up to 2 dB at two receivers (R6 and R7). It is noted that the noise levels at these receivers are not increasing as a result of the proposed activity. Noise from new sources will be effectively controlled by the proposed building and noise wall.

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

# Appendix A

## Construction Noise Contour Maps




# Kemps Creek 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
Education
Industrial
Residential
Shed

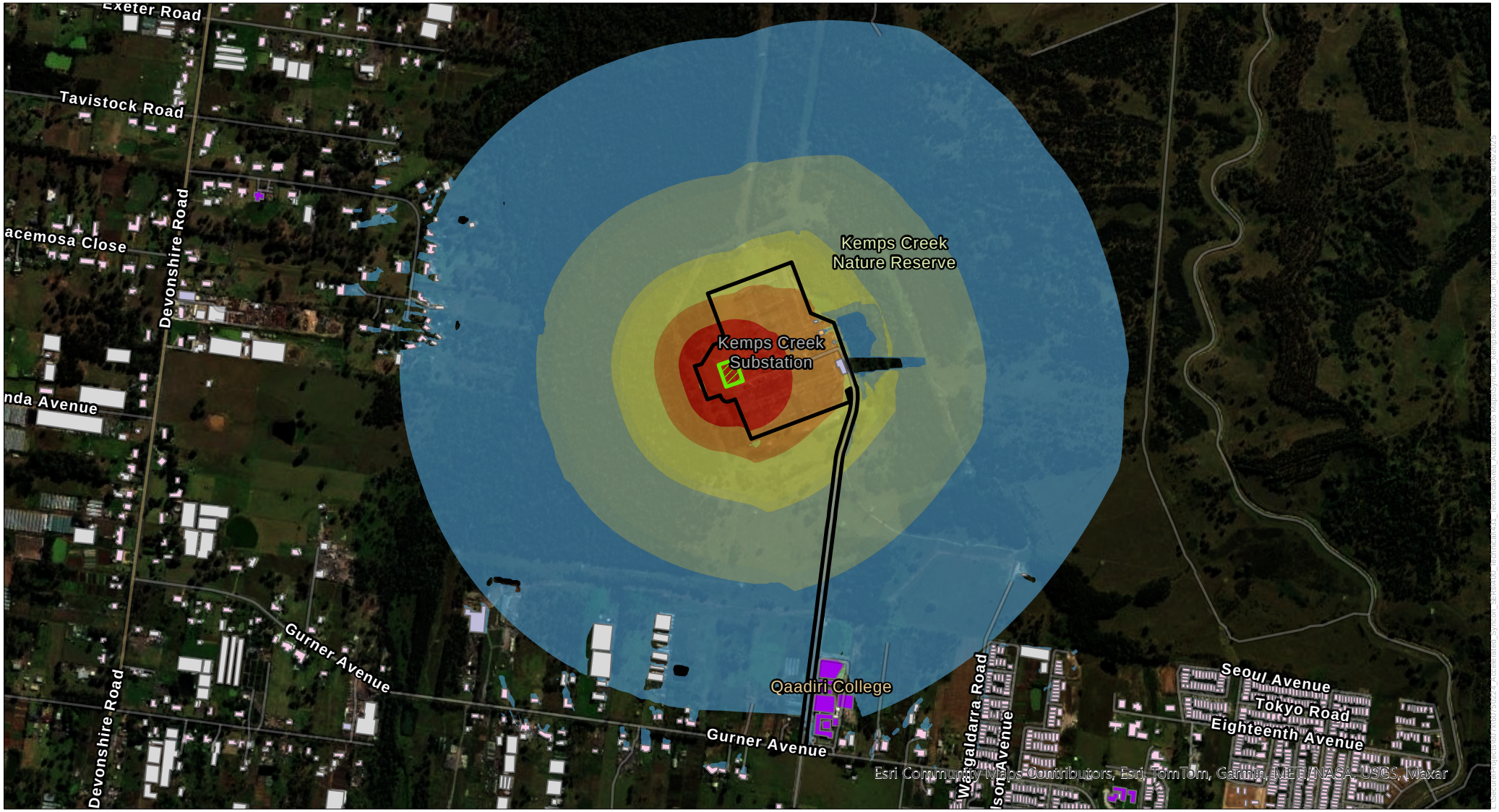
**Predicted noise level $L_{Aeq,15min}$ dB(A)**

47 - 52
53 - 58
59 - 64
65 - 70
71 - 76

N

0 190 380 Meters

AECOM




# Kemps Creek Accelerated Synchronous Condenser
# Construction Contours - Scenario 2B - Demolition of Redundant Infrastructure

