

22 Landscape and visual amenity

The airport site and surrounds is typified by gently undulating landform within a highly modified landscape. The overall landscape character is open and rural with expansive views possible from surrounding hill tops and higher elevations to the west. The area's character is also defined by cleared pastureland, and large lot residences (both single and double storey) set back from the road network and punctuated with exotic planting. Patches of remnant vegetation exist within the airport site, particularly along creek lines, road edges and near farm dams.

The construction of the Stage 1 development is likely to have temporary visual impacts for the nearest sensitive receivers in Luddenham and Bringelly. This would be largely due to the visual effect of earthworks and the presence of construction plant, equipment, stockpiling areas and storage areas. Viewpoints that are further away would have more restricted views of the site and would therefore be less affected.

During operation, the potential for moderate to high visual impacts as a result of overflights have been identified for Luddenham, Elizabeth Drive, Lawson Road and Mount Vernon. Lower level impacts as a result of overflights were identified for areas to the south of the airport site including Silverdale Road, Bents Basin State Conservation Area and Dwyer Road.

Operational lighting is likely to have low impacts on sensitive receivers due to topography, existing vegetation, building design, lighting design and runway configuration.

Mitigation measures have been proposed to minimise visual impacts during construction and operation. These include design measures as well as investigating opportunities for retention of existing vegetation and revegetation in suitable areas.

22.1 Introduction

This chapter provides a review of the visual and landscape values for the airport site and surrounding locality. The chapter draws upon a comprehensive visual assessment undertaken for the proposed Stage 1 development which is included as Appendix N (Volume 4). The assessment considers the visibility of the proposed airport from key vantage points in the surrounding locality and the potential impacts on the visual and landscape character of the area.

The assessment addresses the requirements of the EIS guidelines issued by the Commonwealth Department of the Environment and Energy for consideration of landscape and visual impacts associated with the proposal. The visual impact of aircraft overflights on the Greater Blue Mountains World Heritage Area is considered in Chapter 26.

22.2 Methodology

The methodology for the visual impact assessment has been adapted from the approach developed by NSW Roads and Maritime Services as set out in the *Environmental Impact Assessment Practice Note – Guideline for Landscape Character and the Visual Impact Assessment and Guidelines for Landscape Visual Impact Assessment* (RMS 2013). The assessment focuses on the effect on visual amenity including specific viewpoints in the surrounding area.

The guidelines establish an assessment process for visual impact by reference to the sensitivity of the area and the magnitude (or visual effect) of the proposal in that area.

Visual sensitivity refers to the character of a setting, the quality of a view and how critically a change to the existing landscape would be viewed from various viewpoints. For example, users of recreation areas view the surrounding landscape as part of their leisure experience and would consider view changes to the landscape more critically than others.

The visual magnitude (or visual effect) of a development is the degree of contrast between the development and the pre-existing landscape.

The visual impact of a proposal is determined by considering both the sensitivity of the receivers and the magnitude of impact as indicated in Figure 22–1. The combination of visual sensitivity and visual magnitude results in specific levels of impacts for each receiver.

		Magnitude					
Impact rating		High	Moderate-high	Moderate	Moderate-low	Low	Negligible
Sensitivity	High	High impact	Moderate-high	Moderate	Moderate-low	Low impact	Negligible
	High-moderate	High impact	Moderate-high	Moderate	Moderate-low	Low impact	Negligible
	Moderate	Moderate-high	Moderate-high	Moderate	Moderate-low	Low impact	Negligible
	Moderate-low	Moderate-high	Moderate	Moderate	Moderate-low	Low impact	Negligible
	Low	Moderate	Moderate	Moderate-low	Moderate-low	Low impact	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
KEY		High impact	Moderate-high	Moderate	Moderate-low	Low impact	Negligible

Figure 22–1 Landscape character and visual impact grading matrix

The assessment considers the visibility of the proposed airport from representative viewpoints, identifies visual sensitivity and then assesses visual impact. The viewpoints selected for assessment are intended to represent a range of typical views found within the area, including those viewpoints where a reduction in visual amenity would have some visual impact due to:

- the duration of the view (residents in surrounding suburbs would receive longer duration views in comparison to motorists passing on busy roads);
- the importance of visual amenity to the experience of the location (visitors to recreational areas are likely to place greater value on visual amenity than staff at an industrial estate); or
- where there are large numbers of potential viewers (such as motorists on busy roads).

