Review of Environmental Factors
Transmission tower replacement, Feeder 916/917

REF - 342

Version 1.1

28 Jun 2024

Document control

Document status	FINAL
Document suite	Environment
Release authority	James Hart
Release date	28 Jun 2024
Security classification	UNCLASSIFIED
Proposal name	Transmission tower replacement, Feeder 916/917
Proposed activity	Install poles and remove existing transmission towers along Ausgrid's Feeder 916/917 between Woolooware and Kurnell.
Document code	REF - 342
Work breakdown structure	WBS – Various; project number per tower location
Proponent name	Ausgrid Operator Partnership, trading as Ausgrid
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OneDrive reference	REF342 - Feeder 916 917 Tower Replacements

Disclaimer

The review of environmental factors is based on information provided to the author, including the scope of works as outlined in the proposal description. The review of environmental factors is provided strictly on the basis that information provided for its preparation can be relied on and is accurate, complete and adequate.

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Document history

REF revision history		
Version	**Date**	**Nature of revision**
0.0	29th Oct 20	New issue
0.1	17th Aug 24	Issued for project team review
0.2	19th Sept 24	Issued for preliminary tendering
0.3	7th Feb 24	SEO and M-ESU Reviewed
0.4	30th May 24	Updates throughout relating to DPI and AHI Permits which are still pending
1.0	4th June 24	Final approved version
1.1	28th June 24	Ausgrid Project Director review and minor updates
2.0		Addendum report included

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Glossary

Term	Meaning
A	amp: the unit of measure for current (or load) which is the amount of electricity flowing through the wires.
Aboriginal heritage	Any deposit, object, place or material evidence relating to Aboriginal habitation or places having significance to Aboriginal culture as declared by the Minister which is protected under the NPW Act and EPBC Act.
ACM	Asbestos containing material
AHD	Australian Height Datum
AHIP	Aboriginal Heritage Impact Permit
ASS	Acid sulphate soils: are naturally occurring sediments and soils containing iron sulphides (principally pyrite) and/or their precursors or oxidation products. This includes Actual and Potential acid sulfate soils. Both can be found within the same soil profile.
BC Act	*Biodiversity Conservation Act 2016*
Blue Book	*Managing Urban Stormwater - Soils and Construction* (Landcom, 2004)
CEMP	construction environmental management plan
Classified road	The *Roads Act 1993* provides for roads to be classified as Freeways, Controlled Access Roads, Tollways, State Highways, Main Roads, Secondary Roads, Tourist Roads, Transitways and State Works.
CPESC	Certified Professional in Erosion and Sediment Control
Cm	centimetre
CNVIA	Construction Noise and Vibration Impact Assessment
CNVMP	Construction Noise and Vibration Management Plan
dB(A)	decibels (A) weighted
Determining authority	Minister or public authority by or on whose behalf the activity is or is to be carried out or any Minister or public authority whose approval is required in order to enable the activity to be carried out.
DPE	Department of Planning and Environment (NSW)
DPI	Department of Primary Industries (NSW)
Easement	A collection of rights allowing an entity to undertake certain activities. Easements acquired by Ausgrid are created by a lease, a transfer granting easement, an instrument registered with a deposited plan, or by acquisition.
EEC	Endangered Ecological Community: an assemblage of plant species that is recognisably different from other communities due to differences in species present and structure. The species form complex interactions with not only other species, but also elements of the landscape including underlying geology, aspect and altitude, and external influences such as fire frequency. Many ecological communities have limited natural distributions and are vulnerable to change, while others historically occurred over a wider area and are threatened by changes due to broad scale clearing, fragmentation, invasion by weeds, fire frequency or hydrological regime.
EIS	environmental impact statement

Term	Meaning
Emergency works	Works for the purpose of maintaining or restoring infrastructure facilities or equipment in order to ensure public safety or to protect buildings or the environment due to: • a sudden natural event, including a storm, flood, tree fall, bush fire, land slip or coastal inundation, or • accident, equipment failure or structural collapse, or • damage caused by vandalism or arson, provided the works involve no greater disturbance to soil or vegetation than necessary and are carried out in accordance with all applicable requirements of the Blue Book.
EMR	Environmental Management Representative: a person generally appointed for large projects to independently review, audit and endorse a project's environmental activities.
ENA	Energy Networks Association
Environmental impact	Any change in the environment whether adverse or beneficial, wholly or partially resulting from the development and use of land. The environment includes: • ecosystems and their constituent parts, including people and • communities; and • natural and physical resources; and • the qualities and characteristics of locations, places and areas; and • heritage values of places; and • the social, economic and cultural aspects of these things.
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW.
EP&A Regulations	*Environmental Planning and Assessment Regulation 2021*
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
EPI	Environmental Planning Instruments: made under Part 3 of the EP&A Act.
ES Act	*Electricity Supply Act 1995* (NSW)
ESCP	erosion and sediment control plan
Flood liable land	Land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled *Floodplain Development Manual: the management of flood liable land* (NSW Government, 2005).
Ha	hectare
Hz	hertz
HCA	Heritage Conservation Area
IARC	International Agency for Research on Cancer
ICES	International Committee on Electromagnetic Safety
ICNG	*Interim Construction Noise Guideline (DECC, 2009)*
ICNIRP	International Commission on Non-Ionizing Radiation Protection

Term	Meaning
IECA	International Erosion Control Association
Transport and Infrastructure SEPP	*State Environmental Planning Policy (Transport and Infrastructure) 2021*
kg	kilogram
kV	kilovolts
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan: a type of EPI made under Part 3 of the EP&A Act.
LGA	Local Government Area
Likelihood	A qualitative description of probability or frequency.
Local heritage item	A place, building, work, relic, tree, archaeological site or Aboriginal object that is identified as a heritage item (or by a similar description) in a local or regional environmental plan; or an item of local heritage significance, as defined by the *Heritage Act 1977*, that is the subject of an interim heritage order in force under that Act or is listed as an item of local heritage significance in the State Heritage Inventory under that Act.
mG	milligauss
NES	national environmental significance
NHMRC	National Health and Medical Research Council
Non-Aboriginal heritage	Any deposit, object or material evidence which relates to the settlement of NSW, not being Aboriginal settlement, with local or state significance under the *Heritage Act 1977*.
NPW Act	*National Parks and Wildlife Act 1974*
NPWS	National Parks and Wildlife Service (DPE)
NRPB	National Radiation Protection Board
OHEW	overhead earth wire
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
Principal contractor	Under the WHS Regulation, SafeWork NSW defines a principal contractor as a person conducting a business or undertaking (PCBU – the new term that includes employers) that commissions a construction project. A construction project can only have one principal contractor at any specific time. Ausgrid will be appointing a Principal contractor, who for this project has the same responsibilities with safety as the environment.
Proponent	The person proposing to carry out the activity, and includes any person taken to be the proponent of the activity by virtue of section 110B of the EP&A Act.
Ramsar wetland	An area designated under Article 2 of the Convention on Wetlands (Ramsar, Iran, 1971) or declared by the Commonwealth Minister for the Environment under the EPBC Act.
REF	review of environmental factors
Road	Includes the airspace above the surface of the road, the soil beneath the surface of the road and any bridge, tunnel, causeway, road-ferry, ford or other work or structure forming part of the road. The road reserve is inclusive of the carriageway and the footpath.

Term	Meaning
Roadwork	Includes any kind of work, building or structure (such as roadway, footway, bridge, tunnel, road-ferry, rest area, transit way station or service centre or rail infrastructure) that is constructed, installed or relocated in the vicinity of a road for the purpose of facilitating the use of the road as a road, the regulation of traffic on the road or the carriage of utility services across the road, but does not include a traffic control facility. Carry out road work includes any activity in connection with the construction, erection, installation, maintenance, repair, removal or replacement of a road work.
SEPP	State Environmental Planning Policy: a type of EIP made under Part 3 of the EP&A Act.
SHR	State Heritage Register
SSD	State Significant Development
SSI	State Significant Infrastructure
SWMP	soil and water management plan
TCP	traffic control plan
TfNSW	Transport for NSW
TMP	traffic management plan
TPH	Total petroleum hydrocarbons
TPZ	Tree Protection Zone: the radius of the TPZ equals 12 times the diameter of the trunk at 1.4 m above the ground. For palms and ferns, the TPZ radius should not be less than 1m outside the drip zone.
V	volt: the unit of measure for voltage which is the pressure that electricity is pushed through the wire.
Vibration	Mechanical oscillations about an equilibrium point. Vibration can be caused by many different external sources, including industrial, construction and transportation activities. The vibration may be continuous (with magnitudes varying or remaining constant with time), impulsive (such as in shocks) or intermittent (with the magnitude of each event being either constant or varying with time).
WH&S	Workplace Health & Safety
WHO	World Health Organisation
ZS	Zone substation

Executive summary

The proposal

This review of environmental factors assesses the proposal to install concrete and steel poles to replace transmission towers along Ausgrid's Feeder 916/917 between Woolooware and Kurnell. The proposal would facilitate and include the removal of the existing steel lattice transmission towers.

Construction of the proposal would be expected to commence from September 2024 with commissioning expected by the end of 2028, subject to assessment and approval.

Background and need

The existing lattice steel towers do not meet required structural reliability / capacity requirements. Tower refurbishment having taken place as recently as 2008 is no longer considered a feasible option.

Each tower requires replacement with an alternative solution to meet failure mode configurations.

Proposal alternatives

The design and location of the proposal resulted from an options investigation. A number of options were considered for the planning of this project, these included;

- Do nothing. This option is not considered feasible as it would continue to compromise supply reliability across this part of the network and only further delay the need to replace towers.
- Refurbishment of existing towers. This option was eliminated as towers along the Kurnell Peninsula have been refurbished twice in the last 18 years and still show extensive corrosive damage. These towers have now been deemed to be end of service life.
- In situ replacement of towers utilising the current route.
- In situ replacement of towers utilising the current route whilst realigning a select part of the feeder. Ausgrid have seen an opportunity to improve the feeder route, benefiting the environmentally sensitive land uses in proximity to Ausgrid's Kurnell zone substation. This is the chosen option.

Following the selection of the chosen option this REF has assessed the proposal to ascertain whether there would be a significant impact upon the environment to meet the requirements of section 5.5 of the *Environmental Planning and Assessment Act 1979* and clause 171 of the Environmental Planning and Assessment Regulation 2021. Proposal alternatives are described in section 3.

Statutory planning and legislation

This review of environmental factors has been prepared in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* and clause 171 of the Environmental Planning and Assessment Regulation 2021. Additional key legislation includes the *State Environmental Planning Policy (Transport and Infrastructure) 2021*, *Electricity Supply Act 1995* and *Protection of the Environment Operations Act 1997*.

Other approvals / permits / licences required for the proposal include;

- Fisheries Management Act, section 205, and
- National Parks and Wildlife Act, section 90 (AHIP)

Further information on the legislation applicable to this proposal is in section 4 and the consultation undertaken is in section 2.

Environmental impact assessment

This review of environmental factors investigates the potential environmental impacts associated with the construction, operation, and maintenance of the proposal.

Key issues associated with the proposal were identified as potential impacts to ecology, aboriginal heritage, archaeology, key fish habitat and aquatic reserves. A number of specialist assessments were undertaken to assist in assessing the environmental impacts (section 5).

Mitigation measures have been identified to address the impacts and to minimise any residual issues.

Proposal justification and conclusions

These towers are being replaced as they are at the end of their service life. These towers currently support Feeders 916 and 917. Each tower would be replaced with a dual pole system removing asset failure risk and reducing maintenance requirements from the network.

The dual pole system will increase network security. Currently, if a significant structural failure occurred on one of the towers, feeders supporting Sydney's south could lead to a significant outage. The proposed dual pole system will separate the feeders and decrease risk that both feeders would experience an unplanned outage.

The proposal is driven by ongoing supply reliability for electricity in the area. Supply reliability would be reduced if the proposal was not constructed. This work would help maintain a reliable supply of electricity, meeting Ausgrid's obligations in terms of safety, reliability, quality and continuity of supply.

Based on this review of environmental factors, it is concluded that the proposal:

- is not likely to significantly affect the environment (including critical habitat) or threatened species, populations or ecological communities, or their habitats,
- is not on land that is, or is a part of, critical habitat or a wilderness area, and
- is not likely to have a significant impact on matters of national environmental significance, or a significant impact on the environment (for actions on Commonwealth land) or a significant impact on the environment on Commonwealth land (for actions outside Commonwealth land).

In making these conclusions, consideration of environmental significance was made with regard to clause 171 of the *Environmental Planning and Assessment Regulation 2021* and *the Code of Practice for Authorised Network Operators*[1].

1 Introduction

1.1 Purpose of the review of environmental factors

The purpose of this review of environmental factors (REF) is to assess the potential environmental impacts of the proposal and determine appropriate mitigation measures to reduce those impacts. The findings of this REF would be considered when assessing:

- whether the proposal is likely to have a significant impact on the environment and therefore the necessity for further environmental assessment as described under section 5.7 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act)
- the significance of any impact on threatened species as defined by the NSW *Biodiversity Conservation Act 2016* (BC Act), in section 5.7 of the EP&A Act and the requirement for a species impact statement (SIS)
- the potential for the proposal to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Commonwealth Minister for the Environment in accordance with the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Ausgrid's determination of the proposal under Part 5 of the EP&A Act would be prepared separately to this REF.

1.2 The proposal

This review of environmental factors assesses the proposal to install concrete and steel poles to replace transmission towers along Ausgrid's Feeder 916/917 between Woolooware and Kurnell, namely Towers 52 to 76. The proposal would also facilitate and include the removal of the existing steel lattice transmission towers.

The proposal is to install two cement/ steel poles either side of each transmission tower location to enable the removal of the existing steel lattice transmission towers. Feeder 916/917 would be realigned into Captain Cook Drive between Tower 71 and Ausgrid's existing Kurnell zone substation.

The proposal does not assess any of the works on Towers 54, 57-59 or 72-76 which are all located within NPWS Towra Point Nature Reserve. These towers are assessed separately in accordance with NPWS REF requirements.

There would be select vegetation management for positioning of machinery and lay down of poles and their installation. Civil works for access tracks and pole foundations would be required to erect new poles, transfer existing OH mains, dismantle and remove tower before demobilisation and site reinstatement.

1.2.1 Proposal location

Feeder 916/917 (referred to as 'the feeder') starts at Transgrid's Sydney South Bulk Supply Point located at Picnic Point and heads southeast on a series of steel lattice

transmission towers for approximately 22kms. The feeder terminates at Ausgrid's Kurnell zone substation.

The Kurnell peninsula is strongly characterised by both Towra Point Wetlands, Aquatic and Nature Reserves and its associated coastal dune environment. The feeder and its transmission towers generally occupy transitional land uses; areas bordering environmentally sensitive zones and commercial, recreational or industrialised areas.

The peninsula's environmentally sensitive areas are significant. Being protected by state and commonwealth legislation, they provide for substantial mangrove and woodland communities. The peninsula provides suitable environments for a variety of migratory bird species and breeding grounds for aquatic fauna. Adjacent to the new Greenhills Beach estate, several towers border the state heritage listed Towra Point Nature Reserve at the north and west of Captain Cook Drive.

Heading northeast, the feeder diverges into Cronulla's coastal dune environments via Cronulla Sewerage Treatment Plant and Breen Resources Kurnell Landfill site. Here, several freshwater ponds have historically provided breeding habitat for the endangered Green and Golden Bell Frog.

The feeder again traverses Towra Point Nature Reserve where the importance of transitional estuarine zones is again evident. Several towers boarder Towra Point Nature Reserve at the north of Captain Cook Drive. The feeder then terminates at Ausgrid's Kurnell zone substation.

All towers are located on an easement in proximity to and accessible from Captain Cook Drive (see Figure 5-6 for access to Towers 61 and 62). All tower footings are located on concrete plinths in regularly maintained grassy clearings via established and gated access tracks. Work to existing access tracks and that part of the proposal to realign part of the feeder into Captain Cook Drive are also included as part of the proposal site.

For the purpose of this assessment, the proposal site is defined as the land within the existing easement of Feeder 916/917 between transmission towers 52 to 76 through the suburbs of Woolooware, Cronulla and Kurnell. Figure 1-1 provides for an overview of the proposal location.

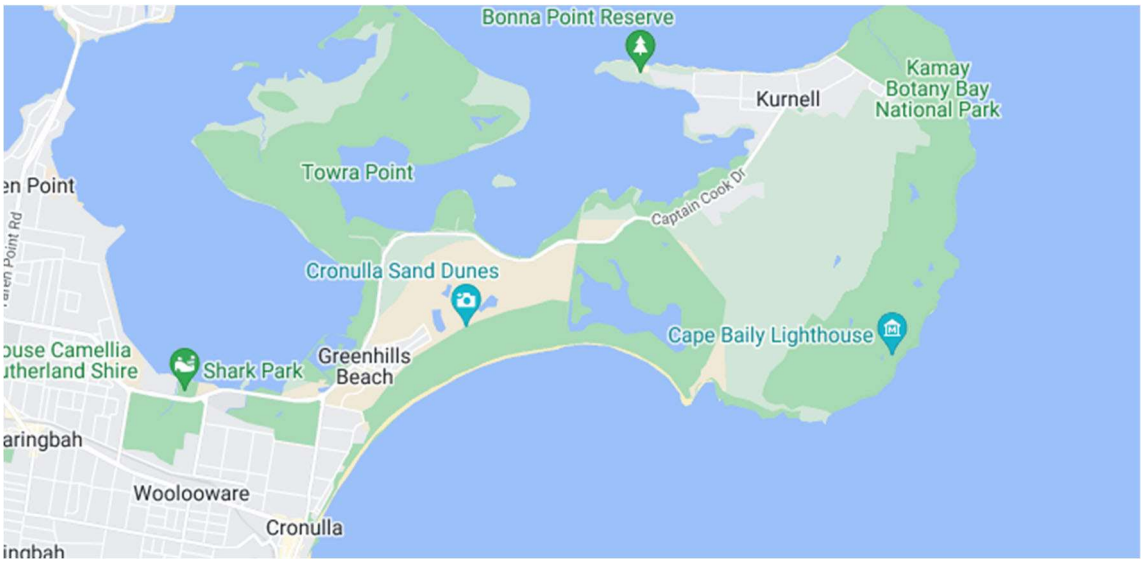

Figure 1-1: Proposal location

Figure 1-2 shows the proposal location within Ausgrid's network area.

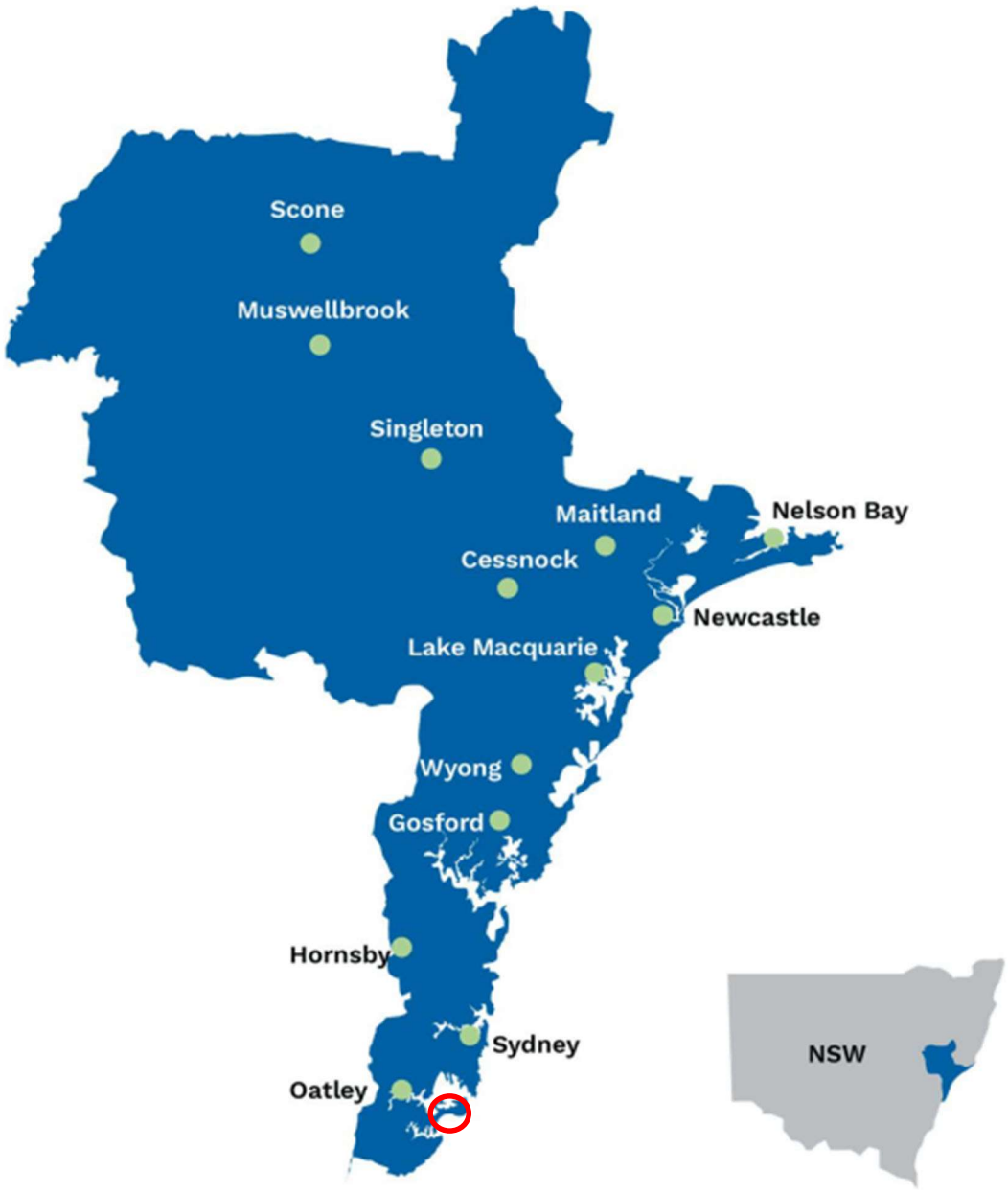

Figure 1-2 Proposal location (circled red) in relation to the Ausgrid network area

1.2.2 Proposal objectives

The objective of the proposal is to replace aging transmission towers and continue to operate and maintain a 132kV feeder to maintain electricity supply and reliability for the local area. This meets Ausgrid's licensing requirements to provide a satisfactory standard of supply to consumers and cater for forecast future load growth.

Other objectives of the proposal are to:

- comply with relevant laws and standards,
- meet Ausgrid's duty of care,
- meet Ausgrid's obligations to plan for and supply reliable electricity,
- maximise social, economic and environmental benefits, and
- minimise environmental, social and cultural impacts.

1.3 Background and need

The existing lattice steel towers do not meet required structural reliability / capacity requirements. Tower refurbishment having taken place as recently as 2008 is no longer considered a feasible option.

The tower requires replacement with an alternative solution to meet failure mode configurations, and in the extreme, prevent towers from collapse. If this were to occur the direct impacts to nature, objects, places and features would result in uncontrolled environmental harm including the risk of bushfire, to public safety and surrounding properties along the transmission line. The incident response of which would likely cause additional impact to make good and restore supply to customers.

1.4 Related projects

Ausgrid projects typically have related proposals and flow on activities due to the interconnected nature of the network. These related projects would be subject to separate environmental impact assessments due to factors such as differences in funding, construction timeframes and design.

Aspects associated with this proposal have been assessed separately under the relevant provisions of the EP&A Act in accordance with NPWS best practice:

- Tower 54,
- Tower 57-59, and
- Tower 72-76.

Known material cumulative impacts associated with these related projects are addressed in section 5.17.

1.5 Study area

The study area is the environment that could be directly or indirectly affected by the proposal. For this REF, the study area is defined as the existing feeder route including a buffer area of up to 250m depending on the issue involved.

Some potential impacts do not have clear physical boundaries. These are assessed on a broader scale and include land use, climate change, air quality, hydrology, waste disposal, fauna (including migratory birds), visual aesthetics, social and economic impacts.

The proposal site and surrounds are described in section 5.1. Figure 1-3 shows the boundary of the study area for direct impacts assessed in this REF.

Figure 1-3: Aerial view of proposal study area - existing transmission towers (red)

1.6 Description of the proposal

1.6.1 Overview

The proposal is to install two poles adjacent to select transmission towers along Ausgrid's Feeder 916/917 between Woolooware and Kurnell except the feeder realignment into Captain Cook Drive from Tower 71 to Kurnell zone substation.

