BOTANY RAIL DUPLICATION

TECHNICAL REPORT

Technical Report 11 –
Landscape and Visual Impact Assessment

IRIS Visual Planning + Design

Botany Rail Duplication Project

Landscape and Visual Impact Assessment

Technical Report 11

Australian Rail Track Corporation

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Glossary and abbreviations

Term	Definition
amenity	*'The pleasantness of a place as conveyed by desirable attributes including visual, noise, odour etc.'* (Australian Institute of Landscape Architects QLD, 2018)
ARTC	Australian Rail Track Corporation (the proponent)
ballast	Material such as crushed rock or stone used to provide a foundation for a railway track. Ballast usually provides the bed on which railway sleepers are laid, transmits the load from train movements and restrains the track from movement.
Botany Line	A dedicated freight rail line (operated by ARTC) that forms part of the Metropolitan Freight Network. The line extends from near Marrickville Station to Port Botany.
construction ancillary facilities	Temporary facilities during construction that include, but are not limited to, construction work areas, sediment basins, temporary water treatment plants, precast yards and material stockpiles, laydown areas, parking, maintenance workshops and offices, and construction compounds.
construction compound	An area used as the base for construction activities, usually for the storage of plant, equipment and materials, and/or construction site offices and worker facilities.
Council, the	Bayside Council
CPTED	Crime Prevention Through Environmental Design
detailed design	The stage of design where project elements are design in detail, suitable for construction.
EIS, the	Botany Rail Duplication environmental impact statement
embankment	A raised area of earth or other materials used to carry a rail line in certain areas.
existing rail corridor	The rail corridor within which the existing rail infrastructure is located. In the study area, the existing rail corridor is the Botany Line.
formation	The earthworks/material on which the ballast, sleepers and tracks are laid.
glare	'*The uncomfortable brightness of a light source when viewed against a dark background*.' (Institute of Lighting Engineers, 2011)
heavy vehicles	A heavy vehicle is classified as a Class 3 vehicle (a two-axle truck) or larger, in accordance with the Austroads Vehicle Classification System.
impact	Influence or effect exerted by a project or other activity on the natural, built and community environment.
landscape	'*All aspects of a tract of land, including landform, vegetation, buildings, villages, towns, cities and infrastructure*.' (Roads and Maritime Services, 2018)
landscape character	The … *'combined quality of built, natural and cultural aspects which make up an area and provide its unique sense of place'*. (Roads and Maritime Services, 2018).

Term	Definition
landscape character zone	'*An area of landscape with similar properties or strongly defined spatial qualities, distinct from areas immediately nearby*.' (Roads and Maritime Services, 2018)
LGA	local government area
light intrusion ('trespass')	'*The spilling of light beyond the boundary of the property or area being lit*.' (Institute of Lighting Engineers, 2011)
magnitude	Magnitude is the … '*measurement of the scale, form and character of a development proposal when compared to the existing condition. In the case of visual assessment this also relates to how far the proposal is from the viewer*.' (Roads and Maritime Services, 2018)
Metropolitan Freight Network	A network of dedicated railway lines for freight in Sydney, linking NSW's rural and interstate rail networks with Port Botany. The Metropolitan Freight Network is managed by ARTC.
OLS	Obstacle limitation surface
possession	A period of time during which a rail line is closed to train operations to permit work to be carried out on or near the line.
project site, the	The area that would be directly affected by construction (also known as the construction footprint). It includes the location of operational project infrastructure, the area that would be directly disturbed by the movement of construction plant and machinery, and the location of the storage areas/compounds etc, that would be used to construct that infrastructure.
project, the	The construction and operation of the Botany Rail Duplication
Secretary's environmental assessment requirements (SEARs)	Requirements and specifications for an environmental assessment prepared by the Secretary of the Department of Planning and Environment under section 115Y of the *Environmental Planning and Assessment Act 1979* (NSW).
sensitivity	'*Susceptibility of a landscape or receptor to accommodate change without losing valued attributes*.' (Australian Institute of Landscape Architects QLD, 2018) The sensitivity of a landscape character zone or view is '*its capacity to absorb change'*. (Roads and Maritime Services, 2018)
sky glow	*'The brightening of the night sky.'* (Institute of Lighting Engineers, 2011)
State significant infrastructure	Major transport and services infrastructure considered to have State significance as a result of size, economic value or potential impacts.
study area, the	The study area is defined as the wider area including and surrounding the project site, with the potential to be directly or indirectly affected by the project (eg by noise and vibration, visual or traffic impacts). The actual size and extent of the study area varies according to the nature and requirements of each assessment and the relative potential for impacts but which is sufficient to allow for a complete assessment of the proposed project impacts to be undertaken.
urban design	Urban design is concerned with the arrangement, appearance and function of our suburbs, towns and cities. It is both a process and an outcome of creating localities in which people live, engage with each other, and the physical place around them. Urban design involves many different disciplines including

Term	Definition
	planning, development, architecture, landscape architecture, engineering, law and finance. (Urban Design Protocol, 2011)
values	*'Any aspect of landscape or views people consider to be important. Landscape and visual values may be reflected in local, state or federal planning regulations, other published documents or be established through community consultation and engagement, or as professionally assessed*.' (Australian Institute of Landscape Architects QLD, 2018)
view	*'Any sight, prospect or field of vision as seen from a place, and may be wide or narrow, partial or full, pleasant or unattractive, distinctive or nondescript, and may include background, mid ground and/or foreground elements or features*.' (Australian Institute of Landscape Architects QLD, 2018)
viewpoint	'*The specific location of a view, typically used for assessment purposes*.' (Australian Institute of Landscape Architects QLD, 2018)
visual absorption capacity	'*The potential for a landscape or scene to absorb a particular change without a noticeable loss of valued attributes*.' (Australian Institute of Landscape Architects QLD, 2018)

Executive summary

Australian Rail Track Corporation proposes to construct and operate a new second track within the existing Botany Line rail corridor between Mascot and Botany, in the Bayside Council local government area. The Botany Rail Duplication would increase freight rail capacity between Sydney Airport and Port Botany.

Methodology

A landscape and visual impact assessment of the project has been undertaken which includes:

- description of the project including the urban design and landscaping principles
- identification of the existing environmental conditions, including identification of character areas and the sensitivity of key receptors
- an assessment of landscape and visual (day and night time) impact during construction
- an assessment of landscape and visual (day and night time) impact during operation
- identification of mitigation measures.

Landscape character impact

Due to the scale of work within the Mascot character precinct, including several bridge replacements, the removal of trees along the southern side of the rail corridor, and the location of site compounds and material storage areas at prominent intersections, there would be a **moderate adverse landscape character impact** during construction.

There would be **minor adverse landscape character impact** in the Botany and Pagewood character precincts. The scale of work being greater in the vicinity of the urban road corridors of Botany Road, and Southern Cross Drive, where it is compatible with the scale of the urban road corridors. Works to construct the bridge crossing the Mill Stream would be visually contained by the surrounding open space and vegetation, as would the works along the rail corridor through the industrial areas of Botany in the vicinity of Lord Street. Furthermore, the works are proposed in the vicinity of the residential and recreational areas of Botany, to the east of the site, would be largely contained within the existing rail corridor.

A **moderate landscape character adverse** has been identified for the Mascot character precinct during operation. This precinct is important to the region as an entry to Sydney from the airport and therefore has a higher landscape character sensitivity. The loss of vegetation along the rail corridor, which contributes to the character of the arrival experience would adversely impact the character of this precinct.

There would be a **minor adverse landscape impact** in the Botany character precinct, due to the close proximity of construction activity to residential areas and loss of vegetation in the Botany Wetlands. The character of the project would be more readily absorbed into the Pagewood character precinct, as it would be a widening of the existing rail corridor and be an incremental increase in character from the existing character.

Visual impact

During construction there would be a **moderate adverse impact** in views in the vicinity of the airport including from the Joyce Drive and O'Riordan Street intersection, Robey Street and O'Riordan Street due to the removal of trees, and the scale of works required for bridgeworks, retaining walls and embankment construction occurring on the south and west of the existing rail corridor. These locations are heavily constrained, and the works will be large scale, so that construction activity and site compounds would comprise a large portion of these views. In views generally from Botany Road east to the residential areas of Botany, there would be **minor adverse visual impacts** during construction. This includes views from adjacent roads, residential and recreation areas. In these areas the works would be of a smaller

scale and contained within the rail corridor. There would also be more vegetation retained along the interface with the open space areas.

At night there would be a **negligible visual impact** on views to the site from within the Mascot character precinct as, whilst there would be night works undertaken for bridge and road works, this is a brightly lit setting and there would be a high capacity for this work to be absorbed into this setting.

There would, however, be a **minor adverse visual impact** at night on the Botany and Pagewood landscape character precincts during night works. This is due to a greater contrast between the existing night setting and the potential lighting of the night works.

During operation, the project would be largely absorbed into the character of views, due to the existing highly urban character of areas to the west of the site, and the reinstatement of the billboards, which largely screen views the bridges at Robey Road and O'Riordan Street. This would result in **negligible visual** impacts in views to the site from adjacent residential areas, open space, roads. There would be a **minor adverse visual impact** from Robey Street due to the removal of both vegetation and the heritage listed bridge.

Cumulative impacts

During operation, combined with the Sydney Gateway road project, the Botany Rail Duplication project would contribute to the intensification of the urban character of this area of the site, and result in an increased adverse landscape character impact during construction and operation.

Similarly, the Sydney Gateway road project and Botany Rail Duplication project would combine to alter views to the vehicular entry to Sydney from the airport. In the areas where both the project and Sydney Gateway road project would be seen, there would be an increased adverse visual impact during construction and operation. Introduction

1. Introduction

1.1 Background

Australian Rail Track Corporation (ARTC) proposes to construct and operate a new second track within the existing Botany Line rail corridor between Mascot and Botany, in the Bayside Council local government area (LGA). The Botany Rail Duplication ('the project') would increase freight rail capacity to and from Port Botany. The location of the project is shown on Figure 1.1.

The project is State Significant Infrastructure in accordance with Division 5.2 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). As State Significant Infrastructure, the project needs approval from the NSW Minister for Planning and Public Spaces.

This report has been prepared to accompany the environmental impact statement (EIS) to support the application for approval of the project and address the Secretary of the Department of Planning and Environment environmental assessment requirements (the SEARs), issued on 21 December 2018.

1.2 Overview of the project

The project would involve:

- Track duplication – constructing a new track predominantly within the rail corridor for a distance of about three kilometres.
- Track realignment (slewing) and upgrading – moving some sections of track sideways (slewing) and upgrading some sections of track to improve the alignment of both tracks and minimise impacts to adjoining land uses.
- New crossovers – constructing new rail crossovers to maintain and improve access at two locations (totalling four new crossovers).
- Bridge works – constructing new bridge structures at Mill Stream, Southern Cross Drive, O'Riordan Street and Robey Street (adjacent to the existing bridges), and re-constructing the existing bridge structures at Robey Street and O'Riordan Street.
- Embankment/retaining structures – construction of a new embankment and retaining structures adjacent to Qantas Drive between Robey and O'Riordan streets and a new embankment between the Mill Stream and Botany Road bridges.

Further information on the key elements of the project is provided in the EIS.

Ancillary work would include bi-directional signalling upgrades, drainage work and protecting/relocating utilities.

Subject to approval of the project, construction is planned to start at the end of 2020, and is expected to take about three years for the main construction works to be undertaken. Construction is expected to be completed in late 2023 with commissioning activities undertaken in early 2024.

It is anticipated that some features of the project would be constructed while the existing rail line continues to operate. Other features of the project would need to be constructed during programmed weekend rail possession periods when rail services along the line cease to operate.

The project would operate as part of the existing Botany Line and would continue to be managed by ARTC. ARTC is not responsible for the operation of rolling stock. Train services are currently, and would continue to be, provided by a variety of operators. Following the completion of works, the existing functionality of surrounding infrastructure would be restored.

Key features of the project are shown on Figure 1.2.

Figure 1.1 Botany Rail Duplication location

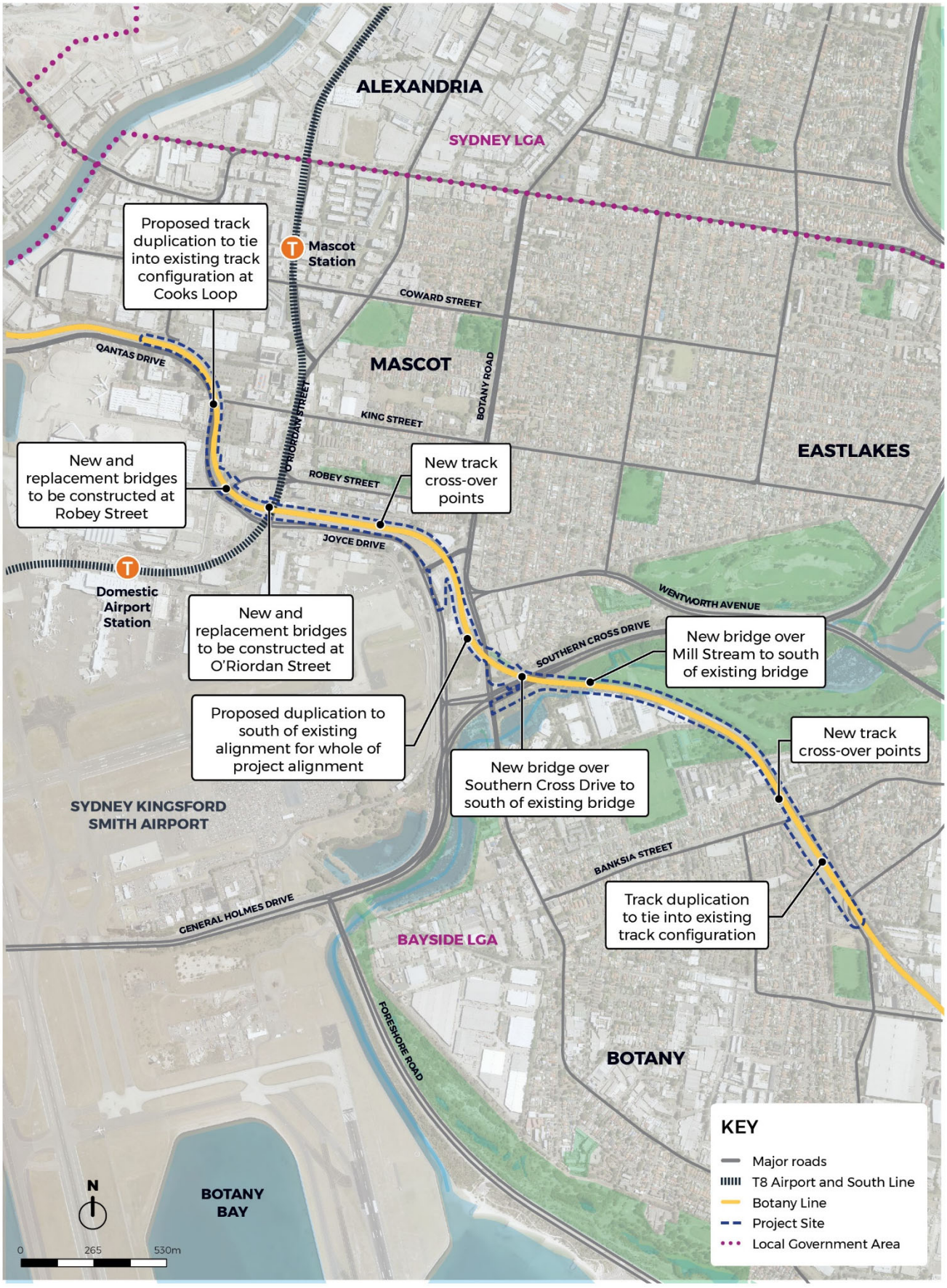


Figure 2.2 Botany Rail Duplication project overview

1.3 Urban design and landscaping principles

Whilst the engineering and rail systems are important elements in the design of project infrastructure, integration with the adjacent and surrounding land uses is also an important factor for the project. In order to support and guide the final design for the project, a series of urban design and landscaping principles have been developed for the project. These principles are:

