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Sydney Metro – Western Sydney Airport

Chapter 20
Landscape and visual

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20 Landscape and visual

This chapter provides a summary of the assessment of potential landscape character and visual amenity impacts during construction and operation of the project and identifies mitigation measures to address these impacts. Full landscape and visual assessment is provided in Technical Paper 9 (Landscape and visual).

20.1 Overview

The project is located within the Western Parkland City where transformational changes to the landscape and visual character of the area are expected during construction and operation.

At St Marys, the landscape is characterised by urban development including the St Marys town centre, where surrounding built form limits the potential visual catchment of the project. In the rural areas south of St Marys, where the plains landform is broader and land cover is more open, the visual catchment extends up to 2.5 kilometres. Beyond this, the project would be an element in the background of the view.

Construction and operation mitigation measures to manage potential landscape and visual impacts of the project include addressing matters such as tree retention, landscaping tree planting, appearance of acoustic sheds during construction, opportunities for vegetation screening at the stabling and maintenance facility, and integration of water management measures with the existing landforms and natural features.

The project would have moderate adverse landscape and visual impacts during construction primarily due to the removal of trees and areas of rural character and the scale and extent of temporary construction activity.

During operation, the landscape and visual impacts of the project would range from moderate adverse to minor beneficial given a large section of the project would be in tunnel and that stations will be designed to be compatible with their future land use context. In the longer term the project would be visually absorbed into the surrounding landscape which is intended to transition to become the Western Parkland City and Western Sydney Aerotropolis.

20.2 Assessment methodology

While the assessment requirements for the off-airport and on-airport project components are not substantially different, a different assessment approach has been used for the on-airport and off-airport sections of the project. This is because Stage 1 of Western Sydney International is currently under construction, which is changing the landscape character and the potential visual catchment of the project. The future layout for the Stage 1 area is outlined in the Western Sydney International Stage 1 airport layout (July 2019) (refer to Figure 1-2). As such it is possible to understand the likely impact of the project on this area.

Planning for the future Western Parkland City is still emerging, so there remains some uncertainty around the future landscape character of the off-airport landscape.

20.2.1 Off-airport

Two approaches have been adopted for the assessment of off-airport landscape character and visual amenity. Each approach has been applied as relevant to the applicable development density of the off-airport landscape as follows:

- urban design approach for the existing highly urban area of St Marys. This urban design focused assessment of landscape impact has considered accessibility, legibility, changes to the public realm, street trees and urban greenery
- landscape character approach for the suburban and rural area to the south of the St Marys town centre. A landscape character and viewpoint assessment is more appropriate for these areas, as it considers the existing landscape character of the area in terms of landform, land cover and changes to built form.

The off-airport assessment methodology (described further in Chapter 3 of Technical Paper 9 (Landscape and visual) included:

- daytime landscape impact assessment
- daytime visual impact assessment
- night-time visual impact assessment.

20.2.2 On-airport

The on-airport landscape and visual amenity assessment approach assumed construction of the project concurrently with the Western Sydney International Stage 1 construction to assess potential construction impacts. The future character of the completed Western Sydney International Stage 1 is assumed as a baseline for operational impacts.

This approach identifies the different types of construction activities and proposed built elements and assesses these types against the predicted character of the Western Sydney International Stage 1 construction and future character of the Western Sydney International Stage 1 airport operations respectively. For the areas of Western Sydney International outside the Western Sydney International Stage 1 Construction Impact Zone, a greenfield landscape has been assumed, followed in the longer term by potential construction and then operation of future stages of the development of the airport to accommodate anticipated long term demand, including a second runway. The impact of the project in relation to these anticipated future landscape conditions has been considered generally.

Due to the ongoing construction of Western Sydney International Stage 1, there are limited publicly accessible views to the project to determine the impacts of the project during construction. The context of any views to the project would be greatly altered during construction of the airport. There are, however, broad panoramic views across the airport site from the Western Sydney International Airport Experience Centre and views to Badgerys Creek from rural areas to the south in Bringelly. These views have been considered in this assessment.

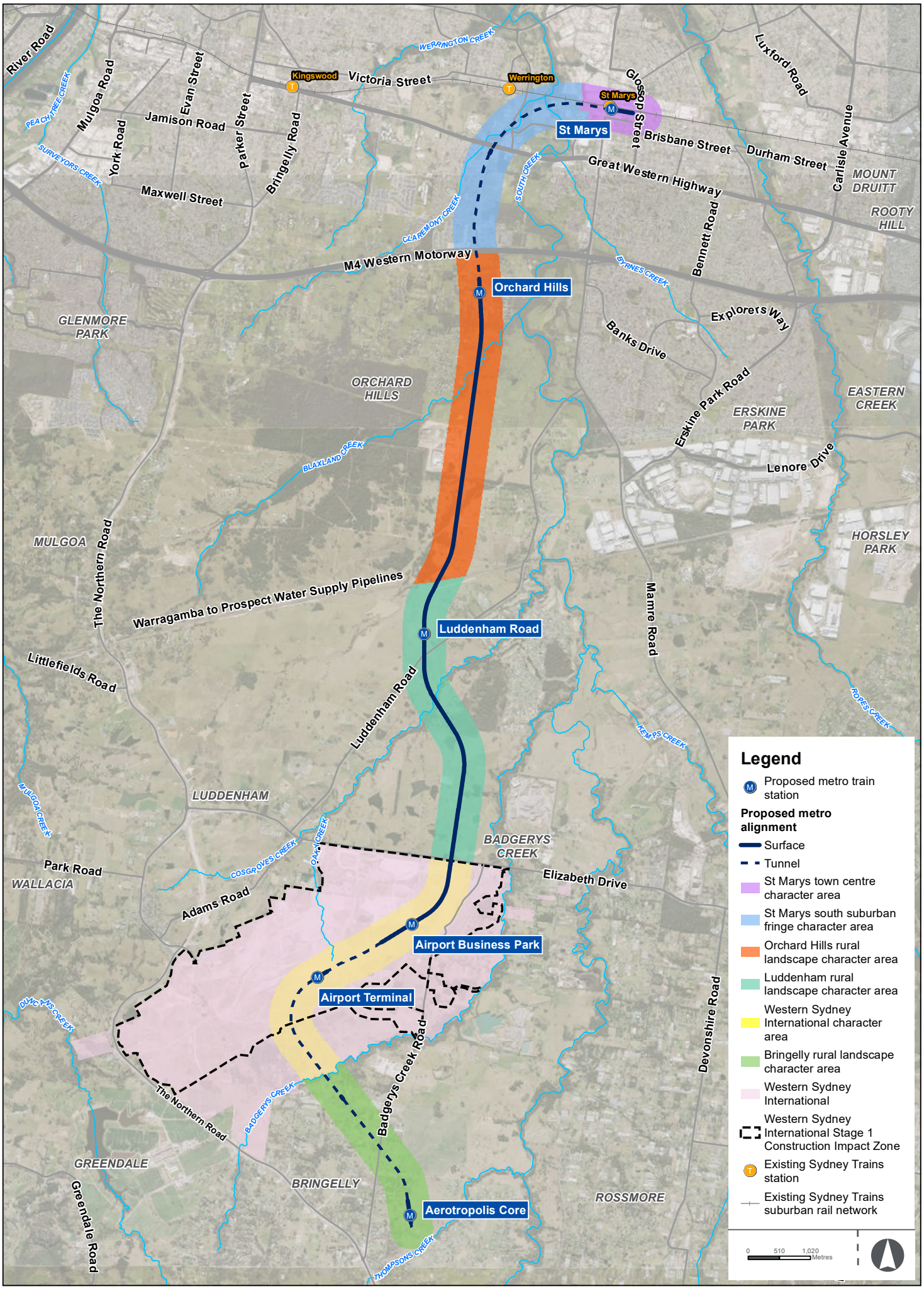
The on-airport assessment methodology (described further in Chapter 3 of Technical Paper 9 (Landscape and visual)) included:

- daytime landscape impact assessment
- daytime visual impact assessment
- night-time visual impact assessment.