The visual impacts of the construction and operation of the Stage 1 development are considered in this chapter. Potential visual impacts associated with the long term development are considered in Chapter 38 (Volume 3).

22.3 Existing environment

22.3.1 Site context

The airport site and surrounding areas include ridgelines and rolling hills within the visual context of the Blue Mountains to the west, which provides the backdrop for many views from the east.

The site landscape is typically gentle and undulating within a highly modified landscape. The overall landscape character is open and rural with views determined by both landform and vegetation, with expansive views possible from surrounding hilltops and higher elevations to the west. The area's character is also defined by cleared pastureland and large lot residences (both single and double storey) set back from the road network and punctuated with exotic planting. Patches of remnant vegetation exist within the airport site, particularly along creek lines, road edges and near farm dams.

Immediately north of the site, farm buildings are generally well set back from Elizabeth Drive. The area north of Elizabeth Drive is rural pasture land with scattered remnant vegetation, farm dams and open views of the landscape. North-east of the airport site is a landfill, which is set back and screened from Elizabeth Drive and therefore has only a minor visual presence. Badgerys Creek runs north–south forming the eastern, and part of the southern, site boundary. The remnant vegetation along its edges establishes a natural character which contrasts with the open rural character of the rest of the site. It also screens views to the eastern areas of the airport site from viewpoints further east.

East of the airport site there is a more regular pattern of lots, residences and farm buildings, with smaller lot sizes aligned perpendicular to the streets. Roads in the area have undefined edges and contribute to the overall rural character. A good example can be seen in Photograph 22–1.



Photograph 22-1 View south from Lawson Road

The area south of the airport site near Badgerys Creek Road is characterised by large, rural residential lots and farms on undulating topography. Homes are generally set back from the road and characterised by a mix of remnant vegetation, exotic planting, farm dams and open lawn. An example can be seen in Photograph 22–2.



Photograph 22-2 View west from Badgerys Creek Road

The Bringelly and Greendale areas south and south-west of the airport site are characterised by large lot rural houses, within a mix of remnant native vegetation, exotic tree plantings and mown grass areas. The landscape opens up in areas with views west to the Blue Mountains as shown in Photograph 22–3.



Photograph 22-3 View west from Dwyer Road, Bringelly

Luddenham is the most urbanised of the areas near the airport site. It consists of a retail area accessed from The Northern Road and a residential area to its east. The character of the residential area is shown in Photograph 22–4.



Photograph 22-4 View north-west along Jamison Road, Luddenham

Mount Vernon is a sparsely populated rural suburb approximately five kilometres north-east of the airport site. Much of the suburb consists of an undulating landscape and some rural-residential properties have views over the wider area including to the west toward the airport site and the Greater Blue Mountains World Heritage Area. This is shown in Photograph 22–5.



Photograph 22-5 View south from Mount Vernon Road, Mount Vernon

22.3.2 Visual catchment and viewpoints

The visual catchment of a site is the extent of the landscape that can be viewed from the site and the extent of locations from which the site can be seen. Landscape vegetation, land use and landform all play a large role in determining the visual catchment.

The visibility of the airport site was determined for the region, based on the maximum allowable structure heights within the obstacle limitation surface that will be established for the purpose of flight safety. This gave a better understanding of the potential visibility of the proposed airport development and informed the selection of representative viewpoints for analysis.

The assessment of visibility was inherently conservative, as the majority of the buildings expected to be developed as part of the Stage 1 development would be two to three storeys high, falling well below the maximum elevation permitted by the obstacle limitation surface. Figure 22–2 illustrates the visibility of the Stage 1 development.

The airport site would be theoretically visible from the pink shaded areas based on existing topography and the maximum allowed building heights of key buildings and structures that would be constructed, such as the airport control tower, terminal buildings and other major structures. Existing structures or vegetation in the surrounding areas were not taken into account, but their presence would further limit visibility from surrounding sensitive viewpoints.