The proposal does not assess any of the works on Towers 54, 57-59 or 72-76 which are all located within NPWS Towra Point Nature Reserve. These towers are assessed separately in accordance with NPWS REF requirements.

The proposal includes the installation of two steel and/ or concrete poles at each corresponding current transmission tower location. The proposal would facilitate the removal of the existing steel lattice transmission towers. Feeder 916/917 would be realigned into Captain Cook Drive between Tower 71 and Ausgrid's existing Kurnell zone substation.

Other infrastructure that would be constructed as part of the project includes:

- Cross-bonded earthing between dual in situ tower replacements
- Access track upgrades to facilitate the safe access and egress of heavy plant and equipment to each site

The following sections details the physical structures (section 1.1), construction activities (section 1.8) and operation and maintenance activities (section 1.9) associated with the proposal. Proposed construction footprints and site plans including the indicative location of key components and ancillary facilities (such as construction compounds and lay down areas) would be undertaken by the Principal Contractor in consultation with Ausgrid.

1.6.2 Design

The project proposal has been designed for a 50-year design life. A copy of the conceptual design plans and drawings are contained within in Appendix A.

It should be noted that the designs are accurate at the time of approval; however, some changes may be made to the final design either prior to, or during construction. These changes are generally of a minor nature, be approved by Ausgrid and would not materially affect the outcome of this environmental assessment.

If there are material changes, the impacts would be reassessed in the form of an REF Addendum or new REF.

1.6.3 Easements

Easements, leases, licences and rights of way / carriageway over land are established to protect the future security and tenure of Ausgrid's assets including substations and distribution lines of all voltages, both overhead and underground.

Section 53 of the *Electricity Supply Act 1995* (ES Act) details the protection of certain electricity works which are not protected by easements.

The proposed route is located within an existing easement under the current terms (to access, operate and maintain the electricity network). The partial feeder realignment would be within the road allocation of Captain Cook Drive where an easement is not required.

1.7 Physical structures

1.7.1 Overhead power lines

The proposal consists of maintaining the supply reliability of two overhead power lines (see Figure 1-3 for locality plan and power line route). Each power line has six conductor wires which transfer electricity at 132 kV and one overhead earth wire (OHEW) for lightning protection and communication.

The power lines would be attached to newly installed poles approximately the same height of those existing steel lattice transmission towers. Each pole would be spaced at a distance consistent with the current arrangement with the exception of the feeder realignment into Captain Cook Drive from Tower 71 to Kurnell zone substation. As Ausgrid would be placing additional repositioned powerlines on the new poles, spacing between spans would need to be smaller, resulting in the installation of more poles.

It should be noted there would be a net increase in the amount of electricity poles present at this location. As a result of this proposal, existing wood poles would be decommissioned and removed from Captain Cook Drive.

1.7.2 Replacement planting

Replacement planting and vegetation reinstatement would be undertaken at each transmission tower locations in accordance with a vegetation management plan and in consultation with the Sutherland Shire Council, National Parks and Wildlife Service and Department of Primary industries where required. Refer to Section 5.10 and Appendix D for additional information.

1.7.3 Pole materials and installation

The proposal is to install two poles adjacent to select transmission towers along Ausgrid’s Feeder 916/917 between Woolooware and Kurnell. Other than the

realignment into Captain Cook Drive, the proposal includes the installation of two steel or concrete poles at each corresponding current transmission tower location.

Engineering requirements govern the type of poles installed along the route. Steel poles would be installed at tower locations where termination towers are currently present. These include Towers 55,56,57,58,59,61,67,69 and 71. Concrete poles would be installed at tower locations where suspension towers are currently located. These include Towers 52-54,60,62-66,68 and 70. All poles forming the feeder realignment into Captain Cook Drive would be concrete poles and replace Towers 72-77.

The construction methodology will vary depending on the pole material. Steel poles would be installed using bored pile foundations inclusive of pile caps. Driven concrete pile foundations would be used for concrete poles.

Refer to Section 1.8.4 for additional information on piling methodologies.

1.8 Construction activities

The precise construction methodology would be determined at the post-contract stage of the proposal. The works would be undertaken by a contractor, selected after a competitive tendering process as a design and construct package, who would be responsible for detailed design and planning all construction processes, including scheduling and overall timing of works.

The specifications included in the competitive tendering process has included a requirement to comply with the scope and mitigation measures detailed in this REF. The mitigation measures of which must detailed in this REF must be included in the contractor construction environmental management plan (CEMP).

Refer to Section 8 for additional information on CEMP requirements.

1.8.1 Construction methods

Vegetation management would be required in proximity to existing towers to facilitate access. In accordance with ecological advice, vegetation would either be disposed off-site or mulched in situ.

A Posi-track (or equivalent) may be used to manage taller vegetative material to ground level to enable plant and equipment access, prevent trips/falls, vehicle damage, and possible contact with vehicle exhausts systems. Civil works would occur using tip truck to deliver material, an excavator to undertake track repairs and boring of required holes. This would also be used to prepare the cleared area for safe traversal by required vehicles and for laying down of poles and tower. The poles would be erected by mobile and slew cranes and line workers would undertake works via suitably sized (reach) EWPs. Earth rods would be drilled and installed by a drilling rig, and these would be linked underground to the new poles. A crane would then be used to lift out the tower in a couple of sections and then lay these down in the clear area to then be cut up and removed from site in smaller / manageable sections. The site would then be cleaned up and then suitably agreed replanting may occur of some areas. Ausgrid will aim to install an access gate and a low fence to replace any failed/fallen fencing.

1.8.2 Materials

ENM would be utilised (placed on a geofabric marker layer) to form required lay down and heavy vehicle access areas such as the track and the cleared areas. The poles will be either concrete (support) or steel (termination) poles, which have been found to

possess greater thermal mass, hence, perform better in bushfire prone areas compared to steel poles. The line materials would be made from forged steel and polymeric line insulators. The tower is made from galvanised or coated steel and would be dismantled/cut on site and removed to be recycled.

Upon the completion of work imported ENM may be removed and the geofabric marker disposed of. Where there is a demonstrated net benefit of the imported material remaining on site, Ausgrid will liaise with NPWS and/or Sutherland Shire Council to ensure any material left is;

- in a state fit for operational purposes,
- demonstrated to have minimal to no maintenance requirements and
- to present no long-term risk to the environment or community.

1.8.3 Equipment

Various items already outlined such as 4x4 vehicles, gang trucks, excavators, drilling rigs, mobile and slew cranes, EWPs, tip trucks, compressive rollers etc.

1.8.4 Piling Methodologies

Ground conditions and technical load bearing parameters of the feeder alignment determine the piling methodology utilised at each site, see Appendix B. The proposal would utilise both;

- Bored Piles, and
- Driven Piles

Bored piles are constructed when large holes are drilled in the ground and filled with concrete. Bored piles are very effective as they transfer the load above ground to the deep rock and soil layers below with minimal settlement, which is ideal for supporting structures such as transmission lines.

Some bored piles may be widened or under-reamed, creating a bulb at the end. A steel reinforcement cage is lowered into the hole before the concrete is placed or dropped in after the concrete has been poured.

Driven piles would be constructed with precast concrete, reinforced to withstand driving stresses, they would be pre-pressed with a square or octagonal section. The piles are driven into the soil, pushing an equal volume of soil sideways and compacting a zone around the pile, increasing its bearing capacity. For this increase in soil strength to take place, the pore water pressures must dissipate by rapid drainage. This type of piling is not suitable for saturated or silty soils as they drain slowly and cannot be compacted in the same way. Where this method is chosen as the preferred, to avoid pore water pressures it may be a requirement that the contractor pre-drill the top third of the pile using a Continuous Flight Auger (CFA) in the first instance. A CFA rig may be used for bored piers; these do not require the use of temporary casing.

The main differences are;

- driven piles are formed off site and put in place on-site,
- driven piles have the advantage of being rapid to build and use,
- bored piers are cast in concrete on-site, and
- bored piers create surplus spoil but have higher bearing capacities.

The existing easement is of adequate width to facilitate construction footprints for the length of the feeder.

1.8.5 Earthing

Butt earthing will need to be installed at each tower location. This is a safety requirement to reduce risk of electrocution. At each of these tower locations a 200-300mm (approximately) trench will be excavated between the two newly installed poles which will be about 15m. The trench will be about 500mm deep. A copper conductor will be installed, connecting the two newly installed structures and covered over.

Following testing of the earthing, if determined not to meet safety requirements, an additional earthing rod will need to be installed. This will similarly involve trenching approximately 200-300mm wide and 500mm deep as close as possible to each pole (likely within 5m) but may vary dependant on safety requirements.

An earthing rod will then be driven into the ground to the level of the water table. The earthing rod will be approximately 15mm in diameter and as deep/long as required to meet the water table. Refer to Appendix A for general details pertaining to earthing.

This earthing arrangement won't be required at T72-T77 (the realigned section of the feeder route). Given each feeder would be located along either side of Captain Cook Drive, there is sufficient spacing to allow each new footing to solely provide earthing.

1.8.6 Demolition and removal of transmission towers and realignment from Tower 71 to Kurnell zone substation

Once the new poles are installed and the conductors are disconnected from the old tower, a crane would be used in conjunction with construction staff to dismantle the arms of each tower. Sections of the tower would be lowered onto the adjacent access track or other previously cleared area. These sections would be cut into manageable sizes for transport offsite and disposal as scrap metal.

Each of the four footings would be removed to below ground level or as discussed with relevant stakeholders to ensure there is residual risk to the community.

Upon the completion of work imported ENM may be removed and the geofabric marker disposed of. Where there is a demonstrated net benefit of the imported material remaining on site, Ausgrid will liaise with relevant stakeholders to ensure the material left is;

- in a state fit for operational purposes,
- demonstrated to have minimal to no maintenance requirements and
- to present no long-term risk to the environment or community.

As the new poles would be re-aligned into Captain Cook Drive, existing wood poles would be removed. Removal would be undertaken in accordance with Ausgrid's existing network standards and associated legislative rights of access to the network.

1.8.7 Vegetation clearing

Vegetation clearing will be required for the successful replacement/relocation of each transmission tower. Impacts have been considered minimal to the surrounding vegetation as the final construction footprint will be prioritised for cleared or disturbed areas.

Vegetation clearing and pruning would be required in some sections of the proposed route to allow for the recovery of existing wood poles in Captain Cook Drive. Impact on flora and fauna is described in section 5.10.

Whilst the proposed activity will see a temporary increase in the impact on clearing of native vegetation, impacts will be minimised in accordance with the project Ecologist and construction contractor in consultation with Ausgrid.

Additional vegetation clearing beyond the assessed construction footprints would be subject to additional justification, investigation, assessment and where required, approval.

1.8.8 Site Compound

Ausgrid's Kurnell substation would be used as a pole storage area and a site compound during construction work. Refer to Figure 1-4 below showing the location of the site compound (blue).

Figure 1-4- Kurnell substation pole storage area and potential site compound

The site compound would be within the existing maintained fenced area, but suitably fenced off from the live substation with access restricted.

Notwithstanding the sites use under license agreement, where contractors use the site during construction, it is to be managed in accordance with:

- The contractors site management plan which is to outline (and depict) all activities undertaken at both sites (material bays, waste storage, plant and equipment, fuels oils chemicals, sediment control devices etc),
- the relevant components of Ausgrid's site inspection and Workplace inspection checklists, submitted to Ausgrid on a monthly basis, and
- Be subject to a pre and post qualitative baseline reports submitted to Ausgrid after occupation.

Any incidents at the site(s) are to be reported to Ausgrid's Environmental Services immediately.

The contractor is responsible for any incident response and/ or remediation of the site to pre-existing condition consultation with Ausgrid.

The site is to be managed in accordance with the requirements of this REF in conjunction with Ausgrid's NS174C.

1.8.9 Installation of temporary environmental controls

Temporary environmental controls would be installed during the construction phase to mitigate potential environmental issues identified in section 5. Temporary controls for the proposal to mitigate such issues as site demarcation, sediment controls, signage and construction materials would be installed where appropriate.

These controls would be removed once construction is complete once it is confirmed there is no potential ongoing risk to the environment.

1.8.10 Timing and working hours

Works are planned to occur from September 2024 through 2028. However, these dates are subject to change. Standard hours of operation would generally be utilised consistent with NS174C. Out of hours work may be required in certain circumstances.

The construction period may also vary in duration depending on weather conditions, technical parameters, environmental issues, availability of contractors and Ausgrid staff. Tower demolition and some other civil activities may require work on Sundays or during other out of hours periods. This is due to 132kV outage constraints that exist for a dual circuit outage (on Sundays).

Works that would generate audible noise at any sensitive receiver would be undertaken between 7am and 6pm Monday to Friday and 8am and 1pm on Saturday. Audible works outside these hours may be undertaken where the following requirements are met:

- the works are emergency works, unplanned or unavoidable and the affected residents have been notified as far as reasonably practicable; or
- the works fall into one of the following categories and the affected residents are provided with a notification letter at least five days prior to the works:
    - the delivery of oversized plant or structures that cannot be undertaken during standard hours
    - maintenance and repair of essential public infrastructure that is unable to occur during standard hours
    - public infrastructure works that shorten the length of the construction phase and are supported by the affected community (this would require community consultation)
    - it is a requirement of a regulatory authority
    - where there is a demonstrated and justified need to operate outside the recommended standard operating hours and this is supported by Ausgrid's Project Manager, Community Relations Section and Environmental Services.

Any out of hours work would need to be suitably justified and all potential sensitive receivers consulted.

Where high impact activities are proposed to take place out of hours within 200m of an identified sensitive receiver, targeted and active consultation consistent with NS174C guidelines would be required.

1.9 Operation and maintenance requirements

Access to the overhead feeder would continue to only be required when the feeder requires repair or maintenance. Repair events would happen on an infrequent basis and would require aerial and pole inspections, at times using a medium rigid vehicle and its Elevated Work Platform (EWP).

Likely maintenance and operation activities associated with the power line include but not limited to:

- vegetation trimming to maintain electrical safety clearances and asset protection zone,
- general landscape maintenance,
- access track maintenance,
- fence and gate maintenance and repair,
- insulator and conductor repair,
- pole replacement where pole integrity is reduced, and
- staff attendance for routine inspection, operation and maintenance activities.

2 Consultation

2.1 Overview

Consultation defines the processes Ausgrid uses to seek views or provide information about our works and seek community feedback. Consultation can include a range of communication activities such as notification to community members and relevant authorities, community information displays, individual contact with residents and meetings with community and authority representatives. These activities are designed to ensure Ausgrid is aware of potential issues so essential electricity upgrades can be conducted with minimal impact on the local community.

The consultation undertaken as a part of this REF meets the Code of Practice for Authorised Network Operators.

Consultation spans the entire proposal from the initial concept stage through to construction and as the new infrastructure is brought into service.

2.2 Statutory notification requirements

Under the ES Act Ausgrid is required to undertake 40 days notification to the local council for proposed works (other than routine repairs or maintenance works) so that Council has an opportunity to comment on the proposal. Submissions received under the ES Act from the relevant local council and Ausgrid's response are summarised in Table 2-1.

Under the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Infrastructure SEPP), Ausgrid is the determining authority for electricity developments under Part 5 of the EP&A Act. While the work undertaken does not require council consent, the Infrastructure SEPP requires Ausgrid to undertake 21 days notification to Council where works may impact upon Council infrastructure, the community or local

heritage items. In some instances, other public authorities need to be notified (see Table 2-1).

Under the Infrastructure SEPP and ES Act, the following stakeholders were consulted about the proposal and asked to provide comment. The submissions received to date are summarised in Table 2-1.

Specific licences, permits and approvals that require consultation are outlined in Table 4-2.

Table 2-1: Consultation responses

Stakeholder	Notification requirement	Summary of engagement	Response
Sutherland Shire Council	ES Act Transport and Infrastructure SEPP	• Meeting 1 – July 2022. Outlined Ausgrid's proposal. Ausgrid explained the proposal including designs and equipment layout across all sites. • Meeting 2 – September 2022, Consultation on design. • Meeting 3- October 2022 to liaise on aspects for design and masterplans etc. • Notification 1 – November 2022 – 40-day Council Notification ISEPP. • Meeting 3 – July 2023. Online meeting initiated by Ausgrid to provide a project update and notify key representatives of planned start dates and provide an opportunity for Council to identify and issues or concerns with Ausgrid's proposal.	Council consultation has been actively pursued by Ausgrid prior to and after formal notification. Council provided additional information on the Marang Parklands landscape masterplan and the road ownership of Captain Cook Drive. Council is satisfied that all environmental and ecological constraints have been addressed by Ausgrid. Whilst it is understood Council is satisfied with Ausgrid's proposal generally, we will continue to engage as the project progresses into construction.

Stakeholder	Notification requirement	Summary of engagement	Response
DPIE - NSW National Parks and Wildlife Service (NPWS) Office	Transport and Infrastructure SEPP	• Ausgrid issued formal notification of the project proposal in May 2023 • Ausgrid met with NPWS to discuss the project proposal in June 2023 • Ausgrid has had ongoing consultation via email and phone calls with the local NPWS Ranger throughout the investigation and planning phase of the project. • Key point of discussion were primarily centred around those parts of the project located on NPWS land, see Section 1.4 for additional information. • Ausgrid submitted an REF to NPWS for determination in December 2023.	Ausgrid will continue to liaise with NPWS on the project proposal as it resides adjacent to NPWS land. Ausgrid has undertaken a separate REF following NPWS processes where working on NPWS land, to achieve joint determination under the EP&A Act. Consultation and engagement with NPWS will be championed by this process. Ausgrid received NPWS determination and consent in May 2024. Refer to Section 1.4 for those components of the proposal located on NPWS land.
DPI- Department of Primary Industries - Fisheries	Fisheries Management Act 1999	• Ausgrid's proposal includes activities defined as dredging and reclamation work. • Ausgrid's proposal includes the harming of marine vegetation and working within an Aquatic Reserve. • Ausgrid issued a formal notification to DPI in June 2023. • Ausgrid met with the DPI's Fisheries Manager in July 2023 to discuss the proposal. • DPI provided information on permit requirements and current notifications relevant to Towra Point Aquatic Reserve (Tower 52) • DPI requested further aquatic assessment following DPI Fisheries Policy and Guidelines for Fish Habitat Conservation and Management 2013. • Construction footprints provided by the contractor in discussions with Ausgrid and specialist contractors informed Ausgrid's Fisheries Permit Application. See Appendix C.	Ausgrid have worked with the successful construction contractor to minimise the construction footprint as much as possible. Ausgrid have applied for a permit under the Act to harm marine vegetation (T52 and T54)and work within Towra Point Aquatic Reserve (T52). Ausgrid undertook additional aquatic ecology assessment at both Tower 52 and 54 (refer to NPWS REF) Refer to Appendix E Ausgrid have developed a Biodiversity Offset Strategy and surveyed construction footprints of T52 and T54 at the request of DPI Additional information on permits and legislative requirements can be found in Section 4.

2.3 Community consultation

2.3.1 Planning

Ausgrid has involved the community in the detailed planning of the proposal. Ausgrid seeks to balance community feedback with other project considerations in finalising the proposal and construction program.

Ausgrid is undertaking a range of activities to ensure community members are aware of the proposed activities and have an opportunity to provide feedback on the project.

A list of key stakeholders identified during preliminary assessments include;

- Fitness First Cronulla,
- Shark Park,
- EG Ampol Woolooware,
- Transport for NSW (as owners of Oyster lease site at Woolooware),
- Sydney Water,
- Breen Resources,
- National Park and Wildlife Service,
- Sutherland Shire Council,
- Cronulla Wastewater Treatment Plant,
- Residents of the Greenhills Estate,
- Woolooware High School,
- Cronulla High School,
- Dicker Data Centre,
- All Sands Pty Ltd,
- Industrial facilities at 262-272 Captain Cook Drive
- Industrial facilities south of Tower 71
- Sayka Safety Equipment Supplier

Community engagement activities for this proposal include:

- Providing a 1800 community information line, project email address and web page.
- Issuing newsletters to provide project updates.
- A dedicated community liaison officer has been part of the project team during planning. This officer has worked closely with the project team, stakeholders and the community to ensure the community is informed about upcoming works and potential impacts, and to address any construction-related issues as quickly as possible.
- Meetings with major stakeholders such as Sutherland Shire Council, Sydney Water, National Parks and Wildlife Service, Breen Resources, Department of Primary Industries and Heritage NSW to ensure that all parties, whether partially or directly impacted, are aware of what Ausgrid is proposing within this project.

A summary of the issues commonly raised during community consultation is contained in Community Engagement Plan, see Appendix C.

2.3.2 Construction

Community engagement activities would continue as the project enters the construction phase.

This would include:

- Dedicating a community liaison officer to part of the project team during planning, continuing into construction. This officer will work closely with construction

personnel and the community to ensure they are informed about upcoming works, potential impacts, and to address any construction related issues promptly.

- Notification and door knocking at properties close to joint bays to provide these stakeholders with more information on potential impacts.
- A community information line, project email address and web page.
- Signage along the route and at site compounds to ensure community members are aware of who is carrying out the work. Signage would include details of the project community information line.
- Notifications to residents and other neighbours seven days prior to the start of work in their local area that would provide information about the proposed construction activities, timing, work hours and traffic and parking arrangements, as well as details of how to find out more information or raise any issues with the project team.
- Specific notification requirements for any noisy works outside standard construction hours

2.3.3 Aboriginal community

Input from the Aboriginal community is an essential part of assessing the significance of Aboriginal objects or places that may be impacted by a proposal. The NSW *Aboriginal cultural heritage requirements for proponents 2010*[2] specify that the proponent:

- Identify Aboriginal people who may have an interest in a proposal and hold knowledge relevant to determining the cultural significance of Aboriginal objects and / or places,
- provide written notification to identified Aboriginal groups / individuals and OEH and place notice in the local paper to undertake a cultural and archaeological assessment,
- provide a draft report to registered stakeholders and the Local Aboriginal Land Council (LALC) for comment, and
- submit a final report to DPIE for determination, where a permit is required.

Ausgrid via Coast History and Heritage have undertaken Aboriginal community consultation in accordance with Clause 60 of the National Parks and Wildlife Regulation 2019. This process has formed part of the Aboriginal Cultural Heritage Assessment Report (ACHAR) undertaken to assess the Aboriginal cultural significance of the study area and any Aboriginal objects within it.

In summary;

- Public and direct notices were placed in order to identify Registered Aboriginal Parties (RAP) for the project as required by the Regulation,
- Several direct notices were sent to agencies including the La Perouse LALC, National Native Title Tribunal, Local Land Services and Heritage NSW.

As a result of notices issued, ten registered aboriginal parties were identified. Each were invited to comment on;

- the scope and assessment methodology, and
- a subsequent copy of the draft ACHAR

Only one RAP provided comment. The comment was in relation to the sensitivity of areas certain areas (i.e. burials) and the need to follow due process accordingly. The ACHAR can be found as Appendix F.

3 Investigation of alternatives for the proposal

3.1 Assessing alternative options

Several factors were considered when determining the most suitable option. The preferred option achieves the best balance of social, environmental, technical and financial objectives.

Options for this project have been restricted due to the need to make points of connection at certain locations. The confines of both the existing feeder route and established easements meant there was limited opportunity to involve the community in the assessment of alternative options.

As part of developing this proposal, consideration was given to alternative, designs, construction and management options.

3.1.1 Do nothing

This option was not considered feasible as it would continue to compromise supply reliability across this part of the network and only further delay the need to replace towers.

3.1.2 Refurbishment of existing towers

This option was eliminated as the Towers along the Kurnell Peninsula have been refurbished twice in the last 18 years and still show extensive corrosive damage. These towers have now been deemed to be end of service life.

3.1.3 In situ replacement of towers

This is the preferred option in principle. In situ replacement enables Ausgrid to utilise the existing easement arrangement as well as previously disturbed footprints and pre-existing access tracks.

3.1.4 In situ replacement of towers and select realignment

Whilst in situ replacement enables;

- the utilisation of the existing easement arrangement,
- retain previously disturbed footprints,
- maintain existing engineering requirements around loading and span lengths, and
- enabling the continued use of pre-existing access tracks.

Ausgrid have seen an opportunity to improve the feeder route, benefiting the environmentally sensitive land uses in proximity to Ausgrid's Kurnell zone substation by realigning Towers 72-76 into Captain Cook Drive

3.2 Chosen route option

The proposed route was selected as the preferred option due to a number of benefits, including:

- the utilisation of the existing easement arrangement,
- retain previously disturbed footprints,
- maintain existing engineering requirements around loading and span lengths, and
- enabling the continued use of pre-existing access tracks.

