Department of Planning,
Housing and Infrastructure

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Transmission Guideline

Technical Supplement for Landscape Character and Visual Impact Assessment

November 2024

Acknowledgement of Country

The Department of Planning, Housing and Infrastructure 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.

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Transmission Guideline: Technical Supplement – Landscape and Visual Impact Assessment

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Glossary of terms

Term	Definition
Dwelling	A room or suite of rooms occupied or used as a separate domicile as well as a building that meets the criteria outlined in section 1.3
Landscape	A holistic area comprising its various parts, including landform, vegetation, buildings, villages, towns, cities and infrastructure
Magnitude	The apparent size of a transmission infrastructure project in the landscape or when viewed from a given viewpoint
Private receiver	A privately owned or used viewpoint type identified in Table 3
Proponent	A person seeking approval for an application for a State significant infrastructure project
Protected area	Lands reserved or otherwise protected for conserving biodiversity or Aboriginal cultural heritage – this includes lands reserved under the *National Parks and Wildlife Act 1974*, flora reserves under the *Forestry Act 2012*, declared wilderness under the *Wilderness Act 1987*, Indigenous protected areas, world heritage areas and Ramsar wetlands
Public viewpoint	A publicly owned or used viewpoint type identified in Table 3
Rural dwelling	A dwelling within a rural zoned area (RU1, RU2, RU3, RU4 and RU6), large lot residential zoned area (R5), or environmental or conservation area zone (C2, C3 and C4)
Sensitive receivers	Viewpoints that are more sensitive to change than others, including dwellings, historic homesteads, tourist and visitor accommodation, places of worship, town centres and central business districts
Sensitivity	A measure of the capacity of an element of the landscape to absorb the impacts from a proposed land use change and/or built form
Transmission infrastructure	Works, infrastructure and buildings for transmitting electricity that are state-significant infrastructure activities, critical state-significant infrastructure activities or both
Urban dwelling	Any dwelling in a residential zoned area (R1, R2, R3 and R4) or rural village (RU5)
View	The sight of a landscape or scene
Visual impact	The impact on views from private and public places, which is determined by considering the visual magnitude and sensitivity

1 Introduction

This technical supplement provides additional guidance for proponents, consent authorities and the community using the Transmission Guideline to understand the process and requirements for assessing visual and landscape character impacts of major transmission infrastructure in NSW.

1.1 Purpose

This technical supplement provides a detailed description of the landscape character and visual impact assessment process.

It ensures that all proposals for State significant transmission infrastructure include an assessment that is proportionate to the scale and impacts of the infrastructure, is easy to understand and considers community views and values of the surrounding landscape.

This technical supplement identifies information that a landscape character and visual impact assessment must provide and includes assessment tools and requirements that proponents must use to produce consistent and comparable results.

The technical supplement also aims to:

- encourage good route selection and design of transmission infrastructure projects early in the planning process
- guide the relevant identification, mitigation and management of significant impacts on the surrounding landscape and viewpoints from private and public places
- recognise that changes to our landscapes will be necessary to facilitate the transition to renewable energy and balance the need for this change with the need to protect unique and high-quality landscapes
- strengthen the landscape and visual impact assessment process to ensure consistent decision-making and reduce delays in the assessment process
- facilitate the appropriate development of transmission infrastructure in NSW.

1.2 Application of the technical supplement

This technical supplement does not apply to the augmentation of existing transmission corridors or development immediately adjacent to existing transmission lines. If a transmission project includes

infrastructure both next to and away from existing transmission corridors, the supplement will only apply to the areas away from existing corridors.

However, applicants and consent authorities are encouraged to consider the broad objectives and principles in this supplement when preparing, assessing and determining applications for projects, or parts of projects, that are next to existing transmission corridors.

Any landscape or visual impact assessment for projects of this nature should recognise the impact of existing transmission lines and consider the extent to which new transmission lines would incrementally increase the visual impacts.

For the avoidance of doubt, applicants are not required to apply the setbacks (Figure 2) to infrastructure next to an existing transmission corridor.

1.3 General requirements

Proponents must prepare a detailed landscape and visual impact assessment as part of an environmental impact statement.

The assessment must include a full description of the proposed transmission infrastructure and use maps to show the location of the project in relation to public viewpoints, private receivers and surrounding landscapes that require analysis.

It must include details of:

- the most recent and highest resolution satellite imagery, aerial photography and available orthophotos at a scale of 1:25,000 (proponents should also provide the date the imagery was captured)
- topographic mapping, zoning and other land use information available on the NSW Planning Portal or SEED
- Google Earth or a similar mapping service and the most recent vegetation mapping, particularly vegetation information that gives an idea of the structure and height of vegetative cover.

Proponents must engage with the community, including the Indigenous community, as early as possible and throughout the assessment, to inform outcomes and any measures to mitigate impacts.

Importantly, the assessment process should happen alongside the design and siting of a transmission infrastructure project so that the community's input can effectively inform the design.

Field visits must inform the assessment to establish and ground truth important inputs into the process, including the area's scenic quality and sensitivity. These site visits can include private property or public areas surrounding the project.

Professional assessment skills

Professional assessment skills are critical to an effective landscape character and visual impact assessment. Proponents must engage relevant professionals (for example, landscape architects, architects, environmental planners, geographers or other visual assessment specialists) with demonstrated experience and capabilities. Experts should follow the guidance in this document to perform an effective and consistent assessment for transmission infrastructure.

1.4 Approach to assessment

The technical supplement differentiates between:

- landscape character impact assessment (the assessment of the potential impact on an area's cumulative built, natural and cultural character or sense of place), and
- visual impact (the assessment of the potential impact on views).

The two assessments should be clear and discrete, as the design response and mitigation measures to address landscape character impact will likely be different from those for visual impact.

Proponents should consult on landscape and visual impacts as part of their broader environmental assessment process.

Landscape character assessment

This is the process for determining the overall impact of a project on an area's character and sense of place, including what people think and feel about it and how society values it.

Visual impact assessment

This process determines the day-to-day visual effects of a project on people's views from the private and public domain.

The likely impacts of a transmission infrastructure project can only be determined by understanding the sensitivity of an area or view to change and the magnitude of the proposed infrastructure in that area or view.

This technical supplement recognises the need to protect visual amenity and provides a range of tools to do so. However, it also recognises the fundamental principle that landowners have no

proprietary right to or ownership of a view,[1] and a visible transmission tower or ancillary infrastructure does not necessarily constitute a visual impact.

Changes to our rural and natural landscapes will be necessary to facilitate a transition to renewable energy and to support the development of the transmission network. This technical supplement aims to achieve balanced outcomes that avoid and manage significant landscape and visual impacts while supporting this change.

Sensitivity

Sensitivity is a measure of the capacity of a landscape or view to absorb the impacts from a proposed change. For example, a pristine natural environment is likely to be more sensitive than an industrial area. A view from a residence is also likely to be more sensitive than from a local road where views are more intermittent and less frequent.

Magnitude

Magnitude refers to the physical scale of the transmission infrastructure. A range of factors influence magnitude, including:

- the apparent size of transmission infrastructure decreases significantly as the distance from the viewer increases
- the apparent size of transmission infrastructure increases with the physical scale and dimensions of a transmission tower and the number of towers that would be visible, although these factors are considerably less discernible as distance from the viewer increases.

Private receivers

The visual impact assessment must assess the potential impacts on private receivers, including private recreation areas and sporting fields, dwellings, and tourist and visitor accommodation.

For the purpose of this document, a dwelling has the same meaning as that defined in the *Standard Instrument – Principal Local Environmental Plan* which is a room or suite of rooms occupied or used as a separate domicile.

Tourist and visitor accommodation has the same meaning as the *Standard Instrument – Principal Local Environmental Plan* which is a building or place that provides temporary or short-term accommodation on a commercial basis, and includes backpacker's accommodation, bed and

[1] Tenacity Consulting v Warringah Council (2004) NSWLEC 140 and Victoria Park Racing & Recreation Grounds Co Ltd v Taylor [1937] HCA 45.

breakfast accommodation, farm stay accommodation, hotel or motel accommodation and serviced apartments.

To avoid doubt, a dwelling or tourist and visitor accommodation (which includes farm stay accommodation) does not include moveable dwellings as defined in the *Standard Instrument – Principal Local Environmental Plan*, including tents, caravans or other portable structures for human habitation.

A visual impact assessment must be undertaken for any of the following at the time the Planning Secretary's environmental assessment requirements are issued:

- existing dwellings and tourist and visitor accommodation
- dwellings and tourist and visitor accommodation that have been approved through a development application or complying development certificate, or are exempt from approval, and have physically commenced construction[2]
- dwellings and tourist and visitor accommodation that are constructed but not yet occupied or used.

A visual impact assessment is not required for any dwelling or tourist and visitor accommodation that is, at the time the Planning Secretary's environmental assessment requirements are issued:

- built illegally (as confirmed by the relevant council)
- derelict (as officially declared by the relevant council)
- under assessment or consideration as part of a development application or complying development certificate application
- approved (under a development consent or a complying development certificate) but for which construction has not physically commenced.

In assessing the visual impacts on dwellings, the assessment must focus only on views from the dwelling and not from the property boundary or other parts of the property. The assessment should also consider the potential worst-case views that have the greatest potential to impact residential amenity.

Residential amenity encompasses the overall quality, experience and nature of views and outlooks available to occupants of a dwelling and its immediate surrounds, including pool areas and adjacent gardens.

In assessing the visual impacts on tourist and visitor accommodation, the assessment must focus on views from the buildings that accommodate guests and/or key areas of the property that significantly contribute to the visitor experience. The assessment should not consider views from

[2] 'Physically commenced' has the same meaning as that in section 96 of the Environmental Planning and Assessment Regulation 2021.

areas that are inaccessible to guests or areas that would otherwise be primarily used by the permanent residents.

Easement-affected receivers

If a private landholding would host the proposed transmission infrastructure, and therefore be affected by an easement, then private receivers on that land need not be assessed in accordance with this document. The affected landholder will be eligible for compensation under the *Land Acquisition (Just Terms Compensation) Act 1991*.

Where possible, proponents should identify these receivers as 'easement-affected' in the scoping report and environmental impact statement, including on any relevant maps.

2 Landscape character assessment

The environmental impact statement must include an assessment of how the infrastructure will affect elements that make up the landscape, its aesthetic and perceptual aspects, and its distinctive character. Landscape character assessment can help the community, proponents and consent authorities understand the sensitivities of a landscape and determine the impact of the infrastructure on an area's character and sense of place.

Landscape character is the distinct, recognisable and consistent pattern of elements in the landscape that make one landscape different from another. This includes physical elements, such as geology, soil, climate, flora and fauna, and the way these elements interact with each other. It also encompasses human influences, such as historical, cultural and economic activities that have shaped the land. Landscape character is an objective assessment of the physical and visual attributes of the landscape.

Landscape assessment is distinctly different from visual impact assessment, which solely focuses on individual views. Consequently, landscape character assessment can help to understand the cumulative effect of a project on a much broader area. The key tasks to be undertaken in assessing landscape character impacts are described below.

The level of assessment should be appropriate for the context in which the development is proposed and should be proportionate to the likely impacts, including cumulative impacts, of the development.

The Department of Planning, Housing and Infrastructure encourages proponents to consult with it in scoping the project to determine the level of detail that the landscape character assessment may require.

The study area for the landscape character assessment should generally be 5 km from the proposed development. However, the character of landscapes can vary significantly, and proponents may provide justification for analysing a smaller area.

2.1 Baseline analysis

Proponents must conduct a baseline study to establish the existing landscape character of the area and its sensitivity. This should be based on desktop analysis and field visits, and it should provide a descriptive and illustrative analysis of the qualities of the place, what makes it valued and any challenges that could arise from the proposed infrastructure.

It is important for proponents to engage with the community (including Indigenous communities), local council and potentially affected landowners as early as possible to identify and establish the importance of particular landscape values and characteristics. Landscape values are the qualities people attribute to a landscape. The values are subjective and reflect the personal, cultural, social and spiritual significance the landscape holds for people. Values can include aesthetic appreciation, cultural heritage, recreation, spiritual connection and ecological importance. Gauging these values can provide a firm basis for siting and designing a transmission infrastructure project that seeks to avoid or minimise impacts.

In undertaking consultation, proponents must adopt the approaches and objectives in the NSW Government's *Undertaking Engagement Guidelines for State Significant Projects*.

The baseline analysis should identify and describe the elements that make up the landscape in the study area, including:

- physical influences (such as geology, soils, landform, natural drainage and waterbodies)
- ecological characteristics and land cover of an area (such as whether it is forested, wetland, scrub or grass) and the quality and type of vegetation cover
- the influence of human activity, including land use and management and the character of any settlements and buildings
- key landscape features or attributes associated with high visual interest or quality that stand out visually, including natural (such as a distinctive mountain peak or hilltop), cultural or agricultural features
- the aesthetic and perceptual aspects of the landscape, particularly those that are key contributors to the distinctive character of the landscape (such as its scale, complexity, openness, tranquillity or wildness)
- aspects that have important Aboriginal cultural heritage value (except artefacts and tangible values that would be assessed as part of an Aboriginal cultural heritage assessment) and why they are valuable to the community
- the overall character of the landscape in the study area, including any identifiable distinctive landscape character types or areas (see further guidance below)
- the condition of the landscape, including that of elements or features such as buildings or vegetation

- the planning designations of an area relating to landscape character, including sensitive land use designations, zonings and heritage listings
- the location of any proposed, operational or approved local and regional transmission infrastructure, including projects that may create direct or indirect cumulative impacts with the project.

Proponents should use descriptive text and photographs to assign scenic quality values and provide a visual profile in the region, including what types of landscape features are typical, less common, rare or unusual, and outstanding. The outcomes of this baseline analysis should inform the visual impact assessment of assessable viewpoints.

2.2 Identify landscape character zones

If the landscape includes distinct areas with different qualities, the study area should be broken down into different character zones (see Figure 1).

Landscape character zones should divide the landscape based on common distinguishing visual characteristics, including landforms and major land cover patterns. Combinations of vegetation, waterbodies, landforms and land use form these patterns, and allow for the identification of key landscape features.

Sources to use to identify and establish the type of regional landscape character zones include:

- Learmonth, Nancy and Andrew (1971), *Regional Landscape of Australia: Form, Function and Change*, Angus and Robertson Publishers, Sydney
- Mitchell, Peter (2022), Descriptions for NSW (Mitchell) Landscapes Version 2, NSW National Parks and Wildlife Service
- Tudor, C (2019), An approach to landscape sensitivity assessment – to inform spatial planning and land management, Natural England
- Australia's bioregional framework as delineated via the Interim Biogeographic Regionalisation for Australia (IBRA)
- eSPADE spatial viewer for soil landscape mapping, NSW Environment, Energy and Science.

Transmission Guideline

Sample Landscape Character Zone Map

Figure 1. Example landscape character zone map

2.3 Assess the landscape character impact

Proponents should determine the impact of the proposal on each landscape character zone by evaluating the sensitivity of the landscape and the magnitude of the project's effects in that area.

The sensitivity and magnitude should be assigned a rating (low, moderate or high) that can help determine the overall landscape character impact on any given zone. Proponents must provide rationale for the ratings as part of the assessment.