20.2.3 Study area and landscape character areas

The study area for this landscape character and visual impact assessment extends to include the potential visual catchment of the project; that is, the area from which the project would be visible. The study area comprises six landscape character areas which have been identified based on characteristics such as landform, land use, vegetation cover and development density (as described above). These landscape character areas are shown in Figure 20-1:

- St Marys town centre character area – St Marys Station and from Glossop Street to South Creek
- St Marys suburban fringe character area – South Creek to the M4 Western Motorway
- Orchard Hills rural landscape character area – M4 Western Motorway to the Warragamba to Prospect Water Supply Pipelines
- Luddenham rural landscape character area – Warragamba to Prospect Water Supply Pipelines to Elizabeth Drive
- Western Sydney International character area – Elizabeth Drive to Badgerys Creek
- Bringelly rural landscape character area – Badgerys Creek to Thompsons Creek.



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Existing landscape character areas

Figure 20-1

At St Marys, the surrounding built form would limit the potential visual catchment of the project, so the study area is smaller in this location. In the rural areas south of St Marys, where the plains landform is broader and land cover is more open, the visual catchment has been considered to a distance of 2.5 kilometres. Beyond this, the project would be an element in the background of the view, with more potential for intervening elements, and would be unlikely to have an adverse visual impact (see Section 20.4 for further details).

20.3 Existing environment

20.3.1 Off-airport

Landscape character areas

A description and sensitivity rating for each landscape character area is provided in Table 20-1.

Table 20-1 Off-airport landscape character areas and sensitivity

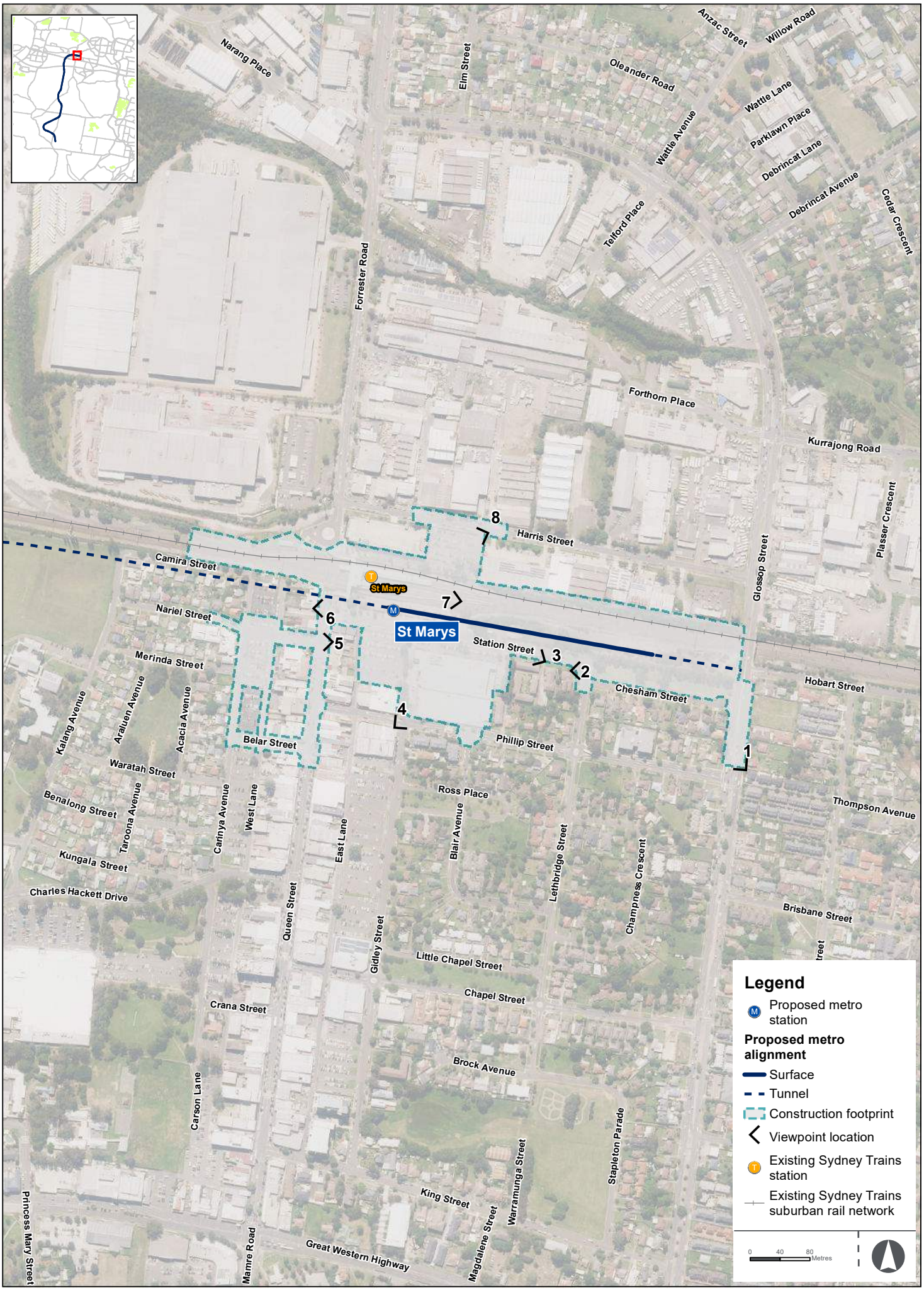
Landscape character area	Description	Daytime sensitivity	Night-time sensitivity
St Marys town centre	This landscape character area comprises a highly urban setting with a diverse mix of land uses and attracts a high concentration of people from across the region. The existing St Marys Station is a State listed heritage item and the town centre is identified as land with 'scenic and landscape values' under the Penrith Local Environmental Plan (LEP) 2010. Penrith City Council intends to facilitate the redevelopment of St Marys town centre. Recent works to revitalise the town centre include the creation of a town square at Coachmans Park on the corner of Chapel and Queen streets, and streetscape improvements to Queen Street including street trees, gardens, murals and high-quality street furniture.	Local	Negligible surrounding St Marys Station. Low for residential areas southeast of St Marys Station.
St Marys suburban fringe	This landscape character area forms a suburban fringe and is in transition to an increasingly urban setting. The landscape is fragmented by a mix of uses including major arterial roads, patches of mature bushland and areas of vacant former rural land, reducing the cohesiveness of the overall landscape character. South Creek provides a strong visual edge to the urban areas of Claremont Meadows and Werrington and is recognised as an important regional corridor under the *Greater Sydney Region Plan* Greater Sydney Commission, 2018a) and Western City District Plan and would be of regional landscape sensitivity. The site of the services facility is within the Claremont Meadows Stage 2 precinct and identified as a 'gateway site' and 'entry point to Claremont Meadows' in the Penrith DCP 2014.	Local	Negligible in the northern portion of this area. Low in the vicinity of the M4 Western Motorway.