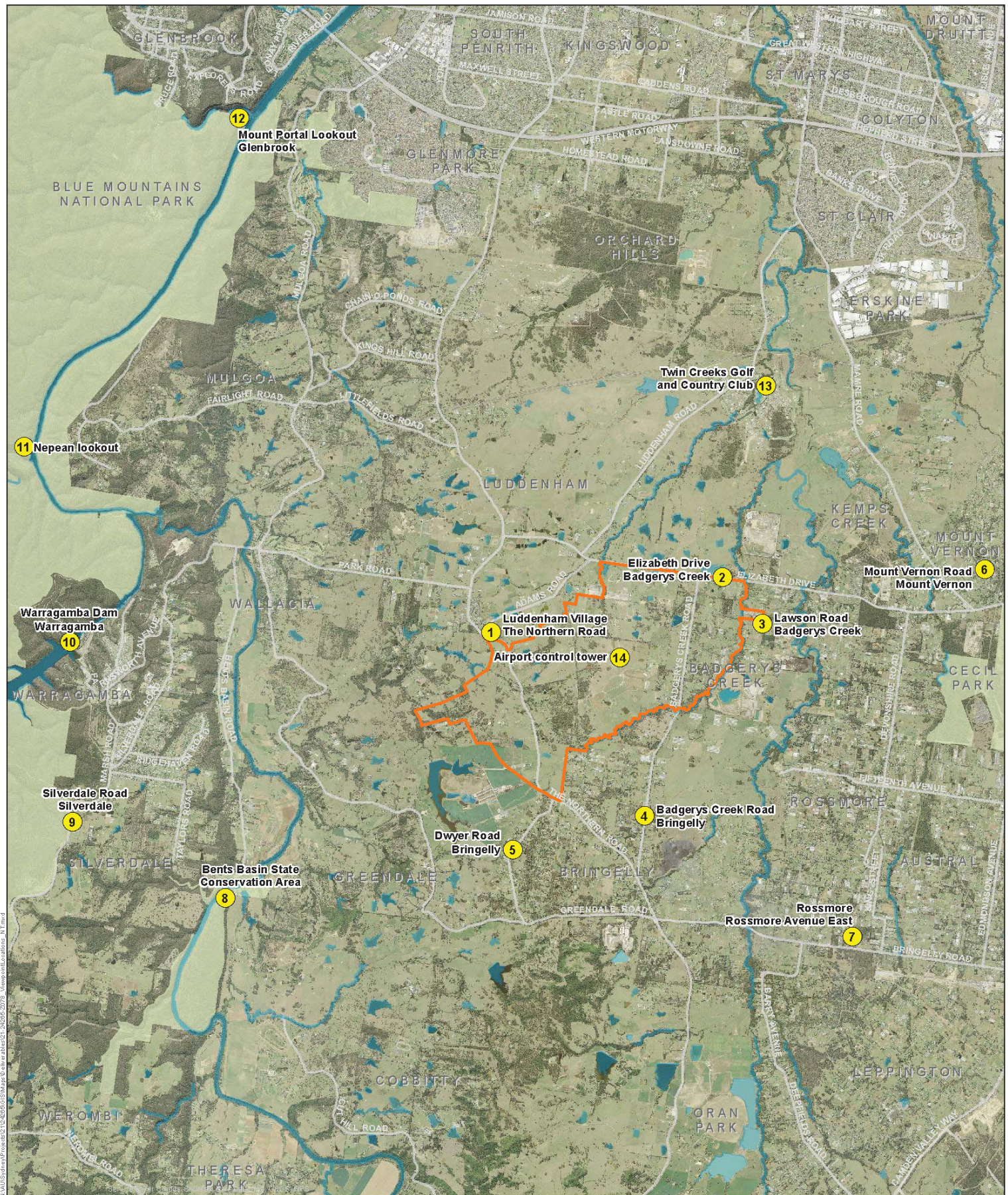
Viewpoints were selected for the assessment to represent a range of typical views found within the area. The details of each viewpoint are provided in Table 22–1, while the location and direction of each viewpoint from the air traffic control tower is shown in Figure 22–3.

The selected viewpoints are considered to represent locations where a reduction in visual amenity would have some visual impact either because of:

- the duration of the view (such as views from residential areas);
- the importance of visual amenity to the land use (such as recreational areas); or
- expected large numbers of potential viewers (such as busy roads).