Proponents should consider the following when analysing and rating the magnitude of the project:

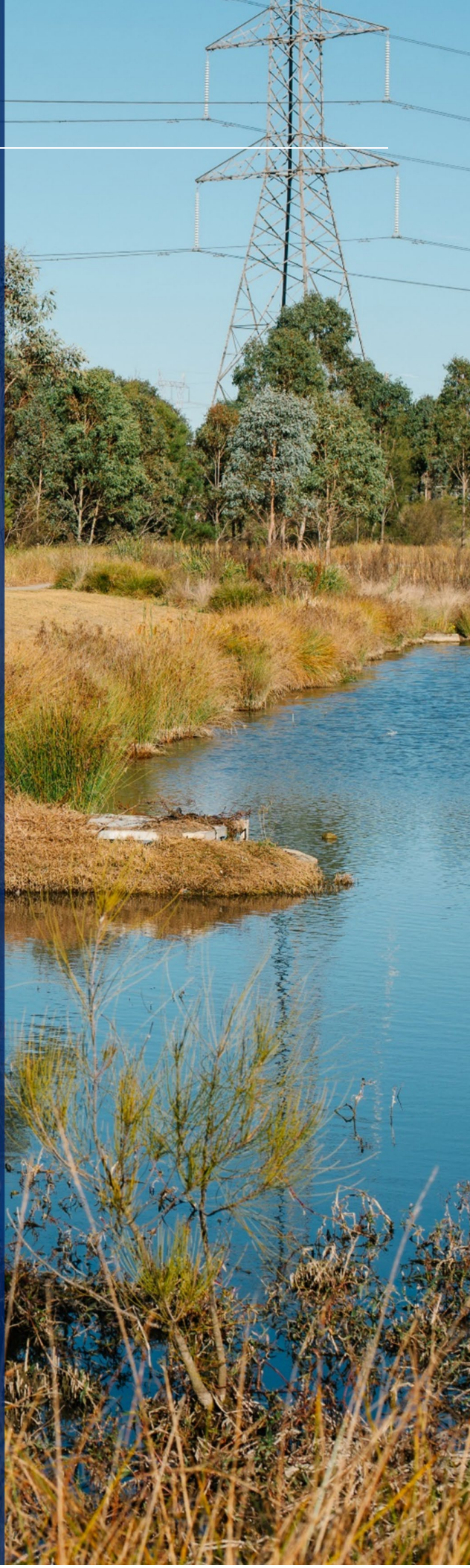
- size and scale including:
  - the extent of existing landscape elements that may be lost and what those elements contribute to the landscape character
  - the extent to which the infrastructure becomes a minor or major element in the landscape and its dominance in the visual catchment
  - the extent to which the project changes the key characteristics of the landscape that are critical to its distinctive character (including the removal of vegetation removal)
- geographical area – the area of the landscape that will experience the project. This could vary from the immediate site setting of the site to a larger scale, where the project may influence several landscape character zones.

Proponents should rate the sensitivity of the landscape character type based on the inherent capability of the area to absorb changes from the project.

Where impacts are expected to be high, the assessment should propose measures to avoid or mitigate these impacts, including re-siting and resizing transmission infrastructure. Proponents should then summarise any significant residual impacts on the landscape after mitigation as the final step in the process.

Appendix A provides an example landscape character assessment.

3 Visual impact assessment framework



A visual impact assessment that considers the likely impacts of the transmission infrastructure on public viewpoints and private receivers must accompany proposals for transmission infrastructure projects.

The method for determining the visual impact of a transmission infrastructure project is generally based on a combination of the sensitivity of a view to change and the magnitude of the proposal. However, in some settings, transmission towers can be visually dominating despite the sensitivity of the view.

Consequently, the visual assessment framework is broken into two key parts: a setback to prevent towers from being close to sensitive receivers and an assessment process for all other public viewpoints and private receivers. This section describes these in detail.

3.1 Setbacks

Transmission towers close to sensitive receivers, including dwellings, historic homesteads, tourist and visitor accommodation, places of worship, town centres and central business districts, can be visually dominating despite the scenic quality or importance of the view. For example, a single 80 m transmission tower generally has a dominant appearance if it's within 370 m of a sensitive receiver and is completely visible.

Figure 2 prescribes setback distances for transmission towers that are likely to have a dominant appearance. The setbacks apply from sensitive receivers and scale, depending on the height of the proposed towers and whether the sensitive receiver is rural or urban in nature (see Table 1). This is because rural areas are typically more sensitive to transmission infrastructure than urban areas, where it is more common to the overall urban fabric.

The setbacks are equivalent to 12 degrees of a person's vertical field of view at rural sensitive receivers and 16 degrees at urban sensitive receivers. This can be measured and visualised in real world settings using the tools described in Section 3.2.

A sensitive receiver will trigger a high visual impact if it is located within the relevant setback distance of a transmission tower and has an unobstructed view of it. In these circumstances, sensitive receivers must be assessed against the high-impact performance criteria in Table 9, which generally require the impact to be avoided.

However, if the transmission tower would be partially visible due to vegetation, topography or other mitigating factors, then the sensitive receiver is exempt from the setback. In these cases, a visual impact assessment must be undertaken in accordance with the process outlined in section 3.2. Figure 3 provides approximate setback distances to sensitive receivers based on the heights of typical tower designs.

Table 1. Classification of rural and urban sensitive receivers for setbacks

Rural sensitive receiver	Urban sensitive receiver
• Dwellings in rural areas (zoned RU1, RU2, RU3, RU4 and RU6), large lot residential areas (zoned R5) and environmental or conservation areas (zoned C2, C3 and C4) • Urban sensitive receivers with rural outlooks • Historic rural homesteads or residences on the national, state or local heritage list in rural areas • Tourist and visitor accommodation (such as bed-and-breakfasts, motels and hotels) and places of worship	• Dwellings in residential areas and rural villages (land zoned R1, R2, R3, R4 and RU5) • Residences on the national, state or local heritage list in urban areas • Town centres and central business districts

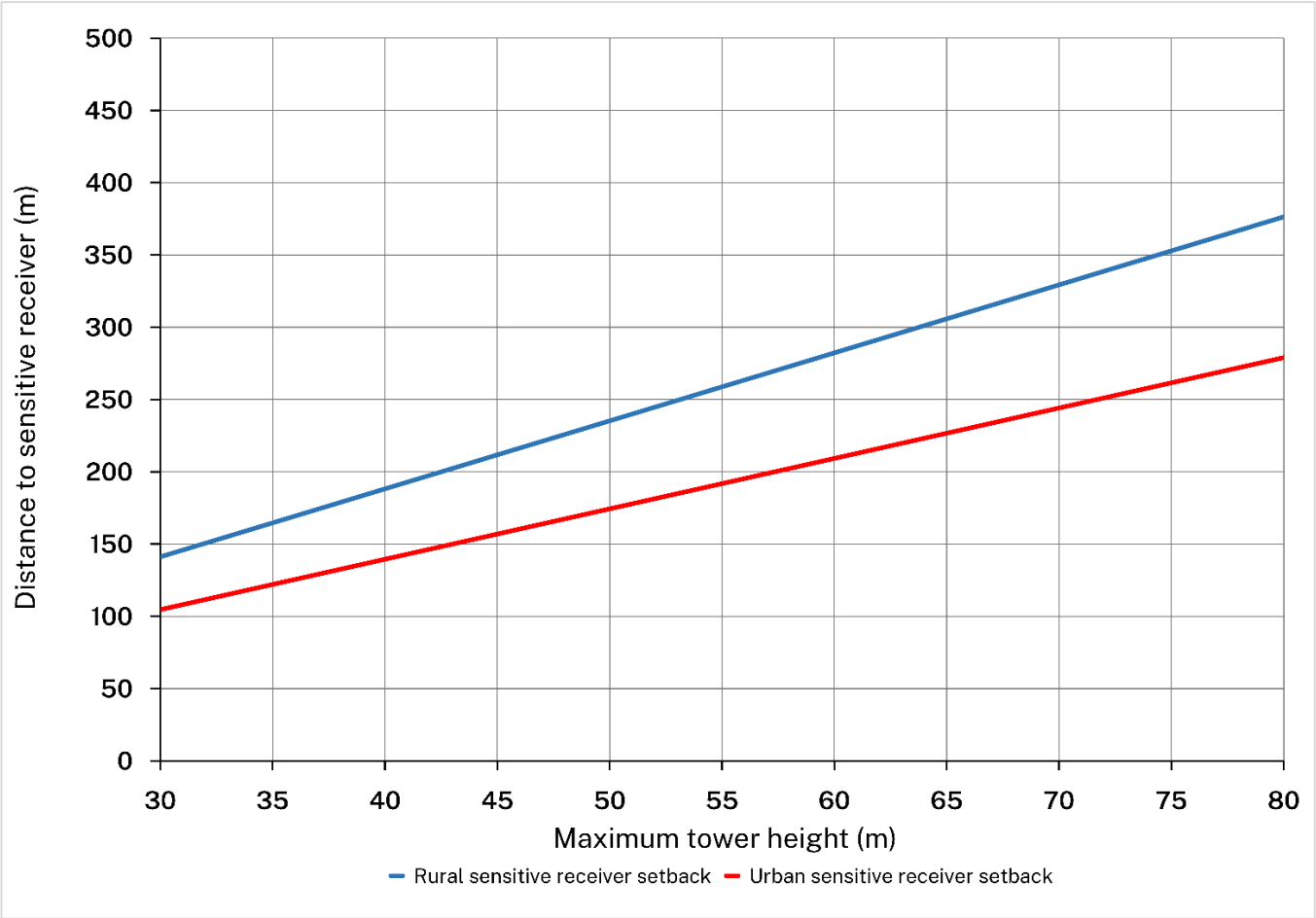


Figure 2. Setback from sensitive rural and urban receivers

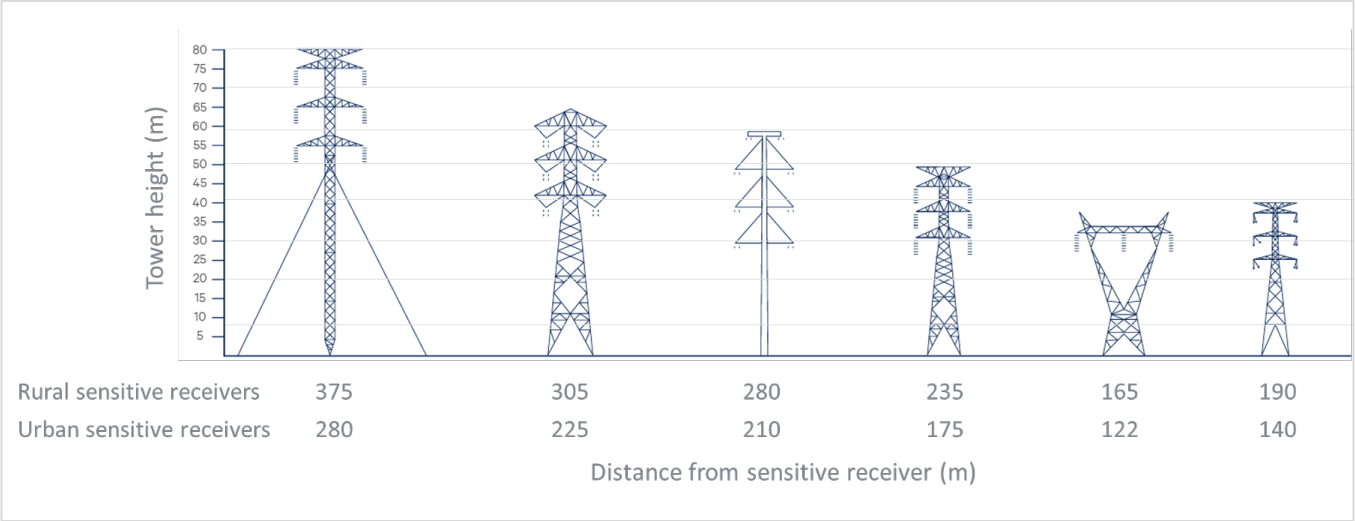


Figure 3. Dominant towers near rural and urban sensitive receivers

3.2 Visual impact assessment process

Proponents must conduct a visual impact assessment for all other public viewpoints and private receivers according the process illustrated in Figure 4 and described below. The level of assessment should be proportionate to the likely impacts of the development (see section 4.2).

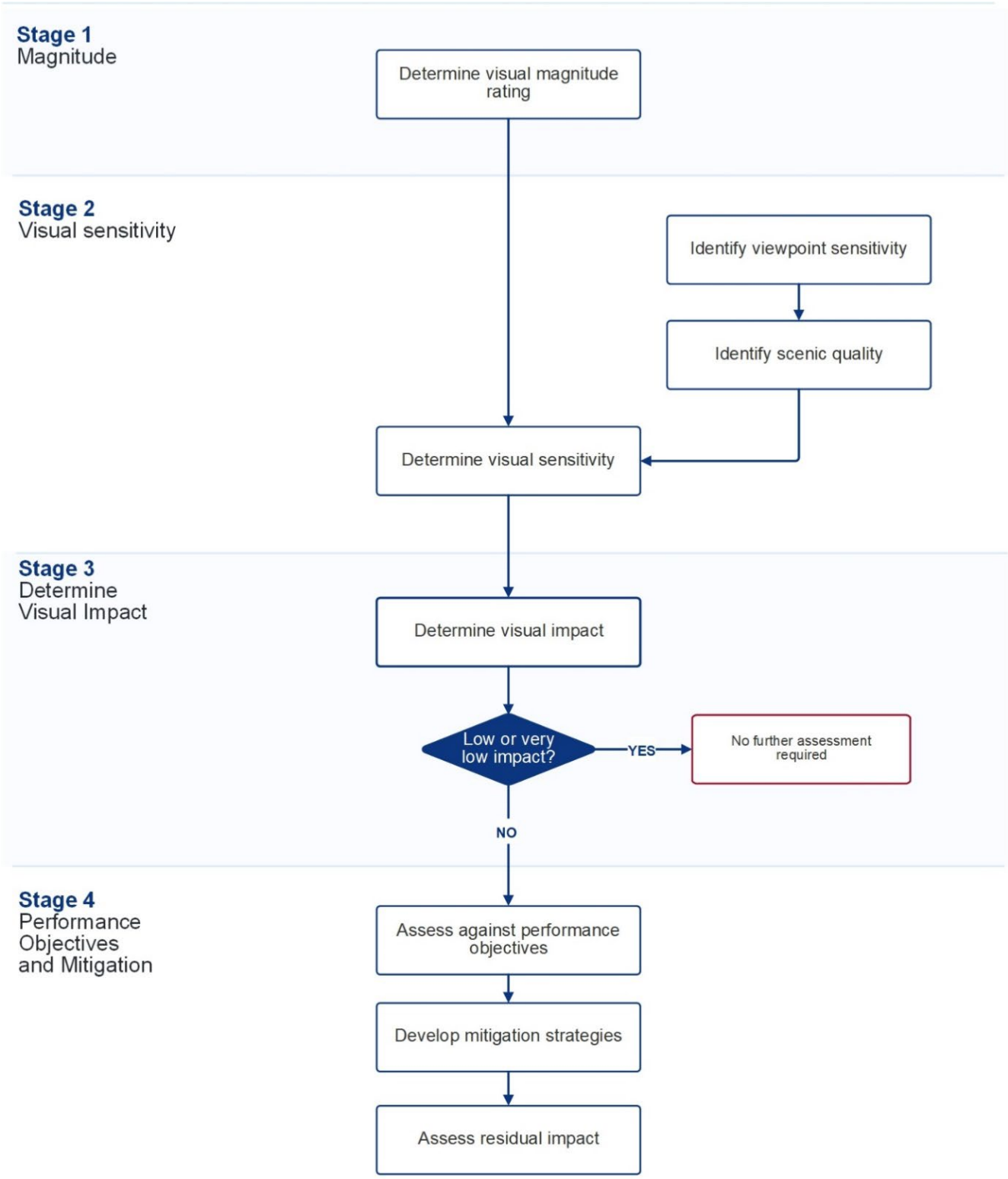


Figure 4. Visual impact assessment process

Visual magnitude

The visual magnitude of a project is its apparent size within the viewshed. It is a key factor in determining the overall visual impact. The typical design of transmission infrastructure is relatively standard. Assumptions have been made and incorporated into the following methodology to improve the efficiency and consistency of determining the visual magnitude of these projects. For example, almost all transmission infrastructure projects comprise similar infrastructure that exhibits common characteristics, including colour, texture and contrast with the rural and urban landscapes in which they are typically located.