Landscape character area	Description	Daytime sensitivity	Night-time sensitivity
Orchard Hills	The landscape character area varies from rolling semi-rural areas in the north to a flat open rural landscape in the south and has been altered for agricultural practices. Visible infrastructure including a high voltage powerline corridor, water supply pipelines and landfill facility also contributes to a reduced cohesiveness of the rural landscape character. The project would be located to the east of the Orchard Hills Cumberland Plain Woodland, which is located to the east of the Northern Road, and would therefore not impact on this important Commonwealth heritage listed vegetation. South Creek and its tributaries are recognised as an important regional corridor for the proposed Western Parkland City under the Greater Sydney Region Plan and Western City District Plan and would be of regional landscape sensitivity. The landscape character of Orchard Hills is intended to transition from a rural residential landscape to a future commercial and mixed-use precinct as part of the Western Parkland City Vision under the Western City District Plan.	Local	Moderate
Luddenham	This landscape is characterised by broad open rural grazing areas located on undulating terrain with patches of bushland and includes South Creek, Badgerys Creek, Cosgroves Creek and Oakey Creek. Key existing features include Luddenham Road, Twin Creeks residential estate, Elizabeth Drive and local heritage property McGarvie-Smith Farm. South Creek and its tributaries are recognised as an important regional corridor for the proposed Western Parkland City under the Greater Sydney Region Plan and Western City District Plan and would be of regional landscape sensitivity. Future development in this area includes the proposed transition from a rural landscape to intensive urban development and would include the future M12 Motorway and the Northern Gateway precinct which will provide future employment, research and knowledge-based employment.	Local	Moderate

Landscape character area	Description	Daytime sensitivity	Night-time sensitivity
Bringelly	This landscape character area comprises mainly rural land with patches of mature bushland, detached dwellings and pockets of intensive agriculture. The Northern Road connects the southern areas of the City of Liverpool with the M4 Western Motorway and Penrith to the north and is currently being upgraded. Heritage listed properties include the Kelvin Park Group property and the former Overseas Telecommunications Radio Station Complex. South Creek and its tributaries are recognised as an important regional corridor for the proposed Western Parkland City under the Greater Sydney Region Plan and Western City District Plan and would be of regional landscape sensitivity. The Bringelly landscape character area is intended to transition from a semi-rural landscape to intensive urban development to form part of the Aerotropolis Core precinct under the Western Sydney Aerotropolis Plan, with South Creek, Badgerys Creek and Thompsons Creek identified as part of the major open space network.	Local	Moderate

Viewpoint locations

The existing daytime viewpoints identified in each landscape character area are shown on Figure 20-2 to Figure 20-6.



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Viewpoints - St Marys town centre

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Figure 20-2

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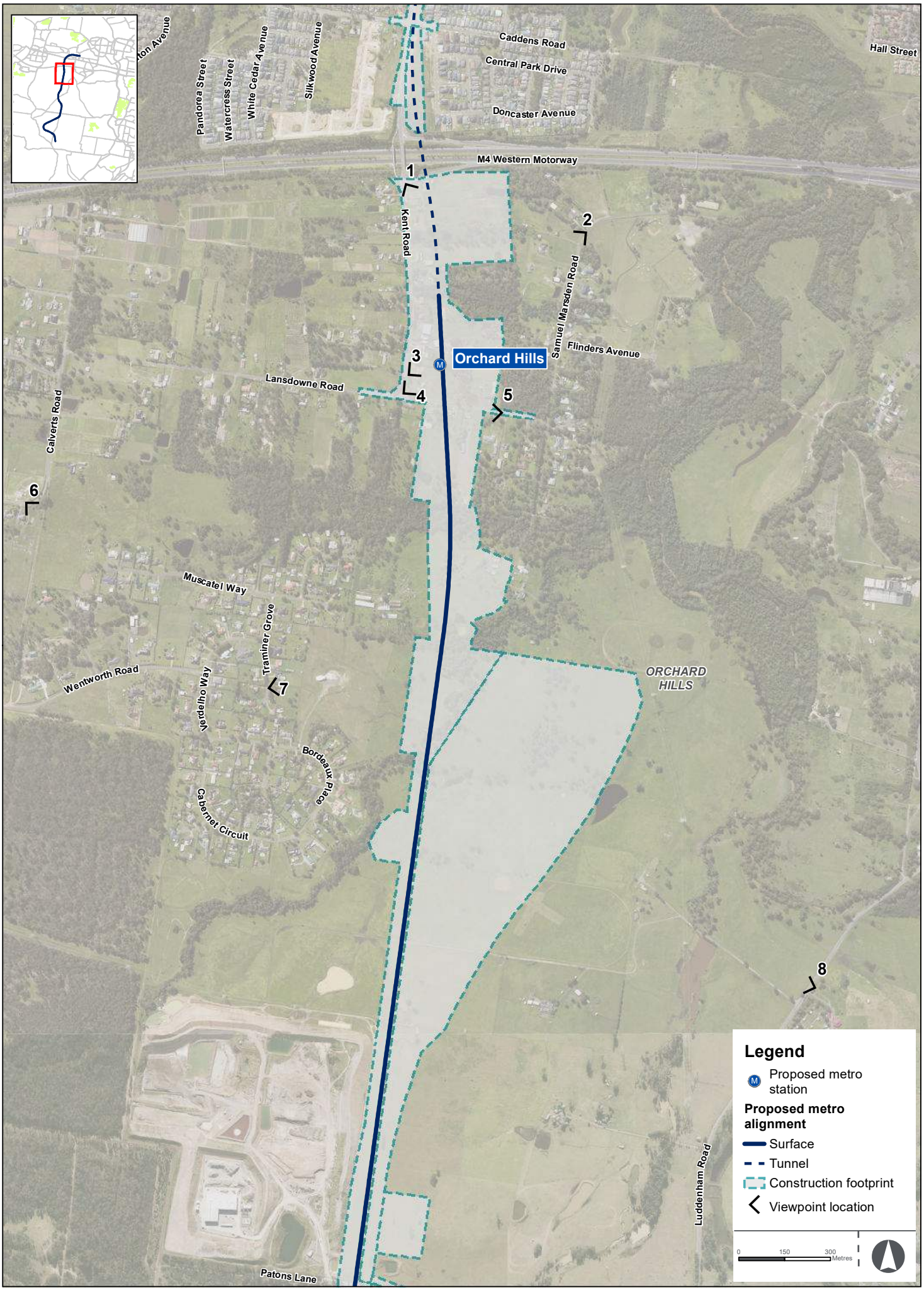
Viewpoints - St Marys suburban fringe

Figure 20-3



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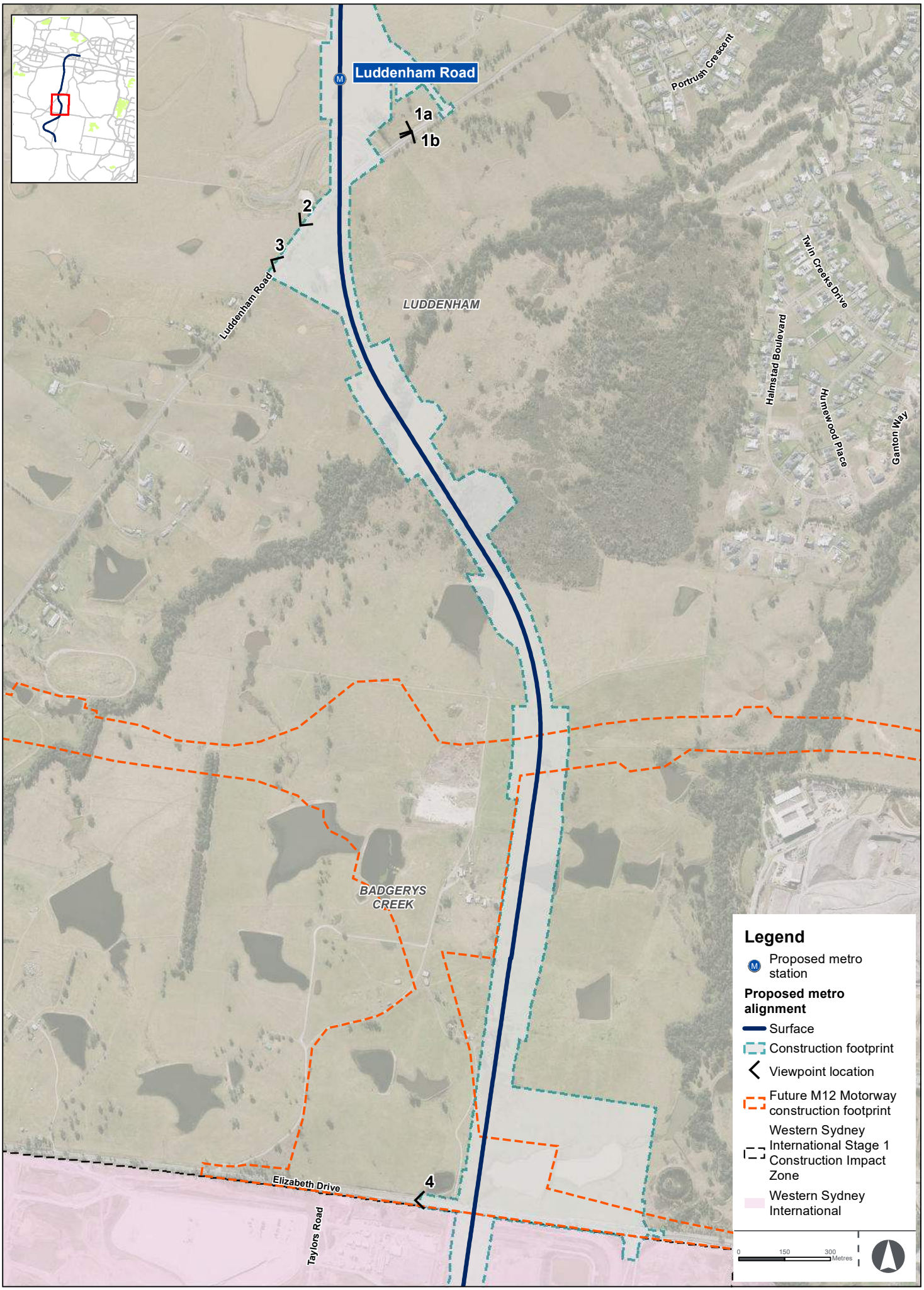
Viewpoints – Orchard Hills

