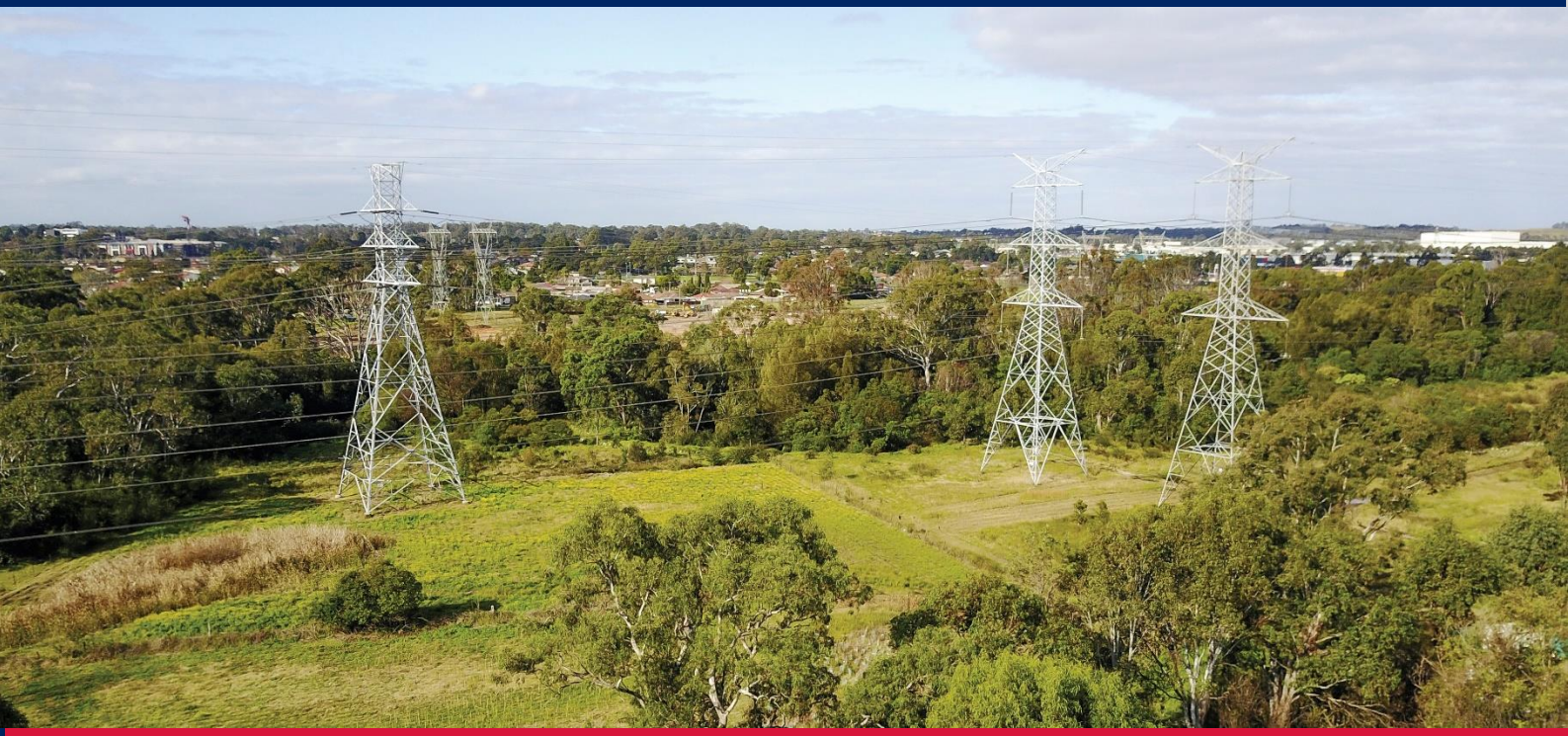
Department of Planning and Environment

dpie.nsw.gov.au

NSW GOVERNMENT

Draft Transmission Guideline



Guidance for state significant infrastructure and critical state significant infrastructure

November 2023

Acknowledgement of Country

The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

Published by NSW Department of Planning and Environment

dpie.nsw.gov.au

Draft Transmission Guideline

Draft published: November 2023

Copyright and disclaimer

TMP-MC-R-DC-V1.2

Contents

Abbreviations

AEMO	Australian Energy Market Operator
AS	Australian Standard
CSSI	Critical State Significant Infrastructure
EIS	Environmental Impact Statement
EMF	Electric and magnetic fields
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	Environmental Planning and Assessment Regulation 2021
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ISP	Integrated System Plan
kV	Kilovolt
LEP	Local Environmental Plan
NSW	New South Wales
REZ	Renewable Energy Zone
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSI	State Significant Infrastructure

Glossary of terms

Authorised network operator	Privately managed network businesses as defined under the *Electricity Network Assets (Authorised Transactions) Act 2015*.
Benefit sharing	Benefit sharing aims to distribute benefits generated by a project between the proponent and the community through mutually agreed opportunities such as funding or sponsoring local community initiatives, programs or projects
Consent authority	The authority responsible for granting or refusing consent for a development application
Department	The Department of Planning and Environment
Environmental impact statement (EIS)	An environmental impact statement prepared by or on behalf of the proponent to accompany an SSI application. It includes a comprehensive assessment of the environmental, social and economic impacts of the project.
Landscape	A holistic area comprised of its various parts including landform, vegetation, buildings, villages, towns, cities and infrastructure
Landscape character	An area or sense of place definable by the quality of its built, natural and cultural elements
Major transmission infrastructure project	Projects that are declared as state significant infrastructure or critical state significant infrastructure
Planning Secretary	The Secretary of the Department of Planning and Environment
Proponent	The person identified as seeking consent for a development application of an SSI or CSSI project
Renewable Energy Zone	A designated area to support renewable energy development as declared in accordance with the *Electricity Infrastructure Investment Act 2020*
Secretary's Environmental Assessment Requirements	The Planning Secretary's environmental assessment requirements, which set out the matters that must be addressed in an EIS
State significant infrastructure (SSI)	A development declared to have state significance due to its size, economic value or potential impacts
Viewpoint	A location within the private or public domain with a potential view of a transmission project
Visual magnitude	The apparent size of a transmission project in the landscape or when viewed from a given viewpoint

1 Introduction

Australia is currently undergoing a transformation that will change the way that we generate and use energy. The national energy sector is transitioning from dependence on large coal-fired generators to one of diverse renewable energy generation, storage and distribution.

New transmission infrastructure is required to connect renewable energy sources to the electricity grid and to ensure NSW is supplied with the cleanest and most affordable energy into the future.

This guideline has been prepared to support major upgrades and expansions to the NSW transmission network and aims to provide communities, industry and regulators with clear and consistent information and guidance on the planning and development of this infrastructure.

The guideline includes a technical supplement that provides additional guidance and tools for assessing, evaluating and mitigating visual and landscape impacts from transmission infrastructure.

1.1 Objectives

The objectives of the guideline are to:

- provide guidance to assist proponents and other stakeholders to understand the NSW planning framework and how it relates to major transmission infrastructure projects
- improve the clarity, certainty and transparency of the assessment and determination of major transmission infrastructure projects in NSW
- provide clear guidance about the route selection process
- explain the typical types of impacts that are associated with major transmission infrastructure projects, particularly visual impacts, and how they should be assessed and managed
- support the safe, considered and efficient roll-out of major transmission infrastructure projects.

1.2 Application of the guideline

This guideline applies to the development of major transmission projects that are declared as state significant infrastructure (SSI) or critical state significant infrastructure (CSSI).

Proponents of major transmission projects must consider the guideline and supporting technical supplement for visual impact assessment where referenced in the Planning Secretary's environmental assessment requirements (SEARs) and prepare its environmental impact statement (EIS) in accordance with the technical guidance.

In the case that SEARs are already issued when the Guideline is finalised and the proponent is yet to submit an EIS, the Guideline will apply if an EIS is not submitted within 6 months from the date of publication of the guideline.

For the avoidance of doubt, this guideline does not apply to standalone Battery Energy Storage Systems.

1.3 Strategic context

In March 2020, the NSW Government released the first stage of its Net Zero Plan, which outlines a clear objective to achieve net zero emissions by 2050 while also creating new jobs, reducing household costs and attracting investment to NSW. To achieve these targets, 4 of 5 coal-fired power stations will come to their scheduled end of life in the next 15 years. These 4 power stations currently generate approximately 75% of NSW's annual electricity.