Table 22–1 Relative heights and distances to representative viewpoints

Viewpoint No.	Location	Approximate height (metres above sea level)	Approximate distance to the air traffic control tower
1	Luddenham Village, east of The Northern Road, Luddenham	100–105	3 kilometres
2	Elizabeth Drive, Badgerys Creek	65–90	2 kilometres
3	Lawson Road, Badgerys Creek	60–65	3 kilometres
4	Badgerys Creek Road, Bringelly	60–75	2 kilometres
5	Dwyer Road, Bringelly	105	5 kilometres
6	Mount Vernon Road, Mount Vernon	80	7 kilometres
7	Rossmore Avenue East, Rossmore	90	7 kilometres
8	Bents Basin State Conservation Area	45	10 kilometres
9	Silverdale Road, Silverdale	210	13 kilometres
10	Warragamba Dam, Warragamba	155	12 kilometres
11	Nepean Lookout, Glenbrook, Greater Blue Mountains World Heritage Area	115	13 kilometres
12	Mount Portal Lookout, Glenbrook, Greater Blue Mountains World Heritage Area	150	14 kilometres
13	Twin Creeks Golf and Country Club, Luddenham	45–50	6 kilometres



- LEGEND
- Badgerys Creek site boundary
 - Waterways
 - Parks and reserves
 - Roads
 - Viewpoints

Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

Figure 22-3 - Location of viewpoints used for assessment



22.3.3 Assessment of impacts

The assessment of visual impacts for the proposed airport has been completed based upon the methodology for assessing visual sensitivity and visual magnitude as discussed in Section 22.2 of this chapter. Visual sensitivity is based primarily upon the character, land use and quality of views from surrounding viewpoints, and would be relatively consistent throughout each phase of the proposed development. The visual magnitude or effect of the proposed airport would change based on the scale and visibility of activities undertaken during the construction and operation of the Stage 1 development.

This section provides an analysis of the potential activities during construction and operation of the Stage 1 development, which would influence the visibility and magnitude of the visual impact of the proposed airport. The visual impact of the proposed airport from these representative viewpoints is then assessed.

22.3.4 Construction

Construction of the proposed airport would result in substantial changes to the landscape, primarily through major earthworks and the removal of existing vegetation. The area would be modified from an undulating, rural landscape to an essentially flat landscape through a balance of cut and fill during the major earthworks phase. This would occur in the context of an area that has limited capacity to absorb the change due to limited vegetation cover, the form of the land, the frequency of views, and the distance between viewers and the Stage 1 development. While the changes to the landform would become a permanent feature, the visual effect of earthworks, construction plant, equipment, stockpiling areas and storage areas would be temporary and confined to the construction period.

Construction activities include the activities necessary for site preparation and the works involved in the establishment of aviation infrastructure. Major construction activities would consist of erecting security fencing, establishing temporary site facilities, bulk earthworks, topsoil stripping and stockpiling, construction of access roads and services, and the construction of aviation infrastructure.

22.3.5 Operations

22.3.5.1 Airport infrastructure

There would be two general types of visual impacts created by the operation of the Stage 1 development:

- permanent views of the airport site with associated infrastructure including:
 - an at least 35 metre high air traffic control tower;
 - a 3,700 metre long runway and associated taxiway system;
 - passenger terminal and freight buildings;
 - other facilities including aircraft stands, emergency services, aircraft maintenance facilities, navigational aids and lighting; and
- ongoing views of aircraft taking off and landing.

The visual impact for the airport site from representative viewpoints is discussed in Section 22.3.6.

22.3.5.2 Airport lighting

Potential lighting impacts associated with the operation of the proposed airport were considered in a specialised assessment (see Appendix N (Volume 4)).

The revised draft Airport Plan provides an indicative concept design of how an airport may be developed at the airport site. A comprehensive approach to airport lighting would be developed as part of the detailed design of the proposed airport closer to the commencement of operations and will comply with civil aviation regulatory requirements. In this context, this EIS has provided a preliminary assessment of lighting impacts based on information from the Civil Aviation and Safety Authority *Manual of Standards* and *Australian Standard AS 4280: Control of the obtrusive effects from outdoor lighting* (AS 4280). Consideration has also been given to the previous operational lighting impact assessment, performed as part of the *Supplement to Draft Environmental Impact Statement: Second Sydney Airport Proposal* (PPK 1999).