Figure 20-4



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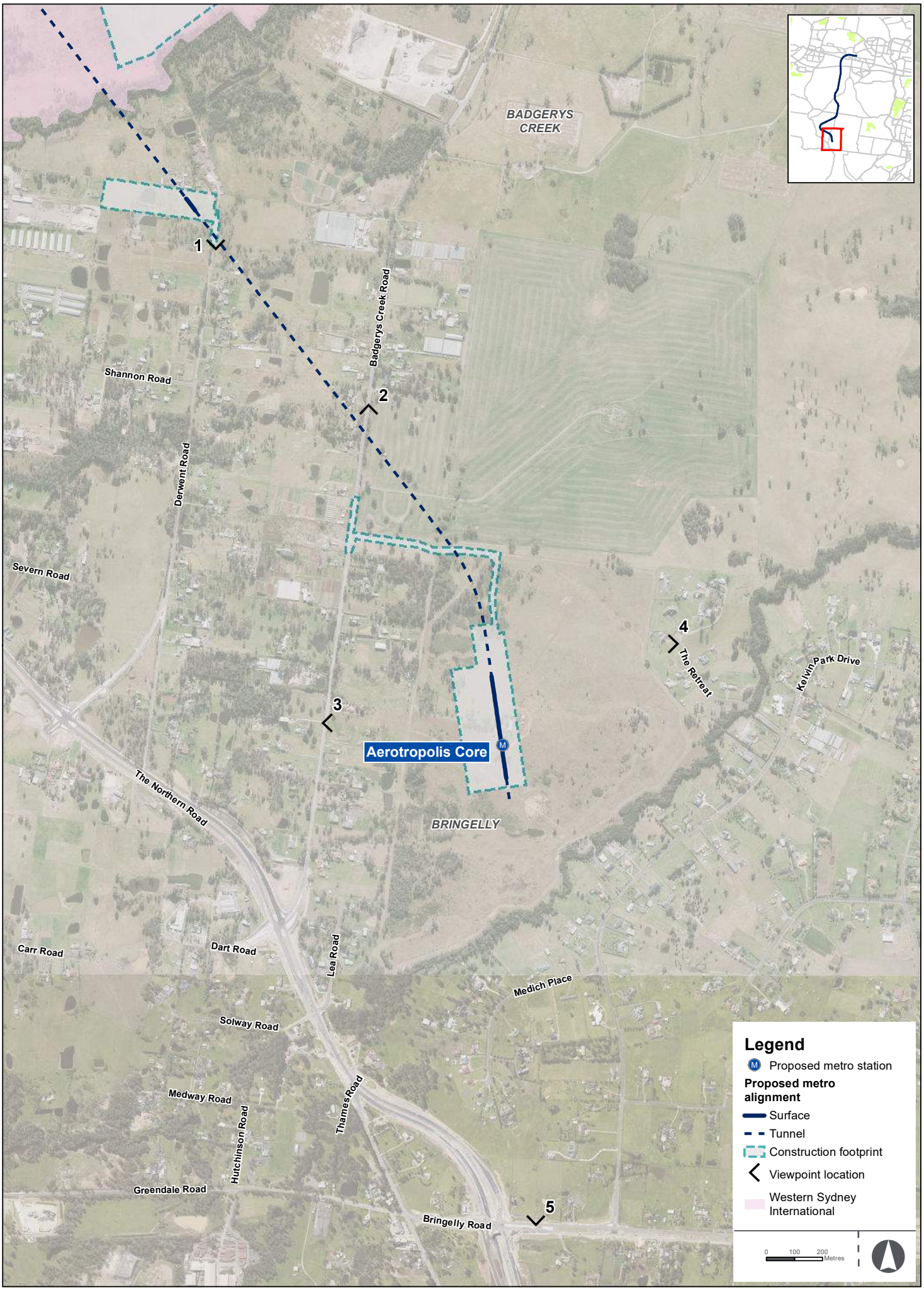
Viewpoints – Luddenham

Figure 20-5



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Viewpoints – Bringelly

Figure 20-6

20.3.2 On-airport

Landscape character

This landscape character area is a former rural landscape undergoing a substantial transformation with the current construction of Stage 1 of Western Sydney International. As part of this construction, substantial earthworks on the site will transform the undulating landform of the site to a newly formed flat landscape to accommodate the airport infrastructure. While the majority of earthworks would be completed before construction of the project, construction of airport infrastructure will be occurring when construction for the project commences, subject to approval.

Western Sydney International Stage 1 will include a single runway, airport terminal, airport access roads and other support facilities. This will be the environment of the airport site upon completion of construction for the project. Western Sydney International will be used by a large volume of airport travellers and workers and would be of local landscape sensitivity for the purposes of assessing the operational impacts of the project.