- minimise visual and urban design impacts as much as possible
- enhance the local character, reflecting the character of the landscape through which the new track alignment would pass
- encourage design of creek crossing structures that fit sensitively within the existing urban environment
- encourage design of creek crossing structures that would enable the linkage of vegetation communities and wildlife access
- encourage careful design of retaining walls, landscaping and fencing to creates a uniform approach, with specific design responses to the local precinct
- all materials should be selected for their robustness and durability.

The design of this project would also be aligned with the urban design concepts of the Sydney Gateway road project. These concepts include a coordinated urban design approach to the new retaining walls that aim to create memorable visual experiences that enhance the 'gateway' function of the project. Mitigation measures relating to retaining wall are provided in section 9.2 and the impact from retaining walls discussed throughout section 6.

This project has limited urban design and landscape interface with the public realm as it is predominantly located within an existing rail corridor. The main features of the project that would interface with the public domain during operation include the four new bridges (Robey Street bridge, O'Riordan Street bridge, Southern Cross Drive bridge and Mill Stream Bridge), embankments, retaining walls and billboards. Mitigation measures relating to bridge structures and embankments are provided in section 9.2 and the impact of these structures is discussed throughout section 6.

Any impacted billboards would be reinstated generally in the same location as they are currently located, situated to maximise views towards them. As a priority, billboards will be replaced like for like. Where they cannot be replaced like for like they would be shifted to allow like for like placement on a new location in immediate vicinity of their current location. Where billboards cannot be placed in their immediate vicinity, they would be relocated along the existing rail corridor and combined with existing structures (such as bridges) where practicable in order to minimise potential to introduce structures in areas where there are minimal existing structures and infrastructure.

1.4 Purpose and scope of this report

The purpose of this report is to assess the potential landscape character and visual impacts from the construction and operation of the project. This landscape and visual assessment addresses the relevant SEARs for the EIS, as outlined in Table 2.1.

The report:

- describes the existing environment with respect to landscape character and views of the project site
- assesses the impacts of constructing and operating the project on the landscape character and views
- recommends measures to mitigate the impacts identified.

1.3 Structure of this report

The structure of the report is outlined below.

- Section 1 – provides an introduction to the report
- Section 2 – describes the legislative and policy context for the assessment
- Section 3 – describes the methodology for the assessment, including reference to relevant guidelines
- Section 4 – describes the existing environment as relevant to the assessment
- Section 5 – is an assessment of landscape character and visual impacts during construction
- Section 6 – is an assessment of landscape character and visual impacts during operation
- Section 7 – provides a summary of impact
- Section 8 – includes a discussion of the cumulative impacts
- Section 9 – includes recommended measures to mitigate potential landscape character and visual impacts
- Section 10 – describes the conclusions of this assessment.

2. Legislative and policy context

This section summarises the legislation, guidelines and policies driving the approach to the assessment.

2.1 Relevant legislation and policies

The assessment was undertaken with reference to the following:

- *Better Placed*, Government Architect NSW (2018)
- *Botany Bay Local Environmental Plan*, City of Botany Bay (2013)
- *Botany Bay Development Control Plan*, City of Botany Bay (2013).

The following is a summary of these documents.

2.1.1 Better Placed, The Office of the NSW State Government Architect

The Office of the NSW State Government Architect has prepared a suite of documents under the title of 'Better Placed' which aim to improve the urban design quality of places in NSW. These documents include:

- *Better Placed: An integrated design policy for the built environment of NSW*, State Government Architect NSW (2018)
- *Better Placed: Draft Good Urban Design Strategies for realising Better Placed objectives in the design of the built environment*, State Government Architect NSW (2018)
- *Better Methods: Evaluating Good Design, Implementing Better Placed design objectives into projects*. (2018).

These documents are intended to inform those involved in the design, planning, and development of the built environment in NSW. The overriding policy establishes the objectives and expectations in relation to design and creating good places.

These documents include seven objectives and suggested criteria for the evaluation of projects against these objectives. These objectives have been considered for this assessment and are:

- better fit contextual, local and of its place
- better performance sustainable, adaptable and durable
- better for community inclusive, connected and diverse
- better for people safe, comfortable and liveable
- better working functional, efficient and fit for purpose
- better value creating and adding value
- better look and feel engaging, inviting and attractive.

Further detail on these plans, and how they have been used in the evaluation of the landscape character impacts of the project are provided in Section 3 Methodology.

2.1.2 Botany Bay Local Environmental Plan, 2013

This Plan aims to make local environmental planning provisions for land in the City of Botany Bay local government area. Relevant aims include:

(d) to identify and conserve those items and localities that contribute to the local built form and the environmental and cultural heritage of Botany Bay,

(e) to protect and enhance the natural and cultural landscapes in Botany Bay,

(f) to create a highly liveable urban place through the promotion of design excellence in all elements of the built environment and public domain,

(g) to protect residential amenity. (clause 1.2.2).

The project site is currently used and zoned as SP2 Infrastructure (Railway). It is located along the northern and eastern perimeter of the SP2 Infrastructure (Airport) zone. The objectives of this zone are:

- *"To provide for infrastructure and related uses.*
- *To prevent development that is not compatible with or that may detract from the provision of infrastructure."* (Zone SP2).

The LEP sets out the maximum building heights allowable in the study area, to ensure new developments respond to the following objectives:

(c) to ensure that building height is consistent with the desired future character of an area,

(d) to minimise visual impact, disruption of views, loss of privacy and loss of solar access to existing development,

(e) to ensure that buildings do not adversely affect the streetscape, skyline or landscape when viewed from adjoining roads and other public places such as parks, and community facilities. (clause 4.3).

The following local heritage items are located in the vicinity of the rail corridor, and contribute to the character of the project area (west to east):

- Houses at 1289-1291 Botany Road (I50-51)
- Beckenham Memorial Church, 1293–1295 Botany Road (I52)
- Railway bridge over Botany Road (I153)
- Botany water reserves (I2)
- Booralee Park (I61).

The plan aims … '*to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views'* (clause 5.10). Potential visual impacts to these heritage features have been considered in this assessment. For further details on these heritage items refer to the Technical Report 9 Statement of heritage impact.

2.1.3 Botany Bay Development Control Plan, 2013

The Development Control Plan (DCP) aims to guide future development within the Bayside Council Local Government Area (LGA). The project site is located within this LGA and therefore this assessment has considered potential impacts from the project in relation to these aims.

Part 1: Introduction, 1.6 General aims and objectives

The objectives of this DCP include several references to amenity, liveability and public domain quality, including:

- *"To create a highly liveable urban place, through promotion of design excellence in all elements of the built environment and public domain*
- *To minimise negative impacts of development on the amenity of adjoining properties, in particular to reduce the landuse conflict between residential and non-residential uses*
- *To ensure that new development protects and enhances the public domain" (clause 1.6).*

The achievement of these general aims and objectives are all affected to some degree by changes to landscape character and visual amenity. These aims and objectives have therefore influenced the consideration of landscape character and visual impacts in the following assessment.

Part 3L: Landscaping and tree management

This section advocates the retention of trees and supplementation of planting, as follows: "Trees contribute significantly to the character, quality and amenity of an area. It is vitally important to protect, preserve and manage trees and vegetation" (3L.1). It further states that "New developments provide an opportunity to reinforce and embellish the landscape character by protecting and planting trees" (3L.1).

Relevant objectives of this section include:

- *"To maintain and embellish the visual and environmental amenity of the City*
- *To ensure that new development incorporates high quality landscaping and planting designs integral to the overall development*
- *To ensure landscaping is site responsive, retains trees and provides adequate and appropriate landscaping*
- *To improve and enhance the landscape structure and character of the City of Botany Bay*
- *To provide vegetated screens and buffers around developments to reduce impacts on neighbouring properties*
- *To enhance the existing streetscape by providing a scale and density of landscaping that softens the visual impact of buildings*
- *Trees contribute significantly to the character, quality and amenity of an area. It is vitally important to protect, preserve and manage trees and vegetation."* (clause 3L.2)

Where possible, the achievement of these objectives in relation to landscaping and tree management has been considered in the following assessment of the landscape character and visual impacts of the project.

Part 7D: Freight transport facilities

Relevant objectives of this section include: "*To ensure development contributes to a high quality landscape environment of the area*" (clause 7D.2).

Where possible, the achievement of this objectives in relation to freight transport facilities has been considered in the following assessment of the landscape character and visual impacts of the project.

Part 8: Character precincts

This section of the DCP identifies nine character precincts in the council area. The Botany Line traverses three of these character precincts, which are: Mascot, Botany and Pagewood. These character areas will be used for the assessment of landscape character impact in this assessment.

The relevant '*Desired Future Character*' guidelines for each of these precincts are as follows.

Mascot character precinct

New development should:

- *Retain existing views*
- *Facilitate landscaping and street plantings to complement the built form and create cohesiveness throughout the Precinct*
- *Encourage landscaping to be incorporated within the development and site layout to soften the built form, promote pedestrian comfort and enhance the aesthetics of the neighbourhood.* (p.50-51).

Botany character precinct

New development should:

- *Retain existing views*
- *Promote vistas, visual links and view corridors to significant areas, features, sky lines and open spaces areas of the LGA and surrounding areas*
- *Unlock vistas and view corridors to parkland, Botany Bay and City skylines.* (p.33).

Pagewood character precinct

New development should:

- *Retain existing views*
- *Encourage landscaping and vegetation planting within both the public and private domain of the precinct to soften the built form, promote pedestrian comfort and enhance the aesthetics of the neighbourhood.* (p.24).

This report will consider these future desired character statements in the assessment of landscape character and visual impact as they apply to the project.

2.2 Guidance for landscape character and visual impact assessment

A range of technical guidance is available for the assessment of landscape character and visual impact. In New South Wales the following are typically referred to.

2.2.1 EIA-N04 Guidelines for Landscape Character and Visual Impact Assessment, NSW State Government, Roads and Maritime Services (2018)

This guideline includes a detailed methodology for landscape character and visual impact assessment of road infrastructure projects. Whilst this guideline includes useful definitions of key terms which have been used for this assessment, it defines a process of assessment which is integrated with the development of urban design strategies. As the Botany Rail Duplication project does not include a substantial urban design scope due to the containment of the project largely with the existing rail corridor, this approach is not considered to be wholly suitable. However, the methodology used for this assessment is based generally upon the principles contained in this guideline.

2.2.2 The Guidance Note for Landscape and Visual Assessment (GNLVA), Australian Institute of Landscape Architects Queensland (2018).

This industry document offers guidance including definitions of key terms used for landscape and visual assessment, general principles and guidance for scoping landscape and visual assessments. This guidance note has been used to ensure consistency with industry best practice.

2.2.3 Other guidance

Whilst there is no complete and relevant guideline for the assessment of visual impact at night, the methodology for this assessment draws upon two guidelines which provide useful definitions and design standards, these are:

- *AS4282 Control of the obtrusive effects of outdoor lighting*, Standards Australia (1997).

Guidance for the reduction of obtrusive light, Institution of Lighting Engineers (UK) (2011).

Section 3.2.5 describes further how these guidelines have been considered for this assessment.

2.3 Secretary's environmental assessment requirements

The Secretary's environmental assessment requirements (SEARs) did not identify landscape character and visual impact as a key issue. However, this report addresses the requirements for the Assessment of Key Issues contained within the introduction to the SEARs.

The SEARs relevant to Landscape Character and Visual Impact, together with a reference to where they are addressed in this report, are outlined in Table 2.1.

Table 2.1 SEARs relevant to this assessment

Requirements	Where addressed in this report
3. Assessment of Key Issues (2) For each key issue the Proponent must:	
a) describe the biophysical and socio-economic environment, as far as it is relevant to that issue;	Section 4 Existing environment
b) describe the legislative and policy context, as far as it is relevant to the issue;	Section 2 Legislative and policy context
c) identify, describe and quantify (if possible) the impacts associated with the issue, including the likelihood and consequence (including worst case scenario) of the impact (comprehensive risk assessment), and the cumulative impacts;	Section 5 Assessment of impact during construction Section 6 Assessment of impact during operation Section 8 Cumulative impacts
d) demonstrate how options within the project potentially affect the impacts relevant to the issue;	Not applicable
e) demonstrate how potential impacts have been avoided (through design, or construction or operation methodologies);	Section 9 Management of impacts
f) detail how likely impacts that have not been avoided through design will be minimised, and the predicted effectiveness of these measures (against performance criteria where relevant); and	Section 9 Management of impacts
g) detail how any residual impacts will be managed or offset, and the approach and effectiveness of these measures.	Section 9 Management of impacts

3. Methodology

This section describes the methodology used to undertake the landscape character and visual assessment.