The proposal to realign Towers 72-76 into Captain Cook Drive would;

- meet Ausgrid's requirements,
- avoid some environmentally sensitive areas,
- remove the need for Ausgrid access and maintenance in the Nature Reserve,
- relinquish existing easements (approximately 2.5ha) and enable the removal of existing transmission infrastructure from the Nature Reserve,
- vacate Ausgrid presence on NPWS owned land at this location, and
- enable future regeneration and restoration opportunities within the Nature Reserve.

Following the selection of the chosen route, Ausgrid prepared this REF to assess the environmental impacts of the proposal and to ascertain whether there would be a significant impact upon the environment to meet the requirements of section 5.5 of the EP&A Act and section 171 of the EP&A Regulation.

4 Environmental legislation

4.1 Environmental Planning and Assessment Act 1979

The EP&A Act is the primary legislation regulating land use planning in NSW. It provides the framework for the development of state and local planning instruments which, through their hierarchy, determine the statutory process for environmental impact assessment. This proposal satisfies the definition of an activity under Part 5 of the EP&A Act since it:

- may be carried out without development consent
- is not exempt development
- would be carried out by a determining authority or requires the approval of a determining authority.

Under Part 5 of the EP&A Act, activities require a determining authority to take into account all matters affecting or likely to affect the environment by the proposed activity.

The NSW Government has included Authorised Network Operators (ANOs) as prescribed determining authorities for the purposes of section 5.6 of the Environment Planning and Assessment Act 1979 (EP&A Act) as per the definition of "public authority" under Schedule 1(4) of the Regulation. That prescription allows an ANO to be a Part 5 Determining Authority for Development for the purposes of an electricity transmission or distribution network. As a determining authority, an ANO can assess and self-determine Activities that are not likely to significantly affect the environment and are conducted by or on behalf of the ANO for the purpose of electricity transmission or distribution.

Environmental planning instruments (EPIs) are legal documents that regulate land use and development, including the type of assessment process required. EPI is the generic term used to describe state environmental planning policies (SEPP) and local environmental plans (LEP).

The following EPIs that apply to the proposal area were considered:

- SEPP – Transport and Infrastructure
- SEPP – Planning Systems
- Sutherland Shire Local Environmental Plan 2015
- SEPP (Resilience and Hazards)
- SEPP (Biodiversity and Conservation)

4.2 State Environmental Planning Policy (Transport and Infrastructure) 2021

Subject to certain exemptions, the Infrastructure SEPP allows development for the purpose of an electricity transmission or distribution network to be carried out by or on behalf of an electricity supply authority or public authority without development consent on any land.

Exclusions to the application of the Transport and Infrastructure SEPP include some developments under the SEPP (Hazards and Resilience). Consistent with the Transport and Infrastructure SEPP, the proposed works to repair/replace the supporting structure on an existing Ausgrid transmission feeder can be completed subject to an assessment and determination under Part 5 of the EP&A Act.

The Transport and Infrastructure SEPP enables that development for a particular purpose that may be carried out without consent includes routine maintenance works, the following works or activities are (subject to and without limiting that provision) taken to be routine maintenance works if they are carried out for that purpose—

(a) routine repairs to or replacement of equipment or assets,
(b) temporary construction yards,
(c) clearing of vegetation (including any necessary cutting, pruning, ringbarking or removal of trees) and associated rectification and landscaping.

Supporting structures associated with Feeder 916/917 are being replaced within the existing easement utilising existing access tracks, employing standard industry practice. Construction footprints will be, where practicable, restricted to previously disturbed areas and refined in consultation with the successful contractor.

Under the Transport and Infrastructure SEPP, works which are deemed routine maintenance works may be carried out without consent, prevailing to the extent of any inconsistency outlined in the SEPP (Hazards and Resilience) (Formerly, State Environmental Planning Policy (Coastal Management) 2018). Explicitly, Clauses 10 and 11, but only if any adverse effect on the land concerned is restricted to the minimum possible to allow the works to be carried out.

This proposal falls within the scope of the Transport and Infrastructure SEPP as an activity permissible without development consent.

Consultation requirements under the Infrastructure SEPP are addressed in section 2.

4.3 State Environmental Planning Policy (Planning Systems) 2021

The *SEPP (Planning Systems) 2021* declares certain development to be State Significant Development (SSD) and State Significant Infrastructure (SSI), including Critical SSI. Applications for SSD and SSI must be accompanied by an Environmental Impact Statement (EIS).

The proposal is not a type of development listed in the schedules of the *SEPP (Planning Systems) 2021* as being SSD or SSI. The proposal would not have a significant impact on the environment (refer to section 6) and therefore does not require an EIS and as such would not be considered SSI.

On this basis, the *SEPP (Planning Systems) 2021* is not applicable to the proposal and it can be assessed under Part 5 of the EP&A Act through the operation of the Infrastructure SEPP.

4.4 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act prescribes the Commonwealth's role in environmental assessment, biodiversity conservation and the management of protected species, populations and communities and heritage items. The approval of the Commonwealth Minister for the Environment is required for the following controlled actions:

- an action that may have a significant impact on matters of national environmental significance (NES)
- actions that are likely to have a significant impact on the environment of Commonwealth land

- actions taken on a Commonwealth land that are likely to have a significant impact on the environment anywhere.

The EPBC Act lists nine matters of NES which must be addressed when assessing the impacts of a proposal. An assessment of how the proposal may impact on matters of NES is provided in Table 6-2.

The assessment of the proposal's impact on matters of NES and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance. Accordingly, the proposal has not been referred to Commonwealth Department of Environment.

4.5 Electricity Supply Act 1995

The ES Act sets out the licensing regime on Ausgrid and provides a framework for the development and maintenance of electricity infrastructure. The ES Act allows Ausgrid to trim and remove trees, carry out works on public roads and acquire land.

The ES Act also requires that works (other than routine repairs or maintenance works) must not be undertaken without a minimum of 40 days consultation with relevant local councils. Any submission must be considered by Ausgrid. Consultation requirements under the ES Act are addressed in section 2.

4.6 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) provides a framework for the licensing of certain activities and is administered by the Environment Protection Authority (EPA) (the statutory authority of OEH). Under the POEO Act, the EPA is the Appropriate Regulatory Authority for Ausgrid.

Schedule 1 of the POEO Act lists activities that require an Environment Protection Licence to operate. The need for a licence would be evaluated and sought prior to the commencement of construction once a detailed construction method has been finalised.

Refer to section 4 for licences that may be required for the proposal. Regardless of whether a licence is required, the following restrictions during construction and operation of the proposal apply:

- works must not pollute the environment,
- waste must be classified, handled, transported and disposed appropriately, and
- environmental incidents involving actual or potential harm to human health or the environment must be reported to OEH.

4.7 Biodiversity Conservation Act 2016

Section 1.7 of the EP&A Act provides that the Act is subject to the provisions of Part 7 of the Biodiversity Conservation Act 2016 (BC Act) and Part 7A of the Fisheries Management Act 1994 (FM Act). The BC Act and FM Act contain additional requirements with respect to assessments, consents and approvals under the EP&A Act, concerning certain terrestrial and aquatic environments.

Where an activity being assessed under Part 5 and is likely to significantly affect threatened species, s 7.8 of the BC Act requires that a species impact statement, or

biodiversity development assessment report must be prepared by the proponent. Where there are other likely significant effects on the environment, then an environmental impact statement would instead be required.

With respect to a development being assessed under Part 5, s 7.2 of the BC Act provides that development or an activity is likely to significantly affect threatened species if:

- it is likely to significantly affect threatened species or ecological communities, or their habitats, or
- it is carried out in a declared area of outstanding biodiversity value.

Section 7.3 of the BC Act lists a number of factors to be considered in determining whether the proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. This includes, for example, 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.

The Schedules to the BC Act prescribe the following lists of specifies, ecological communities, and other matters relevant to this determination:

- Threatened species;
- Threatened ecological communities;
- Extinct species, species extinct in the wild and collapsed ecological communities;
- Key threatening processes;
- Protected animals; and
- Protected plants.

To ensure compliance with the BC Act, Ausgrid has engaged an ecologist to undertake an assessment of impacts against our proposal. It was concluded that Ausgrid's proposal will not have a significant impact any threatened entities. Provided appropriate mitigation is followed, the proposed activity is considered to have a minimal ecological impact.

Refer to Appendix D and E for the Flora and Fauna Impact Assessments undertaken for this proposal.

4.8 Rural Fires Act 1997

The works are consistent with the objectives of protecting life and property and protection of the environment. These works will ensure a safe and reliable supply of electricity is maintained across the area. Ausgrid are aware that parts of the Kurnell Peninsula are mapped as bushfire prone land and will manage the work consistent with Section 63(1) of the Rural Fires Act 1997 (NSW).

4.9 Fisheries Management Act 1994

Ausgrid's proposal has identified that work would be required in water land at Tower 52. The area is also partially mapped as a key fish habitat and within an aquatic reserve.

A summary of the legislative requirements under the FM Act is outlined in the Table 4-1 below.

Table 4-1 Legislative requirements under the Fisheries Management Act

Requirement	Comment	Responsibility
Notification: under s. 199, of 28 days notice to carry out dredging and reclamation work in water land (land permanently or intermittently submerged by water).	Notification was given on 27th June 2023 (Appendix C).	Ausgrid
Permit: under s. 205, to harm any mangroves, seagrass or any other protected marine vegetation.	Ausgrid has applied for a permit under Part 7 of the FM Act to Harm Marine Vegetation for this activity at Tower 52 (see Appendix C).	Ausgrid
Permit: under s. 219, to block the passage of fish.	A Permit / Exemption was not required for this proposal as it was determined there would be not impacts to aquatic fauna (Appendix D and E).	Ausgrid

Ausgrid's proposal has been assessed against the requirements of the FM Act. The proposal was identified to trigger the above requirements at Tower 52 because it will;

- affect marine vegetation, including threatened species, a permit to harm marine vegetation is required, and
- includes the excavation or deposition of material in 'water land' including land that is only intermittently submerged by water

The Ausgrid project team met with the Fisheries Manager Coastal Systems for the Sydney South Region to discuss the proposal. Whilst Ausgrid have a current permit to manage marine vegetation across our network area, the Department advised that due to heavy plant and machinery being be required to facilitate the proposal an additional permit would be required.

For consultation with DPI Fisheries, and any other relevant comments or information, see Section 2.2 and Appendix C.

4.10 Water Management Regulation 2018

A controlled activity approval allows for certain types of activities on waterfront land as defined in the Water Management Act 2000. A controlled activity approval is not required if an exemption applies.

In a general sense, waterfront land is a prescribed distance of 40 metres from the mean high-water mark of the estuary. Ausgrid's proposal would take place on waterfront land in some instances. However, Ausgrid is exempt under Clause 43 of the WM Reg of the need to obtain a Controlled Activity Approval.

The exemption applies to Network operators licensed or authorised under the Electricity Supply Act 1995, for the construction, modification, repair, maintenance, or emergency work on the network operator's electricity infrastructure, provided the;

- activity does not cause any change the course of a river, and
- network operator has considered the environmental impact of the activity and is satisfied that the activity is not likely to significantly affect the environment.

Subject to the mitigation measures outlined in this assessment, Ausgrid's proposal is not likely to significantly affect the environment.

4.11 National Parks and Wildlife Act 1974

Aboriginal objects and places are provided protection from harm under Part 6 of the National Parks and Wildlife Act 1974 (NPW Act). Harm is defined to mean destroying, defacing, damaging or moving an object from the land. There are defences and exemptions to the offence of harming an Aboriginal object or place. One of the defences is that harm was carried out under an Aboriginal Heritage Impact Permit (AHIP). An AHIP sets out any conditions you must comply with. AHIPs are issued by the Chief Executive of Heritage NSW based on a valid application and an accompanying Aboriginal Cultural Heritage Assessment Report (ACHAR).

The ACHAR prepared for AHIP applications must document Aboriginal community consultation in accordance with the Regulation. This involves seeking registrations of interest in the project from Aboriginal people who hold cultural knowledge relevant to the application through public notices and by contacting people identified through notices to Local Aboriginal Land Councils (LALCs) and government agencies who deal with Aboriginal communities in the area. People or organisations can register as 'Registered Aboriginal Parties' which provides them with a right to review and comment on project information and draft reporting, and to provide advice on Aboriginal cultural and historical significance.

The Environmental Planning and Assessment Act 1979 (EP&A Act) provides planning controls and requirements for environmental assessment in the development approval process. It also establishes the framework for Aboriginal heritage values to be formally assessed. Ausgrid have developed a project specific ACHAR, undertaken the required consultation before consolidating and submitting the required documentation to Heritage NSW for an AHIP. The AHIP (when issued) will support Ausgrid's environmental assessment processes and this REF under Part 5 of the EP&A Act.

Refer to Appendix C for a copy of the consultation with Heritage NSW and Appendix F for a copy of the Aboriginal Cultural Heritage Assessment Report undertaken for this proposal.

4.12 Marine Estate Management Act 2014

Under the Regulation, Part 5 assessments are exempt from the need to obtain consent for working within an aquatic reserve. Ministerial consent is not required provided S55 of the Act is given consideration. Consideration needs to be given to;

- Management Rules, regulations or plans which may apply to the aquatic reserve,
- Permissible uses under the regulations or management rules,
- Any relevant management plan, and
- Any relevant aquatic reserve notification

The Minister can prohibit the carrying out of a specified activity via the issue of notifications. Marine Estate Management (Aquatic Reserve) Notification 2020.

The notification states that a person is prohibited from destroying marine vegetation (dead or alive) unless;

- Ministerial consent is obtained, AND
- The activity is for research purposes, aquaculture purposes, aquarium collecting purposes or Aboriginal cultural fishing purposes,

In 2020 a Notification was issued in relation to specified prohibited activities at Towra Point Aquatic Reserve, however, Ausgrid's proposal is not affected.

In accordance with S56 3(b) of the Act- if there is likely to be an impact on plants or animals of the reserve, Ausgrid are required to consult with the Department. Ausgrid met with Fisheries Coastal Systems manager in July 2023 to discuss the proposal.

A Permit is required for harming marine vegetation at Tower 52 and undertaking the maintenance of existing infrastructure within an Aquatic Reserve.

Ausgrid will continue to engage with the Department through both the planning and construction phases of the activities, following the permit conditions (when issued) and any other means as required. Refer to Appendix C for information relating to the permit and Appendix D and E for the impact assessments undertaken.

4.13 Summary of legislative requirements

Additional pieces of environmental legislation that apply to Ausgrid's network area were considered in the preparation of this REF, including:

- *Coastal Management Act 2016* (NSW)
- *Crown Lands Act 2016* (NSW)
- *Forestry Act 2012* (NSW)
- *Heritage Act 1977* (NSW)
- *National Greenhouse and Energy Reporting Act 2007* (NSW)
- *Native Title Act 1993* (Commonwealth)
- *Biosecurity Act 2015* (NSW)
- *Roads Act 1993* (NSW)
- *Water Act 1912* (NSW)
- *Water NSW Act 2014*

Specific licences, permits, approvals and notifications required for the construction, maintenance and operation of the proposal are outlined in Table 4-2.

Table 4-2: Summary of legislative requirements

Legislation	Authority	Requirement	Comment	Responsibility
Aboriginal Land Rights Act 1983	Office of the Registrar	**Approval:** under s. 42, by the Local Aboriginal Land Council (LALC) to consent to property tenure on the land which is subject to the Aboriginal land claim.	Ausgrid have been careful to design the proposal such that it would be fully within the existing, established easement (Appendix A). Further, given that; • native title does not exist or pending, and • the nature of the work being replacement of existing assets Native title is considered to have been extinguished.	Ausgrid
Coastal Management Act 2016	DPIE	Meet the obligations of the relevant SEPPs.	Refer to Section 4.2	Ausgrid
Contaminated Land Management Act 1997	DPIE	**Notification:** under s. 60, by a person whose activities have contaminated land or a landowner whose land has been contaminated is required to notify OEH when they become aware of the contamination.	If contamination is discovered the duty to report would be determined.	Ausgrid
Crown Land Management Act 2016	Crown Lands	**Approval:** under s. 2.18, by the Minister to grant a 'relevant interest' (i.e. lease, licence, permit, easement or right of way) over a Crown Reserve for new works.	An easement exists for the entirety of the proposed route. All work, including construction activities would be restricted to the existing easement allocation in accordance with the current terms being to access, operate and maintain the electricity network. Each location would be accessed using pre-existing approved access tracks consistent with the requirements of the Electricity Supply Act	Ausgrid
EPBC Act (Commonwealth)	Commonwealth Department of Environment	**Approval:** under Part 3, for an action that may have a significant impact on matters of national environmental significance (NES) requires Minister consent.	The proposal is not likely to have a significant impact on a matter of NES	Ausgrid

Legislation	Authority	Requirement	Comment	Responsibility
EP&A Regulation	Ausgrid	**Consideration:** under cl. 171, of the factors to take into account concerning the impact on an activity on the environment.	This REF has considered factors under cl. 228 in section 6.1.	Ausgrid
ES Act	Local Council	**Notification:** under s.45, of 40 days notice for the proposed electricity works.	Notification was given in November 2022 (see section 2.3 and Appendix C).	Ausgrid
Fisheries Management Act 1994 (FM Act)	Department of Primary Industries (DPI)	**Consideration:** under s. 220ZZ, by carrying out a test of significance to determine whether the proposal is likely to significantly affect threatened species, populations or ecological communities, or their habitats.	A test of significance was not required (see Appendix D).	Ausgrid
FM Act	DPI	**Notification:** under s. 199, of 28 days notice to carry out dredging and reclamation work in water land (land permanently or intermittently submerged by water).	Notification was given in June 2023 (see Appendix C and Table 2-1).	Ausgrid
FM Act	DPI	**Permit:** under s. 205, to harm any mangroves, seagrass or any other protected marine vegetation.	Ausgrid has applied for a permit under Part 7 of the FM Act for Towers 52 and 54 (see Appendix C and Table 2-1).	Ausgrid
FM Act	DPI	**Permit:** under s. 219, to block the passage of fish.	A Permit was not required (see Appendix D and E).	Ausgrid
Heritage Act 1977	DPIE	**Approval:** under s. 60, to impact items listed on the State Heritage Register	A Permit was not required (see Appendix G).	Ausgrid
Heritage Act 1977	DPIE	**Permit**: under s. 140, for activities with potential to excavate or disturb a relic.	A Permit was not required (see Appendix F).	Ausgrid
Infrastructure SEPP	Local Council	**Notification:** under s. 2.10-2.12, 21 days notice for substantial impact on council related infrastructure and local heritage or works in flood liable land that will change flood patterns other than to a minor extent.	Notice was given at the same time as the ES Act notification (see Appendix C).	Ausgrid
Infrastructure SEPP	DPIE	**Notification:** under s. 2.15, 21 days notice for works adjacent to land reserved under the *National Parks and Wildlife Act 1974*.	Notification was given in May 2023 (see Appendix C).	Ausgrid

Legislation	Authority	Requirement	Comment	Responsibility
Marine Estate Management (Aquatic Reserve) Notification 2020	DPI	Permit: maintenance of existing infrastructure within an Aquatic Reserve.	Ausgrid has applied for a permit under Marine Estate Management (Aquatic Reserve) Notification 2020 for Tower 52 (see S4.12, Appendix C, D and E).	Ausgrid
National Greenhouse and Energy Reporting Act 2007	Clean Energy Regulator (Commonwealth)	**Reporting:** under s. 19 a registered corporation is required to report information on energy production, energy consumption and the amount of greenhouse gas emissions for the facilities under their operational control on an annual basis by 31 October following the financial year for which they are reporting.	Reporting will be undertaken by 31 October each year.	Ausgrid / Contractor
National Parks and Wildlife Act 1974	DPE	**Approval**: under s. 90, to harm or desecrate Aboriginal objects and Aboriginal places.	Ausgrid has applied for an Aboriginal Heritage Impact Permit (AHIP). See Appendix C and F.	Ausgrid
Biosecurity Act 2015	DPI	**General:** Control of priority weeds on land it occupies to which a weed control order applies, to the extent necessary to prevent the weeds from spreading to adjoining land.	Weed management is addressed in section 5.10.	Ausgrid / Contractor
POEO Act	EPA	**General:** under s. 120, no 'dirty water' discharge into a stormwater drain.	Water management is addressed in section 5.6.	Ausgrid / Contractor
POEO Act	EPA	**Licence**: under s. 49, for scheduled activities not based on a premises for the transport of more than 200 kg of category 1 trackable waste in any load.	Any need for a licence for Category 1 trackable waste would be obtained prior to construction and be evaluated as part of preparation of the CEMP.	Ausgrid / Contractor
POEO Act	EPA	**Licence**: under s. 49, for scheduled activities not based on a premises for the transport of more than 200 kg of category 2 trackable waste in any load.	Any need for a licence for Category 2 trackable waste would be obtained prior to construction and be evaluated as part of preparation of the CEMP.	Ausgrid / Contractor
POEO Act	OEH	**Licence**: under s. 122, for scheduled activities that may cause water pollution.	Any need for a licence would be obtained prior to construction and be evaluated as part of preparation of the CEMP.	Contractor
POEO (Waste Regulation) 2014	OEH	**General:** Ausgrid must track the transportation of certain waste.	Waste management is addressed in section 5.9.	Ausgrid

Legislation	Authority	Requirement	Comment	Responsibility
POEO (Waste Regulation) 2014	OEH	**Specific (T63 and T64):** any substance that is 'reasonably capable of being applied to land' is deemed to be waste when it is received at a scheduled waste facility to which section 88 of the Protection of the Environment Operations Act 1997 applies.	Deductions from the waste levy may be claimed by the occupier of a scheduled waste facility on wastes and other materials that are used at the facility for an operational purpose. In accordance with clause 15, the EPA will consider approval of certain types of waste for use at the facility for operational purposes, including construction works.	Contractor
Roads Act 1993	RMS	**Approval:** under s. 138, for road work on a Classified Road.	Any need for approval would be obtained prior to construction and be evaluated as part of preparation of the CEMP.	Ausgrid / Contractor
Rural Fires Act 1997	NSW Rural Fire Service	**Consideration**: under s. 63, public authorities must take all practicable steps to prevent the occurrence and minimise the spread of bush fires on or from land vested in or under its control or management.	Bush fire is addressed in section 5.11.	Ausgrid / Contractor
SEPP Resilience and Hazards 2021	DPIE	**Approval:** under s. 2.7, the carrying out of earthworks, clearing of native vegetation and harming marine vegetation are declared to be designated development and require an EIS.	Routine maintenance works may be carried out without consent, only if any adverse effect on the land concerned is restricted to the minimum possible to allow the works to be carried out.	Ausgrid
SEPP Resilience and Hazards 2021	DPIE	**Approval:** under s. 4.8, development consent for category 1 remediation work	The proposal does not involve the remediation of contaminated land.	Ausgrid
BC Act	DPIE	**Consideration:** carry out a test of significance to determine whether the proposal is likely to have a significant impact which requires a species impact statement.	A test of significance has been completed as required by the Flora and Fauna Assessment (see Appendix D).	Ausgrid
Water Act 1912	DPIE	**Permit**: under s. 113, to extract groundwater via any type of bore, well or excavation.	Any need for a licence would be obtained prior to construction and be evaluated as part of preparation of the CEMP.	Contractor
Water Management Act 2000	DPIE	**Approval:** under s. 91, to carry out a controlled activity in, on or under waterfront land (within 40m of a river, lake, estuary or mean high water mark).	Clause 39A of the Water Management (General) Regulation 2004 provides an exemption from controlled activity approval.	Ausgrid / Contractor

5 Environmental assessment

This section describes the existing environment of the study area and assesses the potential impacts of the proposal during construction, maintenance and operation. This section also outlines the specific mitigation measures necessary to manage and control environmental impacts which consist of:

- specific mitigation measures prescribed in this REF (to be implemented during the design, construction, operation phases of the proposal or in combination)
- controls detailed in Ausgrid's NS174C Environmental Handbook for Construction and Maintenance.

Where there is an inconsistency, the proposal specific mitigation measures would prevail. Only specific mitigation measures are included in this REF, where required to minimise potential impacts.

Once the detailed construction methodology is known, the principal construction contractor would be responsible for developing further mitigation measures as required to meet both legislative requirements, permits, approvals and commitments in this REF. Section 8.1 outlines the requirements for preparing the construction environmental management plan (CEMP).

5.1 Land use

5.1.1 Existing environment

Feeders 916/917 (referred to as 'the feeder') starts at Transgrid's Sydney South Bulk Supply Point located at Picnic Point and heads southeast on a series of steel lattice transmission towers for approximately 22kms. The feeder terminates at Ausgrid's Kurnell zone substation.