An increasing supply of renewable energy generation will be required over the coming decades to meet the NSW Government's net zero target. The NSW Government's Electricity Infrastructure Roadmap (the Roadmap) sets out a 20-year plan to deliver this generation infrastructure, as well as the storage, firming and transmission infrastructure required to ensure NSW has continued access to cheap, clean and reliable energy as coal-fired power stations are retired.

The existing transmission network is estimated to have a connection capacity of 16 gigawatts in areas with favourable renewable energy resources, which is substantially less than the 125 gigawatts of new grid-scale renewable energy required by 2050.

The existing NSW transmission network, as shown in Figure 1 is made up of over 13,000 km of 500 kV, 330 kV, 220 kV and 132 kV transmission lines. These transmission lines were mostly built in the 1950s to 1990s to connect traditional energy sources, such as coal-fired power stations, to NSW's population centres.

The Roadmap, along with the Australian Energy Market Operator's (AEMO) Integrated System Plan (ISP) 2022, plans for around 10,000 kilometres of new transmission infrastructure Australia wide (of which 4,000 kilometres is required in NSW) over the next two decades to address capacity issues and accommodate new renewable sources of energy generation.

Without investment in new transmission infrastructure, the existing transmission network will reach capacity and new sources of energy generation will not be commercially viable, and NSW will be unlikely to reach its net zero emission target.

Renewable energy zones

As part of the Roadmap, the NSW Government has also introduced renewable energy zones (REZs) that will expand transmission and generation capabilities in strategic areas across NSW (see Figure 1). REZs are modern-day power stations. They combine renewable energy generation with the required transmission infrastructure in dedicated areas of NSW with high energy resource potential.

The NSW Government will deliver at least 5 REZs in the Central-West Orana, New England, South-West, Hunter Central Coast and Illawarra regions of NSW under the Roadmap. Transmission upgrades to and within these designated areas will help facilitate the development of renewable energy generation projects at a lower overall cost.

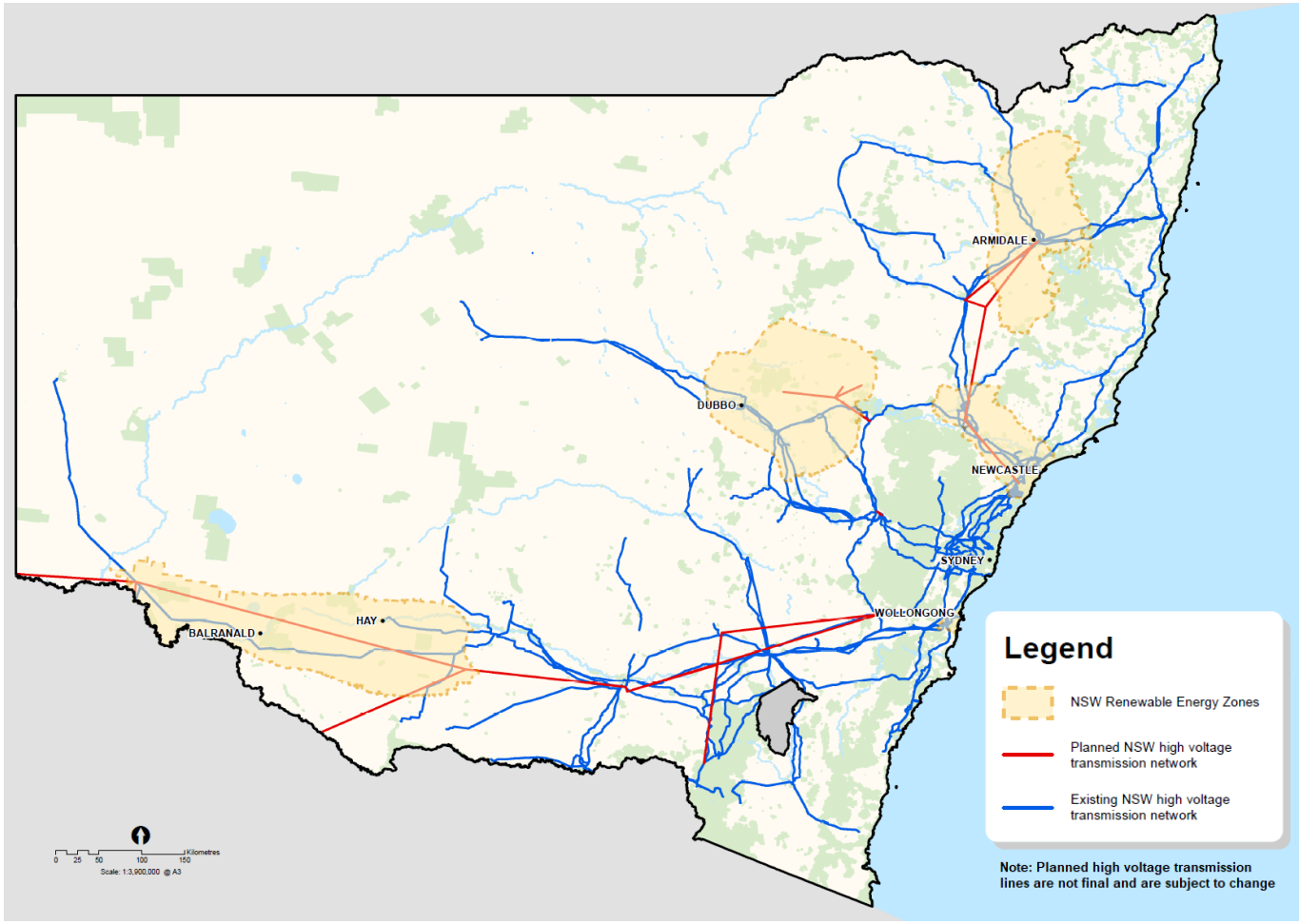


Figure 1 - Existing and planned high voltage transmission infrastructure

1.4 About transmission infrastructure

Transmission infrastructure refers to the network of powerlines and equipment that transports electricity from the point of generation to substations, where it is then distributed to homes, businesses and other places where it is needed. It can be thought of as a highway system for electricity. The key elements of transmission infrastructure and distribution are shown on **Figure 2**.

The most common elements of transmission infrastructure are typically high-voltage aluminium alloy wires supported by large steel lattice towers. These wires enable electricity to flow over long distances spanning hundreds of kilometres. The size of transmission towers is dependent on several factors including voltage level, physical and environmental constraints along the selected route, and public safety considerations. They typically range in height from 30 to 60 metres and are spaced around 400 to 600 metres apart (see **Figure 3**). Some projects may require specially designed towers up to 80 metres in height for large land crossings.

Transmission lines are typically located within easements that restrict some activities from being carried out on the land. These easements are designed to reduce safety risks associated with high voltage electricity and prevent disruption to the reliability of the network. They also provide a right of way to allow construction, operation and maintenance of the infrastructure.