3.1 Study area

The study area for the landscape character and visual impact assessment is the potential visual catchment of the project, extending generally from areas along the existing Botany Line from Mascot in the north west, to Botany and Pagewood in the south east (refer Figure 3.1).

In Mascot, the potential visual catchment would extend south and east across Qantas and Joyce Drives to the Sydney Airport, north and west to the adjacent industrial, commercial and residential areas. These areas include properties along the Qantas Service Roads, King Street, Robey Street, O'Riordan Street, Baxter Road, General Holmes Drive, Botany Road, Wentworth Avenue and McBurney Avenue.

In Botany and Pagewood, the potential visual catchment would extend to include areas adjacent to the existing Botany Line at Southern Cross Drive, the Mill Stream open space, Eastlake golf course, office park on Lord Street, Botany Aquatic Centre, residential properties on Myrtle, Ellis, Bay, Banksia Ocean and Morgan streets, and Stephan Road, and Gaiarine Gardens.

Figure 3.1

Study Area Boundary

Author: David Naiken
Date: 28/06/2019
Map no: PS113386_GIS_058_A1

3.2 Key tasks

The landscape character and visual impact assessment of the project includes:

- identification of the existing environmental conditions, including identification of character areas and the sensitivity of key receptors
- an assessment of the impact on landscape character during construction and operation
- an assessment of the daytime visual impact during construction and operation
- an assessment of night time visual impact during construction and operation
- identification of mitigation measures.

The following sections provide a summary description of the key tasks.

3.2.1 Project description

A summary of the key activities and components that would influence the level of landscape character and visual impact is also provided for each precinct. This includes the activities and components that would be visible during construction and operation, in the day and at night.

The section also summarises the key features of the urban design and landscaping principles (refer to section 6.7 of the EIS), for the overall rail corridor, landscape and structural design.

3.2.2 Existing environment

The existing environment has been described in terms of the key landscape and visual features of the study area. Site visits were carried out during October of 2018 and May 2019, and the existing character, landscape elements and views were recorded through observations and photographs.

Where relevant, the future character and conditions of each precinct have been considered. As landscape and visual conditions evolve and change over time, future development may redefine land use and the character of the study area. This includes developments under construction and those with planning approval.

3.2.3 Approach to landscape character impact assessment

Landscape character in the urban context refers to the overall character and function of a place. It includes all elements within the public realm and the interrelationship between these elements and the people who use it.

The landscape character can be directly or indirectly impacted by the project. To address these impacts, an assessment was carried out by identifying the landscape character, the sensitivity of the character area and the likely magnitude of change expected as a result of the project, then making an overall assessment of the level of impact.

The assessment of modification was based on the extent of change expected and considered a range of urban design factors as identified in the relevant technical assessment guidelines (refer to section 2.2).

Identify landscape character precincts

Several character precincts have been identified for the Botany Bay area in the *Botany Bay Development Control Plan 2013*. These character precincts have been used as the landscape character areas for this assessment as they accurately reflect the different landscape characteristics of the study area.

Landscape sensitivity

Landscape sensitivity refers to the value placed on a landscape element or urban place and the level of service it provides to the community. The sensitivity of a landscape may reflect the frequency and volume of users in a location but may also be valued for other characteristics such as tranquillity, visual relief and contribution to microclimate. The

value of landscapes is often described in council and state government master plans and planning guidance documents, reflecting the importance of landscape resources to the local, regional and state-wide community.

The sensitivity of landscape features is therefore considered in the broadest context of possible landscapes, from those of national importance through to those considered to have a neighbourhood landscape importance (Table 3.1). In this table, the terms 'state' and 'regional' landscape sensitivity are intended to describe the value placed on the landscape by the community. Landscape features which are afforded legislative protection are specifically identified in the policy context section of this assessment.

Table 3.1 Landscape sensitivity levels

Landscape sensitivity	Description
National	Precinct containing a landscape feature protected with national or international legislation.
State	Precinct containing a landscape feature or urban place that is heavily used and/or is iconic to the State, eg Martin Place, Hyde Park.
Regional	Precinct containing a landscape feature or urban place that is heavily used and valued by residents of a major portion of a city or a non-metropolitan region eg Sydney Airport.
Local	Precinct containing a landscape feature or urban place valued and experienced by concentrations of residents and/or local recreational users or provides a considerable service to the community. eg Botany Wetlands, Botany Aquatic Centre or Gaiarine Gardens.
Neighbourhood	Precinct containing a landscape feature valued and appreciated primarily by a small number of residents or provides a noticeable service to the community. For example, it provides a seat or resting place, passive recreation and/or some shade and shelter in a local street eg street trees in a local street.

Landscape modification

Landscape modification refers to the change to the landscape character that would occur as a result of the project. This includes direct impact such as the removal of trees or parkland, as well as indirect impact, such as the functional change of an area of open space due to changing land use and access. Landscape modification can be adverse or beneficial. Table 3.2 lists the terminology used to describe the level of landscape modification.

The levels described in Table 3.2 have been informed by the guidance offered by the draft policy *Better Placed: A design led approach: developing an Architecture and Design Policy for New South Wales* (Government Architect NSW, 2018); particularly its overarching principles of: contextual, local and of its place; sustainable, adaptable and durable; inclusive, connected and diverse; safe, comfortable and liveable; functional, efficient and fit for purpose; creating and adding value; engaging, inviting and attractive.

Specific note has been made of the removal of trees and changes to the functioning of footpaths, built form, access to parks and open space as a result of the project.

Table 3.2 Landscape modification levels

Visual modification	Description
Considerable reduction or improvement	Substantial portion of the landscape is changed. May include substantial changes which are contextual, local and of its place; sustainable, adaptable and durable; inclusive, connected and diverse; safe, comfortable and liveable; functional, efficient and fit for purpose; creating and adding value; engaging, inviting and attractive.
Noticeable reduction or improvement	A portion of the landscape is changed. May include substantial changes which are contextual, local and of its place; sustainable, adaptable and durable; inclusive, connected and diverse; safe, comfortable and liveable; functional, efficient and fit for purpose; creating and adding value; engaging, inviting and attractive.
No perceived reduction or improvement	Either the landscape quality is unchanged or if it is, it is largely mitigated by proposed public realm improvements. Does not alter or not noticeably create changes which are contextual, local and of its place; sustainable, adaptable and durable; inclusive, connected and diverse; safe, comfortable and liveable; functional, efficient and fit for purpose; creating and adding value; engaging, inviting and attractive.

3.2.4 Approach to visual impact assessment

This visual impact assessment considers visual amenity as experienced by the users of the site and surrounds. It aims to identify the range of views to the site which may be impacted, including views from residential areas, offices, parks and streets.

To address the potential impact on visual amenity, an assessment was carried out by identifying the existing visual conditions and views that are representative of these conditions. The sensitivity of the view and the magnitude of change expected as a result of the project was then determined, and an overall assessment of the level of impact was made. Viewpoints have been selected to represent groups of receivers including adjacent residents, and users of hotels, parks, footpaths and roads.

Photorealistic artists impressions (photomontages) were prepared for three of these viewpoints. These viewpoints were selected to represent a range of typical project elements and a range of receptor types. The artists impressions were prepared by combining a three-dimensional model of the project with existing site photographs. Project elements were aligned with the photograph and rendered in the 3D. Photo editing techniques were then used to incorporate these elements into the image.

Identify existing visual conditions

A range of viewpoints were selected to illustrate the potential visual influence of the site. These represent publicly accessible viewpoints from a range of locations and viewing situations. Particular attention was paid to views from places where viewers are expected to congregate such as parks and recreation areas and commercial areas for example.

Visual sensitivity

Visual sensitivity refers to the nature and duration of views. Locations from which a view would potentially be seen for a longer duration, where there are higher numbers of potential viewers and where visual amenity is important to viewers, can be regarded as having a higher visual sensitivity. In addition, views recognised by local, state or federal planning regulations would, by nature of their recognition in these documents, increase the sensitivity level of the view.

The sensitivity of a viewpoint is considered in the broadest context of possible views, from those of national importance through to those considered to have a neighbourhood visual importance (Table 3.3).

Table 3.3 Visual sensitivity levels

Visual sensitivity	Description
National	Heavily experienced view to a national icon, eg view to the Sydney Opera House from Circular Quay or Lady Macquarie's Chair.
State	Heavily experienced view to a feature or landscape that is iconic to the State, eg views along the main avenue in Hyde Park.
Regional	Heavily experienced view to a feature or landscape that is iconic to a major portion of a city or a non-metropolitan region, or an important view from an area of regional open space eg View along Qantas Drive at the Sydney Airport, or a view to the CBD from Centennial Park.
Local	High quality view experienced by concentrations of residents and/or local recreational users, local commercial areas and/or large numbers of road or rail users eg view along Botany Road, views within Gaiarine Gardens.
Neighbourhood	Views where visual amenity is not particularly valued by the wider community. This would include views from private residences and local streets.

Visual modification

Visual modification describes the extent of change resulting from the project and the visual compatibility of these new elements with the surrounding landscape. There are some general principles which determine the level of visual modification which include elements relating to the view itself such as distance, landform, backdrop, enclosure and contrast. There are also characteristics of the project itself, such as scale, form, line and alignment. Visual modification can result in an improvement or reduction in visual amenity.

A high degree of visual modification would result if the development contrasts strongly with the existing landscape. A low degree of visual modification occurs if there is minimal visual contrast and a high level of integration of form, line, shape, pattern, colour or texture between the development and the environment in which it is located.

In some circumstances, there may be a visible change to a view which does not alter the amenity of the view. This would be due to the visual absorption capacity of the surrounding landscape and/or the compatibility of the project with the surrounding visual context. Table 3.4 lists the terminology used to describe the level of visual modification.

Table 3.4 Visual modification levels

Visual modification	Description
Considerable reduction or improvement	Substantial part of the view is altered. The project contrasts substantially with surrounding landscape.
Noticeable reduction or improvement	Alteration to the view is clearly visible. The project contrasts with surrounding landscape.
No perceived reduction or improvement	Either the view is unchanged or if it is, the change in the view is generally unlikely to be perceived by viewers. The project does not contrast with the surrounding landscape.

3.2.5 Assessment of night time visual impact

The assessment of night time impact has been carried out with a similar methodology to the daytime assessment. However, the assessment also draws upon the *Guidance for the reduction of obtrusive light, Institution of Lighting Engineers (UK)* (2011), as well as AS4282 Control of the obtrusive effects of outdoor lighting, Standards Australia (1997).

AS4282 identifies three potential effects of lighting, including:

- *"Changes to the amenity of an area due to the intrusion of spill light into otherwise dark areas, both outdoors and indoors, and to the direct view of bright luminaires.*
- *A reduction in the ability of transport system users to see essential details of the route ahead, including signaling systems, due to glare from bright luminaires.*
- *Changes to night time viewing conditions due to a general luminous glow, i.e. skyglow, caused by the scattering of light in the atmosphere."*

This assessment addresses the first of these potential effects to the amenity of an area, with a focus on the outdoors. AS4282 also notes the potential visual intrusion caused by the daytime appearance of outdoor lighting systems. This potential impact has also been addressed in the daytime assessment where relevant.

AS4282 refers public spaces to *AS1158 Lighting for Roads and Public Spaces* which is a design guide that prioritises safety for vehicle and pedestrian users within the public realm and is not directly relevant to this assessment.

The Guidance for the reduction of obtrusive light, Institution of Lighting Engineers (UK) (2011) identifies environmental zones, useful for the categorising of night time landscape settings. This broad-scale approach to the assessment of obtrusive light is consistent with the detail available at a planning approval application stage of the project and is therefore the basis for the method applied to the night time visual assessment contained within this report.

This guidance document defines the typical features of these environmental zones at night, including sky glow, glare and light trespass. The method for night time visual assessment is as follows.

Identify existing night time conditions

The existing night time conditions are described, using the environmental zones identified in *Guidance for the reduction of obtrusive light* (2011), which are:

- E0: Protected dark landscapes
- E1: Intrinsically dark landscapes
- E2: Low district brightness areas
- E3: Medium district brightness areas
- E4: High district brightness areas.

The environmental zone which best describes the existing night time visual condition was selected for each precinct. These zones are typical night time settings and reflect the predominant light levels of each precinct.

Night time visual sensitivity

Each environmental zone has an inherent level of sensitivity as described in Table 3.5.

Table 3.5 Night time visual sensitivity levels

Visual sensitivity	Description
E0 and E1: Dark and intrinsically dark landscapes	Extremely sensitive visual settings at night, such as national parks and state forests.
E2: Low district brightness areas	Highly sensitive visual settings at night including rural, small village, or relatively dark urban locations.
E3: Medium district brightness areas	Moderately sensitive visual settings at night including small town centres or urban locations.
E4: High district brightness areas	Low sensitivity visual settings at night including town/city centres with high levels of night time activity.

Night time visual modification

Following the sensitivity assessment, the level of modification that would be expected within the study area is then identified. These changes are described, as relevant, in terms of:

- Sky glow – the brightening of the night sky above our towns, cities and countryside.
- Glare – the uncomfortable brightness of a light source when viewed against a dark background.
- Light trespass – the spilling of light beyond the boundary of the property or area being lit.

Table 3.6 lists the terminology used to describe the level of visual modification at night.

Table 3.6 Visual modification levels – night time

Visual modification	Description
Considerable reduction or improvement	Substantial change to the level of skyglow, glare or light trespass would be expected. The lighting of the project contrasts substantially with surrounding landscape at night.
Noticeable reduction or improvement	Alteration to the level of skyglow, glare or light trespass would be clearly visible. The lighting of the project contrasts with surrounding landscape at night.
No perceived reduction or improvement	Either the level of skyglow, glare and light trespass is unchanged or if it is altered, the change is generally unlikely to be perceived by viewers. The project does not contrast with the surrounding landscape at night.

3.2.6 Assigning impact levels

Assessment of landscape and visual impact has been made by combining the landscape/visual sensitivity and landscape/visual modification levels for a landscape/visual element and assigning an impact level (Table 3.7).

Assessment of night time visual impact has been made by combining the visual sensitivity of the environmental zone with the night time visual modification for each precinct generally and assigning an impact level (Table 3.8).