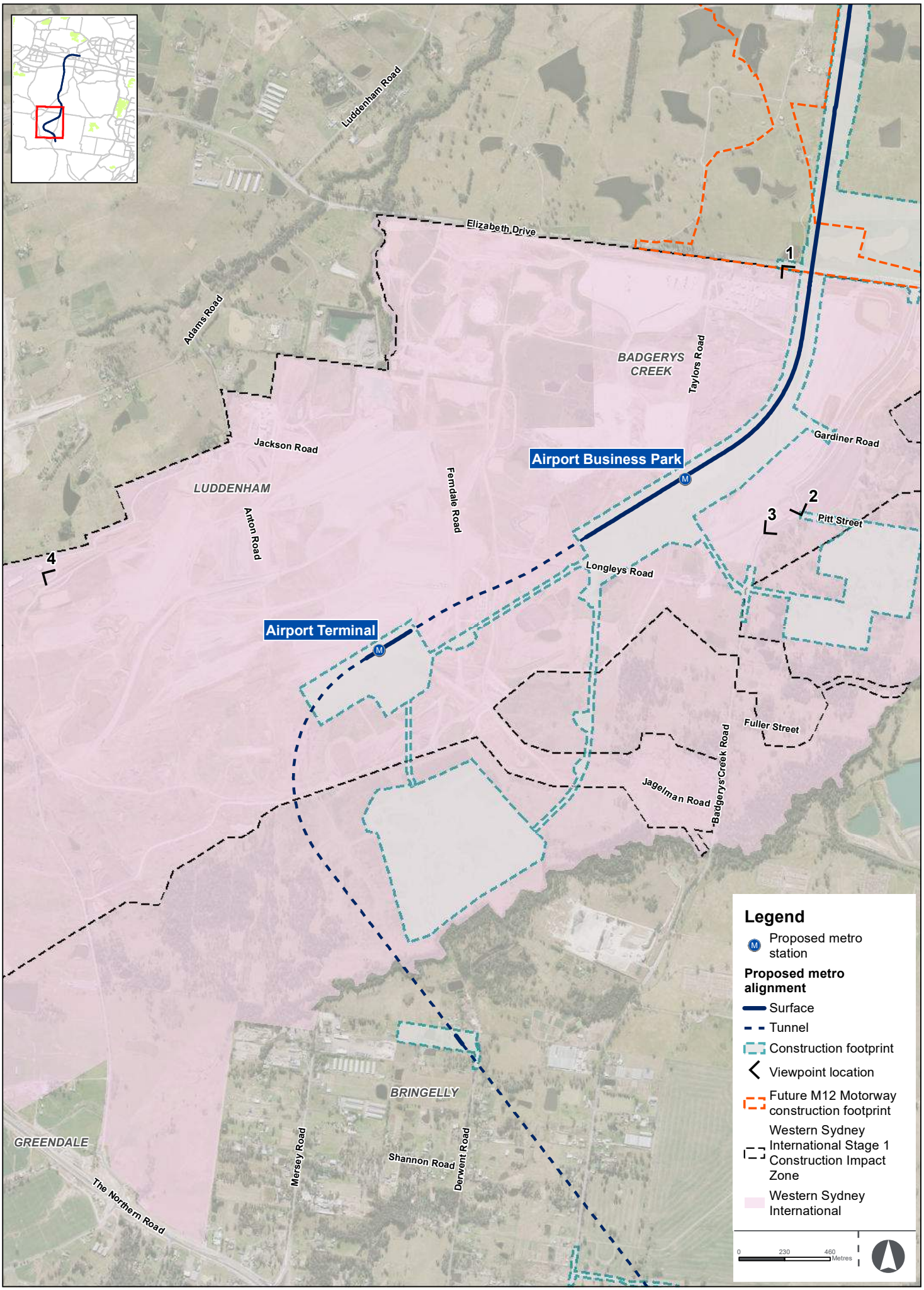
The construction phase night-time sensitivity of the landscape was rated as moderate as a result of the rural uses and relatively dark urban locations with light from traffic movements along Elizabeth Drive, Badgerys Creek Road and The Northern Road. The future operational Western Sydney International landscape character area would become an area of negligible sensitivity as a result of 24/7 airport activities and other proposed developments surrounding the airport site.

Viewpoint locations

The viewpoints identified in the Western Sydney International landscape character area to assess potential construction impacts rating are presented in Figure 20-7. In addition to these views, views to the temporary construction power supply route that would extend between the Airport Business Park station construction site and the Kemps Creek Zone substation (the Kemps Creek construction power corridor) have been considered generally.

During operation, views to the key project elements within the airport would be mainly available to pedestrians and cyclists at short range, approaching and transiting between the stations and the airport terminal, car parking and commercial areas. This would include a large volume of commuters using the airport for regional, national and international travel, and associated workers at the airport and airport-related business park. The on-airport project elements likely to give rise to visual impacts are:

- at-grade corridor
- at-grade (shallow cutting) station – Airport Business Park Station
- cut-and-cover station – Airport Terminal Station
- tunnel portal
- tunnel ventilation facility.



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On-airport construction viewpoint locations – Western Sydney International

Figure 20-7

Indicative only, subject to design development

20.4 Potential impacts – construction and operation

20.4.1 Off-airport

St Marys town centre

Visual amenity impacts

Construction at St Marys Station would have a relatively contained visual catchment due to the built form of the surrounding urban areas.

During daytime construction, there would be a moderate adverse visual impact on views from most areas surrounding the station due to the scale and extent of the construction works, including the demolition of buildings and some trees to the south of the existing rail corridor. An acoustic shed would potentially be established at this location (south of the existing rail corridor), if required, to mitigate environmental impacts (such as noise emissions).

Night-time construction would have a negligible visual impact on the town centre and a minor adverse visual impact in the vicinity of adjacent residential areas as any additional lighting would be largely absorbed into the existing brightly lit night scene. Construction lighting would be designed to minimise light spill outside the construction site.

During daytime operation, there would be negligible visual impacts on views from St Marys Station and from Harris Street towards the station as the new built form would be visually appropriate for a transport interchange. There would be minor adverse visual impacts on views from Station Street and Chesham Street and adjacent residential properties as the bus interchange and aboveground services buildings would be located within an area that is currently open space. While the remaining area of open space would be reinstated, views across the rail corridor to the existing industrial areas would be opened up with the removal of the existing mature trees in this area. There would be a temporary adverse effect on these views until the proposed new trees mature and restore the leafy character of this view.

During night-time operation, there would be a negligible visual impact in the vicinity of St Marys Station as the project would be seen within the brightly lit town centre. There would be a minor adverse visual impact on areas closer to residential properties to the southwest of the station, where the existing lighting levels are lower. In these areas, the project would both open up views to the existing lit station with the removal of existing vegetation and introduce additional bright station lighting further east along the rail corridor.

In the long term, the adverse landscape and visual impacts experienced as a result of the project would reduce as planned urban renewal increases in urban density and transition the land use to mixed use (Penrith DCP 2014) in areas immediately south of St Marys Station. St Marys town centre is also recognised as a strategic centre under the Western City District Plan. The station setting would be more visually compatible with the project, vegetation would mature and the increase in urban built form would reduce the potential visibility of the project from residential areas. An artist's impression of the St Marys Station precinct during operation is in Figure 20-8.

Figure 20-9 shows the existing view west from Station Street (viewpoint 3) and Figure 20-10 shows a photomontage of the project during construction as viewed from that location.

Figure 20-11 shows the existing view east from the corner of Station and Queen streets (viewpoint 6) and Figure 20-12 shows a photomontage of the project during operation as viewed from that location.

Figure 20-13 shows the existing view west from the St Marys Station platform (viewpoint 7) and Figure 20-14 shows a photomontage of St Marys Station during operation as viewed from that location.

Figure 20-8 Artist's impression of the St Marys Station precinct during operation

Figure 20-9 Existing view west from Station Street (viewpoint 3)

Figure 20-10 Photomontage of the view west from Station Street (viewpoint 3) during construction

Figure 20-11 Existing view east from the corner of Station and Queen streets (viewpoint 6)

Figure 20-12 Photomontage of the view east from the corner of Station and Queen streets to St Marys Station (viewpoint 6) during operation

Figure 20-13 Existing view west from the St Marys Station platform (viewpoint 7)

Figure 20-14 Photomontage of the view west from the St Marys Station platform to St Marys Station (viewpoint 7) during operation

St Marys suburban fringe

Landscape character impacts

During construction, there would be a minor adverse landscape impact on the St Marys suburban fringe character area. The project would have a relatively small construction footprint associated with the services facility and would result in minor alterations to the surrounding footpaths. There would be no impact on the character of the nearby M4 Western Motorway corridor.

During operation, there would continue to be a minor adverse landscape impact as the project would be consistent with the scale of development along the Great Western Highway and absorbed into the currently fragmented landscape character of this area which is located adjacent to a major road.

Visual amenity impacts

During daytime construction, the visual catchment of the project would be limited with views to the services facility construction site mainly from surrounding major roads. There would be limited visibility from adjacent residential areas to the west and southeast within Claremont Meadows due to screening by existing acoustic walls and vegetation located along Gipps Street. There would be some temporary views to the Claremont Meadows construction power route (for temporary tunnel boring machine power supply) on local streets between the existing Claremont Meadows substation at Nullaga Way to north of the M4 Western Motorway. The indicative power construction route runs along Gipps Street and under the M4 Western Motorway.

There would be a minor adverse visual impact on views near the services facility construction site from the Great Western Highway, Gipps Street and Sunflower Drive as construction activity would be seen in the context of busy roads. Further south, there would be a minor adverse visual impact on views from Kent Road to the construction power connection works.