The *Manual of Standards* provides guidance on the design of airport lighting, including cyclic/flashing lighting and approach/runway lighting. The Manual regulates the light above the horizontal plane for lighting near runways to limit pilot confusion and glare. While this does not directly address the obtrusive effects of lighting (because the majority of lighting is directed skyward) visual impacts are anticipated to be minimal.

Taxiway lighting would likely be low intensity and would have a negligible effect beyond the airport boundary. Similarly, runway light fittings would be ground mounted and would likely have low visibility impacts.

The airport beacon light is designed to be at peak intensity between two and eight degrees above the horizontal plane. As the position of the beacon is elevated and the surrounding terrain is relatively flat, it is expected that visual impacts from the beacon light at ground level would be low.

Having regard to the provisions of AS 4280, the lighting for the proposed roads, car parks, apron lighting and other ancillary infrastructure is likely to be low impact, due to the large separation distances to sensitive receivers.

22.3.5.3 Sky glow

Sky glow (brightening of the night sky due to artificial lighting) can affect the work of professional and amateur astronomers and generally limit the community's ability to observe and appreciate the night sky. Animal populations can also be affected (see Chapter 16). The visual impact assessment identified three ways that sky glow may be generated by the proposed airport:

- Airfield direct light – the main source of sky glow would be from approach and runway lighting, which is designed to be visible from the sky. Ancillary infrastructure would be shielded from above to reduce sky glow;
- Reflected light – sky glow from reflection would be dependent on the lighting illumination level and how reflective nearby surfaces and structures are; and
- Building internal light – sky glow may also occur due to the internal illumination of buildings, which may be visible externally through windows on those buildings.

Sky glow is expected to be minimal from these sources, particularly if appropriate lighting fixtures are selected and oriented.

22.3.5.4 Aircraft and flight paths

As outlined in Chapter 7 (Volume 1), the proposed airport would operate on a 24-hour basis with flights expected to occur during the day and night. Indicative flight paths for the operation of a single runway in the Stage 1 development (in the preferred 05/23 orientation) show that aircraft would land from the south-west and take off to the north-east, or vice-versa.

An assessment of the indicative flight paths shows that aircraft may be directed over a range of visually sensitive areas, including residential areas, recreational areas and national parks, which may result in visual impacts beyond the airport site. Aircraft would be visible flying overhead as well as when they pass through views near the airport site. Both of these types of views are temporary and at varying distances/heights. Accordingly, they would have a range of different impacts on visual receivers.

Arriving and departing aircraft would generally be less prominent the further they are away from the proposed airport. Views of aircraft would also be affected by airport operational patterns which, although generally consistent, could vary depending on wind conditions and other operational factors.

Generally, aircraft at 3,000 feet are not prominent visual features although they are visible from the ground. At 7,000 feet, aircraft are likely to be difficult to discern from ground level and are not considered to be visually obtrusive. For context, an aircraft at 3,000 feet is presented in Photograph 22-6. The expected altitudes of aircraft at various points along their flight paths are presented in Chapter 7 (Volume 1). After take-off aircraft would ascend relatively quickly reaching 5,000 feet above sea level within about 10 kilometres of the airport site and continuing to ascend to over 10,000 feet. Built up areas are mostly at a distance of greater than six kilometres from the airport site and are unlikely to experience significant visual impacts.



Photograph 22-6 Aircraft at approximately 3,000 feet on a clear day at a ground distance of 2.75 kilometres from the viewer

Many aircraft currently approaching and departing Sydney Airport fly over the Blue Mountains. Aircraft arriving and departing from the proposed airport would further contribute to the existing density of flights over the Blue Mountains, and would likely be at lower altitudes compared to aircraft using Sydney Airport. Consequently, aircraft approaching and departing the proposed airport would likely be more visible to residents and visitors in the Blue Mountains.

The impact of aircraft overflights on the Greater Blue Mountains World Heritage Area values and other values are considered separately in Chapter 26 for the Stage 1 development and Chapter 38 (Volume 3) for the long term development.

22.3.6 Representative viewpoints

An assessment of likely visual impacts at representative viewpoints during construction and operation of the Stage 1 development is provided in Table 22–2.