Table 3.7 Landscape and visual impact levels

		Sensitivity level				
		National	State	Regional	Local	Neighbourhood
Modification level	Considerable reduction	Very high adverse	Very high adverse	High adverse	Moderate adverse	Minor adverse
	Noticeable reduction	Very high adverse	High adverse	Moderate adverse	Minor adverse	Negligible
	No perceived change	Negligible	Negligible	Negligible	Negligible	Negligible
	Noticeable improvement	Very high beneficial	High beneficial	Moderate beneficial	Minor beneficial	Negligible
	Considerable improvement	Very high beneficial	Very high beneficial	High beneficial	Moderate beneficial	Minor beneficial

Table 3.8 Night time visual impact levels

		Sensitivity level			
		E1: Intrinsically dark landscapes	E2: Low district brightness	E3: Medium district brightness	E4: High district brightness
Modification level	Considerable reduction	Very high adverse	High adverse	Moderate adverse	Minor adverse
	Noticeable reduction	High adverse	Moderate adverse	Minor adverse	Negligible
	No perceived change	Negligible	Negligible	Negligible	Negligible
	Noticeable improvement	High beneficial	Moderate beneficial	Minor beneficial	Negligible
	Considerable improvement	Very high beneficial	High beneficial	Moderate beneficial	Minor beneficial

3.2.7 Mitigation measures

Following the assessment of landscape and visual impact, measures to mitigate potential impacts have been identified. These measures include opportunities for mitigation on and off site, during construction and operation of the project, both day and night.

3.3 Limitations and assumptions

The following technical limitations were experienced in the course of undertaking this study:

- The night time assessment is based on assumptions from daytime field work. The extent of lighting was noted during daytime site visits and will enable adequate assumptions to be made to determine night time character.

4. Existing environment

The Botany Rail Duplication project passes through the Bayside Council local government area between Sydney airport in the north west and Botany Bay in the south east. This Botany Line travels through the mixed-use area of Mascot with industrial, commercial, and residential uses to its north and Sydney Airport is to its south.

The landscape and visual environment of the study area is characterised by its highly developed urban nature. The landscape is dominated by Sydney Airport and its facilities, which include large expanses of open and paved areas (the runways and surrounding land), roads, large terminal and freight facilities, and various other buildings and infrastructure. The airport is highly visible from numerous viewpoints in the study area.

The rail corridor, along with the existing motorways, create strong dividing lines through the area, physically and visually separating the airport from the medium to high density hotel and commercial precinct of Mascot.

As the Botany Line crosses over Southern Cross Drive (M1 motorway) into Botany, it interfaces with the Eastlake golf course to the north and industrial uses to the south. The rail line passes residential areas south of Myrtle Street to Botany.

The project site is predominantly located within and adjacent to the existing rail corridor which is physically separated from the public realm in most areas by landform and infrastructure such as security fencing. Therefore, there are few areas where the public interact with the project site and similarly views to the site are limited.

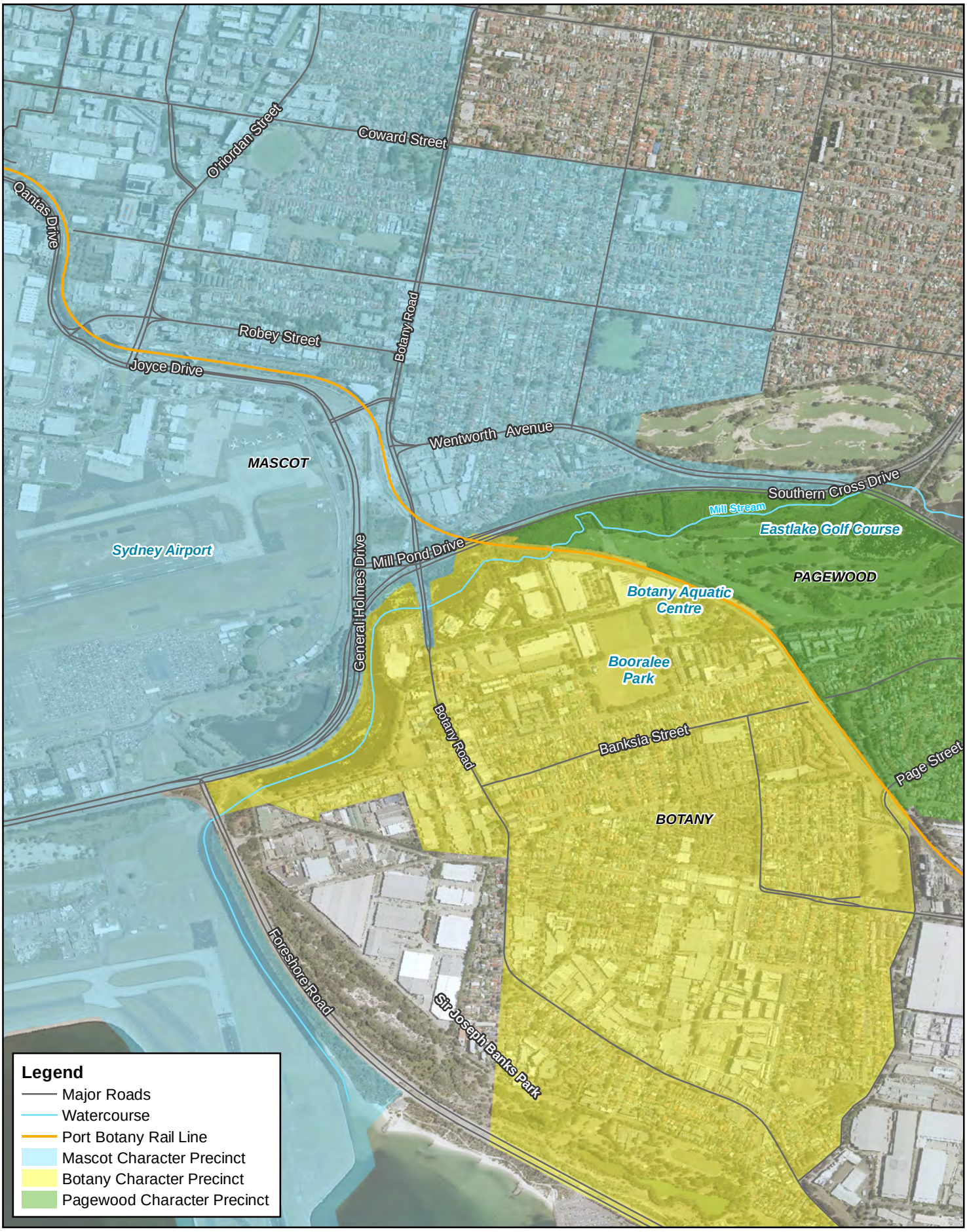
The following landscape impact assessment includes a detailed description of the existing landscape character of the study area.

4.1 Landscape character precincts

The character precincts defined in the *Botany Bay Development Control Plan 2013* have been used for this assessment. These are:

- Mascot character precinct
- Botany character precinct
- Pagewood character precinct.

The location of these character precincts are shown on Figure 4.1.



0 225 450 m

Figure 4.1

Location of Project and Character Precincts

Author: David Naiken
Date: 23/06/2019
Map no: PS113386_GIS_055_A2

4.1.1 Mascot character precinct

This precinct includes the Sydney Airport and nearby commercial, light industrial and retail development associated with the airport. The precinct extends to the north of Southern Cross Way across an area of detached and semi-detached single storey dwellings set amongst high-rise airport-related developments, including hotels and multi-storey car parks and office buildings. O'Riordan Street, Robey Street and Botany Road include shops, cafes and restaurants. There are also offices located along main routes leading to the airport.

Corridors of mature trees are positioned in locations along and adjacent to the existing rail corridor, including between O'Riordan Street and Robey Street and along Qantas Drive. These trees provide a visual separation between the airport and adjacent residential, commercial and retail development. They also provide amenity within this otherwise densely urban landscape.

The rail corridor consists of a single track on an embankment which rises and falls to meet the surrounding levels. There are a mix of bridges and level crossings at road intersections. The O'Riordan Street, Robey Street and Botany Road underbridges are listed on the Transport for NSW S170 Heritage Register, providing visual reminders of early welding techniques for steel bridge and reinforced concrete construction.

The Botany Road underbridge has aesthetic significance as a '*landmark structure over Botany Road with the brick arched piers and wing walls*' (NSWOEH, 2009). The Robey Street bridge is considered to be a '*landmark structure over Robey Street*' (NSWOEH, 2008a). Similarly, the O'Riordan Street bridge '*has aesthetic significance as a landmark structure*' (NSWOEH, 2008b). However, a substantial part of the fabric of these bridges has been covered by advertising signage, reducing their aesthetic quality. The O'Riordan Street underbridge was originally a twin track, single span structure, but was later partially upgraded in c.1983 to precast planks with a topping slab to accommodate the widening of O'Riordan Street below the existing Botany Line.

This character area is dominated by vehicles resulting in low street tree cover, disjointed footpaths with broad signalised pedestrian crossings. Construction works currently underway have diverted footpaths in several locations in the vicinity of O'Riordan Street, reducing legibility and comfort for pedestrians. The scale of the airport and associated facilities and mix of uses in this precinct, and existing character of large-scale linear infrastructure, create a relatively high visual absorption capacity.

In summary, the features of this character area which influence the sensitivity level include:

- Sydney airport which attracts staff and visitors from across the region and wider, with facilities open 24 hours a day, 7 days a week
- heavily trafficked streetscapes which provide access to the airport and adjacent commercial and residential areas
- heritage listed buildings and structures including Beckenham Memorial Church, houses at 1289-1291 Botany Road, and the underbridges at Botany Road, O'Riordan Street and Robey Street
- commercial properties and hotels which attract residents and visitors from the local area
- low density residential areas to the north and east of the rail corridor, on Baxter Road and McBurney Avenue, which are used mainly by residents and their visitors
- mature trees located along and adjacent to the existing rail corridor (particularly the landscaped embankment between O'Riordan Street and Robey Street) and along Qantas Drive, providing visual screening between the airport (and its associated access drives) and adjacent residential, commercial and retail development

Overall, this landscape character precinct is of regional sensitivity.

4.1.2 Botany character precinct

The Botany Wetlands and Water Reserves landscape is listed on the State Heritage Register (Refer to Technical Report 9 Statement of heritage impact) and consists of a series of interconnected open freshwater ponds, former water supply dams, with some shallow swamp areas and adjacent lands used for recreation (golf). The wetlands, including distinctive freshwater wetlands and Banksia scrub, are an integral part of this precinct and have '*special interest as a landmark cultural and recreational landscape for the regional community*' (NSWOEH, 2004). This reserve represents a substantial tract of greenspace with '*important landscape attributes'* including '*extensive areas of water, wetlands, plantings, archaeological features, dunes, remnant indigenous vegetation and fauna - providing notable scenery*' (NSWOEH, 2004).

Much of the wetlands landscape in this precinct is inaccessible for public recreation. The vegetation in and adjacent to the wetlands largely enclose views and provides a visual buffer between the project and adjacent industrial, commercial and residential uses, particularly at Mill Pond. The project site passes through the wetlands and Mill Stream via a bridge, constructed in c.1986, consisting of a single-track concrete bridge with three-spans of rail planks.

South of the wetlands there is a mixture of land uses. This includes light industry along Lord Street, an Aquatic Centre along Myrtle Road, a medium density residential precinct along the railway line between Myrtle Road and Bay Street, and between Banksia and Morgan streets. The heritage listed Booralee Park is a focal point for a precinct of low density residential development south and east of Bay Street.

Low density residential properties along Ellis street are located opposite the rail corridor and a footbridge, with stairs and large ramping structures, provides a connection to Banksia Street and areas to the north.

Publicly accessible areas of the Botany character area are dominated by large roads resulting in low street tree cover, disjointed footpaths with broad signalised pedestrian crossings. The existing rail corridor forms a strong north and eastern border to this precinct. The presence of the existing freight rail corridor and the mix of existing uses increases the absorption capacity of this landscape to accommodate development.

In summary, the features of this character area which influence the sensitivity level include:

- heritage listed landscape at the Botany Wetlands and water reserves, including Mill Stream
- industrial and commercial areas south of the freight line attracting staff and visitors from the local area
- low-density residential areas between Myrtle and Victoria streets, west of the rail corridor, used mainly by residents and their visitors
- several low to medium rise apartment blocks and townhouse developments along Myrtle and Bay streets, overlooking parkland and freight line
- heritage listed landscape at Booralee Park.

Overall, this landscape character precinct is of local sensitivity.

4.1.3 Pagewood character precinct

This is predominantly a precinct of low density residential development, extending northeast from the Botany Line. This includes mainly one and two storey detached dwelling houses of varying architectural styles and periods. There are several low-medium rise apartment blocks and townhouse developments along Myrtle and Bay streets, adjacent to the rail corridor. Those along Myrtle Street overlook Eastlake golf course.

The precinct contains a large area of open space, including Eastlake golf course, Botany Wetlands and water reserves and Gaiarine Gardens. The Botany Line is located along the south and eastern boundary of the precinct. The rail corridor forms a strong visual edge to this precinct, which is otherwise relatively coherent in its residential character with leafy gardens and parkland. The absorption capacity of this landscape to accommodate development is lessened by the finer grained development and consistency of built form type.

In summary, the features of this character area which influence the sensitivity level include:

- heritage listed landscape at the Botany Wetlands and water reserves, including Mill Stream
- low-density residential development located to the northeast of the rail corridor, between Myrtle and Page streets, used mainly by residents and their visitors
- low-medium rise apartment blocks and townhouse developments located along Myrtle and Bay streets, overlooking the Eastlake golf course and freight line
- large areas of open space, including Eastlake golf course and parkland such as Gaiarine Gardens, attracting recreational users.

Overall, this landscape character precinct is of neighbourhood sensitivity.

4.2 Existing views

The following viewing locations were selected as representative of the range of views to the project (see Figure 4.2 for viewpoint locations). They include views to represent groups of receivers including adjacent residents, and users of hotels, parks, footpaths and roads.

Representative viewpoints:

1. View north across the intersection of Joyce Drive and O'Riordan Street intersection
2. View south along Robey Street
3. View south along O'Riordan street
4. View from upper café level of the Citadines Connect Sydney Airport Hotel
5. View southwest from Baxter Road
6. View along Myrtle Street (east of track)
7. View along Myrtle Street (west of track)
8. View along Bay Street (east of track)
9. View east from Ellis Street
10. View south from Banksia Street footbridge
11. View west from Gaiarine Gardens
12. View west from Ocean Street.