During night-time construction, there would be a negligible visual impact on views in the vicinity of the services facility construction site, due to the landscape's ability to absorb physical changes without transformation in its visual character and quality.

During daytime operation, there would be a minor adverse visual impact on views from the Great Western Highway and Gipps Street. Typical visible elements within the Claremont Meadows services facility would include tunnel ventilation plant rooms and associated air-distribution equipment, signage, and ancillary rooms supporting the ventilation system and amenities. While the services facility would be consistent in character with the larger scale built form along the Great Western Highway, it would extend this character further west and adjacent to the lower density residential areas. The services facility would also occupy part of a site which is identified as a local ‘gateway site’ in the Penrith DCP 2014, intended to be ‘developed appropriately as an entrance to Claremont Meadows’. Otherwise there would be negligible visual impacts due to the small scale of the project in this setting.

During operation at night, there would be a negligible visual impact on views in the vicinity of the services facility due to the high visual absorption capacity of the night setting.

In the long term, the landscape and visual impacts experienced as a result of the project would reduce as the future precincts of Claremont Meadows are developed into an increasingly urban setting and associated vegetation matures. This would assist in the landscape's ability to absorb the physical changes associated with the services facility without transformation in its visual character and quality.

Orchard Hills

Landscape character impacts

During construction, there would be a moderate adverse landscape impact at Orchard Hills due to the proposed removal of vegetation and the scale and orientation of the construction sites. An acoustic shed would potentially be established in the area to the south of the M4 Western Motorway and east of Kent Road to mitigate environmental impacts (such as noise emissions). This assessment has considered an acoustic shed in this location. This shed and the adjacent workshops would mostly screen views of a precast segment storage area, which would contain segments stacked and lined up in rows.

During operation, there would be a minor adverse landscape impact due to the insertion of a new station, plaza and surrounding street network into the existing rural landscape, which currently lacks coherence. The new multi-deck car park would be out of scale and character compared to the existing landscape; however, the new station built form elements would be consistent with the transitioning character and would be largely absorbed into the surrounding landscape by the existing vegetation. The track alignment in this location would transition from tunnel at the tunnel portal south of the M4 Western Motorway, to in-cutting and at-grade and then on viaduct including a bridge crossing of Blaxland Creek and the Warragamba to Prospect Water Supply Pipelines.

There would be a minor adverse landscape impact in areas to the south of the station where views to the project alignment and stabling and maintenance facility would contrast with the surrounding rural landscape, but these elements would be seen in the distance of most existing views.

Visual amenity impacts

During daytime construction, Orchard Hills Station (in-cutting station) would be seen mainly from surrounding local rural roads and would be mostly screened from the M4 Western Motorway. The alignment would be visible from a relatively narrow visual catchment, contained to the west by the Orchard Hills Cumberland Plain Woodland and to the east by the vegetation along South Creek. There would be a moderate adverse visual impact on views near the Orchard Hills Station construction site at Kent Road, Lansdowne Road and Traminer Grove, due to the scale and extent of the construction works. There would be a minor adverse visual impact on views from Samuel Marsden Road due to intervening vegetation. There would be a negligible visual impact on elevated views from Homestead Road due to the distance and visual absorption capacity of the panoramic outlook.

The stabling and maintenance facility construction site would be located south of Blaxland Creek and would result in a substantial change to the rural landscape due to the size of the site, footprint and height of structures, and extent of earthworks. However, the quality of the rural landscape in this area is somewhat reduced by the presence of two high voltage powerline corridors. The construction site would contrast in scale and character with the semi-rural residential areas to the west in Orchard Hills, however, the stabling and maintenance facility construction site would not extend west into Blaxland Creek, maintaining this visual and physical edge between these uses. The stabling and maintenance facility would have a moderate adverse visual impact on views northeast from residential properties on Traminer Grove during construction.

During night-time construction, there would be a moderate adverse visual impact on areas of the Orchard Hills landscape near the project construction footprint, as lighting for the works would contrast with the surrounding relatively dark night scene.

During daytime operation, there would be a minor adverse visual impact on views from Kent and Lansdowne Roads towards Orchard Hills Station, as the alignment would be in cutting and the station would not be prominent in views. There would be a moderate visual impact on easterly views from Traminer Grove towards the viaduct structure proposed to be located to the south of the stabling and maintenance facility and from Luddenham Road to the viaduct structure and stabling and maintenance facility.

During operation at night, there would be a moderate adverse visual impact on the Orchard Hills rural character area due to the lighting of the corridor, station and stabling and maintenance facility.

In the long term, the landscape and visual impacts experienced as a result of the project would be visually absorbed into the surrounding landscape, which is intended to transition from a rural residential landscape to a future commercial and mixed-use precinct as part of the Western Parkland City Vision under the Greater Sydney Regional Plan. The increased built form density would reduce the potential visibility of the project, increase the visual compatibility of Orchard Hills Station with the surrounding urban form, and create an improved public realm and landscape framework, resulting in reduced landscape and visual impacts during the day and at night. An artist's impression of the Orchard Hills Station precinct during operation is shown in Figure 20-15.

Figure 20-16 shows the existing view southeast along Kent Road (viewpoint 1) and Figure 20-17 shows a photomontage of the project during construction as viewed from that location.

Figure 20-18 shows the existing view northeast from Kent Road (viewpoint 3) and Figure 20-19 shows a photomontage of Orchard Hills Station during operation as viewed from that location.

Figure 20-20 shows the existing view east from Traminer Grove (viewpoint 7) and Figure 20-21 shows a photomontage of the project during operation as viewed from that If possible it would be good to avoid blank space but may not be possible.

Figure 20-15 Artist's impression of the Orchard Hills Station precinct during operation

Figure 20-16 Existing view southeast along Kent Road (viewpoint 1)

Figure 20-17 Photomontage of the view southeast along Kent Road (viewpoint 1) during construction

Figure 20-18 Existing view northeast from Kent Road (viewpoint 3)

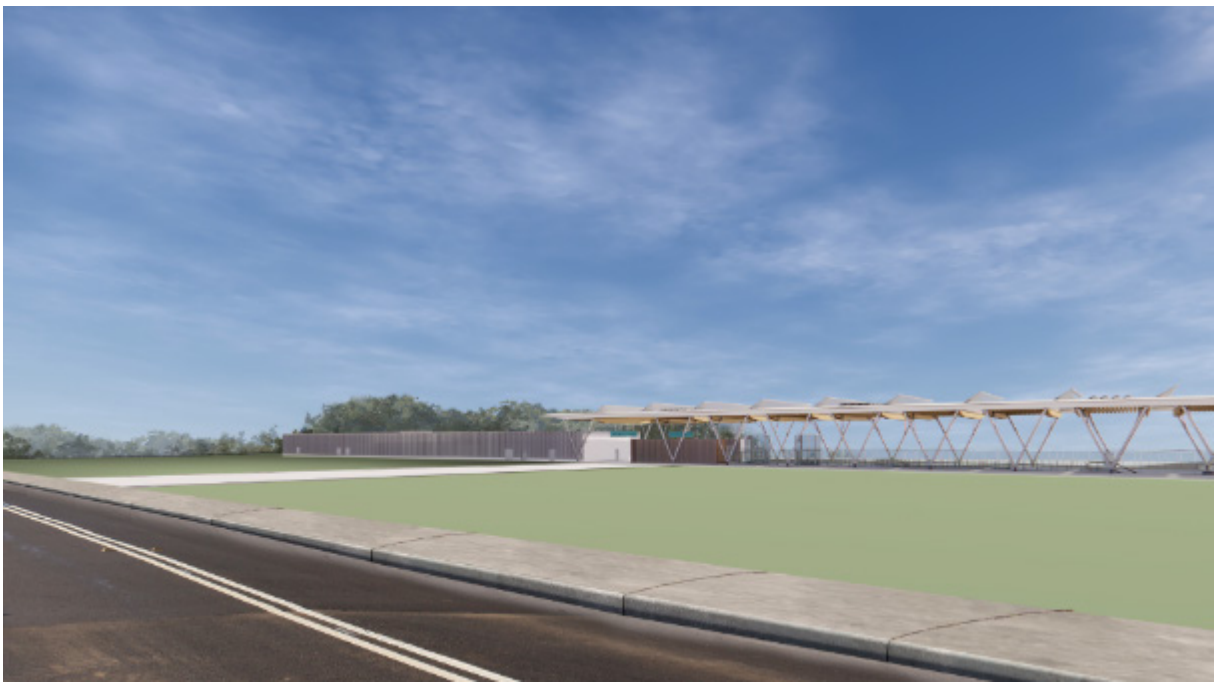

Figure 20-19 Photomontage of the view southeast from Kent Road to Orchard Hills Station (viewpoint 3) during operation

Figure 20-20 Existing view east from Traminer Grove (viewpoint 7)

Figure 20-21 Photomontage of the view east from Traminer Grove to the viaduct crossing of Blaxland Creek (viewpoint 7) during operation

Luddenham

Landscape character impacts

During construction, there would be a moderate adverse landscape impact due to the removal of vegetation and the presence of at-grade construction works to install viaduct and bridge structures over creeks throughout the landscape.