The proposal is located entirely within the Sutherland Shire Local Government Area and the suburbs of Woolooware, Cronulla and Kurnell. At this location, the feeders and its transmission towers generally occupy transitional land uses; areas bordering environmentally sensitive zones and commercial, recreational or industrialised areas. The Kurnell peninsula is strongly characterised by both Towra Point Wetlands, Aquatic and Nature Reserves and its associated coastal dune environment.

The peninsula's environmentally sensitive areas are significant. Being protected by state and commonwealth legislation, they provide for substantial mangrove and woodland communities. The peninsula provides suitable environments for a variety of migratory bird species and breeding grounds for aquatic fauna. Adjacent to the new Greenhills Beach estate, several towers border the state heritage listed Towra Point Nature Reserve at the north and west of Captain Cook Drive.

Heading northeast, the feeder diverges into Cronulla's coastal dune environments via Cronulla Sewerage Treatment Plant and Breen Resources Kurnell Landfill site. Here, several freshwater ponds have historically provided breeding habitat for the endangered Green and Golden Bell Frog.

The feeders again traverse Towra Point Nature Reserve where the importance of transitional estuarine zones is again evident. Several towers boarder Towra Point Nature Reserve at the north of Captain Cook Drive. The feeders then terminate at Ausgrid's Kurnell zone substation.

5.1.2 Potential impacts

All towers are located on an easement for operating and maintaining electrical infrastructure in regularly maintained clearings via established and gated existing access tracks. No potential impacts have been identified.

Short term impacts on the surrounding land use during the construction phase of the proposal would include increased traffic intensity (section 5.15), noise (section 5.4) and visual (section 5.14) impacts.

Once constructed, the proposal would not restrict access to bushland, recreational space, commercial or industrial development or residential development. The proposal would have the benefit of facilitating both existing and future surrounding land uses in the region by providing a reliable supply from the electricity network.

The proposal would not have a significant impact on existing land uses. The access roads and power lines would not form a physical barrier as people, animals and machinery would continue to be able to move along and across the proposed route. Padlocked gates would be installed where the route traverses private property boundaries and Ausgrid would hold keys to these locks.

The proposed works will see the operational footprint of the transmission towers reinstated with two new concrete or steel transmission poles at each location. Upon completion of construction, the operational footprint and maintenance requirements would be lower than the current existing operational footprint, likely enable further habitat restoration and opportunities for conservation.

The proposal to realign Towers 72-76 into Captain Cook Drive would;

- avoid some environmentally sensitive areas,
- remove the need for Ausgrid access and maintenance,
- relinquish existing easements (approximately 2.5ha) and enable the removal of existing transmission infrastructure,
- vacate Ausgrid presence on NPWS owned land at this location, and
- enable future regeneration and restoration opportunities

The proposal would result in a net positive impact on the environment because;

- The operational impact would decrease,
- The feeder would be partially realigned into the road reserve, and
- There would be an improved visual outcome for adjacent residences and the community in general.

5.1.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-1.

Table 5-1: Land use mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Consult with affected stakeholders about the proposal.	✓	✓	

Mitigation measures	Implementation of mitigation measures		
Provide information via a free call 1800 number, email address and Ausgrid's website for people wanting more information.	✓	✓	
Realign Towers 72-76 into Captain Cook Drive	✓	✓	✓
Decrease operational footprint upon completion of construction			✓

5.1.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to land use for reasons including:

- construction related impacts would be minor, localised and short-term
- a reliable supply of electricity would allow existing land uses to continue
- a reduction in operational impact
- realignment outside of sensitive landuses
- an improved visual outcome upon completion.
- mitigation measures outlined in section 5.1.3 would readily manage potential impacts.

5.2 Climate change

5.2.1 Existing environment

Climate change describes both changed average climatic conditions, such as increased temperature, lower average rainfall and sea level rise, as well as changes in the patterns of extreme events, including increased frequency and intensity of storms, floods, lightning strikes, heatwaves and fire danger days.

Mitigation

Greenhouse gas (GHG) emissions contribute to climate change. For effective management of emissions, setting operational boundaries with respect to direct and indirect emissions helps assess full spectrum of emissions along our value chain.

Emissions are defined by the GHG Protocol[3] and international standards[4] as:

- scope 1 - direct emissions owned or controlled by our operations
- scope 2 - indirect emissions from the consumption of purchased energy
- scope 3 - other indirect emissions that are consequence of our activities but occur at sources owned or controlled by another company.

Net zero is a state where the overall emissions balance is zero by 2050. Australia must accelerate its efforts to reach the 2050 target and switch to clean power generation, electrifying buildings, transport, agriculture, and industrial sectors. The NSW Government has committed to net-zero emissions by 2050, and the Electricity Infrastructure Roadmap outlines the steps to transition to a zero-carbon electricity grid.

Adaptation

The changing climate presents an increasing risk that our community may be exposed to prolonged power outages due to weather related damage to our network. Our network covers a diverse geographical area and different areas are exposed to different climate risks. Some areas are expected to experience more storms, while others might be exposed to hotter weather or bushfires.

Additionally, some areas recover from extreme weather events more easily than others. Typically, more vulnerable communities find it harder to recover from the impacts of extreme weather event.

Windstorms have historically been the climate change peril that has impacted Ausgrid the most and are expected to grow by around 1% per annum. Recent windstorms in Ausgrid's network have resulted in outages for between 100,000-500,000 customers, in some cases for up to 10-12 days.

Heatwave risks are expected to increase by 22% by 2050 and heat-related hospitalisation costs are estimated to grow to $506M in Sydney by 2050. A heatwave is when it is hotter than 35ºC on three or more consecutive days. Heatwaves also increase electricity demand for air conditioning, while the efficiency of the transmission is reduced by up to 30% due to high temperatures[5]

Sea levels are rising because of climate change and are projected to cause higher, more extensive and more frequent flooding, with very low-lying areas likely to be permanently inundated. Rising sea levels also makes extreme climate events much more damaging, as the higher sea levels raise storm surge levels and increase erosion. Around 80% of the NSW population live within 50km of the coast. The proposal is located in low-lying areas including a number of wetlands. Refer to Section 5.6 for additional information.

Refer to section 5.11 for an assessment of bush fire risks.

5.2.2 Potential impacts

Climate change and how it impacts on our business is important to Ausgrid. It is our aim to maintain and develop a resilient network that can operate and meet our customers' energy needs now and in the future. To mitigate climate change we are also reducing our own carbon emissions and have set targets to reduce our emissions. The targets are a first for an energy distribution organisation in Australia and demonstrate our commitment to the environment.

Ausgrid's Climate Change strategy has four focus areas:

1. Net zero initiatives to reduce emissions to mitigate the causes of Climate Change.
2. Climate resilience to adapt and respond to the impacts of Climate Change.
3. Sustainability policy and governance to ensure we reduce our emissions, meet regulatory and market conditions and customer expectations.
4. Integration of Customer Energy Resources (CER) and provide our customers with more choices and greater use of renewable energy (REZ and rooftop solar).

Mitigation

There are no direct emissions from operating the proposal. Scope 1 emissions arising from the construction of the proposal include those from vehicles and machinery used for materials delivery and handling, excavation, rehabilitation works, waste transport and general construction activities. The major contributor would be the consumption of fuel by transport vehicles.

Ausgrid's assets are subject to regular maintenance and monitoring to ensure all equipment is operating effectively. Minimal staff would be required to attend the asset, limiting scope 1 emissions during maintenance and repairs.

Scope 2 emissions would arise primarily from the consumption of electricity through network losses when the proposal is in operation. Electrical losses are an inevitable consequence of transmitting electricity through the network. This energy is sourced from the Australian electricity market, which is primarily supplied from coal-fired power stations.

The proposal does not change the capacity of the network and hence there is no increase in scope 2 emissions.

Scope 3 emissions relate to all sources of emissions beyond the direct operations (Scope 1) and purchased energy (Scope 2), such as purchasing construction materials and disposing of waste.

Embodied energy corresponds to energy consumed by all the processes associated with the production of building materials and components. This includes mining and manufacturing of materials and equipment, as well as the transport of materials.

Scope 3 emissions are complex to quantify, however where practicable, this proposal has selected materials (concrete poles) and design techniques with lower embodied energy, embodied carbon and embodied water. Steel poles have a higher embodied energy and will be required in some instances due to engineering requirements. Refer to Section 1.7.3.

Materials and waste generated by the proposal include:

- ENM and geofabric for access may be retained onsite, otherwise they may be reused or recycled.
- Concrete in the new poles has lower embodied energy than steel and slightly lower embodied energy than timber. Steel from the replaced towers and replaced wood poles will be recycled.
- Insulators, conductor and earthing wires would be re-used or similar regardless of the type of replacement poles.
- Replacement planting and vegetation reinstatement would be undertaken at each transmission tower location in accordance with a vegetation management plan.

Under the *National Greenhouse and Energy Reporting Act 2007*, Ausgrid is required to annually report information on energy production, energy consumption and greenhouse gas emissions for the facilities under our operational control. Ausgrid also has a Net Zero Strategy in place and aims to reduce our emissions to net zero by 2045, with an interim target of at least 50% by 2030.

Given the current support structures are at the end of their design life, it is likely this proposal will have a neutral impact on emissions, compared to alternative options to replace the aged assets.

Adaptation

Network resilience is defined as *the network's ability to continue to adequately provide network services and recover those services when subjected to disruptive events*.

Climate resilience helps Ausgrid to promote the long-term interests of consumers with respect to price, quality, safety and security of supply by minimising material risks, including those hazards exacerbated by climate change.

To understand Ausgrid's climate risk profile to 2050, climate scientists completed a climate risk assessment which showed our most significant exposures are in the coastal regions (windstorms)[5].

Without replacing the aged infrastructure, increased electricity demand during heatwaves increases capacity constraints and maintenance of the feeders. The proposed support infrastructure has a greater ability to withstand the increased pressure on the network caused by rising demand and increasing extreme weather events.

Ausgrid's Climate Resilience Program aims to maintain current customer and community service outcomes by enhancing the resilience of electricity distribution services in line with the projected growth in risk of disruptive climate events across the period FY25-50. Ausgrid also has a Resilience Decision Making Framework that communicates how we intend to build resilience and respond to the risks and impacts of extreme weather events. Refer to Figure *5-1*.

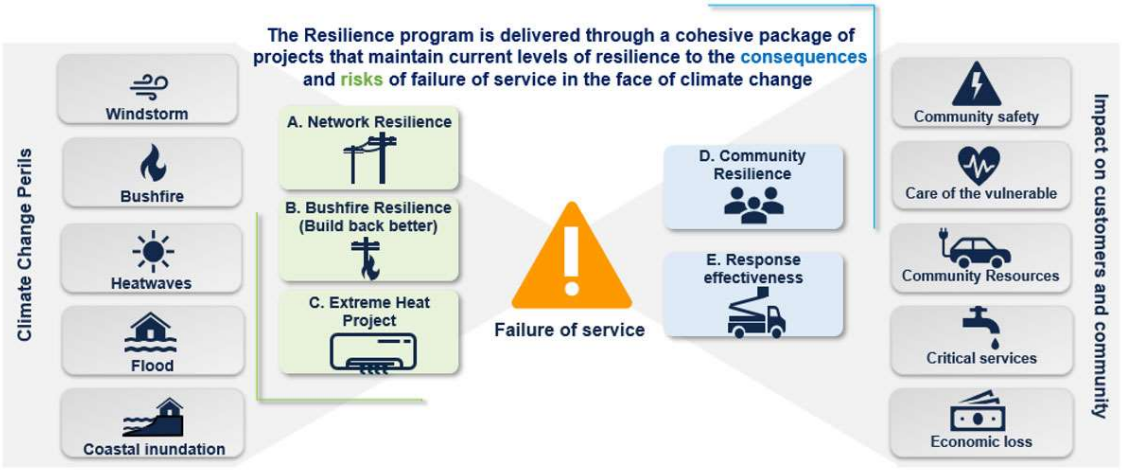

Figure 5-1- Ausgrid's Resilience Decision Making Framework

Sea level rise is very likely to continue even if emissions are reduced. For this reason, adaptation planning for ongoing coastal change is critical. The proposal is located in low-lying areas near coastal areas. Given the proposal relates to replacing the support structures rather than the feeder, there is minimal scope for relocating the proposal into lesser sensitive areas. Albeit, Ausgrid have seen an opportunity to improve the feeder route, benefiting the environmentally sensitive land uses in proximity to Ausgrid's Kurnell zone substation by realigning Towers 72-76 into Captain Cook Drive.

5.2.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-2.

Table 5-2: Climate change mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Comply with section 7 of NS174C Environmental Handbook.		✓	
Implement Ausgrid's Net Zero Strategy.	✓	✓	✓
Replacement planting and vegetation reinstatement to be undertaken at each transmission tower location in accordance with a vegetation management plan.		✓	✓
Adopt Ausgrid's Sustainable Procurement Policy.	✓	✓	

5.2.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to climate change for reasons including:

- construction related impacts would be minor and short-term,
- the proposal is to replace the existing support structures and will not result in increased network losses (scope 2 emissions),
- the proposal will provide more resilient structures and improve Ausgrid's climate change risk profile, and
- the design was adopted to minimise activity in areas affected by coastal processes and hazards as far as practicable.

5.3 Electric and magnetic fields

5.3.1 Existing environment

Electric and magnetic fields (EMF) are part of the natural environment and are present in the atmosphere and static magnetic fields are created by the Earth's core. EMF is also produced wherever electricity or electrical equipment is in use. Power lines, electrical wiring, household appliances and electrical equipment all produce EMF. Power-frequency EMF (also known as extremely low frequency or ELF EMF) have a frequency of 50 Hertz (Hz).

An electric field is a region where electric charges experience an invisible force. The strength of this force is related to the voltage, or the pressure which forces electricity along wires. Electric fields can be present in any appliance plugged into a power point which is switched on. Even if the applicant itself is turned off, if the power point is on, an electric field will be present.

Electric fields are strongest close to their source, and their strength diminishes rapidly as we move away from the source Electric fields are shielded by most objects, including trees, buildings and human skin.

A magnetic field is a region where magnetic materials experience an invisible force produced by the flow of electricity, commonly known as current. The strength of a magnetic field depends on the size of the current (measure in amps) and decreases rapidly with increasing distance from the source. While electric fields are blocked by many common materials, this is not the case with magnetic fields.

Existing magnetic field sources as they relate to Ausgrid's network include a combination of overhead 132kV, 33kV, 11kV and 415V conductors. Refer to Figure 5-2 below for an example of the existing electrical environment.

Figure 5-2- Existing electrical environment along Captain Cook Drive, Kurnell.

In terms of exposure within the home, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) advise that:

> *"Magnetic fields within homes can vary at different locations and also over time. The actual strength of the field at a given location depends upon the number and kinds of sources and their distance from the location of measurement. Typical values measured in areas away from electrical appliances are of the order of 0.1 - 2 mG."*

Typical magnetic field measurements and ranges associated with various appliances and feeders are shown in Table 5-3.

Table 5-3: Magnetic field measurements and ranges associated with various appliances and feeders

Magnetic Field Source	Range of Measurement (in mG)
Electric Stove	2-30
Computer Screen	2-20
Television Screen	0.2-2
Electric Blanket	5-30
Hairdryer	10-70
Refrigerator	2-5

Magnetic Field Source	Range of Measurement (in mG)
Electric Toaster	2-10
Electric Kettle	2-10
Electric Fan	0.2-2
Street Distribution Line (directly underneath)	2-20
HV Transmission Overhead Line (directly underneath)	10-200

Source: Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), Measuring magnetic fields.

5.3.2 Potential impacts

The question of EMF and health has been the subject of a significant amount of research since the 1970s. This large body of scientific research includes both epidemiological (population) and laboratory (at both a cellular and an organism level) studies.

Research into EMF and health is a complex area involving many disciplines, from biology, physics and chemistry to medicine, biophysics and epidemiology.

EMF at levels well above the recognised international exposure guidelines can cause both synaptic effects perceived as magneto-phosphenes in the sensitive retinal tissue (magnetic fields) and micro-shocks (electric fields). The exposure guidelines are in place to protect against these biological effects.

No single study considered in isolation will provide a meaningful answer to the question of whether or not EMF can cause or contribute to adverse health effects. In order to make an informed conclusion from all of the research, it is necessary to consider the science in its totality. Over the years, governments and regulatory agencies around the world have commissioned many independent scientific review panels to provide such overall assessments.

As part of the Health and Aging Portfolio, Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is a Federal Government agency charged with the responsibility for protecting the health and safety of people, and the environment, from EMF.

ARPANSA[6] advises that:

"The scientific evidence does not establish that exposure to the electric and magnetic fields found around the home, the office or near powerlines causes health effects"

These findings are consistent with the views of other credible public health authorities. For example, the World Health Organization (WHO)[7] advises that:

> *"Despite the feeling of some people that more research needs to be done, scientific knowledge in this area is now more extensive than for most chemicals. Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields."*[7]

This proposal would not change the

- Load profile,
- Configuration, or

- Phase arrangement

of the existing feeder. Whilst part of the feeder would be realigned into Captain Cook Drive, as shown in Figure 5-3 below, the nearest permanent receiver would be approximately 25m from the southernmost feeder.

Figure 5-3- Proposed feeder realignment in relation to the nearest permanent receiver

5.3.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-4.

Table 5-4: EMF mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Refer any public enquiries to Ausgrid's Environmental Services.	✓	✓	✓
Decommissioning and removal of the existing 33kV overhead feeder along Captain Cook Drive at Kurnell.	✓	✓	
Vertical transmission feeder configuration ensuring conductors are positioned furthest from permanent receivers	✓	✓	

5.3.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to EMF for reasons including:

- the proposal would not change the load profile, configuration, or phase arrangement of the existing conductors with the exception of a small section on Captain Cook Drive.
- the proposal would meet all relevant International health guidelines, including the, ICNIRP Guideline, and IEEE Standard

5.4 Noise and vibration

5.4.1 Existing environment

The normal day time noise and vibration environment near the proposed route is primarily influenced by traffic flows (including heavy vehicles) and aircraft noise. Noise associated with Botany Ports and their vessels was also observed.

The existing environment is characterised by a mix of commercial, light industrial, recreational areas and residential receivers.

As no detailed noise impact assessment was undertaken with this proposal, a conservative approach has been taken to define sensitive receivers in *proximity (250m)* of the route. See Table 5-5 below;

Table 5-5 – Sensitive receivers in proximity to the proposal

Tower (number)	Receiver (type)	Distance (m)
52	High School	50-100m
52	Residences- Woolooware	~240m
53	High School (Woolooware)	150-200m
53-56	Cronulla Golf Club	50-250m
56	High School (Cronulla)	100-200m
56	Residences- Wanda	~240m
57-59	Residences – Greenhills	50-250m
60-61	Residences – Greenhills	~240m
69	Commercial- various	50-100m
77	Residences – Kurnell	~240m

5.4.2 Potential impacts

Noise during construction

Noise and vibration may be emitted to varying degrees pending construction techniques utilised at each tower location.

Each pole base would only take approximately 15 minutes to be driven, however would create impulsive vibrations. Given the location of each tower with respect to the nearest

sensitive receivers, compliance with adopted structural vibration goals at nearest residential, sensitive and commercial receivers would be expected to be achieved.

Any vibration impacts are anticipated to be less than one week in duration and predominantly associated with driven pile techniques. Best management practice applies during the construction process. Detailed assessment was not undertaken with respect to driven piling activities and vibration impacts. Minimum working distances for vibratory pile driving (sheet piles) is approximately 20m (Transport for NSW, July 2023). Where driven piles are required within 20m of a habitable built structure, additional geotechnical assessment may be required in the first instance.

For all other poles, drilling and excavation work would be required using heavy plant and machinery. Given the ground conditions and the absence of rock throughout the study area, these activities are not expected to be high impact. Noise generated would be governed by the operation of the machinery rather than the activity itself.

The importation of fill materials and compaction activities may be likely to generate noise. When in proximity to noise sensitive receivers, consideration of low noise alternatives would be given to achieve the required construction site compaction levels, for example a compaction roller rather than wacker packer.

Vegetation management may be noisy via the use of the mulcher or chipper at site. These activities are expected to be no more than two days in duration and undertaken during standard operating hours at any one location.

The tower is made from galvanised or coated steel and would be dismantled/cut on site and removed to be recycled. Whilst the cutting up of the tower could be considered noisy work, it is considered best practice and industry standard to utilise hydraulic cutters to undertake this activity thus eliminating the generation of a significant noise source. Refer to section 5.8 for additional information concerning hazardous paint systems.

The noise impacts to wildlife in this environmentally sensitive area also need assessment. While the construction phases of the proposal (along with its ancillary activities) may cause temporary disturbance to animals, the impacts from noise emissions are likely to be localised close to the proposal (up to 100 m) and are not likely to have a significant, long-term, impact on wildlife populations. Refer to Section 5.10 for further impact assessment to fauna with particular reference to controls around mitigating impacts to migratory birds.

Given the linear nature of the proposal in relation to the activities undertaken, it is not expected that a sensitive receiver would be impacted by high impact activities for more than three consecutive weeks at any given time. Thus a qualitative assessment is sufficient for this proposal. The ICNG makes provision for a qualitative assessment and is to be undertaken by the principle contractor utilising, as a minimum those controls outlined in Section 5.4.3 below and reference Ausgrid's Community Engagement Plan (Appendix C).

Impacts to the noise and vibration environment are only associated with construction activities and not during operation. Upon completion of the proposal, there would not be any additional noise or vibration to the surrounding environment.

5.4.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-6.

Table 5-6: Noise and vibration mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	**Construction**	**Operation**
Comply with sections 4.2 of NS174C Environmental Handbook.		✓	
All workers to be made aware of the presence of sensitive receivers (Table 5-5) in the area and the need to avoid impacts.		✓	
Provide at least four clear business days notice to affected receivers (Table 5-5) prior to starting work unless it is emergency works or it is discussed with the affected receivers face-to-face. Include the following information in notification letters: • a description of the works and why they are being undertaken • details of the works that will be noisy • work hours and expected duration • what is being done to minimise the impacts (eg respite periods) 24 hour contact number.		✓	
Consult with affected sensitive receivers, see Table 5-5.		✓	
Where practical and relevant, schedule any high-impact activities during school holidays.		✓	
With reference to Table 5-5, plan the site layout to minimise movements that would activate audible reversing and movement alarms.		✓	
With reference to Table 5-5, Do not affect a receiver for more than two nights in a one-week period.		✓	
Due to unavoidable work requirements or a regulatory licence requirement (eg RMS) out of hours and/or night works may be required.		✓	

Mitigation measures	Implementation of mitigation measures		
Where noisy works impacting a sensitive receiver (Table 5-5) will; • likely to exceed three weeks in duration at one location, or • cause offensive noise, or • involve night pile driving develop and comply with a qualitative Construction Noise and Vibration Management Plan. The management plan must be in accordance with the Interim Construction Noise Guidelines (NSW DECC, 2009). Where noise cannot be effectively managed by other means, additional quantitative assessment may be required.	✓	✓	
Prior to the commencement of work where driven piles are required within 20m of a built structure, obtain additional geotechnical assessment and/ or advice.		✓	
Where works are proposed to be undertaken during breeding periods*, a Migratory Bird Construction Management Plan must be prepared prior to the commencement of works which outlines mitigation strategies for; • the disturbance to migratory shorebird breeding, roosting and/or feeding habitat, • light and noise impacts, • potential predation, • water quality and sedimentation, and • ongoing monitoring for migratory shorebirds during construction works. ** September – April for Towers 54 and T72-76*	✓	✓	
With reference to Table 5-5, consideration of low noise alternatives would be given to achieve the required construction site compaction levels, for example a compaction roller rather than Wacker packer and hydraulic cutters rather than angle grinders.		✓	
Provide information via a free call 1800 number, email address and Ausgrid's website for people wanting more information.	✓	✓	
Provide signage outside the worksite detailing who is undertaking the works and a 24 hour contact number.		✓	

Mitigation measures	Implementation of mitigation measures		
Have a documented complaints process, including an escalation procedure so that if a complainant is not satisfied there is a clear path to follow		✓	
Keep a register of any complaints, including details of the complaint such as date, time, person receiving complaint, complainant's contact number, person referred to, description of the complaint, time of verbal response and timeframe for written response where appropriate.		✓	
Undertake condition reports of structures within five metres of vibration generating works.		✓	

5.4.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to noise and vibration for reasons including:

- the construction would be temporary and transitory,
- potential noise impacts would comply with the OEH ICNG,
- potential vibration impacts would comply with the OEH *Assessing Vibration: A Technical Guidelines* (2006), and
- mitigation measures outlined in section 5.4.3 would readily manage potential impacts.