The following sections summarise the daytime visual impact identified in the representative viewpoint assessment and site visit observations.

Figure 4.2

Viewpoint Location Plan

Author: David Naiken
Date: 25/06/2019
Map no: PS113386_GIS_056_A2

4.2.1 Viewpoint 1: View north across the Joyce Drive and O'Riordan Street intersection

Viewpoint 1: View north across the Joyce Drive and O'Riordan Street intersection

This view across the intersection of Joyce Drive and O'Riordan Street is experienced by large numbers of people as they visit, depart and travel in and around Sydney Airport. It functions as a gateway and entrance to the city to international and interstate travellers who arrive by air. This view is seen from vehicles and by pedestrians using the footpaths at this intersection.

The existing rail corridor can be seen as it passes over O'Riordan Street, via a concrete bridge structure. The bridge has aesthetic significance as a '*landmark structure across O'Riordan Street*', however has been '*obscured by advertising signage*' (NSWOEH, 2008b). Advertising billboards span either side of the bridge along Qantas and Joyce Drive, largely obstructing views to the rail corridor and freight trains.

A large billboard also spans over the rail corridor to the east of O'Riordan Street between Joyce Drive and Baxter Road. A dense corridor of mature trees along the southern rail embankment between O'Riordan and Robey streets provides a visual backdrop to the view, and a sense of visual separation between the airport and the adjacent commercial and retails areas of Mascot, which can be seen rising above the vegetation in the background of view. These trees make an important contribution to the streetscape character of this view.

This view is considered to be of regional visual sensitivity.

4.2.2 Viewpoint 2: View south along Robey Street

Viewpoint 2: View south along Robey Street

The Robey Street bridge is visible in the centre of this view, passing over Robey Street. This bridge is considered to be a '*landmark structure over Robey Street*', however the '*significant fabric has been covered by signage, reducing its aesthetic quality*' (NSWOEH, 2008a). This view is seen from vehicles and by pedestrians using the footpaths on Robey Street.

The rail embankments either side of the bridge are densely covered by mature trees and shrubs. The bridge and mature vegetation enclose the view, providing a visual buffer between the airport and commercial areas of Mascot seen in the view foreground. These trees and open space (right of view) make an important contribution to the streetscape character.

This view is of local visual sensitivity.

4.2.3 Viewpoint 3: View south along O'Riordan Street

Viewpoint 3: View south along O'Riordan Street

The O'Riordan Street bridge can be seen in the centre of this view, passing over O'Riordan Street. This bridge is considered to have '*aesthetic significance as a landmark structure across O'Riordan Street*', however, the bridge structure has been obscured by a large billboard and support structure, reducing its visual importance in the streetscape. This view is seen from vehicles and by pedestrians using the footpaths on O'Riordan Street.

The landform is generally flat, with the rail corridor raised on an embankment. Freight trains can be seen crossing this view. Beyond the track, and in the background of the view, high-rise hotel development can be seen on the airport side of Joyce Drive.

O'Riordan Street consists of six lanes of traffic with footpaths on each side and a row of mature palm street trees (*Livistona sp.*) alongside the adjacent hotel (right of view). This wide roadway, currently with construction work underway, dominates the foreground of this view.

A surface car park is visible on O'Riordan Street (left of view), with perimeter security fencing. Although this site and the site alongside the rail corridor at Baxter Road currently contain only single storey buildings and signage, these sites are zoned 'Business Development' in the *Botany Bay LEP 2013*, with a maximum height of 44 metres. Development of these sites may further block view to the rail corridor and channel views along O'Riordan Street.

This view is along a heavily trafficked road leading to the airport and therefore has a local visual sensitivity.

4.2.4 Viewpoint 4: View from upper café level of the Citadines Connect Sydney Airport Hotel

Viewpoint 4: View from upper café level of the Citadines Connect Sydney Airport Hotel

There are several hotels in Mascot in the vicinity of the site. This includes the Stamford Plaza Hotel on Robey Street, the Branksome and Citadines Connect Sydney Airport Hotels on Baxter Road. These hotels offer elevated views south across the existing rail corridor, Qantas and Joyce Drive and across the airport, to hotel patrons.

In the view from the Citadines Connect Sydney Airport Hotel, the rail corridor can be seen adjacent to an existing surface carpark, and is lined with a mix of trees and shrubs. The industrial areas of Port Botany are visible in the background of this view. This view is part of a wider panorama which includes unobstructed, elevated views across the airport.

This view is of neighbourhood visual sensitivity.

4.2.5 Viewpoint 5: View southwest from Baxter Road

Viewpoint 5: View southwest from Baxter Road

his view represents street level views from Baxter Road and adjacent low rise residential and commercial development. The view shows the privately run, surface car park which extends along the northern side of the existing freight rail corridor. At this location the track is elevated above the street level on a small embankment. This view is seen from vehicles and by pedestrians using the footpaths on Baxter Road.

Mature trees are located along the southern verge of Baxter Road, creating a leafy streetscape and filtering views to the car park and rail corridor beyond. The billboard signage and associated steel support structures are visible extending over the track (left of view). A medium rise hotel development has been recently built between Baxter Road and Robey Street, however, the land either side of Baxter Road is zoned 'Business Development' in the *Botany Bay LEP 2013,* and could be developed to a maximum height of 44 metres, which may further obstruct views from the street to the rail corridor in time.

As this is a small street, mainly accessing adjacent private uses, this view is considered to have neighbourhood visual sensitivity.

4.2.6 Viewpoint 6: View along Myrtle Street (east of track)

Viewpoint 6: View along Myrtle Street (east of track)

This view shows the interface of the rail corridor with the Eastlake golf course (right of view) and a contemporary low-rise apartment and townhouse development on Myrtle Street. Mature native trees provide a dense vegetated backdrop to the view, and a bushland character to the streetscape. The Botany Line is screened by mature trees and shrubs, obstructing views to the rail corridor and existing freight train activity from Myrtle Street. This view is seen from vehicles on Myrtle Street and represents the view likely from the adjacent residential properties and adjacent areas of the Eastlake golf course.

The living spaces within the residences are orientated north, towards Eastlake golf course to take advantage of this view. This orientation directs away from the rail corridor and over the golf course.

This view is considered to have neighbourhood visual sensitivity.

4.2.7 Viewpoint 7: View along Myrtle Street (west of track)

Viewpoint 7: View along Myrtle Street (west of track)

This view at the end of Myrtle Street shows the interface between the rail corridor and a contemporary low-rise apartment and townhouse development. Mature trees can be seen in the middle ground of this view, between the rail corridor, the street and the residential apartments. The rail corridor is located on a small embankment and can be seen, filtered by these trees. Apartments, on the eastern side of the rail corridor, can be seen in the background of this view. This view is seen from vehicles on Myrtle Street and represents the view likely from the adjacent residential properties and adjacent areas of the swimming pool complex.

The living spaces of these residences (right of view) are orientated north, towards the parkland of the aquatic centre (left of view). This orientation directs views away from the Botany Line, through the street trees and to the park.

This view is considered to be of neighbourhood visual sensitivity.

4.2.8 Viewpoint 8: View along Bay Street (east of track)

Viewpoint 8: View along Bay Street (east of track)

This view at the end of Bay Street shows the rail corridor in the middle ground of the view, with a low-density residential precinct (left of view) and a contemporary low-rise apartment development (to the right and out of view) in Pagewood. This view is seen from vehicles on Bay Street and represents the view likely from the adjacent residential properties.

The Botany Line is raised up on a small embankment, and the rail corridor is fenced. Freight trains would be seen passing across the middle ground of this view. Along the edge of the rail corridor there are some mature trees and shrubs, filtering views to the rail corridor somewhat.

Fence panels along the rear boundaries and garden vegetation in residential properties between Myrtle and Banksia Street block ground level views to the track. However, rooms and balconies at the second and third level of these properties would have views over the existing rail corridor.

This view is considered to have neighbourhood visual sensitivity.

4.2.9 Viewpoint 9: View east from Ellis Street

Viewpoint 9: View east from Ellis Street

This view from Ellis Street includes the rail corridor in the foreground of the view. In this location, the rail corridor is located between low rise residential properties. The rail corridor is enclosed by palisade fencing and the track is slightly raised on a small embankment, with grassed verges. There are clear views to the track from adjacent properties. A footbridge is visible to the right of view, extending over the track between Banksia Street and Gaiarine Gardens. This view is seen from vehicles on Ellis Street and represents the view likely from the adjacent residential properties.

This view is considered to have neighbourhood visual sensitivity.

4.2.10 Viewpoint 10: View south from Banksia Street footbridge

Viewpoint 10: View south from Banksia Street footbridge

This elevated view from the Banksia Street footbridge includes a wide expanse of the rail corridor, which spans approximately 50 metres at this point. Gaiarine Gardens can be seen to the east (left of view) and medium rise residential properties to the west (right of view). These residential properties are two and three story apartment blocks and townhouses. This view is seen through the throw screens on the bridge by pedestrians using this bridge. This bridge provides a connection point for pedestrians between Pagewood and Botany suburbs.

The eastern side of the rail corridor includes tall light posts (left of view), and a dual track, with an additional siding (Gleco siding) further to the west. The Stephen Road overpass is visible in the centre of view, crossing over the track west of Page Street. Beyond the overpass, the plant and structures at the Botany Industrial Park are visible in the centre of the view.

This view is considered to have neighbourhood visual sensitivity.

4.2.11 Viewpoint 11: View west from Gaiarine Gardens

Viewpoint 11: View west from Gaiarine Gardens

This view is from Gaiarine Gardens, a local park and gathering place used by residents and visitors, to the suburban area of Pagewood. The park includes formal gardens, lawns and play equipment, with a dense corridor of mature trees and shrubs alongside the existing rail corridor, allowing only filtered views and glimpses to the track and freight train activity. The Botany Line is located in a small cutting, further enclosing views to the track and freight trains.

This view is considered to have local visual sensitivity.

4.2.12 Viewpoint 12: View west from Ocean Street

Viewpoint 12: View west from Ocean Street

Ocean Street is a suburban street east of the Botany Line, linking Banksia Street with the Stephen Road overpass and Page Street. The eastern side of the street is flanked by low density residential development, mostly single storey detached dwellings overlooking Gaiarine Gardens. This view is seen from vehicles and pedestrians on Ocean Street and represents the view likely from the residential properties which face the rail corridor.

In this view the existing rail corridor is located in a small cutting. Mature street trees on both sides of the street filter views between the residences and the Botany Line. The rail corridor is secured by a mixture of steel palisade and chainmesh fencing. The medium-rise residential development to the west of the track is glimpsed through the existing rail corridor vegetation.

This view is considered to have neighbourhood visual sensitivity.

4.3 Existing visual conditions at night

4.3.1 Mascot character precinct

This precinct is an area of **E4: High district brightness** due to the concentration of lighting at Sydney Airport and adjacent brightly lit commercial, light industrial and retail buildings within Mascot. The major roads of Botany Road, Joyce and Qantas Drives, and O'Riordan Street are brightly lit with streetlights, billboard lighting and vehicle headlights which all contribute to the dynamic night time scene. There would also be train headlights from existing freight train movements along the Botany Line.

4.3.2 Botany character precinct

This precinct is an area of **E3: Medium district brightness**, where there is a lower level of lighting associated with the predominantly low and medium rise residential development in Botany. The headlights of trains passing along the Botany Line would increase the night time brightness of areas in close proximity to the rail corridor. This precinct also includes light industrial and commercial uses at Lord and Bay Streets, and the Botany Aquatic Centre beside the Botany Line, which would be brightly lit at night. The northern part of this precinct at Mill Stream and the golf course, however, would be predominantly dark at night. The street lighting and vehicle moving headlights from adjacent roads (Southern Cross Drive and Botany Road) would spill into these open space areas.

4.3.3 Pagewood Character precinct

This precinct is an area of **E3: Medium district brightness,** it is located to the east of the Botany Line, including the Eastlake golf course and low and medium rise residential buildings at Pagewood. Streetlights within the residential areas and the train headlights along the Botany Line, would further add to the night scene. Mature vegetation along the edge of the rail corridor would assist with reducing the light spill to adjacent residential areas. The lighting from residential areas contrast with the low-lit natural area along Mill Stream and adjacent golf course, in the northern part of the precinct.

5. Assessment of impact during construction

5.1 Overview of construction works

A number of early and enabling works would be required to be undertaken prior to the main civil and track work associated with the duplication of the rail line. The enabling works relevant to this landscape and visual impact assessment are:

- construction works related to track realignment / slewing track, utility service relocation and/or protection compound site set up
- billboard removal
- majority of vegetation clearance.

The construction works relevant to this landscape and visual impact assessment are:

- construction of the new and upgraded track, drainage and signalling
- demolition and construction of new bridges and retaining walls
- reinstatement of billboards and signage infrastructure.

5.2 Landscape impact during construction

The following section summarises the potential impact identified for each character precinct and includes impact during construction.

5.2.1 Mascot character precinct

The rail corridor would be widened, retaining walls would be installed to the north and south of the Botany Line and new track would be laid. Vegetation would be trimmed and removed to the north and south of the existing rail corridor accommodate the works. This would include the removal of the mature trees during the enabling works, on the northern embankment between Robey Street and O'Riordan Street across the rail corridor from the Stamford Hotel.

New bridges would be constructed at Robey Street and O'Riordan Street adjacent to the existing bridges. Freight line traffic would be switched to the new track, and the heritage listed O'Riordan and Robey Street underbridges would be demolished, with new bridges constructed on the new northern (up) side. The Botany Road underbridge would be retained and therefore continue to be a *'landmark structure'* (NSWOEH, 2009). However, the Robey and O'Riordan Street bridges, which are also identified as *'landmark structures'* in their heritage listings, would be demolished. Whilst the O'Riordan Street bridge has been modified and views to all of these structures has been greatly obstructed by advertising signage, their removal would temporarily alter the legibility of this precinct by removing the 'gateway' experience of passing under these bridges.

A number of the billboards located along Qantas Drive and Joyce Drive would be removed during the enabling works. Where a billboard cannot be relocated in the immediate vicinity to facilitate the space for main construction works to commence, it would be reconstructed following main construction works in that area or reconstructed elsewhere along the rail corridor.

Vehicular traffic diversions and lane closures are expected during the construction period, associated with the Robey Street and O'Riordan Street bridge works and potentially for utility relocation during enabling work. It expected that some pedestrian and cycle routes would be diverted and reduced in width adjacent to the construction work area.