During operation, there would be a minor adverse landscape impact due to the introduction of large scale built elements into the landscape. Luddenham Road Station would be elevated at viaduct level and would rise substantially above the surrounding rural landscape, contrasting in form, height and scale with nearby scattered low scale rural residential dwellings. This would introduce a large scale modern civic structure which would be visually prominent within the landscape and contrast with the undulating rural landscape.

Visual amenity impacts

During daytime construction, the project alignment would be visible from a wide visual catchment due to the open rural character of this landscape, with some screening provided by vegetation located along Cosgroves Creek and Badgerys Creek.

There would be a moderate adverse visual impact on views from Luddenham Road due to the removal of vegetation, construction activities associated with Luddenham Road Station and the installation of viaduct and bridge structures. There would be a minor adverse visual impact on views from Elizabeth Drive as the project would be seen in the context of extensive construction activity associated with the Western Sydney International and the future M12 Motorway.

During night-time construction, there would be a negligible visual impact on the Luddenham landscape due to the minor nature of the lighting required for construction of the project and local screening provided by the undulating landform and vegetation.

During daytime operation, there would be a moderate adverse visual impact on views from Luddenham Road towards Luddenham Road Station and the viaduct. The project alignment would transition from viaduct after crossing Cosgroves Creek to at-grade as it extends south towards Elizabeth Drive and becomes slightly elevated on an embankment at the future M12 Motorway connection to Western Sydney International. There would be a minor adverse visual impact on views from Elizabeth Drive as the project alignment would be a small change to a view that would be substantially changed when the Western Sydney International and the future M12 Motorway are operational.

During operation at night, Luddenham Road Station would be lit, resulting in a moderate adverse visual impact.

In the long term, the impacts experienced in the areas to the south of Luddenham would reduce as the landscape is transformed from relatively open rural landscapes into the Northern Gateway precinct which will comprise a centre focused on high technology including health, education, research and residential development. The density of this proposed built form would reduce the potential visibility of the project, increase the visual compatibility of the station with the surrounding urban form, and create an improved public realm and landscape framework, resulting in reduced landscape and visual impacts during the day and at night. An artist's impression of the Luddenham Road Station precinct during operation is in Figure 20-22.

Figure 20-23 and Figure 20-25 show the respective existing views west and southwest along Luddenham Road (viewpoint 1a and viewpoint 1b). Figure 20-24 and Figure 20-26 show photomontages of the project during operation as viewed from these locations.

Figure 20-22 Artist's impression of the Luddenham Road Station precinct during operation

Figure 20-23 Existing view west from Luddenham Road (viewpoint 1a)

Figure 20-24 Photomontage of the view west to Luddenham Road Station (viewpoint 1a) during operation

Figure 20-25 Existing view southwest along Luddenham Road (viewpoint 1b)

Figure 20-26 Photomontage of the view southwest along Luddenham Road to the viaduct crossing of Blaxland Creek (viewpoint 1b) during operation

Bringelly

Landscape character impacts

During construction, there would be a minor adverse impact on the Bringelly landscape, and limited impact on vegetation and landform, due to the relatively small scale of the Bringelly services facility construction site north of Derwent Road and the Aerotropolis Core Station construction site east of Badgerys Creek Road. Construction activities would be slightly more noticeable at the proposed Aerotropolis Core Station construction site, where the landscape consists of an open floodplain, and works would contrast in scale and character with the surrounding landscape. However, construction of the services facility would be consistent with the surrounding land use activities. Changes to the character and quality of this rural landscape would be localised and would have a small visual influence on the surrounding landscape.

During operation, there would be a negligible impact on the Bringelly landscape as a result of Aerotropolis Core Station being a low rise contemporary structure in the largely open rural setting north of Thompsons Creek. The services facility would be small in scale and would have a working character consistent with existing land uses. The existing trees in this landscape would assist in the absorption of this building into the landscape. The station would ultimately form part of a new urban precinct which would comprise a grid street network surrounding the station.

Visual amenity impacts

During daytime construction, Aerotropolis Core Station would be visible from a relatively limited visual catchment, mainly from the rural areas west of Badgerys Creek Road. There would also be views to the Bringelly services facility from Derwent Road and adjacent rural residential properties. The vegetation along Badgerys Creek and Thompsons Creek partly encloses views from the broader landscape.

There would be a minor adverse visual impact on views from Badgerys Creek Road, south of Badgerys Creek Road and easterly views from Badgerys Creek Road due to the loss of vegetation, and the scale and extent of the construction works.

During night-time construction, there would be a negligible visual impact on the Bringelly landscape due to the minor nature of the lighting required for the project in this area and distance between the site and adjacent scattered residences.

During daytime operation, there would be a negligible visual impact in views to the Bringelly services facility from Derwent Road and The Retreat due to the capacity of the landscape to absorb this particular change and relatively small scale of the aboveground works.

During operation at night, there would be a moderate adverse visual impact on the Bringelly landscape as the project would introduce additional lighting which would contrast with the predominantly rural setting.

In the long term, the impacts experienced at Bringelly would reduce as the landscape is transformed from a predominantly rural residential landscape into the Aerotropolis, including the Aerotropolis Core to the east of Badgerys Creek Road, which would contain Aerotropolis Core Station. The proposed mix of employment and urban land would have a development density that would reduce the potential visibility of the project, and increase the visual compatibility of the station with the surrounding urban form. This would result in an improved public realm and urban landscape setting, particularly in the vicinity of the station, resulting in reduced landscape and visual impacts during the day and at night. An artist’s impression of the Aerotropolis Core Station precinct during operation is in Figure 20-27.

Figure 20-27 Artist's impression of the Aerotropolis Core Station precinct during operation

Corridor-wide green infrastructure

Green infrastructure adopts an integrated approach to the design of landscape and infrastructure in order to create ecologically healthier, greener and more viable urban landscapes.

In the Western Parkland City, green infrastructure is planned to be implemented at the city scale, as a network of green spaces, natural and semi-natural systems that are strategically planned, designed and managed to support a good quality of life in an urban environment.

As the central spine of infrastructure supporting the new Western Parkland City, the project presents an opportunity to implement a multifunctional design approach that uses primarily nature based solutions to reduce urban heat, manage stormwater, protect the natural environment and improve liveability.

Aligned with the Sydney Metro – Western Sydney Airport Design Guidelines (Appendix E), the Design Quality Framework, Premier's Priorities and wider State government policies and vision for the Western Parkland City, the following green infrastructure objectives have been, and will continue to be, embedded in the design of the project:

- recognise and protect the existing natural and cultural environments (i.e. ecological restoration, connection with Blue and Green grids)
- mitigate urban heat island effect, thereby providing customer comfort and climate resilience
- mitigate stormwater impacts and preserve waterway health via integrated water management
- improve liveability and amenity and contribute to an attractive, green public domain for the Western Parkland City.