5.5 Air quality

5.5.1 Existing environment

No air quality monitoring has been undertaken specifically for the proposal, however DPIE operates a comprehensive air quality monitoring network comprising sites throughout the State, with particular focus on the main population centres of Sydney, the lower Hunter and the Illawarra. The closest monitoring site to the proposal is at Randwick Army Barracks, approximately 20km to the north of the study area. Monitoring data and meteorological data was utilised for the air quality modelling and assessment.

Key air pollutants as identified under the National Environment Protection Measure for Ambient Air Quality include: carbon monoxide, nitrogen dioxide, lead, sulphur dioxide, photochemical smog and fine particles. Photochemical smog (as ozone) and, to a lesser extent, fine particles remain significant issues in NSW.

Air pollution includes emission of odours, smoke, fuel or any other substances to the air. There are many substances in the air which may impair human health as well as the health of plants and animals, or reduce visibility. Impacts from pollutants are governed by the intensity of pollutant discharges, type of discharges and the prevalent weather conditions.

The existing (background) air quality environment is highly influenced by the coastal environment and its processes occurring in the vicinity of the proposal. Other influences on air quality include urban and industrial activities (landfilling and gravel refining) emissions from transportation, major industry, commercial operations, domestic activities.

Sulphurous odours were observed during field inspections at those towers in immediate proximity to wetlands subject to tidal inundation. These odours are a result of naturally occurring acid sulphate soils which are known to occur within the area.

Coastal processes driven by wave action and wind induced salt spray across the Kurnell Peninsula has been the primary driver for steel lattice asset replacement across this component of Feeder 916/917. Salt laden air has demonstrably damaged tower structures, increased near term maintenance costs and inevitably shortened their operational life. Tower degradation and corrosion has likely been exacerbated at some locations due to the presence of heavy industry including landfilling, gravel refining and sand mining; all of which have the potential to increase particulate matter into the local atmosphere, acting as a conduit to accelerated deterioration of tower structures.

5.5.2 Potential impacts

Direct potential impacts from the proposal to the local air quality would be limited to dust and emissions from vehicles, plant and equipment generated during the construction and to a lesser extent the operational phases. Given the nature of the works, it is unlikely that there would be an odour impact.

The presence of ASS material can produce an offensive odour, predominantly due to hydrogen sulfide (H2S - rotten egg gas) and this may in turn affect local amenity. However, the existing environment is locally characterised by such odours. Given each tower location is greater than 50m from any permanent sensitive receiver, natural dispersion and general ASS management is expected to suffice for this proposal.

Exhaust emissions are likely to include nitrogen oxides, carbon monoxide, sulphur oxides, hydrocarbons and total suspended particulates. All equipment would be fitted with approved exhaust systems and maintained to keep vehicle exhaust emissions within accepted standards.

Activities that may generate dust include wind erosion of exposed surfaces, movement of topsoil during excavations and disturbance of stockpiles, movement of vehicles and equipment over unsealed roads, trenching, boring, establishing of access tracks / pads / nibs, clearing vegetation and site preparation works.

The proposal would require the importation of materials and it is estimated disturbed area of more than 250 m2 would be required. Further, in many instances worksites would be in proximity to sensitive environments. An ESCP is required to be prepared for most tower locations. Each site would be exposed for up to three months to facilitate construction work. Each ESCP must be produced in accordance with the ‘Blue Book’[8].

Where sensitive environments are not in immediate proximity and disturbed areas are less than 250m2, Erosion and Sediment Control devices consistent with Ausgrid’s NS174C would be deemed sufficient. Sensitive environments, for the purpose of this section refers to environments which meet the definition of Ecologically Sensitive Areas in NS174C.

The site would be inspected for compliance with the ESCP during the construction phase. During the operational phase works would comply with the erosion and

sediment control measures detailed in section 2.2 of NS174C Environmental Handbook.

Impacts to air quality would be predominantly associated with construction activities. Several mitigation measures (described in section 5.5.3) would be implemented to ensure the amount of dust and emissions generated is minimal and would not affect the surrounding environment.

5.5.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-7.

Table 5-7: Air quality mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Comply with sections 2.1 Erosion and sediment control and 2.2 Air of NS174C Environmental Handbook		✓	
All workers to be made aware of the presence of sensitive receivers in the area and the need to avoid impacts.		✓	
Visually monitor dust levels during works. If dust is leaving site, causing a safety issue or complaints are received suspend works and consider mitigation options and/or substitute with an alternate process.		✓	
Restrict traffic movement and vehicle speeds over disturbed areas and unsealed roads.		✓	
Install dust barriers (shade cloth) on fences and gates as best practice		✓	
The proposal would require the importation of materials and estimated disturbed area of more than 250 m2. Further, in many instances worksites would be in proximity to sensitive environments^. An ESCP is required to be prepared for most* tower locations. The ESCP is to be prepared by a suitably qualified person (i.e. who has completed an International Erosion Control Association (IECA) endorsed course or passed the examination for Certified Professional in Erosion and Sediment Control (CPESC)) in accordance with Managing Urban Stormwater – Soils and Construction. **Where sensitive environments are not in immediate proximity and disturbed areas are less than 250m2, Erosion and Sediment Control devices consistent with Ausgrid's NS174C would be deemed sufficient.* *^ Sensitive environments, for the purpose of this section refers to environments which meet the definition of Ecologically Sensitive Areas in NS174C.*	✓	✓	

Mitigation measures	Implementation of mitigation measures		
No stockpiling on site. All spoil to be tipped into a truck or skip bin.		✓	
To assist in odour control, minimise the time that ASS soils are exposed to air by staging works and storing soils in a lined and covered skip bin or wrapped in plastic. Refer to Section 5.8 for additional information on ASS Management.		✓	

5.5.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to air quality for reasons including:

- construction related impacts would be minor, localised and short-term,
- once in operation, the proposal would have no impact on air quality, and
- mitigation measures outlined in section 5.5.3 would readily manage potential impacts.

5.6 Hydrology

5.6.1 Existing environment

Towra Point Nature Reserve consists of 386.5 hectares of wetlands that lie on the southern shore of Botany Bay. The Georges and Cooks rivers and their tributaries flow into Botany Bay.

Whilst the Botany Bay catchment has a high percentage of bushland, most of the land within the catchment is urban and industrial. Runoff from these areas usually drains directly into the wetlands with no filtration through bushland.

Water from the South Botany Bay sub-catchment drains into Woolooware Bay and Quibray Bay. Runoff from the industrial and residential areas of Taren Point and other surrounding suburbs drains into Woolooware Bay including runoff from playing fields, a rugby league stadium and a golf course. Only a small number of gross pollutant traps and water-quality improvement devices are in place to trap rubbish. The main source of drainage into Quibray Bay is from the Kurnell industrial area which contains the Caltex oil refinery and Kurnell Landfill Company.

Towra Point Wetlands is identified for its value in supporting threatened and endangered species and ecological communities, plants and animals at critical life stages, and fish populations. Associated biodiversity values include;

- hydrological (rain and tides, runoff),
- nutrient cycling (activities of micro flora and fauna),
- food web and habitat services (the transfer of nutrients from organisms predominantly through the intertidal zone).

This is the single biggest item of significance in proximity to the proposal. However, to contextualise the nature and extent of any impacts this proposal may have, provided suitable controls are put in place there would likely be no more than minimal impact on areas waterways and wetlands.

At Woolooware and Cronulla, the nearest surface water receptor is the marine ecosystem of Woolooware Bay located directly to the north and west of the Towers. Groundwater levels have been identified between 0.51 m AHD and 0.83 m AHD in this area. Recorded groundwater level fluctuations did not identify significant groundwater level changes over tidal phases and were not significantly influenced by rainfall events.

At Kurnell, groundwater has been previously encountered in sands adjacent to Captain Cook Drive at depths ranging from approximately 1.40 – 2.76 m below the surface level. Based on previous investigations, groundwater is considered to flow in a generally westerly direction towards Quibray Bay.

5.6.2 Potential impacts

Under clause 228(2)(p) of the EP&A Regulation, Ausgrid is required to consider any impact on coastal processes and hazards, including those under projected climate change conditions. The NSW Government acknowledges that increased sea levels will have significant medium to long-term social, economic and environmental impacts for development located in the coastal zone.

The Feeder is located in low-lying areas near coastal locations. Given the nature of this work being asset rather than feeder replacement, there is minimal scope for realignment into lesser sensitive areas.

The proposal is located in close proximity to the wetlands flanking the southern shoreline of Botany Bay. Each tower, albeit only bordering the wetlands represents a substantial presence in the areas transitional buffer from heavily impacted disturbed to sensitive environments.

The removal of each tower and replacement with two poles at each location within Ausgrid's easement in largely previously disturbed footprints means the affect on the wetland can be managed with no more than minimal impact.

Civil work would cause considerable surface disturbance at each to site during the initial phases of construction and to facilitate pole installation, creating potential for erosion and sedimentation of waterways. During and after wet weather, dewatering may be required to allow work to continue. Onsite treatment of the water may be undertaken to remove sediment from the water. In the case of incursion of groundwater in the basement, groundwater would be tested for water quality and if it satisfies the adopted criteria, it would be discharged to drainage channel/stormwater drain on the boundary of the site.

Up to five tonnes of soil may be managed on site at any point in time. Where no in sensitive environments, stockpiles would be covered when not in use and would be protected with sediment fencing. Additional information on spoil management and stockpiling can be found in Section 5.8.

At the completion of earthworks all exposed soil surfaces would be stabilised in accordance with a vegetation management plan. This would ensure that there would be no long term erosion or sediment impact. Where possible, this stabilisation would happen progressively during construction.

The construction works would involve vegetation removal at each tower location. This vegetation removal would result in areas of exposed soil material that would be prone to erosion in a rainfall event. Given the proposal size, duration of works, the natural topography constraints and the proximity to a variety of sensitive environments it is

proposed to implement temporary sediment control measures on site to minimise any impacts from sediments entering the surrounding environment. Upon completion of construction work, a vegetation plan would be developed to restore an appropriate riparian corridor in consultation with the project's ecologist, refer to section 5.10.

The proposal does not require an increase in hardstand areas or need to change topographic features, therefore local drainage flows would not be altered.

Groundwater is likely to be intercepted to install poles in low lying areas during excavation, boring and pile driving activities. The groundwater intercepted may require dewatering and a licence under the *Water Act 1912* or *Water Management Act 2000*. This licence would not be required during the operation of the proposal.

Water quality in the study area may be affected by spills of hydraulic oil and fuels from equipment or vehicles. Quantities of these products would be kept to a minimum and would be stored in a suitably bunded and covered area. Adequate storage and refuelling controls would be installed to mitigate impacts. Plant and equipment would also be maintained to minimise the potential for leakages.

5.6.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-8.

Table 5-8: Hydrology quality mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Comply with sections 2.1 Erosion and sediment control, 3.1 Oil fuel and chemicals and 2.3 Water discharge of NS174C Environmental Handbook.		✓	
All workers to be made aware of the presence of sensitive areas and the need to avoid impacts.		✓	
The proposal would require the importation of materials and estimated disturbed area of more than 250 m2. Further, in many instances worksites would be in proximity to sensitive environments^. An ESCP is required to be prepared for most* tower locations. The ESCP is to be prepared by a suitably qualified person (i.e. who has completed an International Erosion Control Association (IECA) endorsed course or passed the examination for Certified Professional in Erosion and Sediment Control (CPESC)) in accordance with Managing Urban Stormwater – Soils and Construction. **Where sensitive environments are not in immediate proximity and disturbed areas are less than 250m2, Erosion and Sediment Control devices consistent with Ausgrid's NS174C would be deemed sufficient.* *^ Sensitive environments, for the purpose of this section refers to environments which meet the definition of Ecologically Sensitive Areas in NS174C.*		✓	

Mitigation measures	Implementation of mitigation measures		
Maintain sediment controls, especially during periods of rainfall.		✓	
Remove temporary erosion and sediment controls as the site is stabilised or rehabilitation is complete		✓	
No stockpiling on sites in Coastal Wetland and mapped proximity areas. This includes all Towers with the exception to T61-65, T67-68 and T70. All spoil to be tipped into a truck or skip bin.	✓	✓	
Stockpiles outside of environmentally sensitive areas must be located within the confines of the designated fenced construction footprint and away from roadways, gutters, drains, slopes, concentrated flow paths and channels.		✓	
Stabilise disturbed areas promptly, this may include progressive rehabilitation		✓	✓
Access tracks are to be maintained in accordance with Erosion and sediment control on unsealed roads (OEH, 2012) and Managing Urban Stormwater Volume 2C Unsealed Roads.		✓	✓
Organise a licensed taker to remove the water if the relevant discharge criteria cannot be met.		✓	✓
Where construction activities intercept subsurface water and dewatering is required, activities would be assessed and documented in a Construction Dewatering Management Plan. As a minimum, the plan would detail; • Estimated volumes, • Dewatering method, • Acid Sulphate Soil risk*, • Treatment and/ or discharge disposal requirements, and • Monitoring for effectiveness The plan must ensure the dewatering operations do not impact on the quality of adjacent surface waterbodies. Any license or requirements of an aquifer interference exemption would be the responsibility of the Principal Contractor. ** Water Quality (2018) Guidance for the dewatering of acid sulfate soils in shallow groundwater environments*	✓	✓	
Prior to construction, outline the location of access routes, compound sites, construction boundaries, and exclusion zones on detailed designs, clearly staked and marked onsite.		✓	
Prior to construction, prepare and implement a Vegetation management plan.		✓	

Mitigation measures	Implementation of mitigation measures		
If dewatering of groundwater is required during construction, investigate the need to obtain a licence under the *Water Act 1912* from DPIE where required.		✓	
Provide a secure and bunded area for the storage of fuel, oil or chemicals. This area would be imperviously bunded with a capacity to contain not less than 110% of the volume of the largest container.	✓	✓	
Prior to construction, nominate and sign post a plant refueling area.		✓	
Store oil in a bund unless it is temporary storage.		✓	✓
Ensure a spill kit is readily available and workers and know how to use it.		✓	✓

5.6.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to hydrology for reasons including:

- construction related impacts would be minor, localised and short-term
- once in operation, the proposal would have no impact on hydrology
- potential hydrology impacts would comply with the Blue Book
- mitigation measures outlined in section 5.6.3 would readily manage potential impacts.

5.7 Geology and soil

5.7.1 Existing environment

The study area occurs on primarily low-lying topography with elevation ranging from 2-6m above sea level (asl) where the study area is positioned on the edge of Woolooware Bay, Weeney Bay and Quibray Bay. Elevation rises to 35m asl where the study area is situated further inland (Google Earth 2023). From west to east, the Subject Site is situated on the Mangrove Creek, Kurnell, Wollongong, and Disturbed Terrain soil landscapes as indicated on the Soil Landscapes of the Wollongong – Port Hacking 1:100,000 Sheet.

Review of the regional geologic maps indicate the Cronulla towers are underlain by organic-rich muddy marine sand. Review of the regional soil map identify the local area to be located on tidal mudflats with a relief of less than 3 m and a slope less than 3 %. The local soils consist of waterlogged calcareous sands and siliceous sands.

The Wollongong 1:250,000 Geological sheet S1 56-9, second edition 1966, indicates that the some of the Cronulla towers towards Kurnell are located on alluvium, gravel, swamp deposits and sand dunes from the quaternary period. Previous reports also suggest the presence of sandstone bedrock may be encountered in some areas. The Australian Soil Resource Information System (ASRIS) and CSIRO Australia (www.asris.csiro.au), consider that the general soil type of the site is comprised of Podosol soils. Podosols of the Kurnell area are soils from ancient sand dunes.

Characteristics of these soils include poor drainage and very high erosion potential when cleared.See Appendix B for additional information on the geotechnical investigations undertaken.

5.7.2 Potential impacts

Civil works would occur using tip truck to deliver material, an excavator to undertake track repairs and boring of required holes. This would also be used to prepare the cleared area for safe traversal by required vehicles and for laying down of poles and tower. The concrete poles would be erected by mobile and slew cranes and line workers would undertake works via suitably sized (reach) EWPs. Earth rods would be drilled and installed by a drilling rig, and these would be linked underground to the new poles. A crane would then be used to lift out the tower in a couple of sections and then lay these down in the clear area to then be cut up and removed from site in smaller / manageable sections. The site would then be cleaned up and then suitably agreed replanting may occur of some areas. Ausgrid would ensure access gates are re-installed and any damaged fencing or other barriers to prevent future unauthorised access suitably replaced.

ENM would be utilised (placed on a geofabric marker layer) to form required lay down and heavy vehicle access areas such as the track and the cleared areas. The poles will be mainly concrete, which have been found to possess greater thermal mass, hence, perform better in bushfire prone areas located across the Kurnell Peninsula compared to steel poles, which will be required in some instances due to engineering requirements. Line materials would be made from forged steel and polymeric line insulators. Existing towers are made from galvanised and/or coated steel which would be dismantled/cut on site, removed and recycled. Refer to section 5.8 for information on hazardous paint coatings.

Upon the completion of work imported ENM may be removed and the geofabric marker disposed. Where there is a demonstrated net benefit of the imported material remaining on site, Ausgrid will liaise with Sutherland Shire Council and other relevant stakeholders such as the Department of Primary Industries to ensure the material left is;

- in a state fit for operational purposes,
- demonstrated to have minimal to no maintenance requirements and
- to present no long-term risk to the environment or community.

The construction of the proposal would cause some minor soil instability. Given the importation of materials and estimated construction footprint, there would be more than 250 m^2 of soil disturbed at any one time, and in many instances in proximity to sensitive environments therefore an ESCP is required to be prepared for most tower locations. Each site would be exposed for up to three months to facilitate construction work. The ESCP is to be prepared by a suitably qualified person (i.e. who has completed an International Erosion Control Association (IECA) endorsed course or passed the examination for Certified Professional in Erosion and Sediment Control (CPESC)) in accordance with *Managing Urban Stormwater – Soils and Construction*[9].

The use of existing access tracks could cause a long-term erosion issue. Each track is to be maintained in accordance with *Managing Urban Stormwater Volume 2C Unsealed Roads*[10] and *Erosion and sediment control on unsealed roads – A field guide for erosion and sediment control maintenance practices*[11]. Any long-term impacts

would be minimised by the inclusion of cross banks and crowning as required by a suitably qualified person.

A specific ASS Management Plan would be developed for the works prior to construction commencing. Further soil testing may occur prior to earthworks to determine the nature of the excavated material, presence of ASS and how excavated material would be reused or disposed of according to the NSW *Waste Classification Guidelines*[12].

5.7.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-9.

Table 5-9: Geology and soil mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Comply with section 2.1 Erosion and sediment control of NS174C Environmental Handbook.		✓	
All workers to be made aware of the presence of sensitive areas and the need to avoid impacts.		✓	
The proposal would require the importation of materials and estimated disturbed area of more than 250 m2. Further, in many instances worksites would be in proximity to sensitive environments^. An ESCP is required to be prepared for most* tower locations. The ESCP is to be prepared by a suitably qualified person (i.e. who has completed an International Erosion Control Association (IECA) endorsed course or passed the examination for Certified Professional in Erosion and Sediment Control (CPESC)) in accordance with Managing Urban Stormwater – Soils and Construction. **Where sensitive environments are not in immediate proximity and disturbed areas are less than 250m2, Erosion and Sediment Control devices consistent with Ausgrid's NS174C would be deemed sufficient.* *^ Sensitive environments, for the purpose of this section refers to environments which meet the definition of Ecologically Sensitive Areas in NS174C.*	✓	✓	
Prepare and comply with a Site-Specific ASS Management Plan*. Consistent with the ASS Manual (NSW), spoil may be treated in accordance with Part 4 of the EPA Waste Classification Guidelines (2014). **Mapped areas are shown for Towers 52-59, 65-77 and should be managed as such unless tested.*	✓	✓	

Mitigation measures	Implementation of mitigation measures		
Maintain access tracks in accordance with *Managing Urban Stormwater Volume 2C Unsealed Roads* and *Erosion and sediment control on unsealed roads – A field guide for erosion and sediment control maintenance practices.*	✓	✓	✓

5.7.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to geology and soil for reasons including:

- the construction would be temporary, localised, short term and transitory
- reinstatement works would stabilise the proposed construction footprints once construction is complete
- once in operation, the proposal would have no more than a minor impact on geology and soil
- mitigation measures outlined in section 5.7.3 would readily manage potential impacts.

5.8 Contamination

5.8.1 Existing environment

Given the nature and extent of ground disturbance activities at each site, a limited desktop review of site history information has been undertaken to identify potential areas of environmental concern (PAEC) and related Contaminants of Potential Concern (COPC) which may arise because of previous and current land uses.

Potential sources of contamination at tower locations may be attributable to;

- Historical infilling associated with the construction of Captain Cook Drive and/or initial construction of tower locations,
- The Oyster Farm at T53 as NSW EPA notified site,
- Activities associated with sand mining and the potential for alterations to underlying ground conditions,
- Activities associated with Council's depot and water detention pond at the intersection of Captain Cook Drive and Elouera Road,
- Breen Resources and its associated landfilling activities,
- The former Abbott Australiasia and Phillips Imperial Chemicals (now Dicker Data) site, and
- The Caltex Oil terminal

There are multiple reports associated with adjacent activities and developments in proximity to the proposal. Only one documented contamination source will directly affect this proposal at Tower 53. All others are only for information to be used as a guide when informing the contractors CEMP process and anticipated finds at each site.

Given the limited nature and extent of intrusive works for this proposal, a project-specific Stage 2 Contamination Assessment was not completed.

The existing steel lattice transmission towers which form part of this proposal are at the end of their serviceable life. Structures are corroded to varying degrees with their paint systems compromised. Whilst towers have been refurbished in the past under separate planning pathways, paint systems may contain potentially hazardous substances and remain on some structures. Sampling and testing for hazardous paints in accordance with AS/NZS 4361.1:2017 was not completed as part of the planning for this proposal.

5.8.2 Potential impacts

Whilst the above PAEC's may provide a pathway for COPC's in proximity to tower locations, the highly controlled nature of piling and limited amount of spoil within a designated construction footprint for earthing related activities means the soil can be assumed to be contaminated and managed on site accordingly. This would include observing good hygiene and PPE practices, placing spoil immediately into lined skip bins before being representatively tested in accordance with the NSW EPA Sampling Design guidelines against Part 1 of the NSW Waste Classification Guidelines prior to disposal.

Asbestos in soils is one such COPC which cannot be ruled out where fill materials are encountered at site. Asbestos fragments were identified at Tower 54 during site inspections amongst bricks and other building material likely attributable to historical illegal dumping activities (refer to NPWS REF). Accordingly, the contractor would be required to have an unexpected finds protocol in place in the event asbestos has been uncovered. All works with the potential to disturb asbestos containing materials must be undertaken in accordance with WHS requirements, SafeWorkNSW Code of Practice – How to Safely Remove Asbestos and the specific work instructions detailed in Ausgrid's NS211 Working with asbestos products.

Soil quality may be affected by spills of hydraulic oil and fuels from equipment or vehicles. However, the extent would be localised and appropriate controls would minimise the potential for contamination to occur. Quantities of these products would be kept to a minimum and would be stored in a suitably bunded and covered area. Adequate storage and refuelling controls would be installed to mitigate impacts. Plant and equipment would also need to be maintained to minimise the potential for leakages. Any accidentally contaminated soil would be excavated, stockpiled, chemically classified for disposal and transported to an appropriately licensed waste facility.

Previous studies and their findings relevant to this proposal are summarised in Table 5-10 below.

Table 5-10- Contamination investigations undertaken in proximity to the proposal.

Site	Towers	Report	Comment
Shark Park	T52	Phase 2 Detailed Environmental Site Assessment (DLA 2013)	Asbestos fragments detected in fill materials.

Oyster Lease	T53	Long Term Environmental Management Plan (LTEMP) (JBS&G 2022)	It is the responsibility of contractors and personnel undertaking works within the site (extent of the LTEMP) under the management of the Site Operator or TfNSW and their appointed Project Managers where applicable to ensure that: • They do not commence any works within the site unless they have been inducted into and understand the requirements of this LTEMP; and • They implement all the procedures documented within this LTEMP during all works at the site as well as any additional contamination and/or WHS regulatory requirements in force at that time inclusive of communications with the Site Operator.
Breen Resources	T62-67	Contamination Status Report (GHD 2021)	Available soil data from stockpiled recovered fines/ recovered aggregate analysis indicate that contaminant concentrations meet the analytical thresholds in their respective exemptions and are all below adopted human health criteria for current and future use (recreation / public open space and commercial). Consistent ecological and human health exceedances across the study area in groundwater including Ammonia and manganese (Figure 12). The CEMP should include an unexpected contamination finds protocol to be implemented during construction. If signs of contamination are encountered during construction, such as odours, staining and ACM, work in the area should be stopped and contamination managed in accordance with an unexpected contamination finds procedure.