The level of comfort and amenity for pedestrians and road users would also be reduced, due to temporary partial road and footpaths closures or realignment, presence of construction traffic and activity and removal of vegetation within the project site.

Overall, the level of modification would result in a noticeable reduction in the landscape quality of this precinct during construction. Whilst this precinct has a relatively high visual absorption capacity, the character of the construction works would reduce the quality of the landscape particularly where the trees are removed, and new bridges constructed. as this is a landscape of regional sensitivity, this would result in a **moderate adverse landscape impact** during construction.

5.2.2 Botany character precinct

The construction works would generally be located within and adjacent to the existing rail corridor. The project would cross the Botany Wetlands at the northern part of the precinct, requiring removal of vegetation during the enabling works in the Mill Stream area to widen the earth embankments supporting the track and construct the new Mill Stream bridge and embankments south of the existing bridge. Vegetation would also be removed to the south of the existing track to allow access for the installation of the new bridge structure, track duplication and access track, including vegetation within the wetlands, alongside the track at the aquatic centre, and at the end of Myrtle Street.

The existing embankments would be replaced by a retaining wall which would be constructed along the southern side of the Botany Line from Southern Cross Drive to Mill Stream. Access to this part of the construction work area would be located at the end of Myrtle Street.

A site compound and material storage area would be located in the rail reserve between Banksia Street and Stephen Road, adjacent to medium rise apartments and townhouses. As this area is frequently used as a compound and for access for maintenance of the current operating line, there would be only a small change in character.

Other material storage areas would be located in the rail corridor adjacent to the industrial precinct at Lord Street and at the corner of Botany Road and Southern Cross Way.

There would be some additional construction character introduced to these areas, including construction vehicles within the surrounding residential areas to access the work area and site compounds. However, due to existing maintenance activity in these areas, it is expected that there would be a noticeable reduction in the character of this precinct during construction. As this precinct is of local sensitivity, this would result in a **minor adverse landscape impact** during construction.

5.2.3 Pagewood character precinct

The rail alignment would cross the Botany Wetlands landscape along the southern edge of the precinct. An access track would be installed between the Mill Stream bridge and Myrtle Street, north of the existing track, and between Bay and Banksia streets. This would require the removal of small amount of vegetation during the enabling works, within the rail corridor alongside the golf course and at the end of Myrtle Street. The existing access gates to the rail corridor would be retained at Myrtle, Bay and Banksia streets.

An area of the rail corridor north of the track, west of Myrtle Street alongside the golf course (approximately 125 metres long) would be used as a material storage and laydown area. The entire work area would be secured by fencing and hoarding, providing a visual barrier to adjacent uses. Gaiarine Gardens would not be altered during construction. Banksia Street footbridge would remain open during construction.

It is expected that there would be a considerable reduction in the landscape character of the southern edge of this precinct due to the introduction of construction activities in close proximity to neighbouring properties. As this precinct is of neighbourhood sensitivity, there would be a **minor adverse landscape impact** during construction.

5.3 Visual impact during construction

The following section summarises the potential visual impact of the project during construction.

5.3.1 Viewpoint 1: View north across the Joyce Drive and O'Riordan Street intersection

The construction work area would be established along the rail corridor, and across the north eastern verge of Joyce and Qantas Drive. Site fencing and hoarding securing the site would be seen in the middle ground of this view, extending along Joyce and Qantas Drive. A compound would be located at the corner of Qantas Drive and Robey Street and the verge at the corner of O'Riordan Street and Qantas Drive would be used as a material storage and laydown area. The main construction access points would be off Qantas Drive and Joyce Drive. A number of existing billboards located along Qantas Drive, Joyce Drive, Robey Street and O'Riordan Street would be removed during the enabling works. The views towards some billboards being retained during the construction works, may be partly obstructed by construction equipment, such as plant and cranes, at times.

A concrete retaining wall would be installed along the southern side of the track, between O'Riordan Street and Robey Street, to retain the widened rail corridor. Some of the trees along the rail corridor seen in this view would be removed to accommodate this work.

Following construction of the retaining walls construction and demolition works of Robey Street and O'Riordan Street bridges would be seen. There would be temporary road closures visible along O'Riordan Street at times. The bridge would be replaced with twin single span concrete bridge structures. A piling pad would be visible at the top of the embankment and precast bridge elements would be seen during delivery and installation. Installation would involve a mobile crane set up in the median south of the bridge. After the bridge, tracks, retaining walls and signalling have been installed, finishing works would be visible, including works to rectify adjacent roads, pedestrian and cyclist paths, reinstatement of the compound area and billboards. Billboards would be reinstated generally in the same location as they are currently positioned, situated to maximise views towards them.

The works would introduce a construction character that would extend across much of this view. Due to the absorption capacity of this urban landscape, the project would create a noticeable reduction in the amenity of this view, which is of regional sensitivity, resulting in a **moderate adverse visual impact** during construction.

5.3.2 Viewpoint 2: View south along Robey Street

The construction work area would be established along the rail corridor and site fencing and hoarding would be visible from Robey Street and adjacent commercial and retail development. This would require the removal of the mature trees and vegetation alongside the Stamford Hotel.

A new access gate would be seen alongside the southern bridge abutment. Works to widen the rail corridor and install the new tracks on the widened embankment would be screened in part by the adjacent hotel and vegetation within the open space. The demolition of the Robey Street bridge would be prominent in this view, with road closures also visible in the middle and foreground of the view during these works.

Construction of the twin single span concrete bridge would be seen, with large concrete beams installed by mobile crane. Retaining walls would be constructed along the northern side of the track, extending from the bridge abutments either side of Robey Street. After the bridge, tracks, retaining walls and signalling has been installed, the finishing works would be visible, including roads and footpath rectification works.

Due to the scale of the works, removal of trees and the close proximity to the adjacent commercial and retail areas of Mascot, there would be a considerable reduction in the amenity of this view. As this is a view of local sensitivity, this would result in a **moderate adverse visual impact** during construction.

5.3.3 Viewpoint 3: View south along O'Riordan Street

The construction work area would be established within the rail corridor. Fencing and hoarding would partially obstruct street level views to the work area. The billboard signs on the bridge and embankments would be removed and relocated during construction.

Activity within the work area, including construction of embankments and a retaining wall (to the south of the track) would be seen in the middle ground of this view. Demolition of the O'Riordan Street bridge would be prominent in this view, from the road corridor, footpaths and from adjacent south facing offices and hotel rooms. The bridge would be replaced with a twin single span concrete bridge with large concrete beams spanning across O'Riordan Street. The precast bridge elements would be seen during delivery and installation, via a using mobile crane set up in the O'Riordan Street median and either side of the bridge. Upon completion of the bridges, tracks and signalling would be installed, and the finishing works, including works to rectify the adjacent roads, foot and cycle paths would be visible.

The works would introduce a construction character that would extend across much of this view. Overall this change would create a considerable reduction in the amenity of this view, which is of local sensitivity, resulting in a **moderate adverse visual impact** during construction.

5.3.4 Viewpoint 4: View from upper café level of the Citadines Connect Sydney Airport Hotel

The construction work area would be seen in the background of views from the hotels to the north of the rail corridor such as the Citadines Connect Sydney Airport Hotel. The work area would extend east along the rail corridor and include works to construct embankments to widen the rail corridor and install the new track. The existing trees along the southern side of the rail corridor would be removed during enabling works. The billboard extending over the rail corridor would, be retained. This construction activity would be seen from the upper level café and hotel rooms facing the rail corridor.

Overall, this change would create a noticeable reduction in the amenity of this view, which is of neighbourhood sensitivity, resulting in a **negligible visual impact** during construction.

5.3.5 Viewpoint 5: View southwest from Baxter Road

The construction work area would be seen in the middle to background of this view, extending along the rail corridor, with fencing and hoarding securing the perimeter of the site. This would require the removal of some vegetation along the existing rail embankment.

The existing car park and street trees along Baxter Road, in the middle ground of the view, would remain. and the existing street trees would also be unchanged, in the middle ground of the view.

Works to construct embankments to widen the rail corridor and install the new track would be visible through the existing foreground elements. The billboard extending over the rail corridor, in the background of the view, would be retained. This construction activity would be seen from the road corridor, footpaths and from adjacent south facing rooms from adjacent residences, offices and hotel rooms.

Overall, this change would create a noticeable reduction in the amenity of this view, which is of neighbourhood sensitivity, resulting in a **negligible visual impact** during construction.

5.3.6 Viewpoint 6: View along Myrtle Street (east of track)

The golf course, buildings and street trees in the foreground of this view would be retained. A construction work area would be established within the rail corridor, with fencing and hoarding visible at the end of Myrtle Street. A material storage and laydown area would be installed within the rail corridor north of Myrtle Street, adjacent to Eastlake golf course. The vegetation which overhangs the rail corridor in this section of the project site would be trimmed.

The existing gate on the southern side of Myrtle Street would be used during construction to access the site and a new access road would be installed within the rail corridor, alongside the golf course. Construction of the rail corridor embankments to widen and install the new track would occur on the western side of the rail corridor.

Overall this construction activity would create a considerable reduction in the amenity of this view, which is of neighbourhood sensitivity, resulting in a **minor adverse visual impact** during construction.

5.3.7 Viewpoint 7: View along Myrtle Street (west of track)

A construction work area would be established within the existing rail corridor, with fencing and hoarding visible at the end of Myrtle Street. A new access gate would be installed at the end of Myrtle street, however it is not anticipated that heavy vehicles would travel along Myrtle Street to access the work area. The residences and street trees in the foreground of this view would be retained, however the removal of some vegetation may be required at the end of the street, to provide access to the work area.

Fencing and hoarding would surround the site and filter views from the ground level rooms in apartments beside the rail corridor. A new access gate would be installed at the end of Myrtle Street and vehicles, machinery and plant would be seen accessing the site, and within the work area undertaking construction activities to widen the existing embankment to the west (towards Myrtle Street) and install the new track.

Overall this construction activity would create a considerable reduction in the amenity of this view of adjacent residences, which is of neighbourhood sensitivity, resulting in a **minor adverse visual impact** during construction.

5.3.8 Viewpoint 8: View along Bay Street (east of track)

The construction work area would be established within the existing rail corridor. Site fencing and hoarding would be seen at the end of Bay Street, in the middle ground of the view. The existing gate on the southern side of Bay Street would be used during construction to access the site and install a new access road within the rail corridor. Some construction vehicles would be seen entering the site in this view.

Earthworks and vegetation clearing would be required in this area, to widen the rail embankment and install the new access road. This construction activity would be seen in close proximity from rooms and balconies at the second and third level of properties adjacent to the rail corridor.

Overall this construction activity would create a considerable reduction in the amenity of this view, which is of neighbourhood sensitivity, resulting in a **minor adverse visual impact** during construction.

5.3.9 Viewpoint 9: View east from Ellis Street

The construction work area would be established within the existing rail corridor, extending along Ellis Street. The existing access gates mid-way along Ellis Street and at the corner of Banksia Street, beside the footbridge, would provide access for construction vehicles. Heavy vehicles, machinery and plant would be seen travelling along Ellis Street, entering the work area and within the rail corridor. Construction activity would include earthworks and clearing of vegetation to widen the rail embankment and install the new track, construction of access roads on both sides of the track. Traffic management controls would be seen along Ellis Street, and may include temporary lane closure. The footbridge would remain open during construction.

Overall this construction activity would create a considerable reduction in the amenity of this view, which is of neighbourhood sensitivity, resulting in a **minor adverse visual impact** during construction.

5.3.10 Viewpoint 10: View south from Banksia Street footbridge

The existing rail corridor would be converted into a work area, with site fencing and hoarding visible along the site perimeters. A storage and compound area would extend approximately 200 metres along the western side of the rail corridor, servicing the southern end of the project. The work area and compound would be utilised for possession

period co-ordination and would also be for delivery of materials, laydown, stockpiling and storage, as well as site offices and staff parking. This area would also operate in conjunction with the Gelco siding to provide access for hi-rail plant and track machine stabling and parking.

Construction of the new track would be visible, merging into the existing track, to the east. Installation of a new access track would also be seen to the west of the track, in a U-turn formation towards the main site access gate at the corner of Banksia and Ellis Street.

The vegetation alongside the track perimeter would be retained and filter views from adjacent properties, including the residences between Banksia and Morgan Streets and visitors to Gaiarine Gardens.

Overall, this construction activity would create a considerable reduction in the amenity of this view, which is of neighbourhood sensitivity, resulting in a **minor adverse visual impact** during construction.

5.3.11 Viewpoint 11: View west from Gaiarine Gardens

The existing rail corridor would be partly converted to a work area and would be seen in the background of this view. Site fencing and hoarding would be visible along the site perimeter. A storage and compound area would extend approximately 200 metres along the western side of the rail corridor. The vegetation along the rail corridor boundary and within the park would be retained and would continue to filter views to the rail corridor. However, due to the close proximity of construction activity, there would be a noticeable reduction in the amenity of this view, which is of local sensitivity, and a **minor adverse visual impact** during construction.

5.3.12 Viewpoint 12: View west from Ocean Street

Construction activity at the western side of the Botany Line would be visible in the middle to background of the view. This would include a major compound and materials storage area with site offices and staff parking, internal access road, storage of construction equipment and stockpiles. Construction of the new track duplication would be mostly located on the eastern side of the rail corridor at the bottom of the cutting and would not be seen from this location. Vegetation along the edge of the rail corridor, in the foreground of this view, would be retained and filter views to the compound in the background.

Overall, this construction activity would create a noticeable reduction in the amenity of this view, which is of neighbourhood sensitivity, resulting in a **negligible visual impact** during construction.

5.4 Visual impact at night during construction

5.4.1 Mascot character precinct

The following assessment considers the potential night time visual impact for each of the landscape character precincts during construction (refer 6.1.1 Landscape Character areas).

Due to the positioning of the project site in an operational rail corridor, over busy roadways and adjacent to Sydney Airport, there would be construction activity within the work area at the night time in this precinct. At street level the site hoarding may contain some of the light from within the work area, from Joyce and Qantas Drives, O'Riordan Street and Baxter Road. However, there would be lighting visible above these barriers and in active construction areas including at the bridge works, site offices, construction plant and equipment storage areas and at the construction workforce parking areas. This lighting would be seen from adjacent streets, residential and commercial areas.