Visual magnitude methodology

Visual magnitude should be determined by analysing the volume of the field of view that a project would occupy. You can do this by splitting any view into a grid comprising cells 1 degree high and 10 degrees wide (see Figure 5) and counting the number of cells that a project would occupy.

Figure 5. Determining visual magnitude

You can then compare the total number of cells with the visual magnitude thresholds in Table 2 to determine the visual magnitude rating. There are five ratings: very high, high, moderate, low and very low; these indicate the apparent size of the transmission infrastructure from each public viewpoint or private receiver. Appendix B provides examples of each magnitude rating.

This method is designed to weight vertical changes in magnitude more than horizontal changes. This reflects best practice understanding of visual impacts, including the concept that people are more sensitive to vertical changes to their field of view than horizontal changes.

For example, a 10 m high development that is 100 m wide is likely to have less impact on a viewpoint than if it were 10 m wide and 100 m high. This is particularly true in low-lying regional and pastoral areas where landscapes do not commonly contain natural and built features that occupy large portions of the vertical field of view.

Table 2. Visual magnitude thresholds

Number of occupied cells	Visual magnitude rating
1 to 7	Very low
8 to 14	Low
15 to 25	Moderate
26 to 36	High
More than 37	Very high

Using this concept, there are several ways to calculate magnitude for different purposes and with varying levels of accuracy. These include:

- a practical approach that you can use on location to visualise likely outcomes in real-world settings (Figure 6)
- conservative desktop estimates that you calculate by determining an indicative vertical field of view using basic trigonometry
- detailed analysis using 3D visualisations of the proposed development, including basic 3D models (wire frames) and photomontages that account for influencing factors such as topography and vegetation screening.

The method to be used, including the process for counting occupied cells, should depend on the use case and be proportionate to the likely impact at each location (see section 4.2).

Since the magnitude of transmission towers decreases over distance, there is a point at which they become inconsequential to the overall visual impact and difficult to discern against the background. Similarly, private landowners have no proprietary right to ownership of a view, and any assessment should be limited to a reasonable distance. Consequently, any transmission tower that would be less than 3 degrees in vertical field of view should not be counted when calculating magnitude.

Visual sensitivity

Visual sensitivity refers to the quality of the view and how sensitive it is to the proposed change. In some cases, visual sensitivity also relates to the direction of the view and where it can be viewed from (such as a resident's living room).

The visual sensitivity is determined by identifying the sensitivity of each viewpoint and receiver and categorising the scenic quality of the area in view.

Rule of thumb for measuring magnitude

You can roughly measure the field of view that objects occupy in landscapes and our day-to-day lives using nothing more than your hand and fingers (see Figure 6). This provides a practical approach for visualising how the magnitude ratings would appear and how they might compare with other features in the landscape.

To measure part of your field of view, hold your hand at arm's length and close one eye. Make a fist, with the back of your hand facing upwards. The width of your fist is approximately 10 degrees, or one cell wide. The height of your little finger is approximately one degree, or the equivalent of one cell high.

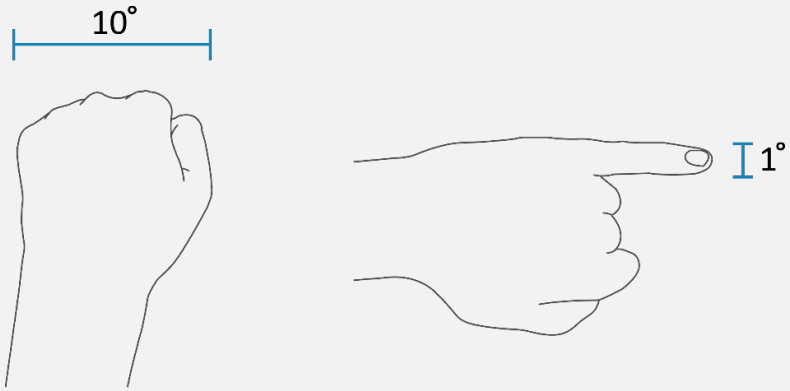


Figure 6. Rule of thumb example for measuring magnitude

Viewpoint sensitivity

Viewpoint sensitivity relates to the relative importance of viewpoints and the value the community or visitors may place on landscapes viewed from public use areas, public travel ways and private receivers such as dwellings.

The sensitivity of each viewpoint must be classified into one of four sensitivity ratings: very low, low, moderate and high considering the examples in Table 3 the baseline landscape study and any consultation with the community and individual landholders. While Table 3 is a good guide, it is not conclusive, and proponents must consider the other inputs to arrive at the final rating.

Proponents should categorise views from a rural dwelling according to their importance. Primary views are considered more sensitive than secondary views (see Table 3 for guidance and the Land and Environment Court planning principle related to views).[3] Proponents should identify one primary

[3] Tenacity Consulting v Warringah Council [2004] NSWLEC140 at 25-29.

view for each dwelling, considering the guidance in Table 3 and the factors that contribute to residential amenity. All other views must be considered secondary.

When conducting simple and intermediate assessments (see section 4.2), proponents may conservatively assume that all views from rural dwellings are from primary viewpoints. Proponents can then refine these assumptions for rural dwellings that progress to a detailed assessment.

Proponents must identify how they have classified each of the residential viewpoints in the environmental impact statement.

Table 3. Viewpoint sensitivity levels and examples

Viewpoint type	Very low viewpoint sensitivity	Low viewpoint sensitivity	Moderate viewpoint sensitivity	High viewpoint sensitivity
Private receiver	n/a	Secondary view from dwelling rural area (zoned RU1, RU2, RU3, RU4 and RU6), large lot residential areas (zoned R5) and environmental or conservation areas (zoned C2, C3 and C4) Primary views from dwellings in residential and rural villages (land zoned R1, R2, R3, R4 and RU5)	Primary view from dwellings in rural areas (zoned RU1, RU2, RU3, RU4 and RU6), large lot residential areas (zoned R5) and environmental or conservation areas (zoned C2, C3 and C4) Tourist and visitor accommodation (bed-and-breakfasts, motels and hotels) and places of worship	Historic rural homesteads or residences on the national, state or local heritage list
Public viewpoint	State highways, freeways and classified main roads	Tourist roads and scenic drives[4] Significant entry ways to regional towns and cities Cemeteries and memorial parks Publicly accessible green and open spaces, including picnic areas, parks, public recreation areas and lookouts Town centres and central business districts	Tourist uses in tourist areas (zoned SP3)	n/a

[4] Tourist road locations are available on the Transport for NSW (TfNSW) Open Data platform.

Table 4. Primary and secondary viewpoints from a dwelling

Primary viewpoint	Secondary viewpoint
Principal/frequented living spaces (for example living rooms, kitchens and dining areas)	Less frequented living and service areas (for example, bedrooms, laundries, bathrooms, garages and studies)
Front or rear views from a dwelling, particularly from any porch, balcony, verandah, entertainment area, adjacent garden, deck or patio	Side views from a dwelling

Scenic quality

Scenic quality refers to the holistic and relative scenic, cultural or aesthetic value of the landscape within the viewshed. It is based on the presence or absence of key landscape features known to be associated with community perceptions of very low, low, moderate or high scenic quality. It is typically a complex process undertaken by experts in visual impact assessment and must also consider community values.

The baseline analysis and landscape character assessment should inform the classification of scenic quality values, including aerial photos, topographic maps and any relevant information from field visits.

Proponents can use the suggested scenic quality classification criteria in Table 5 as a guide; however, the environmental impact statement should consider whether a combination of landscape features influences the overall scenic quality of the setting as well as any community values.

In other words, the presence of just one or even two high-quality features (such as a visually prominent stream) may be insufficient to justify the landscape as high quality. On the other hand, the presence of one highly valued feature (such as a world heritage area) may be significant in and of itself, regardless of other features.

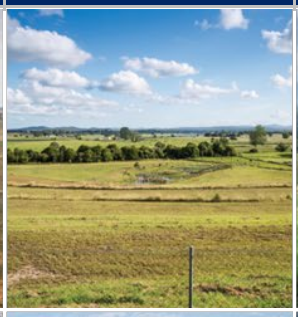
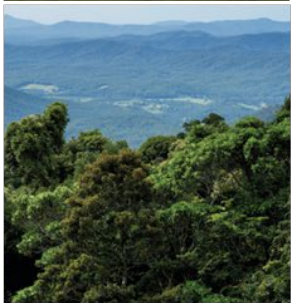
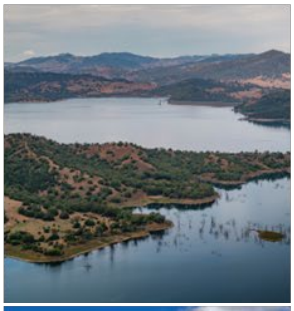
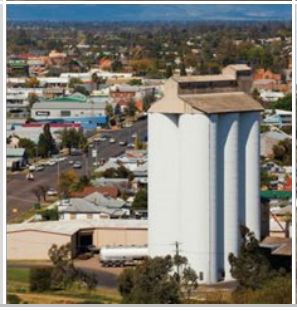
Table 6 provides a visual reference to help proponents, the community and consent authorities understand how scenic quality values may appear across the categories.

Table 5. Frame of reference for scenic quality values

Viewpoint type	Very low scenic quality	Low scenic quality	Moderate scenic quality	High scenic quality
Landform	Large expanses of flat or gently undulating terrain Indistinct, dissected or broken landforms that provide little illusion of spatial definition or landmarks with which to orient	Mostly flat or gently undulating terrain with isolated areas of undulating topography	Steep, hilly and undulating ranges that are not visually dominant Broad, shallow valleys Moderately deep gorges or moderately steep valley walls Minor rock outcrops	Isolated peaks, steep rocky ridges, cones or escarpments with distinctive form and colour contrast that become focal points Large areas of distinctive rock outcrops or boulders Well-defined, steep valley gorges
Vegetation	Extensively cleared and cropped areas with very limited variation in colour and texture Pastoral areas, human-created paddocks, pastures or grasslands and associated buildings typical of grazing lands	Predominantly cleared and cropped areas with small areas of variation in colour and texture Most pastures or grasslands with small blocks of distinct native vegetation	Predominantly open forest or woodland combined with some natural openings in patterns that offer some visual relief Vegetative stands ranging in size, form, colour, texture and spacing, including human-influenced vegetation (for example, vineyards, plantation forests and orchards)	Strongly defined natural patterns with combinations of native forest, naturally appearing openings, streamside vegetation and scattered exotics Distinctive stands of vegetation that may create unusual forms, colours or textures compared with surrounding vegetation
Waterbodies	Absence of natural waterbody Farm dams, irrigation canals or stormwater infrastructure	Minor water forms, such as creeks and streams	Intermittent streams, lakes, rivers, swamps and reservoirs	Visually prominent lakes, reservoirs, rivers, streams, wetlands and swamps Presence of harbour inlet, bay or open ocean

Viewpoint type	Very low scenic quality	Low scenic quality	Moderate scenic quality	High scenic quality
Social and cultural	Places of worship, cemeteries, memorial parks, private open spaces	Places of worship, cemeteries, memorial parks, private open spaces Local heritage sites	Local or state heritage sites Distinguishable entry ways to a regional city identified in the State Environmental Planning Policy (Transport and Infrastructure) 2021	Culturally important sites, wilderness, world heritage areas and protected areas World, national and state heritage sites
Human presence	Dominating presence of infrastructure, human settlements, highly modified landscapes and higher density populations, such as regional cities, industrial areas, agricultural transport or electricity infrastructure	Highly modified landscapes with visible infrastructure, such as transmission lines and railway corridors	Dispersed yet evident presence of human settlement, such as villages, small towns, isolated pockets of production and industry, lower scale and trafficked transport infrastructure	Natural, undisturbed landscape Minimal evidence of human presence and production

Table 6. Visual reference for scenic quality values

Viewpoint type	Very low scenic quality	Low scenic quality	Moderate scenic quality	High scenic quality
Landform				
Vegetation				
Waterbodies				
Social and cultural				
Human presence				

Visual sensitivity

Once the viewpoint sensitivity and scenic quality are determined, these can be combined using the visual sensitivity matrix in Table 7 to determine the overall visual sensitivity of each assessable viewpoint.

Table 7. Visual sensitivity matrix

Viewpoint sensitivity level	High scenic quality	Moderate scenic quality	Low scenic quality	Very low scenic quality
High viewpoint sensitivity	High	High	Moderate	Low
Moderate viewpoint sensitivity	High	Moderate	Moderate	Low
Low viewpoint sensitivity	Moderate	Low	Low	Very low
Very low viewpoint sensitivity	Very low	Very low	Very low	Very low

Visual impact

The overall visual impact rating of all other viewpoints must be determined for each assessable viewpoint by combining the visual magnitude and visual sensitivity using the matrix in Table 8.

Examples of difference visual impacts are provided in Appendix C.

Table 8. Visual impact matrix

Magnitude	High visual sensitivity	Moderate visual sensitivity	Low visual sensitivity	Very low visual sensitivity
Very high magnitude	High	High	Moderate	Moderate
High magnitude	High	Moderate	Moderate	Low
Moderate magnitude	Moderate	Moderate	Low	Low
Low magnitude	Moderate	Low	Low	Very low
Very low magnitude	Low	Low	Very low	Very low

Performance objectives and mitigation

Performance objectives

Proponents must address the relevant performance objective for each assessable viewpoint and the level of impact identified (Table 9).

Table 9. Visual performance objectives

	High visual impact	This level of impact should be avoided unless the proponent can justify that: • all reasonable efforts have been made to avoid the impact and alternative project designs are not feasible or would be unlikely to materially reduce the impact, • all reasonable mitigation options have been considered, and • the proposed mitigation measures would effectively mitigate the impact and would not result in a significant obstruction of views
	Moderate visual impact	**Public road viewpoints** As far as is reasonable and feasible, the proponent should seek to reduce moderate visual impacts to road users. Appropriate mitigation options include vegetation or other screening. Mitigation should only be considered if it would not obstruct important views and sight lines, could be confined to a relatively small area (i.e. vegetation screening would not be required for several hundred meters along a transport corridor) and where agreed with the relevant road authority. **All other private receivers and public viewpoints** Visual impact mitigation should be implemented within the project corridor and/or offered to the affected landowner and should be proportionate to the scale of impact. There is no expectation this mitigation should eliminate the view of the development entirely, but it must reduce the impact to an acceptable level and not create unacceptable visual impacts to other receivers.
	Low and very low visual impact	No mitigation required

Avoidance and mitigation

Proponents may consider several avoidance and mitigation options as methods of minimising visual impacts.

Re-siting

Transmission towers and other project infrastructure such as substations may be re-sited to reduce visual magnitude and to reduce impacts from sensitive viewpoints. This should be the first measure proponents consider when technically feasible and when it does not exacerbate visual amenity impacts for other receivers, and the consent authority may also consider it when assessing the project.

Vegetation screening

Vegetation screening, or planting trees and shrubs, may be useful for visually screening large-scale transmission infrastructure or other potential visual impacts (such as night lighting). Proponents should first consider onsite screening, such as perimeter planting. If this likely to be ineffective, they can consider screening at affected public viewpoints and private receivers.

However, proponents must consider several limitations of vegetation screening. It can obstruct landscape views, resulting in further impacts to particular views. It can also take many years to establish, and during drought or other unfavourable conditions, it may not achieve optimal growth or have the desired screening effect.

Given these considerations, vegetation screening should not result in significant impacts on the amenity of private receivers (such as obstructed scenic views), and proponents should design it in consultation with the affected landowner.

Proponents should select appropriate plant species that suit the environment (for example, drought-tolerant native species, if relevant), are typical of the area and maintain their foliage throughout the year. If possible, they should be suitably mature to provide maximum screening effectiveness in the shortest possible time. Proponents should use vegetation of various heights to ensure the most effective screening and should plant vegetation as soon as possible to reduce the time that impacts would be unmitigated.