Dicker Data	T71-T73	Remedial Action Plan (WSP 2018)	Remediation restricted to the underside of demolished buildings and stockpiles across the site. • Asbestos surface fragments were identified at site. VOC's and PCB's were all below the limit of reporting. • TPH, BTEX, PAH, OCP, PCB were not reported at concentrations exceeding the site criteria. • Off-site impacts were not determined
Former Caltex Refinery	T74-77	Remedial Action Report (WSP 2021) Caltex Kurnell Refinery Conversion (NSW DPIE, 2019) NSW EPA CLM Act Public Record	The EPA reasonably suspects that the site is potentially contaminated with one or more of the following substances ("the contaminants"): • Petroleum hydrocarbons (TPH); • Benzene, Toluene, Ethylbenzene and Xylenes (BTEX); • Polycyclic aromatic hydrocarbons (PAH) including naphthalene; • Ammonia, phosphorus, phosphate and nitrate. There are potential exposure pathways via any leaks of the pipelines and sewers which have the potential to impact on waters off-site.

A number of mitigation measures are recommended, these are reproduced in section 5.4.3.

If unexpected contamination is identified during construction, the works would cease, access restricted and the Environmental Officer and/or Environmental Management Representative contacted to determine the nature and extent of the contamination.

AS/NZS 4361.1:2017 identifies that hazardous paints have historically been used on industrial steel structures. The standard outlines requirements around sampling, testing, management and handling of hazardous paints.

Ausgrid have undertaken selective sampling and testing of paint systems on transmission tower structures across the network in accordance with the Standard. Whilst exceedances have been rare, hazardous paints can and have been identified in tower paint systems. Towers which form part of this proposal have not been tested.

Many, if not all towers are in environmentally sensitive areas. Additional precaution needs to be taken prior to mechanically handling and managing tower structures. Work needs to ensure that potential health risks to workers, the public and environment are reduced to an acceptable level.

Where identified, appropriate management, handling and disposal of hazardous paints through risk assessment needs to be undertaken by the contactor prior to the commencement of work.

5.8.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-11.

Table 5-11: Contamination mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Comply with section 4.3 Contamination of NS174C Environmental Handbook.		✓	
All workers to be made aware of the presence of sensitive areas and the need to avoid impacts.		✓	
Toolbox talk is to include a discussion of the potential contamination at the site.		✓	
Segregate suspected contaminated spoil from clean spoil to reduce disposal costs.		✓	
Undertake testing to determine the waste classification and subsequent storage, transport, tracking, licensing and disposal requirements.		✓	
Temporarily store excavated known or suspected contaminated spoil in a covered, lined/ sealed skip or bulk storage bag or sealed container on-site for classification prior to disposal off site. If storing more than 5 tonnes of spoil, use a licensed storage facility. There may also be a requirement for having a licence to transport the spoil (there are exemptions for Ausgrid staff).		✓	
If contamination is found, work must stop immediately, the site be restricted and Ausgrid's Environmental Services contacted.		✓	
Engage an AS1 licensed contractor to manage asbestos impacted fill in accordance with Work Cover NSW (2008).		✓	
The management and handling of tower structures (cutting, grinding, bending etc) must occur in containment systems suitable to ensure no dust or debris enter the environment. Where dust and debris do inadvertently enter the environment and cannot be readily recovered, stop work and contact Ausgrid's Environmental Services.		✓	

Mitigation measures	Implementation of mitigation measures		
Prior to the commencement of tower demolition and removal works, the towers paint system is to be assessed for the presence of hazardous paints in accordance with the Standard by a suitably qualified hygienist. As advised by the hygienist, the contractor is to comply with the Australian Standard, including; • develop a hazardous paint compliance plan (HPCP) to indicate how compliance with the Standard will be delivered. • submit a compliance report to Ausgrid upon the completion of works demonstrating that all work was undertaken in accordance with the HPCP.	✓	✓	

5.8.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to contamination for reasons including:

- the contamination would be managed in accordance with relevant guidelines
- mitigation measures outlined in section 5.8.3 would readily manage potential impacts.

5.9 Waste

5.9.1 Existing environment

The proposal is currently occupied with existing steel lattice towers, only vegetation, steel support struts and insulators requiring replacement are the only wastes being generated at each tower location.

These wastes will be taken to suitably licensed facilities for recycling and/or disposal.

5.9.2 Potential impacts

The proposal may generate various types of waste, some would be reused or recycled while others would require disposal. Most waste would be generated during the construction phase. Waste likely to require disposal includes:

- excavated earth material that is unsuitable for re-use
- waste oils, liquids and fuels from maintenance of construction plant and equipment
- building waste (packaging material, scrap metal, plastic wrapping, cardboard)
- excess building materials that can't be reused
- vegetation from clearing activities
- timber pallets
- decommissioned steel lattice towers and other redundant equipment

- other general construction waste, potentially including the removal of imported VENM used to facilitate construction pads.

All waste would be re-used where possible, otherwise managed in accordance with the NSW *Waste Classification Guidelines*.

Excavating, trenching and boring for pole installation and earthing will generate minimal spoil soil for disposal.

Waste classification would be undertaken from stockpiles or material stored in skip bins during the works. Any soil identified as virgin excavated natural material (VENM) or excavated natural material (ENM) would be reused where possible.

Where there are no indicators of contamination, the material is not fill, natural materials have undergone chemical assessment and confirmed not contain acid sulfate soils the material may meet the NSW EPA definition of VENM and re-use on site for rehabilitation purposes may be considered in consultation with Ausgrid and other suitable stakeholders.

Any soil suspected of being contaminated would be stored and sampled separately then disposed to an appropriately licensed waste facility (refer to section 5.9.3).

The replacement of towers with poles would require the disposal of twenty-five steel lattice towers deemed to be redundant electrical infrastructure. These items would be reused or recycled.

During operation of the proposal, waste generation would be minimal.

Considering the full life cycle of the proposal, all waste at the end of operational life would be re-used or recycled, where possible.

5.9.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-12.

Table 5-12: Waste mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Comply with section 4.2 Waste management of NS174C Environmental Handbook.		✓	
Classify wastes to determine licensing, waste tracking and disposal requirements.		✓	
Segregate and label waste to improve recycling opportunities, avoid cross contamination and reduce disposal costs.		✓	
Where possible, reuse or recycle or return to the supplier wastes including metal components, transformer oil, spoil and packaging.		✓	✓

Mitigation measures	Implementation of mitigation measures		
Reuse VENM and ENM where options are available. Ensure that: • a valid waste classification certificate is available and • the reuse meets the conditions of the planning approval for that site.		✓	
Where not impacted (contaminated) as a result on construction activities, consideration of imported VENM used to facilitate construction should be; • Remain insitu on site to assist in the future maintenance and operation of the network, or • Other alternate off-site re-use options be explored in the local area Suitable imported VENM should avoid disposal to landfill upon the completion of work.	✓	✓	
T63 and T64 are within a licensed landfill premises operating as Breen Resources. The contractor is to liaise with Breen Resources to ensure compliance with Breen's EPA license.		✓	
Where more than 50kg but less than 1 tonne of Scheduled Chemical Waste (SCW) is stored, ensure that: • there is a clearly defined storage area with conspicuous warning notices • the storage area is constructed to prevent discharge into the external environment. This can be satisfied by storing in a plastic lined and covered bin • an adequate supply of PPE, clean-up material and equipment must be available in a secure external location from the storage area.		✓	
Where more than 1 tonne of SCW is stored: • a licence is required to store the waste. • comply with the conditions of the licence • perform monthly inspections for unauthorised entry or leakage and keep a log at the storage area containing details and reports of inspections.		✓	
When transporting SCW with a concentration of more than 50mg/kg, personnel accompanying the vehicle must: • be trained in methods of containing spilled scheduled chemicals • be provided with adequate personal protective equipment, clean up material and equipment to deal with any spill • notify the EPA of any spill.		✓	

Mitigation measures	Implementation of mitigation measures		
A transport licence or waste tracking is not required to transport oil (liquid or hazardous waste) in Ausgrid vehicles between Ausgrid locations (eg from the substation to a depot). A licence for storage of liquid or hazardous waste of greater than 5 tonnes is required. If these licensing thresholds are breached ensure storage is on a licensed Ausgrid depot. If liquid or hazardous waste will be transported by non-Ausgrid vehicles the appropriate licences must be in place. The waste oil must be disposed of to a facility licensed to accept Liquid and, or hazardous waste. Ausgrid employees must manage the waste oil in accordance with Ausgrid's waste licence and additional requirements outlined in EG 120 Waste Guidelines.		✓	
Ensure a spill kit is readily available and workers and know how to use it.		✓	
Disposal of tower structures with hazardous paints to landfill should be avoided. Recycling decommissioned tower structures through suitably licensed facilities must be given priority.		✓	

5.9.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to waste for reasons including:

- all waste would be re-used or managed in accordance with the NSW Waste Classification Guidelines.
- mitigation measures outlined in section 5.9.3 would readily manage potential impacts.

5.10 Flora and fauna

5.10.1 Existing environment

Flora

Whilst there are seven (7) historically mapped vegetation communities within the study area by the NSW State Vegetation Type Map (DPE 2022), subsequent field surveys conducted at each subject site confirmed six (6) of these vegetation communities. Table 5-13 below summarises these community types and their values.

Table 5-13 – Vegetative communities within the study area and their condition

Vegetation Community	Description and condition
Coastal Sands Littoral Scrub Forest	The vegetation within this zone was in poor condition across the Subject Site. The canopy was dominated by native species including Banksias, Casuarins, *Cupaniopsis anacardioides*, and Eucalyptus. The shrub layer was a mix of exotic and native species.
Estuarine Swamp Oak Twig-rush Forest	This vegetation was in poor condition. The canopy was mainly native in composition and dominated by Casuarinas. Other native canopy species included paperbarks and Eucalyptus. The shrub layer was sparse however was a comprised of a mix of exotic and native species. Native shrub layer species included paperbarks, Acacias, Pittosporum and quinqueflora. Exotic shrubs species included predominantly Priority Weeds, Groundcover was comprised of a mix of native and exotic species, mostly dominated by exotic species.
Grey Mangrove – River Mangrove Forest	This vegetation type was in good condition at the time of the site assessment. The canopy was dominated by *Avicennia marina subsp. australasica*. The shrub layer was sparse. The ground layer was again sparse, with species richness and abundance low. Exotic species sighted within this zone included *Ehrharta erecta, Hydrocotyle bonariensis* and *Conyza bonariensis*. The Priority Weed, Asparagus *aethiopicus* was also recorded in this vegetation type.
Samphire Saltmarsh	This vegetation type was in moderate condition at the time of the site assessment. The canopy layer was sparse with only *Avicennia marina subsp. australasica* being recorded. The shrub layer was also sparse. Native mid-strata species included *Suaeda australis* and *Sarcocornia quinqueflora subsp. quinqueflora*. The groundlayer mainly comprised of native species.
Exotic Vegetation	This vegetation was characterised by exotic species characteristic of urban weed invasion. Exotic shrubs species that dominated this vegetation type included the Priority Weeds.
Mixed Exotic/Native Lawn	Areas of the Subject Site contained historically cleared vegetation with a complete lack of native shrub and canopy species. The ground layer has been heavily modified and is maintained as manicured lawn.

The following locally occurring species were assessed for their potential to occur within each proposed work area;

- Sunshine Wattle
- Netted Bottle Brush

- Sand Spurge
- Epacris purpurascens
- Villous Mint Bush
- Botany Bay Bearded Orchid
- Magenta Lilly Pilly
- Black-hooded Sun Orchid

Thorough targeted surveys were undertaken throughout each proposed work area for potentially occurring threatened flora. It was determined in every instance that further impact assessment was not required.

Three (3) BC Act Endangered Ecological Communities (EECs) were identified within the Subject Site:

- Kurnell Dune Forest in the Sutherland Shire and City of Rockdale;
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions; and
- Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.

Fauna

Desktop analysis revealed a range of threatened fauna as occurring or having the potential to occur on or within a 10km x 10km cell centred on the Subject Site.

These species include;

- Australasian Bittern
- Beach Stone- curlew
- Pied Oystercatcher
- Black Bittern
- Green and Golden Bell Frog
- Southern Giant Petrel
- Maroubra Woodland Snail
- Blue Billed Duck
- Eastern Osprey
- Grey-headed flying fox
- Australian Painted snipe
- Little Tern, and
- Eastern Hooded Dotterel

A list of migratory and marine fauna species was also considered to occasionally use habitat adjacent to some of the subject sites. It was determined that the Bar-tailed Godwit and Eastern Curlew may utilise some of the subject sites during migratory periods.

Towra Point Aquatic Reserve

Towra Point Aquatic Reserve is the largest NSW aquatic reserve and is located on the southern shore of Botany Bay in Sydney. It stretches from Shell Point on the western side of the Bay to Bonna Point in the east. The reserve covers an area of approximately 1,400 hectares and includes Tower 52.

The reserve protects one of the largest and most diverse wetland complexes remaining in the Sydney region. The reserve is adjacent to the Towra Point Nature Reserve which

is a Wetland of International Importance and a declared Ramsar Site. It is an important nursery area for fish and invertebrates, provides important habitat for migratory seabirds and is rich in marine biodiversity. The reserve includes much of the remaining important seagrasses, mangroves and migratory wading bird habitats in Botany Bay. It also represents major nursery habitat supporting commercial and recreational fish stocks in the coastal Sydney region.

Refer to Appendix E for a copy of the Aquatic Ecology Assessment and Fisheries Permit applicable to Tower 52 (and 54, refer to NPWS REF).

5.10.2 Potential impacts

Flora

An Assessment of Significance (5-part Test) was undertaken for each TEC in accordance with the BC Act to assess potential impacts from the proposed activity on BC Act listed threatened ecological communities, Attachment D.

Conservatively, the proposed activity will result in the following impacts to these communities within the Subject Site:

- Up to 0.7ha of vegetation identified as the BC Act listed EEC, Kurnell Dune Forest in the Sutherland Shire and the City of Rockdale (1.3%);
- Up to 0.48ha of vegetation identified as the BC listed EEC Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions (1.6%); and
- Up to 0.05ha of vegetation identified as the BC Act listed EEC, Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions and EPBC Act listed Vulnerable Ecological Community, Subtropical and Temperate Coastal Saltmarsh (0.13%).

Fauna

Given the mobility of these faunal species identified to potentially occur and the degraded nature of each subject site, it is expected there is low anticipated impact to potential foraging habitat and no anticipated impact to breeding habitat.

Concerning marine fauna, it was determined that no marine habitat would be impacted by the proposed activity and therefore not result in a significant impact.

Regarding migratory fauna it was determined that the Bar-tailed Godwit and Eastern Curlew may utilise some of the subject sites during migratory periods. Subject to the mitigation measures outlined in Section 9.2, it was determined that the proposed activity will not have a significant impact on the above threatened entities. If the appropriate recommendations in this report are followed, the proposed activity is considered to have a minimal ecological impact and referral to the minister under the EPBC Act is not required.

Whilst a detailed construction footprint has not been finalised, the survey areas have included a significant buffer to encompass proposed works. Where possible, the final construction footprints will avoid more sensitive or better-quality vegetation to limit impacts on protected and threatened entities. Ausgrid will work with civil construction contractors, refining construction footprints to avoid areas of higher quality bushland.

A specialist Flora and Fauna Impact Assessment was undertaken for the proposal (Appendix D). The report concluded that based on unsuitable habitat, geographic distribution and/or the small scale of the proposed activity, it was determined that the proposed works are unlikely to significantly impact upon any potentially occurring BC Act or EPBC Act listed threatened species. BC Act Tests of Significance (5-part-Tests) and EPBC Act Tests of Significance were carried out for all fauna species that may be potentially significantly impacted by the proposed activity.

Noise impacts

While the construction phases of the proposal (along with its ancillary activities) may cause temporary disturbance to animals, the impacts from noise emissions are likely to be localised close to the proposal (up to 100 m) and are not likely to have a significant, long-term, impact on wildlife populations.

Fragmentation and connectivity

Habitat fragmentation through the clearing of vegetation can increase the isolation of remnant vegetation and create barriers to the movements of small and sedentary fauna such as ground dwelling mammals, reptiles, amphibians and small birds. Furthermore habitat fragmentation can create barriers to the movement of pollinator vectors, such as insects, and thereby affecting the life cycle of both common and threatened flora.

Construction of the proposal in the existing previously disturbed site and easement would not result in additional fragmentation or any edge effects.

Weeds

The spread of weeds through the study area may occur regardless of which site is chosen for the proposal. The proposal has the potential to further disperse weeds into areas of bushland within the study area, particularly adjacent to cleared areas.

The invasion by Priority weeds within the study area is recognised as a key threatening process under the BC Act.

The most likely potential for weed dispersal associated with this proposal would include earthworks, movement of soil and attachment of seed (and other propagules) to vehicles and machinery as a result of vegetation management. Existing disturbed vegetation within the study area, has considerable weed growth already, therefore the overall extent of weed invasion is not likely to increase significantly.

Towra Point Aquatic Reserve

The aquatic vegetation at Tower 52 was dominated by Grey mangrove which was considered to be in good condition. No saltmarsh vegetation was recorded within this study area. The proposal does involve vegetation clearing, which is listed as a key threatening process under the FM Act. However, less than 0.007% of mangrove vegetation across the Kurnell Peninsula would be impacted by this proposal. This potential loss is small in scale and will not compromise connectivity across the coastal wetland. As such, there is a low risk that the loss of habitat related to the proposed works will result in a transformation of the locality or result in a significant environmental impact to the aquatic species, populations, communities or ecosystems present at these locations.

During construction, mobilisation of soils and contaminants may temporarily affect water quality by increasing turbidity and in turn indirectly affecting aquatic biodiversity and habitats. Mobilisation of soils and contaminants would be minimised and managed by the remediation contractor via an Erosion and Sediment Control Plan; refer to Section 5.6 for additional detail. Refer to Appendix E for a copy of the Aquatic Ecology Assessment and Fisheries Permit applicable to Tower 52 (and 54, refer to NPWS REF).

5.10.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-14.

Table 5-14: Flora and fauna mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Undertake a pre-clearing survey including targeted searches for threatened fauna threatened flora and Priority Weeds, and delineating habitat-bearing trees and shrubs.		✓	
Supervise the clearance of any habitat trees or shrubs identified during the pre-clearing survey (native and exotic) to capture, treat and/or relocate any displaced fauna.		✓	
A Vegetation Management Plan (VMP) is to be prepared to ensure appropriate weed management and rehabilitation of each construction area.	✓	✓	✓
Ensure any vegetation management required to facilitate the proposal is restricted to the extent assessed in the Flora and Fauna Assessment (Narla, July 2023- Appendix D)		✓	
Obtain clearance to work during the Green and Gold Bell Frog breeding season*. Vegetation management at these locations must be supervised to catch and relocate any Green and Gold Bell Frogs observed. **September- February when within 100m of Tower 75*	✓	✓	

Mitigation measures	Implementation of mitigation measures		
Where works are proposed to be undertaken during breeding periods*, a Migratory Bird Construction Management Plan must be prepared before the commencement of works which outlines mitigation strategies for; • the disturbance to migratory shorebird breeding, roosting and/or feeding habitat, • light and noise impacts, • potential predation, • water quality and sedimentation, and • ongoing monitoring for migratory shorebirds during construction works. ** September – April for works adjacent to T72-76*	✓	✓	
Comply with section 5 Ecology of NS174C Environmental Handbook.		✓	
Before entering or leaving bushland, check boots, personal items and all components of vehicles and equipment (including radiator, engine, cabin, tray, attachments, guards and plates) are free of soil and vegetation. If identified, disinfected with solutions such as Pine-o-Cleen or Nu Clenz prior to undertaking works in vulnerable areas.		✓	✓
Comply with the Tree Safety Management Plan when undertaking vegetation pruning/ removal and maintenance works.		✓	✓
Trench or excavate outside the SRZ.		✓	
Contain and dispose of cleared vegetation containing weeds to an appropriately licensed vegetation waste disposal facility.		✓	✓
In consultation with a suitably qualified ecologist, implement a tree felling protocol to protect fauna. 1. Identify all hollow-bearing trees in the vicinity of the works with high visibility flag or similar prior to commencement of vegetation clearing. 2. Undertake pre-clearance surveys for fauna immediately prior to clearing. 3. Where fauna is identified in a tree to be felled, the tree must not be cleared until the fauna has relocated itself. 4. Remove understorey vegetation and other trees in the vicinity. 5. Check the tree each morning until the fauna moves into adjacent vegetation (normally following day). 6. Ensure an ecologist is present during felling of hollow-bearing trees to relocate fauna or provide care as necessary.		✓	

Mitigation measures	Implementation of mitigation measures		
Prior to construction, prepare and implement a riparian corridor re-vegetation plan.		✓	
Clear the minimum amount of vegetation necessary and consider replacement planting.		✓	
No disturbance of bush rock, tree hollows, wetlands, mangroves, nests, aquatic or other sensitive habitats without ecological inspection.		✓	
No storing equipment, parking vehicles or accessing the site through undisturbed areas.		✓	
Use locally native species for landscaping.		✓	
No importing mulch from other sites.		✓	✓
No disturbance of mangroves, sea grass, creeks or waterways beyond the requirements of obtained permits		✓	✓
Keep storage areas, stockpiles, vehicle parking, and access tracks clear of the TPZ.	✓	✓	
Where earthing must be laid within the TPZ, minimise the extent impacted and for significant encroachments, underbore/ directional drill at least 600 mm beneath the ground surface, or if excavating, hand dig or use an air knife.	✓	✓	
Vegetation to be retained must be identified and protected to prevent damage from workers and machinery and remain in place for the duration of construction work.		✓	
When working at Tower 52, the contractor is to; • Not commence works until a Permit is obtained from NSW DPI, refer to Table 4-1 • Have the project ecologist provide an induction to all workers outlining the conditions of the project-specific Fisheries Permit, • Ensure all requirements of the permit are met before undertaking any which may directly or indirectly impact the surrounding environment, and • Undertake site rehabilitation and revegetation consistent with the permit requirements. Refer to Appendix E for a copy of the Aquatic Ecology Assessment and Appendix C for consultation undertaken with NSW DPI.			

5.10.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to flora and fauna for reasons including:

- potential impacts to flora and fauna from the proposal have been assessed confirming construction footprints will not cause a significant impact on the environment
- the locations of each proposal area is generally located within existing cleared and or disturbed areas which would minimise the number of trees requiring removal and disruption of habitat
- Five part tests conclude that the proposal is unlikely to significantly impact upon any local population of threatened species or any endangered population, ecological community or their habitats and the preparation of a species impact assessment is not required
- no significant impact to any matters of NES is expected (refer to Table 6-2) and a referral to the Commonwealth is not required
- Ausgrid will work with civil construction contractors, refining construction footprints to avoid areas of higher quality bushland.
- mitigation measures outlined in section 5.10.3 would readily manage potential impacts.

5.11 Bush fire

5.11.1 Existing environment

Work would be occurring within an area mapped as bushfire prone. Work will involve the use of plant and machinery within proximity to natural fuel loads.

Most of the proposed route traverses an existing cleared easement with vegetation located on either side of the easement and the surrounding land does not contain large amounts of vegetation.

For Ausgrid's network area, projections for 2050 show an increase in the frequency of severe bushfire weather of around 13%, with impacts particularly occurring in the Northwest of our operating area[13]. Bushfire risk is evaluated in terms of the frequency of dangerous fire weather days. This considers landscape dryness and the daily weather conditions that can exacerbate fire (windspeed, temperature, and humidity) to assess bushfire risk.

5.11.2 Potential impacts

The risk of causing a bush fire is primarily associated with construction and maintenance activities, except during extreme climate events it's not the inherent nature of the existing infrastructure. There are also associated ongoing vegetation maintenance requirements. The main risks constitute:

- undertaking various kinds of 'hot work' where naked flames are used, such as welding, use of blowtorches, angle-grinding and use of gas torches for shrinking heat shrink components.
- use of machinery with the potential to generate sparks, such as jack hammers, rock saws, and angle grinders.