South facing rooms at the Stamford Plaza Sydney Airport and other hotels on Baxter Road would have elevated views over the work area (including the temporary crane zones) and the site compound and laydown area at Joyce Drive. The removal of mature trees along the rail embankments at the Robey and O'Riordan Street bridges, would also potentially allow construction lighting to be seen from adjacent residential and commercial properties which overlook the site.

There would be a small number of 24-hour deliveries of large equipment required, which would be accompanied by traffic control measures. Whilst there would be additional lighting at the site and compound at General Holmes Drive, the brightly lit adjacent areas of Botany Road, Joyce and Qantas Drives, and O'Riordan Street, would assist in the absorption of the lighting into this setting.

Overall, this work would result in a noticeable change to the surrounding night scene. As this precinct is of high district brightness environment, the proposed lighting would result in a **negligible visual impact** at night.

5.4.2 Botany character precinct

Night works would be required within the work area and compound between Banksia Street and the Stephen Road overbridge occasionally and predominantly during road possessions. The site fencing and hoarding may contain some of the light from within the work area at street level. However, there would be lighting above the site, and likely seen from Myrtle and Ellis streets, and from the adjacent commercial and residential buildings to the west of the Botany Line. The upper levels of adjacent buildings may also have elevated views over the work area, material laydown and storage areas, and compound, including the site offices, construction plant and equipment storage, and construction workforce parking areas. Residences between the Banksia Street and the Stephen Road overbridge would have close range elevated views to the compound. There would also be 24-hour deliveries of large equipment, accompanied by traffic control crews with lighting.

Overall, this work would result in a noticeable change to the amenity of the views at night in the vicinity to the Botany Line. As this precinct is of medium district brightness environment, the proposed lighting would result in a **minor adverse visual impact** at night.

5.4.3 Pagewood character precinct

Night works would be required within the work area and compound between Banksia Street and the Stephen Road overbridge. The site fencing and hoarding would contain much of the light from within the work area at street level from Myrtle, Bay and Banksia streets and from the ground level of adjacent residential buildings to the east of the Botany Line. However, the upper levels of these buildings may have elevated views over the work area and compound.

Overall, there would be a noticeable reduction in the amenity of views from areas adjacent to the site. As this precinct is of medium district brightness environment, the proposed lighting would result in a **minor adverse visual impact** at night.

6. Assessment of impact during operation

6.1 Overview of operational project features

The project would comprise the operation of a new second track predominately within the existing ARTC rail corridor for a distance of about three kilometres between Mascot and Botany. The operational features of the project which are relevant to this landscape and visual impact assessment area:

- new tracks located on the southern side of the existing track four new bridges (Robey Street bridge, O'Riordan Street bridge, Southern Cross Drive bridge and Mill Stream bridge)
- new embankments and retaining walls
- relocated and reinstated billboards
- reinstated vegetation.

6.2 Landscape impact during operation

The following section summarises the potential impact identified for each character precinct and includes impact during operation.

6.2.1 Mascot character precinct

The new track would be generally built on the down side (southern side) of the existing rail corridor, creating an overall wider rail corridor with a consistent character to the existing Botany Line. The additional freight trains and signalling would intensify the influence of this element within this character precinct.

The Botany Road underbridge would be retained and therefore continue to be a *'landmark structure'* (NSWOEH, 2009) in this precinct. The Robey and O'Riordan Street bridges would be removed and replaced with twin single span concrete structures. Whilst the Robey and O'Riordan Street bridges are identified as *'landmark structures'* in their heritage listings, the O'Riordan Street bridge has been modified and views to all of these structures has been greatly obstructed by advertising signage so that their replacement would not be out of character.

Retaining walls would be located between King Street and O'Riordan Street on both sides of the Botany Line, and to the south of the track, for about 115 metres along Joyce Drive. Two other retaining walls would be located between Botany Road and Southern Cross Way, south of the track. There would be a thin corridor of trees retained in this area, retaining some of the vegetated character of this part of the precinct.

Whilst the works would be located within an area with a strong character of linear infrastructure associated with the existing rail corridor, Qantas and Joyce drives, the mature vegetation would be replaced by a retaining wall and new access gate and the visual influence of the freight rail on the character of this precinct would be slightly increased in this area. Overall, it is expected that there would be a noticeable reduction in the landscape character of this precinct, which is a landscape of regional sensitivity, resulting in a **moderate adverse landscape impact** during operation.

6.2.2 Botany character precinct

The new track would be generally built on the down side of the existing rail corridor. The additional freight trains and signalling would result in a higher density of rail elements within the existing rail corridor. This would have a greater influence within the precinct, reinforcing the strong line of the rail corridor as a northern boundary to this precinct.

The existing Mill Stream bridge would be retained and there would be a new bridge located alongside the existing bridge. The material storage areas and site compounds would be reinstated as rail reserve which is the same as the existing use.

Overall, it is expected that there would be a noticeable reduction in the character of this precinct during operation. As this is a landscape of local sensitivity, there would be a **minor adverse landscape impact** during operation.

6.2.3 Pagewood character precinct

The existing track for the Botany Line would be realigned and new track would be installed on the western side of the rail corridor. A new access track would be located along the eastern side of the rail corridor, and the access gate at Myrtle and Bay streets would be maintained. Whilst being consistent with the existing rail corridor use, there would be an increase in the amount of freight activity within the existing rail corridor. Additional freight trains and signalling would intensify the influence of this character element within this precinct, reinforcing the strong line the rail corridor as a southern boundary to this precinct.

The material storage and laydown area would be reinstated as rail reserve and cleared areas would be revegetated similar to the preconstruction environment. There would be an ongoing reduction in amenity due to the trees having been removed during construction to accommodate the works.

Overall, it is expected that there would be a noticeable reduction in the landscape character of this precinct during operation. As this is a landscape of neighbourhood sensitivity, there would be a **negligible landscape impact** during operation.

6.3 Visual impact during operation

The following section summarises the potential visual impact during operation.

6.3.1 Viewpoint 1: View north across the Joyce Drive and O'Riordan Street intersection

Viewpoint 1: View north across the Joyce Drive and O'Riordan Street intersection

Viewpoint 1: View north across the Joyce Drive and O'Riordan Street intersection, photomontage

The new O'Riordan Street Bridge would be seen in the middle ground of this view. It would be a twin single span concrete bridge with large concrete beams spanning across O'Riordan Street. The new structures would be similar in appearance to the existing bridge. Freight trains would be seen in this view, crossing the new twin bridges.

There may be some limited trees and understorey streetscape planting reinstated along the verge of Qantas and Joyce Drive. The impacted billboards would be reinstated generally in the same location as they are currently located, situated to maximise views towards them.

Overall, this change would result in no perceived change in the amenity of this view, which is of regional sensitivity, resulting in a **negligible visual impact** during operation.

6.3.2 Viewpoint 2: View south along Robey Street

The new Robey Street rail bridge would be visible in the centre of this view, including two large precast concrete beams spanning across Robey Street with concrete headstocks and abutments. The new structures would be similar in scale and appearance to the existing bridge. Freight trains would be seen intermittently, travelling across the new twin bridges. Concrete retaining walls extending from the bridge abutments would be visible either side of the bridge. The new bridges would be more visually prominent in the view due to the additional width of two bridges which would be more visually heavy engineering style structures.

New fencing would also be seen along the rail corridor, with new planting installed where feasible to visually integrate the retaining walls and embankments into the existing setting and screen views from adjacent commercial properties. The existing trees on the southern side of the track, would continue to filter views to the airport, at the background of the view.

Overall, there would be a noticeable reduction in the amenity of this view which is of local sensitivity, resulting in a **minor adverse visual impact** during operation.

6.3.3 Viewpoint 3: View south along O'Riordan Street

The billboard would be reinstated on the new O'Riordan Street bridge subject to consultation with the owner. This billboard would be reinstated generally in the same location and replaced like for like.

Although the bridge would be replaced, the works would be largely screened by the reinstated billboard and absorbed into this highly urban view. This would result in no perceived change in the amenity of this view which is of local sensitivity, and a **negligible visual impact** during operation.

If the billboard cannot be replaced on the bridge or in its immediate vicinity, it would be relocated along the existing rail corridor and combined with existing structures (such as bridges) where practicable in order to minimise the potential to introduce structures in areas where there are minimal existing structures and infrastructure. In this instance, the O'Riordan Street bridge would be visible from this location. However, due to the high visual absorption capacity of this urban view, which includes heavily trafficked roads and the existing rail corridor, this outcome would not reduce the amenity of this view. Therefore, there would be no perceived change in the amenity of the view, which is of local sensitivity, resulting in a **negligible visual impact** during operation.

6.3.4 Viewpoint 4: View from upper café level of the Citadines Connect Sydney Airport Hotel

Viewpoint 4: View from upper café level of the Citadines Connect Sydney Airport Hotel

Viewpoint 4: View from upper café level of the Citadines Connect Sydney Airport Hotel, photomontage

Additional freight trains would be seen in the background of this view, travelling along the widened rail corridor. The existing vegetation would remain. The view to additional rail infrastructure would be seen at a distance and would be consistent in character with the existing rail corridor and freight train activity in the view.

As only a relatively small area of this view would be modified, the works would be largely absorbed into this highly urban view. This would result in no perceived change in the amenity of this view which is of neighbourhood sensitivity, and a **negligible visual impact** during operation.

6.3.5 Viewpoint 5: View southwest from Baxter Road

The car park and leafy streetscape of Baxter Road would remain in the foreground of this view. The widened rail corridor on an embankment would be visible in the background of view, with trains seen travelling across the view as per the existing scenario. These elements would be closer to the viewer. There would also be unobstructed, elevated views over the rail corridor from the south-facing rooms and balconies of the medium rise hotel development in Baxter Road as per the existing scenario.

Overall, this would result in a noticeable reduction in the amenity of this view, which is of local sensitivity, resulting in a **negligible visual impact** during operation.

6.3.6 Viewpoint 6: View along Myrtle Street (east of track)

Additional freight trains may be seen in the middle ground of this view, filtered through the existing vegetation. The materials storage and laydown area would be reinstated and revegetated.

Overall this would result in a noticeable reduction in the amenity of this view, which is of neighbourhood sensitivity, resulting in a **negligible visual impact** during operation.

6.3.7 Viewpoint 7: View along Myrtle Street (west of track)

There would be less mature trees in the middle ground of this view, and any construction areas would have been restored. The access gate would be closed and not used during operation.

Overall, it is expected that the project would result in a noticeable reduction in the amenity of this view. This is a view of neighbourhood sensitivity, resulting in a **negligible visual impact** during operation.

6.3.8 Viewpoint 8: View along Bay Street (east of track)

Service vehicles would be seen intermittently, accessing the rail corridor via the Bay Street gate. The Botany Line would also be visible from the rooms and balconies at the second and third level of properties adjacent to the rail corridor, with no noise walls or vegetation filtering these views. There would be views across a wider rail embankment, with two tracks carrying additional trains.

On balance, there would be a noticeable reduction to the amenity of this view, which is of neighbourhood sensitivity, resulting in a **negligible visual impact** during operation.

6.3.9 Viewpoint 9: View east from Ellis Street

There would be views across a wider rail embankment in the foreground of this view, with additional tracks and trains. The Botany Line would be visible from the street as well as the gardens, rooms and balconies at the first and second level of properties adjacent to the rail corridor. The rail corridor and trains would be closer to these residential properties, however, the existing vegetation would filter these views. Overall, there would be a noticeable reduction to the amenity of this view, which is of neighbourhood sensitivity, resulting in a **negligible visual impact** during operation.

6.3.10 Viewpoint 10: View south from Banksia Street footbridge

Viewpoint 10: View south from Banksia Street footbridge

Viewpoint 10: View south from Banksia Street footbridge, photomontage

The Botany Line would be seen in the centre of this view, merging with the existing track beside Gaiarine Gardens. A new access track would be seen to the west of the track (left of view), in a U-turn formation leading to the main site access gate at the corner of Banksia and Ellis Street (out of view).

The remainder of the site compound and materials storage area would be reinstated as grassed rail verge. The vegetation along the rail corridor boundaries would be retained and continue to filter views from adjacent uses, including residences between Banksia and Morgan Streets (right of view) and visitors to Gaiarine Gardens (left of view).

Although a wider rail corridor and more freight trains would be seen in this view, travelling along both tracks, there would be no perceived reduction to the amenity of this view. This is a view of neighbourhood sensitivity, resulting in a **negligible visual impact** during operation.

6.3.11 Viewpoint 11: View west from Gaiarine Gardens

The dense, mature vegetation at the boundary of the existing rail corridor and Gaiarine Gardens would continue to filter and screen views to the rail corridor. There would be glimpses to additional freight trains travelling along the Botany Line in the background of this view, beyond the vegetation.

Overall, there would be no perceived reduction to the amenity of this view, which is of local sensitivity, resulting in a **negligible visual impact** during operation.

6.3.12 Viewpoint 12: View west from Ocean Street

The compound to the west of the Botany Line would be reinstated, following the completion of construction. The additional track would not be visible from this location.

Overall, there would be no perceived reduction to the amenity of this view. This is a view of neighbourhood sensitivity, resulting in a **negligible visual impact** during operation.

6.4 Visual impact at night during operation

The following assessment considers the potential night time visual impact for each of the landscape character precincts during operation (refer to section 6.1 Landscape Character areas).

6.4.1 Mascot character precinct

Whilst the Mascot character area in the vicinity of the project site is well lit and there are existing trains with headlights moving along the existing rail corridor, there would be additional trains with vehicle headlights seen travelling on the widened, dual track Botany Line for a distance of about two kilometres, between Mascot and Southern Cross Drive in Botany. The number of train movements would increase from 20 to an estimated 32 trains by 2020 (per day, per direction and to 45 trains by 2030 (per day, per direction), whose headlights may be visible from adjacent commercial, light industrial and retail buildings and roads. Views to the train headlights would be filtered in some areas by existing street trees.

Overall it is expected that there would be a noticeable reduction in the amenity of views at night due to the additional trains that might be seen during operation of the project. As this is a high district brightness environment, these would be a **negligible visual impact** to this precinct at night.