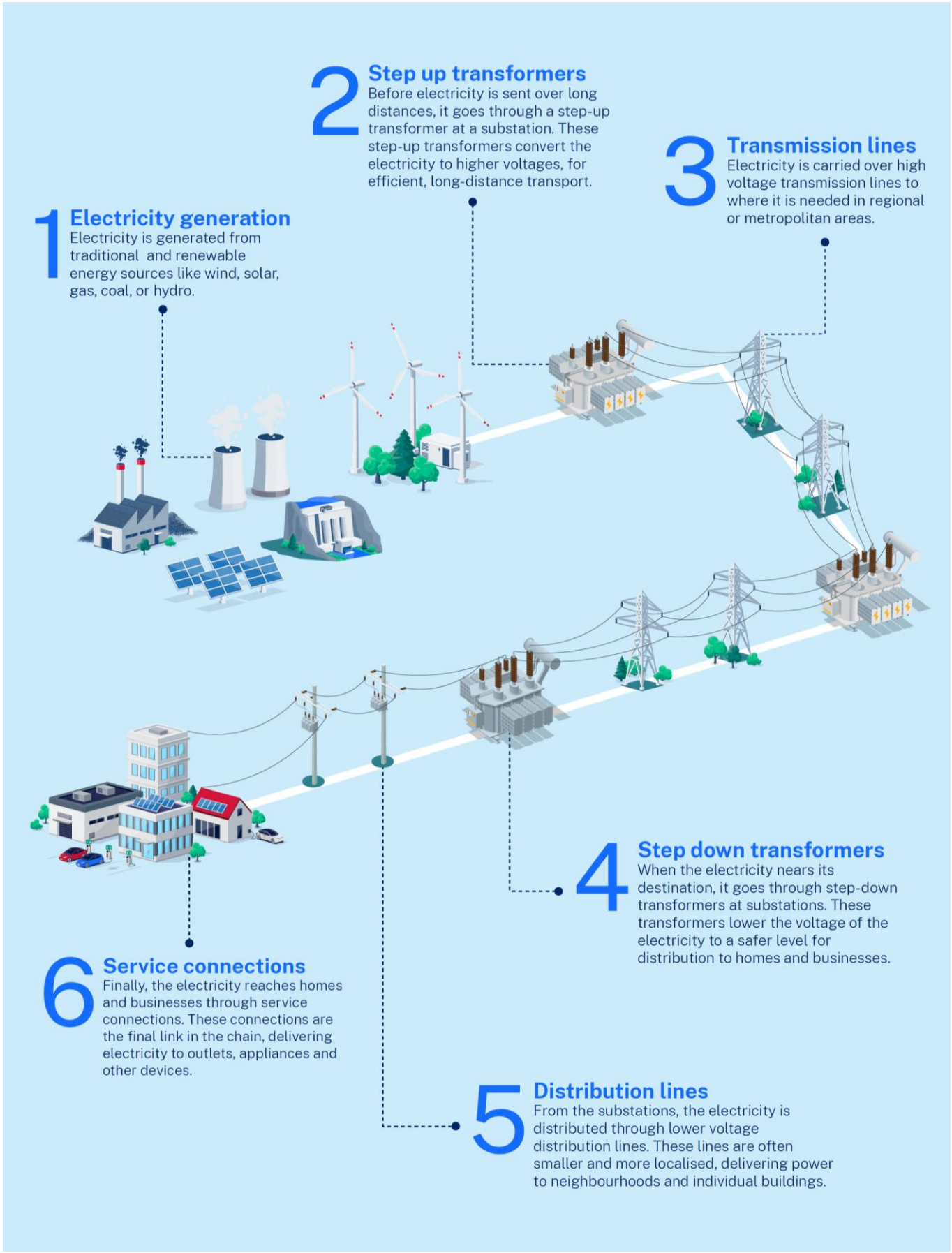


Figure 2 - Key elements of transmission and distribution infrastructure

Despite the restrictions, a range of activities and land uses are able to continue in most parts of an easement with little to no disruption including agricultural activities (such as cropping, grazing and irrigation), provision of public open space and recreational activities.

Easements vary in width depending on the voltage and design of the infrastructure, including the height and maximum span distance between transmission towers. Examples of typical transmission tower designs, heights and easement corridor widths are shown in **Figure 3**. Easement corridors are generally acquired through negotiations with relevant landowners and are subject to private agreements (see Section 6).

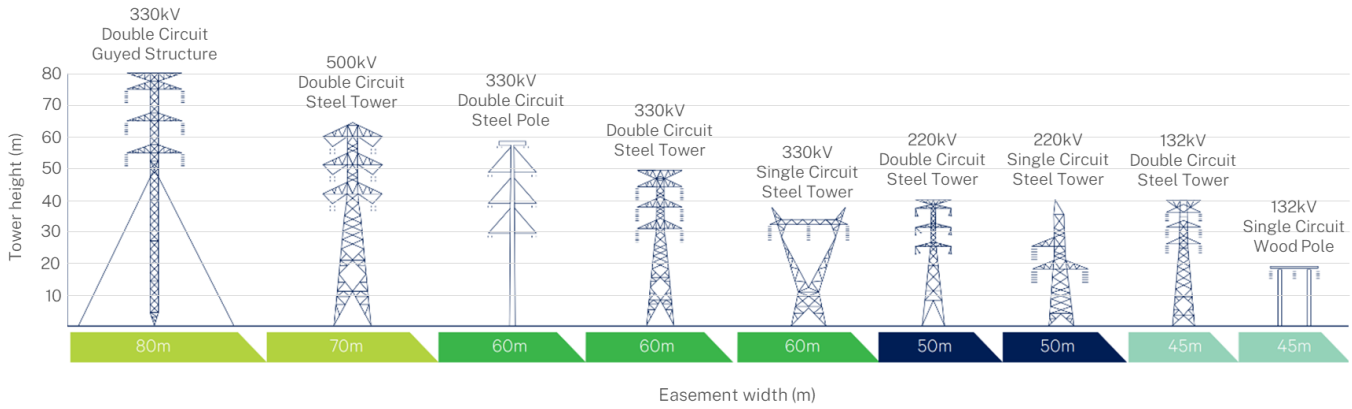


Figure 3 - Typical transmission tower designs, heights and easement widths (Source: Transgrid's Easement Guidelines)

Relevant operators and authorities

The energy market in NSW operates under the National Electricity Market (NEM), which covers several states and territories in Australia. The NEM is a wholesale market where electricity is bought and sold between generators, retailers and large consumers. It is overseen by the Australian Energy Market Operator (AEMO), which manages the market operations and ensures the reliability and security of electricity supply. The AEMO is responsible for undertaking transmission planning as identified in the ISP.

The existing high voltage transmission network in NSW has historically been owned, constructed, managed and operated by Transgrid. Once electricity reaches the distribution stage, it is delegated to one of three distribution companies in NSW who are responsible for delivering electricity to end consumers. The three distribution companies (Ausgrid, Endeavour Energy and Essential Energy) are each responsible for a separate geographic region of NSW.

These privately managed network businesses are referred to as Authorised Network Operators by the *Electricity Network Assets (Authorised Transactions) Act 2015.* These network operators, in addition to Transgrid, may also be responsible for the development and operation of future transmission networks in NSW.

The Energy Corporation of NSW (EnergyCo) is a statutory authority established under the *Energy and Utilities Administration Act 1987* and is the appointed Infrastructure Planner for the NSW REZs. EnergyCo's role includes co-ordinating and carrying out the planning, design, construction and operation of network infrastructure in the REZs on behalf of Authorised Network Operators.

The Department of Planning and Environment (department) is responsible for undertaking the merit assessment of major transmission infrastructure projects in accordance with the provisions for SSI (and CSSI) under the *Environmental Planning and Assessment Act 1979* (EP&A Act) (see Section 2.1). The department then provides its recommendation to the Minister for Planning and Public Spaces (the Minister) for a decision on whether to approve a project.

1.5 Regulatory approvals

Transmission infrastructure projects undergo a multi-phase assessment process to determine the preferred project option against a range of alternatives...

In general, transmission projects to support REZs will be considered through the framework established under the *Electricity Infrastructure Investment Act 2020* (EII Act), whilst the majority of other transmission projects, such as interconnectors, are expected to be considered through the National Framework.

The regulatory process under the National Framework is a multi-step process that consists of the Regulatory Investment Test for Transmission (RIT-T) process prescribed under the National Electricity Rules and the Contingent Project Application process.

Further information about the National Framework is available on the AEMC's website.

The NSW planning approval process is undertaken concurrent to the above processes and is described further below.

2 NSW planning framework

The NSW planning framework consists of the EP&A Act, Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) and a range of environmental planning instruments, including State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs).

This framework identifies where certain types of development may be carried out (for example with or without consent) and sets out an assessment process that is proportionate to the scale, importance, risk and impact of that development.

Transmission development is defined under the Transport and Infrastructure SEPP as an 'electricity transmission or distribution network' and includes:

- above or below ground electricity transmission or distribution lines (and related bridges, cables, conductors, conduits, poles, towers, trenches, tunnels, ventilation and access structures)
- above or below ground electricity kiosks or electricity substations, feeder pillars or transformer housing, substation yards or substation buildings.

Under section 2.44 of the Transport and Infrastructure SEPP, 'development for the purpose of an electricity transmission or distribution network, carried out by, or on behalf of, an electricity supply authority or public authority' is permissible without development consent under Part 4 of the EP&A Act (except on land reserved under the *National Parks and Wildlife Act 1974* and under certain conditions).