Table 22–2 Impact assessment for representative viewpoints

Viewpoint	Assessment	Impact Level
1. Luddenham Village east of The Northern Road, Luddenham	<p>Sensitivity = Moderate–high</p> <p>This viewpoint is representative of views from the Luddenham commercial and residential area. Views to the south and west would be dominated by the proposed airport development and boundary fence in the foreground. There is assumed cultural value placed on the existing rural landscape by local residents where visual amenity is important and where residents and workers would be subject to long duration views.</p> <p>Magnitude = Moderate–high</p> <p>The existing ridge line south of the Luddenham residential area would assist in restricting views directly south from residents. However, airport development along the western boundary would likely be partially or directly visible by residents and workers. Viewing distance is approximately one kilometre from the western end of the runway and there would be views of aircraft taking off or landing. The surrounding rural landscape has limited capacity to absorb the visual effect of the proposed airport due to limited vegetation cover, landform, frequency of views and the distance between viewers and the proposed airport site.</p>	Moderate-high
2. Elizabeth Drive, Badgerys Creek	<p>Sensitivity = Moderate</p> <p>This viewpoint is representative of views from drivers and passengers of vehicles using Elizabeth Drive. Views are brief but are relatively close to the northern areas of the proposed airport and runway.</p> <p>Magnitude = High</p> <p>The existing landscape character within the airport site would be highly modified by landform changes and removal of the existing vegetation. The scale and nature of the airport site development would be noticeable with views of the Stage 1 development and boundary fence in the foreground. Aircraft would be similarly prominent as flights are expected to be directed over Elizabeth Drive (and the proposed M12 Motorway) from the eastern end of the runway.</p>	Moderate-high

Viewpoint	Assessment	Impact Level
3. Lawson Road, Badgerys Creek	<p>Sensitivity = High</p> <p>This viewpoint is representative of views from rural residences and farms approximately five hundred metres east of the airport site boundary. Views toward the western part of the Stage 1 development may be possible from some properties with the boundary fence in the foreground. There is assumed cultural value placed on the existing rural landscape and the landscape along Badgerys Creek by local residents where visual amenity is important and where residents and workers would be subject to long duration views.</p> <p>Magnitude = Moderate</p> <p>The clearance of vegetation and overall extent of change in topography is likely to be visible from some properties in this area. Nevertheless, it would not be prominent as the vegetation along Badgerys Creek would be retained as an environmental conservation zone that would obscure much of the airport site. Aircraft movements are expected to be directed to the north and the south, resulting in a lower level of impact than for viewpoints with direct overflights.</p>	Moderate-high
4. Badgerys Creek Road, Bringelly	<p>Sensitivity = Moderate-high</p> <p>This viewpoint is representative of views from rural residences and farms one to two kilometres south of the airport site boundary. Views to the north of the proposed airport and its features may be possible from some properties. There is assumed cultural value placed on the existing rural landscape by local residents where visual amenity is important and where residents and workers would be subject to long duration views.</p> <p>Magnitude = Low-moderate</p> <p>The clearance of vegetation and overall extent of change in topography is likely to be visible from some properties in this area, however it would not be prominent due to vegetation obscuring much of the airport site. Aircraft are expected to be visible as flights are directed in a north-south direction approximately one kilometre to the east of Badgerys Creek Road.</p>	Moderate
5. Dwyer Road, Bringelly	<p>Sensitivity = Moderate-high</p> <p>This viewpoint is representative of views from rural residences approximately two kilometres south of the airport site boundary. There is assumed cultural value placed on the existing rural landscape by local residents where visual amenity is important and where residents would be subject to long duration views.</p> <p>Magnitude = Low-moderate</p> <p>During construction and operation, views to the north of the proposed airport are unlikely due to existing obscuring vegetation and topography. Aircraft would be visible as movements are expected to be directed in a north-south direction approximately two kilometres to the east of Dwyer Road.</p>	Moderate
6. Mount Vernon Road, Mount Vernon	<p>Sensitivity = Moderate-high</p> <p>This viewpoint is representative of views from rural properties at elevations higher than Badgerys Creek approximately five kilometres from the airport boundary. Some properties have broad views of areas to the west and possibly of the Blue Mountains and beyond. Sensitivity is derived from the assumed cultural value placed on the existing rural landscape by local residents where visual amenity is important and where residents would be subject to long duration views.</p> <p>Magnitude = Moderate</p> <p>Airport features such as the air traffic control tower as well as aircraft taking off and landing would be visible. Views of some areas within the airport site may be partially screened by vegetation and topography, depending on the elevation and aspect of individual residences. The overall landscape has some capacity to absorb views of the development given the views consist of an existing modified landscape character. Aircraft may be seen but at a distance of over four kilometres away.</p>	Moderate-high