6.4.2 Botany character precinct

The number of train movements along the Botany Line would increase from 20 to an estimated 32 trains by 2020 (per day, per direction) and to 45 trains by 2030 (per day, per direction), whose headlights may be visible from adjacent residential, light industrial and commercial buildings to the west of the Botany Line. The residences adjacent to the Botany Line between Bay Street and Stephen Road would have views to the trains at night, partly filtered through retained vegetation along the edge of the rail corridor. The new bridges at Mill Stream and Southern Cross Drive would

require some removal of vegetation, opening up views to the trains in adjacent light industrial and commercial buildings along Lord Street.

Overall, it is expected that during operation there would be a noticeable reduction in the amenity of views at night in the Botany character precinct. As this is a medium district brightness environment, there would be a **minor adverse visual impact** overall.

6.4.3 Pagewood character precinct

At night, the number of train movements along the Botany Line would increase from 20 to an estimated 32 trains by 2020 (per day, per direction) and to 45 trains by 2030 (per day, per direction), whose headlights may be visible from between Southern Cross Drive and Page Street. The residences adjacent to the Botany Line between Myrtle and Banksia streets would have views to the trains, filtered through any retained vegetation along the rail corridor. As the golf course would not be used at night, and the club house is located approximately 800 metres northeast of the Botany Line, this part of the precinct would be unaffected.

Overall, this work would result in a noticeable change in the amenity of views at night, particularly from the residential areas along the rail corridor. As this is a medium district brightness environment, there would be a **minor adverse visual impact** to this precinct at night.

7. Summary of impacts

7.1 Summary of landscape character impact

The following Table 7.1 summarises the potential landscape and visual impacts of the project.

Table 7.1 Landscape impact summary

			Construction		Operation	
No.	Location	Sensitivity	Magnitude	Impact	Magnitude	Impact
1	Mascot character precinct	Regional	Noticeable reduction	Moderate adverse	Noticeable reduction	Moderate adverse
2	Botany character precinct	Local	Noticeable reduction	Minor adverse	Noticeable reduction	Minor adverse
3	Pagewood character precinct	Neighbourhood	Considerable reduction	Minor adverse	Noticeable reduction	Negligible

7.2 Summary of visual impact

The following Table 7.2 and Table 7.3 summarise the potential landscape and visual impacts of the project.

Table 7.2 Daytime visual impact summary

			Construction		Operation	
No.	Location	Sensitivity	Magnitude	Impact	Magnitude	Impact
1	View north across the Joyce Drive and O'Riordan Street intersection	Regional	Noticeable reduction	Moderate adverse	No perceived change	Negligible
2	View south along Robey Street	Local	Considerable reduction	Moderate adverse	Noticeable reduction	Minor adverse
3	View south along O'Riordan Street	Local	Considerable reduction	Moderate adverse	No perceived change	Negligible
4	View from upper café level of the Citadines Connect Sydney Airport Hotel	Neighbourhood	Noticeable reduction	Negligible	Noticeable reduction	Negligible
5	View southwest from Baxter Road	Neighbourhood	Noticeable reduction	Negligible	Noticeable reduction	Negligible
6	View along Myrtle Street (east of track)	Neighbourhood	Considerable reduction	Minor adverse	Noticeable reduction	Negligible
7	View along Myrtle Street (west of track)	Neighbourhood	Considerable reduction	Minor adverse	Noticeable reduction	Negligible
8	View along Bay Street (east of track)	Neighbourhood	Considerable reduction	Minor adverse	Noticeable reduction	Negligible
9	View east from Ellis Street	Neighbourhood	Considerable reduction	Minor adverse	Noticeable reduction	Negligible
10	View south from Banksia Street footbridge	Neighbourhood	Considerable reduction	Minor adverse	No perceived change	Negligible

			Construction		Operation	
No.	Location	Sensitivity	Magnitude	Impact	Magnitude	Impact
11	View west from Gaiarine Gardens	Local	Noticeable reduction	Minor adverse	No perceived change	Negligible
12	View west from Ocean Street	Neighbourhood	Noticeable reduction	Negligible	No perceived change	Negligible

Table 7.3 Night time visual impact summary

			Construction		Operation	
No.	Location	Sensitivity	Magnitude	Impact	Magnitude	Impact
1	Mascot character precinct	High district brightness (E4)	Noticeable reduction	Negligible	Noticeable reduction	Negligible
2	Botany character precinct	Medium district brightness (E3)	Noticeable reduction	Minor adverse	Noticeable reduction	Minor adverse
3	Pagewood character precinct	Medium district brightness (E3)	Noticeable reduction	Minor adverse	Noticeable reduction	Minor adverse

8. Cumulative impacts

There are several projects proposed and under construction that would potentially have a cumulative effect on the identified landscape character and visual impacts for the project.

The Sydney Gateway roads project is located within the Mascot landscape character precinct, and proposes a new direct high capacity road connection linking the Sydney Motorway network with Sydney Kingsford Airport. It would be seen alongside the project where it involves new viaduct sections of road and the widening of Qantas Drive, parallel to the Botany Line between the Cooks Loop and O'Riordan Street.

There are also several WestConnex projects, including the duplication of the M5 East from King Georges Road interchange upgrade at Beverly Hills to a new interchange at St Peters, a new inner western bypass of the Sydney CBD connecting the M4 and M5.

The Airport East and North projects, which are currently under construction, involve the upgrading of roads to the east of Sydney Airport and removing the General Holmes Drive rail level crossing by constructing a road underpass, and upgrading of roads to the north of Sydney's Kingsford Smith Airport to improve traffic flow and connections to the airport and Port Botany.

8.1 Landscape character impact

The character of the Botany landscape character area will be further changed by the proposed Sydney Gateway road project and completion of the Airport East and Airport North Projects. The Airport East and North Projects would be completed prior to construction of the Botany Rail Duplication project construction. The scale of these upgraded works is consistent with the highly urban character of the precinct and complex road system in the vicinity of the Airport.

If approved, construction of the Sydney Gateway road project would be concurrent with the construction of the Botany Rail Duplication project, increasing the influence of construction activity on the Botany character precinct in the western areas of the project, particularly in the vicinity of the bridge replacement and retaining wall works in the at Robey Street, O'Riordan Street and Qantas Drive. This would increase the adverse landscape character impact on the landscape character on this precinct.

During operation, the Sydney Gateway road project and Botany Rail Duplication project combined would contribute to the intensification of the urban character of this area of the site. The Sydney Gateway road project would reduce the space available to the project to reinstate vegetation along the rail corridor along Qantas Drive between Robey and O'Riordan streets. which would otherwise have softened and screened views to project. Therefore, the combined effect of these project would result in an increased adverse landscape character impact.

8.2 Visual impact

If approved, construction of the Sydney Gateway road project, would be seen in views to construction of the Botany Rail Duplication project, adding to the scale and extent of construction activity seen in views from Qantas Drive, Robey Street, and Qantas Drive. The location of the Sydney Gateway road project would inhibit the reinstatement of vegetation on Joyce Street between Robey Street and O'Riordan Street. These views would impact road users, including the arrival experience to Sydney from the Airport, adjacent commercial areas and hotels.

Upon completion, the Sydney Gateway project and Botany Rail Duplication project would combine to alter views to the vehicular entry to Sydney from the airport. In the areas where both the project and Sydney Gateway road project would be seen, there would be an increased adverse visual impact.

9. Management of impacts

9.1 Approach

As described in the EIS Chapter 6 (Project features and operation) and Chapter 7 (Construction), design development and construction planning has focused on avoiding and/or minimising the potential for environmental impacts during all key phases of the process.

The project has purposely been designed to avoid or minimise landscape and visual impacts through:

- The location of construction compounds and other construction areas to avoid impacts on areas of sensitive landscape character and visual amenity. Where possible these areas have been positioned to avoid trees and within previously disturbed areas; this may include the use of the current (Roads and Maritime Services) Airport East project site located adjacent to General Holmes Drive.
- Where construction compounds and other construction areas have been identified outside the rail corridor, these sites have been selected to be positioned within public land wherever possible and/or areas which have previously been disturbed and therefore are locations with less sensitive landscape character and visual amenity.
- The current construction methodology for the project, in combination with the rail alignment for the project (refer to Chapter 6) has sought to minimise impacts to existing billboards during construction.

The urban design and landscaping principles would incorporate specific measures to respond to the identified landscape character and visual impacts. In addition, this project would be aligned with the urban design concepts of the Sydney Gateway project where the projects interface.

Based on the outcomes of the impact assessment, most impacts generated by the project are expected to result from construction activities. Some residual construction impacts would, however, remain. Mitigation measures would be managed through the following:

- ARTC's Site Environmental Management Plans (EMP(s) for enabling works
- project specific Construction Environmental Management Plan (CEMP) for main construction works
- community and stakeholder engagement plan
- ARTC's environmental management system for operation of the project.

9.2 List of mitigation measures

The mitigation measures that would be implemented to address potential landscape character and visual impacts are listed in Table 9.1 and would be incorporated into the relevant management plans.

Table 9.1 Mitigation measures

Stage	Impact	Measure
Design	Landscape character and visual impact of proposed retaining walls	■ Proposed retaining wall finishes will be selected to align with the projects urban design and landscaping principles and aim to minimise adverse visual impact. These treatments will be aligned with the urban design concepts of the Sydney Gateway road project between O'Riordan and Robey Streets should this project be approved.
	Landscape character and visual impact of proposed bridges	■ The proposed twin bridges at Robey and O'Riordan streets and Southern Cross Drive will be designed to minimise visual clutter. ■ All bridges will incorporate measures to discourage graffiti.
	Landscape impact from relocation of Billboards	■ As a priority, billboards will be replaced like for like. ■ Where they cannot be replaced like for like they would be shifted in space to allow like for like placement on a new location in immediate vicinity of their current location. ■ Where they cannot be placed in their immediate vicinity, they would be relocated along the existing rail corridor and combined with existing structures (such as bridges) where practicable in order to minimise potential to introduce structures in areas where there are minimal structures and infrastructure (ie clustering instead of introducing impacts to higher sensitivity areas).
Construction	Landscape character and visual impact from residential properties	■ Shade cloth screening on site boundary fencing will be provided where works or compound sites are being undertaken in close proximity to residential areas to screen street level views into the construction site, such as: ▸ Myrtle Street ▸ Bay Street ▸ Ellis Street ▸ Banksia to Morgan Street.
	Visual impact from construction lighting at night	■ Temporary lighting required during the construction period will be sited and designed to avoid light spill into residential properties. Particular consideration will be given to works near Baxter Road, McBurney Avenue and between Myrtle Street and Stephen Road which are located close to residential properties and hotels.

10. Conclusion

The following is a summary of the results of landscape character and visual assessment.

10.1 Construction

Main sources of landscape and visual impact during construction are:

- vegetation removal along and adjacent to the existing rail corridor through Mascot and Botany
- bridge demolition and construction, retaining walls and embankments
- temporary removal of billboards
- site compounds, temporary crane activity, materials storage and laydown at Robey Street, O'Riordan Street and General Holmes Drive
- construction activity in close proximity to residential properties at Myrtle Street and Banksia and Morgan Streets, Botany.

10.1.1 Landscape character impact

Due to the scale of work within the Mascot character precinct, including several bridge replacements, the removal of trees along the southern side of the rail corridor, and the location of site compounds and material storage areas at prominent intersections, there would be a **moderate adverse landscape character impact** during construction.

There would be **minor adverse landscape character impact** in the Botany and Pagewood character precincts. The scale of work being greater in the vicinity of the urban road corridors of Botany Road, and Southern Cross Drive, where it is compatible with the scale of the urban road corridors. Works to construct the bridge crossing the Mill Stream would be visually contained by the surrounding open space and vegetation, as would the works along the rail corridor in the vicinity of the industrial areas of Botany in the vicinity of Lord Street. Furthermore, the works are proposed in the vicinity of the residential and recreational areas of Botany, to the east of the site, would be largely contained within the existing rail corridor.

10.1.2 Visual impact

During construction there would be a **moderate adverse impact** in views in the vicinity of the airport including from the Joyce Drive and O'Riordan Street intersection, Robey Street and O'Riordan Street due to the removal of trees, and the scale of works required for bridgeworks, retaining walls and embankment construction occurring on the south and west of the existing rail corridor. These locations are heavily constrained, and the works will be large scale, so that construction activity, site compounds and would comprise a large portion of these views. In views generally from Botany Road east to the residential areas of Botany, there would be **minor adverse visual impacts** during construction. This includes views from adjacent roads, residential and recreation areas. In these areas the works would be of a smaller scale and contained within the rail corridor. There would also be more vegetation retained along the interface with the open space areas.

At night there would be a **negligible visual impact** on views to the site from within the Mascot character precinct as, whilst there would be night works undertaken for bridge and road works this is a brightly lit setting and there would be a high capacity for this work to be absorbed into this setting.

There would, however, be a **minor adverse visual impact** at night on the Botany and Pagewood landscape character precincts during night works. This is due to a greater contrast between the existing night setting and the potential lighting of the night works.

10.2 Operation

Main sources of visual impact:

- wider rail corridor including new rail infrastructure
- additional train movements
- service roads and access.

10.2.1 Landscape character impact

A **moderate landscape character adverse** has been identified for the Mascot character precinct. This precinct is important to the region as an entry to Sydney to the airport and therefore has a higher landscape character sensitivity. The loss of vegetation along the rail corridor, which contributes to the character of the arrival experience would adversely impact the character of this precinct.

A **minor landscape character adverse** has been identified for the Botany character precinct, due to the close proximity of construction activity to residential areas and loss of vegetation in the Botany Wetlands. The character of the project would be more readily absorbed into the Pagewood character precinct, as it would be a widening of the existing rail corridor and be an incremental increase in character from the existing character.

10.2.2 Visual impact

During operation, the project would be largely absorbed into the character of views, due to the existing highly urban character of areas to the west of the site, and the reinstatement of the billboards, which largely screen views the bridges at Robey Road and O'Riordan Street. This would result in **negligible visual** impacts in views to the site from adjacent residential areas, open space, roads. There would be a **minor adverse visual impact** from Robey Street due to the removal of both vegetation and the heritage listed bridge.

10.3 Cumulative impacts

10.3.1 Landscape character impact

During operation, combined the Sydney Gateway road project and Botany Rail Duplication project would contribute to the intensification of the urban character of this area of the site, and result in an increased adverse landscape character impact.

10.3.2 Visual impact

Upon completion, the Sydney Gateway road project and Botany Rail Duplication project would combine to alter views to the vehicular entry to Sydney from the airport. In the areas where both the project and Sydney Gateway road project would be seen, there would be an increased adverse visual impact.

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