This means that transmission development does not usually require approval from a consent authority such as the department and can be self-determined by an electricity supply authority or public authority following an environmental assessment under Part 5 of the EP&A Act.

However, if this type of development is of sufficient importance to the state and/or is likely to have a significant impact on the environment, it can become state significant infrastructure (SSI) or critical state significant infrastructure (CSSI).

2.1 Transmission as 'state significant infrastructure'

Most major transmission infrastructure development in NSW will be considered SSI or CSSI as it is important or essential to the State for economic, environmental, or social reasons.

State significant infrastructure

Transmission development can be declared SSI in two ways. Firstly, it is declared SSI if it is likely to have a significant impact on the environment. Under Schedule 3 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP), transmission development is considered SSI if it requires an EIS and if the proponent is also the determining authority. Under section 5.7 of the EP&A Act, an EIS is required for transmission development if it is likely to have a significant impact on the environment.

Secondly, specified transmission development on specified land can be declared SSI by an order of the Minister. All developments declared by the Minister as SSI are listed in Schedule 4 of the Planning SEPP.

The Minister is the determining authority for SSI, and a senior departmental officer may exercise the Minister's approval authority functions in accordance with certain delegations.

Critical state significant infrastructure

The Minister may also declare development to be CSSI under section 5.13 of the EP&A Act if it is considered essential to the State for economic, environmental, or social reasons. The department's Declaration of SSI and CSSI guideline sets out the general principles and reasons for the Minister to declare development as CSSI.

Development declared as CSSI is listed in Schedule 5 of the Planning Systems SEPP. The assessment process for CSSI remains fundamentally the same as SSI (see Section 2.2), however, the following key provisions apply to CSSI applications:

- the Minister is the determining authority for all CSSI decisions and cannot delegate this function (for instance to any senior departmental staff)
- a decision made cannot be subject to judicial review (a review of the administrative decisions and conduct) by the Land and Environment Court unless approved by the Minister
- a development control order, for example an order to deal with compliance issues such as a stop work order, cannot be given in relation to CSSI without approval of the Minister
- certain directions, orders or notices under other legislation cannot be given to prevent or interfere with the carrying out of approved CSSI.

2.2 Process for assessing major transmission projects

All major SSI and CSSI transmission projects will be subject to a rigorous, merit-based assessment that includes extensive community consultation and a detailed consideration of any environmental, social and economic impacts. The main steps in the assessment process are shown in **Figure 4** and summarised below. The process is explained in more detail in the Department's State Significant Infrastructure Guidelines.

All SSI and CSSI applications must be accompanied by an EIS. The purpose of the EIS is to help the community, councils, government agencies and the consent authority understand the impacts of a project so they can make informed submissions or a decision about a project's merits. The EIS must be prepared in accordance with the SEARs. The SEARs identify the information that must be provided in the EIS, and the community engagement that must be carried out.

To enable the department to issue SEARs, the proponent must submit a scoping report which provides a clear overview of the project (for example, its location, proposed layout and proximity to important features and neighbours) and identifies the key environmental assessment issues.

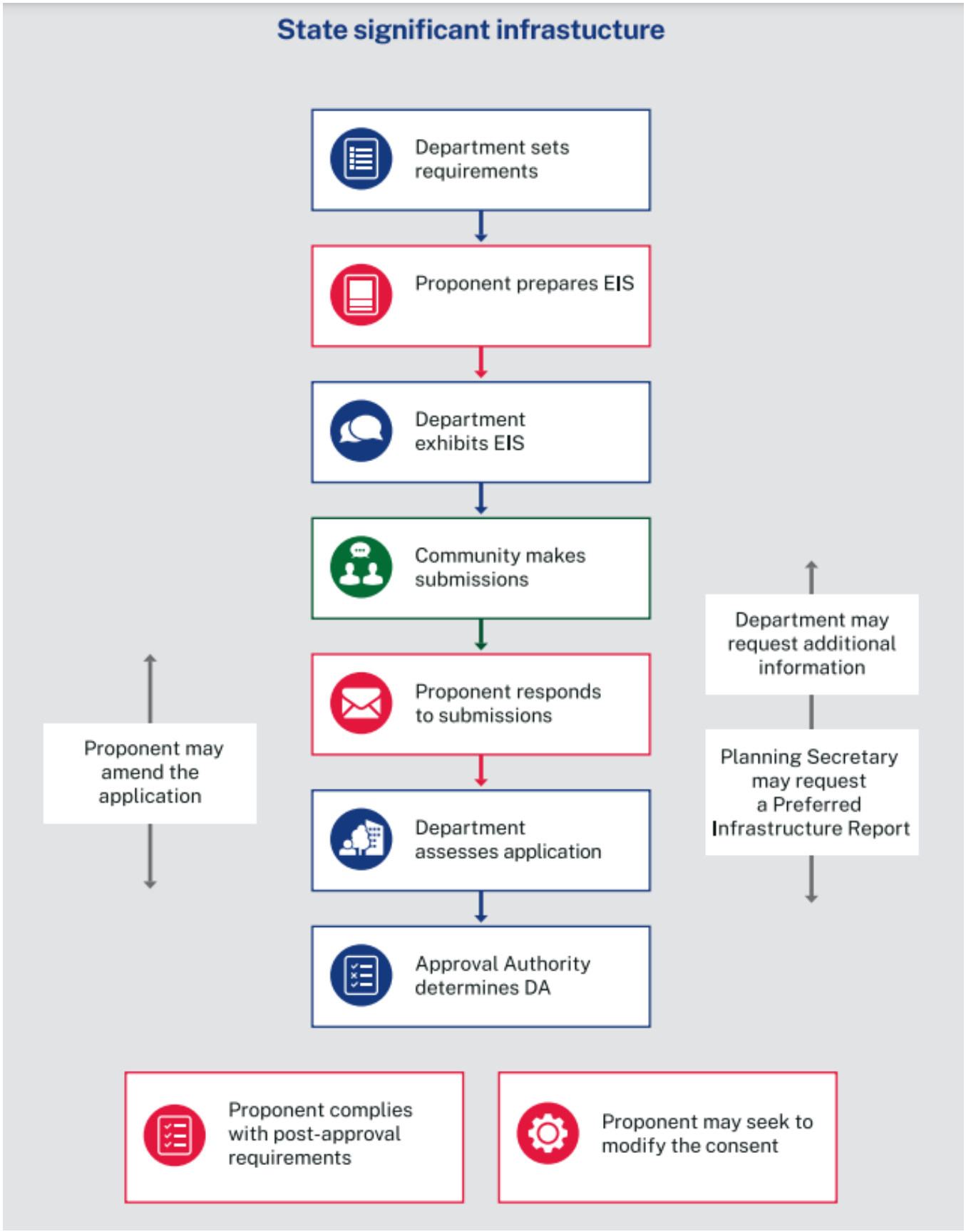


Figure 4 - Overview of SSI assessment process

The scoping report should also outline how the proponent has engaged with the local community in the preliminary planning and how it intends to undertake meaningful consultation with affected stakeholders during the assessment process (refer Section 3 for further guidance). This scoping report must be prepared to a high standard having regard to the department's State Significant Infrastructure Guidelines.

2.3 Commonwealth approval

Under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act), an approval from the Commonwealth Government may be required if a project is likely to have a significant impact on matters of national environmental significance or other protected matters. This includes, but is not limited to, listed threatened species and ecological communities.

Proponents must refer their project to the Commonwealth Department of Climate Change, Energy, the Environment and Water if it is likely to have a significant impact on matters of national environmental significance. The Commonwealth Government's Significant Impact Guidelines provide guidance on whether or not an impact is likely to be significant. Referrals can be made on the Commonwealth Government's EPBC Act Business Portal.

The NSW assessment process under the EP&A Act has been accredited under a bilateral agreement[1] with the Commonwealth Government. Under this agreement, the assessment of both NSW and Commonwealth matters can be integrated into a single assessment process. Following an assessment and determination by the NSW government, the Commonwealth would review the department's report and issue any additional conditions of consent.

[1] See https://www.dcceew.gov.au/sites/default/files/env/pages/43badfb2-b8be-4a10-a5b9-feab2d38a5d2/files/nsw-bilateral-agreement-amending-agreement.pdf

3 Route selection

Good route selection provides an opportunity to avoid or minimise negative impacts at the outset of a development, allowing the assessment of a project to focus on mitigating and managing unavoidable impacts.