Viewpoint	Assessment	Impact Level
7. Rossmore Avenue East, Rossmore	<p>Sensitivity = Moderate</p> <p>This viewpoint is representative of views from rural residential and agricultural properties approximately seven kilometres from the airport boundary. Properties in this area are at elevations higher than the airport site, some having broad views toward the west and north-west. The visual sensitivity of this location is derived from it being a residential and agricultural area, where visual amenity is important and where residents and workers would be subject to long duration views.</p> <p>Magnitude = Low</p> <p>Changes to the landscape including vegetation clearance, earthworks and new structures, such as the air traffic control tower and terminal, would result in a noticeable change in the view and a reduction in visual amenity. However, this impact would be filtered by local vegetation. Aircraft movements are expected to be visible in the sky at a distance of over five kilometres.</p>	Moderate-low
8. Bents Basin State Conservation Area	<p>Sensitivity = Moderate</p> <p>Some visual sensitivity at this location is derived from the importance of visual amenity due to its use as a state recreation area by visitors and staff. Visitor numbers fluctuate seasonally and are only temporary. At night the location would have a higher degree of sensitivity due to its use for overnight recreation.</p> <p>Magnitude = Low</p> <p>There are no direct views of the proposed airport, however visual receivers are expected to be able to see aircraft in the sky from a distance of approximately two kilometres.</p>	Moderate-low
9. Silverdale Road, Silverdale	<p>Sensitivity = Moderate</p> <p>This visual sensitivity of this location is derived from it being an elevated, rural residential area with broad expansive views over surrounding areas, where visual amenity is important and where residents are subject to long duration views. Residences are located approximately 10 kilometres from the airport site.</p> <p>Magnitude = Low</p> <p>Vegetation clearance for the airport would result in a change in the view and a reduction in visual amenity in the vicinity of this view, particularly from houses that may have an unobstructed view of the Badgerys Creek landscape. The new runway and airport structures would be visible from some residences and limited in others, depending on aspect, topography and vegetation.</p> <p>Visual impacts from aircraft are possible due to the south-west to north-east alignment of the flight path two to three kilometres to the south.</p>	Moderate-low
10. Warragamba Dam Recreation Area	<p>Sensitivity = High</p> <p>Visual sensitivity is derived at this location from the importance of visual amenity due to its use as a recreation, educational and historic area. It is assumed that there is significant value placed on both the natural and cultural landscape by visitors and staff. As Warragamba Dam is an operational facility, workers would be subject to long duration views, however views for visitors to the adjoining recreation area and visitor centre would only be temporary.</p> <p>Magnitude = Negligible</p> <p>There are no direct views of the airport site and aircraft would not be prominent as they are expected to be at a distance of approximately five kilometres from the recreation areas and visitor centre.</p>	Negligible

Viewpoint	Assessment	Impact Level
11. Glenbrook Nepean Lookout	<p>Sensitivity = Moderate-high</p> <p>Visual sensitivity is derived from this location being one of the closest elevated positions to the west of the airport site at approximately 11 kilometres and within the Blue Mountains area. It is assumed that there is significant recreational and cultural value placed on the natural landscape and bush setting by park users. Viewer times may be of a long or short duration and the number of viewers fluctuates seasonally.</p> <p>Magnitude = Low</p> <p>Direct views of the airport construction and operation are prevented by topography and vegetation. Views of aircraft may be possible at a distance of over three kilometres.</p>	Moderate
12. Mount Portal Lookout	<p>Sensitivity = Moderate-high</p> <p>This location is an elevated lookout 12 kilometres north-west of the airport site within the Blue Mountains, and offers broad views over western Sydney on a clear day to the south and west. Visitors may stay for short or long periods and this would fluctuate seasonally. It is assumed that there is significant recreational and cultural value placed on the landscape by visual receivers.</p> <p>Magnitude = Negligible</p> <p>Landform and vegetation in the foreground would largely prevent views of the airport site to the south. There is capacity of the landscape to absorb views of the airport development due to broad landscape views of the existing developed areas to the south and east. Views of aircraft are possible at a distance of more than ten kilometres.</p>	Negligible
13. Twin Creeks Golf and Country Club	<p>Sensitivity = Moderate-high</p> <p>Twin Creeks Golf and Country Club is located approximately six kilometres to the north-east of the airport boundary. The sensitivity of this view relates to its use as a country club and recreational and social hub with a presumed high level of use as well as a residential estate. Many views therefore would be of a long duration.</p> <p>Magnitude = Low-moderate</p> <p>The existing vegetation and landform prevent direct views of the proposed airport site. Aircraft movements are expected to be prominent with the indicative flight path positioned in the vicinity of the golf club and oriented on a north-south alignment.</p>	Moderate