At-receiver mitigation

As an alternative to other mitigation options, proponents may consider using at-source treatments at affected public viewpoints and private receivers in consultation with the landowner. These options could include landscaping treatment or building other structures or features (for example, a shed) to screen views.

Residual impact assessment

Proponents should also assess the visual impact that would remain after the adoption of mitigation measures to determine whether the overall visual magnitude rating of the project would decrease.

4

Level of assessment

Proponents must conduct an assessment that is proportionate to the likely impacts on each viewpoint and receiver. This section identifies the required level of assessment in the scoping report and environmental impact statement.

4.1 Scoping report

The scoping stage presents an opportunity for proponents to select sites, designs and layouts to avoid and mitigate significant visual impacts. Consequently, proponents should consider the visual impact assessment process and tools when scoping and designing a project.

The scoping report must include a visual impact analysis that identifies public viewpoints and private receivers that require assessment in the environmental impact statement. Proponents should also use this process to identify where to focus consultation with landowners and the local community.

As part of this process, proponents must conduct a mapping exercise that includes the following steps. You can find further guidance on the contents and form of a scoping report in the department's *State significant development guidelines – preparing a scoping report*.

Study area

The first step of scoping is for proponents to identify a visual study area from the preliminary project corridor (see the *Transmission Guideline*) or transmission tower locations where these are known. They can determine the extent of the assessment area using the maximum height of the proposed transmission towers and the distances set out in Figure 7. As an example, the minimum extent of the study area for 80 m towers is 1.5 km from the preliminary project corridor.

Viewshed mapping

Once proponents have defined the study area, they must conduct viewshed mapping to identify areas from which the project could be visible. This process eliminates the need to assess viewpoints within the study area that have no line of sight to the preliminary project corridor. Proponents should base viewshed mapping on the maximum height of the proposed transmission towers (or on more specific heights across the corridor, where they know them) and use geographic information systems to account for topography. They must not account for other intervening factors, including built structures and vegetation screening.

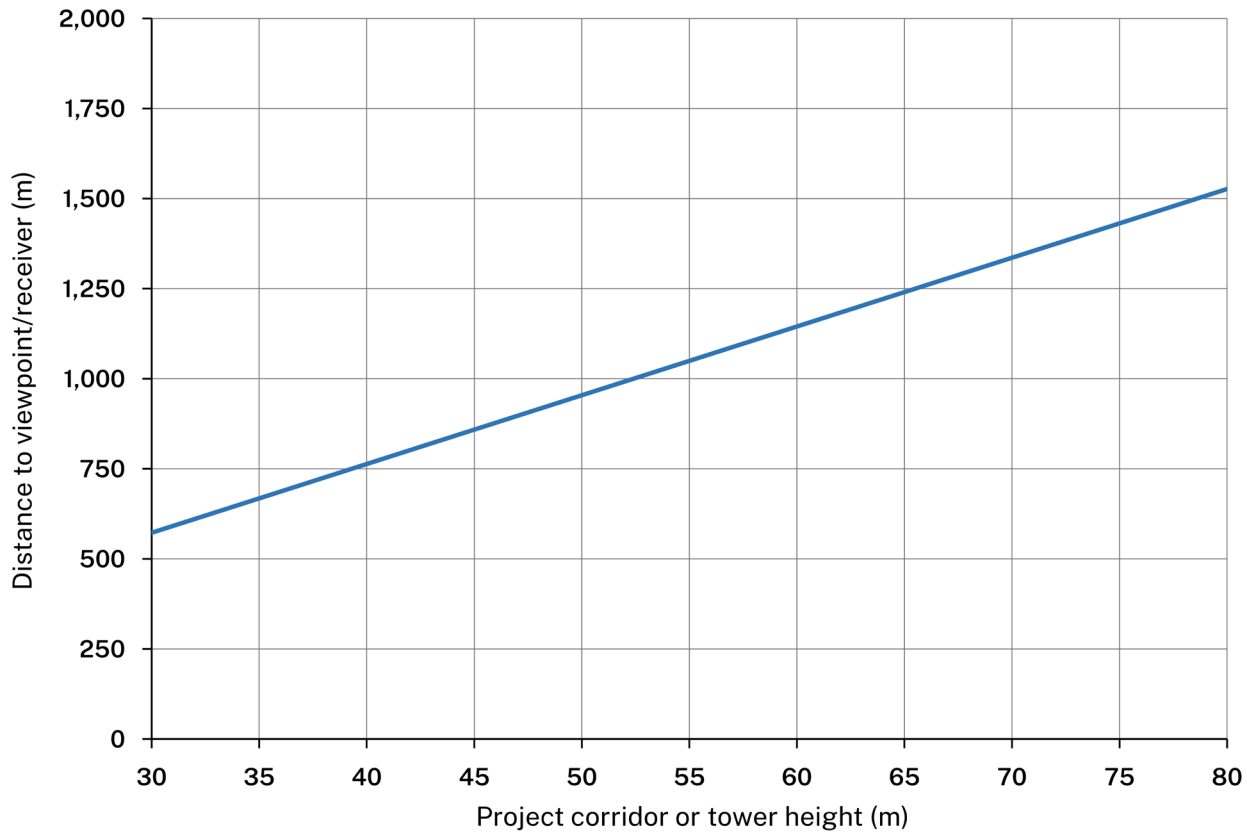


Figure 7. Extent of the scoping study area

Identifying potentially affected viewpoints and receivers

The last step is to identify public viewpoints and private receivers that would have line of sight to the project and sit within the study area. Proponents should use Table 3 to help identify potential viewpoints; however, they need not identify the precise category of each viewpoint at this stage. Proponents should consider additional viewpoints if ancillary infrastructure, such as substations, could potentially cause impacts. Proponents should label all viewpoints for identification and keep this consistent through the assessment process.

Scoping map

The results of the scoping analysis should be presented on a map (see Figure 8) and included in the scoping report. The map should identify the:

- proposed or indicative transmission tower locations
- study area
- results of the viewshed analysis
- relevant setback areas calculated in accordance with Figure 2
- location of public viewpoints and private receivers (including whether they are easement-affected and therefore associated with the project)

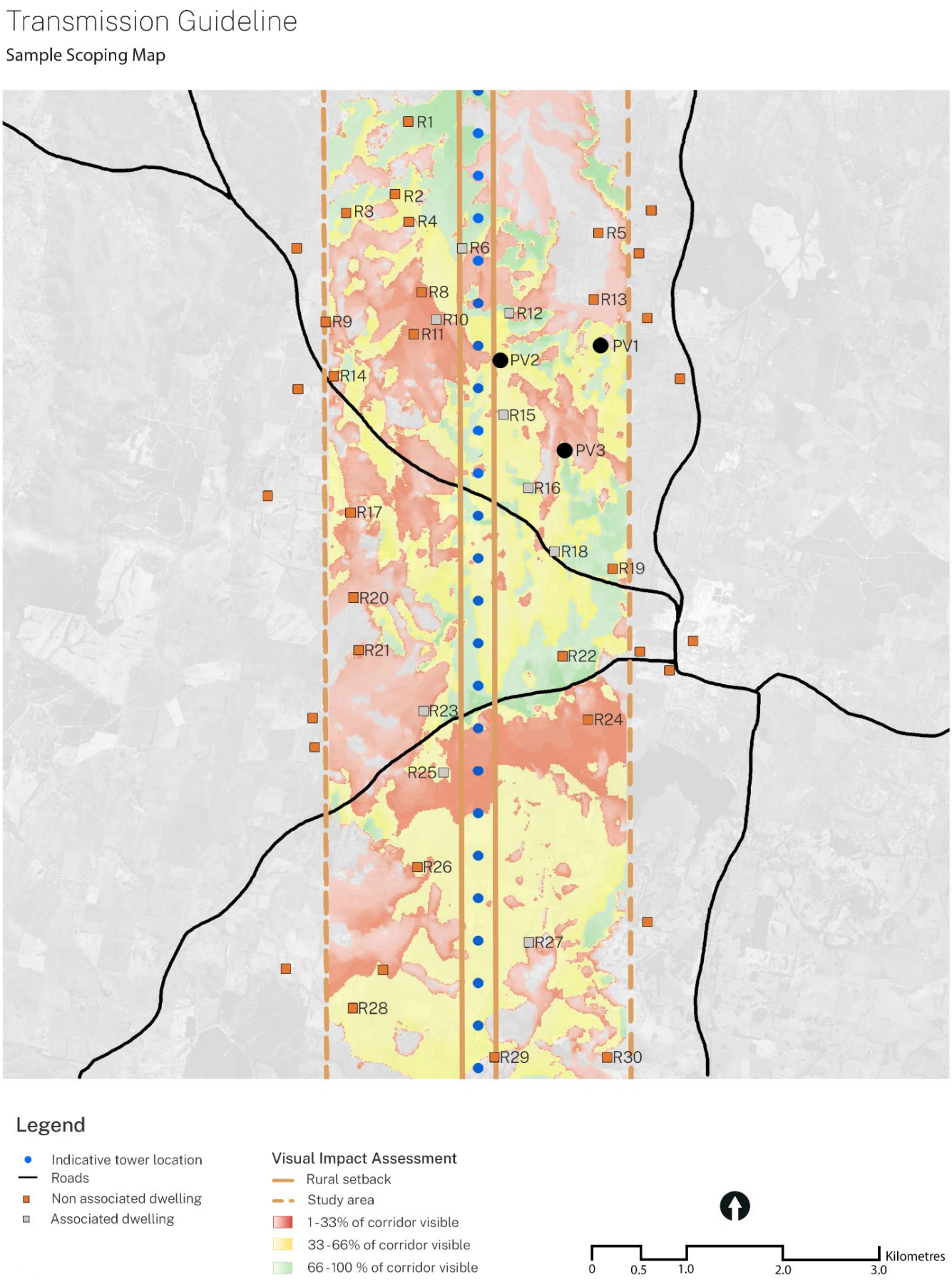


Figure 8. Sample scoping map

4.2 Environmental impact statement

General requirements

All public viewpoints and private receivers identified in the scoping report need to be assessed in some level in the environmental impact statement. A full visual impact assessment is not required if features completely obstruct the view of the project. In such cases, the proponent must provide evidence that intervening topography, screening, or structures would eliminate any impact.

Representative receivers and viewpoints

Given the large and linear nature of transmission infrastructure, proponents may select and assess representative viewpoints in lieu of multiple dwellings. This can be appropriate when private receivers are clustered close together, or when a view is representative or represents a worse case than views located nearby or further away. The types of private receivers that can be assessed by representative views include:

- rural residential areas
- rural villages
- urban residential.

When using representative viewpoints, proponents must:

- clearly identify the number and location of dwellings that are the subject of the selected representative viewpoint
- carefully assess the topography and vegetation of the selected viewpoint area to identify the most sensitive viewpoint with the highest visibility of a proposed transmission tower (that is, the worst-case) location in the selected areas as the representative viewpoint.

Proponents should not use representative viewpoints for views from the public domain except for public road viewpoints. They should also not use them for dwellings within the relevant setbacks.

Setback assessment

If a sensitive receiver is located within the relevant setback (and is not easement-affected), proponents should prepare a photomontage according to the requirements in Appendix D. A photomontage is a composite image from overlaying a panoramic photograph with a computer-generated model of the proposed infrastructure (see examples in Appendix C).

When produced consistently, panoramic photomontages provide a highly effective means of helping stakeholders and consent authorities appreciate the visual presence of transmission infrastructure in context with the landform, land uses and vegetation.

It may not be possible to prepare photomontages in all scenarios (for example, if a landowner does not grant consent for taking photographs from privately owned land). Proponents should make their best efforts to gain access to private land and prepare photomontages. However, proponents can use alternative tools in these circumstances (see Appendix D).

Proponents should use the photomontage to do one of the following:

- demonstrate that the sensitive receiver is eligible for an exemption from the relevant setback (i.e. any transmission tower would not occupy more than 12 or 16 degrees vertically for rural sensitive receivers or urban sensitive receivers, respectively, if within the relevant setback distances in Figure 2
- support their justification of high visual impact, with regard to the performance objectives in Table 9.

If the sensitive receiver is eligible for an exemption from the setback, then proponents should also conduct a visual impact assessment according to the following section and the visual assessment process in section 3.2.

Proportionate visual impact assessment

A visual impact assessment must be undertaken for all public viewpoints and private receivers identified in the scoping report (in accordance with the process outlined in Section 3.2) unless:

- there is no line of sight to the project, and proponents can provide evidence that mitigating factors would eliminate any impact from the project
- the impact can be assessed by a representative public viewpoint or private receiver, or
- a private receiver sits within the setback and would be ineligible for an exemption.

The level of assessment required should be proportionate to the likely impacts. Proponents can begin by carrying out a simple assessment using desktop data and high-level assumptions. They should then conduct further assessment if impacts are likely to be moderate or higher. Figure 9 and the paragraphs below describe this process. Proponents should also prepare the assessment according to the requirements and examples in Appendix E.

Simple assessment

Conduct a basic assessment using worst-case assumptions about the likely magnitude and visual sensitivity. Proceed to undertake an intermediate assessment if impacts could be moderate or higher.

Intermediate assessment

Produce wireframes to more accurately determine the magnitude rating. Proceed to undertake a detailed assessment if impacts continue to be moderate or higher.

Detailed assessment

Prepare photomontages and undertake field visits to more accurately assess scenic quality and determine the effectiveness of existing or proposed screening in mitigating potential impacts.

Figure 9. Proportionate visual impact assessment

Simple assessment

Simple assessment provides a relatively streamlined way to eliminate the need for detailed assessment of public viewpoints and private receivers that are likely to have low and very low impacts. The simple assessment can generally be undertaken at a desktop level using the approach below.

If the simple assessment indicates that a moderate or high impact is likely, then proponents must conduct an intermediate assessment (or detailed assessment if they choose). The environmental impact statement must present the outcomes of the simple assessment for each viewpoint and receiver (or representative location), unless proponents conduct an intermediate or detailed assessment.

Determining visual sensitivity

At this stage, the characterisation of viewpoint sensitivity and scenic quality can be informed by conservative assumptions. For example, it could be assumed that all views from dwellings are primary views to avoid extensive field work and site visits. Proponents can later refine this information as part of an intermediate or detailed assessment if moderate or high impacts could be expected. Proponents can also use desktop analysis to derive scenic quality. However, information and site visits that have been undertaken to inform the landscape character assessment should support this desktop analysis (see Section 2).

Calculating potential magnitude

Simple assessment can rely on a theoretical calculation of the likely magnitude using simple parameters, including the height of the proposed transmission towers and distance of the nearest tower or corridor from each viewpoint.

Given the linear nature of transmission infrastructure, the potential magnitude is relatively predictable. It can be estimated using just the vertical field of view of the nearest tower and the tools below. These tools have built-in assumptions about the horizontal field of view that have been derived from 3D modelling and worse-case assumptions. This potential magnitude also ignores mitigating factors, including topography, vegetation and buildings.

To calculate potential magnitude:

1. Determine the worst-case vertical field of view from the viewpoint using trigonometry (see below), Figure 10 or tools on the Department of Planning, Housing and Infrastructure's website to determine a conservative number of vertical cells that the infrastructure could occupy
2. Cross-reference the vertical field of view with the potential magnitude thresholds in Table 10.