3.1 Foundational principles

The following foundational principles should be used to guide the design and development of major transmission projects. Transmission infrastructure should be co-located with existing infrastructure and/or maximise the use of already disturbed land (such as land already cleared of vegetation for other purposes) where possible to help maximise efficiency and reduce environmental and social impacts.

The large scale of major transmission infrastructure projects makes it difficult to select routes that do not present some challenges. Many environmental and land use factors also compete with each other (e.g. avoiding agricultural land could lead to impacts on important biodiversity values) and it will not be possible to avoid impacts entirely. Consequently, the route selection process should avoid impacts as far as possible while striking an appropriate balance between competing commercial, technical, environmental and social factors.

Priority areas that may be given a higher weighting for the avoidance of impacts include areas of recognised high conservation value such as National Parks, World heritage properties and Ramsar wetlands. The route selection process should also consider the nature and magnitude of impacts as well as feedback from landowners and the local community for each specific project.

When applied correctly, adherence to the foundational principles will help ensure transmission infrastructure is designed appropriately, minimises environmental and social impacts and provides a cost effective and best value for money option. Further information on key assessment issues, including visual and biodiversity impacts is provided in Section 5.

Principle 1 - Efficiency and deliverability

Projects should be efficient from an economic and technical perspective and be deliverable in time to meet the investment need. Given the cost of transmission lines is passed on to consumers through electricity bills, the cost and affordability of new infrastructure should be a significant factor in the evaluation of route options.

However, while the most cost-effective option for linear infrastructure projects is to take a straight-line approach from point to point, this option is not generally feasible due to a range of environmental, social, land use and engineering constraints.

Principle 2 - Environment and land-use

Environmental impacts should be avoided, minimised or mitigated, and best practice environmental management incorporated into project design. Impacts on important biodiversity and cultural values should be a key consideration.

Projects should be sited on public land as far as practicable, with the exception of some categories such as National Parks and reserves (including environmental, heritage, recreation and other reserve categories). When weighing up the appropriateness of prioritising public land over private land, proponents should give careful and sensitive consideration to the inherent characteristics and public purposes between the different categories of public land and their underlying social, economic, environmental and cultural values.

Principle 3 - People and communities

Projects should avoid and minimise social impacts, including those associated with visual impacts, and direct interactions with town centres, residential areas, and other sensitive land uses should be minimised.

3.2 Route selection process

Route selection is an iterative process that involves the analysis of technical, environmental, social and economic factors and incremental improvements to project design. The process involves the following key phases:

- **Options development** – involves the identification and evaluation of different project route options and selection of a preliminary study corridor for further refinement.
- **Corridor refinement and project design** – involves refining the preliminary study corridor to identify a preferred study corridor and project design for detailed environmental assessment.

An overview of the process is shown in **Figure 5**. The key steps and engagement activities for each phase are described in further detail below.

3.2.1 Options development

This phase involves the identification and evaluation of a range of reasonable and feasible project options against the foundational principles. This exercise will ultimately be used to identify a preferred concept-level project option and associated study corridor that is cost effective with the fewest possible constraints.

The types of options explored through this process will vary depending on a wide range of variables, including the:

- start and end points of the transmission infrastructure
- physical and technical characteristics of the infrastructure, including voltage (i.e. 330 kV or 500 kV), single or double circuit configuration, overhead or underground
- composition of greenfield vs brownfield works, including potential for utilising existing infrastructure corridors and paralleling existing electricity easements
- use of non-network (i.e. non-transmission) infrastructure, such as grid-connected storage
- staging and sequencing of project delivery.

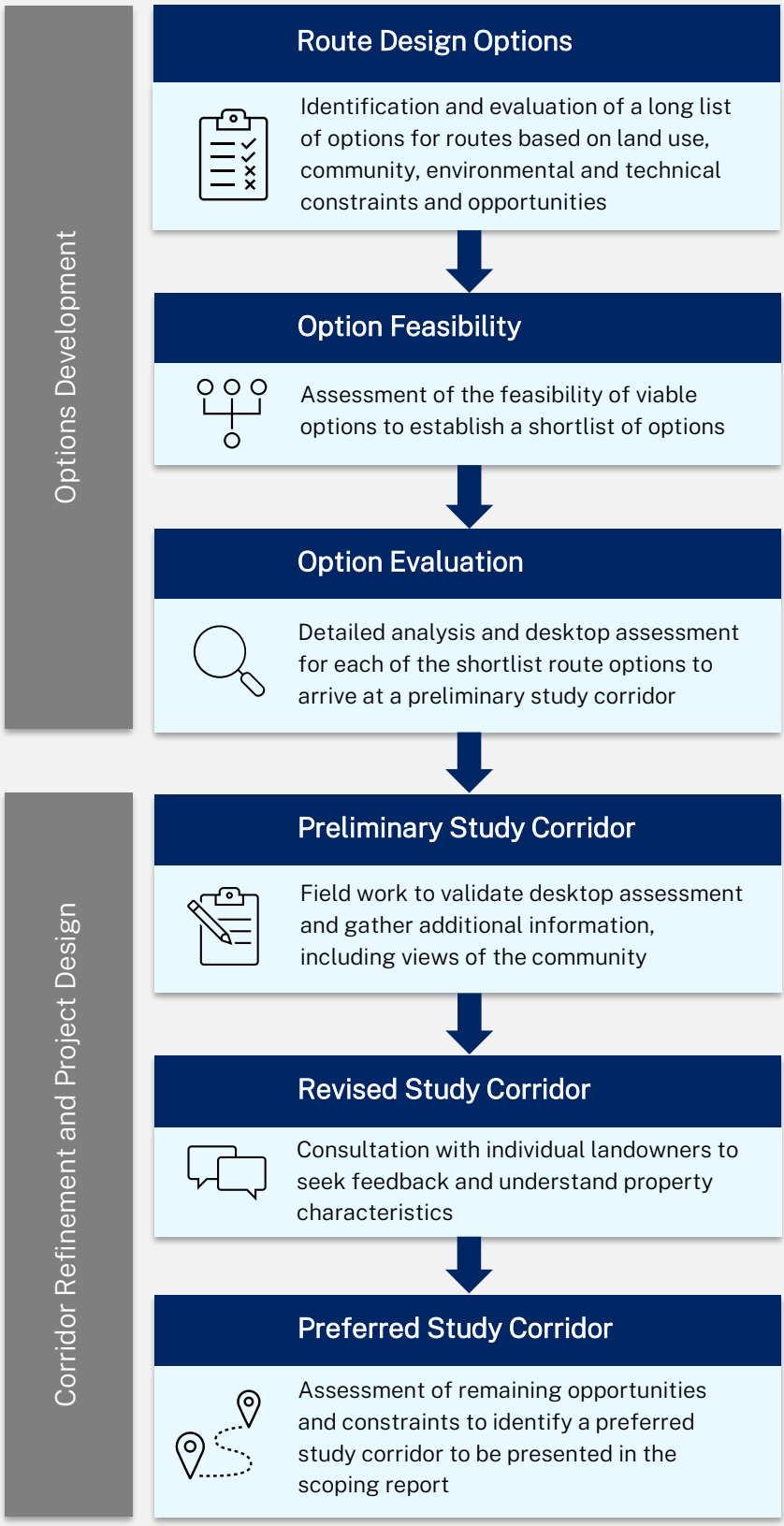


Figure 5 - Overview of route selection process

As part of the analysis, proponents should conduct a high-level desktop assessment to understand land use planning, community, environmental and technical constraints and opportunities to the development of a project. This may include, but is not limited to, mapping of the following:

- Aboriginal Areas identified under the *National Parks and Wildlife Act 1974* and sites listed under the Aboriginal Heritage Information Management System (AHIMS)
- non-Aboriginal heritage items listed on recognised heritage registers and databases
- areas of high environmental value (including threatened species and ecological communities) and protected areas such as National Parks, nature reserves, wetlands and conservation areas
- Biophysical Strategic Agricultural Land
- major waterbodies, waterway crossings and riparian vegetation

During this phase there is often a high level of uncertainty as to what the final option will be, its location, and the people who will be impacted. The options are often broad to allow for further refinement and consideration of regional opportunities and constraints.