Noise contours are shown 1.5 meters above ground level

Proposed impact area
Scenario 2

**Usage**

Commercial
Education
Industrial
Residential
Shed

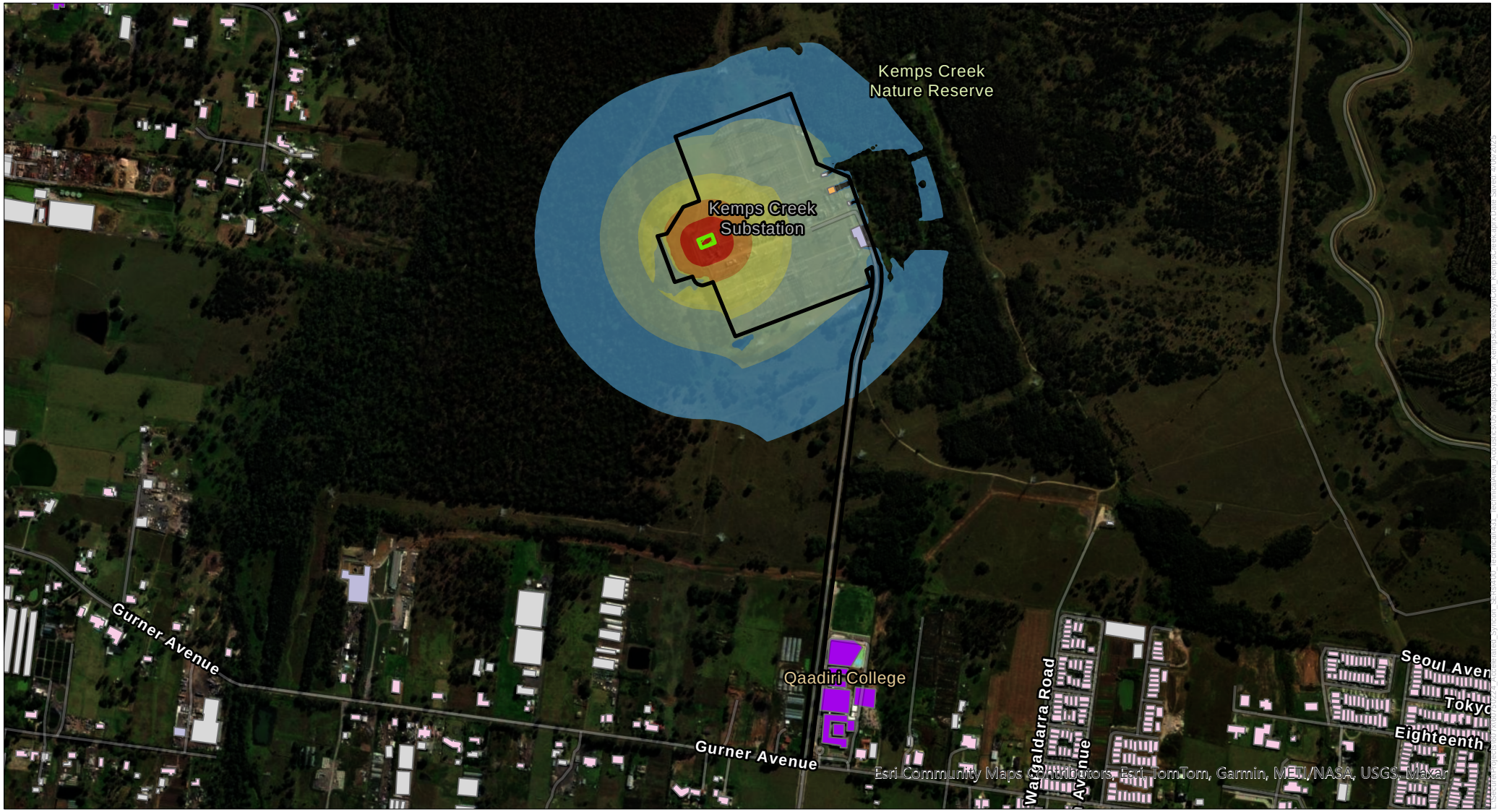
**Predicted noise level $L_{Aeq,15min}$ dB(A)**