Calculating potential magnitude using trigonometry

$$vertical\ field\ of\ view\ (degrees) = \tan^{-1}\left(\frac{height\ of\ tower\ (m)}{distance\ to\ nearest\ tower/corridor\ (m)}\right)$$

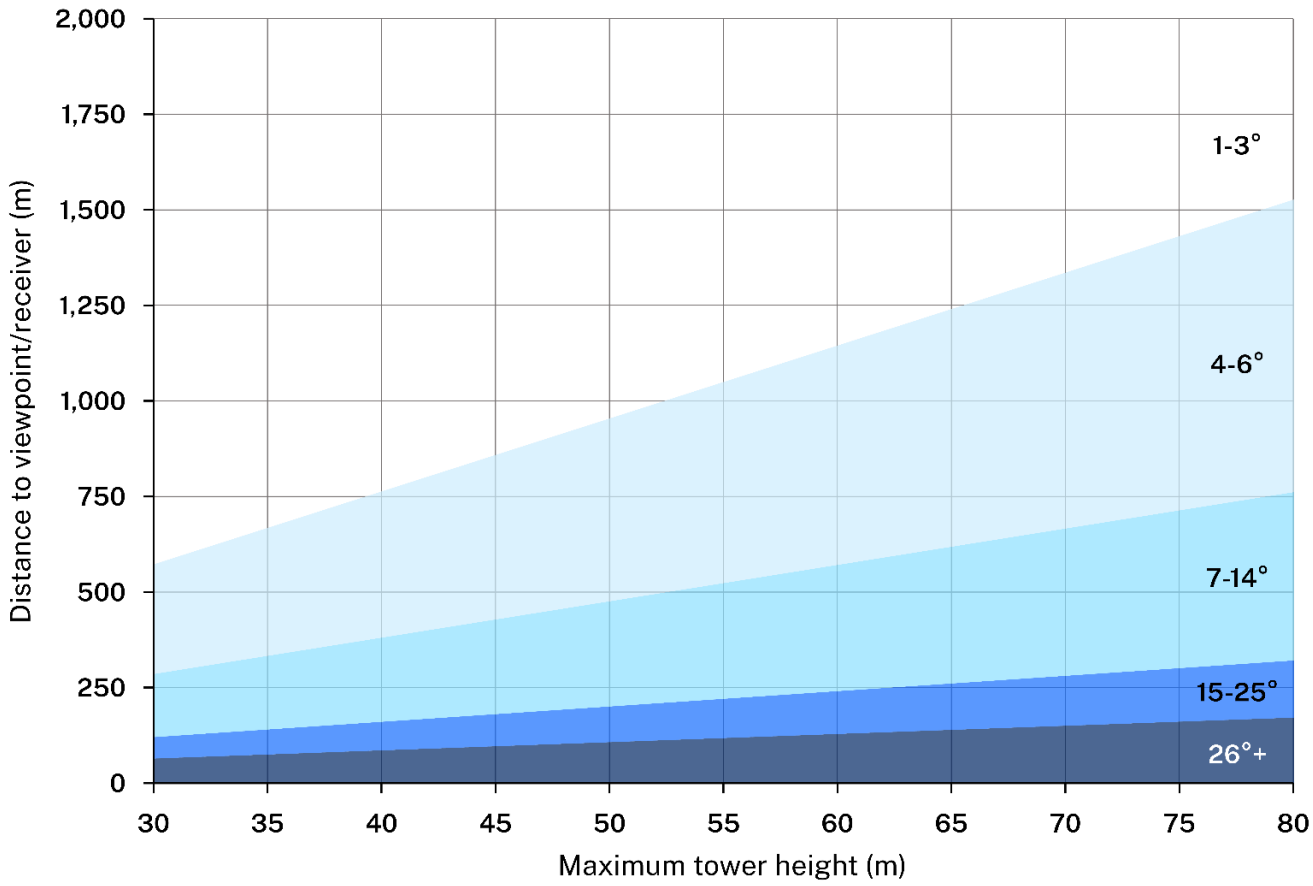


Figure 10. Conservative vertical field of view

Table 10. Potential magnitude thresholds

Vertical field of view of nearest tower or corridor	Potential magnitude
1 to 3°	Very low
4 to 6°	Low
7 to 14°	Moderate
15 to 25°	High
26° or more	Very high

Intermediate assessment

Intermediate assessment provides an opportunity to more accurately determine the visual magnitude of a proposal more accurately. This involves using 3D modelling which can account for many of the factors that influence magnitude including intervening topography, the different

distances at which transmission towers will be visible and spacing between individual transmission towers.

If the intermediate assessment indicates that a moderate or high impact continues to be likely, then the proponent must proceed to undertake a detailed assessment. The environmental impact statement must present the outcomes of the intermediate assessment for each public viewpoint and private receiver (or representative location) unless proponents conduct a detailed assessment.

Calculating magnitude

Building on the assessment outputs from the simple assessment, proponents can replace the calculation of potential magnitude with the use of a visual magnitude grid tool to achieve a more certain calculation of a project's bulk and scale relative to a view.

This tool is a transparent grid that, when overlayed with an accurate 3D representation of a proposed project, can ensure a consistent way to understand its visual magnitude. Figure 11 and the paragraphs below describe this process in further detail.

To calculate visual magnitude for an intermediate assessment:

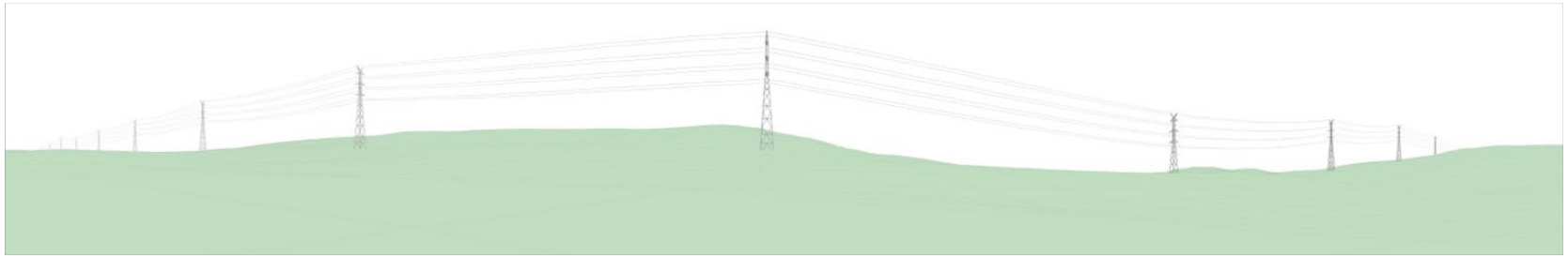
1. Produce a 3D model (such as a wireframe or wireline model) that:
    a. comprises 180 degrees of horizontal field of view
    b. is generated using a bare earth digital terrain model
    c. includes proposed transmission towers at their proposed heights and known or likely locations
    d. includes any visible proposed or approved transmission infrastructure projects.
2. Overlay the visual magnitude grid tool on the wireframe image.
3. Identify and count the number of grid cells that the project would occupy.
4. Determine the magnitude rating based on the number of cells and the thresholds in Table 2.

When overlaying the grid, it should be scaled (so the aspect ratio remains unchanged) to ensure that the width matches the wireframe. The grid tool is available in various file formats on the our website.

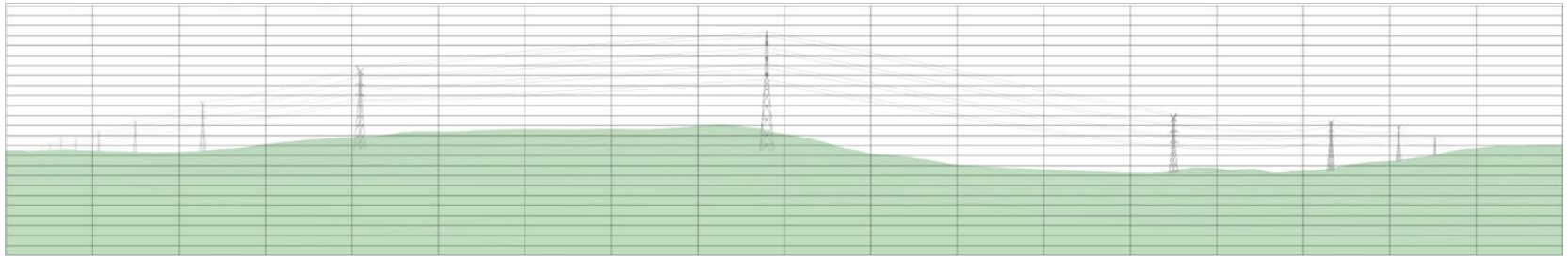
Once scaled appropriately, the visual magnitude grid tool should be moved incrementally to accurately cover the number of cells the project would occupy and to reduce partly occupied cells. In particular, the grid should be positioned to avoid vertical grid lines aligning with transmission towers, as far as is practicable.

Once the grid has been applied to the wireframe, proponents must identify the number of cells that the built form of the project occupies. Proponents must account for the full vertical extent of all visible towers within the field of view (unless 3 degrees or less). Cells that only contain transmission lines can be considered unoccupied. Figure 12 provides examples of occupied and unoccupied cells.

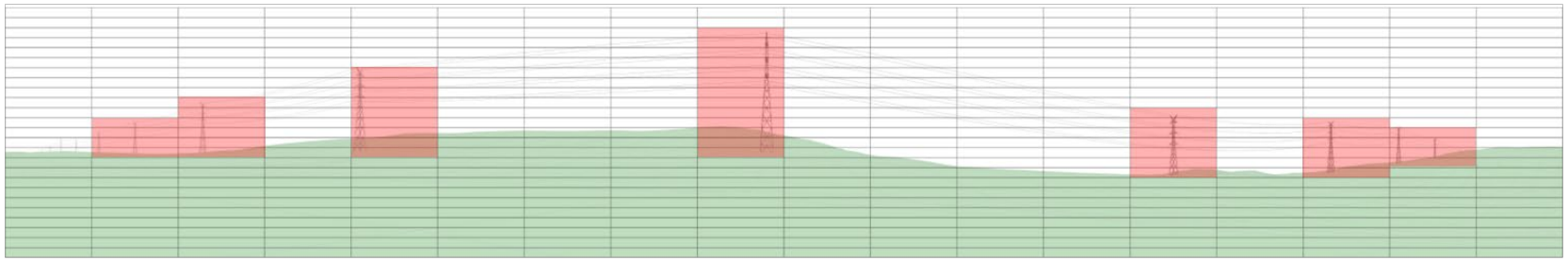
1 Produce wireframe



2 Overlay visual magnitude grid tool



3 Identify occupied cells



4 Determine magnitude rating

Magnitude Rating	Very Low	Low	Moderate	High	Very High
No. Cells	1-7	8-14	15-25	26-36	37+

Figure 11. Steps to determine visual magnitude for an intermediate assessment

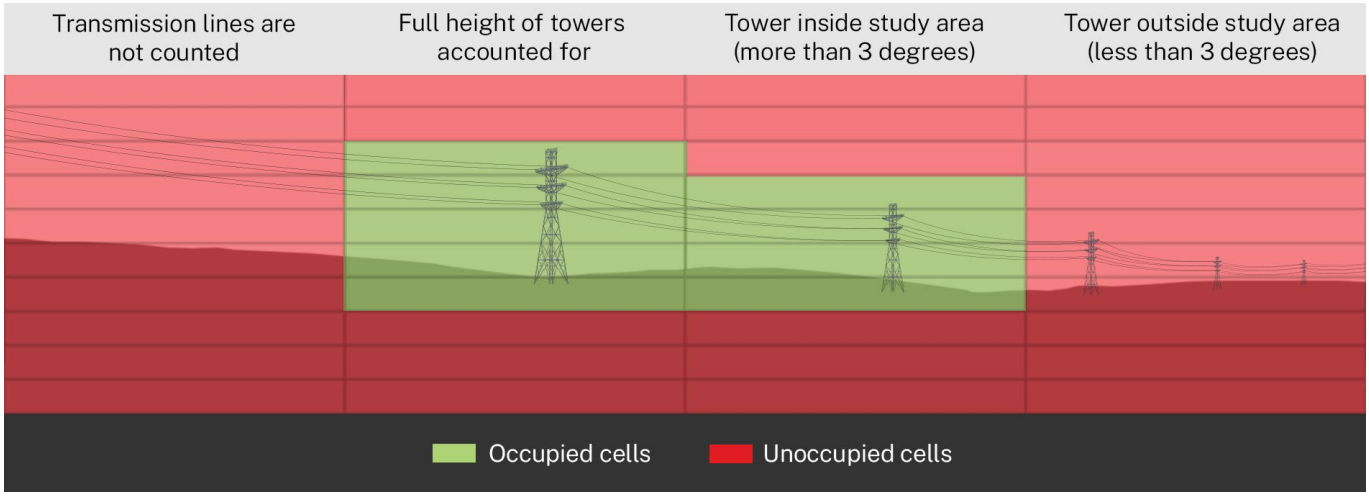


Figure 12. Visual reference for identifying occupied cells

Detailed assessment

Detailed assessment provides an opportunity to refine the magnitude and visual sensitivity inputs using panoramic photomontages and field visits. Photomontages can be used to refine the visual magnitude, by considering the mitigating effects of existing vegetation, and scenic quality by considering very specific attributes of individual views.

Consequently, if a detailed assessment is required, it should be supported by a panoramic photomontage that is prepared in accordance with Appendix D. However, preparing montages for all scenarios may not be possible (for example, if a landowner does not grant consent for taking photographs from privately owned land). Proponents should make their best efforts to prepare photomontages according to the guidance in Appendix D. They can use alternative tools in lieu of a photomontage when land access is not possible (see Appendix D).

Although photomontages are highly effective visual communication tools, they can under-represent the view when compressed on a small page. For this reason, assessment of each viewpoint must also include a full-size 50 mm image of the photomontage with the highest magnitude. This will more appropriately represent the view of the development from the human eye. Where appropriate, the accompanying 50 mm image should comply with the photographic requirements in Appendix D.

Refining visual sensitivity

As part of a detailed assessment, proponents should refine elements of visual sensitivity through field visits. These visits should verify information about scenic quality, including specific features within the view from each public viewpoint and private receiver. They should also verify information about viewpoint sensitivity, particularly whether views from dwellings are primary or secondary (see Table 4).

Refining visual magnitude

Building on the assessment outputs from an intermediate assessment, proponents can refine the calculation of magnitude to account for the mitigating factors of existing vegetation or other screening.

To refine the magnitude:

1. Capture a panoramic photograph from the viewpoint that comprises 180 degrees of horizontal field of view towards a project.
2. Superimpose a 3D-rendered model and the magnitude grid tool on the panoramic photograph.
3. Verify whether existing vegetation or built elements would obstruct any elements of the project.
4. Recalculate the magnitude rating based on the number of occupied cells and the thresholds in Table 2.

Existing screening should be considered effective, and a cell is not occupied if:

- existing vegetation would substantially screen elements of the project (to the point where transmission towers are barely discernible through vegetation), such that any residual view would be very intermittent.
- any existing screening would effectively mitigate the view of the project, such that moving the viewpoint a few metres in any direction would not significantly change the amount of screening.
- the vegetation is not temporary, seasonal or identified as a common weed.

Figure 13 provides examples of effective and ineffective vegetation screening. Although these examples provide a guide, proponents should still use professional and reasonable judgement on a project-by-project basis.