Implementation of the green infrastructure objectives would be undertaken as part of the design development process for the project (refer to Section 7.1.3).

Sydney Metro is also investigating the following opportunities to build upon the green infrastructure objectives:

- green infrastructure targets for the project including performance based metrics which would be measured and tracked throughout design development and project implementation
- seed salvage of targeted local species for future use in landscaping for the project where possible.

The project's green infrastructure approach supports the vision of a Western Parkland City that will be cool, green and liveable with healthy waterways and high quality landscapes, open spaces and recreational links. The project performance outcomes and mitigation measures (see Section 20.5) support the green infrastructure objectives including ensuring a net increase in the number of trees within the project area and using a range of local species to enhance canopy coverage, subject to the constraints on tree planting associated with safe airport operations.

20.4.2 On-airport

Landscape character impacts

During construction, there would be a negligible landscape impact on the Western Sydney International site, as Western Sydney International is currently under construction and the works would be absorbed into this changing landscape.

During operation, the majority of the project would be in tunnel. The surface elements of the project would be compatible with the character of the future landscape and offer improvements to the accessibility and permeability of the Western Sydney International precinct. The stations would have a high-quality architectural treatment and be set within landscaped plazas and streetscapes so that they are integrated with the surrounding urban setting. In particular, Airport Terminal Station would complement the Airport terminal precinct and airport terminal buildings, providing direct and legible access to the heart of this precinct. This would result in a minor beneficial landscape impact.

In the longer term, following full development of the airport site, the project would be a key component of the surrounding landscape of Western Sydney International. This would result in a landscape character change that is more compatible with the project stations and alignment, and an urban built form that would substantially reduce the potential visual influence of the project. Overall, the landscape impacts of the project would reduce as this transformation occurs and development is designed to complement and integrate with the project.

Visual amenity impacts

Construction

During daytime construction, the alignment would be visible from parts of Elizabeth Drive and the rural areas to the north of the airport site. Public access within the airport site is restricted; however, there would be views to the on-airport corridor construction site from Badgerys Creek Road, which has recently been realigned to the east between Elizabeth Drive and Longleys Road. There are broad, panoramic views across the airport site from the Western Sydney International Airport Experience Centre and views to Badgerys Creek from rural areas to the south in Bringelly.

The scale of the project during construction would be largely consistent with, or of a lesser scale than, the Western Sydney International Stage 1 construction works. There would be a negligible visual impact on views from the Western Sydney International Airport Experience Centre, Elizabeth Drive and Badgerys Creek Road due to the visual absorption capacity of this setting. There would also be a negligible visual impact on views of the Kemps Creek construction power corridor due to the minor scale of the works, which would be sensitively set back from the vegetation along South Creek and not require vegetation removal.

During night-time construction, there would be a negligible visual impact on the Western Sydney International landscape character area due to the minor nature of the lighting required for the project during construction.

Operation

During daytime operation, there would be a minor adverse visual impact on views to the at-grade sections of the project alignment, due to the compatibility of the project with the character of views expected within the future Western Sydney International. There would be negligible visual impacts on views to the project alignment, as the alignment would have limited visibility from surrounding areas. There would be a negligible visual impact on views to Airport Business Park Station and Airport Terminal Station as the built form of these stations would be modest in relation to the scale of the surrounding built form and infrastructure. The stations would have a high-quality architectural treatment, would integrate with the surrounding urban setting and be compatible with the expected character of future land uses within Western Sydney International.

During operation at night, there would be a negligible visual impact as lighting at the stations and along the project alignment in the Western Sydney International would be consistent in character with the setting of the future airport.

Figure 20-28 and Figure 20-29 show artist’s impressions of the view to Airport Business Park Station and Airport Terminal Station respectively.

Figure 20-28 Artist's impression of Airport Business Park Station during operation

Figure 20-29 Artist's impression of Airport Terminal Station during operation

20.5 Proposed management and mitigation measures

Environmental management for the project would be undertaken through an environmental management approach as detailed in Chapter 25 (Environmental management and mitigation). The construction and operational environmental management frameworks are discussed in sections 25.2 and 25.3 respectively.

Under these broad frameworks, a series of performance outcomes have been developed to define the minimum environmental standards that would be achieved during construction and operation (detailed in Section 20.5.1), and mitigation measures that would be applied during construction and operation to manage identified impacts (detailed in Section 20.5.2).

20.5.1 Performance outcomes

The performance outcomes for the project in relation to landscape and visual amenity are outlined in Table 20-2.

Table 20-2 Performance outcomes – landscape character and visual amenity

SEARs desired performance outcomes	Project performance outcome	Timing
Supporting the provision of successful places - the project is integrated with and enhances the environment where it is located, including improved accessibility and connectivity for communities	Design excellence is exhibited in the project to complement the anticipated character of the precincts in which the project is located	Operation
The project contributes to greener places through supporting the enhancement and provision of green infrastructure	The number of trees within the project area is increased using a range of local species to enhance canopy coverage, subject to the constraints on tree planting associated with safe airport operations	Operation

20.5.2 Mitigation measures

A Construction Environmental Management Framework (CEMF) (Appendix F) describes the approach to environmental management, monitoring and reporting during construction. Specifically, it lists the requirements to be addressed by the construction contractor in developing the Construction Environmental Management Plans (CEMP), sub-plans, and other supporting documentation for each specific environmental aspect.

The Visual and Landscape CEMP for the on-airport works would be developed in consultation with Western Sydney Airport and would be consistent with the existing *Western Sydney Airport Visual and Landscape Construction Environmental Management Plan* (Western Sydney Airport, 2019i).

The construction and operation mitigation measures to manage potential landscape and visual impacts of the project are listed in Table 20-3.

Table 20-3 Landscape character and visual amenity mitigation measures

Ref	Mitigation measure	Applicable location(s)
Construction		
LV1	Opportunities for the retention and protection of existing street trees and trees within the construction sites would be identified during detailed construction planning.	Off-airport
LV2	Existing trees to be retained would be protected prior to the commencement of construction in the vicinity of these trees in accordance with AS4970-2009 Protection of Trees on Development Sites.	All

Ref	Mitigation measure	Applicable location(s)
LV3	All structures (including potential acoustic sheds, site offices, workshop sheds and site hoarding) would be finished in a colour which aims to minimise their visual impact where appropriate. This finish is to be applied to all visible fixtures and fittings (such as exposed downpipes).	All
Operation		
LV4	The landscape design for the project would include consideration of appropriate species lists to minimise opportunities to attract wildlife at levels likely to present a hazard to aviation operations. The landscape design would have regard to relevant requirements and species lists under Western Sydney Airport's Wildlife Management Plan and other relevant guidelines, including the *National Airports Safeguarding Framework (Guideline C)* and *Recommended Practices No. 1 – Standards for Aerodrome Bird/Wildlife Control* (International Birdstrike Committee 2006).	All
LV5	Lighting at stations would be designed and operated in accordance with AS4282- 2019 Control of the obtrusive effects of outdoor lighting and the National Airports Safeguarding Framework Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports (where relevant).	All
LV6	Opportunities to provide vegetation screening of the stabling and maintenance facility (from sensitive receivers such as Luddenham Road and the surrounding rural areas within the viewshed) would be investigated during design development.	Stabling and maintenance facility
LV7	Landscape screening would be provided along the corridor including restoring vegetation along the creeks to contain local views, in accordance with the Sydney Metro – Western Sydney Airport Design Guidelines, to minimise adverse visual impacts where feasible.	All
LV8	Corridor services, including the combined services route would be designed to reduce visual clutter and minimise visual impact ensuring these structures have a low profile and do not obstruct views across the corridor.	All
LV9	Proposed engineering batters and water management measures would be designed to integrate with the existing landforms and natural features.	All

20.5.3 Consideration of the interaction between measures

Mitigation measures in other chapters that are relevant to the management of potential landscape and visual impacts include:

- Chapter 23 (Hazard and risk), specifically measures which addresses the consideration of species in the landscape design and managing potential light spill for airport operations.