47 - 52
53 - 58
59 - 64
65 - 70
71 - 76

N

0 230 460 Meters

AECOM




# Kemps Creek Accelerated Synchronous Condenser
# Construction Contours - Scenario 2C - Syncon Bench Installation

Noise contours are shown 1.5 meters above ground level

Proposed impact area
Scenario 3

**Usage**

Commercial
Education
Industrial
Residential
Shed

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

47 - 52
53 - 58
59 - 64
65 - 70
71 - 76

N

0 170 340 Meters

AECOM

# Appendix B

## Operational Noise Contour Maps


# Kemps Creek Accelerated Synchronous Condenser Operational Contours - Daytime (with generator)

Noise contours are shown 1.5 meters above ground level

Proposed impact area

Assessment receivers

Usage

- Commercial
- Education
- Industrial
- Residential
- Shed

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

48 - 52 | 53 - 57 | 58 - 62 | 63 - 67 | >= 68

**Note: Contours have been calculated under adverse weather conditions**

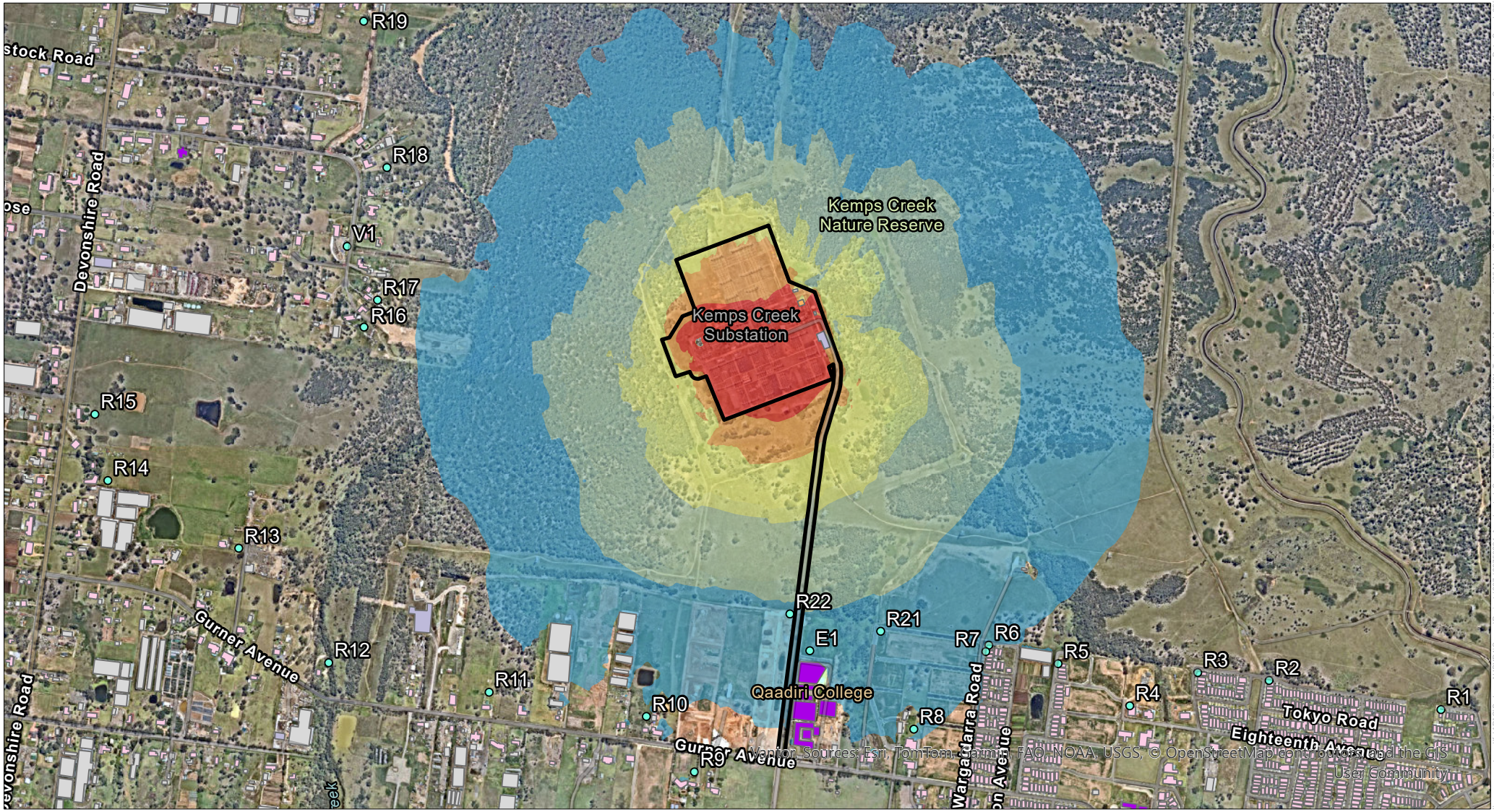
N

0 210 420 Meters

AECOM



Source: Nearmap 2025




# Kemps Creek Accelerated Synchronous Condenser
# Operational Contours - Daytime, evening or night (Typical operation)

Noise contours are shown 1.5 meters above ground level

Proposed impact area

Assessment receivers

Usage

- Commercial
- Education
- Industrial
- Residential
- Shed

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

38 - 42 | 43 - 47 | 48 - 52 | 53 - 57 | >= 58

**Note: Contours have been calculated under adverse weather conditions**

N

0 210 420 Meters

AECOM



Source: Nearmap 2025