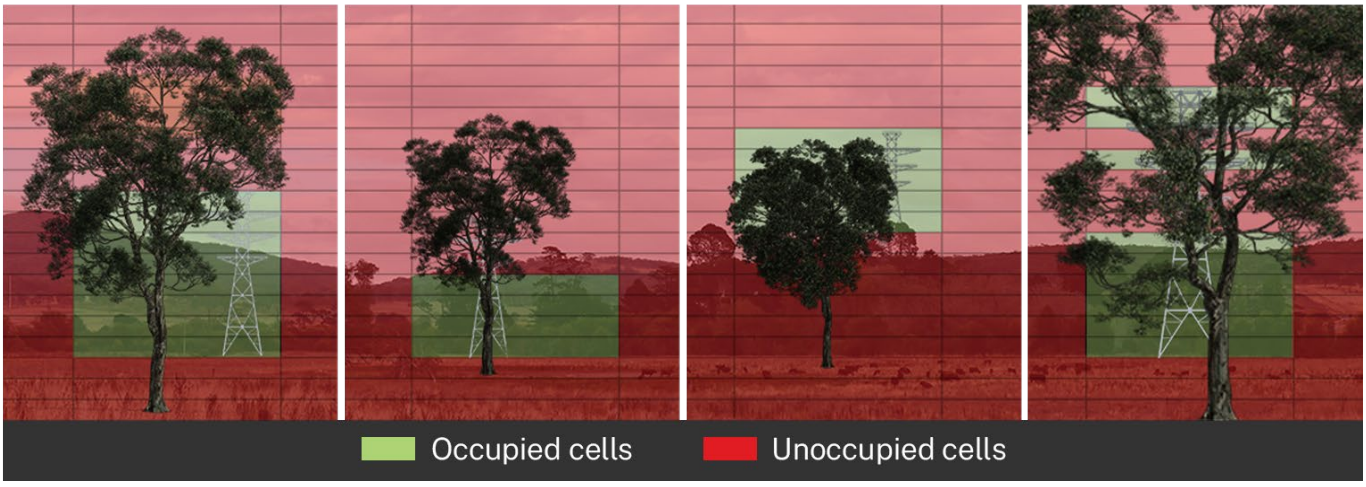


Figure 13. Visual reference for considering existing vegetation screening

Assessment against performance objectives

If, after the above analysis, the visual impact is moderate or higher, proponents must assess the impact according to the performance objectives in Table 9.

If proponents propose screening to mitigate an impact, they must prepare a photomontage to visualise the likely effectiveness of the vegetation (see Figure 14). They should present this photomontage with and without an overlay of the visual magnitude grid tool and indicate the age of the vegetation.

The environmental impact statement must also:

- include details of the proposed landscaping including the type and species of any trees, shrubs and/or grasses and groundcovers to be used,
- demonstrate that the proposed landscaping has a reasonable likelihood of mitigating the impacts due to the mature height and spread of the species.
- include indicative timeframes for establishing vegetation, including an estimate for when the vegetation would achieve the desired mitigation level.

Figure 14. Photomontage with mitigation

Appendix

A

Example landscape character assessment

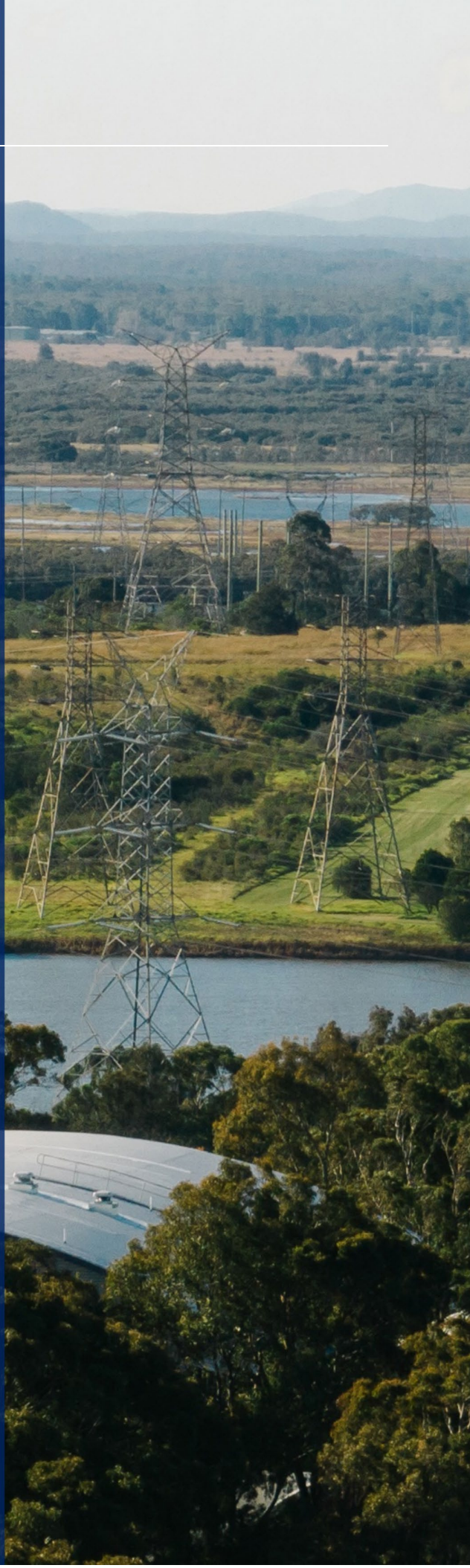


Table 11. Example landscape character assessment

Landscape character zone	Sensitivity	Magnitude	Landscape character impact
Landscape character zone 1: Cleared grazing lands	**Low** • The landscape has been highly modified from its natural state to support grazing. • Human modifications are clearly evident through widespread clearance of native vegetation and the presence of roadways, dwellings, ancillary agricultural buildings and domestic-scale electricity infrastructure. As such, it has some capacity to absorb the change from the proposed transmission infrastructure. • No specific planning controls attribute special value to this landscape. • The landscape elements that contribute to its quality will remain unchanged.	**Low** • Some elements of the project, predominantly ancillary infrastructure, are proposed within this landscape character zone. • The proposed infrastructure in this landscape character zone will result in a minor change in landscape characteristics at close range. However, the extent of this change is minor in relation to the extent and use of this landscape character zone. • The transmission infrastructure would not disrupt any key landscape features.	**Low**
Landscape character zone 2: Undulating forested grassland	**Moderate** • This landscape character zone is generally vegetated and relatively unmodified, particularly on hills and alongside natural watercourses. • It consists of conservation areas and is characterised by forested hills that are a distinct landscape feature. • Some clearing and lightly modified landscapes are present on the plains of the	**Moderate** • When viewed from afar, the project will likely compete visually with the landform and associated vegetation. Its position on the hills will disrupt the skyline of this prominent landscape feature. • When viewed from within the landscape character zone, views towards the project are expected to occupy a small portion of the horizontal and	**Moderate**

Landscape character zone	Sensitivity	Magnitude	Landscape character impact
	landscape character zone, including some large lot residential uses. • Some high-voltage transmission lines transect part of the landscape character zone.	vertical fields of view, often through gaps in vegetation and topography. This will minimise their ability to impact the character of this landscape character zone.	

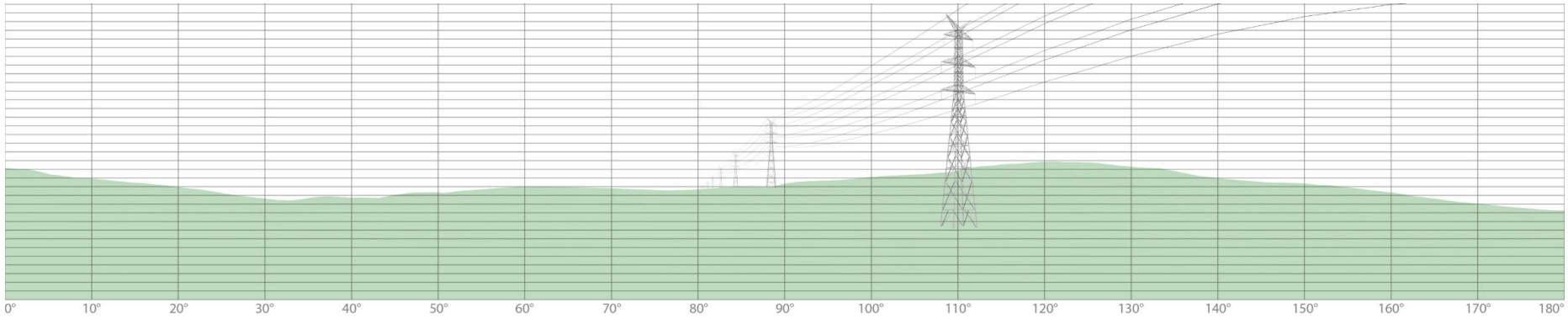
Appendix

B

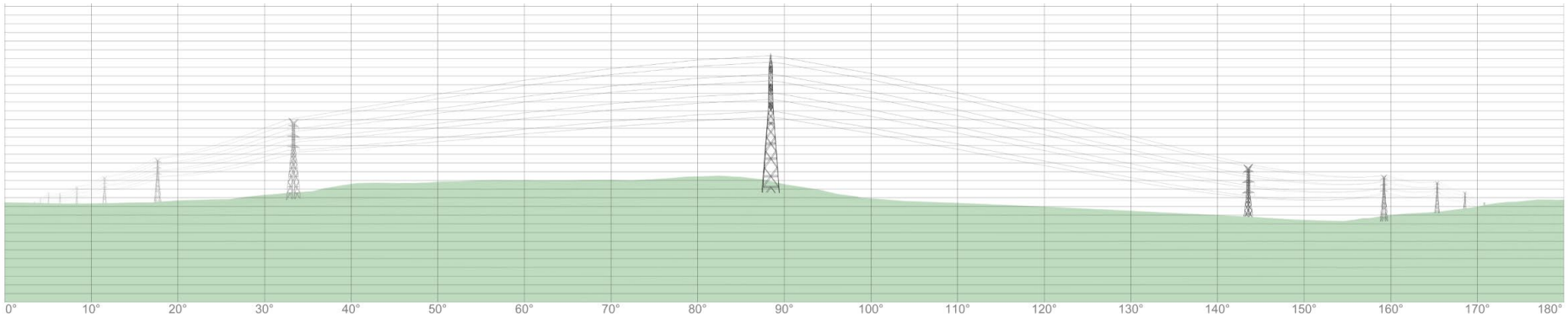
Visual magnitude examples

The following examples depict the magnitude of transmission infrastructure for approximately 80 m high transmission towers. These are highly conservative examples that do not consider intervening vegetation or other mitigating factors.