Whilst targeted consultation is encouraged during this phase, proponents should avoid consulting widely on options when details are overly conceptual or uncertain. Engagement needs to carefully balance the benefits of providing stakeholders with the opportunity to participate in the options evaluation process, whilst also avoiding unnecessary anxiety that may be caused by consulting on options that are highly unlikely to proceed.

Community consultation during this phase should focus on building awareness about the project and providing avenues for landowners to provide specific feedback about their properties early in the process. When undertaking consultation, the proponent should identify the elements of the project that can be influenced or shaped by the community.

At the end of this evaluation, the proponent should be able to identify its preferred project option (noting this may include sub-options for some sections of the proposed project) and an associated study corridor (referred to as the preliminary study corridor), which is then further refined as described below.

A high-level summary of the options considered, and any other alternatives to carrying out the project, must be included in the scoping report for the project, including the opportunities and constraints of each option.

3.2.2 Corridor refinement and project design

As constraints are identified and opportunities to minimise potential disturbance are confirmed, the preliminary study area should be refined from a concept-level proposal to a narrower project corridor that provides a higher degree of confidence around the project footprint.

The refinement of the study corridor and development of the final transmission alignment is an iterative process. It typically involves incremental improvements to project design, including the technical and functional specifications, as the understanding of relevant social and environmental issues (such as interaction with the landscape values and community concerns) are better understood.

As part of this process, proponents should undertake on-ground assessment and engagement with all relevant stakeholders. In this regard, proponents should:

- undertake preliminary studies and field work to validate the desktop assessment and gather additional information. This should include targeted field surveys to identify key biodiversity values and preliminary verification of heritage and cultural heritage sites to determine the presence of any constraints within the study area
- undertake consultation with the Aboriginal community in relation to any Native Title claims and to identify any high-level cultural values not identified in the AHIMS database
- continue to consult with the broader community to identify any further opportunities and constraints
- seek to undertake meetings with individual landowners within the revised study corridor to obtain information about specific characteristics of their properties.

Further guidance around how proponents should undertake community and stakeholder engagement is provided in Section 4.

Information gathered during this phase should be used to determine a preferred study corridor that will be subject to detailed environmental assessment and further refinement through the planning approval process.

The preferred study corridor should be presented in the scoping report along with a description of:

- the route selection methodology
- how corridor options were identified and evaluated, including a consideration of the foundational principles
- key opportunities and constraints (including an identified study area for landscape and visual impact assessment – see *Technical supplement for landscape and visual impact assessment* for more details)
- how landowner and community input informed the preferred study corridor.

The corridor presented in the scoping report is then used as the basis for the preparation of the EIS.

The final project design including the positioning and siting of the transmission infrastructure and associated easements will be further refined during preparation of the EIS with local considerations identified through the engagement process.

Consideration of land-uses and site features at an individual property level, in consultation with landowners, should also be a key input to the final project design. Other requirements for the proponent to undertake during the assessment process that will inform the final design include:

- detailed environmental, cultural and social impact assessments, land access negotiations, geotechnical studies and preliminary engineering design
- targeted stakeholder meetings with potentially affected landholders, the Aboriginal community, conservation bodies, local communities and government agencies. This consultation may identify specific management and mitigation measures that can be implemented to address identified impacts.

4 Community and stakeholder engagement

Effective community and stakeholder engagement is essential for the development of major transmission infrastructure and the environmental assessment process. It is important for proponents to consider a diverse range of views to achieve positive outcomes.

Proponents must undertake meaningful engagement with stakeholders during all phases of the project including route selection, environmental impact assessment and construction and operation. Proponents should undertake consultation in accordance with the Undertaking Engagement Guidelines for State Significant Projects. These guidelines include requirements for proponents to:

- provide clear and concise information to the community and stakeholders about projects and their impacts
- implement activities that encourage and facilitate public participation
- report back on what was heard and what has or hasn't changed in response to this feedback (i.e. closing the loop) and why.

The SEARs and consent conditions may include additional consultation requirements.

The community should be engaged as early as possible to identify potential opportunities and constraints associated with the proposal. These could relate to the design of the project, the characterisation of the area and/or management and mitigation measures. Examples include:

- positioning of the transmission infrastructure and easement corridor, including any setbacks
- characterisation of the scenic quality and sensitivity of the landscape and viewpoints (see the technical supplement for landscape and visual impact assessment)
- visual impacts including mitigation measures.

Proponents must also ensure that stakeholders are given the opportunity to participate in the engagement process in a meaningful way. Details of consultation activities with surrounding residents, community members, relevant authorities and councils should be clearly outlined in the EIS. This should include key matters raised and how feedback was considered into the project.

Proponents should continue to engage with stakeholders after any development consent has been granted and must have an effective complaint handling system which ensures that community concerns are addressed in a timely manner.

The department also has a role to play in consulting with stakeholders is required to:

- consult with relevant government agencies and councils
- exhibit the EIS for public comment for a minimum of 28 days
- publish documents and submissions relating to the project on the planning portal
- ask the proponent to respond to issues raised in submissions to help the community and stakeholders understand how issues have been addressed and considered
- outline its decision or recommendation about whether planning approval should be given for the project, including how community feedback was considered.

5 Key assessment issues and considerations

5.1 Landscape and visual impacts

Transmission towers are static structures built with a lattice-work frame often made of steel. Given their industrial character, they can contrast with rural and urban areas in which they are built. Major transmission infrastructure projects must be accompanied by a landscape and visual impact assessment that is prepared in accordance with the supporting *Technical supplement for landscape and visual impact assessment.* Some of the key considerations are described briefly below.

Visual Impact Assessment

Visual impacts vary depending on the size of the towers, the distance they are located from public viewpoints or private receivers, the number of towers visible, where they are being viewed from and the scenic quality of the view. Rural areas are typically more sensitive to the visual impacts of transmission infrastructure compared to urban areas, where itis a common part of the overall urban fabric.

In some circumstances, transmission towers can be visually dominating despite the scenic quality or importance of the view. For example, a single 80 m tower will generally have a dominant appearance if located within approximately 400 m of a rural dwelling (see **Figure 6**). A tower of this height will be a prominent feature in a rural landscape up to 1.5 km away, after which it will become less noticeable. Beyond this distance, towers can be difficult to see against the backdrop of vegetation and other features of the landscape.

The supporting *Technical supplement for landscape and visual impact assessment* outlines more detailed thresholds for a range of tower sizes (see Section 3.2) in both rural and urban settings. Proponents should design projects and/or implement mitigation measures to avoid fully visible towers within these distances.

The technical supplement includes tools that must be used to inform the assessment of impacts on public viewpoints and private receivers. These consider factors such as:

- a view from a dwelling is more sensitive to change than from a local road where views are more intermittent and less frequent
- a view from a rural dwelling is more sensitive if it is from principal living spaces and the front and rear of the dwelling than from other areas
- a view is more sensitive to change if it has higher scenic qualities and more valued landscape features
- a view from a rural dwelling is more sensitive than a view from an urban dwelling.

Visual impacts must be assigned a rating from very low to high having regard to these considerations. Proponents should design their projects to avoid and mitigate high impacts. The technical supplement provides a range of visual impact examples.