The works are consistent with the objectives of protecting life and property and protection of the environment. These works will ensure a safe and reliable supply of electricity is maintained across the area.

Ausgrid will manage the work consistent with Section 63(1) of the Rural Fires Act 1997 (NSW) this will include a risk assessment of those daily activities against the bushfire risk on the day.

Where risks are deemed high, Ausgrid will either cancel/ reschedule the work or consult with the Rural Fire Service and National Parks and Wildlife Services to ensure suitable controls are in place and any necessary exemptions sought.

Feeder 916/917 will continue to comply with Ausgrid's Network Engineering Guideline NEG-OH21 Vegetation Safety Clearances which would limit the potential for and impact of a bush fire event.

5.11.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-15.

Table 5-15: Bush fire mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Comply with section 5.3 Total fire bans of NS174C Environmental Handbook.		✓	
During a total fire ban, no open fires or hot works are to be undertaken unless in accordance with an exemption granted by the NSW RFS.		✓	✓
Hot work activities to be clear of combustible matter by at least 3 metres. Keep adequate firefighting equipment immediately at hand. Avoid driving a vehicle through long grass or operating motors and equipment in proximity to vegetation.		✓	✓
Undertake consultation with the local fire authority prior to commencing hot works to advise of works in bushfire prone areas and of any access restrictions to fire trails.	✓		

5.11.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to bush fire risk for reasons including:

- during a total fire ban, no open fires or hot works would be undertaken unless in accordance with an exemption granted by the NSW RFS
- majority of the proposed site / route traverses an existing cleared easement and the surrounding land does not contain large amounts of bushland
- The proposed activity, upon completion of construction would result in no net change to bushfire risk of the local area

- mitigation measures outlined in section 5.11.3 would readily manage potential impacts.

5.12 Aboriginal heritage

5.12.1 Existing environment

Aboriginal people have been living along the shore of Kamay (Botany Bay) and across the Kurnell peninsula for thousands of years. They watched and experienced the sandy central peninsula form – the creation of Kamay, the diversion of the Cooks and Georges River, and the formation of large dunes and mangrove wetlands.

Kurnell is the land of the Gweagal people, though it would have been visited and used by other Aboriginal people around Kamay also. The diverse environments within the sandy central part of the peninsula included extensive mangrove mudflats in Quibray Bay and Towra Point, freshwater swamps, forested dunes and open beach to the south. Just a couple of kilometres to the east and south-west were rocky headlands and inlets.

The rich archaeological record demonstrates that Aboriginal people lived in all these environments. Radiocarbon dates and other archaeological evidence shows that several midden campsites along the Quibray Bay foreshore were used for thousands of years and continued to be occupied for decades after the arrival of Europeans. Camped along the foreshore, Aboriginal people ate a range of foods, with a focus on the resources of the sea. They made many types of tools of bone, stone and shell, though the production of shell-fish hooks was more intensive on the rocky Kurnell headland where the turban (conch) shells (Ninella torquata) that they are made from are found. Aboriginal people fished the adjacent shallows and mudflats, as well as the deeper waters inside and outside the bay. They also hunted a range of mammals and reptiles and gathered plant foods, which they processed and cooked at their camps.

Ausgrid via Coast History and Heritage have asked Registered Aboriginal Parties to provide any information which they believe is relevant to determined Aboriginal cultural values relevant to this study, whether in relation to particular Aboriginal objects (artefacts) or the history of the area more generally. Comments received to date relate to Aboriginal heritage management more broadly and to the significance of the locality of the study area.

The study area traverses the following landscape features that have been formed through these geomorphological processes:

- The intertidal zone within the mangroves, saltmarshes and bays,
- The foredunes situated adjacent to Quibray Bay and Woolooware Bay, and
- The transgressive (parabolic) dunes.

Two known sites have been identified within the study area;

1. AHIMS #52-3-0258 is a shell midden first recorded in the 1980s by Frank Dickson who noted a “shell bed” within the section of a gas pipeline trench, and further investigated by MDCA (2014) and Coast (2020). The site comprises a shell midden in both intact and disturbed deposits. One footing is likely to impact the site however, the full extent of the site is not currently known. As such, it is possible that adjacent footings (outside Towra Point Nature Reserve) may also impact portions of the site.

2. AHIMS #52-3-1220 is registered as a PAD which is largely based on the location of the Quibray Bay foredune. The Abbott Site midden (AHIMS #52-3-0258) is partially within the original PAD extent however in the western section, a portion was excavated (outside the current study area) and no material was identified. As such, it is not yet known if there are Aboriginal objects within this registered site extent. 21 footings are proposed within this original PAD extent, however it's possible that no subsurface sites will be impacted.

The potential social and spiritual significance of any sites can only be determined by Aboriginal community members. While no specific knowledge about the significance of the specific work areas has been provided via formal consultation, the concern shown in responses and communications demonstrates that the study area and the surrounding Kurnell Peninsula remain important to Aboriginal people today for a range of reasons.

In addition, there is one Aboriginal Place (Towra Point Keeping Place) located to the north of the study area within Towra Point Nature Reserve. However, this is not registered near the current study area, so the protections given to these are not further considered.

5.12.2 Potential impacts

The location of registered artefacts is generally isolated to areas of potential developments and hence the result of investigations for development or rezoning applications. The presence of registered artefacts does not indicate the significance of sites in regional context, nor reflect the absence of artefacts in other locations. The mapping of registered sites is often misleading and infers the absence of artefacts in other areas, when in fact it reflects an absence of detailed investigations.

Therefore, consideration of the potential for Aboriginal objects across the proposals study area is required regardless of whether the database searches indicate known Aboriginal objects. Aboriginal objects are often associated with landscape features because of Aboriginal people's use of those features in their everyday lives and for traditional cultural activities. Notwithstanding existing known AHIMS sites, the proposal is located near landscape features including sand dunes, waterways, and wetlands.

The ACHAR completed for this proposal has identified that the study area transects various areas of potential from nil to high potential. Ten new footings will be installed in the area identified to have moderate potential and 39 new footings will be installed in area of high archaeological potential. It is not yet known if there are any confirmed Aboriginal cultural material within these areas however, management strategies will be implemented.

The only potential direct impacts to areas of Aboriginal heritage potential relate to the proposed footing for the new poles, new structures and earthing trenching/rod. At least one footing could impact AHIMS #52-3-0258. The footings for the new structures are 1.5m wide and an area of 2 x 2m has been estimated as the impact footprint for each new footing. Initial hand excavation of this footprint will be undertaken to investigate for any unknown services. Once this has been determined, a machine will either bore or drive the new footings (piles) into the ground. Other impacts are likely to be indirect and include the installation of the pads and stockpile areas. It is not yet known what impacts there will be to currently unrecorded sites that may be present within areas of potential including AHIMS #52-3-1220 PAD.

While avoidance may not be possible, the works are in a limited impact footprint and will have some management protocols in place. There is some scope within the project to realign the footings. In the first instance, where Aboriginal cultural material is

identified, consideration would be given to realignment. Where this cannot be undertaken, further archaeological investigations will be undertaken in accordance with a three-stage archaeological program under an approved project specific AHIP in those areas with moderate and high archaeological potential, namely;

- Induction/ monitoring
- Test excavation, and
- Salvage

Outside of these areas there is a low or nil chance of encountering in situ Aboriginal heritage and in some cases a low possibility of encountering Aboriginal heritage in disturbed contexts. Works in these areas will proceed on the understanding that if any potential aboriginal heritage items are found, works stop and additional investigation undertaken.

Refer to Appendix F for a copy of the Aboriginal Cultural Heritage Assessment Report (inclusive of Excavation Methodology) applicable to large parts of the project.

5.12.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-16.

Table 5-16: Aboriginal heritage mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Comply with section 6.1 Aboriginal heritage of NS174C Environmental Handbook.		✓	
All workers to be made aware of sensitive areas and the need to avoid impacts.		✓	
The contractor is to engage a suitably qualified archaeologist* to; • Provide an Aboriginal Heritage Induction, highlighting the requirements of the excavation methodology and legal enforceability of the AHIP. • Work following the Excavation Methodology outlined in the Aboriginal Cultural Heritage Assessment Report (ACHAR), and • Ensure compliance with the AHIP ** For Towers 57-67 and 72-75 [Captain Cook Drive inclusive]* *Refer to Appendix F for a copy of the Aboriginal Cultural Heritage Assessment Report (inclusive of Excavation Methodology.*	✓	✓	

Mitigation measures	Implementation of mitigation measures		
The contractor is to ensure all aspects of the Excavation Methodology are incorporated into their CEMP including; • Archaeological inductions, • Archaeological monitoring, • Test excavation, • Salvage, and • Unexpected finds *For Towers 57-67 and 72-75 [Captain Cook Drive inclusive]* *Refer to Appendix F for a copy of the Aboriginal Cultural Heritage Assessment Report (inclusive of Excavation Methodology).*		✓	
All workers must be informed that Aboriginal sites are in the area. If potential Aboriginal heritage objects are discovered works must stop work immediately and Ausgrid Environmental Services should be contacted.		✓	✓
Restrict vehicle and plant movements to existing roadways, designated and fenced construction areas or access tracks.		✓	

5.12.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to Aboriginal heritage for reasons including:

- All work would be undertaken in accordance with the adopted Excavation Methodology,
- All work would be undertaken in accordance with the project specific AHIP obtained, and
- mitigation measures outlined in section 5.12.3 would readily manage potential impacts.

5.13 Non-Aboriginal heritage

5.13.1 Existing environment

The proposal is listed on the Sutherland Shire Local Environmental Plan 2015 as the Towra Point Nature Reserve and Quibray Bay (LEP ID A2528 and 2509), the State Heritage Register (SHR) as Kamay Botany Bay National Park (North and South) and Towra Point Nature Reserve (SHR #01918). The proposal is also in proximity to Cronulla Sand Dune and Wanda Beach Coastal Landscape (SHR#1668)

The area is significant in demonstrating the layered and shared occupation of the landscape, with evidence of Indigenous and European land use. It has nationally significant associations with Captain James Cook and other notable European explorers.

Located immediately south and east of Towers 61 and 62 is the Cronulla Sand Dune and Wanda Beach Coastal Landscape heritage area. The site is;

- of historic and cultural significance for the Aboriginal community,
- an excellent example of the remnant Cronulla dune system as it existed prior to the commencement of sand removal in the 1930s,
- held in high community esteem, and
- able to potentially yield further scientific information on the Green and Golden Bell Frog

The subject transmission tower alignments are located within vicinity of five archaeological heritage items listed on Schedule 5 of the Sutherland Shire LEP 2015, including:

- Four wheel drive track (A2523);
- Pelican Point (A2529);
- Site of abandoned oyster depot (A2530);
- Site of abandoned oyster lease (A2531); and
- Pells Island Oyster Farm (A2532)

Only the Four wheel drive track (A2523) is located within close proximity to the site, as its heritage curtilage forms the alignment of Captain Cook Drive between the junctions with Eloura Drive and Sir Joseph Banks Drive. The remaining four identified heritage items are located within the Towra Point Nature Reserve away from Ausgrid's proposal.

Archaeological items within the study area include historical oyster lease developments and associated structures. These archaeological items are wholly located within Botany Bay, separated from the main terrestrial land forming Towra Point.

5.13.2 Potential impacts

Some existing transmission towers are located within the curtilage of Towra Point Nature Reserve. The transmission towers and alignment are highly visible within the natural landscape of Towra Point Nature Reserve due to its relative height and alignment, and location in proximity and parallel with Captain Cook Drive. However, they do not form part of the key views and settings of the wider Towra Point Nature Reserve which can only be obtained from within the nature reserve or Botany Bay.

The existing steel lattice transmission towers date from the c.1960s and are contemporary functional infrastructure elements. The transmission towers do not form part of the significance of Towra Point Nature Reserve.

There is low potential for historical archaeological remains associated with this proposal. Assessment of the potential archaeological remains against the NSW Heritage criteria has found that any remaining deposits are unlikely to hold any significance. As such, there is no significant historical archaeological resource at the study area that will be impacted by the proposed works.
The proposed works, including construction laydown areas and penetration locations are wholly located within Towra Point Nature Reserve and will not impact the curtilage of the Four wheel drive track item, which is contained within the Captain Cook Drive road reserve.

The proposal is located outside the state listed curtilage of is the Cronulla Sand Dune and Wanda Beach Coastal Landscape heritage area. The proposal would not result in any indirect impacts as the proposal only involves the insitu replacement of existing steel lattice transmission towers with an industry standard dual pole system.

It has been concluded that this proposal will have a negligible and acceptable impact to non-indigenous cultural heritage including built heritage and historical archaeological significance.

The proposal is located within an existing easement and has been previously disturbed. Due to the previous disturbance and the proposal's location away from existing known archaeological sites, it is not expected that non-Aboriginal heritage would be found or impacted during construction.

A Statement of Heritage Impact (SOHI) was undertaken for the proposal as it relates to Towra Point Nature Reserve (SHR #01918). The SOHI establishes that the proposed works will have a negligible and acceptable impact to non-indigenous cultural heritage including built heritage and historical archaeological significance.

As such, the proposed works associated with electrical supply infrastructure falls within the definition and requirements of the Site-Specific Exemption 9 and does not require approval under the Heritage Act 1977. Refer Appendix G for the Statement of Heritage Impact undertaken for this proposal and the NPWS REF for additional information regarding works in Towra Point Nature Reserve.

5.13.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-17.

Table 5-17: Non-Aboriginal heritage mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Comply with section 7.2 Non-Aboriginal heritage of NS174C Environmental Handbook.		✓	
All works to cease if potential heritage is discovered. Access should be restricted and Supervisor notified to ensure regulator is contacted. Ausgrid employees should contact Ausgrid Environmental Services on 9394 6659.		✓	

5.13.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to non-Aboriginal heritage for reasons including:

- the proposal would not affect known non-Aboriginal heritage items
- mitigation measures outlined in section 5.13.3 would readily manage potential impacts.

5.14 Visual and aesthetics

5.14.1 Existing environment

The existing visual environment consists of:

- residential, industrial, commercial, bushland, parkland and other open space areas beaches and recreational land uses
- predominantly flat terrain apart from the undulating Wanda Sand Dune system
- Towra Point Nature Reserve is a prominent landform feature across the Kurnell Peninsula
- There are prominent views of water including Botany Bay and Cronulla Beach
- There is existing infrastructure in the area including electrical, sewage, residential and commercial industrial development.

Figure 5-4 shows the existing feeder route and visual environment. The photographs show land use adjacent to the proposal.

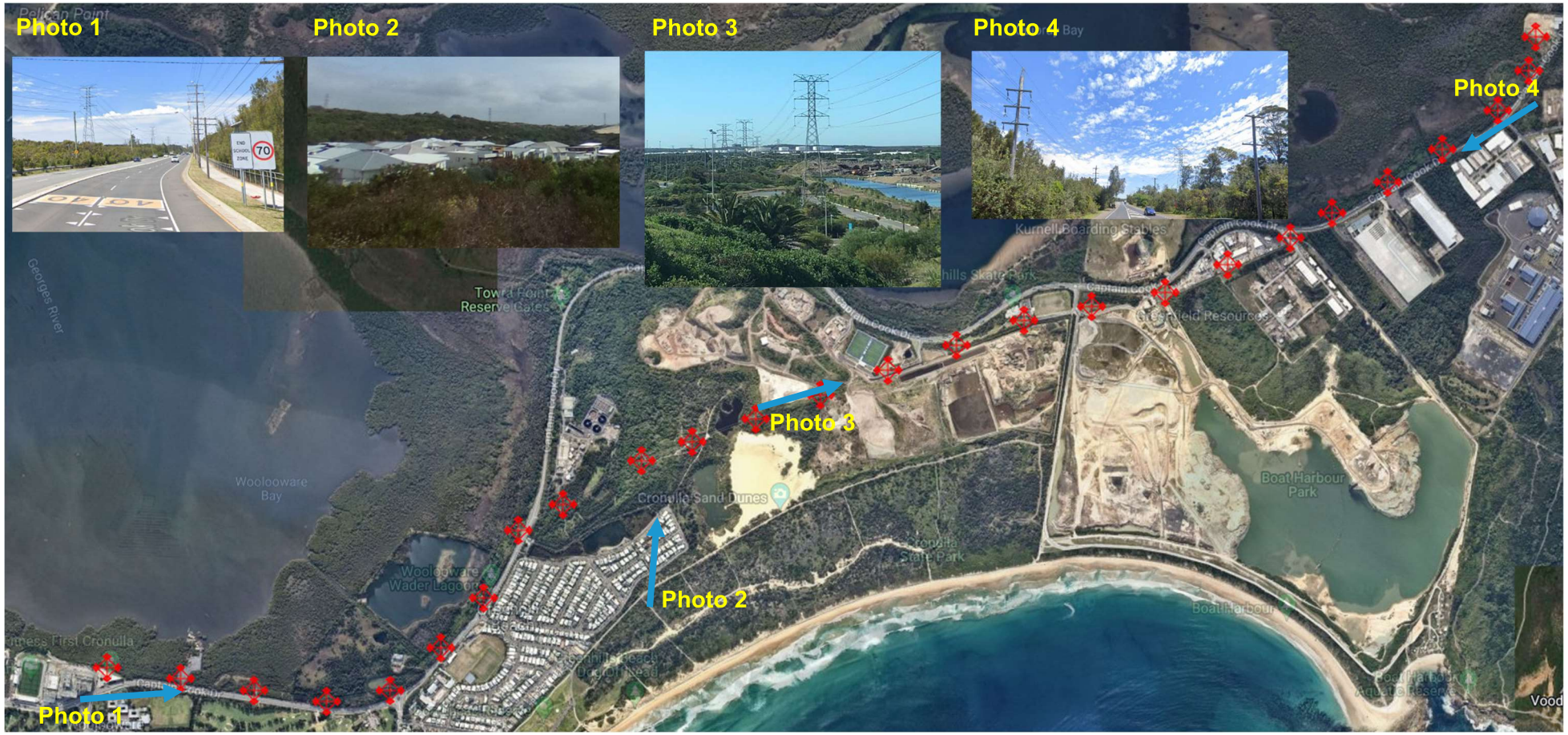

Figure 5-4: Visual environment in relation to Feeder 916/917 and steel lattice transmission towers (red)

5.14.2 Potential impacts

Potential visual impact may be determined through visual sensitivity of the site and the magnitude of changes. The site has a high visual sensitivity.

Visual modifications as a result of the proposal would include:

- limited vegetation clearing, minimised using existing cleared easements,
- erection of a dual pole system at each tower location,
- concrete and steel power poles in replacement of steel lattice transmission towers,
- consolidation of power lines via the re-alignment of Feeder 916/917 into Captain Cook Drive at Tower 71, and
- short term construction activities including the use of heavy plant and equipment such as cranes.

The proposal would remain visible from all existing vantage points.

Short term visual impact

The construction phase of the proposal would have a visual impact on local views due to the presence of plant and equipment, exposed soil and removal of trees. The impact would vary throughout construction, with the pole installation / earthworks stage likely to be most visually prominent. As construction impacts would be short term and the adjoining stakeholders would be consulted about the works, the overall impact during construction is not expected to be significant. Disturbed areas would be reinstated as soon as practicable to further ameliorate short term visual impact.

Long term visual impact

It is largely agreed that the replacement of existing steel lattice transmission towers with industry standard dual pole arrangements would lead to an improvement in visual amenity of the area and its current vantage points.

Examples of visual modification as a result of the proposal are shown in Figure 5-5.

Towers 61-63 views from Greenhills Estate

Towers 64-66 views southbound from Captain Cook Drive

Tower 72 views north bound showing the realignment into Captain Cook Drive

Figure 5-5: Modelling of proposed poles at various locations across the proposal in relation to transmission towers

Long term visual impact on local views would occur through new concrete and steel poles to match existing tower heights. Other than the realignment into Captain Cook Drive, towers would be replaced in situ to the extent engineering and operational requirements can be met. The impact would be limited due to the existing presence of Feeder 916/917.

The built form, character and position using current industry standard allows for a no more than limited and arguably positive visual impact for the surrounding community.

Once constructed, this proposal would not alter existing access to recreational space, commercial or industrial development or residential development. The proposal would require minimal maintenance, reducing the need for plant and equipment to access the site. Maintenance work would form part of Ausgrid's existing maintenance program.

5.14.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-18: Visual mitigation measures.

Table 5-18: Visual mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Consult with affected stakeholders about the proposal.	✓	✓	
Clear the minimum amount of vegetation necessary and undertake replacement planting in accordance with the Vegetation Management Plan		✓	
Explore the use of green and./ or grey coloured poles to reduce visual impact by allowing integration with existing vegetation	✓	✓	✓

5.14.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to visual and aesthetic value for reasons including:

- the minimum amount of vegetation would be cleared as possible and replacement planting would be undertaken in consultation with council
- the proposal would generally be located within the existing easement that contains existing electrical infrastructure
- the proposed would be generally located within the pre-disturbed areas
- mitigation measures outlined in section 5.14.3 would readily manage potential impacts.

5.15 Traffic and access

5.15.1 Existing environment

The proposal would generally be within an existing easement that would be accessed from Captain Cook Drive. Captain Cook Drive is a Transport for NSW Classified Road West of Tower 52 from Taren Point Road to Gannons Road and a Regional Road (Council) east of Gannons Road. Council has care and control of the footpaths and

nature strips on State Roads. TfNSW require road occupancy licenses for lane closures on some regional roads, this includes Captain Cook Drive.

Captain Cook Drive may be used as a staging area and provides safe movement of vehicles and equipment off the road to each construction site.

Transport in the region is heavily reliant on the road network for private vehicle usage and public transport in the form of buses and commercial vehicles. As the single point of transport access for businesses and residents to Kurnell, any impacts on the road network in the region are quickly amplified with the high volumes of traffic which utilise and rely on the road network daily.

There are three roundabouts along Captain Cook Drive adjacent to;

- Cronulla High School at Elouera Road
- Greenhills Estate at Trinity Street, and
- Playing fields at Lidum Road

Captain Cook Drive is generally not utilised for car parking during business hours. Paved footpaths and in some instances shared cycle paths are located along sections of the road including Cronulla Golf Course, Greenhills Estate and the Dicker Data Centre. Overall, traffic surrounding the proposal is dominated by residential and commercial vehicle movements and cyclists generally in the morning, evening and weekend periods.

5.15.2 Potential impacts

The proposal involves utilising Captain Cook Drive for access to the entire proposal. As a Regionally Classified Road, both Council and TfNSW would be consulted and necessary approvals gained prior to construction.

During construction approximately up to 6 vehicles would be required at each site at any one time. Vehicles associated with the proposal would mainly include light vehicles and one to two heavier vehicles such as truck mounted pile driver and cranes. Heavy vehicles at each site are expected to cause some minor disruption to local roads. Construction would also result in temporary changes to traffic arrangements in local roads, particularly when arranging for access to Towers 61 and 62 from Greenhills Street. Portions of some roads would need to be blocked and access may change or be reduced to some buildings and residents for short periods of time.

Where major road disruption will occur, a traffic management plan (TMP) would be prepared in accordance with the RMS Manual *Traffic Control at Work Sites*[14] and would be implemented during construction. The TMP would also include allocated areas for staff parking.

A traffic control plan (TCP) which shows the traffic control arrangements for the proposed site would be prepared in accordance with Australian Standard 1742.3. The TCP consists of a diagram showing temporary signs and devices arranged to warn traffic and guide it around, past or if necessary through the proposed site.

During operation, the route would only be visited by vehicles on an intermittent basis for general maintenance purposes consistent with the current network agreement and easement conditions.

Measures would be employed to minimise traffic disruption. The construction would be undertaken by those experienced in such activities along traffic routes. Any disruption,

however, cannot be fully avoided, but can be minimised through timing the work to avoid peak traffic flows.

Once off Captain Cook Drive, existing access tracks would be utilised to gain access to each construction location. In most instances, this is in close proximity to Captain Cook Drive utilising regularly disturbed areas. Other construction locations require the utilisation of less frequented access tracks. It is expected that track maintenance and/or minor civil work may be required to ensure safe access some construction locations including;

- Tower 60 via Sydney Waters Water Treatment Plant
- Towers 61 and 61, see Figure 5-6
- Tower 63 and 64 via Breen Resources

Figure 5-6 – Access tracks (pink) to Towers 61 and 62 (red) via Greenhills Street, Greenhills.

5.15.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-19.