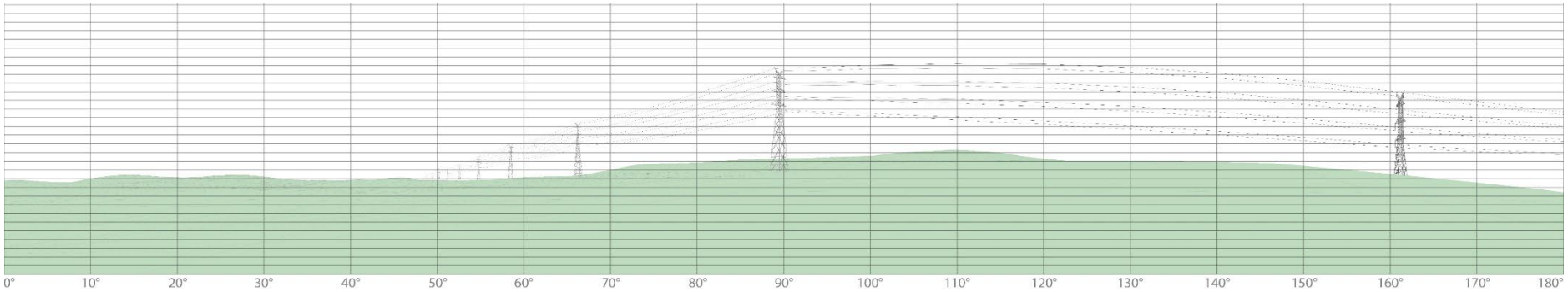
0 - 500m from project



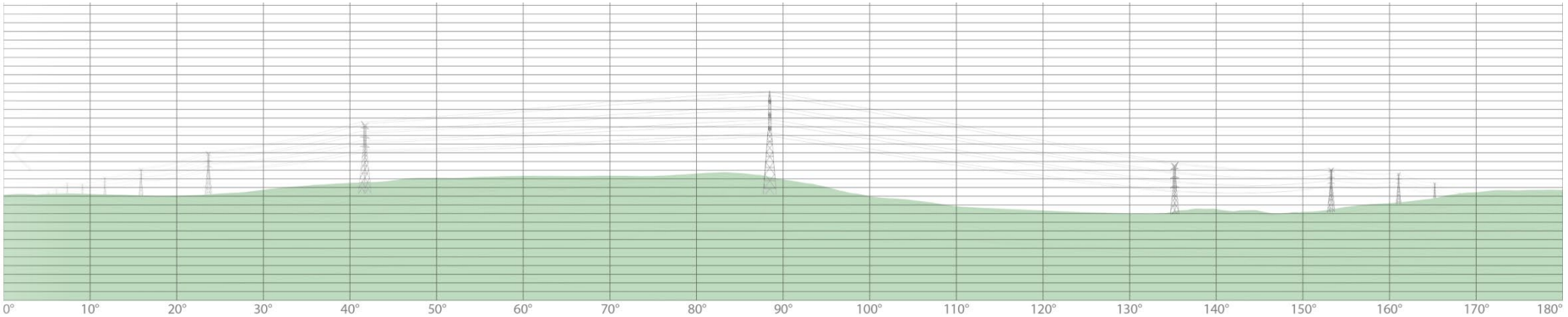
Very high magnitude



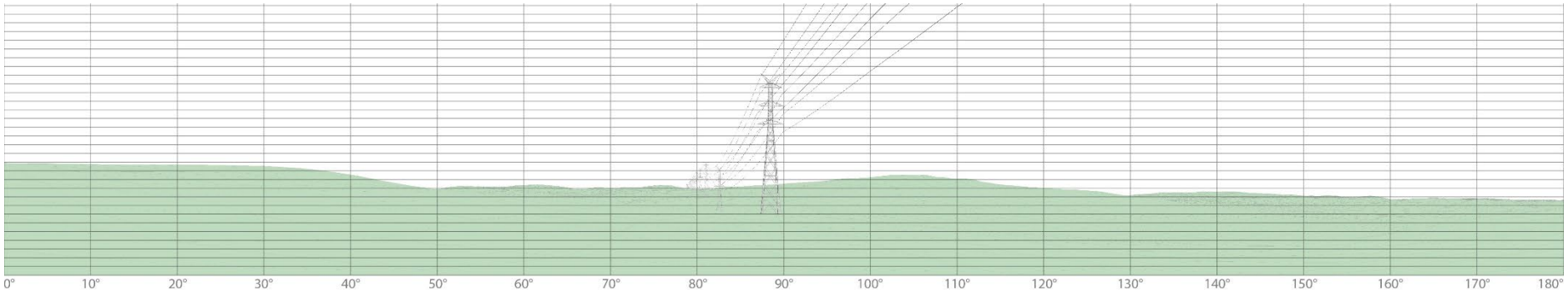
Very high magnitude



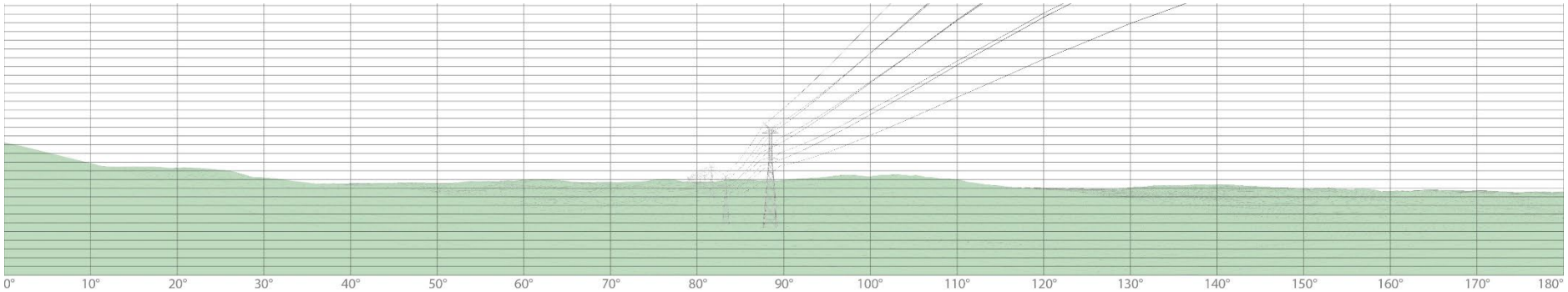
Very high magnitude



Very high magnitude

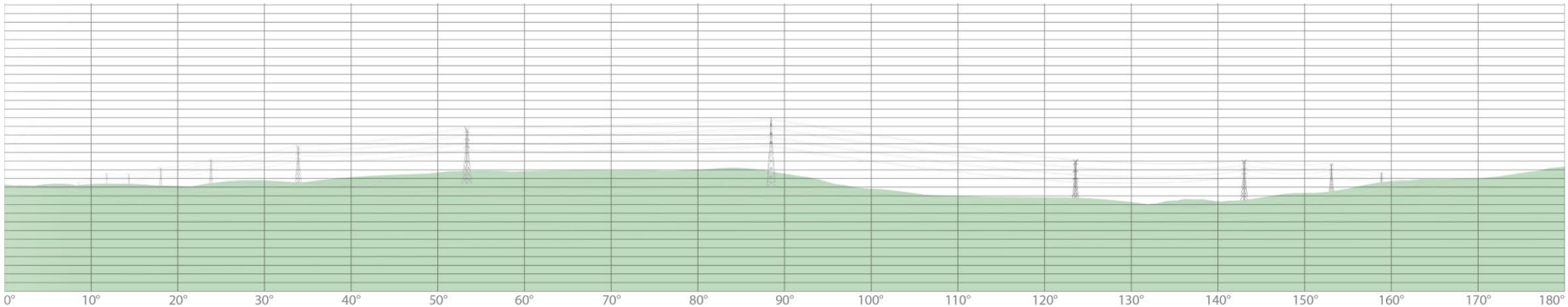


Moderate magnitude

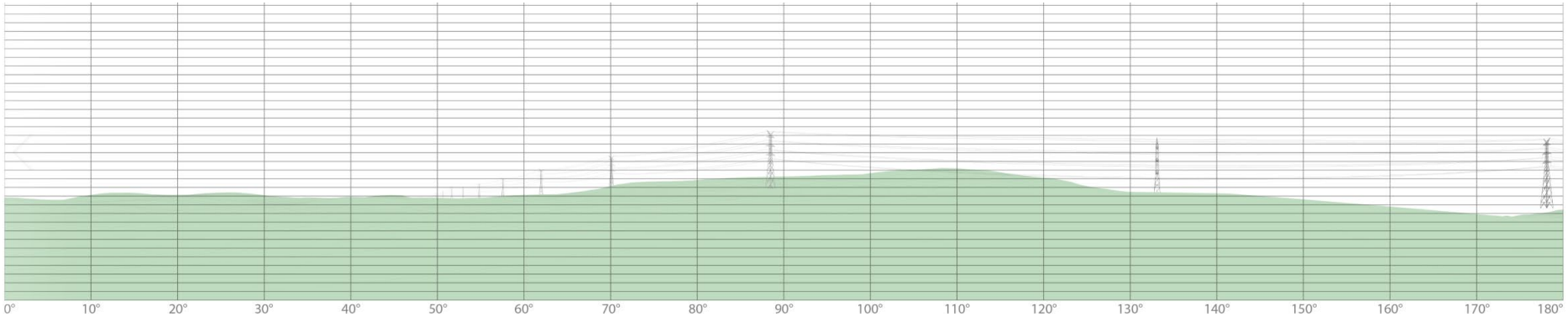


Low magnitude

500 - 1,500m from project



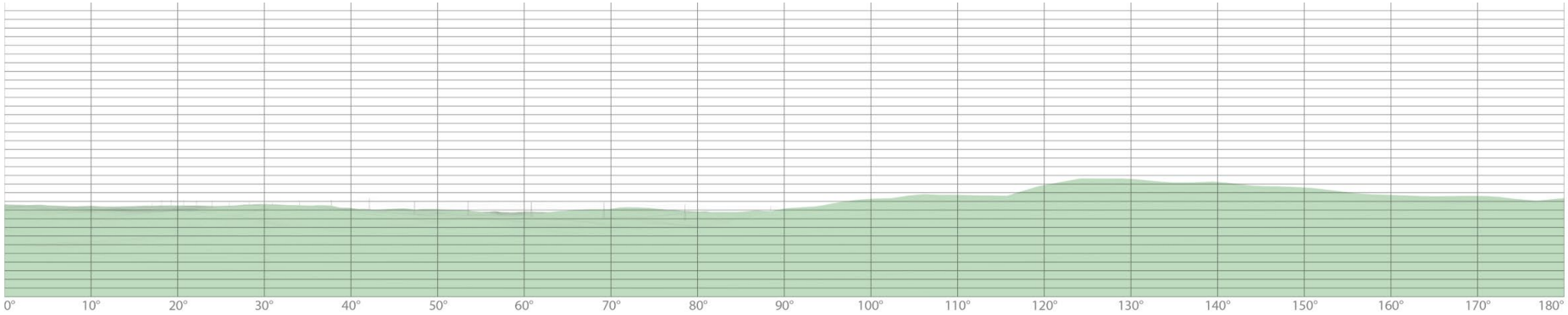
Very high magnitude



High magnitude

Moderate magnitude

Very low magnitude and outside of study area identified at scoping stage



Very low magnitude and outside of study area identified at scoping stage

Appendix C

Visual impact examples

Private receivers

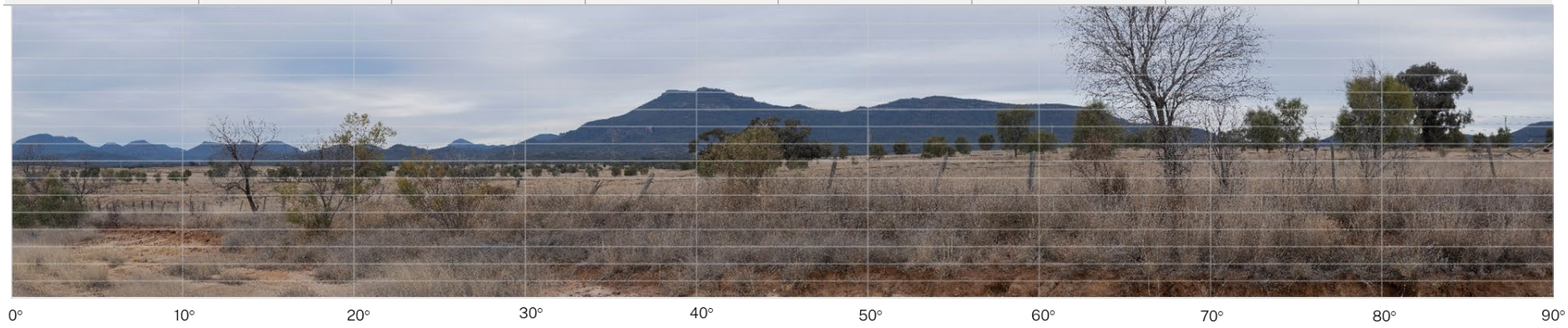
Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
193 m	Rural dwelling primary view	Moderate	High	High	24	Moderate	High (within setback)

Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
520 m	Rural dwelling primary view	Moderate	Low	Moderate	29	High	Moderate

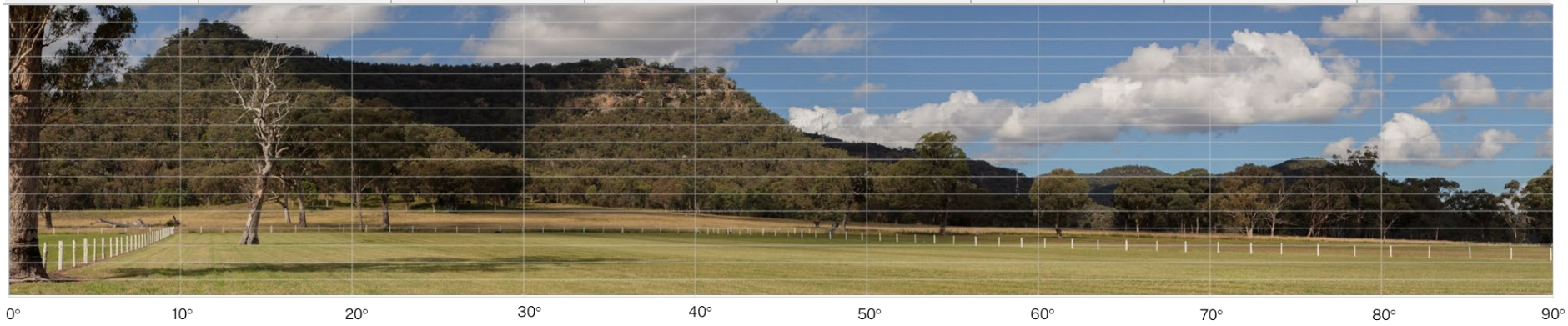
Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
630 m	Rural dwelling primary view	Moderate	Moderate	Moderate	23	Moderate	Moderate

Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
263 m	Urban dwelling primary view	Low	Low	Low	21	Moderate	Low

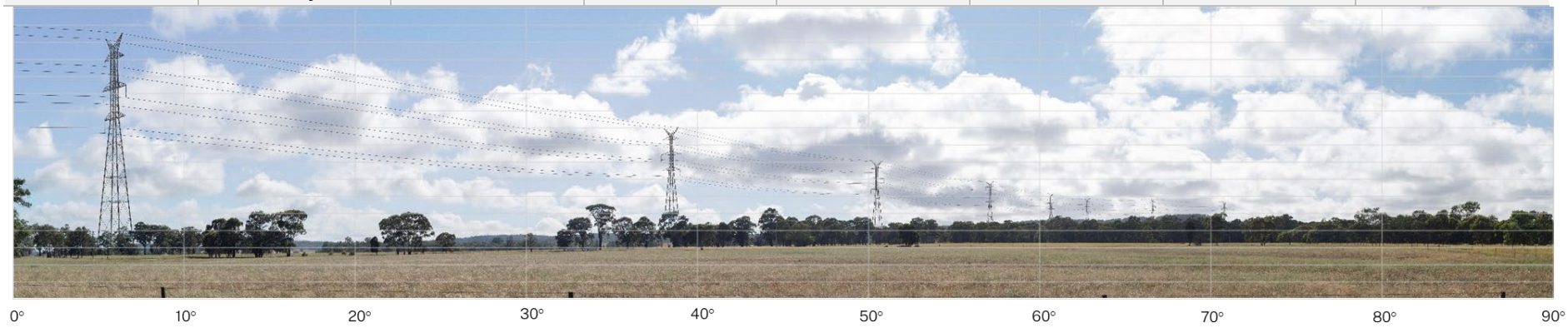
Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
556 m	Rural dwelling primary view	Moderate	High	High	6 (zero cells within cutoff)	Very low	Low



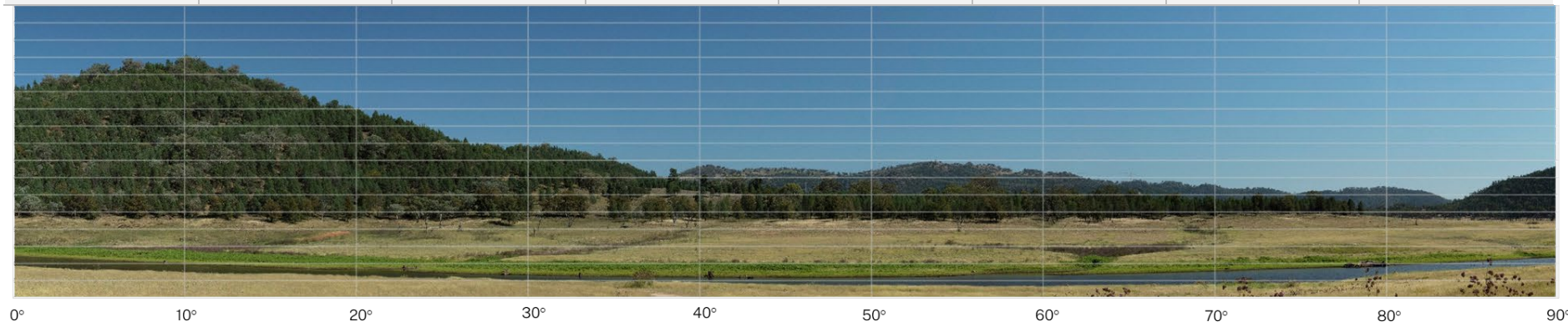
Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
1,960 m	Historic homestead	High	Moderate	High	4 (0 cells within cutoff)	Very low	Low



Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
340 m	Rural dwelling secondary view	Low	Low	Low	25	Moderate	Low

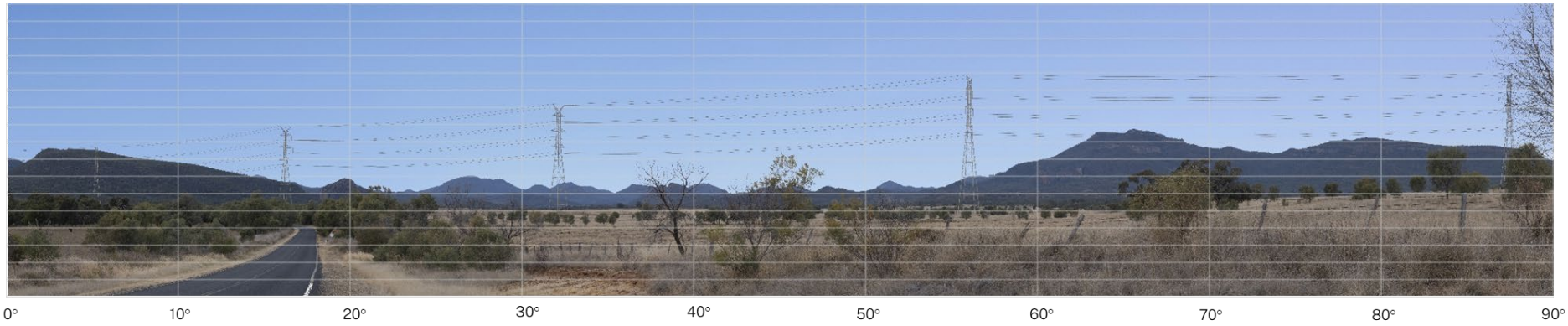


Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
1,420 m	Tourist accommodation	Moderate	Moderate	Moderate	4 (0 cells within cutoff)	Very low	Low

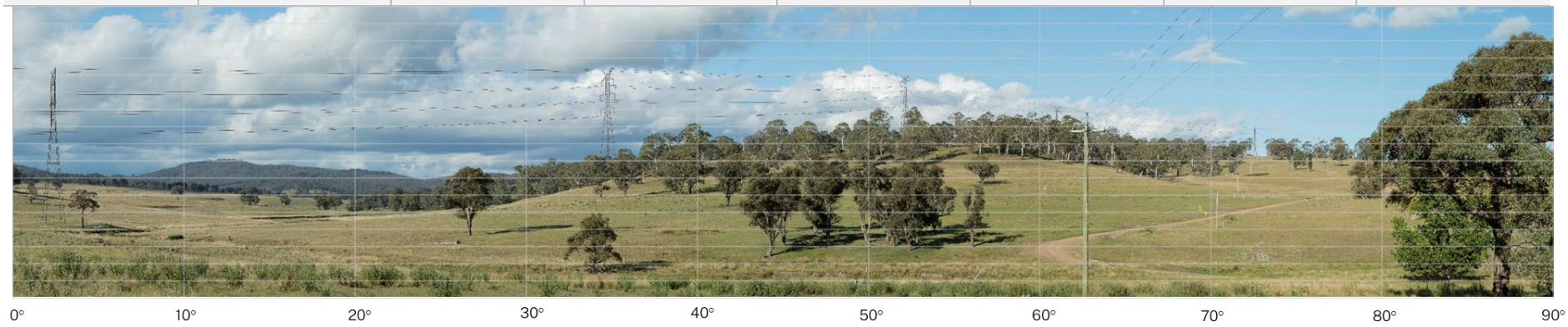


Public viewpoints

Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
556 m	Entry to regional city	Low	High	Moderate	31	High	Moderate