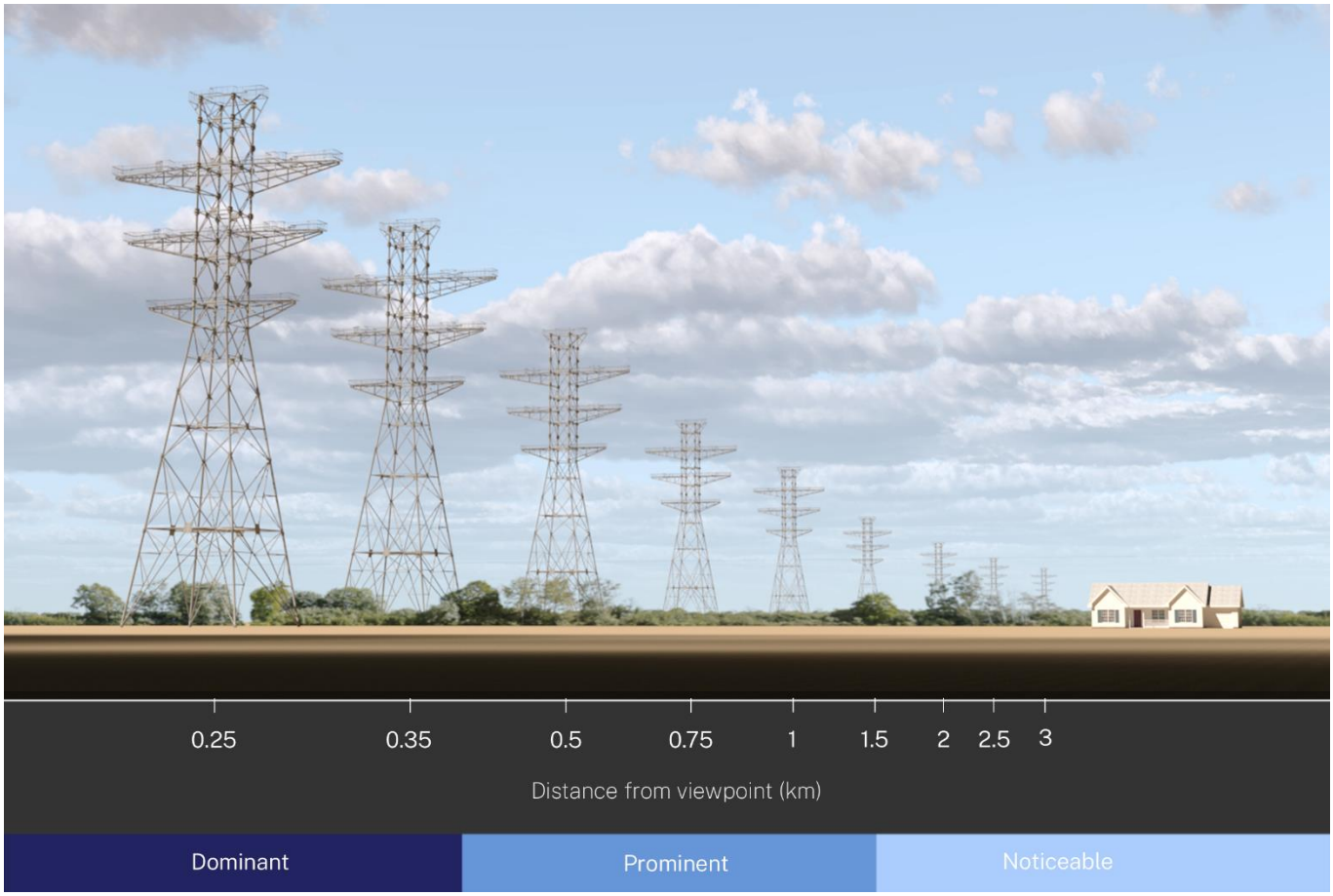


Figure 6 - Visual prominence of 80 m transmission towers in rural areas [2]

Landscape Character Assessment

The purpose of undertaking a landscape character assessment is to understand the sensitivities of the landscape and to help determine the overall impact of a project on an area's character and sense of place.

This should be informed by a baseline analysis that establishes an area's existing character and its sensitivity. It is important that the baseline analysis is prepared in consultation with the community, local council and affected landholders to ensure that landscape values and characteristics are accurately identified.

The impact of the proposal on the landscape should be determined by evaluating the sensitivity of the landscape and the magnitude of the project's effects in that area.

5.2 Biodiversity

Impacts to biodiversity values from transmission infrastructure result from clearing of native vegetation and through direct and indirect impacts to threatened flora and fauna species and ecological communities, during both construction and operational maintenance that requires management of vegetation within easements. These impacts can be potentially significant in scale

[2] Note: Dwelling and tree line are located approximately 250 m from the viewpoint.

given the extensive distances often required for major transmission connections and the associated easement requirements. As with other major linear projects of this scale, complete avoidance of any intersections with native vegetation is not feasible. The best way of minimising the amount of vegetation clearing required is to avoid and minimise these intersections as far as practicable during the route selection process by:

- prioritising areas where native vegetation and species habitat are in the poorest condition
- using existing access tracks where possible to minimise vegetation clearing
- targeting narrow waterway crossing points to minimise clearing of riparian vegetation.

Where a proposed project requires clearing of native vegetation, threatened species habitat or ecological communities, the EIS must include an assessment undertaken in accordance with the *Biodiversity Conservation Act 2016* and the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report.

Proponents are expected to demonstrate that they have applied the principles of avoidance, minimisation and mitigation in the selection of route options. When all attempts to apply these principles have been considered and addressed, the remaining unavoidable impacts can be offset by the purchase and/or retirement of biodiversity credits or payment to the Biodiversity Conservation Fund under the Biodiversity Offset Scheme.

Further detail about this process can be found on the Department's website.

6 Other Issues

A range of other assessment issues are discussed below. While these are not typically key issues in the assessment of projects, they are commonly raised as issues of concern for communities.

6.1 Agricultural land use

Agricultural land has attributes suitable for transmission infrastructure because it is often flat and accessible, which can assist with construction and ongoing maintenance of infrastructure, and cleared of vegetation, which may limit biodiversity impacts.

Agricultural land can continue to support grazing and cropping uses adjacent to and underneath transmission lines. For this reason, the cumulative risks and impacts to agricultural land and productivity due to transmission infrastructure are typically very low. Transgrid has published Easement Guidelines[3] which set out requirements for agricultural activities undertaken within Transgrid easements (including around towers).

Notwithstanding, there may be some restrictions on agricultural operations within a transmission easement. Consequently, the assessment of impacts on agricultural land should focus on any operational impacts that may arise, such as temporarily restricted movements during construction and maintenance, disruption to irrigation operations, and disruptions to aerial agricultural operations. Proponents should consult with affected landowners to maximise opportunities for co-existence and to reduce impacts on agricultural activities.

Proponents must also implement erosion and sediment controls during construction to mitigate and manage potential impacts to soils, including minimising ground disturbance, diverting runoff around disturbed areas, implementing stockpile management procedures and progressively rehabilitating temporary construction areas. Proponents must also implement biosecurity management protocols during and post-construction.

6.2 Undergrounding

It may be possible for transmission projects, or sections of transmission projects, to be located underground depending on the type of land, voltage, required capacity and length of the circuit. Burying high-voltage transmission lines may also be appropriate in certain settings such as in densely populated urban areas or near airports.

Whilst this can help to avoid and mitigate some impacts of a project, particularly visual impacts, the benefits are largely outweighed by other environmental impacts, land use conflicts and financial costs.

As noted in the *Parliamentary inquiry into feasibility of undergrounding transmission infrastructure*, the cost of installing and maintaining underground transmission infrastructure can vary

[3] https://www.transgrid.com.au/media/3tkdd5lr/easement-guidelines.pdf

substantially based upon site-specific conditions, the type of technology used and the method of installation, but is at least double the cost of above ground infrastructure. The cost of installing and maintaining transmission infrastructure is passed on to consumers and is therefore an important factor in route selection and project design.

Another consideration for undergrounding transmission is the surface and sub-surface disturbance associated with the installation and ongoing operation of underground infrastructure. The disruption from underground lines can be more severe than that from the construction of overhead lines[4]. Trenching, which is the most common and generally lowest cost method of constructing underground transmission infrastructure, typically requires removal of all above-ground vegetation as well as 1-2 metres of the ground surface.

Once installed, the land above underground transmission infrastructure must be also kept clear of vegetation so that access can be provided for excavation in the event of a fault or any other maintenance requirement. In such an event, locating and repairing underground cables can be a complex and time-consuming exercise, requiring highly specialised equipment and expertise.

While underground infrastructure typically requires a smaller easement (see **Figure 3**), these easements prevent other productive use of the land, such as ongoing agricultural use, which would otherwise be possible with above ground lines.

Consequently, the benefits of undergrounding need to be carefully weighed up and considered against the costs.

6.3 Bushfire risk

When planned and maintained properly, high voltage overhead transmission lines do not pose a risk of igniting bushfires. In the *Parliamentary inquiry into feasibility of undergrounding transmission infrastructure*, it was reported that bushfires in Australia caused by electricity infrastructure were usually ignited by distribution powerlines or equipment below 66 kV, and not those in voltage ranges of 110 kV and above. It was also acknowledged that authorities have spent considerable effort in managing the bushfire risk of powerlines, including through putting spacers on lines so that powerlines can't touch, and maintaining the easements underneath powerlines so that they are cleared of potential fuel sources.