22.4 Mitigation and management measures

A Visual and Landscape Construction Environmental Management Plan (CEMP) will be prepared and approved prior to Main Construction Works for the proposed airport.

Visual impacts will primarily be managed through the construction of the Stage 1 development, however mitigation and management of visual impacts will also be incorporated into the Biodiversity, Land and Safety Operational Environmental Management Plan (OEMP).

The plans would collate the mitigation and management measures itemised in Table 22–3. These and other environmental management plans are discussed in further detail in Chapter 28 (Volume 2b).

Table 22–3 Mitigation and management measures – landscape and visual amenity

Issue	Mitigation/management measure	Timing
Urban design	<p>To facilitate the appropriate integration of the proposed airport into the surrounding region, and to assist in minimising impacts to community identity and landscape character, the following measures will be implemented throughout the detailed design process:</p> <ul style="list-style-type: none">• site and context analysis to inform the early stages of detailed design; and• consultation with NSW Department of Planning and Environment and relevant local councils, on the detailed design of Stage 1 development.	Pre-construction
Airport lighting impacts	Airport lighting impacts will be mitigated through the use of low angle, cut off LED fixtures in the design of airport infrastructure, where practicable.	Pre-construction
Visual disturbance and clutter from fencing	<p>Subject to safety and security requirements, perimeter fencing design would have regard to the following considerations:</p> <ul style="list-style-type: none">• avoiding long, straight continuous runs;• avoiding finish and colour that is reflective or brightly coloured;• providing a two metre (minimum) setback from the property boundary to allow for perimeter plantings; and• providing a buffer from riparian corridors along the boundary of the airport site.	Pre-construction
Visual disturbance and clutter from construction	<p>Impacts on the visual character of the landscape during construction will be mitigated through the implementation of the following measures:</p> <ul style="list-style-type: none">• large grade cut and fill transitions will be avoided where practicable, particularly near the airport site boundary;• construction plant, machinery and vehicle parking areas will be located as far as practicable from sensitive receivers;• any night lighting required for construction works will be located as far as practicable from sensitive receivers with appropriate screening as required; and• if there is a considerable period of time between the completion of bulk earthworks and construction of aviation infrastructure, earthworks areas will be rehabilitated where it is practical to do so.	Pre-construction
Visual screening	<p>Visual amenity impacts will be mitigated through the use of the following visual screening measures:</p> <ul style="list-style-type: none">• retaining existing vegetation on the edges of the construction impact zone, where practicable to provide visual screening; and• retaining existing vegetation outside of the construction impact zone to provide visual screening. <p>Opportunities for native vegetation screening will be investigated, particularly in relation to the identified moderate-high impact viewpoints. The appropriateness and use of vegetation for visual screening will take into consideration bushfire risks, airport safety and security, potential impacts on aviation operations, and opportunities for the reestablishment of endemic native species and ecological communities.</p>	Construction Operation

22.5 Conclusion

The visual impact of the Stage 1 development of the proposed airport has been assessed by applying an accepted visual impact assessment methodology. This has involved consideration of the existing landscape character and views and the effects of construction and operation of the proposed airport.

During construction, the proposed airport would be likely to have temporary visual impacts for the nearest sensitive receivers in Luddenham and Bringelly. Viewpoints further away would have restricted views of the airport site and the visual impact would likely be low to negligible.

During operation, the potential for moderate to high visual impacts as a result of overflights have been identified for Luddenham, Elizabeth Drive, Lawson Road and Mount Vernon. Operational lighting is likely to have low impacts on sensitive receivers due to topography, existing vegetation, building design, lighting design and runway configuration.

Mitigation measures have been proposed where appropriate to minimise visual impacts during construction and operation of the Stage 1 development.