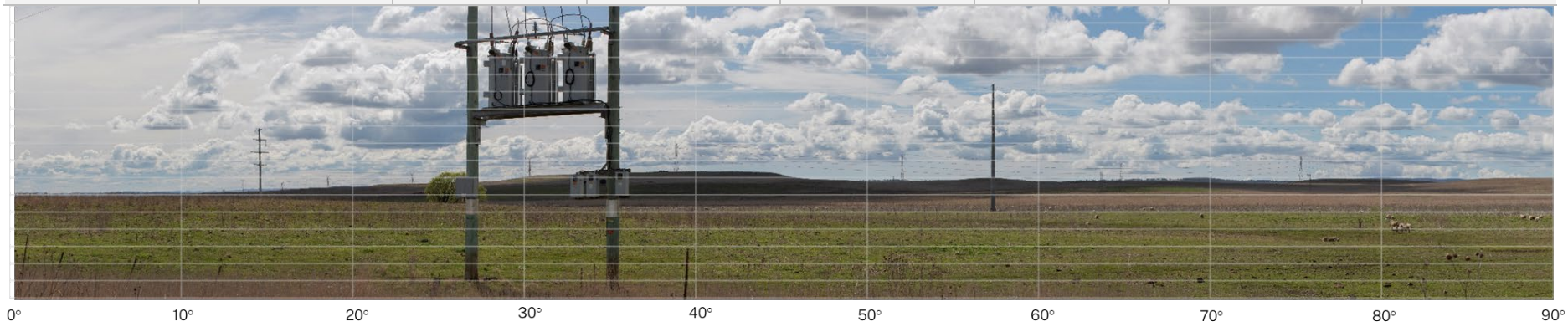


Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
510 m	State highway	Very low	Low	Very low	22	Moderate	Low



Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
1,966 m	Tourist road	Low	Moderate	Low	8 (0 cells within cutoff)	Very low	Very low

Distance to development	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
1,880 m	Classified main road	Very low	Very low	Very low	9 (0 cells within cutoff)	Very low	Very low



Appendix D

Photomontage requirements, land access and alternatives

Photomontages

Panoramic photographs must be constructed by merging a series of photographs to form one image with a horizontal field of view of 180 degrees. To ensure consistency and accuracy, these montages must be prepared in accordance with the requirements below.

If proponents are unable to take a photograph from a viewpoint and cannot choose an appropriate representative viewpoint, they may capture other photography to show the characteristics of the view and landscape. However, the proponent should make all reasonable efforts to take representative panoramic photos to ensure the assessment is as accurate as possible.

Table 12. Parameters and requirements for photomontages

Parameter	Requirement
Camera	• Full frame sensor • Camera positioned 1.5 m above the ground • Use of tripod (with levelling tools) and panoramic head
Lens	• 50 mm focal length • Aperture set to ensure all elements of the photograph are in focus
Composition	• Horizon positioned at the midpoint of the photographs • Multiple photographs taken every 15 degrees or at such frequency to provide adequate overlap (approximately 30%) between images
Location and conditions	• Where possible, photographs should be taken with no or minimal cloud cover and when the sun is high in the sky (generally from 9 am to 3 pm) • Clear skies should be superimposed over any imagery that would otherwise contain overcast skies
Merging photographs	• Photographs merged to achieve a panoramic photograph with horizontal field of view of 180 degrees • Merged panoramic photographs avoid distortion or warping of the individual images

Land access

Proponents generally require access to private property to prepare photomontages and make a detailed assessment of the primary and secondary views from rural dwellings. This generally involves taking photographs from locations outside any dwelling.

While the proponent can use powers under the *NSW Electricity Supply Act 1995* to enter private land, it will generally require consent from landowners for this purpose.

The Department of Planning, Housing and Infrastructure encourages all landholders to grant access to their land and to participate in this process, as it allows for a detailed understanding of the likely impacts of the proposed development. It also allows proponents to identify strategies to minimise impacts if required.

Providing consent for land access does not indicate endorsement of the project but will help ensure a comprehensive assessment of the potential impacts. If landowners do not grant access or restrict it in a manner that prevents proponents from conducting a detailed visual impact assessment, proponents will have to conduct alternative assessments. If landowners deny access or do not engage with the proponents or their consultants, then they may lose their ability to request a photomontage later.

Proponents should make their best efforts to get permission to access and assess visual impacts from private receiver viewpoints by following the guidance below. They should coordinate this with other environmental assessment activities to minimise consultation fatigue and interruptions to property owners or tenants.

Proponents should start by making written requests to landholders to request property access. These requests should include the following:

- a formal request for permission to enter the property, including a consent form
- the reasons they require private property access (for example, to conduct the detailed visual impact assessment)
- the types of activities that will take place during access and the estimated duration of access
- a 28-day timeframe for providing a response to the written request (excluding public and school holidays)
- contact details for the landholder to discuss access requirements and procedures and to provide a response.

Proponents should follow up with the landholder within this 28-day period to ensure the landholder received the request, understands the nature of and reasons for the request, and to answer any questions the landowner may have. Proponents should follow up in person, by phone and, as a last resort, with another letter.

If the landholder has not granted land access or made contact following this process and period and the proponent is not pursuing access under the *NSW Electricity Supply Act 1995,* it may proceed to alternative methods of impact assessment. Examples of alternative methods are available below.

Where a landholder has provided consent, proponents should contact the landholder with dates and times they would require access, providing multiple options where possible. Sometimes weather conditions may impact planned property access, and proponents should make alternative arrangements in these circumstances.

If the landowner cannot accommodate access during the proposed times, proponents should provide alternative options and work with the landholder to find a suitable time within 28 days. If the landholder has not provided a reasonable option for access after this time, proponents may proceed to alternative methods of impact assessment.

Any use of drones to capture imagery for the visual impact assessment must be in accordance with the relevant laws and the Australian Government's Drone Privacy Guideline.

Photomontage alternatives

Although photomontages are the preferred tool for communicating the potential magnitude and overall impact to visual amenity, getting access for the photographic elements can sometimes be intermittent or unachievable.

Proponents should make their best efforts to get permission to access private property for preparing photomontages. However, if the property owner denies or restricts access or is unreachable, proponents and their consultants may use one of the following alternatives:

- select another viewpoint near the view location that is representative of the view and use the resulting imagery to prepare a montage
- use LiDAR and 3D modelling to clearly communicate the location and density of screening elements in the viewshed from the viewpoint
- rely on wire frames and reasonable assumptions about vegetation or other built elements in the viewshed that could screen the project; where proponents use this option, they should provide as much supporting evidence as possible.

Appendix

E

Imagery requirements

Proponents should present the visual impact assessment according to the requirements in the table below and generally according to the following examples.

Table 13. Visual impact assessment components and requirements

Assessment component	Requirements
Viewpoint information and imagery	• Reference to the viewpoint name/number • Baseline panoramic image (using requirements in Appendix D) • Viewpoint location and GPS coordinates • Distance to the infrastructure • Direction of view towards the project • Identification of any known transmission tower, or partially visible transmission tower, that is within the setback from a sensitive viewpoint • Numeric identification of known transmission towers consistent with information in the environmental impact statement • Identification of any proposed transmission infrastructure that is subject to an agreement with a host or neighbouring landholder
Sensitivity analysis	• Identification of viewpoint type • Identification of viewpoint sensitivity (see Table 3) • Identification of scenic quality (see Table 5 and Table 6) • Overall sensitivity (using Table 7) • Relevant commentary on how the scenic quality has been derived
Magnitude analysis	• Identification of the total number of cells that the project would occupy • Identification of the magnitude rating (using Table 2)
Visual impact rating	• Identification of the visual impact rating (using Table 8) • Excerpts of the relevant photomontage (if required) displayed at a size representative of the actual view showing areas with the greatest impact
Performance objectives, mitigation and residual impact	• Commentary on the visual impact, including relevant performance objectives (see Table 9) and any proposed mitigation measures • Detailed justification for high visual impacts that cannot be avoided • Panoramic photomontage including proposed mitigation with and without the magnitude grid tool (see Figure 14) • Age of and timing for the development of vegetation used in montages

Simple assessment example

Viewpoint	Viewpoint type	Viewpoint sensitivity	Scenic quality	Landscape character zone	Potential sensitivity	Maximum vertical field of view	Potential magnitude	Viewpoint in setback?	Potential impact rating
1	Rural dwelling	Moderate	High	Forested ridgeline	High	7° (7 cells)	Moderate	No	Moderate
2	Rural dwelling	Moderate	Low	Agricultural plains	Moderate	5° (5 cells)	Low	No	Low
3	Tourist and visitor accommodation	Moderate	Moderate	Wooded Hills	Moderate	8° (8 cells)	Moderate	No	Moderate
4	Entry to regional city	Low	Moderate	Wooded Hills	Low	4° (4 cells)	Low	No	Low
5	Historic homestead	High	High	Forested escarpment	High	15° (15 cells)	High	No	High

Intermediate assessment example

VIEWPOINT 05

Viewpoint Location

Potential Sensitivity

Viewpoint Type	Rural Dwelling
Viewpoint Sensitivity	Moderate
Scenic Quality	Low
Landscape Character Zone	Agricultural Plains
Overall Potential Sensitivity	Moderate

Scenic Quality Discussion

The surrounding area contains sparse and inconsistent patches of native and exotic vegetation. Pastoral elements dominate the view, and there is a high degree of human presence.

While some farm dams are present in the view, there are no significant waterbodies. There are also no unique or prominent landscape features such as ridgelines or gorges within the view and the landscape is typical of the broader region.

The landscape assessment also confirms that there are no remarkable landscape values within the LCA. As a result of this analysis, the scenic quality is considered low.

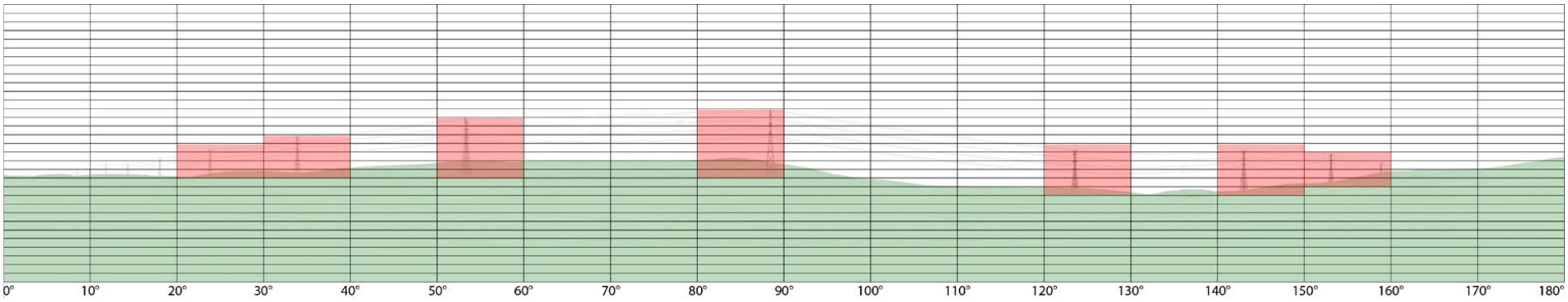
Magnitude

Occupied cells	40 cells
Magnitude	Very High

Impact Rating

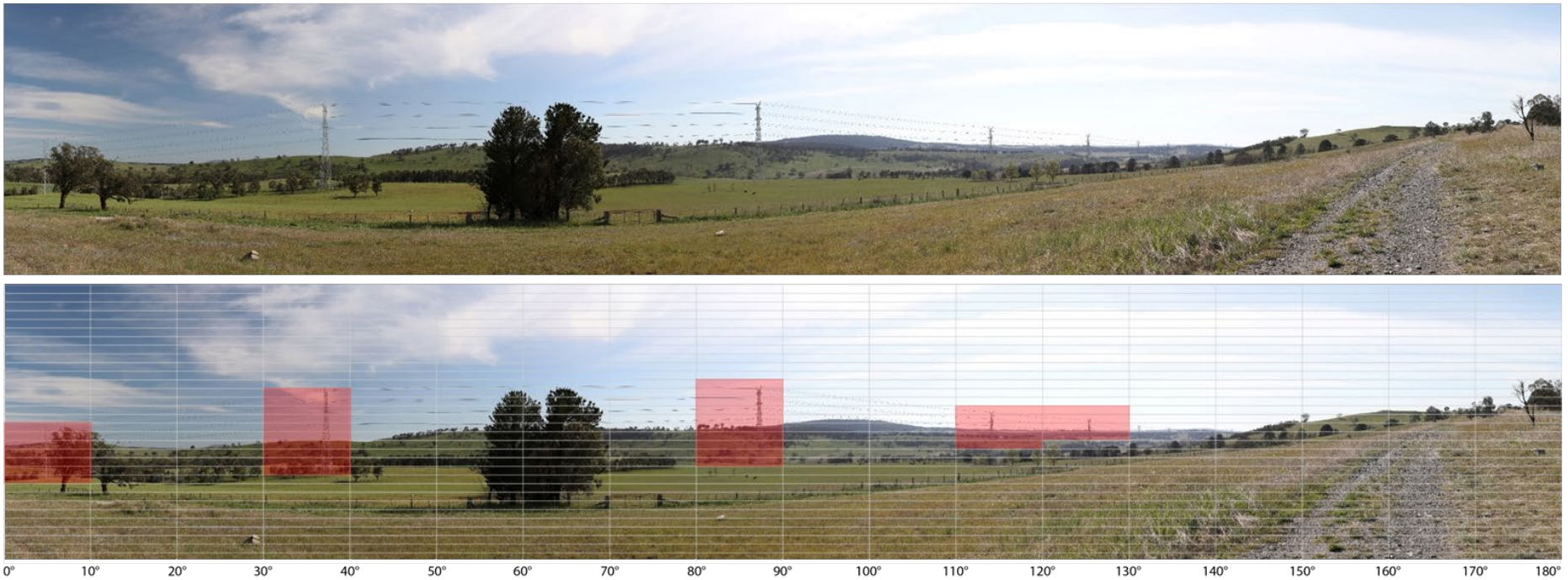
Viewpoint in setback?	No
Impact Rating	High

Wireframe



Detailed assessment example

VIEWPOINT 018



Scenic Quality Discussion

The surrounding area contains sporadic native and exotic vegetation across undulating land. Pastoral elements are highly evident and there is a high degree of human presence. The view contains some distant and forested ridgelines. No significant waterbodies are present. The scenic quality is considered low.

Distance to project	Viewpoint type	Viewpoint sensitivity	Scenic quality	Overall sensitivity	Occupied cells	Magnitude rating	Impact rating
450 m	Rural dwelling (primary)	Moderate	Low	Moderate	36	High	Moderate

VIEWPOINT 018

Visual Impact Rating: Moderate

Inset 1 (Cropped 50mm image)

The inset image provides an accurate representation of the view when you view the document online, at 100% zoom, and at arm's length from the screen.

VIEWPOINT 018

Mitigation – Vegetation screening at 5 years

Mitigation and Residual Impact Discussion

Proposed mitigation at the affected residence includes the planting of native and drought tolerant eucalypts endemic to the region. After five years, these trees will effectively screen a large portion of the transmission towers. This screening will not interrupt sight lines to the ridge lines. Overall, it is expected that with the mitigation measures, the residual impact will be low.

VIEWPOINT 018

Mitigation – Vegetation screening at 5 years

Inset 2 (Cropped 50mm image)

The inset image provides an accurate representation of the view when you view the document online, at 100% zoom, and at arm's length from the screen.