In the event of a bushfire, transmission lines can be quickly shut down for safety reasons (if deemed necessary by the Rural Fire Service). This greatly reduces the risk of fire spreading and causing significant damage to infrastructure and also allows on-ground and aerial firefighting activities to be carried out with significantly less risk.

To ensure that the risk of bushfire from transmission infrastructure remains low, proponents should undertake frequent ground and aerial assessments to manage any vegetation in the easement and to assess the condition of towers and transmission lines.

[4] *Feasibility of undergrounding the transmission infrastructure for renewable energy projects* (Parliament NSW, August 2023): https://www.parliament.nsw.gov.au/committees/inquiries/Pages/inquiry-details.aspx?pk=2966#tab-reportsandgovernmentresponses

Proponents should also adhere to the following development standards and procedures when designing, constructing, operating and maintaining transmission infrastructure:

- Planning for Bushfire Protection 2019 (RFS) or equivalent for Asset Protection Zones
- ISSC3 - Guide for the Management of Vegetation in the Vicinity of Electrical Assets
- Australian Standard AS5577-2013 – Electricity Networks Safety Management Systems
- Australian Standard AS3959-2018 – Construction in Bushfire-prone Areas for the construction of new buildings.

In addition to complying with the above standards, as part of the project design and route selection process, proponents should seek to minimise the proportion of the route in high-risk bushfire areas where feasible.

Proponents must also prepare and implement an Emergency Management Plan and Bushfire Risk Management Plan for the project.

6.4 Electric and magnetic fields (EMF)

Electric and magnetic fields (also known as EMF) occur naturally in the environment due to electric currents such as lightning in the atmosphere and from the Earth's magnetic core. EMF is also present in homes and the built environment wherever there is electricity, from common appliances like toasters to powerlines and transmission infrastructure.

It is acknowledged that a commonly held concern relating to transmission infrastructure is the potential impacts of EMF on human health. This guideline defers to the advice of the World Health Organisation (WHO) and the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) on this matter. Both advisory bodies note that exposure to low level EMF, such as levels found around the home or near powerlines, does not cause adverse health effects[5].

Australia has adopted national standards for EMF that draw on the guideline set by the International Commission on Non-Ionizing Radiation Protection as updated in 2020 (ICNIRP). These guidelines are aimed at preventing the established health effects resulting from exposure to extremely low frequency EMF and consistent with ARPANSA's advice.

The recommended limits of exposure to magnetic fields is 2000 milligauss (mG)[6]. It is noted that the magnetic field levels for a 330kV and 500kV transmission line range from 10mG to 50mG when measured at the edge of the line and range from 20mG to 200mG when measured directly beneath the line.

The international criteria for general human exposure to electric field levels is 5kV/m set by ICNIRP. While levels above this limit can be expected directly beneath high voltage transmission lines, electric fields reduce quickly with distance from the source. In addition, electric fields are easily

[5] Australian Radiation Protection and Nuclear Safety Agency: https://www.arpansa.gov.au/understanding-radiation/radiation-sources/more-radiation-sources/electricity AND World Health Organisation: https://www.who.int/health-topics/electromagnetic-fields#tab=tab_1

[6] The strength of magnetic fields is described in one of two units, microtesla (μT) or milligauss (mG), where 1 μT = 10 mG. ARPANSA: https://www.arpansa.gov.au/understanding-radiation/radiation-sources/more-radiation-sources/electricity#close

shielded by most materials and structures and cannot pass through objects in the way that magnetic fields can.

An assessment of EMF levels should be carried out as part of the EIS to ensure all projects meet the EMF exposure guidelines set by ICNIRP and ARPANSA.

The NSW Government will continue to monitor contemporary scientific research outcomes to ensure its position reflects robust evidence on any health effects, including advice released from the WHO and the APRANSA.

6.5 Aviation

Transmission lines can pose a risk to low flying (60m/200ft) aircraft as they can be difficult to see and may blend into the surroundings and horizon. To mitigate potential risks, proponents are encouraged to install overhead powerline markers to increase the visibility of powerlines where required/identified as high risk.

Proponents must consider designated air routes and aerial agricultural activities during the project design as much as possible (subject to landowner feedback) and assess any potential impacts on aviation communication and navigation.

Proponents are also encouraged to consult with landholders about installing markers where the landowner considers the infrastructure to be a risk to their aerial agricultural activities. Overhead transmission lines should be marked in accordance with Australian Standard AS 3891.1:2021 Air navigation - cables and their supporting structures - Marking and safety requirements, and in consultation with the transmission network provider.

Towers and ancillary infrastructure may occasionally require minimal safety lighting. Where this is required, the off-site lighting impacts of the development should be minimised. Proponents should ensure that any external lighting associated with the development does not shine above the horizontal and complies with the Australian / New Zealand Standard AS/NZS 4282:2019 - Control of Obtrusive Effects of Outdoor Lighting.

6.6 Other assessment issues

Other matters may be relevant to a project are outlined in the table below:

Issue	Requirement
Aboriginal heritage	An assessment of the likely impacts on Aboriginal cultural heritage must be undertaken and should include consultation with the Aboriginal community undertaken in accordance with the Aboriginal cultural heritage consultation requirements for proponents and test excavations, if required.
Non-aboriginal heritage	An assessment is required of potential non-Aboriginal heritage (cultural and archaeological) impacts.

Issue	Requirement
Social and economic impacts	A social impact assessment is required for all state significant projects and should be undertaken in accordance with the department's Social Impact Assessment Guideline for State Significant Projects. This should include consideration of any increase in demand for community infrastructure and services, such as the need for temporary construction workers accommodation.
Water	An assessment of potential hydrology, flooding and water quality impacts and mitigation measures to address these impacts is required.
Soil and contamination	An assessment of impacts on soils and land capability of the site and surrounds and the risk of soil contamination from the project is required.
Air quality	An assessment of the air quality impacts of the project is required. This should include consideration of any construction and ongoing operational impacts.
Noise	An assessment of the construction, operational and road noise and vibration impacts of the project is required.
Traffic and transport	An assessment of the transport impacts of the project on the capacity, condition, safety and efficiency of the local and state road network is required. This should consider construction-related impacts as well as ongoing maintenance works required to service the infrastructure.
Waste	A waste management assessment is required. This assessment should identify, quantify and classify the likely waste streams to be generated during construction and operation of the project, and describe measures to be implemented to manage, reuse, recycle and safely dispose of any waste.

7 Access arrangements and acquisition agreements

Access Arrangements

During the route selection process, the proponent may require consent from some landholders to enter their property to carry out preliminary field work and environmental surveys. An access arrangement or other legal right of access must be reached between the landholder and proponent prior to any access. Further access may also be required to undertake more detailed surveys during the EIS stage and any access must comply with the conditions of the access arrangement.

Acquisition Agreements

Once the study corridor has been sufficiently narrowed and a detailed route developed, proponents will notify affected landowners that an easement is likely to be required on their property.

At this stage, the negotiation process for easement acquisition will commence. The process is set out in the NSW Government's *Land Acquisition (*Just Terms Compensation Act*) Act 1991* and provides a mechanism for compensating landowners through a one-off payment. This payment must include the market value of the land subject to the easement, loss due to severance and disturbance (including potential impacts to the affected property), and reasonable costs and expenses. If an acquisition agreement is unable to be reached, a compulsory acquisition process may be initiated.

The NSW Government also has general foundational principles for engagement that should be considered by proponents when negotiating agreements with landowners, such as:

- clearly informing landowners about the purpose of the engagement
- engaging as early as is appropriate and providing timely information
- providing accurate information that is easy to understand and access
- using plain language
- being open and transparent about the terms of the agreement covered
- ensuring that landholder expectations are properly managed from the outset.

Proponents should identify those residences proposed to be subject to any agreements in the EIS.

8 Strategic benefit payments

The NSW Government has established a Strategic Benefits Payments Scheme to provide payments to landowners who host major transmission projects that are critical to the energy transition. Under this scheme, landholders will receive annual payments for hosting high-voltage transmission infrastructure on their land for a period of 20 years. The total payments will be $200,000 per kilometre of transmission hosted (in real 2022 dollars).

These benefit sharing payments will be made separately, and in addition to, the requirement to pay compensation to landowners for transmission easements under the Just Terms Compensation Act.

Further information, including details on eligible projects, is provided in the NSW Government's policy paper.