Table 5-19: Traffic and access mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Comply with section 4.2 Noise and vibration of NS174C Environmental Handbook.		✓	
Where works are proposed on a classified road, consent is required under section 138(1) of the Roads Act 1993. To apply for a section 138 consent, write to TfNSW for classified state roads or the relevant local council for classified regional roads to request approval, providing a description of the work and including a plan showing the extent of the works. An ROL must be obtained from TfNSW if traffic will be impacted during the works.		✓	
Prepare and implement a Traffic Management Plan in accordance with [RMS/Council requirements and/or approval conditions, including pedestrian and cycle ways].		✓	

Mitigation measures	Implementation of mitigation measures		
Prior to construction, prepare a TCP in accordance with the Australian Standard 1742.3		✓	
The TMP and /or TCP must consider the cumulative impact of construction traffic movements from other Ausgrid and non-Ausgrid works.		✓	
All potentially affected residents and businesses are to be provided with 48 hours notice of any access changes to properties. Where residents and businesses are directly affected by the work (egg their access will be restricted), one week's notice must be given.		✓	
Maintain access tracks in accordance with *Managing Urban Stormwater Volume 2C Unsealed Roads* and *Erosion and sediment control on unsealed roads – A field guide for erosion and sediment control maintenance practices.*		✓	✓

5.15.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to traffic and access for reasons including:

- the construction period is temporary, localised and short term
- all works would be undertaken in accordance with a TMP or TCP
- given the small number of vehicles expected to be used during construction, it is unlikely to result in increased traffic in the area
- once in operation, the proposal would have minimal impact on the local traffic
- mitigation measures outlined in section 5.15.3 would readily manage potential impact.

5.16 Social and economic

5.16.1 Existing environment

The proposal is located entirely within the Sutherland Shire Local Government Area and the suburbs of Woolooware, Cronulla and Kurnell. At this location, the feeder and its transmission towers generally occupy transitional land uses; areas bordering environmentally sensitive zones and commercial, recreational or industrialised areas.

There are a number of industries adjacent to Feeder 916/917 including;

- Sydney Water Treatment Plant,
- Breen Resources Waste Management and Disposal Centre,
- All Sands Pty Ltd,
- Industrial facilities at 262-272 Captain Cook Drive
- Industrial facilities south of Tower 71
- Sayka Safety Equipment Supplier, and
- Dicker Data Centre

There are also other businesses in the area including;

- Fitness First Cronulla,
- Shark Park,
- EG Ampol Woolooware,
- Transport for NSW (as owners of Oyster lease site at Woolooware), and
- Storage King.

Woolooware and Cronulla High School are also located in proximity to the proposal.

5.16.2 Potential impact

With the increased demand for electricity supply in the area, it has become necessary for Ausgrid to ensure a reliable supply is available to homes and other buildings. The proposal would increase the reliability of electrical supply, resulting in a positive impact on the community.

By reducing the probability of power shortages and failure, the proposal is reducing the associated economic risks, including damages and productivity losses resulting from short term interruption of commercial activities.

Construction projects such as this proposal create opportunities for suppliers, contractors and consultants which creates flow on benefits for local communities. Discretionary spending by civil contractors during the construction period would benefit the local region.

Short term impacts on the community during the construction phase of the proposal include increased traffic intensity, altered traffic conditions, maintaining access to properties and noise.

Due to the small scale of the works, the socio-economic impacts of the proposal would be localised.

5.16.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-20.

Table 5-20: Social and economic mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
EMF, noise, visual and traffic mitigation measures (sections 5.3.3, 5.4.3, 5.14.3 and 5.15.3 would reduce potential impacts on the surrounding community.	✓	✓	✓

5.16.4 Conclusion

The proposal is not likely to significantly affect the environment in relation to social or economic impacts for reasons including:

- construction related impacts would be minor, localised and short-term
- once in operation, the small scale of the works means any the socio-economic impacts of the proposal would be localised

- a more reliable electricity supply reduces associated economic risks such as damages and productivity losses resulting from short term interruption of commercial activities
- mitigation measures outlined in section 5.16.3 would readily manage potential impacts.

5.17 Cumulative impact

5.17.1 Existing environment

Cumulative impacts may be experienced due to the interaction of elements within the proposal, or with other existing or proposed developments within the locality. Where possible, the cumulative impact associated with the proposal has been incorporated into the assessments within this REF.

Ausgrid projects typically have related projects and flow on activities due to the interconnected nature of the network. There are no other Ausgrid activities with potentially cumulative impacts beyond that of which is described in Section 1.4.

Other non-Ausgrid activities with potentially cumulative impacts include:

- The Breen Resources Parkland redevelopment
- The Shark Park redevelopment
- Transport for NSW Oyster lease site, and
- Sydney Waters operations

5.17.2 Potential impact

The potential impact due to the interaction of elements within the proposal, or with other existing or proposed developments within the locality is summarised in Table 5-21.

Table 5-21: Summary of cumulative impacts

Potential impact	Other activities with cumulative impacts	Contribution to overall impact	REF section
Noise	Construction noise from construction activities listed in section 5.4.2.	Council was consulted in relation to other development in the area. Council submissions have been given due consideration (see section 2.2). Noise impacts during the construction phase would be localised, short term and staged along the separate sections of the proposal.	5.4
EMF	Existing 132 kV, 33 kV, 11 kV and 415 V power lines.	Council was consulted in relation to other development in the area. Council submissions have been given due consideration (see section 2.2).	5.3

Potential impact	Other activities with cumulative impacts	Contribution to overall impact	REF section
Traffic	Traffic from construction and access activities listed in section 5.15.2	Council was consulted in relation to other development in the area. Council submissions have been given due consideration (see section 2). The TMP and / or TCP would consider the cumulative impact of construction traffic movements.	5.15
Flora and fauna	Flora and fauna impacts from construction activities listed in section 5.10.2.	The specialist flora and fauna assessment considered the cumulative impact of the construction and operation of the substation. Council was consulted in relation to other development in the area. Council submissions have been given due consideration (see section 2).	5.10
Visual	Visual impacts from operation activities listed in section 5.14	Council was consulted in relation to other development in the area. Council submissions have been given due consideration (see section 2). Activities listed in section 5.14.2 would not materially alter the outcome of the visual assessment in 5.14.2.	5.14
Resources	Materials as listed in section 1.8.2 are required for the proposal.	These materials are not currently in short supply, and it is not anticipated that the proposal would substantially increase the demand on these resources. The proposal would not have a major impact on the demand on resources.	5.9

5.17.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 5-22: Cumulative impacts mitigation measures.

Table 5-22: Cumulative impacts mitigation measures

Mitigation measures	Implementation of mitigation measures		
	Design	Construction	Operation
Notify Ausgrid's Community Relations section prior to commencing construction works at each location.		✓	
Liaise and plan works in consultation with relevant stakeholders prior to the commencement of work at each location.		✓	

5.17.4 Conclusion

The proposal is not likely to have significant cumulative impacts for reasons including:

- the localised extent of potential impacts during construction and operational phases
- mitigation measures outlined in section 5.17.3 would readily manage potential impacts.

6 Consideration of environmental factors

6.1 Clause 228 factors

In accordance with clause 228 of the EP&A Regulations, the following factors were considered for the proposal.

Table 6-1: Consideration of clause 228 factors

Clause 228 factors	REF section giving consideration to the factors
Impact on a community	2 Consultation, 5.1 Land use, 5.3 Electric and magnetic fields, 5.4 Noise and vibration, 5.14 Visual and aesthetics, 5.15 Traffic and access and 5.16 Social and economic
Transformation of a locality	5 Environmental assessment
Impact on the ecosystem of the locality	5.10 Flora and fauna, 5.11 Bush fire and 6.3.3 Biodiversity
Reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality	5 Environmental assessment
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	5 Environmental assessment
Impact on the habitat of protected fauna	5.10 Flora and fauna
Endangering any species of animal, plant or other form of life, whether living on land, in water or in the air	5.10 Flora and fauna
Long-term effects on the environment	5 Environmental assessment
Degradation of the quality of the environment	5.7 Geology and soil
Risk to the safety of the environment	5.8 Contamination and 6.3.1 Precautionary principle
Reduction in the range of beneficial uses of the environment	5.1 Land use
Pollution of the environment	5.6 Hydrology and 5.8 Contamination
Environmental problems associated with the disposal of waste	5.9 Waste
Increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply	6.3.4 Improved valuation of resources
Cumulative environmental effect with other existing or likely future activities	5.17 Cumulative impact
Impact on coastal processes and coastal hazards, including those under projected climate change conditions	5.6 Hydrology and 5.2 Climate Change

6.2 Matters of national environmental significance

In accordance with the EPBC Act, the following matters of NES were considered for the proposal[15].

Table 6-2: Consideration of Matters of NES

Matters of NES	Comment	Likely impact
World Heritage Properties	No world heritage properties would be potentially affected by the proposal	Nil
National Heritage Places	Three (3) National Heritage Places were identified in the 10km buffer area of the Subject Site including Kamay Botany Bay: botanical collection sites, Kurnell Peninsula Headland and Royal National Park and Garawarra State Conservation Area. These National Heritage places will not be impacted by the proposed activity.	Nil
Wetlands of International Importance	One (1) Wetland of International Importance was identified in the 10km buffer area of the Subject Site: Towra Point Nature Reserve. The wetland is situated within the feature area. Minor impacts will occur as a result of the proposed activity. Mitigation strategies as outlined in this assessment and its attachments will be put in place to prevent significant impact to the important wetland.	Minor
Commonwealth listed Threatened Species and Ecological Communities	In total, 116 threatened species listed under the EPBC Act were predicted or known to occur within 10km of the Subject Site. No threatened flora or fauna species were identified within the Subject Site. Habitat for threatened fauna was limited to flowering/seed-bearing trees and shrubs. As the proposed activity is limited to the clearing of a relatively small area of predominantly exotic vegetation and low condition native vegetation, the proposed activity was deemed unlikely to result in a significant Impact to any EPBC listed threatened species. In total, fifteen (15) Threatened Ecological Communities listed under the EPBC Act were predicted or known to occur within 10km of the Proposal Area. Following the site assessment, it was confirmed that one (1) EPBC listed TEC, Subtropical and Temperate Coastal Saltmarsh (Vulnerable) occurs within the Subject Site. The TEC will not be significantly impacted by the proposed activity.	Minor
Commonwealth listed Migratory Species	In total, 83 migratory species listed under the EPBC Act, or their habitat, were predicted to occur within 10km of the Subject Site. As minimal habitat for listed migratory species is proposed for removal, the proposed activity is unlikely to substantially modify, destroy or isolate this habitat, resulting in the establishment of a harmful invasive species or seriously disrupt the lifecycle or migration of an ecologically significant population of a migratory species.	Minor
Nuclear Action	The proposal would not result in any nuclear action nor would it require any nuclear action to be undertaken.	Nil

Matters of NES	Comment	Likely impact
Commonwealth Marine Areas	One (1) Commonwealth Marine Area was identified within the 10km buffer area of the Subject Site: EEZ and Territorial Sea. This Commonwealth Marine Area will not be impacted by the proposed activity.	Nil
Great Barrier Reef Marine Park	The Great Barrier Reef Marine Park would not be affected by the proposal as it is not located within Ausgrid's network area.	Nil

6.3 Ecologically sustainable development

The proposal has been assessed against the following four principles of ESD as listed in the *Protection of the Environment Administration Act 1991* (NSW) adopted by s. 4(1) of the EP&A Act.

6.3.1 Precautionary principle

The precautionary principles (s. 6 (2) (a)) states that:

'If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation'.

For the precautionary principle to be applicable two pre-conditions must be satisfied; "first it is not necessary that serious or irreversible environmental damage has actually occurred – it is the threat of such damage that is required. Secondly, the environmental damage threatened must attain the threshold of being serious or irreversible".[16]

When the precautionary principle applies, measures taken must be proportionate to the level of threat. In assessing the level of threat and determining a proportional response, Ausgrid is guided by the relevant regulators and health authorities who are charged with the responsibility for providing such advice.

Potential health effects associated with EMF are discussion in section 5.3.

A range of specialist environmental investigations, including ecological and archaeological have been undertaken during the preparation of this REF to ensure that the potential environmental impacts are understood with a degree of certainty. The design for the proposal has evolved to avoid environmental impacts where practical and mitigation measures have been recommended to minimise adverse impacts.

The proposal is therefore considered to be consistent with the precautionary principle.

6.3.2 Inter-generational equity

The principle of inter-generational equity (s. 6 (2) (b)) states that:

'The present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.'

The key objective of the proposal is to improve electricity supply and reliability, catering for future demand for the benefit of future generations. The proposal would not result in any impacts that are likely to impact on the health, diversity or productivity of the environment for future generations.

Potential health effects associated with EMF are discussed in section 5.3.

The proposal is considered to be consistent with the principle of inter-generational equity.

6.3.3 Biodiversity

The principle of biological diversity and ecological integrity (s. 6 (2) (c)) states that:

'Conservation of biological diversity and ecological integrity should be a fundamental consideration.'

A flora and fauna assessment was undertaken to give due consideration to the proposal's potential impact on the biological diversity and ecological integrity of the study area.

The proposal is consistent with the principle of biological diversity.

6.3.4 Improved valuation of resources

The principle of improved valuation of environmental resources (s. 6 (2) (d)) states that:

'Environmental factors should be included in the valuation of assets and services.'

This principle explains that those who generate pollution and waste should bear the cost of containment, avoidance and abatement; the users of goods and services should pay prices based on the full life cycle of costs; and environmental goals should be pursued in the most cost effective way.

All costs associated with the containment, avoidance and abatement of pollution have been factored into the design of this proposal and Ausgrid's operations generally.

The proposal is considered to be consistent with the principle of improved valuation of environmental resources.

7 Summary of impacts

A summary of the individual impacts for the proposal is presented in Table 7-1.

Table 7-1: Summary of impacts

Issue	Comment	Likely impact
Land use	No land use would be potentially affected by the proposal	Nil
Climate change	The proposal considers sea level rise and flood prone land and the siting of infrastructure complies with all relevant Network Standards.	Nil
Electric and magnetic fields	EMF levels are within the ICNIRP 2010 Public Reference Levels and there are no further ways to reduce exposure consistent with prudent avoidance (ie very low cost and without unduly compromise other issues).	Minor

Issue	Comment	Likely impact
Noise and vibration	The proposal would not involve out of hours work without meeting the notification/respite requirements as outlined in this assessment. Potential impacts would be appropriately managed with the specific construction controls.	Minor
Air quality	The proposal would not involve dust leaving the worksite and would not generate offensive odours/fumes.	Minor
Hydrology	The proposal would not involve handling, storing, transporting or disposing of oils, fuels, chemicals or dangerous goods including oil filled equipment. The proposal may involve discharges of accumulated water, however, potential impacts would be appropriately managed with the specific construction controls. There will be no groundwater extraction without required licensing and or management plans.	Minor
Geology and soil	The proposal would not involve sediment leaving the worksite . Potential impacts would be appropriately managed with the specific construction controls.	Minor
Contamination	No contamination would be potentially affected by the proposal. The proposal will not result in the contamination of soil, surface or groundwater.	Minor
Waste	Waste generated by the proposal would be classified, handled, transported, stored, tracked and disposed in accordance with relevant guidelines, procedures and existing licences.	Minor
Flora and fauna	No threatened species, populations or ecological communities listed within Commonwealth (or State) legislation would be potentially affected by the proposal to the extent a significant impact would be likely	Minor
Bush fire	Potential impacts would be appropriately managed with the specific construction controls.	Minor
Aboriginal heritage	There are known Aboriginal heritage in the area of the works (as identified by WebGIS and other means). Aboriginal heritage is potentially located within the area, however would not be impacted with controls in this assessment or inconsistent with the approved AHIP	Minor
Non-Aboriginal heritage	There are no non aboriginal heritage items (world, national, state, local, S170, archaeological areas) in the area (as identified by WebGIS and other means) that would be impacted beyond what is considered minor.	Minor
Visual and aesthetics	The proposal has considered all high aesthetic, scenic, natural or recreational values and there is no unreasonable impact to these areas. All reasonable ways to further reduce visual impacts have been considered.	Positive

Issue	Comment	Likely impact
Traffic and access	Works on a classified road would comply with the relevant RMS approval and road occupancy licence (ROL) requirements. No other significant access corridors would be restricted. Affected residences and businesses would be consulted about the schedule of work. The proposal would not prevent access or mobility for people with disabilities.	Minor
Social and economic	No social and economic issues would be potentially affected by the proposal .	Minor
Cumulative impact	Cumulative impacts from other projects/proposals within the area would be effectively managed with the specific construction controls.	Minor

A number of potential environmental impacts from the proposal have been avoided or reduced during the design development and options assessment. The proposal as described in this REF best meets the project objectives but would still result in some minor impacts on aspects such as ecology and archaeology.

Mitigation measures as detailed in this REF and permits obtained by respective regulators would avoid or minimise these expected impacts. The proposal would also remove older style steel lattice transmission towers from the landscape leading to ba net positive operational impact on the environment. On balance the proposal is considered justified.

On this basis, it is concluded that the proposal and adopted mitigation measures will result in an overall minor environmental impact.

8 Environmental management plan

8.1 Construction environmental management plan

A construction environmental management plan (CEMP) outlines the environmental objectives of a proposal, the environmental construction mitigation measures to be implemented, the timing of implementation, responsibilities for implementation and management, and a review process to determine the effectiveness of the strategies.

Once the construction methodology is known, the principal construction contractor would be responsible for developing a CEMP that addresses the scope of works to be undertaken, including site specific, measurable and achievable actions to the CEMP and the preparation of any appropriate work methods or sub plans.

The CEMP documents all the procedures and processes necessary to ensure that all personnel comply with:

- legislative requirements and relevant non-statutory policies
- specific environmental construction mitigation measures described in section 5 of this REF
- requirements outlined in any relevant approvals, permits or licences
- NS174C Environmental Handbook.

The CEMP would typically:

- establish environmental goals and objectives
- detail the conditions of approval
- list actions, timing and responsibilities for implementation that arise from the construction mitigation measures recommended in this REF
- detail statutory requirements
- provide a framework for reporting on relevant matters on an ongoing basis
- detail training requirements for personnel in environmental awareness and best practice environmental management system
- detail emergency procedures, including contact names and corrective actions
- detail process surveillance and auditing procedures
- list complaint handling procedures
- detail quality assurance procedures.

The CEMP would be submitted to Ausgrid for adequacy review prior to the commencement of any site works to determine that the CEMP effectively addresses the scope of works to be undertaken, addresses the objectives described above and generally meets the requirements outlined in the *DPIE (2020) Environmental management guidelines for construction (edition 4).*

No works covered by this REF would be permitted to commence until a suitable CEMP is prepared and reviewed by Ausgrid.

It is also noted that the CEMP would be a working document and would be amended and continually improved over time. This would occur when there is a change in scope, during the review process or when processes or strategies are found to be inadequate to mitigate potential environmental harm.

If an activity falls outside the scope of the REF (as defined by section 1.6) or if the mitigation measures outlined in section 5 cannot be implemented, then an additional approval would be required. The activity is not permitted to continue without an appropriate environmental assessment under the EP&A Act.

8.1.1 Implementation

The construction contractor would be responsible for implementing REF controls during construction.

All personnel working on the proposal must be aware of their environmental obligations, responsibilities and have received the necessary training to meet the environmental obligations associated with their duties, as specified in the CEMP. Site induction training would be undertaken for all personnel to highlight sensitive work areas, explain the requirements of the CEMP, outline an individual's responsibilities, and inform all personnel of emergency response procedures. Documented evidence of such training would be available before commencing work on-site.

Prior to works commencing:

- emergency procedures would be displayed in a prominent position within the site working area
- a person would be allocated for the dissemination of general information on the site operations. A contact person and contact numbers would be identified for receiving comments or complaints from the community
- a register for complaints would be established and maintained for the full duration of the work. The register would record details of complaints, complainant contact information and action taken to address complaints.

Auditing of the construction would be undertaken in accordance with the relevant international and Australian standards[17] to establish whether the Contractor is conducting activities in accordance with their current CEMP and whether the CEMP is an effective tool to control adverse environmental impacts. Recommendations regarding improvements to the CEMP must be incorporated as soon as practicable.

An Environmental Officer:

- is to be appointed to the project,
- assist in compliance with permit and approval requirements,
- is to oversee those activities that have the potential to cause harm in Ecologically Sensitive Areas (refer to NS174C), and
- has the authority to stop work if it is deemed necessary to mitigate potential environmental harm.

8.1.2 Compliance

The contractor is required to have an auditing and inspection schedule which involve the Environmental Officer. Ausgrid may undertake audits to ensure the CEMP is being implemented appropriately.

At the conclusion of the construction phase of the proposal, the Contractor must record how and whether the conditions and measures in the REF and CEMP were observed. The documentation must be sufficient to enable a reasonable person who reads the documentation to understand, without reference to any extrinsic material, whether the conditions and measures in question were observed, and the nature of and reasons for any non-compliance.

8.2 Operation environmental management plan

An operation environmental management plan (OEMP) may be required to minimise the potential environmental impacts from operational and maintenance activities conducted because of the proposal.

Usually, it will be the case that Ausgrid network standards, operating procedures and environmental guidelines will be sufficient to fulfil the requirements of an OEMP.

However, where current Ausgrid network standards, operating procedures and environmental guidelines do not address specific requirements of the REF or a licence, permit or approval of a regulatory authority a specific OEMP may be required to be prepared. The specific OEMP would allow for operational and maintenance procedures and activities post construction to be consistent with the environmental outcomes stipulated in the REF.

If an activity falls outside the scope of the REF (as defined by section 1.6) or if the operation mitigation measures outlined in section 5 cannot be implemented, then an additional approval would be required. The activity is not permitted to continue without an appropriate environmental assessment under the EP&A Act.

8.3 Environmental mitigation measures

Mitigation measures for all phases of the proposal are summarised in Table 8-1: Implementation mitigation measures.

Table 8-1: Implementation mitigation measures

Mitigation measures	**Implementation of mitigation measures**		
	Design	**Construction**	**Operation**
Principal construction contractor to prepare CEMP		✓	
Review CEMP for adequacy by Ausgrid		✓	
At the conclusion of the construction phase of the proposal, the Contractor must record how and whether the conditions and measures in the REF and CEMP were observed.		✓	

9 Certification

This REF assesses the potential impacts of the proposal to install cement and steel poles and replace transmission towers along Ausgrid's Feeder 916/917 between Woolooware and Kurnell.

Ausgrid is a statutory State Owned Corporation and is a determining authority as defined in the EP&A Act. The proposal satisfies the definition of an activity under the EP&A Act, and as such, Ausgrid as a proponent and determining authority, must assess and consider the environmental impacts of the proposal before determining whether to proceed.

This REF examines and takes into account to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposed activities outlined in the section 1.6. This REF fulfils the requirements of section 5.5 of the EP&A Act and clause 171 of the EP&A Regulation, which sets out environmental factors to be considered in making the assessment.

On the basis of this REF, it is concluded that the proposal:

- is not likely to significantly affect the environment (including critical habitat) or threatened species, populations or ecological communities, or their habitats
- is not on land that is part of critical habitat
- is not likely to have a significant impact on matters of NES, or a significant impact on the environment (for actions on Commonwealth land) or a significant impact on the environment on Commonwealth land (for actions outside Commonwealth land).

In making these conclusions, consideration of environmental significance was made with regard to clause 171 of the EP&A Regulations and the *Code of Practice for Authorised Network Operators*[1].

REF preparer:

I certify that I have prepared the contents of this REF and, to the best of my knowledge, it is in accordance with the Code approved under section 198 of the Environmental Planning and Assessment Regulation 2021, and the information it contains is neither false nor misleading.

Signature:

Name: Daniel Halton

Title: Environmental Officer

Company: Ausgrid

Date: 28th June 2024

REF reviewer:

I certify that I have reviewed the contents of this REF and, to the best of my knowledge, it is in accordance with the Code approved under section 198 of the Environmental Planning and Assessment Regulation 2021, and the information it contains is neither false nor misleading.

Signature:

Name: James Hart

Title: Manager- Environmental Services

Company: Ausgrid

Date: 28th June 2024

Project manager acceptance:

I accept the description of the proposal outlined in section 1.6 as true and accurate and I commit to the implementation of the mitigation measures outlined in section 5.

Signature:

Name: Amy Tucker

Title: Project Manager

Company: Ausgrid

Date: 28th June 2024

Appendix A Drawings, Construction Footprints and Scoping

Appendix B Geotechnical Investigation

Appendix C Community Engagement Plan

Appendix D Flora and Fauna Impact Assessment

Appendix E Aquatic Ecology Assessment

Appendix F Aboriginal Cultural Heritage Assessment Report

Appendix G Statement of Heritage Impact

References

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